



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

The Township of Matachewan

OPERATIONAL PLAN

for the *Matachewan Drinking Water System*

Revision 6: October 14, 2016



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OPERATIONAL PLAN

Matachewan Drinking Water System

Owned by the Corporation of the Township of Matachewan
Operated by the Ontario Clean Water Agency

This Operational Plan defines and documents the Quality & Environmental Management System (QEMS) for the Matachewan Drinking Water System operated by the Ontario Clean Water Agency (OCWA). It sets out 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).

This Operational Plan expands on OCWA's corporate QEMS Reference Manual. Linkages between OCWA corporate and facility requirements are identified where appropriate.

OPERATIONAL PLAN REVISION HISTORY

Date	Revision #	Description of Revision
Apr. 30, 2010	0	Operational Plan issued
Sep. 07, 2011	1	Revised QEMS Policy section (to address CGSB non-conformance); Replaced “continuous improvement” with “continual improvement to be more consistent with language in the Standard (CGSB OFI); Added additional information/instruction for completing the drinking water description based on the MOE’s guidance document (section 6); Added roles and responsibilities for Senior Operator/Mechanic and Instrumentation Technician based on standard job descriptions and added ORO/OIC prompts to section 9 (CGSB non-conformance); Revised competencies table to reflect skills and knowledge required as per standard job descriptions and section 10 text (CGSB non-conformance and OFIs); Revised Infrastructure Maintenance, Rehabilitation and Renewal to better describe OCWA’s maintenance program (CGSB non-conformance and OFIs); Added list of tables, list of figures and list of acronyms & abbreviations.
Dec. 21, 2012	2	Clarified section 3 as to when the Plan requires re-endorsement; Revised section 6 to include automatic switchover on the sodium hypochlorite system, added classification of the subsystem and updated distribution information (population, number of hydrants and service connections); added distribution map; Updated raw water threats and operational challenges; Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Updated QEMS Roles, Responsibilities and Authorities table and Competencies table to reflect changed positions; Revised request for training process in section 10 – Competencies; Added a completed “Schedule C” Subject System Description Form as per the Director’s Direction, July 2007
May 29, 2013	3	Revised section 3 to include a statement indicating when the Plan was last endorsed; updated section 6 to include a more accurate and legible Process Flow and Instrumentation Diagram and removed the old garage fuel tanks as a threat to the wells; updated tables in sections 9 and 10 to include team lead title for the Senior Operator
Jul. 18, 2014	4	Revised section 6 to include headings which makes the section easier to read, replaced the Process Flow and Instrumentation Diagram with a more current version; updated Raw Water Characteristics Tables 1 & 2 with more current data, Updated corporate titles in section 9; and included OCWA’s monthly operations report in section 15 as a method of reporting system maintenance activities, repairs and changes to the owner.
Feb. 24, 2016	5	Revision 5 of the Operational Plan was re-endorsed by OCWA and the Owner which is reflected in Section 3 of the Plan; Section 6 was revised to include the new water tower, and more current data in Raw Water Characteristics Tables 1 & 2 ; Section 10 was updated with new requirements for the Environmental Compliance course; Section 15 was updated to include Quarterly Operations Reports to the client.

Date	Revision #	Description of Revision
Oct. 14, 2016	6	Revised section 2 to include OCWA's new QEMS policy; Revised section 6 to include a description of the new standby generators at the plant and water tower, an updated Process Flow and Instrumentation Diagram, a Process Flow Diagram of the water tower and updated Raw Water Characteristics in Table 1 and 2 with more current data; Updated position titles and OCWA's organizational structure; Revised section 15 to reflect OCWA's new workplace management system

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LIST OF ACRONYMS AND ABBREVIATIONS

AAP	Analysis/Action Plan
ANSI	American National Standards Institute
AWQI	Adverse Water Quality Indicator
AWWA	American Water Works Association
CCP	Critical Control Point
CEO	Chief Executive Officer
CFU	Coliform Forming Units
CPR	Cardiopulmonary resuscitation
CT	Concentration of disinfectant residual x Contact Time
DWQMS	Drinking Water Quality Management Standard
DWS	Drinking Water System
EEP	Environmental Emergency Procedure
FEP	Facility Emergency Plan
GUDI	Groundwater Under the Direct Influence of Surface Water
LMRS	Large Municipal Residential System
MOR	Monthly Operations Report
ND	Not Detectable
NEO	Northeastern Ontario
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Units
O. Reg.	Ontario Regulation
OCWA	Ontario Clean Water Agency
OIC	Operator-In-Charge
OIT	Operator-In-Training
OPEX	Operational Excellence
ORO	Overall Responsible Operator
PCT	Process and Compliance Technician
PDM	Process Data Management
PLC	Programmable Logic Controller
PPR	Performance Planning & Review
PVC	Polyaluminium chloride
QEMS	Quality & Environmental Management System
QP	Quality Procedure
Rep	Representative
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SOP	Standard Operating Procedure
UV	Ultraviolet (light)
VP	Vice President
WHMIS	Workplace Hazardous Materials Information System
WMS	Work Management System
WTP	Water Treatment Plant

1 OCWA's Quality & Environmental Management System (QEMS)

OCWA is the contracted Operating Authority for the Matachewan Drinking Water System.

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.

2 Quality & Environmental Management System (QEMS) Policy

The Ontario Clean Water Agency, its Board of Directors, Officers and entire staff are committed to the principles and objectives set out in our Quality & Environmental Management System (QEMS) Policy.

OCWA's Policy is to:

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

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).

OCWA's QEMS Policy is readily communicated to all OCWA personnel, the Owner and the public through OCWA's intranet and public websites. A complete review/revision history of the QEMS Policy is maintained on OCWA's intranet.

4 Quality Management System Representative

All personnel have a role and associated responsibilities within OCWA's QEMS.

The role of QEMS Representative for the Matachewan Drinking Water System is shared between Facility Level Top Management (Senior Operations Manager and Operations Manager) and the Process & Compliance Technician (PCT).

The Senior Operations Manager and/or Operations Manager are ultimately responsible for activities related to the operation of the drinking water systems and for establishing and maintaining processes and procedures required for the overall administration of the facility's QEMS.

To assist in fulfilling the specific duties set out for the QEMS Representative, Facility Level Top Management and the PCT are responsible for:

- Reporting on QEMS performance and identifying opportunities for improvement,
- Ensuring that current versions of documents related to the QEMS are in use, and
- Ensuring personnel are aware of all applicable legislative and regulatory requirements that pertain to their operational duties.

The QEMS Representative(s) is responsible for promoting awareness of the QEMS to all facility personnel.

5 Document and Records Control

Refer to Appendix A for QEMS Procedure QP-01 Document and Records Control.

6 Drinking Water System

The Matachewan Drinking Water is owned by the Corporation of the Township of Matachewan and consists of a Class 2 water distribution and supply subsystem. The Ontario Clean Water Agency (OCWA) is designated the Overall Responsible Operator for both the water supply and water distribution facilities.

Description of the Matachewan Drinking Water System (DWS# 220003653)

The Matachewan Drinking Water System is a communal ground water well supply that services the Town of Matachewan. It is a standalone system that is not connected to any other drinking water system.

Raw Water Supply

The water treatment system obtains its water from two production wells with a combined allowable daily volume of 908 m³/day. The wells are situated in buildings located at 391 Bernard Street, adjacent to the Montreal River. The well head assembly for Well 1 is located within the main building for the water treatment plant while the well head assembly for Well 2 is located in a separate building located approximately 4 m away. Both wells consist of a

150 mm diameter steel casing; Well 1 is drilled to a depth of 39.6 m and Well 2 to a depth of 76.2 m. Each well is equipped with a vertical turbine pump assembly and a fixed-rate control system to pump at the maximum rate of 22 L/s. An insertion type magnetic flow meter is installed in the 150 mm diameter line that directs water into the treatment process. Also included are pump-to-waste capabilities from a common pump discharge line.

Water Treatment

The water treatment plant houses the treatment process equipment and wellhead assembly for Well 1. The treatment process equipment includes a sodium hypochlorite disinfection system, iron and manganese sequestering system and chlorine contact chamber. The sodium hypochlorite disinfection system consists of a 200 L storage vessel and duplicated chemical metering pumps with automatic switchover. The operation of the pumps are synchronous with the start/stop cycling of the well pumps. The iron and manganese sequestering system consists of a 200 L sodium silicate solution tank and a single chemical metering pump (operation is also synchronous with the start/stop cycling of the well pumps). The chlorine contact chamber consists of a 750 mm diameter x 54 m long PVC constructed pressure pipe which provides appropriate contact time to ensure adequate disinfection of the water before entering the distribution system. The free chlorine residual is continuously monitored through an alarmed paperless chart recorder. There is also a 100 mm diameter in-line magnetic flow meter installed on the discharge piping (point of entry into the chlorine contact chamber). The plant is controlled by a programmable logic controller (PLC) which communicates with the water tower to control the plant start and stop cycles.

Water Storage

A new elevated water tower with a tank volume of 650 m³ was constructed and put into operation on December 16, 2015. The tower is located at the South East corner of Anita Street and Amabilis Avenue in the community of Matachewan and is used to provide fire storage, equalization storage and emergency storage capability. The tower houses a sodium hypochlorite feed system consisting of two metering pumps (one duty and one spare), two sodium hypochlorite tanks and a chlorine residual analyzer. A flow meter, pressure gauge, process piping, valves, controls and instrumentation are also on-site.

Emergency Power

A 100 KW diesel powered generator is available at the water treatment building and is capable of supplying power to the entire facility during power failures.

A 15 KW diesel generator is also available outside the water tower to provide standby power during emergencies.

Distribution System

The Matachewan Drinking Water System is categorized as a Large Municipal Residential Drinking Water System and serves an estimated population of 407 residents. The distribution system consists of approximately 191 active residential service connections. A review of the distribution system drawings indicated that water mains are primarily six, eight and ten inch in diameter and constructed of ductile iron with PVC constructed pipe used in the upgraded sections of Town. Additionally, service connections to private residences consist primarily of ¾

inch copper pipe. There are an estimated 66 fire hydrants connected to the system for fire protection.



Figure 1: Matachewan Water Treatment Plant Process Flow & Instrumentation Diagram

