Ontario Clean Water Agency
Agence Ontarienne Des Eaux

The Municipality of Charlton and Dack

MULTI-FACILITY OPERATIONAL PLAN

for the *Charlton Drinking Water System & the Bradley Subdivision Distribution System*

Revision 5: August 26, 2015

DISCLAIMER STATEMENT

This Operational Plan is designed for the exclusive use of the Corporation of the Municipality of Charlton and Dack.

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

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

Any documents developed and owned by OCWA which are referred to in this Operational Plan (including, but not limited to, OCWA's QEMS and its associated Standard Operating Procedures, policies, Facility Emergency Plans, and audit protocol) remain the property of OCWA. Accordingly, these documents shall not be considered to form part of the Operational Plan belonging to the owner of a drinking-water system under Section 17 of the *Safe Drinking Water Act, 2002*.

OPERATIONAL PLAN

Charlton Drinking Water System and Bradley Subdivision Distribution System

Owned by the Corporation of the Municipality of Charlton and Dack
Operated by the Ontario Clean Water Agency

This Operational Plan defines and documents the Quality & Environmental Management System (QEMS) for the Charlton Drinking Water System and the Bradley Subdivision Distribution 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
Jan. 31, 2010	0	Operational Plan issued
Jan. 19, 2012	1	Revised QEMS Policy section; replaced "continuous improvement" with "continual improvement to be more consistent with language in the Standard; Indicated when re-endorsement of the Plan is required (section 3); Added additional information for the drinking water description based on the MOE's guidance document (section 6); Corrected dimensions of wastewater settling tank and updated distribution map (section 6); Included private septic systems for potential contamination of the source water; Added roles and responsibilities for Senior Operator/Mechanic, Operator/Mechanic and Instrumentation Technician based on standard job descriptions and added ORO/OIC prompts to section 9; Revised competencies table to reflect skills and knowledge required as per standard job descriptions and section 10 text; Revised Infrastructure Maintenance, Rehabilitation and Renewal to better describe OCWA's maintenance program; Corrected position title (Operations & Compliance Manager to Process Compliance Manager); Added list of tables, list of figures and list of acronyms & abbreviations; Revised header and footer
Mar. 04, 2013	2	Clarified section 3 as to when the Plan requires re-endorsement; Updated system description of the Bradley SD by removing the sample station (section 6.2); 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 section10 – Competencies
Jan. 10, 2014	3	Revised section 6 to include headings which makes the section easier to read, replaced the Process Flow Diagram with a more legible Process Flow and Instrumentation Diagram, removed Map No. 2 of the Bradley Subdivision Distribution System, updated Raw Water Characteristics in Tables 1 & 2 with more current data and corrected KW rating of donor system generator, updated operational challenges to indicate issues with extreme low temperatures of the raw water source; Revised tables in sections 9 and 10 by changing the Senior Operator to the new position of Team Lead
Apr. 22, 2015	4	Updated Section 6, Table 1 - Raw Water Characteristics with more current data, updated the system description for Bradley SD by changing Grant Forest to Georgia-Pacific (bullet no. 1) and described a new generator installed in the donor system; Included OCWA's quarterly operations report in Section 15 as a method of reporting system maintenance activities, repairs and changes to the owner.
Aug. 26, 2015	5	Revision 5 of the Operation Plan was re-endorsed by OCWA and the Owner which is reflected in Section 3 of the Plan; Section 6 (6.2) was revised to reflect the addition of an ammoniation/chloramination process at the Englehart Drinking Water; MOIR changed to MOR under Acronyms and Abbreviations.

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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
PDC	Process Data Collection
PLC	Programmable Logic Controller
PPR	Performance Planning & Review
PVC	Polyaluminimum 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 Charlton Drinking Water System and the Bradley Subdivision Distribution 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:

- Maintain and continually improve upon a comprehensive quality and environmental management system (QEMS) to support the delivery of safe, reliable and cost-effective clean water services that protect public health and the environment.
- Establish clear objectives against which OCWA's environmental performance can be measured and assessed with the goal of continual improvement.
- Understand and comply with applicable legislation and regulations and audit the facilities we operate to ensure compliance.
- Utilize a risk-based approach to quality management that accounts for the complexity and specific challenges of providing operation and maintenance services.
- Promote client and consumer confidence through service excellence and effective communications.
- Collaborate with its clients to prevent pollution and contribute to a more sustainable future by promoting the use of operational efficiencies and improved technology.
- Train staff on their responsibilities under the QEMS and how meeting these responsibilities assist with the protection of public health and the environment.
- Report on facility performance to its employees, clients and stakeholders.

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.

3 Commitment & Endorsement of OCWA'S QEMS & Operational Plan

This Operational Plan supports the overall goal of OCWA and the Corporation of the Municipality of Charlton and Dack to provide safe, cost-effective drinking water through sustained cooperation. OCWA will be responsible for developing, implementing, maintaining and continually improving its QEMS with respect to the operation and maintenance of the Charlton Drinking Water System and the Bradley Subdivision Distribution System and will do so in a manner that ensures compliance with applicable legislation and regulations. Through the endorsement of this Operational Plan, the Corporation of the Municipality of Charlton and Dack commits to cooperating in any reasonable request of OCWA to facilitate this goal.

Top management of both OCWA and the Corporation of the Municipality of Charlton and Dack has approved the QEMS for the drinking water system as documented in this Operational Plan.

Any major revision of the operational plan will be re-endorsed by top management of both OCWA and the Corporation of the Municipality of Charlton and Dack. Major revisions include:

1. Change of Owner
2. Addition or removal of any treatment process
3. Operation of additional drinking water subsystems owned by the same Owner

The Englehart Drinking Water System, donor system to the Bradley Subdivision Distribution System, underwent a process change. An ammoniation/chloramination trial was implemented in April 2015 to determine the effectiveness of using chloramination as secondary disinfection and to reduce trihalomethanes in the Englehart and neighbouring distribution systems

The Operational Plan has been updated to reflect this change. Revision 5 of the Plan was endorsed by both OCWA and the Municipality of Charlton and Dack and the written endorsement is presented below. This updated version of the Plan and associated procedures will be communicated to relevant employees and provided to the Owner.

Operating Authority Approval

Eric Nielson — Date: Sep 1/15
Senior Operations Manager

Gordon Williams — Date: Aug 28/15
Regional Manager, Operations

Owner Endorsement & Approval

Dan Thibeault — Date: Sept 3/15
Clerk-Treasurer

Merrill Bond — Date: Sep 3/15
Reeve

4 Quality Management System Representative

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

The role of QEMS Representative for the Charlton Drinking Water System and the Bradley Subdivision Distribution 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 Systems

6.1 CHARLTON DRINKING WATER SYSTEM

The Charlton Drinking Water System is owned by the Corporation of the Municipality of Charlton and Dack and consists of a Class 3 water treatment subsystem and a Class 1 water distribution subsystem. The Ontario Clean Water Agency is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

Description of the Charlton Drinking Water System (DWS# 220005768)

The Charlton Drinking Water System is a surface water system that serves the residents of Charlton. It is a standalone system that is not connected to any other drinking water system.

Raw Water Supply

The water treatment plant is located on the on the west bank of the Englehart River on Bay Street in the Town of Charlton. The raw water intake system consists of an 83 m long, 200 mm diameter pipe that extends approximately 70 meters into the Englehart River. The pipe is equipped with a vertical intake riser, with manual height adjustment and perforated with 150

mm diameter holes which are covered with 20 mm diameter high density polyethylene mesh. A sand bag weighted drum secures the pipe to the river bed. The intake pipe supplies a 13.6 cubic meter low lift pumping station equipped with three submersible pumps each rated at 3.25 litres per second (L/s). The maximum rated capacity of the plant is 561 $m^{3/}$day.

Water Treatment

The treatment process consists of chemically assisted filtration using a single train "*Ecodyne Monoplant"* package treatment system housed in a 15 m by 16 m building. The process involves pH adjustment with soda ash, flash mixing/coagulation with alum, flocculation with the assistance of polymer, upflow clarification using settling tubes, pre-chlorination using sodium hypochlorite and dual media filtration through two sand and anthracite filters. As the water exits the common filter underdrain the water is post-chlorinated using sodium hypochlorite.

Water Storage and Pumping Capabilities

The filtered water enters a 133 m^3 chlorine contact chamber then flows to a 227 m^3 clearwell. Ammonium sulphate is added at the discharge of the chlorine contact tank to produce a combined chorine residual before entering the distribution system.

There are three high lift pumps each rated at 4.85 L/s that can direct water to the distribution system. High lift pump #1 is not in service because it is located in the chlorine contact tank. Water pumped from this location does not meet chlorine contact time (CT) requirements. A hydro-pneumatic tank having a volume of 1500 L provides pressure to the distribution system. The treated water is monitored for total and free chlorine residual using continuous on-line analyzers. An on-line turbidimeter is used to monitor the turbidity off the filters.

