

Operational Plan

Vaughan Distribution System (011-401)

Prepared by:
The City of Vaughan



Environmental Services

Effective Date: June 2024

UNCONTROLLED WHEN PRINTED

DWQMS Operational Plan for Vaughan Drinking Water System

Operational Plan Elements	Revision Number	Revision Date
QMS-01: Overview of Operational Plan	7	March 22, 2023
QMS-02: Quality Management System Policy	5	March 20, 2023
QMS-03: Commitment and Endorsement	15	November 7, 2023
QMS-04: Quality Management System Representative	7	November 7, 2023
Appendix 4A – Letter of Appointment of QMS Representative	17	May 8, 2024
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Form 05-01 Document Master List	4	March 2, 2023
Form 05-02 Record Master List	5	November 10, 2023
Form 05-03 Document Change Form	3	March 22, 2023
QMS-06: Drinking Water System	12	June 10, 2024
Appendix 6A – City of Vaughan Water Source and Distribution System Schematic	0	April 1, 2019
Schedule C – Director’s Directions for Operational Plans	n/a	2022/11
QMS-07: Risk Assessment	9	June 11, 2024
Table 07-01 Risk Assessment Rating & Hazard Types	5	May 13, 2019
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Table 08-01 Critical Control Point & Critical Control Point Summary	9	June 9, 2021
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QMS-09: Organizational Structure, Roles, Responsibilities and Authorities	10	November 8, 2023
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DWQMS Operational Plan for Vaughan Drinking Water System

QMS-12: Communications	12	June 11, 2024
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QMS-14: Review and Provision of Infrastructure	11	June 11, 2024
QMS-15: Infrastructure Maintenance, Rehabilitation and Renewal	11	March 22, 2023
Form 15-01 Operation and Maintenance Schedule	3	June 11, 2024
QMS-16: Sampling Testing and Monitoring	11	March 22, 2023
QMS-17: Measurement and Recording Equipment Calibration & Maintenance	6	March 22, 2023
Form 17-01 Measurement & Recording Equipment Maintenance & Calibration Schedule	4	June 9, 2021
QMS-18: Emergency Management	8	June 11, 2024
QMS-19: Internal Audits	7	March 22, 2023
Form 19-01 Annual Internal Audit Schedule	3	March 28, 2019
Form 19-02 Internal Audit Checklist	1	March 28, 2019
Form 19-03 Internal Audit Report	1	March 28, 2019
Form 19-04 Nonconformance Report	1	March 28, 2019
Form 19-05 Nonconformance Report Log	1	March 29, 2019
QMS-20: Management Review	12	June 11, 2024
Form 20-01 Management Review Agenda & Meeting Minutes	2	September 3, 2020
QMS-21: Continual Improvement	11	May 8, 2024
Form 21-01 CAR/PAR Analysis Form	3	May 8, 2024
Form 21-04 DWQMS Action Item Status Log	2	March 2, 2023

1.0 Purpose

The Quality Management System is one portion of the mandated Drinking Water Quality Management Standard (DWQMS) 2.0 that is a requirement of the Ministry of Environment, Conservation and Parks (MECP) Municipal Drinking Water Licencing Program (MDWLP) for all drinking water systems in the province of Ontario.

1.1 Procedure

This Operational Plan is a document created and maintained by the Environmental Services Department to demonstrate the City's commitment to provide safe and reliable drinking water to all citizens, businesses, and visitors of Vaughan. The Operational Plan documents twenty-one (21) elements of the DWQMS and provides an understanding of the drinking water system, the responsibilities of the Owner and Operating Authority of the water system, and a commitment to the provision of safe drinking water. This allows the City of Vaughan to plan, implement, check, and continually improve which promotes confidence and security in the municipal drinking water system.

1.2 Associated Documents and Records

MECP - Drinking Water Quality Management Standard 2.0

1.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	6	Added Revision history.
22-Mar-2023	7	Revised for minor wording changes.

2.0 Purpose

To document a Quality Management System (QMS) Policy which demonstrates the City's commitment to deliver safe and clean drinking water and enhance customer confidence in the quality of drinking water.

2.1 Procedure

The QMS Policy is listed below:

As the owners and operators of the City of Vaughan's drinking water system we are committed to:

- providing safe and clean drinking water to our citizens and businesses
- complying with applicable legislation and regulations as related to the provision of safe drinking water
- implementing and continually improving the effectiveness of our QMS

This Policy has been developed in accordance with 2022-2026 Term of Council Service Excellence Strategic Plan to align with the Environmental Sustainability and Service Excellence and Accountability objectives.

The QMS Policy is posted on the City's website as a communication tool to the Owner and the public and is posted at the Joint Operations Centre to inform all Operating Authority personnel.

2.2 Associated Documents and Records

MECP - Drinking Water Quality Management Standard 2.0

QMS-03 Commitment and Endorsement

2.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	4	Added Revision history.
2-Mar-2023	5	Revised to include minor wording update and addition of the 2022-2026 Term of Council Service Excellence Strategic Plan.

3.0 Purpose

The Owner demonstrates commitment and endorsement of the Operational Plan through a Council Resolution. The signatures of the key members of Top Management below demonstrate Top Management's commitment to, and endorsement of, the Operational Plan.

3.1 Procedure

The Corporation of the City of Vaughan (Owner) and Top Management of the Operating Authority (as defined in QMS-09) are committed to the implementation, maintenance, and continual improvement of a Quality Management System (QMS) that meets the requirements of the Drinking Water Quality Management Standard. The QMS for the drinking water system is documented in the Operational Plan. Endorsement by the Owner and Top Management acknowledges the need for, and supports the provision of, sufficient resources to maintain and continually improve the QMS.

Top Management demonstrate their endorsement of the Operational Plan through Annual Drinking Water System Reports to Council which include the results of the annual Management Review.

Staff will submit the Operational Plan to each new term of Council every four years for re-endorsement.

Top Management's commitment to an effective QMS is evidenced by:

- a) Ensuring that a QMS is in place that meets the requirements of the DWQMS,
- b) Ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,
- c) Communicating the QMS according to procedures (QMS-12), and
- d) Determining, obtaining, and/or providing the resources needed to maintain and continually improve the QMS.

Emilie Alderman Digitally signed by Emilie Alderman
Date: 2023.11.13 07:35:10 -05'00'

Emilie Alderman, Director, Environmental Services

3.2 Associated Documents and Records

QMS-02 Quality Management System Policy
QMS-09 Organizational Structure, Roles, Responsibilities and Authorities
QMS-12 Communications
Council Resolution of Endorsement

3.3 Revision History

Date	Revision #	Reason for Revision
23-Mar-2022	10	Added Revision history. Updated Manager of Water Services and Supervisor of Compliance and Training.
15-Jun-2022	11	Updated Supervisor of Compliance and Training and Manager of Water Services title to current.
27-Sep-2022	12	Removed "Acting" from Director of Environmental Services
01-Mar-2023	13	Updated Top Management to reflect current staffing changes.
20-Mar-2023	14	Updated with minor wording changes.
7-Nov-2023	15	The 2023 DWQMS External audit issued an OFI to consider review of the composition of Top Management in relation to the definition provided in the DWQMS Standard. During the July 29, 2023 Management Review it was agreed by all in attendance that the Director, Environmental Services best suits this definition and will be the sole member of Top Management.

4.0 Purpose

To identify a Quality Management System Representative and outline their specific responsibilities.

4.1 Procedure

Top Management appoints and provides authority to the Quality Management System Representative, irrespective of their other responsibilities. The authority, roles and responsibilities are provided in QMS-09.

A letter of appointment of the QMS Representative has been signed by Top Management and is included in Appendix 4-A.

4.2 Associated Documents and Records

QMS-09 Organizational Structure, Roles, Responsibilities and Authorities
Appendix 4-A Letter of Appointment of QMS Representative

4.3 Revision History

Date	Revision #	Reason for Revision
21-Mar-2022	5	Updated to document Director of Environmental Services appoints QMS Representative.
22-Mar-2023	6	Updated with minor wording revision.
7-Nov-2023	7	Updated to reflect OFI issued in the 2023 DWQMS External Audit and to be consistent with wording in the DWQMS Standard.

NOTICE OF APPOINTMENT

QMS Representative

Top Management of the Operating Authority (Water Division of the Environmental Services Department) at the City of Vaughan, has appointed the Quality Management System Representative to be:

Emily Fahlgren, Supervisor of Compliance and Training

The Quality Management System (QMS) Representative is the liaison between Top Management and the Water Division of the Environmental Services Department. The QMS Representative, irrespective of other responsibilities shall:

- a) administer the QMS by ensuring that processes and procedures needed for the QMS are established and maintained,
- b) report to Top Management on the performance of the QMS and any need for improvement,
- c) ensure that current versions of documents required by the QMS are being used at all times,
- d) ensure that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the City of Vaughan's drinking water system, and
- e) promote awareness of the QMS throughout the Water Division of the Environmental Services Department (the Operating Authority).

Emilie
Alderman

Digitally signed by Emilie
Alderman
Date: 2024.05.08
14:32:36 -04'00'

Emilie Alderman, Director of Environmental Services

May 8, 2024

Date

Revision History

Date	Revision #	Reason for Revision
21-Mar-2022	10	Updated to document Director of Environmental Services appoints QMS Representative. QMS Representative appointed is Emily Fahlgren.
10-May-2022	11	Updated QMS Representative to current staff. QMS Representative appointed is Kewal Kharbanda, Supervisor of Compliance and Training.
27-Sep-2022	12	Removed "Acting" from Director of Environmental Services
01-Mar-2023	13	Updated QMS Representative to current staff. QMS Representative appointed is Emily Fahlgren.
22-Mar-2023	14	Updated with minor wording revision.
01-Nov-2023	15	Updated QMS Representative to current appointed staff. Representative appointed is Diana Collura.
15-Nov-2023	16	Updated to reflect wording changes in QMS-04 procedure and to current appointed staff. Representative appointed is Emily Fahlgren
8-May-2024	17	Removed "Acting" from Supervisor of Compliance & Training.

5.0 Purpose

To document a procedure that describes how:

- a) documents required by the QMS are kept current, legible, readily identifiable, and retrievable; as well as stored, protected, retained, and disposed of; and
- b) records are kept legible, readily identifiable, and retrievable; as well as stored, protected, retained, and disposed of.

5.1 Procedure

Documents

The Operational Plan and its associated policies, procedures, (including applicable Standard Operating Procedures), forms, exhibits, flowcharts or other documents that are subject to revision are controlled documents and are maintained on the Document Master List (Form 05-01).

Controlled documents (excluding drawings) of both internal (i.e. documents created by the Operating Authority) or external origin are listed on the Document Master List. The QMS Representative is responsible for maintaining the electronic Document Master List.

All electronically controlled documents for the QMS are available on the network drive.

Documents have revision dates listed on them to identify the current version.

Once the document is printed, the document is considered uncontrolled and not subject to revision.

The QMS Representative and, when applicable, members of Top Management determine the point of use that controlled documents are to be made available. These locations (along with the title and revision date) are recorded on the Document Master List.

All staff are responsible for ensuring that documents remain legible and readily identifiable. If a document has been damaged or made illegible, staff are to request a replacement copy from the QMS Representative.

Documents that are only available in hard copy are kept in a safe location that will ensure no damage or deterioration.

Document Changes

Any employee can make a request for the creation or a change to a QMS related document with their Supervisor's approval. Changes to documents can be a result of a change in procedure, results of an audit, or suggestion for improvement.

The request is recorded in Part A on a Document Change Form (Form 05-03). Suggested changes can also be attached to the Document Change Form.

The Document Change Form is sent to the QMS Representative who will either approve or deny the change request for the document.

Prior to processing document changes the QMS Representative will be responsible for ensuring that the changes will not affect the integrity of the QMS or the processes.

The QMS Representative notes the decision on the Document Change Form.

If approved, the document will be revised. To view changes to the document, the “track changes” feature in Word are available for viewing in the shared drive. Finalized documents will be available in PDF format.

If the request is denied, the QMS Representative will send notification to the requester advising of the decision and the reason why.

The QMS Representative then updates the Document Master List (Form 05-01). The QMS Representative will send an email explaining what has changed in the document to all staff affected by the change. Management are responsible for advising any staff affected by the change.

The QMS Representative ensures that Part C of the Document Change Form is completed, dated, and filed.

Obsolete documents saved on the O Drive must be marked “Obsolete” if retained for legal and/or historical purposes, otherwise they are disposed of once a current version is made available. Only current versions of documents (electronic or hard copy) are maintained on the Document Master List by the QMS Representative. The user of the obsolete document is responsible for disposing of the document once they determine there is no further use for the document. Staff affected by the document change will sign-off that they have received the new revision of the document prior to having physical copy of obsolete document disposed of (i.e. Work Procedures, Appendices). Staff document sign-off sheets are kept on the O Drive. The retention time for obsolete documents is not preset and is based on the user’s requirements.

QMS documents are retained until they are replaced by a more current version (e.g., forms) or are determined to no longer be required. Documents that have been identified as obsolete or superseded by updated versions or replaced due to being damaged/illegible are disposed of by being thrown out.

Records

The Record Master List Form (Form 05-03) identifies all of the records that this procedure applies to.

The electronic documents and records associated with the QMS are maintained on the network drive.

The person completing the record must ensure the record is legible, accurate and complete with regard to recording requirements.

When records are removed from the active filing system, they are submitted by the Compliance and Training Division of the Environmental Services Department to the Archives & Records Management Services Division of the Office of the City Clerk.

order to be stored as archived documents. Records are identified, packed in suitable containers and stored in a safe, dry location that will ensure no damage or deterioration.

Record retention and disposing of official records shall be in accordance with the City's Record Retention Schedule of the City of Vaughan By-law #046-2017, or as updated from time to time.

Records may be electronic and/or printed copy.

Electronic records associated with the QMS are maintained on the network.

5.2 Associated Documents and Records

Form 05-01 Document Master List
Form 05-02 Record Master List
Form 05-03 Document Change Form
City of Vaughan By-Law #046-2017

5.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	9	Added Revision history.
23-Mar-2023	10	Revised to incorporate OFI from DWQMS External Audit- track changes are available for viewing in the shared drive while the completed scanned copy will be in pdf. Minor wording updates and department names were updated.

