ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

The Township of Black-River Matheson

OPERATIONAL PLAN

For the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems

This Operational Plan is designed for the exclusive use of the system(s) specified in this Operational Plan.

This Operational Plan has been developed with OCWA's operating practices in mind and utilizing OCWA personnel to implement it.

Any use which a third party makes of this Operational Plan, or any part thereof, or any reliance on or decisions made based on information within it, is the responsibility of such third parties. OCWA accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Operational Plan or any part thereof.

QEMS

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Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To document OCWA's Quality & Environmental Management System (QEMS). This Operational Plan defines and documents the QEMS for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems operated by the Ontario Clean Water Agency (OCWA). It sets out the OCWA's policies and procedures with respect to quality and environmental management in accordance with the requirements of the Province of Ontario's Drinking Water Quality Management Standard (DWQMS).

2. Definitions

Drinking Water Quality Management Standard (DWQMS) – has the same meaning as Quality Management Standard for Drinking Water Systems approved under section 21 of the Safe Drinking Water Act (SDWA).

Operational Plan – means the operational plan required by the Director's Direction.

Quality & Environmental Management System (QEMS) – a system to:
a) Establish policy and objectives, and to achieve those objectives; and
b) Direct and control an organization with regard to quality.

Ministry - means the Ontario government ministry responsible for the administration of the SDWA.

3. Procedure

3.1 The Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems are owned by the Township of Black River-Matheson. OCWA is the contracted Operating Authority for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems, which includes the Holtyre, Matheson, Ramore and Val Gagne water treatment plants and the Holtyre, Matheson, Ramore and Val Gagne distribution systems.

3.2 OCWA's Quality & Environmental Management System (QEMS) is structured and documented with the purpose of:

1. Establishing policy and objectives with respect to the effective management and operation of water/wastewater facilities;
2. Understanding and controlling the risks associated with the facility's activities and processes;
3. Achieving continual improvement of the QEMS and the facility's performance.

3.3 The Operational Plan for the facilities listed above fulfils the requirements of the Ministry's DWQMS. The 21 QEMS Procedures within this Operational Plan align with the 21 elements of the DWQMS.

4. Related Documents

Ontario's Drinking Water Quality Management Standard, as amended from time to time
All QEMS Procedures and Documents referenced in this Operational Plan

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-01 was originally set out in the main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 6, dated September 27, 2016). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Addition of new wording (s. 3.3) to clarify that the Operational Plan now aligns with the 21 elements of the DWQMS.
2019 03 21	1	Revised to correct revision date in revision history. Changed MOECC to MECP.
2024-06-20	2	Procedure updated definition of DWQMS, added definition of Ministry as the Ontario government ministry responsible for drinking water and environmental legislation to alleviate need for future revisions if/when the Ministry experiences name changes, added "as amended from time to time directly following reference to Ontario's DWQMS to point to the most current version of the document, removed watermark.

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To document a QEMS Policy that provides the foundation for OCWA's Quality & Environmental Management System.

2. Definitions

Quality Management System Policy – means the policy described in Element 2 developed for the Subject System or Subject Systems

3. Procedure

3.1 The Ontario Clean Water Agency, its Board of Directors, Officers and entire staff are committed to the principles and objectives set out in our QEMS Policy.

OCWA's Policy is to:

- Deliver safe water and wastewater services that protect public health, the environment, and the sustainability of communities.
- Comply with applicable legislation and regulations.
- Promote client, consumer and stakeholder confidence through service excellence, effective communications and reporting.
- Train staff on their QEMS responsibilities.
- Maintain and continually improve the QEMS.

Originally issued as Environmental Policy on June 8, 1995
Last revised, approved by OCWA's Board of Directors on April 4, 2024
(This policy is annually reviewed)

3.2 Our Board of Directors, Officers and entire staff will act to ensure the implementation of this Policy and will monitor progress of the Quality & Environmental Management System (QEMS).

3.3 OCWA's QEMS Policy is readily communicated and available to all OCWA personnel, through OCWA's intranet. The Owner and members of the public can access the policy through OCWA's public website (www.ocwa.com). A hardcopy of the QEMS Policy is posted as specified in the OP-05 Document and Records Control procedure.

3.4 Essential suppliers and service providers are advised of OCWA's QEMS Policy as per the OP-13 Essential Supplies and Services procedure.

3.5 Corporate Compliance coordinates the annual review and approval of the QEMS Policy by the Board of Directors and communicates the approval to all OCWA employees via an electronic communication.

3.6 The current version of the policy indicates the date of the last revision and that the policy is annually reviewed. Electronic and hard-copy documents that include the QEMS Policy will only be required to be updated in years when the Policy has been revised. A complete review/revision history of the QEMS Policy (documenting the annual policy review and/or revision approval date) is accessible to all staff on OCWA's intranet and is available upon request for external stakeholders.

4. Related Documents

Current QEMS Policy (Posted on OCWA's intranet and internet)
QEMS Policy Revision History (Posted on OCWA's intranet)
OP-05 Document and Records Control
OP-13 Essential Supplies and Services

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Section 3.4, 3.5 and 3.6 were added to the information originally set out in the main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 6, dated September 29, 2016). New sections: Purpose, Definitions, Procedure, Related Documents and a separate Revision History. Minor revisions to wording in s. 3.3 to reference location of posted copy of the policy. Added sections on how annual policy review is conducted (s. 3.5 and s. 3.6) and reference to OP-13 ESS (s. 3.4). The full revision history for the QEMS policy is available on OCWA's intranet.
2024-06-18	1	The first bullet of the QEMS Policy (approved in 2016) was revised to align with OCWA's updated Mission statement. s. 3.3 and 3.6 were modified to add information/clarify how to access the QEMS Policy and the Policy revision history document, removed watermark.

COMMITMENT AND ENDORSEMENT

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To document the endorsement of the Operational Plan for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems by OCWA Top Management and the Township of Black River-Matheson (Owner) and to set out when re-endorsement would be required.

2. Definitions

Top Management – a person, persons or a group of people at the highest management level within an Operating Authority that makes decisions respecting the QMS and recommendations to the Owner respecting the Subject System or Subject Systems

3. Procedure

3.1 The Operational Plan is provided to OCWA Top Management and to the Owner for endorsement. The signed written endorsement is presented in Appendix OP-03A. At a minimum, two members of Top Management must endorse the Operational Plan; however, the Operational Plan is made available to all members of Top Management in the specified document control location (refer to OP-05 Document and Records Control). Endorsement by OCWA's Top Management is represented by the Senior Operating Manager and Safety, Process and Compliance Manager or the Regional Hub Manager.

3.2 Any major revision of the operational plan will be re-endorsed by OCWA Top Management and the Owner. Major revisions include:

1. A revision to OCWA's QEMS Policy;
2. A change to both representatives of the facility's Top Management and/or both of the Owner's representatives that endorsed the Operational Plan;
3. A modification to the drinking water system processes/components that would require a major change to the description in OP-06 Drinking Water System;
4. The addition of a drinking water subsystem owned by the same Owner to this operational plan.

Any other changes would be considered a minor change and would not require the Operational Plan to be re-endorsed.

4. Related Documents

OP-03A Signed Commitment and Endorsement
OP-05 Document and Records Control
OP-06 Drinking Water System

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-03 was originally set out in the main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 6, dated September 29, 2016). Procedure provides information on who from Top Management endorses the Operational Plan (s. 3.1); when owner re-endorsement is sought and 'criteria' as to what is considered a major revision to the Plan (s. 3.2). Appendix OP-03A includes the Owner and Top Management sign-off section.
2019-08-12	1	Updated step 3.2 by adding "major" changes in the system description will require re-endorsement of the Plan.
2024-08-20	2	Updated section 3.1 to Safety, Process and Compliance Manager for endorsement. Removed watermark.

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems	QEMS Doc: OP-03A Rev Date: 2025-04-15 Rev No: 1 Pages: 1 of 1

SIGNED COMMITMENT AND ENDORSEMENT

This Operational Plan sets out the framework for OCWA's Quality & Environmental Management System (QEMS) that is specific and relevant to your drinking water system(s) and supports the overall goal of OCWA and the Township of Black River- Matheson (Owner) to provide safe, cost-effective drinking water through sustained cooperation. OCWA will be responsible for developing, implementing, maintaining and continually improving its QEMS with respect to the operation and maintenance of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems and will do so in a manner that ensures compliance with applicable legislative and regulatory requirements.

Through the endorsement of this Operational Plan, the Owner commits to work with OCWA to facilitate this goal.

OCWA Top Management Endorsement

Chris Ciarrocca
Senior Operating Manager,
North Eastern Ontario Regional Hub

APR.15 2025
Date

Owner Endorsement

Dave Dyment
Mayor

APR, 15 2025
Date

Eric Nielson
Regional Hub Manager, North Eastern
Ontario Regional Hub

Apr 15/25
Date

Gilles Giguere
Director of Public Services

APR, 15 2025
Date

The endorsement above is based on the Operational Plan that was current as of the revision date of this document (OP-03A).

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) REPRESENTATIVE

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To identify and describe the specific roles and responsibilities of the QEMS Representative(s) for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems.

2. Definitions

None

3. Procedure

3.1 The role of QEMS Representative for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems is the Process and Compliance Technician (PCT). The Safety, Process and Compliance Manager (or alternate PCT) will act as an alternate QEMS Representative when required.

3.2 The QEMS Representative is responsible for:

- Administering the QEMS for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems by ensuring that processes and procedures needed for the facility's QEMS are established and maintained;
- Reporting to Top Management on the facility's QEMS performance and identifying opportunities for improvement;
- Ensuring that current versions of documents related to the QEMS are in use;
- Promoting awareness of the QEMS to all operations personnel; and
- In conjunction with Top Management, ensuring that operations personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the system.

4. Related Documents

None

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-04 was originally set out in the main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 6, dated September 29, 2016). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Change to responsibilities: Operations Manager no longer considered QEMS Representative and SPC Manager to act as alternate as required (s. 3.1); added wording to clarify shared responsibilities for Top Management and QEMS Representative to ensure operations personnel are aware of applicable legislative and regulatory requirements (s. 3.2).

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: SPC Manager

1. Purpose

To describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of. This procedure applies to QEMS Documents and QEMS records pertaining to the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems as identified in this procedure.

2. Definitions

Document – includes a sound recording, video tape, film, photograph, chart, graph, map, plan, survey, book of account, and information recorded or stored by means of any device

Record – a document stating results achieved or providing proof of activities performed

QEMS Document – any document required by OCWA's QEMS as identified in this procedure

QEMS Record – any record required by OCWA's QEMS as identified in this procedure

Controlled – managed as per the conditions of this procedure

Retention Period – length of time that a document or record must be kept; starts from the date of issue for QEMS records or from the point of time when a QEMS document is replaced by a new or amended document

3. Procedure

3.1 Documents and records required by OCWA's QEMS and their locations are listed in Appendix OP-05A Document and Records Control Locations.

3.2 Internally developed QEMS documents and QEMS records (whenever possible) are generated electronically to ensure legibility and are identified through a header/title and revision date. Handwritten records must be legible and permanently rendered in ink or non-erasable marker.

3.3 Controls for the Operational Plan include the use of an authorized approval and a header on every page that includes a title, alpha-numeric procedure code, revision date, revision number and page numbers. A revision history is also included at the end of each procedure.

Authorized personnel for review and approval of this Operational Plan are:

Review: QEMS Representative, Senior Operator or ORO

Approval: SPC Manager or Operations Management

The QEMS Representative ensures that updated documents are provided to the above authorized personnel for review or approval prior to issuance.

Authorized personnel authenticate their review/approval of this Operational Plan via email.

3.4 The QEMS Representative is responsible for ensuring that current versions of QEMS documents are being used at all times. Current QEMS documents and records are readily accessible to operations personnel and to internal and external auditors/inspectors at established document control locations. The currency of internal documents is ensured by comparing the date on the document to that of the master hardcopy and/or electronic copy residing in the designated document control location(s) specified in Appendix OP-05A.

Document control locations are established in areas that provide adequate protection to prevent unauthorized use/access, damage, deterioration or loss of QEMS documents and records. Copies of QEMS documents and records located outside of designated control locations are considered uncontrolled.

3.5 Access to OCWA's computer network infrastructure is restricted through use of individually-assigned usernames and passwords and local area servers. Network security is maintained by OCWA's Information Technology department through a number of established mechanisms and practices such as daily back-up of files stored on servers, password expiry, limitations on login attempts, multi-factor authentication and policies outlining specific conditions of use.

Access to facility QEMS records contained within internal electronic databases and applications (e.g., Wonderware, OPEX, PDM, WMS) is administered by designated application managers/trustees, requires the permission of Operations Management and is restricted through use of usernames and passwords. Records are protected by means of regular network back-ups of electronic files stored on servers and/or within databases.

SCADA records are maintained as per Appendix OP-05A and are accessible to all staff when required.

3.6 Any employee of the drinking water system may make a verbal or written request for a revision be made to improve an existing internal QEMS document or the preparation of a new document. These requests are to be made to the QEMS Representative and should indicate the reason for the change. The need for new or updated documents may also be identified through the Management Review or system audits.

The QEMS Representative communicates any changes made to QEMS documents to relevant operations personnel and coordinates related training (as required). Changes to corporately controlled QEMS documents are communicated and distributed to facility

QEMS Representatives by OCWA's Corporate Compliance Group through e-mails, memos and/or provincial, regional hub/cluster or facility-level training sessions.

3.7 When a QEMS document is superseded, the hardcopy and the electronic copy of the document (as applicable) are promptly removed from the applicable designated document control locations specified in OP-05A. The QEMS Representative ensures that the hardcopy and electronic copy are disposed of or retained (as appropriate)

3.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding. The authorized method for disposal of electronic documents and records after the specified retention requirements have been met is deleting.

3.9 QEMS documents and records are retained in accordance with applicable regulations and legal instruments. Relevant regulatory and corporate minimum retention periods are as follows:

Type of Document/Record	Minimum Retention Time	Requirement Reference
Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form) FEP Long term forecast of major infrastructure maintenance, rehabilitation and renewal activities Sampling plan/schedule/ calendar	10 years	Director's Direction under SDWA
Internal QEMS Audit Results	10 years	OCWA Requirement
External QEMS Audit Results	10 years	OCWA Requirement
Management Review Documentation	10 years	OCWA Requirement
Documents/records required to demonstrate conformance with the DWQMS (specifically all the documents/records listed in OP-05A)	3 years*if no specified legislative requirement below* identified in this table or in the facility's legal instruments *	OCWA Requirement
Log Books or other record-keeping mechanisms	5 years	O. Reg. 128/04
Training Records for water operators and water quality analysts	5 years	O. Reg. 128/04
Operational checks, sampling and testing (e.g., chlorine residuals, turbidity, fluoride, sampling records), microbiological sampling and testing and chain of custodies	2 years	O. Reg. 170/03

Type of Document/Record	Minimum Retention Time	Requirement Reference
Schedule 23 & 24 sampling, chain of custodies and test results	6 years LMR 15 years SMR	O. Reg. 170.03
THM, HAA, nitrates, nitrites and lead program (including pH and alkalinity) sampling, chain of custodies, and test results, Section 11 Annual Reports and Schedule 22 Summary Reports	6 years	O. Reg. 170/03
Sodium sampling, chain of custody and test results and related corrective action records/reports, 60 month fluoride sampling, chain of custody and test results (if the system doesn't fluoridate), Engineering Reports, GUDI/Non-GUDI Reports	15 years	O. Reg. 170/03
Corrective action records/reports for E. Coli, Total Coliforms and bacterial species	2 years	O. Reg. 170/03
Corrective action records/reports for chemical and radiological parameters under SDWA O. Reg. 169/03, pesticides not listed under O. Reg. 169/03 and health-related parameters in an order or approval	6 years LMR 15 years SMR	O. Reg. 170/03
Flow Meter Calibration Records, Analyzer Calibration Reports Maintenance Records/Work Orders	2 years	O. Reg. 170/03
Records required by or created in accordance with the Municipal Drinking Water Licence (MDWL) or Drinking Water Works Permit (DWWP). Except records specifically referenced in O. Reg. 170/03 or otherwise specified in the MDWL or DWWP.	5 years	MDWL

3.10 The Operational Plan is reviewed for currency by the QEMS Representative during internal/external audit and Management Review processes. Other QEMS-related documents are reviewed as per the frequencies set out in this Operational Plan or as significant changes (e.g., changes in regulatory requirements, corporate policies or operational processes and/or equipment, etc.) occur. QEMS documents and records are reviewed for evidence of control during each internal system audit as per OP-19 Internal QEMS Audits.

4. Related Documents

OP-05A Document and Records Control Locations
OP-19 Internal QEMS Audits
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Correction of Process Compliance Manager's title; clarification of responsibility and method of maintaining currency of documents (5.4); description of how network security is maintained (5.5); clarification of retention times (5.9); inclusion of the operation plan review (5.10)
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant; updated Table 1 to reflect current locations
2015-08-20	3	Changed "Well Supply Systems" to "drinking Water Systems" and changed PDC to WISKI
2016-09-29	4	Updated Table 1 to reflect current locations and add references to the new WMS program Maximo, added client reports to records list
2018-06-28	5	QP-01 procedure renamed OP-05. Removed Scope and Responsibilities sections. Moved the former Table 1 (Designated location for documents and records required by OCWA's QEMS) to its own appendix (OP-05A). Assigned responsibility for ensuring current versions of QEMS documents are being used to the QEMS Representative (s. 3.4). Clarified that requests for revisions/new QEMS documents are made to the QEMS Representative (s. 3.6). Moved the former Table 2 (Relevant regulatory and corporate minimum retention periods) to be part of s. 3.9 and expanded on the minimum retention times for documents and records required to demonstrate compliance with legislation. Other minor wording changes.
2020-09-16	6	Added details for superseded electronic documents to section 7.
2022 06 01	7	Added: clarity to version control requirements to align with the Director's Directions dated May 2021, detail to the approval process for Operational Plan, clarity on how electronic documents are handled and [the process for verifying secure shredding of documents and records]; Updated: the table in section 3.9 (clarified minimum retention time requirements for documents/records required to demonstrate conformance with the DWQMS, added forms required by the MDWL and DWWP, including their minimum retention times and requirement reference)].
2024 08 20	8	Procedure updated as follows: added multi factor authentication to 3.5, section 3.9 table revised to include Schedule 23 & 24 records retention times for Large Municipal Residential (LMR) and Small Municipal Resident (SMR) systems, added chain of custody as record for retention for various sampling requirements, lead program clarified to include pH and alkalinity; added GUDI/Non-GUDI Reports, minor wording and type-o's, removed watermark.

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: QEMS Representative	Approved by: Senior Operations Manager

Designated locations for documents and records required by OCWA's QEMS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Internal QEMS Documents	
Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form)	E – Maintained on \\ocwfilereg\NEO Collab HC – Matheson WPCP
QEMS Policy	E - OCWA's Sharepoint site and public website HC – Matheson WPCP
OCWA's Safety Manual	E – OCWA's Sharepoint site
Facility Emergency Plans	E – Maintained on \\ocwfilereg\NEO Collab HC – at the pertinent facility
Corporate Emergency Response Plan (CERP)	E - OCWA's Sharepoint site
Standard Operating Procedures (referenced in Operational Plan and QEMS Procedures)	E – Maintained on \\ocwfilereg\NEO Collab HC - at the pertinent facility
Essential Supplies & Services List	E – Maintained on \\ocwfilereg\NEO Collab HC – at the pertinent facility
Vacation/On-call Schedule	E – Maintained on Outlook Shared Calendar
Sampling Schedule	E- Maintained on \\ocwfilereg\NEO Collab HC – at the pertinent facility
Chain of Custody Forms	E- Maintained on \\ocwfilereg\NEO Collab
External QEMS Documents	
Maintenance/equipment manuals	HC – at the pertinent facility
Engineering schematics/plans/drawings	HC – at the pertinent facility
Municipal Drinking Water Licence	E – Maintained on \\ocwfilereg\NEO Collab HC – Matheson WPCP
Drinking Water Works Permit	E – Maintained on \\ocwfilereg\NEO Collab HC – at the pertinent facility
Permit to Take Water	E – Maintained on \\ocwfilereg\NEO Collab HC – at the pertinent facility
Ministry Inspection Reports	E – Maintained on \\ocwfilereg\NEO Collab
Operator certificates	HC – Matheson WPCP
AWWA Standards	E - \\Torwan\PCT\AWWA Standards
Ontario's Watermain Disinfection Procedure	E - https://www.ontario.ca
DWQMS Standard	E - https://www.ontario.ca
ANSI/NSF product registration documentation for Chemicals/Materials Used	HC – Matheson WPCP
Applicable federal and provincial legislation and municipal by-laws	Provincial Online at www.e-laws.gov.on.ca Federal online at www.laws.justice.gc.ca
Operations Manual	HC – at the pertinent facility
Original Equipment Manuals (OEM)	HC – at the pertinent facility WPCP

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: QEMS Representative	Approved by: Senior Operations Manager

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
QEMS Records	
Rounds sheets	Process data maintained electronically through PDM HC – Matheson WPCP
Facility Operations Logbook(s)	HC – Matheson WPCP E - https://ocwa.eriscloud.com/
Visitor's Logbook	HC – at the pertinent facility
Operator training records	E – Electronic records are maintained in OCWA's Training Summary Database (OPEX)
Maintenance records	E - maintained through WMS
Internal Calibration records	E - maintained through WMS
Chain of Custody forms	E – Maintained on \\ocwfilereg\NEO Collab
Laboratory analyses	Electronic reports from Laboratory – Maintained on \\ocwfilereg\NEO Collab E - maintained through PDM
Additional Sampling records	E – Maintained on \\ocwfilereg\NEO Collab
SCADA records (Wonderware, OCWA)	E - maintained through Wonderware
SCADA Records (Plant SCADA, Client Owned)	E - at the pertinent facility E - maintained through PDM
Internal Audit Reports	E – Maintained on \\ocwfilereg\NEO Collab
External Audit Reports	E – Maintained on \\ocwfilereg\NEO Collab
Management Review documentation	E – Maintained on \\ocwfilereg\NEO Collab
Ministry forms referenced in the Drinking Water Works Permit, including Form 1, Form 2, Form 3 and Director Notifications	E – Maintained on \\ocwfilereg\NEO Collab
Summary of Findings Spreadsheet (Preventive/Corrective) records	E - Maintained on \\ocwfilereg\NEO Collab
External QEMS Communications (including essential suppliers and service providers)	E – Microsoft Outlook E-mail E - Maintained on \\ocwfilereg\NEO Collab
Annual Reports	E – Maintained on \\ocwfilereg\NEO Collab
Summary Reports for Municipalities	E – Maintained on \\ocwfilereg\NEO Collab
AWQI Reports	E – Maintained on \\ocwfilereg\NEO Collab
Incidents of Non-Compliance Records	E – Maintained on \\ocwfilereg\NEO Collab
Analysis and Action Plan (AAP) Report	E – Maintained on \\ocwfilereg\NEO Collab
Contingency Plan Review/Test Summary	E – Maintained on \\ocwfilereg\NEO Collab
Infrastructure review (Capital Letter & Capital and Major Maintenance Recommendations Report)	E – Maintained on \\ocwfilereg\NEO Collab
Community complaint records	E – Maintained on \\ocwfilereg\NEO Collab
Call In/Call Back/Call Out Reports	E – Maintained in WMS
Quarterly Operations Report (to the Owner)	E – Maintained on \\ocwfilereg\NEO Collab

Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (revision 4, dated September 29, 2016). Added section for blank external QEMS forms, changed location for Confined Space Program and Operational Plan and changed name of OCWA's Safety Manual to OCWA's Health and Safety Management System and its location.
2021-12-01	1	Changed public drive from \\ocwfile\public\NEO DWQMS\ DWQMS - Holtyre, Matheson, Ramore and Val Gagne DWS's to \\ocwfilereg\NEO Collab\NEO DWQMS. MOECC changed to MECP. Added EC location for MDWL's PTTW's etc. EC location for MECP forms changed to MECP Cetral Forms Registry. Removed HC location for completed AWQI forms. Removed (DWQMS Filing Cabinet). Added electronic logbook and location.
2022-06-01	2	Added: exact location of documents/records, clarity on which documents are included under the Operational Plan, new documents/records (Watermain Disinfection Procedure results of emergency test exercises/emergency response debriefs and Ministry forms referenced in the Drinking Water Works Permit) and clarity to external communications and inspection reports; Removed: reference to QEMS Reference Manual and OCWA's intranet (replaced with OCWA's Sharepoint site). Added row to header to show who reviewed and approved the document.
2024-08-20	3	Appendix updated with MECP revised to Ministry, updated Corporate Emergency Plan (CERP) name, minor wording, removed watermark.

1. Purpose

To document the following for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System:

- The name of the Owner and Operating Authority; and
- Provide a description of the system, including all applicable water sources, treatment system processes and distribution system components.

2. Definitions

Distribution System - means the part of a drinking water system that is used in the distribution, storage or supply of water and that is not part of a treatment system.

Primary Disinfection - means a process or series of processes intended to remove or inactivate human pathogens such as viruses, bacteria and protozoa in water.

Secondary Disinfection - means a process or series of processes intended to provide and maintain a disinfectant residual in a drinking water system's distribution system, and in plumbing connected to the distribution system, for the purposes of:

(a) protecting water from microbiological re-contamination;
(b) reducing bacterial regrowth;
(c) controlling biofilm formation;
(d) serving as an indicator of distribution system integrity; and

includes the use of disinfectant residuals from primary disinfection to provide and maintain a disinfectant residual in a drinking water system's distribution system for the purposes described in clauses (a) to (d).

Treatment System - means any part of a drinking water system that is used in relation to the treatment of water and includes,

(a) any thing that conveys or stores water and is part of a treatment process, including any treatment equipment installed in plumbing,
(b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the system, and
(c) a well or intake that serves as the source or entry point of raw water supply for the system;

3. Procedure

3.1 Refer to OP-6A for a description of the facilities in the Holtyre Drinking Water System

3.2 Refer to OP-6B for a description of the facilities in the Matheson Drinking Water System

3.3 Refer to OP-6C for a description of the facilities in the Ramore Drinking Water System

3.4 Refer to OP-6D for a description of the facilities in the Val Gagne Drinking Water System

4. Related Documents

None

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-06 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 7, dated September 21, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections.
2024-08-21	1	Removed watermark.

Holtyre Drinking Water System Overview

Owner / Operating Authority

The Holtyre Drinking Water System is a communal ground water well supply that services the Town of Holtyre and is owned by the Corporation of the Township of Black River-Matheson. The Ontario Clean Water Agency (OCWA) is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution systems. Certified municipal operators assist OCWA with operations of the distribution system by performing regular maintenance and checks.

Source Water

Raw Water Supply

Well No. 1 is located 17.5 meters south of Cain Street and 12 meters west of Euclid Street. It is a 200 mm diameter, 57 meter deep drilled groundwater well equipped with a 1.2 kW submersible deep well pump, rated at 47 litres per minute at a Total Dynamic Head of 50.7 metres with a 50 mm diameter discharge line connected to the pump header located in the pumphouse. It is considered the secondary production well for the Holtyre drinking water system.

Well No. 3 is the main production well and is located 19.6 metres west of the road allowance between Concessions 1 and 2, Township of Hislop and 594 metres south of the intersection with Highway 572. It is a 150 mm diameter, 37 metre deep drilled groundwater well equipped with a 1.2 kW submersible deep well pump, rated at 100.8 litres per minute at a Total Dynamic Head of 34 metres with a 50 mm diameter discharge line connected to the pump header located in the pumphouse.

General Characteristics

The raw water sources for the treatment plant are two wells as described above. This is a ground water well system, with good, consistent characteristics. Both wells do not appear to be vulnerable to bacteriological contamination. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards with the exception of sodium.

Holtyre Drinking Water Raw Water Characteristics at Raw Water Source

Characteristic		2021			2022			2023		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
E. coli (CFU/100 mL)	Well 1	0	0	0	0	0	0	0	0	0
	Well 3	0	0	0	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	Well 1	0	0	0	0	2	0.14	0	15	2.14
	Well 3	0	0	0	0	0	0	0	11	1.21
Turbidity (NTU)	Well 1	0.60	1.26	0.81	0.55	2.52	1.05	0.15	0.89	0.66
	Well 3	0.14	0.70	0.33	0.22	0.67	0.37	0.14	0.78	0.37

Characteristic		2021			2022			2023		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Sodium (mg/L)	Well 1	29	32.9	30.6	28	32	30.3	27.6	34	29.9
	Well 3	18	99	39.1	16.1	19.3	18.4	16.8	21	18.4

Common Fluctuations

The water quality remains consistent because well water is not subject to the same fluctuations as surface water.

Threats

The wells are properly sloped and maintained thus infiltration is not an issue.

Operational Challenges

On the rare occasion that a power interruption occurs for a prolonged period of time there are emergency generators to assist in keeping the plant running until power is restored.

