
Subject: Annual Water and Wastewater Quality Management System Update

Report to: Public Works Committee

Report date: Tuesday, December 7, 2021

Recommendations

1. That Report PW 54-2021 **BE RECEIVED** for information as the Annual Water and Wastewater Quality Management System Update; and
2. That the 2021 Water QMS Internal Audit Report, 2021 Water QMS External Audit Report, and 2021 Wastewater QMS Internal Audit Report **BE RECEIVED** for information.

Key Facts

- The purpose of this report is to provide a summary outlining the main processes and work performed by the Water and Wastewater Division to support the Water and Wastewater Quality Management Systems (QMS).
- The *Drinking Water Quality Management Standard* was created under the *Safe Drinking Water Act, 2002*. It requires Drinking Water System Owners to implement and maintain an accredited Water QMS. Niagara Region has maintained accreditation of its Water QMS since 2009.
- Currently, there is no requirement for the Niagara Region to implement a QMS for wastewater services; however, the Division has elected to do so as a due diligence measure.
- The Water QMS and the Wastewater QMS Operational Plans were previously endorsed by Council on December 12, 2019 under PW 67-2019, Annual Water-Wastewater Quality Management System Update.
- Minor administrative changes were made to the Water QMS and Wastewater QMS Operational Plans in May 2021 and February 2021, respectively. These revisions were approved by the Commissioner of Public Works on behalf of Council as per the delegated authority granted to the Commissioner under Report PW 109-2008.

Financial Considerations

A total of approximately \$30,500 (including non-recoverable HST) has been expended in quality management system program costs in 2021 to-date. These routine costs include: annual maintenance and support fees for software used in support of the QMS, and consulting fees for an off-site third-party accreditation audit of the Water QMS. These costs were included in the 2021 approved operating budget for Water and Wastewater Operations.

Expected expenses of \$30,000 have been included in the proposed 2022 operating budget. These expenses include consulting fees for an offsite third-party Water QMS audit, and the annual QMS software maintenance fee. An additional \$12,000 has been included in the proposed 2022 operating budget for remote consulting service fees to provide user upgrades to QMS software.

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. Accordingly, we are legally required to maintain accreditation of our Water QMS.

Roles and Responsibilities – Water QMS

Key Water QMS roles are described 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)

Role	Assignment
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
QMS Representatives	Water-Wastewater Quality Management Specialist, reporting to Associate Director, Water Operations & Maintenance (<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 last endorsed by the current term of Regional Council on December 12, 2019 under PW 67-2019, 2019 Annual Water and Wastewater QMS Update. Further administrative updates were approved by the Commissioner of Public Works as per the delegated authority granted to the Commissioner under Report PW 109-2008.

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*). This 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.

The following elements of Ontario's *Drinking Water Quality Management Standard* were examined during the 2021 internal audit:

- Element 3 – Commitment and Endorsement
- Element 7 – Risk Assessment
- Element 11 – Personnel Coverage
- Element 16 – Sampling, Testing and Monitoring
- Element 18 – Emergency Management
- Element 19 – Internal Audits

The division's internal audits are typically more rigorous and thorough than external accreditation audits, and the number and detail of audit findings demonstrates this. The internal audit findings include 8 non-conformances, 6 potential non-conformances, and 21 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 2021 to confirm that the Water QMS adequately addresses the requirements of all 21 elements of the Standard. 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. A full risk assessment for the Water QMS was completed in 2021, with reviews to follow in 2022 and 2023.

There were **no high-scoring risks identified** during the 2021 full risk assessment. Any previously identified high-scoring risks have been mitigated through capital projects, operational adjustments, or through continual improvement initiatives.

The Region’s “critical control points”, representing critical process steps, remain unchanged following the 2021 risk assessment review. They 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 2021 Management Review was completed on May 31, 2021; Part 2 is scheduled to be completed on November 29, 2021.

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

Table 2: Management Review Meetings and Results – Water QMS

Review Meeting	Date	Results
Part 1 – 2020	May. 28, 2020	<i>Previously reported in 2020 QMS Update to PWC</i>
Part 2 – 2020	Dec. 03, 2020	Two new action items relating to: <ul style="list-style-type: none"> • Continual improvement (2)
Part 1 – 2021	May. 31, 2021	Five new action items relating to: <ul style="list-style-type: none"> • Staff suggestions/customer complaints • Continual improvement • Infrastructure review • Emergency management (2)

Review Meeting	Date	Results
Part 2 – 2021	Nov. 29, 2021	To be reported in 2022 QMS Update to PWC

Changes Impacting the Water QMS

No forthcoming changes have been identified that may impact the Water QMS.

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

Key wastewater QMS roles are described in Table 3.

Table 3: Roles and Responsibilities – Wastewater 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, Wastewater Operations, Maintenance & Laboratory Services 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 Associate Director, Water Operations & Maintenance (<i>backup</i>)

Internal Audits of the Wastewater QMS

Like the Water QMS, annual internal audits of the Wastewater QMS are also undertaken 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 Wastewater QMS with Ontario's *Drinking Water Quality Management Standard* (as modified to suit wastewater operations) and with divisional policies and procedures.

Currently, there is no legislative requirement for the Niagara Region to implement a Wastewater QMS, internal audits of the QMS are undertaken strictly out of due diligence and best practice.

The following elements of Ontario's *Drinking Water Quality Management Standard* were examined during the 2021 wastewater internal audit:

- Element 2 – QMS Policy
- Element 4 – QMS Representative
- Element 5 – Document & Records Control
- Element 6 – Wastewater System
- Element 11 – Personnel Coverage
- Element 12 – Communications
- Element 13 – Essential, Supplies & Services
- Element 21 – Continual Improvement

The internal audit findings include 13 non-conformances, 0 potential non-conformances, and 14 best practices. These findings are detailed in the Wastewater QMS Internal Audit Report (Appendix 3 to this report).

External Audits of the Wastewater QMS

There is no requirement for the Wastewater QMS to be audited nor accredited by an external body. Therefore, no external audits are performed.

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. A full risk assessment for

the Wastewater QMS was completed in the fall of 2021, with reviews to follow in 2022 and 2023. 2021 risk assessment high-risk items are described in Table 4.

Table 4: High-Risk Items – Wastewater QMS Risk Assessment

Category	Examples	Total # Risks	# High Risks	Common Risk Factors	Addressed through
Treatment Plant	Major treatment processes, control systems, standby power, etc.	446	58 (13%)	<ul style="list-style-type: none"> • Aging infrastructure, • Compliance and process risks, • Maintenance needs, • Security 	64% ongoing capital projects; 36% through future capital projects, maintenance activities or operational adjustments
Collection System Facilities	Sewage pumping stations, odour control facilities, combined sewer over flows	132	25 (19%)	<ul style="list-style-type: none"> • Aging infrastructure, • Compliance and process risks, • Maintenance needs 	68% ongoing capital projects; 32% through future capital projects, maintenance activities or operational adjustments

Risks Relating to Sanitary Gravity Sewers and Sanitary Forcemains

As part of this risk assessment exercise, the Water-Wastewater Asset Management Group assessed risks associated with sanitary gravity sewers and sanitary forcemains. Risks were assessed using the risk scoring criteria as defined in the Corporate Asset Management Risk Assessment (CAMRA) model. The scoring criteria consider factors such as pipe age and life expectancy, break history, condition inspection results, population impacted in the event of a failure, and estimated duration and severity of failure.

The Region owns 306 km of gravity sewers and forcemains; 29 km (9.5%) of these were found to be at high-risk of failure. The Water-Wastewater Asset Management group will be reviewing these high-risk mains to prioritize needs and identify scopes of work.

Addressing Risk

For each high-scoring risk identified in the 2021 risk assessments, one or more action items has been initiated and assigned to a member of Divisional staff. High-scoring risks are typically mitigated through operational adjustments, or continual improvement initiatives or capital projects. The Water-Wastewater Services Division works in coordination with the Corporate Asset Management Office to prioritize capital needs and allocate funding for high priority projects.

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 2021 Management Review was completed on August 24, 2021; Part 2 is scheduled to be completed on November 23, 2021.

Action items identified at the Management Review meetings are summarized in Table 5.

Table 5: Management Review Meetings and Results – Wastewater QMS

Review Meeting	Date	Results
Part 1 – 2020	Jun. 22, 2020	No new action items identified.
Part 2 – 2020	Nov. 12, 2020	One new action item relating to: <ul style="list-style-type: none"> • Wastewater compliance
Part 1 - 2021	Aug. 24, 2021	No new action items identified.
Part 2 - 2021	Nov. 23, 2021	To be reported in 2022 QMS Update to PWC

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. There is no forecasted publication date at this time.

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 (molly.macdonald@niagararegion.ca or 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 late 2019 and were re-endorsed by Regional Council on December 12, 2019 under Report PW 67-2019, Drinking Water Compliance and Water-Wastewater Quality Management System Endorsement. Since that time, minor administrative changes were made to the Water QMS and Wastewater QMS Operational Plans in May 2021 and February 2021, respectively, and these revisions were approved by the Commissioner of Public Works on behalf of Council as per the delegated authority granted to the Commissioner under Report PW 109-2008.

Alternatives Reviewed

The Ministry of the Environment, Conservation, and Parks has appointed two accreditation bodies who are authorized to conduct external audits of Drinking Water Quality Management Systems under Part IV of the Safe Drinking Water Act, 2002.

Niagara Region appointed QMI-SAI Global for Water QMS accreditation services in 2013. QMI-SAI continues to act as the Region's external auditor for the Water QMS.

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, and the due diligence established through the Region's Wastewater QMS, provide residents with assurance that their drinking water is safe and that the associated systems are competently managed.

Other Pertinent Reports

- PWA 109-2008, DWQMS Update (October 29, 2008).
- PW 67-2019, 2019 Annual Water and Wastewater Quality Management System Update (December 3, 2019).

Prepared by:

Molly MacDonald, B.Sc., M.E.S.
W-WW Quality Management Specialist
Public Works Department

Recommended by:

Bruce Zvaniga, P.Eng.
Commissioner of Public Works (Interim)
Public Works Department

Submitted by:

Ron Tripp, P.Eng.
Chief Administrative Officer

This report was prepared in consultation with Michelle Max, B. Sc., C. Tech., W-WW Quality Management Specialist; Rachel Whyte, P.Eng., Capital Planning Program Manager, and Pamela Hamilton, Program Financial Specialist. It was reviewed by Jason Oatley, B.Sc., C. Chem., Manager, Wastewater Quality and Compliance; John Brunet, Associate Director, Water Operations and Maintenance; Robert Daw, Associate Director, Wastewater Operations and Maintenance; Richard Pinder M.A.Sc., P.Eng., and Joe Tonellato, P.Eng., Director of Water & Wastewater Services.