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Internal Documents			
Drinking Water Quality Management Standard 2.0 (DWQMS) Operational Plan		Various revision levels.	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan
Environmental Services Department, Water Division Work Procedures		Various revision levels	O:\Environmental Services\Compliance and Training\WATER PROCEDURES MANUAL\Current Version
Environmental Services Department Daily Work Schedule - Water		August 2, 2022	O:\Environmental Services\Water\Daily Work Schedule
Environmental Services Water Distribution Emergency Plan		October 22, 2021	O:\Environmental Services\Compliance and Training\DWQMS\Emergency Plan\Env Services Water Distribution Emergency Plan (Confidential)
Adverse Water Samples Summary Spreadsheet		November 21, 2022	O:\Environmental Services\Compliance and Training\AWQI
Essential Supplies & Services Handbook		June 8, 2021	O:\Environmental Services\Compliance and Training\WATER PROCEDURES MANUAL\Essential Supplies & Services Handbook

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Forms and Tables			
Document Master List Template (Blank)	Form 05-01	May 11, 2020	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 05 Document_Record Control
Record Master List Template (Blank)	Form 05-02	September 17, 2020	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 05 Document_Record Control
Document Change Form	Form 05-03	March 25, 2019	O:\Environmental Services\Compliance and Training\DWQMS\QMS 05 Document_Record Control
Risk Assessment Form	Form 08-01	June 9, 2021	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 08 Risk Assessment
Critical Control Point and Control Point Summary	Table 08-01	June 9, 2021	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 08 Risk Assessment
Measurement & Recording Equipment Maintenance & Calibration Schedule	Form 17-01	June 9, 2021	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 17 Measurement_Recording Equipment Calibration_Maintenance

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Internal Audit Schedule	Form 19-01	March 28, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 19 Internal Audit
Internal Audit Checklist	Form 19-02	March 28, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 19 Internal Audit
Internal Audit Report	Form 19-03	March 28, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 19 Internal Audit
Nonconformance Report (NCR) Form	Form 19-04	March 28, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 19 Internal Audit
Nonconformance Report Log	Form 19-05	March 29, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 19 Internal Audit

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Top Management Review Agenda & Meeting Minutes	Form 20-01	September 3, 2020	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 20 Management Review
Continual Improvement Analysis Form	Form 21-01	December 21, 2020	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 21 Continual Improvement
Corrective Action Report/Preventive Action Report (CAR/PAR) Log	Form 21-02	March 28, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 21 Continual Improvement
Best Management Practices (BMP) Tracking Log	Form 21-03	May 31, 2022	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\QMS 21 Continual Improvement
DWQMS Action Item Log	Form 21-04	March 2, 2023	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 21- Continual Improvement
pH Meter Calibration Schedule Template		March 30, 2022	O:\Environmental Services\Water\Instrument Calibration - Solutions, Templates

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Hach DR300 Chlorine – Verification of Instrument Response (Log)	Appendix W	June 16, 2022	O:\Environmental Services\Compliance and Training\WATER PROCEDURES MANUAL\Current Version\3) Appendix (Procedures and Forms)
Calibration Inventory- Equipment & Solutions		November 25, 2022	O:\Environmental Services\Water\Instrument Calibration - Solutions, Templates
On-the-Job Practical Training Record		February 4, 2021	O:\Environmental Services\Compliance and Training\Staff-Operators OIC-ORO\Staff Training\Training Templates & Sign In Sheets\Templates
Training Request Form for Water/Wastewater		December 12, 2022	O:\Environmental Services\Compliance and Training\WATER PROCEDURES MANUAL\Current Version\7) Training Request Form
New Development Watermain Flushing Program 3 rd Party Chlorine Residual/Consumption Reporting Form		February 24, 2022	O:\Environmental Services\Compliance and Training\Flushing (New Development)\Reporting Forms
Emergency Plan (City of Vaughan)		May 27, 2015	Confidential document – controlled by Sharon Walker in Emergency Services

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
External Documents			
Chain of Custody Form - Template		Lab Revision: November 2019, Rev. 1	O:\Environmental Services\Compliance and Training\WATER SAMPLE FORMS (CHAIN OF CUSTODY FORMS)
MECP – Form 1 – Record of Watermain Authorized as a Future Alteration	2202E	2022/01	O:\Environmental Services\Program & System Planning\Technical\08-Form 1 - Records of Watermains
MECP – Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System	2203E	2021/07	Joint Operation Centre (JOC)- Filing cabinet
MECP – Form 3 – Record of Addition, Modification, or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere	2204E	2022/01	O:\Environmental Services\Program & System Planning\Technical\23 - Form 3
MECP Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems	4444E	2020/04	O:\Environmental Services\Compliance and Training\AWQI\
Municipal Drinking Water Licence	Licence Number: 011-101	Issue Number: 8 December 6, 2019	O:\Environmental Services\Compliance and Training\DWQMS\Permits and Licences\Licences\Current Joint Operation Centre (JOC)

DOCUMENT MASTER LIST

Document Title	Document Reference No.	Date and/or Revision Level	Distribution / File Path
Drinking Water Works Permit	Permit Number: 011-201	Issue Number: 6 March 5, 2021	O:\Environmental Services\Compliance and Training\DWQMS\Permits and Licenses\Permits\Current Joint Operation Centre (JOC)
Long Term Capital Plan		December 17, 2019	Infrastructure Planning and Corporate Asset Management

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Water Quality Inquiry Cases		Maintained through CRM.				
Water- Quarterly Lab Reports	N/A	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\WATER SAMPLE FORMS (CHAIN OF CUSTODY FORMS)	2 years	8 years	Clerk Typist
Adverse Water Quality Incident Records	N/A	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\AWQI	2 years	8 years	Clerk Typist
Water- Yearly Inorganics Analysis Reports	N/A	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\Sampling Program\Sample Results\Yearly Results	2 years	8 years	Clerk Typist

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Hach Pocket Colorimeter Calibration Reports	N/A	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\Calibrations\Chlorine Kits	2 years	8 years	Clerk Typist
Lead Sample Results	N/A	N/A	DWQMS office area O:\Environmental Services\Compliance and Training\WATER SAMPLE FORMS (CHAIN OF CUSTODY FORMS)	2 years	8 years	Clerk Typist
New Main Samples	N/A	Numerical (date order)	DWQMS office area	2 years	8 years	Clerk Typist
Monthly Water Samples	N/A	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\WATER SAMPLE FORMS (CHAIN OF CUSTODY FORMS)	2 years	8 years	Clerk Typist

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Chlorine Daily Residuals	File(year)	Numerical (date order)	DWQMS office area O:\Environmental Services\Compliance and Training\Daily's	2 years	8 years	Clerk Typist
Water Operator License Information	N/A	Alphabetical	DWQMS office area Posted outside Water/Wastewater offices O:\Environmental Services\Compliance and Training\Staff-Operators OIC-ORO\Staff Training\Operators	2 years	8 years	DWQMS Coordinator
Log Books- Operator		N/A	DWQMS office area	2 years	5 years	DWQMS Coordinator

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Appendix C: Watermain Shutdown Report	N/A	Numerical (Date)	DWQMS office area O:\Environmental Services\Compliance and Training\Appendix Forms FILLED (C,D,Q-CP,U)	2 years	8 years	Team Lead DWQMS Coordinator (previous years)
Appendix W: Verification of Instrument Response (Log)	N/A	Numerical (Date)	DWQMS office area O:\Environmental Services\Compliance and Training\Calibrations\Chlorine Kits	2 years	8 years	Clerk Typist
Backflow Pressure Differential Gauge Certificates of Calibration	N/A	Numerical (Date)	O:\Environmental Services\Compliance and Training\Calibrations\Backflow Pressure Differential Gauge	2 years	8 years	Backflow Prevention Coordinator Clerk Typist

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
PS241 Unit (multi gas detector) Calibration Records	N/A	Numerical (Date)	DWQMS office area O:\Environmental Services\Compliance and Training\Calibrations\H2S Detector	2 years	8 years	Clerk Typist
pH Portable Meter and Probe Calibration Records	N/A	Numerical (Date)	DWQMS office area O:\Environmental Services\Compliance and Training\Calibrations\pH Meters	2 years	8 years	Clerk Typist
Review and Provision of Infrastructure Records	N/A	Numerical (Date)	DWQMS Office Area O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION	2 years	8 years	Infrastructure Delivery DWQMS Coordinator

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Training Records	N/A	Employee	DWQMS office area O:\Environmental Services\Compliance and Training\Staff-Operators OIC-ORO\Staff Training	2 years	8 years	DWQMS Coordinator
Management Review Minutes	Form 20-01	N/A	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 20 - Management Review\Top Management Meeting Minutes (Confidential)	10 years	n/a	QMS Representative

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Document Changes and Forms	By year	Numerical (date)	QMS Representative Office O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 05 - Document and Records Control\Document Change Forms	2 years	8 years	QMS Representative
Form 1's/2's/3's	File Box	Record No.	DWQMS office area O:\Environmental Services\Program & System Planning\Technical	10 Years	n/a	QMS Representative

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Internal Audit Schedule and Internal Audit Report	Year	Year	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 19 - Internal Audits	10 Years	n/a	QMS Representative
Continual Improvement Analysis Forms	Form 21-01	Year	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 21- Continual Improvement	10 Years	n/a	QMS Representative

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

RECORD NAME	ID	FILING METHOD	LOCATION	MINIMUM RETENTION TIME		MAINTAINED BY
				Active	Storage	
Corrective Action Report/Preventive Action Report (CAR/PAR) Log	Form 21-02	Year	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 21- Continual Improvement	10 Years	n/a	QMS Representative
Operational Plan and Table of Contents		Electronic and Document Change form binders	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION - 2019\COVER PAGE and TABLE of CONTENTS	10 years	n/a	QMS Representative
Best Management Practices (BMP) Tracking Log	Form 21-03	Year	O:\Environmental Services\Compliance and Training\DWQMS\Operational Plan\CURRENT VERSION\QMS 21- Continual Improvement	10 Years	n/a	QMS Representative

Record Name – Document Title, **ID** – ref. # of form, **Filing Method** – filed numerical, alphabetical, **Location**- dept./office for active file, **Maintained by** - Function responsible for filing and disposing

DOCUMENT CHANGE FORM

Part A Request for Change or Creation of Document (To be completed by requestor)

(Fill in the information below for the document you would like changed)

Document Title: _____

Doc. Reference Number _____

Detail change requested or attach document with changes marked and initialed.

Name and Signature

Date

Supervisor Name and Signature*

Date

Forward to QMS Representative

Part B Approval (To be completed by the QMS Representative)

Creation/change has been () **DENIED** - Reason:

() **APPROVED**

QMS Representative's Name & Signature: _____

Date: _____

Part C – QMS Representative

- Make changes to the electronic documents on network drive
- Update the Document Master List (Form 05-01)
- Provide a paper copy of the change for inclusion in the Operational Plan
- Advise supervisors that are affected by the change
- File Document Change Form as per Records Master List
- Document change request originator is made aware of decision and changes made to document

Notes:

Form 05-03

Any employee can make a request for the creation or a change to a document or data form. Changes to documents can be a result of a change in procedure, results of an audit or suggestion for improvement.

Requestor

- The requestor completes Part A of the Document Change Form 05-03. Suggested changes can also be attached to the Document Change Form.
- After completing Part A of the Document Change Form, and obtaining Supervisor sign-off, the requestor shall submit the Document Change Form to the QMS Representative for evaluation.

QMS Representative

- The QMS Representative evaluates the request and notes the decision on Part B of the Document Change Form.
- If the request is denied, the QMS Representative will send notification to the requester advising of the decision and the reason why.
- The QMS Representative ensures a current version of the Document Change Form is provided to users and training (if applicable) is provided.

6.0 Purpose

To provide a description of the Vaughan's current Water Distribution System.

6.1 Procedure

The City of Vaughan (Owner of the drinking water system) is responsible for the distribution of drinking water to the citizens, businesses, and visitors of Vaughan. The Environmental Services Department's, Water Services Division (Operating Authority) is responsible for the operation, management, maintenance and/or alteration of the Vaughan Water Distribution System.

Description of System

Vaughan purchases its drinking water from the Region of York who is the wholesale supplier to the City of Vaughan. This water is sourced from Lake Ontario by the City of Toronto and the Region of Peel and is already treated for domestic consumption by the time Vaughan has received it. Chloramination (chlorine together with ammonia) is used as the secondary disinfectant. The City of Vaughan owns and operates the Vaughan Water Distribution System and maintains the following: 1,113km of watermain; 9,952 hydrants; 50,993 valves; 9,963 chambers; 9,258 main line valves; 20 PRVs; 26 anti-stagnation valves; 7 pressure districts; 2 pumping stations; and 145 sampling stations. The City of Vaughan is strictly the retail supplier of water to consumers. All associated transmission lines and storage facilities are owned and operated by the Region of York.

Vaughan's Water Distribution System is classified as a "Large Municipal Year-Round Residential System: receiving water from a Large Municipal Year-Round Residential System."

A certificate of classification was issued to the City of Vaughan for the water distribution system under the Ontario Safe Drinking Water Act. The Vaughan Water Distribution System classification is a Class II.

Water Distribution and Treatment

York Region supplies the Vaughan Water Distribution System with treated drinking water. Vaughan owns and operates one booster (pumping) station, one pressure elevating system, watermains, fire hydrants and service connections to service the various pressure districts throughout the City. There are 10 entry points to the Vaughan Water Distribution System; one (1) entry point from Peel to Vaughan, five (5) entry points from Toronto to Vaughan, and four (4) entry points from York Region to Vaughan (purchased water from Toronto and sold to Vaughan). There are 41 meters installed at entry points that are billed from York Region.

The City of Vaughan ensures the disinfection residual is maintained by using the Standard Operating Procedures (below):

- 2340623- Flushing Dead end Watermain
- 2340676- Sampling

Booster Stations and Pressure Elevating Station

In 1997, the Maplewood Booster Station was built to serve pressure district 9 located at the south-east corner of Keele Street and Kirby Road. The system has two duty pumps to meet domestic water demand and two standby fire pumps to meet emergency fire flow requirements. The system elevates water from the North Maple Reservoir in pressure district 7 to pressure district 9. The Booster Station includes a generator as a back-up for power failure and SCADA for monitoring the operation of the Booster Station. The Booster Station also includes a built-in, sub-base, dual wall diesel storage tank.

The Woodland Acres Pressure Elevating Station services a small residential area in the northeast area of the City. In 2003, this station was installed to address fluctuations in water pressure in the immediate area during peak demand.

6.2 Associated Documents and Records

Appendix 6-A City of Vaughan Water Source and Distribution System Schematic

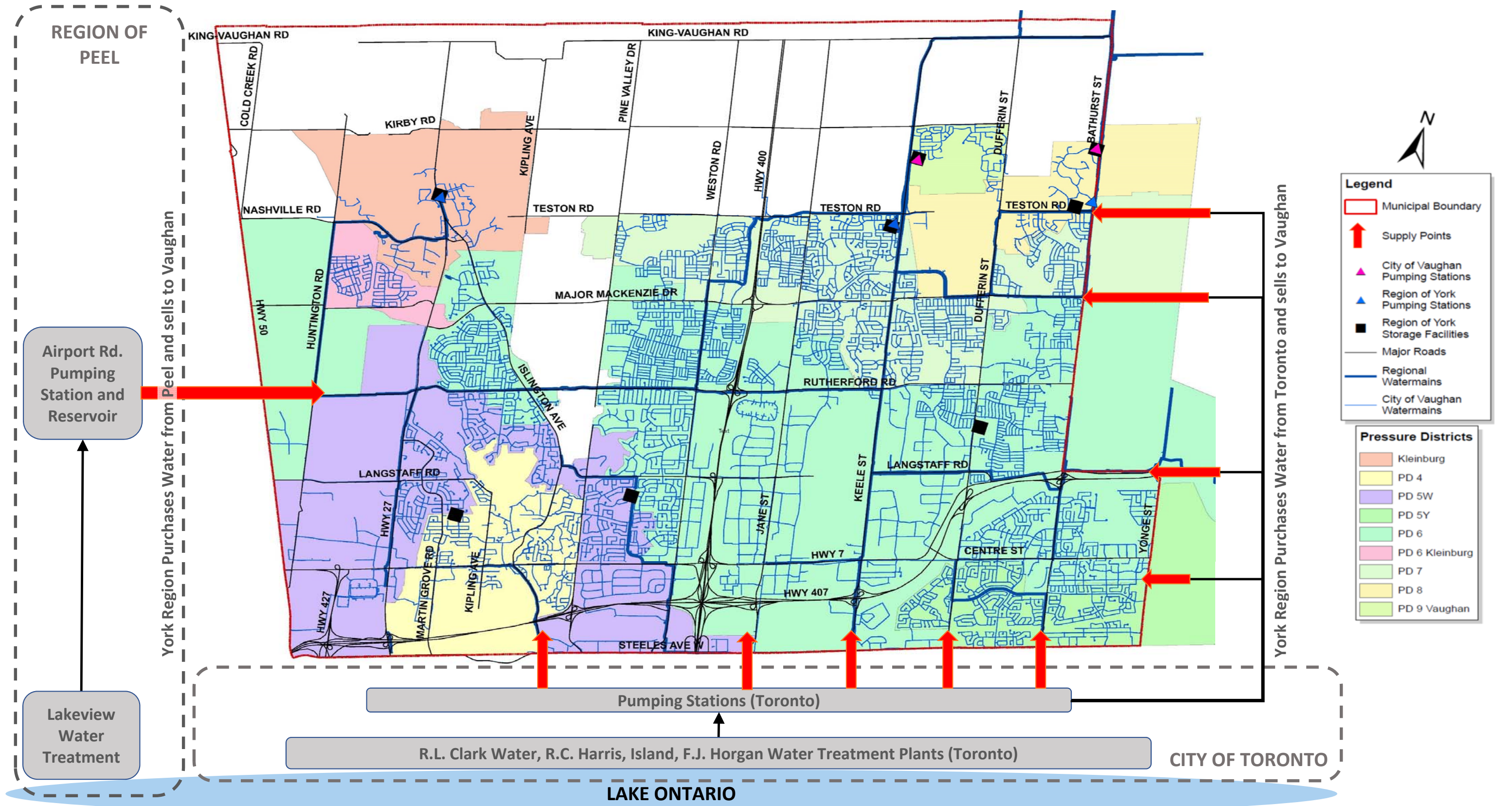
Schedule C – Director’s Directions for Operational Plans

Environmental Services Division Water Procedures Manual

6.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	9	Added Revision history.
22-Mar-2023	10	Revised to update current system data (kms of watermain, hydrants, valves, chambers, PRVs, ASVs, and sample stations) and minor wording revisions.
15-Nov-2023	11	Revised to include mobile back-up generator as identified in and OFI issued in DWQMS Internal Audit.
10-Jun-2024	12	Updated km of watermain, hydrants, valves, chambers, main line valves, PRVs, and anti-stagnation valves. Removed mobile generator from description of Maplewood Booster Station as it is no longer applicable.

