

# MULTI-FACILITY OPERATIONAL PLAN

## For the Township of Springwater Drinking Water Systems:

Minesing

Anten Mills

Elmvale

Hillsdale

Del Trend

Vespra Downs

Midhurst

Snow Valley

Phelpston

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

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

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

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



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Doc: OP-ToC  
Issue Date: 2018-09-21  
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# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-01  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 2

## QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS)

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

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

### 2. Definitions

*Drinking Water Quality Management Standard (DWQMS)* – means the quality management standard approved by the Minister in accordance with section 21 of the SDWA.

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

*Quality & Environmental Management System (QEMS)* – a system to:

- a) Establish policy and objectives, and to achieve those objectives; and
- b) Direct and control an organization with regard to quality.

### 3. Procedure

3.1 The Township of Springwater Drinking Water Systems is owned by the Corporation of the Township of Springwater. OCWA is the contracted Operating Authority for the Township of Springwater Drinking Water Systems, which includes the following facilities:

- Minesing Drinking Water System
- Anten Mills Drinking Water System
- Elmvale Drinking Water System
- Hillsdale Drinking Water System
- Del Trend Drinking Water System
- Vespra Downs Drinking Water System
- Midhurst Drinking Water System
- Snow Valley Drinking Water System
- Phelpston Drinking Water System

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

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



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Township of Springwater Drinking Water Systems

QEMS Proc.: OP-01  
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**QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS)**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

**4. Related Documents**

MECP’s Drinking Water Quality Management Standard  
All QEMS Procedures and Documents referenced in this Operational Plan

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Information within OP-01 was originally set out in the Main body of OCWA’s Operational Plan (last revision 7 dated 2017-09-17). New purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Addition of new wording (section 3.3) to clarify that the OCWA’s Operational Plan now aligns with the 21 elements of DWQMS. |
|            |            |   |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-02  
Rev Date: 2018-09-21  
Rev No: 0  
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**QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

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

**2. Definitions**

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

**3. Procedure**

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

OCWA's Policy is to:

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

Originally issued as Environmental Policy on June 8, 1995

**Last revised, approved by OCWA's Board of Directors on April 6, 2016**

(This policy is annually reviewed)

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

3.3 OCWA's QEMS Policy is readily communicated and available to all OCWA personnel, the Owner and the public through OCWA's intranet and public websites. A hardcopy of the QEMS Policy is posted as specified in the OP-05 Document and Records Control procedure.

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



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-02  
Rev Date: 2018-09-21  
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**QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY**

Reviewed by: Process & Compliance Technician | Approved by: Senior Operations Manager

- 3.5 Corporate Compliance coordinates the annual review and approval of the QEMS Policy by the Board of Directors and communicates the approval to all OCWA employees via an electronic communication.
- 3.6 The current version of the policy indicates the date of the last revision and that the policy is annually reviewed. Electronic and hard-copy documents that include the QEMS Policy will only be required to be updated in years when the Policy has been revised. A complete review/revision history of the QEMS Policy (documenting the annual policy review and/or revision approval date) is maintained on OCWA's intranet.

**4. Related Documents**

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

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Section 3.4, 3.5 and 3.6 were added to the information originally set out in the main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). New sections: Purpose, Definitions, Procedure, Related Documents and a separate Revision History. Minor revisions to wording in section 3.3 to reference location of posted copy of the policy. Added sections on how annual policy review is conducted (section 3.5 and section 3.6) and reference to OP-13 ESS (section 3.4). The full revision history for the QEMS policy is available on OCWA's intranet. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-03  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 2

## COMMITMENT AND ENDORSEMENT

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To document the endorsement of the Operational Plan for the Township of Springwater Drinking Water Systems by OCWA Top Management and the Corporation of the Township of Springwater (Owner), and to set out when re-endorsement would be required.

### 2. Definitions

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

### 3. Procedure

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

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

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

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

### 4. Related Documents

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

### 5. Revision History



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Township of Springwater Drinking Water Systems

QEMS Proc.: OP-03  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 2 of 2

**COMMITMENT AND ENDORSEMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-03 was originally set out in the main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Procedure provides information on who from Top Management endorses the Operations Plan (section 3.1); when owner re-endorsement is sought and 'criteria' as to what is considered a major revision to the plan (section 3.2). The Owner and Top Management sign-off section is Appendix OP-03A. |
|             |                   |  |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Doc: OP-03A  
Rev Date: 2018-09-21  
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**SIGNED COMMITMENT AND ENDORSEMENT**

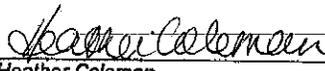
This Operational Plan sets out the framework for OCWA' Quality & Environmental Management System (QEMS) that is specific and relevant to your drinking water system(s) and supports the overall goal of OCWA and the Corporation of the Township of Springwater (Owner) to provide safe, cost-effective drinking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

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

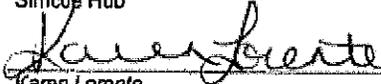
**OCWA Top Management  
Endorsement**

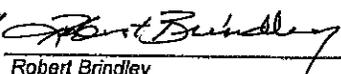
**Owner Endorsement**

  
Richard Eagle  
Senior Operations Manager, North  
Simcoe Hub

Nov 8, 18   
Date Heather Coleman  
Director of Public Works

Dec 12, 2018  
Date

  
Karen Lorente  
Regional Hub Manager, Georgian  
Highlands Region

Dec 5/18   
Date Robert Brindley  
Chief Administrative Officer

Dec 7, 2018  
Date

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



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-04  
Rev Date: 2018-09-21  
Rev No: 0  
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**QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS)  
REPRESENTATIVE**

Reviewed by: Process & Compliance Technician | Approved by: Senior Operations Manager

**1. Purpose**

To identify and describe the specific roles and responsibilities of the QEMS Representative for the Township of Springwater Drinking Water Systems.

**2. Definitions**

None

**3. Procedure**

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

3.2 The QEMS Representative is responsible for:

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

**4. Related Documents**

None

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Information within OP-04 was originally set out in the main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Change to responsibilities: Operations Manager no longer considered QEMS Representative and SPC Manager to act as alternate as required (s. 3.1); added wording to clarify shared responsibilities for Top Management and QEMS Representative to ensure operations personnel are aware of applicable legislative and regulatory requirements (section 3.2). |



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Township of Springwater Drinking Water Systems

QEMS Proc.: OP-05  
Rev Date: 2018-09-21  
Rev No: 8  
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**DOCUMENT AND RECORDS CONTROL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

To describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of. Applies to QEMS Documents and QEMS records pertaining to the Township of Springwater Drinking Water Systems as identified in this procedure.

**2. Definitions**

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

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

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

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

*Controlled* – managed as per the conditions of this procedure

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

**3. Procedure**

- 3.1 Documents and records required by OCWA's QEMS and their locations are listed in Appendix OP-05A Document and Records Control Locations.
- 3.2 Internally developed QEMS documents and QEMS records (whenever possible) are generated electronically to ensure legibility and are identified through a header/title and issue date. Handwritten records must be legible and permanently rendered in ink or non-erasable marker.
- 3.3 Controls for the Operational Plan include the use of authorized approval, alpha-numeric procedure code, issue date, page numbers on every page, revision number and revision history.

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

Review      Process & Compliance Technician  
Approval    Senior Operations Manager

- 3.4 The QEMS Representative is responsible for ensuring that current versions of QEMS documents are being used at all times. Current QEMS documents and records are



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**DOCUMENT AND RECORDS CONTROL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

readily accessible to operations personnel and to internal and external auditors/inspectors at established document control locations. The currency of internal documents is ensured by comparing the date on the document to that of the master hardcopy and/or electronic copy residing in the designated document control location(s) specified in Appendix OP-05A.

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

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

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

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

- 3.6 Any employee of the drinking water system may request, (in writing) to the QEMS Representative, a revision be made to improve an existing internal QEMS document or the preparation of a new document. Written requests should indicate the reason for the requested change. The need for new or updated documents may also be identified through the Management Review or system audits.

The QEMS Representative communicates any changes made to QEMS documents to relevant operations personnel and coordinates related training (as required). Changes to corporately controlled QEMS documents are communicated and distributed to facility QEMS Representatives by OCWA's Corporate Compliance Group through e-mails, memos and/or provincial, regional hub/cluster or facility-level training sessions.

- 3.7 When a QEMS document is superseded, the hardcopy of the document is promptly removed from its location and forwarded to the QEMS Representative for disposal or retention (as appropriate).
- 3.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding.



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Township of Springwater Drinking Water Systems

QEMS Proc.: OP-05  
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**DOCUMENT AND RECORDS CONTROL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

| Type of Document/Record  | Minimum Retention Time                                 | Requirement Reference           |
|--|--|---------------------------------|
| DWQMS Operational Plan   | 10 years   | Director's Direction under SDWA |
| Internal QEMS Audit Results  | 10 years   | OCWA Requirement                |
| External QEMS Audit Results  | 10 years   | OCWA Requirement                |
| Management Review Documentation  | 10 years   | OCWA Requirement                |
| Documents/records required to demonstrate conformance with the DWQMS (specifically all the documents/records listed in Table 1)  | 3 years*if no specified legislative requirement below* | OCWA Requirement                |
| Log Books or other record-keeping mechanisms   | 5 years  | O. Reg. 128/04                  |
| Training Records for water operators and water quality analysts  | 5 years  | O. Reg. 128/04                  |
| Operational checks, sampling and testing (e.g., chlorine residuals, turbidity, fluoride, sampling records), microbiological sampling and testing and chain of custodies                                | 2 years  | O. Reg. 170/03                  |
| Schedule 23 & 24 (LMR) and THM, HAA, nitrates, nitrites and lead program sampling and testing, Section 11 Annual Reports and Schedule 22 Summary Reports   | 6 years  | O. Reg. 170/03                  |
| Sodium test results and related corrective action records/reports, 60 month fluoride test results (if the system doesn't fluoridate), Engineering Reports  | 15 years   | O. Reg. 170/03                  |
| Lead samples, correction action records/reports for E. Coli, Total Coliforms and bacterial species   | 2 years  | O. Reg. 170/03                  |
| Corrective action records/reports for chemical and radiological parameters under SDWA O. Reg. 169/03, pesticides not listed under O. Reg. 169/03 and health-related parameters in an order or approval | 6 years (LMR)<br>15 years (SMR)                        | O. Reg. 170/03                  |
| Flow Meter Calibration Records, Analyzer Calibration Reports Maintenance Records/Work Orders   | 2 years  | O. Reg. 170/03                  |



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Township of Springwater Drinking Water Systems

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**DOCUMENT AND RECORDS CONTROL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

**4. Related Documents**

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

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-09 | 0          | Procedure Issued   |
| 2011-05-05 | 1          | Revised sections 5.4, 5.5, 5.9 & 5.10 as per OCWA Corporate revisions.   |
| 2011-06-08 | 2          | Revised Table 1 and Table 2 as per OCWA Corporate revisions.   |
| 2012-02-13 | 3          | Updated title for Operations Manager to Senior Operations Manager, updated facility titles from Well Supply Systems to Drinking Water Systems, changed CofA to DWWP/MDWL in table 1.   |
| 2013-03-25 | 4          | Expanded point 5.7 to specify where obsolete electronic copies go once superseded.   |
| 2014-10-28 | 5          | Updated QP-01 to include location of electronic inspection and calibration reports. Revised "issued" and "approved" from staff names to position titles.   |
| 2015-12-09 | 6          | Revised Table 1 to reflect name change of Hub server to HB-WASAGA  |
| 2017-09-25 | 7          | Updated "Georgian Bay Hub" to "Georgian Highlands Regional".   |
| 2017-09-21 | 8          | Procedure issued following new template from Corporate Compliance. QP-01 procedure renamed OP-05. Removed Scope and Responsibilities sections. Moved the former Table 1 (Designated location for documents and records required by OCWA's QEMS) to its own appendix (OP-05A). Assigned responsibility for ensuring current versions of QEMS documents are being used to the QEMS Representative (s. 3.4). Clarified that requests for revisions/new QEMS documents are made to the QEMS Representative (s. 3.6). Moved the former Table 2 (Relevant regulatory and corporate minimum retention periods) to be part of s. 3.9 and expanded on the minimum retention times for documents and records required to demonstrate compliance with legislation. Other minor wording changes. |



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**DOCUMENT AND RECORDS CONTROL LOCATIONS**

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

| Type of Document/Record  | Designated Document Control Location<br>(HC = Hardcopy, E = Electronic)                                    |
|--|--|
| <b>Internal QEMS Documents</b>   |  |
| Operational Plan (includes QEMS Procedures)  | HC – at Georgian Highlands Region Office<br>E – Hub Server (S:\)   |
| QEMS Reference Manual  | E - OCWA's intranet  |
| QEMS Policy  | E - OCWA's intranet and public website<br>HC – plaque posted at Georgian Highlands Region Office           |
| Facility Emergency Plans   | HC – at the plant<br>E – Hub Server (S:\)  |
| Emergency Response Plan (corporate)  | E - OCWA's intranet  |
| Standard Operating Procedures (referenced in Operational Plan and QEMS Procedures)                                   | HC – at plant (in Facility Emergency Plan)<br>E – Hub Server (S:\)   |
| Laboratory Manual  | HC – in lab at Elmvale WPCP  |
| Essential Supplies & Services List   | HC – at Georgian Highlands Region Office and at plant (in Facility Emergency Plan)<br>E – Hub Server (S:\) |
| Shift/Vacation Schedule  | E – Outlook Calendar maintained by Hub Admin – updated as requests are approved                            |
| On-call Schedule   | HC – at Georgian Highlands Regional Office<br>E – weekly e-mail notifications                              |
| Round Sheet Form   | E – Hub Server (S:\)   |
| Sampling Schedule/Plan/Calendar  | HC –at plant (in Facility Emergency Plan)<br>E- Hub Server (S:\)   |
| Chain of Custody Forms   | E- Hub Server (S:\)  |
| OPEX Database Action Plan Form (Preventive/Corrective) /Action Plan Summary Spreadsheet (Preventive/Corrective Form) | E- Hub Server (S:\)  |
| <b>External QEMS Documents</b>   |  |
| Maintenance/equipment manuals  | HC – at the plants   |
| Engineering schematics/plans/drawings  | HC – at the plants   |
| Municipal Drinking Water Licence   | HC – at the plants (in Facility Emergency Plan)<br>E – Hub Server (S:\)                                    |
| Drinking Water Works Permit  | HC – at the plants (in Facility Emergency Plan)<br>E – Hub Server (S:\)                                    |
| Permit to Take Water   | HC – at the plants (in Facility Emergency Plan)<br>E – Hub Server (S:\)                                    |
| Operator certificates  | HC – posted at Georgian Highlands Region Office<br>E – Hub Server (S:\)                                    |
| AWWA Standards   | E - \\Torwan\PCT\AWWA Standards  |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Doc: OP-05A  
 Rev Date: 2018-09-21  
 Rev No: 0  
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## DOCUMENT AND RECORDS CONTROL LOCATIONS

| Type of Document/Record   | Designated Document Control Location<br>(HC = Hardcopy, E = Electronic)   |
|---|---|
| DWQMS Standard  | E - <a href="https://www.ontario.ca">https://www.ontario.ca</a>   |
| ANSI/NSF product registration documentation for Chemicals/Materials Used          | E – Hub Server (S:\)  |
| Applicable federal and provincial legislation and municipal by-laws               | Online at <a href="http://www.e-laws.gov.on.ca">www.e-laws.gov.on.ca</a>  |
| Operations Manual<br>Original Equipment Manuals (OEM)                             | HC – at the plants  |
| Source Water Protection Plan  | E – Online at the Township of Springwater Municipal website   |
| <b>QEMS Records</b>   |   |
| Rounds sheets   | HC – at the plants & Georgian Highlands Regional Office<br>E – Process data maintained electronically through PDC               |
| Facility Operations Logbook(s)  | HC – at the plants  |
| Visitor's Logbook   | HC – at the plants  |
| Plant Tour Records  | HC – at Georgian Highlands Region Office  |
| Operator training records   | HC – at Georgian Highlands Region Office<br>E - maintained in OCWA's Training Summary dB  |
| Maintenance records   | HC – at Georgian Highlands Region Office<br>E - maintained in WMS   |
| Internal Calibration records  | HC – at Georgian Highlands Region Office<br>E - maintained through WMS  |
| External Calibration records  | E – Hub Server (S:\)  |
| Chain Custodies   | HC- at Georgian Highlands Region Office<br>E – Hub Server (S:\)   |
| Laboratory analyses   | HC – at Georgian Highlands Region Office<br>Electronic reports from Laboratory – Hub Server (S:\)<br>E - maintained through PDM |
| Additional Sampling records   | HC - at Georgian Highlands Region Office<br>E – Hub Server (S:\)  |
| In-house lab results  | HC – at Georgian Highlands Region Office<br>E - maintained through PDM  |
| SCADA records (Wonderware, OCWA)  | HC – at Georgian Highlands Region Office<br>E - maintained through Wonderware   |
| SCADA Records (Plant SCADA, Client Owned)   | E – Hub Server (S:\)  |
| Internal QEMS audit reports   | E – Hub Server (S:\)  |
| External audit and inspection reports   | E – Hub Server (S:\)  |
| Management Review documentation   | HC – at Georgian Highlands Region Office<br>E – Hub Server (S:\)  |
| OPEX Database Action Plan records<br>(Preventive/Corrective) /Action Plan Summary | E – Hub Server (S:\)  |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Doc: OP-05A  
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**DOCUMENT AND RECORDS CONTROL LOCATIONS**

| Type of Document/Record   | Designated Document Control Location<br>(HC = Hardcopy, E = Electronic) |
|---|---|
| Spreadsheet (Preventive/Corrective records)                       |   |
| Internal QEMS Communications                                      | E – Hub Server (S:\)  |
| External QEMS Communications                                      | E – Hub Server (S:\)  |
| Annual Reports  | E – Hub Server (S:\)  |
| Summary Reports for Municipalities                                | E – Hub Server (S:\)  |
| AWQI Reports  | HC – at Georgian Highlands Region Office<br>E – Hub Server (S:\)        |
| Infrastructure review (capital/maintenance works recommendations) | E – Hub Server (S:\)  |
| Community complaint records                                       | E – OPEX database   |
| Call In Reports   | E – maintained through WMS  |

**Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (last revision 7 dated 2017-09-25). Added additional types of documents and records that require document control. Changed “Georgian Bay Hub Office” to “Georgian Highlands Region Office”. Updated table to reflect current document control locations. |
|            |            |   |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-06  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 2

**DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To document the following for the Township of Springwater Drinking Water Systems:

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

### 2. Definitions

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

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

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

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

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

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

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

### 3. Procedure

The descriptions of the Township of Springwater Drinking Water Systems are outlined in Appendices OP-06A to OP-06I, where:

- OP-06A is Minesing Drinking Water System
- OP-06B is Anten Mills Drinking Water System
- OP-06C is Elmvale Drinking Water System
- OP-06D is Hillsdale Drinking Water System
- OP-06E is Del Trend Drinking Water System
- OP-06F is Vespra Downs Drinking Water System



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

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**DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

- OP-06G is Midhurst Drinking Water System
- OP-06H is Snow Valley Drinking Water System; and
- OP-06I is Phelpston Drinking Water System

Each description will include the following information:

- Drinking Water System Overview
- Source Water
  - *General Characteristics*
  - *Common Fluctuations*
  - *Threats*
  - *Operational Challenges*
- Treatment System Description
- Treatment System Process Flow Chart
- Description of the Distribution System Components

**4. Related Documents**

Operations & Maintenance Manual  
South Simcoe Groundwater Study – Wellhead Protection Area Report  
Site Location Map  
System Schematic

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2018-09-21 | 0          | Procedure issued – Information within OP-06 was originally set out in the Main body of OCWA’s Operational Plan (last revision 7 dated 2017-09-25). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes, separation of systems that provide primary and/or secondary disinfection and systems that do not, for systems that are connected to another system with different owners, must now include which system is relied upon to ensure the provision of safe drinking water). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). |
|            |            |  |



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Township of Springwater Drinking Water Systems

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Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 5

**MINESING DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Minesing Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Minesing Drinking Water System is groundwater and supplies the Community of Minesing with drinking water via 4 drilled wells. The plant is located at 2347 Ronald Road in Minesing.

**Source Water**

*General Characteristics*

The Hydrogeologic Report was prepared by Hydroterra Limited in May 2001 (for Wells 2, 3 & 4). This report states that the raw water from these 3 wells is characterized as hard, essentially free of bacteria and within the limits for all parameters in the Ontario Drinking Water Standards.

The Hydrogeologic Report for Well #1 was prepared by Golder Associates in December 2004. This report states that raw water from Well #1 is bacteria free and meets the Ontario Drinking Water Standard for all parameters tested. Well #1 was drilled into the deeper aquifer to lessen the demand on the shallow aquifer (Wells 2, 3 & 4) and provide additional water supplies.

Each well is drilled with well depths ranging from 34 m – 78 m and each is contained in a concrete crock. Both reports state that the aquifers are not under the influence of surface water.

Raw Water Characteristics for Bacteriological (based on **2017** data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.3 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.4 | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on **2017** data)

| Source            | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|-------------------|------------------------|--|
| Raw – Well No.1-4 | 12/year/well           | 0.11 – 0.50                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Minesing Drinking Water System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area Report. The Wellhead Protection Area Report indicates that land uses within the WHPA area includes mixed residential, light industrial and agricultural. Land uses known or considered likely to involve hydrocarbons or solvents, include an auto garage, gas



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**MINESING DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

station and weld shop, all of which are located within 500 metres of the wells. Other land uses of note in the WHPA include a small industrial building located in the northern section and a livestock operation that includes fuel storage and sludge spreading on the northeastern boundary of the WHPA. The community is serviced by individual in-ground septic systems. Potential contaminant sources identified within the WHPA area consist primarily of on-site septic systems, agricultural land use and, to a lesser extent, the use and storage of hydrocarbon products. The presence of elevated nitrate suggests that this system is susceptible to infiltration of contaminants in the recharge area. As there is evidence of potentially unconfined conditions, this aquifer is considered to be highly susceptible to surface derived contamination. The well is not considered to be groundwater under the direct influence of surface water (i.e. GUDI), based on the engineers report for this system.

All production wells are located on public park property within a residential subdivision. The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located at least 15 metres from Well #2. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

The report suggests that, despite the appreciable thickness of aquitard material in most of the surrounding area, protection measures should be implemented within the WHPA areas because the confining layer is absent in the vicinity of the wellfield and because the yield of the underlying aquifer has not been tested in this area. In addition, improperly sealed and abandoned boreholes pose a threat to this groundwater supply as they provide a conduit for surface contaminants to rapidly move into the aquifer.

*Operational Challenges*

There appears to be no significant operational challenges with respect to the source water for the Minesing Drinking Water System.

**Treatment System Description**

*Well No. 1, 2, 3 & 4*

Each well is equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below, a pitless adapter, and is housed in a concrete tile enclosure.

*Pumphouse*

Raw water from wells #1, #2, #3 and #4 enters the pumphouse through four separate raw water headers, each equipped with a flow meter for measuring raw water flows and a smooth-bore raw water sample tap. The four headers join into a common header prior to chemical dosing. At this point the water can continue through the treatment train or be wasted to the exterior of the building through a raw water blow-off. Prior to discharging to the distribution system, the treated water passes through a flow meter. In addition, the pump house is equipped with a



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**MINESING DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

continuous chlorine residual and turbidity analyzer, as well as a smooth bore treated water sampling tap which is fed water from a point after the contact time. Data is recorded on a data logger.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank and two chemical metering pumps (one duty pump, one standby pump). The pumps are alarmed and possess automatic switch over capabilities in the event of failure. Both pumps discharge sodium hypochlorite solution into the common header before the water is directed to one of two reservoirs described below.

*Storage*

Two (2) 600 m<sup>3</sup> above-ground glass-lined, steel reservoirs. The reservoirs are located adjacent to the pump house and are designed to provide the necessary contact time.

*High Lift Pumps*

The pumphouse utilizes three high lift pumps that direct water to the distribution system from the storage reservoirs. In addition, a fire pump is located in the pumphouse for fire protection. All three high lift pumps have been outfitted with variable frequency drives and are actuated in sequence by demand.

**Description of the Distribution System Components**

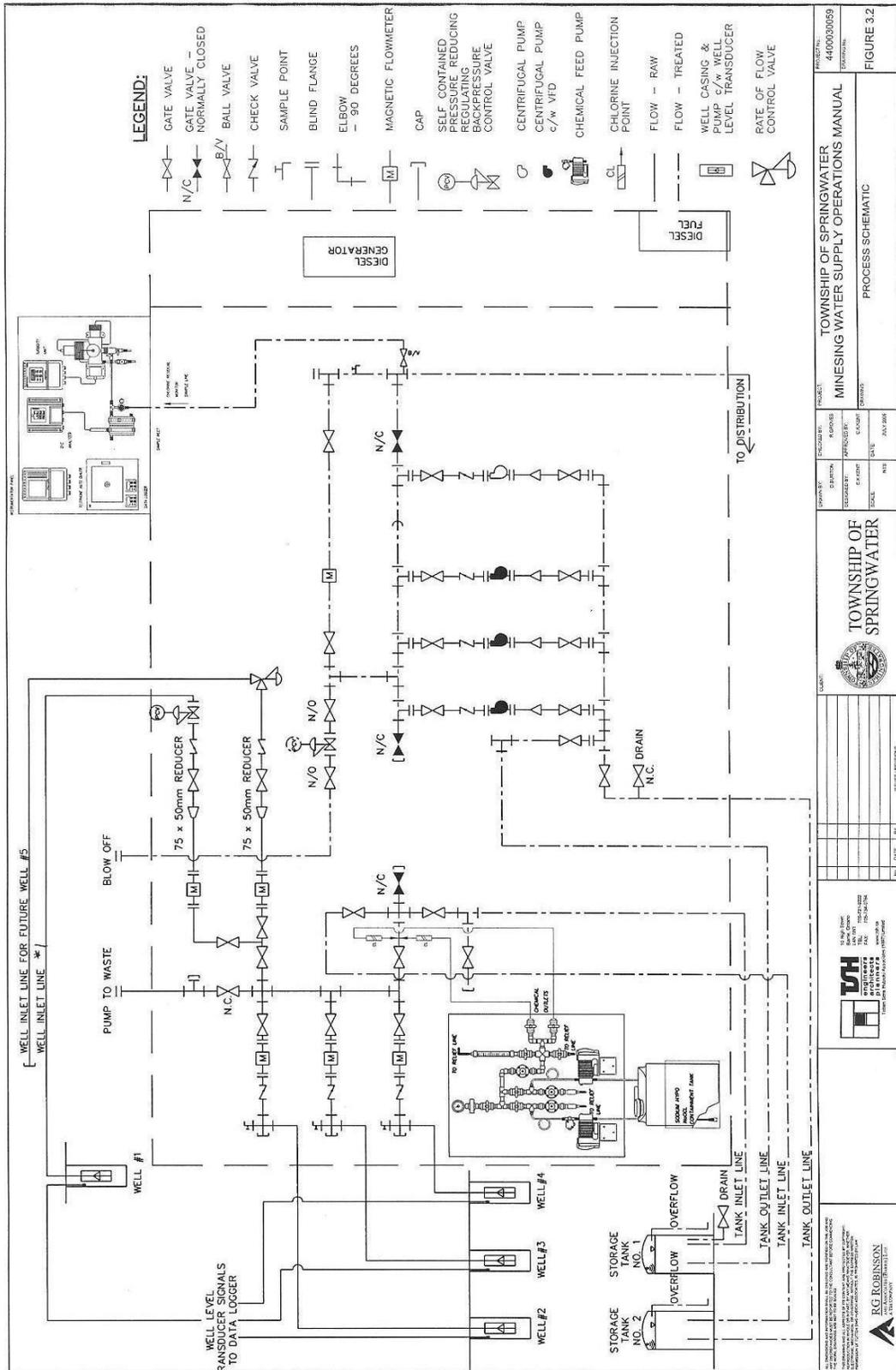
The Minesing Drinking Water System is a Class II Water Distribution and Supply System. The distribution system supplies residential, commercial, and institutional service connections. The piping in the distribution system is comprised of different sizes of PVC pipe. There are approximately 33 hydrants. There are two ground-level 600 cubic meter water storage standpipes that provide contact time and storage prior to it being conveyed to the distribution system. There are four sampling stations in the distribution system located on Huron Street, Plowright Drive, Foyston Park and George Johnston Road.

## MINESING DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart





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**MINESING DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06A was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water data to 2017. |



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Township of Springwater Drinking Water Systems

QEMS Proc.: OP-06B  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 5

**ANTEN MILLS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Anten Mills Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Anten Mills Drinking Water System is groundwater and supplies the Community of Anten Mills with drinking water via 3 drilled wells. The plant is located at 35 Luella Blvd. in Anten Mills.

**Source Water**

*General Characteristics*

A Hydrogeologic Report prepared by Hydroterra Ltd. in May 2001 (for wells 1 & 2) states that the raw groundwater from these wells is characterized as hard, meets ODWS standards for all parameters tested and is not under the influence of surface water.

A Hydrogeologic Report prepared by Dixon Hydrogeology Ltd. in January 2003 (for well 3) states that the groundwater from this well is bacteria free, meets all ODWS standards for all parameters tested and is not groundwater under the direct influence of surface water (non-GUDI).