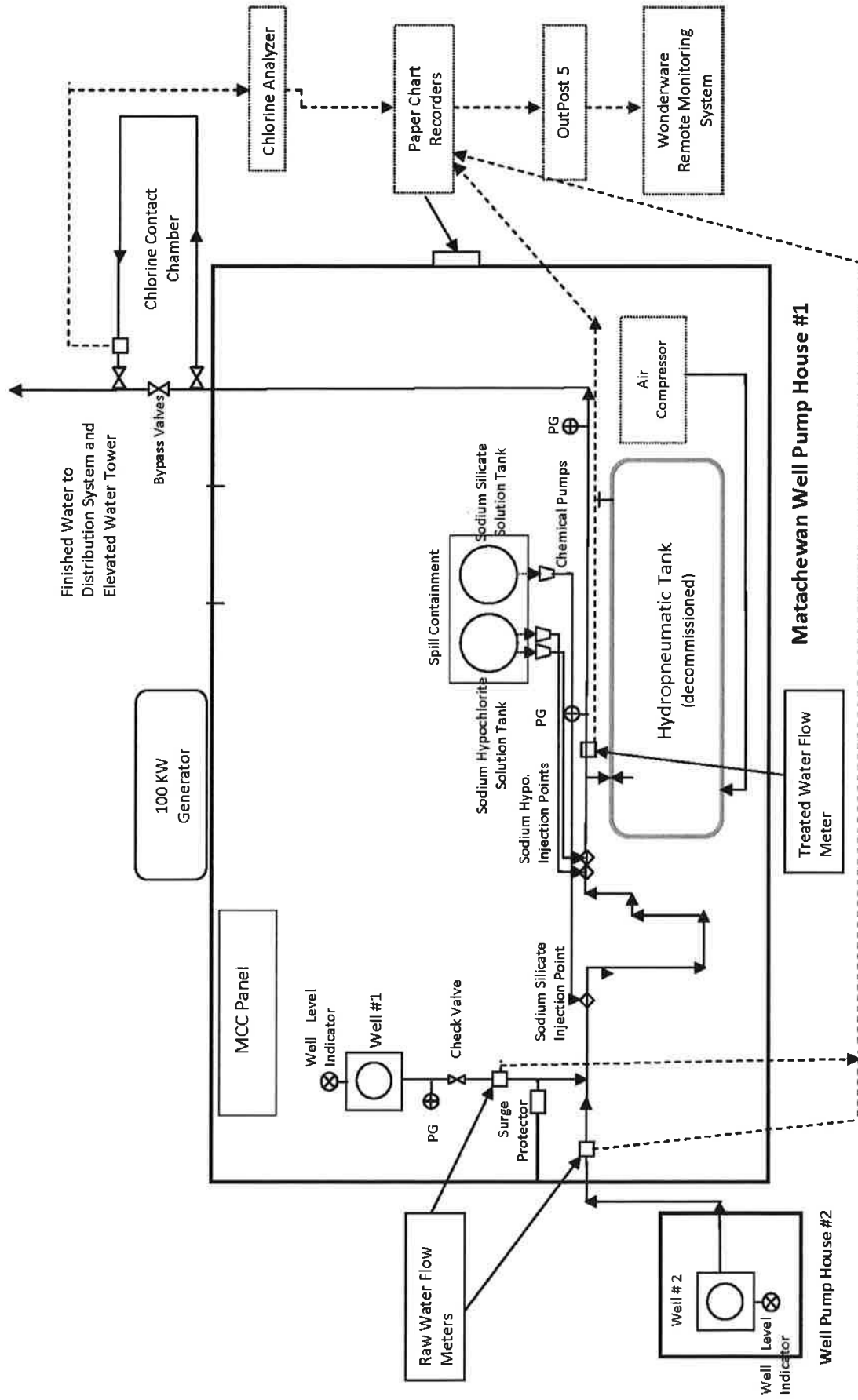


Figure 2: Matachewan Elevated Water Tower Process Flow Diagram

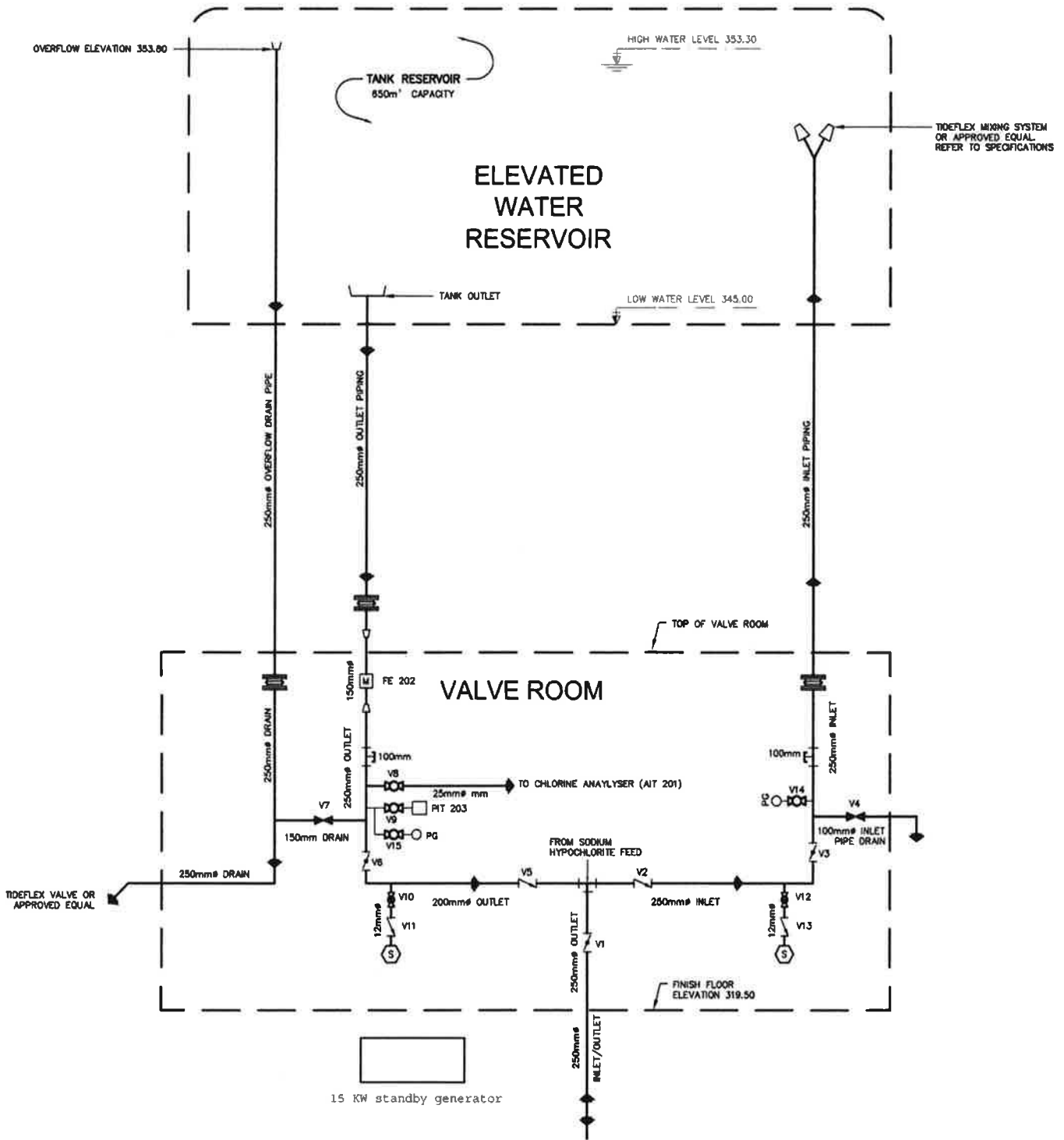
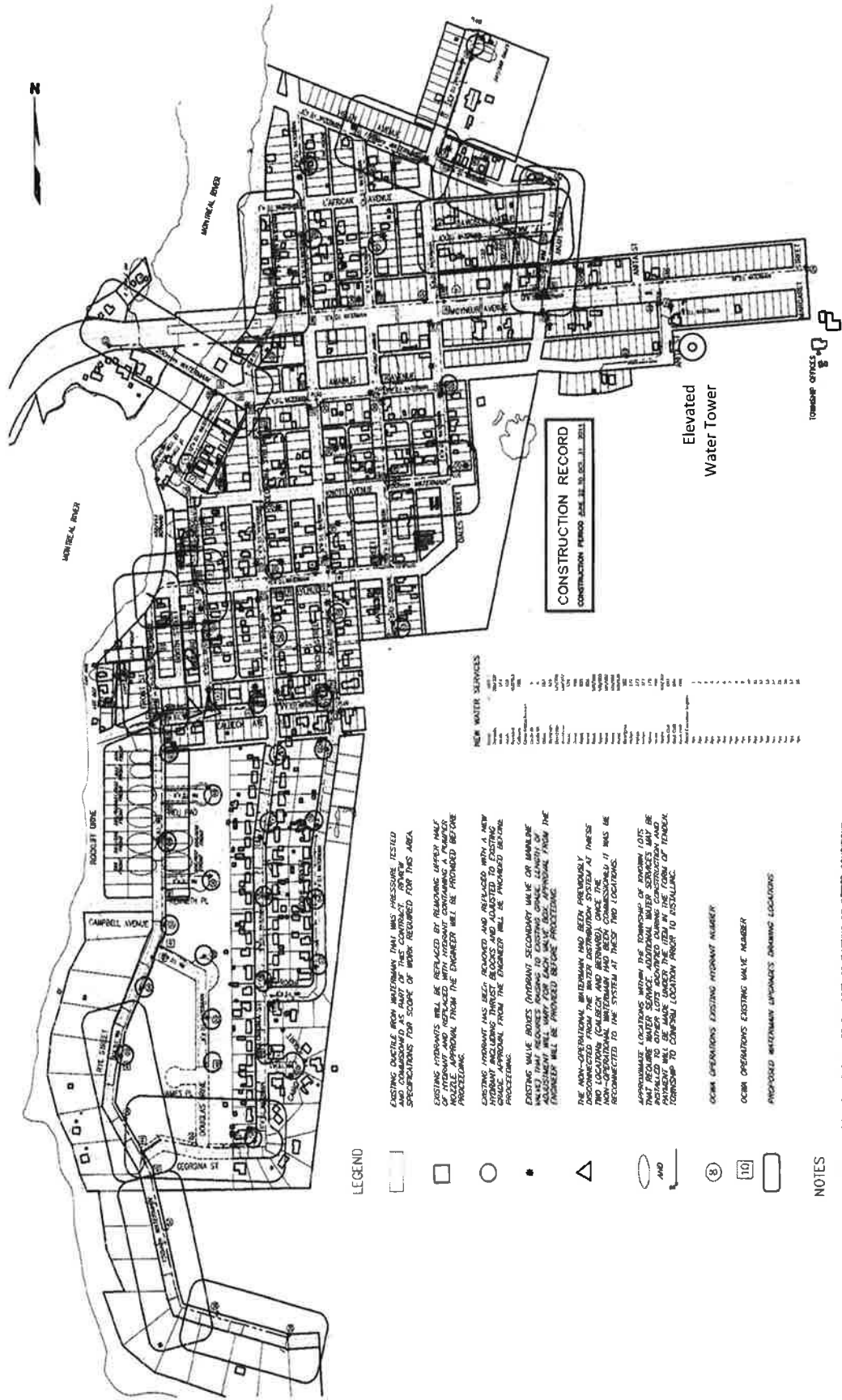


Figure 3: Matachewan Distribution Map



LEGEND

- EXISTING DUCTILE IRON WATERMAIN THAT HAS PRESSURE TESTED SUCCESSFULLY AND IS MEETING ALL CURRENT CODE REQUIREMENTS FOR SCOPE OF WORK REQUIRED FOR THIS AREA.
- EXISTING HYDRANTS WILL BE RETAINED BY REMOVING UPPER HALF OF HYDRANT AND REPLACED WITH HYDRANT CONTAINING A PERFORATED STEEL PLATE FROM THE ENGINEER WILL BE PROVIDED BEFORE PROCEEDING.
- EXISTING HYDRANT HAS BEEN REMOVED AND REPLACED WITH A NEW HYDRANT. THE NEW HYDRANT WILL BE PROVIDED BEFORE PROCEEDING.
- EXISTING VALVE BOXES (NON-OPERATIONAL VALVE OR MANHOLE INKALS) THAT REQUIRES PATCHING TO EXISTING ORANGE LINENET OF ALUMINUM WILL BE PATCHED EACH YEAR. APPROVAL FROM THE ENGINEER WILL BE PROVIDED BEFORE PROCEEDING.
- THE NON-OPERATIONAL WATERMAIN HAD BEEN PREVIOUSLY DISCONNECTED FROM THE WATER DISTRIBUTION SYSTEM AT THESE TWO LOCATIONS (CAMBELL AND GEORGE). SINCE THE EXISTING WATERMAIN IS NOT BEING MAINTAINED IT HAS BE RECONNECTED TO THE SYSTEM AT THESE TWO LOCATIONS.
- APPROXIMATE LOCATIONS WITHIN THE TOWNSHIP OF BROWN LAKE THAT ARE BEING OBTAINED FROM THE MATACHEWAN TOWNSHIP WILL BE MADE UNDER THE ITEM IN THE FORM OF TENDER. TOWNSHIP TO CONSIDER LOCATION PRIOR TO BIDDING.

OCWM OPERATIONS EXISTING HYDRANT NUMBER

OCWM OPERATIONS EXISTING VALVE NUMBER

PROPOSED HYDRANT/VALVE LOCATIONS

NOTES

1. ALL DISTURBED GROUND SHALL BE RESTORED TO EXISTING OR BETTER CONDITIONS.
2. PRIOR TO ADJUSTING THE VALVE BOXES TO GRADE THE EXISTING VALVE WILL BE OPERATED TO ENSURE IT IS WORKING.
3. ALL EXISTING AND PROPOSED HYDRANTS WITHIN THE TOWNSHIP WILL BE PATCHED AFTER UPDATES HAVE BEEN COMPLETED.
4. PAYMENT FOR SYSTEM UPDATES THROUGHOUT MATACHEWAN WILL BE PAID UNDER THE APPROPRIATE ITEMS IN THE FORM OF TENDER.
5. FOR GENERAL NOTES SEE DRAWING 01-G-1001

Source Water

General Characteristics

The raw water source for the treatment plant is the groundwater supplied by Wells 1 and 2. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards. The turbidity is low and shows very little variation. Bacteriological analysis of the raw water also indicates a source of good quality.

Table 1 - Well No. 1: Raw Water Characteristics (based on 2014 & 2015 data)

Characteristic	2014			2015		
	Minimum	Maximum	Average	Minimum	Maximum	Average
<i>E. coli</i> (CFU/100 mL)	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	0	0	0	0	0	0
Turbidity (NTU)	0.19	0.67	0.29	0.25	1.39	0.51
Temperature (°C)	5.50	8.60	7.01	8.10	10.6	8.93
pH	6.22	7.85	7.26	6.57	7.77	7.16
Iron (ug/L)	-	-	-	0.02	0.038	0.024
Manganese (ug/L)	-	-	-	0.018	0.119	0.088

Table 2 - Well No. 2: Raw Water Characteristics (based on 2014 & 2015 data)

Characteristic	2014			2015		
	Minimum	Maximum	Average	Minimum	Maximum	Average
<i>E. coli</i> (CFU/100 mL)	0	0	0	0	0	0
Total Coliforms (CFU/100 mL)	0	0	0	0	0	0
Turbidity (NTU)	0.35	3.7	0.95	0.48	3.17	1.43
Temperature (°C)	9.2	9.4	9.3	8.30	11.1	9.62
pH	6.65	7.81	7.31	6.53	7.80	7.19
Iron (ug/L)	-	-	-	0.523	0.999	0.735
Manganese (ug/L)	-	-	-	0.103	0.139	0.125

Common Fluctuations

Data available for the past five years indicates that the water source is fairly stable and consistent in terms of both quality and quantity.

Threats

From the 2004 Ground Water Study for the Township of Matachewan prepared by Marshall, Macklin and Monahan:

- Improperly constructed or abandoned wells within the bounds of the Township can be a significant source of groundwater pollution.
- An existing gas station with their fuel tanks and associated piping can present a threat to groundwater either through catastrophic failure, or more commonly, through slow leaks that may go unnoticed for months or years.

Operational Challenges

No major challenges have been encountered with the source water; however Well No. 2 is now being maintained as a standby well due to consistently high iron and manganese results. Since the installation of the water tower, water from this well has been causing aesthetic issues in the distribution system.