Treatment System Description

Water Treatment

The water treatment plant is located within the village of Holtyre at 644 Euclid Avenue. It receives raw groundwater from Wells 1 & 3. Within the water treatment plant, the individual well discharge pipes are metered for flow and then join one common header. A sequestering agent for iron and manganese is added to the water prior to being injected with 12% sodium hypochlorite. Treated water is then discharged to the clearwell. The disinfection system consists of two chemical metering pumps (one duty and one on standby) and one chemical solution tank. The iron sequestering system consists of two chemical metering pumps (one duty and one on standby) and one chemical solution tank.

Water Storage and Pumping Capabilities

There are three 3 HP submersible pumps that rotate lead and lag; each has a rated capacity of 3 L/s, a Total Dynamic Head of 47 metres and a Variable Frequency Drive. There is also one 0.9 m^3 pressure tank and one 2255 litre chlorine contact tank (to be utilized when the clearwell is not in operation).

Located under the floor slab of the water treatment plant, the clearwell is a 151 m^3 un-baffled storage reservoir. The high lift pumps transfer the treated water from the reservoir to the pressure tank and subsequently to the distribution system.

Emergency Power

12.5 kW diesel generator and associated fuel tank are available at the plant and is capable of supplying power to the entire facility during power failures.

Treatment System Process Flow Chart

Refer to Figure 1 on page 4.

Description of the Distribution System Components

The system serves an approximate population of 150 persons in 75 private residences with an estimated total of 99 service connections. The distribution system itself consists primarily of four inch asbestos concrete constructed water mains. There is no elevated storage in this system. There are three hydrants which are used only for distribution system flushing, not fire protection.

In late 2007 the municipality installed two automatic flushing devices in strategic locations in the distribution system as a measure to improve the aesthetic water quality

Note: The other hydrants located within the village are not part of the drinking water system. Prior to the establishment of the drinking water system, the Ross Mine provided water for fire protection through a system of hydrants. With the closure of the mine, this water system was abandoned. These non-functional hydrants and associated water mains were/are not connected to the existing drinking water system.

Refer to Figure 2 on page 5 for a map of the Distribution System

Figure 1 – Process Flow Chart

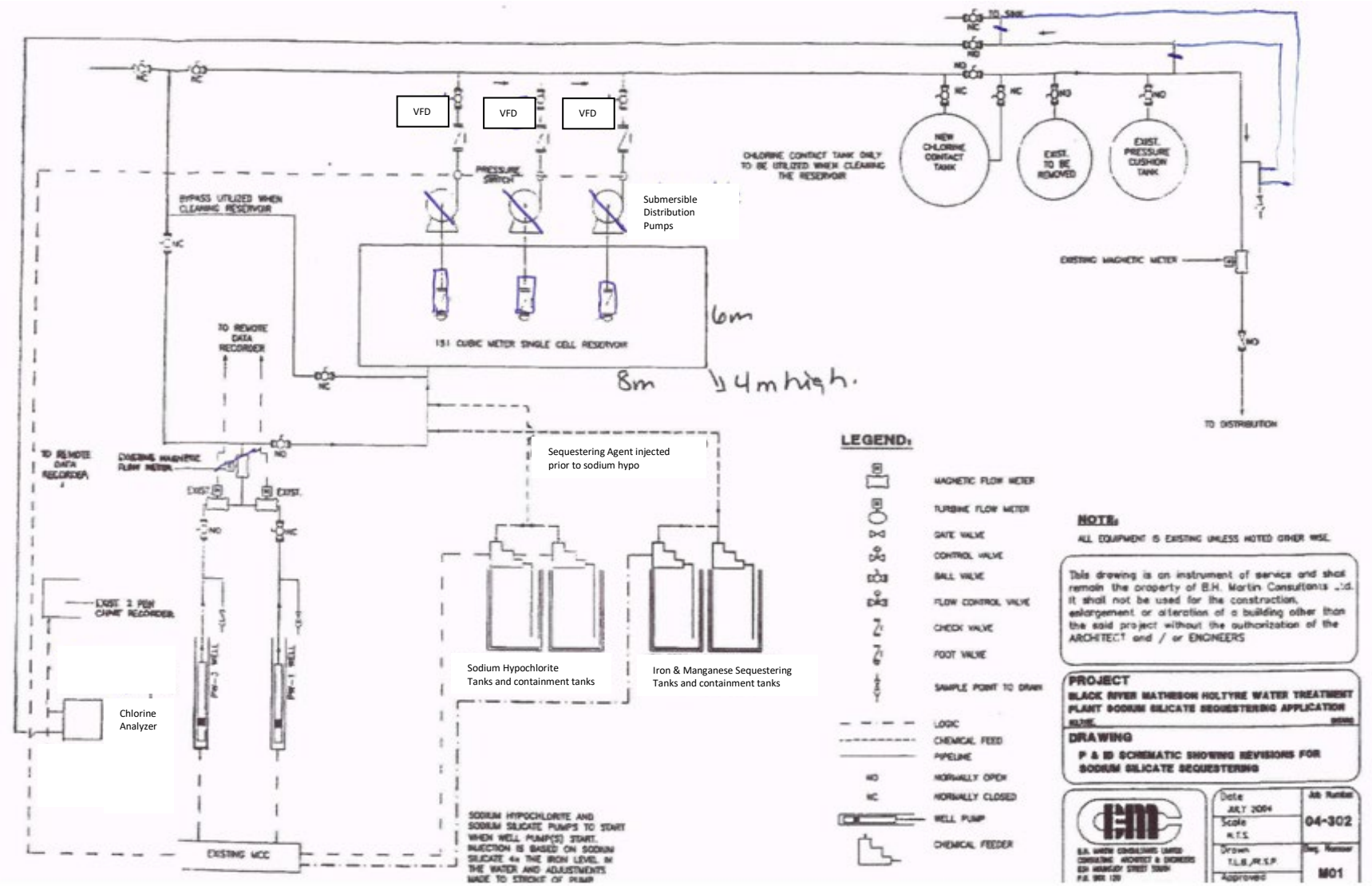
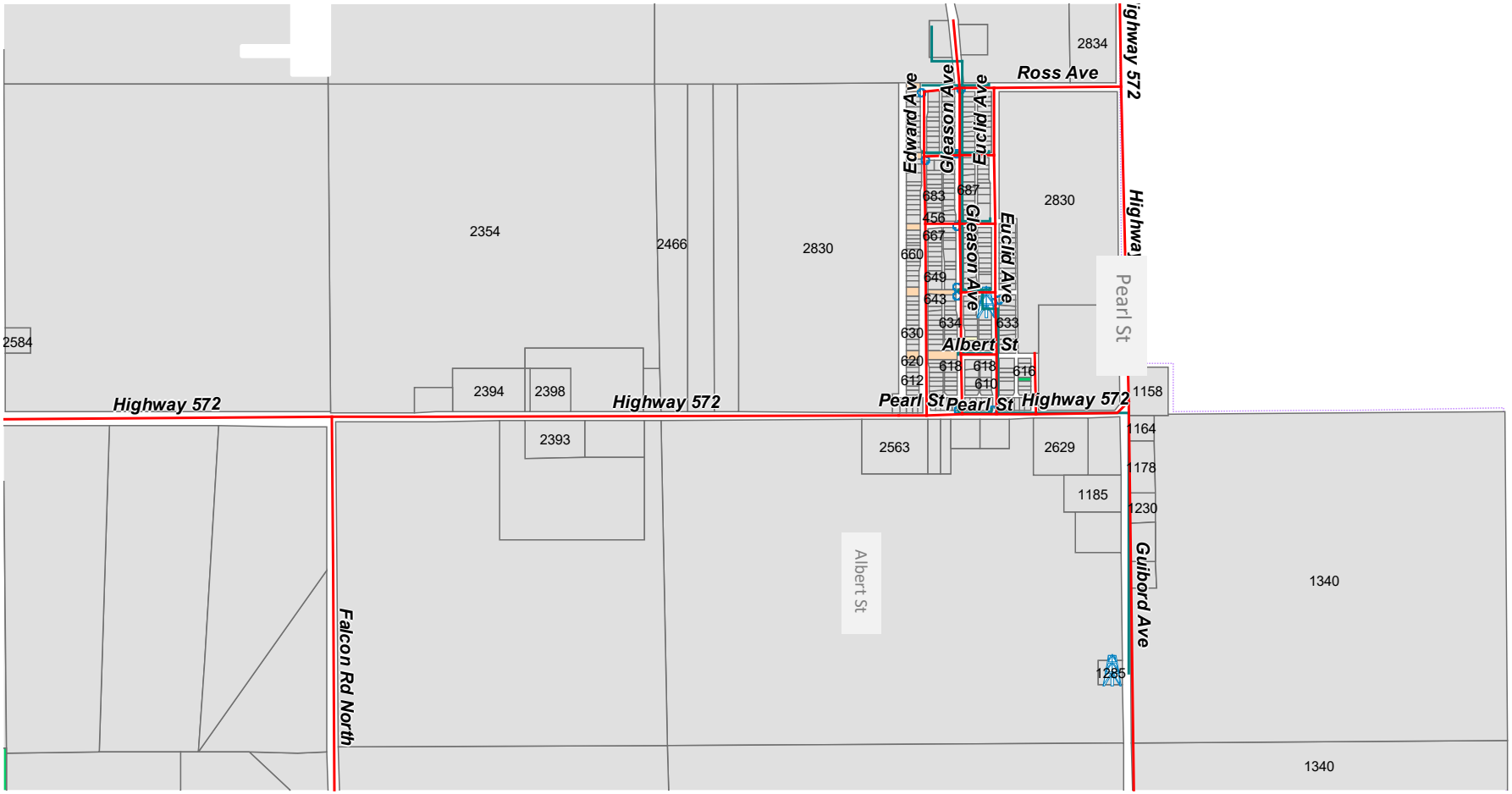

VFD
VFD
VFD
Submersible Distribution Pumps
151 CUBIC METER SINGLE CELL RESERVOIR
6m
8m
4m high.
TO REMOTE DATA RECORDER
BYPASS UTILIZED WHEN CLEANING RESERVOIR
CHLORINE CONTACT TANK ONLY TO BE UTILIZED WHEN CLEANING THE RESERVOIR
NEW CHLORINE CONTACT TANK
EXIST. TO BE REMOVED
EXIST. PRESSURE CUSHION TANK
EXISTING MAGNETIC METER
TO DISTRIBUTION
Sequestering Agent injected prior to sodium hypo
Sodium Hypochlorite Tanks and containment tanks
Iron & Manganese Sequestering Tanks and containment tanks
Chlorine Analyzer
EXISTING MCC
SODIUM HYPOCHLORITE AND SODIUM SILICATE PUMPS TO START WHEN WELL PUMP(S) START. INJECTION IS BASED ON SODIUM SILICATE 4x THE IRON LEVEL IN THE WATER AND ADJUSTMENTS MADE TO STROKE OF PUMP
LEGEND:
MAGNETIC FLOW METER
TURBINE FLOW METER
GATE VALVE
CONTROL VALVE
BALL VALVE
FLOW CONTROL VALVE
CHECK VALVE
FOOT VALVE
SAMPLE POINT TO DRAIN
LOGIC
CHEMICAL FEED
PIPELINE
NO NORMALLY OPEN
NC NORMALLY CLOSED
WELL PUMP
CHEMICAL FEEDER
NOTE:
ALL EQUIPMENT IS EXISTING UNLESS NOTED OTHER WISE.
This drawing is an instrument of service and shall remain the property of E.H. Martin Consultants Ltd. It shall not be used for the construction, enlargement or alteration of a building other than the said project without the authorization of the ARCHITECT and / or ENGINEERS
PROJECT
BLACK RIVER MATHESON HOLTYRE WATER TREATMENT PLANT SODIUM SILICATE SEQUESTERING APPLICATION
DRAWING
P & ID SCHEMATIC SHOWING REVISIONS FOR SODIUM SILICATE SEQUESTERING
Date APRIL 2004
Scale N.T.S.
Drawn T.L.B. / R.S.P.
Approved
Job Number 04-302
Dwg. Number M01

Figure 2 – Distribution Map



Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Document issued – Information within OP-06A (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 7, dated September 21, 2017). Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data.
2019 01 29	1	Changed the high lift pumps from centrifugal to submersible and updated PFD (removed turbidity meter and changed pump description to submersible.
2021-12-01	2	Updated PFD. Changed “Sodium silicate for iron sequestering” to “A sequestering agent for iron and manganese”, added “and Manganese” to last sentence under Water Treatment. Updated raw water data.
2024-08-16	3	Updated description below general characteristics. Updated raw water characteristics. Removed watermark.

Matheson Drinking Water System Overview

Owner / Operating Authority

The Matheson Drinking Water System is a communal ground water well supply that services the Town of Matheson. It is a Class 2 Water Distribution & Supply System owned by the Corporation of the Township of Black River-Matheson. The Ontario Clean Water Agency (OCWA) is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities. Certified municipal operators assist OCWA with distribution operations by performing regular maintenance and checks.

Source Water

Raw Water Supply

Well No. 1 is a 150 mm diameter, 38.2 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 11.34 L/sec. Discharge from this well is through a 100 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Works. This well commenced production in March/April 2000.

Well No. 2 is a 150 mm diameter; 43.6 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 5.70 L/sec. Discharge from this well is through a 75 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Works. This well commenced production in March/April 2000.

Well No. 3 is a 200 mm diameter, 39.6 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 11.34 L/s. Discharge from this well is through a 100 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Works. This well commenced production in March/April 2000.

Well No. 4 is a 150 mm diameter, 35.3 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 2.66 L/s. Discharge from this well is through a 50 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Works. This well commenced production in March/April 2000.

General Characteristics

The raw water sources for the treatment plant are four wells as described above. This is a ground water well system, with good, consistent characteristics. All wells do not appear to be vulnerable to bacteriological contamination. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards

Matheson Drinking Water Raw Water Characteristics at Intake

Characteristic		2021			2022			2023		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
E. coli (CFU/100 mL)	Well 1	0	0	0	0	0	0	0	0	0
	Well 2	0	0	0	0	0	0	0	0	0
	Well 3	0	0	0	0	0	0	0	0	0
	Well 4	0	0	0	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	Well 1	0	0	0	0	0	0	0	0	0
	Well 2	0	0	0	0	0	0	0	0	0
	Well 3	0	0	0	0	3	0.07	0	0	0
	Well 4	0	0	0	0	0	0	0	1	0.02
Turbidity (NTU)	Well 1	0.11	0.55	0.24	0.15	0.65	0.29	0.11	0.40	0.22
	Well 2	0.14	0.44	0.24	0.14	0.42	0.25	0.13	0.80	0.30
	Well 3	0.13	0.42	0.27	0.15	0.56	0.31	0.15	0.27	0.22
	Well 4	0.30	0.88	0.61	0.31	0.91	0.62	0.25	0.93	0.45

Common Fluctuations

The water quality remains consistent because well water is not subject to the same fluctuations as surface water.

Threats

The wells are properly sloped and maintained thus infiltration is not an issue. The wells have been subject to vandalism, but chain link fencing has been erected and police surveillance has been increased.

Operational Challenges

On the rare occasion that a power interruption occurs for a prolonged period of time there are emergency generators to assist in keeping the plant running until power is restored.

Treatment System Description

Water Treatment

The wells and Water Treatment Plant which commenced operation in 2000 are situated on the west shore of Belleek Lake. Within the treatment works, the four individual well discharge pipes are metered for flow and then join into one common header where the water is injected with a sodium hypochlorite solution. Raw water sample taps are located on each of the four well discharge headers. The disinfection system consists of two chemical metering pumps, one duty and one on standby; and one chemical solution tank. Each of the chlorine pumps is capable of pumping sodium hypochlorite solution. After the water is injected with sodium hypochlorite, it is metered then discharged from the treatment works through a 150 mm diameter pipe which runs 1250 metres in length to provide for the minimum 15 minute chlorine contact time. The 1250 m water main also serves as discharge to the reservoir and to the distribution system.

Water Storage and Pumping Capabilities

The single chamber reservoir is located on a high point of land and has a storage capacity of 450 cubic metres. A 1,250 m treated water main runs from the water treatment plant to a valve chamber at the reservoir. This watermain is the chlorine contact vessel. The valve chamber at the end of the watermain directs the treated water either to storage or directly into the distribution system, depending on the time of day and/or the system pressure. Throughout the day, treated water is discharged to the distribution system while the reservoir provides storage/emergency supply. When demand is low (i.e. at night), the water is directed into the reservoir.

Emergency Power

There is a 75 kW diesel generator and fuel tank at the water treatment plant and another 10 kW at the reservoir. These generators are capable of supplying power to the facilities during power outages/failures.

Treatment System Process Flow Chart

Refer to Figure 1 on page 4.

Description of the Distribution System Components

The water supply/treatment/storage system is located in the community of Matheson and serves an estimated population of 800 persons with approximately 390 residential service connections. Based on information provided by the owner, the Matheson Drinking Water is categorized as a Large Municipal Residential System. There are approximately 32 fire hydrants. Watermains range in size from 25 mm to 250 mm and are made of PVC, asbestos-cement or galvanized steel.

Refer to Figures 2a and 2b on pages 5 and 6 for the Distribution System Map

Figure 1 – Matheson Process Flow Chart

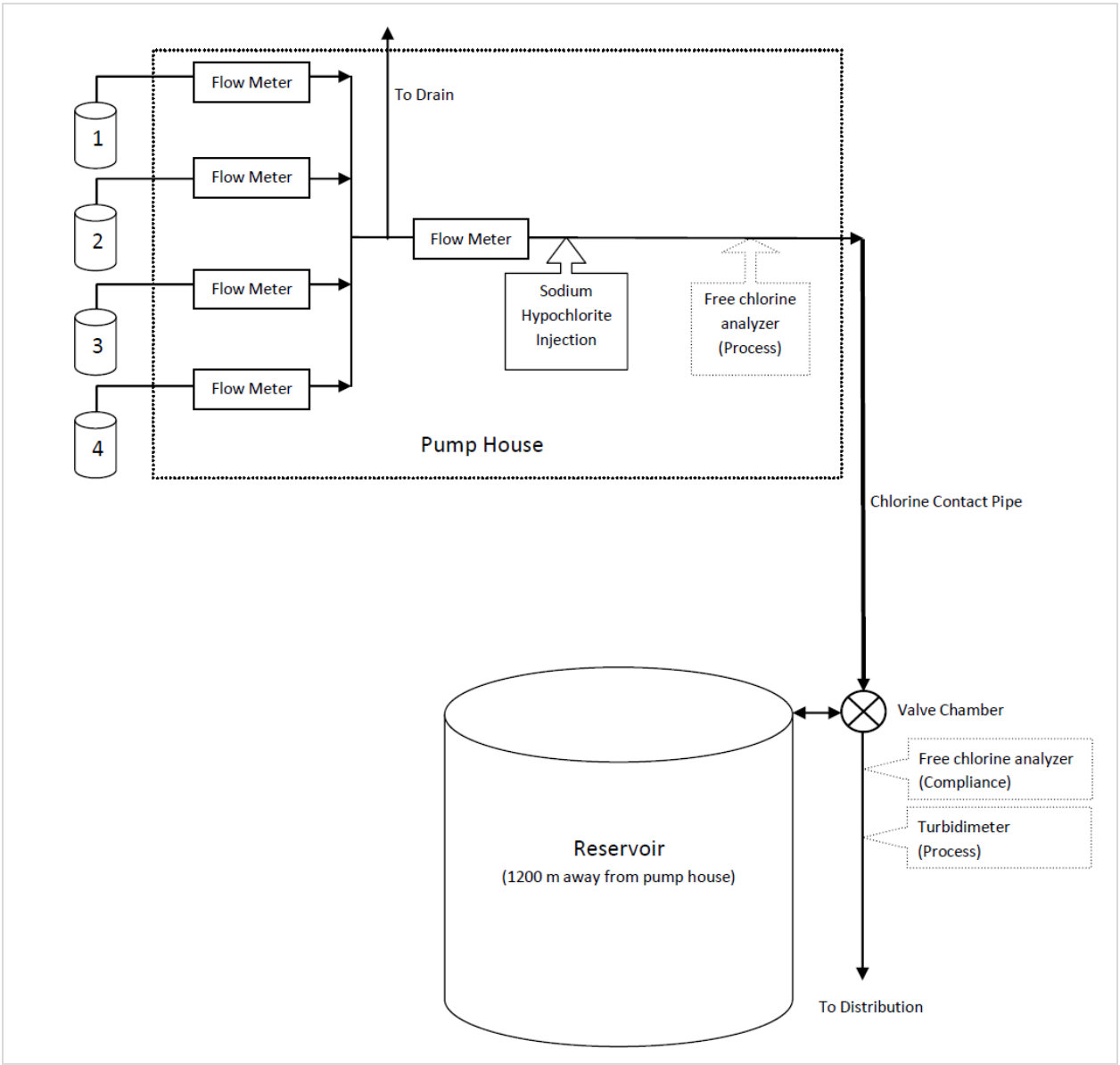


Figure 2A - Distribution Map

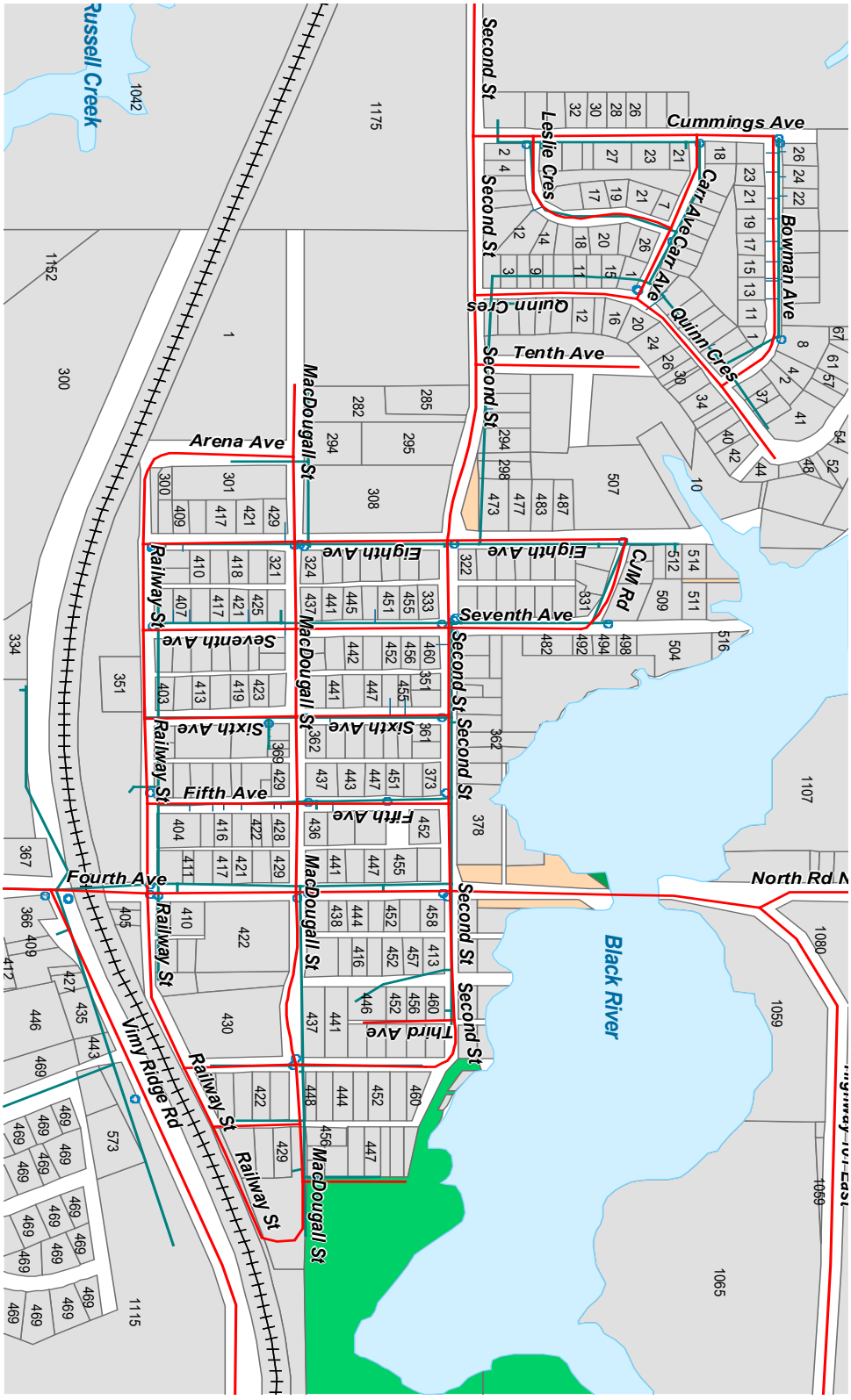
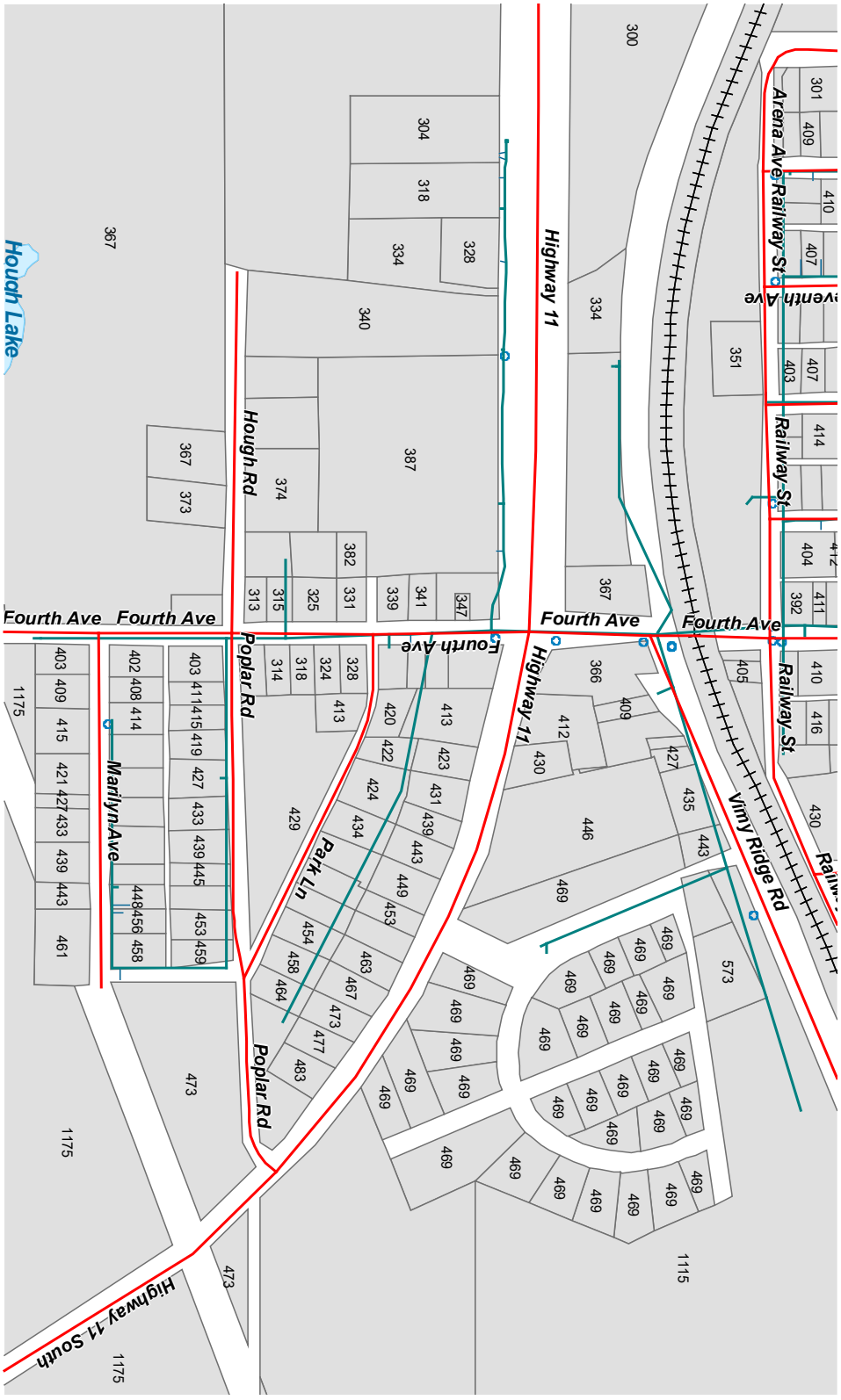


Figure 2B - Distribution Map cont'd



Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-06 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 7, dated September 21, 2017. Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data.
2018-10-25	1	Changed “Class 2 Water Treatment facility and a Class 3 Water Distribution system” to “Class 2 Water Distribution & Supply System” on page 1. Updated Raw water table.
2019-08-12	2	Corrections: Changed 3 chemical pumps to 2, one duty and one standby. Changed diesel generator from 12.5 to 75kW
2021-12-01	3	Added reservoir generator to back up power supply and updated raw water table.
2024-08-19	4	Updated description below general characteristics. Updated raw water characteristics. Removed watermark.

Ramore Drinking Water System Overview

Owner / Operating Authority

The Ramore Drinking Water System is a communal ground water well supply that services the Town of Ramore. It is a Class 1 Water Treatment facility owned by the Corporation of the Township of Black River-Matheson. The Ontario Clean Water Agency (OCWA) is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities. Certified municipal operators assist OCWA with distribution operations by performing regular maintenance and checks.