Waste Management

Residue management consists of one 50 cubic meter wastewater/backwash surge tank, equipped with a sludge pump rated at 5.1 L/s and a 29.7 cubic meter settling tank with a sludge pump that transfers sludge to a tanker truck for disposal. The supernatant is discharged by an effluent weir to the Englehart River. Composite samples of the effluent are collected using an autosampler.

Emergency Power

An 80 kW standby diesel generator set is available on-site to provide power to the water treatment facility during power failures.

Distribution System

The Charlton Water Supply System is classified as a Large Municipal Residential Drinking Water System which serves a population of approximately 250 residents through an estimated 110 service connections. The distribution system is comprised of 6" PVC-constructed ("Blue Brute") lines which were approved for installation in 1988. Other than the clearwell in the water plant, here is no off-site water storage facility associated with the system.

Figure 1: Charlton Treatment Plant – Process Flow & Instrumentation Diagram

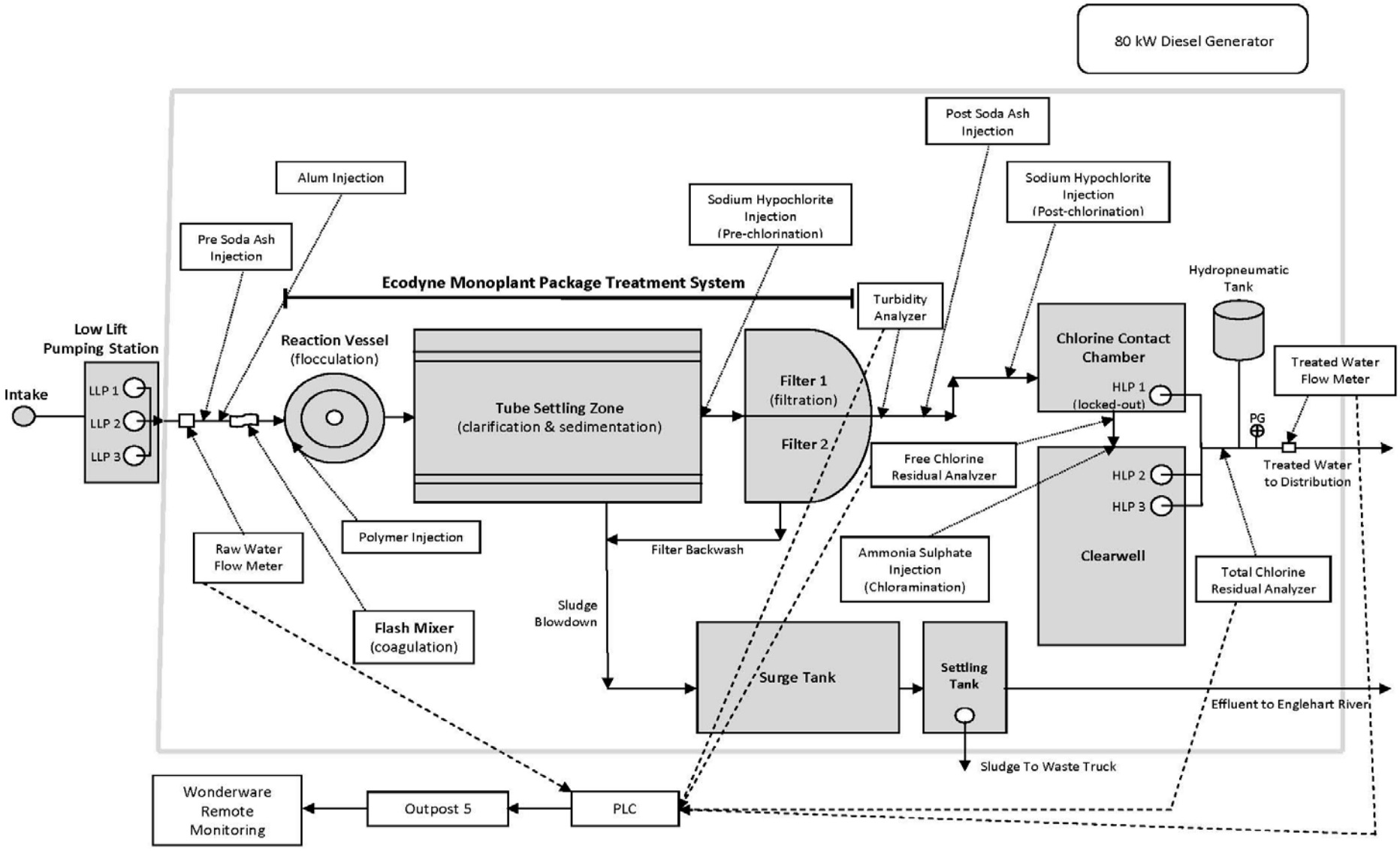
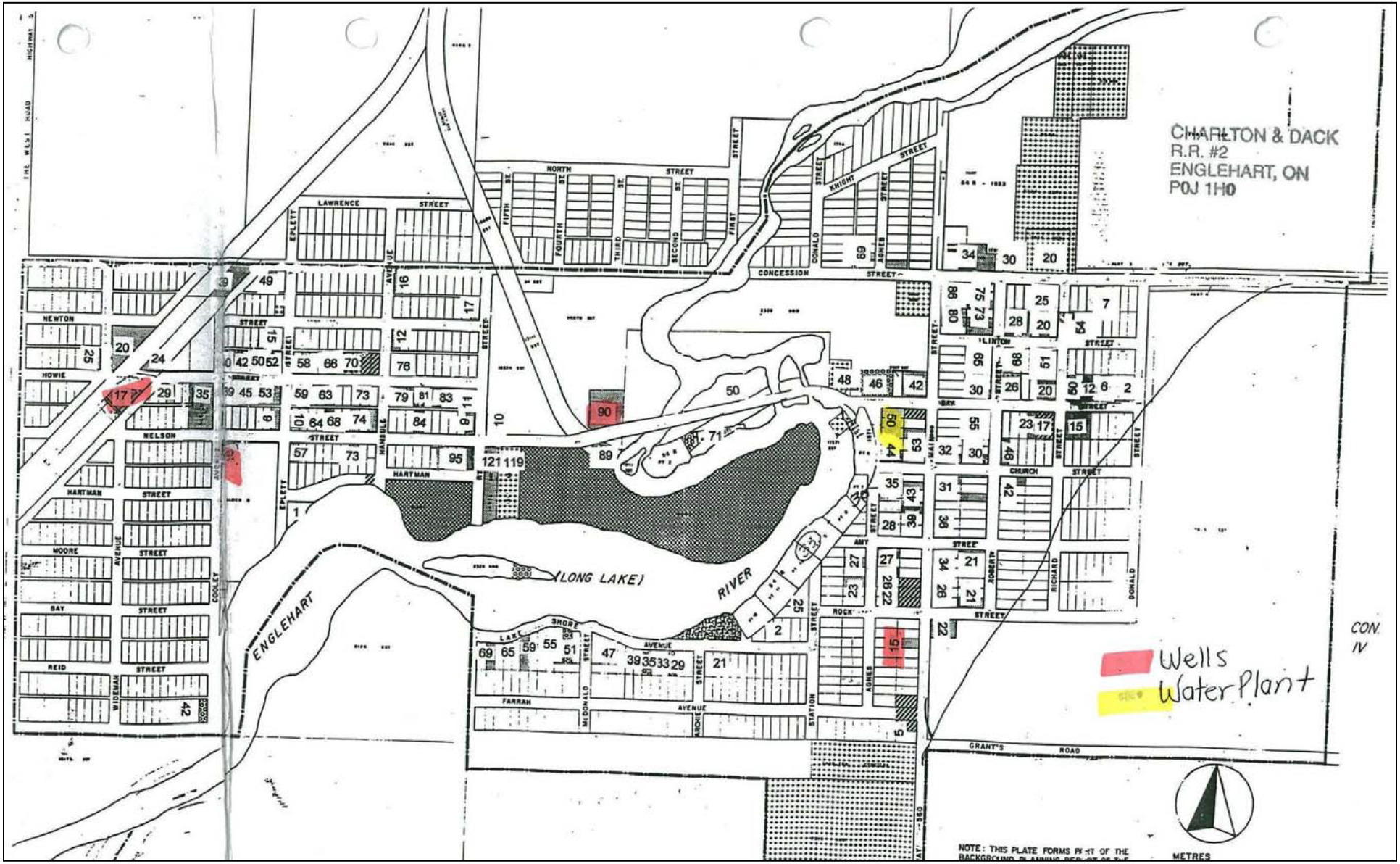


Figure 2: Charlton Drinking Water System – Distribution Map



Source Water

General Characteristics

The raw water source for the treatment plant is the Englehart River. The Charlton Water Treatment THM Control Study dated January 26, 2004, describes the source water as being relatively high in colour, turbidity, microbiological content, and dissolved organic carbon compared to limits found in the Ontario Drinking Water Quality Standards (ODWQS). Iron and manganese are consistently elevated and are occasional above the ODWQS. Aluminum is elevated, but has not exceeded the ODWQS. Temperature fluctuates significantly through the seasons ranging from approximately 0.5 ºC in the winter to as high as 25 ºC during the summer.