Sodium silicate is used to sequester or “hide” the iron and manganese for a short time before it can cause issues in the distribution system. Since the water is now being stored for several days in the tower, the iron and manganese has an opportunity to precipitate out and cause colour and taste problems.

7 Risk Assessment

Refer to Appendix B for QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes.

8 Risk Assessment Outcomes

Refer to Appendix B for Summary of Risk Assessment Outcomes.

9 Organizational Structure, Roles, Responsibilities and Authorities

Organizational Structure and Top Management

OCWA provides operation, maintenance and management services for hundreds of water and wastewater facilities throughout the Province of Ontario. Direct operational activities are primarily delivered through the Agency's Operations Division. Corporate level divisions that carry out administrative functions for the Agency are expanded upon in the QEMS Reference Manual.

To best meet the needs of each facility and its owner, OCWA's Operations Division is structured as follows:

- *Regional Hub* – Facilities are grouped together geographically to form regional hubs. Each regional hub is headed by a Regional Hub Manager who plays a critical role within OCWA's QEMS by acting as a key link between corporate and facility level management.

The Senior Operations Manager has oversight responsibility for all of the facilities contained within a particular region. In some regional hubs, an Operations Manager assists the Senior Operations Manager with his/her duties.

- *Provincial* – Regional Hubs fall under the direction of a VP of Operations.

The chart, QEMS Organizational Structure for the Matachewan Drinking Water System (Appendix C), reflects the lines of responsibility and authority for OCWA's QEMS at both the facility and corporate level.

OCWA has defined two levels of Top Management within its structure, which, through a shared responsibility for conducting periodic management reviews, ensure the maintenance and continual improvement of OCWA’s QEMS:

Facility Level Top Management – consisting of the Senior Operations Manager and the Operations Manager. Management, in accordance with QEMS Procedure QP-11 Management Review, holds a special meeting at least once per year to review the effectiveness and performance of the QEMS implemented at the facility and to initiate appropriate facility management action to maintain and improve the QEMS. The results of the meeting are provided to the Regional Hub Manager for consideration by corporate level Top Management and to initiate appropriate action with respect to the Agency’s broader QEMS.

Corporate Level Top Management – consisting of Regional Hub Managers, VP of Operations, Director of Operational Services, President & CEO and OCWA’s Board of Directors. Each has specific corporate oversight responsibilities for the Agency’s QEMS, which are described in the QEMS Reference Manual. The overall performance and effectiveness of OCWA’s QEMS is formally reviewed and reported to corporate level Top Management on an annual basis. It is also monitored on an ongoing basis through scheduled meetings of OCWA’s Operations & Compliance Committee, Executive Management Team and Board of Directors. Through these reporting and monitoring activities, corporate level Top Management identifies opportunities for improvement, initiates action plans and assigns responsibility for their completion.

QEMS Roles, Responsibilities and Authorities

OCWA management defines the roles, responsibilities and authorities under its QEMS for all employees whose work could have a significant impact on drinking water quality. These are communicated to all personnel to ensure that individual roles and responsibilities and how they relate to those of the rest of the organization are understood.

Specific QEMS-related roles, responsibilities and authorities of Operations personnel for the facility are summarized in Table 3 below. Additional duties of employees are described in their job specifications.

Corporate level roles, responsibilities and authorities are defined in the QEMS Reference Manual.

Responsibilities and authorities for implementing and maintaining individual elements of the facility’s QEMS are outlined in the QEMS Procedures referenced throughout this Operational Plan.

Table 3: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
All Operations Personnel	<ul style="list-style-type: none"> • Work in accordance with OCWA policies, procedures and plans • Document all activities • Participate in QEMS training • Be aware of all the environmental and public health risks at the facility

Table 3: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	<ul style="list-style-type: none"> • Consider risks and ramifications of all actions • Participate in testing and development of procedures and contingency plans • Implement action plans to rectify deficiencies identified in audits and inspections of the facility • Take all appropriate training to ensure competence in their job • Identify and bring forward to the Senior Operations Manager opportunities for improving the facility's QEMS • Perform duties in compliance with applicable legislation and regulations
<p>Regional Hub Manager <i>(Corporate Level Top Management)</i></p>	<ul style="list-style-type: none"> • Review major issues/deficiencies (including those from audit and inspection reports) and provide further direction to address/resolve • Respond to regular facility Management Reviews, as appropriate • Report to corporate level Top Management on the status of the QEMS implemented at the facilities in his/her region
<p>Senior Operations Manager <i>(Facility Level Top Management, QEMS Representative)</i></p>	<ul style="list-style-type: none"> • Delegate responsibilities, deploy resources and supervise sound operation and maintenance of the facility and of the QEMS • Liaise with the owner on relevant components of the QEMS including OCWA's roles, responsibilities and authorities for the facility • Ensure appropriate facility resources to maintain and continually improve the QEMS • Ensure that each facility in the hub has a site-specific emergency plan that meets the corporate standard • Arrange for/review annual internal audits (compliance and QEMS) • Lead regular facility Management Reviews • Report to the Regional Manager on the performance and effectiveness of the QEMS implemented at the facility • Develop action plans to respond to the findings of the internal/external audits and MOE inspections and verify action plan completion • Establish a training plan for staff to address regulatory requirements and the QEMS as part of the PPR process • Fulfill defined duties of the QEMS Representative (refer to element 4)
<p>Operations Manager <i>(Facility Level Top Management & QEMS Representative)</i></p>	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager • Deploy resources and supervise sound operation and maintenance of the facility and of the QEMS • Participate in the completion of annual internal audits • Assist in the development and implementation of action plans to respond to audit and MOE inspection findings • Assist in the establishment, testing and updating of a site-specific emergency plans • Participate in regular facility Management Reviews • Report to the Senior Operations Manager on QEMS

Table 3: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	<p>implementation and identify the need for additional processes and procedures</p> <ul style="list-style-type: none"> • Liaise with the owner on relevant components of the QEMS • Develop/implement training plans for staff • Support Senior Operations Manager on all aspects of the QEMS and fulfill assigned duties of the QEMS Representative (refer to element 4) • Act for the Senior Operations Manager in his/her absence • May act as Overall Responsible Operator (ORO) when required. Refer to ORO Letter
<p>Process & Compliance Technician (PCT) <i>(QEMS Representative)</i></p>	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager • Participate in the completion of annual internal audits and develop/monitor/implement action plans to respond to the findings • Participate in MOE inspections and assist in the response to required actions or recommendations • Actively participate in the development and maintenance of facility emergency plans • Participate in regular facility Management Reviews • Report to the Senior Operations Manager on QEMS implementation and identify the need for additional processes and procedures • Liaise with the owner on relevant components of the QEMS • Deliver/participate in training on regulatory requirements and the QEMS • Implement, monitor and support corporate QEMS programs • Support Senior Operations Manager and Operations Manager on all aspects of the QEMS and fulfill assigned duties of the QEMS Representative (refer to element 4)
<p>Senior Operator</p>	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager and/or Operations Manager • Participate as a technical advisor to staff and management and provide specialized training on technical or other issues. • Prepare and/or coordinate staff work assignments and follow up to ensure completion • Assist management in providing recommendation for annual capital forecasts and gathering information for operational reports as required • Assist in the preparation of facility manuals and documenting operating processes and procedures for staff • Actively participate in the development and maintenance of facility emergency plans and assist with emergencies as required. • Act for management during vacations or periodic absences. • Perform duties of Operator/Mechanic as required • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC)

Table 3: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	<ul style="list-style-type: none"> • May acts as Overall Responsible Operator (ORO) if required. Refer to ORO Letter
Operator/Mechanic	<ul style="list-style-type: none"> • Fulfill duties assigned by the Operations Manager and/or Senior Operator • Monitor facility processes through visual inspection, the SCADA system or by taking readings from the process control equipment • Operate and adjust equipment/processes to maintain compliance with applicable regulations, licences, permits, certificates 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. • Participate in facility inspections and audits • Train and direct new staff on the facility processes, equipment and procedures. • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC), • May act as Overall Responsible Operator (ORO). Refer to ORO Letter
Instrumentation Technician	<ul style="list-style-type: none"> • Provide advice and technical expertise on the services required for process control and automation systems • Formulate technical plans and proposals for deployment and delivery of process control and automation systems in support of operational activities • Coordinate, maintain and provide technical services in regards to process control and automation systems including preventive maintenance procedures • Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, train plant operations and maintenance staff, 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 • Install and commission new electrical/electronic equipment and automation systems.

10 Competencies

The following table presents the competencies required by OCWA personnel whose duties directly affect drinking water quality.

Table 4: Competencies

Position	Required Competencies
<p>Senior Operations Manager</p>	<ul style="list-style-type: none"> • Operator certification in good standing • Comprehensive general knowledge of and experience in managing water treatment operations, maintenance as well as facility financial planning and administration • Outstanding team leadership, managerial and coordinating skills • Advanced knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Excellent knowledge and awareness of the DWQMS • Strong initiative, analytical, evaluating and problem-solving skills to assess administrative and technical needs and capabilities • Well-developed priority-setting and time management skills • Superior interpersonal skills • Excellent oral and written communication skills • Proficiency in office and operational computerized systems • Valid Class G Driver's Licence
<p>Operations Manager</p>	<ul style="list-style-type: none"> • Operator certification in good standing • Experience in water treatment operations, maintenance as well as facility financial planning and administration • Advanced knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Knowledge and awareness of the DWQMS • Advanced technical knowledge of principles, practices, technologies and methodologies for water treatment • Familiarity with complex mechanical equipment and electronic controls • Analytical, evaluating and problem-solving skills • Project management, work planning and scheduling skills • Good oral and written communication skills • Proficiency in office and operational computerized systems • Management/supervisory experience • Valid Class G Driver's Licence
<p>Process & Compliance Technician</p>	<ul style="list-style-type: none"> • Operator certification in good standing; • Extensive knowledge of compliance requirements related to water treatment processes • Good knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures to monitor program delivery and ensure compliance • Sound knowledge and awareness of the DWQMS • Good knowledge and understanding to apply impact of changes to legislative and regulatory requirements on programs and operational processes • Excellent knowledge of computers, operating programs and systems • Evaluative and analytical skills to monitor and assess facility performance against legal requirements and corporate goals • Excellent oral and written communication skills to provide technical advice related to compliance to a variety of staff and officials and to prepare analytical reports • Presentation skills to prepare and present informational material

Table 4: Competencies

Position	Required Competencies
	<ul style="list-style-type: none"> • Auditing skills/experience • Problem-solving skills to resolve compliance issues • Ability to work with a team and take initiative when required • Valid Class G Driver's Licence
Senior Operator	<ul style="list-style-type: none"> • Operator certification in good standing; • Extensive knowledge and experience of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS • Basic mathematics and chemistry • Good knowledge of computers, monitoring and operating systems • Good knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning and organizational skills to lead projects and provide technical direction to staff • Demonstrated leadership and decision making skills required to direct an operational team • Problem solving and evaluative skills to provide technical guidance and resolve operational issues • Planning skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's Licence
Operator/Mechanic	<ul style="list-style-type: none"> • Operator certification in good standing; • Good knowledge of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS • Basic mathematics and chemistry • Familiarity with computers, monitoring and operating systems • Knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning, scheduling and problem-solving skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's Licence
Instrumentation Technician	<ul style="list-style-type: none"> • Operator certification in good standing; • Theoretical and practical knowledge/experience/training in water/wastewater treatment operation processes, design, instrumentation, process control and automation systems

Table 4: Competencies

Position	Required Competencies
	<ul style="list-style-type: none"> • Knowledge and awareness of the DWQMS • Technical evaluation and design skills necessary for process control and automation optimization and deployment • Experience in delivering technical guidance for hardware/software selection • Thorough understanding of network and telecommunications environment, standards and operating systems, computer language, • ladder logic and relational and document based database management systems • Ability to monitor, review and troubleshoot network, hardware, software and instrumentation performance • Analytical and evaluative problem-solving skills to assess client, process and control requirements • Well-developed organizational, time and project management skills • Superior interpersonal skills • Good oral and written communication skills • Valid Class G Driver's Licence

OCWA's recruiting and hiring practices follow those of the Ontario Public Service (OPS). As part of the OPS, 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 and based on this evaluation; the hiring manager selects and assigns personnel for specific duties.

Certified operators are responsible for completing the annual number of required training hours for the highest type and class of subsystem where the operator works and 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 Senior Operations Manager takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the annual training hour requirements.

OCWA's Operational Training Program is maintained by the Operational Research and Development Group and aims to:

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

The Program consists of both continuing education and on-the-job training and is delivered using a combination of methods (e.g., traditional classroom courses 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. Facility personnel receive site-specific training on relevant operational and emergency response procedures to ensure effective operational control of processes and equipment which may impact the safety and quality of drinking water.

Awareness of OCWA's QEMS is promoted through the OCWA Employee Orientation Program for new employees, hub/regional level training sessions and meetings and the Agency's Environmental Compliance course. It is recommended that the Environmental Compliance course be attended by all new staff to ensure that they are aware of regulatory requirements and their roles and responsibilities under OCWA's QEMS. Other mandatory and recommended training requirements are listed as part of the Employee Orientation Program available on OCWA's intranet or through the Human Resources department.

Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is also administrated by the Risk, Compliance & Training Division. Training records maintained at the facility are controlled as per QEMS Procedure QP-01 Document and Records Control.

