



DWQMS Operational Plan
A-C-W

**The Corporation of the Township of Ashfield-Colborne-Wawanosh
and Veolia Water Canada**

Drinking Water Quality Management System

**MASTER
Operational Plan /
QMS Manual
2.0**

ASHFIELD-COLBORNE-WAWANOSH WATER SYSTEMS

Benmiller Drinking Water System

Century Heights Subdivision Drinking Water System

Courtney Subdivision Distribution System

Dungannon Drinking Water System

Huron Sands Drinking Water System

South Lucknow Distribution System

**The Corporation of the Township of Ashfield-Colborne-Wawanosh
82133 Council Line, R.R. # 5
Goderich, Ontario N7A 3Y2**

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Note: To be reviewed annually or when a QMS change occurs.

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Operational Plan Change History Summary

OPERATIONAL PLAN CHANGE HISTORY:					
Procedure Description	Release / Revision No.	Date	Revision Description	Written By	Approved By
Operational Plan / QMS Manual	Release	Apr. 30, 2009	Initial Release	DCS / L. Cox	L. Cox

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DOCUMENT APPROVAL - CHANGE FORM

CHANGE INFORMATION:	NEW:	
	NEW REVISION LEVEL:	
	OBSOLETE:	
ORIGINATOR:		
DOCUMENT TITLE:		
DOCUMENT NUMBER:		
ELECTRONIC ADDRESS:		
WRITTEN / REVISED BY:		
PURPOSE OF DOCUMENT:		
DESCRIBE REVISION:		
DO ANY OTHER DOCUMENTS REQUIRE REVISION AS A RESULT OF THIS CHANGE ?		
HAVE ALL PERSONNEL AFFECTED BY THIS CHANGE BEEN ADVISED?	Employees to sign and date here as advised:	
APPROVED BY: (name & date & comments)		

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Glossary of Terms

Audit:

a systematic and documented 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.

Authority:

official permission or approval to carry out a responsibility or task.

Calendar Year:

a period of one year beginning and ending with the dates conventionally accepted as marking the beginning and end of a year (January 1st to December 31st).

Competence:

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

Compliance:

the fulfillment of a regulatory requirement.

Conformance:

the fulfillment of a DWQMS requirement.

Consumer:

the drinking water end user.

Contingency Plan:

Operating Authority’s procedures to mitigate or control emergency situations beyond the Standard Operating Procedures.

Control Measure:

includes any processes, physical steps, or other contingencies that have been put in place to prevent or reduce a hazard before it occurs.

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Contact Time (CT):

This value is called “Chlorine Contact Time” or CT. The CT Value is a numerical value of (Chlorine Residual) x (Chlorine Contact Time) (mg/l-minutes).

CT disinfection is a measure of the effectiveness of disinfection or pathogen inactivation while the disinfectant (free chlorine) and water are in contact. If the CT value is not met, there is the potential for chemical or biological contamination and an adverse water quality situation.

Corrective Action:

action to eliminate the cause of a detected nonconformity of the QMS within the requirements of the DWQMS or other undesirable situation.

Critical Control Limit (CCL):

the point at which a critical control point response procedure is initiated.

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 to reduce it to an acceptable level.

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.

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 that adversely affects, or is likely to adversely affect, the health of the users of the system, that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or 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.

Drinking Water Quality Management Standard (DWQMS):

means the quality management standard approved by the Minister in accordance with section 21 of the SDWA.

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Drinking Water System:

means a system of works, excluding plumbing, that is established for the purposes of providing users of the system with drinking water and that includes,

- a) any thing used for the collection, production, treatment, storage, supply or distribution of water,
- b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and
- c) a well or intake that serves as the source or entry point of raw water supply for the system.

Emergency:

a potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers.

Emergency Response:

the effort to mitigate the impact of an emergency on consumers.

Emergency Response Plan (ERP):

Municipal Plan or documentation of emergency response procedures.

Gap Analysis:

the process of determining and evaluating the variance between the requirements of the DWQMS, and the methods and documents in place in your drinking water system.

Hazard:

a source of danger or a property that may cause drinking water to be unsafe for human consumption; hazard may be biological, chemical, physical or radiological in nature.

Hazardous Events:

an incident or situation that can lead to the presence of a hazard.

Implementation Action Plan:

the product of a gap analysis which identifies the tasks required for implementing a QMS. The implementation action plan should include tasks, target dates, and people assigned to task duties.

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 and software, and supporting services, such as transportation or communication.

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Monitoring:

includes any checks or systems that are available to detect hazards or the potential for hazards.

Municipal Drinking Water System:

means a drinking water system or part of a drinking water system,

- a) that is owned by a municipality or by a municipal service board established under section 195 of the *Municipal Act, 2001*,
- b) that is owned by a corporation established under section 203 of the *Municipal Act, 2001*, from which a municipality obtains or will obtain water under the terms of a contract between the municipality and the owner of the system, or
- c) that is in a prescribed class.

Municipal Residential Drinking Water System:

means a large municipal residential system or a small municipal residential system as defined in O. Reg. 170/03.

Non-Compliance:

a failure under the *Safe Drinking Water Act, 2002*, the *Ontario Water Resources Act*, or any regulations or instruments under these Acts which are associated with drinking water.

Non-Conformance:

the non-fulfillment of a DWQMS requirement.

Operating Authority:

means, in respect of a subject system, the person or entity that is given responsibility by the owner for the operation, management, maintenance or alteration of the subject system.

Operational Plan:

means, in respect of a subject system, the operational plan required by the Director’s Direction.

Owner:

includes, in respect of a drinking water system, every person who is a legal or beneficial owner of all or part of the system.

Preventative Action:

action to prevent the occurrence of nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation.

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Public:

subject system consumers and stakeholders.

Quality Management System (QMS):

a system to:

- a) establish policy and objectives, and to achieve those objectives, and
- b) direct and control an organization with regard to quality.

Record:

a document stating results achieved or providing proof of activities performed.

Resources:

tangible inputs that are required to deliver safe drinking water.

Responsibility:

a charge, trust, or duty for which one is responsible.

Retrievable:

For documents, “retrievable” means the documents must be readily available for personnel to refer to, especially in emergency situations, or in areas where operational procedures would need to be promptly referenced. For example, sampling procedures should be available for reference where sampling activities are performed. For records, “retrievable” is a slightly more flexible term. Usually, a record is considered to be retrievable if it can be produced on request by the end of the business day. This definition stems from audits and inspections – if a record can be provided by the end of the audit, it is usually considered to be retrievable.

Risk:

the probability of identified hazards causing harm, including the magnitude of that harm or its consequences.

Risk Assessment:

an orderly methodology of identifying hazards or hazardous events that may affect the safety of drinking water and evaluating their significance.

Risk Priority Number (RPN):

in the risk assessment hazards or hazardous event are assigned a numeric value ranging from 1 to 5 in three different categories: likelihood, severity or consequence, and detectability then added to determine the overall risk value or Risk Priority Number (RPN).

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SCADA:

the abbreviation for Supervisory Control And Data Acquisition. It generally refers to an industrial control system: a computer system monitoring and controlling a process.

Standard Operating Procedures (SOP):

standardized operating procedures compiled in an Operations Manual.

Supplier:

an organization or person that provides a product or service that affects drinking water quality.

SDWA:

means *Safe Drinking Water Act, 2002, S.O. 2002, c. 32*, as amended.

Top Management:

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

Water Treatment Plant (WTP):

Operating Authority’s treatment system location.

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1. Quality Management System

The Drinking Water Quality Management Standard (DWQMS) requires an Operating Authority to establish a Quality Management System (QMS) for each system that it operates.

A QMS is a system to establish policies and objectives, achieve those objectives, and assist in the direction and control of the organization with regard to quality.

An Operational Plan is a document or series of documents that outlines the policies, processes and procedures for the overall quality management of the drinking water system, and is the documentation of the QMS.

The QMS is documented in this Operational Plan as part of the effort to ensure clean, safe, and reliable drinking water is supplied to all customers served.

The QMS shall be reviewed each calendar year to ensure that the procedures are correct and current. The review will include the QMS Representative, Owner, Operating Authority and Operators of the system.

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4. QMS Representative

The QMS Representative and the Alternate QMS Representative, in conjunction with the Project Manager / Overall Responsible Operator, will establish, implement, and maintain the policies, processes, and procedures required for the QMS. In addition the QMS Representative will report on the performance of the QMS and any need for improvement to Top Management.

The responsibilities of the QMS Representative are listed in the Responsibilities Table in Appendix E, as part of Element 9, Organizational Structure, Roles, Responsibilities, and Authorities.

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Rev. 3	July 10, 2018	Added Alternate QMS Rep.	C Good – QMS Rep.	John Graham – PM
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5. Document and Records Control

A process is in place for the control and management of the documents and records required by the Quality Management System (QMS).

This process is to ensure that documents are kept up to date with applicable legislation and regulations, and changes in operations. The process also ensures that documents and records are legible, are properly stored, and can be easily located and identified. Retention times and disposal methods are listed in the Document and Records Control Table.

The procedure for Document and Records control can be found in Appendix A.

Appendix A

APPENDIX A1: Procedure for Document and Records Control

APPENDIX A2: Document and Records Control Table

APPENDIX A3: Document Approval – Change Form

File: C:\DWQMS\4 – QMS Representative Policy

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6. Drinking Water System

System Descriptions

Please see the appropriate section tab at the back of this document for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

The Systems included are:

Benmiller Drinking Water System

Century Heights Subdivision Drinking Water System

Courtney Subdivision Distribution System

Dungannon Drinking Water System

Huron Sands Drinking Water System

South Lucknow Distribution System

File: C:\DWQMS\ACW\ - 6 – Drinking Water System

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7. Risk Assessment

A Risk Assessment Procedure has been established and implemented to determine the potential hazards and critical control points that exist in the water treatment system.

A Risk Assessment Table has been developed to list potential hazards and their effects, and the associated monitoring and control measures. Critical Control Points (CCP) and Critical Control Limits (CCL) are identified using a Risk Priority Number system described in the risk assessment procedure.

For emergency situations or hazardous events outside the regular monitoring and control process, a Contingency Plan is available for response to deviations from critical control limits.

An Operations Plan binder and Contingency Plan are readily available for employee's reference at the Water Treatment Plant Main Office.

Procedures are implemented for reporting and recording deviations from critical control limits.

An annual Management Review, as described in Element 20, takes place to ensure the system is current and the risk assessment procedure and outcomes are reviewed and maintained.

A full updated Risk Assessment is to be conducted every 36 months in addition to the annual reviews.

Appendix B

APPENDIX B 1: Risk Assessment Procedure

APPENDIX B 2: Risk Assessment Table

File: C:\DWQMS\ACW\ - 7 - Risk Assessment

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8. Risk Assessment Outcomes

System Descriptions

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The Systems included are:

Benmiller Drinking Water System

Century Heights Subdivision Drinking Water System

Courtney Subdivision Distribution System

Dungannon Drinking Water System

Huron Sands Drinking Water System

South Lucknow Distribution System

File: C:\DWQMS\ACW\ - 8 – Risk Assessment Outcomes

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9. Organizational Structure, Roles, Responsibilities, and Authorities

The system Owner, and the Operating Authority, Veolia Water Canada, have an organizational structure in place to ensure the management of the drinking water system by qualified staff.

Job descriptions are created for each Operating Authority and Owner position, and are outlined in the Responsibilities Table, showing title, responsibilities and authorities. Organizational Charts show the relationship of roles in the structure. These can be found in Appendix E.

An annual Management Review, as described in Element 20, takes place to ensure the system is current.

Appendix E

APPENDIX E 1: Organizational Chart - Veolia

APPENDIX E 2: Responsibilities Table - Veolia

APPENDIX E 3: Job Descriptions - Veolia

APPENDIX E 4: Organizational Chart – Township of Ashfield-Colborne-Wawanosh

APPENDIX E 5: Responsibilities Table - Township of Ashfield-Colborne-Wawanosh

File: C:\DWQMS\ACW – 9 – Organizational Structure, Roles, Responsibilities, and Authorities

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 28, 2011	E4,E5 to ACW	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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10. Competencies

All personnel performing duties directly affecting drinking water quality must have adequate training and be competent in their position. This relates to legislative as well as DWQMS requirements.

Legislative Requirements:

- All Water Treatment Plant operators shall, at a minimum, attain and maintain a Class I certification as per O. Reg. 128/04.
- The Water Treatment Plant Overall Responsible Operator (ORO) shall maintain, at a minimum, a Class III certification (with exceptions for relief periods as specified in the legislation).
- All Water Treatment Plant distribution employees shall, at a minimum, maintain a Class I certification as per O. Reg. 128/04 and in accordance with the classification of the works.
- The Water Treatment Plant distribution Overall Responsible Operator (ORO) shall maintain, at a minimum, a Class III certification.

Additionally, annual training is provided to ensure that personnel meet or exceed minimum standards for annual training hours and continuing education hours as established in O. Reg. 128/04.

Veolia is required to provide competent operators to maintain effective water treatment. It is required as part of the operator’s responsibility to monitor and ensure he / she receives adequate annual training hours to maintain his / her operator certification for the operation of the Water Treatment Plant.

An annual review of training records and certifications is made by the **Administrative Assistant** (or Project Manager) to ensure classifications are current and competency is maintained. Operators are advised by the **CO** of upcoming requirements.

The Project Manager may also recommend training courses and approve training registration requests as appropriate. The **Administrative Assistant** assists in course arrangements and maintains and monitors the employee training matrix.

File: C:\DWQMS\ACW – 10 – Competencies

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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File: C:\DWQMS\ACW – 10 – Competencies

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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Effectiveness of outside training is evaluated by the Project Manager, after completion, by discussions with the employee. Certifications from the training, when provided, are filed with the employee training records, and added to the Training Matrix.

In-House Training Requirements

In-house training such as new employee orientation, internal systems (SCADA etc.), refresher training is provided by the Project Manager / Overall Responsible Operator or designate.

Training session records are to be noted by the employee, signed by the trainer and trainee, and forwarded to the **Administrative Assistant** for filing and entering in the Training Matrix.

QMS Awareness Training Requirements

All personnel must be aware of the Quality Management System and their requirements under the QMS, especially those pertaining to their specific roles.

The QMS Operational Plan, and any changes to procedures affecting personnel, will be reviewed with employees by the Project Manager and / or QMS Representative at least prior to the accreditation audit, and as appropriate throughout the development of the Operational Plan (Document and Records Control, Risk Assessment, for example) and when changes may be made to the Operational Plan.

Appendix F

APPENDIX F 1: Competency Requirements Table

APPENDIX F 2 : Training Matrix

File: C:\DWQMS\ACW – 10 – Competencies

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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11. Personnel Coverage

The Water Treatment Plant (WTP) is staffed from Monday to Friday from 8:00 a.m. until 4:30 p.m. and attended on weekends for normal daily rounds.

The Water Treatment Plant Project Manager is the primary Overall Responsible Operator (ORO). Back-up OROs are identified in the shift log, as required.

There is an assigned on-call water treatment plant operator during off-hours as described in the After Hours Dispatch Procedure for WTP personnel coverage. The on-call operator conducts a physical verification of conditions at the plant **once per day** during weekends and statutory holidays.

The normal on-call schedule for water treatment plant operators shall be from quitting time on Tuesday to start time the following Tuesday. The Water Treatment Plant Project Manager establishes and maintains the on-call schedule.

The Water Treatment Systems are monitored by a SCADA system, PLC control or alarm system as appropriate. An auto-dialer has been programmed to contact the Project Manager / Overall Responsible Operator, or personnel designated by the Project Manager, whenever conditions warrant.

The on-call operator is the designated operator in charge and will respond to, and investigate all alarms within 45 minutes.

An Overall Responsible Operator, or designated back-up ORO, is available by cell phone when not physically at the system.

There are regular daily checks of the distribution system conducted by water distribution personnel. The time of the visit and the details of any related action taken are recorded in the on-site daily log. Procedures are located in the WTP Operations Manual.

Veolia Water Canada is a non-unionized operation and labour disputes are unlikely, although management personnel are trained in operations if back-up operators are required.

Appendix G

APPENDIX G1: After Hours Dispatch Procedure and Response to Auto-Dialer Alarm Procedure

File: C:\DWQMS\ACW - 11 – Personnel Coverage

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Modify for SCADA	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev 2	Nov. 30, 2011	Add labour dispute coverage	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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12. Communications

The Project Manager / ORO shall ensure that the Owner is provided with a current copy of the Operational Plan. The owner shall also be advised of any changes to the Quality Management System, following revisions, and a status update shall be communicated following Management Reviews. This communication may take place during the regular annual report to Council by the Project Manager, or separate meetings arranged as necessary.

In addition to the Operational Plan, potential changes, and Management Reviews, other relevant information could include audit reviews, risk assessment changes, and provision for infrastructure information. The procedure for this information to be communicated to the Owner will be by the Project Manager to the Owner through the Owner’s liaison, at Council Meetings, or Committee Meetings, as applicable.

Operating Authority Personnel will be informed of the QMS and any changes or updates through staff meetings with the Project Manager and/or QMS Representative following the original implementation, and thereafter following the Management Review, or as changes occur. The QMS Policy and Operational Plan are to be posted in the **Operations Room** for access by all employees.

Essential Suppliers shall receive information regarding the QMS from the Operating Authority as required for purchasing as described in Element 13.

Consumers or the General Public will have access to the QMS policy at the Operating Authority’s Water Treatment Plant (WTP) site, as well as at the Municipal Office.

The Owner shall make the Operational Plan available for viewing by the public at the principal office of the Owner **and at one other publicly accessible location in the geographical area served by the subject system.**

Information about the QMS may be added to the Municipal website, as decided by the Owner.

File: C:\DWQMS\ACW – 13 – Essential Supplies and Services

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30. 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Remove annual letter	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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13. Essential Supplies and Services

Essential supplies and services are purchased by the Operating Authority on behalf of the Owner under the direction of the Project Manager.

All essential Chemical, Material, Equipment, and Part Suppliers, and Service Providers must meet the Quality and Performance standards suitable for the production and delivery of safe drinking water to the customer.

Essential suppliers of chemicals and materials must meet NSF / ANSI (National Sanitary Foundation / American National Standards Institute) and / or AWWA (American Water Works Association) standards. Current versions of these standards are to be reviewed, as required, on the appropriate internet website by Operations or Purchasing personnel.

Ontario legislation requires that Laboratories performing drinking water testing must be accredited for the parameters being tested, and Operating Authorities must use accredited labs as required for testing.

Documentation on quality, and other supplier requirements, is provided to all essential suppliers and service providers to advise of the implementation of a Quality Management System, and as required if conditions change, by letter or information outlined on a Purchase Order regarding requirements.

The Project Manager / ORO reviews the requirements annually, or as may be required for changes, and suppliers are informed (as required and noted above), by the Project Manager, **Administrative Assistant, or designate.**

Meetings may be held with contractors and service providers prior to work being carried out on water treatment equipment. They are accompanied by a Water Treatment Operator to ensure water plant and distribution system requirements are understood and met prior to performing their task. **Contractors and service providers are required to sign a document confirming the meeting with the Project Manager or Operator, and their understanding of the requirements.**

Appendix H lists the Essential Suppliers and Services, Procurement information, and Quality expectations.

Appendix H

APPENDIX H: Essential Supplies and Services Table

File: C:\DWQMS\ACW - 13 - Essential Supplies and Services

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott - QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Remove annual letter	DC Scott - QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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14. Review and Provision of Infrastructure

On an annual basis, a summary of the Water Treatment System is prepared by the Operating Authority’s Project Manager / Overall Responsible Operator and is submitted to the Owner. Included in the Summary Report is a review and updates on the Operating Authority’s infrastructure and related programs.

The procedure will be for the Project Manager / Overall Responsible Operator to compile information received from the Maintenance Manager and Operators throughout the year based on work orders and observations relating to the infrastructure of the water treatment system. This information will be summarized in an Infrastructure section of the annual summary report and presented to the Owner on an annual basis.

During the annual Management Review, participants will discuss all infrastructure topics related to the Drinking Water System. The following topics shall be reviewed:

- A. Drinking Water Quality Trends.
- B. Annual Summary Report.
- C. Watermain replacement and rehabilitation.
- D. Planned maintenance on roads and sewers that will directly affect the Drinking Water Distribution System.
- E. Any issues with annual hydrant flushing, valve operation and/or hydrant maintenance.
- F. Planned maintenance and/or structural updates on the Drinking Water System (treatment or distribution).
- G. Capital budget.
- H. Preventative maintenance program.
- I. Long-term forecast of major infrastructure maintenance, rehabilitation and renewal activities.
- J. Outcome of the 36 month Risk Assessment.
- K. Town’s Asset Management Plan

File: C:\DWQMS\ACW – 14- Review and Provision of Infrastructure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Add Management Rev Requirements	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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15. Infrastructure Maintenance, Rehabilitation and Renewal

The Operating Authority maintains a documented summary of the Operating Authority's infrastructure maintenance, rehabilitation, and renewal programs for the water treatment and distribution system. This assists in ensuring the infrastructure required is in place and is adequately maintained, or plans for improvement are in place for continued safe drinking water to be provided to the customer.

The summary is kept current, and is communicated to the Owner at least annually, or as deemed required by the Operating Authority's Project Manager / Overall Responsible Operator, in the Management Review as well as presentations to the local council, and committee, if applicable or required.

Monitoring of the effectiveness of the maintenance, rehabilitation, and renewal programs is a requirement of the DWQMS, and is carried out by monitoring the maintenance work order system and assessing the amount of planned versus unplanned maintenance activity.

The Maintenance Request system can be initiated by any employee by filling in a Maintenance Request Form. This request is then forwarded to be assessed by the Maintenance Manager or Project Manager / ORO. Maintenance Requests are filed and reviewed as required to assess or confirm trends and issues are reported in the annual summary.

A "Jobs Plus" Maintenance system also generates work orders for routine equipment servicing and preventive maintenance for designated equipment in the water treatment and distribution system.

A summary of key infrastructure material and equipment from Jobs Plus is generated by the Maintenance Manager or Project Manager / ORO and also added to the annual infrastructure summary.

File: C:\DWQMS\ACW – 15 - Infrastructure Maintenance, Rehabilitation and Renewal

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Clarify summary	DC Scott –QMS Rep.	John Graham- Veolia Project Manager
Rev. 2	May 30, 2018	Add Management Rev Requirements	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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16. Sampling, Testing, and Monitoring

The Operating Authority maintains a sampling, testing, and monitoring process as required by the Ontario Regulation 170/03, including under conditions challenging to the system, as shown in the Table in Appendix I 1.

Specific sampling and monitoring procedures are established for operating the water treatment facility, and are listed in the Operations Manual. Laboratory analysis is carried out in-house as well as from an accredited outside lab. In house test procedures are kept in a binder in the test lab.

Test results are reported to the Operating Authority by the Accredited Lab and Operator Test results are recorded in the logbook in the Water Treatment Plant **lab** by the Operator.

All sampling and test records from the SCADA system, laboratories, and Operators are recorded, properly filed and maintained according to procedures as outlined in the Document and Records Control Procedures, and the Water Treatment Plant Operations Manual.

The procedure is for test results to be provided to the Owner on a monthly basis by the **Quality Assurance and Compliance Specialist** who compiles the data and forwards the results to the Owner, The accredited Lab also forwards test results to the owner **on a monthly basis**, unless otherwise requested by the Owner to forward the results to the Operating Authority only.

A summary of the sampling and monitoring requirements of the various WTP process steps, including frequency, location, quality targets, challenging conditions, and records is shown in Appendix I - Sampling, Testing and Monitoring Table.

Appendix I

APPENDIX I1: Sampling, Testing and Monitoring Summary Table

File: C:\DWQMS\ACW – 16 – Sampling, Testing and Monitoring

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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17. Measuring and Recording Equipment Calibration and Maintenance

The Operating Authority maintains a calibration and maintenance process, as required for the measurement and recording equipment used in the water treatment system. Procedures are established for calibration and maintenance of this equipment, and are listed in the Operations Manual.

Specific equipment procedures are available in the Equipment Manufacturer’s Manuals and Users Manuals are available for Operators as required.

Certified sub-contractor’s are used as required for maintenance and calibration of flow meters, and records maintained.

All calibration and maintenance records are properly filed and maintained according to procedures as outlined in the Document and Records Control Procedures, and the Water Treatment Plant Operations Manual.

A summary of the calibration and maintenance requirements, for the WTP measurement and recording instruments, including method, frequency, and records is shown in Appendix J - Measurement and Recording Equipment Calibration Table. The Table is maintained by the Quality Assurance and Compliance Specialist as revisions are required.

Appendix J

APPENDIX J1: Measurement and Recording Equipment Calibration Table

File: C:\DWQMS\ACW – 17 – Measuring and Recording Equipment Calibration and Maintenance

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 30, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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18. Emergency Management

An emergency, with regard to drinking water, is a potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers. Some emergency situations that could occur include chemical, biological, or radiological contamination, major distribution line or watermain breaks, interruptions in pressure, or loss of power. The Risk Assessment Outcomes and Risk Assessment Table in Section 8 reference potential emergency situations. Procedures or Contingency Plans related to potential emergency situations can be found in the Operations Manual or Contingency Plan.

A Contingency Plan (Emergency Response Plan) for the Operating Authority is available at the Water Treatment Plant listing potential emergencies and the appropriate measures for response, contacts, and how to restore the system to normal operation. WTP Operators and staff are kept up to date with annual reviews of the Operations Manual and Contingency Plan, or as required if changes occur.

It is the responsibility of the Project Manager to ensure that employees are aware of the Contingency Plan and are trained in their responsibilities with regard to emergency preparedness.

A list of emergency contacts and essential suppliers and services is kept with the Contingency Plan.

In addition to the above, the Owner has an Emergency Response Plan, in accordance with current legislation and regulations, at the municipal office that provides information and contact information in the case of a water related emergency situation. Owner Responsibilities are listed as required, in the Emergency Response Plan.

Emergency Response Testing can be accomplished by review of one or more Contingency Plan procedures, review of actual emergencies, or by participation in the Municipality's annual emergency exercise. This should be carried out by the Project Manager, or designate, on a regular basis (minimum annually) and followed up in the form of a documented meeting with Operators and employees to ensure awareness of the procedures, and allow discussion and input on situations that could arise as an emergency situation.

Appendix K

APPENDIX K1: Emergency Procedures

File: C:\DWQMS\ACW - 18 - Emergency Management

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Clarify ER Testing	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	June 20, 2013	Correct typo ref to H-K	DC Scott -QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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19. Internal Audits

An Internal Audit procedure has been established by the Operating Authority to comply with the DWQMS standard. The intent of the procedure is to evaluate conformity of the QMS with the requirements of the Standard.

The Procedure, found in Appendix L1, identifies the internal audit criteria, the frequency recommended for the audit schedule, the scope, method and requirement for documentation of the audits.

The procedure also describes how Corrective Action Reports (CARs) are initiated and addressed to provide irreversible corrective actions to deficiencies found in the audits.

Previous internal and external audit results should be reviewed for consideration when planning the internal audit.

An Internal Audit Checklist is also included as Appendix L2 to assist with the audit.

A Checklist will be prepared by the internal auditor(s), based on the review of applicable documentation for the element(s) to be audited. The documentation review could include the Operational Plan – Policy Procedures, and Tables, Operations Manuals/Contingency Plan, Process Maps, Work Instructions, and previous internal and external audit reports.

Internal Audits are required to be completed at least annually.

Appendix L

APPENDIX L1: Internal Audit Procedure and Schedule

APPENDIX L2: Internal Audit Checklist

File: C:\DWQMS\ACW – 19 – Internal Audits

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Add review of prev. audits	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 2	June 14, 2013	Update checklist info	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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20. Management Review

A Management Review procedure has been established by the Operating Authority to comply with the DWQMS standard. The intent of the procedure is to provide a structured mechanism for Top Management to perform an annual review of prescribed topics covering compliance, consumer, performance, and audit information based on the Quality Management System.

Top Management for the Operating Authority is defined, in Element 9 Organizational Structure, Roles, Responsibilities and Authorities, and Appendix E2, as the Area Manager and Project Manager. A Municipality representative is also included in the Management Review.

The Procedure, found in Appendix M1, identifies the Management Review process and specific topics to be assessed.

Management Reviews are required to be completed at least annually.

A report of the results of the Management Review are reported to the Owner by the Project Manager on an annual basis.

Appendix M

APPENDIX M1: Management Review Procedure

File: C:\DWQMS\ACW - 20 - Management Review

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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21. Continual Improvement

The Operating Authority shall strive to continually improve the effectiveness of its Quality Management System through the use of corrective actions.

The review of the Operations Plan by a third party represents the first step in improving the effectiveness of the QMS. On-going annual Management Reviews and resulting corrective actions will be the basis for further improvement.

Corrective Actions are added to the Corrective Actions Report Log – Appendix N2, when identified. Sources of Corrective Actions include:

- a) internal audits
- b) external audits
- c) AWQIs
- d) MECP inspection reports

The QMS Rep is responsible for ensuring corrective actions are identified, implemented and their effectiveness monitored in the Corrective Actions Report Log.

Preventative Actions are added to the Preventative Actions Log – Appendix N3, when identified. Sources of Preventative Actions may include:

- a) Opportunities for Improvement
- b) Staff suggestions
- c) risk assessment outcomes
- d) emergency response training outcomes
- e) management reviews

The QMS Rep is responsible for ensuring preventative actions identified are implemented and their effectiveness monitored in the Preventative Action Log.

File: C:\DWQMS\ACW - 21 – Continual Improvement

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	April 25, 2017	Added App N1&N2 & assoc. verbiage	C. Black – QMS Rep.	John Graham – Veolia PM
Rev. 2	May 30, 2018	Updated to 2.0 standard	C Good – QMS Rep.	John Graham – Veolia PM
Rev. 2	July 15, 2019	MOECC to MECP	N.Mayhew -QMS Rep	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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Best Management Practices (BMPs) are added to the Best Management Practices Log – Appendix N4, when identified. Sources of BMPs include:

- a) BMPs published by the MECP
- b) consumer complaints
- c) training sessions
- d) staff feedback
- e) publications by professional organizations

The QMS Rep is responsible for ensuring BMPs identified are implemented and their effectiveness monitored in the **Best Management Practices Log**.

An annual review of Appendix N2, N3 and N4 will be completed during the Management Review to ensure they are implemented and are effective in correcting and preventing the recurrence of the nonconformity. Additionally, the effectiveness of these items shall be measured at the time of the Management Review by reviewing the number of associated AWQIs, MECP inspection non-compliances, internal and external audit results, consumer complaints, etc.

Continual improvement of the DWQMS will be scheduled within the calendar year to concentrate on specific elements each month. Each element within the agenda is subject to change depending on schedule conflicts of the QMS Rep. and those who may be involved. A sample schedule is provided in the appendix shown below.

Appendix N

Appendix N1: DWQMS Annual Review Form

Appendix N2: Corrective Action Report (CAR) Log

Appendix N3: Preventative Action Report (PAR) Log

Appendix N4: Best Management Practices (BMP) Log

File: C:\DWQMS\ACW - 21 – Continual Improvement

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	April 25, 2017	Added App N1&N2 & assoc. verbiage	C. Black – QMS Rep.	John Graham – Veolia PM
Rev. 2	May 30, 2018	Updated to 2.0 standard	C Good – QMS Rep.	John Graham – Veolia PM
Rev. 2	July 15, 2019	MOECC to MECP	N.Mayhew -QMS Rep	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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APPENDIX A1: DOCUMENT and RECORDS CONTROL PROCEDURE

1.0 Keywords and Definitions

- 1.1 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.
- 1.2 Record – a document stating results achieved or providing proof of activities performed

2.0 Purpose

- 2.1 This procedure defines the process to ensure proper control of documents and control of records affecting the Quality Management System (QMS).
- 2.2 These documents and records are required to ensure effective operation and control of the Water Treatment System, and must be kept current and legible.
- 2.3 Methods for identification, storage, protection, retrieval, retention time, and disposition of documents and records are also included.
- 2.4 The procedure also provides a system for consistently creating, revising, approving, releasing, and a means to obsolete documents when required.

3.0 References

DWQMS Element 5
 Ontario Regulation 128/04
 Ontario Regulation 170/03
 SDWA 2002 Section 17, Clause (2)
 Municipal By-Laws as applicable
 Document and Records Control Table Appendix A 2

4.0 Control and Maintaining Documents and Records

- 4.1 Documents and Records are maintained as evidence that the requirements of applicable legislation and regulations and the DWQMS are in place and have been effectively met.

File: C:\DWQMS\ACW\ - APPENDIX A 1- Document and Records Control Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Updates to procedure and location	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 2	June 14, 2013	Updates for Veolia hub	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	May 31, 2018	Removed ref. to CO and other sites	C Good – QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	July 15, 2019	Removed ref. to plastic/MOECC to MECP	N.Mayhew – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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- 4.2 Records may be retained in hard copy (i.e. test reports, lab results, equipment and maintenance calibration, etc.) or in soft copy (i.e. SCADA, excel or other electronic files).
- 4.3 A listing of documents and records retained is shown in Appendix A2: Documents and Records Control Table.
- 4.4 All records required by the MECP Regulations to demonstrate compliance and/or conformance shall be maintained according to the regulations.
- 4.5 All documents and records required by the Quality Management System shall be kept legible, readily identifiable, retrievable, and stored to protect from damage.

5.0 Record Type and Processes

QMS records include external lab test results, **in house lab results**, completed Operator Log Books, completed checklists, raw water quality records, monitoring records, training records, meeting minutes, etc. as listed in the Control Table Appendix A2

5.1. Lab Custody Sheets

- 5.1.1. Lab Custody Sheets, Labels for sample bottles, and monthly log sheets are kept on all computers **for retrieval from the local network as blank forms.**
- 5.1.2. **Operators** print custody sheets and bottle labels for samples, prepare bottles for samples, including labeling and coding.
- 5.1.3. After sampling, sample bottles are put into properly labeled coolers with the original custody sheets, completed by the operator for shipment to the lab.
- 5.1.4. A copy of the custody sheet is returned to the **Quality Assurance and Compliance Specialist's** desk to be checked and filed in appropriate **Bacti binder.**
- 5.1.5. Lab results are received weekly by e-Mail, checked by the **Quality Assurance and Compliance Specialist** for any errors, and filed in the appropriate Bacti binder with the matching custody sheet. These are stored on shelves in the **Water Treatment Plant Record Log Depository (Main Lobby).**

5.2. Monthly Log Sheets & Lab Results

- 5.2.1. Completed Monthly log sheets are labeled and kept in the front of the Bacti binders.
- 5.2.2. Log sheet and Lab results are input into electronic form (HACH WIMS). Backup is carried out through the **Veolia North America on-line system.**

File: C:\DWQMS\ACW\ - APPENDIX A 1- Document and Records Control Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Updates to procedure and location	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 2	June 14, 2013	Updates for Veolia hub	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	May 31, 2018	Removed ref. to CO and other sites	C Good – QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	July 15, 2019	Removed ref. to plastic/MOECC to MECP	N.Mayhew – QMS Rep.	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



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5.3. Daily Reports

- 5.3.1 Endress Hauser data logger records data and is downloaded to a Compact Flash drive on a **weekly basis**.
- 5.3.2 The Compact Flash drive is returned to the office and downloaded onto a separate computer. Daily records are printed out and filed in Binders **stored at the WTP Main Lobby**.

5.4. Monthly Reports

- 5.4.1. Every month end, data entry is checked and reports are sent to the MECP and Municipalities.