City of Vaughan Water Source and Distribution System



Schedule C – Director’s Directions for Operational Plans (Subject System Description Form)

Municipal Residential Drinking Water System

Fields marked with an asterisk (*) are mandatory.

Owner of Municipal Residential Drinking Water System *
 The Corporation of the City of Vaughan

Subject Systems

Name of Drinking Water System (DWS) *	Licence Number *	Name of Operating Subsystems (if applicable)	Name of Operating Authority *	DWS Number(s) *
1. Vaughan Distribution System	011-101		Environmental Services- Water Division	260003097

Contact Information for Questions Regarding the Operational Plan

Primary Contact

Last Name *	First Name *	Middle Initial
Fahlgren	Emily	
Title *	Telephone Number *	Email Address
Supervisor of Compliance & Training	905-832-2281 ext. 6175	emily.fahlgren@vaughan.ca

Secondary Contact

Last Name	First Name	Middle Initial
Perin	Michael	
Title	Telephone Number	Email Address
Manager, Water Services	905-832-2281 ext. 6197	michael.perin@vaughan.ca

7.0 Purpose

To document the procedure used to complete a risk assessment for the Vaughan drinking water system. The risk assessment process will:

- consider potential hazardous events and associated hazards, as identified in the Ministry of the Environment, Conservation and Parks document titled “Potential Hazardous Events for Municipal Residential Drinking Water Systems,” as amended,
- identify potential hazardous events and associated hazards,
- assess and rank the risks associated with the hazards,
- identify control measures to address the hazards,
- identify critical control points within the drinking water system,
- identify a method to verify the risk assessment validity and assumptions at least once every calendar year,
- ensure a risk assessment is conducted at least once every thirty-six (36) months, and
- consider the reliability and redundancy of the equipment.

7.1 Procedure

Annual Verification of Risk Assessment

At least once every calendar year, the QMS Representative facilitates a verification of the currency of the information and validity of the assumptions used in the risk assessment process for the drinking water system. This is undertaken by a team comprised of (at a minimum) the Manager and Supervisor’s of Water Services and/or designates and the QMS Representative.

When reviewing the currency of the risk assessment information, the following may be considered:

- process changes
- reliability and redundancy of equipment
- emergency situations
- critical control point deviations
- QMS non-conformances related to standard operating procedures

Risk Assessment Methodology

The verification is completed by verifying the currency of information document in the Drinking Water Risk Assessment Form (Form 08-01) which lists the activity, hazard description, control measures and associated rank. The previous years’ completed form is used as a template during the annual verification: newly identified hazards are inserted into the previous year’s form and the columns are filled out as described below and existing hazards are updated, remain unchanged, or are removed.

Column in Risk Assessment Form	Information in Column
Activity	Distribution system related activity is recorded in this column.
Hazard Description	Associated potential hazards are documented this column.
Control Measures	Measures currently in place to lower the possibility of the hazard occurring
Likelihood	The likelihood (L) and consequence (C) of the hazardous event occurring are assessed using the Risk Assessment Rating Table (Table 07-01) as a guide. Detectability, vulnerability and/or critical customers may also be considered when assigning the likelihood and/or consequence rating. Using this methodology, the higher number indicates a higher likelihood or consequence
Consequence	
Total Rank	The Total Rank (R) is then assigned for each hazard based on the calculation of the likelihood of the event occurring (L) plus the consequence of the event (C) or $L + C = R$. If the total rank is greater than six (6) then it is considered a Critical Control Point (CCP) and the control measures/corrective action
Considerations for Determining CCP's	Consider below when determining CCP's: <ol style="list-style-type: none"> 1) If the hazard is controlled by a preventative measure or training, then the program is noted in this column and the hazard may not be a "Critical Control Point (CCP)" 2) For a hazard to be identified as a CCP - 3) Must answer the question ("If control was lost could someone be hurt and could a control measure(s) be used by the operator to alleviate the issue?"), 4) "Control Point (CP)" are identified as hazards that are controlled by a prerequisite program
CCP #	The identified CCPs are numbered sequentially and highlighted

Comprehensive Thirty-Six (36) Month Risk Assessment

Every thirty-six (36) months a comprehensive re-assessment of the drinking water system risk assessment process is conducted by removing the likelihood, consequence, and rank for each potential hazard in the Risk Assessment Outcome table to avoid being

influenced. This is an opportunity to re-assess the risk assessment process and outcomes as well as the “total rank” number. To undertake this more comprehensive re-assessment the QMS Representative facilitates a team comprised of (at a minimum) Manager of Water Services, Supervisors of Water Services, and/or designates and other potential internal departmental staff (e.g., other City Departments, consultants, other utilities) that the QMS Representative may decide to invite.

In the years where the thirty-six (36) month re-assessment process is completed, the annual verification of the risk assessment will be completed at the same time.

Document and Records Management

The meeting minutes of the Risk Assessment and completed Risk Assessment Form (08-01) are shared with Top Management.

The QMS Representative is responsible for ensuring that minutes are taken during the risk assessment meetings taking place once every calendar year and once every thirty-six (36) months and that these are maintained as per Document and Records Control QMS-05 Procedure.

The QMS Representative is responsible for maintaining and making any necessary changes/updates to the Risk Assessment Form as per Document and Records Control QMS-05 Procedure.

The QMS Representative is responsible for ensuring that any necessary changes are made to the training requirements, standard operating procedures, system procedures or other parts of the QMS resulting from changes to the Risk Assessment.

7.2 Associated Documents and Records

Form 08-01 Risk Assessment Form
Table 07-01 Risk Assessment Rating
Table 08-01 Summary of Critical Control Points
QMS-05 Document and Records Control QMS System Procedure

7.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	6	Added Revision history.
22-Mar-2023	7	Updated for minor wording revision.
10-Nov-2023	8	Revised to incorporate the OFI issued during the 2023 DWQMS External Audit. To refrain from referring to the once every calendar year verification of the assumptions and info used of the Risk Assessment as

a review as it confuses with the usage of the same word "review" for the Risk Assessment.

11-Jun-24

9

Revised to incorporate an OFI identified during the DWQMS External System Audit to ensure the wording in the procedure addresses the requirements under the Standard for 7 (h).

Risk Assessment Rating

Risk = Likelihood + Consequence (if sum is >6, Risk is considered a Critical Control Point)

Description	Likelihood of Hazardous Event Occurring	Rating
Rare	May occur in exceptional circumstances	1
Unlikely	Could occur at some time	2
Possible	Has occurred or may occur once every 1 to 5 years	3
Likely	Has occurred or may occur on a yearly basis	4
Very Likely	One or more occurrences on a monthly or more frequent basis	5

Description	Consequence of Hazardous Event Occurring	Rating
Insignificant	Insignificant impact, little public exposure, little or no health risk	1
Minor	Limited public exposure, minor health risk	2
Moderate	Minor public exposure, health impact for smaller population	3
Major	Major public exposure, larger population at risk	4
Catastrophic	Major impact for large population, complete failure of systems	5

8.0 Purpose

To document the outcomes of the Risk Assessment for the drinking water system and to identify the Critical Control Points (CCP).

8.1 Procedure

The Risk Assessment must be conducted as per the requirements of QMS-07 Risk Assessment and the outcomes will be documented on the Form 08-01 Risk Assessment Form.

The CCPs will be identified on Form 08-01 and will be detailed in Table 08-01 Summary of Critical Control Points.

As per QMS-07 Risk Assessment, the activities that comprise the Risk Assessment are the annual verification of in the Risk Assessment Form (Form 08-01) for accuracy and validity and may be updated following the annual verification or after a major process change and a more comprehensive re-assessment conducted every thirty-six (36) months which provides the opportunity to re-assess the risk assessment process, outcomes and risk ratings.

8.2 Associated Documents and Records

Form 08-01 Risk Assessment Form
Table 07-01 Risk Assessment Rating
Table 08-01 Summary of Critical Control Points
QMS-05 Document and Records Control QMS System Procedure

8.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	2	Added Revision history.
22-Mar-2023	3	Updated with minor wording revisions.
11-Jun-2024	4	Updated to incorporate OFI identified in the 2024 DWQMS External system audit.

Critical Control Points		Control Limits	Control Measures
CCP #1	<p><u>Watermain Break</u></p> <p>Environmental contamination may be introduced into the water distribution system.</p>	<p><u>Combined Chlorine Limits:</u> City of Vaughan Operational Limits: 0.30 mg/L MIN and 2.75 mg/L MAX</p> <p><u>Ontario Reg 170/03 Limits:</u> 0.25 mg/L MIN and 3.0 mg/L MAX</p> <p><u>Bacteriological Limits:</u> Total Coliform - 0 E.coli - 0 NDOG - 0</p>	<p><u>Sampling after watermain break repairs as per Water Standard Operating Procedures (SOP):</u></p> <p>a) Activity #2340621 (WatermainRepair / Replacement) b) Responding to Adverse Water Quality – Water Operator c) After Hours Adverse Reporting d) Activity #2340676 (Sampling)</p> <p>Contractors are updated on requirements of Ontario Watermain Disinfection Procedure.</p> <p>Environmental Services meets with contractors monthly to ensure awareness of Ministry of the Environment, Conservation, and Parks (MECP) watermain disinfection requirements and City's requirements.</p>
CCP #2	<p><u>Watermain Break</u></p> <p>Contamination from backflow into the distribution system.</p>	<p><u>Combined Chlorine Limits:</u> City of Vaughan Operational Limits: 0.30 mg/L MIN and 2.75 mg/L MAX</p> <p><u>Ontario Reg 170/03 Limits:</u> 0.25 mg/L MIN and 3.0 mg/L MAX</p> <p><u>Bacteriological Limits:</u> Total Coliform - 0 E.coli - 0 NDOG - 0</p> <p>Significant distribution system pressure reduction less than design standards</p>	<p>Maintaining pressure in the distribution system as per watermain design standards.</p> <p>Backflow prevention by-law # 177-20</p>
CCP #3	<p><u>Terrorist Threat/Vandalism</u></p> <p>Damage and/or contamination to municipal/regional drinking water system and/or water quality (i.e. control of PRVs).</p>	<p><u>Alarms</u> Illegal entry alarms Limit alarms Pre-set alarms to identify abnormal operations</p>	<p>Acitivate the Emergency Response Plan</p> <p>Security measures such as: cameras on site, fencing around stations, and keypad swipe for entrance.</p> <p>City of Vaughan Office of Chief Information Officer- IT Services has conducted full upgrade of securities for potential entry points into the system. There are different levels of security to access infromation - limited access to set and modify operational parameters</p>

A Critical Control Point is an essential step or point in the City of Vaughan's distribution system where you apply some sort of control to prevent or eliminate a drinking-water hazard or to reduce it to an acceptable level.

Information Updated as Part of March 28, 2023 36-Month Comprehensive Risk Assessment Review

RANKING (Likelihood + Consequence)
CCP Threshold = 6

Potential Hazard/Event	Hazardous Events and Associated Hazards	Control Measures to Address Potential Hazards & Hazardous Events	RANKING (Likelihood + Consequence)				Maintenance and Capital Works Addressed *
			Likelihood	Consequence	Rank	CCP #	
DISTRIBUTION SYSTEM							
Bulk Water Services	Using dirty hosing and previous contamination in tank prior to hooking up, from previous truck usage (e.g., fertilizer, pool) allowing contaminants to enter into the system.	Backflow preventers are in place at all bulk water filling stations. Most haulage trucks have an air gap.	1	2	3	-	Enclosures have been installed for better protection of bulk water services.
Bulk Water Services	Freezing during winter season causing unit to cease functioning.	The non functioning station would not add risk to the water distribution system. Payment system is locked and therefore, water cannot be dispensed. Monthly and year round routine inspections assist to indentify problems in advance.	2	1	3	-	Enclosures assist with freezing prevention.
Watermain Flushing	Loss of secondary disinfection.	Regular dead end fluhing program.	2	2	4	-	15 Anti stag devices are currently maintained Sampling locations have been selected at strategic locations.
Watermain Break	Environmental contamination may be introduced into the water distribution system.	Attempt to mitigate as per Water Standard Operating Procedures (SOP- Activity #2340621) using 2 Categories (i.e. Category 1, Category 2, Category 2-special cases) as per MECP Watermain Disinfection Procedures.	3	4	7	CCP #1	
Watermain Break	Contamination from backflow into the distribution system	The City's Backflow prevention by-law 004-2018 applies to ICI and multi-story residential properties. Backflow preventers are required under building codes for process control and industry is required to perform an annual inspection. Maintain air gap during repair to prevent back flow	3	4	7	CCP #2	Cross control surveys, more awareness from stakeholders by using the backflow prevention program
Temporary Connections	High temperatures due to temporary pipe not being buried may cause bacteria growth and loss of secondary disinfection.	Chlorine residuals are monitored and City of Vaughan certified water operators are present at connection activities. Flushing of connections to limit bacteria growth.	2	2	4	-	Flushing programs, isolating from system.
Exercising Valves	(1) Unknown water hammers (2) Unknown transient rates (3) Leaking and broken valves dues to exeriscing	When applicable, exercise valves as per valve exercicing program (SOP- Activity #2340611). Staff are trained on the program and the SOP is shared with applicable contractor(s). Flushing program(s) on temporary connections and water mains.	3	2	5	-	Valve exercicing program- completed internally and externally.
Unauthorized Hydrant Connections	Contamination or water transients, from tampering/illegal connections to hydrants. Potential watermain breaks due to water transients due to improper operation of hydrant.	Water By-law prohibits illegal connections and by-law enforcement monitors and proceeds with charges where required.	4	2	6	-	Rebuilt and functional tested PRVs that feed pressure districts in place. Redundancy that would supply. Conditional assessment in maintenance completed in Q4 2020 on 14 PRVs.
Long Term Impacts of Climate Change (i.e. Intense rainfall (100mL), fast spring thaw, extreme heat/cold, extreme rain/storm events)	Flooding at Woodland Acres Pressure Elevating Station.	SCADA alarms provide notification to Water Operations. Regular station checks completed by staff can help identify any issues.	4	2	6	-	Sump pump and discharge assist with mitigating flooding at station 1 above and below the pit.
	Erosion on major river crossings.	Looping watermain systems and leak detection can mitigate erosion.	2	3	5	-	Watermain replaced under the Humber River.
	Flooded air valve and meter chambers.	Implementation of water- proofing chambers and self-draining chambers. Conducting chamber inspections to assess condition. Vented air valves implementation. Not many are vented to be addressed on program.	3	2	5	-	Check valve in place to prevent flooding at the chamber.
	Change in frost line due to extended cold weather	Revisit the watermain design standards to preserve integrity of infrastrcuture.	2	2	4	-	

Information Updated as Part of March 28, 2023 36-Month Comprehensive Risk Assessment Review