Source Water

Raw Water Supply

Ramore Drinking Water system is fed by three source wells, located in an easement approximately 335 m east of Ferguson Avenue and approximately 110 m south of Saint Joseph Street in the Town of Ramore. Each of the three wells has a discharge line connected to a well pump header, located in the pumphouse. The descriptions below of the wells are based on Certificate of Approval No. 1092-6AZPA9 issued on May 1, 2005.

Well No. 5 is a main production well consisting of a 150 mm diameter, 48.11 m deep drilled groundwater production well. This well is equipped with a submersible deep well pump rated at 162 L/min at a total dynamic head (TDH) of 65 m. Discharge from this well is through a 50 mm diameter discharge line.

Well No. 4 is a main production well consisting of a 200 mm diameter, 45.36 m deep drilled groundwater production well, which is equipped with a submersible deep well pump rated at 318 L/min at a TDH of 65 m. Discharge from this well is through a 75 mm diameter discharge line.

Well No. 3 is a standby well consisting of a 400 mm diameter, 43.26 m deep drilled groundwater production well. This well is equipped with a submersible deep well pump rated at 180 L/min at a TDH of 65 m. Discharge from this well is through a 50 mm diameter discharge line.

General Characteristics

The raw water source for the treatment plant is groundwater via Wells 3, 4 and 5. The water from the wells is typically low in turbidity. Temperature does not fluctuate significantly through the seasons. Bacteriological analysis of the raw water indicates a source of relatively good quality. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards

Ramore Drinking Water Raw Water Characteristics at Intake

Characteristic		2021			2022			2023		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
E. coli (CFU/100 mL)	Well 3	0	0	0	0	0	0	0	0	0
	Well 4	0	0	0	0	0	0	0	0	0
	Well 5	0	0	0	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	Well 3	0	0	0	0	0	0	0	0	0
	Well 4	0	0	0	0	0	0	0	0	0
	Well 5	0	0	0	0	0	0	0	0	0
Turbidity (NTU)	Well 3	0.33	1.09	0.76	0.51	1.65	0.84	0.64	0.93	0.72
	Well 4	0.16	0.44	0.30	0.13	0.50	0.34	0.14	0.95	0.37
	Well 5	0.27	0.92	0.46	0.41	1.31	0.85	0.25	0.88	0.57

Common Fluctuations

The water quality remains consistent because well water is not subject to the same fluctuations as surface water.

Threats

The wells are properly sloped and maintained thus infiltration is not an issue.

Operational Challenges

On the rare occasion that a power interruption occurs for a prolonged period of time there are emergency generators to assist in keeping the plant running until power is restored.

Treatment System Description

Water Treatment

The pumphouse contains the disinfection equipment, system controls and two 500 litre pressure tanks. The sodium hypochlorite disinfection system consists of one 60 litre chemical storage tank and three chemical metering pumps (two duty and one standby). The feed of sodium hypochlorite is directly into the well pump discharge header immediately downstream from the pump. The sodium silicate injection system consists of one chemical storage tank and two metering pumps (one duty and one standby). The sodium silicate feed is directly into the well pump discharge header immediately downstream from the pump. The sodium silicate injection system is usually only used when Well No. 3 is operating. Chlorine contact is provided by a below ground contact

chamber consisting of a 35 m (105 feet) x 750 mm (24 inch) HDPE (high density polyethylene) water main before discharge to the distribution system.

Emergency Power

35 kW diesel generator and associated fuel tank are available at the plant and is capable of supplying power to the entire facility during power failures.

Treatment System Process Flow Chart

Refer to Figure 1 on page 4.

Description of the Distribution System Components

The distribution system serves an approximate population of 175 people residing in approximately 50 private residences. The total number of service connections is estimated to be 98, the difference of which being commercial properties and serviced undeveloped properties. The distribution system piping consists mainly of four (4) inch asbestos concrete constructed watermain.

Refer to Figure 2 on page 5 for the Distribution Map

Figure 1 – Ramore Process Flow Chart

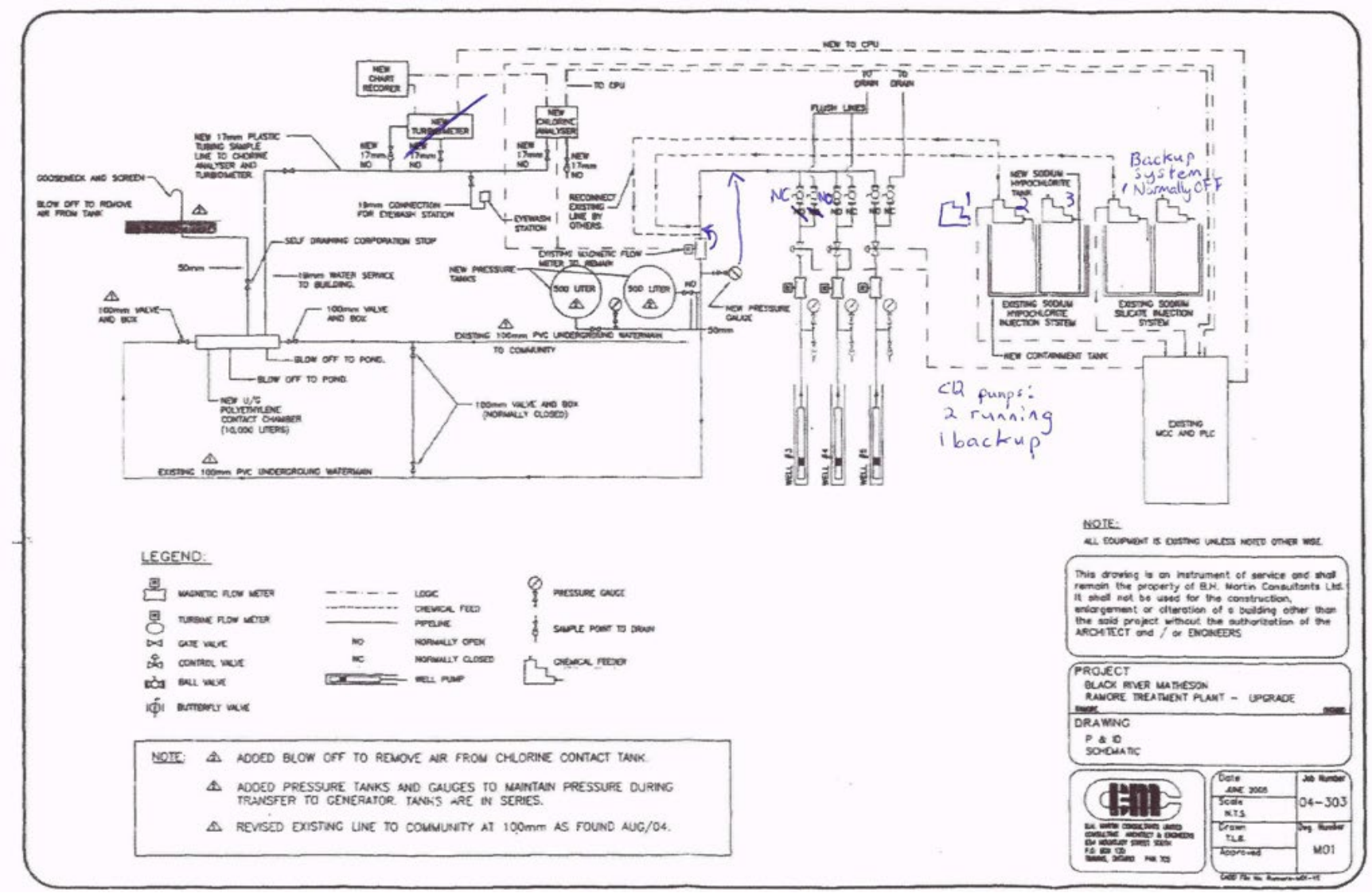
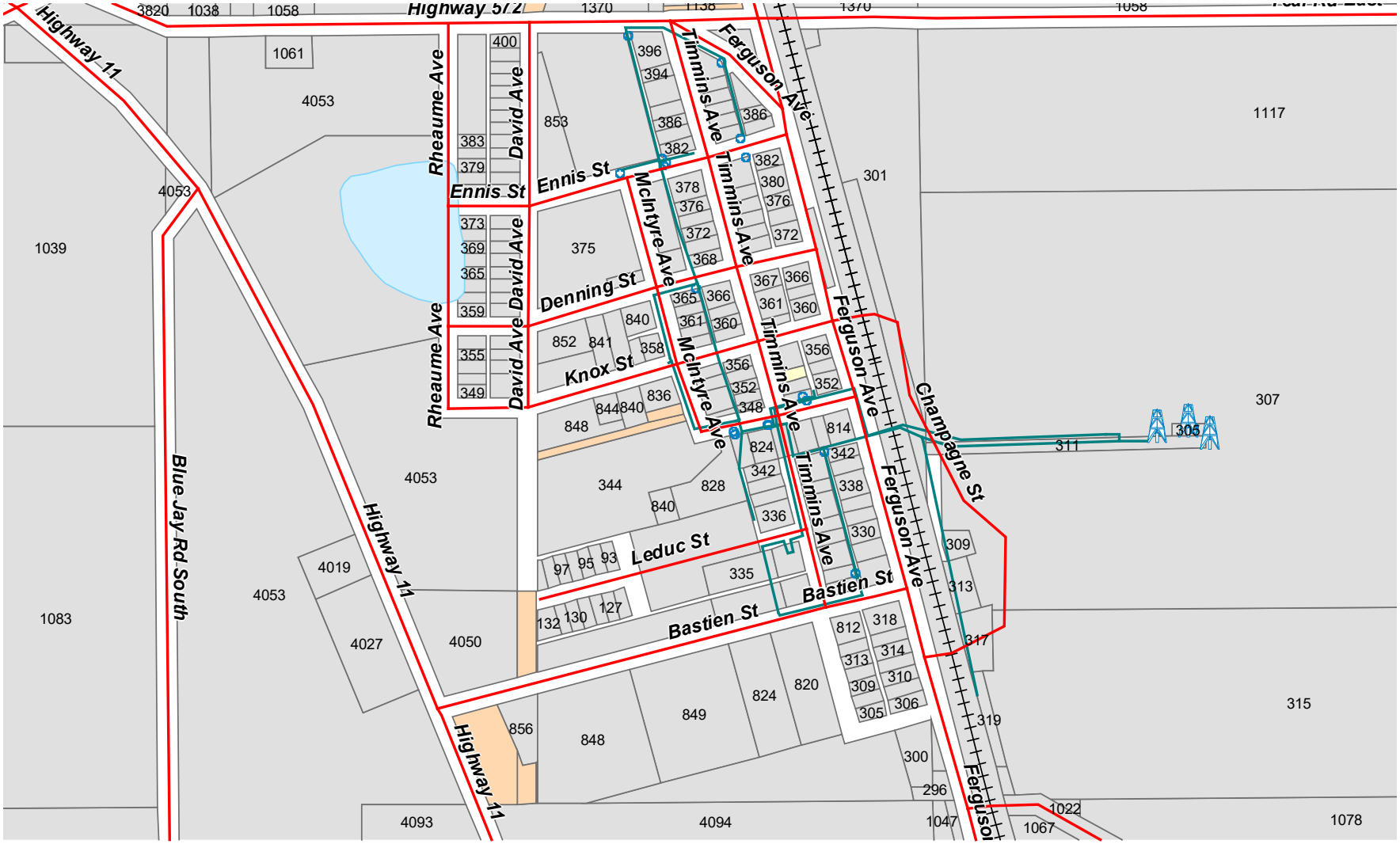


Figure 2 – Distribution Map



Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-06 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 7, dated September 21, 2017). Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data.
2019-08-12	1	Correction: changed diesel generator from 12.5 to 35 kW, two chemical pumps to three (2 duty, 1 standby).
2021-12-01	2	Updated raw water table and PFD.
2024-08-19	3	Updated raw water characteristics. Removed watermark.

Val Gagne Drinking Water System Overview

Owner / Operating Authority

The Val Gagne Drinking Water System is a communal ground water well supply that services the Town of Val Gagne. It is a Class 1 facility owned by the Corporation of the Township of Black River-Matheson. The Ontario Clean Water Agency (OCWA) is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities. Certified municipal operators assist OCWA with distribution system operations by performing regular maintenance and checks.

Source Water

Raw Water Supply

The main production well, Well 1, is located near Highway 11 on the south side of the concessions 5 & 6 side road, Country Lane Road. It is a deep drilled groundwater well that is 150 mm in diameter and 22.9 m deep. The well is pumped at the rate of 158.9 L/min by a 2.23 kW submersible deep well pump. It then connects to the Val Gagne water treatment plant by a 1027 meter long watermain.

A back-up well, Well 6, is located in the treatment plant building. It is a drilled groundwater well that is 200 mm in diameter and 56.4 m deep. It is equipped with a submersible pump, rated at 46 L/min at a TDH of 62 m, with a 50 mm diameter discharge line connected to a common well pump header. This well has not been used in several years and is for mainly emergency use only although it has recently been run at least monthly for testing

Well 4 was decommissioned November 25, 2016.

General Characteristics

The raw water source for the treatment plant is groundwater via Wells 1 and 6. The water from the wells is typically low in turbidity. Temperature does not fluctuate significantly through the seasons. Bacteriological analysis of the raw water indicates a source of relatively good quality. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards with the exception of sodium in Well 1.

Val Gagne Drinking Water Raw Water Characteristics at Intake

Characteristic		2021			2022			2023		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
E. coli (CFU/100 mL)	Well 1	0	0	0	0	0	0	0	0	0
	Well 6	0	0	0	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	Well 1	0	0	0	0	0	0	0	0	0
	Well 6	0	0	0	0	0	0	0	3	0.23
Turbidity (NTU)	Well 1	0.10	0.63	0.34	0.11	0.62	0.33	0.22	0.94	0.53
	Well 6	1.21	2.74	1.71	0.86	1.61	1.13	0.72	1.00	0.88
Sodium mg/L	Well 1	23	27	25	24.6	26.4	25.5	24.8	30.2	27.5
	Well 6	6.12	6.12	6.12				-	-	-

Common Fluctuations

The water quality remains consistent because well water is not subject to the same fluctuations as surface water.

Threats

The wells are properly sloped and maintained thus infiltration is not an issue.

Operational Challenges

On the rare occasion that a power interruption occurs for a prolonged period of time there are emergency generators to assist in keeping the plant running until power is restored.

Treatment System Description

Water Treatment

The main plant houses the disinfection system; both the chemical storage and feed system. Sodium hypochlorite is injected directly into the well pump discharge header by two pace-to-flow metering pumps (one duty and one standby). The sodium hypochlorite is stored in one solution tank equipped with secondary containment.

An in-ground reservoir with a storage capacity of 550 m^3 serves as the chlorine contact chamber and provides water storage for the distribution system. A 3100 litre baffled contact tank is used during scheduled cleaning of the reservoir. The chlorinated water is directed to the tank to provide sufficient contact time before entering the distribution system.

Water Storage and Pumping Capabilities

An in-ground reservoir with a storage capacity of 550 m^3 serves as the chlorine contact chamber and provides water storage for the distribution system. A 3100 litre baffled contact tank is used during scheduled cleaning of the reservoir.

Water is pumped into the distribution system by two 3 H.P. submersible pumps with variable frequency drives and a capacity of 150 L/min. A diesel driven high flow pump is also available to deliver water at the rate of 2270 L/min during emergencies

Emergency Power

12.5 kW diesel generator and associated fuel tank are available at the plant and is capable of supplying power to the entire facility during power failures.

Treatment System Process Flow Chart

Refer to Figure 1 on page 4.

Description of the Distribution System Components

The distribution system for the Val Gagne Drinking Water system serves a population of 175 people with a total of 88 service connections (74 in Val Gagne North and 14 in Val Gagne South). In Val Gagne North, the distribution system consists primarily of six (6) inch water main, 75% of which are asbestos concrete construction and the remainder being PVC construction. In Val Gagne South, the distribution system consists primarily of singular straight length six (6) inch ductile water main. A valve is located at the terminal end of the water main and is used during system flushing.

Refer to Figure 2 on page 5 for Distribution System Map

Figure 1 – Val Gagne Process Flow Chart

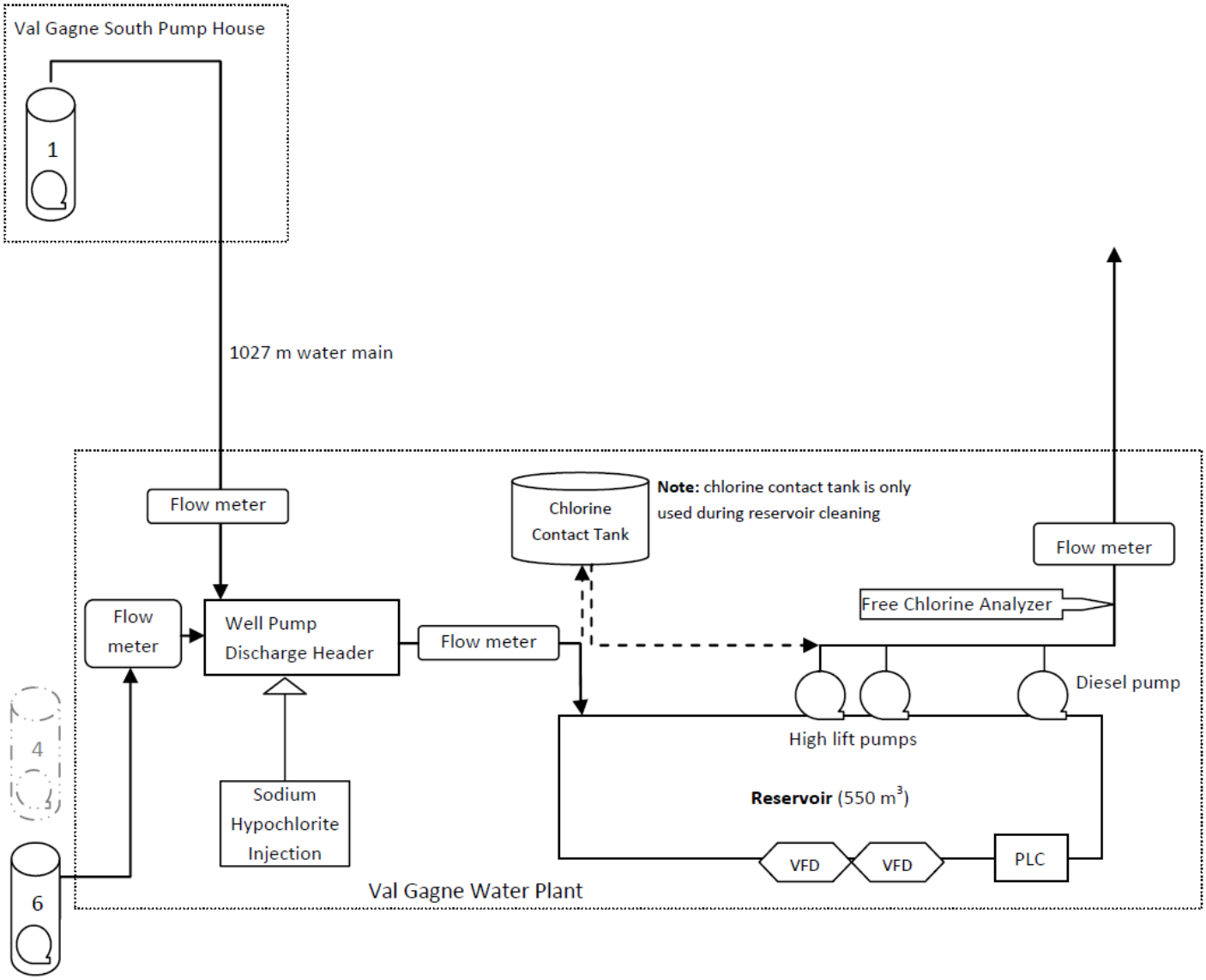
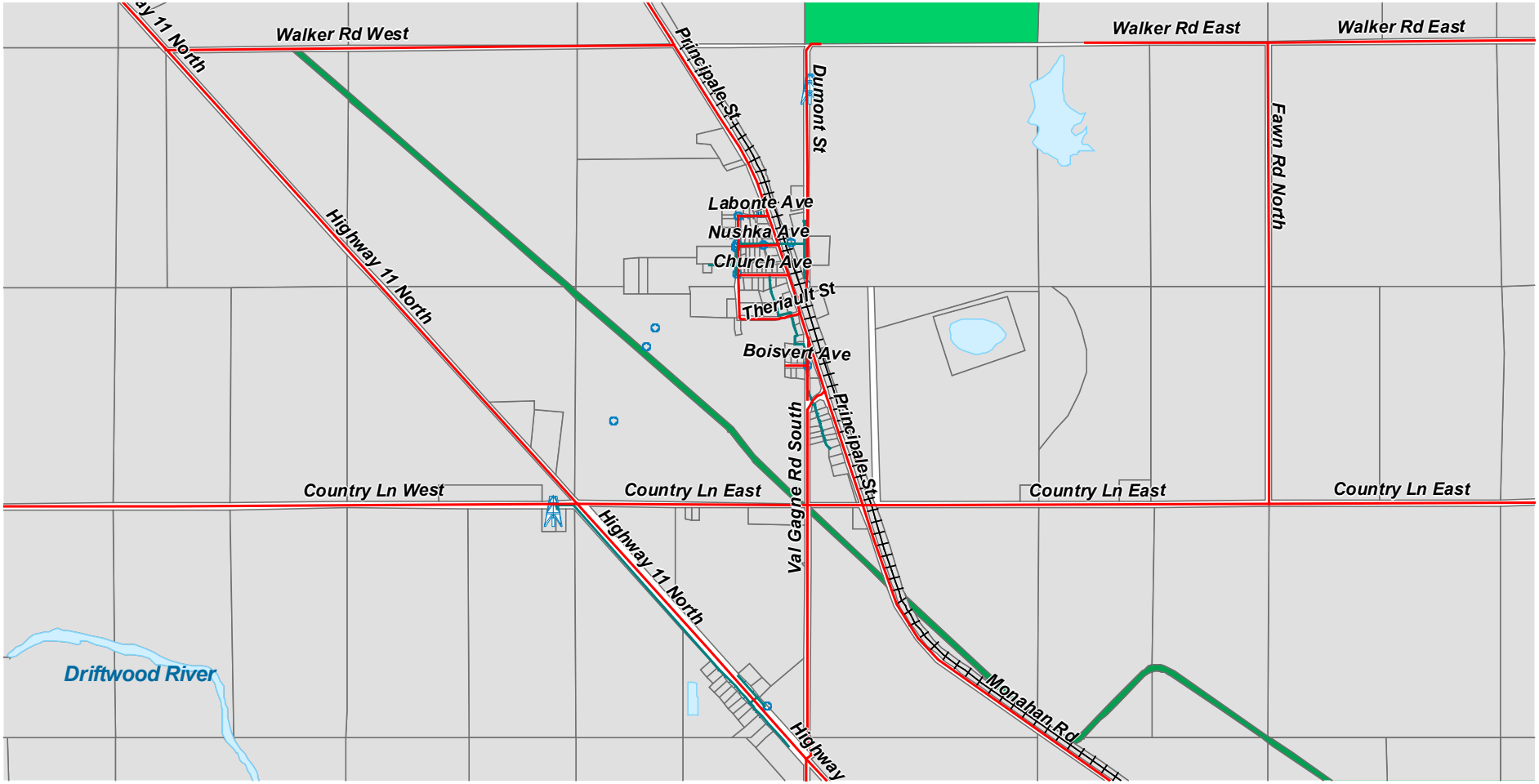


Figure 2 – Val Gagne Distribution Map



Related Documents

None

Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-06 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems Operational Plan (revision 7, dated September 21, 2017). Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data.
2021-12-07	1	Changed two solution tanks for hypo to one and changed two 5.6 Kw vertical turbine pumps rated at a capacity of 290 L/min to 3 H.P. submersible pumps with variable frequency drives and a capacity of 150 L/min. Updated raw water table.
2024-08-19	2	Updated raw water characteristics. Removed watermark.

1. Purpose

To document the process for conducting a risk assessment to identify and assess potential hazardous events and associated hazards that could affect drinking water safety.

2. Definitions

Consequence – the potential impact to public health and/or operation of the drinking water system if a hazard/hazardous event is not controlled

Control Measure – includes any processes, physical steps or other practices that have been put in place at a drinking water system to prevent or reduce a hazard before it occurs

Critical Control Point (CCP) – An essential step or point in the subject system at which control can be applied by the Operating Authority to prevent or eliminate a drinking water health hazard or reduce it to an acceptable level

Drinking Water Health Hazard – means, in respect of a drinking water system,

a) a condition of the system or a condition associated with the system's waters, including anything found in the waters,
    i. that adversely affects, or is likely to adversely affect, the health of the users of the system,
    ii. that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or
    iii. that endangers or is likely to endanger public health,
b) a prescribed condition of the drinking water system, or
c) a prescribed condition associated with the system's waters or the presence of a prescribed thing in the waters

Hazardous Event – an incident or situation that can lead to the presence of a hazard

Hazard – a biological, chemical, physical or radiological agent that has the potential to cause harm

Likelihood – the probability of a hazard or hazardous event occurring

3. Procedure

3.1 Operations Management ensures that operations personnel are assigned to conduct a risk assessment at least once every thirty-six months. At a minimum, the Risk Assessment Team must include the QEMS Representative, at least one Operator for the system and at least one member of Operations Management.

3.2 The QEMS Representative is responsible for coordinating the risk assessment and ensuring that documents and records related to the risk assessment activities are maintained.

3.3 The Risk Assessment Team performs the risk assessment as follows:

3.3.1 OP-07 Risk Assessment and OP-08 Risk Assessment Outcomes are reviewed.

3.3.2 For each of the system's activities/process steps, potential hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water are identified. At a minimum, potential hazardous events and associated hazard as identified in the most current version of the Ministry's document titled "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as applicable to the system type) must be considered.

3.3.3 For each of the hazardous events, control measures currently in place at the system to eliminate the hazard or prevent it from becoming a threat to public health are specified. Control measures may include alarms, monitoring procedures, standard operating procedures/emergency procedures/contingency plans, preventive maintenance activities, backup equipment, engineering controls, etc.

3.3.4 To ensure that potential drinking water health hazards are addressed and minimum treatment requirements as regulated by SDWA O. Reg. 170/03 and the Ministry's "Procedure for Disinfection of Drinking Water in Ontario" (as amended) are met, OCWA has established mandatory Critical Control Points (CCPs).

<u>As a minimum, the following must be included as CCPs (as applicable):</u>

- Equipment or processes required to achieve primary disinfection (e.g., chemical and/or UV disinfection system, coagulant dosing system, filters, etc.)
- Equipment or processes necessary for maintaining secondary disinfection in the distribution system
- Fluoridation system

3.3.5 Additional CCPs for the system are determined by evaluating and ranking the hazardous events for the remaining activities/process steps (i.e., those <u>not</u> included as OCWA's minimum CCPs).

3.3.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), each hazardous event is assigned a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:

Value	Likelihood of Hazardous Event Occurring
1	**Rare** – Estimated to occur every 50 years or more (usually no documented occurrence at site)
2	**Unlikely** – Estimated to occur in the range of 10 – 49 years
3	**Possible** – Estimated to occur in the range of 1 – 9 years
4	**Likely** – Occurs monthly to annually
5	**Certain** – Occurs monthly or more frequently

Value	Consequence of Hazardous Event Occurring
1	**Insignificant** – Little or no disruption to normal operations, no impact on public health
2	**Minor** – Significant modification to normal operations but manageable, no impact on public health
3	**Moderate** – Potentially reportable, corrective action required, potential public health impact, disruption to operations is manageable
4	**Major** – Reportable, system significantly compromised and abnormal operations if at all, high level of monitoring and corrective action required, threat to public health
5	**Catastrophic** – Complete failure of system, water unsuitable for consumption

The likelihood and consequence values are multiplied to determine the risk value (ranking) of each hazardous event. Hazardous events with a ranking of 12 or greater are considered high risk.

3.3.7 Hazardous events and rankings are reviewed and any activity/process step is identified as an additional CCP if <u>all</u> of the following criteria are met:

- ✓ The associated hazardous event has a ranking of 12 or greater;
- ✓ The associated hazardous event can be controlled through control measure(s);
- ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion;
- ✓ Specific control limits can be established for the control measure(s); and
- ✓ Failure of the control measures would lead to immediate notification to the Medical Officer of Health (MOH) and/or Ministry.