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 51                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.3 | 51                | 0 - 0                                  | 0 - 2   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source            | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|-------------------|------------------------|--|
| Raw – Well No.1-3 | 12/year/well           | 0.13 – 0.76                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Anten Mills Drinking Water System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area Report. This report states that the overall Wellhead Protection Area (WHPA) uncertainty zone extends in a northeasterly direction for approximately 1.2km. Land use in the immediate vicinity of the wells is residential with the area beyond that being made up of agricultural and forested properties. A waste disposal site and livestock operation are both situated beyond the WHPA, approximately 2km from the wellfield.



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**ANTEN MILLS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

The local subdivisions are serviced by individual in- ground septic systems. There are no industrial or hydrocarbon related land uses in the WHPA. A farm located approximately 2km to the northeast of the wellfield has livestock operations and a large poultry operation is located approximately 3.5km northeast of the wells. Simcoe County Landfill No. 6 is located approximately 2km north of the wellfield and, based on the potentiometric surface, is believed to be located cross-gradient from the wellfield in terms of the upper aquifer.

Several vehicle maintenance facilities are located 2 to 3.5km east or northeast of the wellfield and an automobile service station and retail fuel outlet is located 3.5km northeast of the wellfield. A cemetery is located approximately 4.5 km northeast of the wellfield.

All production wells are located on public park property within a residential subdivision. The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located approximately 15m to the south of Well #2. Historical sampling data does not suggest that the septic system is negatively impacting any of the wells. Some of the homes to the north of the well field are serviced by private wells. There was no evidence of direct routes of entry to the aquifer such as open wells or pits in the vicinity of the works at the time of inspection. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

Approximately 77 residential units in the community are not connected to the municipal water system and are generally supplied by wells completed in the upper aquifer.

*Operational Challenges*

There appears to be no significant operational challenges with respect to the source water for the Anten Mills Drinking Water System.

**Treatment System Description**

*Well No. 1, 2 & 3*

Each well is equipped with a submersible deep well pump with a flow control valve and discharge line connected to the well pump header in the pumphouse described below.

*Pump house*

Submersible well pumps pump water from the wells into three raw water headers, one per well, located within the pumphouse. Flow meters monitor the quantity of water entering the pumphouse from each well and the outgoing treated water flow to the distribution system. Flow is recorded by a data logger.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank contained within a spill containment, one on-line free chlorine residual analyzer and two chemical metering



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**ANTEN MILLS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

pumps (duty and standby), complete with alarm, data recorder, automatic switch over and sample line connected at the end of the chlorine contact zone prior to entering the distribution system.

*Storage*

Water storage and contact time is supplied by a 6.1m diameter glass coated steel tank with an elevation of 11.6m above grade to provide an effective volume of 318m<sup>3</sup>, and is located approximately 85m northeast of the pumphouse building.

*High Lift Pumps*

The pump house utilizes four (4) centrifugal high lift pumps, two (2) equipped with variable frequency drives).

*Stand-by Generator*

Manual standby power is housed in an addition to the existing building, in the form of a diesel generator set rated at 160 kW/200 KVA.

**Description of the Distribution System Components**

The Anten Mills Drinking Water System is a Class II Water Distribution and Supply System. The distribution system supplies private residences and commercial properties. Piping in the system consists of polyvinyl chloride materials. There are no additional storage facilities or booster stations installed throughout the distribution system. The Anten Mills distribution system is equipped with 26 fire hydrants and 4 outdoor sample stations.





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**ANTEN MILLS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06B was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw characteristics with 2017 data. |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-06C  
Rev Date: 2018-09-21  
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**ELMVALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Elmvale Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Elmvale Drinking Water System is groundwater and supplies the Community of Elmvale with drinking water via 2 drilled wells. The well pump houses are located at 6 Shaw Street and the booster station and towers are located at 11 William Street in Elmvale.

**Source Water**

*General Characteristics*

The Hydrogeologic Report, prepared by Hydroterra Ltd. in May 2001, states that the raw groundwater is characterized as hard, is bacteria free, meets all ODWS standards for all parameters tested and is not directly under the influence of surface water (non-GUDI).

Well #1 was drilled in 1960-1961, is 54.3m deep and is housed inside its own pumphouse with all associated equipment.

Well #2 was drilled in 1989, is 56.6m deep and is housed inside its own pumphouse with all associated equipment.

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source            | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|-------------------|------------------------|--|
| Raw – Well No.1-2 | 12/year/well           | 0.08 – 0.38                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Elmvale Well Supply System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that the land use within the immediate vicinity of the wells and throughout the WHPA is primarily residential with a few commercial buildings. Municipal sewers service the community of Elmvale, therefore, private septic tanks are not a potential pollution source. Road salt and other material applied to the roads would not impact the wells as they are located within protective pumphouses.



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**ELMVALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

There were no potential sources of contamination located within 15 metres of any of the production wells. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally owned land.

*Operational Challenges*

There appears to be no significant operational challenges with respect to the source water for the Elmvale Drinking Water System.

**Treatment System Description**

*Well No. 1 & 2*

Each well is equipped with a vertical turbine pump discharging to the well pump header in the pumphouse described below.

*Pumphouses*

There are two pumphouses; each well is located in its own pumphouse at the corner of Shaw and Kerr Street. Magnetic flow meters measure the quantity of water withdrawn from each well. Water travels from the two pump houses through a contact chamber and transmission main, to the two standpipes, then to the booster pumping station. Disinfectant contact time occurs in the contact chamber, transmission main and standpipes. Well pump house #2 is equipped with a continuous online monitored free-chlorine distribution analyzer that is alarmed.

*Booster Pumping Station*

Four vertical in-line pumps in the booster pumping station, two equipped with variable frequency drives, pump treated water to the distribution system. Either high lift pump (HLP) one or two is set as the lead pump and runs constantly. The remaining high lift pumps will come on based on demand. The booster pumping station is equipped with a continuous on-line analyzer for free chlorine residual. A free chlorine residual analyzer monitors the free chlorine residual in the outgoing treated water continuously.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank contained within a spill containment in each pumphouse. Raw water is injected with sodium hypochlorite within each well header in each pumphouse to initiate the process of disinfection. A free-chlorine analyzer, equipped with a well lock-out, monitors the chlorine residual in the water leaving the contact chamber.

*Storage Reservoirs*

Two high grade level glass-lined steel storage tanks provide water storage in the system. Both storage tanks are located on a concrete pad adjacent to the booster pumping station. Each tank provides 1060 m<sup>3</sup> of water storage.



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**ELMVALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

*Stand-by Generator*

There is a 175 kilowatt diesel generator in the booster pumping station that supplies power for the Elmvale water system in the event of a power outage.

**Description of the Distribution System Components**

The Elmvale Well Drinking Water System is a Class II Water Distribution and Supply System. The distribution system supplies residential and commercial connections. This includes the business district of the village, local industry, schools, community centres and residential dwellings. Piping consists of polyvinyl chloride and ductile iron materials. The system supports 101 fire hydrants.



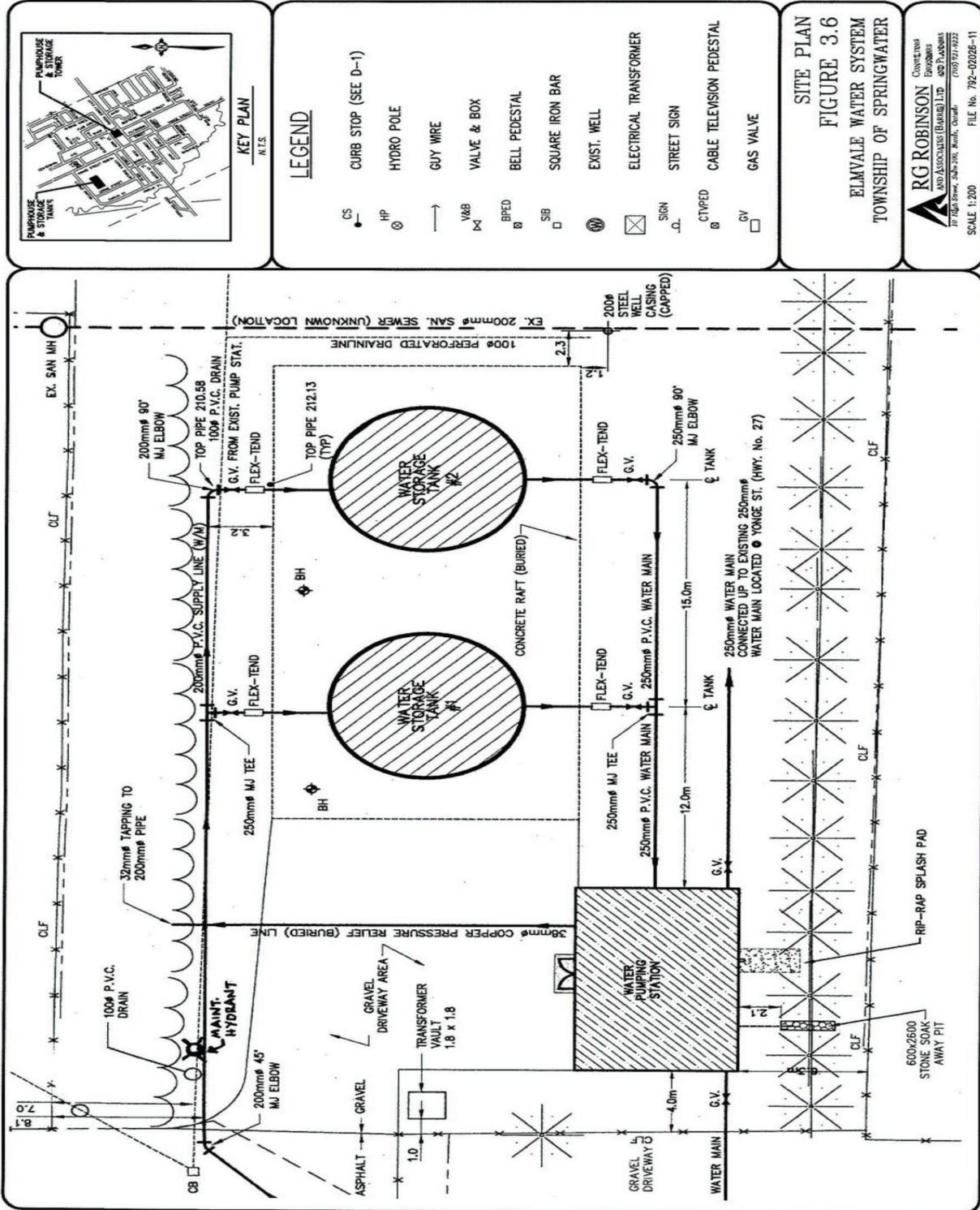


## ELMVALE DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Booster Station





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**ELMVALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
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|             |                   |  |



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**HILLSDALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Hillsdale Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Hillsdale Drinking Water System is groundwater and supplies the Community of Hillsdale with drinking water via 3 drilled wells. The plant is located at 140 Scarlett Line in Hillsdale.

**Source Water**

*General Characteristics*

The Hydrogeologic Report was prepared by Hydroterra Limited in May 2001 for wells #1 and #2. This report states that each well is located in a separate aquifer, with well #1 being in the lower aquifer. Both wells are classified as being groundwater sources that are not influenced by surface water (non-GUDI).

The Hydrogeologic Report for Well #3 was prepared in February 2004 by Dixon Hydrogeology Limited. Well #3 is located in the same aquifer as Well #2 and was drilled to replace Well #1, due to aesthetic problems. This well is also considered to be non-GUDI.

Each well is drilled with well depths ranging from 74m – 97m and each is contained in a concrete crock.

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.3 | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source             | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|--------------------|------------------------|--|
| Raw – Wells No.2-3 | 12/year/well           | 0.11 – 0.47                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Hillsdale Well Supply System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that the land use within the immediate vicinity of the wells and throughout the WHPA is primarily residential. The surrounding subdivision is serviced by individual in-ground septic systems. The nitrate monitoring data from quarterly sampling suggests that the septic beds are not impacting the wells.



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Township of Springwater Drinking Water Systems

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**HILLSDALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located at least 15 metres from any of the production wells. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

*Operational Challenges*

Well No. 1 is not used for production due to aesthetic problems; the water from Well 1 is wasted out the side of the pumphouse. Other than that, there appears to be no significant operational challenges with respect to the source water for the Hillsdale Well Supply System

**Treatment System Description**

*Well No. 2 & 3*

Well equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below, a pitless adapter, and is housed in a concrete tile enclosure.

*Pumphouse*

Raw water from the wells enters the pumphouse through separate raw water headers, each equipped with a flow meter used for measuring raw water flows, a pressure relief valve and a smooth-bore raw water sample tap. As the raw water continues past the flow meters, it can either be directed through the treatment train or wasted through the wall by operating in-line valves. Water from Wells 2 and 3 flow through the raw water headers to join into a common header prior to chemical dosing.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank and two chemical metering pumps (one duty pump, one standby pump), that discharge into the common header. The pumps are alarmed and possess automatic switch over capabilities in the event of failure. After chemical dosing, the water is directed to one of the two chlorine contact chambers. The south contact chamber is a 205m long, 300mm diameter contact watermain to provide the required contact time prior to the first consumer. The north contact chamber is approximately 50m long and 150mm in diameter, and provides water to five residences north of the pumphouse. In addition, the pumphouse is equipped with two continuous chlorine residual analyzers, one for each of the chlorine contact pipes.

*Storage Reservoirs*

The distribution system includes one high grade level glass lined storage reservoir with a total usable storage volume of 1485m<sup>3</sup>. The storage reservoir is located at 2233 Mill Street West.



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**HILLSDALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Description of the Distribution System Components**

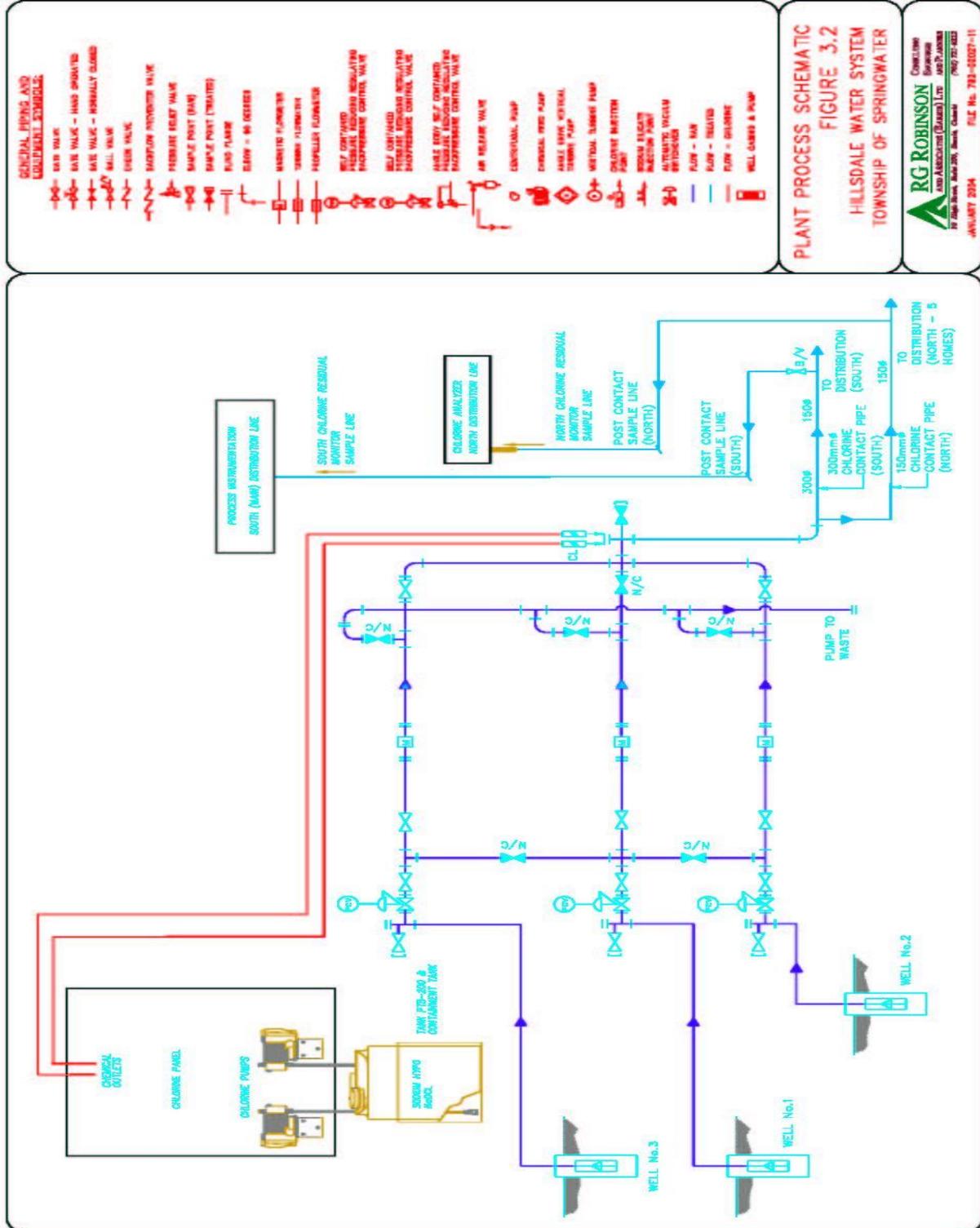
The Hillsdale Drinking Water System is a Class II Water Distribution and Supply System. There are residential, institutional and commercial properties in Hillsdale. Piping consists of mainly polyvinyl chloride (PVC) material. The system supports approximately 57 hydrants.

## HILLSDALE DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart



**PLANT PROCESS SCHEMATIC**  
**FIGURE 3.2**  
**HILLSDALE WATER SYSTEM**  
**TOWNSHIP OF SPRINGWATER**

**RG ROBINSON**  
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 JANUARY 2004 FILE NO. 783-0007-11

Rev.2 [Nov2011]



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**HILLSDALE DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06D was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water characteristics with 2017 data. |
|             |                   |  |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

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Rev Date: 2018-09-21  
Rev No: 0  
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## DEL TREND DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Drinking Water System Overview

The Del Trend Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Del Trend Drinking Water System is groundwater and supplies the Springwater Country Estates Subdivision and Glenhuron Subdivision with drinking water via 3 drilled wells. The plant is located at 9 Paddy Dunns Circle.

### Source Water

#### *General Characteristics*

The hydrogeologic report, prepared by Hydroterra Limited in May 2001, states that the raw water from these three wells is chemically characterized as hard, calcium/magnesium bicarbonate water containing low to moderate concentrations of nitrate, sodium, chloride and sulphate. The groundwater chemistry remains essentially unchanged and all three wells yield similar water quality. The well depths range from 61-69m deep. The developed aquifer should have low vulnerability to surface bacteriological sources and all wells are deemed to be not under the influence of surface water (non-GUDI).

#### Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.3 | 52                | 0 - 0                                  | 0 - 7   |

#### Raw Water Characteristics for Turbidity (based on 2017 data)

| Source            | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|-------------------|------------------------|--|
| Raw – Well No.1-3 | 12/year/well           | 0.07 – 0.50                                      |

#### *Common Fluctuations*

There appears to be no common fluctuations within the Del Trend Well Supply System.

#### *Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that the land use within the immediate vicinity of the wells and throughout the WHPA is primarily residential and forested with the exception of a utility complex located immediately northwest of the production wells. Three underground fuel storage tanks are located along Highway 27, outside of the WHPA.



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**DEL TREND DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

Two of these are located at active fuel stations. Other vehicle maintenance and storage facilities are also located in this area, as is a chemical storage/processing facility, also located outside (and down-gradient) of the WHPA. There are no other industrial, commercial, agricultural or hydrocarbon related land uses in the WHPA. The surrounding subdivisions are serviced by individual in-ground septic systems. The thick aquitard covering the aquifer provides a significant level of protection.

Overall, this aquifer is considered to have a low risk of surface derived contamination. The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located at least 15 metres from any of the production wells. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

*Operational Challenges*

Sodium Silicate is added as a sequestering agent due to higher iron and manganese concentrations. Other than that, there appears to be no significant operational challenges with respect to the source water for the Del Trend Well Supply System

**Treatment System Description**

*Well No. 1, 2 & 3*

Each well is equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse*

Raw water is drawn from each production well by submersible pump and enters the pumphouse through a dedicated header from each well. Raw water flow is monitored by individual flow meters on each header. The individual well headers combine into a common well header prior to the point where the sodium hypochlorite and sodium silicate are injected.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump), that discharge into the common header. Sodium hypochlorite is injected by one of two alternating chemical metering pumps to the raw water downstream of the flow meters. A chlorine analyzer monitors the free chlorine residual in the outgoing treated water continuously.

*Sequestering*

Sodium silicate is injected by one chemical metering pump at a point adjacent to the sodium hypochlorite injection site. Sodium silicate acts as a sequestering agent to keep iron and manganese in solution.



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**DEL TREND DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

*Storage Reservoirs*

Following chemical injection, water is delivered to the underground concrete reservoirs. One reservoir is dual-celled and has a total capacity of 301.8m<sup>3</sup>. The other reservoir has a total capacity of 375 m<sup>3</sup>. Stainless steel baffles were installed in the reservoirs to increase the contact time.

*High Lift Pumps*

Four high lift pumps equipped with variable frequency drives deliver treated water from the reservoir to the distribution system. One flow meter measures the flow of treated water to the distribution system.

**Description of the Distribution System Components**

The Del Trend Drinking Water System is a Class II Water Distribution and Supply System. The system supports 32 hydrants and is comprised of polyvinyl chloride (PVS) piping. There are no water storage structures within the distribution system.

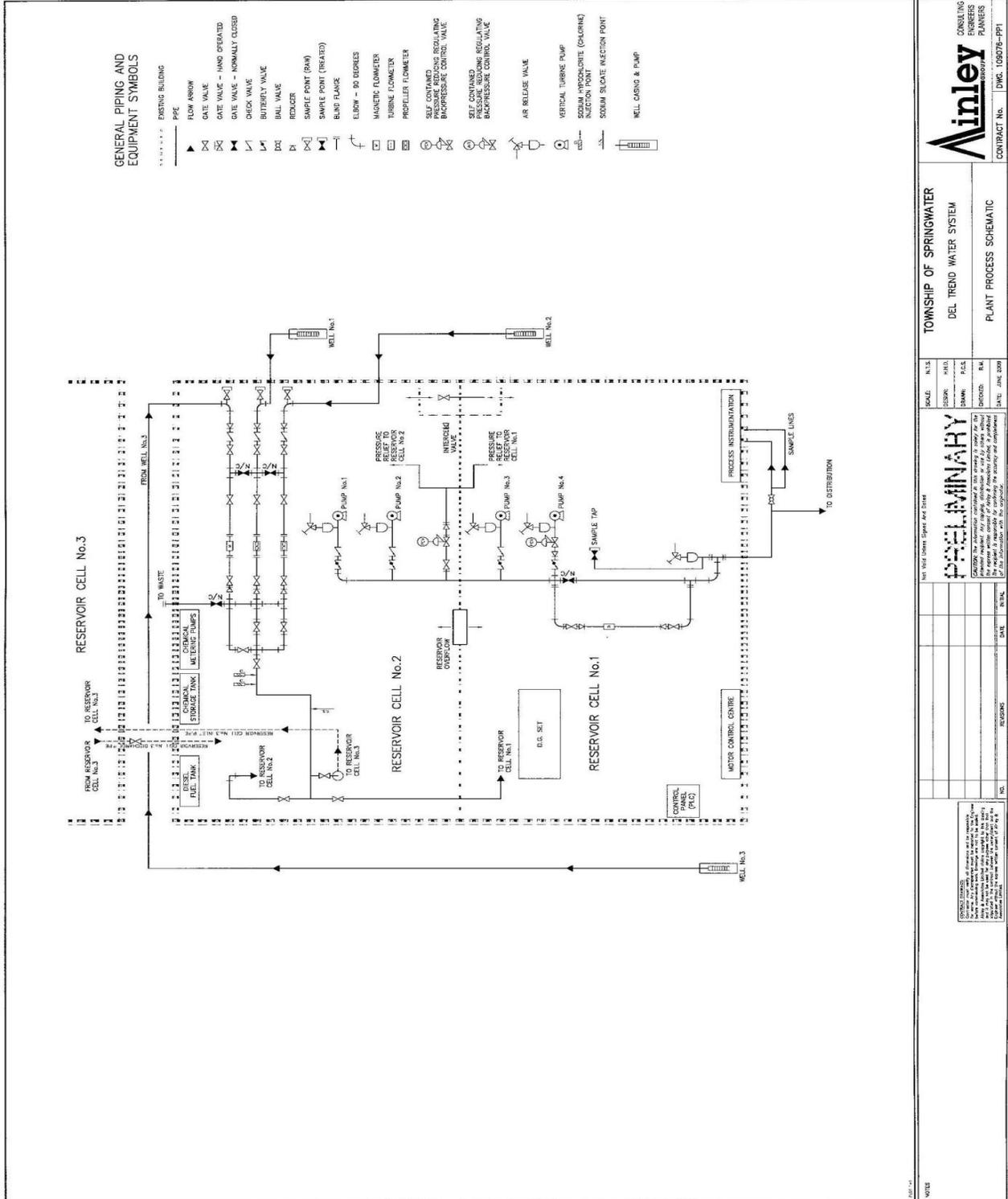
The system is connected to the Midhurst Drinking Water System (works #220005474) by a valve outside the Carson Road pumphouse (1121 Carson Road). This valve remains closed.

## DEL TREND DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart





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**DEL TREND DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06E was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water characteristics with 2017 data. |
|             |                   |  |



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**VESPra DOWNs DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Vespra Downs Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Vespra Downs Drinking Water System is groundwater and supplies the Vespra Downs Subdivision with drinking water via 2 drilled wells. The subdivision is comprised of the homes along one street, Parr Boulevard, with the plant located at 13 Parr Blvd.

**Source Water**

*General Characteristics*

The Hydrogeologic Report was prepared by Hydroterra Limited in May 2001. This report states that the raw water from these wells originates in the same aquifer and can be characterized as hard with elevated iron and manganese levels. The essential absence of Total Coliform and *E. Coli*/Fecal bacteria indicates that the aquifer has low vulnerability to surface bacteriological sources and the wells have been deemed as non-GUDI.

Well #1 was drilled in 1993 and is approximately 58m deep. Well #2 was drilled in 1991 and is approximately 57m deep. Both wells are contained in concrete crocks.

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source             | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|--------------------|------------------------|--|
| Raw – Wells No.1-2 | 12/year/well           | 0.20 – 0.62                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Vespra Downs Drinking Water System.

*Threats*

The Township of Springwater took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The South Simcoe Groundwater Study reports that the upper contact of the production aquifer for the Vespra Downs wells is found approximately 52 to 54m below ground surface. The aquifer is overlain by approximately 5 to 7m of aquitard material, exclusive of the aquitard separating the upper and intermediate aquifers. Despite the thickness of aquitard material, the report recommends that protection measures should be implemented within the WHPA areas because improperly sealed and



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**VESPRA DOWNS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

abandoned boreholes could pose a threat to this groundwater supply as they provide a conduit for surface contaminants to rapidly move to deep underlying aquifers.

The southern portion of the Vespra Downs WHPA is located within neighbouring Essa Township. As a result, protection of these water supplies will require co-operation and co-ordination of both municipalities. The report states that Springwater Township will need to work together with Essa Township to ensure that land use planning is coordinated within the crossborder WHPA areas.

*Operational Challenges*

Sodium Silicate is added as a sequestering agent due to higher iron and manganese concentrations. Other than that, there appears to be no significant operational challenges with respect to the source water for the Vespra Downs Drinking Water System.

**Treatment System Description**

*Well No. 1 & 2*

Each well is equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse*

The submersible pumps in each well pump water into the pumphouse via discharge lines, one for each well. The flow of water from each well is monitored using an inline flow meter. The flow measurements are recorded by a data logger. The raw water from the wells combine into a common header, at which point sodium hypochlorite is injected.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump), that discharge into the common header. Continuous analyzers for free chlorine residual and turbidity draw treated water from a line installed at the point in the contact main where the contact time has been achieved, prior to the first consumer.

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of two chemical metering pumps, as well as one storage tank with containment.

*Pressure Tanks*

Eight 108L pressure tanks located in the pumphouse are utilized to maintain pressure within the system. The well pumps turn on once the system pressure reaches a certain level. The lead duty well pump engages once the pressure reaches 50 psi and the lag well pump is activated at 40 psi.



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**VESPRA DOWNS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

*Stand-by Generator*

There is a 40 kilowatt diesel generator on-site in the event of a power outage.

**Description of the Distribution System Components**

The Vespra Downs Drinking Water System is classified as a Limited Ground Water System.