Table 1: Raw Water Characteristics (based on 2013 & 2014 data)

Characteristic	Minimum		Maximum		Annual Average	
	2013	2014	2013	2014	2013	2014
pH	6.03	6.15	8.31	7.5	6.91	6.94
Temperature (^{o}C)	1.6	2.0	16.1	18.8	8.9	9.66
Colour (TCU)	17	58	164	207	105	112
Alkalinity	54	45	115	352	86	86
E. coli (CFU/100 mL)	<1	<2	42	36	6.1	5.0
Total Coliforms (CFU/100 mL)	<1	<2	300	>300	62.2	56.7

< = less than > = greater than

Common Fluctuations

Raw water turbidity increases during spring runoff and significant rainfall events. As well, water temperature changes significantly from winter to summer. Warm summer temperatures may result in an increase of taste, colour and odour concerns. Extreme cold water temperatures can affect the process and cause high turbidity events. Aluminum sulphate and polymer are adjusted accordingly to assist with sedimentation and filtration.

Threats

Potential sources of raw water contamination include fuel spills from recreational water crafts, snowmobiles, and traffic including transport trucks. Biological contamination from private septic systems and wildlife (eg. beavers) may also be a potential risk.

Operational Challenges

Spring and fall turnover is the greatest operational challenge for the Charlton water treatment plant. The turnover creates higher demands on process operations. It can affect the source waters alkalinity, pH, temperature, colour and turbidity. These changes can occur quickly and require adjustments to chemical dosages.

6.2 BRADLEY SUBDIVISION DISTRIBUTION SYSTEM

The Bradley Subdivision Distribution System is owned by the Corporation of the Municipality of Charlton and Dack with the Ontario Clean Water Agency designated as the Overall

Responsible Operator.

Description of the Bradley Subdivision Distribution System (DWS# 260069927)

The Bradley Subdivision distribution system is a standalone system that was constructed in the early 1980's by a private developer, with ownership later being assumed by the Municipality of Charlton and Dack. Based on the number of residential service connections (17), the Bradley Subdivision Distribution System is classified as a small municipal residential drinking water system.

The watermains and appurtenances that comprise this water distribution system are described as follows:

- 6 inch PVC constructed watermain located on the Old Ferguson Highway that connects to the Englehart Well Supply in the vicinity of Fifth Avenue, in front of the Georgia-Pacific Forest Products complex;

- 1½ inch PVC constructed watermain connected to the 6 inch main, extending west along Highway 560 to service the residences in that area;

- 2 inch PVC constructed watermain that connects to the 6 inch watermain at Old Ferguson Highway, extending west down Christopher Street and north on Michael Street;

- a single fire hydrant located at the junction of Old Ferguson Highway and Christopher Street;

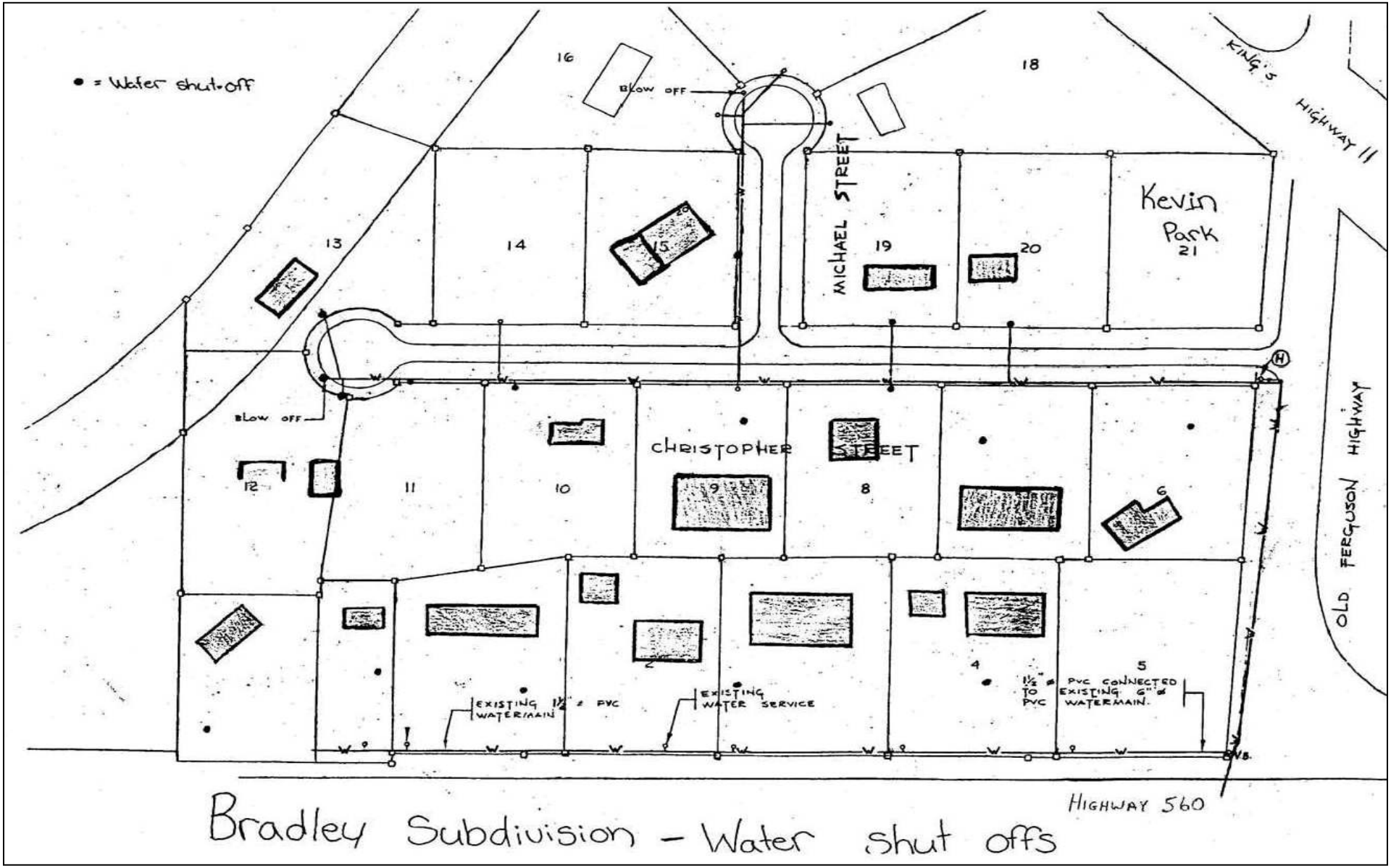
Donor System

The system connects to and receives all water from the drinking water system owned by the Town of Englehart (DWS # 220000353). The Englehart Drinking Water System is owned by the Corporation of the Town of Englehart. It is a communal ground water well supply that services the Town of Englehart and six neighbouring distribution systems. The Englehart Drinking Water System is operated by the Ontario Clean Water Agency (OCWA). The water treatment facility has a maximum rated capacity of 45.4 liters per second or 2,488 cubic meters per day. It is located on 56 First Street in Evanturel Township in the district of Timiskaming.

The Englehart water system consists of two deep-drilled wells that feed the main treatment building that houses an iron and manganese removal/pressure filtration system, chemical feed systems, a pump station and reservoir. Sodium hypochlorite is used to achieve primary disinfection and ammonium sulphate is added prior to the reservoir to produce a combined chorine residual before entering the distribution system.

A 150 kW diesel generator is located outside the water treatment plant building and has the capacity to maintain all aspects of the operation during power outages.

Figure 3: Bradley Subdivision Distribution System Map



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:

- *Hub* – Facilities are grouped together geographically to form hubs. The Senior Operations Manager has oversight responsibility for all of the facilities contained within a particular hub. In some hubs, an Operations Manager assists the Senior Operations Manager with his/her duties.
- *Regional* – Hubs are further grouped together to form regions, each headed by a Regional Manager. Regional Managers play a critical role within OCWA's QEMS in that they act as a key link between corporate and facility level management.
- *Provincial* – Regions fall under the direction of a VP of Operations.

The chart, QEMS Organizational Structure for the Charlton Drinking Water System and the Bradley Subdivision Distribution 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 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 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 they understand their individual roles and responsibilities and how they relate to rest of the organization.