3.4 The outcomes of the risk assessment are documented as per OP-08 Risk Assessment Outcomes.

3.5 At least once every calendar year, the QEMS Representative facilitates the verification of the currency of the information and the validity of the assumptions used in the risk assessment in preparation for the Management Review (OP-20). When performing this review, the following may be considered:

- Process/equipment changes
- Reliability and redundancy of equipment
- Emergency situations/service interruptions
- CCP deviations
- Audit/inspection results
- Changes to the Ministry document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)

4. Related Documents

Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)
Ministry's "Procedure for Disinfection of Drinking Water in Ontario" (as amended)
OP-08 Risk Assessment Outcomes
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-07 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (revision 6, dated September 29, 2016). Revised Purpose to reflect element 7 requirements only. Included minimum requirements for the Risk Assessment Team (QEMS Representative, at least one operator for the system and at least one member of Operation Management. Clarified role of QEMS Representative in coordinating the risk assessment and maintaining documents and records. Re-worded procedure for performing the risk assessment (process itself remains essentially unchanged). Included reference to MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems". Removed requirements for documenting the outcomes of the risk assessment (now covered in OP-08). Changed annual review to at least once every calendar year and included potential considerations when performing the review.
2019-08-12	1	Changed MOECC to MECP
2022-05-01	1	Procedure updated - Replaced MOECC with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following any references to Ministry documents to refer to the most current version of the document and added the Ministry document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended) to the list of items that may be considered when

Date	Revision #	Reason for Revision
		performing the annual verification of the currency of the information in the risk assessment)].

1. Purpose

To document the outcomes of the risk assessment conducted as per OP-07 Risk Assessment.

2. Definitions

Critical Control Point (CCP) – An essential step or point in the subject system at which control can be applied by the Operating Authority to prevent or eliminate a drinking water health hazard or reduce it to an acceptable level

Critical Control Limit (CCL) – The point at which a Critical Control Point response procedure is initiated

3. Procedure

3.1 The QEMS Representative is responsible for updating the information in OP-08A Summary of Risk Assessment Outcomes as required.

3.2 The results of the risk assessment conducted as per OP-07 are documented in Table 1 of OP-08A. This includes:

- Identified potential hazardous events and associated hazards (possible outcomes) for each of the system's activities/process steps;
  Note: Hazards listed in the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended) are indicated in the appropriate column using the reference numbers in Table 4 of OP-08A.
- Identified control measures to address the potential hazards and hazardous events; and
- Assigned rankings for the hazardous events (likelihood x consequence = risk value) and whether the hazardous event is a Critical Control Point (CCP) (mandatory or additional).
  Note: If the hazardous event is ranked as 12 or higher and it is <u>not</u> being identified as a CCP, provide rationale as to why it does not meet the criteria set out in section 3.3.7 of OP-07).

3.3 Operations Management is responsible for ensuring that for each CCP:

- Critical Control Limits (CCLs) are set;
- Procedures and processes to monitor the CCLs are established; and
- Procedures to respond to, report and record deviations from the CCLs are implemented.

The identified CCPs, their respective CCLs and associated procedures are documented in Table 2 of OP-08A.

3.4 A summary of the results of the annual review/36-month risk assessment is recorded in Table 3 of OP-08A.

3.5 Operations Management considers the risk assessment outcomes during the review of the adequacy of the infrastructure (Refer to OP-14 Review and Provision of Infrastructure).

4. Related Documents

OP-07 Risk Assessment
OP-08A Summary of Risk Assessment Outcomes
OP-14 Review and Provision of Infrastructure
Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)

5. Revision History

Date	Revision #	Reason for Revision
2018-06-28	0	Procedure issued – Information within OP-08 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (revision 6, dated September 29, 2016). Clarified role of QEMS Representative in updating the information in OP-08A Summary of Risk Assessment Outcomes. Included requirements for how to document the risk assessment outcomes using the tables in OP-08A. Clarified responsibility of Operations Management to ensure Critical Control Limits are set and related procedures are developed. Included reference to OP-14 Review and Provision of Infrastructure to emphasize the need for Operations Management to review the risk assessment outcomes during the infrastructure review.
2019-08-12	1	Changed MOECC to MECP
2022 05 01	1	Procedure updated - Replaced MOECC with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following references to the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to refer to the most current version of the document)].

Summary of Risk Assessment Outcomes
Holtyre Drinking Water System

Table 1: Risk Assessment Table for Holtyre Drinking Water System

Note: Processes referred to in section 3.3.4 of OP-07 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water/Well *(2 wells)*	1, 2, 3, 4, 6	Well casing collapse	Loss of raw water	• Redundancy - Back-up well and pump	1	2	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 9	Low Groundwater Levels or Depletion of the Aquifer	Less water supply	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	2	4	8	
	1, 2, 3, 4, 9	Drought Conditions	Less water supply, could lead to depletion of aquifer	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	1	4	4	
	2	Well pump failure	Loss of raw water	• Back-up well and pump, • Well pump(s) failure alarm, • Site specific Environmental Emergency Procedure (EEP) for Well Pump Failure • Spare pumps within hub	2	2	4	
	2, 5, 6, 9	Fuel/Chemical Spill	Contamination of aquifer	• Monitoring and sampling • Contingency Plan for loss of service • Site specific EEP for Off-site Chemical/Fuel Spill • Site specific EEP for Contaminated Raw Water	1	4	4	
Sodium Hypochlorite System	10	Chemical feed pump failure	Loss of disinfection, Low chlorine residual,	• On-line monitoring with alarms (low level set point no lower than 0.2 mg/L), • Redundancy				☒ Yes – Mandatory CCP

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
(for primary disinfection)			Inadequate inactivation of pathogens, Potential for AWQI	• In-house residual testing and dosage calculations, • Scheduled maintenance activities, • Site specific EEP for Chlorine Pump Failure, • Site specific Standard Operating Procedure (SOP) for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to Adverse Results, • Contingency Plan for Unsafe Water				☐ Yes – Additional CCP identified for facility ☐ No
Sodium Hypochlorite System (for primary disinfection) (continued)	10	Analyzer failure	Unknown chlorine residual levels, Potential for AWQI	• Low level Alarm (set point no lower than 0.2 mg/L), • In-house residual testing, • Scheduled maintenance activities, • Back-up analyzers within Hub, • Site specific SOP for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Adverse Water/Potential and/or Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	10	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	• Low chlorine residual alarms (set point no lower than 0.2 mg/L), • Operator checks, • Chemical available within hub. • SOP for Chlorine Contact Time,				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Site specific EEP for Low or High Chlorine Residual in Treated Water. • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Unsafe Water.				☐ No
	5	High chlorine residual	Potential for irritation to skin and sensitive individuals	• High chlorine residual alarms (set point no higher than 1.99 mg/L), • Operator checks, • Site specific EEP for Low or High Chlorine Residual in Treated Water. • Contingency Plan for Unsafe Water.	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Clearwells (1 reservoir)	1, 2, 3, 10	Low level	Inadequate contact time for primary disinfection, Inadequate treated water supply	• Low level alarm (set point ≥2.5 meters) • Schedule maintenance and inspection activities, • Town ordered water conservation or ban, • Site specific EEP for Water Supply Shortage. • Contingency plan for Loss of Service • Contact Time SOP	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 3, 6, 7, 10	Reservoir out of service for repair, maintenance	Inadequate contact time for primary disinfection	• Use contact tank as a contingency, • Scheduled controlled maintenance plan • Contact Time SOP	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	2, 6, 10	Fuel/Chemical Spill	Contamination of treated water, loss of service	• Containment tank on fuel tank • EEP for chemical spill and contaminated treated water • Monitor and sample • Contingency Plan for Unsafe Water. • Contingency plan for Loss of Service	2	5	10	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
High Lift	2, 6, 7, 8	High lift pump failure (run one at a time)	Low pressure in distribution system, Possible contamination due to backflow	• Redundancy - 3 pumps, automatic switchover (1 duty, 2 standby) • Third pump running alarm • On-line monitoring of discharge pressure, • Sampling and monitoring • Scheduled maintenance activities, • operational control, • Site specific EEP for High Lift Pump Failure. • Environmental Emergency Procedure for Low Pressure Events in the Distribution System	2	1	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Secondary Disinfection	11	Loss of residual in distribution	Failure to control biofilm and pathogens (long-term), AWQI	• Continuous on-line monitoring of chlorine residual into the distribution system, • System-wide residual testing, • Regularly scheduled maintenance (by municipality) • Alarms for low/high chlorine residuals in water entering distribution system (set point no lower than 0.2 mg/L) • EEP for Reporting and Responding to Adverse Results				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
Water Treatment System	1, 2, 3, 6, 7	Power failure of long duration	Loss of treated water	• Back-up diesel generator,	3	2	6	☐ Yes – Mandatory CCP

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Water Treatment System Cont'd			supply	• Scheduled maintenance activities for back-up generator • Site specific EEP for Power Failure of Long Duration • Site specific EEP for Standby Power Failure • Contingency Plan for Loss of Service				☐ Yes – Additional CCP identified for facility ☒ No
	3	Power failure of short duration	Loss of treated water supply	• Back-up diesel generator, • Scheduled maintenance activities for back-up generator, • Site specific EEP for Standby Power Failure	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 5, 6, 7, 10, 11	Vandalism/terrorism	Contamination of the water supply, Damage to critical equipment	• Locked and/or alarmed (water plant , well houses, clearwell hatches inside & outside plant), • Wells are surrounded by concrete tiles and have concrete lids (well 1 needs a concrete container or fence) Well 3 surrounded by fence • Visited routinely by OCWA staff, • Site specific EEP for Vandalism or Suspected Unauthorized Entry • Lighting	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	CP for Critical Shortage of Staff Staff training and PPE OCWA's Emergency Operations Center (EOC)	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP

HOLTYRE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
				Staff isolation/ remote work done where possible Alternate suppliers available, refer to ESS list				identified for facility ☒ No

HOLTYRE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
Water Treatment System Cont'd	13	Cybersecurity threats	Loss of system process visibility for operators (e.g., unable to monitor treatment processes) Interruption of data recording leading to a loss of critical/compliance data Inability to remotely control processes and/or loss of automatic control installation of malicious programs like ransomware, which can disable business enterprise until money is paid Loss of data (stolen or maliciously deleted)	Implementing Identity and Access Management throughout the account management lifecycle. Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job. Employing default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands. Applying multiple layers of defense including: o Intrusion detection systems constantly monitoring traffic flow (borders) o Firewalls that provide real-time filtering and blocking (walls) o Cryptography and layered authentication (zones) o Certified professionals ensuring system integrity (gatekeepers) Constant monitoring and tracking for quick and effective response to attacks Perform routine vulnerability scans and threat assessments Carry out periodic cyber security audits and risk compliance checks	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Distribution System	1, 2, 3, 6, 7, 11	Adverse Water Result as described in O. Reg. 170/03	Potential for unsafe drinking water	• Standard Operating Procedure for the Holtyre Drinking Water Sampling Schedule, • EEP for Reporting and Responding to Adverse Results in Small Municipal Residential Systems (several EEPs) • Notification by Lab	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 6, 7, 8, 11	Water Main Break	Potential for unsafe drinking water or loss of supply	• Monitoring of flows leaving plant • EEP for Reporting and Responding to Adverse Results in Small Municipal Residential Systems (several EEPs). • Site specific EEP for Water Supply Shortage • SOP and forms for watermain break	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 7, 8	Increased consumption	Loss of supply, loss of fire protection, contamination	• Monitoring of clearwell and flows • EEP for Reporting and Responding to Adverse Results in Small Municipal Residential Systems (several EEPs). • Site specific EEP for Water Supply Shortage • CP Unsafe Water	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Valves	1, 3, 4, 6, 7, 8	Failure	Loss of control, line breaks and/or contamination, loss of water supply	• Maintenance program, • Response to consumer complaints • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

HOLTYRE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Flushing (clean out pipes, remove accumulation)	2, 11	Failure to flush	Contamination, build up, decreased velocity	• Maintenance program, • Training, • Procedures for flushing • Public Works does flushing twice per year	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Connection, hydrants, valves, constructions, etc.	1, 2, 3, 4, 6, 7, 8, 11	Accident, vandalism	Contamination, loss of supply	• Inspection by OCWA or Public Works during flushing • Notification/complaints from consumers, • Increase in water/wastewater usage/flows • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Service Connections	1, 11	Cross connection	Contamination	• Consumer notification/complaints • Distribution system microbiological testing • Contingency Plan for Unsafe Water	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 3, 4, 7, 8, 11	Structural failure/breaks	Contamination, loss of pressure, loss of supply	• Consumer notification/complaints • Microbiological sampling/testing • Monitor flows and usage • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

HOLTYRE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
Maintain System Pressure	1, 2, 3, 7, 8, 11	Major fire	Contamination, loss of pressure	• Emergency management, • Notification by fire department for major fires, • SOP for Reporting AWQI's • Fire dept keeps fire trucks full and does Not get water from the distribution system • Contingency Plan for Unsafe Water	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
New Construction	11	Sub-standard construction and/or commissioning	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • Ontario's New Watermain Disinfection Procedure • EEP for Adverse Water Quality Incidents • Communication with the Health Unit • Contingency Plan for Unsafe Water	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Temporary Water Distribution System (temporary system put in place during construction)	11	Infiltration	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • Ontario's New Watermain Disinfection Procedure • EEP for Adverse Water Quality Incidents • Contingency Plan for Unsafe Water	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	3, 6, 8	Vandalism or accidental break	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • EEP for reporting adverse water quality • Microbiological sampling	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Table 2: Identified Critical Control Points (CCPs) for Holtyre Drinking Water System

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Sodium Hypochlorite System (Primary Disinfection)	**Free Chlorine Residual - Alarms Set Points at Plant** low alarm set point ≥ 0.20 mg/L high alarm set point ≤ 2.0 mg/L	• SCADA (continuous online analyzers) • Regular operator checks via remote monitoring system • On-site checks routinely by OCWA staff • Trend review and sign-off as per O. Reg. 170/03	Refer to: • Site specific SOP for Chlorine Contact Time • Site specific EEP for Chlorine Pump Failure • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems
Secondary Disinfection	**Free Chlorine Residual - Distribution** Operational Low = 0.2 mg/L Regulatory Low - 0.05 mg/L Operational High - 4.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03.	Refer to: • Environmental Emergency Procedure for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems.

Note: Environmental Emergency Procedures (EEP) and Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as OP-05 Document and Records Control.

Table 3: Potential Hazardous Event/Hazard Reference Numbers (based on the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
N/A	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

Table 4: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
2009 09 30	Initial assessment conducted	Brian Jibb, Cluster Manager Dale Waghorn, Senior Operator April Swanson, PCT	Original risk assessment
2010 08 18	Reviewed assessment	Eric Nielson, Process Compliance Manager Dale Waghorn, Senior Operator April Swanson, PCT	Assessment accepted – no revision
2011 10 11	Reviewed assessment	Eric Nielson, Process Compliance Manager April Swanson, PCT	Assessment accepted – no revision
2012 09 20	Conducted the re-assessment of all four facilities	Dale Waghorn, Senior Operator April Swanson, PCT	Holtyre: fuel chemical spill re-ranked as 2/3/6; high lift failure was re-ranked 2/2/4 as only one pump is able to run at a time; addition of watermain break as a hazardous event (details above)
2013 10 25	Reviewed assessment	Dale Waghorn, Senior Operator April Swanson, PCT Carine Huard, Operator	Revised wording for alarm set points to 'no lower than' or 'no higher than' as the situation warrants; clarified power failure to specify long and short duration; Val Gagne WTP had recently installed a backup generator and that was referenced rather than the backup diesel pump
2014 11 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	No changes required.
2015 08 20	Risk Assessment Re-Do	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	Holtyre: Changed likelihood of well casing collapse to 1, changed likelihood of fuel/chemical spill from 2 to 1 and consequence from 3 to 4, changed likelihood of Reservoir out of service from 3 to 2, changed likelihood of adverse water result from 3 to 2, removed "signage" as a control

Date of Activity	Type of Activity	Participants	Summary of Results
			measure for vandalism and added lighting and concrete tiles and lid. Added Chemical/fuel spill into the treated reservoir as risk. Regular daily operator checks was changed to "Regular Operator Checks" in table 2 A, B, C & D under monitoring procedures. Added more items in column 1 of table 1 A, B, C and D to incorporate risks in the distribution system.
2016 09 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator Carine Bosse, Operator	Holtyre: add high chlorine residual as a risk under the sodium hypochlorite system; in 'Flushing' added the control measure of Public Works conducting flushing; Val Gagne: corrected security measures in place Clarify that Val's provides 2 years full service on generators; addition of new procedure 'Ontario's Watermain Disinfection Procedure'; addition of control measure of Bacti sampling
2017 06 20	Reviewed Risk Assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator	Holtyre: changed clearwell set point from 1.5m to not less than 2.5m
2018 07 24	Risk Assessment Re-Do	Carine Bosse, Operator Rebecca Marshall, PCT Anthony Danis, Sr. Operations Manager	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07. Changed Adverse Water CP to "Unsafe Water". Decreased rating for high chlorine and removed SOP for CT as a control measure. Added control measures for low CW level, reservoir out of service, high lift pump failure, long duration power failure, vandalism/terrorism, AWQI's, WM break, Structural failure of service connections & major fire. Increased risk rating for

Date of Activity	Type of Activity	Participants	Summary of Results
			distribution AWQI, WM break, vandalism or accident to connections, hydrants, structural break of service connections, valve failure, accident/vandalism and Major fire. Separated DWS's into individual RA outcomes
2019 12 04	Annual review	Rebecca Marshall (PCT)	No updates required.
2020 10 31	Annual review	Rebecca Marshall (PCT), Alex Mauno (Operator)	No updates required.
2021 11 17	36 Month Re-Assessment	Rebecca Marshall (PCT), Chad Byce (SOM), Remi Boucher (ORO), Alex Mauno (Operator), Miles Rogers (Operator) Andy Mills (Operator).	Changed EEP for Reporting and Responding to Adverse Results in Small Municipal Systems to EEP for Reporting and Responding to Adverse Results throughout. Added High chlorine residual alarms set point to be no higher than 1.99 mg/L. Changed Low level alarm set point to ≥2.5 meters Added "Wells are surrounded by concrete tiles and Have concrete lids and Well 3 is surrounded by fence" as control measure for treatment system/vandalism. Added "Fire dept keeps fire trucks full and does not get water from the distribution system" as control measure for maintaining pressure
2022 06 01	Annual Review	Rebecca Marshall (PCT), Alex Mauno (Team Lead)	Added: cybersecurity threats" to Table 3 (new Ministry requirement), Replaced: MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Updated revision date of Ministry's document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to April 2022 (previously February 2017); updated table 1 to include pandemic and cybersecurity threats;

Date of Activity	Type of Activity	Participants	Summary of Results
			added possible outcomes and existing control measures for each.
2023 11 15	Annual Review	Rebecca Marshall (PCT/QEMS Representative)	Added Spare pumps within hub as control measure for well pump failure, Contingency plan for loss of service as control measure for fuel or chemical spill, added loss of service as outcome for Clear well fuel/chemical spill and added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for Valves, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for service connections and hydrants and contingency plan for unsafe water and EEP for adverse water quality incidents added to the control measures section for new construction temporary water lines and system pressure.
2024 09 05	36 Month Risk Assessment	Joshua Gravelle (PCT/QEMS Rep.), Jeremy Galda (SPCM/QEMS Rep.), Chris Ciarrocca (SOM) and Joshua Archer (Operator)	Added Low Groundwater Level or Depletion of Aquifer and Drought Conditions with associated hazards and control measures. Revised likelihood and consequence for AWQI in distribution system.

Revision History

Date	Revision #	Reason for Revision
2009 09 30	0	Initial risk assessment conducted.
2011 10 21	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3).
2013 02 28	2	36-month Risk Assessment redo was conducted (2012 09 20); corrected typos and cut and paste errors.
2014 01 17	3	Made required changes as described in previous table (Oct 25, 2013) after review.
2015 08 20	4	Conducted 36 month redo 2015 08 19, incorporated risks in the distribution system.
2016 09 28	5	Made required changes as described in previous table (2016 09 28) after review.
2017 06 20	6	Made required changes as described in previous table after review.
2018 07 31	7	Updated table 1 and 3, added new table – rearranged order, new table is #3, added section in Table 1 for MECP's Potential Hazards List reference number. Separated DWS's into individual RA outcomes.
2019 12 04	8	Updated Table 4.
2020 10 31	9	Updated Table 4.
2021 11 17	10	Conducted 36 month re-assessment and made changes as outlined in Table 4.
2022 06 01	11	Made changes as outlined in Table 4.
2023 09 21	12	Updated Table 4 to include the 2022 annual review and summary of results.
2023 11 15	13	Updated Table 4 to include the 2023 annual review and summary of results.
2024-09-06	14	Conducted 36 month Risk Assessment. Added operational low for secondary disinfection in Table 2. Updated note below Table 2. Removed footer. Made changes as outlined in Table 4 and updated Table 4.

Summary of Risk Assessment Outcomes
Matheson Drinking Water System

Table 1: Risk Assessment Table for Matheson Drinking Water System

Note: Processes referred to in section 3.3.4 of OP-07 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water/Well	1, 2, 3, 4, 6	Well casing collapse	Loss of raw water	• Redundancy - Back-up wells and pump (4 total)	1	2	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 9	Low Groundwater Levels or Depletion of the Aquifer	Less water supply	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 9	Drought Conditions	Less water supply, could lead to depletion of aquifer	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2	Well pump failure	Loss of raw water	• Back-up wells and pump, • Site specific Environmental Emergency Procedure (EEP) for Well Pump Failure	2	2	4	☐ Yes – Mandatory CCP

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water/Well				• Contingency Plan for Loss of Service • Spare pumps within the hub				☐ Yes – Additional CCP identified for facility ☒ No
	2, 5, 6, 9	Fuel/Chemical Spill	Contamination of aquifer	• Monitor and sample • Site specific EEP for Off-site Chemical/Fuel Spill • Site specific EEP for Contaminated Raw Water • Contingency Plan for Loss of Service • Contingency Plan for Unsafe Water	1	5	5	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Sodium Hypochlorite System (for primary disinfection)	10	Chemical feed pump failure	Loss of disinfection, Low chlorine residual, Inadequate inactivation of pathogens, Potential for AWQI	• On-line monitoring with alarms (low level set point no lower than 0.20 mg/L at the reservoir) and plant shutdown • Plant shutdown on low chlorine • In-house residual testing and dosage calculations, • Scheduled maintenance activities, • Site specific EEP for Chlorine Pump Failure, • Site specific Standard Operating Procedure (SOP) for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems, • Contingency Plan for Unsafe Water • Backup chemical feed pump for duty pump				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	10	Analyzer failure (or pump failure - causing analyzer failure)	Unknown chlorine residual levels, Potential for AWQI	• Low level Alarm (set point no lower than 0.20 mg/L at reservoir) and plant shutdown • Analyzer has failure alarm • In-house residual testing, • Scheduled maintenance activities, • Back-up analyzers within Hub, • Site specific SOP for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water,				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Sodium Hypochlorite System (for primary disinfection)				• EEP for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems, • Contingency Plan Unsafe Water				
	10	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	• Low chlorine residual alarms (set point no lower than 0.20 mg/L at reservoir) and plant shutdown • Operator checks, • Chemical available within hub or from local supplier • SOP for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water. • EEP for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems, • Contingency Plan for Unsafe Water.				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	5	High chlorine residual	Potential for irritation to skin and sensitive individuals	• High chlorine residual alarms (set point no lower than 2. mg/L), • Operator checks, • SOP for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water. • EEP for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems, • Contingency Plan for Unsafe Water.	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Reservoir	1, 2, 3, 10	Low level	Inadequate contact time for primary disinfection, Inadequate treated water supply, loss of fire protection	• Low level alarm (set point ≥2.0 meters) • Schedule maintenance and inspection activities, • Town ordered water conservation or ban, • Site specific EEP for Water Supply Shortage. • Fire dept can draw water from the river	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 3, 6, 7, 10	Reservoir Out of service for repair, maintenance	Inadequate contact time for primary disinfection	• Scheduled controlled maintenance plan • Bypass reservoir and feed directly to town • Robotic cleaning • Contingency Plan for Unsafe Water • EEP for reporting and responding to adverse events	2	1	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 6, 10	Chemical/Fuel Spill	Contaminated treated water	• EEP for chemical spill and contaminated treated water, • Monitor and sample • Spill containment for Genset fuel • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	1	5	5	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Secondary Disinfection	11	Loss of residual in distribution	Failure to control biofilm and pathogens (long-term), AWQI	• Continuous on-line monitoring of chlorine residual into the distribution system, • System-wide residual testing, • Regularly scheduled maintenance (performed by municipality), • Alarms for low/high chlorine residuals in water entering distribution system from the reservoir (set point at ≥0.15 mg/L)				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• EEP for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems • Contingency Plan for Unsafe Water				
Water Treatment System	1, 2, 3, 6, 7	Power failure of long duration	Loss of treated water supply	• Back-up diesel generator, • Scheduled maintenance activities for back-up generator, • Site specific EEP for Power Failure of Long Duration • Site specific EEP for Standby Power Failure • Contingency Plan for Loss of Service	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	3	Power failure of short duration	Loss of treated water supply	• Back-up diesel generator, • Scheduled maintenance activities for back-up generator (Complete service for 2 years by Val's) • Site specific EEP for Power Failure of Long Duration • Site specific EEP for Standby Power Failure • contingency plan for loss of service	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 5, 6, 7, 10, 11	Vandalism/terrorism	Contamination of the water supply, Damage to critical equipment	• Water plant and reservoir - locked and alarmed • Well houses – locked and fenced • Clearwell hatches (inside reservoir building), intrusion alarm, fenced and locked • Signage, lighting At WTP and Reservoir • Visited routinely by OCWA staff,	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Site specific EEP for Vandalism or Suspected Unauthorized Entry • contingency plan for unsafe water				
Water Treatment System cont'd	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	• CP for Critical Shortage of Staff • Staff training and PPE • OCWA's Emergency Operations Center (EOC) • Staff isolation/ remote work done where possible • Alternate suppliers available, refer to ESS list	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	13	Cybersecurity threats	Loss of system process visibility for operators (e.g., unable to monitor treatment processes) Interruption of data recording leading to A loss of critical/compliance data Inability to remotely control processes and/or loss of automatic control installation of malicious programs like ransomware, which can disable	• Implementing Identity and Access Management throughout the account management lifecycle. Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job. • Employing default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands. • Applying multiple layers of defense including: • Intrusion detection systems constantly monitoring traffic flow (borders) • Firewalls that provide real-time filtering and blocking (walls) • Cryptography and layered authentication (zones)	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			business enterprise until money is paid Loss of data (stolen or maliciously deleted)	• Certified professionals ensuring system integrity (gatekeepers) • Constant monitoring and tracking for quick and effective response to attacks • Perform routine vulnerability scans and threat assessments • Carry out periodic cyber security audits and risk compliance checks				
Distribution System	1, 2, 3, 6, 7, 11	Adverse Water Result as described in O. Reg. 170/03	Potential for unsafe drinking water	• Standard Operating Procedure for the Matheson Drinking Water Sampling Schedule • EEP for Reporting and Responding to Adverse Results • Weekly testing • Contingency Plan For Unsafe Water • Notification by lab	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No - does not meet criteria
Distribution System	1, 2, 3, 4, 6, 7, 8, 11	Water main Break	Potential for unsafe drinking water or loss of supply	• Monitoring of flows leaving plant • EEP for Reporting and Responding to Adverse Results in Large Municipal Residential Systems (several EEPs). • Site specific EEP for Water Supply Shortage • Ontario's Watermain Disinfection Procedure • SOP for watermain disinfection and maintenance forms • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	1, 2, 3, 4, 7, 8	Increased consumption	Loss of supply, loss of fire protection, contamination	• Monitoring of reservoir and flows • EEP for Reporting and Responding to Adverse Results • Site specific EEP for Water Supply Shortage • CP for Unsafe Water • Town can implement water conservation measures	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Valves	1, 3, 4, 6, 7, 8	Failure	Loss of control, line breaks and/or contamination, loss of water supply	• Maintenance program, • Response to consumer complaints • Low pressure alarm • Contingency Plan for Loss of Service • Contingency Plan for Unsafe Water	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Flushing (clean out pipes, remove accumulation)	2, 11	Failure to flush	Build up, decreased flow, contamination, loss of supply, loss of fire protection	• Maintenance program (town flushes twice a year), • Training, • Procedures for flushing • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	2	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Connection, hydrants, valves, constructions, etc.	1, 2, 3, 4, 6, 7, 8, 11	Accident, vandalism	Contamination, loss of supply	• Inspection, • Notification/complaints from consumers, • Increase in water/wastewater usage • Contingency Plan for Unsafe Water • Contingency Plan for Loss of Service	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	8	Trucks filling up with water At hydrants	Contamination from back flow	• Notification/complaints from consumers, • Possible increase in water flows/usage	3	3	9	☐ Yes – Mandatory CCP

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Usually water is drawn from the river • Contingency Plan for Unsafe Water • EEP for reporting and responding to adverse events				☐ Yes – Additional CCP identified for facility ☒ No (nothing to measure/control)
Service Connections	1, 11	Cross connection	Contamination	• Consumer notification/complaints • Distribution system microbiological testing • Weekly testing • Contingency Plan for Unsafe Water • EEP for reporting and responding to adverse events	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 3, 4, 7, 8, 11	Structural failure/breaks	Contamination, loss of pressure, loss of supply	• Consumer notification/complaints • Bacti testing • Pressure alarm • EEP for reporting and responding to adverse events • Contingency Plan for Loss of Service • contingency plan for unsafe water	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Maintain System Pressure	1, 2, 3, 7, 8, 11	Major fire	Contamination, loss of pressure	• Emergency management procedures • Notification by fire department for major fires, • EEP for reporting and responding to adverse events • Contingency Plan For Unsafe Water • Contingency Plan for Loss of Service	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
New Construction	11	Sub-standard construction and/or commissioning	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • Ontario's Watermain Disinfection Procedure	1	4	4	☐ Yes – Mandatory CCP

MATHESON DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Contingency Plan for Unsafe Water • EEP for reporting and responding to adverse events				☐ Yes – Additional CCP identified for facility ☒ No
Temporary Water Distribution System (temporary system put in place during construction)	8, 11	Infiltration	Contamination	• AWWA guidelines, testing, Provincial Standard • Inspection, training • SOP and forms for watermain maintenance • Contingency Plan for Unsafe Water • EEP for reporting and responding adverse events	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	3, 6, 8	Vandalism or accidental break	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • EEP for reporting and responding to adverse events • Microbiological sampling • Contingency Plan for Unsafe Water	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Table 2 Identified Critical Control Points (CCPs) for Matheson Drinking Water System

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Sodium Hypochlorite System (Primary Disinfection)	**Free Chlorine Residual - Alarms Set Points at Reservoir** low alarm set point ≥ 0.20 mg/L high alarm set point ≤ 2.0 mg/L	• SCADA (continuous online analyzers) • Regular operator checks via remote monitoring system • On-site checks routinely by OCWA staff • Trend review and sign-off as per O. Reg. 170/03	Refer to: • Site specific SOP for Chlorine Contact Time • Site specific EEP for Chlorine Pump Failure • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems
Secondary Disinfection	**Free Chlorine Residual – Distribution** Operational Low = 0.2 mg/L Regulatory Low - 0.05 mg/L Operational High - 4.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03.	Refer to: • Environmental Emergency Procedure for Reporting and Responding to Adverse Chlorine Residuals in Large Municipal Residential Systems

Note: Environmental Emergency Procedures (EEP) and Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as OP-05 Document and Records Control.