Appendices

Appendix 1	Water QMS Internal Audit Report
Appendix 2	Water QMS External Audit Report
Appendix 3	Wastewater QMS Internal Audit Report

INTERNAL AUDIT

REPORT

Commitment and Endorsement

Risk Assessment

Personnel Coverage

Sampling, Testing, and Monitoring

Emergency Management

Internal Audits

Niagara Region Drinking Water Quality Management System Internal Audit

Rosehill WTP (Area 1)
Port Colborne WTP (Area 2)
DeCew Falls WTP (Area 3)

1.1 AUDIT PLANNING OVERVIEW

1.2 Purpose

The 2021 internal audit was undertaken:

- To verify the continued conformance of the Water-Wastewater (W-WW) Division's Water QMS (Quality Management System) with the requirements of the DWQMS (Drinking Water Quality Management Standard) and the Water QMS Operational Plan; and
- To verify the effective implementation and maintenance of the Water QMS for all five of Niagara Region's drinking water systems.

Audits were completed between March 1st and 31st, 2021, covering activities at Rosehill WTP (Area 1), Port Colborne WTP (Area 2), and DeCew Falls WTP (Area 3). Internal audit interviews were also conducted with members of Top Management and with various support staff in other sections of the division.

1.3 Scope

The scope of the 2021 Water QMS internal audit was modified in consideration of the ongoing COVID-19 pandemic and associated impacts to W-WW work processes. Auditors placed a focus on elements/processes of the QMS that could be audited remotely, and efforts were made to minimize additional workload for front-line management and staff.

The 2021 internal audit was conducted via a mix of element-based and process-based auditing.

In a **process-based audit**, auditors review a QMS process and examine the main process as well as any adjacent QMS processes/elements; for example, a process audit of Sampling, Testing, and Monitoring may also examine Competencies (e.g., "is this person suitably trained to conduct sampling?") and Measurement and Recording Equipment Calibration and Maintenance (e.g., "is instrumentation appropriately calibrated to ensure accurate monitoring results?").

In an **element-based audit**, auditors examine a specific element to ensure that requirements of the DWQMS and the associated procedure are met. Element-based audits do not typically examine adjacent processes.

The following elements were examined during the 2021 internal audit:

- Element 3 – Commitment and Endorsement
- Element 7 – Risk Assessment
- Element 11 – Personnel Coverage
- Element 16 – Sampling, Testing and Monitoring
- Element 18 – Emergency Management (*process audit*)
- Element 19 – Internal Audits

Elements that were not audited during the 2021 internal audit will be included in future internal audits such that frequency requirements specified in ***Internal Auditing*** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020) are satisfied.

1.4 Selection of Internal Audit Team

Rachel Whyte acted as Lead Auditor for this internal audit.

Auditors were assigned as follows:

- Element 3 – Commitment and Endorsement: **Dawn MacArthur**
- Element 7 – Risk Assessment: **Michelle Max**
- Element 11 – Personnel Coverage: **Rachel Whyte**
- Element 16 – Sampling, Testing, and Monitoring: **Jen Crowell/Josh MacArthur**
- Element 18 – Emergency Management: **Jason Oatley/Dana Knegt**
- Element 19 – Internal Audit: **Janet Rose**

All internal auditors have completed Internal Auditor Training as required by ***Internal Auditing*** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020).

1.5 Criteria and Methodology

Audit criteria included the following:

- **Internal Auditing** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020);
- **Niagara Region Water Operational Plan** (QMS-WT-ALL-MAN-010, rev11, effective 7Dec2020) and supporting procedures; and
- Internal audit training materials (various auditor training courses).

Remote work arrangements remain in place due to the ongoing COVID-19 pandemic; as such, formal opening and closing meetings were not held with auditors or auditees. The Lead Auditor assembled the audit team and assigned auditors to audits via email. Initiation of the audit was communicated to Top Management and Divisional staff via email.

Audits were conducted by assigned auditors as noted in Section 1.3 of this report. Where required, auditors completed interviews with various members of Divisional staff to support audit findings. These checklists were submitted to the Lead Auditor and used as input to this report.

The audit findings will be communicated via e-mail circulation of this Internal Audit Report and assignment of associated corrective actions, preventive actions, and best management practices.

Internal audit checklists, along with copies of communication emails, are retained as per **Document & Records Control** (QMS-WT-ALL-P-050, rev8, effective 6Jan2020). These can be found in the "Records Control" module of EtQ.

1.6 INTERNAL AUDIT RESULTS

1.7 Review of Previous Internal Audit Findings

Previous internal audit findings were not reviewed during this internal audit, as much work was done in advance of the internal audits to address and close open corrective actions from the previous internal audit in 2019. These efforts were summarized in a memo to Public Works Committee ([PWC-C 8-2020, 10March2020](#)).

1.8 Review of Previous External Audit Findings

No non-conformances were identified in the 2020 external reaccreditation audits.

Eight best practices were identified in the 2020 external reaccreditation audits. Three of these best practices have been addressed; these include role clarifications in the Operational Plan, definition of operating areas in the Operational Plan, and addition of a MetroLinx contact to the Emergency Contact List. The Lead Auditor confirmed that these continual improvement suggestions were effectively implemented.

The remaining five best practices are being evaluated and will be addressed appropriately. It is important to note that best practices are issued more as “suggestions for improvement” and do not have to be implemented if they do not meet business needs.

1.9 Summary of New Internal Audit Findings

Findings are categorized as follows and are summarized in Table 1 below.

- **Non-conformance:** A requirement of the Drinking Water Quality Management Standard or a documented Standard Operating Procedure is not being met. These findings require **corrective action**.
- **Potential non-conformance:** A non-conformance has not yet occurred, but a trend or pattern indicates that occurrence of a non-conformance is likely. These findings require **preventive action**.
- **Best practice for evaluation:** A best practice behaviour or opportunity for improvement is identified. These findings are brought forward to the appropriate level of management for review and consideration, and those requiring Top Management direction or input are reviewed at the annual Management Review.

Table 1: Summary of Internal Audit Findings – Number and Type

Element	NC	PNC	BP	Total
3 – Commitment and Endorsement	-	-	2	2
7 – Risk Assessment	-	1	3	4
11 – Personnel Coverage	2	-	-	2
16 – Sampling, Testing, and Monitoring	1	3	3	7
18 – Emergency Management	2	2	9	13
19 – Internal Audits	3	-	4	7
Total	8	6	21	35

Table 2 provides a summary of findings from the QMS Internal Audit. In reviewing Table 2, the following acronyms should be noted:

Acronym	Definition
C	Conformance
NC	Non-Conformance
PNC	Potential Non-Conformance
BP	Best Practice for Evaluation

Table 2 is provided below.

Table 2: Summary of Findings – 2020 Internal Audit

Element #	Finding	DWQMS Standard Element
3 – Commitment and Endorsement	BP	The Operational Plan states "Continued endorsement of the Operational Plan is demonstrated through the enactment of a confirmatory by-law preceding each Council meeting." In practice, continued endorsement is demonstrated through Public Works Committee's receipt of annual QMS information updates and through re-endorsement of the Operational Plan as required. Consider rewording the Operational Plan to more clearly reflect this process.
3 – Commitment and Endorsement	BP	All members of top management have taken Standard of Care training, with the exception of the Acting Commissioner of Public Works. Consider adding Standard of Care training to the Competencies Table (QMS-ALL-ALL-T-100) if this is a required or preferred training requirement for top management. Consider also adding a timing from hire date to complete the training to allow for potential scheduling conflicts.
7 – Risk Assessment	PNC	Drinking-Water Risk Assessment (QMS-WT-ALL-P-070, Rev 9, 5-Feb-2020) does not mention the requirement to connect risk assessment results to capital activities. Consider explicitly mentioning this requirement in the procedure in order to ensure that linkages to capital validation continue to be identified during risk assessment processes.
7 – Risk Assessment	BP	It may be beneficial to add a column in the Drinking Water Risk Assessment Outcomes Table to correlate EtQ risk action item numbers with risk IDs in the table.

Element #	Finding	DWQMS Standard Element
7 – Risk Assessment	BP	Consider evaluating risks at each individual remote station rather than grouping them under generic line items covering multiple stations.
7 – Risk Assessment	BP	<p>The following procedure improvements are recommended:</p> <ul style="list-style-type: none"> • Section 5.5.1 of <i>Drinking-Water System Risk Assessment (QMS-WT-ALL-P-070, rev 9, 5Feb2020)</i> procedure states that "the Process Engineer or delegate develops action plans related to high scoring risks (greater than 15)". There is not Process Engineer – Water; in practice, the QMS Representative completes this task. • Section 5.2.7 of <i>Drinking Water System Risk Assessment (QMS-WT-ALL-P-070, rev9, 5Feb2020)</i> states that "the [risk assessment] team identifies critical control points (CCPs) within the drinking-water system". CCPs have already been established for the Region's Drinking Water Systems and are generally just confirmed during annual exercises. Consider modifying this language to clarify. • The <i>Niagara Region Water QMS Operational Plan (QMS-WT-ALL-MAN-010, rev11, 7Dec2020)</i> identifies a risk assessment frequency of once every 3 years; this is less stringent than the 36-month frequency specified in the DWQMS, Element 7. This should be corrected. • Consider identifying the Wastewater QMS Rep as backup for the Water QMS Rep.