Specific QEMS-related roles, responsibilities and authorities of Operations personnel for the facility are summarized in Table 2 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 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
All Operations Personnel	• 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 • 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
Regional Manager *(Corporate Level Top Management)*	• Review major issues/deficiencies (including those from audit and inspection reports) and provide further direction to

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	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
Senior Operations Manager *(Facility Level Top Management, QEMS Representative)*	• 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)
Operations Manager *(Facility Level Top Management & QEMS Representative)*	• 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 implementation and identify the need for additional processes and procedures • 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 • Act as Overall Responsible Operator (ORO) when required. Refer to ORO Letter

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
Process & Compliance Technician (PCT) *(QEMS Representative)*	• 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)
Team Lead	• 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) • Acts as Overall Responsible Operator (ORO). Refer to ORO Letter
Operator/Mechanic	• 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

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	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)
Instrumentation Technician	• 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 3: Competencies

Position	Required Competencies
Senior Operations Manager	• 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

Table 3: Competencies

Position	Required Competencies
	• 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
Operations Manager	• 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
Process & Compliance Technician	• 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 • 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
Team Lead	• 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

Table 3: Competencies

Position	Required Competencies
	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	• 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	• Operator certification in good standing; • Theoretical and practical knowledge/experience/training in water/wastewater treatment operation processes, design, instrumentation, process control and automation systems • 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,

Table 3: Competencies

Position	Required Competencies
	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 staff at least every five years to ensure staff are kept current on any changes to regulatory requirements and to reinforce 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 daily, monthly, seasonal, and annual maintenance activities to be conducted to ensure the good and proper upkeep 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 reservoir condition and levels
- 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 issuance of WMS work orders. Work orders are generated by a designated Operator/Mechanic on a monthly, quarterly, seasonal, or annual basis and are distributed accordingly. Completed work orders are returned to the designated Operator/Mechanic for entry into WMS except for those pertaining to the calibration of equipment. Completed calibration reports are entered into WMS by a designated Instrumentation Technician. Records of these activities are maintained as per QEMS Procedure QP-01 Document and Records Control.

The Team Lead or designate maintains the inventory of equipment in WMS and ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements. Equipment Operation and Maintenance (O&M) manuals are accessible to 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 monthly, quarterly, seasonal, or annual work orders. In addition to the monthly reports completed by the Operations Manager which indicate the status of completed work orders, the Senior Operations Manager and Regional Manager are provided with monthly summary reports for each facility to assist in monitoring the effectiveness of the program. OCWA's Executive Management Team is also provided with hub and regional summary reports on an ongoing basis.

OCWA provides the Owner Quarterly Operations Reports which describes system repairs, changes and improvements and gives the status of maintenance work orders. 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

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 Charlton Drinking Water System and the Bradley Subdivision Distribution System, as identified in this procedure.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Team Lead
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 Charlton Drinking Water System and the Bradley Subdivision Distribution System are:

Review	PCT or Team Lead
Approval	Senior Operations Manager or Operations Manager

5.4 The PCT and Team Lead 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, WISKI 7/PDC, 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Clarification of responsibility and method of maintaining currency of documents (step 5.4); Provided a better description of how network security is maintained (step 5.5); Clarified retention times (step 5.9); Included the operation plan review (step 5.10); added “verbally” to documents revision requests (step 5.6); Corrected position title (Operations & Compliance Manager to Process Compliance Manager); Updated document locations in Table 1
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Changed C of A Exceedance form & record to MDWL Exceedance form & record and updated document locations in Table 1
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised Table 1 to include the Municipality of Charlton and Dack’s municipal office and website as controlled locations for the Operational Plan and the public drive as the controlled location for laboratory reports and completed chain of custody forms, added Facility Emergency Plan (FEP) Binder, AWWA standards, Confined Space Program, Health & Safety Binder, Action and Analysis Plan, Incidents of Non-Compliance form and records, MOE forms and records, QEMS Summary of Findings form and records , Tailgate Meeting form and records, Transportation of Dangerous Goods forms and records, and removed SOPs reference in Plan and QEMS procedures as they are captured in other documents listed in the table.
Apr. 22, 2015	4	Revised step 5.5 to include OCWA’s new process data collection system (WISKI 7); Updated Table 1 by changing the Health & Safety binder to

OCWA's Safety Manual, removing the MDWL Exceedance form which is no longer in use, adding the Quarterly Operations Reports to the owner, adding the Contingency Plan Review Test Summary and Form, changing the control location for completed MOE forms and 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

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 - Charlton 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 and Site Specific Emergency Procedures)	HC - Charlton 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 - Charlton & Bradley SD Drinking Water Systems EC - www.charltonanddack.com HC – Charlton Water Treatment Plant HC- Municipality of Charlton & Dack Municipal Office
ORO Letter	HC – Charlton Water Treatment Plant
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 - Charlton & Bradley SD Drinking Water Systems HC - Charlton Water Treatment Plant
Vacation Calendar	EC - Microsoft Outlook Shared Calendar (Team Lead)
Internal QEMS Forms (Blank)	
Analysis and Action Plan Form	EC - \\ocwfile\public\NEO DWQMS
Call-in Report Form	
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	
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)	HC - Charlton Water Treatment Plant
Applicable Federal and Provincial Legislation	Online at www.e-laws.gov.on.ca

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Drinking Water Works Permits (DWWPs)	HC – Charlton Water Treatment Plant
Equipment Operation /Maintenance Manuals	HC - Charlton Water Treatment Plant
MOE - Director Notification Form	EC - \\ocwfile\public\NEO DWQMS
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 - Charlton & Bradley SD Drinking Water Systems
Municipal By-laws	Municipal Office
Municipal Drinking Water Licences (MDWLs)	HC - Charlton Water Treatment Plant
Operations Manuals (including Standard Operating Procedures)	HC - Charlton SD Water Treatment Plant
Operator Certificates	HC - Kirkland Lake Wastewater Treatment Plant
Permit to Take Water (PTTW)	HC - Charlton Water Treatment Plant
QEMS Records (Completed)	
Adverse Water Quality Incident (AWQI) Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems HC - Kirkland Lake Process & Compliance Office
Analysis and Action Plan Report	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Annual Compliance / Summary Reports for Municipalities	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Audit Reports – External	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Audit Reports - Internal	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Call-in Reports	HC - Kirkland Lake Process & Compliance Office
Community Complaint Records	EC - OPEX database
Contingency Plan Review/Test Summary	EC - \\ocwfile\public\NEO DWQMS
Distribution Maintenance and Repair Records	HC - Kirkland Lake Process & Compliance Office
Environmental Incident Reports	EC - OPEX database
Facility Logbooks	HC - Charlton Water Treatment Plant
Facility Rounds Sheets	HC - Kirkland Lake Process & Compliance Office
Incidents of Non-Compliance Reports	EC - OPEX database
Infrastructure Review (letter of capital/maintenance works recommendations)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Instrumentation Calibration/Maintenance Records	EC - Workplace Management System (Hansen) HC - Kirkland Lake Process & Compliance Office
Laboratory Analytical Reports and completed Chain of Custody Forms	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
Loss of Pressure Incident Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton &

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
	Bradley SD Drinking Water Systems
Maintenance Records (completed WMS/Hansen work orders)	EC - Workplace Management System (Hansen)
Management Review Documentation	EC - \\ocwfile\public\NEO DWQMS - Charlton & Bradley SD Drinking Water Systems
MOE - Director Notification	Kirkland Lake Process and Compliance Office
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)	
Quarterly Operations Reports (to the owner)	EC - \\ocwfile\public\NEO DWQMS - Charlton & Bradley SD Drinking Water Systems
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 Record	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Charlton & Bradley SD Drinking Water Systems
SCADA Records	EC - INSQL server (Outpost5/Wonderware)
Transportation of Dangerous Goods Record	EC - \\ocwfile\public\NEO DWQMS
WMS/Hansen Status Reports	EC - \\ocwfile\public\NEO DWQMS

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

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)
Team Lead

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 any thing 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), Team Lead, 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 1[1] 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 process[2] 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 <u>all</u> of the following criteria are met:

- ✓ The associated hazardous event has a ranking of 12 or greater
- ✓ The associated hazardous event can be controlled through control measure(s)
- ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion
- ✓ Specific control limits can be established for the control measure(s)
- ✓ 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Revised Scope (section 2.0) to better reflect the intent of the risk assessment process and to be more consistent with the MOE's guidance document; Revised bullet in step 5.7 to clarify intent; Revised step 5.10 to reflect changes of the review process for the risk assessment; Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Oct. 28, 2013	3	Updated Senior Operator position to new position title of Team Lead