RANKING (Likelihood + Consequence)
CCP Threshold = 6

Potential Hazard/Event	Hazardous Events and Associated Hazards	Control Measures to Address Potential Hazards & Hazardous Events	Likelihood	Consequence	Rank	CCP #	Maintenance and Capital Works Addressed *
Source Water Supply Shortfall	Insufficient production transmission of drinking water from upstream supply which could develop into a back siphonage situation at the top end of pressure districts	Corporate communications and communication to consumers through social media to ensure consumers are aware. Delivery services by independent courier will deliver notices to residents.	1	4	5	-	
Extreme Weather Events	Impact on water supply (quantity and quality), distribution piping, valves and appurtenances (i.e. electrical power failure and mechanical equipment failure), and could result in adverse water quality.	Use of the back-up power supply generator and mobile power trailer during power outage. Implement Corporate Emergency Plan and Public Works Escalated Response procedure where applicable.	2	3	5	-	
Sustained Extreme Temperatures	Impact on water supply (quantity and quality), distribution piping, valves and appurtenances (i.e. electrical power failure and mechanical equipment failure), could cause watermain breaks, could result in adverse water quality, and cause frozen water services.	Review design criteria (frozen services) to preserve integrity of infrastructure. Communication to consumers (i.e. through social media, etc.) to ensure awareness. Staff training on thawing equipment, and implementing appropriate SOPs.	3	3	6	-	
Chemical Spill Impacting Source Water	Impacts water supply (quality and quantity) and adverse water quality can be created.	Initiate Corporate Emergency Plan and Public Works Escalated Response Procedure (where applicable), communication with York Region on status of spill, and communication to consumers to ensure awareness.	1	5	6	-	
Sustained Pressure Loss	Regional pump operation could create a water hammer causing main breaks and pressure issues, lack of immediate communication about pressure with York Region, Pressure District 9 is a single feed service area (failure of watermain).	Enforce the Backflow Prevention By-law (By-law #004-2018), communication with Vaughan Fire Department during a fire emergency (i.e. high water demand), implement Public Works Escalated Response Procedure where applicable.	2	3	5	-	
Backflow	Increase in infrastructure failure can lead to decreased chlorine residual and possibility of contamination through back siphonage; ICI and multi-residential service connections could introduce contamination in the drinking water system due to moderate or severe risk cross connection with no or failed backflow prevention; hydrant usage by the Vaughan Fire Department could cause sustained negative pressure at high points in the system when hydrants are used at lower elevations, this could result in cross contamination through back flow. Drop in pressure could cause water to siphon back into the system at air valve.	Enforce Backflow Prevention By-law (By-law #004-2018), enforcement by By-law and Compliance, Licencing and Permit Services, review of watermain design standards to preserve integrity of infrastructure and water quality.	2	4	6	-	
Terrorist Threat/Vandalism	Damage and/or contamination to municipal/regional drinking water system and/or water quality (i.e. control of PRVs). Compromised SCADA system to hazardous event section.	SCADA alarms (illegal entry alarms) can notify staff, enforcement of Backflow Prevention By-law (By-law #004-2018), enforcement by By-law and Compliance, Licencing and Permit Services, communication with the public (public awareness of the drinking water system), if applicable implement the Corporate Emergency Plan and the Public Works Escalated Response Procedure.	2	5	7	CCP #3	
Business Continuity	Staffing shortages, contractor availability, materials/supplies, source water quality/quantity, water born viruses out of our control.	Pandemic directive that determines how staff enter homes, essential activities to do- minimize staff exposure; second touch down stations, reducing in-person meetings/training; relief from microbiological sampling as approved by the MECP.	3	3	6	-	

Information Updated as Part of March 28, 2023 36-Month Comprehensive Risk Assessment Review

RANKING (Likelihood + Consequence)
CCP Threshold = 6

Potential Hazard/Event	Hazardous Events and Associated Hazards	Control Measures to Address Potential Hazards & Hazardous Events	Likelihood	Consequence	Rank	CCP #	Maintenance and Capital Works Addressed *
Unauthorized Operation of Valves	Contractor operate valves without permission, external groups operating valves.	By-law #177-20 and associated enforcement. Monitoring active construction site- staff from Infrastructure Delivery and Water monitoring activities. DWWP is an item that was added to pre-con meetings so that contractors and other parties are aware of the City's commitment to providing safe and clean drinking water and regulatory requirements for watermain works.	3	2	5	-	
Return to Service of watermain isolated from distribution system	Non-potable water entering distribution system	Maintain positive pressure, collect samples, isolate valve. On-site certified operators monitoring activities. MECP new watermain disinfection procedure and City of Vaughan SOP and water main commissioning requirements.	3	2	5	-	
Nitrification in the Distribution System	Increased odour inquiries, increase chlorine demand. Potential lack of confidence in the system. Increase low chlorine adverse water quality events. Nitrate/Nitrite formation, reduction in pH and alkalinity which may affect lead in drinking water.	Responding to Adverse Water Quality - Water Operator and After Hours Adverse Reporting SOPs; Nitrification Study completed by WSP and recommendations provided to the City for sampling plan.	2	2	4	-	
BOOSTER/PRESSURE ELEVATING STATIONS							
Maplewood	Pressure fluctuations due to potential power failure.	Regular maintenance is performed	2	1	3	-	
Woodland Acres	pressure fluctuation due to potential power failure.	Regular maintenance is performed	1	1	2	-	

* This section is to document consideration of risk assessment outcomes under QMS- 14 Provision of Infrastructure Procedure.

Rating System Key		
Likelihood	1	Rare
	2	Unlikely
	3	Possible
	4	Likely
	5	Very Likely
Consequence	1	Insignificant
	2	Minor
	3	Moderate
	4	Major
	5	Catastrophic

For full descriptions see Table 07-01 Risk Assessment Rating

9.0 Purpose

To document a procedure that:

- a) defines the Owner, Operating Authority and Top Management;
- b) describes the organizational structure of the Operating Authority; and
- c) identifies the roles, responsibilities, and authorities of Top Management and key positions within the Operating Authority.

9.1 Procedure

Organizational Structure

The organizational structure of the Operating Authority, as it relates to the DWQMS responsibilities, is outlined in Appendix 9-A: Organizational Chart.

The Owner is the Corporation of the City of Vaughan and is represented by Council.

Identifying Key QMS Roles

Top Management and the Operating Authority of the drinking water system are defined in Table 9-1.

Top Management is responsible for conducting the Management Review as outlined in procedure QMS-20 Management Review.

The QMS Representative is appointed by Top Management. Irrespective of other responsibilities, the QMS Representative shall have specific QMS related responsibilities as outlined in Table 9-2.

The appointment letter for the QMS Representative is included in procedure QMS-04.

Organizational Roles, Responsibilities and Authorities

Specific responsibilities and authorities for positions with key roles in the Drinking Water Quality Management System are detailed in the various system procedures and standard operating procedures (including Activity Methods) that form the Operational Plan.

Table 9-2 provides a summary of the overall roles, responsibilities and authorities related to the provision of safe drinking water in the drinking water system. The specific responsibilities and authorities for the various roles are provided in the Job Descriptions maintained by the City's Human Resources Department.

9.2 Associated Documents and Records

Job Descriptions

QMS-04 QMS Representative

QMS-20 Management Review

Table 9-1 Operating Authority Key Roles

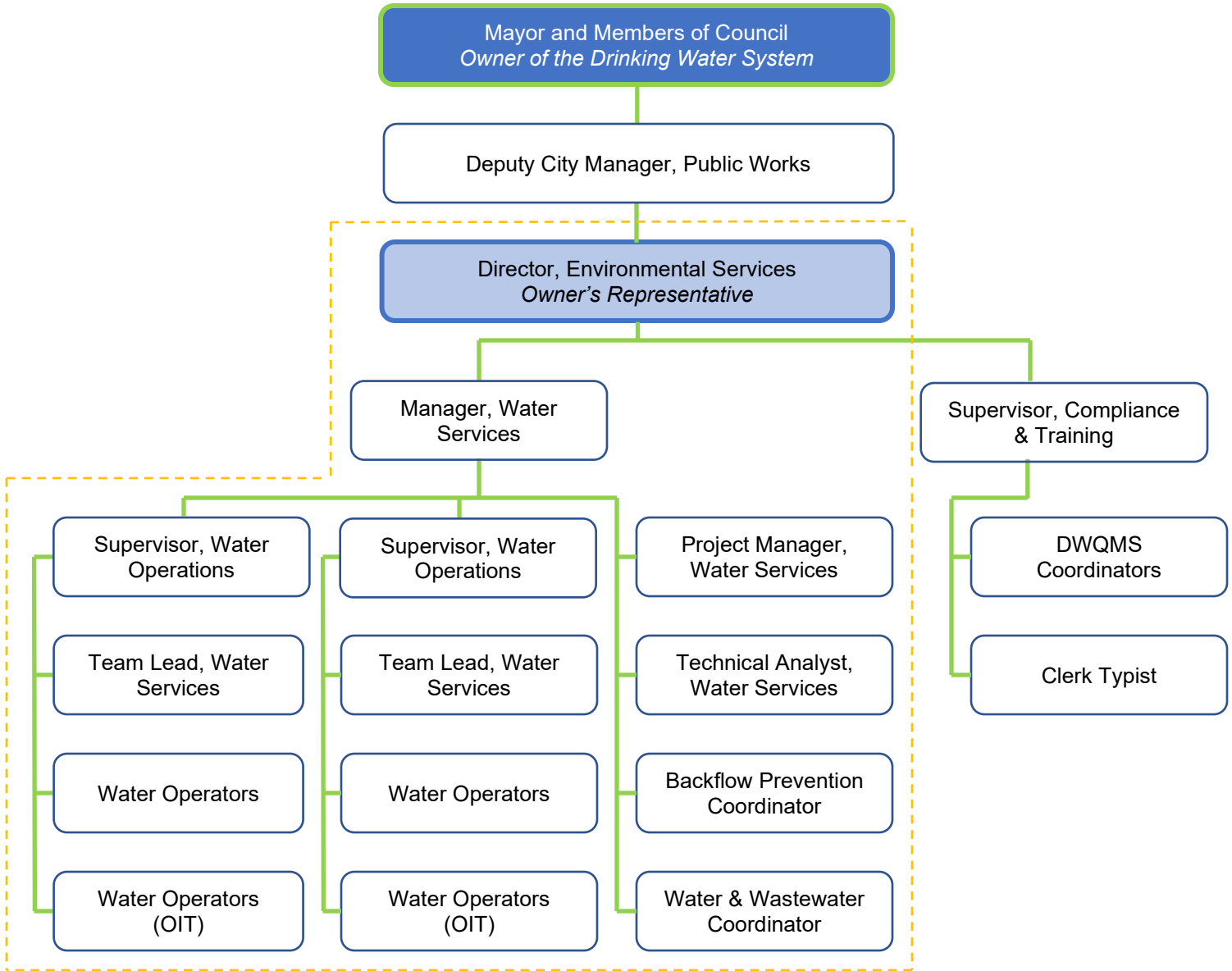
Table 9-2 QMS Roles, Responsibilities and Authorities

Appendix 9-A Organizational Chart

9.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	8	Added Revision history.
22-Mar-2023	9	Revised to incorporate OFI from the DWQMS External Audit. To be consistent with QMS-04, the QMS Rep will continue to be appointed by the Director of Environmental Services. Minor wording revisions.
8-Nov-2023	10	Minor wording revision to reflect updates to QMS-04

Appendix 9-A: QMS Organizational Chart



- : Owner
- : Top Management
- : Operating Authority

Owner – The Corporation of the City of Vaughan (Vaughan Council acts on its behalf)

Operating Authority – Environmental Services (Water Division)

QMS Representative – Appointed by Top Management

Top Management:

- Director of Environmental Services*

*or appointed designate

Table 9-2

QMS Roles, Responsibilities and Authorities



Roles	Responsibilities	Authorities
Owner	<ul style="list-style-type: none"> - Demonstrates commitment to the QMS Policy - Ensures the resource needs to support the QMS are met - Endorses the contents of the Operational Plan 	<ul style="list-style-type: none"> - Financial, administrative authority related to the provision of safe drinking water - Allocate necessary resources for the safe operation of the system based on recommendations from the Operating Authority
Top Management	<ul style="list-style-type: none"> - Ensures a Management Review is conducted at least once every calendar year - Reports the results of the Management Review to the Owner - Ensures compliance with the terms and conditions of the License and its components, and applicable acts and regulations related to the delivery of safe drinking water - Appoints QMS Representative - Makes recommendations related to necessary resources for QMS - Supports the Operational Plan 	<ul style="list-style-type: none"> - Makes recommendations to the Owner on the drinking water system - Make decisions respecting corporate aspects of the QMS - Makes recommendations on improvements to QMS - Provides and obtains resources for the QMS and necessary infrastructure to operate and maintain the drinking water system safely and effectively - Makes decisions related to system-specific aspects of the QMS
QMS Representative	<ul style="list-style-type: none"> - Administers the QMS by ensuring that processes and procedures needed for the QMS are established and maintained - Reports to Top Management on the performance of the QMS and any need for improvement - Ensures that current versions of documents required by the QMS are being used at all times - Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the drinking water system 	<ul style="list-style-type: none"> - Makes necessary changes to the QMS and system procedures in the Operational Plan - Participates in inspections with MECP

Table 9-2

QMS Roles, Responsibilities and Authorities



Roles	Responsibilities	Authorities
	<ul style="list-style-type: none"> - Promotes awareness of the QMS throughout the Operating Authority - Liaison for internal and external auditing process 	
<p>Director of Environmental Services</p>	<ul style="list-style-type: none"> - Plans, develops, recommends and implements strategies and goals to address service levels/standards of the City related to water distribution - Provides long-range operational and productivity objectives - Liaises with the Owner, staff, public and external agencies - Authorizes Committee and council reports, presentations and correspondence - Attends Council, general public, external agencies, other levels of government, etc. meetings as required - Approves the Overall Responsible Operator (ORO) - 	<ul style="list-style-type: none"> - Monitors expenditures and financial performance, ensuring cost effective service, maintenance management programs, technical studies - Oversees budget preparation and administration - Oversees Operating Authority staff - Owner’s Representative of the drinking water system
<p>Manager of Water Services</p>	<ul style="list-style-type: none"> - Required to act as Overall Responsible Operator, when necessary, if at least Class 2 Water Distribution licence is maintained - Managing activities for Environmental Services operations encompassing water - Administration of service contracts, equipment tenders, maintenance programming of water, budget preparation, preparing reports and recommendations - Participates on municipal committees and liaises with other levels of government - Assesses staffing needs and provides recommendations on staff selection, including the ORO designation 	<ul style="list-style-type: none"> - Implementation of service procedures and planning and establishing project priorities - Responds to and/or addresses inquiries from the public, Council, Contractors and City Staff

Table 9-2

QMS Roles, Responsibilities and Authorities



Roles	Responsibilities	Authorities
<p>Supervisor(s) of Water Operations</p>	<ul style="list-style-type: none"> - Primary acting ORO - Supervises water testing and corrective action in consultation with the Supervisor of Compliance and Training. - Creation of preventative maintenance programs and repair activities for all parts of the water distribution. - Prepares and maintain associated records, reports and paperwork. 	<ul style="list-style-type: none"> - Participates in inspections with MECP - Reviews and approves changes to Standard Operating Procedures and/or Activity Methods in consultation with the QMS Rep.
<p>Team Lead</p>	<ul style="list-style-type: none"> - Support the primary ORO and may be required to act as ORO when necessary at least Class 2 Water Distribution licence is maintained - Coordinates proactive and preventative maintenance programs of water distribution infrastructure including distribution mains, valves, hydrants, meters, chambers, bulk water stations, booster stations, water pumping stations in accordance with all provincial regulations in order to maximize the performance of the asset and maintain regulatory compliance of the water distribution system Collaborates with other divisions, departments and York Region to coordinate water distribution infrastructure projects/initiatives including planning, executing, monitoring, reporting and implementing continual improvement opportunities. - Maintains associated records, reports and paperwork. - Acts as Operator in Charge during applicable shift. 	<ul style="list-style-type: none"> - Oversees field operations including assisting with prioritizing and implementing approved operational and preventative maintenance programs applied to the water distribution infrastructure. - Oversees new main commissioning, capital project support and specialized maintenance activities.