Element #	Finding	DWQMS Standard Element
11 – Personnel Coverage	NC	<p>Section 5.1.3 of <i>Personnel Coverage (QMS-WT-ALL-P-110, rev8, 1Aug2018)</i> specifies that "during regular business hours, Area Operations Managers who are not designated as "on-call" are designated as Operators-in-Charge (OICs) for the WTPs and remote locations in their areas." In a sample of 11 logsheets selected between April 2020 and February 2021, Operations Managers were never identified as OICs in Areas 2 and 3. They were identified as OICs in Area 1 approximately 65% of the time.</p>
11 – Personnel Coverage	NC	<p>Section 5.3.2 of <i>Water Treatment Plant Logbook Entries and Review (OP-WT-ALL-P-032, rev8, 6Mar2018)</i> includes an excerpt from O. Reg. 128/04, s.27(4): "A person who makes an entry in a log or other record-keeping mechanism shall do so in a manner that permits the person to be unambiguously identified as the maker of the entry." A review of a sample of 15-20 Area 2 logsheets between Apr 2020 and Feb 2021 included 12 instances where an OIC entered the same initials for more than one person on shift (23Feb2021, 12Feb2021, 4Feb2021, 18Jan2021, 13Jan2021, 9Sep2020, 19Aug2020, 18Aug2020, 11Aug2020, 16Jun2020, 21May2020, 8Apr2020).</p>

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	NC	<p>Sampling, testing, and monitoring tables for all WTPs identify a quality target of 0CFU/100mL for microbiological testing and specify that chlorine dosage should be increased as a corrective action. The auditor identified two total coliform exceedances within the distribution system:</p> <ul style="list-style-type: none"> • Rosehill DWS – Ridgeway Standpipe (31Mar2020) • Grimsby DWS – Smithville Reservoir Outlet (10Jun2020) <p>There is no evidence that chlorine dosing was increased for either event. <i>(NOTE: Public Health was satisfied with the response actions.)</i></p>
16 – Sampling, Testing, and Monitoring	PNC	<p>Section 5.2.7 of <i>Initial Response to the Interruption of SCADA, SCADA Components, and/or Flatline Alarms (rev5, 30Aug2019)</i> notes that SCADA staff typically respond to communication failures and complete associated chlorine residual testing. During a communication failure at the NOTL 400mm and 450mm mains on 17Sep2020, secondary disinfection free chlorine residuals were missing. Free chlorine residuals were collected at 04:00 by a member of Maintenance staff (certified WT1, 68598), with results of 0.81mg/L for the 400mm and 0.84mg/L for the 450mm sampling location. A WaterTrax report for the corresponding timeframe does not include the results from this sampling event.</p>

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	PNC	<p>MECP inspection reports generated by the SCADA should include complete datasets for provision to the Ministry at inspection.</p> <p>Continuous monitoring data captured on MECP inspection reports in Jan2020, Apr2020, and Sep2020 were reviewed for each plant. The distribution free chlorine MECP inspection report for the Rosehill Water Treatment Plant report does not include recent changes made to sampling at the Erie Road remote station where a redundant chlorine analyzer was repurposed and installed at the sampling station inlet. Sampling points were previously labeled as primary and secondary (both on the outlet) and changed to pre (inlet) and post (outlet). SCADA trending review shows that data is present and recorded as required.</p>
16 – Sampling, Testing, and Monitoring	PNC	<p>UV parameters on STM Tables for NF, WE, and DF refer to CCP: Verification of Primary Disinfection (OP-WT-ALL-P-010, rev7, 7May 2020). The CCP procedure notes that “UV equipment...is to be operated at the discretion of the Region and [used to] augment disinfection when primary disinfection is not achieved through application of sodium hypochlorite”. The procedure generically discusses use of UV for primary disinfection, but neither provides specific direction regarding use of UV for primary disinfection nor references external procedures for guidance.</p>

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	BP	<p>The STM tables instruct the reader to reference <i>Confirmed Adverse Drinking Water Quality Results (ERP-WT-ALL-P-010)</i> when raw water samples that are tested by an external lab exceed the standards listed in O. Reg. 169/03. Raw water samples are not reportable if they exceed established standards, however, it may be beneficial to implement response protocols for due diligence purposes. Consider revising response actions for raw water exceedances to align with mandated requirements and/or exploratory measures.</p>
16 – Sampling, Testing, and Monitoring	BP	<p>Niagara Falls, Decew Falls, and Welland WTPs collect UV dose/flow information at a minimum sampling interval of 5 minutes in accordance with MDWL requirements. MECP inspection reports for the NF WTP show low-volume, intermittent flow with a UV dose of 0mJ/cm². There was no risk to water quality during these periods, as the UV units in question were off and primary disinfection was met through chlorination; however, it may be beneficial to classify the conditions under which UV dose will be analyzed, and a review of these reports to correct errant flows should be undertaken.</p>
16 – Sampling, Testing, and Monitoring	BP	<p>There is potential to improve clarity of all six sampling, testing, and monitoring (STM) tables, including addition of references to appropriate regulations; review and revision of sampling parameters; refinement of corrective actions; elimination of duplication; addition of definitions; and general updates.</p>

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	NC	Section 1.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that the ERP contact list is updated quarterly and distributed. Copies of the contact list found at the DeCew Falls WTP Control Room and in the Associate Director – Water’s office were found out of date. It was also unknown who was responsible to update the AD's personal ERP.
18 – Emergency Management	NC	Section 7.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> discusses continual improvement findings from mock emergencies, specifying that required action items are developed and assigned in consultation with management. The summary report from the 2019 mock emergency was completed by a third-party consultant, and there is no evidence that action items were entered into EtQ for assignment and completion.
18 – Emergency Management	PNC	Section 4.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that "during normal working hours, the Operations Manager or System Maintenance Manager shall assume the role of W-WW Incident Manager. After hours, the on-call ORO or System Maintenance Manager (or designate) shall assume the role of the W-WW Incident Manager." While managers seem to be aware of these role designations, auditors were unable to find evidence that the roles were formally communicated to staff.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	PNC	Section 7.0 of <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> discusses the role of the Manager of Quality and Compliance, Water in planning and executing tests of the ERP. The Manager role was eliminated in Q2 2020. It is unclear who has assumed the responsibilities previously assigned to this role.
18 – Emergency Management	BP	Section 1.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that the EOC is activated when an emergency event cannot be effectively managed and mitigated by the W-WW ERP. It may be beneficial to consider parameters for “trickle-down” activation, i.e., when an emergency originating outside of W-WW necessitates a W-WW response. If a procedure exists that defines the response in more detail, it should also be referenced in the ERP.
18 – Emergency Management	BP	<p>There is an opportunity to improve/clarify processes for management of hard copies of the ERP:</p> <ul style="list-style-type: none"> • Responsibilities for distribution of hard copy documents to staff. • Responsibilities for distribution of hard copy documents to external parties. • Differences in distribution processes for full manual reviews vs. updates to individual procedure could also be clarified. • Identification of printed ERP procedures "CONTROLLED DOCUMENTS" while associated SOPs are marked as “uncontrolled”.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	BP	Where watermain breaks warrant debriefing, it would be a best practice to ensure that the work order number for the associated watermain break report is included in the debrief form so the report can be easily located.
18 – Emergency Management	BP	The memo "COVID-19 Corporate Daily Report and Safe Use of Regional Vehicles" (31Mar2020) outlines requirements for daily monitoring of PPE and cleaning supply inventories. Daily checklists were completed and submitted electronically using the eRIS logbook, but were changed to weekly in June 2020. It is unclear who is responsible to review the checklists or how paper copies are managed. The Operating Authority may also wish to consider using the "managed workflow" in eRIS to ensure that checklist reviews are documented and action items are promoted.
18 – Emergency Management	BP	Section 3.0 of the W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019) states that "communication with media is to be coordinated by the Corporate Communication Specialist". It may be beneficial to further define the relationship between the Corporate Specialist and the W-WW Education and Engagement Coordinator, as well as to outline how social media communications are managed.
18 – Emergency Management	BP	The NIIMS mobile app (for in-the-field access) was recently removed, making it difficult for staff to obtain mapping information in the field. It may be beneficial to consider reinstating the app or finding an alternate way to provide staff with access to NIIMS.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	BP	Auditors heard about processes for addressing resident concerns from various sources (direct receipt, social media, online portal entries). It may be beneficial to add public communications as a branch in the <i>Emergency Response Communication Tree (ERP-ALL-ALL-V-001, rev4, 22Oct2019)</i> and to describe associated processes in the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> .
18 – Emergency Management	BP	It may be beneficial to consider smaller drills for the purpose of testing emergency response procedures that have not been tested through large-scale mock emergencies.
18 – Emergency Management	BP	Section 5.2.2 of <i>Post-Event Debriefing (ADM-ALL-ALL-P-009, rev4, 1Apr2020)</i> recommends that "for longer-term events, periodic debriefing sessions can be conducted throughout the event response...[at] the discretion of the appropriate Associate Director." The COVID-19 pandemic has been ongoing for approximately 14 months, and a formal debrief has yet to be conducted. It may be beneficial to conduct a debrief to ensure that lessons learned are adequately captured.
19 – Internal Audit	NC	Section 5.1.1 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> identifies responsibilities of the Lead auditor and specifies that the Lead Auditor must have completed Lead Auditor training for the DWQMS or for a similar standard. The Lead Auditor for the 2020 audit has completed ISO 9001 training, but was unable to provide a copy of the associated certificate. Additionally, it is not clear who assumed responsibility for audit planning, as the 2020 audit report does not identify the Lead Auditor.

Element #	Finding	DWQMS Standard Element
19 – Internal Audit	NC	Section 5.5.3 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> specifies that audit notes “should include the date of the audit, the name of the auditors, and the location of the audit”. Slides from the internal audit planning session also included a request to record this information, and the audit checklist template includes spaces to record these data. Date, name, and location information was recorded in its entirety on only 3 of 11 sets of audit notes from the 2020 Internal Audit.
19 – Internal Audit	NC	The 2020 Internal Audit Report notes that "auditor checklists were completed and reviewed with the Lead Auditor...[and]...are retained as per <i>Document & Records Control (QMS-WT-ALL-P-050, rev8, effective 6Jan2020)</i> ." Audit records in EtQ (Quality Record # REC-00187) show that several sets of audit notes are missing (D. Barrow, R. McCabe, J. Rose, M. Max)
19 – Internal Audit	BP	It was noted that some auditors had not had any refresher training since 2010. It may be beneficial to require internal auditor refresher training on a regular schedule (e.g. every five years).
19 – Internal Audit	BP	Section 5.5.3 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> recommends that “all suspected non-conformance issues be reviewed with the party being audited at the time of discovery”. The 2020 Internal Audit report includes 10 non-conformances, but in-situ reviews were only documented in audit notes for two of the non-conformances. As a best practice, it may be beneficial for auditors to mention these reviews in the audit notes.

Element #	Finding	DWQMS Standard Element
19 – Internal Audit	BP	Section 5.5.1 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> specifies responsibilities of the Lead Auditor. This auditor noted that in all the documentation, including the 2020 Internal Audit report found in Quality Record # REC-00187 that nowhere does it state the name of the Lead Auditor. For clarity in record keeping and transparency on roles and responsibilities be may be beneficial to identify the Lead Auditor in the audit notes/checklists and in the internal audit report.
19 – Internal Audit	BP	<i>Documents & Records Control (QMS-WT-ALL-P-050, rev8, effective 6Jan2020)</i> specifies retention times of “T+1 year active, 3 years inactive – selective retention” (as per bylaw) and 5 years (internal standard). The bylaw assigns a “selective” retention, meaning that there is an option to retain beyond the retention period where necessary. The Records Management module EtQ contains internal audit records from as far back as 2008. It may be beneficial to review and evaluate whether these records need to be retained.

Prepared by: Rachel Whyte

Date: April 23, 2021 (rev0)

Audit Report

12 Month Surveillance Audit for

The Regional Municipality of Niagara

1631650-02

Address: 3501 Schmon Parkway, Thorold, Ontario, CAN, L2V 4T7

Start Date: May 17, 2021 End Date: May 19, 2021

Type of audit - Surveillance System Audit

Issue Date: May 28, 2021

Revision Level: Final

BACKGROUND INFORMATION

SAI Global conducted an audit of The Regional Municipality of Niagara beginning on May 17, 2021 and ending on May 19, 2021 to DRINKING WATER QUALITY MANAGEMENT STANDARD VERSION 2 - 2017.