5.5. Annual Summaries

- 5.5.1. Annual Summaries are compiled from data entry and information from log books etc.
 - 5.5.2. All Annual Summaries are compiled in electronic form for distribution to the Owner of System and MECP.
 - 5.5.3. Annual Summary - Hard copy is filed in front of the Bacti binder with the Compliance Letter with a confirmation of being sent and received.
 - 5.5.4. After annual summaries are completed, all backup information is stored in **plastic bins** with labels detailing contents and date, in the **Goderich WTP Storage Room**.
 - 5.5.5. A sign-out sheet is kept in the **Quality Assurance and Compliance Specialist's** office to record when information is taken away and returned.
- 5.6. Training Records are maintained by **the Administrative Assistant** in a matrix format and stored in hard and soft copy.
 - 5.7. Meeting minutes are filed in **labeled folders in the Main Office file cabinet**
 - 5.8. Operator Logbooks, log sheets and forms, as required for the site, are filled out by the Operator, **and are stored at the WTP (or Well House) until year end, and then transferred storage bins in the Goderich WTP Storage Room.**
 - 5.9. Distribution Logbooks are filled in by Operators when work is done in Distribution, **stored at the WTP (or Well House), or with the Operator until year end, and then transferred to storage bins in the Goderich WTP Storage Room.**

File: C:\DWQMS\ACW\ - APPENDIX A 1- Document and Records Control Procedure

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- 5.10. Request, Inquiry, Complaints, and Locates blank forms are filled out by office staff when calls come in, and forwarded to the Operator. After work is completed, and comments noted, the form is returned to the main office and filed in the binder or folder as required. At year end the binder or folder is then transferred to **storage bins in the Storage Room.**
- 5.11. Flushing Record / Valve Opening Record Binders – Forms are filled out by Operators as the work is done. When complete, forms are stored in the appropriate binder in **the Main Lobby, and at year end transferred to plastic storage bins in the Goderich WTP Storage Room.**
- 5.12. Calibration Certificates and Calibration Book – Certificates are supplied by the contractor that performs the calibration, and are stored in the filing cabinet in the **main office**, and electronically in **shared files**, and at the WTP or Well House as required. The Calibration Book is filled out by Operators on a monthly basis, and **stored in the Lab.**
- 5.13. PCMP (Process Control Monitoring Program) – results (as required for some sites), are uploaded from HACH WIMS and stored on the **Quality Assurance and Compliance Specialist's** computer.
- 5.14. Inspection Reports are received from MECP Inspector, and stored in the Main Office filing cabinet and **electronically in shared files.**
- 5.15. Chemical Bills of Lading are supplied by the shipper when supplies are received, and filed by the Owner or Operating Authority as required. At year end they are transferred to appropriate storage bins in the Storage Room.
- 5.16. Employee Personnel Records – Personnel and Training Records are updated when necessary, and are stored **in separate locked cabinets at the WTP.**
- 5.17. Maintenance Records are filed as hard copy as required, **by the Maintenance Manager**, and using the Jobs Plus Maintenance Program Software as installed.
- 5.18. Audit Results from DWQMS auditors will be filed in separate file cabinets **at the WTP.**
- 5.19. Documents and Records relating to the DWQMS that are **maintained by the Owner or Municipality**, as duplicates of the Operating Authority records, or specific to the Municipality, are listed in the Documents and Records Control Table as a separate section showing the relevant information on location, storage and retention time, etc.
- 5.20. Current Records shall be kept separate from those stored for archive or retention purpose.
- 5.21. Documents and Records shall be shredded as per the disposal method when required.

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6.0 Retention Time

6.1 Minimum retention times for all Ministry of the Environment and Climate Change required documents and records shall be maintained as per relevant regulations. Current document and record retention times are shown in Appendix A2: Documents and Records Control Table.

7.0 Internal Documents

- 7.1 Internal documents include the QMS Manual / Operational Plan, Policies and Procedures, Operations Manual, Contingency Plan, Work Instructions (SOP), and Blank Forms and Checklists.
- 7.2 QMS documents shall be identified by a standard header and footer containing required information such as Title, Water System Identification, Release and Revision information and Approver Name and Title.
- 7.3 Original QMS documents shall be filed electronically on the main computer system, password protected to restrict access, and also in hard copy in the WTP Record Log Depository (Main Lobby). The original hard copy shall display the original signature of approval.
- 7.4 Additional copies of the QMS Manual / Operational Plan, or sections thereof shall be controlled with locations identified, and shall be revised, and properly distributed, at the same time as any original document revisions.

8.0 External Documents

- 8.1 External documents include Legislation and Regulations, Drinking Water Quality Management Standard (DWQMS), Permits, Licences and Certificates, Contracts, Industry Standards, MSDS, and Equipment Manuals.
- 8.2 External documents are accessed from the website where possible to ensure the most recent version, and printed for temporary use as required. Licences and Certificates are stored in binders in the Main Office and electronically in shared files.

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9.0 Document Change System

- 9.1 A Document Approval / Change Form shall be used at any time changes to Documents are required.
- 9.2 The Form shall be initiated by the requestor, and submitted for approval to the Project Manager or Overall Responsible Operator. Approved changes will be updated in the QMS Manual / Operational Plan and filed by the Quality Assurance and Compliance Specialist, or QMS Rep, with approval documentation, in the Original Binder. The electronic version shall be updated as well as any additional copies of the QMS Manual / Operational Plan.
- 9.3 New or changed documents will be presented to all affected employees and other system personnel as required, and recorded on the Document Change Form.

10.0 Responsibilities

- 10.1 The Project Manager / Overall Responsible Operator, or designated alternate, creates, changes / edits, and submits QMS documents for review and approval.
- 10.2 The Project Manager / Overall Responsible Operator signs as Approver, and releases newly created or changed QMS documents. The PM / ORO, or delegated person, controls obsolete documents.
- 10.3 Operators complete and file records related to test results and inspections, and record unscheduled occurrences in the Operator Log Book.
- 10.4 The Maintenance Manager, or delegate, completes and files records related to preventive and unscheduled maintenance, through the maintenance management system.
- 10.5 The Quality Assurance and Compliance Specialist, Administrative Assistant, or QMS Rep files QMS records.

11.0 Reviewing / Approving QMS Documents

- 11.1 The Project Manager / Overall Responsible Operator may delegate document modifications to the Quality Assurance and Compliance Specialist or Administrative Assistant.

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- 11.2 The Project Manager / **Overall Responsible Operator**, in conjunction with the Owner, as required, makes changes or edits and approves newly created documents as required, and sends a copy electronically to the **Area Manager**.
- 11.3 Changes to the document are summarized on the revision block located within the body of the document (Change History).

12.0 Releasing of Documents

- 12.1 All internal QMS documents are electronically controlled, with only the **Overall Responsible Operator, Quality Assurance and Compliance Specialist** and QMS Rep having electronic access to modify them.
- 12.2 All printed versions of QMS documents are marked 'uncontrolled'.
- 12.3 Printed versions of QMS procedures and forms are available at the **Water Treatment Plant and with the Owner**.
- 12.4 All external QMS documents are filed **at the WTP**.
- 12.5 External documents of a legal nature, including C of A's, Licences, Drinking Water Works Permit (DWWP) and other permits, are controlled by the Owner, with **appropriate copies on file at the Water Treatment Plant**.
- 12.6 Printed legislation is uncontrolled. When referring to legislation, the Project Manager / ORO refers to the online legislation.

13.0 Obsolete Documents

- 13.1 Obsolete electronic documents and obsolete legislation is archived or not retained.
- 13.2 Printed QMS Manual / Operational Plan documents that are obsolete are promptly removed from use by the **Quality Assurance and Compliance Specialist** or QMS Rep and replaced by current printed versions.
- 13.3 The **Quality Assurance and Compliance Specialist** or QMS Rep writes or stamps 'obsolete' on hard copies of obsolete QMS Manual documents and **files at the WTP, as designated by the ORO**.
- 13.4 After approximately two years on file, the **Quality Assurance and Compliance Specialist** or QMS Rep may move obsolete documents to a designated storage area for archiving.
- 13.5 Currently, obsolete QMS Manual **documents are retained indefinitely**.....WHY?

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Uncontrolled Printed Copy



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14.0 Protecting Documents From Damage

- 14.1 Hard copies of documents are stored in file cabinets or in storage bins, or other suitable containers, in allocated file storage areas.
- 14.2 All electronic QMS documents reside on the shared files.
- 14.3 The Network Computer is backed up at the Water Treatment Plant on an external hard drive.
- 14.4 Backup is performed weekly and the backups maintained for a period of approximately two weeks using two external hard drives.

15.0 MSDS Documents (Material Safety Data Sheet)

- 15.1 MSDSs are controlled under the QMS due to their importance in Emergency Preparedness
- 15.2 MSDSs are forwarded to the Safety Representative or Quality Assurance and Compliance Specialist
- 15.3
- 15.4 Maintaining MSDS documents
The Safety Representative, Quality Assurance and Compliance Specialist, or designated alternate, files MSDSs in the Document Binder located in each well house, and copies relevant MSDSs to other workstations as required.
- 15.5 The Safety Representative or Quality Assurance and Compliance Specialist is responsible for ensuring the proper maintenance of MSDSs
- 15.6 Obsolete MSDSs are retained as required for best practice and due diligence.

16.0 Filing of Records

- 16.1 Hard copies of Operator's records, excluding log books, are submitted to the Quality Assurance and Compliance Specialist, or designated alternate, to input data into HACH WIMS, and then filed in the Bacti binder in the WTP Record Log Depository (Main Lobby).
- 16.2 Annually, the Quality Assurance and Compliance Specialist moves Operators records to the Storage Room Bins. Three years are intended to be maintained at the WTP,

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and then moved to Goderich Town Hall Storage area. Electronic records are stored in shared files.

- 16.3 Records of Government Compliance Reports / Inspection Reports are filed at the WTP, in the Main Office.
- 16.4 Records of Engineer's reports are filed with the Owner, with a copy also at the Water Treatment Plant (WTP) Main Office.
- 16.5 Training records are filed by the Administrative Assistant in the employee training files.
- 16.6 Relevant training certificates are posted in the WTP main office, and pump houses as required.
- 16.7 Work orders, which are records of maintenance, are filed electronically, and hard copy as required, in the maintenance system.
- 16.8 All other QMS records are filed in the Main office.
- 16.9 All paper copies are properly stored (clean, dry, organized)

17.0 Special Requirements For Log Books

- 17.1 Logs and other record-keeping mechanisms must be used according to requirements in O.Reg. 128/04 – Certification of Drinking-Water System Operators and Water Quality Analysts, including:
 - 17.1.1 Making chronological entries
 - 17.1.2 Ensuring entries are only made by authorized personnel
 - 17.1.3 Authorized personnel identifying themselves as the maker of the entry
 - 17.1.4 Recording information concerning dates, times, shifts, operator on duty, departures from procedures, special instructions, abnormal conditions, and equipment taken out of service
- 17.2 Filing of log books, in appropriate file cabinet at the WTP.

18.0 SCADA Records and Back-up

- 18.1 Endress Hauser data logger records data and is downloaded to a Compact Flash drive on a weekly basis.

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18.2 The Compact Flash drive is returned to the WTP office and downloaded onto a separate computer. Daily records are printed out and filed in Binders stored at the WTP Main Lobby.

19.0 Associated Forms / Checklists

19.1 Blank Forms and Checklists are maintained in electronic format on the Quality Assurance and Compliance Specialist's Computer desktop, and are available on other network computer desktops. Hard copies are printed as required.

19.2 Copies are also available in the Operations Manual in electronic and hard copy format.

19.3 Changes to the forms, if required are made per section 9.0 - Document Change System.

20.0 List of Forms (examples)

- 20.1 Document Change Request Form
- 20.2 Request, Inquiry, Complaints, and Locates
- 20.3 Custody Sheets
- 20.4 Log Sheets
- 20.5 Notice of Adverse Test Result - Adverse Water Quality Indicator
- 20.6 (AWQI) Form - O.Reg170/03 – 2A /2B
- 20.7 Operations Manual (Standard Operating Procedures)

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APPENDIX A2: DOCUMENT AND RECORDS CONTROL TABLE

RECORDS:

Records	Type of Record	Current File Location	Archive File Location	Authorized Editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
Bacti Book	Hard Copy	WTP Record Log Depository (Main Lobby)	Goderich WTP Storage Room, Bin as labeled and dated (after 3 yrs move to Municipality storage facility)	OIC Labs: -SGS Lakefield Research Ltd. -Maxim Analytics Inc (Alternate) Quality Assurance and Compliance Specialist (QACS) / PM / Overall Responsible Operator (ORO)	Quality Assurance and Compliance Specialist (QACS) / PM / Overall Responsible Operator (ORO)	15 years plus (as storage available)	Shred when Required	-Bacti – Microbiological Sample Testing Forms: -Request for Laboratory Services and Chain of Custody- (Custody Sheet) -Certificate of Analysis- (Lab Results) -MECP Change Notice of Adverse Test Results and Other Problems-AWQI-1 (Adverse Water Quality Indicator records) -Notice of Issue Resolution at Drinking Water Systems-AWQI-2 -Precautionary Boil Water Notice - Drinking-Water Systems Regulation O.Reg. 170/03 Annual Summary -Compliance Summary / Annual Report -log sheets as required for well houses (Goderich log sheets filed with Log Book)
HACH WIMS	Soft Copy (electronic file copy)	Internet	Back-up by Veolia	QACS	OIC / PM / ORO QACS	5 years Minimum	N/A	HACH WIMS (prev OPS 32)- An Operations Data Management Software system

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

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(previously .OPS 32)								
SCADA	Soft Copy (electronic file copy)	Endress Hauser Data Logger	Lunch Room Computer	Operator in Charge (OIC) QACS	OIC/ PM/ORO QACS	5 years Minimum	Overwritten at storage maximum	SCADA- Supervisory Control And Data Acquisition system
SCADA Daily Summary Binder	Hard Copy	Main Lobby	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	QACS	Operator In Charge (OIC) / Overall Responsible Operator (ORO/ QACS	15 years plus (as storage available)	Shred when Required	-Daily Trending reports for UV, Turbidity, Chlorine Residual, and Flow Data. -Printed weekly by QACS and filed in binders in Main Lobby.
Training Certificates (Drinking Water Operator's Certificates) ----- Record of Training -----	Hard Copy Hard copy Soft Copy	Main Office File Cabinet with Personnel Records Personnel File	Posted and Copy Maintained on file in Personnel Records file Personnel file Backup on	OWWCO Issuer of Certificate QACS	OWWCO Issuer of Certificate QACS / PM	3 years min 15 years plus 3 years min	Shred when Required Shred overwrite	- sent with employee when leaving the Company -Copy maintained by Company for record -Posted at Plant -OWWCO - Ontario Water Wastewater Certification Office (previously - OETC -Ontario Education Training Consortium) -in addition to Operator's Certificate -Printed copies supplied to Operators for tracking

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Training Matrix		Network shared Drives	External hard drive					
Meeting Minutes	Hard Copy	Main Office File Cabinet	Main Office File Cabinet	Quality Assurance and Compliance Specialist / PM / Overall Responsible Operator (ORO)	PM / Overall Responsible Operator (ORO)	QMS records 5 years min. Others As Required	Shred when Required	Examples: -Environmental Committee -Town meetings - QMS -Staff Meetings (QMS etc) -Safety Meetings (filed by H&S Rep)
Operator Logbook(s)	Hard Copy	Record Log Depository (Main Lobby)	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Operator In Charge (OIC)	Quality Assurance and Compliance Specialist (QACS) / PM / Overall Responsible Operator (ORO)	15 years plus (as storage available)	Shred when Required	Goderich Logbook(s) -Includes WTP : -Lab Results -On-line Analyzer readings -Booster Station readings -Daily Operating Log -one logbook per month filed in binders for Goderich - annual logbooks for well houses with log sheets filed in Bacti book WTP – Water Treatment Plant
Distribution Log	Hard Copy	Maintained by Distribution Operator at Booster Station	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Operator In Charge (OIC)	Operator In Charge (OIC)	15 years plus (as storage available)	Shred when Required	Maintained by Distribution Operator (OIC) for compiling – filed after year end

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Request, Inquiry, Complaints, & Locates	Hard Copy	Main Lobby	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Operator In Charge (OIC)	Operator In Charge (OIC) / PM / Overall Responsible Operator (ORO)	15 years plus (as storage available)	Shred when Required	Form used – ‘ Request, Inquiry, Complaints and Locates ‘ Form -Complaints, same form, filed separately by QACS in Main Office for Goderich
Flushing Records	Hard Copy	WTP Record Log Depository (Main Lobby)	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Operator In Charge (OIC)	OIC / PM / ORO QACS	2 years	Shred when Required	-hydrant flushing --water valve checks to be included in binder
Calibration Certificates	Hard Copy plus electronic copy on shared files	Main Office File Cabinet	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Issuer of Certificate	Operator In Charge (OIC) / PM Overall Responsible Operator (ORO)	15 years plus (as storage available)	Shred when Required	- Certificates by outside contractor for Raw water and finished water flow meters

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Calibration Book	Hard Copy	WTP Lab	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Operator In Charge (OIC)	Quality Assurance and Compliance Specialist (QACS) / PM Overall Responsible Operator (ORO)	15 years plus (as storage available)	Shred when Required	-pH meter Calibration Reports -Pocket Colorimeter Calibration Reports -Spectrophotometer Calibration Reports Calibration Reports -On-Line Turbidity Calibration Reports -Hand Held Turbidity Calibration Reports Note: On-line analyzer checked daily against hand held and reported in log book
PCMP	Soft Copy (electronic file copy)	Internet (Veolia)	Backup by Veolia	Quality Assurance and Compliance Specialist (QACS)	Quality Assurance and Compliance Specialist (QACS)	5 years Minimum	Overwritten at storage maximum	- Process Control Monitoring Program (PCMP) lists Critical Control Points (CCP) -Compiled on HACH WIMS (Previously Ops 32) Program
Inspection Reports	Hard Copy	Main Office File Cabinet plus electronic copies	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Issuer of Report - MECP Inspector	MEC /District Manager	15 years plus (as storage available)	Shred when Required	Stored in filing cabinet in Main Office. Original copy sent to the Owner by MECP.

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Updates and office location change	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
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Rev. 3	May 31, 2018	Removed Reference to CO and other sites	C Good – QMS Rep.	John Graham - Veolia Project Manager
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Chemical Bills of Lading	Hard Copy	WTP Record Log Depository (WTP accounting files)	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Chemical Suppliers	Administrative Assistant	15 years plus (as storage available)	Shred when Required	Chemical Supplier examples: -Chlorine -Coagulant -Activated Carbon -Fluoride (per NSF Certificates and PO requirements)
Employee Personnel Records	Hard Copy	WTP Office File Cabinet with Personnel Records	Maintained indefinitely at WTP office	PM / Administrative Assistant	PM / Administrative Assistant	15 years plus (as storage available)	Shred when Required	
Audit Results	Hard Copy plus Electronic copy in DWQMS shared files	WTP Record Log Depository (Main Lobby)	WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Auditor	Project Manager / ORO / QMS Rep Township ACW Representative	5 years minimum	Shred when Required	Internal and Accreditation Body Audits and Reports

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APPENDIX A: DOCUMENT AND RECORDS CONTROL TABLE

DOCUMENTS:

Documents (Internal)	Type of Record	Current File Location	Archive File Location	Authorized editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
QMS Manual (Operational Plan) Policy, Procedures and Appendices	Soft Copy and Hard Copy	Shared files- DWQMS WTP Record Log Depository (Main Lobby)	-To be maintained indefinitely -Changes to be documented and filed	QMS Rep.	PM / Overall Responsible Operator (ORO)	Min. 10 yrs	Not Required	-retention per Director's Direction 4.0.1 -policy, procedure, -forms, checklists included with Operations Manual - SOP sections
Operations Manual (SOP's) and Contingency Plan (Emergency Response Plan - ERP)	Soft Copy and Hard Copy	Network Computer / WTP Office (Main Lobby)	-To be maintained indefinitely -Changes to be documented and filed	PM / ORO / QMS Rep.	PM / Overall Responsible Operator (ORO)	Min. 10 yrs	Not Required	-Includes forms and checklists -with reference to Equipment Manuals as required

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

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Documents (Internal)	Type of Record	Current File Location	Archive File Location	Authorized editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
WTP Blank Forms and Checklists	Soft Copy Hard Copy	Shared files network Printed as Required	Backup on external hard drive -To be maintained indefinitely -Changes to be documented and filed	Quality Assurance and Compliance Specialist / PM / Overall Responsible Operator (ORO)	Quality Assurance and Compliance Specialist / PM / Overall Responsible Operator (ORO)	Min. 10 yrs	Not Required	-Director's Direction 4.0.1 -policy, procedure, forms, checklists -QMS Manual / Operational Plan -Forms to be stored with the Operations Manual as part of SOP, if required, not QMS Manual

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Documents (EXTERNAL)	Type of Record	Current File Location	Archive File Location	Authorized editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
Legislation and Regulations Binder	Soft Copy Hard Copy	Website QACS / Main Office	Not Required	Ministry of Environment	Not Required	As Updates Available	Shred when Required	Some examples maintained for hard copy reference: Safe Drinking Water Act O.Reg 128 O.Reg 169 O.Reg 170 (Plus related misc. reference section)\ Note: Procedure to access on website Procedure for monthly checks for changes
Certificate of Approval and Permit To Take Water Binder	Hard Copy	Binders in Quality Assurance and Compliance Specialist's Office -	Goderich WTP Storage Room, Bin as labeled and dated	Supplier of Document	Overall Responsible Operator (ORO)	5 yrs minimum (or until not current or applicable)	Shred when Required	Examples: -Permit to Take Water -C o A Note: CoA replaced with MECP License and DWWP – archive copy maintained
Licences, Drinking Water Works Permit (DWWP) and Accreditation Certificates	Hard Copy And electronic copies	Posted in Main office Shared files	Goderich WTP Storage Room, Bin as labeled and dated	MECP	MECP	15 years plus (as storage available)	Shred when Required	-WTP Certificate of Classification for Treatment and Distribution posted in Main Office - Licence, DWWP / accreditation certificates issued on recommendation from Accreditation Body

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Township of Ashfield-Colborne-Wawanosh

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Documents (EXTERNAL)	Type of Record	Current File Location	Archive File Location	Authorized editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
DWQMS Standard	Soft Copy and Hard Copy	Shared files network WTP Record Log Depository (Main Lobby)	-To be maintained indefinitely -Changes to be documented and filed	QMS Rep.	Overall Responsible Operator (ORO)	Min. 10 yrs	Not Required	- retain per Director's Direction 4.0.1 -policy, procedure, -file with QMS Manual
Approvals, Legal Documents	Hard Copy And Soft copy	Binder in Main Office	Goderich WTP Storage Room, Plastic Bin as labeled and dated (after 3yrs to Municipality storage area)	Town of Goderich / Operating Authority	Town of Goderich / Overall Responsible Operator (ORO)	15 yrs minimum (or until not current or applicable)	Shred when Required	-Township ACW Contract
Industry Standards	Soft Copy Hard Copy	Website Printed for temporary use	Not Required	AWWA (American Water Works Association)	AWWA	As Updates Available	Shred when Required	Example: -AWWA Standard for drinking water disinfection of watermain on repair / replacement printed as required for reference for Operating Procedures -others purchased as required

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

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Township of Ashfield-Colborne-Wawanosh

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Documents (EXTERNAL)	Type of Record	Current File Location	Archive File Location	Authorized editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
MSDS Binder	Hard Copy	WTP Record Log Depository (Main Lobby)	Goderich WTP Storage Room, Bin as labeled and dated (after 3yrs to Municipality storage area)	Supplier	Supplier / H&S Rep	As Updates supplied (2 yrs)	Shred when Required	-QACS tracks for updates as required
Equipment Manuals	Hard Copy	Main Office file cabinet / Lunch Room	Not Required	Supplier	Supplier / PM / Overall Responsible Operator (ORO)	As Updates supplied (2 yrs)	Shred when Required	- to be centralized in one location as feasible

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

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Township of Ashfield-Colborne-Wawanosh

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Municipal Records

Records	Type of Record	Current File Location	Archive File Location	Authorized Editor	Reviewer / Approvers	Retention Time	Disposal Method	Comments / Notes
<i>Municipal Records</i>						-Permanent -15 years -15 years -7 years -7 years -6 years -6 years -5 years -3 years -2 years		-Engineering Drawings -Engineering files -Design files - Design estimates -Contract files -General Correspondence -Yearly Work Diaries -Monthly Reports -Project Progress Reports -Purchase Order copies -Asset Management list -'As Recorded' drawings (compare w/ Veolia) -other legal documents - License, DWWP, PTTW - First Engineers Report -Lab reports etc

File: C:\DWQMS\ACW\ - APPENDIX A 2 – Document and Records Control Table -

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Township of Ashfield-Colborne-Wawanosh



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APPENDIX A3: DOCUMENT APPROVAL - CHANGE FORM

CHANGE INFORMATION:	NEW:	
	NEW REVISION LEVEL:	
	OBSOLETE:	
ORIGINATOR:		
DOCUMENT TITLE:		
DOCUMENT NUMBER:		
ELECTRONIC ADDRESS:		
WRITTEN / REVISED BY:		
PURPOSE OF DOCUMENT:		
DESCRIBE REVISION:		
DO ANY OTHER DOCUMENTS REQUIRE REVISION AS A RESULT OF THIS CHANGE?		
HAVE ALL PERSONNEL AFFECTED BY THIS CHANGE BEEN ADVISED?	Employees to sign and date here as advised:	
APPROVED BY: (name & date & comments)		

File: C:\DWQMS\ACW\ - Appendix A 3 - Document Approval - Change Form

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott - QMS Rep.	Laurie Cox - Veolia Project Manager

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX B 1: RISK ASSESSMENT AND OUTCOMES PROCEDURE

1.0 Procedure Description

This Risk Assessment Approach is based on the Walkerton Clean Water Centre's 'Risk Assessment & Emergency Preparedness' Training Course and the Health Canada Approach and methodology in addition to the Implementing Quality Management Guide on Risk Assessment.

This includes:

- 1- identification of existing or potential hazards, and hazardous events, for the drinking water
- 2- determination of the hazards, and hazardous events that are or could be significant
- 3- development of a plan to manage the water system to ensure any health risk from a significant hazard is reduced to an acceptable level

This procedure describes the method of hazard identification, risk assessment, and critical control point determination used for the Water Treatment Plant and Distribution System. The procedure consists of four main exercises: hazard, and hazardous event identification and the potential for biological, chemical, physical, or radiological concern, risk assessment, critical control point determination, and critical limit identification. Each exercise is described in detail in Section 4.0 - Procedure.

2.0 Reason for Procedure

The systematic approach used for risk identification and assessment lessens the likelihood of overlooking potential treatment process hazards and associated risks to drinking water quality and public health. Hazard analysis, identifying critical control points, establishing critical limits and control instructions provides all operators with consistent direction for responding to conditions that pose a risk of jeopardizing drinking water quality.

3.0 Responsibility

The designated QMS Representative, with the assistance of the Project Manager or Overall Responsible Operator, forms a committee consisting of at least four persons who are familiar with

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File: C:\DWQMS\ACW\ - APPENDIX B1 – Risk Assessment Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr.30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Aug.23, 2022	Reference to MECP Document	S. Telford-QMS Rep	P. Phillips - Office Manager

Note: To be reviewed annually or when a QMS change occurs.

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the facilities. The Risk Assessment Committee is responsible for identifying all actual and potential hazards, assessing the associated risks, determining critical control points, and setting critical limits. The committee communicates all associated procedures to the remainder of WTP operators through training sessions and documentation.

4.0 Procedure

The Risk Assessment analysis procedure is to be conducted at least every 36 months, with a review conducted annually by the Overall Responsible Operator / Project Manager or QMS Representative, prior to the annual Management Review. These exercises may also be completed when a significant change occurs in operations, such as a change in the type of process chemical or a change of equipment.

A risk assessment is completed based on the previous Risk Assessment outcomes. Potential hazardous events and associated hazards as identified in the Ministry of the Environment, Conservation and Parks (MECP) Document titled Potential Hazardous Events for Municipal Residential Drinking Water Systems are also to be considered in the Risk Assessment.

4.1 Hazards and Hazardous Events Identification and Control Measures

Using the WTP Drinking Water System Description and Process Flow Diagram (from Element 6) as a guide, the committee reviews the water treatment process steps from the raw water intake to the customer's curbside. The committee reviews the existing list of hazards and identifies any new potential hazards, or hazardous events. Special attention is given to areas within the process where changes have occurred since conducting the previous hazard identification exercise.

A Risk Assessment Table (Appendix B) template is used to record all hazards and hazardous events, and potential effects of the hazard or event, identified by the committee for each stage of the Drinking Water System.

Once all of the hazards have been identified, the committee identifies measures in place to monitor and control the hazards and hazardous events that have been identified. Any measures that are currently in place to address the hazards are listed in the Risk Assessment Table. The reliability and redundancy of equipment is considered during this

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exercise.

4.2 Risk Assessment

A risk assessment is performed for all events that are deemed to be controllable and the hazardous results of which are measurable. Controllable events are those that may be prevented through the actions of an operator. All other events are considered “emergency situations” and may require the development of a contingency plan.

Each hazard or hazardous event is assigned a numeric value although not all can be controlled through subsequent processes. These hazards are assigned a numeric value ranging from 1 to 5 in three different categories: likelihood, severity or consequence, and detectability (see Tables below). The three assigned numbers for each event are then added to determine the overall risk value or Risk Priority Number (RPN).

RISK ASSESSMENT RATING VALUES

LIKELIHOOD:

Description	Likelihood of Hazardous Event Occurring	Rating
Rare	May occur in exceptional circumstances, has not occurred in the past	1
Unlikely	Could occur at some time, historically has occurred less than once every 5 to 10 years.	2
Possible	Has occurred or may occur once or more per year.	3
Likely	Has occurred or may occur on a monthly to quarterly basis.	4

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File: C:\DWQMS\ACW\ - APPENDIX B1 – Risk Assessment Procedure

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Very Likely	One or more occurrences on a monthly or more frequent basis.	5
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SEVERITY / CONSEQUENCE:

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

DETECTABILITY:

Description	Detectability of Hazardous Event Occurring	Rating
Very Detectable	Easy to detect, on-line monitoring through SCADA.	1
Moderately Detectable	Moderately detectable, alarm present but not in SCADA, may require operator to walk by and notice alarm; problem is indicated promptly by in house lab test results.	2
Normally Detectable	Normally detectable, visually detectable on rounds or through regular maintenance.	3
Poorly Detectable	Poorly detectable, visually detectable but not inspected on a regular basis; not normally detected before problem becomes evident; lab tests are not	4

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	done on a regular basis (e.g. quarterly).	
Undetectable	Cannot be detected.	5

The highest overall risk (RPN) values are typically indicators of potential critical events. Based on a review of the overall risk values and the associated events, a threshold number is chosen such that all events associated with risk values which are equivalent to or greater than the threshold number are considered critical. Discretion may be used when determining which events are indeed critical, regardless of the calculated risk. Careful evaluation is required for each hazard event. Only controllable events will be considered for Critical Control Point determination and response. Other high ranking events will be assessed at a later date for further consideration in the Operating Authority's Contingency Plan or the Municipal Emergency Response Plan.

In the case where an event having a higher calculated risk value is not determined by the committee to be critical, an explanation of the reasoning for this distinction is required. An explanation of the reasoning is also required when the committee deems an event with a lower calculated risk critical.

Note that there are three events that are always critically hazardous to water quality: **high turbidity**, inadequate primary or secondary disinfection, and low system pressure.

4.3 Critical Control Point Determination

From the hazards, or hazardous events, identified as critical in the risk assessment analysis, an associated critical control point (CCP) can be determined.

A critical control point (CCP) is a point in the system where control is established to prevent, eliminate, or reduce to an acceptable level, a drinking water health hazard. In some cases of multi barrier protection several control points could address a particular hazard. The final point in a process step that leads to a critical event is identified as the critical control point in this procedure.

Normally the Critical Control Point is the point at which an Operator's intervention is required.

File: C:\DWQMS\ACW\ - APPENDIX B1 – Risk Assessment Procedure

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Critical control points require the establishment of controlled conditions, including: critical control limits, equipment redundancy, and control and recovery procedures.

Critical Control Points (CCPs) are determined by the Risk Assessment Team by review of the hazards or hazardous events in the Risk Assessment Table using the definition above. From the identified CCPs, and assessment of the Risk Priority Numbers (RPN) associated, a threshold value is determined by the Team or the QMS Rep and Project Manager. Controllable hazards are then assessed to ensure control limits and control measures are in place to ensure proper response to maintain safe drinking water.

4.4 Critical Limits

Critical limits are established for values that measure critical events. The limits provide operators with a range of acceptable values within which no preventive or corrective actions are required. Critical limits define the point at which an operator must take action to prevent escalation of the critical event or to correct the critical event.

Critical limits are determined based on regulatory requirements, process monitoring capabilities, off-hours response time, and historical plant performance. Process alarms (if available) are normally set at, or near critical limits. Responses to breached critical limits are detailed in the Operations Manual with Standard operating Procedures for each Critical Control Point.

Operators in Charge are required to respond to deviations from Critical Control Limits and to properly document occurrences and to notify the proper chain of command and authorities as required by the Project Manager and as regulated by the **MOE**. Operator response is required to correct the deviation, investigate why the CCP was exceeded, and to act accordingly to prevent a recurrence in order to maintain a safe supply of drinking water to the customer.

5.0 Associated Documents

Refer to the following for detailed information:

- Operations Manual – Standard Operating Procedures (SOPs) control procedures, control limits

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Township of Ashfield-Colborne-Wawanosh

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- Contingency Plan - Emergency Response Procedures

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX B 2 – RISK ASSESSMENT TABLE

Risk Assessment Table

Please see the appropriate section tab at the back of this document for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

The Systems included are:

Benmiller Drinking Water System

Century Heights Subdivision Drinking Water System

Courtney Subdivision Distribution System

Dungannon Drinking Water System

Huron Sands Drinking Water System

South Lucknow Distribution System

File: C:\DWQMS\ACW\ - APPENDIX B1 – Risk Assessment Procedure

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX C 1: GAP ANALYSIS

A Gap Analysis allows building on the systems already in place, and identifies areas where the DWQMS requirements are not yet being met, or may require modification.

Gap analysis involves reviewing processes and procedures that are documented, and reviewing existing methods that may not be documented.

In the implementation of the DWQMS for Veolia Water Canada, a Gap Analysis was undertaken by the Project Manager and the QMS Representative by reviewing the Gap Analysis Checklist from the DWQMS Guide (Implementing Quality Management: A Guide For Ontario's Drinking Water Systems). The checklist was used to identify areas requiring development of a more detailed process or procedure.

Since there were potential gaps in all elements, the Operational Plan / QMS Manual would be reviewed Element by Element and the Policy, Procedures, and Tables required for the DWQMS would be written, modified or updated, and implemented as required to meet the intent of the Ministry of Environment's 'Implementing Quality Management: A Guide For Ontario's Drinking Water Systems' publication.

It was thought that a formal or more detailed gap analysis report would only be beneficial if there were more people that could be involved in the development of the DWQMS, and sections could be assigned to different individuals. Veolia's approach is intended to be more cost effective with the QMS Representative and Project Manager addressing the elements directly, through review of the Implementation Guide, and applying the requirements to best suit the Water System in the development.