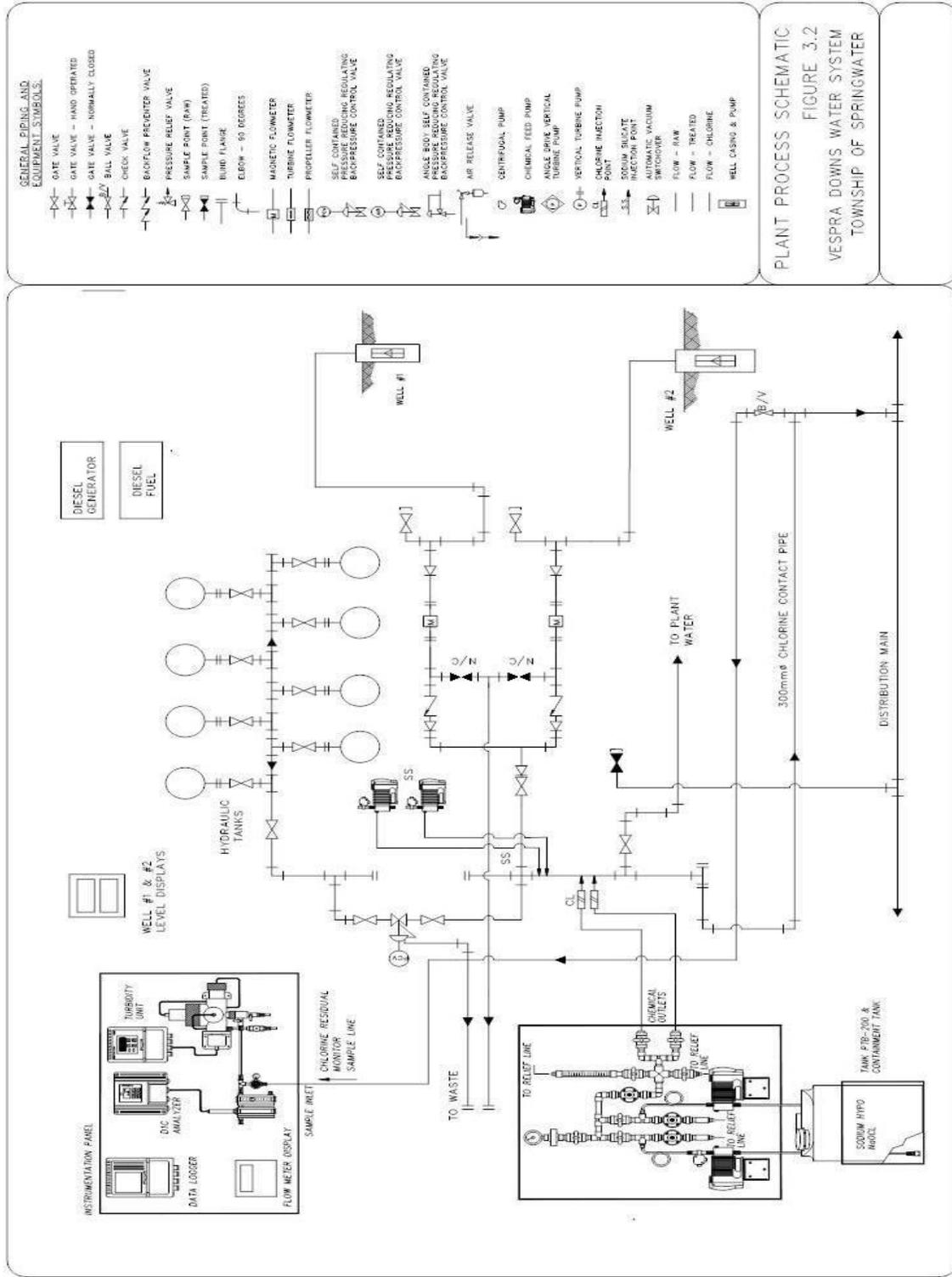
The treated water passes through a 300mm diameter, 95.3m long chlorine contact pipe prior to the first consumer in the distribution system. The distribution system has approximately 8 hydrants, two sampling points, and is comprised of PVC piping. Only residential dwellings are connected to the system. There are no storage structures or reservoirs within the system and therefore, there is no fire protection for the subdivision. The hydrants present in the system are for maintenance purposes only.

## VESPRA DOWNS DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart





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**VESPRA DOWNS DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06E was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water characteristics with 2017 data. |
|             |                   |  |



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**MIDHURST DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Midhurst Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Midhurst Drinking Water System is groundwater and supplies the Community of Midhurst with drinking water via 4 drilled wells. The Midhurst Drinking Water System is comprised of three plants: Idlewood (54 Idlewood Drive), Greenpine (19 Greenpine Avenue) and Carson (1021 Carson Road).

**Source Water**

*General Characteristics*

The Hydrogeologic Report was prepared by Hydroterra Limited in May 2001 for wells #2, 3 & 4. This report states that the raw water from these three wells is chemically characterized as hard, calcium/magnesium bicarbonate water with iron and manganese at higher concentrations. The essential absence of bacteria in water samples suggests that the aquifer has low vulnerability to surface bacteriological sources and is deemed non-GUDI (groundwater not under the influence of surface water).

Well #2 (MOE #5711983) was drilled in 1974 and is approximately 79m deep. Well #3 (MOE #5718775) was drilled in 1983 and is approximately 79m deep. Well #4 (no MOE # assigned) was drilled in 1990 and is approximately 77m deep. Well #5 (MOE #5725264) was drilled in 1989 and is approximately 89m deep. All wells are contained within concrete crocks.

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source                    | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|---------------------------|-------------------|--|---|
| Raw – Idlewood Well No.2  | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Idlewood Well No.3  | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Greenpine Well No.4 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Carson Well No.5    | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source               | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|----------------------|------------------------|--|
| Raw – Wells No.2 - 5 | 12/year/well           | 0.08 – 0.39                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Midhurst Drinking Water System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that



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**MIDHURST DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

the land use within the immediate vicinity of the wells and throughout the WHPA is primarily residential. Each of the production wells for the Midhurst Drinking Water are located within protective concrete well crocks.

Private septic systems service Midhurst; however, there are no septic beds within 20m of the wells. The nitrate levels from quarterly sampling do not suggest that the septic beds are impacting the wells. Well 5 (formerly Carson Road Well No. 4) is located adjacent to a storm drainage ditch which originates in the Glen Huron subdivision. The ditch is of the variety which will allow infiltration of storm water into the soil.

There were no potential sources of contamination located within 15m of any of the production wells. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

*Operational Challenges*

Sodium Silicate is added as a sequestering agent due to higher iron and manganese concentrations. Other than that, there appears to be no significant operational challenges with respect to the source water for the Midhurst Drinking Water System.

**Treatment System Description**

Raw water is supplied by four drilled wells identified as wells #2, #3, #4 and #5. The submersible pumps in each well pump water into the pumphouse via discharge lines, one for each well. The flow of water from each well is monitored using an inline flow meter.

**Idlewood Drive Well Supply and Treatment**

*Well No. 2 & No.3*

Each well is equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse:*

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump) with automatic switchover in case one pump fails. The plant is equipped with a continuous chlorine residual and turbidity analyzer. This data, along with flow and well level data are recorded via a data recorder. The systems are alarmed for various parameters. A contact chamber 190m long of 450mm diameter pipe provides the required contact time.



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**MIDHURST DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of one (1) chemical metering pumps, also includes one storage tank with containment.

**Greenpine Well Supply and Treatment**

*Well No. 4*

Well equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse:*

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump) with automatic switchover in case one pump fails. The plant is equipped with a continuous chlorine residual and turbidity analyzer. This data, along with flow and well level data are recorded via a data recorder. The systems are alarmed for various parameters.

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of one (1) chemical metering pumps, also includes one storage tank with containment.

*Storage Reservoir*

Following chemical injection, a 65.2 m<sup>3</sup> underground concrete baffled reservoir provides the required contact time. Continuous analyzers for free chlorine residual and turbidity receive water from the end of the contact chamber for analysis. The reservoir is equipped with two (2) high lift pumps which supply water to the distribution system.

**Carson Well Supply and Treatment**

*Well No. 5*

Well equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse:*

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump) with automatic switchover in case one pump fails. The plant is equipped with a continuous chlorine residual and turbidity analyzer. This data, along with flow and well level data are recorded via a



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**MIDHURST DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

data recorder. The systems are alarmed for various parameters. A contact chamber 14.6m long of 1.37m diameter pipe provides the required contact time.

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of one (1) chemical metering pump, also includes one storage tank with containment.

*Stand-by Generator*

The Carson pump house is equipped with a 40 kW diesel generator for back-up power in case of emergencies, while the other two pump houses are not equipped with back-up power.

**Booster Pumping Stations**

Forest Hill Booster is located at 19 Forest Hill Drive, and is equipped with one (1) in-line booster pump to provide additional pressure for the residences located in the Forest Hill Subdivision.

Park Trail Booster is located at Park Trail at Wattie Rd., and is equipped with one (1) in-line booster pump to provide additional pressure for residences along Park Trail.

**Distribution & Storage**

Two glass lined steel storage tanks provide storage in the system. (East and West Tower) Each tank provides approximately 996 m<sup>3</sup> of storage and they are located at a higher elevation at the end of Wattie Road within the community.

**Description of the Distribution System Components**

The Midhurst Drinking Water System is a Class II Water Distribution and Supply System.

The distribution system is comprised of PVC piping. The distribution system consists of distribution watermains, two (2) Booster pumping stations, and two (2) grade level storage reservoirs. The booster pumps in the Forest Hill and Park Trail areas are in-line pumps and run constantly to maintain pressure in areas of higher elevation.

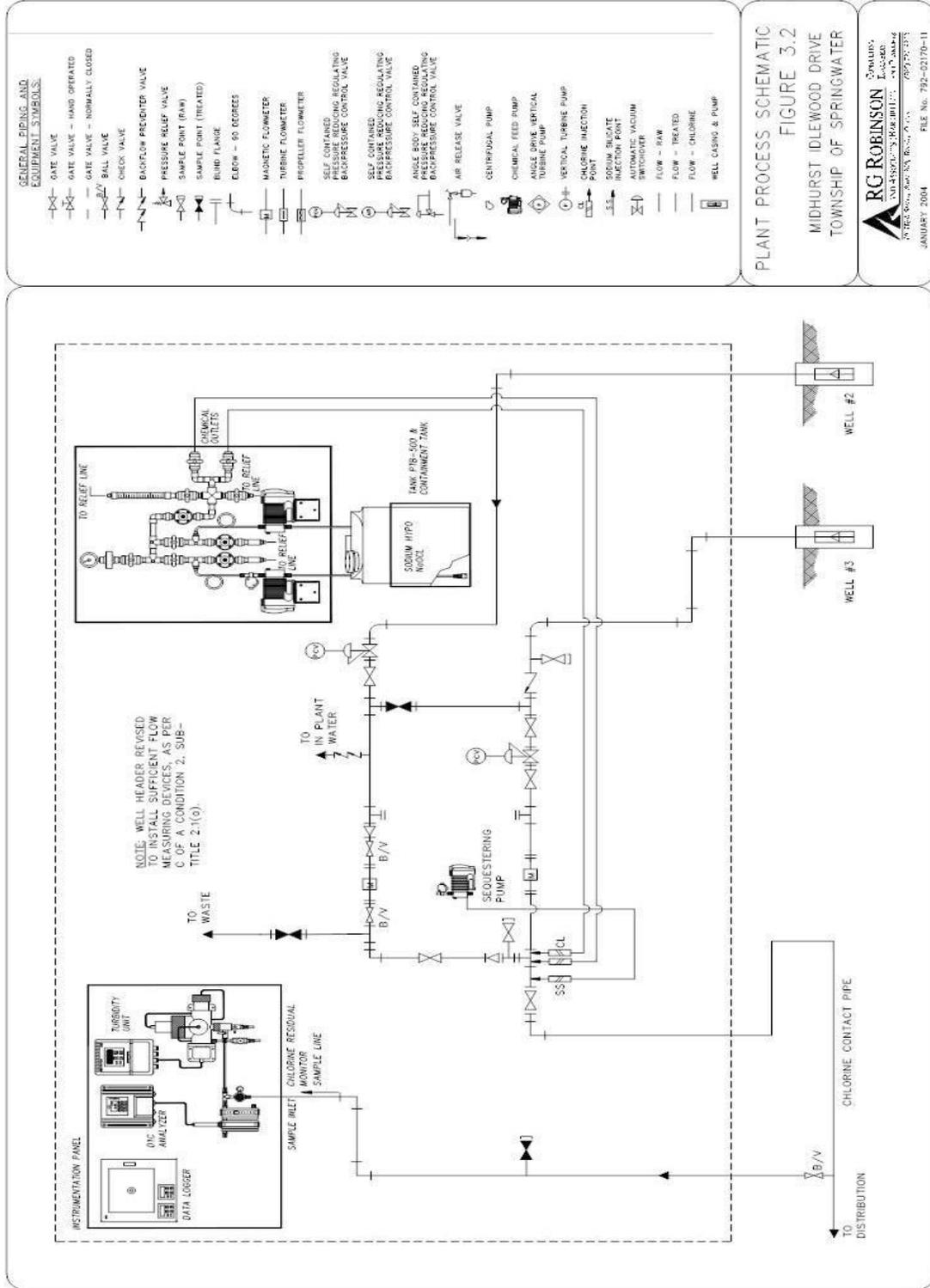
\*Del Trend Water System – the Midhurst system is capable of supplying water to the Del Trend water system (waterworks #220009149) if required through a valve located in a manhole outside the Carson Road pumphouse. This valve remains closed.

## MIDHURST DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Idlewood



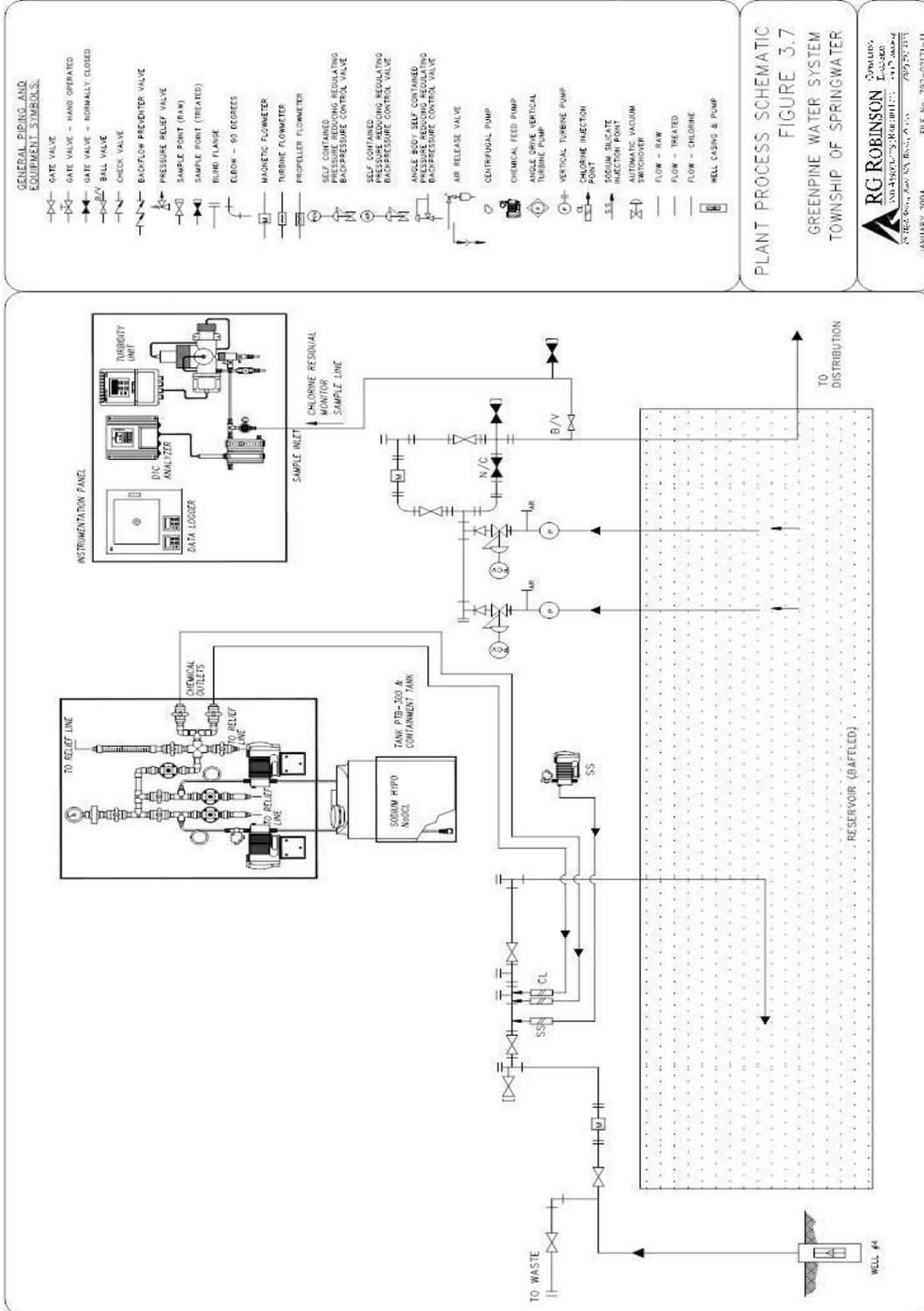
PLANT PROCESS SCHEMATIC  
 FIGURE 3.2  
 MIDHURST IDLEWOOD DRIVE  
 TOWNSHIP OF SPRINGWATER  
**RG ROBINSON** CONSULTANTS  
 1000 SHEPPARD AVENUE EAST, SUITE 200  
 SCARBOROUGH, ONTARIO M1S 1T5  
 (416) 291-2222  
 JANUARY 2004 FILE NO. 792-02170-11

## MIDHURST DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Greenpine

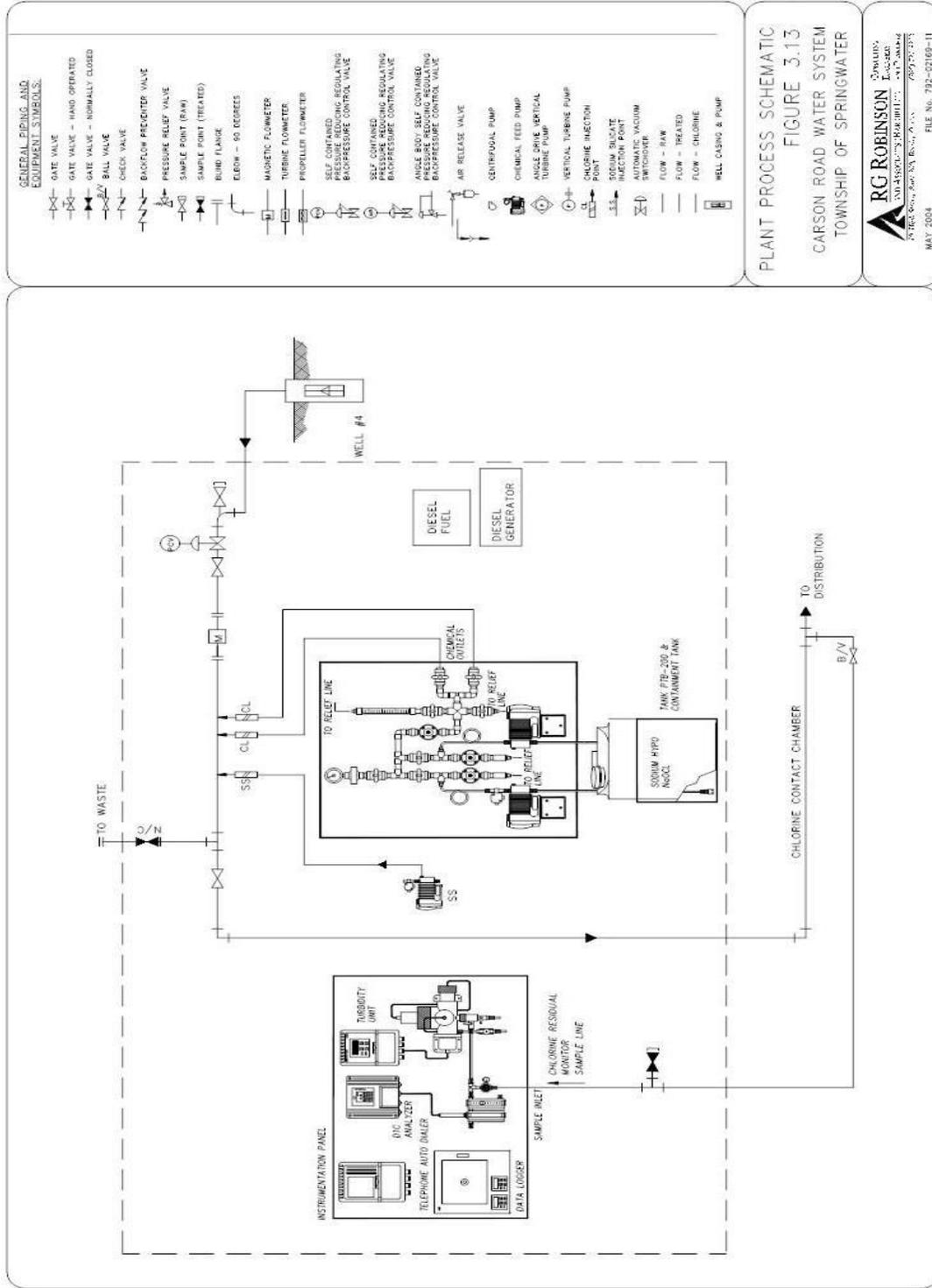


## MIDHURST DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Carson





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**MIDHURST DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06G was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water characteristics with 2017 data. |
|             |                   |  |



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**SNOW VALLEY DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Drinking Water System Overview**

The Snow Valley Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Snow Valley Drinking Water System is groundwater and supplies the Community of Snow Valley with drinking water via 4 drilled wells.

The Snow Valley water treatment system is comprised of three buildings located in Snow Valley. The 'Old' Snow Valley plant is located at 2602 George Parkway, the 'Highlands' Snow Valley plant is located at 15 Alpine Drive and the 'Booster Station' is located at 29A Eder Trail.

The system also includes the Centre Vespra (*Booster & Re-chlorination Facility*) located at 3168 Dobson Rd. This facility is a water storage, rechlorination, and pumping system serving the Centre Vespra Community. (*It also houses the wastewater treatment facilities for the Centre Vespra subdivision.*)

**Source Water**

*General Characteristics*

A Hydrogeological Study was conducted in May 2001 for Wells #1 & 2. This assessment concluded that both wells are not under the influence of surface water (non-GUDI). The Engineer's Report (May 2001) also did not determine any direct sources of microbiological contamination during the site assessment. Well #1 (MOE #5723284) was drilled in 2003 and is approximately 66m deep. Well #2 (MOE #5724900) was drilled in 2003 and is approximately 67m deep. All wells are contained within concrete crocks on municipal property.

A Hydrogeological Study was prepared by International Water Consultants in September 2003 for Well #3. This report states that water from this well is within Ontario Drinking Water Standards with the exception of manganese which only marginally exceeds the aesthetic criteria. Based on the well construction, hydrogeologic setting, water quality and location away from surface water, this well supply is considered to be secure from surface water and not a GUDI supply. Well #3 (MOE #5738227) was drilled in 2003 and is approximately 73m deep.

A Hydrogeological Study was prepared by International Water Consultants in December 2004 for Well #4. This report states that water from this well is within Ontario Drinking Water Standards with the exception of manganese and organic nitrogen which only marginally exceeds the criteria. Well #4 is not a GUDI supply well, nor would it be flagged as a potential GUDI supply. Well #4 (MOE TagID#A011213) was drilled in 2003 and is approximately 73m deep.



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**SNOW VALLEY DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 51                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 52                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.3 | 52                | 0 - 1                                  | 0 - 1   |
| Raw – Well No.4 | 52                | 0 - 0                                  | 0 - 0   |

Raw Water Characteristics for Turbidity (based on 2017 data)

| Source              | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|---------------------|------------------------|--|
| Raw – Well No.1 - 4 | 12/year/well           | 0.14 – 0.75                                      |

*Common Fluctuations*

There appears to be no common fluctuations within the Snow Valley Drinking Water System.

*Threats*

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that land use within the WHPA of Well 1 and Well 2 is exclusively residential, with the rest of the WHPA being made up of forested land and an active railway. The community is serviced by individual in-ground septic systems. Potential contaminant sources identified within the WHPA area consist primarily of on-site septic systems and the railway. The absence of detectable concentrations of nitrate in samples collected from Well 1 and Well 2 indicate that the municipal water supply is not impacted by septic effluent. Overall, this aquifer is considered to have a low risk of surface derived contamination.

All production wells are located on public property within a residential subdivision. The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located at least 15m from any of the production wells. There was no evidence of direct routes of entry to the aquifer such as open wells or pits in the vicinity of the works at the time of inspection. The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

*Operational Challenges*

Raw water from Well No. 3 & 4 is dosed with sodium silicate as a sequestering agent due to higher concentrations of iron and manganese. Raw water from Well No. 1 & 2 is dosed with polyphosphate (on a trial basis) as an alternative to sodium silicate for reducing/eliminating the colour concerns.



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**SNOW VALLEY DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Treatment System Description**

Raw water is supplied by four drilled wells identified as wells #1, #2, #3 and #4. Wells #1 and #2 are located at the Old plant and wells #3 and #4 are located at the booster station site. All four wells are equipped with submersible well pumps and flow meters.

***Snow Valley Old Pumphouse***

*Well No. 1 & Well No.2*

Raw water from Well 1 and Well 2 enter the pumphouse through two separate raw water headers. Following the normal flow path into the treatment train, the two raw water headers join into a common header prior to chemical dosing. The plant is equipped with continuous chlorine residual and turbidity analyzers. This data, as well as flow and well level data, is recorded on data loggers. The facility is alarmed for various parameters.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump) with automatic switchover in case one pump fails.

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of one (1) chemical metering pump with a back-up pump with no automatic switch over; one storage tank with containment.

*\*Note – At the Old Snow Valley Pumphouse, the sodium silicate system has been converted to a Polyphosphate dosing system. This is captured in the Schedule C that has been issued for the drinking water system and should it be determined to become a **permanent** modification, it will be added to the works description during the next revision of the DWWP.*

*Reservoir & High Lift Pumping*

Adequate contact time is provided by an underground concrete dual-celled baffled reservoir with a capacity of 95.9 m<sup>3</sup> which also provides storage for the facility. Reservoir is also equipped with four (4) high lift pumps which deliver treated water to the distribution system.

*Stand-by Generator*

The Old plant is equipped with a 142 kW diesel generator for back-up power in case of emergencies.

***Booster Pumphouse***

*Well No. 3 & Well No. 4*



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

Raw water from Well 3 and Well 4 enter the pumphouse through two separate raw water headers. Following the normal flow path into the treatment train, the two raw water headers join into a common header prior to chemical dosing. The plant is equipped with continuous chlorine residual and turbidity analyzers. This data, as well as flow and well level data, is recorded on data loggers. The facility is alarmed for various parameters. The chemically dosed water then exists the building and travels through the contact water main prior to entering the Snow Valley Environmental Centre. The water is then directed back to the well pumphouse, or into the reservoir(s) based on system demand.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank with containment, and two chemical metering pumps (one duty pump, one standby pump) with automatic switchover in case one pump fails.

*Sequestering*

Sodium silicate is also added to the water for iron and manganese sequestration with the use of two (2) chemical metering pumps (one duty pump, one standby pump); one storage tank with containment.

*Booster pumps*

Two (2) booster pumps which allow the water from the discharge line to the lower pressure zone to be circulated into the piping going to the upper pressure zone only if the motorized valve entering the lowland distribution system is closed.

***Highlands (Environmental Centre Pumphouse & Re-chlorination Facility)***

Snow Valley Environmental Centre is capable of directing water to both the upper and lower pressure zones. The water enters the Snow Valley Environmental Centre and is directed either back down to the Well 3 and Well 4 pumphouse, or to one of the two (2) standpipe reservoirs. In addition, there is a continuous chlorine residual analyzer that monitors the treated water before it enters the distribution system.

*High Lift Pumps*

Three (3) high lifts pumps provide water to the upper pressure zone.

*Distribution & Storage*

Two glass lined steel storage tanks provide storage in the system. Each tank provides approximately 500 m<sup>3</sup> of storage (total capacity of 1000 m<sup>3</sup>).

*Stand-by Generator*

The Highlands plant is equipped with a 500 kW diesel generator and provides stand-by power to the booster station as well.



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

***Centre Vespra (Booster & Re-chlorination Facility)***

*Re-Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of two chemical metering pumps (one duty pump, one standby pump) with feed points upstream of the high lift pumps and upstream of the storage tanks. Two (2) free chlorine residual analyzers for incoming and the other one on the distributed water. There are also two (2) flow meters, one on the incoming water supply, and the other on the high lift pump discharge header.

*Highlift pumps*

There are three (3) high lift pumps (two duty and a standby).

*Storage Tanks*

Two (2) on-site glass lined, above grade storage tanks providing approximately 1096m<sup>3</sup> each.

*Stand-by Generator*

The facility is equipped with a 500 kW natural gas generator, capable of providing alternate power for the on-site water and wastewater facilities.

**Description of the Distribution System Components**

The Snow Valley Drinking Water System is a Class III Water Distribution and Supply System.