Table 3: Potential Hazardous Event/Hazard Reference Numbers (based on the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
N/A	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

Table 4: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
2009 09 30	Initial assessment conducted	Brian Jibb, Cluster Manager Dale Waghorn, Senior Operator April Swanson, PCT	Original risk assessment
2010 08 18	Reviewed assessment	Eric Nielson, Process Compliance Manager Dale Waghorn, Senior Operator April Swanson, PCT	Assessment accepted – no revision
2011 10 11	Reviewed assessment	Eric Nielson, Process Compliance Manager April Swanson, PCT	Assessment accepted – no revision
2012 09 20	Conducted the re-assessment of all four facilities	Dale Waghorn, Senior Operator April Swanson, PCT	with the PLC upgrades, the plant can now shut down which has been added to the Activity/Process step of primary disinfection; Clearwell low level is 2.0 m rather than the 1.5 m previously used; added the control measure of bypassing the reservoir and feeding directly into town if the reservoir is out of service and re-ranked as 2/1/2; vandalism/terrorism was re-ranked 3/3/9; addition of watermain break as a hazardous event (details above)
2013 10 25	Reviewed assessment	Dale Waghorn, Senior Operator April Swanson, PCT Carine Huard, Operator	Revised wording for alarm set points to ‘no lower than’ or ‘no higher than’ as the situation warrants; clarified power failure to specify long and short duration; Val Gagne WTP had recently installed a backup generator and that was referenced rather than the backup diesel pump
2014 11 28	Reviewed assessment	Dale Waghorn, Senior Operator, Rebecca Marshall, PCT, Carine Bosse, Operator	No changes required.

Date of Activity	Type of Activity	Participants	Summary of Results
2015 08 20	36 month Risk Assessment Re-Do	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	Matheson: Changed likelihood of well casing collapse to 1, changed the consequence of reservoir out of service from 1 to 2, omitted low lift pumps as there aren't any, changed likelihood of long power outage from 4 to 3 and consequence from 1 to 2, changed power failure of short duration likelihood from 3 to 4, changed likelihood of adverse water result from 3 to 2 and added lighting as a control measure for vandalism. Added Chemical/fuel spill into the treated reservoir as risk. Regular daily operator checks was changed to "Regular Operator Checks" in table 2 A, B, C & D under monitoring procedures. Added more items in column 1 of table 1 A, B, C and D to incorporate risks in the distribution system.
2016 09 28	Reviewed risk assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator Carine Bosse, Operator	Matheson: corrected security measures in place Ramore: for sodium hypochlorite system added the ability to remotely access pumps and adjust Val Gagne: corrected security measures in place Clarified that Val's provides 2 years full service on generators; addition of new procedure 'Ontario's Watermain Disinfection Procedure'; addition of control measure of Bacti sampling
2017 06 20	Reviewed Risk Assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator	Matheson: changed clearwell low level to not less than 2m, changed reservoir set point from 0.15 to 0.2 mg/L, added hazard "trucks filling up at hydrants"
2018 07 24	36 Month Risk Assessment Re-Do and Review	Carine Bosse, Operator Rebecca Marshall, PCT Anthony Danis, Sr. Operations Manager	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MECP's "Potential Hazardous Events for Municipal Residential

Date of Activity	Type of Activity	Participants	Summary of Results
			Drinking Water Systems") and ranked according to OP-07. Added Hazardous events: increased consumption under Distribution system and Vandalism/Accident under Temporary distribution system. Added control measures to Well Pump Failure, Chemical feed pump failure, Chlorine analyzer failure, Low supply of chlorine, Chemical/fuel spill, trucks filling up with water, Vandalism of temporary system. Removed control measure – well pump failure alarm from Well pump failure. Added loss of fire protection as outcome for low CW level. Reduced rating for raw water fuel/chemical spill and trucks filling from hydrant. Increased rating of dist. adverse, watermain break, valve failure, major fire (system pressure). Removed fuel being stored outside as a control measure chemical spill to the CW.
2019 12 04	Annual review	Rebecca Marshall (PCT)	Added (or jet pump failure - causing analyzer failure) To analyzer failure under primary disinfection.
2020 10 30	Annual Review	Rebecca Marshall (PCT), Dale Waghorn (ORO)	No updates required.
2021 11 10	36 Month Risk Assessment Re-Do and Review	Rebecca Marshall (PCT), Chad Byce (Ops Mgr), Alex Mauno (Team Lead), Remi Boucher (ORO) and Miles Rogers (OIT)	All Activities/Process Steps were re-assessed (including those in the MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07. No additional hazards or hazardous events were identified. Jet pump changed to pump under primary disinfection. Clearwell changed to Reservoir under secondary disinfection and distribution system. Reporting and Responding to Adverse Results in Small Municipal Residential Systems (several EEPs) changed to Reporting and Responding to Adverse Results through out. Added control

Date of Activity	Type of Activity	Participants	Summary of Results
			measure to “increased Usage” hazard: Town can implement water conservation measures. Added control measure to valve failure: Low pressure alarm. Added (town flushes twice a year) to control measure “maintenance” for failure to flush hydrants. Added control measure “Pressure alarms” to Structural failure/breaks under service connections.
2022 06 01	Annual Review	Rebecca Marshall (PCT) & Alex Mauno (Team Lead)	Added: cybersecurity threats” to Table 3 (new Ministry requirement), Replaced: MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Updated revision date of Ministry’s document “Potential Hazardous Events for Municipal Residential Drinking Water Systems” to April 2022 (previously February 2017); updated table 1 to include pandemic and cybersecurity threats; added possible outcomes and existing control measures for each
2023 11 15	Annual Review	Rebecca Marshall space (PCT/QEMS Representative)	Added Spare pumps within hub as control measure for well pump failure, Contingency plan for loss of service as control measure for fuel or chemical spill, added loss of service as outcome for Clear well fuel/chemical spill and added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for Valves, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for service connections and hydrants and contingency plan for unsafe water and EEP for adverse water quality incidents added to the control measures section for new construction temporary water lines and system pressure.

Date of Activity	Type of Activity	Participants	Summary of Results
2024 09 05	36 Month Risk Assessment	Joshua Gravelle (PCT/QEMS Rep.), Jeremy Galda (SPCM/QEMS Rep.), Chris Ciarrocca (SOM) and Joshua Archer (Operator)	Added Low Groundwater Level or Depletion of Aquifer and Drought Conditions with associated hazards and control measures. Revised likelihood and consequence for AWQI in distribution system.

Revision History

Date	Revision #	Reason for Revision
2009 09 30	0	Initial risk assessment conducted.
2011 10 21	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3).
2013 02 28	2	36-month Risk Assessment redo was conducted (2012 09 20); corrected typos and cut and paste errors.
2014 01 17	3	Made required changes as described in previous table (Oct 25, 2013) after review.
2015 08 20	4	Conducted 36 month redo 2015 08 19, incorporated risks in the distribution system.
2016 09 28	5	Made required changes as described in previous table (2016 09 28) after review.
2017 06 20	6	Made required changes as described in previous table after review.
2018 07 31	7	Updated table 1 and 3, added new table – rearranged order, new table is #3, added section in Table 1 for MECP's Potential Hazards List reference number. Separated DWS's into individual RA outcomes.
2019 12 04	8	Updated Table 4.
2020 10 31	9	Updated Table 4.
2021 11 17	10	Conducted 36 month re-assessment and made changes as outlined in Table 4.
2022 06 01	11	Made changes as outlined in Table 4.
2023 09 21	12	Updated Table 4 to include the 2022 annual review and summary of results.
2023 11 15	13	Updated Table 4 to include the 2023 annual review and summary of results.
2024 09 09	14	Conducted 36 month Risk Assessment. Added operational low for secondary disinfection in Table 2. Updated note below Table 2. Removed footer. Made changes as outlined in Table 4 and updated Table 4.

Summary of Risk Assessment Outcomes
Ramore Drinking Water System

Table 1: Risk Assessment Table for Ramore Drinking Water System

Note: Processes referred to in section 3.3.4 of OP-07 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

RAMORE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water/Well	1, 2, 3, 4, 6	Well casing collapse	Loss of raw water	Back-up wells and pump	1	2	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 9	Low Groundwater Levels or Depletion of the Aquifer	Less water supply	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	2	4	8	
	1, 2, 3, 4, 9	Drought Conditions	Less water supply, could lead to depletion of aquifer	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	1	4	4	
	2	Well pump failure	Loss of raw water	• Back-up wells and pump, • Well pump(s) failure alarm, • Site specific Environmental Emergency Procedure (EEP) for Well Pump Failure	2	2	4	
	2, 5, 6, 9	Fuel/Chemical Spill	Contamination of aquifer from road	• Monitor and sample • Site specific EEP for Off-site Chemical/Fuel Spill • Site specific EEP for Contaminated Raw Water	1	4	4	
Sodium Hypochlorite System (for primary disinfection)	10	Chemical feed pump failure	Loss of disinfection, Low chlorine residual, Inadequate inactivation of pathogens, Potential for AWQI	• On-line monitoring with alarms (low level set point = no lower than 0.2 mg/L), • In-house residual testing and dosage calculations				☒ Yes – Mandatory CCP ☐ Yes – Additional

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
				• Redundancy – 2 metering pumps running simultaneously and one auto backup • Chlorine pump failure alarm • Scheduled maintenance activities, • Site specific EEP for Chlorine Pump Failure, • Site specific Standard Operating Procedure (SOP) for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Unsafe Water • Remote access to pumps to adjust				CCP identified for facility ☐ No
Sodium Hypochlorite System (for primary disinfection)	10	Analyzer failure	Unknown chlorine residual levels, Potential for AWQI	• Low level Alarm (set point = no lower than 0.2 mg/L), • In-house residual testing • Scheduled maintenance activities • Back-up analyzers within Hub • Site specific SOP for Chlorine Contact Time • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	10	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	• Low chlorine residual alarms (set point no lower than 0.2 mg/L), • Operator checks				☒ Yes – Mandatory CCP ☐ Yes – Additional

RAMORE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Chemical available within hub and from local supplier • SOP for Chlorine Contact Time • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Unsafe Water				CCP identified for facility ☐ No
	5	High chlorine residual	Potential for irritation to skin and sensitive individuals	• High chlorine residual alarms (set point no higher than 1.99 mg/L), • Operator checks, • Site specific EEP for Low or High Chlorine Residual in Treated Water. • Contingency Plan for Unsafe Water.	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Water Treatment System	1, 2, 3, 6, 7	Power failure of long duration	Loss of treated water supply	• Back-up diesel generator, • Scheduled maintenance activities for back-up generator, • Site specific EEP for Power Failure of Long Duration • Site specific EEP for Standby Power Failure	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	3	Power failure of short duration	Loss of treated water supply	• Back-up diesel generator, • Scheduled maintenance activities for back-up generator, • Site specific EEP for Standby Power Failure	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
	2, 5, 6, 7, 10, 11	Vandalism/terrorism	Contamination of the water supply, Damage to critical equipment	• Locked and/or alarmed (water plant, well houses), • Signage, lighting • Fencing around wells • Visited routinely by OCWA staff, • Site specific EEP for Vandalism or Suspected Unauthorized Entry	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Water Treatment System cont'd	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	CP for Critical Shortage of Staff Staff training and PPE OCWA's Emergency Operations Center (EOC) Staff isolation/ remote work done where possible Alternate suppliers available, refer to ESS list	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	13	Cybersecurity threats	Loss of system process visibility for operators (e.g., unable to monitor treatment processes) Interruption of data recording leading to a loss of critical/compliance data Inability to remotely control processes and/or loss of automatic control installation of malicious programs	Implementing Identity and Access Management throughout the account management lifecycle. Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job. Employing default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands. Applying multiple layers of defense including: o Intrusion detection systems constantly monitoring traffic flow (borders) o Firewalls that provide real-time filtering and blocking (walls)	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
			like ransomware, which can disable business enterprise until money is paid Loss of data (stolen or maliciously deleted)	o Cryptography and layered authentication (zones) o Certified professionals ensuring system integrity (gatekeepers) Constant monitoring and tracking for quick and effective response to attacks Perform routine vulnerability scans and threat assessments Carry out periodic cyber security audits and risk compliance checks				
Secondary Disinfection	11	Loss of residual in distribution	Failure to control biofilm and pathogens (long-term), AWQI	• Continuous on-line monitoring of chlorine residual into the distribution system, • System-wide residual testing, • Regularly scheduled maintenance (performed by municipality), • Alarms for low/high chlorine residuals in water entering distribution system (set point no lower than 0.2 mg/L) • EEP for Reporting and Responding to Adverse Results • Chlorine Residuals in Small Municipal Residential Systems • Contingency plan for Loss of Service				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
Distribution System	1, 2, 3, 6, 7, 11	Adverse Water Result as described in O. Reg. 170/03	Potential for unsafe drinking water	• Standard Operating Procedure for the Ramore Drinking Water Sampling Schedule • EEP for Reporting and Responding to Adverse Results • Lab notification • Contingency Plan for Unsafe Water	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
	1, 2, 3, 4, 6, 7, 8, 11	Water main Break	Potential for unsafe drinking water or loss of supply	• Monitoring of flows leaving plant • EEP for Reporting and Responding to Adverse Results • Site specific EEP for Water Supply Shortage • Ontario's Watermain Disinfection Procedure • OCWA SOP and Forms for Watermain maintenance/Repair	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 7, 8	Increased consumption	Loss of supply, loss of fire protection, contamination	• Monitoring of clearwell and flows • EEP for Reporting and Responding to Adverse Results • Site specific EEP for Water Supply Shortage • CP Unsafe Water	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Valves	1, 3, 4, 6, 7, 8	Failure	Loss of control, line breaks and/or contamination, loss of water supply	• Maintenance program, • Response to consumer complaints	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Flushing (clean out pipes, remove accumulation)	2, 11	Failure to flush	Contamination, build up, decreased flow, loss of supply, loss of fire protection	• Maintenance program, • Training, • Procedures for flushing	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
Connection, hydrants, valves, constructions, etc.	1, 2, 3, 4, 6, 7, 8, 11	Accident, vandalism	Contamination, loss of supply	• Inspection, • Notification/complaints from consumers, • Increase in water/wastewater usage	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Service Connections	1, 11	Cross connection	Contamination	• Consumer notification/complaints • Distribution system microbiological testing	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 3, 4, 7, 8, 11	Structural failure/breaks	Contamination, loss of pressure, loss of supply	• Consumer notification/complaints • Distribution system microbiological testing	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Maintain System Pressure	1, 2, 3, 7, 8, 11	Major fire	Contamination, loss of pressure	• Emergency management, • Notification by fire department for major fires, • Trucks are pre-filled at night and ready to go – if they need more water they would go to a lake in the area or Matheson	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
New Construction	11	Sub-standard construction and/or commissioning	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • Ontario's Watermain Disinfection Procedure	1	4	4	☐ Yes – Mandatory CCP

RAMORE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
				• OCWA's SOP and Watermain Maintenance forms				☐ Yes – Additional CCP identified for facility ☒ No
	3, 6, 8	Vandalism or accidental break	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • EEP for reporting Adverse Results • Microbiological sampling	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Temporary Water Distribution System (temporary system put in place during construction)	11	Infiltration	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • Ontario's Watermain Disinfection Procedure	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Table 2: Identified Critical Control Points (CCPs) for Ramore Drinking Water System

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Sodium Hypochlorite System (Primary Disinfection)	**Free Chlorine Residual – Alarms Set Points at Plant** low alarm set point ≥ 0.20 mg/L high alarm set point ≤ 1.99 mg/L	• SCADA (continuous online analyzers) • Regular operator checks via remote monitoring system • On-site checks routinely by OCWA staff • Trend review and sign-off as per O. Reg. 170/03	Refer to: • Site specific SOP for Chlorine Contact Time • Site specific EEP for Chlorine Pump Failure • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems
Secondary Disinfection	**Free Chlorine Residual – Distribution** Operational Low = 0.2 mg/L Regulatory Low - 0.05 mg/L Operational High - 4.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03.	Refer to: • Environmental Emergency Procedure for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems

Note: Environmental Emergency Procedures (EEP) and Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as OP-05 Document and Records Control.

Table 3: Potential Hazardous Event/Hazard Reference Numbers (based on the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
N/A	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

Table 4: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
2009 09 30	Initial assessment conducted	Brian Jibb, Cluster Manager Dale Waghorn, Senior Operator April Swanson, PCT	Original risk assessment
2010 08 18	Reviewed assessment	Eric Nielson, Process Compliance Manager Dale Waghorn, Senior Operator April Swanson, PCT	Assessment accepted – no revision
2011 10 11	Reviewed assessment	Eric Nielson, Process Compliance Manager April Swanson, PCT	Assessment accepted – no revision
2012 09 20	Conducted the re-assessment of all four facilities	Dale Waghorn, Senior Operator April Swanson, PCT	Ramore: low level set point is 'no lower than' 0.2 mg/L depending upon conditions; removed the clearwell section as it doesn't apply addition of watermain break as a hazardous event (details above)
2013 10 25	Reviewed assessment	Dale Waghorn, Senior Operator April Swanson, PCT Carine Huard, Operator	Revised wording for alarm set points to 'no lower than' or 'no higher than' as the situation warrants; clarified power failure to specify long and short duration; Val Gagne WTP had recently installed a backup generator and that was referenced rather than the backup diesel pump
2014 11 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	No changes required.
2015 08 20	Risk Assessment Re-Do	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	Changed likelihood of well casing collapse to 1, changed control measure of pump with automatic switchover to say 2 metering pumps running simultaneously, omitted low lift pumps as there aren't any, added fencing and lighting as a control measure for vandalism and changed the likelihood of an adverse water result from 3 to 2.

Date of Activity	Type of Activity	Participants	Summary of Results
			Regular daily operator checks was changed to "Regular Operator Checks" in table 2 A, B, C & D under monitoring procedures. Added more items in column 1 of table 1 A, B, C and D to incorporate risks in the distribution system.
2016 09 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator Carine Bosse, Operator	Ramore: for sodium hypochlorite system added the ability to remotely access pumps and adjust Val Gagne: corrected security measures in place Clarify that Val's provides 2 years full service on generators; addition of new procedure 'Ontario's Watermain Disinfection Procedure'; addition of control measure of Bacti sampling
2017 06 20	Reviewed Risk Assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator	No updates required.
2018 07 24	Risk Assessment Re-Do	Carine Bosse, Operator Rebecca Marshall, PCT Anthony Danis, Sr. Operations Manager	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07. Added Hazardous events: increased consumption under Distribution system and Vandalism/Accident under Temporary distribution system. Added control measures to Power failure of long duration, adverse water in distribution. Decreased rating of chemical/fuel spill under raw water. Added control measures to Power failure of long duration, Adverse Water result, water main break. Increased risk ratings for adverse water result, water main break, valve failure, Structural failure of service connections, system pressure

Date of Activity	Type of Activity	Participants	Summary of Results
2019 12 04	Annual Review	Rebecca Marshall (PCT)	No changes required
2020 10 30	Annual Review	Rebecca Marshall (PCT), Alex Mauno (Operator)	No changes required
2021 12 01	36 Month Re-Assessment	Rebecca Marshall (PCT), Alex Mauno (Team Lead), Andy Mills (Operator), Rick Gravelle (Operator)	Added -Trucks are pre-filled at night and ready to go – if they need more water they would go to a lake in the area or Matheson – as a control measure for system pressure. Changed EEP for Reporting and Responding to Adverse Results in Small Municipal Systems to EEP for Reporting and Responding to Adverse Results throughout the document. Changed chlorine CCP for low set point from >0.20 mg/L to ≥ 0.20 mg/L and the high alarm set point from < 2.0 mg/L to ≤ 1.99 mg/L.
2022 06 01	Annual Review	Rebecca Marshall (PCT) & Alex Mauno (Team Lead)	Added: cybersecurity threats" to Table 3 (new Ministry requirement), Replaced: MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Updated revision date of Ministry's document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to April 2022 (previously February 2017); updated table 1 to include pandemic and cybersecurity threats; added possible outcomes and existing control measures for each.
2023 11 15	Annual Review	Rebecca Marshall space (PCT/QEMS Representative)	Added Spare pumps within hub as control measure for well pump failure, Contingency plan for loss of service as control measure for fuel or chemical spill, added loss of service as outcome for Clear well fuel/chemical spill and added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for Valves, added Contingency Plan for Unsafe Water and

Date of Activity	Type of Activity	Participants	Summary of Results
			Contingency plan for Loss of Service as control measures for service connections and hydrants and contingency plan for unsafe water and EEP for adverse water quality incidents added to the control measures section for new construction temporary water lines and system pressure.
2024 09 05	36 Month Risk Assessment	Joshua Gravelle (PCT/QEMS Rep.), Jeremy Galda (SPCM/QEMS Rep.), Chris Ciarrocca (SOM) and Joshua Archer (Operator)	Added Low Groundwater Level or Depletion of Aquifer and Drought Conditions with associated hazards and control measures. Revised likelihood and consequence for AWQI in distribution system.

Revision History

Date	Revision #	Reason for Revision
2009 09 30	0	Initial risk assessment conducted
2011 10 21	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3)
2013 02 28	2	36-month Risk Assessment redo was conducted (2012 09 20); corrected typos and cut and paste errors.
2014 01 17	3	Made required changes as described in previous table (Oct 25, 2013) after review
2015 08 20	4	Conducted 36 month redo 2015 08 19, incorporated risks in the distribution system
2016 09 28	5	Made required changes as described in previous table (2016 09 28) after review
2017 06 20	6	Made required changes as described in previous table after review
2018 07 31	7	Updated table 1 and 3, added table 4, added section in Table 1 for MECP's Potential Hazards List Separated DWS's into individual RA outcomes
2019 03 21	8	Corrected date and revision number in header
2019 12 04	9	Updated Table 4
2020 10 30	10	Updated Table 4
2021 12 01	11	Conducted 36 Month Re-Assessment an updated Table 4.
2022 06 01	12	Made changes as outlined in Table 4
2023 09 21	13	Updated Table 4 to include the 2022 annual review and summary of results.
2023 11 15	14	Updated Table 4 to include the 2023 annual review and summary of results.
2024 09 10	15	Conducted 36 month Risk Assessment. Added operational low for secondary disinfection in Table 2. Updated note below Table 2. Removed footer. Made changes as outlined in Table 4 and updated Table 4.

Summary of Risk Assessment Outcomes
Val Gagne Drinking Water System

Table 1: Risk Assessment Table for Val Gagne Drinking Water System

Note: Processes referred to in section 3.3.4 of OP-07 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water	1, 2, 3, 4, 6	Well casing collapse	Loss of raw water	• One emergency well and pump	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 9	Low Groundwater Levels or Depletion of the Aquifer	Less water supply	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required •	2	4	8	
	1, 2, 3, 4, 9	Drought Conditions	Less water supply, could lead to depletion of aquifer	• Back-up well and pump (redundancy) • Monitor and sample • Water Conservation measures if required	1	4	4	
	2	Well pump failure	Loss of raw water	• One emergency well and pump • Well pump failure alarms, • Site specific Environmental Emergency Procedure (EEP) for Well Pump Failure	2	2	4	
	2, 5, 6, 9	Chemical/Fuel Spill	Contamination of aquifer	• Monitor and sample • Site specific EEP for Off-site Chemical Spill • Site specific EEP for Contaminated Raw Water	2	4	8	
Sodium Hypochlorite System (for primary disinfection)	10	Chemical feed pump failure	Loss of disinfection, Low chlorine residual, Inadequate inactivation of pathogens,	• On-line monitoring with alarms (low level set point no lower than 0.2 mg/L), • In-house residual testing and dosage calculations				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			Potential for AWQI	• Redundancy - Back-up pump with automatic switchover • Chlorine pump failure alarm • Scheduled maintenance activities, • Site specific EEP for Chlorine Pump Failure, • Site specific Standard Operating Procedure (SOP) for Chlorine Contact Time, • Site specific EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Unsafe Water				☐ No
	10	Analyzer failure	Unknown chlorine residual levels, Potential for AWQI	• Low level Alarm (set point no lower than 0.2 mg/L) • In-house residual testing • Scheduled maintenance activities • Back-up analyzers within Hub • Site specific SOP for Chlorine Contact Time • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Adverse Water/Potential and/or Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	10	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	• Low chlorine residual alarms (set point no lower than 0.2 mg/L) • Operator checks • Existing supply is monitored and ordered well in advance				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• Chemical available within hub and from local supplier • SOP for Chlorine Contact Time • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Results • Contingency Plan for Adverse Water/Potential and/or Unsafe Water				
Clearwells (single reservoir)	1, 2, 3, 10	Low level	Inadequate contact time for primary disinfection, potential AWQI, Inadequate treated water supply	• Low level alarm (set point = ≥1.5 meters) • Schedule maintenance and inspection activities, • Town ordered water conservation or ban, • Site specific EEP for Water Supply Shortage.	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	2, 3, 6, 7, 10	Reservoir out of service for repair, maintenance	Inadequate contact time for primary disinfection	• Scheduled controlled maintenance plan • Cleaning with robotics (rather than draining)	1	3	3	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
High Lift	2, 6, 10	High lift pump failures	Low pressure in distribution system, Possible contamination due to backflow	• Redundancy (2 pumps, automatic start up) • High flow pump will kick in and turn the highlifts off • On-line monitoring of discharge pressure • Sampling and monitoring • Scheduled maintenance activities, • operational control, • Site specific EEP for High Lift Pump Failure.	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
				• EEP for Low Pressure Events in the Distribution System				
Secondary Disinfection	11	Loss of residual in distribution	Failure to control biofilm and pathogens (long-term), AWQI	• Continuous on-line monitoring of chlorine residual into the distribution system, • System-wide residual testing, • Regularly scheduled maintenance (performed by municipality), • Alarms for low/high chlorine residuals in water entering distribution system (set point no lower than 0.2 mg/L) • EEP for Reporting and Responding to Adverse Results				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
Water Treatment System	1, 2, 3, 6, 7	Power failure of short duration	Loss of treated water supply	• Back-up diesel generator • Back-up diesel pump • Scheduled maintenance activities for back-up generator • Site specific EEP for Standby Power Failure	4	1	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	3	Power failure of long duration	Loss of treated water supply	• Back-up diesel generator • Back-up diesel pump • Scheduled maintenance activities for back-up pump • Site specific EEP for Power Failure of Long Duration • Site specific EEP for Standby Power Failure • CP for Loss of Service	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	2, 5, 6, 7, 10, 11	Vandalism/terrorism	Contamination of the water supply, Damage to critical equipment	• Locked and/or alarmed (water plant, well houses, clearwell hatch), • Signage, lighting • Visited routinely by OCWA staff, • Site specific EEP for Vandalism or Suspected Unauthorized Entry • Well 1 is inside a building and well 6 is inside the treatment building	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Water Treatment System Cont'd	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	CP for Critical Shortage of Staff Staff training and PPE OCWA's Emergency Operations Center (EOC) Staff isolation/ remote work done where possible Alternate suppliers available, refer to ESS list	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	13	Cybersecurity threats	Loss of system process visibility for operators (e.g., unable to monitor treatment processes) Interruption of data recording leading to a loss of critical/compliance data Inability to remotely control processes and/or loss of automatic control installation of malicious programs like ransomware,	Implementing Identity and Access Management throughout the account management lifecycle. Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job. Employing default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands. Applying multiple layers of defense including: o Intrusion detection systems constantly monitoring traffic flow (borders) o Firewalls that provide real-time filtering and blocking (walls) o Cryptography and layered authentication (zones)	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM								
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			which can disable business enterprise until money is paid Loss of data (stolen or maliciously deleted)	o Certified professionals ensuring system integrity (gatekeepers) Constant monitoring and tracking for quick and effective response to attacks Perform routine vulnerability scans and threat assessments Carry out periodic cyber security audits and risk compliance checks				
Distribution System	1, 2, 3, 6, 7, 11	Adverse Water Result as described in O. Reg. 170/03	Potential for unsafe drinking water	• Standard Operating Procedure for the Val Gagne Drinking Water Sampling Schedule • EEP for Reporting and Responding to Adverse Results • Lab notification • CP for Unsafe Water	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 6, 7, 8, 11	Water main Break	Potential for unsafe drinking water or loss of supply	• Monitoring of flows leaving plant • EEP for Reporting and Responding to Adverse Results . • Site specific EEP for Water Supply Shortage • Ontario's Watermain Disinfection Procedure • SOP & forms for watermain break	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	1, 2, 3, 4, 7, 8	Increased consumption	Loss of supply, loss of fire protection, contamination	• Monitoring of clearwell and flows • EEP for Reporting and Responding to Adverse Results • Site specific EEP for Water Supply Shortage • CP for Unsafe Water	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
Valves	1, 3, 4, 6, 7, 8	Failure	Loss of control, line breaks and/or contamination, loss of water supply	• Maintenance program, • Response to consumer complaints • Regular flushing program (Public Works)	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Flushing (clean out pipes, remove accumulation)	2, 11	Failure to flush	Build up, decreased flow, contamination	• Maintenance program(town flushes 2x year • Training, • Procedures for flushing	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Connection, hydrants, valves, constructions, etc.	1, 2, 3, 4, 6, 7, 8, 11	Accident, vandalism	Contamination, loss of supply	• Inspection, • Notification/complaints from consumers, • Increase in water/wastewater usage/flows	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Service Connections	1, 11	Cross connection	Contamination	• Consumer notification/complaints • Distribution system microbiological testing	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
Service Connections (*continued*)	1, 3, 4, 7, 8, 11	Structural failure/breaks	Contamination, loss of pressure, loss of supply	• Consumer notification/complaints • Microbiological sampling/testing • Monitor flows and usage	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Maintain System Pressure	1, 2, 3, 7, 8, 11	Major fire	Contamination, loss of pressure	• Emergency management, • Notification by fire department for major fires, • Diesel pump	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
New Construction	11	Sub-standard construction and/or commissioning	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Temporary Water Distribution System (temporary system put in	11	Infiltration	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

VAL GAGNE DRINKING WATER SYSTEM					Likelihood	Consequence	Risk Value	CCP?
Activity/ Process Step	**MECP Potential Hazardous Event/Hazard Reference # (see Table 3)**	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**				
place during construction)	3, 6, 8	Vandalism or accidental break	Contamination	• AWWA guidelines, testing, Provincial Standard Inspection, training • EEP for Reporting Adverse Results • Microbiological sampling	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Table 2: Identified Critical Control Points (CCPs) for Val Gagne Drinking Water System

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Sodium Hypochlorite System (Primary Disinfection)	**Free Chlorine Residual – Alarms Set Points at Plant** low alarm set point ≥ 0.20 mg/L high alarm set point ≤ 1.99 mg/L	• SCADA (continuous online analyzers) • Regular operator checks via remote monitoring system • On-site checks routinely by OCWA staff • Trend review and sign-off as per O. Reg. 170/03	Refer to: • Site specific SOP for Chlorine Contact Time • Site specific EEP for Chlorine Pump Failure • Site specific EEP for Low or High Chlorine Residual in Treated Water • EEP for Reporting and Responding to Adverse Chlorine Residuals in Small Municipal Residential Systems
Secondary Disinfection	**Free Chlorine Residual – Distribution** Operational Low = 0.2 mg/L Regulatory Low - 0.05 mg/L Operational High - 4.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03.	Refer to: • Environmental Emergency Procedure for Reporting and Responding to Adverse Results.