Roles	Responsibilities	Authorities
Team Lead	<ul style="list-style-type: none"> - In consultation with the Supervisor, provides technical direction as required and oversees day to day activities of Water Operations staff including scheduling of work; enforcement of departmental procedures and programs, City health and safety practices, policies, procedures, and provincial acts and regulations - Investigates and troubleshoots water infrastructure maintenance issues and customer service concerns brought forward by residents, internal departments and external agencies 	
Water Operator OIT	<ul style="list-style-type: none"> - Assists with maintenance and repair of water works infrastructure including valves, pumps, hydrants, meters, chambers, and any other appurtenances - Performs water sampling activities and AWQI corrective actions with OIC oversight 	
Water Operator I	<ul style="list-style-type: none"> - Operator in Charge during applicable shift - Maintenance and repair of water works infrastructure including basic inspection duties involving valves, hydrants, meters, chambers, mains, service connections, etc. - Provides assistance in maintenance and repairs of water works infrastructure - Responds to SCADA alarms on site only - Completes associated paperwork - Performs water sampling activities and AWQI corrective actions 	

Table 9-2

QMS Roles, Responsibilities and Authorities



Roles	Responsibilities	Authorities
<p>Water Operator II</p>	<ul style="list-style-type: none"> - Support the primary ORO and may be required to act as ORO when necessary - Operator in Charge during applicable shift - Maintenance and repair of water works infrastructure including inspection duties involving hydrants, meters, chambers, pumping/booster stations, etc. - Responds to SCADA alarms on site only - Completes associated paperwork - Provides backup support to Team Lead - Performs water sampling activities and AWQI corrective actions 	
<p>Supervisor of Compliance and Training</p>	<ul style="list-style-type: none"> - Coordinates and maintains QMS - Ensures compliance initiatives, systems and programs are maintained - Supervises, tracks and monitors water sample collection program and reporting of corrective action for the Water section - Facilitates and conducts training sessions and opportunities - Completes annual budgeting for training opportunities - Liaises with MECP compliance officer and QMS auditors during inspections of water system - Reviews MECP web site for regulatory changes and informs appropriate City staff of changes - Prepares Annual Report, Summary Report and other 	<ul style="list-style-type: none"> - Recommends procedural changes to operating activities to ensure compliance with acts and regulations - Oversees Operator Certification tracking and license renewals to maintain operator licenses

Table 9-2

QMS Roles, Responsibilities and Authorities



Roles	Responsibilities	Authorities
DWQMS Coordinator	<p>pertinent reports to ensure compliance</p> <ul style="list-style-type: none"> - Schedules operator training and examinations - Maintains a data base to track status of operator licenses and associated records - Researches and compiles data for maintenance of QMS - Retrieve and compile records and information for MECP inspections and audits - Backup to clerk and technical staff responsible for scheduling, tracking and reporting of water samples 	<ul style="list-style-type: none"> - Reports AWQIs to MECP and York Public Health
Clerk Typist D	<ul style="list-style-type: none"> - Development of chains of custody, data entry, organization of sampling including monthly, quarterly, yearly, lead, adverse, new main, complaints and main breaks - Assists with adverse reporting, written notices, and resolutions - Uploads information and runs reports related to water samples 	<ul style="list-style-type: none"> - Reports AWQIs to MECP and York Public Health
Environmental Services Dispatch Coordinator	<ul style="list-style-type: none"> - Receives transferred calls (e.g., complaints) and Customer Relations Management (CRM) cases from Service Vaughan, related to the drinking water system - Generates and closes out CRM cases and work orders based on calls received - Contacts Water Operations Supervisor to have work assigned based on calls 	
Backflow Prevention Coordinator	<ul style="list-style-type: none"> - Responsible for leading the City's Backflow Prevention Program including the implementation and ongoing 	

Roles	Responsibilities	Authorities
<p>Backflow Prevention Coordinator</p>	<p>administration of the program, provide guidance on the installation/retrofitting on new and existing industrial, commercial, and institutional (ICI) and high-risk sites, and develop and update the backflow prevention by-law and associated forms</p> <ul style="list-style-type: none"> - Reviews engineering drawings, site servicing plans and inspections, various reports as well as managing the backflow prevention database to ensure compliance with the City's backflow prevention program - Engages ICI properties, businesses, and high-risk sites, and promotes public awareness about the backflow prevention program - Engage in regular surveillance with respect to compliance with the program and recommend measures to by-law enforcement and various stakeholders to ensure continual improvement 	
<p>Manager, Corporate Asset Management</p>	<ul style="list-style-type: none"> - May participate in the DWQMS Internal audit process, as required. - Prioritizes long-term Capital/renewal activities and preparation of 10-year Long-term Capital Plan. - Ensures up to date inventory of assets. - Completes asset assessment and condition assessment. - Maintains and updates Asset Management Plans. 	

10.0 Purpose

To document a procedure that identifies:

- a) competencies required for personnel performing duties directly affecting drinking water quality,
- b) activities to develop and maintain competencies for personnel performing duties directly affecting drinking water quality, and
- c) activities to ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water.

10.1 Procedure

Competencies

Supervisors and the Manager of Water Services are responsible for identifying required competencies for employees performing duties directly affecting drinking water quality. The minimum levels of competencies required for personnel with duties affecting drinking water quality are identified in Table 10-1 Competencies.

Table 10-01 indicates the skill level required for each position whose actions may have a direct impact on water quality. The following is a general description of the various competency levels:

- Competency Level 1 indicates a basic, theoretical level of understanding. Level 1 understanding is normally acquired through a combination of instruction, on-the-job training, and external training events.
- Level 2 indicates an intermediate, theoretical and working knowledge of a skill, typically acquired through theoretical/practical instruction, on-the-job experience, and/or participation in specialty workshops and training courses.
- Level 3 indicates advanced theoretical and working understanding of a particular subject area, particularly as it pertains to the person's responsibilities in the water distribution process. Level 3 is achieved through a combination of successful completion of a post-secondary degree or diploma (or equivalent in the water related field), at least 4 years of directly related on-the-job experience and/or participation in specialty workshops and training courses.

Job descriptions are managed by Human Resources and may be updated if determined as a requirement by either the employee, Supervisor, and/or Manager.

Competency is demonstrated by having appropriate education, training, skills and experience required for each relevant position.

There is a probationary period for new or transferred employees and, at the end of the probationary period, the Supervisor evaluates the employee's competency.

Competency for management positions is reviewed at least annually during performance reviews conducted by the employee's immediate Supervisor.

Training Needs Identification

Supervisors identify training needs for employees performing duties directly affecting drinking water quality based on the identified competencies.

The need for training (to ensure competency is maintained) may also be determined based on the following:

- Training requirements identified in O. Reg 128/04;
- Comparison of the employee's skills and abilities with the requirements of the job description and qualifications, in particular for new, temporary and transferred employees;
- Corrective action (e.g., resulting from internal audits or non-conformances) if the need for training is found to be a root cause (Element 21);
- Changes due to updates to the risk assessment outcomes (Element 8); and
- Changes in legislative/regulatory requirements.

Training needs are continually being reviewed based on regulatory changes, evaluation of existing programs, and operator suggestions.

Training needs may be identified through the Continual Improvement process (Element 21) and documented in a Corrective Action Report (CAR). For these training needs, the employee's Supervisor is responsible for ensuring the training is completed and competency is achieved and reporting it to the QMS Representative.

Training Plans

The Supervisors of Water Operations work together with Water Operators to identify training goals for their current operator licensing cycle.

Once complete, the Supervisor of Compliance and Training will review the proposed training plans and develop the training budget based on training needs.

The Supervisor of Compliance and Training and the DWQMS Coordinator meet during each year to plan out the training requirements necessary for licensed operators working in the City's drinking water system. Required competencies, the completed training from previous years, and availability and relevancy of courses are considered.

The DWQMS Coordinator records the completed training hours in a database for each Water Operator. These are maintained as per Element 5 Document and Records Control.

On-the-job training is provided to employees through courses and job shadowing and is determined to be effective when the Supervisor allows the employee to perform that function unassisted.

Employee DWQMS Orientation

The Manager of Water Services or Supervisor of Operations ensures a Drinking Water Quality Management Standard (DWQMS) awareness session is provided to new or transferred employees who will be performing duties which relate to the City's drinking water system. The following types of information are included in the DWQMS awareness session:

- Introduction to the Operational Plan and QMS Representative;
- Review of pertinent procedures and Standard Operating Procedures; and
- Review of QMS policy and ensuring that personnel are aware of the relevance of their duties and how they affect safe drinking water.

The DWQMS Coordinator records completion of the DWQMS awareness session in the employee's training matrix.

Training on the DWQMS Operational Plan will be provided to Water Operations staff at least once every calendar year by the Compliance and Training Division of the Environmental Services Department. Training will be documented on employee's training matrices.

Training Methods

Competency requirements can be satisfied through the use of in-house, off-site, or on-line training, attendance at seminars/conferences, presentations by subject matter experts or on-the-job training.

On-the-job training may include using a "job shadowing system" to demonstrate and monitor how to perform various job duties using the appropriate documented procedures.

Effectiveness of Training

When external trainers conduct courses, the trainer may review/verify training effectiveness through various means (e.g., mini quiz or mini workshops are undertaken for CEU courses). If the employee is knowledgeable and able to demonstrate the skills, then the external trainer may issue a certificate to indicate the training outcome was realized by the recipient.

The DWQMS Coordinator may periodically review externally provided courses as a means of determining training effectiveness and applicability. This may include making contact with staff who participated in the course to determine the effectiveness of the training. In addition, they may ask the instructor to provide feedback on the trainee's understanding of the information.

10.2 Associated Documents and Records

QMS-05 Procedure Document and Records Control
QMS-08 Risk Assessment Outcomes
QMS-21 Continual Improvement
Form 21-01 Corrective Action Report
Table 10-01 Drinking Water Related Competencies
Training Matrix
Training Plan Template

10.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	8	Added Revision history.
22-Mar-2023	9	Updated for minor wording and formatting changes.

Drinking Water Related Competencies										
	Director of Environmental Services	Manager of Water Services	Supervisor of Water Operations	Supervisor of Compliance and Training	DWQMS Coordinator(s)	Water Operator OIT	Water Operator I	Water Operator II	Back flow Prevention Coordinator	Team Lead
- "0" indicates competency not required - "1" indicates basic level of competence - "2" indicates intermediate level of competence - "3" indicates advanced level of competence										
MECP WD Licensing (level of licence required)	N/A	N/A	II	N/A	N/A	OIT	I	II	II	II
Technical Competencies										
Emergency Procedures	3	3	3	3	2	2	2	2	2	2
Technical Mathematics	1	2	2	2	1	1	1	2	2	2
Regulatory Requirements	3	3	3	3	3	2	2	2	2	2
Interpreting technical drawings	1	3	3	1	1	2	2	3	3	3
Sampling	0	3	2	2	1	3	3	3	1	3
Pumps/valves/pumping maintenance	0	3	3	1	0	2	2	3	3	3
Electrical Instrumentation/controls	0	2	3	1	0	1	1	2	1	2
Motor Controls	0	2	3	1	0	2	2	3	1	2
Confined Space Entry	0	2	3	0	0	3	3	3	3	3
Standard First Aid with CPR-C	2	2	2	2	2	2	2	2	2	2
Drinking Water Quality Management System	2	2	2	3	3	1	2	2	2	2
Behavioural Competencies										
Leadership Skills	3	3	3	3	1	0	1	2	2	2
Presentatation Skills	3	3	2	3	3	0	0	1	2	1
Word Processing (i.e. Microsoft Word, Microsoft Excel, etc.)	2	2	2	3	3	1	1	1	2	2
Verbal Communications	3	3	3	3	3	2	2	2	2	2
Written Communications	3	3	2	3	3	2	2	2	2	2
Other										
Budget Preparation/Analysis	3	3	3	3	2	0	0	0	1	1
Long Term Planning	3	3	3	3	2	0	1	1	2	2
Scheduling/Work Planning	3	3	3	3	2	1	1	2	3	3
Record Keeping (including operational logbooks and workorders)	2	2	3	3	3	1	1	2	3	3

11.0 Purpose

To document a procedure for ensuring that sufficient personnel, whom meet the competency requirements identified in QMS 10 as well as O. Reg 170/03 and O. Reg 128/04, are available for duties directly affecting drinking water quality.

11.1 Procedure

Overall Responsible Operator (ORO)

The Team Lead completes the Environmental Services Daily Work Schedule and On-call Notification Form which identifies the designated Overall Responsible Operator (ORO) for the week and the Operator in Charge (OIC) along with their appropriate contact numbers.

The OIC must hold a Class 1 licence or higher and 1 or more operators can be designated as OICs at any given time. An operator-in-training cannot be designated as OIC.

The ORO is approved by the Director of Environmental Services in consultation with the Manager of Water Services.

Standard Working Hours

Licensed Water Distribution Operators are available during the standard working hours, excluding statutory holidays (Monday to Friday from 7:00 am to 3:30 pm). Operator(s) may be designated to be on late or alternate shifts as required.

The Environmental Services Department provides an answering service Monday to Friday 8:30 am to 7:30 pm in the Joint Operations Centre. Service Vaughan, the City's Corporate Call Centre, provides an answering service from 8:30 am to 7:30 pm Monday to Friday. There is also a contracted external answering service from 7:30 pm to 8:30 am, Monday to Friday, and all day on weekends and statutory holidays. An on-call supervisor/manager is rotated weekly amongst the management team to support after hours requests.

Non-Standard Working/On-call hours

Service Vaughan and/or the contracted external answering service receive all non-standard working hours phone calls and contacts the On-call Manager/Supervisor.

The On-call Manager/Supervisor contacts the designated On-call Water Operator to respond to the service request.

Response Times

Circumstances permitting, staff should be able to respond within a reasonable time frame upon receiving the call from Environmental Services staff and/or Access Vaughan.

When responding to customer calls, City staff will follow the Service Vaughan Program, Citizen Service Standards to ensure that staff deliver high-quality services with efficiency, integrity, and pride, and to communicate effectively with our citizens, businesses, and each other.

Labour Disruptions

Non-Union Management staff, who are MECP licensed, can rotate as ORO and designate the OIC(s).

Non-Union Management staff may contact contractors to undertake work, to deliver necessary supplies and/or make them available for pick-up.

Qualified contractors are available to assist with regulatory requirements and can be located off-site to a designated satellite location.

Some Non-Union Management staff are available for operational maintenance for emergency and/or routine situations.

Business continuity plans are created and facilitated by the City's Emergency Planning Department.

11.2 Associated Documents and Records

QMS-10 Competencies
Environmental Services – Water Division Daily Work Schedule Form
On Call Notice Form
Citizen Service Standards

11.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	11	Added Revision history.
22-Mar-2023	12	Revised to update wording for late or alternate shifts for operators and minor wording revisions.
11-Jun-2024	13	Updated to Access Vaughan to Service Vaughan and updated Environmental Services Dispatch answering service to 8:30am to 7:30pm.

12.0 Purpose

To document a procedure for communications that describes how relevant aspects of the Quality Management System are communicated between Top Management and:

- a) the Owner;
- b) the Operating Authority personnel;
- c) Suppliers that have been identified as essential under Element 13 of the Quality Management System; and
- d) the Public.

This procedure does not include communication procedures used in Emergency situations. These are described in QMS-18 Procedure Emergency Management.

12.1 Procedure

Communication of QMS Policy

The QMS Policy is made available:

- on the City of Vaughan website,
- posted in the Joint Operations Centre,
- is available to the public upon request, and
- in procurement documents related to water services.

Communication Methodologies

Communication Between the Operating Authority/Top Management and the Owner (Council)

Communication to Council from the Operating Authority/Top Management is facilitated through the use of Council reports, Schedule 22 and Section 11 Annual Reports on the distribution system and water quality, briefing notes, information memos or presentations to Council. New Terms of Council are asked to re-endorse the Operational Plan.

Council can communicate directly to the Operating Authority/Top Management through formal Council meeting minutes and/or Council resolutions and confirming through a by-law. Council may also communicate through emails sent to the Deputy City Manager, Public Works or the Director of Environmental Services.

Communication Between Operating Authority Personnel

Top Management communicates to the Operating Authority personnel through meetings (i.e. Top Management to Managers, Managers to Supervisors, Supervisors to Staff), written documentation, emails, verbal discussions, training sessions, and circulation of applicable procedures and other QMS documentation.

Communication Between City of Vaughan and Suppliers

Communication to suppliers is done through the issuance of tenders, contracts and/or purchase orders. Operating Authority personnel may deal directly with suppliers through the use of LDM's or P-Cards. The QMS Policy and copies of specific standard operating procedures may be provided to Suppliers along with the purchase orders, contracts, and/or tender documents.

Communication from suppliers to Top Management (via City staff) can be through written correspondence, email, phone calls, and/or the procurement process.

Operating Authority personnel contact suppliers directly if problems occur with the supplier. A vendor performance record/evaluation can be created and filed with Procurement if concerns with their performance are realized.