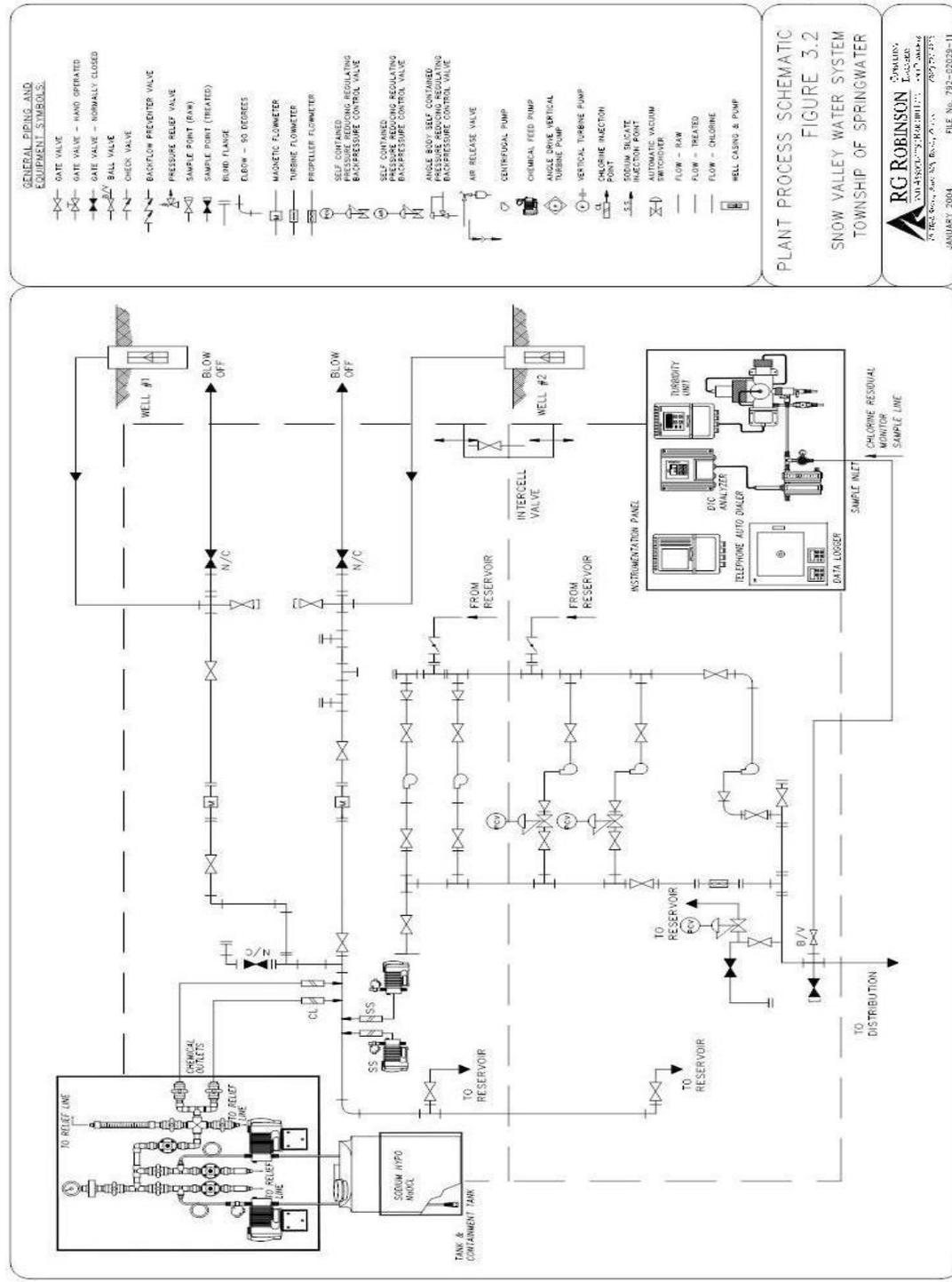
The Snow Valley distribution system is comprised of two zones – the upper distribution zone and the lower distribution zone. The upper zone is supplied by water from wells #3 and #4 only. The lower zone is supplied by all four wells. The distribution system is comprised of PVC piping. There are several dedicated sample station and fire hydrants located within the distribution system.

## SNOW VALLEY DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Snow Valley Old Pumphouse (Well No. 1 & 2)

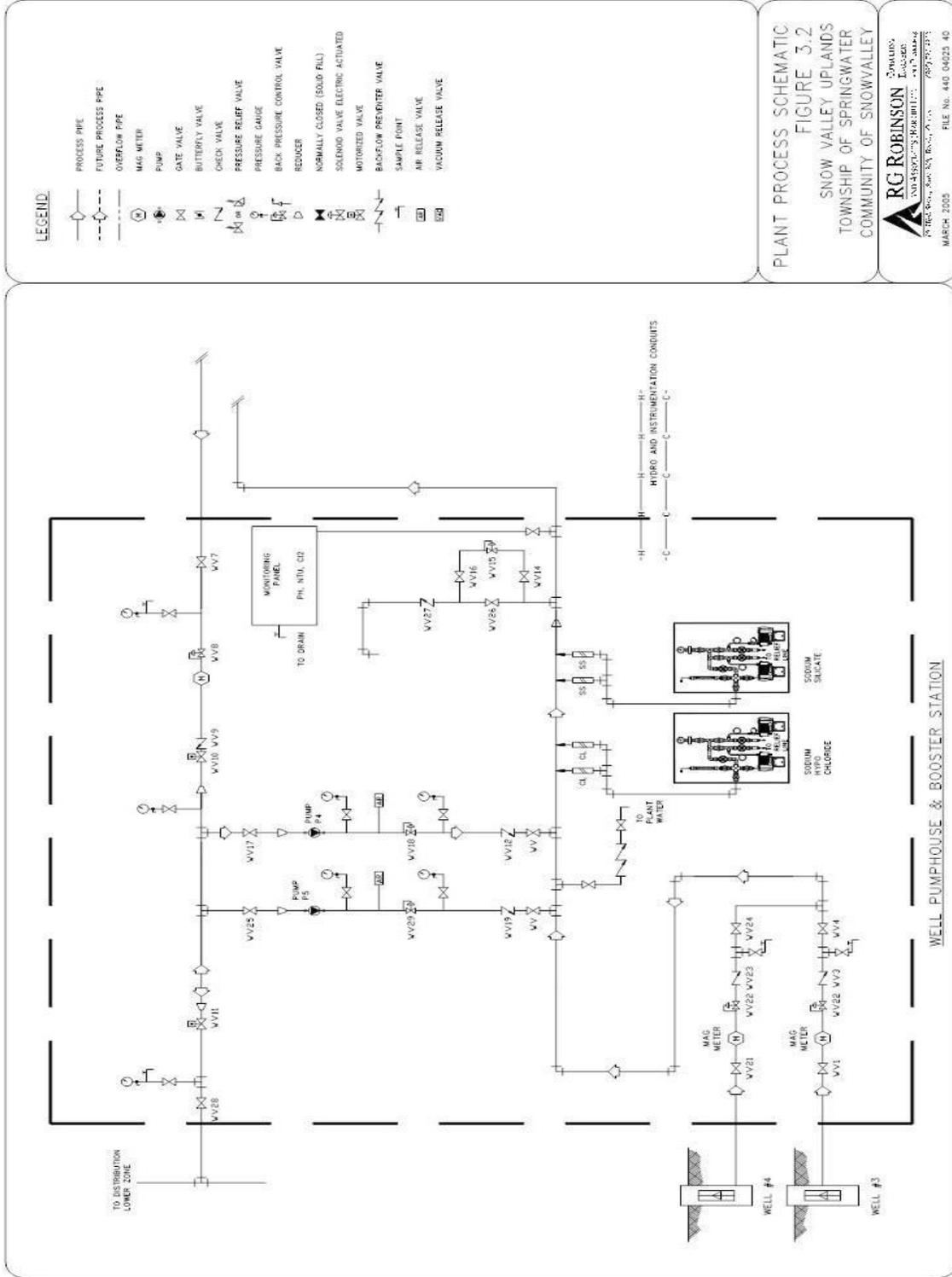


## SNOW VALLEY DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Booster Pumphouse (Well No. 3 & 4)

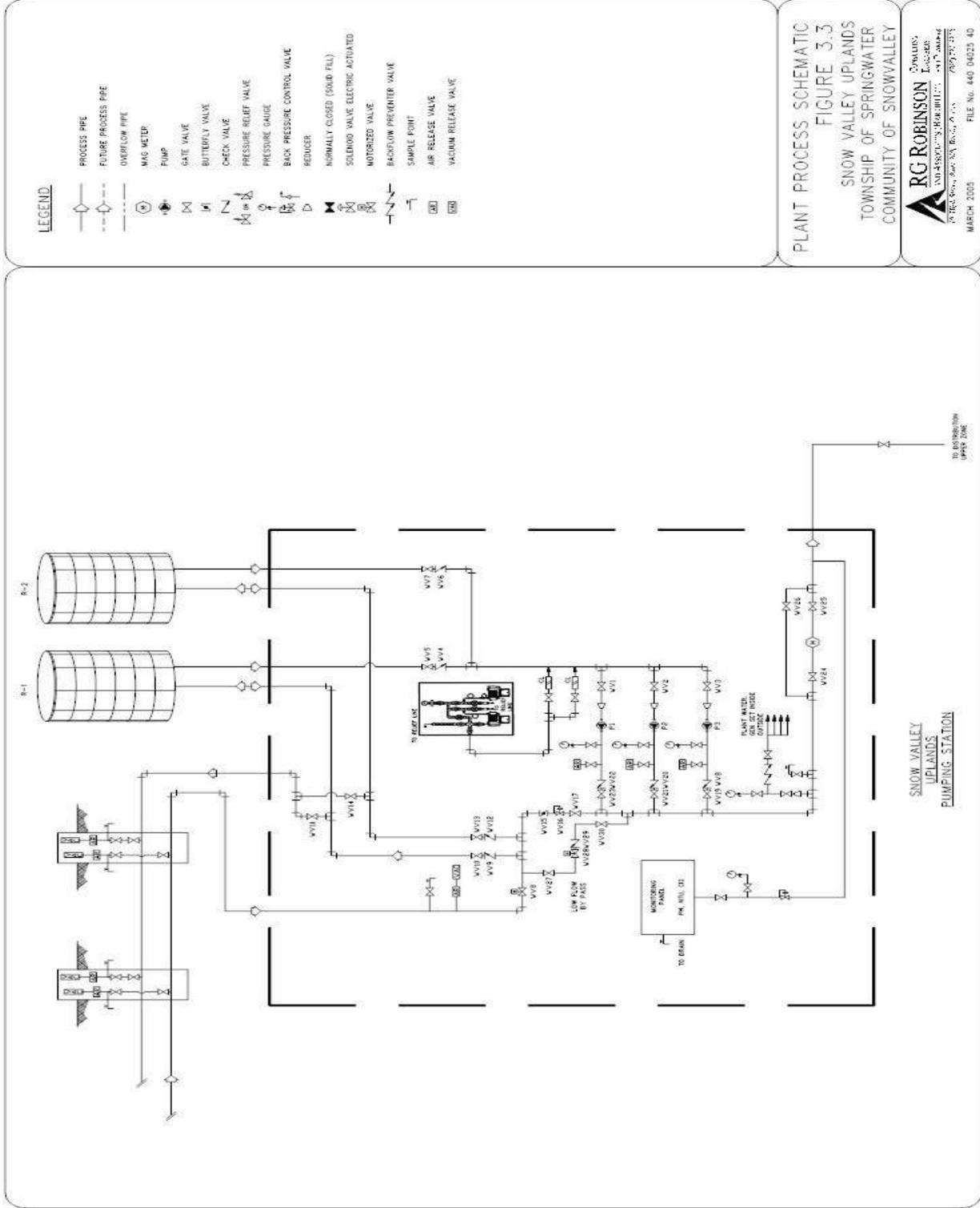


## SNOW VALLEY DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart – Highlands Plant





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**SNOW VALLEY DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06H was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water characteristics with 2017 data. |
|             |                   |  |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-06I  
Rev Date: 2018-09-21  
Rev No: 0  
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## PHELPSTON DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Drinking Water System Overview

The Phelpston Drinking Water System is owned by the Corporation of the Township of Springwater and operated on behalf of the Township by the Ontario Clean Water Agency (OCWA). The source for the Phelpston Drinking Water System is groundwater and supplies the subdivision known as Shamrock Meadows in Phelpston with drinking water via 2 drilled wells. The plant is located at 2 Hall Street, community of Phelpston.

### Source Water

A Well Field Evaluation Report, prepared by Ian D. Wilson Associates Ltd. in August 2003, states that the raw water bacteriological and chemical quality is acceptable. This report also states that this well field is not under the influence of surface water. The Wellhead Protection Area report, prepared by Golder Associates in May 2005, states that their sample results are indicative of a typical hard calcium-bicarbonate type water of good quality and meets the ODWS for all parameters tested.

Well #1 (MOE #5730347) was constructed in 1994 by Drury Well Drilling and is a 152mm diameter well constructed with 4.8mm thick steel casing. The well is contained within a concrete crock with lid.

Well #2 (MOE #not assigned) was constructed in 2003 by Allan Wright Water Wells Inc. and is a 203mm diameter well constructed with 8.18mm thick steel casing. The well is contained within a concrete crock with lid.

#### Raw Water Characteristics for Bacteriological (based on 2017 data)

| Source          | Number of Samples | Range of E. Coli Results [orgs/100 mL] | Range of Total Coliform Results [orgs/100 mL] |
|-----------------|-------------------|--|---|
| Raw – Well No.1 | 12                | 0 - 0                                  | 0 - 0   |
| Raw – Well No.2 | 12                | 0 - 0                                  | 0 - 1   |

#### Raw Water Characteristics for Turbidity (based on 2017 data)

| Source             | Number of Grab Samples | Range of Turbidity Results (min #)-(max #) [NTU] |
|--------------------|------------------------|--|
| Raw – Wells No.1-2 | 12/year/well           | 0.13 – 0.50                                      |

### Common Fluctuations

There appears to be no common fluctuations within the Phelpston Drinking Water System.

### Threats

The Township took part in the South Simcoe Groundwater Study which has resulted in a Wellhead Protection Area (WHPA) Report. The Wellhead Protection Area Report indicates that the land use within the immediate vicinity of the wells and throughout the WHPA is primarily residential. There are no industrial, commercial, agricultural or hydrocarbon related land uses in



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Approved by: Senior Operations Manager

the WHPA. The surrounding subdivision is serviced by individual in-ground septic systems. The nitrate monitoring data from quarterly sampling suggests that the septic beds are not impacting the wells. The Township of Springwater Community of Phelpston Wellhead Protection Area Report, prepared by Golder Associates in May 2005, states that past land uses, particularly farming, have not impacted the aquifer, based on the low nitrate concentrations. The Report also notes that road salt has not impacted the water supply.

The nearest potential source of contamination is the individual septic systems servicing the neighboring residential houses. The closest septic system is located at least 15 m from any of the production wells.

The wellheads are sufficiently protected and secure and the wells are located within a sizeable tract of municipally-owned land.

*Operational Challenges*

There appears to be no significant operational challenges with respect to the source water for the Phelpston Drinking Water System.

**Treatment System Description**

*Well No. 1 & 2*

Each well is equipped with a submersible deep well pump with a discharge line connected to the well pump header in the pumphouse described below.

*Pumphouse*

Two submersible pumps draw water from Well 1 and Well 2 respectively. Each well header has a smooth sample tap located before any chemical addition. Flow meters on each well monitor the quantity of water conveyed to the treatment system. A continuous analyzer for free chlorine residual draws water from the end of the contact chamber for analysis. There is a backflow preventer on the sample line for the continuous analyzer. There is a smooth sample tap on the pipe that directs water to the distribution system. A flow meter measures the amount of water conveyed to the distribution system from the reservoir. Flow, treated water chlorine residuals and other parameters are recorded by a data logger for review.

*Chlorination System*

A disinfection system utilizing sodium hypochlorite, consisting of one storage tank, spill containment, and two chemical metering pumps (one duty pump, one standby pump) which are used for sodium hypochlorite injection to the common header after the raw water headers for Well 1 and Well 2 join. There are two injection points, one for each of the chemical metering pumps. Sodium hypochlorite is kept in a separate room.

*Reservoir*

Following chemical injection, water enters the 635 m<sup>3</sup> in-ground, dual-celled reservoir located beneath the pumphouse. Water can either enter the south cell of the reservoir, the north cell of



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

the reservoir or be directed through a pipe that will direct water to both cells. There is a blow off line to direct water out of the pumphouse to a retention pond located northwest of the pumphouse. The blow off line is located after the three pipes that direct water to the reservoir. A manhole outside of the pumphouse provides access to the blow off line.

*High Lift Pumps*

Four (4) vertical turbine pumps supply water to the distribution system, as well as two (2) fire pumps for fire protection.

*Back-up Power Supply*

The pumphouse is equipped with a 200 kW diesel generator, capable of supplying power to all of the equipment in the pumphouse in case of emergencies.

**Description of the Distribution System Components**

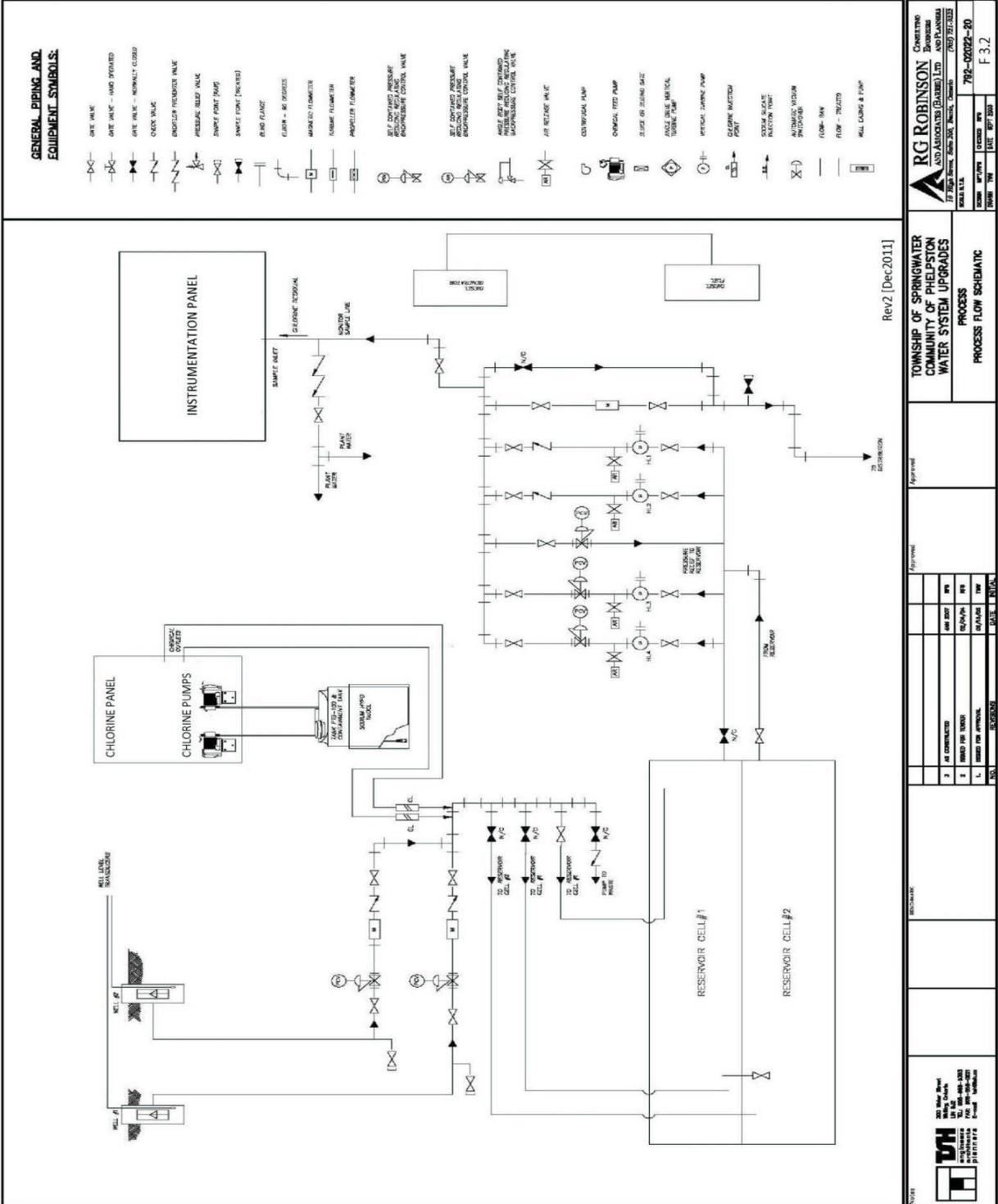
The Phelpston Drinking Water System is classified as a Limited Ground Water System. The distribution system consists of 6" (150-millimeter) Polyvinyl chloride piping. There are no storage structures in the distribution system. There are 17 hydrants throughout the Phelpston distribution system.

## PHELPSTON DRINKING WATER SYSTEM

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### Process Flow Chart





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**PHELPSTON DRINKING WATER SYSTEM**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>   |
|-------------|-------------------|--|
| 2018-09-21  | 0                 | Procedure issued – Information within OP-06A was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Separated the DWS descriptions from the body of this procedure into Appendices. Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Completed all sections: source water, treatment system description, treatment system process flow chart, and description of distribution system components. Updated raw water data to 2017. |



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**RISK ASSESSMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

## 1. Purpose

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

## 2. Definitions

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

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

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

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

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

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

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

*Likelihood* – the probability of a hazard or hazardous event occurring

## 3. Procedure

- 3.1 Operations Management ensures that operations personnel are assigned to conduct a risk assessment at least once every thirty-six months. At a minimum, the Risk Assessment Team must include the QEMS Representative, at least one Operator for the system and at least one member of Operations Management.
- 3.2 The QEMS Representative is responsible for coordinating the risk assessment and ensuring that documents and records related to the risk assessment activities are maintained.



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**RISK ASSESSMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

- 3.3.1 OP-07 Risk Assessment and OP-08 Risk Assessment Outcomes are reviewed.
- 3.3.2 For each of the system's activities/process steps, potential hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water are identified. At a minimum, potential hazardous events and associated hazard as identified in the most current version of the Ministry of the Environment, Conservation and Parks (MECP) document titled "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as applicable to the system type) must be considered.
- 3.3.3 For each of the hazardous events, control measures currently in place at the system to eliminate the hazard or prevent it from becoming a threat to public health are specified. Control measures may include alarms, monitoring procedures, SOPs/contingency plans, preventive maintenance activities, backup equipment, engineering controls, etc.
- 3.3.4 To ensure that potential drinking water health hazards are addressed and minimum treatment requirements as regulated by SDWA O. Reg. 170/03 and the MECP's "Procedure for Disinfection of Drinking Water in Ontario" are met, OCWA has established mandatory Critical Control Points (CCPs).

As a minimum, the following must be included as CCPs (as applicable):

- Equipment or processes required to achieve primary disinfection (e.g., chemical and/or UV disinfection system, coagulant dosing system, filters, etc.)
  - Equipment or processes necessary for maintaining secondary disinfection in the distribution system
  - Fluoridation system
- 3.3.5 Additional CCPs for the system are determined by evaluating and ranking the hazardous events for the remaining activities/process steps (i.e., those not included as OCWA's minimum CCPs).
- 3.3.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), each hazardous event is assigned a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:



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Approved by: Senior Operations Manager

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

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

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

- 3.3.7 Hazardous events and rankings are reviewed and any activity/process step is identified as an additional CCP if all of the following criteria are met:
- ✓ The associated hazardous event has a ranking of 12 or greater;
  - ✓ The associated hazardous event can be controlled through control measure(s);
  - ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion;
  - ✓ Specific control limits can be established for the control measure(s); and
  - ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or MECP or both.

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

3.5 At least once every calendar year, the QEMS Representative facilitates the verification of the currency of the information and the validity of the assumptions used in the risk



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assessment in preparation for the Management Review (OP-20). When performing this review, the following may be considered:

- Process/equipment changes
- Reliability and redundancy of equipment
- Emergency situations/service interruptions
- CCP deviations
- Audit/inspection results

### 4. Related Documents

OP-08 Risk Assessment Outcomes

OP-20 Management Review

MECP’s “Potential Hazardous Events for Municipal Residential Drinking Water Systems”

MECP’s “Procedure for Disinfection of Drinking Water in Ontario”

### 5. Revision History

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2017-09-21 | 0          | Procedure issued – Information within OP-07 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (last revision 7 dated 2017-09-25). Revised Purpose to reflect element 7 requirements only. Included minimum requirements for the Risk Assessment Team (QEMS Representative, at least one operator for the system and at least one member of Operation Management. Clarified role of QEMS Representative in coordinating the risk assessment and maintaining documents and records. Re-worded procedure for performing the risk assessment (process itself remains essentially unchanged). Included reference to MECP’s “Potential Hazardous Events for Municipal Residential Drinking Water Systems”. Removed requirements for documenting the outcomes of the risk assessment (now covered in OP-08). Changed annual review to at least once every calendar year and included potential considerations when performing the review. |



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**RISK ASSESSMENT OUTCOMES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

## 1. Purpose

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

## 2. Definitions

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

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

## 3. Procedure

3.1 The QEMS Representative is responsible for updating the information in OP-08A to OP-08I inclusive, Summary of Risk Assessment Outcomes as required where:

- OP-08A Minesing Drinking Water System
- OP-08B Anten Mills Drinking Water System
- OP-08C Elmvale Drinking Water System
- OP-08D Hillsdale Drinking Water System
- OP-08E Del Trend Drinking Water System
- OP-08F Vespra Downs Drinking Water System
- OP-08G Midhurst Drinking Water System
- OP-08H Snow Valley Drinking Water System
- OP-08I Phelpston Drinking Water System

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

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



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- 3.3 Operations Management is responsible for ensuring that for each CCP:
- Critical Control Limits (CCLs) are set;
  - Procedures and processes to monitor the CCLs are established; and
  - Procedures to respond to, report and record deviations from the CCLs are implemented.