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 by the facility's management team as part of this process (and on an ongoing basis). In addition to this process, OCWA employees may at any time request training by both internal and external providers by obtaining authorization from their respective managers.

11 Personnel Coverage

Refer to Appendix D for QEMS Procedure QP-03 Personnel Coverage.

12 Communications

Refer to Appendix E for QEMS Procedure QP-04 Communications.

13 Essential Supplies and Services

Refer to Appendix F for QEMS Procedure QP-05 Essential Supplies and Services.

14 Review and Provision of Infrastructure

Refer to Appendix G for QEMS Procedure QP-06 Review and Provision of Infrastructure.

15 Infrastructure Maintenance, Rehabilitation and Renewal

Planned Maintenance

OCWA, under contract with the owner, maintains a program of scheduled inspection and maintenance of infrastructure for which it is operationally responsible. OCWA, as the service provider, has prepared a Preventative Maintenance Plan, which includes a complete list of all

equipment, as well as scheduled maintenance activities to ensure the reliable operation of the water facility.

OCWA is responsible for completing the following routine maintenance:

- Inspect, adjust and calibrate process control and monitoring equipment to ensure proper operation of water treatment systems pumps, chemical feeders, analyzers and all other equipment installed at the facility
- Check water tower to ensure everything is in order
- Perform routine maintenance duties to equipment including the inspection of machinery and electrical equipment when required
- Perform routine maintenance of the distribution systems
- Maintain an inventory of all equipment
- Maintain accurate records of work conducted, activities, and achievements

Planned maintenance activities are scheduled using a computerized Work Management System (WMS) that allows user to:

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

Planned maintenance activities are communicated to the person responsible for completing the task through the electronic generation of work orders. Work orders are generated on a monthly, quarterly, seasonal, annual or other frequency as required.

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 staff at the locations specified in QEMS Procedure QP-01 Document and Records Control.

Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Manager. Unplanned maintenance activities are recorded in the facility's logbook and/or are recorded on work orders and entered into WMS.

Any major unplanned maintenance activities and deficiencies are communicated with the Owner.

Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades are determined on an annual basis in consultation with the Owner (refer to QP-06 Review and Provision of Infrastructure). A list of required replacement or desired new equipment is compiled and prioritized by the Operations Manager and/or designate and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner.

Program Monitoring and Reporting

As mentioned above, 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. To assist in monitoring the effectiveness of the program, the Operations Manager (or designate) is provided with monthly summary reports for the facility. OCWA's Executive Management Team is also provided with summary reports on an ongoing basis.

Quarterly Operations Reports which describes any maintenance done on the system is provided electronically to the owner. More detailed reports can also be provided at the owner's request.

16 Sampling, Testing and Monitoring

Refer to Appendix H for QEMS Procedure QP-07 Sampling, Testing and Monitoring.

17 Measurement and Recording Equipment Calibration and Maintenance

Refer to Appendix I for QEMS Procedure QP-08 Measurement and Recording Equipment Calibration and Maintenance.

18 Emergency Management

Refer to Appendix J for QEMS Procedure QP-09 Emergency Management.

19 Internal QEMS Audits

Refer to Appendix K for QEMS Procedure QP-10 Internal QEMS Audits.

20 Management Review

Refer to Appendix L for QEMS Procedure QP-11 Management Review.

21 Continual Improvement

In conjunction with the internal QEMS audit and Management Review processes documented above, OCWA uses action plan summary to continually improve its QEMS. Through these processes, areas of concern as well as opportunities for improvement are identified at the drinking water systems operated and maintained by OCWA.

Appendix A

QP-01 Document and Records Control



Ontario Clean Water Agency

QEMS Procedure

Proc.: QP-01
Issued: October 14, 2016
Rev.#: 6
Pages: 1 of 8

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manger

DOCUMENT and RECORDS CONTROL

1.0 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.

2.0 Scope

Applies to QEMS Documents and QEMS Records pertaining to the Matachewan Drinking Water System, as identified in this procedure.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Senior Operator
Overall Responsible Operator (ORO)
Process & Compliance Technician (PCT)
All Facility Staff
Information Technology Department
Corporate Compliance Group

4.0 Definitions

Controlled – managed as per the conditions of this procedure

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

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

5.0 Procedure

- 5.1 Documents and records required by OCWA's QEMS are listed in Table 1.
- 5.2 Internally developed QEMS documents and QEMS records (whenever possible) are generated electronically to ensure legibility and are identified through a header/title and issue date. Handwritten records must be legible and permanently rendered in ink or non-erasable marker.

- 5.3 Additional controls for QEMS Procedures within this Operational Plan are used to ensure appropriate review and approval. These include the use of authorized approval, alpha-numeric procedure code, issue date, revision number and revision history.

Authorized personnel for review and approval of QEMS Procedures for the Matachewan Drinking Water System are:

Review	PCT, Senior Operator or ORO
Approval	Senior Operations Manager or Operations Manager

- 5.4 The PCT, Senior Operator and ORO are 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 document control locations established by the QEMS Representative. 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 Table 1.

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.

- 5.5 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 and policies outlining specific conditions of use.

Access to facility QEMS records contained within internal electronic databases and applications (e.g., OPEX, PDM/WISKI 7, WMS) is administered by designated application managers/trustees, requires the permission of the Senior Operations Manager or Operations Manager and is restricted through use of usernames and passwords.

SCADA records are maintained and accessible to all staff when required.

- 5.6 Any employee of the drinking water system may request verbally or in writing a revision to improve an existing internal QEMS document or the preparation of a new document. Requests should indicate the reason for the change. The need for new or updated documents may also be identified through the annual Management Review or system audits.

The QEMS Representative communicates any changes made to QEMS documents to relevant facility 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, OCWA's weekly electronic bulletin and provincial, regional, hub or facility-level training sessions.

- 5.7 When a QEMS document is superseded, the hardcopy of the document is promptly removed from its location and forwarded to the QEMS Representative or designate for

disposal or retention (as appropriate). The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding.

5.8 Electronic copies are re-located to an obsolete folder and marked "superseded".

5.9 QEMS documents and records are retained in accordance with applicable regulations and legal instruments. Relevant regulatory and corporate minimum retention periods are listed in Table 2.

5.10 The Operational Plan is reviewed for currency at least annually in preparation for audits and the Management Review. Other QEMS-related documents are reviewed as per the schedules set out in this Operational Plan or as significant changes (e.g., changes in regulatory requirements, corporate policy 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 QEMS Procedure QP-10 Internal QEMS Audits.

6.0 Related Documents

QP-10 Internal QEMS Audits

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	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)
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Added "verbally" to documents revision requests; Changed C of A Exceedance form & record to MDWL Exceedance form & record and updated document locations in Table 1
May 29, 2013	3	Revised Table 1 to include the Township of Matachewan municipal office and website as controlled locations for the Operational Plan, added Incidents of Non-Compliance form & reports, QEMS Summary of Findings forms & reports and AWWA standards
Jul. 18, 2014	4	Updated Senior Operator position to new position title of Team Lead; Revised Table 1 to include the Facility Emergency Plan (FEP) Binder, Confined Space Program, OCWA's Safety Binder, Action and Analysis Plan, Distribution Maintenance and Repair forms and records, MOE forms and records, Transportation of Dangerous Goods forms and records, Monthly Operations Report, the public drive as the controlled location for laboratory reports and completed chain of custody forms, and removed SOPs reference in Plan and QEMS procedures as they are captured in other documents listed in the table.
Feb. 24, 2016	5	Revised step 5.5 to include OCWA's new process data management system (PDM/WISKI 7); updated table 1 by changing Monthly Operations report to Quarterly Operations Report, adding the Contingency Plan Review/Test Summary and Form and Record, changing the Kirkland Lake Water Pollution Control Plant to the Kirkland Lake Wastewater Treatment Plant to reflect the new plant and workplace of operations staff

Date	Revision #	Reason for Revision
Oct. 14, 2016	6	Changed Team Lead to Senior Operator and added overall responsible operator (ORO); Updated Table 1 to include MOECC's Watermain Disinfection Procedure, added the internet as a location for Equipment Operation Manuals; removed blank call-in forms; changed the location for ORO letters, community complaints, facility records, incident reports, call-in reports, WMS summary reports, maintenance and calibration records

Table 1: Designated location for documents and records required by OCWA's QEMS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Internal QEMS Documents	
Confined Space Program	HC - Matachewan Water Treatment Plant
Emergency Response Plan (corporate)	EC - OCWA's intranet (ocwanet.ocwa.com)
Facility Emergency Plan (FEP) Binder (includes Emergency Contact List, Essential Supplies and Services List, Contingency Plans, Site Specific Emergency Procedures and OCWA's Emergency Management Program)	HC - Matachewan Water Treatment Plant
OCWA's Safety Manual	EC - OCWA's intranet (ocwanet.ocwa.com)
On-call Schedule	EC - Microsoft Outlook Shared Calendar (Senior Operator)
Operational Plan (includes QEMS Procedures)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System EC – Township of Matachewan website www.matachewan.com HC- Township of Matachewan Municipal Office HC - Matachewan Water Treatment Plant
ORO Letter	EC - \\ocwfile\public\NEO DWQMS\DWQMS
QEMS Policy	EC - Online at www.ocwa.com & OCWA's intranet (ocwanet.ocwa.com) HC - Kirkland Lake Process & Compliance Office HC - Kirkland Lake Wastewater Treatment Plant
QEMS Reference Manual	EC - \\ocwfile\public\NEO DWQMS
Sample Schedule	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System HC - Matachewan Water Treatment Plant
Vacation Calendar	EC - Microsoft Outlook Shared Calendar (Senior Operator)
Internal QEMS Forms (Blank)	
Analysis and Action Plan (AAP) Form	EC - \\ocwfile\public\NEO DWQMS
Community Complaint Form	
Contingency Plan Review/Test Summary Form	
Distribution Maintenance and Repair Forms	
Environmental Incident Report Form	
Facility Rounds Sheets	
Incidents of Non-Compliance Form	
Instrumentation Calibration/Maintenance Report Form	
Laboratory Chain of Custody Forms	
Loss of Pressure Incident Form	
QEMS – Summary of Findings Form	
Transportation of Dangerous Goods Form	

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
External QEMS Documents & Forms	
Adverse Water Quality Incident (AWQI) Form	EC - \\ocwfile\public\NEO DWQMS
American Water Works Association (AWWA) Standards (as referenced in the DWWP) & MOECC's Watermain Disinfection Procedure	HC - Matachewan Water Treatment Plant EC - Internet
Applicable Federal and Provincial Legislation	Online at www.e-laws.gov.on.ca
Drinking Water Works Permit (DWWP)	HC - Matachewan Water Treatment Plant
Equipment Operation /Maintenance Manuals	HC - Matachewan Water Treatment Plant
MOE - Director Notification Form	EC - \\ocwfile\public\NEO DWQMS or MOE website
MOE - Form 1 (Record of Watermains Authorized as a Future Alteration)	
MOE – Form 2 (Record of Minor Modifications or Replacements to the Drinking Water System)	
MOE – Form 3 (Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere)	
MOE Inspection Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Municipal By-laws	Municipal Office
Municipal Drinking Water Licence (MDWL)	HC - Matachewan Water Treatment Plant
Operations Manual (including Standard Operating Procedures)	HC - Matachewan Water Treatment Plant
Operator Certificates	HC - Kirkland Lake Wastewater Treatment Plant
Permit to Take Water (PTTW)	HC - Matachewan Water Treatment Plant
QEMS Records (Completed)	
Adverse Water Quality Incident (AWQI) Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Analysis and Action Plan (AAP) Report	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Annual Compliance / Summary Reports for Municipalities	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Audit Reports - External	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Audit Reports - Internal	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Call-in Reports	EC - Workplace Management System (Maximo)
Community Complaint Records	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Contingency Plan Review/Test Summary	EC - \\ocwfile\public\NEO DWQMS
Distribution Maintenance and Repair Records	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Environmental Incident Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Facility Logbooks	HC - Matachewan Water Treatment Plant
Facility Rounds Sheets	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Incidents of Non-Compliance Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Infrastructure Review (letter of capital/maintenance works recommendations)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Laboratory Analytical Reports and completed Chain of Custody Forms	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Loss of Pressure Incident Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Matachewan Drinking Water System
Maintenance & Calibration Records (completed WMS work orders)	EC - Workplace Management System (Maximo)
Management Review Documentation	EC - \\ocwfile\public\NEO DWQMS - Matachewan Drinking Water System
MOE - Director Notification	EC - \\ocwfile\public\NEO DWQMS - Matachewan Drinking Water System
MOE – Completed Form 1 (Record of Watermains Authorized as a Future Alteration)	
MOE – Completed Form 2 (Record of Minor Modifications or Replacements to the Drinking Water System)	
MOE – Completed Form 3 (Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere)	
Operator Training Records	EC - OCWA's Training Summary Database
QEMS Communications - External	EC - Microsoft Outlook E-mail
QEMS Communications - Internal	EC - Microsoft Outlook E-mail
QEMS – Summary of Findings Report	EC - \\ocwfile\public\NEO DWQMS - Matachewan Drinking Water System
Quarterly Operations Reports (to the owner)	EC - \\ocwfile\public\NEO DWQMS - Matachewan Drinking Water System
SCADA Records	EC - INSQL server (Outpost5/Wonderware)
Transportation of Dangerous Goods Record	EC - \\ocwfile\public\NEO DWQMS
WMS Summary Reports	EC - Workplace Management System (Maximo)

Table 2: Relevant regulatory and corporate minimum retention periods

Type of Document/Record	Minimum Retention Time	Requirement Reference
DWQMS Operational Plan	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	3 years	OCWA Requirement
Documents/records required to demonstrate compliance with Ontario legislation	As per applicable regulations	SDWA O. Reg. 170/03, O. Reg. 128/04

Appendix B

QP-02 Risk Assessment and Risk Assessment Outcomes



QEMS Procedure

Proc.: QP-02
Issued: October 14, 2016
Rev.#: 4
Pages: 1 of 4

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

RISK ASSESSMENT and RISK ASSESSMENT OUTCOMES

1.0 Purpose

To define the process for conducting a drinking water risk assessment and for documenting and reviewing the results of the assessment at the facility level.