Communications Between City of Vaughan and the Public

All non-emergency communication (related to QMS) to the public is facilitated through one or more of the following:

- newspaper notification and/or media advisories;
- hand delivered notices/door hangers;
- mobile signs;
- posting on the City of Vaughan website (e.g., annual reports, QMS Policy);
- coordination with York Region (i.e., outdoor water use restrictions); and/or
- outreach, educational activities, and targeted communication campaigns through special events and social media.

The public can communicate water related issues/queries through:

- calling the Service Vaughan call centre;
- calling Environmental Services Dispatch and/or contracted Answering Service (after business hours);
- e-mails sent to the City;
- e-mails and/or phone calls directly to Councillors and City staff; and/or
- letters.

Service Vaughan and Environmental Services Dispatch (Monday- Friday 8:30am-7:30pm) receive the majority of the water-related queries from the public. Queries that cannot be answered by Service Vaughan are directed to the Environmental Services Dispatch Coordinator(s). For larger scale or sensitive issues, Communications Marketing and Engagement may be contacted to assist in dealing with public communications. Water quality inquiries are tracked for the purposes of QMS Element 20 Management Review. A summary of these calls is provided during the Top Management Review Meeting.

12.2 Associated Documents and Records

QMS-05	Document and Records Control
QMS-13	Essential Supplies and Services
QMS-18	Emergency Management
QMS-20	Management Review

12.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	10	Added Revision history.
22-Mar-2023	11	Updated with minor wording revisions.
11-Jun-2024	12	Updated Access Vaughan to Service Vaughan and other minor wording updates.

13.0 Purpose

To document a procedure ensuring the quality of essential supplies and services, in as much as they may affect drinking water quality. The procedure shall include identification of these supplies and services and a means to ensure their procurement

13.1 Procedure

Procurement Process

The acquisition of goods and services related to the provision of drinking water is addressed by the Procurement Policy which is administered by the Procurement Department.

When required, specifications and/or certification of product requirements for supplies and services are requested by Environmental Services staff.

Procurement documents are created by the requestor in Environmental Services with the assistance of the Contract Services Division.

The Procurement Policy has price thresholds and thus some supplies (below the threshold) may be purchased directly by Environmental Services from local sources.

Some supplies are kept in stock (e.g., repair clamps, odd-sized pipes, etc.) and are available at the Joint Operations Centre.

A copy of the relevant procedures/specifications, a copy of the QMS Policy and general information regarding the presence of a QMS are included in procurement documents related to services that will potentially affect drinking water quality.

A vendor's list of approved contractors is contained in the Essential Supplies and Services Handbook. The QMS Representative is responsible for updating the handbook as changes are identified by Water Operations Staff. All chemicals and materials used in the alteration or operations of the drinking water system that come into contact with the water within the system shall meet all applicable standards (i.e. AWWA, NSF standards).

A list of contractors available during after hours and emergency situations is kept in the Essential Supplies and Services List. For the provision of supplies and/or services during emergency situations, the ORO can contact these contractors and, if they are unavailable, contractors on the vendor's list may be contacted.

Identification of Supplies & Services and Requirements

Form 13-01 Essential Supplies and Services for drinking water identifies the essential supplies and services critical to the provision of safe drinking water.

The form provides a description of the Procurement of Supplies or Services including:

- how to ensure it is available, when required
- how to ensure it is made available, when required (daily operations & emergencies)

The form also includes identification of the Quality Requirements:

- what requirements are needed related to quality of supply or service (e.g., product/service quality; performance of supplier/service provider; method of delivery; on-site activities)
- definition of how quality requirements are met

Monitoring Supplies and Services

Environmental Services ensures that the supplies and services meet the requirements and/or specifications identified in the documentation. The Team Lead or designated Operations staff ensure essential supplies are marked or tagged with the identified quality requirement. The quality requirement could also be documented on the packing slip upon receipt of the essential supply.

Any problems that are encountered regarding the supplies and/or services are documented and forwarded to the Procurement Services Department. Performance evaluation forms are provided by Procurement Services for suppliers and are required to be completed by Environmental Services through the course of an awarded contract.

An inventory of water meters is tracked by the Water Account Analysts. The Water Services Division maintains an inventory of clamps, valves, and other materials on a tracking spreadsheet.

13.2 Associated Documents and Records

Form 13-01 Essential Supplies and Services
Essential Supplies and Services List

13.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	7	Added Revision history.
22-Mar-2023	8	Updated for minor wording revisions.

Item Number	Essential Supply or Service	Procurement of Supplies or Services - how do you ensure it is available, when required - how do you ensure it is made available, when required (daily operations & emergencies)	Quality Requirements - what requirements are needed related to quality of supply or service (e.g., product/service quality; performance of supplier/service provider; method of delivery; on-site activities) - define how you make sure they are met
1	Repair clamps Valves Hydrants Pipe material (e.g., pipe fittings, pipes) Main stops	<ul style="list-style-type: none"> • Stock on hand (inventory) • Inventory re-stocked by Team Lead(s) using the supplies, as needed • Water Operations order themselves or notify the Water Co-ordinator as stock is taken to ensure replacement supplies • 24 hour access to Vaughan inventory and/or suppliers with access to most materials to ensure supplies for daily operations and emergencies • Vaughan Design Standards provided to key suppliers on an annual basis • Monthly P.O., P.O., Purchasing Card (P-Card), and/or LDM are used to procure supplies • Cooperation with local municipalities allows for material to be obtained from their inventory in an emergency situation 	<ul style="list-style-type: none"> • NSF/ANSI approved and provided from key supplier familiar with design and quality needs • 24 hour access to suppliers that have in-stock supplies • Team Lead(s) orders and/or ensures supplies and/or specifications and quality needs at delivery or prior to use • Water Operations staff can order and pick up supplies directly from supplier or have supplies delivered to JOC. Water Operations staff initial the packing slip which is forwarded with the P.O. to ensure what was ordered meets design specifications at delivery or prior to use • Water Operator(s) or Team Lead(s) that orders usually receives material to verify order or verifies based on the packing slip, P.O., tags, and /or stamps
2	Chlorine residual test kits	<ul style="list-style-type: none"> • Clerk Typist D orders supplies (e.g., pillows, bottles) as required to maintain supplies • Access to local suppliers for regular or rush pick up/delivery 	<ul style="list-style-type: none"> • Rush delivery/pick-up available • Clerk Typist D orders supplies from supplier catalogue and previous supplies • Clerk Typist D verifies order has been filled with required material
3	Tools to open/close valves	<ul style="list-style-type: none"> • Extras kept at JOC for emergencies and replenished if needed • Provided by local suppliers based on Water Operation's needs 	<ul style="list-style-type: none"> • Use suppliers that provide quality material • Purchased by Team Lead(s) or picked up by Water Operator(s) directly
4	Liquid chlorine (12%)	<ul style="list-style-type: none"> • Kept in stock at the JOC • Obtained from local suppliers 	<ul style="list-style-type: none"> • Can be obtained on a 24 hour basis
5	Calibrations	<ul style="list-style-type: none"> • Hach DR300 Chlorine Instruments, pH portable meter and probe, PS241 units (multi gas detectors) • Calibration scheduled or companies informed when equipment needs to be calibrated by the Team Lead(s) 	<ul style="list-style-type: none"> • Calibrated to meet manufacturer/equipment specification • Team Lead(s) informs the Clerk D Typist to set up calibration, when required
6	Verifications	<ul style="list-style-type: none"> • Hach DR300 Chlorine Instruments, pH portable meter and probe, PS241 units (multi gas detectors)- bump test prior to each use. • Team Lead(s) or designated Operator conduct verification where applicable 	<ul style="list-style-type: none"> • Verified to meet manufacturer/equipment specifications. • Team Lead(s) perform verification based on defined frequency according to manufacturer/equipment specifications and document verification response where appropriate
7	Laboratory Services	<ul style="list-style-type: none"> • MECP endorsed, accredited authority to provide laboratory services as required through O.Reg 170. • Operational hours and after-hour services available 	<ul style="list-style-type: none"> • Accredited Laboratory through Standards Council of Canada • Certificate of accreditation • MECP Laboratory Services Notification Schedule 6 (Subsection 6-9(4))
8	Emergency Services	<ul style="list-style-type: none"> • Main breaks, valve repairs, Booster stations (SCADA alarms) • Main breaks and valve repairs are retained by contract. Contract for booster stations. 	<ul style="list-style-type: none"> • Contracts for main breaks and valve repair must meet tender requirements at a minimum • Able to supply 24 hour service
9	Drinking Water Supplied by York Region	<ul style="list-style-type: none"> • Vaughan purchases its drinking water from York Region who is the wholesale supplier to the City of Vaughan. This water is sourced from Lake Ontario by the City of Toronto and the Peel Region, and is already treated for domestic consumption by the time Vaughan has received it. • The City of Toronto operates four (4) water treatment plants using Lake Ontario as a raw water source. • The City initiates the Environmental Services Water Distribution Emergency Plan in the case of an emergency to ensure a safe, potable, and dependable water supply, without any disruptions in service or quality 	<ul style="list-style-type: none"> • City of Vaughan and York Region conduct sampling and testing of drinking water in accordance of Ontario Regulation 170/03 of the <i>Safe Drinking Water Act</i> and send samples for analysis to an MECP-accredited drinking water laboratory. • Communication with York Region Water Operations on water quality trending, service disruptions, etc.

14.0 Purpose

To ensure the adequacy of the infrastructure necessary to operate and maintain the Vaughan Water Distribution System is reviewed at least once every calendar year.

14.1 Procedure

Review and provision of the City of Vaughan's drinking water infrastructure is achieved through reviewing existing infrastructure and planning for new infrastructure.

Existing Infrastructure

Planning for water infrastructure construction, replacement, repair, and/or upgrades is undertaken by Infrastructure Planning and Corporate Asset Management in consultation with Infrastructure Delivery and Environmental Services Departments and results in the development of a running 10-year Capital Plan.

Infrastructure Delivery and Environmental Services conduct an annual review of the capital projects under consideration for the following calendar year. At which time, the risk assessment outcomes documented in Form 08-01 are considered as part of the planning process as well as location-based operational considerations (for example, watermain break history). The outcome of this annual review assists Infrastructure Delivery in prioritizing capital projects and is documented through Meeting Minutes which are shared with Environmental Services.

The running 10-year Capital Plan is provided to Council yearly as part of the annual budget process.

With the requirement of Asset Management Plans for core assets (roads, bridges and culverts, water, wastewater and stormwater management systems), there is a strong connection between the Infrastructure Planning and Corporate Asset Management Department, Infrastructure Delivery Department, and Environmental Services Department. The Asset Management Plan will help drive water infrastructure planning in future years by using a risk-based framework to determine when assets should be replaced.

New Infrastructure

The review process for new infrastructure is primarily driven by Development Engineering and Infrastructure Planning and Corporate Asset Management.

The following plans document growth-related drinking water infrastructure needs:

- Official Plan (OP)
- Master Servicing Studies (MSS)

The OP focuses on population projections, land use and infrastructure development policies.

MSS are completed by Infrastructure Planning and Corporate Asset Management in order to determine the specific needs and timing for drinking water infrastructure to support growth in the project area.

Environmental Services reviews drawings to support operational needs (e.g., valves at boundaries, hydrants, etc.).

Any road reconstruction projects being completed by York Region are also considered to help identify priority projects.

The Manager of Water Services is notified of the projects that were determined to not be a priority for the year. Projects that were removed can be rescheduled for the following year.

14.2 Associated Documents and Records

Capital Planning Documents
Form 08-01 Drinking Water Risk Assessment

14.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	9	Added Revision history.
23-Mar-2023	10	Revised to incorporate minor wording changes.
11-Jun-2024	11	Revised to incorporate minor wording changes.

15.0 Purpose

To document a procedure for infrastructure maintenance, rehabilitation and renewal programs for the drinking water system and a long term forecast of major infrastructure maintenance, rehabilitation and renewal activities.

15.1 Procedure

Booster and Pressure Elevating Stations - Preventative Maintenance

Both stations are checked by Certified Water Operators and maintenance activities are undertaken by City staff or a Contractor. If required, contractors are asked to submit their Drinking Water Licence under O. Reg 128/04.

Using the work order system, Environmental Services' Administrative Staff and the Team Lead schedule maintenance activities based on manufacturer recommendations, industry best practices, and legislation.

Preventative maintenance activities for the Booster and Pressure Elevating Stations are tracked on Form 15-01 Operation and Maintenance Schedule. The form shows the activity description, frequency at which the activity is to be completed, the responsible designate, and the tracking method (i.e. work order, spreadsheet, etc.).

Booster and Pressure Elevating Stations - Unplanned Maintenance

Unplanned maintenance activities may be identified by the Contractor if noticed during preventative maintenance work. The City may also identify the need for maintenance during regular station inspections.

The Contractor and/or City Operator communicate the maintenance needs (including minor and major repairs) to the Supervisor(s) of Water Operations.

The Supervisor(s) of Water Operations determines how to complete the work and informs the Contractor.

Other Infrastructure - Preventative Maintenance

Hydrant Maintenance and Valve Turning

The Supervisor of Water Operations sets up overall programs for hydrant maintenance, flushing and valve turning to meet AWWA standards and/or industry best practices.

Hydrant maintenance and valve turning are completed by a Contractor.

Environmental Services' Water Services Division develops a spreadsheet for the hydrant maintenance and valve turning schedules. The spreadsheets are provided to the Contractor on an annual basis and they update the spreadsheet as the maintenance is completed.

As part of the hydrant maintenance program, pressure tests are performed and are reported back to the Water Services Division for tracking and analysis.

Pressure Relief valves (PRVs) and Air relief Valves

Regular inspection of the 16 PRVs have been initiated through support of a contractor with any resulting identified repairs being made at that time. Similarly, internal staff have inspected the 30 air relief valves in the system and continue to make required repairs resulting from the inspection.

Anti-Stagnation Valves

Annual inspection of the 18 valves has been initiated through the support of a contractor. This will help improve water quality in dead end areas (across zone valves).

Preventative maintenance activities conducted by both the City staff and Contractors are tracked on Form 15-01 Operation and Maintenance Schedule.

Other Infrastructure - Unplanned Maintenance

The Environmental Services Department's Water Procedures Manual contains Standard Operating Procedures to guide City Operators when completing maintenance activities.

Hydrant Repairs

Environmental Services' Coordinator and/or Dispatch Coordinator receive requests for hydrant repairs and creates a work order that is assigned to the Water Services Division. Vaughan Fire and Rescue Services is notified of the requested repair and when the hydrant will be out of service.

Environmental Services' Coordinator and/or Dispatch Coordinator also notify Vaughan Fire and Rescue Services when the hydrant is back in service or if further repairs are required.

Completed work orders are recorded in Environmental Services' Work Order Management System.

Watermain Repairs

Environmental Services' Coordinator and/or Dispatch Coordinator receives calls from Access Vaughan regarding suspected watermain breaks. The Water Services' Division is notified, and a work order is created to repair the watermain break.

Watermain breaks are repaired by contractors. An Operator contacts the contractor and fills out Appendix C: Watermain Shutdown Report for a main break repair.

Completed work orders are recorded in Environmental Services' Work Order Management System. A log of watermain breaks is maintained by the Water Services Division and this information is shared at the annual Management Review meeting.

Maintenance programs are communicated to Top Management and the Owner through the meeting minutes of the Management Review (Form 20-01). The meeting minutes are shared with the Owner.

Effectiveness of Maintenance

The effectiveness of maintenance is reviewed by the Supervisor(s) of Water Operations and the Manager of Water Services. The Manager of Water Services meets with the Supervisor(s) of Water Operations regularly to track completed maintenance activities and plan for upcoming activities.

The Manager of Water Services meets with the Supervisor(s) of Water Operations monthly. The number of valves requiring repairs, the number of hydrants repaired, and infrastructure repairs completed are among the items discussed during the monthly meetings.

The Water Services' Division Leadership Team meets monthly to discuss status of operations and upcoming planned maintenance. The Leadership team consists of the Team Lead(s), Supervisor of Water Operation(s), and Manager of Water Services.

On a regular basis, metrics related to water operations are documented, visually displayed and discussed with all staff.

Renewal

Renewal infrastructure needs are based on repair history, pipe material, and age.