File: C:\DWQMS\ACW\ -Appendix C 1 - Gap Analysis

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

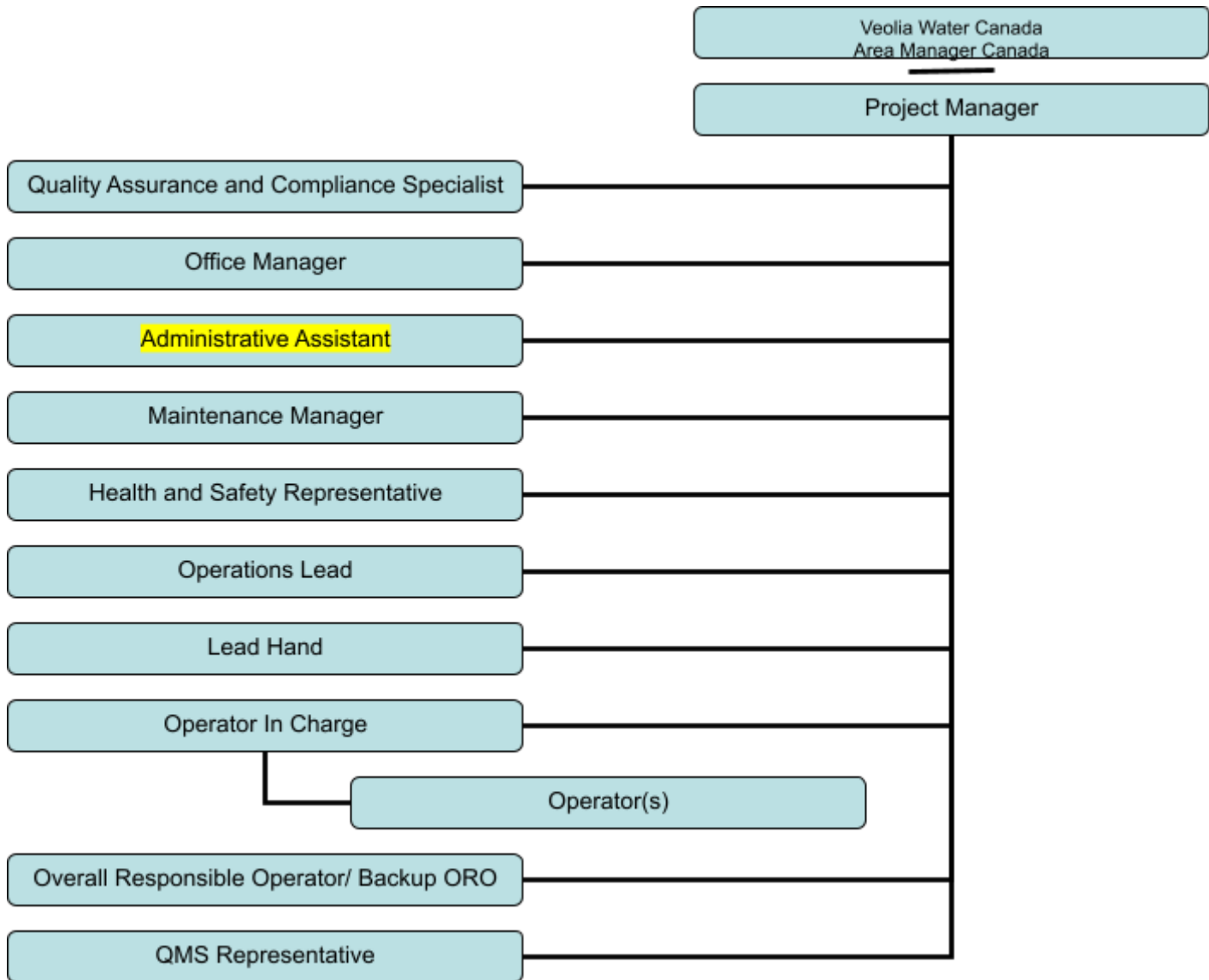


Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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APPENDIX E 1: ORGANIZATION CHART – VEOLIA WATER CANADA



File: C:\DWQMS\ACW- APPENDIX E 1 - Org. Structure, Roles, Resp. Authorities – Veolia Water Org. Chart

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 20, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 4, 2013	Update, add H&S Rep.	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	Feb. 21, 2017	Update, add QACS, OL, & OM	C. Black – QMS Rep.	John Graham – Veolia Project Manager
Rev. 3	May 31, 2018	Added LH and removed AM	C Good – QMS Rep.	John Graham – Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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APPENDIX E 2: RESPONSIBILITIES TABLE

Role / Title	Responsibilities	Authorities
<p>Area Manager - Canada</p> <p>(Top Management role)</p>	<ul style="list-style-type: none"> o Complete Corporate oversight for Veolia Water Canada operations o Ensures operations are performed as per the Contract between the Operating Authority and the Owner, and by the regulatory requirements o Provides resources required for operation of drinking water system according to contract o Ensures a QMS is implemented and maintained to meet the DWQMS requirements o Participates in Management Reviews 	<ul style="list-style-type: none"> - Financial and administrative authority related to all VWC operation - Hiring and discipline of staff - To perform listed responsibilities
<p>WTP Project Manager / Overall Responsible Operator</p> <p>(Top Management role)</p>	<p>Project Manager</p> <ul style="list-style-type: none"> o Ensures operations are performed as per the Contract between the Operating Authority and the Owner, and by the regulatory requirements o Obtains resources or infrastructure as necessary from the Owner o Provides resources or infrastructure as necessary o Organizes a work safety program o Develops the facilities budget. o Appoints QMS Representative o Undertakes performance reviews o Schedules work assignments o Supervises Operations and Maintenance staff o Participates in Management Reviews <p>Project Manager and / or ORO</p> <ul style="list-style-type: none"> o Ensures that the DWQMS is implemented and maintained, and that the operating authority is accredited o Communicates with the Owner about the drinking water system and the QMS o Reports on Operations and the QMS to top management and the owner as required o Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the water treatment system 	<ul style="list-style-type: none"> - To perform listed responsibilities - To recommend improvements or changes according to the Operating Contract - To implement improvements or changes according to the Operating Contract - To develop, approve, and direct implementation of standard safety and operating strategies and policies - To administer the QMS - To report Adverse Water Quality Incidents (AWQI), and other non-compliance issues, to regulatory agencies, the Owner, and Top Management and the Public as required - To perform listed responsibilities - To recommend improvements or changes according to the Operating Contract

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	May 15, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 4	May 31, 2018	Replaced W&WWS with LH	C Good – QMS Rep.	John Graham – Veolia PM
Rev.5	July 15, 2019	Corrected page #'s	N. Mayhew – QMS Rep	John Graham - Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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	<p>Overall Responsible Operator</p> <ul style="list-style-type: none"> o Maintains provincial operator license at Plant certification level o Maintains regulatory compliance o Monitors water quality and demand 	
<p>Quality Assurance and Compliance Specialist</p>	<ul style="list-style-type: none"> o Communication liaison with Project Manager, Operators, and MECP o Communication with Head Office regarding Facilities issues o Review and track log sheets, sampling schedule, custody sheets, lab reports, and input of data to compliance program o Prepare monthly and annual reports as required by clients, Project Manager, Head Office, and MECP o Report Out of Compliance issues and appropriate documentation to Project Manager and MECP o Ensures that current versions of documents, record forms, personnel training records, etc. , required by the QMS, and the Facility, are being used at all times o Assists with the development of the Operational Plan and on-going maintenance of the QMS system during the first cycle, the accreditation of the Operating Authority, and beyond o Administers the QMS by ensuring that processes and procedures needed for the QMS are established and maintained o Reports to Top Management on the performance of the QMS and any need for improvement o Ensures that current versions of documents required by the QMS are being used at all times o Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the water treatment system o Promotes awareness of the QMS throughout the Operating Authority o Has knowledge of best practices for the drinking water system 	<p>- To perform listed responsibilities</p>

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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Township of Ashfield-Colborne-Wawanosh

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	<ul style="list-style-type: none"> o Is familiar with the DWQMS o Is familiar with the audit principles and what is needed to demonstrate the DWQMS requirements have been met to an auditor o Is familiar with applicable legislation and regulatory requirements 	
Office Manager	<ul style="list-style-type: none"> o Communication liaison with Project Manager and Operators. o Document and respond to, as appropriate, public or customer complaints. o Document and communicate customer inquiries to Project Manager. o Communicate and liaison with Corporate Safety, Finance and Procurement Teams. o Assist VP of Operations for Canada and Project Manager on new Contracts for Veolia North America. o Work with Quality Assurance and Compliance Specialist and Administrative Assistance to ensure completion of tasks or provide assistance. o Work with Project Manager on Human Resource items or issues. o Liaison between Veolia staff and Vendors. o Liaison between Veolia Staff and Payroll and HR. o Prepare WSIB paperwork in event of employee injury. o Input Requisitions into Coupa System, send PO's to vendors, receive items on PO, and send invoices to Accounts Payable. o Prepare and submit Project Managers Monthly Purchasing Card expenses and statements in Coupa. o Prepare and submit Employee Expenses in Coupa. o Review monthly reports from Finance in regards to Match Exceptions, Accounts Relievable, Billings. o Prepare monthly accruals, estimates, billings, and Repair and Maintenance Spreadsheets for multiple clients. o Prepare for and develop multiple budgets to be reviewed by Project Manager and VP of Operations for Canada. 	- To perform listed responsibilities

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

Rev. Level:	Date:	Change:	By:	Approved By:
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Township of Ashfield-Colborne-Wawanosh

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DWQMS Operational Plan
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	<ul style="list-style-type: none"> o Review timesheets for proper coding and approve time sheets when Project Manager is not available. o Create Requisitions for New Staff, prepare documentation for New Employees, also do same for exiting employees. o Prepare and submit forms for employee bonuses and pay increases to Project Manager for approval. o Keep Employee Personnel Files up to date and Confidential. 	
Administrative Assistant	<ul style="list-style-type: none"> o Payment of bills, preparation of accruals, estimates, billings, and payroll for Head Office o Document and respond to, as appropriate, public and customer complaints, and communicate to the project Manager o Preparation of reports and input of data as required o Work with annual budgets, filing, phone and office duties as required 	- To perform listed responsibilities
Maintenance Manager	<ul style="list-style-type: none"> o Maintains Industrial Certification o Communication liaison with Project Manager and Operators on maintenance issues o Provides information on resources or infrastructure, and equipment to the Project Manager as necessary o Schedules day to day maintenance activities relating to the water/waste water system o Preventive Maintenance checks as required on equipment outside the scope of Operators o Installation, repair or replacement of equipment as qualifications allow, and as approved by the Project Manager o Schedule, direct and supervise services provided by specialty contractors when needed o Document and respond to, as appropriate, public or customer complaints. o Document and communicate customer inquiries to Project Manager o Communicates maintenance / capital requirements to Project Manager for budget o Prepare reports as required by Project Mgr. 	- To perform listed responsibilities

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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Township of Ashfield-Colborne-Wawanosh

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DWQMS Operational Plan
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	<ul style="list-style-type: none"> o Maintains current maintenance records and schedules work as required to maintain equipment o Maintains Maintenance Preventive Maintenance System- Jobs Plus Maintenance Program Software (implementation 2008-2009) 	
<p>Operator Designations</p>	<p>Overall Responsible Operator (ORO)</p> <ul style="list-style-type: none"> o Is designated by the Owner or Operating Authority as ORO o Holds a certificate suitable for the class of system or higher certification o Provides instruction to Operator-in-Charge (OIC) <p>Operator-in-Charge (OIC)</p> <ul style="list-style-type: none"> o Is designated as Operator-in-Charge of a system by the ORO / Project Manager o Sets operational parameters for the system as required o Directs or instructs other Operators as required o Takes all steps reasonably necessary to operate the process o Ensures the process is monitored, sampled, and tested as required o Ensures records are maintained of all adjustments made to the process o Ensures all equipment used in the process is monitored, inspected, tested, and evaluated, and that records are properly maintained <p>Operations Lead</p> <ul style="list-style-type: none"> o Maintains communications with the project manager and fellow operators regarding the status of the water systems assigned o Assist Maintenance Supervisor to coordinate project management o Identify and research efficiencies in facilities o Prepare budget estimates for client consideration. o Conducts operational checks 	<p>- To perform listed responsibilities</p>

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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Township of Ashfield-Colborne-Wawanosh

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	<ul style="list-style-type: none"> o Adjusts, tests, evaluates the process o Adjusts or directs flow, pressure or quality of the water o Reports and acts upon non-conformances o Follows procedures, completes forms o Files records o Attends training o Receives and communicates external complaints o Regularly communicates with the Operator-in-Charge (OIC) o Performs required operations and maintenance activities o Maintains Operators license o Follows the Standard Operating Procedures at each site o Is designated as Operator-in-Charge as required o Assists in training of Operator-in-Training as required <p>Lead Hand</p> <ul style="list-style-type: none"> o Organize daily activities while maintaining communications with the Project Manager and fellow operators regarding the status of the water/waste water systems assigned o Conducts operational checks o Adjusts, tests, evaluates the process o Adjusts or directs flow, pressure or quality of the water o Reports and acts upon non-conformances o Follows procedures, completes forms o Files records o Attends training o Receives and communicates external complaints o Regularly communicates with the Operator-in-Charge (OIC) o Performs required operations and maintenance activities o Maintains Operators license o Follows the Standard Operating Procedures at each site o Is designated as Operator-in-Charge as required 	
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File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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	<ul style="list-style-type: none"> o Assists in training of Operator-in-Training as required <p><u>Operator</u></p> <ul style="list-style-type: none"> o Conducts operational checks o Adjusts, tests, evaluates the process o Adjusts or directs flow, pressure or quality of the water o Reports and acts upon non-conformances o Follows procedures, completes forms o Files records o Attends training o Receives and communicates external complaints o Regularly communicates with the Operator-in-Charge (OIC) o Performs required operations and maintenance activities o Maintains Operators license o Follows the Standard Operating Procedures at each site o Is designated as Operator-in-Charge as required o Assists in training of Operator-in-Training as required <p><u>Operator-in-Training</u></p> <ul style="list-style-type: none"> o Has successfully completed Grade 12 o Has successfully completed an Operator-in-Training course o Works under the supervision of the Operator-in-Charge o Performs duties of Operator with exception of being able to be designated Operator-in-Charge 	
<p>QMS Representative</p>	<ul style="list-style-type: none"> o Assists with the development of the Operational Plan and on-going maintenance of the QMS system during the first cycle, the accreditation of the Operating Authority, and beyond 	<p>- To perform listed responsibilities</p>

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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Rev. 4	May 31, 2018	Replaced W&WWS with LH	C Good – QMS Rep.	John Graham – Veolia PM
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Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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DWQMS Operational Plan
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	<ul style="list-style-type: none"> o Administers the QMS by ensuring that processes and procedures needed for the QMS are established and maintained o Reports to Top Management on the performance of the QMS and any need for improvement o Ensures that current versions of documents required by the QMS are being used at all times o Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the water treatment system o Promotes awareness of the QMS throughout the Operating Authority o Is familiar with the drinking water system o Has knowledge of best practices for the drinking water system o Is familiar with the DWQMS o Is familiar with the audit principles and what is needed to demonstrate the DWQMS requirements have been met to an auditor o Is familiar with applicable legislation and regulatory requirements o Has open communication with top mgmt. 	
<p>Health and Safety Representative</p>	<ul style="list-style-type: none"> o Assists with the development and on-going maintenance of processes and procedures needed for the Health and Safety Program. o Makes recommendations to Top Management on the performance of the Health and Safety Program o Is familiar with, and keeps up to date with, applicable legislation and regulatory requirements. o Ensures that personnel are aware of all applicable legislative and regulatory requirements o Ensures that current versions of documents required are being used o Ensures regular workplace inspections are arranged, at least once per month o Ensures regular workplace safety meetings to review safety topics for employee training and discussion of safety hazards, are carried out at least 	<p>- To perform listed responsibilities</p>

File: C:\DWQMS \APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

Rev. Level:	Date:	Change:	By:	Approved By:
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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
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	<ul style="list-style-type: none"> once per month o Consults on and is available for workplace testing and safety procedure assessment. o Assists with the investigation of safety incidents, near miss reporting, Ministry of Labour visits, and work refusals o Inputs safety and near miss incident data into the 'Triple I' database and follows reporting procedures as required. 	
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File: C:\DWQMS\APPENDIX E2 - Org. Structure, Roles, Resp. Authorities - Responsibilities Table-

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Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan A-C-W

APPENDIX E 3: **JOB DESCRIPTIONS**

Job Description Project Manager

Under the general supervision of the Area Manager this position will ensure the effective operation of the various waste and drinking water facilities managed from the Goderich hub. This position will ensure safety and environmental compliance with all regulatory & corporate standards is met at all the sites managed. It will manage the finances, personnel matters, and physical resources in such a manner as to provide the client with a high quality professional level of service.

Job Duties

1. Maintain ongoing communications with the clients
2. Develop and maintain a good working relationship with the regulatory **bodies**
3. Facilitate necessary maintenance and repairs on the facilities' equipment
4. Develop and maintain Standard Operating Procedures
5. Prepare and monitor annual budgets
6. Review lab results and conduct routine lab work
7. Perform operational duties
8. Conduct monthly safety inspections
9. Maintain records as required by the regulators, the clients and the company
10. Preparation of monthly/ annual operations reports
11. Ensure optimal operations of water and waste water treatment processes
12. Other duties as assigned.

Qualifications

1. Valid Class 4 Ontario Certification in Water Treatment
2. Valid Class 3 Ontario Certification in Water Distribution
3. Valid Class 2 Ontario Certification in Waste Water Treatment
4. Diploma in Environmental/Chemical Engineering Technology or acceptable equivalent (related trade designation, experience, other related formal training)
5. Demonstrated managerial skills
6. 10 years experience in the waste/ drinking water industry
7. Computer literacy
8. Valid driver's license

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File: C:\DWQMS\ACW- APPENDIX E3 - Org. Structure, Roles, Resp., Authorities - Job Descriptions

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 20, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia PM
Rev. 1	June 4, 2013	Update, add H&S Rep.	DC Scott -QMS Rep.	John Graham - Veolia PM
Rev. 2	Mar 23, 2017	Added QACS, OM, OL, & W&WWS	C. Black - QMS Rep.	John Graham - Veolia PM
Rev. 3	May 31, 2018	Replaced W&WWS with LH	C Good - QMS Rep.	John Graham - Veolia PM
Rev. 4	July 15, 2019	Updated MOECC to MECP/Corrected #9 to read #7/Changed font size	N. Mayhew -QMS Rep	John Graham - Veolia PM

Note: To be reviewed annually or when a QMS change occurs.

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan A-C-W

Job Description Quality Assurance and Compliance Specialist

Under the general supervision of the Project Manager, this position will ensure the effective operation of the various waste and drinking water facilities' regulatory requirements managed from the Goderich hub.

This position will comply with safety, environmental, regulatory & corporate standard requirements. This position will also carry out duties in such a manner as to provide the client with a high quality and professional level of service.

Job Duties

1. Assures compliance with legislation and regulations including the Safe Drinking Water Act, O. Reg. 170/03, O. Reg. 128/04, O. Reg. 129/04, Ontario's Municipal Drinking Water License Program
2. Document and respond to, as appropriate, public or customer complaints
3. Document and communicate customer inquiries to Project Manager
4. Review and input log sheets, sampling and SCADA data into HACH WIMS database
5. Coordinate and track sample scheduling as required by regulation of the MECP
6. Reviews water quality data received from the laboratories to ensure conformance to applicable legislation.
7. Prepare monthly and annual reports as required by Clients, Project Manager, Head Office and the MECP
8. Coordinates development and maintenance of the Drinking Water Quality Management Standard (DWQMS), including Operational Plans, document controls, procedures, and standard operating procedures.
9. Reports to Top Management on the performance of the QMS and any need for improvement
10. Conduct routine chlorine residual analysis, turbidity readings and fluoride analysis
11. Collect and prepare samples for submission to accredited labs
12. Ensure optimal operations of water treatment processes through chemical dosage assessment and adjustment
13. Maintain records as required by the regulators, the clients and the company
14. Others duties as assigned.

Qualifications

1. Demonstrated knowledge of the operations of water/wastewater facilities
2. **Valid Class of Ontario Certification in Water Treatment for work assigned**
3. Knowledge of water/wastewater regulations
4. Knowledge of DWQMS.
5. Demonstrated administrative and organizational skills.
6. Computer literacy
7. Valid driver's license

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File: C:\DWQMS\ACW- APPENDIX E3 - Org. Structure, Roles, Resp., Authorities - Job Descriptions

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 20, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia PM
Rev. 1	June 4, 2013	Update, add H&S Rep.	DC Scott -QMS Rep.	John Graham - Veolia PM
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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan A-C-W

Job Description Office Manager

Under the general supervision of the Project Manager / Overall Responsible Operator this position will ensure the effective operation of the various waste and drinking water facilities administrative and accounts payable requirements managed from the Goderich hub. This position will comply with safety, environmental, regulatory & corporate standards requirements. This position will also carry out duties in such a manner as to provide the client with a high quality professional level of service.

Job Duties

1. Communication liaison with Project Manager and Operators.
2. Communicate and liaison with Corporate Safety, Finance and Procurement Teams.
3. Assist VP of Operations for Canada and Project Manager on new Contracts for Veolia North America.
4. Work with Project Manager on Human Resource items or issues.
5. Liaison between Veolia staff and Vendors.
6. Liaison between Veolia Staff and Payroll and HR.
7. Prepare WSIB paperwork in event of employee injury.
8. Input Requisitions into Coupa System, send PO's to vendors, receive items on PO, and send invoices to Accounts Payable.
9. Prepare and submit Employee Expenses /Project Managers Monthly Purchasing Card expenses and statements in Coupa..
10. Review monthly reports from Finance in regards to Match Exceptions, Accounts Receivable, Billings.
11. Prepare monthly accruals, estimates, billings, and Repair and Maintenance Spreadsheets for multiple clients.
12. Prepare for and develop multiple budgets to be reviewed by Project Manager and VP of Operations for Canada.
13. Review timesheets for proper coding and approve time sheets when Project Manager is not available.
14. Create Requisitions for New Staff, prepare documentation for New Employees, also do same for exiting employees.
15. Prepare and submit forms for employee bonuses and pay increases to Project Manager for approval.
16. Keep Employee Personnel Files up to date and Confidential.
17. Other duties as assigned.

Qualifications

1. Administrative skills and Basic Accounting knowledge
2. Understanding of Privilege and Confidential Information
3. Human Resource knowledge
4. Understanding and working knowledge of OHSA and Regulations
5. Communication skills
6. Knowledge of the operations of the Water/Wastewater Facilities
7. Computer literacy
8. Valid driver's license

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File: C:\DWQMS\ACW- APPENDIX E3 – Org. Structure, Roles, Resp., Authorities – Job Descriptions

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Township of Ashfield-Colborne-Wawanosh

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Job Description Administrative Assistant

Under the general supervision of the Project Manager / Overall Responsible Operator this position will ensure the effective operation of the various waste and drinking water facilities administrative and accounts payable requirements managed from the Goderich hub.

This position will comply with safety, environmental, regulatory & corporate standards requirements. This position will also carry out duties in such a manner as to provide the client with a high quality professional level of service .

Job Duties

1. Communication liaison with Project Manager and Operators.
2. Document and respond to, as appropriate, public or customer complaints.
3. Document and communicate customer inquiries to Project Manager.
4. Prepare reports as required by Project Manager.
5. Input data as required.
6. Pay bills, prepare accruals, estimates, billings and payroll for head office.
7. Work with annual budgets.
8. Filing, answering phone, misc office duties.
9. Other duties as assigned.

Qualifications

1. Administrative Assistant skills and Bookkeeping knowledge.
2. Communication skills.
3. Knowledge of the operations of the Water/Wastewater Facilities.
4. Computer literacy
5. Valid driver's license

File: C:\DWQMS\ACW- APPENDIX E3 - Org. Structure, Roles, Resp., Authorities - Job Descriptions

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 20, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia PM
Rev. 1	June 4, 2013	Update, add H&S Rep.	DC Scott -QMS Rep.	John Graham - Veolia PM
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Rev. 3	May 31, 2018	Replaced W&WWS with LH	C Good - QMS Rep.	John Graham - Veolia PM
Rev. 4	July 15, 2019	Updated MOECC to MECP/Corrected #9 to read #7/Changed font size	N. Mayhew -QMS Rep	John Graham - Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
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Job Description Maintenance Manager

Under the general supervision of the Project Manager / Overall Responsible Operator this position will ensure the effective operation of the various waste and drinking water facilities maintenance requirements managed from the Goderich hub.

This position will comply with safety, environmental, regulatory & corporate standards requirements. This position will also carry out duties in such a manner as to provide the client with a high quality professional level of service.

Job Duties

1. Communication liaison with Project Manager and Operators on maintenance issues.
2. Provide information on resources or infrastructure, and equipment to the Project Manager as necessary
3. Schedule day to day maintenance activities relating to the water/waste water system
4. Preventive Maintenance checks as required on equipment outside the scope of Operators
5. Installation, repair or replacement of equipment as qualifications allow, and as approved by the Project Manager
6. Schedule, direct and supervise services provided by specialty contractors when needed
7. Document and respond to, as appropriate, public or customer complaints.
8. Document and communicate customer inquiries to Project Manager.
9. Communicate maintenance / capital requirements to Project Manager for budget
10. Prepare reports as required by Project Manager
11. Maintains current maintenance records and schedules work as required to maintain equipment
12. Maintain Maintenance Preventive Maintenance System- Jobs Plus Maintenance Program Software (implementation 2008-2009)
13. Other duties as assigned

Qualifications

1. Valid Trade Licence / Certification – Electrical / Mechanical
2. Demonstrated knowledge of the operations of the Water /Waste water Facilities.
3. Computer literacy
4. Valid driving Licence
5. Valid Class Ontario Certification in Water Treatment

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File: C:\DWQMS\ACW- APPENDIX E3 – Org. Structure, Roles, Resp., Authorities – Job Descriptions

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Note: To be reviewed annually or when a QMS change occurs.

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DWQMS Operational Plan
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Job Description Operations Lead

Under the supervision of the Project Manager this position will ensure the effective operation of the various waste water/drinking water facilities assigned.

This position will ensure safety and environmental compliance with all regulatory & corporate standards is met at all the sites operated.

Job Duties

1. Maintain communications with the project manager and fellow operators regarding the status of the water systems assigned
2. Assist Maintenance Manager to coordinate project management
3. Identify and research efficiencies in facilities
4. Prepare budget estimates for client consideration.
5. Conduct routine maintenance and repairs on the facilities' equipment
6. Follow the Standard Operating Procedures at each site
7. Conduct routine chlorine residual analysis, turbidity readings and fluoride analysis
8. Perform routine calibration and verification of online and hand held instrumentation as per operations manuals
9. Collect and prepare samples for submission to accredited labs
10. Conduct monthly safety inspections on equipment and facilities assigned
11. Maintain records as required by the regulators, the clients and the company
12. Ensure optimal operations of water treatment processes through chemical dosage assessment and adjustment
13. Perform locates of the underground plant for third parties
14. Conduct and/or coordinate repairs on the distribution systems and their appurtenances
15. Other duties as assigned.

Qualifications

1. Valid Class of Ontario Certification in Water Treatment, Water Distribution, and Waste Water Treatment for work assigned.
2. Familiarity with the Ontario drinking water regulations as they apply to large and small municipally owned residential water systems
3. Grade 12
4. Demonstrated technical skills
5. 1 year experience in the waste/ drinking water industry
6. Computer literacy
7. Valid driver's license

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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Job Description Lead Hand

Under the supervision of the Project Manager, this position will ensure the effective operation of the various waste water/drinking water facilities, oversee operators under direct supervision and organize work duties. This position will ensure that all corporate and regulatory safety and compliance standards are met at all the sites supervised.

Job Duties

1. Possess strong interpersonal, communication and organizational skills, and the ability to delegate and prioritize tasks
2. Organize daily activities while maintaining communications with the Project Manager and fellow operators regarding the status of the water/waste water systems assigned
3. Conduct routine maintenance and repairs on the facilities' equipment
4. Follow the Standard Operating Procedures at each site
5. Conduct routine chlorine residual analysis, turbidity readings and other tests as required by the MECP
6. Perform routine calibration and verification of online and handheld instrumentation as per operations manuals
7. Collect and prepare samples for submission to accredited labs
8. Conduct monthly site inspections on equipment and facilities assigned
9. Maintain records as required by the regulators, the clients and the company
10. Ensure optimal operations of water/waste water treatment processes through chemical dosage assessment and adjustment
11. Perform locates of the underground plant for third parties
12. Conduct and/or coordinate repairs on the distribution systems and their appurtenances
13. Other duties as assigned.

Qualifications

1. Valid Class of Ontario Certification in Water Treatment for work assigned
2. Valid Class of Ontario Certification in Water Distribution for work assigned
3. Valid Class of Ontario Certification in Waste Water Treatment for work assigned
4. Valid Class of Ontario Certification in Waste Water Collection for work assigned
5. Familiarity with the Ontario drinking water regulations as they apply to large and small municipally owned residential water systems
6. High school diploma or equivalent, demonstrate technical skills and computer literacy
7. 1 year experience in the waste/ drinking water industry
8. Valid driver's license

File: C:\DWQMS\ACW- APPENDIX E3 – Org. Structure, Roles, Resp., Authorities – Job Descriptions

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Township of Ashfield-Colborne-Wawanosh

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Job Description Water/Waste Water Operator

Under the supervision of the Project Manager this position will ensure the effective operation of the various waste water/drinking water facilities assigned.

This position will ensure safety and environmental compliance with all regulatory & corporate standards is met at all the sites operated.

Job Duties

1. Maintain communications with the project manager and fellow operators regarding the status of the water systems assigned
2. Conduct routine maintenance and repairs on the facilities' equipment
3. Follow the Standard Operating Procedures at each site
4. Conduct routine chlorine residual analysis, turbidity readings and fluoride analysis
5. Perform routine calibration and verification of online and hand held instrumentation as per operations manuals
6. Collect and prepare samples for submission to accredited labs
7. Conduct monthly safety inspections on equipment and facilities assigned
8. Maintain records as required by the regulators, the clients and the company
9. Ensure optimal operations of water treatment processes through chemical dosage assessment and adjustment
10. Perform locates of the underground plant for third parties
11. Conduct and/or coordinate repairs on the distribution systems and their appurtenances
12. Other duties as assigned.

Qualifications

1. Valid Class of Ontario Certification in Water Treatment for work assigned
2. Valid Class of Ontario Certification in Water Distribution for work assigned
3. Valid Class of Ontario Certification in Waste Water Treatment for work assigned
4. Familiarity with the Ontario drinking water regulations as they apply to large and small municipally owned residential water systems
5. Grade 12
6. Demonstrated technical skills
7. 1 year experience in the waste/ drinking water industry
8. Computer literacy
9. Valid driver's license

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan A-C-W

Job Description QMS Representative

Under the general supervision of the Project Manager / Overall Responsible Operator this position will ensure the effective operation of the various drinking water facilities Quality Management System requirements managed from the Goderich hub.

This position will comply with safety, environmental, regulatory & corporate standards requirements. This position will also carry out duties in such a manner as to provide the client with a high quality professional level of service.

Job Duties

1. Assists with the development of the Operational Plan and on-going maintenance of the QMS system during the first cycle, the accreditation of the Operating Authority, and beyond
2. Administers the QMS by ensuring that processes and procedures needed for the QMS are established and maintained
3. Reports to Top Management on the performance of the QMS and any need for improvement
4. Ensures that current versions of documents required by the QMS are being used at all times
5. Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the water treatment system
6. Promotes awareness of the QMS throughout the Operating Authority
7. Is familiar with the drinking water system
8. Has knowledge of best practices for the drinking water system
9. Is familiar with the DWQMS
10. Is familiar with the audit principles and what is needed to demonstrate the DWQMS requirements have been met to an auditor
11. Is familiar with applicable legislation and regulatory requirements
12. Has good open communication with top management.
13. Other duties as assigned.

Qualifications

1. Demonstrated knowledge of the operations of the Water /Waste water Facilities
2. Demonstrated knowledge of QMS systems
3. Computer literacy
4. Valid driving Licence
5. **Valid Class Ontario Certification in Water Treatment**

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File: C:\DWQMS\ACW- APPENDIX E3 – Org. Structure, Roles, Resp., Authorities – Job Descriptions

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Job Description – Health and Safety Representative

At a workplace where no committee is required (if under 20 employees per OH&S sect 9) and where the number of workers regularly exceeds five, the employer shall cause the workers to select at least one health and safety representative from among the workers at the workplace who do not exercise managerial functions. The employer shall ensure that the H&S representative receives training to enable him or her to effectively exercise the powers and perform the duties of the health and safety representative (OH&S sect 8).

Under the general supervision of the Project Manager this position will ensure the effective operation of the various drinking water and wastewater facilities concerning Health and Safety requirements managed from the Goderich hub.

This position will comply with safety, environmental, regulatory & corporate standards and their requirements. This position will also carry out duties in such a manner as to provide the client with a high quality professional level of service.

Job Duties

1. Assists with the development and on-going maintenance of processes and procedures needed for the Health and Safety Program.
2. Makes recommendations to Top Management on the performance of the Health and Safety Program and any need for improvement.
3. Is familiar with, and keeps up to date with, applicable legislation and regulatory requirements.
4. Ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the water and wastewater systems.
5. Ensures that current versions of documents required are being used (OH&S Act, MSDS etc) Ensures regular workplace inspections are arranged, at least once per month, to identify hazards and safety concerns, and help prevent accidents. In addition helps evaluate potential hazards, recommends corrective action and follows up on implemented recommendations.
6. Ensures regular workplace safety meetings to review safety topics for employee training and discussion of safety hazards, are carried out at least once per month
7. Consults on and is available for workplace testing and safety procedure assessment.
8. Assists with the investigation of safety incidents, near miss reporting, Ministry of Labour visits, and work refusals.
9. Inputs safety and near miss incident data into the 'Triple I' database and follows reporting procedures as required.
10. Other duties as assigned or required.