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

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

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

**4. Related Documents**

- OP-07 Risk Assessment
- OP-08A to OP-08I Summary of Risk Assessment Outcomes
- OP-14 Review and Provision of Infrastructure
- MECP’s “Potential Hazardous Events for Municipal Residential Drinking Water Systems”

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2018-09-21 | 0          | Procedure issued – Information within OP-08 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (last revision 7 dated 2017-09-25). Included separate Appendix for each Drinking Water System and summarized their reference page. Clarified role of QEMS Representative in updating the information in OP-08A to OP-08-I, inclusive, Summary of Risk Assessment Outcomes. Included requirements for how to document the risk assessment outcomes using the tables in OP-08A to OP-08I, inclusive. Clarified responsibility of Operations Management to ensure Critical Control Limits are set and related procedures are developed. Included reference to OP-14 Review and Provision of Infrastructure to emphasize the need for Operations Management to review the risk assessment outcomes during the infrastructure review. |



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Approved by: Senior Operations Manager

**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step               | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards)                 | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---|--|--|---|--|------------|-------------|------------|---|
| <b>Raw Water – Wells</b>                | 2  | Well casing collapse   | - Loss of raw water supply<br>- Contamination | Back-up wells and pumps, annual well inspections, “crock” protection on well head, locks on wells  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|   | 2  | Well pump failure  | - Loss of raw water supply                    | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|   | 5  | Chemical spill   | - Contamination of aquifer                    | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|   | 5  | Contamination via surface water (storm water ditch surrounding property) | - Contamination of aquifer                    | Weekly bacteriological review, quarterly review of nitrate/nitrite quality results, plant inspections, “crock” protection on well head                             | 2          | 5           | 10         | <input checked="" type="checkbox"/> No                  |
| <b>Primary Disinfection – Treatment</b> | 10   | Chemical pump system failure   | - Lack of disinfection                        | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital              |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | works discussions with Township  |            |             |            |   |
|                           | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring                   | Alarms, scheduled maintenance, hand held readings, plant inspections, spare parts, budget and capital works discussions with Township  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
| <b>Distribution</b>       |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out                    | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, low level alarm (in towers), system pressure plant inspections,  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |

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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event    | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                      |  | leak detection program (Township), water conservation by-law, water restriction notice when needed, water meter upgrades (Township)  |            |             |            |  |
| <b>Towers (2)</b>         | 2, 7   | Low level                            | - Low treated water supply<br>- Low pressure | Back-up tower, alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High level                           | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure                | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Terrorism, Vandalism & Illegal Entry | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Control Systems</b>    | 2, 7   | Power failure                        | - Service                                    | Stand-by generator, alarm  | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                       | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|---|---|------------|-------------|------------|--|
|                           |  |                                   | interruption  | notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit |            |             |            |  |
|                           |  | Loss of alarm system/phone line   | - Lack of monitoring                                | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure            | - Service interruption                              | Alarm notification, call-out, manually operate facility   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                 | - Loss of service                                   | Alarm notification, Township & OCWA portable generators, UPS  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage              | - Lack of back-up power<br>- Loss of service        | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs  | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry           | - Contamination of well source<br>- Property damage | Plants securely locked, alarms, call-out, plant signage, plant inspections, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |

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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|---|------------|-------------|------------|--|
| All                       | 1  | Long Term Impacts of Climate Change | - Increase/<br>decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses   | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal enforcement, fire bans<br>Flooding: Storm water management ponds, two Towers (i.e. one back-up), alternate water source/supply | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - High winds<br>- Tornadoes  | Back-up Tower, concrete and brick building materials, manually operate pumphouse, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, community calls                     | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - Source water quality impacted by extreme weather events (e.g. overflows / bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--------------------------------|--|------------|-------------|------------|--|
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Infrastructure damage        | Redundancy in wells, chlorination system and towers, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires                 | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Fuel supply                  | Essential Supplies & Services List, back-up suppliers,   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | shortage   | Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance  |            |             |            |  |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of towers (for ice), continuous monitoring, alarms, call-out, secure premise around Towers, contractor for frozen service lines, back-up wells, pumps and towers | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Heat wave issues – staff   | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work  | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks   |            |             |            |  |
|                           | 6  | Terrorism                         | Cyber terrorism                                | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system   | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination       | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                                  | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow                          | Contamination of treated water (public health) | Calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards) | Existing Control Measures                            | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|--|-------------------------------|--|------------|-------------|------------|------|
|                           |  |  |                               |  |            |             |            |      |
|                           | 9  | Sudden Changes to Raw Water  |                               | Not Applicable – Groundwater Source                  |            |             |            |      |
|                           | 11   | Failure of Equipment or process associated with secondary disinfection (e.g. chlorination equipment) |                               | Not Applicable – No Secondary Disinfection Equipment |            |             |            |      |
|                           | 12   | Algal Blooms   |                               | Not Applicable – Groundwater Source                  |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits   | Monitoring Procedures  | Response, Reporting and Recording Procedures   |
|---|---|--|--|
| <b>Primary Disinfection:<br/>Sodium hypochlorite system</b> | <i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.<br><br><i>Note: well pump shutdown on chemical pump failure.</i> | - Plant inspections (weekdays)<br>- Continuous monitoring of chlorine residual | Standard Operating Procedures:<br>- Responding to Alarms<br>- Low Chlorine Residual – Treated [Improper Disinfection]<br>- High Chlorine Residual<br>- Adverse Water Quality<br>CT calculation sheets<br>Logbook entry & call-in report (if after hours) |
| <b>Secondary Disinfection</b>                               | <i>Free chlorine residual:</i> 0.05 mg/L in distribution system   | Distribution chlorine residuals monitored as per O. Reg. 170/03                | Standard Operating Procedures:<br>- Low Chlorine - Distribution System<br>- Adverse Water Quality  |



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Approved by: Senior Operations Manager

| CCP | Critical Control Limits | Monitoring Procedures | Response, Reporting and Recording Procedures    |
|-----|-------------------------|-----------------------|---|
|     |                         |                       | Logbook entry & call-in report (if after hours) |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants  | Summary of Results   |
|------------------|------------------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann                 | Completed a full assessment of hazardous events for facility.  |
| 2010-09-15       | Re-Assessed Hazards                | Jen Bitten, Karen Lorente, Larry McMann                           | Re-assessed hazards, result of CAR 535.  |
| 2012-02-13       | 36-Month Risk Assessment           | Richard Eagle, Karen Lorente, Larry McMann                        | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-18       | Complete review of Risk Assessment | Richard Eagle, Larry McMann                                       | Total review of Risk Assessment. Changed back-up generator fail to generator fail since facility has an on-site genset. Also updated chlorine critical control limit.  |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann                                       | Added storm water ditch surrounding property around wells. Added concerned residents notifying OCWA and Semi Annual and main valves in Distribution. Added stand-by generator and autodialer as Existing Control Measures. Added loss of phone line to Description of Hazardous Event. |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the  |



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Minesing Well Supply System

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Approved by: Senior Operations Manager

| Date of Activity | Type of Activity | Participants                                       | Summary of Results   |
|------------------|------------------|--|--|
|                  |                  | and Larry McMann (Senior Operator & O&M Team Lead) | MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

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



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2010-09-15 | 1          | Re-assessed hazards, result of CAR 535   |
| 2012-02-13 | 2          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs  |
| 2013-02-08 | 3          | Total review of Risk Assessment. Changed back-up generator fail to generator fail since facility has an on-site genset. Also updated chlorine critical control limit.  |
| 2015-07-27 | 4          | Added storm water ditch surrounding property around wells. Added concerned residents notifying OCWA and Semi Annual and main valves in Distribution. Added stand-by generator and autodialer as Existing Control Measures. Added loss of phone line to Description of Hazardous Event.   |
| 2018-08-10 | 5          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08A); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



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Approved by: Senior Operations Manager

**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                     | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination     | Back-up wells and pumps, annual well inspections, “crock” protection on well head, locks on wells   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                        | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests                    | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                        | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                            | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections,   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | spare parts, budget and capital works discussions with Township  |            |             |            |   |
| Distribution              |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out                    | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, low level alarm (in tower), system pressure, plant inspections, leak detection program (Township), water conservation by-law, water restriction notice when needed, water meter upgrades     | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event    | Possible Outcome<br>(Hazards)                | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--------------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                      |  | (Township)  |            |             |            |  |
| <b>Tower</b>              | 2, 7   | Low level                            | - Low treated water supply<br>- Low pressure | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly with a boiled water advisory issued | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High level                           | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination   | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure                | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Terrorism, Vandalism & Illegal Entry | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Control Systems</b>    | 2, 7   | Power failure                        | - Service interruption                       | Stand-by generator, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-   | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                     |  | out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit                             |            |             |            |  |
|                           |  | Loss of alarm system/phone line     | - Lack of monitoring   | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                   | - Loss of service  | Alarm notification, Township & OCWA portable generators, UPS   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage                | - Lack of back-up power<br>- Loss of service                         | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage                  | Plants securely locked, alarms, call-out, plant signage, plant inspections, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | drought etc.)<br>- Flooding of<br>pumphouses   | enforcement, fire bans<br>Flooding: one tower, alternate<br>water source/supply, sandy   |            |             |            |  |
|                           |  |                                   | - High winds<br>- Tornadoes  | Concrete and brick building<br>materials, manually operate<br>pumphouse, alarms (e.g. loss<br>of communication from radio<br>signals), police road closures,<br>OCWA Corporate weather<br>warnings, emergency power,<br>community calls  | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Source water<br>quality impacted by<br>extreme weather<br>events (e.g.<br>overflows /<br>bypasses at<br>wastewater<br>facilities, leaching<br>from landfills and<br>residential septic<br>tanks, etc.) | Additional raw water<br>sampling/monitoring during<br>overflow/bypass events,<br>overflow/bypass procedures,<br>well sampling and testing,<br>source water protection<br>designation and signage,<br>Conservation authority<br>monitoring and enforcement,<br>Township by-laws | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather<br>Conditions     | - Lack of access to<br>facilities  | Capital upgrades, remote<br>access to facility PLC,<br>agreement with Township and<br>police for priority access,<br>response, and/or escort,<br>OERT, Standard Operating<br>Procedures, Contingency Plan,<br>Trained personnel, Staff   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)         | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|---------------------------------------|--|------------|-------------|------------|--|
|                           |  |                                   |                                       | located locally and distributed around Township, local contacts, radio reports   |            |             |            |  |
|                           |  |                                   | - Infrastructure damage               | Redundancy in wells and chlorination system, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires                        | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Fuel supply shortage                | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 4  | Sustained extreme                 | - Frozen equipment and infrastructure | Requirement of residents to run faucets, communications  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                 | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|--|
|                           |  | temperatures                      | (e.g. tower, services, mains, hydrants, etc.) | protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of tower (for ice), continuous monitoring, alarms, call-out, secure premise around Tower, contractor for frozen service lines, back-up wells and pumps |            |             |            |  |
|                           |  |                                   | Heat wave issues – staff                      | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks   | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism                               | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |



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Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event                    | Possible Outcome<br>(Hazards)                  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--|--|--|------------|-------------|------------|--|
|                           |  |  |  | rights restricted to IT, data back-up, back-up monitoring system.  |            |             |            |  |
|                           |  |  | Chemical / bacteriological contamination       | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |  | Confrontation                                  | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow   | Contamination of treated water (public health) | Calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 9  | Sudden Changes to Raw Water                          | Not Applicable – Groundwater Source            |  |            |             |            |  |
| 11                        | Failure of Equipment or process associated with secondary                    | Not Applicable – No Secondary Disinfection Equipment |  |  |            |             |            |  |



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Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event          | Possible Outcome<br>(Hazards) | Existing Control Measures           | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|--|-------------------------------|-------------------------------------|------------|-------------|------------|------|
|                           |  |  |                               |                                     |            |             |            |      |
|                           |  | disinfection (e.g. chlorination equipment) |                               |                                     |            |             |            |      |
|                           | 12   | Algal Blooms                               |                               | Not Applicable – Groundwater Source |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits   | Monitoring Procedures  | Response, Reporting and Recording Procedures   |
|---|---|--|--|
| <b>Primary Disinfection: Sodium hypochlorite system</b> | <i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.<br><br><i>Note: well pump shutdown on chemical pump failure.</i> | - Plant inspections (weekdays)<br>- Continuous monitoring of chlorine residual | Standard Operating Procedures:<br>- Responding to Alarms<br>- Low Chlorine Residual – Treated [Improper Disinfection]<br>- High Chlorine Residual<br>- Adverse Water Quality<br>CT calculation sheets<br>Logbook entry & call-in report (if after hours) |
| <b>Secondary Disinfection</b>                           | <i>Free chlorine residual:</i> 0.05 mg/L in distribution system   | Distribution chlorine residuals monitored as per O. Reg. 170/03                | Standard Operating Procedures:<br>- Low Chlorine - Distribution System<br>- Adverse Water Quality<br>Logbook entry & call-in report (if after hours)   |

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



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**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants   | Summary of Results   |
|------------------|------------------------------------|--|--|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann  | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment          | Richard Eagle, Karen Lorente, Larry McMann   | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-18       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann  | Total review of Risk Assessment. Changed back-up generator fail to generator fail since facility has an on-site genset. Also updated chlorine critical control limit.  |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann  | Added concerned residents notifying OCWA as an Existing Control Measure, added Semi-Annual inspections of hydrants and valves, added installation of portable dialer, added storm ditch around property and loss of phonenumber.   |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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



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

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs. |
| 2013-02-08 | 2          | Total review of Risk Assessment. Changed back-up generator fail to generator fail since facility has an on-site genset. Also updated chlorine critical control limit.  |
| 2015-07-27 | 3          | Added concerned residents notifying OCWA as an Existing Control Measure, added Semi-Annual inspections of hydrants and valves, added installation of portable dialer, added storm ditch around property and loss of phoneline.     |



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**SUMMARY OF RISK ASSESSMENT OUTCOMES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08B); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |





## OPERATIONAL PLAN

Elmvale Well Supply System

QEMS Doc.: OP-08C  
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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                     | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination     | Back-up well and pump, annual well inspections, located inside building   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                        | Back-up well and pump, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                        | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                            | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township, well and booster systems |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections,   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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QEMS Doc.: OP-08C  
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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | spare parts, budget and capital works discussions with Township, back-up analyzers (pre-chlor, treated, and distribution)  |            |             |            |   |
| <b>Distribution</b>       |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, online distribution chlorine analyzer, flushing   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out                    | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, low level alarm (in towers), system pressure, plant inspections, leak detection program (Township), water  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event    | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                      |  | conservation by-law, water restriction notice when needed, water meter upgrades (Township)   |            |             |            |  |
| <b>Towers (2)</b>         | 2, 7   | Low level                            | - Low treated water supply<br>- Low pressure | Back-up tower, alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly                                     | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High level                           | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure                | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan, variable frequency drives for better efficiency and reduction of ON/OFF operation | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Terrorism, Vandalism & Illegal Entry | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |



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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards) | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|-------------------------------|---|------------|-------------|------------|--|
| Control Systems           | 2, 7   | Power failure at Well House       | - Service interruption        | Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit, alarm notification                     | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Power failure at Booster          | - Service interruption        | Stand-by generator, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |
|                           |  | Loss of alarm system/phone line   | - Lack of monitoring          | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure            | - Service interruption        | Alarm notification, call-out, manually operate facility   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                 | - Loss of service             | Alarm notification, Township &  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                     |  | OCWA portable generators, UPS  |            |             |            |  |
|                           | 2, 7   | Diesel fuel shortage                | - Lack of back-up power<br>- Loss of service   | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs   | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage  | Plants securely locked, plant signage, plant inspections, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal enforcement, fire bans<br>Flooding: two Towers (i.e. one back-up), alternate water source/supply, Township ditch clearing | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - High winds<br>- Tornadoes  | Back-up Tower, concrete and brick building materials, manually operate pumphouse, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, community calls                | 1          | 3           | 3          | <input checked="" type="checkbox"/> No |



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Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | - Source water quality impacted by extreme weather events (e.g. overflows / bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities   | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally (within Elmvale itself) and distributed around Township, local contacts, radio reports | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Infrastructure damage  | Redundancy in wells, chlorination system and towers, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires   | On-call and communications procedures with Township and Fire Department, staff   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                   |  | availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection   |            |             |            |  |
|                           |  |                                   | - Fuel supply shortage   | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of towers (for ice), continuous | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)            | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | monitoring, alarms, call-out, secure premise around Towers, contractor for frozen service lines, back-up wells, pumps, and towers  |            |             |            |  |
|                           |  |                                   | Heat wave issues – staff                 | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism                          | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system.  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination | Restricted access, keys, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                            | Restricted access, keys,   | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |



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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards)                        | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--|--|--|------------|-------------|------------|--|
|                           |  |  |  | contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  |            |             |            |  |
|                           | 8  | Backflow   | Contamination of treated water (public health)       | Backflow preventers at homes, calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 9  | Sudden Changes to Raw Water  | Not Applicable – Groundwater Source                  |  |            |             |            |  |
|                           | 11   | Failure of Equipment or process associated with secondary disinfection (e.g. chlorination equipment) | Not Applicable – No Secondary Disinfection Equipment |  |            |             |            |  |
|                           | 12   | Algal Blooms   | Not Applicable – Groundwater Source                  |  |            |             |            |  |



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**SUMMARY OF RISK ASSESSMENT OUTCOMES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits   | Monitoring Procedures  | Response, Reporting and Recording Procedures  |
|---|---|--|---|
| <b>Primary Disinfection: Sodium hypochlorite system</b> | <p><i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.</p> <p><i>Note: well pump shutdown on chemical pump failure and pre-chlorine analyzer low chlorine set point.</i></p> | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> <li>- Adverse Water Quality</li> </ul> <p>CT calculation sheets<br/>Logbook entry &amp; call-in report (if after hours)</p> |
| <b>Secondary Disinfection</b>                           | <p><i>Free chlorine residual:</i> 0.05 mg/L in distribution system</p>  | <p>Distribution chlorine residuals monitored as per O. Reg. 170/03</p>   | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Low Chlorine - Distribution System</li> <li>- Adverse Water Quality</li> </ul> <p>Logbook entry &amp; call-in report (if after hours)</p>  |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity          | Participants                                      | Summary of Results   |
|------------------|---------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment   | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Date of Activity | Type of Activity                   | Participants   | Summary of Results   |
|------------------|------------------------------------|--|--|
|                  |                                    |  | changed SOP names to reflect exactly what is on the SOPs.  |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann  | Total Review of Risk Assessment. Updated generator failure event for well house and added booster station power fail to hazardous event. Also updated chlorine critical control limit.   |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann  | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, storm ditch around property and loss of phoneline, pre-chlorine analyzer with well lock-out, online chlorine analyzer, supply distribution system from well house.        |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

| System Type<br>(indicate all that apply to this DWS) |             | Reference Number | Description of Hazardous Event/Hazard                         |
|--|-------------|------------------|---|
| Yes  | All Systems | 1                | Long Term Impacts of Climate Change                           |
| Yes  | All Systems | 2                | Water supply shortfall  |
| Yes  | All Systems | 3                | Extreme weather events (e.g., tornado, ice storm)             |
| Yes  | All Systems | 4                | Sustained extreme temperatures (e.g., heat wave, deep freeze) |
| Yes  | All Systems | 5                | Chemical spill impacting source water                         |
| Yes  | All Systems | 6                | Terrorist and vandalism actions                               |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| System Type<br>(indicate all that apply to this DWS) |   | Reference Number | Description of Hazardous Event/Hazard   |
|--|---|------------------|---|
| Yes  | Distribution Systems  | 7                | Sustained pressure loss   |
| Yes  | Distribution Systems  | 8                | Backflow  |
| N/A  | Treatment Systems   | 9                | Sudden changes to raw water characteristics (e.g., turbidity, pH)   |
| Yes  | Treatment Systems   | 10               | Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system) |
| N/A  | Treatment Systems and Distribution Systems providing Secondary Disinfection | 11               | Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)               |
| N/A  | Treatment Systems using Surface Water                                       | 12               | Algal blooms  |

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs  |
| 2013-02-08 | 2          | Total Review of Risk Assessment. Updated generator failure event for well house and added booster station power fail to hazardous event. Also updated chlorine critical control limit.   |
| 2015-07-27 | 3          | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, storm ditch around property and loss of phoneline, pre-chlorine analyzer with well lock-out, online chlorine analyzer, supply distribution system from well house.  |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08C); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained extreme temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



## OPERATIONAL PLAN

Hillsdale Well Supply System

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### SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                     | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination     | Back-up wells and pumps, annual well inspections, “crock” protection on well head, locks on wells   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                        | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests                    | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                        | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                            | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections,   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | spare parts, budget and capital works discussions with Township, back-up analyzers (pre-chlor, north, and south)   |            |             |            |   |
| <b>Distribution</b>       |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out                    | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, low level alarm (in tower), system pressure, plant inspections, leak detection program (Township), water conservation by-law, water restriction notice when                                  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event    | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                      |  | needed, water meter upgrades (Township)  |            |             |            |  |
| <b>Tower</b>              | 2, 7   | Low level                            | - Low treated water supply<br>- Low pressure | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly (north side would need boiled water advisory issued) | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High level                           | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure                | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Terrorism, Vandalism & Illegal Entry | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Control Systems</b>    | 2, 7   | Power failure                        | - Service interruption                       | Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water   | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                     |  | haulage, call-out, storage volume available, alarm notification, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit                     |            |             |            |  |
|                           |  | Loss of alarm system/phone line     | - Lack of monitoring   | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage  | Plants securely locked, alarms, call-out, plant signage, plant inspections, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal enforcement, fire bans<br>Flooding: one tower, alternate water source/supply, sandy | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - High winds<br>- Tornadoes  | Concrete and brick building materials, manually operate pumphouse, alarms (e.g. loss of communication from radio signals), police road closures,   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | OCWA Corporate weather warnings, community calls   |            |             |            |  |
|                           |  |                                   | - Source water quality impacted by extreme weather events (e.g. overflows / bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities   | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Infrastructure damage  | Redundancy in wells and chlorination system, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires   | On-call and communications   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)   | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|--|
|                           |  |                                   |   | procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection  |            |             |            |  |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. tower, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of tower (for ice), continuous monitoring, alarms, call-out, secure premise around Tower, contractor for frozen service lines, back-up wells and pumps | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | Heat wave issues – staff                 | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism                          | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system   | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                            | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow                          | Contamination of                         | Calibration of municipally   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)                        | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|---|--|---|------------|-------------|------------|------|
|                           |  |   | treated water<br>(public health)                     | owned backflow preventers,<br>SOP for fixing failed units,<br>plumbing code, procedures for<br>maintaining system distribution<br>pressures, secondary<br>disinfection residual<br>throughout distribution system |            |             |            |      |
|                           | 9  | Sudden Changes<br>to Raw Water  | Not Applicable – Groundwater Source                  |   |            |             |            |      |
|                           | 11   | Failure of<br>Equipment or<br>process<br>associated with<br>secondary<br>disinfection (e.g.<br>chlorination<br>equipment) | Not Applicable – No Secondary Disinfection Equipment |   |            |             |            |      |
|                           | 12   | Algal Blooms  | Not Applicable – Groundwater Source                  |   |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits  | Monitoring Procedures  | Response, Reporting and Recording<br>Procedures  |
|---|--|--|--|
| <b>Primary Disinfection:<br/>Sodium hypochlorite<br/>system</b> | <i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps. | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | Standard Operating Procedures: <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> </ul> |



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| CCP                           | Critical Control Limits  | Monitoring Procedures   | Response, Reporting and Recording Procedures   |
|-------------------------------|--|---|--|
|                               | <i>Note: well pump shutdown on chemical pump failure and pre-chlorine analyzer low chlorine set point.</i> |   | - Adverse Water Quality<br>CT calculation sheets<br>Logbook entry & call-in report (if after hours)  |
| <b>Secondary Disinfection</b> | <i>Free chlorine residual: 0.05 mg/L in distribution system</i>  | Distribution chlorine residuals monitored as per O. Reg. 170/03 | Standard Operating Procedures:<br>- Low Chlorine - Distribution System<br>- Adverse Water Quality<br>Logbook entry & call-in report (if after hours) |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants                                      | Summary of Results   |
|------------------|------------------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment          | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs. |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann                       | Total Review of Risk Assessment. Updated chlorine critical control limit.  |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann                       | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, loss of phoneline, two  |



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| Date of Activity | Type of Activity         | Participants   | Summary of Results   |
|------------------|--------------------------|--|--|
|                  |                          |  | lead well pumps, omit back-ups on analyzers  |
| 2018-07-25       | 36-Month Risk Assessment | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

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



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| System Type<br>(indicate all that apply to this DWS) |                                       | Reference Number | Description of Hazardous Event/Hazard |
|--|---------------------------------------|------------------|---------------------------------------|
| N/A  | Treatment Systems using Surface Water | 12               | Algal blooms                          |

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-08 | 2          | Total Review of Risk Assessment. Updated chlorine critical control limit.  |
| 2015-07-27 | 3          | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, loss of phonenumber, two lead well pumps, omit back-ups on analyzers  |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08D); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



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**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                 | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination | Back-up wells and pump, annual well inspections, “crock” protection on well head, locks on wells  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                    | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests, connected to Midhurst DWS via valve | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                    | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                        | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township                   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels                     | Alarms, scheduled maintenance, hand held  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
|                           |  |                                   |   |   |            |             |            |   |
|                           |  |                                   | - Lack of monitoring  | readings, plant inspections, spare parts, budget and capital works discussions with Township  |            |             |            |   |
| <b>Distribution</b>       |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, alarm for high flow, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, system pressure, plant inspections, leak detection program (Township), water conservation by-law, water restriction notice when   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event    | Possible Outcome<br>(Hazards)                | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--------------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                      |  | needed, water meter upgrades (Township)   |            |             |            |  |
| Reservoir                 | 2, 7   | Low level                            | - Low treated water supply<br>- Low pressure | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High level                           | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination   | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure                | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan                                 | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Terrorism, Vandalism & Illegal Entry | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| Control Systems           | 2, 7   | Power failure                        | - Service interruption                       | Stand-by generator, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-   | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                     |  | out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit                             |            |             |            |  |
|                           |  | Loss of alarm system/phone line     | - Lack of monitoring   | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                   | - Loss of service  | Alarm notification, Township & OCWA portable generators, UPS   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage                | - Lack of back-up power<br>- Loss of service                                       | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage                                | Plant securely locked, plant signage, plant inspections, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.) | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal enforcement, fire bans                                    | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                   | - Flooding of pumphouses   | Flooding: tied into Midhurst DWS via valve which has three pumphouses and two Towers (i.e. back-ups), alternate water source/supply   |            |             |            |  |
|                           |  |                                   | - High winds<br>- Tornadoes  | Tied into Midhurst DWS via valve which has three pumphouses and two Towers (i.e. back-ups), in-ground reservoir, concrete and brick building materials, manually operate pumphouse, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, community calls | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Source water quality impacted by extreme weather events (e.g. overflows / bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities   | Capital upgrades, remote access to facility PLC,  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards) | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|-------------------------------|--|------------|-------------|------------|--|
|                           |  |                                   |                               | agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports  |            |             |            |  |
|                           |  |                                   | - Infrastructure damage       | Redundancy in wells, chlorination systems and towers, tied into Midhurst DWS via valve which has three pumphouses and two Towers (i.e. back-ups), discussions with Township for funding  | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires                | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.), tied into Midhurst DWS via valve which has three pumphouses and two Towers | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | (i.e. back-ups), tower and reservoir volume for fire protection  |            |             |            |  |
|                           |  |                                   | - Fuel supply shortage   | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, continuous monitoring, alarms, call-out, contractor for frozen service lines, back-up wells and pumps, in-ground reservoir | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Heat wave issues – staff   | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to   | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouses and/or trucks     |            |             |            |  |
|                           | 6  | Terrorism                         | Cyber terrorism                                | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination       | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement                          | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                                  | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow                          | Contamination of treated water (public health) | Calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution                                   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)                        | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|---|--|---|------------|-------------|------------|------|
|                           |  |   |  | pressures, secondary<br>disinfection residual<br>throughout distribution system |            |             |            |      |
|                           | 9  | Sudden Changes<br>to Raw Water  | Not Applicable – Groundwater Source                  |   |            |             |            |      |
|                           | 11   | Failure of<br>Equipment or<br>process<br>associated with<br>secondary<br>disinfection (e.g.<br>chlorination<br>equipment) | Not Applicable – No Secondary Disinfection Equipment |   |            |             |            |      |
|                           | 12   | Algal Blooms  | Not Applicable – Groundwater Source                  |   |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits  | Monitoring Procedures  | Response, Reporting and Recording<br>Procedures  |
|---|--|--|--|
| <b>Primary Disinfection:<br/>Sodium hypochlorite<br/>system</b> | <p><i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.</p> <p><i>Note: well pump shutdown on chemical pump failure.</i></p> | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> <li>- Adverse Water Quality</li> </ul> <p>CT calculation sheets<br/>           Logbook entry &amp; call-in report (if after hours)</p> |



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| CCP                           | Critical Control Limits   | Monitoring Procedures   | Response, Reporting and Recording Procedures   |
|-------------------------------|---|---|--|
| <b>Secondary Disinfection</b> | <i>Free chlorine residual:</i> 0.05 mg/L in distribution system | Distribution chlorine residuals monitored as per O. Reg. 170/03 | Standard Operating Procedures:<br>- Low Chlorine - Distribution System<br>- Adverse Water Quality<br>Logbook entry & call-in report (if after hours) |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants                                      | Summary of Results  |
|------------------|------------------------------------|---|---|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.   |
| 2011-02-13       | Review of Risk Assessment          | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.                                  |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann                       | Total Risk Assessment Review. Changed back-up generator fail to generator failure since facility has an on-site genset. Increased illegal entry likelihood from 1 to 2 due to new reservoir located outside of plant. Also updated chlorine critical control limit. |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann                       | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, loss of phoneline, back-up generator.  |



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| Date of Activity | Type of Activity         | Participants   | Summary of Results   |
|------------------|--------------------------|--|--|
| 2018-07-25       | 36-Month Risk Assessment | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

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



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**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-08 | 2          | Total Risk Assessment Review. Changed back-up generator fail to generator failure since facility has an on-site genset. Increased illegal entry likelihood from 1 to 2 due to new reservoir located outside of plant. Also updated chlorine critical control limit.  |
| 2015-07-27 | 3          | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, loss of phoneline, back-up generator.   |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08E); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



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**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                     | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination     | Back-up well and pump, annual well inspections, “crock” protection on well head, locks on wells   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                        | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests                    | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                        | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                            | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections,   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | spare parts, budget and capital works discussions with Township  |            |             |            |   |
| Distribution              |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township, high flow alarms | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Annual inspection, maintenance of hydrants and annual inspection of main valves, community calls   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, system pressure, eight (8) pressure tanks, run time on well pumps, planned maintenance, annual swabbing and swab checks  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
| Control Systems           | 2, 7   | Power failure                     | - Service interruption  | Stand-by generator, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-  | 4          | 1           | 4          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                     |  | out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit                             |            |             |            |  |
|                           |  | Loss of alarm system/phone line     | - Lack of monitoring   | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                   | - Loss of service  | Alarm notification, Township & OCWA portable generators, UPS   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage                | - Lack of back-up power<br>- Loss of service                         | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage                  | Plants securely locked, alarms, call-out, plant signage, plant inspections, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|--|
|                           |  |                                   | drought etc.)<br>- Flooding of<br>pumphouses  | enforcement, fire bans<br>Flooding: alternate water<br>source/supply   |            |             |            |  |
|                           |  |                                   | - High winds<br>- Tornadoes   | Concrete and brick building<br>materials, manually operate<br>pumphouse, alarms (e.g. loss<br>of communication from radio<br>signals), police road closures,<br>OCWA Corporate weather<br>warnings, emergency power,<br>alarms, community calls                                | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Source water<br>quality impacted by<br>extreme weather<br>events (e.g.<br>overflows/bypasses<br>at wastewater<br>facilities, leaching<br>from landfills and<br>residential septic<br>tanks, etc.) | Additional raw water<br>sampling/monitoring during<br>overflow/bypass events,<br>overflow/bypass procedures,<br>well sampling and testing,<br>source water protection<br>designation and signage,<br>Conservation authority<br>monitoring and enforcement,<br>Township by-laws | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather<br>Conditions     | - Lack of access to<br>facilities   | Capital upgrades, remote<br>access to facility PLC,<br>agreement with Township and<br>police for priority access,<br>response, and/or escort,<br>OERT, Standard Operating<br>Procedures, Contingency Plan,<br>Trained personnel, Staff<br>located locally and distributed      | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |



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|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | around Township, local contacts, radio reports   |            |             |            |  |
|                           |  |                                   | - Infrastructure damage  | Redundancy in wells and chlorination system, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires   | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick, etc.) | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Fuel supply shortage   | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, | Requirement of residents to run faucets, communications protocol with community / residents (for complaints &  | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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|---------------------------|--|-----------------------------------|-------------------------------|--|------------|-------------|------------|--|
|                           |  |                                   | hydrants, etc.)               | feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, continuous monitoring, alarms, call-out, contractor for frozen service lines, back-up wells and pumps    |            |             |            |  |
|                           |  |                                   | Heat wave issues – staff      | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism               | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system.  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological    | Restricted access, keys, security alarms, monitoring &   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards)                        | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--|--|--|------------|-------------|------------|--|
|                           |  |  | contamination  | facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement   |            |             |            |  |
|                           |  |  | Confrontation  | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow   | Contamination of treated water (public health)       | Backflow preventers at homes, calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 9  | Sudden Changes to Raw Water  | Not Applicable – Groundwater Source                  |  |            |             |            |  |
|                           | 11   | Failure of Equipment or process associated with secondary disinfection (e.g. chlorination equipment) | Not Applicable – No Secondary Disinfection Equipment |  |            |             |            |  |
|                           | 12   | Algal Blooms   | Not Applicable – Groundwater Source                  |  |            |             |            |  |

**SUMMARY OF RISK ASSESSMENT OUTCOMES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits  | Monitoring Procedures  | Response, Reporting and Recording Procedures  |
|---|--|--|---|
| <b>Primary Disinfection: Sodium hypochlorite system</b> | <p><i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.</p> <p><i>Note: well pump shutdown on chemical pump failure.</i></p> | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> <li>- Adverse Water Quality</li> </ul> <p>CT calculation sheets<br/>Logbook entry &amp; call-in report (if after hours)</p> |
| <b>Secondary Disinfection</b>                           | <p><i>Free chlorine residual:</i> 0.05 mg/L in distribution system</p>   | <p>Distribution chlorine residuals monitored as per O. Reg. 170/03</p>   | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Low Chlorine - Distribution System</li> <li>- Adverse Water Quality</li> </ul> <p>Logbook entry &amp; call-in report (if after hours)</p>  |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity          | Participants                                      | Summary of Results   |
|------------------|---------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment   | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.50mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard |



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| Date of Activity | Type of Activity                   | Participants   | Summary of Results   |
|------------------|------------------------------------|--|--|
|                  |                                    |  | for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.  |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann  | Changed back-up generator fail to generator failure since facility has an on-site genset. Updated chlorine critical control limit. Total Review of Risk Assessment.  |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann  | Added: concerned residents notifying OCWA, stand-by generator, installation of portable dialer.  |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

| System Type<br>(indicate all that apply to this DWS) |                      | Reference Number | Description of Hazardous Event/Hazard                         |
|--|----------------------|------------------|---|
| Yes  | All Systems          | 1                | Long Term Impacts of Climate Change                           |
| Yes  | All Systems          | 2                | Water supply shortfall  |
| Yes  | All Systems          | 3                | Extreme weather events (e.g., tornado, ice storm)             |
| Yes  | All Systems          | 4                | Sustained extreme temperatures (e.g., heat wave, deep freeze) |
| Yes  | All Systems          | 5                | Chemical spill impacting source water                         |
| Yes  | All Systems          | 6                | Terrorist and vandalism actions                               |
| Yes  | Distribution Systems | 7                | Sustained pressure loss                                       |
| Yes  | Distribution Systems | 8                | Backflow  |



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Approved by: Senior Operations Manager

| System Type<br>(indicate all that apply to this DWS) |   | Reference Number | Description of Hazardous Event/Hazard   |
|--|---|------------------|---|
| N/A  | Treatment Systems   | 9                | Sudden changes to raw water characteristics (e.g., turbidity, pH)   |
| Yes  | Treatment Systems   | 10               | Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system) |
| N/A  | Treatment Systems and Distribution Systems providing Secondary Disinfection | 11               | Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)               |
| N/A  | Treatment Systems using Surface Water                                       | 12               | Algal blooms  |

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.50mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-08 | 2          | Changed back-up generator fail to generator failure since facility has an on-site genset. Updated chlorine critical control limit. Total Review of Risk Assessment.  |
| 2015-07-27 | 3          | Added: concerned residents notifying OCWA, stand-by generator, installation of portable dialer.  |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08F); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



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**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                 | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination | Back-up wells and pump, annual well inspections, “crock” protection on well head, locks on wells, located by no vehicle traffic areas   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                    | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests, redundancy in storage and pumphouses, tied into Del Trend DWS via valve | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                    | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                        | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township, back-up pumphouses                                   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
|                           |  |                                   |   |   |            |             |            |   |
|                           | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring                   | Alarms, scheduled maintenance, hand held readings, plant inspections, spare parts, budget and capital works discussions with Township, back-up analyzers (pre-chlor & treated at three pumphouses)  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
| <b>Distribution</b>       |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure (low level/pressure in towers), scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls, call-out   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, low level alarm (in towers), system   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step                       | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---|--|-----------------------------------|--|--|------------|-------------|------------|--|
|   |  |                                   |  | pressure, plant inspections, leak detection program (Township), water conservation by-law, water restriction notice when needed, water meter upgrades (Township)   |            |             |            |  |
| <b>Reservoir<br/>[ Greenpine<br/>Pumphouse]</b> | 2, 7   | Low level                         | - Low treated water supply<br>- Low pressure | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly, tied into Del Trend DWS via valve | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|   |  | High Level                        | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|   | 2, 7   | Highlift pump failure             | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan  | 1          | 2           | 2          | <input checked="" type="checkbox"/> No |
|   | 5, 6   | Vandalism / Illegal Entry         | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
| <b>Towers (2)</b>         | 2, 7   | Low level                         | - Low treated water supply<br>- Low pressure | Back-up tower, alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly, tied into Del Trend DWS via valve                                      | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  | High Level                        | - Overflow of treated water to ditch         | Alarm notification, plant inspections, overflow, call-out, dechlorination, catchment drainage basin nearby, shortened overflow pipe  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Vandalism / Illegal Entry         | - Contamination of treated water supply      | Hatches securely locked, plant inspections, alarms, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Control Systems</b>    | 2, 7   | Power failure                     | - Service interruption                       | Stand-by generator at Carson Pumphouse, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                     |  | and delivery of back-up unit  |            |             |            |  |
|                           |  | Loss of alarm system/phone line     | - Lack of monitoring   | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility, back-up pumphouses   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                   | - Loss of service  | Alarm notification, Township & OCWA portable generators, Idlewood portable generator (Honda), UPS, back-up pumphouses, alarm routed through/originate at Idlewood   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
| <b>Pumphouses</b>         | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage  | Plants securely locked, plant signage, plant inspections, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses | Drought: Water conservation, water use restrictions, implementation of water meters, production well level monitoring, municipal enforcement, fire bans<br>Flooding: three Pumphouses (i.e. back-up), two Towers (i.e. back-up), tied into Del Trend DWS via valve, alternate water source/supply | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood                     | Consequence  | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|--------------------------------|--|------------|--|
|                           |  |                                   | - High winds<br>- Tornadoes  | Back-up Pumphouses, back-up Towers, tied into Del Trend DWS via valve, ability to isolate Pumphouses for safety reasons, concrete and brick building materials, manually operate pumphouses, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, community calls | 3                              | 3  | 9          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Source water quality impacted by extreme weather events (e.g. overflows / bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws  | 2                              | 4  | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | 3  | Extreme Weather Conditions   | - Lack of access to facilities | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, | 2          | 2                                      |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards) | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|-------------------------------|---|------------|-------------|------------|--|
|                           |  |                                   |                               | Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports   |            |             |            |  |
|                           |  |                                   | - Infrastructure damage       | Redundancy in pumphouses and wells, chlorination systems and towers, tied into Del Trend DWS via valve, discussions with Township for funding, control of Caron and Greenpine via Idlewood  | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires                | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouses, majority of building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Natural gas supply shortage | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, SOPs, scheduled maintenance  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouses (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of towers (for ice), continuous monitoring, alarms, call-out, secure premise around Towers, contractor for frozen service lines, back-up wells, pumps and towers | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Heat wave issues – staff   | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouses and/or trucks   | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism  | Password protection, changing passwords, individual login,  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event                    | Possible Outcome<br>(Hazards)                  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--|--|--|------------|-------------|------------|--|
|                           |  |  |  | anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system.   |            |             |            |  |
|                           |  |  | Chemical / bacteriological contamination       | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |  | Confrontation                                  | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow   | Contamination of treated water (public health) | Calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system, tank start/stop flow efficient | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 9  | Sudden Changes to Raw Water                          | Not Applicable – Groundwater Source            |  |            |             |            |  |
| 11                        | Failure of Equipment or  | Not Applicable – No Secondary Disinfection Equipment |  |  |            |             |            |  |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards) | Existing Control Measures           | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|--|-------------------------------|-------------------------------------|------------|-------------|------------|------|
|                           |  |  |                               |                                     |            |             |            |      |
|                           |  | process associated with secondary disinfection (e.g. chlorination equipment) |                               |                                     |            |             |            |      |
|                           | 12   | Algal Blooms   |                               | Not Applicable – Groundwater Source |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits   | Monitoring Procedures  | Response, Reporting and Recording Procedures   |
|---|---|--|--|
| <b>Primary Disinfection: Sodium hypochlorite system</b> | <p><i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.</p> <p><i>Note: well pump shutdown on chemical pump failure and pre-chlorine analyzer low chlorine set point.</i></p> | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> <li>- Adverse Water Quality</li> </ul> <p>CT calculation sheets<br/>           Logbook entry &amp; call-in report (if after hours)</p> |
| <b>Secondary Disinfection</b>                           | <p><i>Free chlorine residual:</i> 0.05 mg/L in distribution system</p>  | <p>Distribution chlorine residuals monitored as per O. Reg. 170/03</p>   | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Low Chlorine - Distribution System</li> <li>- Adverse Water Quality</li> </ul> <p>Logbook entry &amp; call-in report (if after hours)</p>   |

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



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**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants   | Summary of Results   |
|------------------|------------------------------------|--|--|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann  | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment          | Richard Eagle, Karen Lorente, Larry McMann   | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann  | Total Review of Risk Assessment. Updated generator failure event for well house and added booster station power fail to hazardous event. Also updated chlorine critical control limit.   |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann  | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, storm ditch around property and loss of phoneline, pre-chlorine analyzer with well lock-out, online chlorine analyzer, supply distribution system from well house.        |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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



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

### Revision History

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Initial risk assessment conducted   |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs |
| 2013-02-08 | 2          | Total Review of Risk Assessment. Updated generator failure event for well house and added booster station power fail to hazardous event. Also updated chlorine critical control limit.  |
| 2015-07-27 | 3          | Added: concerned residents notifying OCWA as an Existing Control Measure, Semi-Annual inspections of hydrants and valves, installation of portable dialer, storm ditch around property and loss of phoneline, pre-                |



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| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-08-10 | 4          | chlorine analyzer with well lock-out, online chlorine analyzer, supply distribution system from well house.<br>36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08G); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |





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**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                 | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination | Back-up wells and pumps, annual well inspections, “crock” protection on well head, locks on wells   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                    | Back-up wells and pumps, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests, redundancy in storage and pumphouses  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                    | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                        | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township, back-up pumphouses, pre-chlorine analyzer well lock out at the booster station |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
|                           |  |                                   |   |   |            |             |            |   |
|                           | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring                   | Alarms, scheduled maintenance, hand held readings, plant inspections, spare parts, budget and capital works discussions with Township, back-up analyzers (pre-chlor & treated at two pumphouses and distribution at Stonemanor Centre Vespra)   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
| Distribution              |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing, continuous chlorine analyzer at Stonemanor Centre Vespra (i.e. distribution)   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure (low level/pressure in towers, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township) | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Semi Annual inspection, maintenance of hydrants and annual inspection of main valves, flow testing hydrants (Fire Department), communications with Fire Department, community calls,  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step                    | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|--|--|-----------------------------------|--|--|------------|-------------|------------|--|
|  |  |                                   |  | call-out   |            |             |            |  |
|  | 2, 7   | Low pressure                      | - Distribution pressure low                  | Alarm notification, low level alarm (in towers), system pressure, plant inspections, leak detection program (Township), water conservation by-law, water restriction notice when needed, water meter upgrades (Township) | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
| Reservoir (1)<br>[Old Snow Valley Pumphouse] | 2, 7   | Low level                         | - Low treated water supply<br>- Low pressure | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouses directly     | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|  |  | High Level                        | - Overflow of treated water                  | Alarm notification, plant inspections, overflow, call-out, dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|  | 2, 7   | Highlift pump failure             | - Loss of service                            | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan, back-up Pumphouses and              | 1          | 2           | 2          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step   | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                   | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---|--|-----------------------------------|---|--|------------|-------------|------------|--|
|   |  |                                   |   | storage  |            |             |            |  |
|   | 5, 6   | Vandalism / Illegal<br>Entry      | - Contamination of<br>treated water<br>supply   | Hatches securely locked, plant<br>inspections, alarms, bird/insect<br>screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Towers (4)</b><br>[2 x Highlands &<br>2 x Stonemanor<br>Centre Vespra] | 2, 7   | Low level                         | - Low treated water<br>supply<br>- Low pressure | Back-up tower (two locations),<br>alarm notification, water<br>conservation by-law, water<br>restriction notice when<br>needed, plant inspections,<br>potable water haulage, public<br>outreach, call-out, ability to<br>supply lower distribution by<br>gravity | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|   |  | High Level                        | - Overflow of<br>treated water                  | Alarm notification, plant<br>inspections, overflow, call-out,<br>dechlorination  | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|   | 2, 7   | Highlift pump<br>failure          | - Loss of service                               | Alarm notification, back-up<br>highlift pumps, pump<br>maintenance, plant<br>inspections, trained personnel,<br>budget and capital works<br>discussions with Township,<br>Township 20-year asset plan,<br>back-up Pumphouses and<br>storage                      | 1          | 2           | 2          | <input checked="" type="checkbox"/> No |
|   | 5, 6   | Vandalism / Illegal<br>Entry      | - Contamination of<br>treated water<br>supply   | Hatches securely locked, plant<br>inspections, alarms, bird/insect<br>screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
| Control Systems           | 2, 7   | Power failure                     | - Service interruption                       | Stand-by generator, alarm notification, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |
|                           |  | Loss of alarm system/phone line   | - Lack of monitoring                         | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Control system failure            | - Service interruption                       | Alarm notification, call-out, manually operate facility, back-up pumphouses   | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                 | - Loss of service                            | Alarm notification, Township & OCWA portable generators, UPS, back-up pumphouses  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage              | - Lack of back-up power<br>- Loss of service | Plant inspections, scheduled maintenance, back-up pumphouses with generators, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs  | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|---|------------|-------------|------------|--|
| <b>Pumphouses</b>         | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage  | Plants securely locked, plant signage, plant inspections, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | align="center">1   | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses | Drought: Water conservation, water use restrictions, implementation of water meters, production well level monitoring, municipal enforcement, fire bans<br>Flooding: two Pumphouses (i.e. back-up), four Towers (i.e. back-up), alternate water source/supply   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - High winds<br>- Tornadoes  | Back-up Pumphouses, back-up Towers, ability to isolate Pumphouses for safety reasons, concrete and brick building materials, manually operate pumphouses, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, community calls | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - Source water quality impacted by extreme weather events (e.g. overflows /                                    | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing,  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws   |            |             |            |  |
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities   | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Infrastructure damage  | Redundancy in pumphouses, wells, chlorination systems and towers, discussions with Township for funding  | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires   | On-call and communications procedures with Township and Fire Department, staff availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouses, majority of   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards) | Existing Control Measures  | Likelihood   | Consequence  | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|-------------------------------|--|--|--|------------|--|
|                           |  |                                   |                               | building materials are non-flammable (concrete, brick, etc.), tower volume for fire protection   |  |  |            |  |
|                           |  |                                   | - Fuel supply shortage        | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance | 2  | 4  | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | 4                             | Sustained extreme temperatures   | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouses (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, additional monitoring of towers (for ice), continuous monitoring, alarms, call-out, secure premise around Towers, contractor for frozen service lines, back-up wells, pumps and towers, in-ground reservoir | 2          | 3                                      |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)            | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                   | Heat wave issues – staff                 | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouses and/or trucks | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism                          | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system.   | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement.  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                            | Restricted access, keys, security alarms, contact police, work cellphones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event  | Possible Outcome<br>(Hazards)                     | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|--|---|--|------------|-------------|------------|--|
|                           | 8  | Backflow   | Contamination of treated water (public health)    | Calibration of municipally owned backflow preventers, SOP for fixing failed units, plumbing code, procedures for maintaining system distribution pressures, secondary disinfection residual throughout distribution system   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 9  | Sudden Changes to Raw Water  | Not Applicable – Groundwater Source               |  |            |             |            |  |
|                           | 11   | Failure of Equipment or process associated with secondary disinfection (e.g. chlorination equipment) | - Lack of secondary disinfection                  | Back-up chemical pump at Stonemanor Centre Vespra, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township, ability to adjust chlorine injection at Booster Pumphouse and Highlands | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
|                           |  |  | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections, spare parts, budget and capital works discussions with Township  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 12   | Algal Blooms   | Not Applicable – Groundwater Source               |  |            |             |            |  |



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**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits  | Monitoring Procedures  | Response, Reporting and Recording Procedures  |
|---|--|--|---|
| <b>Primary Disinfection: Sodium hypochlorite system</b> | <p><i>Free chlorine residual:</i> Please refer to the posted CT calculation sheet to calculate the minimum free chlorine residual needed to meet CT based on the flow rate from well pumps.</p> <p><i>Note: well pump shutdown on chemical pump failure and pre-chlorine analyzer low chlorine set point (at booster pumphouse only)</i></p> | <ul style="list-style-type: none"> <li>- Plant inspections (weekdays)</li> <li>- Continuous monitoring of chlorine residual</li> </ul> | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Responding to Alarms</li> <li>- Low Chlorine Residual – Treated [Improper Disinfection]</li> <li>- High Chlorine Residual</li> <li>- Adverse Water Quality</li> </ul> <p>CT calculation sheets<br/>Logbook entry &amp; call-in report (if after hours)</p> |
| <b>Secondary Disinfection</b>                           | <p><i>Free chlorine residual:</i> 0.05 mg/L in distribution system</p>   | <p>Distribution chlorine residuals monitored as per O. Reg. 170/03</p>   | <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> <li>- Low Chlorine - Distribution System</li> <li>- Adverse Water Quality</li> </ul> <p>Logbook entry &amp; call-in report (if after hours)</p>  |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity          | Participants                                      | Summary of Results   |
|------------------|---------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment   | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard |



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| Date of Activity | Type of Activity                   | Participants   | Summary of Results   |
|------------------|------------------------------------|--|--|
|                  |                                    |  | for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.  |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann  | Changed back-up generator fail to generator failure since facility has an on-site genset. Also updated chlorine critical control limit. Total review of Risk Assessment.   |
| 2015-07-27       | 36-Month Risk Assessment           | Mary-Jo Santi, Larry McMann  | Added: pre-chlorine analyzer well lock out at booster station, loss of phone line, concerned residents notifying OCWA, semi-annual inspections & maintenance of hydrants and main valves, installation of portable dialer.   |
| 2018-07-25       | 36-Month Risk Assessment           | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

| System Type<br>(indicate all that apply to this DWS) |             | Reference Number | Description of Hazardous Event/Hazard                         |
|--|-------------|------------------|---|
| Yes  | All Systems | 1                | Long Term Impacts of Climate Change                           |
| Yes  | All Systems | 2                | Water supply shortfall  |
| Yes  | All Systems | 3                | Extreme weather events (e.g., tornado, ice storm)             |
| Yes  | All Systems | 4                | Sustained extreme temperatures (e.g., heat wave, deep freeze) |
| Yes  | All Systems | 5                | Chemical spill impacting source water                         |
| Yes  | All Systems | 6                | Terrorist and vandalism actions                               |



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| System Type<br>(indicate all that apply to this DWS) |   | Reference Number | Description of Hazardous Event/Hazard   |
|--|---|------------------|---|
| Yes  | Distribution Systems  | 7                | Sustained pressure loss   |
| Yes  | Distribution Systems  | 8                | Backflow  |
| N/A  | Treatment Systems   | 9                | Sudden changes to raw water characteristics (e.g., turbidity, pH)   |
| Yes  | Treatment Systems   | 10               | Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system) |
| Yes  | Treatment Systems and Distribution Systems providing Secondary Disinfection | 11               | Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)               |
| N/A  | Treatment Systems using Surface Water                                       | 12               | Algal blooms  |

**Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Initial risk assessment conducted   |
| 2011-02-13 | 1          | Removed alarm set points of 0.30mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.  |
| 2013-02-08 | 2          | Changed back-up generator fail to generator failure since facility has an on-site genset. Also updated chlorine critical control limit. Total review of Risk Assessment.  |
| 2015-07-27 | 3          | Added: pre-chlorine analyzer well lock out at booster station, loss of phone line, concerned residents notifying OCWA, semi-annual inspections & maintenance of hydrants and main valves, installation of portable dialer.  |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-08H); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained extreme temperatures, Terrorism, Backflow, and Failure of Equipment or Process Associated with Secondary Disinfection based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



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**Table 1:** Risk Assessment Table

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

| Activity/<br>Process Step        | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                     | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?  |
|----------------------------------|--|-----------------------------------|---|---|------------|-------------|------------|---|
| Raw Water – Wells                | 2  | Well casing collapse              | - Loss of raw water supply<br>- Contamination     | Back-up well and pump, annual well inspections, “crock” protection on well head, locks on wells   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
|                                  | 2  | Well pump failure                 | - Loss of raw water supply                        | Back-up well and pump, alarm notification, raw water samples, preventive maintenance, budget and capital works discussions with Township, pump performance tests                      | 3          | 2           | 6          | <input checked="" type="checkbox"/> No                  |
|                                  | 5  | Chemical spill                    | - Contamination of aquifer                        | Well head protection, spill containment for on-site chemicals, monitor and sample, SDS, SOP   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No                  |
| Primary Disinfection – Treatment | 10   | Chemical pump system failure      | - Lack of disinfection                            | Back-up chemical pump, alarm notification, flow sensors, spare parts, spare pumps, new pumps are common spares for all facilities, budget and capital works discussions with Township |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                                  | 10   | Chlorine analyzer failure         | - Unknown residual levels<br>- Lack of monitoring | Alarms, scheduled maintenance, hand held readings, plant inspections,   |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)                                       | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?  |
|---------------------------|--|-----------------------------------|---|--|------------|-------------|------------|---|
|                           |  |                                   |   |  |            |             |            |   |
|                           |  |                                   |   | spare parts, budget and capital works discussions with Township  |            |             |            |   |
| Distribution              |  | Loss of chlorine residual         | - Contamination of distributed water                                | Samples, monitoring, flushing  |            |             |            | <input checked="" type="checkbox"/> Yes – Mandatory CCP |
|                           | 2, 7   | Watermain break                   | - Contamination of distributed water<br>- Loss of service           | Alarm for low pressure, scheduled maintenance, plant inspections, concerned residents notifying OCWA, certified Operators, leak detection program (Township), budget and capital works discussions with Township, high flow alarms | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           |  | Hydrant & valve failure           | - Lack of fire protection<br>- No isolation<br>- Service disruption | Annual inspection and maintenance of hydrants and annual inspection of main valves, community calls  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
|                           | 2, 7   | Low pressure                      | - Distribution pressure low   | Alarm notification, system pressure, run time on well pumps, planned maintenance   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |
| Reservoir                 | 2, 7   | Low level                         | - Low treated water supply<br>- Low pressure                        | Alarm notification, water conservation by-law, water restriction notice when needed, plant inspections, potable water haulage, public outreach, call-out, ability to supply distribution by well pumphouse directly with a         | 3          | 3           | 9          | <input checked="" type="checkbox"/> No                  |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)           | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|---|---|------------|-------------|------------|--|
|                           |  |                                   |   | boiled water advisory issued  |            |             |            |  |
|                           |  | High Level                        | - Overflow of treated water             | Alarm notification, plant inspections, overflow, call-out, dechlorination   | 3          | 1           | 3          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Highlift pump failure             | - Loss of service                       | Alarm notification, back-up highlift pumps, pump maintenance, plant inspections, trained personnel, budget and capital works discussions with Township, Township 20-year asset plan   | 1          | 2           | 2          | <input checked="" type="checkbox"/> No |
|                           | 5, 6   | Vandalism / Illegal Entry         | - Contamination of treated water supply | Hatches securely locked, plant inspections, alarms, bird/insect screens   | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>Control Systems</b>    | 2, 7   | Power failure                     | - Service interruption                  | Stand-by generator, Township & OCWA portable generators, datalogger back-up to reduce occurrence of data loss, potable water haulage, call-out, storage volume available, alarm notification, Essential Supplies & Services List, agreement with generator company for 4 hour response and delivery of back-up unit | 4          | 1           | 4          | <input checked="" type="checkbox"/> No |
|                           |  | Loss of alarm system/phone line   | - Lack of monitoring                    | Staffed as per MOH and MOE direction, installation of portable dialer, call-out, remote monitoring via Red Lion   | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-------------------------------------|--|--|------------|-------------|------------|--|
|                           | 2, 7   | Control system failure              | - Service interruption   | Alarm notification, call-out, manually operate facility  | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Generator failure                   | - Loss of service  | Alarm notification, Township & OCWA portable generators, UPS   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 2, 7   | Diesel fuel shortage                | - Lack of back-up power<br>- Loss of service   | Plant inspections, scheduled maintenance, low level gauge, generator run alarms, call-out, fuel supply coordinate by Township, Operators check diesel fuel level after long runs                   | 2          | 5           | 10         | <input checked="" type="checkbox"/> No |
| <b>Pumphouse</b>          | 5, 6   | Vandalism/Illegal Entry             | - Contamination of well source<br>- Property damage  | Plants securely locked, alarms, call-out, plant signage, plant inspections, bird/insect screens  | 1          | 4           | 4          | <input checked="" type="checkbox"/> No |
| <b>All</b>                | 1  | Long Term Impacts of Climate Change | - Increase/decrease in water levels in lakes and aquifers (flooding, drought etc.)<br>- Flooding of pumphouses | Drought: Water conservation, water use restrictions, water meter upgrades, production well level monitoring, municipal enforcement, fire bans<br>Flooding: alternate water source/supply           | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                     | - High winds<br>- Tornadoes  | Concrete and brick building materials, manually operate pumphouse, alarms (e.g. loss of communication from radio signals), police road closures, OCWA Corporate weather warnings, emergency power, | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   |  | community calls  |            |             |            |  |
|                           |  |                                   | - Source water quality impacted by extreme weather events (e.g. overflows/bypasses at wastewater facilities, leaching from landfills and residential septic tanks, etc.) | Additional raw water sampling/monitoring during overflow/bypass events, overflow/bypass procedures, well sampling and testing, source water protection designation and signage, Conservation authority monitoring and enforcement, Township by-laws  | 3          | 3           | 9          | <input checked="" type="checkbox"/> No |
|                           | 3  | Extreme Weather Conditions        | - Lack of access to facilities   | Capital upgrades, remote access to facility PLC, agreement with Township and police for priority access, response, and/or escort, OERT, Standard Operating Procedures, Contingency Plan, Trained personnel, Staff located locally and distributed around Township, local contacts, radio reports | 3          | 2           | 6          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Infrastructure damage  | Redundancy in wells and chlorination system, discussions with Township for funding   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | - Forest fires   | On-call and communications procedures with Township and Fire Department, staff   | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)  | Existing Control Measures   | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|---|------------|-------------|------------|--|
|                           |  |                                   |  | availability, OERT, grounds-keeping by Township to reduce presence of flammable materials, procedures to not store flammable materials at Pumphouse, majority of building materials are non-flammable (concrete, brick)   |            |             |            |  |
|                           |  |                                   | - Fuel supply shortage   | Essential Supplies & Services List, back-up suppliers, Township and OCWA portable generators, decrease duration of monthly generator runs, gas stations, SOPs, scheduled maintenance  | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           | 4  | Sustained extreme temperatures    | - Frozen equipment and infrastructure (e.g. towers, services, mains, hydrants, etc.) | Requirement of residents to run faucets, communications protocol with community / residents (for complaints & feedback), heaters inside Pumphouse (temperature controlled), trained personnel, proper hydrant maintenance procedures, reduce hydrant usage where possible, plant checks by Operators, continuous monitoring, alarms, call-out, contractor for frozen service lines, back-up well and pump | 2          | 3           | 6          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event | Possible Outcome<br>(Hazards)            | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP?                                   |
|---------------------------|--|-----------------------------------|--|--|------------|-------------|------------|--|
|                           |  |                                   | Heat wave issues – staff                 | Frequent work breaks, hydration, informing staff (H&S Topic), PPE policy, wide range of PPE selection available to suit high temperatures yet still adhere to PPE policy, restricted duties, reduced work schedule (shorter days), ice packs, ability to seek shelter in pumphouse and/or trucks | 4          | 2           | 8          | <input checked="" type="checkbox"/> No |
|                           | 6  | Terrorism                         | Cyber terrorism                          | Password protection, changing passwords, individual login, anti-virus programs, folder permissions, Administrator rights restricted to IT, data back-up, back-up monitoring system.  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Chemical / bacteriological contamination | Restricted access, keys, security alarms, monitoring & facility checks, sampling, community complaints and feedback, Township by-laws, Police enforcement.   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |
|                           |  |                                   | Confrontation                            | Restricted access, keys, security alarms, contact police, phones, Security Breach Contingency Plan, trained personnel, lone worker policy  | 2          | 2           | 4          | <input checked="" type="checkbox"/> No |
|                           | 8  | Backflow                          | Contamination of                         | Backflow preventers at homes   | 2          | 4           | 8          | <input checked="" type="checkbox"/> No |