For renewal projects, water modelling is used to consider projected growth and determine if upsizing of watermain is required in the area. If upsizing of the watermain is recommended, then Development Engineering, Infrastructure Planning and Corporate Asset Management, and Infrastructure Delivery work with Environmental Services' Business and Operational Support Division to complete modelling to determine the demand basis.

Development Engineering, Infrastructure Planning and Corporate Asset Management, and Infrastructure Delivery identify new roads projects and discussions are held with Environmental Services to determine if the watermain under these roads require renewal.

If the road is not being replaced then Environmental Services could undertake the project as stand-alone otherwise, this work is prioritized through Infrastructure Planning and Corporate Asset Management's running 10-year Capital Plan as outlined in QMS-14.

If road work associated with the watermain renewal is not completed during the year, then the project is automatically carried forward to the following year but Environmental Services is consulted to determine if that watermain renewal is still a priority.

Rehabilitation

Rehabilitation needs are assessed by the review of watermain break history, Capital projects prioritization as outlined in QMS-14, field observations, and best management practices where applicable.

Environmental Services and Infrastructure Delivery will determine if the project will be completed as a stand-alone project or with Infrastructure Delivery as part of a road project.

Long-Term Forecast Review

At least once every calendar year, the running 10-year Capital Plan will be reviewed as part of the annual budgeting process. During this time, priority capital projects for the Vaughan Distribution System are identified for the next ten (10) years.

The Financial Services Department coordinates budget meetings with City staff to discuss this process.

15.2 Associated Documents and Records

Environmental Services Division Water Procedures Manual
Work Order Management System
Form 15-01 Operation and Maintenance Schedule
Appendix C: Watermain Shutdown Report
QMS-14 Review and Provision of Infrastructure

15.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	10	Added Revision history.
22-Mar-2023	11	Update to current system information for number of PRVs and ASVs. Minor wording updates.

Activity	Location	Frequency of Maintenance	Responsible Designate	Tracking Method (i.e. WO, spreadsheet, etc.)
Maplewood Booster Station Inspection	Maplewood Booster Station	Bi-weekly	City of Vaughan Water Operations	Work order
Woodland Acres Pressure Elevating Station Inspection	Woodland Acres Pressure Elevating Station	Bi-weekly	City of Vaughan Water Operations	Work order
Generator Run Tests	Maplewood Booster Station	Monthly	City of Vaughan Water Operations	Work order
Dead- end Flushing (locations tracked by Water Operations, archived by Compliance)	Various locations throughout the Vaughan Distribution System	Quarterly	City of Vaughan Water Operations	Spreadsheet
Hydrant Maintenance	Various locations throughout the Vaughan Distribution System	Annually	Contractor and City of Vaughan Water Operations	Spreadsheet and Work order
Anti-Stagnation Valves	Various locations throughout the Vaughan Distribution System	Annually	Contractor and City of Vaughan Water Operations	Spreadsheet and Work order
Pressure Reducing Valves (PRV)	Various locations throughout the Vaughan Distribution System	Annually	Contractor and City of Vaughan Water Operations	Spreadsheet and Work order
Air-Relief Valves	Various locations throughout the Vaughan Distribution System	Annually	Contractor and City of Vaughan Water Operations	Spreadsheet and Work order
Valve Exercising	Various locations throughout the Vaughan Distribution System	Annually	Contractor and City of Vaughan Water Operations	Spreadsheet and Work order
Dead-end Flushing (locations tracked by Water Operations, archived by Compliance)	Various locations throughout the Vaughan Distribution System	Annually	City of Vaughan Water Operations	Spreadsheets

16.0 Purpose

To document a procedure for sampling, testing and monitoring activities completed for drinking water quality. The procedure describes how the sampling, testing and monitoring results are recorded and shared with the Owner, where applicable.

16.1 Procedure

Sampling & Testing

Sampling, testing, and monitoring is completed on the City's water distribution system to:

- Ensure compliance with applicable Ontario Drinking Water Regulations;
- Ensure water quality is maintained as water travels through the distribution system;
- Identify trends in water quality and emerging issues; and
- Provide Water Operators with knowledge required to proactively operate the drinking water system.

For the purposes of this procedure, "sampling" is defined as the process of collecting drinking water samples for laboratory analysis, and "testing" is the laboratory analysis.

To further ensure disinfection throughout the distribution network, Operators collect water samples at various points for microbiological analyses, chlorine residuals on site, turbidity, NDMA, Nitrate/Nitrite, Haloacetic Acids (HAA), Trihalomethanes (THM), lead, sodium, and inorganic parameters per O. Reg. 170/03.

These samples are taken at various locations throughout the system to ensure all areas of the distribution system are represented.

The sampling points and corresponding analyses are listed on the chain of custody form (which track the sample from the point of collection to the lab for analysis). The Water Operator who obtained the sample is also recorded on the form.

The number of samples taken per month is determined by O. Reg. 170/03.

The Clerk Typist is responsible for the organization of the monthly, quarterly, yearly and lead sampling and for generating the chain of custody forms.

The sampling frequency (monthly, quarterly, semi-annual, yearly) for the various parameters is determined by the regulatory requirements under O. Reg. 170/03.

The protocols for collecting and handling water samples are provided in the Standard Operating Procedures/Activity Method.

The Supervisor of Compliance and Training is responsible for reviewing the water quality sampling program for changes required to the water quality parameters, sampling frequency and sampling locations.

The DWQMS Coordinators and Clerk Typist are responsible for updating the sampling schedule based on this review.

Sampling & Testing Results

A Ministry of the Environment, Conservation and Parks (MECP) accredited laboratory receives all drinking water samples and conducts the sample analysis. Analytical results are compared to the MECP's Ontario Drinking Water Standards (ODWS, O. Reg. 169/03). The Supervisor of Compliance and Training reviews the analytical results as they are released. The results are compiled annually and listed along with the Maximum Acceptable Concentration (based on the ODWS) and City limits (min, max, average) for each parameter that is tested. Per regulatory requirements, this information is posted on the City's website each year.

All results are uploaded into an external database by the lab and the Clerk Typist manually enters chlorine residuals into the external database.

Adverse Water Quality Incidents (AWQI's) related to microbiological or lead are identified through lab notification. Low chlorine events can be identified by Water Operations staff. Should the analytical results indicate an adverse condition, the AWQI Procedure in the Environmental Services Department's Water Procedures Manual will be followed.

Sampling and testing records are managed in accordance with QMS-05 (Document and Record Control System Procedure).

Monitoring

The Maplewood Booster Station and the Woodland Acres Pressure Elevating Station are directly linked to a City owned and operated Supervisory, Control and Data Acquisition (SCADA) system. The system will instantaneously notify the SCADA Technician during regular business hours of any occurrences requiring attention. The SCADA Technician will work with Environmental Services' Managers and Supervisors to send out Operators to take corrective action. The SCADA system notifies the On-call Supervisor/Manager directly should an alarm be triggered after hours.

As a backup, the Maplewood Booster Station and the Woodland Acres Pressure Elevating Station are directly linked to alarm dialers that instantaneously contact the SCADA Technician during regular business hours and the on-call Supervisor/Manager after hours. City of Vaughan operators are dispatched to take corrective action for maintenance and/or repair.

For additional monitoring, the City completes a review of York Region's, Peel Region's, and City of Toronto's Annual Water Quality Reports, once issued, to understand operational trends and, if required, communicate with York Region for further clarification. Any observed trends are documented at the Quarterly DWQMS Action Item meetings with the QMS Representative and the DWQMS Coordinator(s).

Reporting to the Owner

In accordance with relevant legislation, Annual Drinking Water System Summary Reports, including sampling results, are provided to Council and posted on the City of Vaughan's website on an annual basis.

16.2 Associated Documents and Records

QMS-05 Document and Records Control
Environmental Services Division Water Procedures Manual
Ontario Regulation 169/03
Ontario Regulation 170/03

16.3 Revision History

Date	Revision #	Reason for Revision
29-Mar-2022	10	Added Revision history. Added monitoring of York Region, Peel Region, and Toronto Water Quality Reports for trending purposes.
22-Mar-2023	11	Updated with minor wording revisions.

17.0 Purpose

To document the calibration and maintenance of measurement and recording equipment used for to ensure drinking water quality.

17.1 Procedure

Calibration and Maintenance Frequency and Schedule

Measurement and recording equipment (i.e. chlorine residual test kits, pH meters, etc.) are recorded on Form 17-01 and are maintained and calibrated as per equipment manufacturer's specifications or as required by O. Reg. 170/03; whichever is more frequent.

All external parties providing calibration/maintenance and/or testing shall be accredited should their service involve usage of measurement equipment. The City will request the external party to provide a copy of their accreditation to keep on file.

The frequency and responsibility for calibration and maintenance of each equipment type is summarized on Form 17-01.

The Team Lead of the Water Services Division is responsible for ensuring that the calibration is undertaken and the applicable forms are completed for in-house calibration and maintenance or the designated outside contractor.

Contractors who are permitted to adjust settings (i.e. on generators, sump pump alarms) and/or calibrate flow and magnetic flow meters, can only do so when approved by the City and when witnessed by a City Water Operator.

Calibration/Maintenance Verification

The equipment calibrated in-house is identified and tracked by the Team Lead from the Water Services Division on the applicable forms identified in section 17.2.

The Team Lead from the Water Services Division files a copy of the logs of the maintenance and calibration as per QMS-05 Document and Records Control Procedure.

The Team Lead from the Water Services Division reviews the calibration and maintenance schedules to ensure the information is updated.

17.2 Associated Documents and Records

QMS-05 Document and Records Control
Form 17-01 Measurement & Recording Equipment Maintenance & Calibration Schedule
Schedule for Calibration of Pocket Colorimeters (chlorine kits) form
pH Meter Calibration Schedule form
Water Operations Calibration Inventory- Equipment/Solutions

17.3 Revision History

Date	Revision #	Reason for Revision
29-Mar-2022	5	Added Revision history. Added accreditation requirement for services involving usage of measurement equipment.
22-Mar-2023	6	Updated with minor wording revisions.

**MEASUREMENT & RECORDING EQUIPMENT
MAINTENANCE & CALIBRATION/VERIFICATION SCHEDULE**



Equipment Description	Reference Number / Serial Number	Calibration/ Verification Frequency	Tracking method for Calibration/ Verification	Outside Contractor or Calibrated In-house
HACH – HQ11d- pH Portable Meter (4) and, HACH – IntelliCAL -pH, PHC101 Probe (4)	Unit #1: Meter- 080200018407 Probe- 140912567008 Unit #2: Meter- 080200017751 Probe- 180802567050 Unit #3: Meter- 070800011796 Probe- 170762568023 Unit #4: Meter- 080200017735 Probe- 200772561271	Calibration: at least two times per year	✓ pH Meter Calibration Form completed by Team Lead ✓ Calendar reminder	Calibrated In-house by Team Lead
DR300 Chlorine Instruments (22 units)	20030A003279 20030A003441 20030A003258 20030A003467 20030A003260 20030A003253 20030A003278 20030A003267 20030A003268 20030A003457 20030A003271 20030A003265 20030A003451 20030A003270 20030A003277 20030A003445 20030A004516 20030A003272 20030A004535 19090A003136 20030A003439 19090A002079	Verification: Monthly	✓ Appendix W- Verification of Instrument Response completed by Team Lead ✓ Calendar reminder	Verified In-house by Team Lead Calibrated by outside contractor

**MEASUREMENT & RECORDING EQUIPMENT
MAINTENANCE & CALIBRATION/VERIFICATION SCHEDULE**



Equipment Description	Reference Number / Serial Number	Calibration/ Verification Frequency	Tracking method for Calibration/ Verification	Outside Contractor or Calibrated In-house
Gas Measurement Instruments (GMI) Ltd.- MSA – Altair 4XR (6 units PS241 Multi Gas Detector Units (2 units)	248366 309154 309155 316705 316739 284385 211065 209846	Calibration: At least once every year Verification: Bump test completed before each use.	✓ Unit is tagged with calibration dates ✓ Calendar reminder ✓ Bump tests logged in operator logbook	Outside contractor
Backflow Pressure Differential Gauge (Watts)	Model TK99E 0-200PSI	Serial Number 670164 TP18-036	Calibration: Annually	✓ Work Order Outside contractor

18.0 Purpose

The purpose of this procedure is to document how we maintain a state of emergency preparedness, including:

- a) a list of potential emergency situations or service interruptions;
- b) processes for emergency response & recovery;
- c) emergency response training & testing requirements;
- d) Owner & Operating Authority responsibilities during emergency situations;
- e) references to municipal emergency planning measures; and
- f) emergency communication protocol and up-to-date list of emergency contacts.

18.1 Procedure

Identification of Emergency Situations or Service Interruptions

During the Management Review Meeting, the results of relevant emergency response testing are discussed to determine if staff require further training for a particular emergency.

In addition, during the risk assessment process, outcomes are identified which may include some emergency situations or service interruptions. This is another opportunity where the re-assessment process may identify emergency situations or service interruptions that can be considered for future emergency response testing.

The QMS Representative is responsible for maintaining and updating the potential emergency situations or service interruptions.

Process for Emergency Response and Recovery

Specific instructions for responding to emergencies, including emergency situations that have the potential to result in acute drinking water health risks, are included in the Environmental Services Department's Water Procedures Manual which each Operator possesses.

The QMS Representative is responsible for ensuring that the Standard Operating Procedures (SOPs) are evaluated and modified based on recommendations from training, mock scenarios, or incident debriefings. The following are considered emergency response SOPs:

- 2340621 - Watermain Repair
- 2340663 - Booster Station Repair
- Operational - Reporting Adverse Water Quality Incidents Procedure

The SOPs outline the roles and responsibilities for various staff and the activities related to the response and recovery from the emergency situation or service interruption.

The Water Services Division is an on-call, 24-hour service to ensure that a qualified staff member will attend and assess any water emergency.

The ORO is designated to be responsible for overall management, decision-making, and communications during an emergency. In the event the ORO is unavailable, the Director of Environmental Services, or designate, shall be notified.

The Director of Environmental Services is responsible for contacting the Communications Marketing and Engagement Department for emergencies that have escalated to a corporate level of response.

In the event of a situation occurring greater than an AWQI or typical watermain break, the City of Vaughan Corporate Emergency Plan will be implemented. The Manager of Emergency Planning from Vaughan Fire and Rescue Services is the owner of the City's Emergency Plan.

The Corporate Emergency Plan outlines communication procedures during emergency situations and the roles and responsibilities of the Owner and appropriate Water Division staff depending upon the level of emergency. Annual testing of the City's Corporate Emergency Plan is coordinated by the Manager of Emergency Planning and may involve a water-related emergency.

Emergency Response Training and Testing Requirements

All Water Operators shall receive general emergency response training every two (2) years. Testing of Operator's awareness of emergency response SOPs may be in the form of desktop exercises and/or mock scenarios. The training is tracked by the DWQMS Coordinator on each Operator's training matrix.

This training shall include, but is not limited to, a review of emergency response SOPs and a discussion of emergencies that have occurred since the previous training.

The Supervisor of Compliance and Training, Supervisor of Water Operations, and/or DWQMS Coordinator are responsible for ensuring that emergency response training is undertaken by appropriate staff.

In addition, a debriefing after larger scale emergencies may be undertaken by the Manager of Water Services and may include the Director of Environmental Services, Supervisors of Water Operations, QMS Representative, and/or other applicable staff.

18.2 Associated Documents and Records

QMS-7 Risk Assessment
QMS-10 Competencies
QMS-20 Management Review
Environmental Services Division Water Procedures Manual
City of Vaughan Corporate Emergency Plan

18.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	6	Added Revision history.
22-Mar-2023	7	Updated for minor wording revisions.
11-June-2024	8	Updated for minor wording revisions.

19.0 Purpose

To document the procedure for internal audits that:

- Evaluates conformity of the QMS with the requirements of the DWQMS;
- Identifies internal audit criteria, frequency, scope, methodology and record keeping requirements;
- Considers previous internal and external audit results; and
- Describes how the QMS corrective actions are identified and initiated.

19.1 Procedure

Audit Team Structure and Roles

The audit team contains:

- The **QMS Representative** acts as a liaison between the auditors and the auditees.
- The **Auditors** who are responsible for performing the internal audit of a specified element or process and computing the audit report.