The purpose of this audit report is to summarise the degree of compliance with relevant criteria, as defined on the cover page of this report, based on the evidence obtained during the audit of your organization. This audit report considers your organization's policies, objectives, and continual improvement processes. Comments may include how suitable the objectives selected by your organization appear to be in regard to maintaining customer satisfaction levels and providing other benefits with respect to policy and other external and internal needs. We may also comment regarding the measurable progress you have made in reaching these targets for improvement.

SAI Global audits are carried out within the requirements of SAI Global procedures that also reflect the requirements and guidance provided in the international standards relating to audit practice such as ISO/IEC 17021-1, ISO 19011 and other normative criteria. SAI Global Auditors are assigned to audits according to industry, standard or technical competencies appropriate to the organization being audited. Details of such experience and competency are maintained in our records.

In addition to the information contained in this audit report, SAI Global maintains files for each client. These files contain details of organization size and personnel as well as evidence collected during preliminary and subsequent audit activities (Documentation Review and Scope) relevant to the application for initial and continuing certification of your organization.

Please take care to advise us of any change that may affect the application/certification or may assist us to keep your contact information up to date, as required by SAI Global Terms and Conditions.

This report has been prepared by SAI Global Limited (SAI Global) in respect of a Client's application for assessment by SAI Global. The purpose of the report is to comment upon evidence of the Client's compliance with the standards or other criteria specified. The content of this report applies only to matters, which were evident to SAI Global at the time of the audit, based on sampling of evidence provided and within the audit scope. SAI Global does not warrant or otherwise comment upon the suitability of the contents of the report or the certificate for any particular purpose or use. SAI Global accepts no liability whatsoever for consequences to, or actions taken by, third parties as a result of or in reliance upon information contained in this report or certificate.

Please note that this report is subject to independent review and approval. Should changes to the outcomes of this report be necessary as a result of the review, a revised report will be issued and will supersede this report.

Standard:	DRINKING WATER QUALITY MANAGEMENT STANDARD VERSION 2 - 2017
Scope of Certification:	Full Scope for Treatment and Distribution System
Drinking Water System Owner:	Regional Municipality of Niagara
Operating Authority:	Regional Municipality of Niagara
Population Served:	482,000
Activities:	Treatment & Distribution Decew Falls / Niagara Falls Drinking Water System, Municipal Drinking Water Licence # 007-102, Issue 5 Grimsby Drinking Water System, Municipal Drinking Water Licence # 007-105, Issue 3 Port Colborne Drinking Water System, Municipal Drinking Water Licence # 007-101, Issue 3 Welland Drinking Water System; Municipal Drinking Water Licence # 007-104, Issue 3 Rosehill Drinking Water System, Municipal Drinking Water Licence # 007-103, Issue 5
Drinking Water Systems	
Total audit duration:	Person(s): 1 Day(s): 2.25
Audit Team Member(s):	Team Leader Marco Brunato

Audit Report

Definitions and action required with respect to audit findings

Major Non-conformance:

Based on objective evidence, the absence of, or a significant failure to implement and/or maintain conformance to requirements of the applicable standard. Such issues may raise significant doubt as to the capability of the management system to achieve its intended outputs (i.e. the absence of or failure to implement a complete Management System clause of the standard); or

A situation which would on the basis of available objective evidence, raise significant doubt as to the capability of the Management System to achieve the stated policy and objectives of the customer.

NOTE: The "applicable Standard" is the Standard which SAI Global are issuing certification against, and may be a Product Standard, a management system Standard, a food safety Standard or another set of documented criteria.

Action required: This category of findings requires SAI Global to issue a formal NCR; to receive and approve client's proposed correction and corrective action plans; and formally verify the effective implementation of planned activities. Correction and corrective action plan should be submitted to SAI Global prior to commencement of follow-up activities as required. Follow-up action by SAI Global must 'close out' the NCR or reduce it to a lesser category **within 90 days for initial certification and within 60 days for surveillance or re-certification audits, from the last day of the audit.**

If significant risk issues (e.g. safety, environmental, food safety, product legality/quality, etc.) are detected during an audit these shall be reported immediately to the Client and more immediate or instant correction shall be requested. If this is not agreed and cannot be resolved to the satisfaction of SAI Global, immediate suspension shall be recommended.

In the case of initial certification, failure to close out NCR within the time limits means that the Certification Audit may be repeated.

If significant risk issues (e.g. safety, environmental, food safety, product legality/quality, etc.) are detected during an audit these shall be reported immediately to the Client and more immediate or instant correction shall be requested. If this is not agreed and cannot be resolved to the satisfaction of SAI Global, immediate suspension shall be recommended.

In the case of an already certified client, failure to close out NCR within the time limits means that suspension proceedings may be instituted by SAI Global.

Follow-up activities incur additional charges.

Minor Non-conformance:

Represents either a management system weakness or minor issue that could lead to a major nonconformance if not addressed. Each minor NC should be considered for potential improvement and to further investigate any system weaknesses for possible inclusion in the corrective action program

Action required: This category of findings requires SAI Global to issue a formal NCR; to receive and approve client's proposed correction and corrective action plans; and formally verify the effective implementation of planned activities at the next scheduled audit.

Opportunity for Improvement:

A documented statement, which may identify areas for improvement however shall not make specific recommendation(s).

Action required: Client may develop and implement solutions in order to add value to operations and management systems. SAI Global is not required to follow-up on this category of audit finding.

Audit Type and Purpose

Surveillance Audit:

A systems desktop audit in accordance with the systems audit procedure as it applies to Full Scope accreditation. The audit also included consideration of the results of the most recent audit undertaken in accordance with this Accreditation Protocol and any of the following that have occurred subsequent to that audit including but limited to;

- (a) the results of any audits undertaken in accordance with element 19 of the DWQMS V2;
- (b) historical responses taken to address corrective action requests made by an Accreditation Body;
- (c) the results of any management reviews undertaken in accordance with element 20 of the DWQMS V2; and,
- (d) any changes to the documentation and implementation of the QMS.

Audit Objectives

The objective of the audit was to determine whether the drinking water Quality Management System (QMS) of the subject system conforms to the requirements of the Ontario Ministry of the Environment & Climate Change (MOECC) Drinking Water Quality Management Standard (DWQMS V2).

The audit was also intended to gather the information necessary for SAI Global to assess whether accreditation can continue.

Audit Scope

The processes associated with the operating authority's QMS were objectively evaluated to obtain audit evidence and to determine a) whether the quality management activities and related results conform with DWQMS V2 requirements, and b) if they have been effectively implemented and/or maintained.

Audit Criteria:

- The Drinking Water Quality Management Standard Version 2
- Current QMS manuals, procedures and records implemented by the Operating Authority
- SAI Global Accreditation Program Handbook

Confidentiality and Documentation Requirements

The SAI Global stores their records and reports to ensure their preservation and confidentiality. Unless required by law, the SAI Global will not disclose audit records to a third party without prior written consent of the applicant. The only exception will be that the SAI Global will provide audit and corrective action reports to the Ontario Ministry of the Environment. For more information, please refer to the SAI Global Accreditation Program Handbook.

As part of the SAI Global Terms, it is necessary for you to notify SAI Global of any changes to your Quality Management System that you believe are significant enough to risk non-conformity with DWQMS V2: For more information, please refer to the SAI Global Accreditation Program Handbook.

Review of any changes

Changes to the Operating Authority since last audit include: There have been no changes that would impact the scope of accreditation,

EXECUTIVE OVERVIEW

Based on the results of this surveillance system audit the management system remains effectively implemented and meets the requirements of the standard relative to the scope of certification; therefore, a recommendation for continued certification will be submitted.

Recommendation

Based on the results of this audit it has been determined that the management system is effectively implemented and maintained and meets the requirements of the standard relative to the scope of certification identified in this report; therefore, a recommendation for continued certification will be submitted to SAI Global review team.

Opportunities for Improvement:

No opportunities for improvement were offered during this surveillance audit.

Management System Documentation

The management systems operational plan(s) was reviewed and found to be in conformance with the requirements of the standard.

Management Review

Records of the most recent management review meetings were verified and found to meet the requirements of the standard. All inputs were reflected in the records, and appear suitably managed as reflected by resulting actions and decisions.

Internal Audits

Internal audits are being conducted at planned intervals to ensure conformance to planned arrangements, the requirements of the standard and the established management system.

Corrective, Preventive Action & Continual Improvement Processes

The Operating Authority is implementing an effective process for the continual improvement of the management system through the use of the quality policy, quality objectives, audit results, data analysis, the appropriate management of corrective and preventive actions and management review.

Actions taken and planned to address the previously issued NCR 2020-01 were reviewed and accepted following the Reaccreditation audit in 2020. Evidence of the actions completed was reviewed during this surveillance audit and found to be satisfactory in effectively addressing the issues identified.

Summary of Findings

1. Quality Management System	Conforms
2. Quality Management System Policy	NANC
3. Commitment and Endorsement	Conforms
4. Quality Management System Representative	Conforms
5. Document and Records Control	NANC
6. Drinking-Water System	Conforms
7. Risk Assessment	Conforms
8. Risk Assessment Outcomes	Conforms
9. Organizational Structure, Roles, Responsibilities and Authorities	NANC
10. Competencies	NANC
11. Personnel Coverage	NANC
12. Communications	NANC
13. Essential Supplies and Services	NANC
14. Review and Provision of Infrastructure	Conforms
15. Infrastructure Maintenance, Rehabilitation & Renewal	NANC
16. Sampling, Testing and Monitoring	Conforms
17. Measurement & Recording Equipment Calibration and Maintenance	NANC
18. Emergency Management	NANC
19. Internal Audits	Conforms ****
20. Management Review	Conforms
21. Continual Improvement	Conforms
Major NCR #	Major non-conformity. The auditor has determined one of the following: (a) a required element of the DWQMS has not been incorporated into a QMS; (b) a systemic problem with a QMS is evidenced by two or more minor non-conformities; or (c) a minor non-conformity identified with a corrective action request has not been remedied.
Minor NCR #	Minor non-conformity. In the opinion of the auditor, part of a required element of the DWQMS has not been incorporated satisfactorily into a QMS.
OFI	Opportunity for improvement. Conforms to requirement, but there is an opportunity for improvement.
Conforms	Conforms to requirement.
NANC	Not applicable/Not Covered during this audit.
****	Additional comment added by auditor in the body of the report.