2.0 Scope

Applies to all OCWA-operated municipal residential drinking water systems and includes the identification and assessment of potential hazardous events and hazards that could affect drinking water safety. OCWA's approach to addressing other potential hazards is set out in QEMS Procedure QP-09 Emergency Management.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Process & Compliance Technician (PCT)
Senior Operator
Overall Responsible Operator (ORO)

4.0 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

5.0 Procedure

- 5.1 The Senior Operations Manager assigns personnel to conduct the risk assessment (e.g., Process & Compliance Technicians (PCTs), Operations staff, Facility Managers).
- 5.2 Using the system's process diagram, identify hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water in Table 1¹ for each activity/process step.
- 5.3 For each of the hazardous events, specify control measures currently in place at the facility that eliminate the hazard or prevent it from becoming a threat to public health.

Note: Some hazards/hazardous events may have step-by-step contingency plans associated with them. These contingency plans are developed as per OCWA's Emergency Management Program and are further described in QEMS Procedure QP-09 Emergency Management.

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

As a minimum, the following must be included as CCPs at all OCWA-operated facilities (as applicable):

- Processes necessary to achieve the required log removal or inactivation of pathogens (i.e., chemical and/or UV disinfection system, filtration process² for surface water and GUDI systems)
- Processes necessary for maintaining a disinfectant residual in the distribution system (includes re-chlorination points)
- Fluoridation system

Identify the above processes (as they apply) as mandatory CCPs in the 'CCP?' column in Table 1.

- 5.5 To determine if there are any additional CCPs for the system, evaluate and rank the hazardous events (as set out below in steps 5.6 and 5.7) for the remaining activities/process steps (i.e., those not included as OCWA's minimum CCPs).
- 5.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), assign each hazardous event a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:

¹ Tables referred to in this procedure are contained within the facility-specific **Summary of Risk Assessment Outcomes**

² Filtration process includes related processes (e.g., chemical coagulation, rapid mixing, flocculation, sedimentation)

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

Multiply the likelihood and consequence values to determine the risk value (ranking) of each hazardous event and record all values in Table 1. Hazardous events with a ranking of 12 or greater are considered high risk.

- 5.7 Review the hazardous events and rankings documented in Table 1 and identify any activity/process step as an additional CCP if all 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)
 - ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry of the Environment (MOE) or both.
- 5.8 List identified CCPs (required minimum and any additional CCPs established by the risk assessment) in Table 2. Set related critical control limits (e.g., limits for turbidity, chlorine residual, temperature, pH) for each CCP as appropriate.
- 5.9 Ensure procedures have been developed and implemented at the facility to:
- Monitor the critical control limits
 - Respond to, report and record deviations from the critical control limits.

List these procedures in Table 2.

- 5.10 The information recorded in the Summary of Risk Assessment Outcomes is maintained at the facility level on an ongoing basis. At least once a year, the PCT, in conjunction with the facility level top management and/or operations staff, reviews the risk

assessment documentation to verify the currency of the information and the validity of the assumptions used in the risk assessment in preparation for the Management Review.

5.11 The Senior Operations Manager and PCT ensures that a risk assessment is conducted and documented at least once every thirty-six months.

6.0 Related Documents

Summary of Risk Assessment Outcomes (facility-specific)
QP-09 Emergency Management

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Clarification of wording for Scope (2.0) and Procedure 5.7. Procedure 5.10 revised to reflect changes of the review process for the risk assessment
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jul. 18, 2014	3	Updated Senior Operator position to new position title of Team Lead
Oct. 14, 2016	4	Changed Team Lead to Senior Operator and added overall responsible operator (ORO)



Summary of Risk Assessment Outcomes

Matachewan Drinking Water System

Issued: October 14, 2016
 Rev. #: 6
 Pages: 1 of 11

Table 1: Risk Assessment Table

Note: Processes referred to in section 5.4 of QP-02 Risk Assessment and Risk Assessment Outcomes must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

Risk Assessment for Matachewan Drinking Water System							
Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Raw Water/Wells	Well casing collapse	Loss of raw water	Second well and pump, Alarms (pump failed to start, well pump unavailable, uncommand stop), Implement water restrictions and/or ban if necessary, Routine monitoring of well water flows via SCADA (Wonderware), Routine operational checks, Site specific Environmental Emergency Procedure (EEP) for Water Supply Shortage	2	2	4	NO
Raw Water/Wells	Well pump failure	Loss of raw water	Second well and pump, spare motor, Alarms (pump failed to start, well pump unavailable, uncommand stop), Routine monitoring of well water flows via SCADA (Wonderware), Routine operational checks, Site specific Environmental Emergency Procedure (EEP) for Well Pump Failure, EEP for Low or Loss Pressure in the Distribution System	2	2	4	NO

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Raw Water/Wells	Fuel/Chemical Spill (proximity to a gas station)	Contamination of aquifer	Monitor and sample, Town ordered water conservation or ban, EEP for Fuel/Chemical Spill, EEP for Contaminated Raw Water Supply, Contingency Plan (CP) for Spill Response	2	3	6	NO
Raw Water/Wells	Wells Overdrawn	Loss or reduction of raw water	Routine well level checks, Regular sampling of wells, Town ordered water conservation or ban, EEP for Water Supply Shortage	2	4	8	NO
Sodium Hypochlorite System (for primary disinfection)	Chemical feed pump failure	Loss of disinfection, Low chlorine residual, Inadequate inactivation of pathogens, Potential for AWQI	Redundancy - back-up pump with automatic switchover, Continuous online monitoring with alarms, In-house residual testing, Remote and on-site operator checks, Lead sodium hypochlorite pump failure alarm, Scheduled maintenance activities, EEP for Sodium Hypochlorite Pump Failure, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, Standard Operating Procedure (SOP) for CT (Chlorine Concentration x Time),				YES – Mandatory CCP

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Sodium Hypochlorite System	Analyzer failure	Unknown chlorine residual levels, Potential for AWQI	Site specific spreadsheet to calculate CT, CP for Unsafe Water Low chlorine residual alarm, In-house residual testing, Scheduled maintenance activities, Back-up analyzers within the Region, EEP for Free Chlorine Analyzer Failure, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, SOP for CT, Site specific spreadsheet to calculate CT, CP for Unsafe Water,				YES – Mandatory CCP
Sodium Hypochlorite System	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	Low chlorine residual alarms , Operator checks, Chemical available within Region, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, SOP for CT, Site specific spreadsheet to calculate CT, CP for Unsafe Water				YES – Mandatory CCP
Contact Chamber	Reservoir out of service for repair, maintenance	Potential for inadequate CT (primary disinfection)	Scheduled controlled maintenance plan and monitoring,				YES – Mandatory CCP

Refer to QP-02 Risk Assessment and Risk Assessment Outcomes for instructions on how to complete this summary

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			Re-calculate CT and increase chlorine dosage to maintain primary disinfection, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, SOP for CT, SOP for When to Use CT Calculation,				
Sodium Silicate Addition	Chemical Pump failure	Iron and manganese would no longer be sequestered, Consumer complaints	Notification/complaints from customers, Routinely monitored by OCWA staff, EEP for Community Complaints	3	1	3	NO
Water Treatment System	Power failure	Loss of treated water supply	Power failure alarm, Back-up diesel generator, Scheduled maintenance activities for back-up generator, Routine operator checks, EEP for Power Failure of Long Duration, EEP for Standby Power Failure, CP for Loss of Service	4	1	4	NO
Water Treatment System	Generator failure	Loss of treated water supply	Portable generator available within the Region, Scheduled maintenance, EEP for Power Failure of Long Duration, EEP for Standby Power Failure, CP for Loss of Service	2	4	8	NO
Water Treatment System	Vandalism/terrorism	Contamination of the water supply, Damage to critical	Locked (water plant , well house), Intrusion alarm, Appropriate signage,	2	4	8	NO

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
		equipment	Routine visits by OCWA staff, EEP for Vandalism or Suspected Unauthorized Entry, CP for Security Breach				
Water Treatment System	Fire in the Water	Partial or full plant shutdown, Damage to critical equipment	System alarms, Regular operator visits EEP for Fire in Plant	2	3	6	NO
Water Treatment System	Natural Disasters	Loss of supply, contamination	Contingency Plans, Emergency Procedures, OCWA's Emergency Response Plan, Town's Emergency Management Plan, Staff training	2	4	8	NO
Distribution System (secondary disinfection)	Loss of residual in distribution system	Failure to control biofilm and pathogens (long- term), Potential AWQI	Continuous on-line monitoring of chlorine residual into the distribution system, On-line monitoring of chlorine residual at the water tower, Sodium hypochlorite can be added at water tower to increase distribution chlorine residual, System-wide residual testing, Regularly scheduled maintenance , Alarms for low/high chlorine residuals in water entering distribution system, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, CP for Unsafe Water				YES – Mandatory CCP

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Distribution System	Adverse Water Quality Result as described in O. Reg. 170/03 (eg. Bacteriological, Total Trihalomethanes)	Potential for unsafe drinking water	Site specific Sampling Schedule, EEP for Reporting and Responding to Adverse Results in Large Municipal Residential Systems (several EEPs), CP for Unsafe Water	2	4	8	NO
Water Tower	Tower out of service for repair, maintenance	Minor modifications to operations	Scheduled controlled maintenance plan, Bypass Tower to supply Town	2	2	4	NO
Water Tower	Loss of structural integrity	Contamination, loss of supply	Alarms (pressure, flow), Regular on-site checks by OCWA operational staff, Remote monitoring of flows & pressure via SCADA (Wonderware), EEP for Water Supply Shortage, CP for Unsafe Water	1	4	4	NO
Watermains	Structural failure/breaks	Contamination, Loss of pressure, Loss of supply, Consumer complaints	Notification/complaints from customers, Routine monitoring of flows & pressure via SCADA (Wonderware), Low pressure alarm, Regular operator checks, EEP for Distribution System – Watermain Breaks, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage EEP for Reporting and Responding to Adverse Bacteriological Results, CP for Unsafe Water	3	3	9	NO

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Service Connections	Cross connection/ backflow, siphonage	Contamination	Preventative Town bylaw in place, Design Standards - ICI, Plumbing Code, EEP for Reporting and Responding to Adverse Bacteriological Results, CP for Unsafe Water	2	3	6	NO
Service Connections	Structural Failure/Breaks	Contamination, Loss of pressure, Loss of supply,	Customer notification/complaints, Low pressure alarm, EEP for Distribution System – Watermain Breaks, EEP for Low or Loss of Pressure, EEP for Reporting and Responding to Adverse Bacteriological Results, CP for Unsafe Water	3	2	6	NO
Valves	Failure	Loss of control, Loss of pressure, Loss of water supply	Routine monitoring of flows and pressure via SCADA (Wonderware), Low pressure alarm, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, CP for Unsafe Water	2	3	6	NO
Hydrants	Structural failure/break	Contamination, Loss of water supply, Loss of pressure Loss of fire control	Routine monitoring of flows and pressure via SCADA (Wonderware), Regular operator checks, Low pressure alarm, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results,	2	3	6	NO

Risk Assessment for Matachewan Drinking Water System

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
All (watermains, connections, valves, hydrants, construction)	Accident, Vandalism,	Contamination, Loss of water supply, Loss of pressure	CP for Unsafe Water Notification/complaints from customers, Routine monitoring of flows and pressure via SCADA (Wonderware), Regular operator checks, Low pressure alarm, EEP for Distribution System – Watermain Breaks, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results, CP for Unsafe Water	3	2	6	NO
New Construction	Sub-standard construction and for commissioning	Contamination, Loss of pressure	AWWA Standards and MOECC's Watermain Disinfection Procedure, Sampling & Testing, Ontario Provincial Standards for Road and Public Works, Staff training	2	3	6	NO

Table 2: Identified Critical Control Points (CCPs)

Identified Critical Control Points the Matachewan Drinking Water System			
CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
<p>Sodium Hypochlorite System (for primary disinfection)</p>	<p>Free Chlorine Residual Alarms – Treated Water (Main Pumping Station)</p> <p>Low alarm = never below 0.60 mg/L High alarm set point = 3.0 mg/L</p>	<p>Continuous online monitoring, Routine operator checks via remote monitoring system, Trend review and sign-off as per O. Reg. 170/03, Routine on-site checks conducted by OCWA staff</p>	<p>Refer to:</p> <ul style="list-style-type: none"> SOP for CT (Chlorine Concentration x Time), SOP for When to Use CT Calculation, EEP for Sodium Hypochlorite Pump Failure, EEP for Free Chlorine Analyzer Failure, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, CP for Unsafe Water
<p>Secondary Disinfection</p>	<p>Free Chlorine Residual - Distribution</p> <p>Regulatory Low - 0.05 mg/L High - 4.0 mg/L</p>	<p>Distribution chlorine residuals monitored as per O. Reg. 170/03.</p>	<p>Refer to:</p> <ul style="list-style-type: none"> EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, CP for Potential and/or Unsafe Water

Note: Procedures referenced in Tables 1 and 2 are controlled as QP-01 Document and Records Control.