Summary of Risk Assessment Outcomes
Charlton Drinking Water System

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 the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Source/Intake	Spill of biological or chemical material into Englehart River (private septic systems, beaver activity, snowmobiles or water crafts and traffic including transports)	Contamination of source water	Monitor and sample, 2 to 3 days supply from clearwells, Town ordered water conservation or ban, Site specific Environmental Emergency Procedure (EEP) for Fuel or Chemical Spill, Site specific Environmental Emergency Procedure (EEP) for Contaminated Raw Water Supply, Site specific Environmental Emergency Procedure (EEP) for Water Supply Shortage Contingency Plan (CP) for Spill Response	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Breakage/blockage of intake pipe	Loss of water supply	Use of alternate pump (submersible pump can be located in river to supply water to the low lift station), 2 to 3 days supply from clearwells, Town ordered water conservation or ban EEP for Raw Intake Line Blocked, EEP for Water Supply Shortage	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Spring/fall turnover	Increased demand on process operations such	Appropriate operational changes,	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
		as chemical optimization for changes in colour odour, alkalinity, pH, temperature and turbidity	In-house pH, alkalinity, colour, and temperature testing, Treated water turbidity analyzer, Treated water turbidity alarm with automatic plant shut down				identified for facility ☒ No
Low Lift Pumps	Low lift pump failures	Loss of water supply	Redundancy (1 duty pump, 2 standby pumps), Alternative submersible pump can be used if all 3 pumps fail, Annual inspection of the inlet chamber, Alarms for low clearwell level, Back-up generator, EEP for Low Lift Pump Failure	2	1	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Filtration Process (includes flocculation, coagulation, dual media gravity filters)	Aluminum Sulphate (alum) feed pump failure	Ineffective removal of pathogens (minimum treatment requirements not met)	Redundancy (1 back-up system), Continuous online monitoring of turbidity and tank levels, High turbidity alarm with automatic plant shutdown at 0.8 NTU, Remote and on-site operator checks (tank levels & turbidity), Dosage calculations, Scheduled maintenance activities, EEP for High Turbidity in Filtered Water, EEP for Chemical Pump Failure, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			Systems, CP for Unsafe Water				
	Soda Ash feed pump failure (pre-treatment)	Lowered pH Ineffective coagulation process Potential for increased turbidity and/or potential Adverse Water Quality Incident (AWQI)	Regular in-house pH testing, Continuous online monitoring of turbidity and tank levels, High turbidity alarm with automatic plant shutdown at 0.8 NTU, Remote and on-site operator checks (tank levels & turbidity), Dosage calculations, Scheduled maintenance activities, EEP for High Turbidity in Filtered Water, EEP for Chemical Pump Failure, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems, CP for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Polymer feed pump failure	Increased turbidity Ineffective removal of pathogens Potential for AWQI	Continuous online monitoring of filter effluent turbidity, High turbidity alarm with automatic plant shutdown at 0.8 NTU, On-site operator checks (tank levels), Dosage calculations, Scheduled maintenance activities, Increase backwash schedule if poly dose				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			is too high, EEP for High Turbidity in Filtered Water, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems, CP for Unsafe Water				
	Filter breakthrough	Increased turbidity, Ineffective removal of pathogens, Potential for AWQI	Continuous online monitoring of filter effluent turbidity, High turbidity alarm with automatic plant shutdown at 0.8 NTU, Regular operator checks, Redundancy (2 filters), Regular automated backwash schedule, Scheduled maintenance activities, EEP for High Turbidity in Filtered Water, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems, CP for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Backwash system failure	Increased turbidity, Ineffective removal of pathogens, Potential for AWQI, Potential for loss of treated water supply	Continuous online monitoring of filter effluent turbidity, High turbidity alarm with automatic plant shutdown at 0.8 NTU, Scheduled maintenance activities, Alternate system for backwashing (manual),				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			EEP for Backwash Failure (Filters), EEP for High Turbidity in Filtered Water, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems, EEP for Water Supply Shortage, CP for Unsafe Water				
	Turbidity analyzer failure	Unknown turbidity levels, potential for AWQI	System has 2 to 3 days supply from clearwell to allow for repairs, Back-up analyzer available within hub, Scheduled maintenance activities, In-house turbidity readings, Regular operator checks, OCWA Instrumentation Technician available to repair analyzer in case of failure, EEP for Turbidity Analyzer Failure, EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems, CP for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Heating System Failure	Freeze up of chemicals affecting filtration process, High turbidity, Potential AWQI	Portable heaters, On-line monitoring of effluent turbidity, High turbidity alarm with automatic plant shutdown at 0.8 NTU, Remote and on-site checks of turbidity				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			and tanks levels (alum and pre-soda ash), EEP for Reporting and Responding to Adverse Turbidity , CP for Unsafe Water				
Sodium Hypochlorite System (for primary disinfection)	Chlorine feed pump failure	Loss of disinfection Low chlorine residual Inadequate inactivation of pathogens Potential for AWQI	Redundancy (1 back-up pump), Continuous online monitoring with alarms, In-house residual testing, Remote and on-site operator checks (free and total chlorine residual), Scheduled maintenance activities, EEP for Chemical 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), Site specific spreadsheet to calculate CT CP for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Analyzer failure (Total and Free Chlorine Analyzers)	Sodium Hypochlorite System (for primary disinfection)	Low chlorine residual alarms, In-house residual testing, Scheduled maintenance activities, Back-up analyzer available within hub,				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			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				
	Low supply of sodium hypochlorite	Inadequate disinfection, Potential for AWQI	Low chlorine residual alarms , Regular operator checks, Chemical available within hub, 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 ☐ Yes – Additional CCP identified for facility ☐ No
Contact Tank	Low Chlorine	Inadequate disinfection, Potential AWQI	On-line monitoring with alarms in chlorine contact tank (cell #1), In-house residual testing and dosage calculations, Remote and on-site operator checks (chlorine residuals),				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			Maintenance activities, 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				
	Out of service for repair or maintenance	Potential loss of water supply to consumers	Clearwell has 2 to 3 days supply to allow for repairs or maintenance, Scheduled and controlled maintenance plan, EEP for Water Supply Shortage	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Clearwell	Low level	Loss of water supply to consumers	Duel celled - contact tank can be isolated to provide water to consumers, Low level clearwell alarm (Low alarm = 1.0 m), High lift pumps lock out at a clearwell level of 0.5 m, Schedule maintenance and inspection activities, Town ordered water conservation or ban, EEP for Clearwell-Low Level, EEP for Water Supply Shortage	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	Cell out of service for repair, maintenance	Loss of water supply to consumers	Duel celled - contact tank can be isolated to provide water to consumers, Increase chlorine dosage into contact tank, Schedule controlled maintenance plan, 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	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
High Lift	High lift pump failures	Low supply of water	Redundancy (2 pumps), Scheduled maintenance activities, On-line monitoring of discharge pressure, EEP for High Lift Pump Failure, EEP for Water Supply Shortage	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Water Treatment System	Power failure	Loss of treated water supply	Back-up diesel generator, Scheduled maintenance activities for back-up generator, Routine operator checks, Low fuel level alarm (gen-set), EEP for Power Failure of Long Duration, EEP for Standby Power Failure CP for Loss of Service	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	Generator Failure	Loss of treated water supply	Generator Fail Alarm, Portable generator available within the Hub, Scheduled maintenance, EEP for Power Failure of Long Duration, EEP for Standby Power Failure CP for Loss of Service	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Vandalism/terrorism at Water Treatment Plant and Low Lift Chamber	Contamination of the water supply, Damage to critical equipment	Locked (water plant , low lift chamber), Security alarm at water plant, Appropriate signage and lighting, Visited regularly by operational staff, Highly visible in a residential area, EEP for Vandalism or Suspected Unauthorized Entry CP for Security Breach	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Natural Disasters	Loss of supply, contamination	Contingency Plans, Emergency Procedures, OCWA's Emergency Response Plan, Town's Emergency Response Plan, Staff training	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Secondary Disinfection	Loss of residual in distribution	Failure to control biofilm and pathogens (longterm), AWQI	Continuous on-line monitoring of chlorine residual into the distribution system, System-wide residual testing,				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			Scheduled maintenance, Low alarms for chlorine residual in water entering distribution system , EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems				
Watermains	Structural failure/breaks	Contamination, Loss of pressure, Loss of supply,	Notification/complaints from customers, Routine monitoring of flows, pressure and clearwell levels via SCADA (Wonderware), Alarms (low pressure, low clearwell, high flows), Regular operator checks, EEP for Water Line Breaks, EEP for Low or Loss of Pressure in Distribution System, EEP for Water Supply Shortage	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Service connections	Cross connection/ backflow, siphonage	Contamination	Design standards, EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Structural failure/breaks	Contamination, Loss of pressure, Loss of supply,	Customer notification/complaints, Routine monitoring of pressure via SCADA (Wonderware), Low pressure alarm, EEP for Water Line Breaks,	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			EEP for Low or Loss of Pressure in Distribution System, EEP for Reporting and Responding to Adverse Bacteriological Results				
Valves	Failure	Loss of control, Line breaks and/or contamination Loss of pressure Loss of water supply	Routine monitoring of pressure via SCADA (Wonderware), Low pressure alarm, Maintenance program, EEP for Low or Loss of Pressure in the Distribution System, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
All (watermains, connections, valves, construction, etc.)	Accident, Vandalism	Contamination, Loss of water supply, Loss of pressure	Notification/complaints from customers, Routine monitoring of flows, pressure and clearwell levels via SCADA (Wonderware), Alarms (low pressure, low clearwell), Operator checks, EEP for Water Line Breaks, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Substandard repair procedures	Contamination	AWWA standards, Staff training,	1	3	3	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP

Risk Assessment for the Charlton Drinking Water System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			Operator Certification,				identified for facility ☒ No
New construction	Sub-standard construction and /or commissioning	Contamination, Loss of pressure	AWWA Standards, Testing, Provincial Standard Inspection, Training of staff,	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
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)	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No – does not meet all criteria outlined in section 5.7 of QP-02 Risk Assessment and Risk Assessment Outcomes. No control available at this point, therefore not a CCP Assessment Outcomes

Table 2: Identified Critical Control Points (CCPs)