PART D. Audit Observations, Findings and Comments

DWQMS Reference:	1 Quality Management System
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 dated May 4, 2021
<p><i>Details: The operational plan details all requirements of the standard. All systems in place at all treatment plants; all plants follow similar SOPs and for the smaller treatments sites. Policies & procedures established in all locations – few procedures plant specific. Operational Plan Rev 12</i></p>	

DWQMS Reference:	3 Commitment and Endorsement
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 3
<p><i>Details: Owner Representatives of Niagara Regional Council; The Regional Chair and Regional Clerk endorse the Operational plan through direct sign off the Operational Plan in Section 3. Operating Authority top management representatives sign off via the Commitment and Endorsement Memorandum.</i></p> <p><i>Per Section 9 Top Management includes the</i></p> <ul style="list-style-type: none"> • <i>Commissioner of Public Works</i> • <i>Director of Water and Wastewater</i> • <i>Associate Director, Water Operations, Maintenance, and Staff Development</i> <p><i>Commitment & Endorsement from</i> <i>John Brunet Associate Director Water Operations & Maintenance Dec 18, 2019</i> <i>Tony Cimino Associate Director W-WW Engineering May 25, 2018</i> <i>Craig Courteau Associate Director W-WW Integrated Systems May 24, 2018</i> <i>Richard Pinder Associate Director Asset Management Oct 15, 2019</i> <i>Tony Tonellato Director of Water Waste Water Services May 24, 2018</i> <i>Bruce Zvaniga Commissioner Public Work Oct 13, 2020</i></p>	

DWQMS Reference:	4 Quality Management System Representative
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 4 & Section 9
<p><i>Details: Top Management has appointed the Water-Wastewater Quality Management Specialist (reporting to the Manager, Quality & Compliance – Water) as the QMS Representative for Niagara Region’s drinking water systems. The representatives’ responsibilities with respect to the DWQMS are defined in Section 4. The role is also reflected in Section 9 of the operational plan</i></p> <p><i>WW QM Specialist responsible for the system maintenance</i> <i>Interface with all departments i.e. Integrated Systems; Asset Management</i> <i>Least connected with Engineering; interface needs to be managed by the WW Specialist</i> <i>Compliance awareness shared with water compliance specialist; Communications via training course “This is how we do it” mandatory compliance course</i> <i>Displayed Rev June 2019</i> <i>Revised – look at the responsibilities of the various work groups; aligned the learning objectives</i> <i>Contractors and Consultants also receive awareness training of Quality & Compliance - completed</i> <i>Standard of Care for top Management, Ops Managers & Mtce Managers; once per council cycle and as required.</i></p>	

DWQMS Reference:	6 Drinking Water System
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 6 Decew Falls DWS QMS-WT-DN-P-060 Rev 7 Grimsby DWS QMS-WT-GR-P-060 Rev 4 Port Colborne DWS QMS-WT-PC-P-060 Rev 5 Rosehill DWS QMS-WT-RH-P-060 Rev 9 Welland DWS QMS-WT-WE-P-060 Rev 7
<p><i>Details:</i></p>	

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Decew DWS Process Schematic QMS-WT-DN-V-060 Rev 3
 Grimsby DWS_Process Schematic QMS-WT-GR-V-060 Rev 3
 Welland DWS_Process Schematic QMS-WT-WE-V-060 Rev 6
 Port Colborne DWS Schematic QMS-WT-PC-V-060 Rev 4
 Rosehill DWS Schematic QMS-WT-RH-V-060 Rev 5

DWQMS Reference	7 Risk Assessment
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 7 Procedure - Drinking Water System Risk Assessment (QMS-WT-ALL-P-070) Rev 9
<p>Details: <i>The procedure outlines the risk assessment method and criteria. Risk assessment outcome are documented in Risk Assessment Outcomes Table (QMS-WT-ALL-T-080) and stored in the EtQ portal.</i> <i>Risk assessment is completed annually.</i> <i>Risk Assessment Review Form - Water (QMS-WT-ALL-F-070 Rev 0) is used to update the completed Risk Assessment Outcomes Table with changes as applicable. A rank of >15 denotes the need for action.</i> <i>Appendix A of the procedure defines the risk assessment scoring criteria;</i> <i>Table A1 Likelihood (1-5; 1=Rare, 5=Imminent);</i> <i>Table A2 Severity impact water quality (1-5; 1=Insignificant, 5=Catastrophic);</i> <i>Table A3 Severity impact on system capacity (1-5; 1=Insignificant, 5=Catastrophic);</i> <i>Table A4 Severity impact on compliance (1-5; 1=Insignificant, 5=Catastrophic);</i> <i>Table A5 Severity impact on the environment (1-5; 1=Insignificant, 5=Catastrophic);</i> <i>Table A6 Severity impact financial (1-5; 1=Insignificant, 5=Catastrophic);</i> <i>Table A4 Severity impact on reputation (1-5; 1=Insignificant, 5=Catastrophic);</i></p> <p><i>Risk assessment completed remotely.</i> <i>Area 1 Niagara Falls Feb 2, 2021, Rosehill Feb 4, 2021</i> <i>Area 2 Welland Feb 9, 2021 Port Colborne Feb 11, 2021</i> <i>Area 3 DeCew March 11, 2021 Grimsby March 12, 2021</i></p> <p><i>Potential areas of concern discussed</i></p> <ul style="list-style-type: none"> - Aging assets - Known infrastructure weaknesses - Lack of redundancy 	

DWQMS Reference:	8 Risk Assessment Outcomes
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 8
<p>Details: <i>Risk Outcomes Table QMS-WT-ALL-T-080 Rev 4</i> <i>CCPs for Niagara Region's drinking water systems are identified as:</i></p> <ul style="list-style-type: none"> • CCP: Coagulant (Aluminum Sulphate) Feed (OP-WT-ALL-P-006) • CCP: Secondary Disinfection (Distribution Chlorine) (OP-WT-ALL-P-007) • CCP: Filter Effluent Turbidity (OP-WT-ALL-P-008) • CCP: Primary Disinfectant (Sodium Hypochlorite) Feed (OP-WT-ALL-P-009) • CCP: Verification of Primary Disinfection (OP-WT-ALL-P-010) • Tracking of all Critical Control Limit Deviations (OP-WT-ALL-P-028 Rev 3) <p>Risk Assessments Outcomes Table and Summary– All WTPs 2021 Rev 4 No high level risk identified; Medium and low risks only identified DeCew DWS with most risks identified 73 low and 24 medium 0 high Niagara Falls 56 low and 12 medium 0 high Welland 55 low and 15 medium 0 high</p> <p>new risk DF-156 - Decew Falls– water main break – 400mm cast iron watermain along Power Glen; new 400 mm PVC pipe connection installed – confirm formal transfer to city of ST. Catharines</p>	

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new risk DF-157 Decew Falls – improper abandonment of Carlton St. Reservoir; revisit RFP for SOW for proper abandonment of adjoining water mains (2021)
 new risk NF-83 – Niagara Falls – Valve or appurtenance failure at Drummond Road watermain (Sheldon St. to Glengate St.); Capital project scheduled for water main – design and construction 2021
 WE-114 Welland – initiate PIR for a study in area
 New risk RH-54 0 - Dominion Road AC - break history – no immediate cause for concern

DWQMS Reference:	14 Review and Provision of Infrastructure
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 10 Section 14 Procedure - Review, Rehabilitation, and Renewal of Infrastructure QMS-WT-ALL-P-140 Rev 9
<p>Details: <i>Procedure outlines a process for the annual review of drinking water system infrastructure to ensure its continued adequacy. It details how capitolly-funded drinking-water infrastructure rehabilitation and renewal projects are initiated, approved and communicated to the Owner.</i></p> <p><i>Capital budget completed in Jan</i> <i>EAM system input</i> <i>Meeting with ops and maintenance; process works</i> <i>End of life;</i> <i>Parts availability considered</i> <i>Capital projects some years off; what is the mitigation to keep asset operational</i> <i>Municipalities meeting annually to discuss infrastructure work and number of projects</i></p> <p><i>The 3 year risk assessment outcomes completed 2021 (see notes under element 8 above) reflects a discussion of the adequacy of infrastructure necessary to operate and maintain the subject systems.</i></p>	

DWQMS Reference:	16 Sampling, Testing and Monitoring
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 16 Procedure -Sampling, Testing and Monitoring QMS-WT-ALL-P-160 Rev 5
<p>Details:</p> <p><i>Details for Sampling, Testing and Monitoring Activities in each DWS are reflected the following procedures;</i></p> <ul style="list-style-type: none"> • <i>Rosehill WTP QMS-WT-RH-T-160 Rev 6</i> • <i>Niagara Falls QMS-WT-NF-T-160 Rev 6</i> • <i>Welland QMS-WT-RH-T-160 Rev 7</i> • <i>Port Colborne QMS-WT-PC-T-160 Rev 7</i> • <i>Grimsby QMS-WT-GR-T-160 Rev 6</i> • <i>DeCew Falls QMS-WT-DF-T-160 Rev6</i> <p><i>The tables within each of the listed procedures includes a column for challenging conditions.</i> <i>Key process parameters for each drinking water system are continuously monitored using a SCADA system.</i></p> <p><i>External testing includes analyses that are performed by an external, Ministry-licenced drinking-water laboratory as defined in the above noted procedures. External testing covers Microbiological, Chemical, Radiological and Inorganic Parameters as defined in the referenced regulations.</i></p>	

DWQMS Reference:	19 Internal Audits
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 19 Procedure Internal Auditing QMS-WT-ALL-P-190 Rev 9
<p>Details:</p> <p><i>The procedure documents the criteria (Section 1), scope (Section 5.2) and frequency of internal audits (Section 5.3) ; that all 21 elements are assessed at least every 3 calendar years and that each DWS facility is audited at least every 2 calendar years.</i> <i>Records keeping is defined in section 5.6 reporting and references the Document and Records Control procedure QMS-WT-ALL-P-050.</i> <i>Internal audit conducted all at once – with all requirements covered.</i> <i>Initiated planning Jan 2020</i> <i>Meeting held to develop audit plan; training refresher on audit objectives</i> <i>Determine what areas need to be audited based</i> <i>All elements once every 3 years;</i> <i>All 3 areas covered; each plant once every 2 years.</i> <i>Audit Plan Feb 22, 2021</i></p> <p>- 3 Commitment & Endorsement</p>	

Audit Report

- 7 Risk Assessment
 - 11 personnel Coverage
 - 16 Sampling testing & Monitoring
 - 18 Emergency Management
 - 19 Internal Audit

*Internal Audit Report issued April 23, 2021 for the audit conducted March 1-31, 2021 (includes coverage of Area 1 Rosehill WTP, Area 2 Port Colborne WTP and Area 3 DeCew WTP) **Observation/Comment******; Section 2.2 of the report erroneously reports the audit findings from the 2020 External Audit.*

Internal audit identified 8 NCRs, 6 potential NCRs and 21 best practice for evaluation. Elements 3 and 7 were found to be conforming. Report provided to Associate Director Water Operations & Maintenance April 23, 2021. And to all staff April 27, 2021