Table 3: 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 a year. In addition, the risk assessment must be conducted at least once every thirty-six months. Refer to steps 5.10 and 5.11 of QP-02.

Record of Annual Review/36-Month Risk Assessment for the Matachewan Drinking Water System			
Date of Activity	Type of Activity	Participants	Summary of Results
April 30, 2010	Initial Risk Assessment Conducted	Brian Jibb (Cluster Manger) Anthony Danis (Senior Operator/Mechanic) April Swanson (PCT)	Establish CCP of Free Chlorine Residual both at the plant and in the distribution
June 20, 2011	Review Risk Assessment – during Management Review meeting	Tony Janssen (Operations Manager) Eric Nielson (Process Compliance Manager) Brian Jibb (Cluster Manger) April Swanson (PCT)	Accept Risk Assessment as complete and current
December 20, 2011	Review Risk Assessment – during Management Review meeting	Tony Janssen (Operations Manager) Eric Nielson (Process Compliance Manager) Brian Jibb (Cluster Manger) April Swanson (PCT), Ilona Bruneau (PCT)	Information in summary remains current and assumptions still valid. No revisions necessary
November 6, 2012	36-month Risk Assessment	Yvan Rondeau (Operator), Ilona Bruneau (PCT)	All activities/process steps were re-assessed and new hazardous events and hazards were ranked according to QP-02 (Revision 1). Results are captured in Revision 2 of this Summary of Risk Assessment Outcomes.
May 28, 2013	Meeting with the owner to discuss risks of near-by fuel tanks to the wells	Anthony Danis (Team Lead), Ilona Bruneau (PCT), Andrew Van Oosten (CAO-Clerk-Treasurer)	Owner informed OCWA that a study was conducted and determined that the fuel tanks located at a site of an old garage were not located in the well head protection area. This issue is no longer considered a risk and has been removed from the summary.
September 17, 2013	Reviewed during internal audit	Yvan Rondeau (Operator), Ilona Bruneau (PCT)	No revisions necessary
July 9, 2014	Reviewed during internal audit	Anthony Danis (Team Lead), Ilona Bruneau (PCT), Zack Peltier (COOP – PCT/Operator)	No revisions necessary
July 16, 2014	Reviewed during update of Operational Plan	Ilona Bruneau (PCT)	Revised Contingency Plan titles for Spill Response (formerly Accidental Release, Unsafe Water (formerly Potential or Actual Unsafe Water and Loss of Service (formerly Power Failure and Catastrophic Equipment Failure and added new CP for Security Breach under Water Treatment System - Vandalism/terrorism

Refer to QP-02 Risk Assessment and Risk Assessment Outcomes for instructions on how to complete this summary

Record of Annual Review/36-Month Risk Assessment for the Matachewan Drinking Water System

Date of Activity	Type of Activity	Participants	Summary of Results
October 26, 2015	36-month Risk Assessment	Anthony Danis (Operations Manager), Ilona Bruneau (PCT)	Removed "failure to sample after a water main break" as this is not a hazard as defined in the Risk Assessment and Risk Assessment Outcomes procedure.
February 23, 2016	Reviewed during update of Operational Plan	Anthony Danis (Operations Manager), Ilona Bruneau (PCT)	All activities/process steps were re-assessed and new hazardous events and hazards were ranked according to QP-02 (Revision 1). Results are captured in Revision 2 of this Summary of Risk Assessment Outcomes.
June 24, 2016	Reviewed during internal audit	Ilona Bruneau (PCT, Leslie Sina (Operator)	Revised risk assessment to include the new water tower
October 14, 2016	Reviewed during update of Operational Plan	Ilona Bruneau (PCT)	Revised to clarify alarms for well casing collapse, well pump failure and loss of integrity of water tower, updated critical control limits for primary disinfection and re-ranked AWQIs in the distribution system Revised to include notifications as a control measure for sodium silicate pump failure, added the plumbing code as a control measure for service connections and updated assessment with MOECC's new Watemain Disinfection procedure and OCWA's new Watemain Break EEP

Revision History

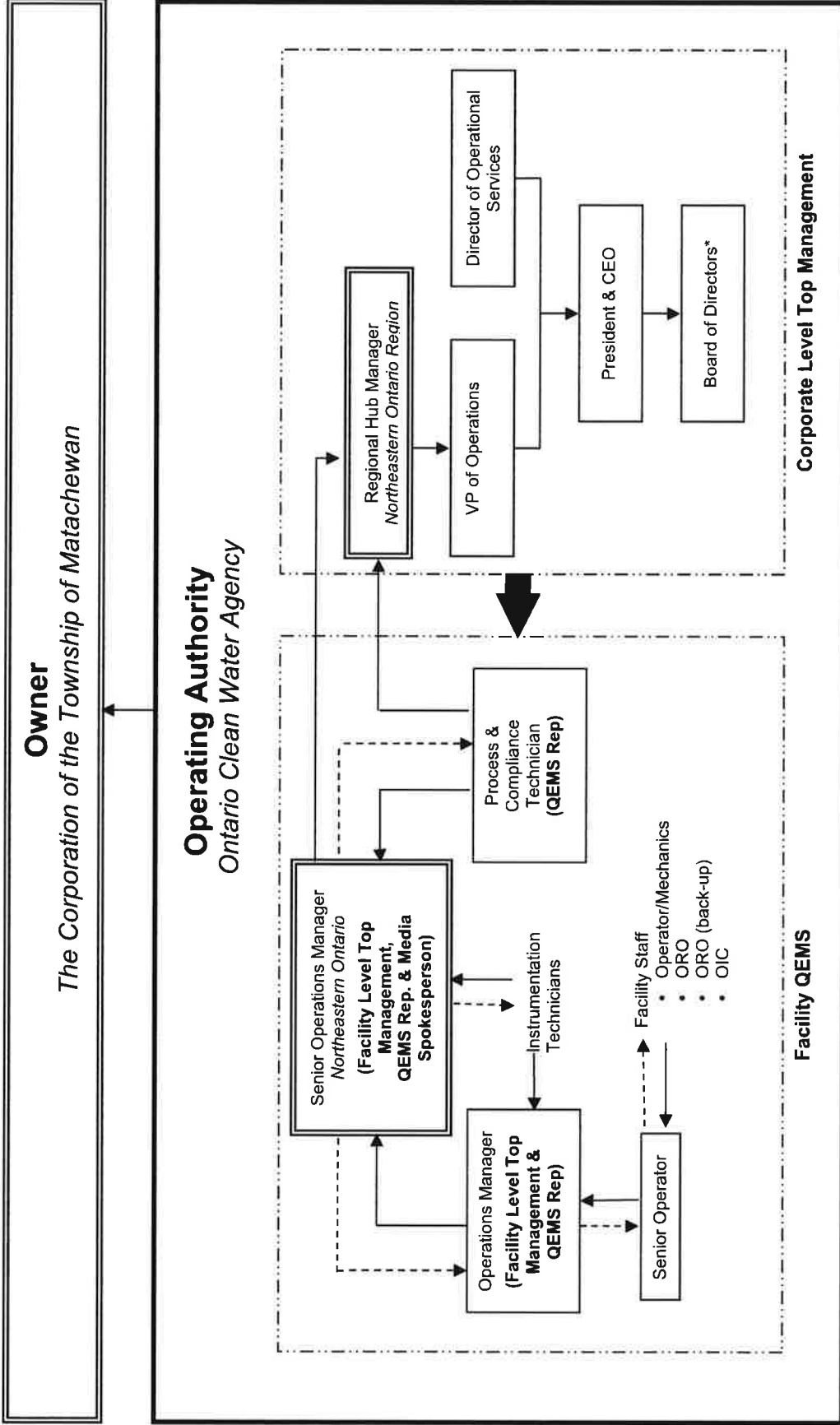
Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Initial risk assessment conducted and issued
Sep. 07, 2011	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3)
Nov. 29, 2012	2	Revised summary based on results of 36-month risk assessment
May 29, 2013	3	Summary of outcomes revised as per May 28, 2013 meeting with owner
Jul. 18, 2014	4	Revised summary based on results of July 16, 2014 review.
Feb. 24, 2016	5	Revised summary based on results of 36-month risk assessment (October 2015) and February 23, 2016 review
Oct. 14, 2016	6	Revised summary based on results of June 24 And October 14, 2016 reviews.

Appendix C

QEMS Organizational Structure for the Matachewan Drinking Water System



QEMS Organizational Structure for the Matachewan Drinking Water System



Endorsement & Approval of the Facility's QEMS & Operational Plan
 ← Overall Leadership & Support for OCWA's QEMS
 → Reports To
 - - - - - Supervises/Directs
 - - - - - Delineates Corporate & Facility Level Functions

* Represents the highest level of OCWA's Top Management

Appendix D

QP-03 Personnel Coverage



QEMS Procedure

Proc.: QP-03
Issued: October 14, 2016
Rev.#: 4
Pages: 1 of 3

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

PERSONNEL COVERAGE

1.0 Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality.

2.0 Scope

Applies to operations personnel working in the Matachewan Drinking Water System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Senior Operator
Overall Responsible Operator (ORO)

4.0 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)

5.0 Procedure

- 5.1 The Senior Operations Manager ensures that personnel meeting the competencies identified in the Operational Plan are available for duties that directly affect drinking water quality.
- 5.2 The Matachewan Drinking Water System is considered an un-manned facility. OCWA operations personnel routinely visit the system twice per week and are available 24 hours a day, 7 days a week by an alarm system and cell phone. The facility is regularly monitored via OCWA's remote monitoring SCADA system.

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

- 5.3 OCWA 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.

An Operator/Mechanic is the designated overall responsible operator (ORO). When the Operator/Mechanic is unavailable, the Operations Manager is designated as the ORO and is recorded as such in the facility logbook.

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

- 5.4 The Operations Manager and/or Senior Operator 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 rotates every Friday morning at 0730 hours. The on-call schedule is maintained by the Team Lead and is available to on-call operators in the Microsoft Outlook shared calendar.
- 5.5 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.
- 5.6 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 in OCWA's Workplace Management System (WMS/Maximo).
- 5.7 The Operations Manager and/or Senior Operator is responsible for approving vacation time for staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties. The Vacation Calendar is maintained electronically by the Senior Operator and is available in the Microsoft Outlook shared calendar.
- 5.8 OCWA's Operations staff are represented by the Ontario Public Service Employees Union (OPSEU). In the event of a labour disruption, the Operations Manager, together with the union, identifies "essential services" required to operate the facility so that the quality of drinking water is not compromised in any way.
- 5.9 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction to staff in the event that there is a severe shortage of staff due to sickness (e.g., pandemic flu) or other unusual situations where personnel might not be available.

6.0 Related Documents

Call-In Reports (WMS-Maximo)

Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)

Facility Logbook

Facility Round Sheets

On-Call Schedule

Vacation Calendar

QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Procedure 5.9 was added to reference contingency planning for Critical Shortage of Staff
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Clarified monitoring of the facility and added duties of a watchman in step 5.2; Added location of Vacation Calendar in step 5.7
Jul. 18, 2014	3	Updated Senior Operator position to new position title of Team Lead; Clarified the on-call rotation in step 5.4
Oct. 14, 2016	4	Changed Team Lead to Senior Operator and added overall responsible operator (ORO), updated location of call-in reports

Appendix E

QP-04 Communications



QEMS Procedure

Proc.: QP-04
Issued: October 14, 2016
Rev.#: 6
Pages: 1 of 3

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

COMMUNICATIONS

1.0 Purpose

To describe the procedures for QEMS-related communications between the facility's Top Management and OCWA personnel, the owner, suppliers and the public.

2.0 Scope

Applies to facility level internal and external communications regarding the Quality & Environmental Management System (QEMS) implemented at the Matachewan Drinking Water System.

3.0 Responsibility

Senior Operations Manager (Facility Level Top Management)
Operations Manager (Facility Level Top Management)
Senior Operator
Overall Responsible Operator
Process & Compliance Technician (PCT)
Regional Hub Manager (Corporate Level Top Management)

4.0 Definitions

None

5.0 Procedure

- 5.1 The Senior Operations Manager and PCT are responsible for identifying and coordinating any site-specific communications in relation to the status/development of the facility's QEMS. They are also responsible for ensuring that the Regional Hub Manager is promptly informed regarding QEMS-related matters with Agency-wide significance.
- 5.2 As part of the orientation process, OCWA personnel are scheduled to attend training sessions which provide a general understanding and awareness of environmental compliance and OCWA's QEMS.

The Senior Operations Manager, Operations Manager and/or PCT ensures all facility personnel receive site-specific training on the Operational Plan, QEMS Procedures and other related operating instructions and procedures during regularly scheduled training sessions.

Revisions to the QEMS and associated documentation are communicated to relevant employees at meetings, through internal memos or e-mails on an as-needed basis. The Operational Plan and associated procedures are available to all facility employees

as per Table 1 of QP-01 Document and Records Control. The plan and associated procedures are also accessible to the public at the Matachewan Municipal Office and website (www.matachewan.com.)

The QEMS Policy and an overview of the QEMS are available to all OCWA personnel through OCWA's intranet. The QEMS Policy is also available to the public on OCWA's internet website.