Identified Critical Control Points for Charlton Drinking Water System			
CCP	**Critical Control Limits**	**Monitoring Procedures**	**Response, Reporting and Recording Procedures**
Filtration Process	**Filter Effluent Turbidity Alarm** High set point = 1.0 NTU (Automatic plant shutdown when turbidity reaches 0.8 NTU for 72 second)	SCADA (continuous online analyzer and tank levels), 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, Dosage calculations	Refer to: • EEP for High Turbidity in Filtered Water • EEP for Turbidity Analyzer Failure • EEP for Reporting and Responding to Adverse Turbidity in Large Municipal Systems • CP for Unsafe Water.
Sodium Hypochlorite System (for primary disinfection)	**Free Chlorine Residual - Treated Alarms** Low set point = 0.50 mg/L (summer temperatures) Low set point = 1.0 mg/L (winter temperatures) High set point = 3.0 mg/L	SCADA (continuous online analyzers) 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	Refer to: • SOP for CT (Chlorine Concentration x Time), • Site specific spreadsheet to calculate CT, • 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 Potential and/or Unsafe Water
Contact Tank	**Free Chlorine Residual - Treated Alarms** Low set point = 0.50 mg/L (summer temperatures) Low set point = 1.0 mg/L (winter temperatures) High set point = 3.0 mg/L	SCADA (continuous online analyzers) 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	Refer to: • SOP for CT (Chlorine Concentration x Time), • Site specific spreadsheet to calculate CT, • EEP for Low or High Chlorine Residual in Treated Water, • EEP for Reporting and Responding to

Identified Critical Control Points for Charlton Drinking Water System			
CCP	**Critical Control Limits**	**Monitoring Procedures**	**Response, Reporting and Recording Procedures**
			Adverse Chlorine or CT Results in Large Municipal Residential Systems, • CP for Unsafe Water
Secondary Disinfection	**Combined Chlorine Residual - Distribution** Low = 0.25 mg/L (low free chlorine residual = 0.05) High = 3.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03	Refer to: • EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems, • CP for 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 Charlton Drinking Water System			
Date of Activity	**Type of Activity**	**Participants**	**Summary of Results**
Jan. 14, 2010	Initial Risk Assessment conducted	Ilona Bruneau (PCT), Brian Jibb (Cluster Manager), Anthony Danis (Senior Operator)	Results captured in Revision 0 of this Summary of Risk Assessment Outcomes
May 10, 2010	Reviewed during the annual internal audit	Eric Nielson (Process Compliance Manager), Ilona Bruneau (PCT)	Information remains current and assumptions still valid – no changes
Jun. 21, 2011	Reviewed during Management Review meeting	Tony Janssen (Operations Manager), Eric Nielson (Process Compliance Manager), Brian Jibb (Cluster Manager), Ilona Bruneau (PCT)	All process steps were re-assessed and no new hazardous events or hazards were identified. Information in summary remains current and assumptions still valid – no revisions necessary
Jan. 18, 2012	Reviewed prior submission for Full Scope Accreditation	Anthony Danis (Senior Operator), Ilona Bruneau (PCT)	Added private septic systems for potential contamination of the source water. Updated turbidity level for automatic plant shutdown. Updated low clearwell level alarm and high lift shutdown. Updated and added control measures for alum pump failure. Corrected low lift pump operation. Separately identified and updated hazards for the contact tank and the clearwell. Table 2 to be updated to reflect updates to contact tank.
Dec. 12, 2012	36-month Risk Assessment	Steve Gerl (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.
Jan. 7, 2014	Reviewed during update of Operational Plan	Ilona Bruneau (PCT)	Revised to include Town ordered water conservation or ban and EEP for Contaminated Raw Water to existing control measures for spills into Englehart River. Added new Generator Failure Alarm to existing control measure for Generator Failure.

			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.
May 7, 2014	Reviewed during the annual internal audit	Anthony Danis (Team Lead), Steve Gerl (Operator), Ilona Bruneau (PCT),	No changes were identified, no revisions necessary
Apr. 22, 2015	Reviewed during the update of the Operational Plan and Procedures	Ilona Bruneau (PCT)	Revised to include Contingency Plans for Spill Response, Loss of Service, CP for Security Breach and to update title for Unsafe Water (formerly Potential or Actual Unsafe Water)
May 5, 2015	Reviewed during the annual internal audit	Patrick Roy (Operator), Ilona Bruneau (PCT),	No changes were identified, no revisions necessary

Revision History

Date	Revision #	Reason for Revision
Jan 31, 2010	0	Risk assessment finalized and issued
Jan 19, 2012	1	Revised to include ‘Record of Annual Review/36-Month Risk Assessment’ (Table 3); updated to include results of January 18th review; updated drinking water system name to be consistent with the MOE
Jan 14 , 2013	2	Revised Summary based on results of 36-month risk assessment
Jan. 10, 2014	3	Revised summary based on results of January 7, 2014 review.
Apr. 22, 2015	4	Revised summary based on results of April 22, 2014 review.

Summary of Risk Assessment Outcomes
Bradley Subdivision Distribution System

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.

Note: Recipient system (Bradley Subdivision Distribution) and donor system (Englehart Water Treatment Plant) operated by same operating authority (OCWA)

Risk Assessment for the Bradley Subdivision Distribution System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Raw Water/Well (Englehart WTP)	Contamination of Source	Contamination of aquifer and potentially the distribution system	Monitor and sample, Site specific Environmental Emergency Procedure (EEP) for Contaminated Raw Water, EEP for Fuel or Chemical Spill Contingency Plan (CP) for Spill Response	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Loss of supply	Contamination, Loss of pressure, Total loss of supply,	Notification/complaints from customers, Donor System - Routine monitoring of pressure, flows and clearwell levels via SCADA (Wonderware), Donor System - Alarms (low pressure, high flows, low clearwell levels), Operator checks, EEP for Water Supply Shortage	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Bradley Subdivision Distribution System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
Secondary Disinfection	Loss of residual in distribution	Failure to control biofilm and pathogens, AWQI	Donor System - Continuous on-line monitoring of total chlorine residual into the distribution system, Donor System - Low/high free chlorine residual alarm, System-wide residual testing, Regularly scheduled maintenance, EEP for Reporting and Responding to Adverse Chorine or CT Results in Large Municipal Residential Systems, CP for Unsafe Water				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
Watermains	Structural failure/breaks	Contamination, Loss of pressure, Loss of supply,	Notification/complaints from customers, Donor System - Routine monitoring of flows, pressure and clearwell via SCADA (Wonderware), Donor System - Alarms (low pressure, high flows, low clearwell), Regular operator checks, EEP for Water Line Breaks, EEP for Low or Loss of Pressure in the Distribution System, EEP for Water Supply Shortage	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Service connections	Cross Connection	Contamination	Design standards, EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Bradley Subdivision Distribution System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	Structural failure/breaks	Contamination, Loss of pressure, Loss of supply	Customer notification/complaints, Donor System - Alarms (low pressure), EEP for Water Line Breaks, EEP for Low or Loss of Pressure in the Distribution System, EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Valves	Failure	Loss of control, Line breaks and/or contamination Loss of pressure Loss of water supply	Maintenance program, Donor System - Routine monitoring pressure via SCADA (Wonderware), Donor System - Low pressure alarm, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Hydrant (a single fire hydrant located at the junction of Old Ferguson Highway and Christopher Street)	Structural failure/breaks, Component failure	Contamination, Loss of pressure, Loss of supply, Loss of fire control	Donor System - Routine monitoring of flows, clearwell levels and pressure via SCADA (Wonderware), Donor System - Alarms (low pressure, high flows, low clearwell levels), Operator checks, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage,	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No

Risk Assessment for the Bradley Subdivision Distribution System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
			EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems				
All (watermains, connections, hydrants, valves, construction, etc.)	Accident, Vandalism	Contamination, Loss of water supply, Loss of pressure	Notification/complaints from customers, Donor System - Routine monitoring of flows, pressure and clearwell levels via SCADA (Wonderware), Donor System - Alarms (low pressure, high flows, low clearwell level), Regular operator checks, EEP for Water Line Breaks, EEP for Low or Loss of Pressure in the Distribution System, EEP for Water Supply Shortage, EEP for Reporting and Responding to Adverse Bacteriological Results in Large Municipal Residential Systems	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Substandard repair procedures	Contamination	AWWA standards, Staff training, Operator Certification,	1	3	3	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
New construction	Sub-standard construction and /or commissioning	Contamination, Loss of pressure	AWWA Standards, Testing, Provincial Standard Inspection, Training of staff	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Distribution System	Adverse Water Quality Result as described in	Potential for unsafe drinking water	Site specific Sampling Schedule EEP for Reporting and Responding to	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP

Risk Assessment for the Bradley Subdivision Distribution System							
Activity/ Process Step	**Description of Hazardous Event**	**Possible Outcome (Hazards)**	**Existing Control Measures**	**Likelihood**	**Consequence**	**Risk Value**	**CCP?**
	O. Reg. 170/03		Adverse Results in Large Municipal Residential Systems (several EEPs)				identified for facility ☒ No – does not meet all criteria outlined in section 5.7 of QP-02 Risk Assessment and Risk Assessment Outcomes. No control available at this point, therefore not a CCP