DWQMS Reference:	20 Management Review
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 20 Procedure - Management Review QMS-WT-ALL-P-200 Rev 7
<p>Details: <i>The procedure specifies a management review once per calendar by means of a Q2 and a Q4 meeting with all requirements discussed over course of the 2 meetings. In section 5.3.1, the procedure defines the specific items to be discussed in each of the respective meetings. All required inputs have been specified.</i></p> <p>Management Review Part 1 2020/05/28 Agenda & Minutes Management Review Part 2 2020/12/03 Agenda & Minutes</p> <p>Action item 46 regarding Transportation control plan; & Action item 71 regarding elevated tank design standards identified.</p>	

DWQMS Reference:	21 Continual Improvement
Client Reference:	Operational Plan QMS-WT-ALL-MAN-010 Rev 12 Section 21 Procedure - Corrective Action, Preventive Action, and Best Practices QMS-WT-ALL-P-210 Rev 8
<p>Details: <i>EtQ is the Management system software tool used to track and monitor corrective and preventive actions. EtQ is also used record the root cause analysis.</i> <i>Best Practices are also part of the procedure. The procedure specifies that at least once every 36 months the QMS representative will review best practices published by the MECP.</i> <i>The procedure describes activities for handling both corrective actions and preventive actions. Handling of best practices and preventive action are addressed in Section 5.4 of the procedure with Figure 2 providing an overview of the process</i></p> <p><i>QMR follows up for implementation and verification of the actions</i> <i>Annual update includes internal audit results</i> <i>Compliance obligations/MECP Inspections</i></p> <p><i>Per Management Review 12/03/2020 14 nonconformances and 49 potential nonconformances closed in 2020</i></p> <p><i>AWQI 152646 Grimsby WTP coagulant interruption 2020-10-22</i></p> <p><i>External Audit NCR 2020-01 CAR WTCAR-20-011 actioned Sept 2020</i> <i>Corrective actions: "Work orders for PM 10511 are contracted out to third-party calibration technicians, and this contract work is typically completed each September. Since the contract is coming due shortly, we have elected to complete this work on the regular PM schedule. It is anticipated that all 11 installed flowmeters will be calibrated by September 30th, 2020."</i></p> <p><i>"PM 10511 was converted to a "duplicate" PM type to ensure that, in future, new work orders will be released on an annual basis regardless of the status of work orders from previous years."</i></p> <p><i>Evidence provided:</i> Certificate of Calibration Oct 7, 2020 Flow transmitters 41909, 41908, 42475, 41905, 41912, 41907, 41906, 41448, 41452, 41450, 41913 Screen shot of EAM PM10511 indicating "Duplicate"; Frequency Annual</p>	

Audit Report

Details regarding the objective evidence reviewed are maintained on file at SAI Global.

This report was prepared by:

Marco Brunato
SAI Global Management Systems Auditor

The audit report is distributed as follows:

- SAI Global
- Operating Authority
- Owner
- MOECC

Notes

Copies of this report distributed outside the organization must include all pages.

INTERNAL AUDIT REPORT

General Elements

**Niagara Region
All Wastewater
Systems**

Internal Audit

October 12 – October 27, 2021

1.0 INTRODUCTION

1.1 Purpose

The 2021 internal audit was undertaken:

- To verify that the Wastewater QMS conforms to the requirements of the DWQMS¹ and the requirements of the Wastewater QMS Operational Plan; and
- To verify the effective implementation and maintenance of the Wastewater QMS for all Niagara Region's wastewater systems.

Audits were completed between October 12th and October 27th, 2021. Wastewater internal audits are not a legislative requirement, but are performed annually out of due diligence and best practice. Internal audit interviews were conducted with wastewater Operating Authority personnel and other members of the division, as required.

1.2 Scope

The scope of the 2021 Wastewater QMS internal audit was modified in consideration of the ongoing COVID-19 pandemic and associated impacts to W-WW work processes. The Lead Auditor placed a focus on elements/processes of the QMS that could be audited remotely in effort to minimize additional workload for front-line management and staff.

The 2021 wastewater internal audit was conducted as an element-based audit.

In an **element-based audit**, auditors examined specific elements to ensure that requirements of the WWQMS and the associated procedures are met. Element-based audits do not typically examine adjacent processes.

¹ As modified by Niagara Region to suit our wastewater services.

The following elements were examined during the 2021 internal audit:

- Element 2 – Quality Management System Policy
- Element 4 – Quality Management System Representative
- Element 5 – Document and Records Control
- Element 6 – Wastewater Systems
- Element 11 – Personnel Coverage
- Element 12 – Communications
- Element 13 – Essential Supplies & Services
- Element 21 – Continual Improvement

Elements that were not audited during the 2021 internal audit will be included in future internal audits such that frequency requirements specified in *Internal Auditing (QMS-WW-ALL-P-190, rev1, effective 30Sep2019)* are satisfied.

1.3 Selection of Internal Audit Team

Michelle Max acted as Lead Auditor for this internal audit.

Auditors were assigned as follows:

- Element 2 – Quality Management System Policy: **Molly MacDonald**
- Element 4 – Quality Management System Representative: **Molly MacDonald**
- Element 5 – Document and Records Control: **Molly MacDonald**
- Element 6 – Wastewater Systems:
 - Area 1: **Jason Oatley, Michelle Max**
 - Area 2: **Dawn MacArthur**
 - Area 3: **Dana Knegt**
- Element 11 – Personnel Coverage: **Janet Rose**
- Element 12 – Communications: **Rachel Whyte**
- Element 13 – Essential Supplies & Services: **Molly MacDonald, Michelle Max**
- Element 21 – Continual Improvement: **Rachel Whyte**

All internal auditors have completed Internal Auditor Training as required by the *Internal Auditing (QMS-WW-ALL-P-190, rev1, effective 30Sep2019)*.

1.4 Criteria and Methodology

Audit criteria included the following:

- **Internal Auditing** (QMS-WW-ALL-P-190, Rev1, effective 30Sep2019);
- **Niagara Region Wastewater Operational Plan** (QMS-WW-ALL-MAN-010, Rev4, effective 4Feb2020) and supporting procedures; and
- Internal audit training materials (various auditor training courses).

Audits were conducted by assigned auditors as noted in Section 1.3 of this report. Operating Authority personnel were also interviewed by assigned auditors. Auditor checklists were completed and reviewed with the Lead Auditor; the checklists are not attached, but are filed as per the **Document & Records Control Procedure** (QMS-WW-ALL-P-050, rev2, effective 16Sep2021).

Remote work arrangements remain in place due to the ongoing COVID-19 pandemic; as such, formal opening and closing meetings were not held with auditors or auditees. The Lead Auditor assembled the audit team and assigned auditors to audits via email. Initiation of the audit was communicated to Top Management and Divisional staff via email.

Audits were conducted by assigned auditors as noted in Section 1.3 of this report. Where required, auditors completed interviews with various members of Divisional staff to support audit findings. These checklists were submitted to the Lead Auditor and used as input to this report.

The audit findings will be communicated via e-mail circulation of this Internal Audit Report and assignment of associated corrective actions, preventive actions, and best management practices.

Internal audit checklists, along with copies of communication emails, are retained as per **Document & Records Control** (QMS-WW-ALL-P-050, Rev2, effective 16Sep2021). These can be found in the "Records Control" module of EtQ.

2.0 INTERNAL AUDIT RESULTS

2.1 Review of Previous Internal Audit Findings

Previous internal audit findings were not reviewed during this internal audit, as much work was done in advance of the internal audits to address and close open corrective actions from the previous internal audit in 2019. These efforts were summarized in a memo to Public Works Committee ([PWC-C 8-2020, 10March2020](#)).

2.2 Review of Previous External Audit Findings

Not applicable. The Wastewater QMS is not subject to external auditing at this time.

2.3 Summary of New Internal Audit Findings

Findings are categorized as follows and are summarized in Table 1 below.

- **Conformance:** Audit interviews and sampled records indicate that QMS requirements are met and applicable procedures are implemented as written.
- **Non-conformance:** Audit interviews and sampled records indicate that a requirement of the QMS Standard was not met or a documented procedure was not implemented as written. These findings require **corrective action**.
- **Potential non-conformance:** A non-conformance has not yet occurred, but a trend or pattern indicates that occurrence of a non-conformance is likely. These findings require **preventive action**.
- **Best practice for evaluation:** A best practice behaviour or opportunity for improvement is identified. Program, process, procedure or improvement which, if implemented, may assist in the collection and treatment of wastewater, provide efficiencies in operational processes or provide information to assist in future planning. These findings are brought forward to the appropriate level of management for review and consideration, and those requiring Top Management direction or input are reviewed at the annual Management Review.

Table 1: Summary of Internal Audit Findings – Number and Type

Element	NC	PNC	BP	Total
Element 1 – Quality Management System	-	-	1	1
Element 3 – Quality Management System Policy	-	-	-	-
Element 4 – Quality Management System Representative	1	-	-	1
Element 5 – Document and Records Control	2	-	1	3
Element 6 – Wastewater Systems	1	-	1	2
Element 11 – Personnel Coverage	4	-	3	7
Element 12 – Communications	1	-	1	2
Element 13 – Essential Supplies & Services	3	-	4	7
Element 21 – Continual Improvement	1	-	3	4
Total	13	0	14	27

Table 2 provides a summary of findings from the QMS Internal Audit. In reviewing Table 2, the following acronyms should be noted:

Acronym	Definition
C	Conformance
NC	Non-Conformance
PNC	Potential Non-Conformance
BP	Best Practice for Evaluation

Table 2 is provided below.

Table 2: Summary of Findings – 2021 Internal Audit

Finding	WWQMS Standard Element
Element 1: Operational Plan	
BP	<p>The following procedure improvements are recommended under the Wastewater Operational Plan (QMS-WW-ALL-MAN-010, Rev4, 4Feb2020) section 6.1.1, Table 1: Niagara Region’s Wastewater Systems:</p> <ul style="list-style-type: none"> • The Niagara Falls WTP contributes water residuals to Garner Road Biosolids, however this is not included under the municipal collection system for Garner Road. Consider including. • There is an opportunity to include the following facilities under the corresponding wastewater systems: <ul style="list-style-type: none"> - Grimsby Works Yard combined sewage detention facility, Niagara Road 12 Landfill leachate pumping station, Park Road, Sann Road and Thirty Road odour control facilities under the Baker Road wastewater system. - Lock Street Sewage Detention Facility under the Port Dalhousie wastewater system. - Peel Street Sanitary Storage Facility under the Port Weller wastewater system. • The format of Table 1 for Seaway could be updated. It appears that it used to extend to the next page and includes wording “Continued” on the pdf format. The two separate cells for Seaway could be combined and the “continued” be removed. • The Operational Plan and the Wastewater System documentation do not explicitly state that the local area municipalities are the Owner and Operating Authority of their systems. Consider clarifying.