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| Activity/<br>Process Step | MOECC Potential<br>Hazardous<br>Event/Hazard<br>Reference #<br>(see Table 4) | Description of<br>Hazardous Event   | Possible Outcome<br>(Hazards)                        | Existing Control Measures  | Likelihood | Consequence | Risk Value | CCP? |
|---------------------------|--|---|--|--|------------|-------------|------------|------|
|                           |  |   | treated water<br>(public health)                     | and new developments,<br>calibration of municipally<br>owned backflow preventers,<br>SOP for fixing failed units,<br>plumbing code, procedures for<br>maintaining system distribution<br>pressures, secondary<br>disinfection residual<br>throughout distribution system |            |             |            |      |
|                           | 9  | Sudden Changes<br>to Raw Water  | Not Applicable – Groundwater Source                  |  |            |             |            |      |
|                           | 11   | Failure of<br>Equipment or<br>process<br>associated with<br>secondary<br>disinfection (e.g.<br>chlorination<br>equipment) | Not Applicable – No Secondary Disinfection Equipment |  |            |             |            |      |
|                           | 12   | Algal Blooms  | Not Applicable – Groundwater Source                  |  |            |             |            |      |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP   | Critical Control Limits  | Monitoring Procedures   | Response, Reporting and Recording<br>Procedures   |
|---|--|---|---|
| <b>Primary Disinfection:<br/>Sodium hypochlorite<br/>system</b> | <i>Free chlorine residual:</i> Please refer to the<br>posted CT calculation sheet to calculate the<br>minimum free chlorine residual needed to | - Plant inspections<br>(weekdays)<br>- Continuous monitoring of | Standard Operating Procedures:<br>- Responding to Alarms<br>- Low Chlorine Residual – Treated [Improper |



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| CCP                           | Critical Control Limits   | Monitoring Procedures   | Response, Reporting and Recording Procedures   |
|-------------------------------|---|---|--|
|                               | meet CT based on the flow rate from well pumps.<br><br><i>Note: well pump shutdown on chemical pump failure</i> | chlorine residual   | Disinfection]<br>- High Chlorine Residual<br>- Adverse Water Quality<br>CT calculation sheets<br>Logbook entry & call-in report (if after hours)     |
| <b>Secondary Disinfection</b> | <i>Free chlorine residual:</i> 0.05 mg/L in distribution system   | Distribution chlorine residuals monitored as per O. Reg. 170/03 | Standard Operating Procedures:<br>- Low Chlorine - Distribution System<br>- Adverse Water Quality<br>Logbook entry & call-in report (if after hours) |

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

**Table 3:** Record of Annual Review/36-Month Risk Assessment

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

| Date of Activity | Type of Activity                   | Participants                                      | Summary of Results   |
|------------------|------------------------------------|---|--|
| 2009-07-13       | Initial Risk Assessment            | Jen Bitten, Karen Lorente, Rick Fox, Larry McMann | Completed a full assessment of hazardous events for facility.  |
| 2011-02-13       | Review of Risk Assessment          | Richard Eagle, Karen Lorente, Larry McMann        | Removed alarm set points of 0.50mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs. |
| 2013-02-08       | Complete Review of Risk Assessment | Richard Eagle, Larry McMann                       | Changed back-up generator fail to generator failure since facility has an on-site genset. Updated chlorine critical control limit. Total review of Risk Assessment.  |
| 2015-07-27       | 36-Month Risk                      | Mary-Jo Santi, Larry McMann                       | Added: loss of phone line, concerned residents notifying   |



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| Date of Activity | Type of Activity         | Participants   | Summary of Results   |
|------------------|--------------------------|--|--|
|                  | Assessment               |  | OCWA, semi-annual inspections & maintenance of hydrants and main valves, installation of portable dialer.  |
| 2018-07-25       | 36-Month Risk Assessment | Robyn Waher (PCT (A)), Richard Eagle (Senior Operations Manager), and Larry McMann (Senior Operator & O&M Team Lead) | All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 5 of this Summary of Risk Assessment Outcomes. |

**Table 4:** Potential Hazardous Event/Hazard Reference Numbers (based on MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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

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



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**SUMMARY OF RISK ASSESSMENT OUTCOMES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| System Type<br>(indicate all that apply to this DWS) |                                       | Reference Number | Description of Hazardous Event/Hazard                    |
|--|---------------------------------------|------------------|--|
|  | providing Secondary Disinfection      |                  | (e.g., chlorination equipment, chloramination equipment) |
| N/A  | Treatment Systems using Surface Water | 12               | Algal blooms   |

**Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Initial risk assessment conducted  |
| 2011-02-13 | 1          | Removed alarm set points of 0.50mg/L(low) & 3.0mg/L(high) as CCL, added statement to refer to pumphouse whiteboard for alarm set points, added Responding to Alarms SOP, changed SOP names to reflect exactly what is on the SOPs.   |
| 2013-02-08 | 2          | Changed back-up generator fail to generator failure since facility has an on-site genset. Updated chlorine critical control limit. Total review of Risk Assessment.  |
| 2015-07-27 | 3          | Added: loss of phone line, concerned residents notifying OCWA, semi-annual inspections & maintenance of hydrants and main valves, installation of portable dialer.   |
| 2018-08-10 | 4          | 36-Month Risk Assessment review. Re-assessed existing hazardous events and control measures for current configuration at site, and reviewed new hazardous events as per DWQMS 2.0 requirements. Summary of Risk Assessment Outcomes assigned document number (OP-081); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include Long Term Impacts of Climate Change, Extreme Weather Conditions, Sustained Extreme Temperatures, Terrorism and Backflow based on results of 36-month risk assessment that took place on 2018-07-25 and requirement to include all new Hazardous Events as per DWQMS 2.0. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

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## ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To document the following for the Township of Springwater Drinking Water Systems:

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

### 2. Definitions

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

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

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

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

### 3. Procedure

#### 3.1 Organizational Structure

The Township of Springwater Drinking Water Systems is owned by the Corporation of the Township of Springwater and is represented by Heather Coleman, Director of Public Works, and Robert Brindley, Chief Administrative Officer.

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

#### 3.2 Top Management

Top Management for the Township of Springwater Drinking Water Systems consists of:

- Operations Management – North Simcoe Hub
- Regional Hub Manager – Georgian Highlands Region
- Safety, Process & Compliance Manager – Georgian Highlands Region

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



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Reviewed by: Process & Compliance Technician      Approved by: Senior Operations Manager

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

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

### 3.3 Corporate Oversight

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

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

| Role                         | Responsibilities and Authorities   |
|------------------------------|--|
| Board of Directors           | <ul style="list-style-type: none"> <li>• Set the Agency's strategic direction, monitor overall performance and ensure appropriate systems and controls are in place in accordance with the Agency's governing documents</li> <li>• Review and approve the QEMS Policy</li> </ul>   |
| Senior Leadership Team (SLT) | <ul style="list-style-type: none"> <li>• Establish the Agency's organizational structure and governing documents and ensure resources are in place to support strategic initiatives</li> <li>• Monitor and report on OCWA's operational and business performance to the Board of Directors</li> <li>• Review the QEMS Policy and recommend its approval to the Board</li> <li>• Approve corporate QEMS programs and procedures</li> </ul>  |
| Corporate Compliance         | <ul style="list-style-type: none"> <li>• Manage the QEMS Policy and corporate QEMS programs and procedures</li> <li>• Provide support for the local implementation of the QEMS</li> <li>• Monitor and report on QEMS performance and any need for improvement to SLT</li> <li>• Consult with the MOECC and other regulators and provide compliance support/guidance on applicable legislative, regulatory and policy requirements</li> <li>• Manage contract with OCWA's DWQMS accreditation body</li> </ul> |

### 3.4 Regional Hub Roles, Responsibilities and Authorities



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Approved by: Senior Operations Manager

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

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

**Table 9-2: QEMS Roles, Responsibilities and Authorities for the Georgian Highlands Region**

| Role                                      | Responsibilities and Authorities   |
|---|--|
| All Operations Personnel                  | <ul style="list-style-type: none"> <li>• Perform duties in compliance with applicable legislative and regulatory requirements</li> <li>• Be familiar with the QEMS Policy and work in accordance with QEMS programs and procedures</li> <li>• Maintain operator certification (as required)</li> <li>• Attend/participate in training relevant to their duties under the QEMS</li> <li>• Document all operational activities</li> <li>• Identify potential hazards at their facility that could affect the environmental and/or public health and report to Operations Management</li> <li>• Report and act on all operational incidents</li> <li>• Recommend changes to improve the QEMS</li> </ul> |
| Regional Hub Manager<br>(Top Management)  | <ul style="list-style-type: none"> <li>• Oversee the administration and delivery of contractual water/wastewater services on a Regional Hub level</li> <li>• Fulfill role of Top Management</li> <li>• Ensure corporate QEMS programs and procedures are implemented consistently throughout the Regional Hub</li> <li>• Manages the planning of training programs for Regional Hub</li> <li>• Report to VP of Operations/SLT on the regional performance of the QEMS and any need for Agency-wide improvement</li> </ul>  |
| Operations Management<br>(Top Management) | <ul style="list-style-type: none"> <li>• Manage the day-to-day operations and maintenance of his/her assigned facilities and supervise facility operational staff</li> <li>• Fulfill role of Top Management</li> <li>• Ensure corporate and site-specific QEMS programs and procedures are implemented at his/her assigned facilities</li> <li>• Determine necessary action and assign resources in response to operational issues</li> <li>• Report to the Regional Hub Manager on facility operational performance</li> <li>• Ensure operational training is provided for the cluster (in consultation with the SPC Manager as required)</li> </ul>  |



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Reviewed by: Process & Compliance Technician      Approved by: Senior Operations Manager

| Role  | Responsibilities and Authorities  |
|---|---|
|   | <ul style="list-style-type: none"> <li>Act as Overall Responsible Operator (ORO) when required.</li> </ul>  |
| Safety, Process & Compliance (SPC) Manager<br>(Top Management)  | <ul style="list-style-type: none"> <li>Supervise facility compliance staff and provide technical and program support to the Regional Hub related to process control and compliant operations</li> <li>Fulfill role of Top Management</li> <li>Ensure corporate/regional QEMS programs and procedures are implemented consistently throughout the Regional Hub</li> <li>Assist in the development of site-specific operational procedures as required</li> <li>Ensure training on applicable legislative and regulatory requirements and the QEMS is provided for the Regional Hub (in consultation with Operations Management as required)</li> <li>Monitor and report to the Regional Hub Manager and Operations Management on the compliance status and QEMS performance within his/her Regional Hub and any need for improvement</li> <li>Act as alternate QEMS Representative (when required)</li> </ul>  |
| Process & Compliance Technician (PCT)/ Operations & Compliance (O&C) Team Lead<br>(QEMS Representative) | <ul style="list-style-type: none"> <li>Implement, monitor and support corporate programs relating to environmental compliance and support management by evaluating and implementing process control systems at his/her assigned facilities</li> <li>Fulfill role of QEMS Representative (OP-04)</li> <li>Monitor, evaluate and report on compliance/quality status of his/her assigned facilities</li> <li>Implement facility-specific QEMS programs and procedures consistently at his/her assigned facilities</li> <li>Participate in audits and inspections and assist in developing, implementing and monitoring action items to respond to findings</li> <li>Report to the SPC Manager on QEMS implementation and identify the need for additional/improved processes and procedures at the regional/cluster/facility level (in consultation with the Operations Management as required)</li> <li>Communicates to Owners on facility compliance and DWQMS accreditation as directed</li> <li>Deliver/participate in/coordinate training including applicable legislative and regulatory requirements and the QEMS</li> <li>May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul> |
| Senior Operator/Mechanic  | <ul style="list-style-type: none"> <li>Perform duties as assigned by Operations Management</li> <li>Prepare and/or coordinate operational staff work assignments and follow up to ensure completion</li> <li>Assist management in providing recommendations for annual capital forecasts and gathering information for operational reports as required</li> </ul>   |



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Role                       | Responsibilities and Authorities  |
|----------------------------|---|
|                            | <ul style="list-style-type: none"> <li>• Assist in the preparation of facility manuals and documenting operating processes and procedures for staff</li> <li>• Act for management during vacations or periodic absences.</li> <li>• Perform duties of Operator/Mechanic as required</li> <li>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul>  |
| Operator/Mechanic          | <ul style="list-style-type: none"> <li>• Perform duties as assigned by Operations Management or designate</li> <li>• Monitor, maintain and operate facilities in accordance with applicable regulations, approvals and established operating procedures</li> <li>• Collect samples and perform laboratory tests and equipment calibrations as required</li> <li>• Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned</li> <li>• Participate in facility inspections and audits</li> <li>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul>   |
| Mechanic/Operator          | <ul style="list-style-type: none"> <li>• Perform duties as assigned by Operations Management or designate</li> <li>• Act as lead with other staff on extensive maintenance/repair projects</li> <li>• Schedule and perform maintenance on equipment and processes in accordance with established procedures and record the maintenance data</li> <li>• Regularly inspect operating equipment, perform routine preventive maintenance and repairs</li> <li>• Perform duties of Operator/Mechanic as required</li> <li>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul>  |
| Instrumentation Technician | <ul style="list-style-type: none"> <li>• Provide advice and technical expertise on the services required for process control and automation systems</li> <li>• Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems</li> <li>• Conduct inspections of the process control and automation systems to validate that all is operating within established parameters as requested</li> <li>• Install and commission new electrical/electronic equipment and automation systems</li> </ul> |



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Reviewed by: Process & Compliance Technician      Approved by: Senior Operations Manager

| Role  | Responsibilities and Authorities   |
|---|--|
|   | <ul style="list-style-type: none"> <li>May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul>   |
| Operational and Maintenance (O&M) Team Lead | <ul style="list-style-type: none"> <li>Perform duties as assigned by Operations Management</li> <li>Oversee maintenance activities on equipment and process in order to maintain compliance with applicable legislation, regulations, approvals and established operating procedures</li> <li>Prepare and/or coordinate staff work assignments and follow up to ensure completion</li> <li>Act for management during vacations or periodic absences.</li> <li>Develop and provide O&amp;M reports to management and recommend changes in operating procedures/processes to improve facility operations</li> <li>Assist with facility operations including monitoring facility processes, reviewing process data and trouble-shooting</li> <li>Assist management in developing annual O&amp;M budgets and provide recommendations relating to potential O&amp;M expenditures</li> <li>May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul> |
| Maintenance Electrician/Operator            | <ul style="list-style-type: none"> <li>Perform repairs, inspections, preventive maintenance and/or scheduled maintenance on electrical systems, equipment, components and devices in accordance with established procedures and record the maintenance data</li> <li>Monitor facility processes through visual inspection, the SCADA system or by taking readings from the process control equipment</li> <li>Operate and adjust equipment/processes to maintain compliance with applicable legislation, regulations, approvals and established operating procedures</li> <li>May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.</li> </ul>  |
| Administrative Assistant/Project Clerk      | <ul style="list-style-type: none"> <li>Support the administrative functions of the regional hub/cluster/facility including coordinating delivery of training as directed</li> <li>Assist with entering operational data (including operational training records, process data and maintenance records ) into the appropriate database as directed</li> </ul>   |

**4. Related Documents**

- OP-03 Commitment and Endorsement
- OP-04 QEMS Representative
- OP-05 Document and Records Control
- OP-09A Organizational Structure
- OP-12 Communications



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## ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

OP-20 Management Review

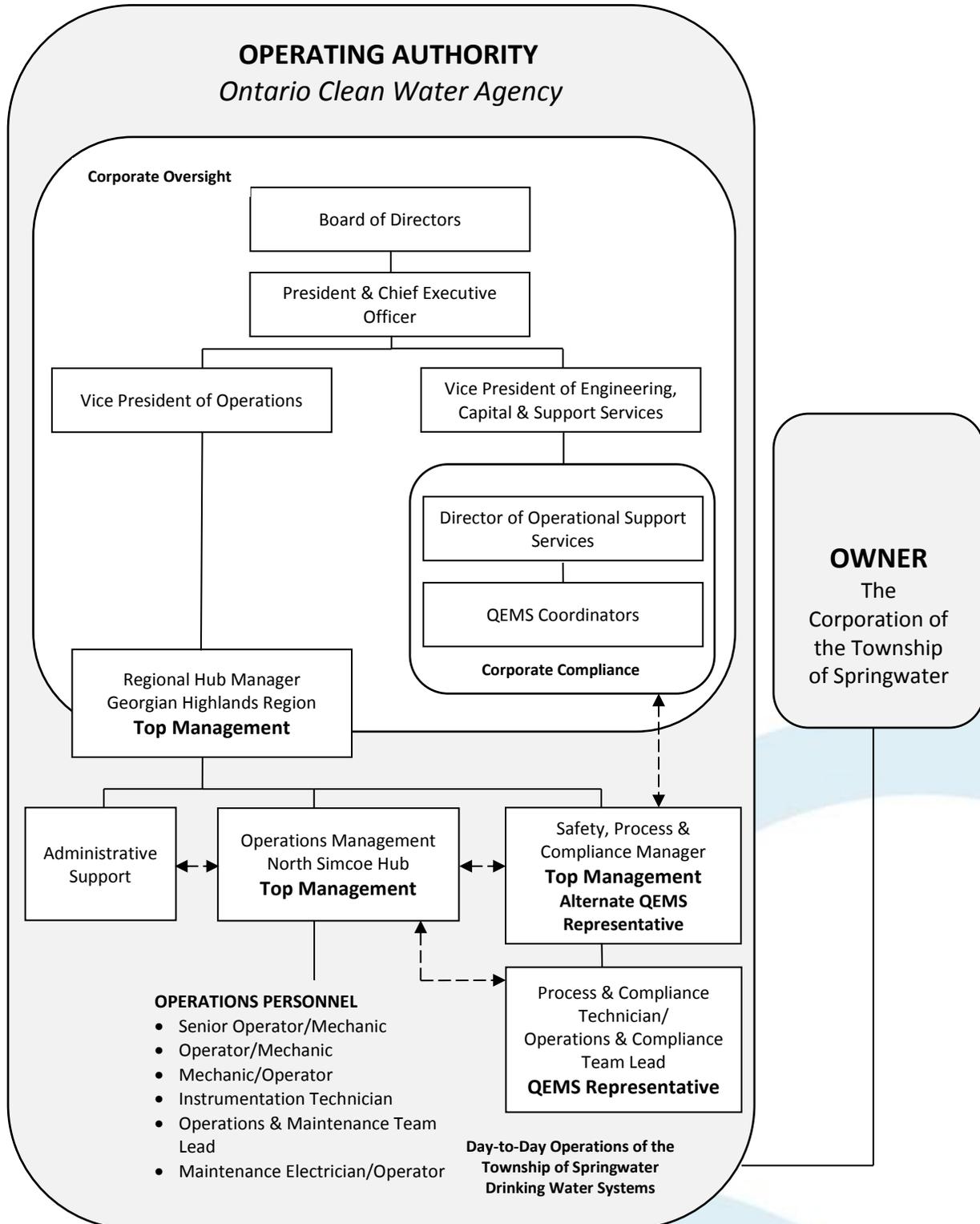
### 5. Revision History

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2018-09-21 | 0          | Procedure issued – Information within OP-09 was originally set out in the main body of OCWA’s Operational Plan (last revision 7 dated 2017-09-25). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced ‘Senior Operations Manager’ references with ‘Operations Management’. Incorporated OCWA’s new org structure, including SPC Manager. Removed two levels of Top Management (e.g. Facility Level and Corporate level), instead Top Management is only at the facility level and corporate has been moved to Corporate oversight. Re-worded QEMS Roles, Responsibilities and Authorities for each position. Added QEMS Roles, Responsibilities and Authorities for Administrative Assistant/Project Clerk. |
|            |            |  |

**ORGANIZATIONAL STRUCTURE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager





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**ORGANIZATIONAL STRUCTURE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**Revision History**

| <b>Date</b> | <b>Revision #</b> | <b>Reason for Revision</b>  |
|-------------|-------------------|---|
| 2009-07-13  | 0                 | Procedure Issued  |
| 2011-06-08  | 1                 | Revised Regional Manager to Eastern Region, revised VP Operations to Southern Ontario   |
| 2013-02-12  | 2                 | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems.  |
| 2018-09-21  | 3                 | Appendix issued following new template from Corporate Compliance. Organizational Chart previously contained as Appendix C of the Operational Plan. (Last revision 7 dated 2017-09-25) Moved to a new Appendix OP-09A in new Operational Plan. New Revision History section. Incorporated OCWA's new org structure, including SPC Manager. Removed two levels of Top Management (e.g. Facility Level and Corporate level), instead Top Management is only at the facility level and corporate has been moved to Corporate oversight. Added Administrative Support. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water System

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## COMPETENCIES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To document a procedure that describes:

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

### 2. Definitions

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

*Operations Management* – refers to the General Manager, Senior Operations Manager and/or Operations Manager that directly oversees a facility’s operations

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

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

### 3. Procedure

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

| Position              | Required Minimum Competencies  |
|-----------------------|--|
| Operations Management | <ul style="list-style-type: none"> <li>• Operator certification in good standing; minimum OIT or minimum level of WD Class III, if required to act as ORO</li> <li>• Experience and/or training in managing/supervising drinking water system operations, maintenance, financial planning and administration</li> <li>• Training and/or experience related to drinking water system processes, principles and technologies</li> <li>• Training on OCWA’s QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul> |



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## COMPETENCIES

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| Position                                   | Required Minimum Competencies  |
|--|--|
| Safety, Process & Compliance (SPC) Manager | <ul style="list-style-type: none"> <li>• Valid operator certification</li> <li>• Experience in providing technical support and leading/managing programs related to process control and compliant operations</li> <li>• Experience and/or training in conducting compliance audits, and management system audits</li> <li>• Experience and/or training in preparing and presenting informational and training material</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul> |
| Senior Operator/Mechanic                   | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum level of WD Class III if required to act as ORO</li> <li>• Experience leading/directing operations personnel, and providing technical guidance to resolve operational issues</li> <li>• Training and experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul>             |
| Operator/Mechanic                          | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum OIT or minimum level of WD Class III if required to act as ORO</li> <li>• Training and/or experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul>  |
| Mechanic/Operator                          | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum OIT or minimum level of WD Class III if required to act as ORO</li> <li>• Experience in maintaining and repairing equipment and structures and in planning and scheduling maintenance and repair tasks</li> <li>• Training and/or experience related to drinking water system processes</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul>   |
| Process & Compliance Technician,           | <ul style="list-style-type: none"> <li>• Valid operator certification; if required</li> <li>• Experience and/or training in resolving/addressing compliance issues for drinking water systems</li> </ul>   |



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**COMPETENCIES**

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| Position                            | Required Minimum Competencies  |
|-------------------------------------|--|
| Operations and Compliance Team Lead | <ul style="list-style-type: none"> <li>• Experience and/or training in monitoring, assessing and reporting on facility performance against legal requirements and corporate goals</li> <li>• Experience and/or training in preparing and presenting informational and training material</li> <li>• Experience in conducting management system audits or internal auditor education/training</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul>  |
| Instrumentation Technician          | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum OIT</li> <li>• Experience and/or training in monitoring, programming, installing and troubleshooting network, hardware, software and instrumentation</li> <li>• Experience and/or training in drinking water system processes, design, instrumentation, process control and automation systems</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul>  |
| O&M Team Lead                       | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum OIT or minimum level of WD Class III if required to act as OIC and/or ORO</li> <li>• One of: Electrical/Electronic/Instrumentation Technician or Technologist Diploma; Mechanical Millwright; Certified Engineering Technician/Technologist designation, or; a valid Engineering or Environmental Technician diploma</li> <li>• Experience and/or training in managing and planning multiple projects, assessing priorities and effectively coordinating operation and maintenance programs</li> <li>• Training and/or experience related to operations and maintenance of drinking water system processes, principles and technologies</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers and operational computerized systems</li> </ul> |
| Maintenance Electrician/Operator    | <ul style="list-style-type: none"> <li>• Valid operator certification; minimum OIT or minimum level of WD Class III if required to act as OIC and/or ORO</li> <li>• Completion of any electrical or electronic training program certified by the Ministry of Advanced Education and Skills Development (formerly the Ministry of Training, Colleges and Universities)</li> <li>• Experience in performing maintenance and repair of electrical and electronic equipment</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> </ul>   |



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**COMPETENCIES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Position | Required Minimum Competencies   |
|----------|---|
|          | <ul style="list-style-type: none"> <li>• Experience using computers and operational computerized systems</li> </ul> |

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

| Position                               | Required Minimum Competencies   |
|--|---|
| Administrative Assistant/Project Clerk | <ul style="list-style-type: none"> <li>• Experience and/or training related to procurement and business administration practices</li> <li>• Training on OCWA's QEMS and the DWQMS</li> <li>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures</li> <li>• Experience using computers</li> </ul> |

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

3.4 OCWA's Operational Training Program aims to:

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

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

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



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Township of Springwater Drinking Water System

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Rev Date: 2018-09-21  
Rev No: 0  
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## COMPETENCIES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

- 3.7 Staff are also required to complete the mandatory environmental and health and safety compliance training listed in OCWA's Mandatory Compliance Training Requirements document, based on their position and/or the duties they perform. This list is available on OCWA's intranet.
- 3.8 Operations personnel also receive site-specific training/instruction on relevant operational and emergency response procedures to ensure effective operational control of processes and equipment which may impact the safety and quality of drinking water.
- 3.9 As part of OCWA's annual Performance Planning and Review (PPR) process, employee performance is evaluated against their job expectations. Professional development opportunities and training needs (which could include formalized courses as well as site-specific on-the-job training or job shadowing/mentoring) are identified as part of this process (and on an ongoing basis). In addition to this process, OCWA employees may at any time request training from either internal or external providers by obtaining approval from their Manager.
- 3.10 Certified drinking water operators are responsible for completing the required number of training hours in order to renew their certificates based on the highest class of drinking water subsystem they operate. They are also responsible for completing mandatory courses required by *Safe Drinking Water Act (SDWA) O. Reg. 128/04 Certification of Drinking Water System Operators and Water Quality Analysts*. The Operations Management takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the requirements.
- 3.11 It is the responsibility of operations personnel to ensure Operations Management are aware of any change to the status/classification of their drinking water operator certificate(s), the validity of their driver's licence (required to hold at a minimum a Class G license which is initially verified upon hire) and/or the validity of any other required certificates/qualifications.
- 3.12 Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is administrated by OCWA's Training Department. Training records maintained at the facility are controlled as per OP-05 Document and Records Control.

#### 4. Related Documents

OCWA's Training Resources (OCWA Intranet)  
[Orientation checklists/documentation]  
OCWA's Mandatory Compliance Training list (OCWA intranet)  
Performance Planning and Review Database  
OP-5 Document and Records Control  
OCWA Training Summary Database

#### 5. Revision History



# OPERATIONAL PLAN

Township of Springwater Drinking Water System

QEMS Proc.: OP-10  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 6 of 6

## COMPETENCIES

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Information within OP-10 was originally set out in the main body of OCWA's Operational Plan (last revision 7 dated 2018-09-25). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Modified table in procedure (s. 3.1 and s. 3.2): removed/revised non-measurable competencies, added the word 'minimum' to competencies; removed 'Valid Class G Driver's License' listed under individual positions and referenced in s. 3.11; added competencies for SPC Managers and Admin Assistants and merged competencies for Senior Operations Manager and Operations Manager under Operations Management. Updated training sections (s. 3.4 to s. 3.7) to reference new Environmental 101 course, Mandatory Compliance Training list and removed specific references to Orientation Training Program. Added s. 3.11 related to ensuring operators make Operations Management aware of changes to operator certification and other certificates/licenses. Other minor changes to wording. |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-11  
Rev Date: 2018-09-21  
Rev No: 3  
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**PERSONNEL COVERAGE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

## 1. Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality at the Township of Springwater Drinking Water Systems.

## 2. Definitions

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

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

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

(*Crown Employees Collective Bargaining Act, 1993*)

## 3. Procedure

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

3.2 The Township of Springwater Drinking Water Systems is staffed by OCWA personnel as follows:

7:30 a.m. to 4:00 p.m. Monday to Friday

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

The Senior Operations Manager designates an overall responsible operator (ORO) for Water Distribution and Supply in the Georgian Highlands Region – North Simcoe Hub. When the ORO is unavailable, the Back-up ORO is designated as the ORO and is recorded as such in the facility logbook. Refer to the current ORO posting at the facilities.

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

3.4 The Senior Operations Manager or designate assigns an on-call Operator based on the on-call schedule for the time that the facility is un-staffed (i.e. evenings, weekends,

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



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**PERSONNEL COVERAGE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

and Statutory Holidays) to be available for return to work 24/7. The on-call shift change is end of business day on Thursday of each week. The on-call schedule is maintained by the Operators that are on-call for this water system and given to the Senior Operations Manager or designate for approval.