Qualifications

1. Demonstrated knowledge of OH&S Act and Regulations and safety systems
2. Demonstrated knowledge of the operations of the Water /Waste Water Facilities
3. **Valid Water /Waste Water Certification**
4. Valid driving Licence
5. Computer literacy

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File: C:\DWQMS\ACW- APPENDIX E3 – Org. Structure, Roles, Resp., Authorities – Job Descriptions

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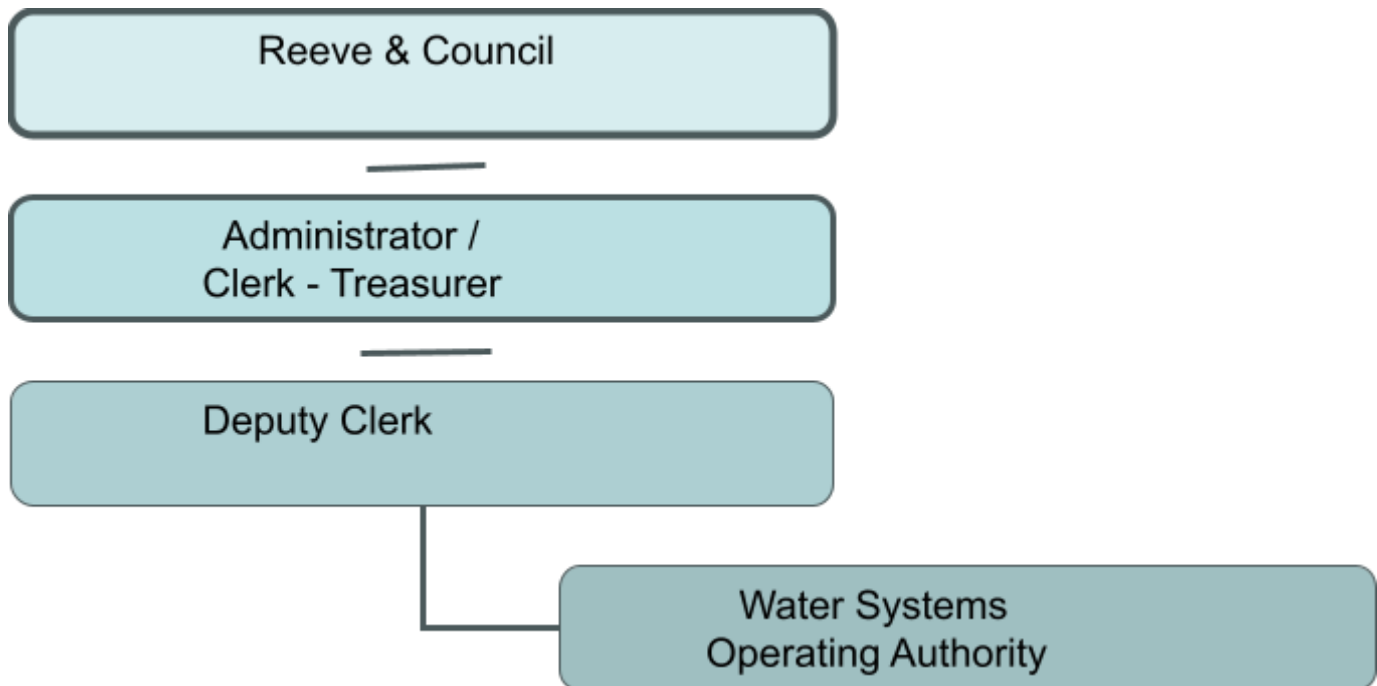
Township of Ashfield-Colborne-Wawanosh

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DWQMS Operational Plan
A-C-W

APPENDIX E 4: ORGANIZATION CHART

MUNICIPALITY OF ASHFIELD-COLBORNE-WAWANOSH



File: C:\DWQMS\ACW\ - APPENDIX E4 - Org. Structure, Roles, Resp. Authorities – Municipality of ACW – Org. Chart

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Update PM	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX E 5: RESPONSIBILITIES TABLE - OWNER

Role / Title	Responsibilities	Authorities
Reeve and Council	<ul style="list-style-type: none"> o Responsible for Municipality of Ashfield-Colborne-Wawanosh operations o Approves facility budget for resources or infrastructure as necessary o Endorses the implementation of a DWQMS o Endorses the Operational Plan o Owns the Operational Plan o Submits operational Plan to MECP o Applies for licence and DWWP o Ensures Operating Authority is accredited o Ensures compliance with license o Monitors the QMS and the need to support with resources o Reviews the Operating Authority's capital works recommendations and sets budgets as appropriate o Emergency response as listed in the Municipal Emergency Plan 	<ul style="list-style-type: none"> - Financial and administrative authority related to all Municipal operations - Hiring and discipline of staff and contractors - To perform listed responsibilities
CAO/Deputy-Clerk	<ul style="list-style-type: none"> o Obtains resources or infrastructure as necessary o Assists in preparation of the facility's budget o Appoints Municipality QMS representation o Participates in Management Reviews o Participates in ongoing communication with the Operating Authority o Serves as liaison between the Operating Authority and Council o Emergency response as listed in the Municipal Emergency Plan o Ensures operations are performed as per the Contract between the Operating Authority and the Owner, and by the regulatory requirements 	<ul style="list-style-type: none"> - To recommend improvements or changes according to the Operating Contract - To communicate with the public if required - To perform listed responsibilities
Clerk	<ul style="list-style-type: none"> o Emergency response as listed in the Municipal Emergency Plan o Assists in overseeing water operations, distribution and treatment 	<ul style="list-style-type: none"> - Work is performed under the direction of the CAO with access to other departments and appropriate ministries for

File: C:\DWQMS\ACW\ - APPENDIX E5 -Org. Structure, Roles, Resp. Authorities - Municipality of ACW – Resp. Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Update PM	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev.2	July 15, 2019	Update Moe to MECP	N.Mayhew-QMS Rep	John Graham – Veolia PM

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Township of Ashfield-Colborne-Wawanosh

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	<ul style="list-style-type: none"> o Reports on Operations and the QMS to Council as required o Communicates and provides support to the Operating Authority o Ensures that the DWQMS is implemented and maintained, and that the operating authority is accredited o Ensures that current versions of documents required by the QMS are being used at all times o Maintains and files required QMS documentation o Emergency response as listed in the Municipal Emergency Plan 	<p>assistance and information</p> <ul style="list-style-type: none"> - To perform listed responsibilities
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File: C:\DWQMS\ACW\ - APPENDIX E5 -Org. Structure, Roles, Resp. Authorities - Municipality of ACW – Resp. Table

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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APPENDIX F 1: COMPETENCY REQUIREMENTS TABLE

Competency Requirements Table		
Role	Required Competencies	Desired Competencies
Project Manager / Overall Responsible Operator	<p>WTP Class III Certification</p> <p>Distribution Class III Certification</p> <p>Supervisory Experience/Training</p> <p>System ORO</p> <p>SCADA Training</p> <p>WHMIS</p> <p>Mechanical Aptitude</p> <p>Internal Auditor Training</p> <p>First Aid (Including CPR)</p> <p>Computer literate</p> <p>Related post secondary school</p>	<p>Leadership Training</p> <p>WD Class III Certification</p> <p>WT Class III Certification</p> <p>Trade designation/CET</p> <p>SCADA Training</p>
Quality Assurance and Compliance Specialist	<p>Familiarity with O. Reg's Water</p> <p>Computer literate</p> <p>WHMIS</p> <p>Office Management training</p> <p>Familiarity with QMS</p> <p>Related post-secondary school</p>	<p>WT/WD certification</p> <p>SCADA training</p> <p>Leadership Training</p> <p>Mechanical / electrical skills</p> <p>Familiarity with Plant / Lab procedures</p>
Office Manager	<p>Computer literate</p> <p>Book keeping training</p> <p>Office organization</p> <p>Customer relations</p> <ul style="list-style-type: none"> Knowledge of WSIB <p>WHMIS</p>	<p>WT/WD certification</p> <p>SCADA training</p> <ul style="list-style-type: none">

File: C:\DWQMS\ACW – APPENDIX F 1 – Competency Requirements Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Add First Aid, Confined space	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 2	May 31, 2018	Added Job Titles	C Good – QMS Rep.	John Graham – Veolia PM

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Township of Ashfield-Colborne-Wawanosh

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Administrative Assistant	<ul style="list-style-type: none"> Computer literate Book keeping training Office organization Customer relations WHMIS 	<ul style="list-style-type: none"> WT/WD certification SCADA training
Maintenance Manager	<ul style="list-style-type: none"> Electrician/Millwright designation SCADA training Supervisory experience Computer literate Confined space training WHMIS 	<ul style="list-style-type: none"> WT/WD certification
Operations Lead	<ul style="list-style-type: none"> Supervisory Experience/Training System ORO SCADA Training WHMIS Mechanical Aptitude First Aid (Including CPR) Computer literate Related post secondary school 	<ul style="list-style-type: none"> Leadership Training SCADA Training
Lead Hand	<ul style="list-style-type: none"> Supervisory Experience/Training SCADA Training WHMIS Mechanical Aptitude First Aid (Including CPR) Computer literate Related post secondary school 	<ul style="list-style-type: none"> Leadership Training SCADA Training
WTP Operator	<ul style="list-style-type: none"> WT/WD certification Designated OIC SCADA training WHMIS 	<ul style="list-style-type: none"> Confined space training Computer literacy Related post secondary school

File: C:\DWQMS\ACW – APPENDIX F 1 – Competency Requirements Table

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Township of Ashfield-Colborne-Wawanosh

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	Mechanical/electrical skills Familiarity with Lab procedures Minimum G2 Operator's licence First Aid (Including CPR) Computer literate	
QMS Representative	Familiarity with QMS Related post secondary school Familiarity with O. Reg's Water Computer literate	WT/WD certification Leadership Training Mechanical / electrical skills Familiarity with Plant / Lab procedures WHMIS

File: C:\DWQMS\ACW – APPENDIX F 1 – Competency Requirements Table

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Veolia Water Canada

Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan
A-C-W

APPENDIX F2: TRAINING MATRIX

Example Only: Note- complete training record matrix stored electronically on Administrative Assistant's Computer.
2008

Date	Course/Training	CEU	CE Hours	Other Training Hrs	Total Hours
Feb. 14/08	Risk Assessment & Emergency Preparedness	0.7	7	0	7
April 22/08	Drinking Water Quality Management Standard	0.7	7	0	7
Jan/08-Apr/08	Safety Training-1/2 Hr. Month	0	0	2	2
Total For 2008		1.4	14	2	9

MECP Required Hours- Annually

System Class	Continuing Ed.	On-the- Job	Total hrs
Limited System-Ground	7 hrs	13 hrs	20
Limited System- Surface	7 hrs	13 hrs	20
Class I	7 hrs	23 hrs	30
Class II	12 hrs	23 hrs	35
Class III	14 hrs	26 hrs	40
Class IV	14 hrs	36 hrs	50

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File: C:\DWQMS \ACW - APPENDIX F 2 – Competencies -Training Matrix

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Removed Reference to CO	C Good – QMS Rep.	John Graham – Veolia PM
Rev. 2	July 15, 2019	Updated MOE to MECP/Changed font size	N. Mayhew – QMS Rep.	John Graham – Veolia PM

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX G1: AFTER HOURS DISPATCH AND RESPONSE TO AUTO-DIALER ALARM

Please refer to the Water Treatment Plant Operations Manual for the latest information for After Hours Dispatch and for the Response to the Auto-Dialer Alarm.

Copies are located at the Water Treatment Plant and the Municipal Office.

File: C:\DWQMS\ACW - APPENDIX G 1 – Personnel Coverage – After Hours Dispatch

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APPENDIX H 1: SUPPLIES AND SERVICES TABLE

ESSENTIAL SUPPLY OR SERVICE	REASON FOR THE SUPPLY OR SERVICE	PROCUREMENT	QUALITY REQUIREMENTS
Disinfectant -Chlorine 12% and 6%	Disinfection for WTPs	Primary Supplier : D.H. Jutzi Limited Stratford ON N5A 6T1 519-271-9831	Contingency / Emergency Supplier: -Brockton or Other local Municipalities in emergency situations
Dechlorination pucks	Neutralizing chlorinated water during flushing	Primary Supplier: D.H. Jutzi Limited Stratford ON N5A 6T1 519-271-9831	Requirements as applicable from listing above.
Meters and Analysers -Chlorine residual -Turbidity -pH		Primary Supplier : HACH Sales and Service Can. 3020 Gore Rd. London N5V4T7 1-970-663-1377 Contingency / Emergency Supplier: ClearTech 7480 Bath Rd Mississauga ON L4T 1L2 1-800-387-7503	Requirements as applicable from listing above. -parts and services used must be certified to ensure proper functionality of meters and analyzers for the water industry
Instrumentation Parts		Primary Supplier : HACH Sales and Service Can. 3020 Gore Rd. London N5V4T7 1-970-663-1377 Contingency / Emergency Supplier: ClearTech 7480 Bath Rd Mississauga ON L4T 1L2 1-800-387-7503	Requirements as applicable from listing above. -parts and services used must be certified to ensure proper functionality of meters and analyzers for the water industry

File: C:\DWQMS\ACW\ - Appendix H 1 - Supplies and Services Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 4	May 31, 2018	Removed references to other sites	C Good – QMS Rep.	John Graham - Veolia Project Manager
Rev. 5	July 15, 2019	Update Contacts	N.Mayhew-QMS Rep.	John Graham – Veolia PM

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		<p>Contingency / Emergency Supplier: SGS 657 Consortium Crt London ON N6E 2S8 1-877-848-8060 Fax: 1-519-672-4500 SGS 185 Concession St P.O. Box 4300 Lakefield ON K0L 2H0 1-705-652-2000 Fax: 1-705-652-6365</p> <p>Maxxam Analytics Inc 6740 Campobello Rd Mississauga, ON L5N 2L8 <u>or alternative option</u> AGAT Laboratories 5835 Coopers Ave Mississauga, ON L4Z 1Y2</p>	
<p>Instrument Calibration Services (metering pumps, on-line analysers etc.)</p>		<p>Primary Supplier : ICS Instrumentation and Control Solutions Inc. 525 Highland Rd W. Suite 406 Kitchener ON N2M 5P4 519-465-2489</p> <p>Contingency / Emergency Supplier: Ferguson Plumbing 425 Parsons Crt Goderich ON N7A 4K3 519-524-5968</p>	<p>Requirements as applicable from listing above.</p> <p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>

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		<p>ICONIX Waterworks LP 58 Rosland Rd W Oshawa ON L1G 2V5 905-743-9222</p>	
Underwater Services	<p>Maintenance / Inspection / video of intake pipe, towers, standpipes, reservoirs</p>	<p>Primary Supplier : <u>Watech Services Inc</u> 895 Valetta St London, ON 519-289-5678 watech@xplornet.com inspection – intake and reservoir) Contingency/Emergency Supplier: <u>Aplus RTD</u> 5305 John Lucas Dr - #1 Burlington, ON 905-331-8810 (tower / res, video insp)</p>	<p>Requirements as applicable from listing above.</p> <p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>
Diesel Engine Service and Maintenance		Primary Supplier :	Requirements as applicable from listing above.

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		<p>Sommers Motor Generator Sales Tavistock, ON 800-690-2396</p> <p>Contingency / Emergency Supplier:</p> <p>TNT Standby Generator (Rental / Service) Airport Line, Exeter 519-237-3641</p>	<p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>
Computer System Maintenance		<p>Primary Supplier :</p> <p>MicroAge Basics 223 Huron Rd Goderich ON N7A 2Z8 519-524-9863</p>	<p>Requirements as applicable from listing above.</p> <p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>
SCADA System Maintenance		<p>Primary Supplier :</p> <p><u>Datasoft Software Solutions</u> - London Rick Beer 519-317-2657</p> <p>Contingency/Emergency Supplier: <u>ICS Instrumentation & Control Solutions Inc.</u> 525 Highland Rd W Suite 406 Kitchener ON N2M 5P4</p>	<p>Requirements as applicable from listing above.</p> <p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>

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Rev. 5	July 15, 2019	Update Contacts	N.Mayhew-QMS Rep.	John Graham – Veolia PM

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		<p>1-519-465-2497 / 2489 (Tim Heutinck) Emerson Process Management -905-948-3348 (Bolton) -Andrei Pantelica - 416-414-9019 (cell)</p> <p>MicroAge Basics -519-524-9863 H2Ontario -519-625-1151</p>	
Contractors / Excavators		<p>Primary Supplier : Bruinsma Sid Excavating Services 79905B Pondsview Rd Goderich ON N7A 3X8 519-524-8668</p> <p>Contingency / Emergency Supplier: Lavis Contracting 37462A Huron Rd Clinton ON NoM1L0</p>	<p>Requirements as applicable from listing above.</p> <p>-service providers to be properly licensed or certified to perform requested services (i.e. instrument calibrations, underwater services, mechanical / electrical services, excavation etc)</p>

Revision History Summary Table:

File: C:\DWQMS\ACW\ - Appendix H 1 - Supplies and Services Table

Rev. Level:	Date:	Change:	By:	Approved By:
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Rev. 5	July 15, 2019	Update Contacts	N.Mayhew-QMS Rep.	John Graham – Veolia PM

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Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Updates	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 2	June 14, 2013	Updates	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Mar. 20, 2015	Updates re Audits – matching other systems H1 Table	DC Scott –QMS Rep.	John Graham - Veolia PM
Rev. 4	May 31, 2018	Removed references to other sites	C Good – QMS Rep.	John Graham - Veolia Project Manager
Rev. 5	July 15, 2019	Updates	N Mayhew –QMS Rep	John Graham - Veolia PM
Rev. 6	June 10, 2020	Updates	S Telford – QMS Rep	John Graham - Veolia Pm

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APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE

Please see the appropriate section tab at the back of this document for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

The Systems included are:

Benmiller Drinking Water System

Century Heights Subdivision Drinking Water System

Courtney Subdivision Distribution System

Dungannon Drinking Water System

Huron Sands Drinking Water System

South Lucknow Distribution System

ACW - APPENDIX I 1 – Sampling, Testing, and Monitoring Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 28, 2011	Revise System names	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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APPENDIX J 1: MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION TABLE

CALIBRATION SUMMARY TABLE			
Instrument	Method	Frequency	Records
Hand Held Chlorine Analyzer (Hach Pocket Chlorine Colorimeter with each service vehicle for analysing distribution grab samples)	User's Manual copies kept with each unit for procedure and reference Operators track schedule requirement and record results	-Daily visual inspection, cleaning and alarm check -Weekly accuracy check (calibration as required)	-maintenance recorded in instrument log -calibration recorded in calibration binder
Spectrophotometer (Hach DR3900 Spectrophotometer located in Goderich Lab used for various analysis)	User's Manual copy stored in Lab for procedure and reference Operators track schedule requirement and record results	-Monthly checks per user's manual (calibration as required)	-maintenance recorded in instrument log -calibration recorded in calibration binder
Hand Held Turbidimeter (Hach 2100P portable turbidimeter with each service vehicle)	User's Manual kept with each unit for procedure and reference Operators track schedule requirement and record results	-Daily visual inspection, cleaning and alarm check -Weekly accuracy check (calibration as required) -Quarterly calibration using 'formazin' as detailed in user's manual	-maintenance recorded in instrument log -calibration recorded in calibration binder

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File: C:\DWQMS\ACW - APPENDIX J1 -Measurement and Recording Equipment Calibration Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 1	Mar. 28, 2011	Add note re Veolia Hub	DC Scott -QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 2	Mar. 20, 2015	Update info	DC Scott -QMS Rep.	John Graham - Veolia PM / ORO
Rev. 3	May 31, 2018	Removed online fluoride analyzer	C Good - QMS Rep.	John Graham - Veolia PM / ORO

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Devices	Method	Frequency	Schedule
On-Line Turbidimeter (Hach 1720C turbidimeter monitoring filter effluent and point of entry to distribution) (Hach surface scatter #5 turbidimeter monitors raw water)	User's Manual copy stored at the WTP for procedure and reference Operators track schedule requirement and record results	-Daily visual checks of flows, alarms, comparison of instrument reading to calibrated bench instrument (calibration as required) -Monthly cleaning of sample cell per user's manual -Annual replacement of supply tubing	-maintenance recorded in instrument log -calibration recorded in calibration binder
Bench Turbidimeter (Hach 2100N used to verify on-line treated, filter effluent, and raw water turbidimeters plus used to monitor settled water turbidity)	User's Manual copy stored in Lab for procedure and reference Operators track schedule requirement and record results	-Daily accuracy checks using prepared gel standards (calibration as required) -Quarterly calibration using 'formazin' standards	-maintenance recorded in instrument log -calibration recorded in calibration binder
On-Line Chlorine Analyzer (Hach Cl-17 on-line chlorine analyzers monitoring water entering the Goderich WTP from intake, treated water at point of entry to distribution, water entering and leaving the booster station.)	User's Manual copy stored at each location for procedure and reference Operators track schedule requirement and record results	-Daily visual check of reagent levels, flow through instrument, alarms -Weekly comparison of instrument to calibrated hand held instrument or spectrophotometer (calibration as required) Monthly cleaning of sample cell per user's manual -Annual replacement of pumping tubes and supply tubing	-maintenance recorded in instrument log -calibration recorded in calibration binder
pH meters (portable)	User's Manual copy stored at each location for procedure and reference	-Weekly checks against bench instrument -Quarterly calibration to purchased prepared standards	-maintenance recorded in instrument log -calibration recorded in calibration binder

File: C:\DWQMS\ACW - APPENDIX J1 - Measurement and Recording Equipment Calibration Table

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Rev. 1	Mar. 28, 2011	Add note re Veolia Hub	DC Scott - QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 2	Mar. 20, 2015	Update info	DC Scott - QMS Rep.	John Graham - Veolia PM / ORO
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	Operators track schedule requirement and record results		
Devices	Method	Frequency	Schedule
SCADA	Comparison to on-line instruments	-as required based on conditions- power outages etc	-maintenance recorded in instrument log -calibration recorded in calibration binder
Flow Meters	-outside contract	-annual inspection -more frequent if concerns noted by Operator	-Certificates filed in main office -copy filed with Operations Manual as required

Note: All main devices are listed in this Table for the Veolia hub, and may not be required at individual systems.

File: C:\DWQMS\ACW - APPENDIX J1 -Measurement and Recording Equipment Calibration Table

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APPENDIX K 1: EMERGENCY PROCEDURES

Emergency Response Procedures for Veolia Water Canada are located at the Water Treatment Plant in the Contingency Plan Booklet filed with the Operations Manual – Standard Operating Procedures.

The Municipal Emergency Response Plan for water is filed at the Municipal Office as well as a copy being maintained at the Water Treatment Plant stored near the Contingency Plan.

File: C:\DWQMS\ACW - APPENDIX K 1 – Emergency Procedures

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia PM / ORO

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Township of Ashfield-Colborne-Wawanosh

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APPENDIX L 1: INTERNAL AUDIT PROCEDURE AND SCHEDULE

Procedure:

1.0 Audit Criteria

Internal audits of the QMS shall be conducted to confirm that the QMS meets or exceeds the requirements of the DWQMS Standard, and that it is effectively implemented and maintained.

Internal Audits also are expected to identify sources of variation from the requirements of the written policy and procedures.

Internal Audits also are intended to promote awareness of the QMS, and to promote requirements for quality performance within the system, and to help ensure employees are aware of the systems and procedures to control the process.

2.0 Audit Schedule, Frequency and Scope

Audit schedules will be developed and posted by the Project Manager or designate.

Internal audits are to be scheduled once a year. Each element of the Standard is required to be audited at least once during the calendar year.

Audit schedules are intended to cause the least disruption to the operation, and heavy vacation schedules, and other high activity periods will be avoided when practical to help ensure the right people (process owners for the sections of the QMS) are available for the audit review.

The Operating Authority requires that Internal Audits be carried out prior to surveillance and accreditation audits, and prior to Management Reviews.

File: C:\DWQMS\ACW – APPENDIX L 1 – Internal Audit – Schedule and Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Updated Audit Schedule	C Good – QMS Rep.	John Graham – Veolia PM

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On-going audit schedules will be developed and posted by the end of December each year for the upcoming year by the Project Manager or designate.

3.0 Audit Preparation

Internal Auditors are selected based on their training and qualifications. Auditors must successfully complete an Auditor Training Course approved by the Project Manager. Auditors also are expected to have certain attributes such as good communication skills, being a good listener, being open minded, organized, courteous and polite.

Internal auditors are also expected to have some familiarity with the Water Treatment Plant or System. Auditors may possibly be 'shared' between locations or Operating Authorities to assist with scheduling arrangements, and provide a more objective look at a system other than the one they currently work in.

The Project Manager, and /or designate, based on the audit schedule, will select audit dates, start an audit file, confirm the audit scope, ensure auditor(s) develop an audit plan and checklist, and advise auditees well in advance of the audit dates.

A Checklist will be prepared by the internal auditor(s), based on the review of applicable documentation for the element(s) to be audited. The documentation review could include the Operational Plan – Policy Procedures, and Tables, Operations Manuals/Contingency Plan, Process Maps, Work Instructions, and previous audit reports.

The Checklist is required to assist in organizing the audit to help maintain focus on the QMS, assist the auditor in preparation of audit questions, and to provide a place to record information from the audit. A template for an initial QMS Internal Audit Checklist is listed in Appendix L2. Additional

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templates should be prepared and implemented as audits progress to specific policy and procedures of the QMS.

Document and Records Control Policy and Procedures sections should be sampled and reviewed with each audit to better ensure any variations are noted and corrected.

4.0 Conducting the Audit

Audits will be conducted on Elements of the QMS for conformance to DWQMS Standard and the documented Policy and Procedures in the Operational Plan.

Once the audit preparation is complete, and specific audit schedules arranged, an Opening Meeting with the appropriate WTP staff and employees is recommended to review the audit agenda just prior to proceeding with the audit interviews and questions. Availability of appropriate personnel, and a closing meeting time and location can also be confirmed.

Once the audit is complete, a Closing Meeting is required with appropriate WTP staff to review audit findings and advise of observations and any non-conformances.

5.0 Audit Report and Follow-Up

An Audit Report will be issued to report the results of the internal audit to the Project Manager. The report overview should identify persons contacted during the audit (although not attributing specifics to any persons), audit team members, elements audited, and any relevant observations or concerns, and non-conformances. The audit report should be reported in the form of a completed audit checklist for consistency.

Corrective Action Requests (CAR's) document a non-conformance that requires action by the auditee, and are issued with the audit report. The report of a non-conformance should state the

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requirement, the non-conformance, and the objective evidence to support the CAR. The CAR can also serve as a source of information for checklists and future audits.

Corrective Action Requests (CARs) should be completed in a timely manner, and follow-up actions reported and filed with the Audit Report files. The internal audit file can be considered closed when CARs have been responded to and agreed to by the Project Manager.

For initial audit reports a list of potential non-conformances and observations can be provided instead of individual CARs for each. A Corrective Action Request (CAR) form is included in this Appendix.

Follow-up to the report of observations or non-conformances will be directed by the Project Manager to the appropriate personnel or team to determine the Root Cause of the issue and to develop appropriate corrective actions to prevent future recurrence.

The “Five Why?” Method of determining Corrective actions will be used in developing appropriate corrective actions to prevent future recurrence. A 5-Why Procedure and Form is included in this Appendix for reference.

As the Internal Audit process develops, the Project Manager may consider Process Audits in addition to Elemental Audits to ‘tie-in’ various Water Treatment Plant process steps to look for variation, and opportunities to improve the process.

6.0 Associated Documents

DWQMS Standard

QMS Implementation Guide

WCWC Internal Auditing for Drinking Water QMS Course Materials

APPENDIX L1: Internal Audit Schedule

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APPENDIX L2: Internal Audit Checklist

Corrective Action Request Form (Internal Audit)		
CAR #	Audit Date:	Priority:
Issue Date:	Auditor:	Respond by date:
Issued by:	Title:	Respond to:
Requirement:		
Non-Conformance:		
Objective Evidence:		
Action Proposed / Taken (by auditee)		

File: C:\DWQMS\ACW – APPENDIX L 1 – Internal Audit – Schedule and Procedure

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Completion date:	Completed by:	
5-Why Root Cause Analysis Form (Corrective Action Request - Internal Audit)		
CAR #	Audit Date:	Priority:
Issue Date:	Auditor:	Respond by date:
Team Members: (with practical knowledge of the process)		
Non-Conformance:		
Immediate Corrective Action / Containment as required / Interim Actions :		
5 - Why Root Cause Analysis:		
1- Why did the non-conformance occur:		
2- Why:		
3- Why:		
4- Why:		
5- Why:		
Root Cause Determined:		
Solution / Action / Verification: (long term solution to eliminate the cause of the problem)		

File: C:\DWQMS\ACW – APPENDIX L 1 – Internal Audit – Schedule and Procedure

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Implementation Steps / By whom / Estimated completion date:

5 Whys Procedure - Determining Root Cause

The 5 Whys is a simple problem-solving technique that helps users to get to the root of the problem quickly. Made popular in the 1970s by the Toyota Production System, the 5 Whys strategy involves looking at any problem and asking: "Why?" and "What caused this problem? Very often, the answer to the first "why" will prompt another "why" and the answer to the second "why" will prompt another and so on; hence the name the 5 Whys strategy.

By repeatedly asking the question "Why" (five is a good rule of thumb), you can peel away the layers of symptoms which can lead to the root cause of a problem. Although this technique is called "5 Whys," you may find that you will need to ask the question fewer or more times than five before you find the issue related to a problem.

Benefits of the 5 Whys include helping to quickly determine the root cause of a problem and that it is easy to learn and apply.

Procedure:

1. Write down the specific problem. Writing the issue helps you formalize the problem and describe it completely. It also helps a team focus on the same problem.
2. Ask Why the problem happens and write the answer down below the problem.
3. If the answer you just provided doesn't identify the root cause of the problem that you wrote down in step 1, ask Why again and write that answer down.
4. Loop back to step 3 until the team is in agreement that the problem's root cause is identified. Again, this may take fewer or more times than five Whys.

Example:

Problem Statement: You are on your way home from work and your car stops in the middle of the road.

1. **Why** did your car stop?
- Because it ran out of gas.
2. **Why** did it run out of gas?
- Because I didn't buy any gas on my way to work.
3. **Why** didn't you buy any gas this morning?
- Because I didn't have any money.
4. **Why** didn't you have any money?
- Because I lost it all last night in a poker game.

File: C:\DWQMS\ACW – APPENDIX L 1 – Internal Audit – Schedule and Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Updated Audit Schedule	C Good – QMS Rep.	John Graham – Veolia PM

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5. Why did you lose your money in last night's poker game?

- Because I'm not very good at "bluffing" when I don't have a good hand.

The final Why leads the team to a statement (root cause) that the team can take action upon. It is much quicker to teach a person to "bluff" a hand than it is to try to directly solve the stated problem above without further investigation.

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APPENDIX L 2: INTERNAL AUDIT CHECKLIST

DATE OF INTERNAL AUDIT:

AUDITOR NAMES:

AREAS VISITED:

PEOPLE INTERVIEWED:

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DWQMS Requirement	Notes, Questions, Observations, Audit Evidence	Conformance?	Records of Documents Reviewed, Interviews Conducted
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1. Quality Management System

PLAN – The Operational Plan shall document a Quality Management System that meets the requirements of this Standard.

DO – The Operating Authority shall establish and maintain the Quality Management System in accordance with the requirements of this Standard and the policies and procedures documented in the Operational Plan.

2. Quality Management System Policy

PLAN – The Operational Plan shall document a Quality Management System Policy that provides the foundation for the Quality Management System, and:

- a) includes a commitment to the maintenance and continual improvement of the Quality Management System,

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- b) includes a commitment to the Consumer to provide safe drinking water,
- c) includes a commitment to comply with applicable legislation and regulations, and
- d) is in a form that can be communicated to all Operating Authority personnel, the Owner and the Public.

DO – The Operating Authority shall establish and maintain a Quality Management System that is consistent with the Quality Management System Policy.

3. Commitment and Endorsement

PLAN – The Operational Plan shall contain a written endorsement of its contents by Top Management and the Owner.

DO – Top Management shall provide evidence of its commitment to an effective Quality Management System by:

- a) ensuring that a Quality Management System is in place that meets the requirements of this Standard,
- b) ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,

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- c) communicating the Quality Management System according to the procedure for communications, and
- d) determining, obtaining or providing the resources needed to maintain and continually improve the Quality Management System.

4. Quality Management System Representative

PLAN – The Operational Plan shall identify a Quality Management System representative.

DO – Top Management shall appoint, and authorize a Quality Management System representative who, irrespective of other responsibilities, shall:

- a) administer the Quality Management System by ensuring that processes and procedures needed for the Quality Management System are established and maintained,
- b) report to Top Management on the performance of the Quality Management System and any need for improvement,
- c) ensure that current versions of documents required by the Quality Management System are being used at all times,

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- d) ensure that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the subject system, and
- e) promote awareness of the Quality Management System throughout the Operating Authority.

5. Document and Records Control

PLAN – The Operational Plan shall document a procedure for document and records control that describes how:

- a) documents required by the Quality Management System are:
 - i. kept current, legible and readily identifiable
 - ii. retrievable
 - iii. stored, protected, retained and disposed of, and
- b) records required by the Quality Management System are:
 - i. kept legible, and readily identifiable
 - ii. retrievable
 - iii. stored, protected, retained and disposed of.

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DO – The Operating Authority shall implement and conform to the procedure for document and records control and shall ensure that the Quality Management System documentation for the subject system includes:

- a) the Operational Plan and its associated policies and procedures,
- b) documents and records determined by the Operating Authority as being needed to ensure the effective planning, operation and control of its operations, and
- c) the results of internal and external audits and management reviews.

6. Drinking-Water System

PLAN – The Operational Plan shall document, as applicable:

- a) for the subject system:
 - i. the name of the Owner and Operating Authority
 - ii. if the system includes equipment that provides Primary Disinfection and/or Secondary Disinfection:
 - A. a description of the system including all applicable Treatment System processes and Distribution System components,
 - B. a Treatment System process flow chart,

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- C a description of the water source, including:
 - I. general characteristics of the raw water supply,
 - II. common event-driven fluctuations, and
 - II. any resulting operational challenges and threats.
 - iii. if the system does not include equipment that provides Primary Disinfection or Secondary Disinfection:
 - A. a description of the system including all Distribution System components, and
 - B. a description of any procedures that are in place to maintain disinfection residuals.
 - b) if the Subject System is an Operational Subsystem, a summary description of the Municipal Residential Drinking Water System it is a part of including the name of the Operating Authority(ies) for the other Operational Subsystems.
 - c) if the Subject System is connected to one or more other Drinking Water Systems owned by different Owners, a summary description of those systems which:

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- i. indicates whether the Subject System obtains water from or supplies water to those systems,
- ii. names the Owner and Operating Authority(ies) of those systems, and
- iii. identifies which, if any, of those systems that the Subject System obtains water from are relied upon to ensure the provision of safe drinking water.

DO – The Operating Authority shall ensure that the description of the drinking-water system is kept current.

7. Risk Assessment

PLAN – The Operational Plan shall document a risk assessment process that:

- a) Considers potential hazardous events and associated hazards, as identified in the Ministry of the Environment and Climate Change document titled Potential Hazardous Events for Municipal Residential Drinking Water Systems, dated December 2016 as it may be amended. A copy of this document is available at www.ontario.ca/drinkingwater
- b) identifies potential hazardous events and associated hazards,

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- c) assesses the risks associated with the occurrence of hazardous events,
- d) ranks the hazardous events according to the associated risk,
- e) identifies control measures to address the potential hazards and hazardous events,
- f) identifies critical control points,
- g) identifies a method to verify at least once every calendar year, the currency of the information and the validity of the assumptions used in the risk assessment,
- h) ensures that a risk assessment is conducted at least once every thirty-six months, and
- i) considers the reliability and redundancy of equipment.

DO – The Operating Authority shall perform a risk assessment consistent with the documented process.

8. Risk Assessment Outcomes

PLAN – The Operational Plan shall document:

- a) the identified potential hazardous events and associated hazards,
- b) the assessed risks associated with the occurrence of hazardous events,
- c) the ranked hazardous events,

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- d) the identified control measures to address the potential hazards and hazardous events,
- e) the identified critical control points and their respective critical control limits,
- f) procedures and/or processes to monitor the critical control limits,
- g) procedures to respond to deviations from the critical control limits, and
- h) procedures for reporting and recording deviations from the critical control limits.

DO – The Operating Authority shall implement and conform to the procedures.

9. Organizational Structure, Roles, Responsibilities and Authorities

PLAN – The Operational Plan shall:

- a) describe the organizational structure of the Operating Authority including respective roles, responsibilities and authorities,
- b) delineate corporate oversight roles, responsibilities and authorities in the case where the Operating Authority operates multiple subject systems,
- c) identify the person, persons or group of people within the management structure of

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- the organization responsible for undertaking the Management Review,
- d) identify the person, persons or group of people, having Top Management responsibilities required by this Standard, along with their responsibilities, and
 - e) identify the Owner of the subject system.

DO – The Operating Authority shall keep current the description of the organizational structure including respective roles, responsibilities and authorities, and shall communicate this information to Operating Authority personnel and the Owner.

10. Competencies

PLAN – The Operational Plan shall document:

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

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DO – The Operating Authority shall undertake activities to:

- a) meet and maintain competencies for personnel directly affecting drinking water quality and shall maintain records of these activities, and
- b) ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water, and shall maintain records of these activities.

11. Personnel Coverage

PLAN – The Operational Plan shall document a procedure to ensure that sufficient personnel meeting identified competencies are available for duties that directly affect drinking water quality.

DO – The Operating Authority shall implement and conform to the procedure.

12. Communications

PLAN – The Operational Plan shall document a procedure for communications that describes how the relevant aspects of the Quality Management System are communicated between Top Management and:

- a) the Owner,
- b) Operating Authority personnel,

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c) Suppliers that have been identified as essential under Plan 9a) of Element 13 of this Standard, and

d) the public.

DO – The Operating Authority shall implement and conform to the procedure.

13. Essential Supplies and Services

PLAN – The Operational Plan shall:

a) identify all supplies and services essential for the delivery of safe drinking water and shall state, for each supply or service, the means to ensure its procurement, and

b) include a procedure by which the Operating Authority ensures the quality of essential supplies and services, in as much as they may affect drinking water quality.

DO – The Operating Authority shall implement the procedure.

14. Review and Provision of Infrastructure

PLAN – The Operational Plan shall document a procedure for the annual review of the adequacy of the infrastructure necessary to operate and maintain the Subject System that:

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a) Considers the outcomes of the risk assessment documented under Element 8, and

b) Ensures that the adequacy of the infrastructure necessary to operate and maintain the Subject System is reviewed at least once every Calendar Year.
DO – The Operating Authority shall implement and conform to the procedure and communicate the findings of the review to the Owner.

15. Infrastructure Maintenance, Rehabilitation and Renewal

PLAN – The Operational Plan shall document:

a) a summary of the Operating Authority’s infrastructure maintenance, rehabilitation and renewal programs for the Subject System, and

b) a long term forecast of major infrastructure maintenance, rehabilitation and renewal activities

DO – The Operating Authority shall:

a) keep the summary of the infrastructure maintenance, rehabilitation and renewal programs current,

b) ensure that the long term forecast is reviewed at least once every calendar year,

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- c) communicate the programs to the Owner, and
- d) monitor the effectiveness of the maintenance program.

16. Sampling, Testing and Monitoring

PLAN – The Operational Plan shall document:

- a) a sampling, testing and monitoring procedure for process control and finished drinking water quality including requirements for sampling, testing and monitoring at the conditions most challenging to the subject system,
- b) a description of any relevant sampling, testing or monitoring activities that take place upstream of the subject system, and
- c) a procedure that describes how sampling, testing and monitoring results are recorded and shared between the Operating Authority and the Owner, where applicable.

DO – The Operating Authority shall implement and conform to the procedures.

17. Measurement and Recording Equipment Calibration and Maintenance

PLAN – The Operational Plan shall document a procedure for the calibration

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and maintenance of measurement and recording equipment.
DO – The Operating Authority shall implement and conform to the procedure.