Finding		WWQMS Standard Element
Element 3: Quality Management System Policy		
C	<i>The Wastewater QMS conforms to the requirements of this element.</i>	
Element 4: Quality Management System Representative		
NC	Element 4 of the Wastewater Operational Plan (QMS-WW-ALL-MAN-010, Rev4, 4Feb2020) states “Top Management has appointed the Water-Wastewater Quality Management Specialist (reporting to the Manager, Quality & Compliance – Wastewater) as the QMS Representative for Niagara Region’s drinking water systems.” Update to reflect wastewater systems instead of drinking water systems.	
Element 5: Document and Records Control		
NC	Section 5.4.2 of the Document and Records Control (QMS-WW-ALL-050), Rev2, 16Sep2021 states, “Records required to support the QMS are identified in Table 2.” Table 2 lists that certificates of analysis are to be kept by the Operations Managers and maintained at respective WWTPs. When asked to provide a certificate of analysis for a delivery of sodium bisulphite on 2-Sept-2021, the auditee was unable to present it and confirmed that the Certificate of Analysis was not provided.	
NC	Section 5.4.2 of the Document and Records Control (QMS-WW-ALL-050), Rev2, 16Sep2021 states “The majority of QMS documents are typically reviewed every three (3) years unless otherwise indicated in the document header.” The auditor discovered eight (8) QMS documents that were not reviewed within the specified timeframe.	

Finding	WWQMS Standard Element
Element 5: Document and Records Control	
BP	<p>Section 5.4.3 of the <i>Document and Records Control (QMS-WW-ALL-050), Rev2, 16Sep2021</i> states that “the emergency response plan (ERP) documents are typically reviewed annually. Reviews can be performed through any one of the following means: document review in EtQ, monthly e-learning assignments and table top workshops.” It may be beneficial to include a note in EtQ for each ERP document indicating when training was last issued and the method delivered (i.e. e-learning exercise, table top workshop) to ensure the annual review is captured.</p>
Element 6: Wastewater System	
NC	<p>Element 6 of the standard indicates that the Operating Authority shall ensure that the description of the system is kept current. Non-conformances have been noted in several wastewater system documents for this element:</p> <ul style="list-style-type: none"> • <i>Anger Avenue WWTP System Description (QMS-WW-FE-P-060, Rev1, 11Apr2019):</i> <ul style="list-style-type: none"> - The system schematic shows the effluent from Anger Avenue wastewater treatment plant going to Lake Erie, however the effluent is directed to the Niagara River. • <i>Niagara Falls WWTP System Description (QMS-WW-NF-P-060, Rev1, 27May2019):</i> <ul style="list-style-type: none"> - The auditor identified that the RBC effluent polymer system has been in service since 2018. As this will stay in place into the capital project, it should be described as a temporary system under section 5.5.2.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<p><i>continued</i></p>	<ul style="list-style-type: none"> • Queenston WWTP System Description (QMS-WW-QT-P-060, Rev1, 3Feb2020): <ul style="list-style-type: none"> - Section 5.4.2 specifies that the screened wastewater is sent to the plant's treatment processing via five (5) submersible pumps installed in the wet well. The auditee identified that only two (2) submersible pumps are installed in the wet well. • Seaway WWTP System Schematic (QMS-WW-SW-V-061, Rev8, 28Sep2021): <ul style="list-style-type: none"> - Marina 3 SPS is listed in the operational plan and the Seaway wastewater system description but it is not included in the Seaway WWTP system schematic. Review station status and consider removing or adding from documentation as necessary. - Consider adding the storm chlorine contact tank and chlorination/dechlorination details for plant overflows from the CSO storage tank to section 5.4.5 and 5.4.6. Alternatively, consider including a separate section for wet weather flow treatment/ mitigation. • Seaway WWTP System Schematic (QMS-WW-SW-V-061, Rev8, 28Sep2021): <ul style="list-style-type: none"> - Section 5.4.8, methane gas produced by the digesters is not currently utilized in the boilers. Gas is sent to the flare stack. The document should be updated to reflect this.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<i>continued</i>	<ul style="list-style-type: none"> • Port Weller Wastewater System Description (QMS-WW-PW-P-060, Rev2, 20Apr2021): <ul style="list-style-type: none"> - Section 5.4.1 specifies “Influent flows for treatment are passed through a screening process consisting of three (3) parallel mechanical bar screens that are 1,800mm wide with 10 mm bar openings.” Updates to the influent screening were performed in 2020, which consisted of two (2) 6 mm mechanical screens, each rated at 136,200 m³/d and one (1) 16 mm bar screen. - Section 5.4.6, indicates that the east bank clarifiers (5&6) have a total combined surface area of 7,868m². The auditor identified that the east bank clarifiers (5&6) should have a combined surface area around 1,700m².
BP	<p>Best practices for evaluation are recommended in several wastewater system documents:</p> <ul style="list-style-type: none"> • Anger Avenue WWTP System Description (QMS-WW-FE-P-060, Rev1, 11Apr2019): <ul style="list-style-type: none"> - Section 1, update spelling of Catharine Street to Catherine Street. - Section 5.3.2 - Downstream Processes states “The Niagara Falls WTP draws raw water from the Niagara River via the Welland River (Chippawa Creek) downstream of the Anger Avenue WWTP.” The auditor has suggested that the text be updated to “The Niagara Falls WTP draws its water from the Welland River.”

Finding	WWQMS Standard Element
Element 6: Wastewater System	
continued	<ul style="list-style-type: none"> • Stevensville-Douglastown Lagoon System Description (QMS-WW-SD-P-060, Rev1, 22Sep2020): <ul style="list-style-type: none"> - Section 1 states “the Stevensville-Douglastown (works #120003110) and associated sewage pumping stations are owned and operated by the Niagara Region.” The auditor noted that the Black Creek sewage pumping station is not owned, but rather monitored by the Region. Consider clarifying. • Stevensville-Douglastown Lagoon System Schematic (QMS-WW-SD-V-061, Rev7, 3May2021): <ul style="list-style-type: none"> - The auditor noted that the Stevensville sewage pumping station is capable of an overflow under certain conditions. It would be beneficial to depict the overflow in the system schematic. • Niagara Falls WWTP System Description (QMS-WW-NF-P-060, Rev1, 27May2019): <ul style="list-style-type: none"> - Section 5.5.11 states “the WWTP is equipped with two (2) primary anaerobic digesters.” Due to operational issues, digester #2 has been out of service for several years. The description should be revised to state that digester #2 is “out of service”. • Queenston WWTP System Description (QMS-WW-QT-P-060, Rev1, 3Feb2020): <ul style="list-style-type: none"> - Section 5.4 lists chlorine pump failure as one of the common event-driven fluctuations. The auditor identified that a second stand-by chlorine pump can be put into service in the event that the lead pump fails. It may be beneficial to include details that a stand-by pump can be placed into service if needed, as an action/control measure.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<p><i>continued</i></p>	<ul style="list-style-type: none"> • <i>Garner Road Biosolids Handling and Dewatering Facility System Description (QMS-WW-GR-P-060, Rev1, 27May2019):</i> <ul style="list-style-type: none"> - The document does not describe the solids tank processes, nor is the Niagara Falls WTP listed as a facility that supplies process waste residuals to Garner Road under Table 1. Consider including. • <i>Crystal Beach WWTP System Description (QMS-WW-CB-P-060, Rev1, 1Apr2019):</i> <ul style="list-style-type: none"> - Section 5.4.1, consider updating the word “bypass” to “overflow” to align with MECP definitions of bypass and overflow. - Under the secondary clarifiers section 5.4.5 the wording used to describe return and waste sludge should be updated. The system description describes two (2) sludge pumps for the removal of waste activated sludge. These pumps are not currently in use. Return and waste activated sludge are on a common header pipe. Return activated sludge valve #1 and #2 are used to restrict return flow and divert waste activated sludge to the gravity belt thickener. Valving is in place to go to waste holding tanks, but common practice is to waste directly to the gravity belt thickener. - Scum handling is not included in the description. Consider including. - Section 5.4.8, consider including dosage point for dechlorination for consistency with disinfection section.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<p><i>continued</i></p>	<ul style="list-style-type: none"> • Seaway Wastewater System Description (QMS-WW-SW-P-060, Rev1, 13Jan2020): <ul style="list-style-type: none"> - Section 5.2 – Table 4, the auditor noted that the wording “sample at direct point of overflow” listed under the action/control measure column for wet weather fluctuations needs to be more specific, as it could be interpreted as sampling at the canal where it directly overflows to the environment. In practice, samples are collected at the end of the storm chlorine contact tank. Consider modifying language to clarify. It was also identified that during wet weather the bar screens can be run manually in the event of grit and rag build-up. It would be beneficial to include details under the action/control measure section. - The auditor identified that operational challenges could occur from receiving winery wastewater, which may result in increased loading to the plant. As an action/control measure it is recommended that details be included under section 5.2 to monitor the inventory of solids, F/M ratio and adjust mixed liquor suspended solids and/or wasting as needed. - Section 5.3.2, consider updating the wording from “bypass” to “overflow” to align with the Ministry of Environment Conservation and Parks definitions of bypass and overflow and include a link to the Spills and Overflows – Downstream Water User and Public Notification (OP-WW-SW-P-002) procedure. - Section 5.4.2 refers to the aerated grit tanks, however Seaway has vortex grit removal tanks. Recommend updating section title to reflect the proper description. - Consider adding phosphorus removal as a separate section for ease of reference.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<i>continued</i>	<ul style="list-style-type: none"> • Seaway Wastewater System Description (QMS-WW-SW-P-060, Rev1, 13Jan2020): <ul style="list-style-type: none"> - Section 5.4.3, consider adding details that specify that primary tanks can be used (as storage) to mitigate storm flow if available and where capacity allows. - Section 5.4.6, consider adding dosage point for dechlorination to be consistent with disinfection section. - Section 5.4.8, the sentence “sludge from the primary and secondary clarifiers is sent to primary digester” is vague. Consider updating to state “raw sludge and co-thickened waste activated sludge from the primary clarifiers is sent to the primary digester.” • Seaway WWTP Process Schematic (QMS-WW-SW-V-060, Rev4, 6Feb2020): <ul style="list-style-type: none"> - Update wording from “Natural Gas Boiler/Waste Boiler” to “Natural Gas Boiler/Waste Burner.” • Welland Wastewater System Description (QMS-WW-WE-V-060, Rev2, 9Mar2021): <ul style="list-style-type: none"> - The descriptions for the raw sewage pumps under section 5.1.3 does not accurately describe the equipment currently on-site. The section describes the pumps that are to be installed as part of the plant upgrade, which has been delayed. Consider updating to reflect equipment currently in use. - Section 5.4.5 states that for the primary storm clarifiers “gates are operated by RPU program set parameters.” Gates are currently being operated in manual mode, pending completion of phase 1 capital upgrades. Consider adding operating mode to the description.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<p><i>continued</i></p>	<ul style="list-style-type: none"> • Welland Wastewater System Description (QMS-WW-WE-V-060, Rev2, 9Mar2021): <ul style="list-style-type: none"> - The disinfection and dechlorination processes are described under the disinfection heading for section 5.4.7. Consider separating into two separate sections to keep consistent with the other area system descriptions. - Section 5.4.8 - anaerobic digestion process, consider updating sentence to state “the remaining solids are hauled off-site for dewatering and/or application.” - Consider adding phosphorus removal as a separate section for ease of reference. Currently, included in the secondary clarifiers section. - The Welland WWTP environmental compliance approval (ECA) link in section 7 points to the Port Weller ECA. For consistency, consider incorporating a general link that points to the wastewater operations page on the Vine and listing all stations with ECA’s under the references/other attachments section. • Port Dalhousie Wastewater System Description (QMS-WW-PD-P-060, Rev1, 29May2019): <ul style="list-style-type: none"> - The influent and effluent wastewater characteristics outlined in Table 1 and 2 depict data from 2012-2017. Consider updating to reflect current plant performance data. - It was identified that metering and sample locations have been included in the Seaway WWTP Process Schematic (QMS-WW-SW-V-060, Rev4, 6-Feb-2020) consider adopting this approach in other WWTP process schematics as best practice.