Table 2: Identified Critical Control Points (CCPs)

Identified Critical Control Points the Bradley Subdivision Distribution System			
CCP	**Critical Control Limits**	**Monitoring Procedures**	**Response, Reporting and Recording Procedures**
Secondary Disinfection	**Combined Chlorine Residual - Distribution System** Low – 0.25 mg/L (or 0.05 mg/L free chlorine residual) High - 3.0 mg/L (high)	Distribution chlorine residuals monitored as per O. Reg. 170/03.	Refer to: • EEP for Reporting and Responding to Adverse Chlorine or CT Results in Large Municipal Residential Systems • CP for 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 Bradley Subdivision Distribution System			
Date of Activity	**Type of Activity**	**Participants**	**Summary of Results**
Jan. 14, 2010	Initial Risk Assessment conducted	Ilona Bruneau (PCT), Brian Jibb (Cluster Manager), Anthony Danis (Senior Operator)	Results captured in Revision 0 of this Summary of Risk Assessment Outcomes
May 10, 2010	Reviewed during the annual internal audit	Eric Nielson (Process Compliance Manager), Ilona Bruneau (PCT)	Information remains current and assumptions still valid – no changes
Jun. 21, 2011	Reviewed during Management Review meeting	Tony Janssen (Operations Manager), Eric Nielson (Process Compliance Manager), Brian Jibb (Cluster Manager), Ilona Bruneau (PCT)	All process steps were re-assessed and no new hazardous events or hazards were identified. Information in summary remains current and assumptions still valid – no revisions necessary
Jan. 18, 2012	Reviewed prior submission for Full Scope Accreditation	Ilona Bruneau (Process and Compliance Technician), Anthony Danis (Senior Operator)	No changes, information remains current and assumptions still valid
Dec.12, 2012	36-month Risk Assessment	Steve Gerl (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.
Jan. 7, 2014	Reviewed during update of Operational Plan	Ilona Bruneau (PCT)	Revised to clarify that SCADA monitoring, continuous on-line monitoring and alarms are conducted at the Donor System 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.
May 7, 2014	Reviewed during the annual internal audit	Anthony Danis (Team Lead), Steve Gerl (Operator), Ilona Bruneau (PCT),	No changes were identified, no revisions necessary
Apr. 22, 2015	Reviewed during the update of the Operational Plan and procedures	Ilona Bruneau (PCT)	Revised to include Contingency Plans for Spill Response and to update title for Unsafe Water (formerly Potential or Actual Unsafe Water)

May 5, 2015	Reviewed during the annual internal audit	Patrick Roy (Operator), Ilona Bruneau (PCT)	Changes were made to reflect the new ammoniation/chloramination process at the donor system. On-line free chlorine residual monitoring changed to total chorine residual monitoring and the CCLs for secondary disinfection changed from free to combined.

Revision History

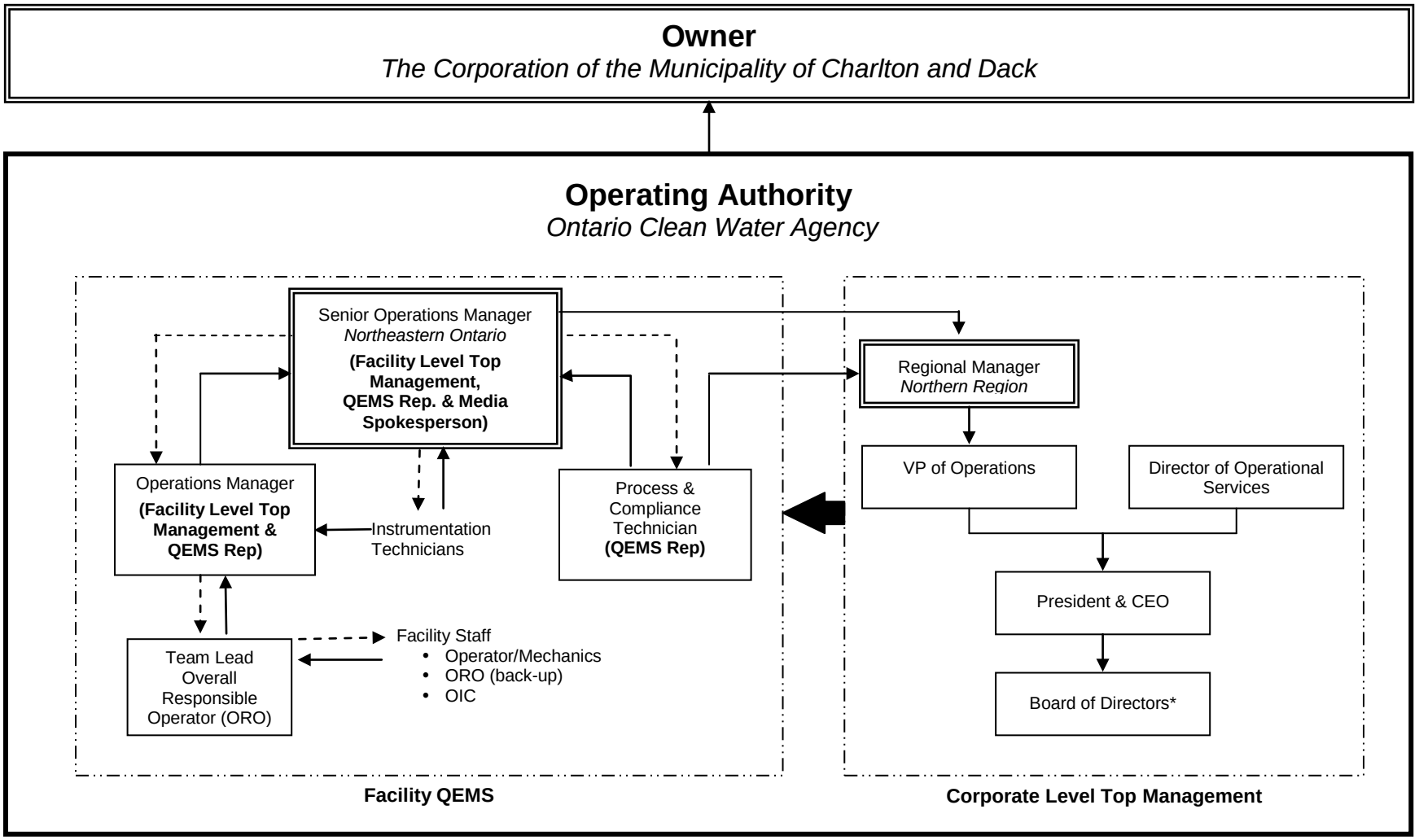
Date	Revision #	Reason for Revision
Jan. 31, 2010	0	Risk assessment finalized and issued
Jan. 19, 2012	1	Revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3)
Jan. 14, 2013	2	Revised Summary based on results of 36-month risk assessment
Jan. 10, 2014	3	Revised summary based on results of January 7, 2014 review.
Apr. 22, 2015	4	Revised summary based on results of April 22, 2015 review.
Aug. 26, 2015	5	Revised summary based on results of May 5, 2015 review.

Appendix C

QEMS Organizational Structure for the Charlton Drinking Water System and the Bradley Subdivision Distribution System

Ontario Clean Water Agency

QEMS Organizational Structure for the *Charlton Drinking Water System and the Bradley Subdivision Distribution 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

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 Charlton Drinking Water System and the Bradley Subdivision Distribution System

3.0 Responsibility

Senior Operations Manager
Operations Manager
Team Lead

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 Charlton Water Treatment plant 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.

Both the Charlton and Bradley Subdivision Distribution Systems are visited twice per week. Operational staff are available 24 hours a day, 7 days a week via cell phone.

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[*] 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.

The Team Lead is the designated overall responsible operator (ORO). When the Team Lead 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 Team Lead assigns an on-call operator for the time that the facility is un-staffed (i.e.: evenings, weekends and Statutory Holidays). The on-call shift 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 on the Call-In Report form.

5.7 The Operations Manager and/or Team Lead 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 Team Lead 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
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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Step 5.9 was added to reference contingency planning for Critical Shortage of Staff; Updated location and maintenance of on-call schedule; Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Clarified on-call rotation in step 5.4

Appendix E

QP-04 Communications

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 Charlton Drinking Water System and Bradley Subdivision Distribution System.

3.0 Responsibility

Senior Operations Manager (Facility Level Top Management)
Operations Manager (Facility Level Top Management)
Team Lead
Process & Compliance Technician (PCT)
Regional 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 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 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 Charlton and Dack Municipal Office and website (www.charltonanddack.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 Charlton Drinking Water System and the Bradley Subdivision Distribution 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 and recorded in the OPEX database. As appropriate, the Operations Manager or Team Lead 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
OPEX Incident Reports
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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Revised step 5.2 to better describe how relevant aspects of the QEMS are communicated to OCWA personnel; Clarified OCWA's handling of media inquiries & complaints in steps 5.5 & 5.6; Removed position of Client Service Representative in section 3.0 Responsibility; corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	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
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.2 to state that the Operational Plan and associated procedures are also available to the public as per QP-01
Apr. 22, 2015	4	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 quarterly operations reports as part of OCWA's on-going communication with the owner.
Aug 26, 2015	5	Changed 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

Appendix F

QP-05 Essential Supplies and Services

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 Charlton Drinking Water System and Bradley Subdivision Distribution System, as identified in this procedure.