18. Emergency Management

PLAN – The Operational Plan shall document a procedure to maintain a state of emergency preparedness that includes:

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

DO – The Operating Authority shall implement and conform to the procedure.

19. Internal Audits

PLAN – The Operational Plan shall document a procedure for internal audits that:

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- a) evaluates conformity of the QMS with the requirements of this Standard,
- b) identifies internal audit criteria, frequency, scope, methodology and record-keeping requirements,
- c) considers previous internal and external audit results, and
- d) describes how Quality Management System corrective actions are identified and initiated.

DO – The Operating Authority shall implement and conform to the procedure and shall ensure that internal audits are conducted at least once every Calendar Year.

20. Management Review

PLAN - The Operational Plan shall document a procedure for management review that evaluates the continuing suitability, adequacy and effectiveness of the Quality Management System and that includes consideration of:

- a) incidents of regulatory non-compliance,
- b) incidents of adverse drinking-water tests,
- c) deviations from critical control point limits and response actions,
- d) the effectiveness of the risk assessment process,
- e) internal and third-party audit results,
- f) results of emergency response testing,

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- 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 Quality Management System,
- l) consumer feedback,
- m) the resources needed to maintain the Quality Management System,
- n) the results of the infrastructure review,
- o) Operational Plan currency, content and updates, and
- p) staff suggestions.

DO – Top Management shall implement and conform to the procedure and shall:

- a) ensure that a management review is conducted at least once every Calendar Year
- b) consider the results of the management review and identify deficiencies and actions items to address the deficiencies,
- c) provide a record of any decisions and action items related to the management review including the personnel responsible for delivering the

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action items and the proposed timelines for their implementation,
d) report the results of the management review, the identified deficiencies, decisions and action items to the Owner.

21. Continual Improvement

PLAN – The Operating Authority shall develop a procedure for tracking and measuring continual improvement of its Quality Management System by:

a) reviewing and considering applicable best management practices, including any published by the Ministry of the Environment and Climate Change and available on www.ontario.ca/drinkingwater, at least once every thirty-six months;

b) documenting a process for identification and management of Quality Management System Corrective Actions that includes:

- i. investigating the cause(s) of an identified non-conformity,
- ii. documenting the action(s) that will be taken to correct the non-conformity and prevent the non-conformity from re-occurring, and

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iii. reviewing the action(s) taken to correct the non-conformity, verifying that they are implemented and are effective in correcting and preventing the re-occurrence of the non-conformity.

c) documenting a process for identifying and implementing Preventive Actions to eliminate the occurrence of potential non-conformities in the Quality Management System that includes:

- i. reviewing potential non-conformities that are identified to determine if preventive actions may be necessary,
- ii. documenting the outcome of the review, including the action(s), if any, that will be taken to prevent a non-conformity from occurring, and
- iii. reviewing the action(s) taken to prevent a non-conformity, verifying that they are implemented and are effective in preventing the occurrence of the non-conformity

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DO – The Operating Authority shall strive to continually improve the effectiveness of its Quality Management System by implementing and conforming to the procedure.

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Initial Release	May 15, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 1	May 31, 2018	Updated to 2.0 standard	C Good – QMS Rep.	John Graham – Veolia PM
Rev. 2	July 15, 2019	Corrected Spelling	N.Mayhew –QMS Rep	John Graham – Veolia PM

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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APPENDIX M 1: MANAGEMENT REVIEW PROCEDURE

1. Frequency

1.1 Top management shall review the QMS on an annual basis to assess and ensure the continuing suitability, adequacy and effectiveness of the QMS.

1.2 Management Review(s) shall be scheduled following the internal audit.

2. Reviewers

2.1 Management review participants shall include:

- Operating Authority Project Manager
- Quality Assurance and Compliance Specialist and/or QMS Representative
- Municipality representative

2.2 The Project Manager may include other personnel at his or her discretion

2.3 Attendees shall be notified of the management review meeting in advance by e-mail.

3. Process

3.1 The Quality Assurance and Compliance Specialist shall provide a summary of the following information in a suitable format to the management review meeting attendees at least seven days prior to the meeting:

- Incidents of regulatory non-compliance,
- Incidents of adverse drinking-water tests,
- Deviations from critical control-point limits and response actions,

File: C:\DWQMS\ACW- Appendix M 1 – Management Review Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Added discussion items	C Good – QMS Rep.	John Graham – Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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- The efficacy of the risk assessment process,
- Internal and third-party audit results,
- Results of emergency response testing,
- Operational performance,
- Raw water supply and drinking water quality trends,
- Follow-up on action items from previous management reviews,
- The status of management action items identified between reviews,
- Changes that could affect the QMS,
- Consumer feedback
- The resources needed to maintain the QMS,
- The results of the infrastructure review,
- Asset management review
- Best Management Practices review
- Corrective Actions review
- Preventative Actions review
- Operational plan currency, content and updates, and
- Staff suggestions.

3.2 The Quality Assurance and Compliance Specialist (or QMS Representative) shall prepare a meeting agenda and distribute with relevant management review data.

3.3 The management review participants shall review all data presented, and where necessary, identify deficiencies. These may include deficiencies related to the:

- effectiveness of the QMS and related procedures
- ability of the Operating Authority to implement the QMS
- provision of adequate human and financial resources
- the level of consumer satisfaction.

3.4 For all deficiencies identified, the management review participants shall identify action items, personnel responsible for implementing action items, and timelines for action items. Minutes will be issued by the Quality Assurance and Compliance Specialist and/ or QMS Representative to the participants.

File: C:\DWQMS\ACW- Appendix M 1 – Management Review Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Added discussion items	C Good – QMS Rep.	John Graham – Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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3.5 Records of management reviews, recommendations, decisions, action items, personnel responsibilities, and timelines shall be forwarded to the Owner upon completion. This reporting is also carried out on a regular annual basis to best suit the needs of the Owner and operating Authority, such as with the Annual Summary.

Records shall be maintained by the Quality Assurance and Compliance Specialist (or QMS Representative). The records shall reflect all new action items and any decisions made by the review team, deficiencies, personnel responsible for action items, and timelines.

File: C:\DWQMS\ACW- Appendix M 1 – Management Review Procedure

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	May 31, 2018	Added discussion items	C Good – QMS Rep.	John Graham – Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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APPENDIX N 1: DWQMS Annual Review

Year Reviewed: _____

Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Completed By
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													

Notes: Calendar is subject to change without notice due to scheduling conflicts.

File: C:\DWQMS\ACW- Appendix N! - DWQMS Annual Review

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 25, 2017	Release	C. Black -QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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APPENDIX N 4: Best Management Practices (BMP) Log

BMP #	Description	Actions Taken	Person(s) Responsible	Date Due	Follow Up Date	Completed By

File: C:\DWQMS \Appendix N 4 – Best Management Practices (BMP) Log

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	May 31, 2018	Release	C. Good –QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh



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BENMILLER DRINKING WATER SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

File: C:\DWQMS\ACW\BENMILLER SYSTEM APPENDIX

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30. 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Mar. 2, 2015	Update system name	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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Benmiller

6. Drinking Water System

Benmiller Drinking Water System:

System Description

6.1 General

6.1.1 The Benmiller water system is characterized as a “secure ground water” system and is classified as a small municipally owned water system. The system consisted of one well with a rated capacity of 196 m³/day, with chlorination treatment. A second monitoring well was drilled due west of the well house to monitor water movement in the aquifer, with the potential to be equipped with a pump and piping to replace the current production well if needed. This well # 2 was put into service in January 2015, including a new well pump and watermain. Well #1 was officially abandoned at that time. The entire system is located on Concession 1, Part Lot 1, Eastern Division of Ashfield-Colborne-Wawanosh Township. The distribution system serves the community of Benmiller with a population of approximately 50 residents, with approximately 18 customer services, and a 47 guest room Inn.

6.1.2 The system consists of a Limited Drinking Water System, which is owned by the Township of Ashfield-Colborne-Wawanosh and operated by Veolia Water Canada, the Operating Authority.

6.1.3 Well # 1 was abandoned in January 2015. It was originally a 150 mm drilled well, 66 metres deep, equipped with a submersible pump with a rated capacity of 4.54 Litres /second, with instrumentation and control equipment, and 50 mm discharge line connected to the pump house. Well # 1 was drilled in 1970, and associated piping installed at the same time. The well pump was replaced in 2005.

Well # 2 was put into service in January 2015, replacing # 1 well. It is a 150 mm drilled well, 70.1 m deep, originally drilled as a monitoring well in 2006. Well # 2 is equipped with a submersible vertical turbine pump rated at 2.5 L/s at 56.4 m TDH.

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File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev . 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.

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- 6.1.4 The well house is equipped with well pump, flow restrictor limiting flow to 2.27 litres/second, back-up diesel generator, chlorinators, a chlorine contact reservoir, on-line monitoring and alarm generation and auto-dialer.
- 6.1.5 Back-up power is supplied by one 20 KW, 25 kVA diesel standby generator with automatic transfer switch and 340 L double wall sub-base fuel tank, all installed in an external weatherproof and acoustic enclosure on a concrete pad.
- 6.1.6 The well house and its equipment have a daily maximum capacity to deliver 196 cubic metres of potable water per day to the Benmiller community. The current water source is one secure deep bed rock well. The well is located on the well house site with a dedicated raw water main feeding the well house.
- 6.1.7 The water from the well is pumped to a chlorine contact / storage reservoir (7.6 m x 4.6 m x 3.8 m deep) to provide adequate chlorine contact time at maximum flow and before the first consumer, complete with a sampling / service water connection feed back to the pump house.
- 6.1.8 The well house is monitored by an alarm dialer and is equipped with a data logger that tracks chlorine residual on the treated water and reservoir levels.
- 6.1.9 The attached distribution system is constructed with a combination of galvanized steel and PVC piping with polyethylene services.
- 6.1.10 There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks and 3 pressure pumps.
- 6.1.11 The system has no fire hydrants and lacks the capacity to provide fire flows.

File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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6.2 Description of Water Source

6.2.1 The current water source is from one secure deep bed rock well. Land use in the vicinity of the well is a mixture of single family residential and hotel property. The area is served by sanitary sewers with the nearest no closer than 25m.

6.2.2 Nitrate and nitrite concentrations, and trihalomethanes in the treated water, parameter tests indicate the aquifer is not influenced by run-off from surface-level activities.

6.2.3 The full characterization of the raw water supply source is listed in the First Engineer's Report, section 4 and Appendix K. (Township of Ashfield-Colborne-Wawanosh Benmiller Well Supply Engineer's Report - Nov. 30, 2000). A follow-up Raw Water Assessment was also carried out by BM Ross Consulting Engineers in May, 2009. Based on the BMR 2009 review of the hydrogeologic information and historic and recent water quality results, it was concluded that the character of the Benmiller area groundwater supply has not deteriorated since the 2000 Engineer's Report.

A Raw Water Assessment was also carried out in February 2015 by BM Ross in preparation for the Municipal Drinking Water Licence (MDWL) Renewal. It was concluded that the characterization of the Benmiller area groundwater supply has remained the same.

6.2.4 There also does not appear to be any event driven fluctuations, and there are also no resulting operational challenges or threats to the water source.

6.2.5 There also does not appear to be any upstream or downstream processes that the Municipality controls that are critical for the provision of water.

6.3 Disinfection System

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File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev . 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.

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6.3.1 Disinfection is achieved on the Benmiller well supply through the use of 6% sodium hypochlorite. In the well house this chemical is added prior to the water entering the chlorine contact reservoir at dosages high enough to achieve both primary and secondary disinfection objectives.

6.3.2 The chlorine dosages range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/l and < 1.30 mg/l.

6.4 System Flows

6.4.1 The Benmiller well supply has 1 PTTW (Permit To Take Water) # 3180-BJKPVH issued December 27, 2019, with an expiry date of December 13, 2029, which allows 196 cubic metres per day to be pumped from the well.

6.4.2 The Benmiller Drinking Water System (treatment Subsystem) has maximum flows as specified in the Municipal Drinking Water Licence (MDWL) 080-104 Exp. August 24, 2020 and Drinking Water Works Permit (DWWP) 080-204. The maximum total daily flow is 196 cubic meters per day

6.4.3 The limiting factor regarding flow is the condition of the current production well.

6.5 Distribution System

6.5.1 The treated water is monitored by an on-line chlorine analyzer

6.5.2 Distribution piping typically ranges in size from 50 mm to 100 mm, and consists of galvanized or PVC piping, with polyethylene service connections.

6.5.3 A 100 mm diameter discharge watermain outside the pump house supplies treated water to the Benmiller Estates Subdivision, and two 50 mm discharge watermain supply treated water to the Benmiller Inn.

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File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.

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Benmiller

6.5.4 Typical system pressure ranges from 40 P.S.I to 60 P.S.I.

6.6 Process Flow Schematic and Distribution Diagram:

See Below:

File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev . 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager
See Revision History Summary Table at end of this document - Section 6.6.3				

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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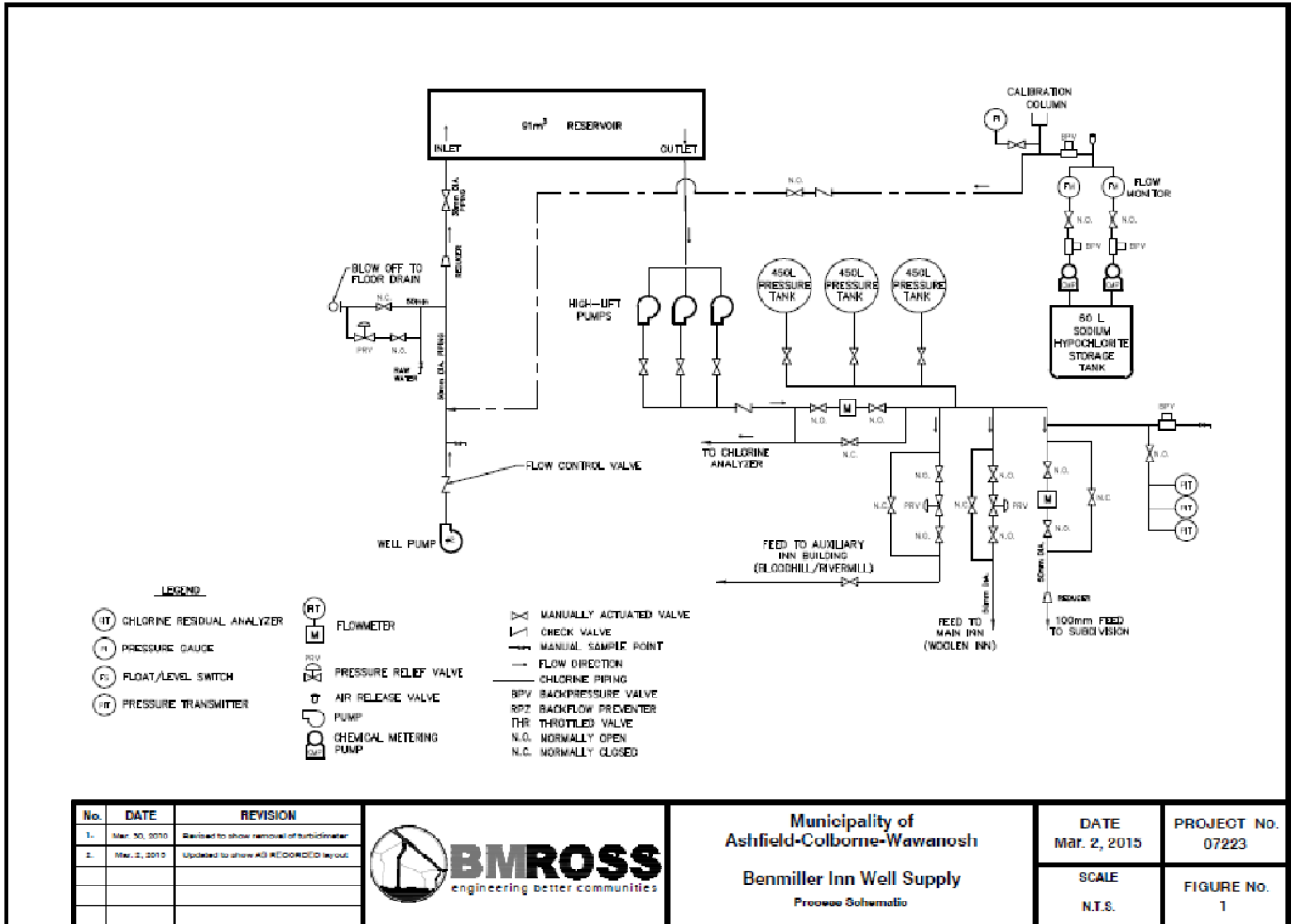
6.6.1 Benmiller Process Flow Schematic

File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev . 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager
See Revision History Summary Table at end of this document - Section 6.6.3				

Note: To be reviewed annually or when a QMS change occurs.

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No.	DATE	REVISION
1.	Mar. 30, 2010	Revised to show removal of turbidimeter
2.	Mar. 2, 2015	Updated to show AG RECORDED layout



Municipality of
Ashfield-Colborne-Wawanosh
Benmiller Inn Well Supply
Process Schematic

DATE	PROJECT No.
Mar. 2, 2015	07223
SCALE	FIGURE No.
N.T.S.	1

File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

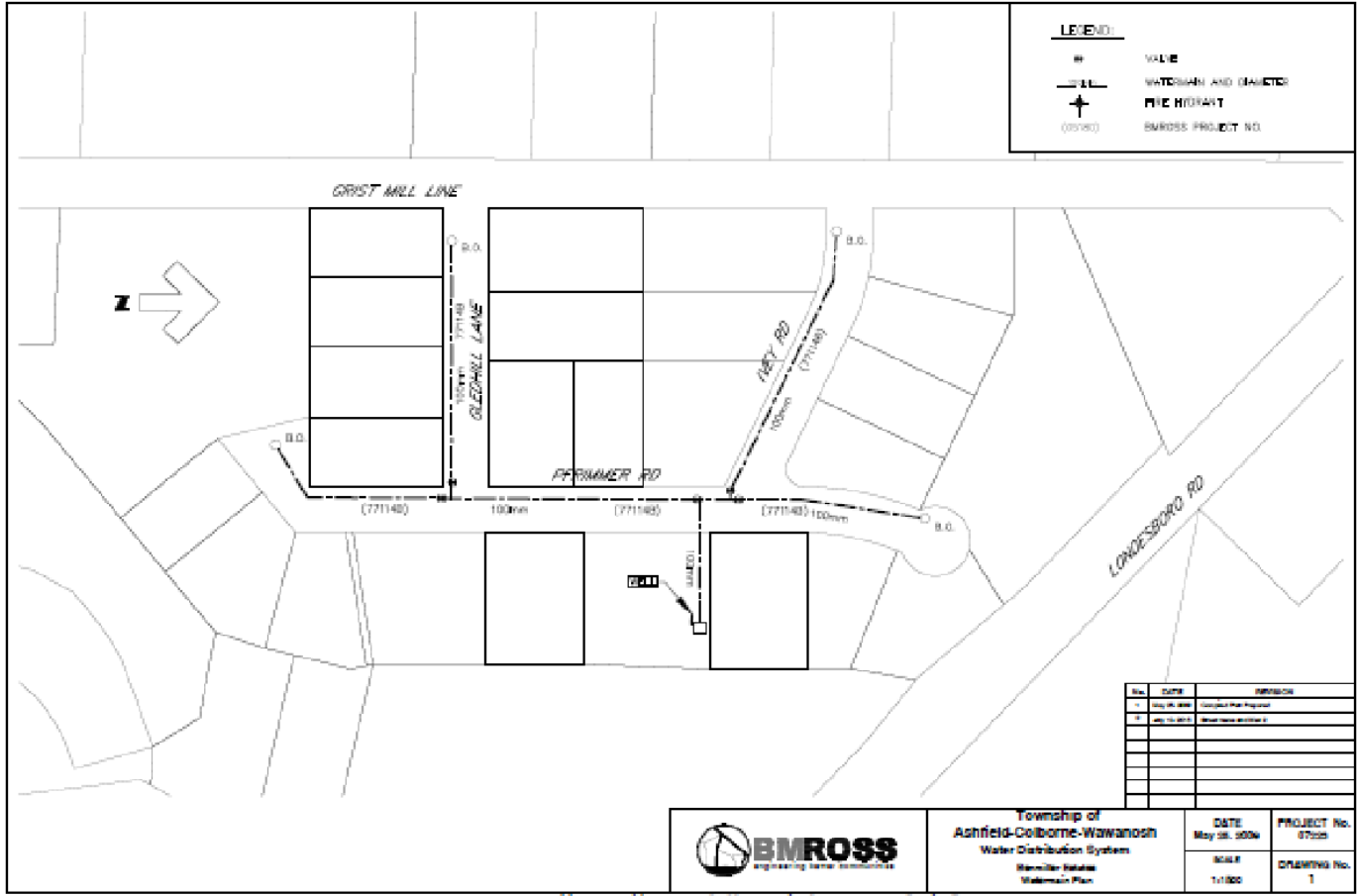
Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott - QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
Rev. 7	June 11, 2020	Updated System Description	S. Telford - QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.

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6.6.2 Benmiller Distribution



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Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott - QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
Rev. 7	June 11, 2020	Updated System Description	S. Telford - QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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6.6.3 Revision History:

File: C:\DWQMS\ACW\Benmiller - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	CoA, PTTW updates	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	July 30, 2013	Water source fluct. / challenges	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Feb. 25, 2015	Update Dist. Syst. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	Mar. 2, 2015	Update PFS Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 5	June 15, 2015	Limited DWS, data logger	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

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Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott -QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 6	Sept. 30, 2015	Add revised Dist. Dwg.	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 7	June 11, 2020	Updated System Description	S. Telford-QMS Rep	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document - Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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8. Risk Assessment Outcomes

Benmiller Drinking Water System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 4 to 11 (out of a total max of 15).

An RPN Threshold Value of 6 was chosen from review of the Risk Table because the Critical Control Point minimum number is 6. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure for response if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

File: C:\DWQMS\ACW\Benmiller- 8 – Risk Assessment Outcome

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 19, 2013	Update to 36 mo review	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	May 31, 2018	Updates due to App B2 revision	C Good – QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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Risk Assessment Table Summary

NOTE: A total 28 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures \geq 6 RPN.

	<u>RPN</u>	<u>CONTROL</u>
4 – Agricultural Run-off	8	CP-16
5 – Chemical feed pump failure	6	OM-02, CP-01
7 – Degredation of Liquid Chlorine	8	OM-21
9 – Well pump failure and related equipment	7	CP-13
11 – Watermain Break	8	CP – 10, OM – 9

Hazards with Critical Control Limits or Control Measures < 6 RPN

12 – Loss of chlorine residual	5	OM-02, CP-01
15 – Non-functioning pressure relief valve back to environment	4	OM - 8

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See below for additional potential hazards or hazardous events identified in the risk assessment as \geq 6 RPN.

File: C:\DWQMS\ACW\Benmiller- 8 – Risk Assessment Outcome

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 19, 2013	Update to 36 mo review	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	May 31, 2018	Updates due to App B2 revision	C Good – QMS Rep.	John Graham - Veolia Project Manager

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Township of Ashfield-Colborne-Wawanosh

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Items with ≥ 6 RPN values and no associated CCP

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
1	Raw Water Supply	Well Casing Failure	6	There are no quantifiable parameters associated with this event to monitor.
2	Raw Water Supply	Chemical Spill	9	There is no specific parameter to monitor until the contaminant is identified.
13	Distribution	Commission of New Mains	9	There are no quantifiable parameters associated with this event to monitor.
14	Distribution	Backflow from private plumbing	8	There are no quantifiable parameters associated with this event to monitor.
16	Suppliers	Failure to receive critical supply of parts or chemical	10	There are no quantifiable parameters associated with this event to monitor.
17	Suppliers	Receipt of wrong or non NSF material	8	There are no quantifiable parameters associated with this event to monitor.
18	Control Systems	Power failure (controls only)	6	There are no quantifiable parameters associated with this event to monitor.
19	Control Systems	other electronic equipment failure	6	There are no quantifiable parameters associated with this event to monitor.
22	Entire System	Power failure (controls and equipment)	8	There are no quantifiable parameters associated with this event to monitor.
23	Entire System	Vandalism	11	There are no quantifiable parameters associated with this event to monitor.

RPN numbers less than 6 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered

File: C:\DWQMS\ACW\Benmiller- 8 – Risk Assessment Outcome

Rev. Level:	Date:	Change:	By:	Approved By:
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Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

File: C:\DWQMS\ACW\Benmiller- 8 – Risk Assessment Outcome

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Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
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Rev. 2	May 31, 2018	Updates due to App B2 revision	C Good – QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



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APPENDIX B 2: RISK ASSESSMENT TABLE (Well #1) Team Meeting - November 2, 2016

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan / Comments
1	Raw Water / Well	Well casing failure	-Loss of raw water -potential biological / chemical contamination	-daily hand held turbidity -bi-weekly samples for microbiological testing -monthly monitoring and	-No specific control procedure - Contingency Plan	1	2	3	6	N	None	CP-15 –Well Casing / Well Head / Well Pump Failure Note:

File: C:\DWQMS\ACW\Benmiller - APPENDIX B 2 – Risk Assessment Table

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Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June, 19, 2013	36 mo update review	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
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				raw water turbidity testing								CP-Contingency Plan Procedure OM-Operations Manual -SOP Procedure
2	Raw Water / Well	Well pump failure	-loss of raw water	-alarm system -back-up water purchase option	-No specific control procedure -Maintenance schedule - Contingency Plan	2	1	1	4	N	None	CP-15 –Well Casing / Well Head / Well Pump Failure
3	Raw Water / Well	Chemical spill	-potential chemical contamination of aquifer	-monitoring weekly microbiological, -monthly turbidity -60 month chemical testing -Operator observation -Customer complaint -well head protection plan	-No specific control procedure -Spill containment in place on site - Contingency Plan	1	4	4	9	N	None (Regular 60 month testing per 170)	CP-07 – Chemical or Fuel Spill / Leak

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4	Raw Water / Well	Agricultural run-off	-potential biological / chemical contamination of aquifer	-monitoring -bi-weekly microbiological, -monthly turbidity -60 month chemical testing -Quarterly testing (Nitrate/Nitrite THM's, HAA's) -Operator observation -Customer complaint -well head protection plan	No specific control procedure	1	3	4	8	N	None (Regular 60 month testing per 170)	CP-16 – Agricultural Run-off
5	Additional Treated Water Quality Exceedances	Changes in aquifer water quality	-potential chemical contamination -restrictions on water use	-monitoring -advise health unit as required	Refer to SOP	1	2	4	7	N	None	BM-OM-04 – (Adverse Water Quality)

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6	Primary Disinfection	Chemical feed pump failure	-loss of disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response -back-up feed system	-Operator response -maintain spare parts on site -refer to SOP -routine preventative maintenance	2	3	1	6	YES	-Alarm at 0.50 mg/l -Pump lockout at 0.20 mg/l free chlorine -operator response	OM-02 – Chlorine System and CT Value CP-01- Low Chlorine Residual
7	Primary Disinfection	High flows	-insufficient chlorine contact time -potential biological / chemical contamination	-on-line monitoring and controls -Operator inspection, response, and repair	-Operator Response -no specific control procedure -SOP for maintaining CT values	2	2	1	5	N	None (limit based on PTTW)	OM-02 – Chlorine System and CT Value
8	Primary Disinfection	Degradation of liquid chlorine	-improper disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response -rotate stock, operator	No specific control procedure -Operator response, reaction plan	3	2	3	8	N	None	OM-21- Chlorine Strength Determination

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				checks on strength								
9	Chlorine Contact Reservoir	- out of service for maintenance / repair	-inadequate contact time for primary disinfection -potential biological / chemical contamination	-increase dosage rate (use alternate source of pressure if possible)	No specific control procedure	2	2	1	5	N	None	OM-02 – Chlorine System and CT Value CP-01- Low Chlorine Residual
10	High Lift Pumps	Pump failure and related equipment	-loss of treated water -loss of system pressure -potential biological / chemical contamination	-alarms -back-up pump-redundancy	-No specific control procedure -Operator response -SOP	3	3	1	7	YES	> 20 psi Operator response to maintain pressure above 20 psi	CP-13 – High Lift Pump Failure
11	Secondary Disinfection (no secondary chlorine addition, controlled from primary disinfection chlorination point	Chemical feed pump failure	-inadequate chlorine residual in distribution system	-on-line monitoring and controls -chlorine residual at point of entry to distribution	-Operator response -maintain spare parts on site -refer to SOP	2	2	1	5	N	None (see distribution)	OM-02 – Chlorine System and CT Value CP-01- Low Chlorine Residual

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	- see distribution)		-potential biological contamination	-daily sample from distribution system -Operator response -back-up feed system -primary disinfection	-routine preventative maintenance -No specific control procedure								
12	Distribution	Watermain break	-loss of system pressure - potential biological contamination of distributed water	- low pressure alarm -Operator response / observation -consumer complaint	-No specific control procedure -SOP	3	2	3	8	N	None	CP-10 – Watermain Break OM-09- Procedure for Watermain and Service Leak Repair -MOECC Procedure	
13	Distribution	Loss of chlorine residual (no secondary disinfection-	-potential biological contamination of distributed water	-on-line chlorine residual at point of entry to distribution system -daily sample from distribution system	-Operator response -maintain spare parts on site -refer to SOP	2	2	1	5	YES	-point of entry chlorine alarm 0.50 mg/l	OM-02 – Chlorine System and CT Value	

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		controlled by primary addition)		-Operator response -increase dosage of primary disinfection -flushing lines	-routine preventative maintenance							-pump lockout at 0.20 mg/l free chlorine	CP-01- Low Chlorine Residual
14	Distribution	Commission of new mains	-potential biological contamination	-daily sampling and monitoring -Operator response -system maintenance and repair	No specific control procedure -SOP –AWWA procedures	3	3	3	9	N	none		CP-10 – Watermain Break OM-09- Procedure for Watermain and Service Leak Repair
15	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure -Operator response	1	3	4	8	N	None		CP-17 – Backflow from Private Plumbing -backflow prevention in water connection by-law
16	Distribution	Non-functioning pressure relief valve back to environment	-loss of water pressure -high pressure breaks	-alarms -consumer complaints	-operator response No specific control procedure	1	2	1	4	N	None		OM-08 – Flushing and Valve Turning Procedure

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			-no access to fire protection									
17	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat or supply water adequately	-written communication and agreements with suppliers -NSF and CofA requirement -critical spare parts available on site	No specific control procedure -Operator response	2	5	3	10	N	None	CP-09 – Failure to Receive Critical Supply of Parts or Chemicals
18	Suppliers	Receipt of wrong or non NSF material	-potential chemical contamination	-written communication and agreements with suppliers -NSF materials -Operator checks	-No specific control procedure -Operator checks for NSF designation	1	4	3	8	N	None	CP-09 – Failure to Receive Critical Supply of Parts or Chemicals -Operator training
19	Control Systems	Power failure (controls only)	-loss of pumps, water pressure, and supply	-UPS -back-up disks, memory stick -back-up diesel generator with	-SOP -Operator response -No specific control procedure	2	3	1	6	N	None (Power required)	CP-05 – Data Recorder System Failure

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				auto transfer switch -redundancy in data retention								(UPS -Universal Power Supply)
20	Control Systems	or other electronic equipment failure	-loss of pumps, water pressure, and supply	-UPS -back-up disks, memory stick -redundancy in data retention -daily checks	-SOP -Operator response -No specific control procedure	2	3	1	6	N	None (Control systems required)	CP-05 – Data Recorder System Failure
21	Control Systems	Remote Transmitting Unit / Remote Processing Unit Failure	-loss of communication -loss of central record keeping	-alarms -regular checks -redundancy of alarms	-Operator response -spare components -SOP -No specific control procedure	3	1	1	5	N	None	CP-05 – Data Recorder System Failure
22	Control Systems	- auto-dialer failure	-loss of operator monitoring and	-alarms -regular checks	-Operator response	3	1	1	5	N	None	CP-05 – Data Recorder System Failure

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			control / communication	-redundancy of alarms	-No specific control procedure							
23	Entire System	Power failure (controls and equipment)	-loss of treated water supply	-back-up diesel generator with auto transfer switch	-Operator response -No specific control procedure	2	5	1	8	N	None	CP-04 – Power Outage
24	Facility Security	-Vandalism, -introduction of contaminant	--damage to equipment -inability to produce treated water -potential contamination	-locks -alarms -regular employees site visits	No specific control procedure	2	4	5	11	N	None	CP-08 - Vandalism
25	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events -warmer and drier summers	-back-up well and pump -back-up water purchase option -well head protection plan -Source Water Protection Plan	No specific control procedure -long-term monitoring of well levels	#	#	#	#	N	None	CP-21

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26	Entire System	Extreme Weather Event (tornado, ice storm, etc.,)	-damage to well head and/or well house -power outages	-back-up water purchase option -UPS -back-up diesel generator with auto transfer switch	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	CP-04 CP-06 CP-21
27	Entire System	Sustained extreme temperatures (e.g., heat wave, deep freeze)	-increase in frozen water mains/breaks -increase in consumption	- low pressure alarm -consumer complaint -Operator response / observation -back-up well and pump	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	CP-03 CP-10 OM-07 -frozen services responsibilities in water connection by-law
28	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None	CP-07 CP-15

Risk Assessment Team Meeting – November 2, 2016 – Participants: Florence Witherspoon, John Graham & Courtney Black

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APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE: (Ground Water System)

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Raw Water -WELL LEVEL STATIC	<u>MONTHLY</u> level checks -static	Well # 2 (Well # 1 abandoned Jan. 2015)	<u>Flows & level:</u> Operator responds to / reports significant changes in flows, levels or pressure	-Operator to note and respond to significant changes in readings or observations and note in Log Book	None known	Recorded in Log Book and log sheet
Raw Water -TURBIDITY	<u>MONTHLY</u> grab sample testing from each well -turbidity	-collected at raw water tap	<u>Turbidity:</u> Observe trends, report significant change (of +/- .25 NTU)	-Operator to note and respond to significant changes in readings or observations and note in Log Book	-status of aquifer such as limestone flaking -well casing deterioration	Recorded in Log Book and log sheet
Raw Water MICRO-BIOLOGICAL	<u>MONTHLY</u> microbiological grab sample from each well -E-coli -total coliform	-collected at raw water tap	-not detectable -not detectable	samples sent to outside lab for analysis and report	As above	-Operator records on Custody Sheets -results reported by outside lab to WTP
Process step	Sampling or Monitoring Parameter	Location	Quality Targets	Response	Challenging Conditions	Records

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Initial Release	Apr. 30, 2009	Release -Draft	DC Scott –QMS Rep.	Laurie Cox - Veolia PM / ORO
Rev. 1	Feb. 25, 2015	Radionuclides not reqd, start-up Well #2, minor additional updates – Lead rev	DC Scott –QMS Rep.	John Graham - Veolia PM / ORO
Rev. 2	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham - Veolia PM / ORO

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Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water CHLORINE RESIDUAL - Disinfection / Chlorination	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	point of entry treated tap	-Operational Goal is 0.90-1.10 mg/l	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	On-line Cl ₂ data logger record Recorded in Log Book and log sheet
Treated Water TURBIDITY	turbidity monitoring analysis Daily Regular Operator checks	-point of entry to distribution system (treated tap)	-observe trends	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded on log sheets only
Treated Water NITRATE & NITRITE	<u>QUARTERLY</u> (every 3 mo) -nitrate & nitrite testing	-point of entry (collected at treated water tap)	Per O.Reg 169/03 -MAC 10 mg/l (Operational Goal 5 mg/l) -MAC 1.0 mg/l (as nitrogen) (Operational goal 0.5 mg/l)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP

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Treated Water INORGANICS	5 YEAR intervals (every 60 mo) Per schedule 23 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 23 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water ORGANICS	5 YEAR intervals (every 60 mo) Per schedule 24 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 24 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Treated Water SODIUM	5 YEAR intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	-point of entry (collected at treated water tap)	<20 mg/l (if above- advise MOH) See also Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water	5 YEAR intervals	- point of entry	Operational goal is < 1.5 mg/l		Raw water quality	

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FLUORIDE CONTENT	(every 60 mo) (Per schedule 23 of O.Reg. 107/03)	(treated water sample tap)	(if above – call MOH)	-samples tested by Operator, records results, and advises MOH if above 1.5 mg/l		Recorded in Log Book
Treated Water HARDNESS	<u>ON REQUEST</u> grab sample collected	-collected at treated tap	N/A See Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	Operator to report result to ORO / CO to respond to Request	N/A	Recorded in Log Book
Distribution System CHLORINE RESIDUAL	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis (At Point of Entry to Distr) - <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	-household or business tap	-Operational Goal is > 0.2 mg/l (and <2.0 mg/l)	Operator to respond as required and note in Log Book	-raw water quality changes	On-line record (At Point of Entry to Distr) Recorded in Log Book
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution System	<u>BI-WEEKLY</u> sample collection (every 2 weeks)	Distribution system per Weekly Bacti Sample Routes and Locations	Operational Goals: -E-coli- not detectable	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on

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MICRO-BIOLOGICAL	microbiological sample for -E-coli -total coliform -Heterotrophic Plate Count (HPC) bacteria plate count (25% HPC- distr.)	(per SOP Sampling Schedule)	-Coliform-not detectable -HPC steady baseline, no sudden change Operational Goal ((< 10 – plate count (colonies per ml) < 10- HPC plate count (colonies per ml))			Custody Sheets -results reported by outside lab to WTP
Distribution System TRihalOMETHANES	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at rotating distant points in the system)	MAC - 0.10 mg/l (Ref. O.Reg 169/03)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Distribution System Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Distribution System LEAD (see SOP also for lead Sampling Schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alk twice per year	-distribution system- private plumbing, non-private plumbing, and distribution system samples (collected per Operations Manual Schedule)	0.10 mg/l Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
A-C-W

CENTURY HEIGHTS DRINKING WATER SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

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Rev. Level:	Date:	Change:	By:	Approved By:
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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
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6. Drinking Water System

Century Heights Drinking Water System:

System Description

6.1 General

- 6.1.1 The Century Heights water system is characterized as a “secure ground water” system and is classified as a small municipally owned water system. Studies to establish the security of these wells from surrounding water proved inconclusive in 2007 and they are now considered to be GUDI (Ground Under the Direct Influence of surface water) sources. The system consists of two wells with a rated capacity of (#1 at 4.2 L/s and #2 at 4.3 L/s) 734 m³/day, with ultra violet and sodium hypochlorite disinfection treatment.
- 6.1.2 The entire system is located on Concession 1, Lot 1, Western Division, of Ashfield-Colborne-Wawanosh Township. The distribution system serves the community of Century Heights, Maitlandview Subdivision, and parts of the Community of Saltford, with a population approximately 200 residents, with approximately 78 customer services.
- 6.1.3 The system consists of a Class 1 Distribution and Supply, and Class 1 Treatment which is owned by the Township of Ashfield-Colborne-Wawanosh and operated by Veolia Water Canada, the Operating Authority.
- 6.1.4 Well # 1 is a 150 mm drilled well 66 metres deep, equipped with a submersible pump with a rated capacity of 4.2 Litres /second, with instrumentation and control equipment, and 50 mm discharge line connected to the pump house. Well # 2 is a 150 mm drilled well 66 metres deep equipped with a submersible pump with a rated capacity of 4.3 Litres /second, with instrumentation and control equipment and 100 mm discharge line connected to the pump house. Well # 1 was constructed in 1979, located within the well house and # 2 was constructed in 2005, approximately 10 meters north of the well house.