Finding	WWQMS Standard Element
Element 6: Wastewater System	
<i>continued</i>	<ul style="list-style-type: none"> • It may be beneficial to include details on the active discharge agreements under the critical upstream and downstream processes section for all the WWTP Process Descriptions. • It was identified in several of the wastewater treatment plant system descriptions that in Table 2: WWTP Effluent Wastewater Characteristics the “typical values” for wastewater effluent are listed, but are not reflective of the monthly averages for each effluent parameter. Consider removing this column from the tables.
Element 11: Personnel Coverage	
NC	<p>Section 5.4.2 of the Document and Records Control (QMS-WW-ALL-P-050, Rev2, 16Sep2021) states “The majority of QMS documents are typically reviewed every three years unless otherwise indicated in the document header.” The auditor identified that the On-call Scheduling (ADM-ALL-ALL-P-005, Rev3, 2Aug2017) procedure referenced in section 5.1.3 and 5.2.1 of the Personnel Coverage (QMS-WW-ALL-P-110, Rev4, 6Oct2021) was out of date with a review date of 2-Aug-2020.</p>
NC	<p>Section 5.3.2 of the On-call Scheduling (ADM-ALL-ALL-P-005, Rev3, 2Aug2017) procedure states “The Program Assistants check for change requests on a daily basis and updates the On-Call Managers Schedule when changes are received.” The auditor identified an incident where the on-call calendar had not been updated correctly after a change request had been made. It may be beneficial to have managers check the calendar when changes are made to confirm they have been recorded correctly.</p>

Finding	WWQMS Standard Element
Element 11: Personnel Coverage	
NC	<p>Section 5.1.1 of the Wastewater Treatment Plant Logbook Entries (OP-WW-ALL-P-024, Rev3, 8Sep2021) procedure notes that the overall responsible operator is to be identified as per the Personnel Coverage procedure. It also required that an overall responsible operator and any operator making a log entry for the day be included in the shift details. The auditor identified an incident where changes to the on-call schedule were made, however the corresponding logbooks were not updated to reflect the change in personnel. It may be beneficial to consider how changes in on-call manager duties are communicated to staff to ensure logbooks accurately reflect any changes.</p>
NC	<p>Section 5.1.1 of the Wastewater Treatment Plant Logbook Entries (OP-WW-ALL-P-024, Rev3, 8Sep2021) notes “staff on duty during the shift holding an Operator-in-Training wastewater treatment licence are to be designated as OIT” and “staff on duty during the shift holding a Class I, II, III, or IV wastewater treatment licence are to be designated as operator in charge.” The auditor identified that on 20-Oct-2021, a System Operator holding Class I treatment licence was noted as OIT in the logbook when they should have been recorded as an OIC.</p>
BP	<p>The Personnel Coverage (QMS-WW-ALL-P-110, Rev4, 6Oct2021) procedure states “The Manager On-Call Schedule is established collaboratively by the Associate Director Wastewater Operations and Maintenance and the Area Operations Managers”. In practice, the schedule is based on an on-going rotation, which continues to roll-over each year. As this seems to be the common practice, it may be beneficial to state in the procedure that collaboration is possible where/when needed.</p>

Finding	WWQMS Standard Element
Element 11: Personnel Coverage	
BP	It is recommended that a formal program be implemented during the on-boarding of new maintenance staff to prepare, track and document the readiness of staff for on-call duties. Currently, it is up to the discretion of the managers as to when a new staff member be placed on-call.
BP	It may be beneficial to consider developing a process or formal document for the Associate Director and new Manager to complete that acknowledges that the Manager is ready to be on-call.
Element 12: Communications	
NC	Communications (QMS-WW-ALL-P-120, Rev3, 12Aug2021) specifies that Top Management communicates with Operating Authority staff through division-specific orientation training for new employees. This in-person training was paused at the start of the COVID-19 pandemic in Q1 2020, and no evidence was observed to indicate that employees hired after March 2020 have received this orientation training.
BP	The PWC report and presentation include a discussion of Wastewater QMS risk assessment results, however, risk assessment is not included in the list of Annual Report inputs in Communications (QMS-WW-ALL-P-120, Rev3, 12Aug2021) . Consider adding “risk assessment results” to the procedure.
Element 13: Essential, Supplies & Services	
NC	Bulk Chemical Deliveries (OP-ALL-ALL-P-001, Rev8, 7Feb2020) Table 1 specifies that aluminum sulphate and hydrogen peroxide % concentration was based on w/v. In reviewing the tender documents for the chemicals (contract #1147, #943), the auditor identified that both chemicals unit of concentration specified % w/w.

Finding	WWQMS Standard Element
Element 13: Essential, Supplies & Services	
NC	<p>Section 5.1.6 of the <i>Bulk Chemical Deliveries (OP-ALL-ALL-P-001, Rev8, 7Feb2020)</i> states “The system operator unlocks the cap on the appropriate fill pipe. Some fill caps may not be locked if they are located behind a locked door.” The auditor observed that all of the fill ports were not securely locked at the Niagara Falls, Welland and Baker Road WWTP.</p>
NC	<p>Section 5.2.3 of the <i>Essential Supplies & Services (QMS-WW-ALL-P-130, Rev 8, 7Feb2020)</i> states “Chemical delivery/offloading is not initiated until the Manifest, Bill of Lading, and Certificate of Analysis have been checked to confirm that the requirements are met”. Several chemical deliveries for each of the wastewater facilities were reviewed. The auditor identified that only the manifest was provided for a sodium bisulphite delivery at the Welland WWTP on 2-Sep-2021. Since the Bill of Lading and Certificate of Analysis for the sodium bisulphite delivery was not provided at the time of chemical delivery/offloading, this would also be in non-conformance to section 5.1.2 of the <i>Bulk Chemical Deliveries (OP-ALL-ALL-P-001, Rev8, 7Feb2020)</i> which describes that the System Operator obtains the Bill of Lading and Certificate of Analysis from the driver and verifies the product name, quantity, seal number, and product UN number. Verification of documents was not confirmed upon arrival therefore, the Operator did not confirm that the chemical quality and quantity requirements were met.</p>
BP	<p>It was identified that a Seasonal Grounds Complaint link is provided on each of the area’s e-boards to record any issues with seasonal grounds maintenance activities. In reviewing the <i>Essential Supplies & Services (QMS-WW-ALL-P-130, Rev 8, 7Feb2020)</i> the auditor noted that there is no program in place for evaluating suppliers and/or service providers. It is strongly recommended that a program be adopted for evaluating contractors.</p>

Finding	WWQMS Standard Element
Element 13: Essential, Supplies & Services	
BP	Essential Supplies & Services (QMS-WW-ALL-P-130, Rev 8, 7Feb2020) specifies “any staff procuring supplies or services are responsible to ensure that the supplier or service provider has up-to-date WSIB insurance.” There is an opportunity to improve/clarify the process for verifying insurance coverage requirements of a supplier or service provider.
BP	The auditor had identified that an Emergency Spill Response Information document exists for several of the wastewater facilities. Consider including reference to these documents in the Bulk Chemical Deliveries (OP-ALL-ALL-P-001, Rev8, 7Feb2020) procedure.
BP	Section 5.1.12 of the Bulk Chemical Deliveries (OP-ALL-ALL-P-001, Rev8, 7Feb2020) states “the System Operator confirms delivery quantity on SCADA and records delivery details in the plant logbook.” Observed log entries were made but little detail was provided in terms of quantity and quality. The operator accepting the delivery should note the certificate of analysis has been checked to conform to the procedure and total volume received to ensure accuracy.
Element 21: Continual Improvement	
NC	Corrective Action, Preventive Action, and Best Practices (QMS-WW-ALL-P-210, Rev1, 1Apr2020) specifies that a root cause analysis is completed to identify why a non-conforming condition was allowed to occur. The procedure also states that the QMS Representative monitors the effectiveness of the corrective action by assigning a date for follow-up and verifying the effectiveness of the corrective action on or immediately before that date. Root causes were not identified for two of the non-conformance records that were reviewed (WWCAR-20-001 and 20-004), despite the records having been pushed beyond the “root cause” stage of the workflow. Additionally, WWCAR-19-007 was closed without verifying the effectiveness of the corrective action.

Finding	WWQMS Standard Element
Finding	WWQMS Standard Element
Element 21: Continual Improvement	
BP	<p><i>Corrective Action, Preventive Action, and Best Practices (QMS-WW-ALL-P-210, Rev1, 1Apr2020)</i></p> <p>describes the process for identification and management of QMS non-conformances, as well as QMS potential non-conformances and QMS best practices. A potential non-conformance can be loosely defined as “a corrective action that hasn’t happened yet, but will likely occur given adequate time”. The implication is that there is a root cause that needs to be addressed, and that doing so shouldn’t be considered as an optional exercise. It may therefore be beneficial for PNCs to follow the “corrective action” route rather than the “best practice” route.</p>
BP	<p>The Operating Authority may wish to consider identifying criteria to indicate what level of verification of effectiveness is required and/or identifying examples of activities that could be undertaken to verify effectiveness. Some corrective actions may require a simple review of a standard operating procedure, while others may require more intense monitoring and study. There may even be corrective actions that don’t require any monitoring of effectiveness at all.</p>
BP	<p>There may be an opportunity to review open BPEs that are currently in the draft phase and assign them to process owners, particularly those that precede the most recent audit.</p>

Prepared by: Michelle Max

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