- 5.3 The continuing suitability, adequacy and effectiveness of OCWA's QEMS are communicated to the owner as part of the Management Review process (refer to QEMS Procedure QP-11 Management Review). Ongoing QEMS updates are provided to the owner during scheduled meetings, quarterly operations reports and through electronic and verbal communications.
- 5.4 Communication requirements for ensuring suppliers and contractors understand the relevant OCWA QEMS policies, procedures and expectations are described in QEMS Procedure QP-05 Essential Supplies and Services.
- 5.5 Media enquiries must be directed to the facility's designated media spokesperson. The Senior Operations Manager is the media spokesperson for the Matachewan Drinking Water System. The media spokesperson coordinates with facility and corporate personnel (as appropriate) and the Owner in responding to media enquiries.
- 5.6 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website. The QEMS Policy is also posted at the Kirkland Lake Wastewater Treatment Plant and the Kirkland Lake Process and Compliance Office.

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

All complaints, whether received from the consumer, the community or other interested parties, are documented on a Community Complaint form. As appropriate, the Operations Manager or Senior Operator ensures that the owner is informed of the complaint and/or an action plan is developed to address the issue in a timely manner. Complaints will be included for discussion at the Management Review.
- 5.7 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 Emergency Response Plan). Refer to QEMS Procedure QP-09 Emergency Management.

6.0 Related Documents

Community Complaint Form
Emergency Response Plan
Facility Emergency Plan
Facility Logbook
Quarterly Operations Reports
QP-01 Document and Records Control
QP-05 Essential Supplies and Services
QP-09 Emergency Management
QP-11 Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Correction of some employee titles and update to Procedure 5.2 to include information how revisions are communicated
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Clarified training requirements for environmental compliance and OCWA's QEMS; Updated the media spokes person in step 5.5 and corrected approvals for facility tours in step 5.6
May 29, 2013	3	Updated step 5.2 to state that the Operational Plan and associated procedures are also available to the public as per QP-01
Jul. 18, 2014	4	Updated Senior Operator position to new position title of Team Lead; Revised step 5.2 to include locations where the Operational Plan, associated procedures and QEMS policy are available to the public; Revised step 5.3 to include the monthly operations reports as part of OCWA's on-going communication with the owner
Feb. 24, 2016	5	Changed Monthly Operations Reports to Quarterly Operations Reports and changed the Kirkland Lake Water Pollution Control Plant to the Kirkland Lake Wastewater Treatment Plant in step 5.6 to reflect the new plant and workplace of operations staff
Oct. 14, 2016	6	Changed Team Lead to Senior Operator, Regional Manager to Regional Hub Manager, added overall responsible operator (ORO) and removed OPEX reporting from section 5.6

Appendix F

QP-05 Essential Supplies and Services



QEMS Procedure

Proc.: QP-05
Issued: October 14, 2016
Rev.#: 4
Pages: 1 of 2

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

ESSENTIAL SUPPLIES and SERVICES

1.0 Purpose

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

2.0 Scope

Applies to essential supplies and services pertaining to the Matachewan Drinking Water System, as identified in this procedure.

3.0 Responsibility

Corporate Procurement and Administration
Senior Operations Manager
Operations Manager
Senior Operator
Overall Responsible Operator (ORO)
Process & Compliance Technician (PCT)

4.0 Definitions

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

5.0 Procedure

- 5.1 Essential supplies and services for the Matachewan Drinking Water System are listed in the Facility Emergency Plan binder. The list is reviewed and updated as required by the PCT or designate.
- 5.2 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.
- 5.3 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/service providers (including those contracted locally) are sent a letter that provides an overview of the relevant aspects of the QEMS.
- 5.4 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.

- 5.5 All third-party drinking water testing services are provided by accredited and licensed laboratories.
- 5.6 Calibration services are provided by qualified personnel.
- 5.7 Chemicals and lubricants purchased for use in the drinking water treatment process must meet the requirements listed in Section 14.0 “Chemicals and Materials” of the system’s Municipal Drinking Water License (MDWL).
- 5.8 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.
- 5.9 The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities.
- 5.10 All supplies purchased, once received, are inspected and/or verified to ensure that an acceptable product is received.

6.0 Related Documents

Essential Supplies and Services List
Municipal Drinking Water License (MDWL)
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 7, 2011	1	Addition of Procedure 5.3 clarifying how suppliers are informed of relevant aspects of OCWA's QEMS
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jul. 18, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised procedure to include step 5.9 to inspect and verify products when received.
Oct. 14, 2016	4	Changed Team Lead to Senior Operator and added overall responsible operator (ORO) and updated step 5.7 to better clarify the requirements for chemicals and materials used in the drinking water system.

Appendix G

QP-06 Review and Provision of Infrastructure





Ontario Clean Water Agency

QEMS Procedure

Proc.: QP-06
Issued: October 14, 2016
Rev.#: 5
Pages: 1 of 2

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

REVIEW and PROVISION of INFRASTRUCTURE

1.0 Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain a drinking water system.

2.0 Scope

Applies to the Matachewan Drinking Water System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Senior Operator
Overall Responsible Operator (ORO)
Owner/Municipal Representative(s)

4.0 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

5.0 Procedure

- 5.1 On an annual basis, the Operations Manager; with input from operational staff, conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system.
- 5.2 The output of the review is a letter, summarizing capital works recommendations and estimated expenditures, is submitted to the owner for review and comment. The owner acknowledges receipt of the letter by verbal or written response. Together with the owner, timelines and responsibilities for implementation of priority items are determined and documented.
- 5.3 The Senior Operations Manager, Operations Manager or designate ensures that results of the review are included as input to the Management Review process.

6.0 Related Documents

Letter of Capital Works Recommendations
Minutes of Management Review
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Revised to include the position of Process Compliance Manager
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Included input from operational staff in step 5.1
May 29, 2013	3	Updated step 5.2 to include written acknowledgement of the Capital Letter from the owner
Jul. 18, 2014	4	Updated Senior Operator position to new position title of Team Lead; Revised step 5.2 to include verbal acknowledgement of the Capital Letter from the owner
Oct. 14, 2016	5	Changed Team Lead to Senior Operator and added overall responsible operator (ORO)

Appendix H

QP-07 Sampling, Testing and Monitoring



QEMS Procedure

Proc.: QP-07
Issued: October 14, 2016
Rev.#: 6
Pages: 1 of 4

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

SAMPLING, TESTING and MONITORING

1.0 Purpose

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

2.0 Scope

Applies to sampling, testing and monitoring at the Matachewan Drinking Water System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Process & Compliance Technician (PCT)
Senior Operator
Overall Responsible Operator (ORO)
Operators

4.0 Definitions

Challenging Conditions – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under the Drinking Water System section in the facility's Operational Plan

Environmental Emergency Procedure – site specific procedure developed for emergency situations.

5.0 Procedure

5.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03. Adverse water quality incidents are responded to and reported as per Environmental Emergency Procedures (EEPs) found in the Facility Emergency Plan Binder.

5.2 Samples are collected according to the facility's sampling schedule and delivered to an accredited and licensed laboratory. The sample schedule is maintained by the PCT and is updated as required.

Analytical results from laboratory reports are entered into OCWA's Process Data Management system (PDM/WISKI 7) either manually or uploaded by the laboratory. Reports are maintained as per QP-01 Document and Records Control.

5.3 Continuous monitoring equipment is used to collect and record information on the following parameters related to process control and finished drinking water quality:

- *Free chlorine residual* – treated water to distribution system

- *Flow rates (including totalized flows)* – raw water from each well & treated water to the distribution system
- *Discharge pressure* – treated water into the distribution system
- *Building temperature*

Data from continuous monitoring equipment is captured by OCWA's SCADA system and are stored electronically on the INSQL server. Results are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03. A Data Review Protocol and a Standard Operating Procedure for the Continuous Monitoring of Operational Parameters for Drinking Water Systems are available in the systems Operations Manual.

The following data is stored on a newly installed Programmable Logic Controller (PLC) at the water plant.

- *Free chlorine residual* – potable water leaving the water tower
- *Flow rates (including totalized flows)* – water leaving the tower
- *Tower level*
- *Well pump running status*

5.4 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
Turbidity	Raw Water (Well #1 & Well #2)	Grab - monthly
Free Chlorine Residual	Treated Water Tap	Grab - weekly
	Water Tower	Grab - weekly
	Distribution Water (various locations)	Grab - weekly (4 & 3)
pH	Raw Water (Well #1 & #2)	Grab - monthly
	Treated Water Tap	Grab - monthly
Temperature	Treated Water Tap	Grab - monthly
Colour	Treated Water Tap	Grab - monthly
Well Level - Pumping	Raw Water (Well #1 & Well #2)	Reading – monthly
Well Level - Static	Raw Water (Well #1 & Well #2)	Reading – monthly
Sodium Hypochlorite Usage	Water Treatment Plant	Reading - weekly
Sodium Silicate Usage	Water Treatment Plant	Reading - weekly

In-house samples are analyzed following approved laboratory procedures. The results of these activities are recorded on a round sheet and are entered into PDM. Any adjustments made to process parameters are recorded in the facility log book.

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

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

5.7 Sampling, testing and monitoring results are readily accessible to the owner at the Municipal Office and/or the Kirkland Lake Process and Compliance office.

Owners are provided Quarterly Operations Reports which discusses regulatory results and operational issues. Owners are also provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 section 11 and schedule 22 reports and through the Management Review process outlined in QP-11 Management Review.

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

6.0 Related Documents

Annual Compliance/Summary Reports
Continuous Monitoring of Operational Parameters for Drinking Water Systems SOP
Data Review Protocol
Facility Round Sheets
Facility Logbooks
Laboratory Analytical Reports
Quarterly Operations Reports
Reporting and Responding to Adverse Results (EEPs)
Sampling Schedule
QP-01 Document and Records Control
QP-11 Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Added Process and Compliance Manager (3.0 Responsibility) and clarified sampling under 5.0 Procedure
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Clarified monitoring and recording requirements and referenced a Data Review Protocol in step 5.3
May 29, 2013	3	Revised table in step 5.2 to include pumping and static levels of the wells
Jul. 18, 2014	4	Updated Senior Operator position to new position title of Team Lead; Revised step 5.3 to include continuous monitoring the Building Temperature; Updated step 5.4 to include pH on raw water and change the location of the SOP for Continuous Monitoring of Operational Parameters from the FEP binder to the Operations Manual; Updated step 5.7 to include Monthly Operations Reports to the client
Feb. 24, 2016	5	Revised procedure to include sampling at the new water tower; Updated step 5.2 and 5.7 to include OCWA's new process data management system (PDM/WISKI 7); Updated 5.7 to change Monthly Operations Reports to Quarterly Operations Reports

Oct. 14, 2016 6

Changed Team Lead to Senior Operator and added overall responsible operator (ORO)

Appendix I

QP-08 Measurement and Recording Equipment Calibration and Maintenance



QEMS Procedure

Proc.: QP-08
Issued: October 14, 2016
Rev.#: 4
Pages: 1 of 2

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

MEASUREMENT and RECORDING EQUIPMENT CALIBRATION and MAINTENANCE

1.0 Purpose

To describe the procedure for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

Applies to the measurement and recording equipment in the Matachewan Drinking Water System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Process & Compliance Technician (PCT)
Senior Operator
Overall Responsible Operator (ORO)
Instrumentation Technicians
Operators

4.0 Definitions

None

5.0 Procedure

- 5.1 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 QP-05 Essential Supplies and Services).
- 5.2 The Instrumentation Technician or designate establishes and maintains a list of measurement and recording devices and associated calibration schedules using the automated Work Management System (WMS).
- 5.3 Calibration and maintenance activities are carried out in accordance with methods specified in OCWA's calibration procedures, the manufacturer's manual and/or instructions specified in WMS.
- 5.4 Any measurement device which does not meet its specified performance requirements during calibration must be removed from service (if practical) until repaired or replaced. The failure must be reported to the Operations Manager and/or Senior Operator 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/or WMS. Any

notifications required by applicable legislation are completed and documented within the specified time period.

- 5.5 Calibration and maintenance records and maintenance/equipment manuals are maintained as per QP-01 Document and Records Control.

6.0 Related Documents

Calibration/Maintenance Records

Facility Logbook

WMS Records

QP-01 Document and Records Control

QP-05 Essential Supplies and Services

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Revised to include proper title for Process Compliance Manager
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jul. 18, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.3 to include OCWA's calibration procedures
Oct. 14, 2016	4	Changed Team Lead to Senior Operator and added overall responsible operator (ORO)

Appendix J

QP-09 Emergency Management



QEMS Procedure

Proc.: QP-09
Issued: July 18, 2014
Rev.#: 4
Pages: 1 of 3

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

EMERGENCY MANAGEMENT

1.0 Purpose

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

2.0 Scope

Applies to potential operations emergency situations or service interruptions identified for the Matachewan Drinking Water System.

3.0 Responsibility

Refer to section 5.8 of this procedure.

4.0 Definitions

Facility Emergency Plan – a facility level plan for preparedness for operations emergencies that can be managed by plant staff and local resources

Emergency Response Plan – a corporate level plan for preparedness for serious operations emergencies

5.0 Procedure

5.1 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.

Level 3 is an actual or potential situation that will likely require significant resources from normal operations and/or threatens continued operations. Examples may include disruption of service/inability to meet demand, critical injury, 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.