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Note: To be reviewed annually or when a QMS change occurs.



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- 6.1.5 The well house is equipped with well pumps, back-up diesel generator, chlorinators, a chlorine contact main, cartridge filter trains, UV disinfection system, hydropneumatic pressure vessels, on-line monitoring and alarm generation. The system is controlled by an on site control.
- 6.1.6 Back-up power is supplied by one 30 KW, diesel standby generator with fuel tank in sub base, complete with spill containment curb, installed outside the pump house.
- 6.1.7 The well house and its equipment have a daily maximum capacity to deliver 734 cubic metres of potable water per day to the Century Heights community. The current water sources are two secure deep bed rock wells. Both wells are located on the well house site with dedicated raw water mains feeding the well house.
- 6.1.8 The water from each well is pumped to a common chlorine contact pipeline (120 m long by 150 mm diameter plus an additional 13 m long by 600 mm diameter watermain for additional chlorine contact time) to provide adequate chlorine contact time at maximum flow and before the first consumer, complete with a sampling / service water connection feed back to the pump house.
- 6.1.9 The well house and equipment are monitored and controlled by an alarm dialer and data recorder.
- 6.1.10 The attached distribution system is constructed with a combination of polyethylene and PVC piping with polyethylene services.
- 6.1.11 There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks and the well pumps.
- 6.1.12 The system has fire hydrants but lacks the capacity to provide fire flows.

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6.2 Description of Water Source

- 6.2.1 The current water source is from two secure deep bed rock wells. Studies to establish the security of these wells from surrounding water proved inconclusive in 2007 and they are now considered to be GUDI (Ground Under the Direct Influence of surface water) sources. Land use in the vicinity of the wells is a residential. The area is served by storm sewers and septic tanks.
- 6.2.2 Nitrate and nitrite concentrations, and trihalomethanes in the treated water, parameter tests indicate the aquifer is not influenced by run-off from surface-level activities.
- 6.2.3 The full characterization of the raw water supply source is listed in the First Engineer's Report, section 4 and Appendix K. (Township of Ashfield-Colborne-Wawanosh Century Heights Well Supply Engineer's Report - Nov 30, 2000). A follow-up Raw Water Assessment was also carried out by BM Ross Consulting Engineers in May, 2009. Based on the BMR 2009 review of the hydrogeologic information and historic and recent water quality results, it was concluded that the character of the Century Heights area groundwater supply has not deteriorated since the 2000 Engineer's Report.

A Raw Water Assessment was also carried out in February 2015 by BM Ross in preparation for the Municipal Drinking Water Licence (MDWL) Renewal. It was concluded that the characterization of the Benmiller area groundwater supply has remained the same.

- 6.2.4 There also does not appear to be any event driven fluctuations, and there are also no resulting operational challenges or threats to the water source.
- 6.2.5 There also does not appear to be any upstream or downstream processes that the Municipality controls that are critical for the provision of water.

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6.3 Disinfection System

6.3.1 Primary Disinfection is achieved with a UV Disinfection System consisting of two (2) disinfection reactors, one duty and one standby, rated at 40 mJ/cm² throughout the lamp life time, complete with UV intensity monitor.

Disinfection is also achieved on the Century Heights well supply through chemical treatment with the use of 12% sodium hypochlorite. In the well house this chemical is added prior to the water entering the chlorine contact reservoir at dosages high enough to achieve both primary and secondary disinfection objectives. The system consists of two (2) sodium hypochlorite feed pumps (duty and standby) rated at 0.8 L/hr complete with auto switchover controls, piping, valves and associated monitoring equipment and 13 meters of 600 mm diameter watermain as a contact reservoir.

6.3.2 The chlorine dosages range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/l and < 1.30 mg/l.

6.3.3 Additional treatment ~~disinfection~~ consists of a filtration system consisting of 2 streams of 2 cartridge filter trains one duty and one standby for the removal of particles 5 micron and larger, rated at 8.5 L/s

6.4 System Flows

6.4.1 The Century Heights well supply has 1 PTWW (Permit To Take Water) # ~~7587-5SBQU2~~ # 8807-98EQ6C with Expiry Date: November 30, 2023, Issued July 25, 2013, which allows 734 cubic metres per day to be pumped from the combined wells.

6.4.2 The Century Heights treatment system has maximum flows as specified in the Municipal Drinking Water Licence - MDWL - 080-105 and Drinking Water Works Permit - DWWP-080-205) (previously C of A # 5503-6G3KFF). The maximum total daily flow is 734 cubic meters per day and the maximum instantaneous flow is 8.5 litres per second.

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6.4.3 The limiting factor regarding flow is chlorine contact time in the chlorine contact main. In order to meet the regulatory CT requirements (CT value > 3.0) increased flows beyond 8.5 litres per second must have an adequate free chlorine residual to counter the decreased retention time in the chlorine contact main.

6.5 Distribution System

6.5.1 The treated water is monitored by an on-line chlorine analyzer.

6.5.2 Distribution piping typically ranges in size from 50 mm to 100 mm, and consists of a combination of polyethylene and PVC piping, with polyethylene service connections.

6.5.3 Typical system pressure ranges from 40 P.S.I to 60 P.S.I.

6.6 Process Flow Schematic and Distribution Diagram:

See below

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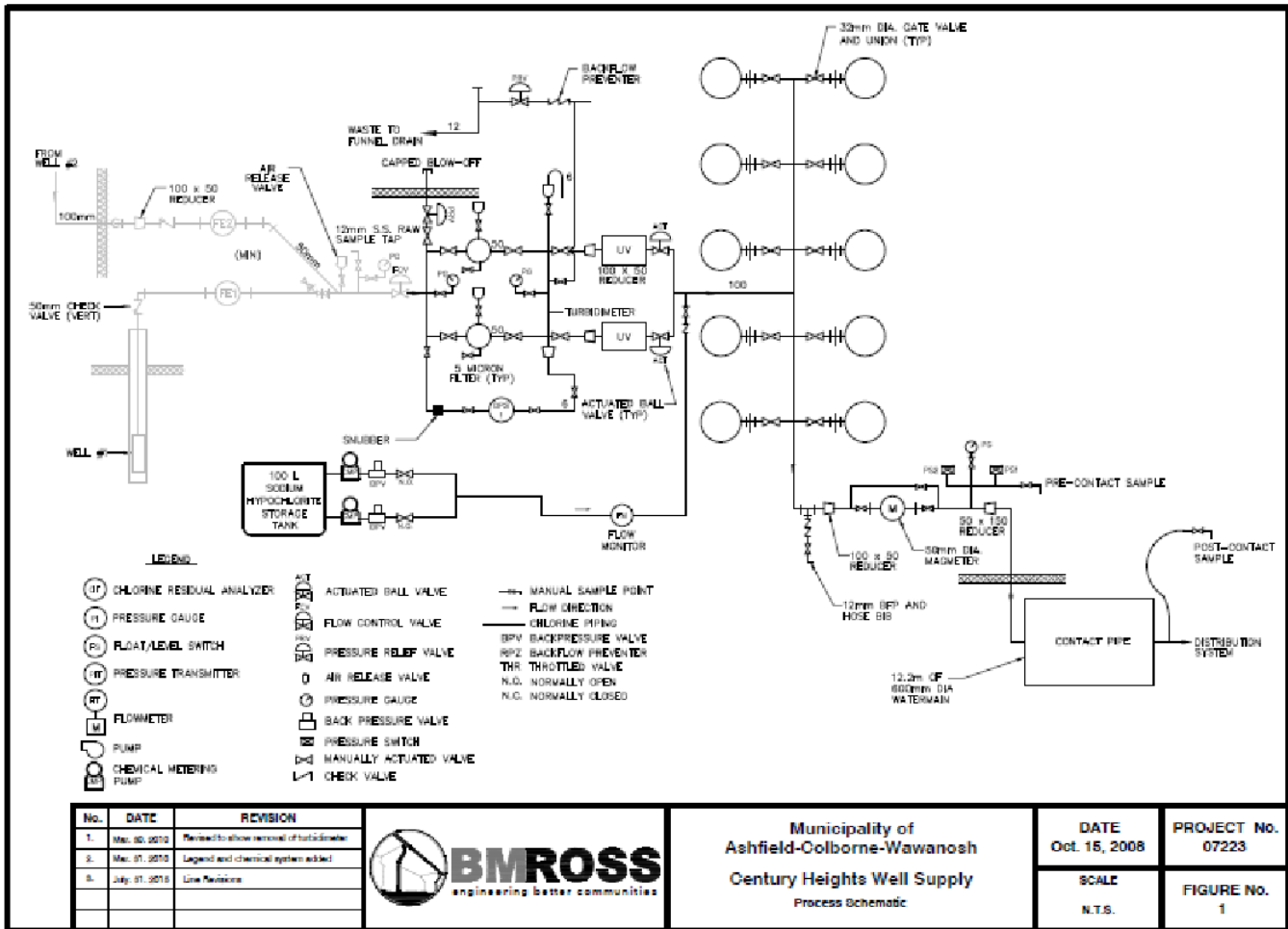
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6.6.1 Process Flow Schematic



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6.6.2 Distribution System



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6.6.3 Revision History

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Rev. 2	June 14, 2013	CoA to DWWP, Licence	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	July 30, 2013	Water source - fluct / challenges	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	Feb. 25, 2015	Update PFS/Dist Dwg	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
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8. Risk Assessment Outcomes

Century Heights Drinking Water System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 4 to 11 (out of a total max of 15).

An RPN Threshold Value of 6 was chosen from review of the Risk Table because the Critical Control Point minimum number is 6. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure ~~for response~~ if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

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Risk Assessment Table Summary

NOTE: A total 27 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures \geq 6 RPN.

	<u>RPN</u>	<u>CONTROL</u>
4 - Agricultural run-off / septic infiltration	9	CP-16
7- filter breakthrough / plugging	7	OM-17
8- UV system equipment failure	8	OM-17
9- Post-chlorinator equipment failure, low chlorine concentration	6	OM-02, CP-01
10- Post-chlorinator failure, elevated (high) chlorine concentration	6	CP-02
11 - Chlorine Contact / pressure tank integrity	6	CP-18
13- Loss of system pressure	7	CP-03
14- Inadequate chlorine residual in distribution system	10	OM-02, CP-01
15 – Water Main Break	8	CP-10, OM-9

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as \geq 6 RPN.

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Items with ≥ 6 RPN values and no associated CCP

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
1	Raw Water Supply	Well Casing Failure	6	There are no quantifiable parameters associated with this event to monitor.
3	Raw Water Supply	Chemical Spill	9	There is no specific parameter to monitor until the contaminant is identified.
5	Raw Water/ Well	Low Well Levels	6	No studies have been conducted to determine when well levels are a cause for concern.
6	Raw Water/ Well	Iron	9	Iron is not regularly tested for. High iron levels are monitored qualitatively using water colour as an indicator.
12	Standby Power	Generator Failure	8	There is no specific parameter to monitor until the contaminant is identified.
17	Distribution	Non-functioning appurtenances	6	There is no specific parameter to monitor until the contaminant is identified.
19	Suppliers	Failure to receive parts	6	There is no specific parameter to monitor until the contaminant is identified.
20	Control Systems	Equipment Failure	10	There is no specific parameter to monitor until the contaminant is identified.
21	Facility Security	Vandalism	11	There is no specific parameter to monitor until the contaminant is identified.

RPN numbers less than 6 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

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APPENDIX B 2: RISK ASSESSMENT TABLE Well #1 & #2 - GUDI Well System – Team Meeting: November 2, 2016

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan / Comments (reference to an SOP or Contingency Plan)
1	Raw Water / Well	Well casing failure / Well head damage	-Loss of raw water -potential biological / chemical contamination	-treated water on-line turbidity testing -weekly samples for microbiological testing -preventative maintenance	-Operator response -shut down the affected well -truck water from Goderich	2	2	3	7	No	None	CP-15 –Well Casing / Well Head / Well Pump Failure Note: CP-Contingen cy Plan Procedure

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				-second well available	-no specific control procedure								OM-Operations Manual -SOP Procedure
2	Raw Water / Well	Well pump failure / transmission line or equipment failure	-loss of raw water	-alarm system - low press / turbidity -preventative maintenance -2 nd pump	-Operator response -shut down the affected well -refer to SOP	2	2	1	5	No	None		CP-15 –Well Casing / Well Head / Well Pump Failure
3	Raw Water / Well	Chemical spill	-potential chemical contamination of aquifer	-monitoring weekly microbiological -treated on-line turbidity monitor -60 month chemical testing -Customer complaint -well head protection plan	-refer to contingency plan -Operator response -no specific control procedure	1	4	4	9	No	None		CP-07 – Chemical or Fuel Spill / Leak
4	Raw Water / Well	Agricultural run-off / septic infiltration	-potential biological / chemical	- weekly microbiological testing	-Operator response -refer to SOP	1	4	4	9	No	None		CP-16 – Agricultural Run-off

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			contamination of aquifer	-treated on-line turbidity monitoring -60 month chemical testing -Customer complaint -well head protection plan -Quarterly testing	effective treatment process -no specific control procedure							
5	Raw Water / Well	Low well levels	-loss of water	-daily well level recording -seasonal observations -daily level monitoring	-Operator response -refer to SOP - water use restrictions	1	2	3	6	No	None	Consider SOP / CP
6	Raw Water Supply	Iron	-potential taste and odour problems (esthetic) -potential household plumbing damage	-Operator visual checks of raw water quality -taste and odour observation by Operator -consumer complaint	-regular cartridge filter replacement -no specific control procedure	5	1	3	9	No	none	OM-17 – Cartridge Filtration and UV Disinfection System - no iron sequestering

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				-filtration and disinfection								
7	Additional Treated Water Quality Exceedances	Changes in aquifer water quality	-potential chemical contamination -restrictions on water use	-monitoring -advise health unit as required	Refer to SOP	1	2	4	7	N	None	CH-OM-04 – (Adverse Water Quality)
8	Filtration (Cartridge Filters)	-filter breakthrough / plugging	-loss of water to system -high turbidity -potential microbiological contamination	-operator response -low press. alarm -redundancy- spare filters -turbidity alarm	-Operator response -SOP required	2	3	2	7	No	none	OM-17 – Cartridge Filtration and UV Disinfection System

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9	UV Disinfection Treatment (primary)	UV system equipment failure	-potential microbiological contamination	Operator response / observation On-line monitoring (data logger) -auto shut down and alarm -redundancy -auto switch-over	Operator response -SOP	2	4	2	8	YES	-maintain intensity dosage minimum > 40 mJ/cm2 (shown as min 0.5 volt readout) (Alarm at 80, lock-out above 40)	OM-17 – Cartridge Filtration and UV Disinfection System -UV unit is obsolete but spare parts are available for a limited time
10	Disinfection / Chlorination	-post-chlorinator equipment failure -low chlorine concentration	-potential for biological contamination	-on-line monitoring residual testing point of entry -daily residual testing grab sample -alarms	-Operator response -Op. Manual -SOP	3	2	1	6	YES	>1.0 mg/l alarm >0.50 mg/l at point of entry (Alarms at 0.6 low	CP-01 – Low Chlorine Residual OM-02- Chlorine System and CT Value

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				-redundancy with auto pump switch-over capability							and 2.5 high)	
11	Disinfection / Chlorination	-post-chlorinator failure -elevated (high) chlorine concentration	Potential health hazard if above limit	-on-line monitoring-from point of entry -daily residual testing grab sample - customer complaint	-Operator response -SOP High Cl2 in distribution System	2	1	3	6	YES	< 4.0 mg/l at point of entry	CP-02 – High Chlorine Residual
12	Disinfection / Chlorination	Chlorine Contact / pressure tank integrity	-tank failure -potential microbiological contamination -potential loss of supply	-Operator observation -low distribution pressure alarm -redundancy -supplied water	-Operator response -no specific control procedure	1	3	2	6	No	None	CP-18 – Chlorine Contact Chamber Out of Service -
13	Stand-By Power Facilities	Failure of stand-by power	-loss of system pressure	-preventive maintenance	-Operator response -alarms	2	5	1	8	No	None	CP-06

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			-potential for microbiological contamination	-monthly generator testing	-no specific control procedure							- Diesel Generator Failure
14	Distribution System	Loss of system pressure	potential pressure drop could allow contaminants back into system (back siphoning)	Operator response -back flow preventers added to new connections -alarm	Operator response SOP	3	3	1	7	YES	>20 PSI at Plant (45-60 psi operation-al range)	CP-03 – Loss of System Pressure -backflow prevention included in the water connection by-law
15	Distribution	Inadequate chlorine residual in distribution system	-potential biological contamination	-on-line chlorine residual at point of entry to distribution system -daily grab residual from distribution system	-Operator response -increase chemical dosage -routine flushing of dead-ends -refer to contingency plan / SOP	3	4	3	10	YES	-minimum of 0.2 mg/L free chlorine in distribution (Alarms at 0.6 low and 2.5 high)	CP-01 – Low Chlorine Residual OM-03 Procedure to Address Low Chlorine in the Distribution System
16	Distribution	Watermain break	-loss of system pressure - potential biological contamination	-alarm -Operator response / observation -consumer complaint	-Operator response -refer to procedure	2	3	3	8	No	None	CP-10 – Watermain Break OM-09 – Procedure for

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			of distributed water -property damage	- disinfection	-refer to contingency plan -no specific control procedure							Watermain and Service Leak -MOECC Procedure
17	Distribution	Commission of new mains	-potential contamination	-required sampling and monitoring -Operator response -system maintenance and repair	-Disinfection procedure -no specific control procedure	3	1	1	5	No	None	CP-10 – Watermain Break OM-09 – Procedure for Watermain and Service Leak
18	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure (new plumbing to have backflow preventers) -Operator response	1	3	4	8	N	None	CP-17 -Backflow from Private Plumbing-Cross Contamination -backflow prevention included in the water connection by-law

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19	Distribution	Non-functioning appurtenances	-unable to isolate	-annual exercise -annual inspection -regular maintenance/ annual flushing	-Operator response -no specific control procedure	2	1	3	6	No	None	OM-08 – Flushing and Valve Turning Procedure
20	Distribution	Non-functioning pressure relief valve back to environment	-loss of water pressure -high pressure breaks -no access to fire protection	-alarms -consumer complaints	-operator response No specific control procedure	1	2	1	4	No	None	OM-22 – Pressure Reducing / Pressure Sustaining Valve
21	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat water adequately -failure of equipment	-written communication and agreements with suppliers -NSF and CofA requirement on site -redundancy of equipment	-Operator response -alternate source -critical spare parts available -no specific control procedure	1	2	3	6	No	None	CP-09 – Failure to Receive Critical Supply of Parts or Chemicals

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Century Heights

22	Control Systems (auto-dialer)	-equipment failure alarm system failure	potential for biological contamination -loss of treated water	-Operator response - consumer complaint -daily checks	-Operator response -no specific control procedure	2	5	3	10	No	None	CP-05 - Data Logger / PC System Failure
23	Facility Security	-Vandalism, -introduction of contaminant	-damage to equipment -inability to produce treated water -potential contamination	-locks -daily checks -high visibility	-operator response -refer to procedure -no specific control procedure	1	5	5	11	No	None	CP-08 - Vandalism
24	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events	-back-up well and pump -back-up water purchase option -well head protection plan	No specific control procedure -long-term monitoring of well levels	#	#	#	#	N	None	CP-21

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			-warmer and drier summers	-Source Water Protection Plan								
25	Entire System	Extreme Weather Event (tornado, ice storm, etc.,)	-damage to well head and/or well house -power outages	-back-up water purchase option -UPS -back-up diesel generator with auto transfer switch	-No specific control procedure -Contingency Plan	#	#	#	#	N	None	CP-04 CP-06 CP-21
26	Entire System	Sustained extreme temperatures (e.g., heat wave, deep freeze)	-increase in frozen water mains/breaks -increase in consumption	- low pressure alarm -consumer complaint -Operator response / observation -back-up well and pump	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	CP-03 CP-10 OM-07 -Frozen Services Responsibilities in Water Connection By-Law
27	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None	CP-07 CP-15

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Township of Ashfield-Colborne-Wawanosh

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Century Heights

Risk Assessment Team Meeting – November 2, 2016 – Participants: Florence Witherspoon, John Graham & Courtney Black

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Century Heights

APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE: (Ground Water System)

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
<u>Raw Water</u> -WELL LEVEL STATIC	<u>MONTHLY</u> level checks -static	Well # 2 (Well # 1 abandoned Jan. 2015)	<u>Flows & level:</u> Operator responds to / reports significant changes in flows, levels or pressure	-Operator to note and respond to significant changes in readings or observations and note in Log Book	None known	Recorded in Log Book and log sheet
<u>Raw Water</u> -TURBIDITY	<u>MONTHLY</u> grab sample testing from each well -turbidity	-collected at raw water tap	<u>Turbidity:</u> Observe trends, report significant change (of +/- .25 NTU)	-Operator to note and respond to significant changes in readings or observations and note in Log Book	-status of aquifer such as limestone flaking -well casing deterioration	Recorded in Log Book and log sheet
<u>Raw Water</u> MICRO-BIOLOGICAL	<u>MONTHLY</u> microbiological grab sample from each well -E-coli -total coliform	-collected at raw water tap	-not detectable -not detectable	samples sent to outside lab for analysis and report	As above	-Operator records on Custody Sheets -results reported by outside lab to WTP

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Century Heights

Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water CHLORINE RESIDUAL - Disinfection / Chlorination	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	point of entry treated tap	-Operational Goal is 0.90-1.10 mg/l	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	On-line Cl ₂ data logger record Recorded in Log Book and log sheet
Treated Water TURBIDITY	turbidity monitoring analysis Daily Regular Operator checks	-point of entry to distribution system (treated tap)	-observe trends	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded on log sheets only
Treated Water NITRATE & NITRITE	<u>QUARTERLY</u> (every 3 mo) -nitrate & nitrite testing	-point of entry (collected at treated water tap)	Per O.Reg 169/03 -MAC 10 mg/l (Operational Goal 5 mg/l) -MAC 1.0 mg/l (as nitrogen) (Operational goal 0.5 mg/l)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Process step	Sampling or Monitoring Parameter	Location	Quality Targets	Response	Challenging Conditions	Records

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DWQMS Operational Plan
Century Heights

Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water INORGANICS	<u>5 YEAR</u> intervals (every 60 mo) Per schedule 23 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 23 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water ORGANICS	<u>5 YEAR</u> intervals (every 60 mo) Per schedule 24 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 24 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Treated Water SODIUM	<u>5 YEAR</u> intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	-point of entry (collected at treated water tap)	<20 mg/l (if above- advise MOH) See also Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records

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Treated Water FLUORIDE CONTENT	<u>5 YEAR</u> intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	- point of entry (treated water sample tap)	Operational goal is < 1.5 mg/l (if above – call MOH)	-samples tested by Operator, records results, and advises MOH if above 1.5 mg/l	Raw water quality	Recorded in Log Book
Treated Water HARDNESS	<u>ON REQUEST</u> grab sample collected	-collected at treated tap	N/A See Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	Operator to report result to ORO / CO to respond to Request	N/A	Recorded in Log Book
Distribution System CHLORINE RESIDUAL	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis (At Point of Entry to Distr) - <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	-household or business tap	-Operational Goal is > 0.2 mg/l (and <2.0 mg/l)	Operator to respond as required and note in Log Book	-raw water quality changes	On-line record (At Point of Entry to Distr) Recorded in Log Book
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution System	<u>BI-WEEKLY</u> sample collection		Operational Goals:	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on

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MICRO-BIOLOGICAL	(every 2 weeks) microbiological sample for -E-coli -total coliform -Heterotrophic Plate Count (HPC) bacteria plate count (25% HPC- distr.)	Distribution system per Weekly Bacti Sample Routes and Locations (per SOP Sampling Schedule)	-E-coli- not detectable -Coliform-not detectable -HPC steady baseline, no sudden change Operational Goal ((< 10 – plate count (colonies per ml) < 10- HPC plate count (colonies per ml))			Custody Sheets -results reported by outside lab to WTP
<u>Distribution System</u> TRIHALOMETHANES	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at rotating distant points in the system)	MAC - 0.10 mg/l (Ref. O.Reg 169/03)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> LEAD (see SOP also for lead Sampling Schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alkalinity twice per year	-distribution system- private plumbing, non-private plumbing, and distribution system samples (collected per Operations Manual Schedule)	0.10 mg/l Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab

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Township of Ashfield-Colborne-Wawanosh

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Century Heights

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Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan
A-C-W

COURTNEY SUBDIVISION DISTRIBUTION SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

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Rev. Level:	Date:	Change:	By:	Approved By:
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Rev. 1	Mar. 2, 2015	Update system name	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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A-C-W

6. Drinking Water System

Courtney Subdivision Distribution System:

System Description

6.1 General

6.1.1 The Courtney Subdivision Distribution System, located west of Amberley, Ontario, provides a potable water supply to the residents of Corporation of the Township of Ashfield-Colborne-Wawanosh in the area known as Courtney Subdivision, located on Courtney Crescent, approximately 1 km west of Amberley. There are approximately 120 customers connected in this service area.

6.1.2 The distribution system, consists of a Class 1 Water Distribution system, which is owned by the Township of Ashfield-Colborne-Wawanosh and operated by Veolia Water Canada, the Operating Authority.

6.1.3 The treated water is supplied by and delivered to the Courtney Subdivision Distribution system through the Huron-Kinloss Lakeshore Distribution system.

6.2 Description of Water Source

6.2.1 Raw water is obtained from the Huron-Kinloss Lakeshore Distribution system, and supplied to the Township of Ashfield-Colborne-Wawanosh and the Operating Authority, Veolia Water Canada.

6.2.2 Details of the raw water source, as well as common event driven fluctuations and resulting operational challenges and threats are addressed in the Huron-Kinloss - Lakeshore Drinking Water System, and are not considered to be a significant concern to the Courtney Subdivision water.

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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6.3 Distribution System

6.3.1 Water meter chamber located on the Township of Huron-Kinloss and Township of Ashfield-Colborne-Wawanosh boundary consisting of an in-ground manhole structure with a magnetic flow meter, valve bypass piping, watertight vandal proof access hatchway and a remote telemetry unit. Adjacent is an above ground electrical control panel in a waterproof enclosure.

6.3.3 Typical system pressure ranges from 35 P.S.I to 95 P.S.I, due to elevation changes.

6.4 Sample Analysis

6.4.1 Provincial regulations dictate the sampling and monitoring requirements for the system. Water quality is tested from dedicated sampling sites located at the extremities of the Distribution System. Where required by regulation, samples are submitted to an accredited laboratory for analyses.

6.5 Distribution System Schematic

See below

The distribution system schematic updates are in progress by BMR.

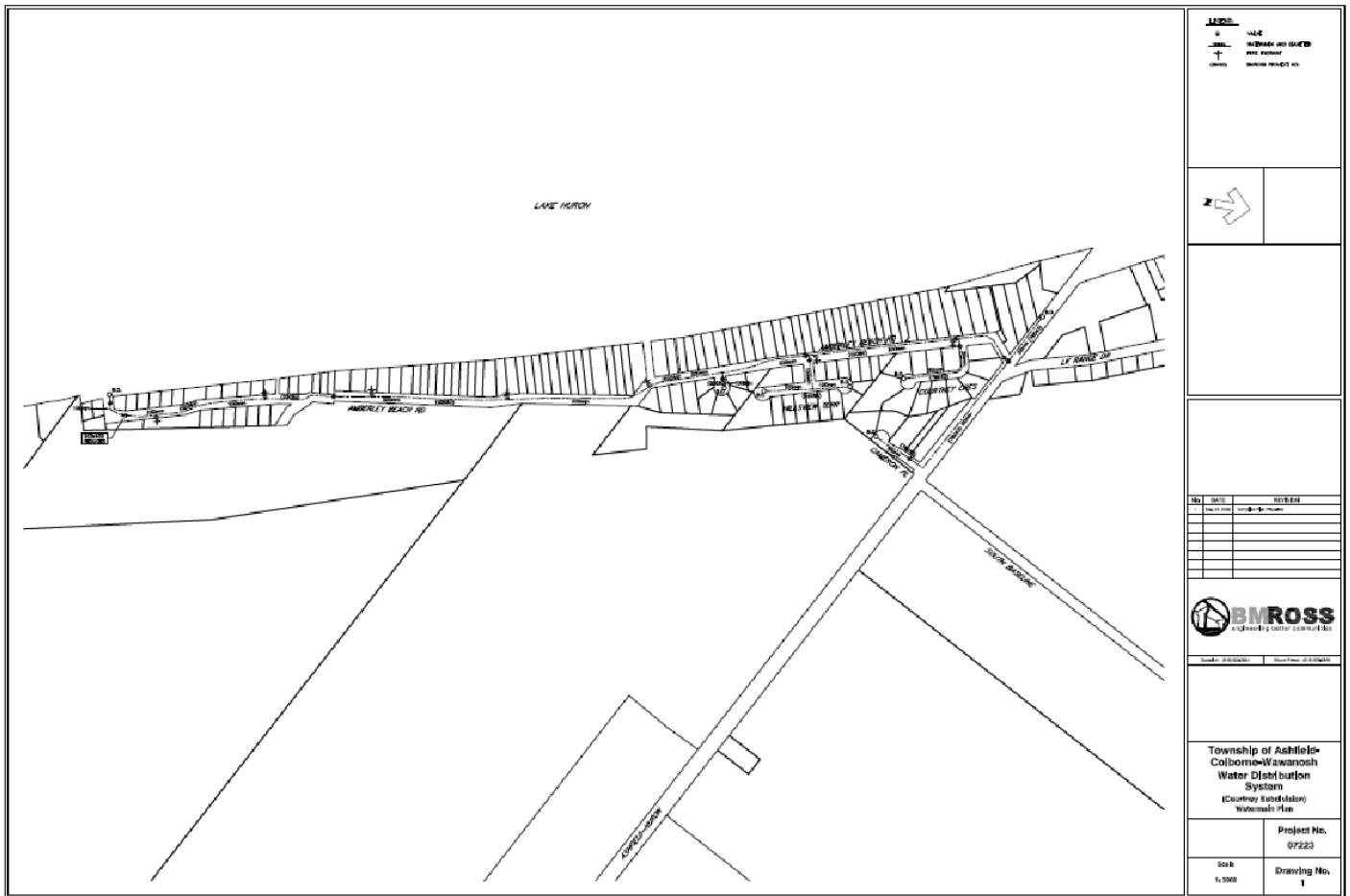
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6.5.1 Distribution System Schematic



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Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan
Courtney Subdivision

8. Risk Assessment Outcomes

Courtney Distribution System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 7 to 11 (out of a total max of 15).

An RPN Threshold Value of 7 was chosen from review of the Risk Table because the Critical Control Point minimum number is 7. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure ~~for response~~ if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

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File: C:\DWQMS\ACW\Courtney Subdivision- 8 - Risk Assessment Outcome

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
Courtney Subdivision

Risk Assessment Table Summary

NOTE: A total 13 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures ≥ 7 RPN.

	<u>RPN</u>	<u>CONTROL</u>
1- Loss of System Pressure	7	CP-03
2- Inadequate chlorine residual in distribution system	10	CP-01
3 – Water Main Break	8	CP-06

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as ≥ 7 RPN.

Items with ≥ 7 RPN values and no associated CCP

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
Courtney Subdivision

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
7	Control Systems	Power Failure	7	There are no quantifiable parameters associated with this event to monitor.
8	Facility Security	Vandalsim	11	There are no quantifiable parameters associated with this event to monitor.

RPN numbers less than 7 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

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DWQMS Operational Plan
Courtney Subdivision Distribution

APPENDIX B 2: RISK ASSESSMENT TABLE (Distribution System – Team Meeting November 2, 2016)

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure <small>(or reference to an SOP)</small>	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan <small>(reference to an SOP or Contingency Plan)</small>
1	Raw Water / Well	Chemical spill in source water	-potential chemical contamination of aquifer	-monitoring monthly microbiological -treated on-line turbidity monitor	-refer to contingency plan -Operator response -no specific control procedure	1	4	4	9	No	None	Lakeshore CP-07

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DWQMS Operational Plan
Courtney Subdivision Distribution

				-60 month chemical testing -Customer complaint -well head protection plan								
2	Raw Water / Well	Low well levels in source water	-loss of water	-monthly well level recording -seasonal observations -daily level monitoring	-Operator response -refer to SOP - water use restrictions -no specific control procedure	1	2	3	6	No	None	Consider SOP / CP
3	Distribution System	Loss of system pressure	pressure drop could allow contaminants into system (back siphoning) -potential for biological contamination	Operator response -back flow preventers added to new connections -Lucknow Standpipe	Operator response	3	3	1	7	YES	>20 PSI at Plant	LS-CP-03 -Low System Pressure

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DWQMS Operational Plan
Courtney Subdivision Distribution

4	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure -Operator response	1	3	4	8	N	None	LS-CP-17 -Backflow from Private Plumbing-Cross Contamination -backflow prevention in water connection by-law
5	Distribution	Commission of new mains	-potential biological contamination	-required sampling and monitoring -Operator response -system maintenance and repair	-Disinfection procedure	3	1	1	5	No	None	-CP-06 -Watermain Break -AWWA Procedure -MOECC Procedure
6	Distribution	Non-functioning appurtenances	-unable to isolate -no access to fire protection	-annual exercise -annual inspection -regular maintenance	-Operator response -no specific control,	2	1	3	6	No	None	CP to be considered

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Note: To be reviewed annually or when a QMS change occurs.