Note: Environmental Emergency Procedures (EEP) and Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as OP-05 Document and Records Control.

Table 3: Potential Hazardous Event/Hazard Reference Numbers (based on the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
N/A	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

Table 4: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
2009 09 30	Initial assessment conducted	Brian Jibb, Cluster Manager Dale Waghorn, Senior Operator April Swanson, PCT	Original risk assessment
2010 08 18	Reviewed assessment	Eric Nielson, Process Compliance Manager Dale Waghorn, Senior Operator April Swanson, PCT	Assessment accepted – no revision
2011 10 11	Reviewed assessment	Eric Nielson, Process Compliance Manager April Swanson, PCT	Assessment accepted – no revision
2012 09 20	Conducted the re-assessment of all four facilities	Dale Waghorn, Senior Operator April Swanson, PCT	Val Gagne: low level set point was raised to 0.2 mg/L; reservoir out of service for repair was re-ranked 2/3/6; high lift redundancy was corrected to two pumps rather than the 3 used previously; addition of watermain break as a hazardous event (details above)
2013 10 25	Reviewed assessment	Dale Waghorn, Senior Operator April Swanson, PCT Carine Huard, Operator	Revised wording for alarm set points to ‘no lower than’ or ‘no higher than’ as the situation warrants; clarified power failure to specify long and short duration; Val Gagne WTP had recently installed a backup generator and that was referenced rather than the backup diesel pump
2014 11 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	No changes required.

Date of Activity	Type of Activity	Participants	Summary of Results
2015 08 20	Risk Assessment Re-Do	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Carine Bosse, Operator	Changed likelihood of well casing collapse to 1, changed the likelihood of a chemical spill from 3 to 2 and combined with fuel, changed likelihood of clearwell low level from 3 to 4, changed likelihood of reservoir out of service from 2 to 1, changed "diesel/fire pump to high flow pump and automatic switchover to automatic start up under high lift pump failure and changed the likelihood from 3 to 2, changed 0.1 to 0.2 under loss of distribution residual, added lighting, fencing and wells in building as a control measure for vandalism and changed the likelihood of an adverse water result from 3 to 2. Regular daily operator checks was changed to "Regular Operator Checks" in table 2 A, B, C & D under monitoring procedures. Added more items in column 1 of table 1 A, B, C and D to incorporate risks in the distribution system.
2016 09 28	Reviewed assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator Carine Bosse, Operator	Corrected security measures in place Clarify that Val's provides 2 years full service on generators; addition of new procedure 'Ontario's Watermain Disinfection Procedure'; addition of control measure of Bacti sampling
2017 06 20	Reviewed Risk Assessment	Dale Waghorn, Senior Operator Rebecca Marshall, PCT Remi Boucher, Operator	Removed back up well and pump from existing control measures and added back up diesel pump and generator to power failure hazards.
2018 07 24	Risk Assessment Re-Do	Carine Bosse, Operator Rebecca Marshall, PCT Anthony Danis, Sr. Operations Manager	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07. Removed back up well, only one emerg - increased risk rating for well pump failure. Changed Adverse Water CP to "Unsafe Water". Added control method to Low hypo. Added potential awqi as hazardous event to clearwell low

Date of Activity	Type of Activity	Participants	Summary of Results
			level and increased rating, Increased risk rating for Long power failure, added control method. Increased risk rating of valve failure, accident/vandalism and Major fire. Added hazardous event – increased consumption, reduced supply. Added vandalism & accidental break as a hazard under temporary distribution. Other minor updates. Separated DWS's into individual RA outcomes
2019 12 04	Annual Review	Rebecca Marshall (PCT)	No changes required.
2020 10 30	Annual Review	Rebecca Marshall (PCT)	No changes required.
2021 12 01	36 Month Re-Assessment	Rebecca Marshall (PCT), Alex Mauno (Team Lead), Andy Mills (Operator), Rick Gravelle (Operator)	Changed EEP for Reporting and Responding to Adverse Results in Small Municipal Systems to EEP for Reporting and Responding to Adverse Results throughout the document. Changed chlorine CCP for low set point from >0.20 mg/L to ≥ 0.20 mg/L and the high alarm set point from < 2.0 mg/L to ≤ 1.99 mg/L.
2022 06 01	Annual Review	Rebecca Marshall (PCT), Alex Mauno (Team Lead)	Added: cybersecurity threats" to Table 3 (new Ministry requirement), Replaced: MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Updated revision date of Ministry's document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to April 2022 (previously February 2017); updated table 1 to include pandemic and cybersecurity threats; added possible outcomes and existing control measures for each.
2023 11 15	Annual Review	Rebecca Marshall space (PCT/QEMS Representative)	Added Spare pumps within hub as control measure for well pump failure, Contingency plan for loss of service as control measure for fuel or chemical spill, added loss of service as outcome for Clear well fuel/chemical spill and added Contingency Plan for Unsafe Water and

Date of Activity	Type of Activity	Participants	Summary of Results
			Contingency plan for Loss of Service as control measures, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for Valves, added Contingency Plan for Unsafe Water and Contingency plan for Loss of Service as control measures for service connections and hydrants and contingency plan for unsafe water and EEP for adverse water quality incidents added to the control measures section for new construction temporary water lines and system pressure.
2024 09 05	36 Month Risk Assessment	Joshua Gravelle (PCT/QEMS Rep.), Jeremy Galda (SPCM/QEMS Rep.), Chris Ciarrocca (SOM) and Joshua Archer (Operator)	Added Low Groundwater Level or Depletion of Aquifer and Drought Conditions with associated hazards and control measures. Revised likelihood and consequence for AWQI in distribution system.

Revision History

Date	Revision #	Reason for Revision
2009 09 30	0	Initial risk assessment conducted
2011 10 21	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3)
2013 02 28	2	36-month Risk Assessment redo was conducted (2012 09 20); corrected typos and cut and paste errors.
2014 01 17	3	Made required changes as described in previous table (Oct 25, 2013) after review
2015 08 20	4	Conducted 36 month redo 2015 08 19, incorporated risks in the distribution system
2016 09 28	5	Made required changes as described in previous table (2016 09 28) after review
2017 06 20	6	Made required changes as described in previous table after review
2019 01 28	7	Updated table 1 and 3, added new table – rearranged order, new table is #3, added section in Table 1 for MECP's Potential Hazards List reference number. Separated DWS's into their own individual outcomes sheet.
2019 12 04	8	Updated Table 4
2020 10 30	9	Updated Table 4

Date	Revision #	Reason for Revision
2021 12 01	10	Conducted 36 month re-assessment and made changes as outlined in Table 4.
2022 06 01	11	Made changes as outlined in Table 4
2023 09 21	12	Updated Table 4 to include the 2022 annual review and summary of results.
2023 11 15	13	Updated Table 4 to include the 2023 annual review and summary of results.
2024 09 10	14	Conducted 36 month Risk Assessment. Added operational low for secondary disinfection in Table 2. Updated note below Table 2. Removed footer. Made changes as outlined in Table 4 and updated Table 4.

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: PCT	Approved by: SPC Manager

1. Purpose

To document the following for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System:

- Owner;
- Organizational structure of the Operating Authority;
- QEMS roles, responsibilities and authorities of staff, Top Management and individuals/groups that provide corporate oversight; and
- Responsibilities for conducting the Management Review

2. Definitions

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Senior Leadership Team (SLT) – members include President and CEO, Executive Vice President and General Counsel, Vice Presidents of OCWA's business units and Regional Hub Managers

Top Management – a person, persons or a group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems

Operations Personnel – Employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality

3. Procedure

3.1 Organizational Structure

The Holtyre, Matheson, Ramore and Val Gagne Drinking Water System is owned by the Corporation of the Township of Black River-Matheson and is represented by the Mayor, CAO and Council.

The organizational structure of OCWA, the Operating Authority, is outlined in appendix OP-09A: Organizational Structure.

3.2 Top Management

Top Management for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System consists of:

- Operations Management – Matheson Cluster
- Regional Hub Manager – Northeastern Ontario Regional Hub

- Operations Management, Capital Projects – Northeastern Ontario Regional Hub
- Safety, Process & Compliance Manager – Northeastern Ontario Regional Hub

Irrespective of other duties (see Table 9-2 below), Top Management's responsibilities and authorities include:

- Endorsing the Operational Plan as per the Commitment and Endorsement procedure (OP-03);
- Ensuring that the QEMS meets the requirements of the DWQMS;
- Ensuring staff are aware of the applicable legislative and regulatory requirements;
- Communicating the QEMS according to the Communications procedure (OP-12);
- Providing resources needed to maintain and continually improve the QEMS;
- Appointing and authorizing a QEMS Representative (OP-04); and
- Undertaking Management Reviews as per the Management Review procedure (OP-20).

Note: Specific responsibilities of the individual members of Top Management are identified in the referenced procedures.

3.3 Corporate Oversight

Roles, responsibilities and authorities for individuals/groups providing corporate oversight of OCWA's QEMS are summarized in Table 9-1 below.

Table 9-1: Corporate QEMS Roles, Responsibilities and Authorities

Role	Responsibilities and Authorities
Board of Directors	• Set the Agency's strategic direction, monitor overall performance and ensure appropriate systems and controls are in place in accordance with the Agency's governing documents • Review and approve the QEMS Policy
Senior Leadership Team (SLT)	• Establish the Agency's organizational structure and governing documents and ensure resources are in place to support strategic initiatives • Monitor and report on OCWA's operational and business performance to the Board of Directors • Review the QEMS Policy and recommend its approval to the Board • Approve corporate QEMS programs and procedures

Corporate Compliance	• Manage the QEMS Policy and corporate QEMS programs and procedures • Provide support for the local implementation of the QEMS • Monitor and report on QEMS performance and any need for improvement to SLT • Consult with the Ministry and other regulators and provide compliance support/guidance on applicable legislative, regulatory and policy requirements • Manage contract with OCWA's DWQMS accreditation body

3.4 Regional Hub Roles, Responsibilities and Authorities

QEMS roles, responsibilities and authorities of Northeastern Ontario Regional Hub personnel are summarized in Table 9-2 below. This information is kept current as per the Document and Records Control procedure (OP-05) and is communicated to staff as per the Communications procedure (OP-12).

Additional duties of employees are detailed in their job specifications and in the various QEMS programs and procedures that form, or are referenced in, this Operational Plan.

Table 9-2: QEMS Roles, Responsibilities and Authorities for the Regional Hub

Role/Position	Responsibilities and Authorities
All Operations Personnel	• Perform duties in compliance with applicable legislative and regulatory requirements • Be familiar with the QEMS Policy and work in accordance with QEMS programs and procedures • Maintain operator certification (as required) • Attend/participate in training relevant to their duties under the QEMS • Document all operational activities • Identify potential hazards at their facility that could affect the environmental and/or public health and report to Operations Management • Report and act on all operational incidents • Recommend changes to improve the QEMS
Regional Hub Manager (Top Management)	• Oversee the administration and delivery of contractual water/wastewater services on a Regional Hub level • Fulfill role of Top Management • Ensure corporate QEMS programs and procedures are implemented consistently throughout the Regional Hub • Manage the planning of training programs for Regional Hub • Report to VP of Operations/SLT on the regional performance of the QEMS and any need for Agency-wide improvement

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: PCT | Approved by: SPC Manager

Role/Position	Responsibilities and Authorities
Operations Management (Top Management)	• Manage the day-to-day operations and maintenance of their assigned facilities and supervise facility staff • Fulfill role of Top Management • Ensure corporate and site-specific QEMS programs and procedures are implemented at their assigned facilities • Determine necessary action and assign resources in response to operational issues • Report to the Regional Hub Manager on facility operational performance • Ensure operational training is provided for the cluster (in consultation with the SPC Manager as required) • Act as Overall Responsible Operator (ORO) when required (based on certification).
Operations Management, Capital Projects (Top Management)	• Provide support to the regional operations teams related to planning and execution of capital projects. • Develop standard processes to provide efficiency when providing capital project related support to clients (internal/external) • Report to the Regional Hub Manager on regional capital project status' • Prepare and manage project budgets, ensuring cost-effectiveness • Develop detailed project plans, including timelines, budgets and resource allocation.
Safety, Process & Compliance (SPC) Manager (Top Management)	• Supervise facility compliance staff and provide technical and program support to the Regional Hub related to process control and compliant operations • Fulfill role of Top Management • Ensure corporate/regional QEMS programs and procedures are implemented consistently throughout the Regional Hub • Assist in the development of site-specific operational procedures as required • Ensure training on applicable legislative and regulatory requirements and the QEMS is provided for the Regional Hub (in consultation with Operations Management as required) • Monitor and report to the Regional Hub Manager and Operations Management on the compliance status and QEMS performance within their Regional Hub and any need for improvement • Act as alternate QEMS Representative (when required)
Process & Compliance Technician (PCT)/	• Implement, monitor and support corporate programs relating to environmental compliance and support management by

Role/Position	Responsibilities and Authorities
Operations & Compliance (O&C) Team Lead (QEMS Representative)	evaluating and implementing process control systems at their assigned facilities • Fulfill role of QEMS Representative (OP-04) • Monitor, evaluate and report on compliance/quality status of their assigned facilities • Implement facility-specific QEMS programs and procedures consistently at their assigned facilities • Participate in audits and inspections and assist in developing, implementing and monitoring action items to respond to findings • Report to the SPC Manager on QEMS implementation and identify the need for additional/improved processes and procedures at the Regional Hub/cluster/facility level (in consultation with the Operations Management as required) • Communicate to Owners on facility compliance and DWQMS accreditation as directed • Deliver/participate in/coordinate training including applicable legislative and regulatory requirements and the QEMS
Certified Operator May include the following positions: [insert positions – e.g. • Operations Supervisor Water & Wastewater • Water & Wastewater Lead • Senior Water & Wastewater Operator • Water & Wastewater Operator • Water & Wastewater Operator-In-Training (OIT)]	• Perform duties outlined under Operations Personnel • Monitor, maintain and operate facilities in accordance with applicable regulations, approvals and established operating procedures • Collect samples and perform laboratory tests and equipment calibrations as required • Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned • Ensure records of adjustments made to the process under their responsibility, equipment operating status during their shifts and any departures from normal operations observed and actions taken are maintained within facility logs/record keeping mechanisms (as per O. Reg. 128) • Participate in facility inspections and audits • May act as OIC and/or ORO when required (based on certification). Refer to ORO Letter. **NOTE:** OITs cannot act as OIC and/or ORO. OITs perform the above duties under the direction of the OIC/ORO and as assigned by Operations Management or designate.
Maintenance Personnel May include the following positions: [insert positions – e.g.,	• Schedule and perform maintenance on equipment and processes in accordance with established procedures and record the maintenance data • Regularly inspect operating equipment, perform routine preventive maintenance and repairs

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: PCT | Approved by: SPC Manager

Role/Position	Responsibilities and Authorities
• Mechanic/Operator • Maintenance Technician • Maintenance Shift Lead • Senior Water & Wastewater Operator, etc.]	• May fulfill role of Certified Operator when required (based on certification).
Instrumentation Technician May include the following positions: [insert positions – e.g., • Utility Plant Instrument Technician (UPIT) • Utility Plant Electrician Operator • Instrumentation Technician • Operations Supervisor Water & Wastewater, etc.	• Provide advice and technical expertise on the services required for process control and automation systems • Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems • Conduct inspections of the process control and automation systems to validate that all is operating within established parameters as requested • Install and commission new electrical/electronic equipment and automation systems • May fulfill role of Certified Operator as required (based on certification).
Electrical Maintenance Personnel May include the following positions: [insert applicable positions/roles: e.g., • Utility Plant Electrician Operator • Maintenance Electrician • Electrician Shift Lead etc.]	• Perform repairs, inspections, preventive maintenance and/or scheduled maintenance on electrical systems, equipment, components and devices in accordance with established procedures and record the maintenance data • Examine, trouble shoot and carry out systematic diagnostic testing of faults/failures, identification, assessment, repairs/service to equipment, fixtures and other electrical component • May fulfill role of Certified Operator as required (based on certification)
Municipal Operators	• Perform day to day operations of the distribution system

Role/Position	Responsibilities and Authorities
(Distribution System only)	• Repair distribution main breaks and perform required maintenance of the distribution system • Act on and report any incidents of noncompliance or adverse water quality incidents associated with the distribution system • Regularly inspect the distribution system • Respond to and document public complaints
Administrative Assistant/Project Clerk	• Support the administrative functions of the Regional Hub/cluster/facility including coordinating delivery of training as directed • Assist with entering operational data (including operational training records, process data and maintenance records) into the appropriate database as directed

4. Related Documents

OP-03 Commitment and Endorsement
OP-04 QEMS Representative
OP-05 Document and Records Control
OP-09A Organizational Structure
OP-12 Communications
OP-20 Management Review
OCWA Position Descriptions/Job Specifications

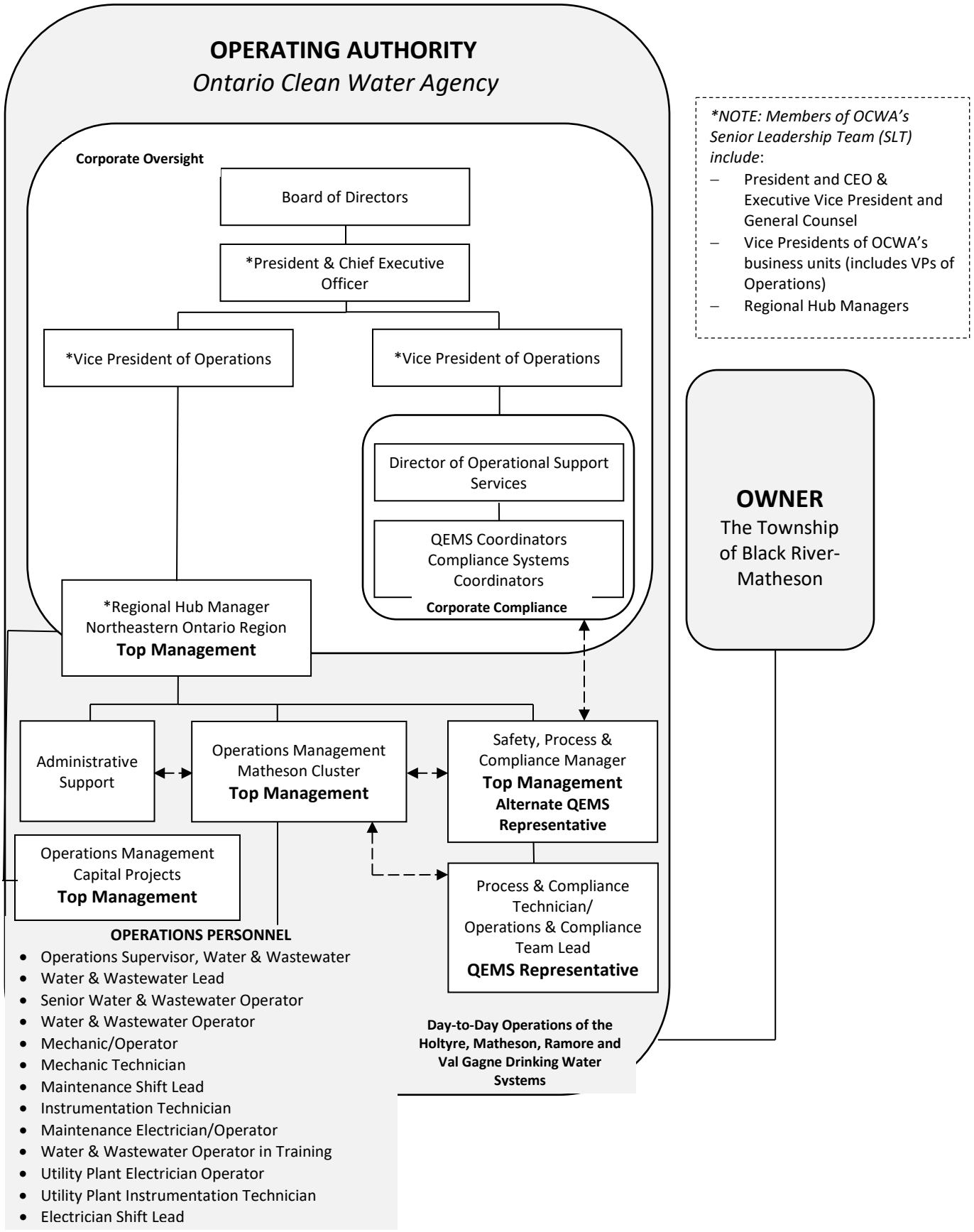
5. Revision History

Date	Revision #	Reason for Revision
2018-06-29	0	Procedure issued – Information within OP-09 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System Operational Plan (revision 6, dated September 29, 2016). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Incorporated OCWA's new org structure, including SPC Manager. Removed two levels of Top Management (e.g. Facility Level and Corporate level), instead Top Management is only at the facility level and corporate has been moved to Corporate oversight. Re-worded QEMS Roles, Responsibilities and Authorities for each position. Added QEMS Roles, Responsibilities and Authorities for Mechanic and Data Clerk.

2024-08-20	1	Procedure updated with revisions to Table 9-2 as follows: Role/Position updated to clarify roles are performed by multiple positions, position titles updated, note added regarding OITs operating limitations. Additional revisions include replaced MOECC with Ministry, minor rewording and type-o's, removed watermark. Added Capital Manager and Municipal Staff.

ORGANIZATIONAL STRUCTURE

Reviewed by: PCT	Approved by: SPC Manager



Revision History

Date	Revision #	Reason for Revision
2010-05-01	0	Organizational Chart issued.
2012-02-23	1	Added media spokesperson.
2013-02-21	2	Removed position of Process and Compliance Manager, changed Operations Manager to Senior Operations Manager, changed Cluster Manager to Operations Manager.
2013-05-24	3	Added Team Lead position.
2014-05-30	4	Changed Director of Risk, Compliance & Training to Director of Operational Services.
2016-09-15	5	Removed Team Lead and added position of Senior Operator.
2017-09-21	6	Added Safety Process and Compliance Manager Position and changed media spokesperson from Senior Operations Manager to Regional Hub Manager.
2018-06-29	7	Appendix issued - Organizational Chart previously contained as Appendix C of the Operational Plan. Moved to a new Appendix.
2021-12-02	8	Updated to reflect that Corporate Compliance now reports to VP of Operations (previously reported to Vice President of Engineering, Capital & Support Services)
2024-08-20	9	Revised to include Senior Leadership Team (SLT) in reporting structure and identify members, added Compliance System Coordinators, updated Operations Personnel position titles, removed watermark, added Capital Manager.

1. Purpose

To document a procedure that describes:

- the competencies required for personnel performing duties directly affecting drinking water quality;
- the activities to develop and/or maintain those competencies; and
- the activities to ensure personnel are aware of the relevance of their duties and how they affect safe drinking water.

2. Definitions

Competence – the combination of observable and measurable knowledge, skills, and abilities which are required for a person to carry out assigned responsibilities

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Operations Personnel – employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality

Top Management – a person, persons or a group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the Owner respecting the subject system or subject systems

3. Procedure

3.1 The following table presents the minimum competencies required by operations personnel.

Role/Position	Required Minimum Competencies
Operations Management	• Valid operator certification; if required to act as Overall Responsible Operator (ORO), certification must be at the level of the facility or higher • Experience and/or training in managing/supervising drinking water system operations, maintenance, financial planning and administration • Training and/or experience related to drinking water system processes, principles and technologies • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

Role/Position	Required Minimum Competencies
Safety, Process & Compliance (SPC) Manager (Top Management) (May also fulfill the role of Alternate QEMS Representative)	• Valid operator certification required to fulfil certified operator duties (if assigned). • Experience in providing technical support and leading/managing programs related to process control and compliant operations • Experience and/or training in conducting compliance audits, and management system audits • Experience and/or training in preparing and presenting informational and training material • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Process & Compliance Technician, Operations and Compliance Team Lead (QEMS Representative)	• Valid operator certification required to fulfil certified operator duties (if assigned) • Experience and/or training in resolving/addressing compliance issues for drinking water systems • Experience and/or training in monitoring, assessing and reporting on facility performance against legal requirements and corporate goals • Experience and/or training in preparing and presenting informational and training material • Experience in conducting management system audits or internal auditor education/training • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Certified Operator May include the following: [insert positions – e.g. • Operations Supervisor Water & Wastewater • Water & Wastewater Lead • Senior Water & Wastewater Operator • Water & Wastewater Operator	• Valid operator certification • If required to act as ORO, certification must be at the level of the facility or higher • If required to act as Operator-in-Charge (OIC), certification must be level 1 or higher • Training and/or experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

Role/Position	Required Minimum Competencies
• Water & Wastewater Operator-in-Training	
Maintenance Personnel May include the following: [insert positions: – e.g., • Mechanic/Operator • Maintenance Technician • Maintenance Shift Lead • Operations Supervisor Water & Wastewater etc.	• Valid operator certification required to fulfil certified operator duties (if assigned) • Millwright and/or other trades certificates • Experience in maintaining and repairing equipment and structures and in planning and scheduling maintenance and repair tasks • Training and/or experience related to drinking water system processes • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Instrumentation Technician May include the following: [insert positions: e.g. • Utility Plant Instrument Technician • Instrumentation Technician • etc.]	• Valid operator certification required to fulfil certified operator duties (if assigned) • Experience and/or training in monitoring, programming, installing and troubleshooting network, hardware, software and instrumentation • Experience and/or training in drinking water system processes, design, instrumentation, process control and automation systems • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Electrical Maintenance Personnel May include the following: [insert positions: e.g. - • Utility Plant Electrician Operator • Maintenance Electrician • Electrician Shift Lead etc.]	• Valid operator certification required to fulfil certified operator duties (if assigned) • Completion of any electrical or electronic training program certified by the Ministry of Advanced Education and Skills Development (formerly the Ministry of Training, Colleges and Universities) • Experience in performing maintenance and repair of electrical and electronic equipment • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

Role/Position	Required Minimum Competencies
Municipal Operators (Distribution System only)	• Valid operator certification • Experience and/or training in distribution system operations and maintenance • Training in water treatment processes • Training on relevant legislation, regulations, codes, policies, guidelines and procedures

3.2 The following table presents the minimum competencies required by staff that provide administrative support to operations personnel.