3.0 Responsibility

Corporate Procurement and Administration
Senior Operations Manager
Operations Manager
Team Lead
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 Charlton Drinking Water System and Bradley Subdivision Distribution 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 purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified.

The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities.

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 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
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Addition of step 5.3 clarifying how suppliers are informed of relevant aspects of OCWA's QEMS; Updated Section 3.0 Responsibility; corrected position title of (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jan, 10, 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.

Appendix G

QP-06 Review and Provision of Infrastructure

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 Charlton Drinking Water System and the Bradley Subdivision Distribution System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Team Lead
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 and Team Lead; with input from operational staff, conduct 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Revised to include position of Process Compliance Manager
Mar. 04, 2013	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
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.2 to include written acknowledgement of the Capital Letter from the owner
Apr. 22, 2015	4	Revised step 5.2 to also include verbal acknowledgement of the Capital Letter from the owner

Appendix H

QP-07 Sampling, Testing and Monitoring

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 Charlton Drinking Water System and Bradley Subdivision Distribution System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Process & Compliance Technician (PCT)
Team Lead
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.

Additional sampling and testing requirements for the system are defined in the facility's Municipal Drinking water Licence (MDWL). A monthly composite sample of the effluent discharged to the Englehart River is collected and tested for Total Suspended Solids (TSS).

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

Analytical results from laboratory reports are entered into WISKI 7/PDC either manually or uploaded by the laboratory. Reports are maintained as per QP-01 Document and Records Control.

5.3 At the Charlton water treatment plant, continuous monitoring equipment is used to collect and record information on the following parameters related to process control and finished drinking water quality:

- *Turbidity* – filter effluent
- *Free chlorine residual* – contact tank
- *Total chlorine residual* – treated water to distribution
- *Discharge pressure* – treated water into the distribution system
- *Flow r*ates (*including totalized flows)* – raw water, treated water
- *Water Levels* – clearwell
- *Filter run times*
- *Chemical tank levels (Alum, Soda Ash, Ammonium Sulphate)*

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.

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	Process Top of Package Plant	Grab - monthly
	Treated Water at Tap	
	Raw Water at tap	
Free Chlorine Residual	Contact Tank (CT)	Grab - weekly
	Charlton Distribution Water (various locations)	Grab - weekly (4 & 3)
	Bradley Distribution Water	Grab – bi-weekly (2/wk.)
Total Chlorine Residual	Treated Water at Tap	Grab - weekly
	Charlton Distribution Water (various locations)	Grab - weekly (4 & 3)
	Bradley Distribution Water	Grab – bi-weekly (2/wk.)
Combined Chlorine Residual	Water Treatment Plant	Calculation - weekly
	Charlton Distribution Water (various locations)	Calc. - weekly (4 & 3)
	Bradley Distribution Water	Calc. – bi-weekly (2/wk.)
Monochloromine	Charlton Distribution Water	Grab - monthly
	Bradley Distribution Water	
Free Ammonia	Charlton Distribution Water	Grab - monthly
	Bradley Distribution Water	
pH	Process - Top of Package Plant	Grab - monthly
	Treated Water at Tap	
	Raw Water at Tap	

Operational Parameter	Location	Frequency
Temperature	Process - Top of Package Plant	Grab - monthly
	Treated Water at Tap	
	Raw Water at Tap	
Colour	Treated Water at Tap	Grab - monthly
	Raw Water at Tap	
Alkalinity	Raw Water at Tap	Grab - monthly
Aluminum Residual	Treated Water at Tap	Grab - monthly
Sodium Hypochlorite Dosage	Water Treatment Plant	Calculation – as required
Alum Dosage	Water Treatment Plant	Calculation – as required
Polymer Dosage	Water Treatment Plant	Calculation – as required
Pre-soda Ash Dosage	Water Treatment Plant	Calculation – as required
Post Soda Ash Dosage	Water Treatment Plant	Calculation – as required
Ammonium Sulphate	Water Treatment Plant	Calculation – as required

In-house samples are analyzed following approved laboratory procedures. The results of these activities are recorded on a round sheet and are entered into WISKI 7/PDC. 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 the Charlton Drinking Water System. Upstream sampling, testing and monitoring activities for the Bradley Subdivision Distribution System are done according to Englehart Drinking Water System's Sampling Schedule (Procedure No. ENG-01) which is located in the Bradley Subdivision Distribution System Operations Manual.

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 discuss 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Clarification of sampling under Section 5.0 Procedure; corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager; Updated monitoring and recording requirements and referenced a Data Review Protocol in step 5.3, Updated sampling information for the Bradley Subdivision in step 5.6
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.1 to include sampling and testing requirements identified in the MDWL; Updated the table in step 5.4 to include alkalinity testing on raw water
Apr. 22, 2015	4	Revised step 5.2 to include OCWA's new process data collection system (WISKI 7); Updated Table in step 5.4 to include raw water testing for turbidity; Updated step 5.7 to change Monthly Operations Reports to Quarterly Operations Reports
Aug. 26, 2015	5	Revised Table in step 5.4 to include total and combined chlorine residuals, monochloromines and free ammonia in the Charlton and Bradley distribution systems

Appendix I

QP-08 Measurement and Recording Equipment Calibration and Maintenance

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 Charlton Drinking Water System and used in the Bradley Subdivision Distribution System.

3.0 Responsibility

Senior Operations Manager
Operations Manager
Process & Compliance Technician (PCT)
Team Lead
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 Senior Operations Manager, Operations Manager or designate 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.3 to include OCWA's calibration procedures

Appendix J

QP-09 Emergency Management

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 Charlton Drinking Water System and the Bradley Subdivision Distribution 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 Charlton and Bradley Drinking Water Systems 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	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; Clarified training on emergency procedures and contingency plans in step 5.3
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead; Revised step 5.2 to include OCWA's list of mandatory contingency plans as described in the new Facility Emergency Plan template
Apr. 22, 2015	4	Updated procedure as per OCWA's revised corporate template which; reflects updates to OCWA's improved 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; Updates reviewing frequencies of CPs in step 5.6; Describes when revision changes to procedures are required in step 5.7

Appendix K

QP-10 Internal QEMS Audits

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 at the Charlton Drinking Water System and the Bradley Subdivision Distribution System 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
Team Lead
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 where 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 Audit 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 Audit 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.

6.0 Related Documents

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

7.0 Revision History

Date	Revision #	Reason for Revision
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Clarified time frames in step 5.1; Updated the development of the audit protocol in step 5.2; Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jan. 10, 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
Aug. 26, 2015	4	Major revisions throughout procedure to clarify requirements for conducting internal QEMS audits, reporting results and dealing with corrective actions

Appendix L

QP-11 Management Review

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 Charlton Drinking Water System and the Bradley Subdivision Distribution System.

3.0 Responsibility

Facility Level Top Management:

- Senior Operations Manager
- Operations Manager

Other Management Review Participants:

- Process & Compliance Technician (PCT)
- Team Lead (as required)
- Operators (as required)
- Regional Compliance Advisor (as required)
- Corporate Compliance Advisor (as required)
- Regional 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 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
Jan. 31, 2010	0	Procedure issued
Jan. 19, 2012	1	Corrected position title (Operations & Compliance Manager to Process Compliance Manager)
Mar. 04, 2013	2	Changed Operations Manager position to new position title of Senior Operations Manager, changed Cluster Manager to Operations Manager, removed Process and Compliance Manager
Jan. 10, 2014	3	Updated Senior Operator position to new position title of Team Lead

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 Municipality of Charlton and Dack
Name of Municipal Residential Drinking-Water System:[2]	Charlton Drinking Water System

Subject Systems

	Name of Operational Subsystems (if applicable)[3]	Name of Operating Authority[5]	DWS Number(s)[6]
✓ 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		Ontario Clean Water Agency	220005768
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 & Compliance Technician	705-567-3955	ibruneau@ocwa.com
Alternate Brian Jibb	Operations Manager	705-567-3955 ex.	bjibb@ocwa.com
Alternate Anthony Danis	Team Lead	705-567-2236	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.

Schedule "C"

Subject System Description Form

Municipal Residential Drinking-Water System

Owner of Municipal Residential Drinking-Water System:[1]	The Corporation of the Municipality of Charlton and Dack
Name of Municipal Residential Drinking-Water System:[2]	Bradley Subdivision Distribution System

Subject Systems

	Name of Operational Subsystems (if applicable)[3]	Name of Operating Authority[5]	DWS Number(s)[6]
✓ 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		Ontario Clean Water Agency	26006992
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 & Compliance Technician	705-567-3955	ibruneau@ocwa.com
Alternate Brian Jibb	Operations Manager	705-567-3955	bjibb@ocwa.com
Alternate Anthony Danis	Team Lead	705-567-2236	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.