DWQMS Operational Plan
Courtney Subdivision Distribution

7	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat water adequately -failure of equipment	-written communication and agreements with suppliers -NSF and C of A requirement -on site redundancy of equipment, parts and supplies	-Operator response -alternate source -critical spare parts available -no specific control,	1	2	3	6	No	None	CP-05 -Failure to Receive Critical Supply of Parts or Chemicals
8	Control Systems	Power failure	-potential loss of water supply	-Lucknow Standpipe	-no specific control,	2	3	2	7	No	None	CP to be considered
9	Facility Security	-Vandalism, -introduction of contaminant	-damage to equipment -inability to supply treated water -potential contamination	-locks -daily checks -high visibility	-operator response -refer to procedure -no specific control,	1	5	5	11	No	None	CP-04 -Vandalism

File: C:\DWQMS\ACW – Courtney Subdivision Distribution- APPENDIX B2 - Risk Assessment Table -

Rev. Level:	Date:	Change:	By:	Approved By:
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Courtney Subdivision Distribution

10	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events -warmer and drier summers	-back-up well and pump -back-up water purchase option -well head protection plan -Source Water Protection Plan	No specific control procedure -long-term monitoring of well levels	#	#	#	#	N	None	LS-CP-21
11	Entire System	Extreme Weather Event (tornado, ice storm, etc.)	-damage to well head and/or well house -power outages	-back-up water purchase option -UPS -back-up diesel generator with auto transfer switch	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	LS-CP-04 LS-CP-06 LS-CP-21
12	Entire System	Sustained extreme temperatures (e.g., heat wave, deep freeze)	-increase in frozen water mains/breaks -increase in consumption	- low pressure alarm -consumer complaint -Operator response / observation -back-up well and pump	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	LS-CP-03 LS-CP-10 LS-OM-07 -Frozen Services Responsibilities in Water Connection By-Law

File: C:\DWQMS\ACW – Courtney Subdivision Distribution- APPENDIX B2 - Risk Assessment Table -

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13	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None	LS-CP-07 LS-CP-15

Risk Assessment Team Meeting – November 2, 2016 – Participants: Florence Witherspoon, John Graham & Courtney Black

File: C:\DWQMS\ACW – Courtney Subdivision Distribution- APPENDIX B2 - Risk Assessment Table -

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DWQMS Operational Plan
Courtney Subdivision Distribution

APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution Water CHLORINE RESIDUAL - Disinfection / Chlorination	- <u>WEEKLY</u> grab sample Cl2 residual testing (free chlorine residuals)	distribution system	>0.2 mg/l min. chlorine residual at point of entry to distribution system	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded in Log Book
Distribution Water -FLOWS	- <u>DAILY</u> checks	-Distribution system	-Observation of trends	Operator to respond to significant changes in readings or observations and note in Log Book	-water supply -water main breaks	Recorded in Log Book
Distribution Water MICRO-BIOLOGICAL	- <u>WEEKLY</u> sample collection 1 - sample from distribution system microbiological sample for -E-coli -total coliform -bacteria plate count (25% HPC- distr.)	Distribution system	Operational Goals: -E-coli- not detectable -Coliform-not detectable -HPC steady baseline, no sudden change <200 – plate count (colonies per ml) <500- HPC plate count (colonies per ml)	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Process step	Sampling or Monitoring Parameter	Location	Quality Targets	Response	Challenging Conditions	Records

File: C:\DWQMS\ACW - Courtney Subdivision - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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Rev. 1	Feb. 25, 2015	Updates - Lead	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

DWQMS Operational Plan
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	and Frequency					
Treated Water TRIHALOMETHANES (Sampling schedule)	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at furthest, oldest water points in the system)	Per O.Reg 169/03	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Distribution System Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water LEAD (Sampling schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alk twice per year	-distribution system (collected per Operations Manual Schedule)	Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab to WTP

File: C:\DWQMS\ACW - Courtney Subdivision - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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Rev. 2	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham - Veolia Project Manager

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Township of Ashfield-Colborne-Wawanosh



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DUNGANNON DRINKING WATER SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

File: C:\DWQMS\ACW\DUNGANNON SYSTEM APPENDIX

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Township of Ashfield-Colborne-Wawanosh

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6. Drinking Water System

Dungannon Drinking Water System:

System Description

6.1 General

- 6.1.1 The Dungannon water system is characterized as a “secure ground water” system and is classified as a large municipally owned water system. The system consists of one well with a rated capacity of 657 m³/day, with chlorination treatment and iron sequestering. The entire system is located on Concession 4, Lot 13, North Half. The distribution system serves the community of Dungannon with a population of approximately 300 residents, with approximately 105 customer services.
- 6.1.2 The system consists of a Class 2 Distribution and Supply, which is owned by the Township of Ashfield-Colborne-Wawanosh and operated by Veolia Water Canada, the Operating Authority.
- 6.1.3 Well # 1 is 77.7 metres deep, equipped with a submersible pump with a rated capacity of 5.5 Litres /second, with instrumentation and control equipment, and 75 mm discharge line connected to the pump house. Well #1 was abandoned on April 3, 2017. Well # 2 is 87.2 metres deep equipped with a submersible pump with a rated capacity of 7.6 Litres /second, with instrumentation and control equipment and 75 mm discharge line connected to the pump house. Well # 1 and # 2 were drilled in 2003. The well pump and associated piping in wells 1 and 2 was installed in 2005.
- 6.1.4 The well house is equipped with well pumps, back-up diesel generator, chlorinators, a chlorine contact main, iron sequestering equipment, on-line monitoring and alarm generation. The system is controlled by an on site PLC.

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File: C:\DWQMS\ACW\Dungannon - 6 - Drinking Water System -

Rev. Level:	Date:	Change:	By:	Approved By:
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Rev. 5	May 31, 2018	Removed ref to Well #1	C Good – QMS Rep.	John Graham - Veolia Project Manager

See Revision History Summary Table at end of this document – Section 6.7.3

Note: To be reviewed annually or when a QMS change occurs.

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- 6.1.5 Back-up power is supplied by one 35 KW, diesel standby generator with fuel tank in sub base, complete with spill containment curb, all installed inside the pump house.
- 6.1.6 The well house and its equipment have a daily maximum capacity to deliver 657 cubic metres of potable water per day to the Dungannon community. The current water source is a secure deep bed rock well. The well is located on the well house site with dedicated raw water mains feeding the well house.
- 6.1.7 The water from the well is pumped to a common chlorine contact pipeline (56 m long by 400 mm diameter located below grade) to provide adequate chlorine contact time at maximum flow and before the first consumer, complete with a sampling / service water connection feed back to the pump house.
- 6.1.8 The well house and equipment are monitored and controlled by an on site PLC .SCADA pack. The system is further monitored by an on site data recorder.
- 6.1.9 The attached distribution system is constructed with PVC piping with polyethylene services.
- 6.1.10 There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks and the well pumps.
- 6.1.11 The system has no fire hydrants and lacks the capacity to provide fire flows.

6.2 Description of Water Source

- 6.2.1 The current water source is from a secure deep bed rock well. Land use in the vicinity of the wells is a mixture of residential and agricultural. The area is served by storm drains and septic tanks.
- 6.2.2 Nitrate and nitrite concentrations, and trihalomethanes in the treated water, parameter tests indicate the aquifer is not influenced by run-off from surface-level activities.

File: C:\DWQMS\ACW\Dungannon - 6 - Drinking Water System -

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See Revision History Summary Table at end of this document – Section 6.7.3

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Township of Ashfield-Colborne-Wawanosh

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6.2.3 The full characterization of the original raw water supply source is listed in the First Engineer’s Report, section 4 and Appendix K. (Township of Ashfield-Colborne-Wawanosh Dungannon Well Supply Engineer’s Report – May 16, 2001). Two new wells were installed in 2005 and the original well returned to the original owner.

A study on the new wells - ‘Well Field Evaluation Test Wells’ was carried out April 23, 2003. A follow-up Raw Water Assessment was also carried out by BM Ross Consulting Engineers in May, 2009. Based on the BMR 2009 review of the hydrogeologic information and historic and recent water quality results, it was concluded that the character of the Dungannon area groundwater supply has not deteriorated since the 2000 Engineer’s Report.

6.2.4 There also does not appear to be any event driven fluctuations, and there are also no resulting operational challenges or threats to the water source.

6.2.5 There also does not appear to be any upstream or downstream processes that the Municipality controls that are critical for the provision of water.

6.3 Disinfection System

6.3.1 Disinfection is achieved on the Dungannon well supply through the use of 6% sodium hypochlorite. In the well house this chemical is added prior to the water entering the chlorine contact chamber at dosages high enough to achieve both primary and secondary disinfection objectives.

6.3.2 The chlorine dosages range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/l and < 1.30 mg/l.

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See Revision History Summary Table at end of this document – Section 6.7.3

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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6.4 Iron Sequestering

6.4.1 The well water at Dungannon has iron levels higher than what is considered aesthetically acceptable. The well house provides chemically assisted iron sequestering. The chemical used is sodium silicate. This chemical is fed prior to the chlorine contact main.

6.5 System Flows

6.5.1 The Dungannon well supply has 1 Permit To Take Water (PTWW) # 2814-99NH4D, June 2013, which allows 876 cubic metres per day to be pumped from the combined wells.

6.5.2 The Dungannon treatment system has maximum flows as specified in the Municipal Drinking Water Licence - MDWL - 080-103 and Drinking Water Works Permit - DWWP - 080-203 (previously C of A #6295-6X9QB2). The maximum total daily flow is 657 cubic meters per day and the maximum instantaneous flow is 7.6 litres per second.

6.5.3 The limiting factor regarding flow is chlorine contact time in the chlorine contact main. In order to meet the regulatory CT requirements (CT value > 3.0) increased flows beyond 7.6 litres per second must have an adequate free chlorine residual to counter the decreased retention time in the chlorine contact main.

6.6 Distribution System

6.6.1 The treated water is monitored by an on-line chlorine analyzer.

6.6.2 Distribution piping typically ranges in size from 100 mm to 400 mm, and consists of PVC, with polyethylene service connections.

6.6.3 Typical system pressure ranges from 40 P.S.I to 60 P.S.I.

6.7 Process Flow Schematic and Diagram:

See Below:

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See Revision History Summary Table at end of this document – Section 6.7.3

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6.7.3 Revision History Summary Table

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Rev. 1	June 14, 2013	CoA to Licence and DWWP	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	July 30, 2013	Water source fluct / challenges	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Sept 13, 2013	Rev Process Schematic	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	Feb. 25, 2015	Update Distr. Dwg. from Prelim.	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
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Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan
Dungannon

8. Risk Assessment Outcomes

Dungannon Drinking Water System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 4 to 11 (out of a total max of 15).

An RPN Threshold Value of 5 was chosen from review of the Risk Table because the Critical Control Point minimum number is 5. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure for response if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

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File: C:\DWQMS\ACW\Dungannon- 8 - Risk Assessment Outcome

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Risk Assessment Table Summary

NOTE: A total 29 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures ≥ 5 RPN.

	<u>RPN</u>	<u>CONTROL</u>
4 – Agricultural run-off	8	CP-16
5- Chemical feed pump failure	7	OM-02, CP-01
6 –High Flows	6	CP-01
7 –Degradation of Liquid Chlorine	8	OM-21
11- Water Main Break	8	CP-10, OM-09
12- Loss of chlorine residual	5	OM-02, CP-01

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as ≥ 5 RPN.

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Township of Ashfield-Colborne-Wawanosh

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Items with ≥ 5 RPN values and no associated CCP

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
1	Raw Water Supply	Well Casing Failure	6	There are no quantifiable parameters associated with this event to monitor.
3	Raw Water Supply	Chemical Spill	9	There is no specific parameter to monitor until the contaminant is identified.
8	Chlorine Contact Reservoir	Out of Service for Maintenance / Repair	5	There are no quantifiable parameters associated with this event to monitor.
9	Iron Sequestering	Potential Underfeeding of Sodium Silicate	7	Parameter is monitored qualitatively with the glass wool test.
10	Iron Sequestering	Potential Overfeeding of Sodium Silicate	7	Parameter is monitored qualitatively with the glass wool test.
13	Distribution	Commission of new Water Mains	8	There are no quantifiable parameters associated with this event to monitor.
14	Distribution	Backflow from Private Plumbing	8	There are no quantifiable parameters associated with this event to monitor.
16	Suppliers	Failure to Receive Parts	10	There are no quantifiable parameters associated with this event to monitor.
17	Suppliers	Receipt of Wrong or Non NSF Material	8	There are no quantifiable parameters associated with this event to monitor.
18	Control Systems	Power failure (controls only)	6	There are no quantifiable parameters associated with this event to monitor.
19	Control Systems	on-line monitoring / communication	6	There are no quantifiable parameters associated with this event to monitor.

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		or other electronic equipment failure		
20	Control Systems	Remote Transmitting Unit / Remote Processing Unit Failure	5	There are no quantifiable parameters associated with this event to monitor.
21	Control Systems	on-line monitoring / communication failure (auto-dialer)	5	There are no quantifiable parameters associated with this event to monitor.
22	Entire System	Power failure (controls and equipment)	8	There are no quantifiable parameters associated with this event to monitor.
23	Facility Security	Vandalism	10	There are no quantifiable parameters associated with this event to monitor.

RPN numbers less than 5 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

File: C:\DWQMS\ACW\Dungannon- 8 - Risk Assessment Outcome

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DWQMS Operational Plan
Dungannon

APPENDIX B 2: RISK ASSESSMENT TABLE (Well #1 & # 2) Team Meeting November 2, 2016

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan / Comments
1	Raw Water / Well	Well casing failure	-Loss of raw water -potential biological / chemical contamination	-finished water daily hand held turbidity testing -weekly samples for microbiological testing -monthly monitoring and raw water turbidity testing	-No specific control procedure -Contingency Plan	1	2	3	6	N	None	CP-15 –Well Casing / Well Head / Well Pump Failure Note: CP-Contingency Plan Procedure

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				-redundancy - back-up well pump available – (second well high in arsenic)								OM- Operations Manual -SOP Procedure
2	Raw Water / Well	Well pump failure	-loss of raw water	-alarm system -back-up well pump -back-up water purchase option	-No specific control procedure -Maintenance schedule -Contingency Plan	2	1	1	4	N	None	CP-15 –Well Casing / Well Head / Well Pump Failure
3	Raw Water / Well	Chemical spill	-potential chemical contamination of aquifer	-monitoring weekly microbiological, -monthly turbidity -36 month chemical testing -Operator observation -Customer complaint -well head protection plan	-No specific control procedure -Spill containment in place on site -Contingency Plan	1	4	4	9	N	None (Regular 36 month testing per 170)	CP -07 -Chemical or Fuel Spill / Leak
4	Raw Water / Well	Agricultural run-off	-potential biological / chemical	-monitoring - weekly microbiological,	No specific control procedure	1	3	4	8	N	None	CP-16 -Agricultural Run-off

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DWQMS Operational Plan
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			contamination of aquifer	-monthly turbidity -36 month chemical testing -Quarterly testing (Nitrate/Nitrite, THM's, HAA's) -Operator observation -Customer complaint -well head protection plan							(Regular 36 month testing per 170)	
5	Raw Water / Well	Low well levels	-loss of water	-monthly well level recording -seasonal observations -daily level monitoring	-Operator response -refer to SOP - water use restrictions -no specific control procedure	1	2	3	6	No	None	Consider SOP / CP

File: C:\DWQMS\ACW\Dungannon - APPENDIX B 2 – Risk Assessment Table-

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DWQMS Operational Plan
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6	Additional Treated Water Quality Exceedances	Changes in aquifer water quality	-potential chemical contamination -restrictions on water use	-monitoring -advise health unit as required	Refer to SOP	1	2	4	7	N	None	DG-OM-04 – (Adverse Water Quality)
7	Primary Disinfection	Chemical feed pump failure	-loss of disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response -back-up feed system	-Operator response -maintain spare parts on site -refer to SOP -routine preventative maintenance	3	3	1	7	YES	-Alarm at 0.60 mg/L Low and 2.5mg/L high -Pump lockout at 0.20 mg/l free chlorine -operator response	CP-01 - Low Chlorine Residual OM-02 -Chlorine System and CT Value
8	Primary Disinfection	High flows	-insufficient chlorine contact time -potential biological / chemical contamination	-on-line monitoring and controls -Operator inspection, response, and repair	-Operator Response -no specific control procedure -SOP for maintaining CT values	3	2	1	6	N	None (limit based on PTTW CT > 3.0)	SOP or CP to be considered

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9	Primary Disinfection	Degradation of liquid chlorine	-improper disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response -rotate stock, operator checks on strength	No specific control procedure -Operator response, reaction plan	3	2	3	8	N	None	OM-21 -Chlorine Strength Determination (note 6% sodium hypochlorite vs 12% for other locations)
10	Chlorine Contact Reservoir	- out of service for maintenance / repair	-inadequate contact time for primary disinfection -potential biological / chemical contamination	-increase dosage rate	No specific control procedure	2	2	1	5	N	None	CP-01 - Low Chlorine Residual OM-02 -Chlorine System and CT Value
11	Iron Sequestering	Potential underfeeding of sodium silicate	-customer complaints, aesthetic, staining	-Operator response -monitoring dosages -glass wool test	-No specific control procedure -SOP	2	2	3	7	N	None	OM-17 -Silicate Procedure (higher sodium levels as consequence)

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12	Iron Sequestering	Potential overfeeding of sodium silicate	-potential chemical contamination	-Operator response -monitoring dosages -glass wool test	-No specific control procedure -SOP	2	2	3	7	N	None	OM-17 -Silicate Procedure (higher sodium levels as consequence)	
13	Distribution	Watermain break (and service leaks)	-loss of system pressure - potential biological contamination of distributed water	- low pressure alarm -Operator response / observation -consumer complaint	-No specific control procedure -SOP -MECP Water Main Break Procedure	3	2	3	8	N	None	CP-10 -Watermain Break OM-09 -Procedure for Watermain and Service Leak Repair	

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14	Distribution	Loss of chlorine residual (no secondary disinfection-controlled by primary addition)	-potential biological contamination of distributed water	-chlorine residual at point of entry to distribution system -daily sample from distribution system -Operator response -increase dosage of primary disinfection -flushing lines -monitoring of primary disinfection	-Operator response -maintain spare parts on site -refer to SOP -routine preventative maintenance	2	2	1	5	YES	-operator response -point of entry chlorine alarm 0.60 mg/l low 2.5 mg/L high -pump lockout at 0.20 mg/l free chlorine	CP-01 - Low Chlorine Residual OM-02 -Chlorine System and CT Value
15	Distribution	Commission of new mains	-potential biological contamination	-daily sampling and monitoring -Operator response -system maintenance and repair	No specific control procedure -SOP –AWWA procedures -MECP Water Main Disinfection Procedure	2	3	3	8	N	none	OM-09 -Procedure for Watermain and Service Leak Repair -AWWA procedures

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													-MOECC Procedure
16	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure (new plumbing to have back flow preventors) -Operator response	1	3	4	8	N	None		CP-17 -Backflow from Private Plumbing-Cross Contamination - Backflow Prevention Regulations in Municipal Water Connection By-law
17	Distribution	Non-functioning pressure relief valve back to environment	-loss of water pressure -high pressure breaks -no access to fire protection	-alarms -consumer complaints	-operator response No specific control procedure	1	2	1	4	N	None		OM-08 -Flushing and Valve Turning Procedures (dialer system vs SCADA)
18	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat or supply water adequately	-written communication and agreements with suppliers -NSF and Licence requirement	No specific control procedure -Operator response	2	5	3	10	N	None		CP -09 -Failure to Receive Critical Supply of Parts or Chemicals

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				-critical spare parts available on site								
19	Suppliers	Receipt of wrong or non NSF material	-potential chemical contamination	-written communication and agreements with suppliers -NSF materials -Operator checks	-No specific control procedure -Operator checks for NSF designation	1	4	3	8	N	None	CP -09 -Failure to Receive Critical Supply of Parts or Chemicals -Operator training
20	Control Systems	Power failure (controls only)	-loss of on-line monitoring -loss of pumps, water pressure, and supply	-UPS -back-up disks, memory stick -back-up diesel generator with auto transfer switch -redundancy in data retention	-SOP -Operator response -No specific control procedure	2	3	1	6	N	None (Power required)	CP-05 -SCADA / PC System Failure (UPS -Universal Power Supply)
21	Control Systems	on-line monitoring / communication or other electronic	-loss of pumps, water pressure, and supply	-UPS -back-up disks, memory stick -redundancy in data retention	-SOP -Operator response	2	3	1	6	N	None (Control systems required)	SOP / CP to be considered

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		equipment failure			-No specific control procedure							
22	Control Systems	Remote Transmitting Unit / Remote Processing Unit Failure	-loss of remote monitoring -loss of communication -loss of central record keeping	-alarms -regular checks -redundancy of alarms	-Operator response -spare components -SOP -No specific control procedure	3	1	1	5	N	None	CP-05 Data Recorder System Failure
23	Control Systems	- on-line monitoring / communication failure (auto-dialer)	-loss of operator monitoring and control	UPS -Daily checks	-Operator response -No specific control procedure	3	1	1	5	N	None	CP-05 Data Recorder System Failure
24	Entire System	Power failure (controls and equipment)	-loss of treated water supply	-back-up diesel generator with auto transfer switch	-Operator response -No specific control procedure -monthly generator run	2	5	1	8	N	None	CP-04 -Power Outage

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DWQMS Operational Plan
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					-potential to monitor well levels long-term							
25	Facility Security	-Vandalism, -introduction of contaminant	--damage to equipment -inability to produce treated water -potential contamination	-locks -alarms -regular employees site visits	No specific control procedure	1	4	5	10	N	None	CP-08 -Vandalism
26	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events -warmer and drier summers	-back-up well and pump -back-up water purchase option -well head protection plan -Source Water Protection Plan	No specific control procedure	#	#	#	#	N	None	CP-21
27	Entire System	Extreme Weather Event (tornado, ice storm, etc.,)	-damage to well head and/or well house	-back-up water purchase option -UPS	-No specific control procedure	#	#	#	#	N	None	CP-04 CP-06 CP-21

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		Health – Infectious disease	-power outages	-back-up diesel generator with auto transfer switch -Reports from world/local and Ministry of health units	-Contingency Plan -Refer to directions from regulatory agencies								Emergency Management Act, Guidance from our emergency agencies
28	Entire System	Sustained extreme temperatures (e.g., heat wave, deep freeze)	-increase in frozen water mains/breaks -increase in consumption	- low pressure alarm -consumer complaint -Operator response / observation -back-up well and pump	-No specific control procedure -Contingency Plan	#	#	#	#	N	None	CP-03 CP-10 OM-07 -Frozen Services Responsibilities covered in Water Connection By-Law	
29	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None	CP-07 CP-15	

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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Dungannon

Risk Assessment Team Meeting – November 2, 2016 – Participants: Florence Witherspoon, John Graham & Courtney Black

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APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE: (Ground Water System)

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Raw Water -WELL LEVEL STATIC	<u>MONTHLY</u> level checks -static	Well # 2 (Well # 1 abandoned Jan. 2015)	<u>Flows & level:</u> Operator responds to / reports significant changes in flows, levels or pressure	-Operator to note and respond to significant changes in readings or observations and note in Log Book	None known	Recorded in Log Book and log sheet
Raw Water -TURBIDITY	<u>MONTHLY</u> grab sample testing from each well -turbidity	-collected at raw water tap	<u>Turbidity:</u> Observe trends, report significant change (of +/- .25 NTU)	-Operator to note and respond to significant changes in readings or observations and note in Log Book	-status of aquifer such as limestone flaking -well casing deterioration	Recorded in Log Book and log sheet
Raw Water MICRO-BIOLOGICAL	<u>MONTHLY</u> microbiological grab sample from each well -E-coli -total coliform	-collected at raw water tap	-not detectable -not detectable	samples sent to outside lab for analysis and report	As above	-Operator records on Custody Sheets -results reported by outside lab to WTP
Process step	Sampling or Monitoring Parameter	Location	Quality Targets	Response	Challenging Conditions	Records

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Rev. 2	July 17, 2013	Radionuclides not req'd	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Feb. 25, 2015	Rev. Lead	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 4	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham - Veolia PM / ORO

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Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water CHLORINE RESIDUAL - Disinfection / Chlorination	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	point of entry treated tap	-Operational Goal is 0.90-1.10 mg/l	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	On-line Cl ₂ data logger record Recorded in Log Book and log sheet
Treated Water TURBIDITY	turbidity monitoring analysis Daily Regular Operator checks	-point of entry to distribution system (treated tap)	-observe trends	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded on log sheets only
Treated Water NITRATE & NITRITE	<u>QUARTERLY</u> (every 3 mo) -nitrate & nitrite testing	-point of entry (collected at treated water tap)	Per O.Reg 169/03 -MAC 10 mg/l (Operational Goal 5 mg/l) -MAC 1.0 mg/l (as nitrogen) (Operational goal 0.5 mg/l)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP

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Treated Water INORGANICS	5 YEAR intervals (every 60 mo) Per schedule 23 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 23 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water ORGANICS	5 YEAR intervals (every 60 mo) Per schedule 24 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 24 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Treated Water SODIUM	5 YEAR intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	-point of entry (collected at treated water tap)	<20 mg/l (if above- advise MOH) See also Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records

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Treated Water FLUORIDE CONTENT	<u>5 YEAR</u> intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	- point of entry (treated water sample tap)	Operational goal is < 1.5 mg/l (if above – call MOH)	-samples tested by Operator, records results, and advises MOH if above 1.5 mg/l	Raw water quality	Recorded in Log Book
Treated Water HARDNESS	<u>ON REQUEST</u> grab sample collected	-collected at treated tap	N/A See Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	Operator to report result to ORO / CO to respond to Request	N/A	Recorded in Log Book
Distribution System CHLORINE RESIDUAL	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis (At Point of Entry to Distr) - <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	-household or business tap	-Operational Goal is > 0.2 mg/l (and <2.0 mg/l)	Operator to respond as required and note in Log Book	-raw water quality changes	On-line record (At Point of Entry to Distr) Recorded in Log Book
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution System	<u>BI-WEEKLY</u> sample collection		Operational Goals:	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on

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MICRO-BIOLOGICAL	(every 2 weeks) microbiological sample for -E-coli -total coliform -Heterotrophic Plate Count (HPC) bacteria plate count (25% HPC- distr.)	Distribution system per Weekly Bacti Sample Routes and Locations (per SOP Sampling Schedule)	-E-coli- not detectable -Coliform-not detectable -HPC steady baseline, no sudden change Operational Goal ((< 10 – plate count (colonies per ml) < 10- HPC plate count (colonies per ml))			Custody Sheets -results reported by outside lab to WTP
<u>Distribution System</u> TRihalOMETHANES	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at rotating distant points in the system)	MAC - 0.10 mg/l (Ref. O.Reg 169/03)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> LEAD (see SOP also for lead Sampling Schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alk twice per year	-distribution system- private plumbing, non-private plumbing, and distribution system samples (collected per Operations Manual Schedule)	0.10 mg/l Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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HURON SANDS DRINKING WATER SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

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Rev. Level:	Date:	Change:	By:	Approved By:
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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

DWQMS Operational Plan
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6. Drinking Water System

Huron Sands Drinking Water System:

System Description

6.1 General

- 6.1.1 The Huron Sands water system is characterized as a “secure ground water” system and is classified as a “Limited System” by definition under O.Reg. 128/04. It is owned by the Township of ACW and operated by Veolia Water Canada, the Operating Authority. The system consists of one well with chlorination treatment and iron sequestering, and is operated seasonally between April and November.
- 6.1.2 The entire system is located on Front Concession, Lot 19, in the Huron Sands Subdivision of Ashfield-Colborne-Wawanosh Township. The Huron Sands well house is located at 85019 Michelle St. S, Huron Sands Subdivision, Ashfield-Colborne-Wawanosh Township (Lot 19, Front Concession – legal description – block C, Plan 587, Ashfield Ward). The distribution system serves the community of Huron Sands with a population of approximately 100 residents and approximately 48 customer services.
- 6.1.3 Well # 1, drilled in 2001, is a secure deep bedrock well, 200 mm Ø, 100 metres deep, equipped with a submersible pump with a rated capacity of 3.8 L/s, with instrumentation and control equipment, and 50 mm discharge line connected to the pump house. The well house and its equipment have a daily capacity to deliver 328 m³ of potable water per day to the Huron Sands community. Typical daily peak flow is 60 m³.
- 6.1.4 The well house is equipped with a flow control valve, a chlorine pump, a chemical feed pump for iron sequestering, a chlorine contact watermain, on-line chlorine monitoring, alarm generation, data recorder and auto-dialer. A double throw manually operated transfer switch is available allowing the use of a portable gen set during extended power outages.
- 6.1.5 The water from the well is chlorinated with 6% sodium hypochlorite. Sodium silicate (diluted 2:1) is also added prior to entering the chlorine contact main. The contact watermain is a 900 mm Ø x 6.1 metres long DR41 PVC pipe (4,101 L), and provides adequate chlorine contact time at maximum flow and before the first consumer, complete with a sampling / service water connection feed back to the pump house. The distribution system is constructed with a combination of PVC piping with polyethylene services.

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Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
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See Revision History Summary Table at end of this document – Section 6.6.3

Note: To be reviewed annually or when a QMS change occurs.

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- 6.1.9 There is no elevated storage to maintain pressure and the system pressure is maintained using four (4) pressure tanks and the well pump.
- 6.1.10 The system has no fire hydrants and lacks the capacity to provide fire flows.

6.2 Description of Water Source

- 6.2.1 The current water source is from a secure deep bedrock well. Land use in the vicinity of the well is a mixture of single family residential and agricultural. The area is served by septic tanks.
- 6.2.2 Nitrate/nitrite concentrations and trihalomethanes in the treated water indicate the aquifer is not influenced by run-off from surface-level activities.
- 6.2.3 The full characterization of the raw water supply source is listed in the First Engineer's Report. (Township of Ashfield-Colborne-Wawanosh, Huron Sands Well Supply Engineer's Report, Nov 30, 2000). A well was drilled in March 2001. The original 2000 Engineer's Report for the previous wells determined that the groundwater supply was not under the direct influence of surface water. The MOECC, in a 2005 inspection stated, "the Ministry did not require a GUDI assessment following the construction of the new well".
- 6.2.4 A follow-up Raw Water Assessment was also carried out by BM Ross Consulting Engineers in May, 2015. Based on the BMR 2015 review of the hydrogeological information, historic and recent water quality results, it was concluded that the character of the Huron Sands area groundwater supply has not deteriorated since the evaluation after the well's construction in 2001.
- 6.2.5 A Maitland Valley Source Protection Area Updated Assessment Report was conducted and Table 4.14 indicates that no issues with wells or conditions resulting from past activities were identified with the WHPA. There also does not appear to be any event driven fluctuations, and there are also no resulting operational challenges or threats to the water source.
- 6.2.6 There also does not appear to be any upstream or downstream processes that the Municipality controls that are critical for the provision of water.

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6.3 Disinfection System

- 6.3.1 Disinfection is achieved on the Huron Sands well supply through the use of 6% sodium hypochlorite. In the well house, this chemical is added prior to the water entering the chlorine contact main at dosages high enough to achieve, at a minimum, 2-log (99%) removal or inactivation of viruses before the water is delivered to the first consumer, which encompasses both primary and secondary disinfection objectives.
- 6.3.2 The chlorine dosages range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/L and < 1.30 mg/L.

6.4 System Flows

- 6.4.1 The Huron Sands well supply has 1 Permit To Take Water (PTWW) # 2571-8GQQ4X, issued June 2011, which allows 328 m³/day at a max rate of 228 L/min (3.8 L/s) to be pumped from the well.
- 6.4.2 The Huron Sands treatment system has maximum flows as specified in the Municipal Drinking Water License (MDWL) # 080-106 and Drinking Water Works Permit (DWWP) # 080-206, (previously C of A 1827-5TNHT6). The maximum total daily flow is 328 m³ per day and the maximum instantaneous flow is 3.8 L/s.
- 6.4.3 The limiting factor regarding flow is chlorine contact time in the chlorine contact main. In order to meet the regulatory CT requirements (CT value > 4.0), increased flows beyond 3.8 L/s must have adequate free chlorine residual to counter the decreased retention time in the chlorine contact watermain.

6.5 Distribution System

- 6.5.1 The treated water is monitored by an on-line chlorine analyzer.
- 6.5.2 Distribution piping typically ranges in size from 50 mm to 100 mm, and consists of PVC piping, with polyethylene service connections.
- 6.5.3 A 100 mm diameter discharge watermain outside the pump house supplies treated water to the Huron Sands Estates Subdivision.
- 6.5.4 Typical system pressure ranges from 40 P.S.I to 60 P.S.I.