Role and/or Position	Required Minimum Competencies
Administrative Staff May include the following: [insert positions: e.g. - Administrative Assistant Project Clerk	• Experience and/or training related to procurement and business administration practices • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers

3.3 OCWA's recruiting and hiring practices follow those of the Ontario Public Service (OPS). As part of the OPS, minimum competencies, which include education, skills, knowledge and experience requirements, are established when designing the job description for a particular position. As part of the recruitment process, competencies are then evaluated against the job description. Based on this evaluation, the hiring manager selects and assigns personnel for specific duties.

3.4 OCWA's Operational Training Program aims to:

- Develop the skills and increase the knowledge of staff and management;
- Provide staff with information and access to resources that can assist them in performing their duties; and
- Assist OCWA certified operators in meeting the legislative and regulatory requirements with respect to training.

3.5 The Program consists of Director Approved, continuing education and on-the-job training and is delivered using a combination of methods (e.g., traditional classroom courses, e-learning/webinars and custom/program-based courses/sessions). A formal evaluation process is in place for all sessions under the Operational Training Program and is a critical part of the Program's continual improvement.

3.6 Awareness of OCWA's QEMS is promoted during the orientation of new staff, at facility/cluster/regional hub level training sessions and meetings and through OCWA's Environmental Compliance 101 (EC 101) course. All new staff are required to complete the EC 101 course within their first year of joining OCWA. The purpose of the EC 101 course is to ensure staff are aware of applicable legislative and regulatory requirements, to promote awareness of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.7 Staff are also required to complete the mandatory environmental and health and safety compliance training listed in OCWA's Mandatory Compliance Training Requirements document, based on their position and/or the duties they perform. This list is available on OCWA's intranet.

3.8 Staff are also required to complete the training listed in OCWA's Mandatory Training Requirements procedure, based on their position and/or the duties they perform. This list includes mandatory environmental and health and safety compliance training, as well as the training deemed mandatory by OCWA corporate and Ontario Public Service (OPS) policies and is available on OCWA's intranet (sharepoint site).

3.9 As part of OCWA's annual Performance Planning and Review (PPR) process, employee performance is evaluated against their job expectations. Professional development opportunities and training needs (which could include formalized courses as well as site-specific on-the-job training or job shadowing/mentoring) are identified as part of this process (and on an ongoing basis). In addition to this process, OCWA employees may at any time request training from either internal or external providers by obtaining approval from their Manager.

3.10 Certified drinking water operators are responsible for completing the required number of training hours in order to renew their certificates based on the highest class of drinking water subsystem they operate. They are also responsible for completing mandatory courses required by *Safe Drinking Water Act* (SDWA) O. Reg. 128/04 Certification of Drinking Water System Operators and Water Quality Analysts. The Operations Management takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the requirements.

3.11 It is the responsibility of operations personnel to ensure Operations Management are aware of any change to the status/classification of their drinking water operator certificate(s), the validity of their driver's licence (required to hold at a minimum a Class G license which is initially verified upon hire) and/or the validity of any other required certificates/qualifications.

3.12 Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is administrated by OCWA's Learning and Development Department. Training records maintained at the facility are controlled as per OP-05 Document and Records Control.

4. Related Documents

OCWA's Learning and Development Resources (OCWA Intranet/sharepoint)
OCWA's Mandatory Training Requirements (OCWA intranet/sharepoint)
OCWA's Training Resources (OCWA Intranet)
OCWA's Training Summary Database
Performance Planning and Review (PPR) Database
OP-5 Document and Records Control

5. Revision History

Date	Revision #	Reason for Revision
2018-06-29	0	Procedure issued – Information within OP-10 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System Operational Plan (revision 6, dated September 29, 2016). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Modified table in procedure (s. 3.1 and s. 3.2): removed/revised non-measurable competencies, added the word 'minimum' to competencies; removed 'Valid Class G Driver's License' listed under individual positions and referenced in s. 3.11; added competencies for SPC Manager and Data Clerk and merged competencies for Senior Operations Manager and Operations Manager under Operations Management. Updated training sections (s. 3.4 to s. 3.7) to reference new Environmental 101 course, Mandatory Compliance Training list and removed specific references to Orientation Training Program. Added s. 3.11 related to ensuring operators make Operations Management aware of changes to operator certification and other certificates/licenses. Other minor changes to wording.
2019-03-04	1	Added competencies for Municipal Operators to the table.
2024-08-20	2	Procedure updated with revisions to table in 3.1 Role/Position updated to clarify roles are performed by multiple positions, position titles updated, removed watermark, updated Procedure to reflect changes to title and content of OCWA's Mandatory Training Requirements Document, added sharepoint.

PERSONNEL COVERAGE

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality at the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems.

2. Definitions

Competency – an integrated set of requisite skills and knowledge that enables an individual to effectively perform the activities of a given occupation *

Essential Services – services that are necessary to enable the employer to prevent,

(a) danger to life, health or safety,
(b) the destruction or serious deterioration of machinery, equipment or premises,
(c) serious environmental damage, or
(d) disruption of the administration of the courts or of legislative drafting.

(*Crown Employees Collective Bargaining Act*, 1993)

3. Procedure

3.1 Operations Management ensures that personnel meeting the competencies identified in OP-10 Competencies are available for duties that directly affect drinking water quality.

3.2 The Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems are considered un-manned facilities. OCWA operations personnel routinely visit the systems twice per week and monitor the facilities daily using OCWA's remote monitoring SCADA system

Certified Township employees perform the following duties;

- Regularly inspect the distribution system and perform routine maintenance and repairs.
- Contact OCWA for all non-routine operational concerns or adjustments
- Maintain a distribution log book

OCWA operators are available 24 hours a day, 7 days a week by an alarm system and cell phone.

* Based on the *2005 National Occupational Guidelines for Canadian Water and Wastewater Operators* and International Board of Standards for Training, Performance and Instruction

3.3 Operations personnel are assigned to act as and fulfill the duties of Overall Responsible Operator (ORO) and Operator-in-Charge (OIC) in accordance with SDWA O. Reg. 128/04.

The Team Lead/Senior Operator is the designated ORO. When the ORO is unavailable, an operator is designated as the ORO and is recorded as such in the facility logbook (refer to the ORO Letter).

The designated OIC for each shift is recorded in the facility logbook.

3.4 The Senior Operator/Team Lead assigns an on-call operator for the time that the facility is un-staffed (i.e., evenings, weekends and Statutory Holidays). The on-call shift change occurs every other Thursday afternoon at 1600 hrs. The on-call schedule is maintained by the Team Lead and is available to on-call operators in the Microsoft Outlook shared calendar.

3.5 The on-call operator conducts an inspection of the facility process at least once per day during the weekends and Statutory Holidays either on-site or via OCWA's remote monitoring system. Details of the inspection are recorded in the facility logbook and/or round sheets.

3.6 The alarm system auto dialer is programmed to contact the operator on-call. The operator on-call is responsible for responding to the alarm within a reasonable timeframe. If the nature of the alarm requires additional staff, the on-call operator can request assistance from any of the other certified operators. The on-call operator records details of the call-in in the facility logbook and OCWA operators also record details in OCWA's Workplace Management System (WMS/Maximo).

3.7 The Senior Operator/Team Lead or Operations Management is responsible for approving vacation time for their staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties.

3.8 OCWA's operations personnel are represented by the Ontario Public Service Employees Union (OPSEU). In the event of a labour disruption, Operations Management, together with the union, identifies operations personnel to provide "essential services" required to operate the facility so that the quality of drinking water is not compromised in any way.

3.9 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction in the event that there is a severe shortage of operations personnel due to sickness (e.g., pandemic flu) or other unusual situations.

4. Related Documents

Call-In Reports (WMS)
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)
Facility Logbook
Facility Round Sheets
On-Call Schedule
ORO Letter
Vacation Schedule
OP-10 Competencies

5. Revision History

Date	Revision #	Reason for Revision
2009-09 30	0	Procedure issued
2011-10-21	1	Procedure 5.9 was added to reference contingency planning for Critical Shortage of Staff
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant
2015-08-20	3	Added responsibilities of town employees, changed Well Supply Systems to Drinking Water Systems
2018-06-29	4	QP-03 procedure renamed OP-11. Removed Scope and Responsibilities sections. Other minor edits in wording.
2019-03-04	5	Corrected revision number in header
2021-12-02	6	Updated section 3.4 with current on-call switch over time/day.

COMMUNICATIONS

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe the procedure for facility level internal and external QEMS-related communications between Top Management and:

- OCWA staff;
- the Owner;
- essential suppliers and service providers (as identified in OP-13); and
- the public.

2. Definitions

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Operations Personnel – employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality.

3. Procedure

3.1 Operations Management and the QEMS Representative are responsible for identifying and coordinating any site-specific communications in relation to the status/ development of the facility's QEMS.

3.2 Internal and external communication responsibilities and reporting requirements for emergency situations are set out under OCWA's Emergency Management Program (i.e., Facility Emergency Plan and OCWA's Corporate Emergency Response Plan). Refer to OP-18 Emergency Management for more information.

3.3 Communication with OCWA staff:

3.3.1 Within the first year of hire, all staff are required to complete the Environmental Compliance 101 (EC101) course. The objective of the EC 101 course is to ensure that staff are aware of applicable legislative and regulatory requirements and of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.3.2 Operations Management are responsible for ensuring operations personnel receive site-specific training on the Operational Plan, the organizational structure for the facility including the roles and responsibilities and authorities (outlined in OP-09 Organizational Structure, Roles, Responsibilities and Authorities), QEMS Procedures and other related operating instructions and procedures as part of the orientation process and on an on-going basis as required.

3.3.3 The Safety, Process and Compliance (SPC) Manager is responsible for ensuring training is provided for the Regional Hub (in consultation with Operations Management as required) on applicable legislative and regulatory requirements and the QEMS.

3.3.4 The QEMS Representative assists Operations Management and/or the SPC Manager in the coordination/delivery of training as required.

3.3.5 Revisions to the QEMS and associated documentation are communicated as per OP-05 Document and Records Control.

3.3.6 The QEMS Policy is available to all OCWA personnel through OCWA's intranet and as outlined in 3.6.2 of this procedure.

3.3.7 Operations personnel are responsible for identifying potential hazards at the facility that could affect the environmental and/or public health, and communicating these to Operations Management. They may also recommend changes be made to improve the facility's QEMS by making a request to the QEMS Representative (as per OP-05).

3.3.8 The QEMS Representative is responsible for ensuring that the Operations Management and the SPC Manager are informed regarding the compliance/quality status of the facility and QEMS implementation and any need for improved processes/procedures at the cluster/facility level.

3.3.9 The SPC Manager reports to the Regional Hub Manager on the compliance status, the QEMS performance and effectiveness, any need for improvement and on issues that may have Agency-wide significance. Operations Management reports to the Regional Hub Manager on facility operational performance.

3.4 Communication with the Owner:

3.4.1 The Regional Hub Manager, Operations Management and SPC Manager ensures that the Owner is provided with QEMS updates and that they are kept informed of the status of the facility's operational and compliance performance during regularly scheduled meetings and/or through electronic and/or verbal communications. The QEMS Representative/PCT assists in the coordination of these meetings and with communicating the updates as directed.

3.4.2 The continuing suitability, adequacy and effectiveness of OCWA's QEMS are communicated to the Owner as part of the Management Review process (refer to OP-20 Management Review).

3.5 Communications with Essential Suppliers and Service Providers:

3.5.1 Communication requirements to ensure essential suppliers and service providers understand the relevant OCWA QEMS policies, procedures and expectations are described in OP-13 Essential Supplies and Services.

3.6 Communication with the Public:

3.6.1 Media enquiries must be directed to the facility's designated media spokesperson as identified in the Facility Emergency Plan. The media spokesperson coordinates with local and corporate personnel (as appropriate) and the Owner in responding to media enquiries.

3.6.2 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website (www.ocwa.com). The QEMS Policy is also posted at the Matheson Office and the Kirkland Lake Process and Compliance Office.

3.6.3 Facility tours of interested parties must be approved in advance by the Owner. A record of any tour is made in the facility logbook.

3.6.4 All complaints, whether received from the consumer, the community or other interested parties, are documented on a Community Complaint form. As appropriate, the Operations Management or the Senior Operator/Team Lead ensures that the Owner is informed of the complaint and/or an action is developed to address the issue in a timely manner. The QEMS Representative ensures that consumer feedback is included for discussion at the Management Review.

4. Related Documents

Community Complaint Form
Corporate Emergency Response Plan
Facility Emergency Plan
OP-05 Document and Records Control
OP-09 Organizational Structure, Roles, Responsibilities and Authorities
OP-13 Essential Supplies and Services
OP-18 Emergency Management
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Correction of some employee titles and update to Procedure 5.2 to include information how revisions are communicated

2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant. Clarification of the training referred to in 5.2
2015-08-20	3	Changed Well Supply systems to drinking Water Systems
2016-09-29	4	Added Client Reports to the Related Documents section
2018-06-29	5	QP-04 procedure renamed OP-12. Removed Scope and Responsibilities sections. Added definitions for Operations Management and Operations Personnel. Reordered and created separate sections to clarify communications to each of the 4 parties. Clarified suppliers were those listed as essential as per Element 13 (as per DWQMS v. 2.0) and replaced references to Senior Operations Manager with 'Operations Management'. Updated training sections for OCWA personnel (s. 3.3.1 to s. 3.3.4) to reference new Environmental Compliance 101 course completed within first year of hire and to outline how training is coordinated between SPC Manager/Operations Management, and QEMS Representative. Included sections on R&Rs for performance reporting within OCWA (s. 3.3.7 to s. 3.3.9) and to Client (3.4.1). Replaced identification of media spokesperson (s. 3.6.1) with 'as identified in Facility Emergency Plan'. Added reference to site-specific records/documents used for recording tours (s. 3.6.3). Other minor edits.
2019-03-04	6	Revised to correct revision number in the header.
2024-06-20	7	Procedure revised reference updated title of Corporate Emergency Response Plan, removed watermark.

ESSENTIAL SUPPLIES AND SERVICES

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe OCWA's procedures for procurement and for ensuring the quality of essential supplies and services.

2. Definitions

Essential Supplies and Services – supplies and services deemed to be critical to the delivery of safe drinking water

3. Procedure

3.1 Essential supplies and services for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems are contained in the Facility Emergency Plan on the Essential Supplies and Services List. The list is reviewed at least once every calendar year by the QEMS Representative and updated as required.

3.2 Purchasing is conducted in accordance with OCWA's Corporate Procurement and Administration policies, procedures and guidelines, which are adopted from those of the Ontario Public Service.

Purchases of capital equipment are subject to formal approval by the facility's owner.

3.3 As part of the corporate procurement process, potential suppliers/service providers are informed of relevant aspects of OCWA's QEMS through the tendering process and through specific terms and conditions set out in our agreements and purchase orders. Essential suppliers and service providers (including those contracted locally) are sent a letter that provides an overview of the relevant aspects of the QEMS.

3.4 Contractors are selected based on their qualifications and ability to meet the facility's needs without compromising operational performance and compliance with applicable legislation and regulations.

Contracted personnel including suppliers may be requested or required to participate in additional relevant training/orientation activities to ensure conformance with facility procedures and to become familiar with OCWA workplaces.

If necessary, appropriate control measures are implemented while contracted work is being carried out and communicated to all relevant parties to minimize the risk to the integrity of the drinking water system and the environment.

3.5 All third-party drinking water testing services are provided by accredited and licensed laboratories. The Ministry of the Environment, Conservation & Parks (MECP) has agreement with The Canadian Association for Laboratory Accreditation (CALA) for accreditation of laboratories testing drinking water. The QEMS Representative is

responsible for notifying the MECP of any change to the drinking water testing services being utilized.

3.6 Internal verification and calibration activities (e.g. chlorine analyzer, flowmeters, etc.) are conducted by operations personnel in accordance with equipment manuals and/or procedures (Refer to OP-17 Measurement Recording Equipment Calibration and Maintenance).

3.7 External calibration activities, if required are conducted by qualified third-party providers. Qualifications of the service provider are verified during the procurement process. The service provider is responsible for providing a record/certificate of all calibrations conducted.

3.8 Chemicals purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified as per the Municipal Drinking Water Licence (MDWL).

3.9 The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities. Incoming chemical orders are verified by reviewing the manifest or invoice in order to confirm that the product received is the product ordered.

3.10 Process components/equipment provided by the supplier must meet applicable regulatory requirements and industry standards for use in drinking water systems prior to their installation.

4. Related Documents

ANSI/NSF Documentation
AWWA Standards
Calibration Certificates/Records
Essential Supplies and Services List
Municipal Drinking Water Licence (MDWL)
OP-17 Measurement Recording Equipment Calibration and Maintenance

5. Revision History

6.

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Addition of Procedure 5.3 clarifying how suppliers are informed of relevant aspects of OCWA's QEMS
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant.

2015-08-20	3	Changed Well Supply Systems to Drinking Water Systems
2018-06-29	4	QP-05 procedure renamed OP-13. Removed Scope and Responsibilities sections. Changes to wording to provide clarification on ensuring quality of essential supplies and services (s. 3.5, 3.6, 3.7 and 3.9).
2019-03-04	5	Revised to correct revision number in header. Changed MOECC to MECP

REVIEW AND PROVISION OF INFRASTRUCTURE

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems.

2. Definitions

Infrastructure – the set of interconnected structural elements that provide the framework for supporting the operation of the drinking water system, including buildings, workspace, process equipment, hardware, software and supporting services, such as transport or communication

3. Procedure

3.1 At least once every calendar year, Operations Management in conjunction with operations personnel (Senior Operator/Team Lead, PCT, operators, mechanics and instrumentation technicians) conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. Operations personnel assist with identifying the need for infrastructure repairs, replacements or alterations and with prioritizing each identified item. Documents and records that are reviewed may include:

- Maintenance records
- Call-in reports
- Adverse Water Quality Incidents (AWQIs) or other incidents
- Health & Safety Inspections
- MECP Inspection Reports
- QEMS Audit Reports

3.2 The outcomes of the risk assessment documented as per OP-08 are considered as part of this review.

3.3 The output of the review is a 5 year rolling Recommended Capital and Major Maintenance Report to assist the Owner and OCWA with planning infrastructure needs for the short and long-term. A letter, summarizing capital works recommendations and estimated expenditures for the upcoming year, is submitted to the Owner for review and approval. A capital letter is submitted, at least once every calendar year by Operations Management.

3.4 The final approved capital items form the long term forecast for any major infrastructure maintenance, rehabilitation and renewal activities as per OP-15.

3.5 Operations Management ensures that results of this review are considered during the Management Review process (OP-20).

4. Related Documents

Capital and Major Maintenance Recommendations Report
Capital Letter & Acknowledgement/Approval from the Owner
Management Review Minutes
OP-08 Risk Assessment Outcomes
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Revised to include the position of Process Compliance Manager
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant.
2015-08-20	3	Changed Well Supply to Drinking water System
2018-06-29	4	QP-06 procedure renamed OP-14. Removed Scope and Responsibilities sections. Replaced ‘once every 12 months’ with ‘once every calendar year’ (s. 3.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2 to consider the outcomes of the risk assessment under Element 8 during the review to reflect wording in DWQMS v. 2.0. Changes to wording to provide clarification on who is required to attend the review and what documents and records may be considered during the review (s. 3.1). Linked the procedure with OP-15 in terms of documenting a long-term forecast (s. 3.3 and s. 3.4).
2019-03-21	5	Corrected revision number in header. Changed MOECC to MECP.

1. Purpose

To describe OCWA's infrastructure maintenance, rehabilitation and renewal program for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems

2. Definitions

Infrastructure – the set of interconnected structural elements that provide the framework for supporting the operation of the drinking water system, including buildings, workspace, process equipment, hardware, software and supporting services, such as transport or communication

Rehabilitation – the process of repairing or refurbishing an infrastructure element.

Renewal – the process of replacing the infrastructure elements with new elements.

3. Procedure

3.1 OCWA, under contract with the Owner, maintains a computerized Work Management System (WMS) to manage maintenance, rehabilitation and renewal of infrastructure for which it is operationally responsible. The major components of the WMS consist of planned maintenance, unplanned maintenance, rehabilitation, renewal and program monitoring and reporting.

3.1.1 Planned Maintenance

Routine planned maintenance activities include:

- Inspect, adjust and calibrate process control equipment to ensure proper operation of water systems, pumps, chemical feeders, and all other equipment installed at the facilities.
- Inspect reservoir
- Perform routine maintenance duties to equipment including checking machinery and electrical equipment when required.
- Maintain an inventory of all equipment
- Maintain accurate records of work conducted, activities, and achievements.

Planned maintenance activities are scheduled in the WMS that allows the user to:

- Enter detailed asset information;
- Generate and process work orders;
- Access maintenance and inspection procedures;
- Plan preventive maintenance and inspection work;
- Plan, schedule and document all asset related tasks and activities; and
- Access maintenance records and asset histories.

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a daily, weekly, monthly, quarterly and annual schedule as determined based on manufacturer's recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the Senior Operator/Team Lead. Work orders are completed and electronically entered into WMS by the person responsible for completing the task. Records of these activities are maintained as per OP-05 Document and Records Control.

The Senior Operator/Team Lead maintains the inventory of equipment in WMS and ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements. Equipment Operation and Maintenance (O&M) manuals are accessible to operations personnel at the locations specified in OP-05 Document and Records Control.

3.1.2 Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Management. Unplanned maintenance activities are recorded in the facility's logbook and as corrective/emergency work order and are entered into WMS by the person responsible for completing the unplanned maintenance activity.

3.1.3 Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades (major infrastructure maintenance) are determined at least once every calendar year in consultation with Operations Management and the Owner A list of required replacement or desired new equipment is compiled and prioritized by Operations Management in conjunction with operations personnel and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner. In addition to the short-term facility needs (i.e. current year), the Capital and Major Maintenance Recommendations Report also provides a long-term (i.e. rolling 5-year) list of major maintenance recommendations. (Refer to OP-14 Review and Provision of Infrastructure).

3.1.4 Program Monitoring and Reporting

Maintenance needs for the facility are determined through review of manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements and are communicated by means of work orders. Additionally, Operations Management and operations personnel (Senior Operator/Team Lead, PCT, operators, mechanics and instrumentation technicians) conduct a review of the drinking water system's infrastructure to

assess its adequacy for the operation and maintenance of the system. (Refer to OP-14 Review and Provision of Infrastructure).

To assist in monitoring the effectiveness of the program Operations Management (or designate) are provided monthly summary reports which are automatically generated and emailed from WMS.

3.2 OCWA's infrastructure maintenance, rehabilitation and renewal program is initially communicated to the Owner through the operating agreement. OCWA's program is communicated to the Owner on an on-going basis through quarterly reports and at a minimum once every calendar year through submission of the capital letter and the results of the Management Review.

4. Related Documents

Capital and Major Maintenance Recommendations Report
Capital Letter & Acknowledgement/Approval from the Owner
Minutes of Management Review
OP-05 Document and Records Control
OP-14 Review and Provision of Infrastructure

5. Revision History

Date	Revision #	Reason for Revision
2018-06-29	0	Procedure issued – Information within OP-15 (s. 3) was originally set out in main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System Operational Plan (last revision , dated September 29, 2016). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added the requirement to ensure the long term forecast is reviewed at once every calendar year and to document a long term forecast (s. 3.1.3) to reflect in DWQMS v. 2.0. Minor wording updates to reflect OCWA's current WMS.

SAMPLING, TESTING AND MONITORING

1. Purpose

To describe the procedure for sampling, testing and monitoring for process control and finished drinking water quality.

2. Definitions

Challenging Conditions – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under OP-06A Holtyre Drinking Water System, OP-06B Matheson Drinking Water System, OP-06C Ramore Drinking Water System and OP-06DVal Gagne Drinking Water System.

3. Procedure

3.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03 and the facility's Municipal Drinking Water License (MDWL).

3.2 Sampling requirements for the facility are defined in the facility's sampling schedule which is available to operations personnel, at the location(s) noted in OP-05 Document and Records Control. The sampling schedule is maintained by the PCT and is updated as required.

3.3 Samples that are required to be tested by an accredited and licensed laboratory, are collected, handled and submitted according to the directions provided by the licensed laboratory(ies) that conducts the analysis. The laboratory(ies) used for this facility are listed in the Essential Supplies and Services List (within the Facility Emergency Plan (FEP)).

Electronic and/or hardcopy reports received from the laboratory are maintained as per OP-05 Document and Records Control. Analytical results from laboratory reports are uploaded into OCWA's Process Data Management system (PDM).

3.4 Continuous monitoring equipment is used to sample and test for the following parameters related to process control and finished drinking water quality:

Holtyre Drinking Water System – total and peak flows for both well and treated water; free chlorine residual of the treated water

Matheson Drinking Water System - total and peak flows for both well and treated water; free chlorine residual of the treated water

Ramore Drinking Water System – total and peak flows for both well and treated water; free chlorine residual of the treated water

Val Gagne Drinking Water System – total and peak flows for both well and treated water; free chlorine residual of the treated water

Test results from continuous monitoring equipment are captured by the SCADA system and are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03.

The SCADA system also collects and records information on the following parameters related to process control and finished drinking water quality:

Holtyre Drinking Water System - clear well level, generator running, treated water turbidity, low chlorine alarm, flood conditions, low temperature

Matheson Drinking Water System - reservoir level, chlorine residual at the reservoir and at the plant, turbidity (reservoir), control power, smoke alarm, low temperature, flood conditions, chorine pump failure

Ramore Drinking Water System – generator running, discharge pressure, treated water turbidity, failure of both chlorine pumps, low temperature, flood conditions

Val Gagne Drinking Water System – clear well level, failure of both chlorine pumps, low pressure, diesel pump running, treated water turbidity, low temperature, flood conditions

3.5 Adverse water quality incidents are responded to and reported as per Environmental Emergency Procedures (EEPs) found in the Facility Emergency Plan Binder.

3.6 In-house process control activities are conducted on a regular basis by the certified operator(s) on duty and are as follows:

Operational Parameter	Location	Frequency
Holtyre Well Supply System		
Turbidity	Wells 1 and 3	Grab monthly
Static and Pumping Levels	Wells 1 and 3	Yearly
Temperature	Treated water	As required to calculate CT
pH	Treated water	As required to calculate CT
Hypochlorite Usage	Chemical tank	Reading min 3 times/week
Sodium Silicate Usage	Chemical tank	Reading min 3 times/week
Matheson Well Supply System		
Turbidity	Wells 1 - 4	Grab monthly
Static and Pumping Levels	Wells 1 - 4	Weekly
Temperature	Treated water	As required to calculate CT
pH	Treated water	As required to calculate CT
Hypochlorite Usage	Chemical tank	Reading min 3 times/week
Ramore Well Supply System		
Turbidity	Wells 3, 4 and 5	Grab monthly
Static and Pumping Levels	Wells 3, 4 and 5	Monthly

Operational Parameter	Location	Frequency
Temperature	Treated water	As required to calculate CT
pH	Treated water	As required to calculate CT
Hypochlorite Usage	Chemical tank	Reading min 3 times/week
Val Gagne Well Supply System		
Turbidity	Wells 1 and 6	Grab monthly
Static and Pumping Levels	Wells 1 and 6	Twice per year
Temperature	Treated water	As required to calculate CT
pH	Treated water	As required to calculate CT
Hypochlorite Usage	Chemical tank	Reading min 3 times/week

In-house samples are analyzed following approved laboratory procedures. The sampling results are recorded on a facility round sheet and are entered into the PDM system. Any required operational process adjustments are recorded in the facility log book.

3.7 Additional sampling, testing and monitoring activities related to the facility's most challenging conditions are captured in the existing in-house program as described above.

3.8 There are no relevant upstream sampling, testing and monitoring activities that take place for this facility/system.

3.9 Sampling, testing and monitoring results are readily accessible to the Owner at the Matheson Cluster office and/or the Municipal Office.

The owner is provided Quarterly Operations Reports which discusses regulatory results and operational issues. The owner is also provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 Section 11 - Annual Report, Schedule 22 - Municipal Summary Report and through the Management Review process outlined in OP-20 Management Review.