Auditor Qualifications and Selection

The Auditors must meet the following criteria:

- Have knowledge of the DWQMS and Vaughan's drinking water QMS;
- Be independent of the work that is going to be audited;
- Have the ability to make objective observations and record the results; and
- Have successfully completed auditor training

Audit Process

Schedule

Each element of the QMS for the drinking water system must be audited a minimum of once every calendar year. Additional audits can be scheduled based on the importance of the process or area, or in response to previous audits results (internal and external). Typically, the internal audit focuses on the previous calendar year.

If the audit is being conducted in-house by City of Vaughan staff, the QMS Representative creates an Internal Audit Schedule using Form 19-01, with assistance from the Auditors. The QMS Representative forwards the Audit Schedule to the Manager and Supervisors of the areas being audited. If a third-party is conducting the audit, the Auditor(s) will provide the schedule and the QMS Representative will review with the appropriate staff.

Checklist

The QMS Representative and Auditors prepare the Internal Audit Checklist (Form 19-02) or other similar document that records questions asked and elements verified if the audit is being conducted in-house by City of Vaughan staff. The checklist defines the scope

(i.e., applicable area of the QMS, time period to be audited, organizational unit and/or facility) and audit criteria (i.e., applicable manuals and standards).

The checklist reflects the current policies and procedures of the area that are being audited. A copy of the procedures with the points highlighted that are going to be checked can be attached to the checklist and referenced for the audit.

Opening Meeting

An opening meeting may be held before the audit is conducted. The people present would be the Audit Team and the personnel responsible for the area to be audited. Other employees to be interviewed during the audit can be included in the meeting.

The opening meeting includes the following agenda:

- audit team introductions;
- review of the objective and scope of the audit;
- discussion of the method of conducting and communicating the audit; and
- clarification of the schedule and availability of staff for the audit.

Audit

The audit is performed by the Auditors using the Internal Audit Checklist Form 19-02 or applicable document(s). Observations that provide evidence of conformance or nonconformance are noted by the Auditor and shared with participating staff.

Audit Findings

The results of the audit are reviewed by the Audit Team. Agreement is reached under the leadership of the QMS Representative. The Audit Team completes the summary of findings on the Audit Report Form 19-03 or similar document.

The DWQMS Coordinator(s) records nonconformances from the internal audits on Nonconformance Report (NCR) Form 19-04 which records:

- Audit report number;
- Report date; and
- Brief description of nonconformance.

The DWQMS Coordinator(s) tracks the internal audit nonconformances by recording the NCR number in the Non-conformance Report Log Form 19-05. The QMS Representative can choose to not agree with a Non-conformance. Once issued, the QMS Representative and DWQMS Coordinator(s) will proceed to follow the requirements for corrective actions under QMS-21 Continual Improvement Procedure.

Closing Meeting

The results of the audit are presented at the closing meeting, if one is held. At a minimum the Supervisor responsible for the area audited and the Audit Team would attend.

The closing meeting will include the following:

- thank the staff for their cooperation;
- review the commendable features;
- review documented observations – what is effective, what needs improvement and what is unsatisfactory;
- ensure the issue is understood and get agreement on a response date for the Corrective Action for each finding or NCR with the person responsible for the area audited; and
- Record the NCR number on the Audit Report to ensure audit results are understood, if applicable.

Audit Report

The Auditor(s) will compile their findings in an audit report which will be shared with participating staff. Corrective Actions that may be issued during the audit will be documented by the DWQMS Coordinator per QMS-21 Continual Improvement procedure.

A copy of the report is given to the Director of Environmental Services, Manager of Water Services, Supervisors of Water Operations, and the QMS Representative; the original is kept by the Audit Team and used for follow-up. The report is filed according to QMS-05 Procedure Document and Records Control.

Audit Follow-up and Review

For all accepted NCR's, the Auditors verify that the action has been taken and that it is effective. The results of the follow-up are recorded by the DWQMS Coordinator on the NCR Log (including the date closed).

The results of the internal audits and the follow up audits are reviewed by management at the Management Review Meeting as per QMS-20 (Management Review) or more frequently, if required.

If the internal audit is outsourced to a professional third party experienced in DWQMS audits, they would be using their own documentation to plan the audit and report on the findings.

19.2 Associated Documents and Records

Form 19-01	Annual Internal Audit Schedule
Form 19-02	Internal Audit Checklist
Form 19-03	Internal Audit Report
Form 19-04	Nonconformance Report
Form 19-05	Nonconformance Report Log
QMS-05	Document and Records Control
QMS-20	Management Review
QMS-21	Continual Improvement

19.3 Revision History

Date	Revision #	Reason for Revision
24-Mar-2022	6	Added Revision history. Added reference to QMS-21 Continual Improvement procedure to link corrective action requirements for identified non-conformances.
22-Mar-2023	7	Updated with minor wording revisions.



City of Vaughan - Environmental Services Internal Audit of the QMS

Auditor Assigned	Auditee Name	Date	Time Reqd (hrs)	Time	Location	DWQMS ELEMENT TO AUDIT																				
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

INTERNAL AUDIT CHECKLIST

Process / DWQMS Element:	Page of
Scope & Audit Criteria:	
Date of Audit:	
Person Responsible for the Area:	
Audit Team Member(s):	

OK = Satisfactory Response

U = Unsatisfactory Response (may result in nonconformance report or corrective action)

NI = Needs improvement – observation or suggestion

Ref.#	Procedure/Question	OK	U	NI	Comments

INTERNAL AUDIT REPORT

Procedure Section:	Audit Report #	Date of Audit:
Audit Scope & Objectives:		
Person Responsible for Area Audited:		
Auditor Team Member(s):		
Attended Opening Meeting (if applicable):	Attended Closing Meeting:	

Commendations – summary of activity that is in conformance or other points that are well done.
Summary of Audit Findings
Corrective Action Reports Issued:
Suggestion for next audit
Result of Audit () OK () Not OK - if not OK state date of follow up audit:
Result of Follow-Up Audit (if applicable) () OK () Not OK – state action to be taken

_____ Date _____
 Audit Team Member(s)

Distributed to: _____

NON-CONFORMANCE REPORT LOG

NCR#	Description of Situation	Action Taken	Date Issued	Date Closed	Time to Resolve	CAR#/PAR# if applies

NCR = Nonconformance Report CAR = Corrective Action Report PAR = Preventive Action Report

20.0 Purpose

To document the procedure for describing how the QMS will ensure its continuing suitability, adequacy and effectiveness. To ensure the necessary information is collected for Top Management to review and to provide review output of any decisions and actions related to the QMS and maintain records of the reviews.

20.1 Procedure

Management Review

A Management Review will be held at least once every calendar year by Top Management to review the overall suitability, adequacy and effectiveness of the QMS. At a minimum, Top Management and the QMS Representative must be in attendance to hold the meeting.

The QMS Representative is responsible for:

- establishing the date for the Management Review meeting;
- forwarding notification of the meeting to participants; and
- forwarding the agenda for the meeting to the participants.

Management Review Input

Top Management will review information in the agenda on Form 20-01, where applicable on:

- a) Annual review of the QMS 02- Quality Management System Policy
- b) Incidents of regulatory non-compliance
- c) Incidents of adverse drinking water tests
- d) Deviations from critical control point limits and response actions
- e) Efficacy of the risk assessment process
- f) Results of audits (internal and external)
- g) Results of relevant emergency response testing
- h) Operational performance
- i) Raw water supply and drinking water quality trends
- j) Follow-up action items from previous management reviews
- k) Status of management action items identified between reviews
- l) Changes that could affect the QMS
- m) Summary of consumer feedback
- n) Resources needed to maintain the QMS
- o) Results of the infrastructure review
- p) Operational Plan currency, content and updates
- q) Summary of staff suggestions
- r) Review of Best Management Practices
- s) New Business- other issues that impact on the QMS
- t) Date of Next Meeting

Management Review Action Items

The Management Review will include identification of specific actions items to address deficiencies, personnel responsible for delivering those action items and proposed implementation timelines. During the Management Review, Top Management will provide input to:

- Improvement of the QMS and related procedures;
- Improvement of the Operating Authority's ability to implement consistently the QMS; and/or
- Human and financial resource needs.

The results of the Management Review will be included in a Council Report each year as a means of reporting to the Owner (Council).

Recording of Management Review

Minutes of the meeting will be recorded on Form 20-01 and maintained as per QMS-05 Document and Records Control. These minutes will reflect the action items that were identified during the meeting. Copies of the minutes are distributed to all attendees.

20.2 Associated Documents and Records

Form 20-01 Management Review Agenda & Meeting Minutes
QMS-05 Document and Records Control

20.3 Revision History

Date	Revision #	Reason for Revision
31-Mar-2022	9	Added Revision history.
22-Mar-2023	10	Updated with minor wording revisions.
8-Nov-2023	11	Updated to reflect composition changes of the Top Management team as identified in an OFI issued in the 2023 DWQMS External Audit.
11-Jun-2024	12	Updated with minor wording revisions.

Top Management Review Agenda & Meeting Minutes

Date of last meeting (This meeting must be held once per calendar year at a minimum): _____

Today's Date: _____

Attendance:

Meeting Time: _____

Agenda Item	Decision/Action	Responsible	Date Due
a) Annual Review of QMS 02 – Quality Management System Policy			
b) Incidents of regulatory non-compliance			
c) Incidents of adverse drinking water tests			

Top Management Review Agenda & Meeting Minutes

Agenda Item	Decision/Action	Responsible	Date Due
d) Deviations from critical control point limits and response actions			
e) Efficacy of the risk assessment process			
f) Results of audits (internal and external)			
g) Results of relevant emergency response testing			
h) Operational performance			
i) Raw water supply and drinking water quality trends			

Top Management Review Agenda & Meeting Minutes

Agenda Item	Decision/Action	Responsible	Date Due
j) Follow-up action items from previous Management Reviews			
k) Status of management action items identified between reviews			
l) Changes that could affect the QMS			
m) Summary of consumer feedback			
n) Resources needed to maintain the QMS			
o) Results of the infrastructure review			

Top Management Review Agenda & Meeting Minutes

Agenda Item	Decision/Action	Responsible	Date Due
p) Operational Plan currency, content and updates			
q) Summary of staff suggestions			
r) Review of Best Management Practices			
s) New Business - Other issues that impact on the QMS. Specify for agenda.			
t) Date of Next Meeting			

Minutes distributed to attendees and the following people:

21.0 Purpose

To document a procedure for tracking and measuring continual improvement of the Quality Management System. This procedure ensures the Operating Authority continually improves the effectiveness of its Quality Management System by reviewing and considering best management practices, identifying corrective actions and identifying and implementing preventive actions to eliminate the occurrence of non-conformities.

21.1 Procedure

Best Management Practices

Best Management Practices (BMPs) will be reviewed and considered at least once every thirty-six (36) months. This could include:

- BMPs published by the Ministry of the Environment, Conservation and Parks (MECP). These can be available at the following website: www.ontario.ca/drinkingwater
- Attending the annual DWQMS workshop facilitated by the Walkerton Clean Water Centre (WCWC)
- Communicating with Local Area Municipalities (LAMs) of York Region
- Attending the quarterly MWWRC meeting, when feasible
- Internal Audits
- External Audits
- MECP inspections
- Any other means (i.e. manufacturer recommendations, staff suggestions, etc.)

Form 21-04 DWQMS Action Item Log, will be maintained by the Compliance and Training Division. It will be used to track the date the BMP was considered, the source of the BMP (i.e. LAM discussion), the DWQMS element associated with the BMP, the action item(s) associated with the implementation of the BMP, the due date to implement the BMP, and the completion date.

Corrective Action

Corrective action involves taking measures to eliminate causes of identified nonconformances of the QMS with the requirements of the DWQMS or other undesirable situation. Corrective actions may be initiated as a result of the following indicators:

- Internal audits
- Management Review
- External audits
- Customer complaints
- Staff suggestions
- Trends identified in management reports

Corrective actions are documented on the CAR/PAR Analysis Form (Form 21-01). Once Part A and Part B (root cause analysis) of the form are complete, the corrective action is then logged in the DWQMS Action Item Log (Form 21-04).

Corrective actions and the completion of Forms 21-01 and 21-04 will be required to address non-conformities identified during any one of the indicators above.

Preventive Action

Preventive actions are identified to eliminate the occurrence of potential non-conformities in the quality management system.

Preventive actions may be initiated as a result of the following indicators:

- Internal audits (i.e. Opportunities for Improvement)
- Management Review
- External audits (i.e. Opportunities for Improvement)
- Customer complaints
- Staff suggestions
- Trends identified in management reports

The results or actions reported from the indicators above will be evaluated during the quarterly review of Form 21-04 between the DWQMS Coordinator(s) and QMS Representative which will document and identify any potential non-conformities that may occur and determine if preventive actions may be necessary. The outcome of the quarterly review is documented in meeting minutes and Form 21-04.

Once a preventive action is identified, Form 21-01 will be required to be completed to complete a root cause analysis and document the actions to be taken to prevent the potential non-conformity, verify that the action(s) is implemented and are effective in preventing the occurrence of the non-conformity. Any employee can initiate a preventive action by issuing a Continual Improvement Analysis Form 21-01.

CAR/PAR Analysis Form

The Issuer completes Part A of the CAR/PAR Analysis Form 21-01 and forwards the form to the QMS Representative.

The QMS Representative will issue the Corrective Action Report (CAR) or Preventive Action Report (PAR) number and determine who is assigned to address the issue.

To determine the root cause of the problem, the assigned individual should determine why the issue or potential issue occurred or had the potential to occur.

The assigned individual will determine and implement the corrective action or preventive action and change documentation as applicable as per QMS-05 Procedure

Document and Records Control. They are responsible for investigating who is involved, the root cause of the problem or potential problem, required action, the necessary steps to be taken, and an appropriate timeframe.

The QMS Representative will determine a follow-up date to review the effectiveness of the implemented changes, and/or may use the internal audit process to verify effectiveness in Part C of Form 21-01.

The QMS Representative reviews the CARs, PARs, and BMPs identified during Management Review and records if any further action is required.

The CAR/PAR Analysis Form 21-01 is maintained as per QMS-05 Procedure Document and Records Control.

Form 21-04 will document all action items related to the DWQMS. The form identifies the year the action was requested, the source (i.e. internal audit, external audit, Management Review, etc.), the DWQMS element affected, a description of the action item, whether the item was identified as a CAR, PAR, BMP, or OFI, the status of the action item, and the completion date. It is the DWQMS Coordinator’s responsibility to update this table and review items with the QMS Representative on a quarterly basis.

21.2 Associated Documents and Records

Form 21-01	CAR/PAR Analysis Form
Form 21-04	DWQMS Action Item Status Log
QMS-05	Document and Records Control

21.3 Revision History

Date	Revision #	Reason for Revision
24-Mar-2022	8	Added Revision history. Elaborated on corrective action criteria.
23-Mar-2023	9	Updated with minor wording revisions.
8-Nov-2023	10	The process for identifying and implementing Preventive Actions was updated to ensure alignment with the definition of Preventive Action in the DWQMS Standard as identified as OFI’s in both the 2023 DWQMS External and Internal Audits.
8-May-2024	11	To remove obsolete documents (Form 21-02 and 21-03); they were identified to be redundant during the November 16 & 17, 2023 DWQMS Internal Audit. Added that effectiveness of actions taken in response to a CAR or PAR can be verified during the internal audit process.



CAR # (if applicable) _____

PAR # (if applicable) _____

Part A

Date:	Issued by:
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Corrective Action

Preventive Action

Source:

Internal Audit

Management Review Meeting
Date: _____

External Audit

Customer Complaint

Staff Suggestion

NCR #: _____

Other: _____

Description of the issue/concern:



Part B

Assigned to: _____ **Date** _____
Due:

What is the root cause of the problem or potential problem?

Why?

Why?

Why?

Why?

Why?

Describe the action to be taken:

Can the effectiveness of action be measured, and if so how?

Follow up date: _____ Assigned to: _____

Which documents need to be changed?



Part C

Was corrective action completed? Specify.	
Date Completed:	<input type="checkbox"/> Yes <input type="checkbox"/> Not applicable
Was action taken effective?	
Document Change Complete:	<input type="checkbox"/> Yes <input type="checkbox"/> Not applicable
Verification of Completion/Effectiveness:	
_____ Signature – QMS Representative	_____ Date