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See Revision History Summary Table at end of this document – Section 6.6.3

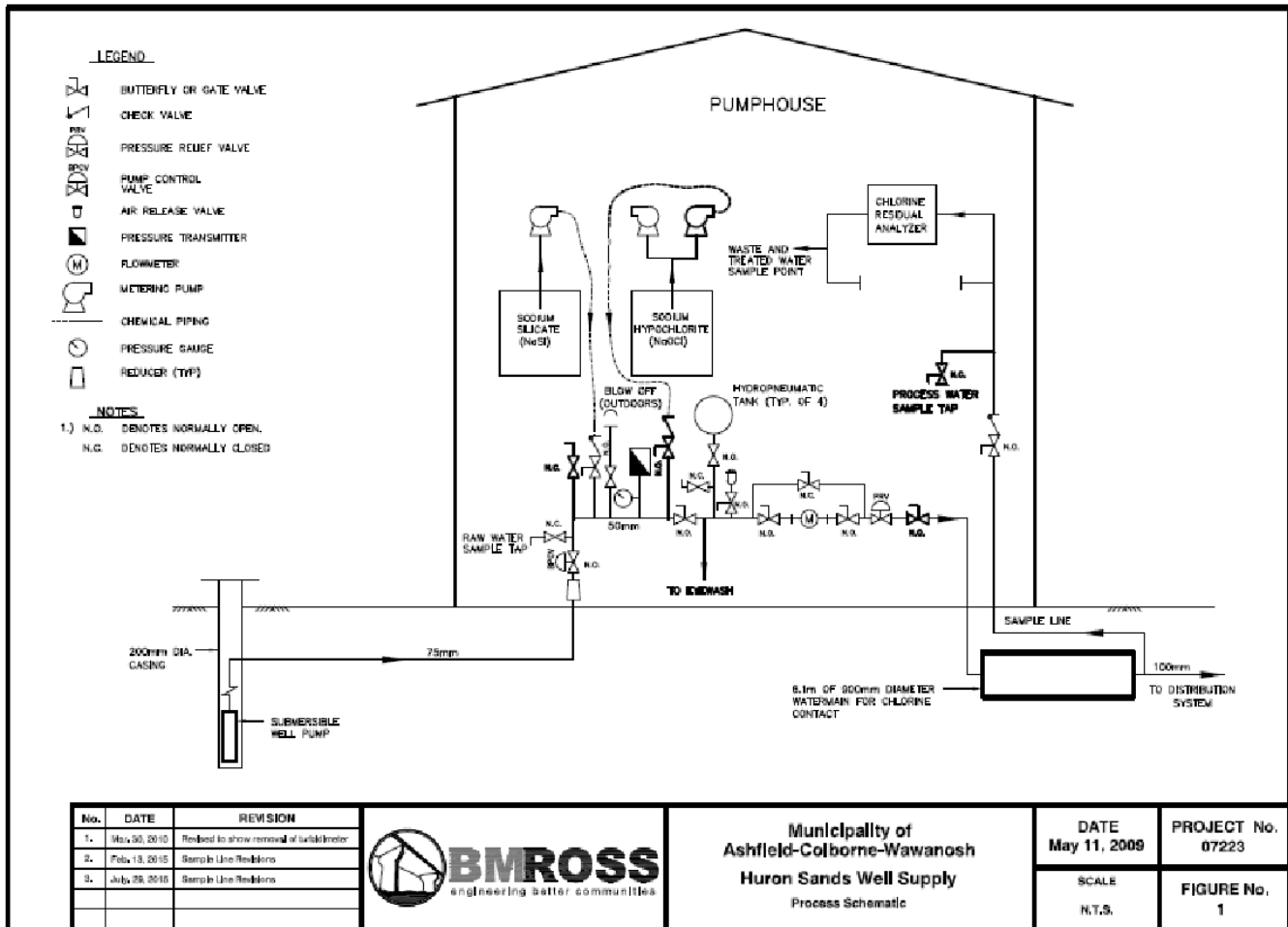
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6.6 Process Flow Schematic and Diagram:

6.6.1 Process Flow Schematic



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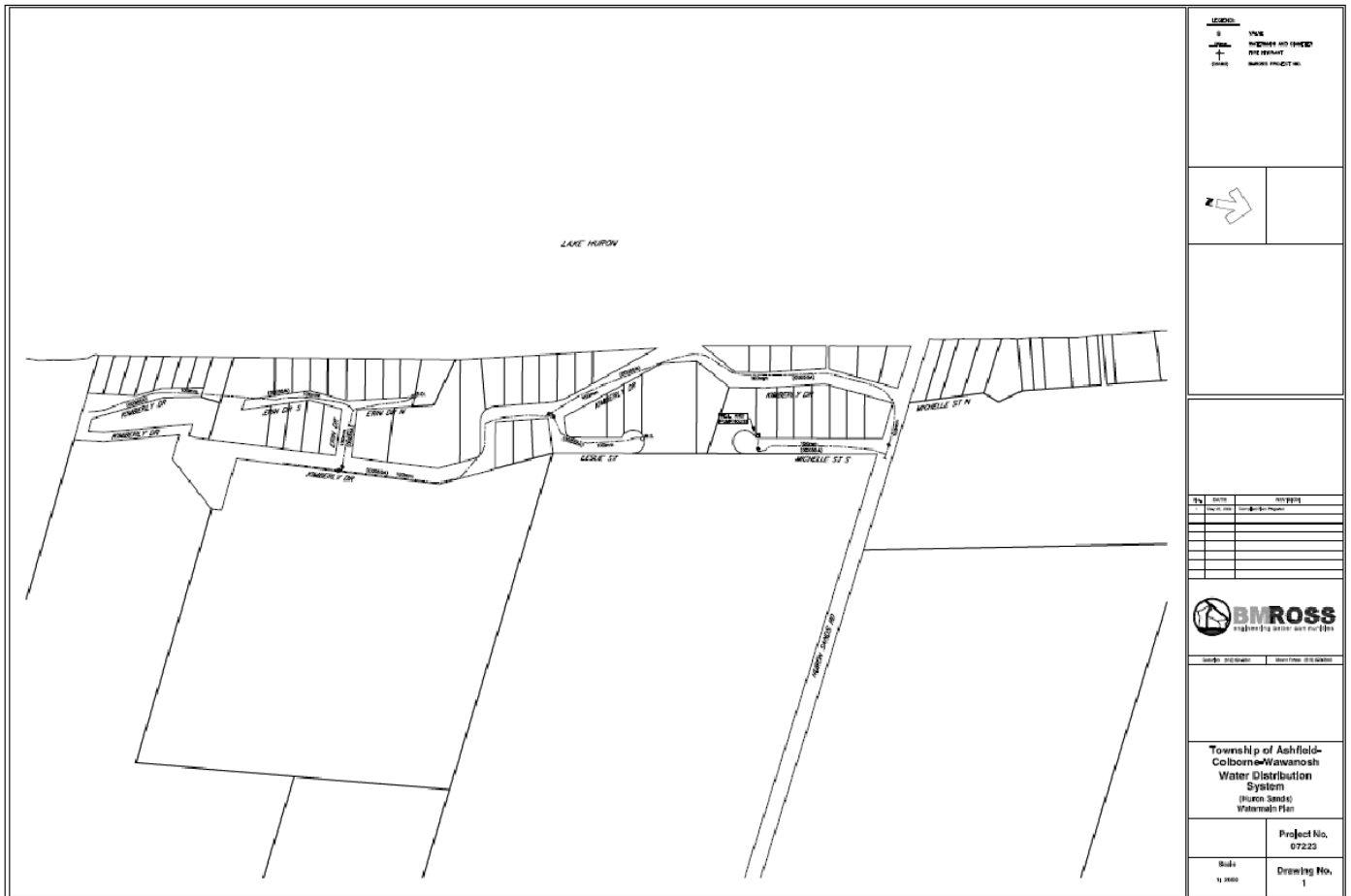
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6.6.2 Distribution System Drawing



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6.6.3 Revision History Summary Table

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Rev. 1	June 14, 2013	CoA to Licence and DWWP	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	July 30, 2013	Water source fluct / challenges	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Dec. 11, 2014	Limited system	N Mayhew - Operator	John Graham – Veolia Project Manager
Rev. 4	Feb. 25, 2015	Update PFS and Distrib. Dwg.	DC Scott –QMS Rep.	John Graham – Veolia Project Manager
Rev. 5	Oct. 15, 2015	Update PFS Dwg to July 29, 2015	DC Scott –QMS Rep.	John Graham – Veolia Project Manager
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8. Risk Assessment Outcomes

Huron Sands Drinking Water System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 4 to 11 (out of a total max of 15).

An RPN Threshold Value of 5 was chosen from review of the Risk Table because the Critical Control Point minimum number is 5. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure for response if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

File: C:\DWQMS\ACW\Huron Sands- 8 - Risk Assessment Outcome

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Rev. 2	May 31, 2018	Updates from B2 review	C Good - QMS Rep.	John Graham - Veolia Project Manager

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Risk Assessment Table Summary

NOTE: A total 25 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures \geq 5 RPN.

	<u>RPN</u>	<u>CONTROL</u>
4 –Agricultural run-off	8	CP-16
5- Chemical feed pump failure	6	OM-02, CP-01
6 – High flows	5	CP-01
7 –Degradation of chlorine	8	CP-21
9 –Water main break	8	CP-10, OM-09
10- Loss of chlorine residual	5	OM-02, CP-01

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as \geq 5 RPN.

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Items with ≥ 5 RPN values and no associated CCP

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
1	Raw Water Supply	Well Casing Failure	6	There are no quantifiable parameters associated with this event to monitor.
3	Raw Water Supply	Chemical Spill	9	There is no specific parameter to monitor until the contaminant is identified.
8	Chlorine Contact Main	Out of Service for Maintenance/Repair	5	There is no specific parameter to monitor until the contaminant is identified.
11	Distribution	Commission of new mains	9	There is no specific parameter to monitor until the contaminant is identified.
12	Distribution	Backflow from Private Plumbing	8	There is no specific parameter to monitor until the contaminant is identified.
14	Suppliers	Failure to Receive Parts	10	There is no specific parameter to monitor until the contaminant is identified.
15	Suppliers	Receipt of non-NSF parts/chemicals	8	There is no specific parameter to monitor until the contaminant is identified.
16	Control Systems	Power Failure	6	There is no specific parameter to monitor until the contaminant is identified.
17	Control Systems	Equipment Failure	6	There is no specific parameter to monitor until the contaminant is identified.
18	Control Systems	Auto-Dialer Failure	5	There is no specific parameter to monitor until the contaminant is identified.
19	Entire System	Power Failure (entire system)	8	There is no specific parameter to monitor until the contaminant is identified.

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20	Entire System	Vandalism	11	There is no specific parameter to monitor until the contaminant is identified.
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RPN numbers less than 5 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

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APPENDIX B 2: RISK ASSESSMENT TABLE (Well #1) Team Meeting: November 2, 2016

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan / Comments
1	Raw Water / Well	Well casing failure	-Loss of raw water -potential biological / chemical contamination	-bi-weekly samples for microbiological testing -monthly raw water turbidity testing	-No specific control procedure - Contingency Plan	1	2	3	6	N	None	CP-15 –Well Casing / Well Head / Well Pump Failure Note:

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												CP-Contingency Plan Procedure	OM-Operations Manual -SOP Procedure
2	Raw Water / Well	Well pump failure	-loss of raw water	-alarm system -back-up water purchase option	-No specific control procedure -Maintenance schedule - Contingency Plan	2	1	1	4	N	None	CP-15 -Well Casing / Well Head / Well Pump Failure	
3	Raw Water / Well	Chemical spill	-potential chemical contamination of aquifer	-monitoring bi-weekly microbiological, -monthly turbidity -60 month chemical testing -Operator observation -Customer complaint -well head protection plan	-No specific control procedure -Spill containment in place on site - Contingency Plan	1	4	4	9	N	None (Regular 60 month testing per 170)	CP -07 -Chemical or Fuel Spill / Leak	

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4	Raw Water / Well	Agricultural run-off	-potential biological / chemical contamination of aquifer	-monitoring bi-weekly microbiological, -monthly turbidity -60 month chemical testing -Quarterly testing -Operator observation -Customer complaint -well head protection plan	No specific control procedure CP	1	3	4	8	N	None (Regular 60 month testing per 170)	CP-16 -Agricultural Run-off
5	Additional Treated Water Quality Exceedances	Changes in aquifer water quality	-potential chemical contamination -restrictions on water use	-monitoring -advise health unit as required	Refer to SOP	1	2	4	7	N	None	HS-OM-04 – (Adverse Water Quality)

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6	Primary Disinfection	Chemical feed pump failure	-loss of disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response	-Operator response -maintain spare parts on site -refer to SOP -routine preventative maintenance	2	3	1	6	YES	-Alarms at 0.60 mg/l and 2.5 -Pump lockout at 0.20 mg/l chlorine res. -operator response	CP-01 - Low Chlorine Residual OM-02 -Chlorine System and CT Value
7	Primary Disinfection	High flows	-insufficient chlorine contact time -potential biological / chemical contamination	-on-line monitoring and controls -Operator inspection, response, and repair	-Operator Response -no specific control procedure -SOP for maintaining CT values	2	2	1	5	N	None (limit based on PTTW)	To consider SOP / CP
8	Primary Disinfection	Degradation of liquid chlorine	-improper disinfection -potential biological / chemical contamination	-on-line monitoring and controls with auto pump lock-out -Operator response -rotate stock, operator	No specific control procedure -Operator response, reaction plan	3	2	3	8	N	None	CP-21 -Chlorine Strength Determination

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				checks on strength								
9	Chlorine Contact Main	- out of service for maintenance / repair	-inadequate contact time for primary disinfection -potential biological / chemical contamination	-increase dosage rate	No specific control procedure	2	2	1	5	N	None	CP-01 - Low Chlorine Residual OM-02 -Chlorine System and CT Value
10	Distribution	Watermain break	-loss of system pressure - potential biological contamination of distributed water	- low pressure alarm -Operator response / observation -consumer complaint	-No specific control procedure -SOP	3	2	3	8	N	None	CP-10 -Watermain Break OM-09 -Procedure for Watermain and Service Leak Repair -MOECC Procedure
11	Distribution	Loss of chlorine residual	-potential biological contamination of distributed water	-chlorine residual at point of entry to distribution system -daily sample from distribution system -Operator response	-Operator response -maintain spare parts on site -refer to SOP	2	2	1	5	YES	-operator response -point of entry chlorine alarms 0.60 / 2.5mg/l	CP-01 - Low Chlorine Residual OM-02

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				-increase dosage of primary disinfection -flushing lines	-routine preventative maintenance							-pump lockout at 0.20 mg/l free chlorine	-Chlorine System and CT Value
12	Distribution	Commission of new mains	-potential biological contamination	-daily sampling and monitoring -Operator response -system maintenance and repair	No specific control procedure -SOP –AWWA procedures	3	3	3	9	N	none	OM-09 -Procedure for Watermain and Service Leak Repair	
13	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure -Operator response	1	3	4	8	N	None	CP-17 -Backflow from Private Plumbing-Cross Contamination -backflow prevention in water connection by-law	
14	Distribution	Non-functioning pressure relief valve back to environment	-loss of water pressure -high pressure breaks	-alarms -consumer complaints	-operator response No specific control procedure	1	2	1	4	N	None	OM-08 -Flushing and Valve Turning Procedures	

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												(no current press relief valves)
15	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat or supply water adequately	-written communication and agreements with suppliers -NSF and PTTW requirement -critical spare parts available on site	No specific control procedure -Operator response	2	5	3	10	N	None	CP -09 -Failure to Receive Critical Supply of Parts or Chemicals
16	Suppliers	Receipt of wrong or non NSF material	-potential chemical contamination	-written communication and agreements with suppliers -NSF materials -Operator checks	-No specific control procedure -Operator checks for NSF designation	1	4	3	8	N	None	CP -09 -Failure to Receive Critical Supply of Parts or Chemicals -Operator training
17	Control Systems	Power failure (controls only)	-loss of pumps, water pressure, and supply	Manual transfer switch -portable genset req'd	Alarm dialer	2	3	1	6	N	None (Power required)	CP-05 -Data Recorder System Fail

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18	Control Systems	equipment failure	-loss of pumps, water pressure, and supply	Alarm dialer -daily checks	-SOP -Operator response -No specific control procedure	2	3	1	6	N	None (Control systems required)	CP-05 -Data Recorder System Fail
19	Control Systems	auto-dialer failure	-loss of operator monitoring	Alarm dialer	-Operator response -No specific control procedure	3	1	1	5	N	None	CP-05 -Data Recorder System Fail
20	Entire System	Power failure (controls and equipment)	-loss of treated water supply -loss of Cl ₂ residual data	Manual transfer switch, portable gen set	-Operator response -No specific control procedure	2	5	1	8	N	None	CP-04 -Power Outage
21	Facility Security	-Vandalism, -introduction of contaminant	--damage to equipment -inability to produce treated water	-locks -regular employees site visits	No specific control procedure	2	4	5	11	N	None	CP-08 -Vandalism

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			-potential contamination									
22	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events -warmer and drier summers	-back-up well and pump -back-up water purchase option -well head protection plan -Source Water Protection Plan	No specific control procedure -long-term monitoring of well levels	#	#	#	#	N	None	CP-21
23	Entire System	Extreme Weather Event (tornado, ice storm, etc.,) Health -Infectious disease	-damage to well head and/or well house -power outages -	-back-up water purchase option -UPS	-No specific control procedure - Contingency Plan -Reports from worl/local and ministry of health units	#	#	#	#	N	None	CP-04 CP-21 Emergency Management Act, guidance from our emergency agencies
24	Entire System	Sustained extreme temperatures	-increase in frozen water mains/breaks	- low pressure alarm -consumer complaint	-No specific control procedure	#	#	#	#	N	None	CP-03 CP-10 OM-07

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Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 19, 2013	36 mo update review	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
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		(e.g., heat wave, deep freeze)	-increase in consumption	-Operator response / observation -back-up well and pump	- Contingency Plan								-frozen services responsibilities in water connection by-law
25	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None		CP-07 CP-15

Risk Assessment Team Meeting – November 2, 2016 – Participants: Florence Witherspoon, John Graham & Courtney Black

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APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE: (Ground Water System)

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Raw Water -WELL LEVEL STATIC	<u>MONTHLY</u> level checks -static	Well # 2 (Well # 1 abandoned Jan. 2015)	<u>Flows & level:</u> Operator responds to / reports significant changes in flows, levels or pressure	-Operator to note and respond to significant changes in readings or observations and note in Log Book	None known	Recorded in Log Book and log sheet
Raw Water -TURBIDITY	<u>MONTHLY</u> grab sample testing from each well -turbidity	-collected at raw water tap	<u>Turbidity:</u> Observe trends, report significant change (of +/- .25 NTU)	-Operator to note and respond to significant changes in readings or observations and note in Log Book	-status of aquifer such as limestone flaking -well casing deterioration	Recorded in Log Book and log sheet
Raw Water MICRO-BIOLOGICAL	<u>MONTHLY</u> microbiological grab sample from each well -E-coli -total coliform	-collected at raw water tap	-not detectable -not detectable	samples sent to outside lab for analysis and report	As above	-Operator records on Custody Sheets -results reported by outside lab to WTP
Process step	Sampling or Monitoring Parameter	Location	Quality Targets	Response	Challenging Conditions	Records

File: C:\DWQMS\ACW – Huron Sands - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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Rev. 1	Feb. 25, 2015	Rev. Lead	DC Scott –QMS Rep.	John Graham - Veolia PM / ORO
Rev. 2	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham - Veolia PM / ORO

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Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water CHLORINE RESIDUAL - Disinfection / Chlorination	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	point of entry treated tap	-Operational Goal is 0.90-1.10 mg/l	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	On-line Cl ₂ data logger record Recorded in Log Book and log sheet
Treated Water TURBIDITY	turbidity monitoring analysis Daily Regular Operator checks	-point of entry to distribution system (treated tap)	-observe trends	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded on log sheets only
Treated Water NITRATE & NITRITE	<u>QUARTERLY</u> (every 3 mo) -nitrate & nitrite testing	-point of entry (collected at treated water tap)	Per O.Reg 169/03 -MAC 10 mg/l (Operational Goal 5 mg/l) -MAC 1.0 mg/l (as nitrogen) (Operational goal 0.5 mg/l)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP

File: C:\DWQMS\ACW – Huron Sands - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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Treated Water INORGANICS	5 YEAR intervals (every 60 mo) Per schedule 23 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 23 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water ORGANICS	5 YEAR intervals (every 60 mo) Per schedule 24 of O.Reg. 170/03	-point of entry (collected at treated water tap)	As outlined in O.Reg 169/03 for parameters in sch. 24 of O.Reg. 170/03 (< 50% MAC Operational Goal)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Treated Water SODIUM	5 YEAR intervals (every 60 mo) (Per schedule 23 of O.Reg. 107/03)	-point of entry (collected at treated water tap)	<20 mg/l (if above- advise MOH) See also Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water	5 YEAR intervals	- point of entry	Operational goal is < 1.5 mg/l		Raw water quality	

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FLUORIDE CONTENT	(every 60 mo) (Per schedule 23 of O.Reg. 107/03)	(treated water sample tap)	(if above – call MOH)	-samples tested by Operator, records results, and advises MOH if above 1.5 mg/l		Recorded in Log Book
Treated Water HARDNESS	<u>ON REQUEST</u> grab sample collected	-collected at treated tap	N/A See Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines	Operator to report result to ORO / CO to respond to Request	N/A	Recorded in Log Book
Distribution System CHLORINE RESIDUAL	<u>ON-LINE</u> Cl ₂ analyzer residual monitoring analysis (At Point of Entry to Distr) - <u>DAILY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	-household or business tap	-Operational Goal is > 0.2 mg/l (and <2.0 mg/l)	Operator to respond as required and note in Log Book	-raw water quality changes	On-line record (At Point of Entry to Distr) Recorded in Log Book
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution System	<u>BI-WEEKLY</u> sample collection (every 2 weeks)	Distribution system per Weekly Bacti Sample Routes and Locations	Operational Goals: -E-coli- not detectable	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on

File: C:\DWQMS\ACW – Huron Sands - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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MICRO-BIOLOGICAL	microbiological sample for -E-coli -total coliform -Heterotrophic Plate Count (HPC) bacteria plate count (25% HPC- distr.)	(per SOP Sampling Schedule)	-Coliform-not detectable -HPC steady baseline, no sudden change Operational Goal ((< 10 – plate count (colonies per ml) < 10- HPC plate count (colonies per ml))			Custody Sheets -results reported by outside lab to WTP
<u>Distribution System</u> TRIHALOMETHANES	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at rotating distant points in the system)	MAC - 0.10 mg/l (Ref. O.Reg 169/03)	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
<u>Distribution System</u> LEAD (see SOP also for lead Sampling Schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alk twice per year	-distribution system- private plumbing, non-private plumbing, and distribution system samples (collected per Operations Manual Schedule)	0.10 mg/l Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab

File: C:\DWQMS\ACW – Huron Sands - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

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Township of Ashfield-Colborne-Wawanosh

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SOUTH LUCKNOW SUBDIVISION DISTRIBUTION SYSTEM APPENDIX

The following Section represents DWQMS information specific to the individual systems.

Element 6 - System Description

Element 8 – Risk Assessment Outcomes

Appendix B 2 – Risk Assessment Table

Appendix I 1 – Sampling, Testing, and Monitoring Table

Please see the appropriate section for details on the individual systems for the Township of Ashfield-Colborne-Wawanosh.

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Rev. Level:	Date:	Change:	By:	Approved By:
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Rev. 1	Mar. 2, 2015	Update system name	DC Scott –QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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6. Drinking Water System

South Lucknow Subdivision Distribution System:

System Description

6.1 General

- 6.1.1 The South Lucknow Subdivision Distribution System, located south of the Town of Lucknow, Ontario, provides a potable water supply to the residents of Corporation of the Township of Ashfield-Colborne-Wawanosh in the area known as South Lucknow Subdivision, located immediately south of the Town of Lucknow. There are approximately 13 customers connected in this service area.
- 6.1.2 The distribution system, consists of a Class 1 Water Distribution system, which is owned by the Township of Ashfield-Colborne-Wawanosh and operated by Veolia Water Canada, the Operating Authority.
- 6.1.3 The treated water is supplied by and delivered to the South Lucknow Subdivision Distribution system through the Huron-Kinloss Lucknow Distribution system.

6.2 Description of Water Source

- 6.2.1 Raw water is obtained from the Huron-Kinloss Lucknow Distribution system, and supplied to the Township of Ashfield-Colborne-Wawanosh and the Operating Authority, Veolia Water Canada.
- 6.2.2 Details of the raw water source, as well as common event driven fluctuations and resulting operational challenges and threats are addressed in the Huron-Kinloss - Lucknow Drinking Water System, and are not considered to be a significant concern to the South Lucknow Subdivision water.

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Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott - QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 14, 2013	Update PM	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	July 30, 2013	Water source update	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
Rev. 3	Feb. 25, 2015	Update Distr. Dwg.	DC Scott - QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.



Township of Ashfield-Colborne-Wawanosh

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6.3 Distribution System

6.3.1 Each home is individually metered.

6.3.3 Typical system pressure ranges from 35 P.S.I to 40 P.S.I, due to elevation changes.

6.4 Sample Analysis

6.4.1 Provincial regulations dictate the sampling and monitoring requirements for the system. Water quality is tested from dedicated sampling sites located at the extremities of the Distribution System. Where required by regulation, samples are submitted to an accredited laboratory for analyses.

6.5 Distribution System Schematic

See below

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Rev. 1	June 14, 2013	Update PM	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	July 30, 2013	Water source update	DC Scott - QMS Rep.	John Graham - Veolia Project Manager
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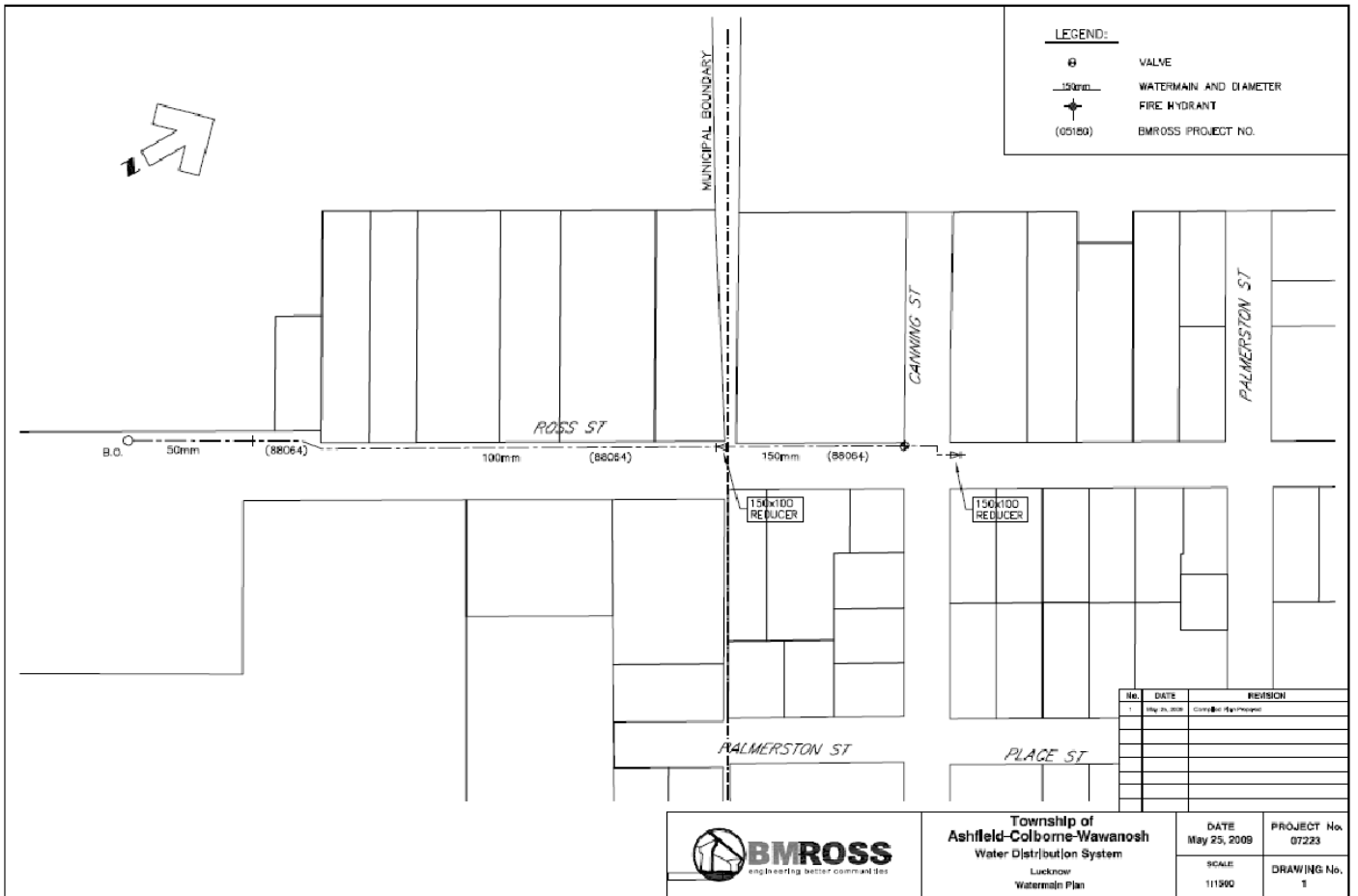


Township of Ashfield-Colborne-Wawanosh

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6.5.1 Distribution System Schematic



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Township of Ashfield-Colborne-Wawanosh

DWQMS Operational Plan
South Lucknow Subdivision

8. Risk Assessment Outcomes

South Lucknow Distribution System

Basis: Risk Assessment Table and Team Meeting June 19, 2013 (Appendix B2)

1- First Engineer's Report

No outstanding items.

2- Rank Hazardous Events and Identify CCP's

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 4 to 11 (out of a total max of 15).

An RPN Threshold Value of 7 was chosen from review of the Risk Table because the Critical Control Point minimum number is 7. It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available, necessarily have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure for response if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority's Operations Manual (OM) or Contingency Plan (CP)

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File: C:\DWQMS\ACW\South Lucknow Subdivision- 8 - Risk Assessment Outcome

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Rev. 1	June 19, 2013	Update to 36 mo review	DC Scott -QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	May 31, 2018	Updates from App B2	C Good - QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

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Township of Ashfield-Colborne-Wawanosh

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South Lucknow Subdivision

Risk Assessment Table Summary

NOTE: A total 13 potential hazards were identified in the Risk Assessment Table - Appendix B2, Critical Control Points are listed below:

CCP's (see additional details in Table APP B2)

Hazards with Critical Control Limits or Control Measures ≥ 7 RPN.

	<u>RPN</u>	<u>CONTROL</u>
1- Loss of System Pressure	7	CP-03
2- Inadequate chlorine residual in distribution system	10	CP-01

Note: OM- Operations Manual and SOP #; CP- Contingency Plan and Procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as ≥ 7 RPN.

Items with ≥ 7 RPN values and no associated CCP

Item #	Process Step	Description of Hazard	RPN	Why is no CCP needed?
7	Control Systems	Power Failure	7	There are no quantifiable parameters associated with this event to monitor.

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Township of Ashfield-Colborne-Wawanosh

Veolia Water Canada

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South Lucknow Subdivision

8	Facility Security	Vandalsim	11	There are no quantifiable parameters associated with this event to monitor.
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RPN numbers less than 7 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.

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APPENDIX B 2: RISK ASSESSMENT TABLE Distribution System – Team Meeting – November 2, 2016

	Process Step	Description of Hazard	Potential Result of Hazard	Available Monitoring and Control Measures	Control Procedure <small>(or reference to an SOP)</small>	L i k e l i h o o d	S e v e r i t y	D e t e c t a b i l i t y	R i s k P r i o r i t y N u m b e r - R P N	CCP ?	Critical Control Limits	Contingency Plan / Comments <small>(reference to an SOP or Contingency Plan)</small>
1	Raw Water / Well	Chemical spill in source water	-potential chemical contamination of aquifer	-monitoring monthly microbiological -treated on-line turbidity monitor	-refer to contingency plan -Operator response -no specific control procedure	1	4	4	9	No	None	Lucknow CP-07

File: C:\DWQMS\ACW – South Lucknow Distribution- APPENDIX B2 - Risk Assessment Table

Rev. Level:	Date:	Change:	By:	Approved By:
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South Lucknow Distribution

				-60 month chemical testing -Customer complaint -well head protection plan								
2	Raw Water / Well	Low well levels in source water	-loss of water	-monthly well level recording -seasonal observations -daily level monitoring	-Operator response -refer to SOP - water use restrictions -no specific control procedure	1	2	3	6	No	None	Consider SOP / CP
3	Distribution System	Loss of system pressure	pressure drop could allow contaminants into system (back siphoning) -potential for biological contamination	Operator response -back flow preventers added to new connections -Lucknow Standpipe	Operator response	3	3	1	7	YES	>20 PSI at Plant	L-CP-03 -Low System Pressure -backflow prevention in water connection by-law

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South Lucknow Distribution

4	Distribution	Backflow from private plumbing (Cross Contamination)	-potential chemical or biological contamination	-monitoring of system pressure -precautionary boil water notice	No specific control procedure -Operator response	1	3	4	8	N	None	L-CP-17 -Backflow from Private Plumbing-Cross Contamination -backflow prevention in water connection by-law
5	Distribution	Commission of new mains	-potential biological contamination	-required sampling and monitoring -Operator response -system maintenance and repair	-Disinfection procedure	3	1	1	5	No	None	SL-CP-06 -Watermain Break -AWWA Procedure -MOECC Procedure
6	Distribution	Non-functioning appurtenances	-unable to isolate -no access to fire protection	-annual exercise -annual inspection -regular maintenance	-Operator response -no specific control,	2	1	3	6	No	None	CP to be considered

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South Lucknow Distribution

7	Suppliers	Failure to receive critical supply of parts or chemical	-unable to treat water adequately -failure of equipment	-written communication and agreements with suppliers -NSF and CofA requirement -on site redundancy of equipment, parts and supplies	-Operator response -alternate source -critical spare parts available -no specific control,	1	2	3	6	No	None	CP-05 -Failure to Receive Critical Supply of Parts or Chemicals
8	Control Systems	Power failure	-potential loss of water supply	-Lucknow Standpipe	-no specific control,	2	3	2	7	No	None	CP to be considered
9	Facility Security	-Vandalism, -introduction of contaminant	-damage to equipment -inability to supply treated water -potential contamination	-locks -daily checks -high visibility	-operator response -refer to procedure -no specific control,	1	5	5	11	No	None	SL-CP-04 -Vandalism

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DWQMS Operational Plan
South Lucknow Distribution

10	Entire System	Long-Term Impacts of Climate Change	-changes in precipitation patterns -increase in frequency and severity of extreme weather events -warmer and drier summers	-back-up well and pump -back-up water purchase option -well head protection plan -Source Water Protection Plan	No specific control procedure -long-term monitoring of well levels	#	#	#	#	N	None	L-CP-21
11	Entire System	Extreme Weather Event (tornado, ice storm, etc.)	-damage to well head and/or well house -power outages	-back-up water purchase option -UPS -back-up diesel generator with auto transfer switch	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	L-CP-04 L-CP-06 L-CP-21
12	Entire System	Sustained extreme temperatures (e.g., heat wave, deep freeze)	-increase in frozen water mains/breaks -increase in consumption	- low pressure alarm -consumer complaint -Operator response / observation -back-up well and pump	-No specific control procedure - Contingency Plan	#	#	#	#	N	None	L-CP-03 L-CP-10 L-OM-07 -frozen services responsibilities in water connection by-law

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Note: To be reviewed annually or when a QMS change occurs.



DWQMS Operational Plan
South Lucknow Distribution

13	Entire System	Terrorist Threat	-contamination of well head/reservoir -damage to well house	-back-up water purchase option -well head protection plan -Source Water Protection Plan	-No specific control procedure	#	#	#	#	N	None	L-CP-07 L-CP-15

Risk Assessment Team Meeting – November 2, 2016 Participants: Florence Witherspoon, John Graham & Courtney Black

File: C:\DWQMS\ACW – South Lucknow Distribution- APPENDIX B2 - Risk Assessment Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	June 19, 2013	36 mo update review	DC Scott –QMS Rep.	John Graham - Veolia Project Manager
Rev. 2	Nov 7, 2016	36 mo update review	C Black – QMS Rep.	John Graham - Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

DWQMS Operational Plan
South Lucknow Distribution

APPENDIX I 1: SAMPLING, TESTING, AND MONITORING SUMMARY TABLE

PARAMETER						
Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Distribution Water CHLORINE RESIDUAL - Disinfection / Chlorination	- <u>WEEKLY</u> grab sample Cl ₂ residual testing (free chlorine residuals)	distribution system	>0.2 mg/l min. chlorine residual at point of entry to distribution system	Operator to respond to significant changes in readings or observations and note in Log Book	-raw water quality changes	Recorded in Log Book
Distribution Water -FLOWS	- <u>DAILY</u> checks	-Distribution system	-Observation of trends	Operator to respond to significant changes in readings or observations and note in Log Book	-water supply -water main breaks	Recorded in Log Book
Distribution Water MICRO-BIOLOGICAL	- <u>WEEKLY</u> sample collection 1 - sample from distribution system microbiological sample for -E-coli -total coliform -bacteria plate count (25% HPC- distr.)	Distribution system	Operational Goals: -E-coli- not detectable -Coliform-not detectable -HPC steady baseline, no sudden change <200 – plate count (colonies per ml) <500- HPC plate count (colonies per ml)	samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP

File: C:\DWQMS\ACW – South Lucknow - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
Rev. 1	Feb. 25, 2015	Rev. Lead	DC Scott –QMS Rep.	John Graham – Veolia Project Manager
Rev. 2	May 31, 2018	Added HAA Sampling	C Good – QMS Rep.	John Graham – Veolia Project Manager

Note: To be reviewed annually or when a QMS change occurs.

DWQMS Operational Plan
South Lucknow Distribution

Process step	Sampling or Monitoring Parameter and Frequency	Location	Quality Targets	Response	Challenging Conditions	Records
Treated Water TRIHALOMETHANES (Sampling schedule)	<u>QUARTERLY</u> (every 3 mo) trihalomethane testing	-distribution system (collected at furthest, oldest water points in the system)	Per O.Reg 169/03	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab to WTP
Distribution System Haloacetic Acids	<u>QUARTERLY</u> (every 3 mo) Haloacetic acid testing	-distribution system (collected at the first user)	No MAC until 2020	-samples sent to outside lab for analysis and report	Raw water quality	-Operator records on Custody Sheets -results reported by outside lab
Treated Water LEAD (Sampling schedule)	<u>ANNUALLY</u> (every 12 mo or as reduced sampling allows for -lead testing) pH and Alk twice per year	-distribution system (collected per Operations Manual Schedule)	Per O.Reg 169/03	-samples sent to outside lab for analysis and report		-Operator records on Custody Sheets -results reported by outside lab to WTP

File: C:\DWQMS\ACW – South Lucknow - APPENDIX I 1 – Sampling, Testing, and Monitoring Summary Table

Rev. Level:	Date:	Change:	By:	Approved By:
Initial Release	Apr. 30, 2009	Release	DC Scott –QMS Rep.	Laurie Cox - Veolia Project Manager
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Note: To be reviewed annually or when a QMS change occurs.