In addition, updates regarding sampling, testing and monitoring activities are provided as per the operating agreement and during regular client meetings.

4. Related Documents

Annual Report (O. Reg. 170 Section 11)
Continuous Monitoring of Operational Parameters for Drinking Water Systems SOP
Data Review Protocol
Facility Emergency Plan (FEP) Binder
Facility Logbook
Facility Round Sheets

Laboratory Analysis Reports
Laboratory Chain of Custody Forms
Municipal Summary Report (O. Reg. 170 Schedule 22)
Process Data Management System (PDM)
Quarterly Operations Reports
Reporting and Responding to Adverse Results (EEPs)
Sampling Schedule
OP-05 Document and Records Control
OP-06 Drinking Water System
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Addition of Process and Compliance Manager (3.0 Responsibility) and clarification of sampling under 5.0 Procedure
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant.
2015-08-20	3	Changed Well Supply Systems to Drinking Water Systems
2016-09-29	4	Val Gagne no longer uses well 4 but uses well 6 instead; references to PDC have been replaced with the new program of WISKI, added client reports to the related documents
2018-06-28	5	QP-07 procedure renamed OP-16. Removed Scope and Responsibilities sections. Updated s. 3.1 to reference Municipal Drinking Water License and s. 3.2 to reference sampling calendar/plan and removed sampling table. Expanded information related to accredited and licensed laboratories (s. 3.3). Removed pumping and static levels. Reordered some sections and other minor edits.
2019 03 21	6	Corrected date and rev# in header

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe the procedure for the calibration and/or verification and maintenance of measurement and recording equipment at the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems.

2. Definitions

None

3. Procedure

3.1 All measurement and recording equipment calibration and maintenance activities must be performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to OP-13 Essential Supplies and Services).

3.2 The Instrumentation Technician establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). When a new device is installed, it is added to the WMS system by a SuperUser. The new device is tagged with a unique identification number and the maintenance schedule is set up. Work orders are then automatically generated as per the schedule (refer to OP-15 Infrastructure Maintenance, Rehabilitation and Renewal).

3.3 Details regarding the results of the calibration and/or verification are recorded within each individual work order generated by the WMS, and in the facility logbook.

3.4 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual, instructions specified in WMS or OCWA's calibration procedures.

3.5 Standards, reagents and/or chemicals that may be utilized during calibration and/or verification and/or maintenance activities are verified before use to ensure they are not expired. Any expired standards, reagents and/or chemicals are appropriately disposed of and are replaced with new standards, reagents and/or chemicals as applicable.

3.6 Any measurement device which does not meet its specified performance requirements during calibration and/or verification must be removed from service (if practical) until repaired, replaced or successfully calibrated. The failure must be reported to Operations Management and ORO, as soon as possible so that immediate measures can be taken to ensure that drinking water quality has not been compromised by the malfunctioning device. Any actions taken as a result of the failure are recorded in the facility logbook and Instrumentation Calibration/Maintenance form. Operations Management or the PCT ensures that any notifications required by applicable legislation are completed and documented within the specified time period.

3.7 Calibration and maintenance records and maintenance/equipment manuals are maintained as per OP-05 Document and Records Control.

4. Related Documents

Calibration/Maintenance Records
Facility Logbook
Maintenance/Equipment Manuals
WMS Records
OP-05 Document and Records Control
OP-13 Essential Supplies and Services
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Revised to include proper title for Process Compliance Manager
2013-02 28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant
2015-08-20	3	Changed Well Supply systems to Drinking Water Systems
2018-06-29	4	QP-08 procedure renamed OP-17. Removed Scope and Responsibilities sections. Added s. 3.3 to clarify how calibration and/or verification activities are documented. Added s. 3.5 to include how standards, reagents and/or chemicals are verified before use to ensure they are not expired. Other minor edits.
2019-03-21	5	Corrected revision number in header

1. Purpose

To describe the procedure for maintaining a state of emergency preparedness at the facility level under OCWA's Emergency Management Program.

2. Definitions

Corporate Emergency Response Plan (CERP) – a corporate-level emergency preparedness plan for responding to and supporting serious (Level 3) operations emergencies

Facility Emergency Plan (FEP) – a facility-level emergency preparedness plan for responding to and recovering from operations emergencies

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

3. Procedure

3.1 The Facility Emergency Plan (FEP) is the corporate standard for emergency management at OCWA-operated facilities. The FEP supports the facility-level response to and recovery from Level 1, 2 and 3 events related to water and wastewater operations and directly links to the Corporate Emergency Response Plan (CERP) for management of Level 3 events that require corporate support. Operations Management is responsible for establishing a site-specific FEP that meets the corporate standard for this drinking water system.

3.2 OCWA recognizes three levels of events:

Level 1 is an event that can be handled entirely by plant staff and regular contractors. The event and the actions taken to resolve it (and to prevent a reoccurrence, if possible) are then included in regular reporting (both internally and externally). Examples may include response to an operational alarm, first aid incident, small on-site spill, or a process upset that can be easily brought under control.

Level 2 is an event that is more serious and requires immediate notification of others (regulator, owner). Examples may include minor basement flooding, injury to staff that requires medical attention, or a spill that causes or is likely to cause localized, off-site adverse effects. If the event reaches this level, the instructions indicate the need to contact the Safety, Process and Compliance Manager and/or Regional Hub Manager.

Level 3 is an actual or potential situation that will likely require significant additional resources and/or threatens continued operations. It may require corporate-level support including activation of the OCWA Action Group and opening of an Emergency Operations Centre (EOC) as described in the corporate ERP. Level 3 events usually

involve intervention from outside organizations (client, emergency responders, Ministry, media, etc.). Examples may include:

- Disruption of service/inability to meet demand;
- Critical injury including loss of life;
- Breach of security that is a threat to public health;
- Intense media attention;
- Community emergency affecting water supply/treatment;
- Declared pandemic; or
- Catastrophic failure that could impact public health or the environment or cause significant property damage.

3.3 Potential emergency situations or service interruptions identified for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems include:

- Unsafe Water
- Spill Response
- Critical Injury
- Critical Shortage of Staff
- Loss of Service
- Security Breach

3.4 The processes for responding to and recovering from each potential emergency situation/service disruption are documented within a site-specific contingency plan (CP). The CPs and related standard operating procedures (SOPs) are contained within the FEP.

3.5 OCWA's training requirements related to the FEP are as follows:

Training Topic	Training Provider	Type of Training	Frequency	Required For
Establishing and maintaining a FEP that meets the corporate standard	Safety, Process and Compliance Manager and/or Corporate Compliance (as required)	On-the-Job Practical	Upon hire and when changes are made to the corporate standard*	PCTs (or others identified by the Operations Management)
Contents of the site-specific FEP	Facility Level (coordinated by QEMS Representative)	On-the-Job Practical	Upon hire and when changes to the FEP are made*	All operations personnel with responsibilities for responding to an emergency

*Note: Changes to the corporate standard or site-specific FEP may only require the change to be communicated to Operations for implementation. Therefore, not all changes will require training.

3.6 At least one CP must be tested each calendar year and each CP must be reviewed at least once in a five-calendar year period. The reviews and tests are recorded on the FEP-01 Contingency Plan Review/Test Summary Form. This record includes the outcomes of the review/test, and identifies any opportunities for improvement and

actions taken. A scheduled test of a CP may be regarded as a review of that particular CP as long as the outcomes are evaluated using the FEP-01 form. A CP-related response to an actual event may also be considered a review or a test. A review of the incident including lessons learned should be recorded on FEP-01 following the resolution of the actual event, along with any opportunities for improvement/actions identified.

3.7 Revisions to the CPs, SOPs and other FEP documents are made (as necessary) following a review, test, actual event or other significant change (e.g., changes in regulatory requirements, corporate policy or operational processes and/or equipment, etc.). Results of the emergency response testing and any opportunities for improvement/actions identified are considered during the Management Review (OP-20).

3.8 Roles and responsibilities for emergency management at OCWA-operated facilities are set out in the FEP. Specific roles and responsibilities related to a particular emergency situation or service interruption (including those of the Owner where applicable) are set out in the relevant site-specific CP. A general description of the respective responsibilities of the Owner and the operating authority in the event an emergency occurs is included in the service agreement with the Owner (as required by the *Safe Drinking Water Act*).

3.9 Where they exist, any relevant sections of the Municipal Emergency Response Plan (MERP) are included or referenced in the appendices section of the FEP. Measures specified in the MERP are incorporated into CPs where appropriate.

3.10 An emergency contact list in conjunction with the essential supplies and services list is contained within the FEP and is reviewed/updated at least once per calendar year. An emergency communications protocol is contained within the FEP. Specific notification requirements during emergency situations or service interruptions are set out in the individual CPs and in the ERP.

4. Related Documents

Corporate Emergency Response Plan
Emergency Contact List/Essential Supplies & Services List (Contacts section of FEP)
Facility Emergency Plan
FEP-01 Contingency Plan Review/Test Summary Form
Municipal Emergency Response Plan (as applicable)
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2014-06-09	0	Procedure issued
2015-08-20	1	Changed Well Supply Systems to Drinking Water Systems
2018-06-29	2	QP-09 procedure renamed OP-18. Removed Scope and Responsibilities sections and reordered some sections. Added definition 'Operations Management'. Throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Removed references to *'OCWA's Approach to Facility Emergency Planning'* document throughout procedure and referenced FEP instead. Aligned wording for level 1, 2 & 3 events (s. 3.2) with wording in '*OCWA's Emergency Response Plan*'. Updated training section to include role of SPC Manager (s. 3.5) and expanded testing/review section specifically to clarify how an actual test is documented (s. 3.6). Other minor edits.
2019-03-21	3	Corrected revision number in header. Changed MOECC to MECP.
2024-06-20	4	Procedure updated as follows: Ministry of Environment and Climate Change revised to Ministry, removed watermark. Modified references to Emergency Response Plan to indicate it is now referred to as Corporate Emergency Response Plan (CERP).

INTERNAL QEMS AUDITS

Reviewed by: R. Marshall, PCT	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To describe the procedure for conducting internal audits at the facility level that evaluate the conformance of OCWA's Quality & Environmental Management System (QEMS) to the requirements of the Drinking Water Quality Management Standard (DWQMS).

This procedure applies to Internal QEMS Audits conducted at the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems for the purpose of meeting the DWQMS requirements for internal audits.

Note**:** This procedure does not apply to internal compliance audits conducted in accordance with OCWA's Internal Audit Program.

2. Definitions

Audit Team – one or more Internal Auditors conducting an audit

Internal Auditor – an individual selected to conduct an Internal QEMS Audit

Internal QEMS Audit – a systematic and documented internal verification process that involves objectively obtaining and evaluating documents and processes to determine whether a quality management system conforms to the requirements of the DWQMS

Lead Auditor – Internal Auditor responsible for leading an Audit Team

Non-conformance – non-fulfillment of a DWQMS requirement

Objective Evidence – verifiable information, records or statements of facts. Audit evidence is typically based on interviews, examination of documents, observations of activities and conditions, reviewing results of measurements and tests or other means. Information gathered through interviews should be verified by acquiring supporting information from independent sources

Opportunity for Improvement (OFI) – an observation about the QEMS that may, in the opinion of the Internal Auditor, offer an opportunity to improve the effectiveness of the system or prevent future problems; implementation of an OFI is optional

3. Procedure

3.1 Audit Objectives, Scope and Criteria

3.1.1 In general, the objectives of an internal QEMS audit are:

- To evaluate conformance of the implemented QEMS to the requirements of the DWQMS;
- To identify non-conformances with the documented QEMS; and

- To assess the effectiveness of the QEMS and assist in its continual improvement.

3.1.2 The scope of an internal QEMS audit includes activities and processes related to the QEMS as documented in the Operational Plan.

3.1.3 The criteria covered by an internal QEMS audit include:
- Drinking Water Quality Management Standard (DWQMS)
- Current Operational Plan
- QEMS-related documents and records

3.1.4 The audit scope and criteria may be customized as necessary to focus on a particular process/critical control point and/or any elements of the DWQMS which may warrant specific attention. The results of previous internal and external audits should also be considered.

3.2 Audit Frequency

3.2.1 Internal QEMS audits may be scheduled and conducted once every calendar year or may be separated into smaller audit sessions scheduled at various intervals throughout the calendar year. However, all elements of the DWQMS must be audited at least once every calendar year.

3.2.2 The QEMS Representative is responsible for maintaining the internal QEMS audit schedule. The audit schedule may be modified based on previous audit results.

3.3 Internal Auditor Qualifications

3.3.1 Internal QEMS audits shall only be conducted by persons approved by the QEMS Representative and having the following minimum qualifications:
- Internal auditor training or experience in conducting management system audits; and
- Familiarity with the DWQMS requirements.

3.3.2 Internal Auditors that do not meet the qualifications in s.3.3.1 may form part of the Audit Team for training purposes, but cannot act as Lead Auditor.

3.3.3 Internal Auditors must remain objective and, where practical, be independent of the areas/activities being audited. It may not be possible for internal auditors to be fully independent of the activity being audited, but every effort should be made to remove bias and encourage objectivity. Auditors should maintain objectivity throughout the audit process to ensure that the audit findings and conclusions are based only on the audit evidence. Objectivity can be demonstrated by obtaining sufficient appropriate evidence to provide a reasonable basis for the

audit findings.

3.4 Audit Preparation

3.4.1 Together, the QEMS Representative and the Lead Auditor:

- Establish the audit objectives, scope and criteria;
- Confirm the audit logistics (locations, dates, expected time and duration of audit activities, any health and safety considerations, availability of key personnel, audit team assignments, etc.).

3.4.2 Each Internal Auditor is responsible for:

- Reviewing documentation to prepare for their audit assignments including:
  - the Operational Plan and related procedures;
  - results of previous internal and external QEMS audits;
  - the status and effectiveness of corrective and preventive actions implemented;
  - the results of the management review;
  - the status/consideration of OFIs identified in previous audits; and
  - other relevant documentation.
- Preparing work documents (e.g., checklists, forms, etc.) for reference purposes and for recording objective evidence collected during the audit

3.5 Conducting the Audit

3.5.1 Opening and closing meetings are not required, but may be conducted at the discretion of the QEMS Representative and the Lead Auditor taking into account expectations of Top Management.

3.5.2 The Audit Team gathers and records objective evidence by engaging in activities that may include conducting interviews with Operations Management and staff (in person, over the phone and/or through e-mail), observing operational activities and reviewing documents and records.

3.5.3 The Audit Team generates the audit findings by evaluating the objective evidence against the audit criteria (s. 3.1.3). In addition to indicating conformance or non-conformance, the audit findings may also lead to the identification of opportunities for improvement (OFIs). The Lead Auditor is responsible for resolving any differences of opinion among Audit Team members with respect to the audit findings and conclusions.

3.6 Reporting the Results

3.6.1 The Lead Auditor reviews the audit findings and conclusions with the QEMS Representative and Top Management. Other audit participants may also take part in this review as appropriate. This review may take place in person (e.g.,

during a closing meeting) or through other means (phone call, email, etc.). Any diverging opinions regarding the audit findings and conclusions should be discussed and, if possible, resolved. If not resolved, this should be noted by the Lead Auditor.

3.6.2 The Lead Auditor submits a written report and/or completed work documents to the QEMS Representative. The submitted documentation must identify (at a minimum):

- Audit objectives, scope and criteria;
- Audit Team member(s) and audit participants;
- Date(s) and location(s) where audit activities where conducted;
- Audit findings including:
  - Related objective evidence for each element;
  - Any non-conformance identified referencing the requirement that was not met; and
  - OFIs or other observations.
- Audit conclusions.

3.6.3 The QEMS Representative distributes the audit results to Top Management and others as appropriate.

3.6.4 The QEMS Representative ensures that results of internal QEMS audits are included as inputs to the Management Review as per OP-20 Management Review.

3.7 Corrective Actions and Opportunities for Improvement (OFIs)

3.7.1 Corrective actions are initiated when non-conformances are identified through internal QEMS audits and are documented and monitored as per OP-21 Continual Improvement.

3.7.2 OFIs are considered, and preventive actions initiated, documented and monitored as per OP-21 Continual Improvement.

3.8 Record-Keeping

3.8.1 Internal QEMS audit records are filed by the QEMS Representative and retained as per OP-05 Document and Records Control.

4. Related Documents

Internal Audit Records (checklists, forms, reports, etc.)
Summary of Findings spreadsheet
OP-05 Document and Records Control
OP-20 Management Review

OP-21 Continual Improvement

5. Revision History

Date	Revision #	Reason for Revision
2010-04-30	0	Procedure issued
2011-09-12	1	Clarified time frames in step 5.1; Updated the development of the audit protocol in step 5.2; Updated drinking water system name to be consistent with the MOE; Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
2013-02-15	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
2014-08-20	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.5 to include the review of opportunities for improvements (OFIs); Revised step 5.6 to indicate the development of action plans for significant OFIs and the use of the QEMS–Summary of Findings form; Updated section 6.0 by removing Action Plans and adding the QEMS-Summary of Findings form
2015-08-20	4	Major revisions throughout procedure to clarify requirements for conducting internal QEMS audits, reporting results and dealing with corrective actions
2018-06-29	5	QP-10 procedure renamed OP-19. Removed Scope and Responsibilities sections and moved scope wording to purpose section. Added definition 'Objective Evidence' and modified 'non-conformance' definition. Replaced 'audit evidence' with 'objective evidence', and 'conformity' with 'conformance' throughout procedure. Replaced 'once every 12 months' with 'once every calendar year' (s. 3.2.1, s. 3.2.3 and s. 3.4.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2.3 (and modified s. 3.4.1) to describe the frequency for auditing all DWSs covered in multi-facility Operational Plans. Changed s. 3.4.2 to include preventive actions, the results of the management review and the status/consideration of OFIs. Included wording 'for each element', and 'identified referencing the requirement that was not met' to s. 3.6.2. Moved description of process for corrective actions from QP-10 s. 5.7 and OFIs from QP-10 s. 5.8 to OP-21. Added s. 3.7 to refer to OP-21.
2019-03-04	6	Revised to correct revision number in header
2024-06-20	7	Procedure updated to describe and document how objectivity is maintained when an internal auditor is not fully independent of the activity being audited with additions to 3.3.3, removed watermark.

MANAGEMENT REVIEW

Reviewed by: PCT	Approved by: SPC Manager

1. Purpose

To describe the procedure for conducting a Management Review of the Quality & Environmental Management System (QEMS) at the facility level.

2. Definitions

Management Review – a formal (documented) meeting conducted at least once every calendar year by Top Management to evaluate the continuing suitability, adequacy and effectiveness of OCWA's Quality & Environmental Management System (QEMS)

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Top Management – a person, persons or group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems.

OCWA has defined Top Management for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System as:

- Operations Management – Matheson Cluster
- Regional Hub Manager – Northeastern Ontario Regional Hub
- Safety, Process & Compliance (SPC) Manager – Northeastern Ontario Regional Hub

3. Procedure

3.1 Top Management ensures that a Management Review is conducted at least once every calendar year.

Management Reviews for more than one drinking water system may be conducted at the same meeting provided the systems belong to the same owner and the considerations listed in section 3.4 below are taken into account for each individual system and documented in the Management Review meeting minutes.

3.2 At a minimum, the QEMS Representative, at least one member of Top Management and at least one facility operator must attend the Management Review meeting. Other members of Top Management may participate though their attendance is optional.

3.3 Other staff may be invited to attend the Management Review meeting or to assist with presenting information or in reviewing the information presented, where they offer additional expertise regarding the subject matter.

3.4 The standing agenda for Management Review meetings is as follows:

a) Incidents of regulatory non-compliance;
b) Incidents of adverse drinking water tests;

c) Deviations from critical control limits and response actions;
d) The effectiveness of the risk assessment process;
e) Internal and third-party audit results (including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented);
f) Results of emergency response testing (including any OFIs identified);
g) Operational performance;
h) Raw water supply and drinking water quality trends;
i) Follow-up on action items from previous Management Reviews;
j) The status of management action items identified between reviews;
k) Changes that could affect the QEMS;
l) Consumer feedback;
m) The resources needed to maintain the QEMS;
n) The results of the infrastructure review;
o) Operational Plan currency, content and updates;
p) Staff suggestions; and
q) Consideration of applicable Best Management Practices (BMPs).

3.5 In relation to standing agenda item q), applicable BMPs, if any, to address drinking water system risks discussed during other agenda items, are identified and documented in the Management Review minutes. Review and possible adoption of applicable BMPs are revisited during subsequent Management Reviews and are incorporated into preventive and/or corrective actions as per OP-21 as appropriate.

3.6 The SPC Manager coordinates the Management Review and distributes the agenda with identified responsibilities to participants in advance of the Management Review meeting along with any related reference materials.

3.7 The Management Review participants review the data presented and make recommendations and/or initiate action to address identified deficiencies as appropriate as per OP-21.

3.8 The QEMS Representative ensures that minutes of and actions resulting from the Management Review meeting are prepared and distributed to the appropriate OCWA Top Management, personnel and the Owner.

3.9 The QEMS Representative monitors the progress and documents the completion of actions resulting from the Management Review.

4. Related Documents

Management Review Reference Materials
Minutes and actions resulting from the Management Review
OP-21 Continual Improvement

5. Revision History

Date	Revision #	Reason for Revision
2009-09-30	0	Procedure issued
2011-10-21	1	Corrected Process Compliance Manager's title
2013-02-28	2	Updated managerial title changes – Operations Manager is now the Senior Operations Manager and Cluster Manager is now the Operations Manager. References to Process Compliance Manager have been replaced with Senior Operations Manager or removed if redundant
2015 08 20	3	Changed Well Supply Systems to Drinking Water Systems
2018-06-29	4	Removed Scope and Responsibilities sections. Added definitions for Top Management and Operations Management. Revisions based on new requirements of the Standard; at least once every 12 months changed to once every calendar year (s. 3.1) and efficacy changed to effectiveness (s. 3.4). Added s. 3.2 and s. 3.3 to describe who is participating in the Management Review process. Added clarification on including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented when reviewing audit results (s. 3.4.e). Added Best Management Practices (BMPs) as a standing agenda item (s. 3.4.q). Added s. 3.5 to include consideration of BMPs and link OP-20 to OP-21 Continual Improvement.
2019-03-21	5	Corrected revision number in header
2024-08-21	6	Removed question marks beside Matheson Cluster and removed watermark.

1. Purpose

To describe the procedure for tracking and measuring continual improvement of the Quality & Environmental Management System (QEMS) for the Holtyre, Matheson, Ramore and Val Gagne Drinking Water Systems.

2. Definitions

Continual Improvement - recurring activity to enhance performance *(ISO 14001:2014)*

Corrective Action – action to eliminate the cause of detected nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation

Non-conformance – the non-fulfilment of a DWQMS requirement

Preventive Action – action to prevent the occurrence of nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation

3. Procedure

3.1 OCWA strives to continually improve the effectiveness of its QEMS for this drinking water system(s) through the identification and implementation of corrective/preventive actions and, as appropriate, through review and consideration of applicable Best Management Practices (BMPs).

3.2 Corrective Actions

3.2.1 Non-conformances may be identified through an internal or external QEMS audit(s) conducted for this drinking water system. They may also be identified as a result of other events such as:

- an incident/emergency;
- community/Owner complaint;
- other reviews; and
- operational checks, inspections or audits.

3.2.2 The QEMS Representative (in consultation with Operations Management and/or the SPC Manager) investigates the need for a corrective action to eliminate the root cause(s) so as to prevent the non-conformance from recurring. The investigation may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate. A root-cause analysis is performed for any non-conformance identified through one of the events listed in section 3.2.1. The root cause analysis is documented in the Summary of Findings" spreadsheet. An issue analysis is completed for non-compliances identified during Ministry of the Environment, Conservation and Parks inspections. The issue analysis is documented in the "Analysis Action Plan" table.

3.2.3 The QEMS Representative determines the corrective action needed based on this consultation. The Operations Management (or designate) assigns responsibility and a target date for resolution.

3.2.4 The QEMS Representative ensures corrective actions are documented using the QEMS - Summary of Findings spreadsheet. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Top Management.

3.2.5 The implementation and effectiveness of corrective actions are verified during subsequent internal QEMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the Operations Management (or designate) initiates further corrective action and assigns resources as appropriate until the non-conformance is fully resolved.

3.3 Preventive Actions

3.3.1 Potential preventive actions may be identified through an internal or external QEMS audit as Opportunities For Improvement (OFIs), during the Management Review or through other means such as:

- staff/Owner suggestions;
- regulator observations;
- evaluation of incidents/emergency response/tests;
- the analysis of facility/Regional Hub or OCWA-wide data/trends;
- non-conformances identified at other drinking water systems; or
- a result of considering a BMP.

3.3.2 The QEMS Representative (in consultation with Operations Management and/or the SPC Manager) considers whether a preventive action is necessary. The review may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

3.3.3 If it is decided that a preventive action is necessary, the QEMS Representative determines the action to be taken based on this consultation and the Operations Management (or designate) assigns responsibility and a target date for implementation.

3.3.4 The implementation of preventive actions are tracked by the QEMS Representative using the QEMS - Summary of Findings spreadsheet.

3.3.5 The implementation and effectiveness of preventive actions are verified during subsequent internal QEMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the Operations Management (or designate) may consider further preventive actions and assigns resources as appropriate.

3.4 The QEMS Rep. and Operations Management monitor corrective/preventive actions on an ongoing basis and review the status and effectiveness of the actions during subsequent Management Review meetings.

3.5 Best Management Practices (BMPs)

3.5.1 The QEMS Representative and/or Operations Management in consultation with the SPC Manager will review and consider applicable internal and/or external BMPs identified by internal and/or external sources as part of the Management Review (OP-20) and in the corrective and preventive action processes described above.

3.5.2 BMPs may include, but are not limited to:

- Facility/Regional Hub practices developed and adopted as a result of changes to legislative or regulatory requirements, trends from audit findings or drinking water system performance trends;
- OCWA-wide BMPs/guidance or recommended actions;
- Drinking water industry based standards/BMPs or recommendations; or
- Those published by the Ministry of the Environment, Conservation & Parks.

3.5.3 At a minimum, applicable BMPs must be reviewed and considered once every 36 months.

4. Related Documents

Internal Audit Records
QEMS - Summary of Findings spreadsheet
OP-05 Document and Records Control
OP-20 Management Review
Analysis and Action Plan table

5. Revision History

Date	Revision #	Reason for Revision
2018-06-29	0	Procedure issued – The original information within the main body of the Holtyre, Matheson, Ramore and Val Gagne Drinking Water System Operational Plan (revision 6, dated September 29, 2016) was not used in OP-21 as it did meet the requirements of the new DWQMS v. 2.0. Information from QP-10 Internal Audit (s. 5.7 and s. 5.8) was incorporated into s. 3.2 and s. 3.3 of OP-21 but was modified to address non-conformances identified from additional inputs other than internal audits and preventive actions resulting from means other than OFIs from internal audits. In addition R&Rs were revised to include the SPC Manager, and to clarify the role of the QEMS Representative in investigating and determining corrective and preventive actions needed. A section on Best Management Practices (s. 3.5) was added to meet the new requirements of DWQMS v. 2.0.

Date	Revision #	Reason for Revision
2019-11-08	1	Added to section 3.2.2: A root cause analysis is performed for any non-conformance and is documented in the Summary of Findings" spreadsheet. Changed MOECC to MECP.
2020-06-08	2	Section 3.2.2 clarified that non-compliances from MECP are documented in Analysis Action Plan.

Ontario

Ministry of the Environment, Conservation and Parks

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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 Township of Black River - Matheson

Subject Systems

Name of Drinking Water System (DWS) *	Licence Number *	Name of Operating Subsystems (if applicable)	Name of Operating Authority *	DWS Number(s) *	
1. Holtyre Drinking Water System	204-101		Ontario Clean Water Agency	220002565	-
2. Matheson Drinking Water System	204-103		Ontario Clean Water Agency	220002574	-
3. Ramore Drinking Water System	204-104		Ontario Clean Water Agency	220002538	-
4. Val Gagne Drinking Water System	204-102		Ontario Clean Water Agency	210001674	-

Add item (+)

Contact Information for Questions Regarding the Operational Plan

i

Primary Contact

Last Name *	First Name *	Middle Initial
Ciarrocca	Chris	

Title *	Telephone Number *	ext.	Email Address *
Senior Operations Manager	705-570-0992		cciarrocca@ocwa.com

Secondary Contact

Last Name	First Name	Middle Initial
Galda	Jeremy	

Title	Telephone Number	ext.	Email Address
Safety, Process and Compliance Manager	705-642-7208		jgalda@ocwa.com

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Ontario

Ministry of the Environment, Conservation and Parks

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1. Holtyre Drinking Water System	204-101		Ontario Clean Water Agency	220002565	-

Add item (+)

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1. Matheson Drinking Water System	204-103		Ontario Clean Water Agency	220002574	-

Add item (+)

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Subject Systems

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1. Ramore Drinking Water System	204-104		Ontario Clean Water Agency	220002538	-

Add item (+)

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The Corporation of the Township of Black River - Matheson

Subject Systems

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1. Val Gagne Drinking Water System	204-102		Ontario Clean Water Agency	210001674	-

Add item (+)

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