5.2 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 operations-related events and directly links to the corporate-level Emergency Response Plan (ERP) for management of Level

3 events that require corporate support. The Senior Operations Manager or designate is responsible for establishing a site-specific FEP that meets the corporate standard for each facility in the hub. The document, “Emergency Management Program: OCWA’s Approach to Facility Emergency Planning”, provides as an overview of OCWA’s approach to emergency management and outlines the corporate requirements for implementing the FEP at each facility operated by OCWA.

5.3 Potential emergency situations or service interruptions identified for the Matachewan Drinking Water System include:

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

5.4 The processes for responding to and recovering from each potential emergency situation/service disruption are documented within a contingency plan (CP). The CPs and, if applicable, related site-specific environmental emergency procedures (EEPs) are contained within the FEP.

5.5 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	Corporate Compliance/ Regional Compliance Advisor	On-the-Job Practical	Upon hire and when changes are made to the corporate standard*	PCTs (or others identified by the Senior Operations Manager)
Contents of the site-specific FEP	Hub-Level (QEMS Rep)	On-the-Job Practical	Upon hire and when changes to the FEP are made*	All facility employees with responsibilities for responding to an emergency

*Note: Minor 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.

5.6 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 outcomes of reviews and tests are evaluated using the FEP-01 Contingency Plan Review/Test Summary Form. A CP-related response to an actual event may be considered a review or a test and a scheduled test of a CP may also be regarded as a review of that particular CP as long as the outcomes are evaluated using the FEP-01 form. Reviewing and testing of the Plans also provides training. Additional information regarding CP review and testing requirements is contained with “Emergency Management Program: OCWA’s Approach to Facility Emergency Planning”.

5.7 Revisions to the CPs, EEPs 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.).

5.8 Roles and responsibilities for emergency management at OCWA-operated facilities are set out in “OCWA’s Approach to Facility Emergency Planning”. 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*).

- 5.9 Where they exist, any relevant sections of the Municipal Emergency Response Plan (MERP) are included or referenced in the appendix section of the FEP. Measures specified in the MERP are incorporated into CPs where appropriate.
- 5.10 An emergency contact list is contained within the FEP and is reviewed/updated at least once per calendar year. OCWA's Emergency Communications Protocol depicts the established escalation of communications in relation to Level 1, 2 and 3 events. Specific notification requirements during emergency situations or service interruptions are set out in the individual contingency plans, emergency procedures and in OCWA's Emergency Response Plan.

6.0 Related Documents

Corporate Emergency Response Plan
Contingency Plan Review/Test Summary Form
Emergency Contact List and Emergency Communication Protocol (Contacts section of the FEP)
Emergency Management Program: OCWA's Approach to Facility Emergency Planning (appendix to the FEP)
Facility Emergency Plan
Municipal Emergency Response Plan
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Corrected Process Compliance Manager's title
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Added Forest Fire Evacuation Contingency Plan to step 5.2; Removed list of site specific procedures and instead referred to EEPs; Clarified training on emergency procedures and contingency plans in step 5.3
May 29, 2013	3	Revised step 5.3 to state that all contingency plans must be tested over a 3 year period
Jul. 18, 2014	4	Updated Section 3.0 Responsibilities; Revised procedure to reflect updates to OCWA's Facility Emergency Plan; References the three levels of operations-related events, OCWA's Emergency Management Program and OCWA's Emergency Communications Protocol; Clarifies training requirements in step 5.5; Describes when revision changes to procedures are required in step 5.7

Appendix K

QP-10 Internal QEMS Audits



QEMS Procedure

Proc.: QP-10
Issued: October 14, 2016
Rev.#: 5
Pages: 1 of 5

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

INTERNAL QEMS AUDITS

1.0 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).

2.0 Scope

This procedure applies to Internal QEMS Audits conducted in the Matachewan Drinking Water for the purpose of meeting the DWQMS requirements for internal audits (element 19).

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

3.0 Responsibility

Senior Operations Manager
Operations Manager
Senior Operator
Overall Responsible Operator (ORO)
Process & Compliance Technician (PCT)

4.0 Definitions

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

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

Lead Auditor – Internal Auditor responsible for leading an Audit Team

Audit Team – one or more Internal Auditors conducting an audit

Nonconformity – non-fulfillment of a requirement

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

5.0 Procedure

5.1 Audit Objectives, Scope and Criteria

5.1.1 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 nonconformities with the documented QEMS, and
- To assess the effectiveness of the QEMS and assist in its continual improvement.

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

5.1.3 The criteria covered by an internal QEMS audit include:

- Drinking Water Quality Management Standard (DWQMS)
- Current Operational Plan
- QEMS-related documents and records

5.1.4 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. However, all elements of the DWQMS must be audited at least once every 12 months.

5.2 Audit Frequency

5.2.1 Internal QEMS audits may be scheduled and conducted in one annual exercise or may be separated into smaller audit sessions scheduled at various intervals throughout the year.

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

5.2.3 Regardless of the approach, the QEMS Representative must ensure that an internal audit is conducted at least once every 12 months.

5.3 Internal Auditor Qualifications

5.3.1 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
- Familiarity with the DWQMS requirements

5.3.2 Internal Auditors that do not meet the qualifications in s.5.3.1 may form part of the Audit Team for training purposes, but cannot act as Lead Auditor.

5.3.3 Internal Auditors must remain objective and, where practical, be independent of the areas/activities being audited.

5.4 Audit Preparation

5.4.1 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.)

5.4.2 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 actions to address previously identified nonconformities and other relevant documentation
- Preparing work documents (e.g., checklists, forms, etc.) for reference purposes and for recording audit evidence collected during the audit

5.5 Conducting the Audit

- 5.5.1 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 Facility Top Management.
- 5.5.2 The Audit Team gathers and records audit evidence by engaging in activities that may include conducting interviews with facility management and staff (in person, over the phone and/or through e-mail), observing operational activities and reviewing documents and records.
- 5.5.3 The Audit Team generates the audit findings by evaluating the audit evidence against the audit criteria. In addition to indicating conformity or nonconformity, 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.

5.6 Reporting the Results

- 5.6.1 The Lead Auditor reviews the audit findings and conclusions with the QEMS Representative and Facility 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.
- 5.6.2 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 were conducted
 - Audit findings and related evidence (including any nonconformities, OFIs or other observations)
 - Audit conclusions
- 5.6.3 The QEMS Representative distributes the audit results to Facility Top Management and others as appropriate.

- 5.6.4 The QEMS Representative ensures that results of internal QEMS audits are included as inputs to the Management Review as per QP-11 Management Review.

5.7 Corrective Action

- 5.7.1 Corrective action is initiated when a nonconformity is identified through an internal QEMS audit.
- 5.7.2 The Senior Operations Manager (or designate) investigates the need for action to eliminate the root cause(s) so as to prevent the nonconformity from recurring. The investigation may include consultation with the Operations Manager, PCT, operators and others as appropriate.
- 5.7.3 The Senior Operations Manager (or designate) determines the corrective action needed and assigns responsibility and a target date for resolution.
- 5.7.4 Any necessary revisions to QEMS documents are completed as per QP-01 Document and Records Control.
- 5.7.5 The QEMS Representative ensures corrective actions are documented on the QEMS – Summary of Findings form. The QEMS Representative monitors the progress of corrective action(s) until they are fully resolved.
- 5.7.6 The effectiveness of corrective actions is reviewed during subsequent internal QEMS audits. If there is evidence that the action taken was not effective, the Senior Operations Manager (or designate) initiates further corrective action and assigns resources as appropriate until the nonconformity is fully resolved.

5.8 Opportunities for Improvement (OFIs)

- 5.8.1 The implementation status of any identified OFIs (or rationale for not implementing an OFI) is discussed and documented during the Management Review.
- 5.8.2 The implementation of OFIs are tracked by the QEMS Representative using the QEMS – Summary of Findings form.

5.9 Record-Keeping

- 5.9.1 Internal QEMS audit records are filed by the QEMS Representative and retained as per QP-01 Document and Records Control.
- 5.9.2

6.0 Related Documents

Internal Audit Records (review sheets, check lists, forms, reports, etc.)
QEMS – Summary of Findings Form
QP-01 Document and Records Control
QP-11 Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Clarification of time frames in Procedure 5.1; Corrected Process Compliance Manager's title; Updated the development of audit protocol in Procedure 5.2
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jul. 18, 2014	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.
Feb. 24, 2016	4	Major revisions throughout procedure to clarify requirements for conducting internal QEMS audits, reporting results and dealing with corrective actions
Oct. 14, 2016	5	Changed Team Lead to Senior Operator and added overall responsible operator (ORO)

Appendix L

QP-11 Management Review



QEMS Procedure

Proc.: QP-11
Issued: October 14, 2016
Rev.#: 4
Pages: 1 of 2

Reviewed by: Ilona Bruneau, PCT

Approved by: Eric Nielson, Senior Operations Manager

MANAGEMENT REVIEW

1.0 Purpose

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

2.0 Scope

Applies to the review of the QEMS implemented at the Matachewan Drinking Water System.

3.0 Responsibility

Facility Level Top Management:

- Senior Operations Manager
- Operations Manager

Other Management Review Participants:

- Process & Compliance Technician (PCT)
- Senior Operator (as required)
- Overall Responsible Operator (as required)
- Operators (as required)
- Regional Compliance Advisor (as required)
- Corporate Compliance Advisor (as required)
- Regional Hub Manager (as required)

4.0 Definitions

Management Review – a formal (documented) meeting conducted at least once every 12 months by Top Management to evaluate the continuing suitability, adequacy and effectiveness of OCWA's Quality & Environmental Management System (QEMS)

5.0 Procedure

5.1 The Senior Operations Manager determines a suitable frequency for Management Review meetings for the drinking water system. As a minimum, reviews must be conducted at least once every 12 months.

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 5.2 below are taken into account for each individual system and documented in the Management Review meeting minutes.

5.2 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 efficacy of the risk assessment process,
- e) Internal and third-party audit results,
- f) Results of emergency response testing,
- 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, and
- p) Staff suggestions.

The QEMS Representative 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.

- 5.3 The Management Review participants review the data presented and make recommendations and/or initiate action plans to address identified deficiencies as appropriate.
- 5.4 The QEMS Representative ensures that minutes of and action plans resulting from the Management Review meeting are prepared and distributed to appropriate OCWA management (including the Regional Hub Manager), personnel and the municipality.
- 5.5 The QEMS Representative monitors the progress and documents the completion of action plans resulting from the Management Review.

6.0 Related Documents

Minutes and action plans resulting from the Management Review
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 30, 2010	0	Procedure issued
Sep. 07, 2011	1	Corrected Process Compliance Manager's title
Dec. 21, 2012	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jul. 18, 2014	3	Updated Senior Operator position to new position title of Team Lead
Oct. 14, 2016	4	Changed Team Lead to Senior Operator, Regional Manager to Regional Hub Manager and added overall responsible operator (ORO)

Appendix M

MOE's Director's Directions *Minimum Requirements for Operational Plans* – Schedule "C"

Schedule "C"

Subject System Description Form			
Municipal Residential Drinking-Water System			
Owner of Municipal Residential Drinking-Water System: ¹	The Corporation of the Township of Matachewan		
Name of Municipal Residential Drinking-Water System: ²	Matachewan Drinking Water System		
Subject Systems			
Name of Operational Subsystems (if applicable) ³	Name of Operating Authority ⁵	DWS Number(s) ⁶	
<input checked="" type="checkbox"/> Check here if the Municipal Residential Drinking-Water System is operated by one operating authority. Enter the name of the operating authority in adjacent column ⁴	Ontario Clean Water Agency	220003653	
Operational Subsystem 1:			
Operational Subsystem 2:			
Operational Subsystem 3:			
Operational Subsystem 4:			
Add attachments if there are additional 'Operational Subsystems'			
Contact Information ⁷			
Name	Title	Phone No(s).	Email Address
Primary Ilona Bruneau	Process and Compliance Technician	705 567-3955	ibruneau@ocwa.com
Alternate Anthony Danis	Operations Manager	705 567-3955	adanis@ocwa.com

Subject System Description Form Notes:

1. The legal name of the owner should be used for this entry.
2. The name of the municipal residential drinking-water system should be the name most commonly used to describe the entire system. If information or records have been submitted to the ministry respecting this system, using an identifier name (e.g. for DWS), that identifier name should be used.
3. The identification of each operational subsystem will be necessary in cases where the municipal residential drinking-water system is being operated by more than one operating authority. For example, if a municipality owns a treatment and distribution system but contracts the operation of the treatment system to a separate entity there will be two 'operational subsystems', treatment and distribution. The name used to identify these operational subsystems should be one that is commonly used or describes the component. For example, the Everytown Treatment System and the Everytown Distribution System as separate operational subsystems of the same municipal residential drinking-water system.
4. If there is only one operating authority for the municipal residential drinking-water system, the box should be checked as such. In this case the subject system is the municipal residential drinking-water system and there will be no operational subsystem. The operating authority will need to be identified in the adjacent box.
5. The legal or corporate name of the operating authority should be used for this entry.
6. The DWS number is the number, or numbers, assigned to the drinking-water system by the Ministry of the Environment in response to the owner submitting a written notice containing information about the system further to section 10.1 of O. Reg. 170/03. In some cases multiple DWS numbers may exist for components of a municipal residential drinking-water system. In these cases enter all DWS numbers. Conversely, if one DWS number exists for multiple subject systems, enter the number opposite each operational subsystem.
7. The contact entry should identify a person who may be contacted for clarification of information contained in the form. An alternate person may also be identified.