- 3.5 The on-call operator does not conduct a physical inspection of the facility during weekends. However, during long 3-day weekends due to Statutory Holidays, the on-call Operator does a physical inspection of the facility on one day during the long weekend. Details of the inspection are recorded in the facility logbook and daily round sheets.
- 3.6 The auto dialer is programmed to contact a contracted call-centre operator whenever there is an alarm condition. The call-centre operator contacts the on-call operator through a designated text page. The on-call operator contacts the call-centre to obtain the details of the alarm to determine the appropriate response. If the nature of the alarm requires additional staff, the on-call operator can request assistance from the Hub Contact or any of the other Certified Operators. The on-call Operator records details of the call-in in the facility logbook and in the Call-In Report within WMS.
- 3.7 Each manager (e.g. Operations Management/SPC Manager) is responsible for approving vacation time for their staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties.
- 3.8 OCWA's operations personnel are represented by the Ontario Public Service Employees Union (OPSEU). In the event of a labour disruption, Operations Management, together with the union, identifies operations personnel to provide "essential services" required to operate the facility so that the quality of drinking water is not compromised in any way.
- 3.9 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction in the event that there is a severe shortage of operations personnel due to sickness (e.g., pandemic flu) or other unusual situations.

**4. Related Documents**

OP-10 Competencies  
Facility Logbook  
Daily Round Sheets  
On-Call Schedule  
Call-In Reports  
Shift/Vacation Schedule  
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)



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**PERSONNEL COVERAGE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Procedure issued  |
| 2011-06-08 | 1          | Added step 5.9 as per OCWA's corporate revisions  |
| 2012-02-13 | 2          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility titles from Well Supply Systems to Drinking Water Systems, changed 5.5 from plant checks on Sunday to just one day during the long weekend.  |
| 2018-09-21 | 3          | Procedure issued following new template from Corporate Compliance. QP-04 procedure renamed OP-12. Removed Scope and Responsibilities sections. Added definitions for Operations Management and Operations Personnel. Reordered and created separate sections to clarify communications to each of the 4 parties. Clarified suppliers were those listed as essential as per Element 13 (as per DWQMS v. 2.0) and replaced references to Senior Operations Manager with 'Operations Management'. Updated training sections for OCWA personnel (s. 3.3.1 to s. 3.3.4) to reference new Environmental Compliance 101 course completed within first year of hire and to outline how training is coordinated between SPC Manager/Operations Management, and QEMS Representative. Included sections on R&Rs for performance reporting within OCWA (s. 3.3.7 to s. 3.3.9) and to Client (3.4.1). Replaced identification of media spokesperson (s. 3.6.1) with 'as identified in Facility Emergency Plan'. Added reference to site-specific records/documents used for recording tours (s. 3.6.3). Other minor edits. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-12  
Rev Date: 2018-09-21  
Rev No: 3  
Pages: 1 of 4

## COMMUNICATIONS

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

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

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

### 2. Definitions

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

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

### 3. Procedure

- 3.1 Operations Management and the QEMS Representative are responsible for identifying and coordinating any site-specific communications in relation to the status/development of the facility's QEMS.
- 3.2 Internal and external communication responsibilities and reporting requirements for emergency situations are set out under OCWA's Emergency Management Program (i.e., Facility Emergency Plan and OCWA's Emergency Response Plan). Refer to OP-18 Emergency Management for more information.
- 3.3 Communication with OCWA staff:
  - 3.3.1 Within the first year of hire, all staff are required to complete the Environmental Compliance 101 (EC101) course. The objective of the EC 101 course is to ensure that staff are aware of applicable legislative and regulatory requirements and of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.
  - 3.3.2 Operations Management are responsible for ensuring operations personnel receive site-specific training on the Operational Plan, the organizational structure for the facility including the roles and responsibilities and authorities (outlined in OP-09 Organizational Structure, Roles, Responsibilities and Authorities), QEMS Procedures and other related operating instructions and procedures as part of the orientation process and on an on-going basis as required.



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Township of Springwater Drinking Water Systems

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**COMMUNICATIONS**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

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

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

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

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

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

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

3.4 Communication with the Owner:

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

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

3.5 Communications with Essential Suppliers and Service Providers:



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## COMMUNICATIONS

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

### 3.6 Communication with the Public:

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

3.6.2 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website. The QEMS Policy is also posted at the regional hub office.

3.6.3 Facility tours of interested parties must be approved in advance by the Operations Management. Refer to Plant Tour Records.

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

## 4. Related Documents

OP-05 Document and Records Control  
OP-09 Organizational Structure, Roles, Responsibilities and Authorities  
OP-13 Essential Supplies and Services  
OP-18 Emergency Management  
OP-20 Management Review  
Facility Emergency Plan  
Emergency Response Plan  
OPEX Incident Reports  
Plant Tour Records

## 5. Revision History

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Procedure issued  |
| 2011-05-05 | 1          | Revised sections 3.0, 5.2 & 5.5 as per OCWA's Corporate revisions |



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**COMMUNICATIONS**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

|            |   |   |
|------------|---|---|
| 2012-02-13 | 2 | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems.  |
| 2018-09-21 | 3 | Procedure issues following new template from Corporate Compliance. QP-04 procedure renamed OP-12. Removed Scope and Responsibilities sections. Added definitions for Operations Management and Operations Personnel. Reordered and created separate sections to clarify communications to each of the 4 parties. Clarified suppliers were those listed as essential as per Element 13 (as per DWQMS v. 2.0) and replaced references to Senior Operations Manager with 'Operations Management'. Updated training sections for OCWA personnel (s. 3.3.1 to s. 3.3.4) to reference new Environmental Compliance 101 course completed within first year of hire and to outline how training is coordinated between SPC Manager/Operations Management, and QEMS Representative. Included sections on R&Rs for performance reporting within OCWA (s. 3.3.7 to s. 3.3.9) and to Client (3.4.1). Replaced identification of media spokesperson (s. 3.6.1) with 'as identified in Facility Emergency Plan'. Added reference to site-specific records/documents used for recording tours (s. 3.6.3). Other minor edits. |



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Township of Springwater Drinking Water Systems

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Rev No: 5  
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**ESSENTIAL SUPPLIES AND SERVICES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

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

**2. Definitions**

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

**3. Procedure**

3.1 Essential supplies and services lists for the Township of Springwater Drinking Water Systems are contained in the Facility Emergency Plan, Emergency Contact/Essential Supplies and Services List. The list is reviewed and updated at least once every calendar year by the QEMS Representative.

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

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

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

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

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

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

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



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**ESSENTIAL SUPPLIES AND SERVICES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

- 3.6 Internal verification and calibration activities (e.g. chlorine analyzer, turbidimeter, etc.) are conducted by operations personnel in accordance with equipment manuals and/or procedures (Refer to OP-17 Measurement Recording Equipment Calibration and Maintenance).
- 3.7 External calibration activities (e.g. flow meters) are conducted by qualified third-party providers. Qualifications of the service provider are verified during the procurement process. The service provider is responsible for providing a record/certificate of all calibrations conducted.
- 3.8 Chemicals purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified as per the Municipal Drinking Water Licence (MDWL).
- 3.9 The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities. Incoming chemical orders are verified by reviewing the manifest or invoice in order to confirm that the product received is the product ordered.
- 3.10 Process components/equipment provided by the supplier must meet applicable regulatory requirements and industry standards for use in drinking water systems prior to their installation.

**4. Related Documents**

Emergency Contact/Essential Supplies and Services List  
OP-17 Measurement Recording Equipment Calibration and Maintenance  
ANSI/NSF Documentation  
AWWA Standards  
MDWL  
Calibration Certificates/Records

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Procedure issued   |
| 2012-02-13 | 1          | Updated title for Operations Manager to Senior Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems |
| 2013-03-19 | 2          | Updated 5.3 as per corporate revisions and added 5.9 for NCR#2013-03 systems audit, expanded 5.7 for NCR#2013-04                             |



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Township of Springwater Drinking Water Systems

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**ESSENTIAL SUPPLIES AND SERVICES**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

|            |   |   |
|------------|---|---|
| 2013-04-18 | 3 | Specified ANSI/NSF 60 in 5.7 & the quality of supplies to be ANSI/NSF 61 in 5.8. Reworded 5.9.  |
| 2013-04-24 | 4 | Revised 5.1 to include reviewing Essential Supplies and Services list during Management Review  |
| 2018-09-21 | 5 | Procedure updated following new template from Corporate Compliance. QP-05 procedure renamed OP-13. Removed Scope and Responsibilities sections. Changes to wording to provide clarification on ensuring quality of essential supplies and services (s. 3.5, 3.6, 3.7 and 3.9) |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-14  
Rev Date: 2018-09-21  
Rev No: 2  
Pages: 1 of 2

## REVIEW AND PROVISION OF INFRASTRUCTURE

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the Township of Springwater Drinking Water Systems.

### 2. Definitions

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

### 3. Procedure

3.1 At least once every calendar year, Operations Management in conjunction with operations personnel conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. Operations personnel assist with identifying the need for infrastructure repairs, replacements or alterations and with prioritizing each identified item. Documents and records that are reviewed may include:

- Maintenance records
- Call-in reports
- Adverse Water Quality Incidents (AWQIs) or other incidents
- Health & Safety Inspections
- MOECC Inspection Reports
- Facility Logbooks
- Operational Staff Suggestions
- DWQMS Management Review

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

3.3 The output of the review is a 6 year rolling Capital Works Spreadsheet to assist the Owner and OCWA with planning infrastructure needs for the short and long-term. This report is submitted, at least once every calendar year by Operations Management, to the Owner for review and approval. Together with the Owner, Operations Management determines and documents timelines and responsibilities for implementation of priority items.

3.4 The final approved Capital Works Spreadsheet forms the long term forecast for any major infrastructure maintenance, rehabilitation and renewal activities as per OP-15.

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



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Township of Springwater Drinking Water Systems

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**REVIEW AND PROVISION OF INFRASTRUCTURE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**4. Related Documents**

Capital Works Spreadsheet & Acknowledgement/Approval from the owner  
OP-08 Risk Assessment Outcomes  
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal  
OP-20 Management Review  
Management Review Minutes

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2013-07-09 | 0          | Procedure issued   |
| 2012-02-13 | 1          | Updated title for Operations Manager to Senior Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems   |
| 2018-09-21 | 2          | Procedure updated following new template from Corporate Compliance. QP-06 procedure renamed OP-14. Removed Scope and Responsibilities sections. Replaced 'once every 12 months' with 'once every calendar year' (s. 3.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2 to consider the outcomes of the risk assessment under Element 8 during the review to reflect wording in DWQMS v. 2.0. Changes to wording to provide clarification on who is required to attend the review and what documents and records may be considered during the review (s. 3.1). Linked the procedure with OP-15 in terms of documenting a long-term forecast (s. 3.3 and s. 3.4). |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-15  
Rev Date: 2018-09-21  
Rev No: 0  
Pages: 1 of 3

## INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To describe OCWA's infrastructure maintenance, rehabilitation and renewal program for the Township of Springwater Drinking Water Systems.

### 2. Definitions

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

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

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

### 3. Procedure

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

#### 3.1.1 Planned Maintenance

Routine planned maintenance activities include: pump inspection, analyzer calibrations, flow meter calibrations, valve inspection, hydrant flushing and inspections, reservoir inspections, tower inspections, weekly inspections of the facility, etc.

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

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

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a daily, weekly, monthly, quarterly and annual schedule as determined based on manufacturer's recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the WMS Primary,



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**INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

Operations Management, O&M team lead and/or applicable Operations personnel. Work orders are completed and electronically entered into WMS by the person responsible for completing the task. Records of these activities are maintained as per OP-05 Document and Records Control.

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

**3.1.2 Unplanned Maintenance**

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Management. Unplanned maintenance activities are recorded on corrective work orders and are entered into WMS by the person responsible for completing the unplanned maintenance activity.

**3.1.3 Rehabilitation and Renewal**

Rehabilitation and renewal activities including capital upgrades (major infrastructure maintenance) are determined at least once every calendar year in consultation with Operations Management and the Owner. A list of required replacement or desired new equipment is compiled and prioritized by Operations Management in conjunction with operations personnel and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner. In addition to the short-term facility needs (i.e. current year), the Capital Works Spreadsheet also provides a long-term (i.e. rolling [6-year]) list of major maintenance recommendations. (Refer to OP-14 Review and Provision of Infrastructure).

**3.1.4 Program Monitoring and Reporting**

Maintenance needs for the facility are determined through review of manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements and are communicated by means of work orders. Additionally, Operations Management and operations personnel e.g. Senior Operator, O&M Team Lead, etc. conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. (Refer to OP-14 Review and Provision of Infrastructure).

To assist in monitoring the effectiveness of the program a "Hub Work Order Status by Facility Report" is generated on a monthly basis for the Georgian Bay



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Township of Springwater Drinking Water Systems

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**INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

Hub by the corporate WSM administrator, and is forwarded to the Regional Manager, Senior Operations Manager, Operations Manager and Project Clerk. This report tracks corrective, preventative, weekly, capital and operational work orders as to the number scheduled, closed or in process of closing for all of the facilities within the Township of Springwater. The total number of labour hours and total costs of each group of work orders are also monitored. The completion rate of all work orders is monitored as a percentage closed and percentage variance.

3.2 OCWA's infrastructure maintenance, rehabilitation and renewal program is initially communicated to the Owner through the operating agreement. OCWA's program is communicated to the Owner at a minimum of at least once every calendar year through submission of the Capital works spreadsheet and through the results of the Management Review.

**4. Related Documents**

- Minutes of Management Review
- Capital Works Spreadsheet & Acknowledgement/Approval from the Owner
- OP-05 Document and Records Control
- OP-14 Review and Provision of Infrastructure

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Information within OP-15 was originally set out in the Main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added the requirement to ensure the long term forecast is reviewed at once every calendar year and to document a long term forecast (s. 3.1.3) to reflect in DWQMS v. 2.0. Minor wording updates to reflect OCWA's current WMS. |
|            |            |   |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-16  
Rev Date: 2018-09-21  
Rev No: 4  
Pages: 1 of 3

**SAMPLING, TESTING AND MONITORING**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

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

**2. Definitions**

*Challenging Conditions* – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under OP-06 Drinking Water System

**3. Procedure**

- 3.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03, the facility's Municipal Drinking Water License (MDWL) as well as sampling/testing and monitoring requirements listed within the facility's Permit to Take Water (e.g. recording monitoring well levels).
- 3.2 Sampling requirements for the facility are defined in the facility's sampling schedule plan which is available to operations personnel, at the location(s) noted in OP-05 Document and Records Control. The sampling schedule is maintained by the PCT and is updated as required.
- 3.3 Samples that are required to be tested by an accredited and licensed laboratory, are collected, handled and submitted according to the directions provided by the licensed laboratory(ies) that conducts the analysis. The laboratory(ies) used for this facility are listed in the Essential Supplies and Services List (within the Facility Emergency Plan (FEP)).

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

- 3.4 Continuous monitoring equipment is used to sample and test for treated water turbidity, treated water free chlorine residual. Test results from continuous monitoring equipment are captured by a data recorder and are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03.

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

- Raw and treated water flow rates
- Reservoir Levels
- Tower Levels
- System pressures; etc.



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-16  
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**SAMPLING, TESTING AND MONITORING**

Reviewed by: Process & Compliance Technician      Approved by: Senior Operations Manager

- 3.5 Adverse water quality incidents are responded to and reported as per SOP for Reporting “Adverse Water Quality” which is located within the FEP.
- 3.6 In-house process control activities are conducted on a regular basis by the certified operator(s) on duty and are as follows:

| Operational Parameter       | Location                                    | Frequency   |
|-----------------------------|---|---|
| Turbidity, pH & Temperature | Raw water tap of each well at each facility | Grab monthly  |
| Free Chlorine               | Treated water tap at each facility          | Monday to Friday - Grab   |
| Free Chlorine               | Distribution (sample stations)              | <p><i>Large Municipal Residential System (Minesing, Anten Mills, Elmvale, Hillsdale, Del Trend, Midhurst, Snow Valley): At least seven (7) Grab samples a week with at least 4 on one day and 3 on a 2<sup>nd</sup> day (&gt;48 hours between sampling days)</i></p> <p><i>Small Municipal Residential Systems (Vespra Downs, Phelpston): At least 2 each week (Must be taken at least 48 hours apart and during same week)</i></p> |

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

- 3.7 Sampling, testing and monitoring for the systems’ most challenging conditions are included in the existing in-house activities as described in this procedure.
- 3.8 There are no relevant upstream sampling, testing and monitoring activities that take place for this facility/system.
- 3.9 Sampling, testing and monitoring results are readily accessible to the Owner at the Georgian Highlands Regional Office in Wasaga Beach.

At a minimum, Owners are provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 Section 11 Annual Report, the Schedule 22 Municipal Summary Report and through the Management Review process outlined in OP-20 Management Review.



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Township of Springwater Drinking Water Systems

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**SAMPLING, TESTING AND MONITORING**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

**4. Related Documents**

- Facility Logbook
- OP-05 Document and Records Control
- OP-06 Drinking Water System
- OP-20 Management Review
- Laboratory Analysis Reports
- Laboratory Chain of Custody Forms
- Annual Report (O. Reg. 170 Section 11)
- Municipal Summary Report (O. Reg. 170 Schedule 22)
- Process Data Management System (PDM)
- Emergency Contact List and Essential Supplies & Services List (Contacts section of FEP)
- Facility Emergency Plan (FEP) Binder
- SOP – Adverse Water Quality (FEP Binder)
- Monthly Data Sheet
- Sampling Schedule/Plan/Calendar
- SCADA Records

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Procedure issued  |
| 2010-09-15 | 1          | Procedure revised (CAR 539), sampling under challenging conditions  |
| 2011-05-05 | 2          | Removed treated turbidity from Table in 5.4 and added sentence regarding upstream sampling  |
| 2012-02-13 | 3          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems   |
| 2018-09-21 | 4          | Procedure updated following new template from Corporate Compliance. QP-07 procedure renamed OP-16. Removed Scope and Responsibilities sections. Updated s. 3.1 to reference Municipal Drinking Water License and s. 3.2 to reference sampling calendar/plan and removed sampling table. Expanded information related to accredited and licensed laboratories (s. 3.3). Reordered some sections and other minor edits. |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-17  
Rev Date: 2018-09-21  
Rev No: 2  
Pages: 1 of 2

**MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

To describe the procedure for the calibration and/or verification and maintenance of measurement and recording equipment at the Township of Springwater Drinking Water Systems.

**2. Definitions**

None

**3. Procedure**

- 3.1 All measurement and recording equipment calibration and maintenance activities must be performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to OP-13 Essential Supplies and Services).
- 3.2 The Safety, Process and Compliance Manager or designate establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). When a new device is installed, it is added to the WMS system by the WMS Primary, Senior Operations Manager or O&M Team Lead. The new device is tagged with a unique identification number and the maintenance schedule is set up. Work orders are then automatically generated as per the schedule (refer to OP-15 Infrastructure Maintenance, Rehabilitation and Renewal).
- 3.3 Details regarding the results of the calibration and/or verification are recorded within each individual work order generated by the WMS.
- 3.4 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual, instructions specified in WMS.
- 3.5 Standards, reagents and/or chemicals that may be utilized during calibration and/or verification and/or maintenance activities are verified before use to ensure they are not expired. Any expired standards, reagents and/or chemicals are appropriately disposed of and are replaced with new standards, reagents and/or chemicals as applicable. Additionally, a work order is issued on a monthly basis to ensure that standards, reagents and/or chemicals utilized during calibration and/or verification and/or maintenance within the system are verified.
- 3.6 Any measurement device which does not meet its specified performance requirements during calibration and/or verification must be removed from service (if practical) until repaired, replaced or successfully calibrated. The failure must be reported to the Operations Management, ORO and/or PCT as soon as possible so that immediate measures can be taken to ensure that drinking water quality has not been compromised by the malfunctioning device. Any actions taken as a result of the failure



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**MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

are recorded in the facility logbook. The PCT or designate ensures that any notifications required by applicable legislation are completed and documented within the specified time period.

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

**4. Related Documents**

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

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Procedure issued   |
| 2012-02-13 | 1          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems  |
| 2018-09-21 | 2          | Procedure updated following new template from Corporate Compliance. QP-08 procedure renamed OP-17. Removed Scope and Responsibilities sections. Added s. 3.3 to clarify how calibration and/or verification activities are documented. Added s. 3.5 to include how standards, reagents and/or chemicals are verified before use to ensure they are not expired. Other minor edits. |



**OPERATIONAL PLAN**  
Township of Springwater Drinking Water Systems

QEMS Proc.: OP-18  
Rev Date: 2018-09-21  
Rev No: 3  
Pages: 1 of 4

**EMERGENCY MANAGEMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**1. Purpose**

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

**2. Definitions**

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

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

*Operations Management* – refers to the General Manager, Senior Operations Manager and/or Operations Manager that directly oversees a facility’s operations

**3. Procedure**

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

3.2 OCWA recognizes three levels of events:

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

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

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



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Reviewed by: Process & Compliance Technician | Approved by: Senior Operations Manager

involve intervention from outside organizations (client, emergency responders, Ministry of the Environment, Parks and Conservations, media, etc.). Examples may include:

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

3.3 Potential emergency situations or service interruptions identified for the Township of Springwater Drinking Water Systems include:

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

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

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

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

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

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



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

- 3.7 Revisions to the CPs, SOPs and other FEP documents are made (as necessary) following a review, test, actual event or other significant change (e.g., changes in regulatory requirements, corporate policy or operational processes and/or equipment, etc.). Results of the emergency response testing and any opportunities for improvement/actions identified are considered during the Management Review (OP-20).
- 3.8 Roles and responsibilities for emergency management at OCWA-operated facilities are set out in the FEP. Specific roles and responsibilities related to a particular emergency situation or service interruption (including those of the Owner where applicable) are set out in the relevant site-specific CP. A general description of the respective responsibilities of the Owner and the operating authority in the event an emergency occurs is included in the service agreement with the Owner (as required by the *Safe Drinking Water Act*).
- 3.9 Where they exist, any relevant sections of the Municipal Emergency Response Plan (MERP) are included or referenced in the appendices section of the FEP. Measures specified in the MERP are incorporated into CPs where appropriate.
- 3.10 An emergency contact list in conjunction with the essential supplies and services list is contained within the FEP and is reviewed/updated at least once per calendar year. An emergency communications protocol is contained within the FEP. Specific notification requirements during emergency situations or service interruptions are set out in the individual CPs and in the ERP.

**4. Related Documents**

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



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**EMERGENCY MANAGEMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**5. Revision History**

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2009-07-13 | 0          | Procedure issued  |
| 2012-02-13 | 1          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems   |
| 2014-06-26 | 2          | Corporate Update  |
| 2018-09-21 | 3          | Procedure updated following new template from Corporate Compliance. QP-09 procedure renamed OP-18. Removed Scope and Responsibilities sections and reordered some sections. Added definition 'Operations Management'. Throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Removed references to 'OCWA's Approach to Facility Emergency Planning' document throughout procedure and referenced FEP instead. Aligned wording for level 1, 2 & 3 events (s. 3.2) with wording in 'OCWA's Emergency Response Plan'. Updated training section to include role of SPC Manager (s. 3.5) and expanded testing/review section specifically to clarify how an actual test is documented (s. 3.6). Other minor edits. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-19  
Rev Date: 2018-09-21  
Rev No: 3  
Pages: 1 of 5

## INTERNAL QEMS AUDITS

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

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

This procedure applies to Internal QEMS Audits conducted at the Township of Springwater Drinking Water Systems for the purpose of meeting the DWQMS requirements for internal audits.

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

### 2. Definitions

*Audit Team* – one or more Internal Auditors conducting an audit

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

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

*Lead Auditor* – Internal Auditor responsible for leading an Audit Team

*Non-conformance* – non-fulfillment of a DWQMS requirement

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

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

### 3. Procedure

#### 3.1 Audit Objectives, Scope and Criteria

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

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



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Township of Springwater Drinking Water Systems

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## INTERNAL QEMS AUDITS

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

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

3.1.3 The criteria covered by an internal QEMS audit include:

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

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

### 3.2 Audit Frequency

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

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

### 3.3 Internal Auditor Qualifications

3.3.1 Internal QEMS audits shall only be conducted by persons approved by the QEMS Representative and having the following minimum qualifications:

- Internal auditor training or experience in conducting management system audits; and
- Familiarity with the DWQMS requirements.

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

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

### 3.4 Audit Preparation

3.4.1 Together, the QEMS Representative and the Lead Auditor:

- Establish the audit objectives, scope and criteria;



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Township of Springwater Drinking Water Systems

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## INTERNAL QEMS AUDITS

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

### 3.4.2 Each Internal Auditor is responsible for:

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

## 3.5 Conducting the Audit

- 3.5.1 Opening and closing meetings are not required, but may be conducted at the discretion of the QEMS Representative and the Lead Auditor taking into account expectations of Top Management.
- 3.5.2 The Audit Team gathers and records objective evidence by engaging in activities that may include conducting interviews with Operations Management and staff (in person, over the phone and/or through e-mail), observing operational activities and reviewing documents and records.
- 3.5.3 The Audit Team generates the audit findings by evaluating the objective evidence against the audit criteria (s. 3.1.3). In addition to indicating conformance or non-conformance, the audit findings may also lead to the identification of opportunities for improvement (OFIs). The Lead Auditor is responsible for resolving any differences of opinion among Audit Team members with respect to the audit findings and conclusions.

## 3.6 Reporting the Results

- 3.6.1 The Lead Auditor reviews the audit findings and conclusions with the QEMS Representative and Top Management. Other audit participants may also take part in this review as appropriate. This review may take place in person (e.g., during a closing meeting) or through other means (phone call, email, etc.). Any diverging opinions regarding the audit findings and conclusions should be discussed and, if possible, resolved. If not resolved, this should be noted by the Lead Auditor.



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Approved by: Senior Operations Manager

- 3.6.2 The Lead Auditor submits a written report and/or completed work documents to the QEMS Representative. The submitted documentation must identify (at a minimum):
- Audit objectives, scope and criteria;
  - Audit Team member(s) and audit participants;
  - Date(s) and location(s) where audit activities were conducted;
  - Audit findings including:
    - Related objective evidence for each element;
    - Any non-conformance identified referencing the requirement that was not met; and
    - OFIs or other observations.
  - Audit conclusions.
- 3.6.3 The QEMS Representative distributes the audit results to Top Management and others as appropriate.
- 3.6.4 The QEMS Representative ensures that results of internal QEMS audits are included as inputs to the Management Review as per OP-20 Management Review.

3.7 Corrective Actions and Opportunities for Improvement (OFIs)

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

3.8 Record-Keeping

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

**4. Related Documents**

Internal Audit Records (checklists, forms, reports, etc.)  
OP-05 Document and Records Control  
OP-20 Management Review  
OP-21 Continual Improvement



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**INTERNAL QEMS AUDITS**

Reviewed by: Process & Compliance Technician | Approved by: Senior Operations Manager

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Procedure issued   |
| 2011-05-05 | 1          | Revised 5.1 as per OCWA's Corporate revisions  |
| 2012-02-13 | 2          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems  |
| 2018-09-21 | 3          | Procedure updated following new template from Corporate Compliance. QP-10 procedure renamed OP-19. Removed Scope and Responsibilities sections and moved scope wording to purpose section. Added definition 'Objective Evidence' and modified 'non-conformance' definition. Replaced 'audit evidence' with 'objective evidence', and 'conformity' with 'conformance' throughout procedure. Replaced 'once every 12 months' with 'once every calendar year' (s. 3.2.1, s. 3.2.3 and s. 3.4.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2.3 (and modified s. 3.4.1) to describe the frequency for auditing all DWSs covered in multi-facility Operational Plans. Changed s. 3.4.2 to include preventive actions, the results of the management review and the status/consideration of OFIs. Included wording 'for each element', and 'identified referencing the requirement that was not met' to s. 3.6.2. Moved description of process for corrective actions from QP-10 s. 5.7 and OFIs from QP-10 s. 5.8 to OP-21. Added s. 3.7 to refer to OP-21. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-20  
Rev Date: 2018-09-21  
Rev No: 3  
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## MANAGEMENT REVIEW

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

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

### 2. Definitions

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

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

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

OCWA has defined Top Management for the Township of Springwater Drinking Water Systems as:

- Operations Management – North Simcoe Hub
- Regional Hub Manager – Georgian Highlands Region
- Safety, Process & Compliance (SPC) Manager – Georgian Highlands Region

### 3. Procedure

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

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

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

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

3.4 The standing agenda for Management Review meetings is as follows:  
a) Incidents of regulatory non-compliance;  
b) Incidents of adverse drinking water tests;



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Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

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

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

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

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

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

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

#### 4. Related Documents

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



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**MANAGEMENT REVIEW**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

**5. Revision History**

| Date       | Revision # | Reason for Revision  |
|------------|------------|--|
| 2009-07-13 | 0          | Procedure issued   |
| 2012-02-13 | 1          | Updated title for Operations Manager to Senior Operations Manager, Cluster Manager to Operations Manager, updated facility title from Well Supply Systems to Drinking Water Systems  |
| 2014-05-05 | 2          | Added "Review Essential Supplies and Services List" to the Management review meeting standing agenda and expanded on e) in response to NCR 2013-03   |
| 2018-09-21 | 3          | Procedure updated following new template from Corporate Compliance. Removed Scope and Responsibilities sections. Added definitions for Top Management and Operations Management. Revisions based on new requirements of the Standard; at least once every 12 months changed to once every calendar year (s. 3.1) and efficacy changed to effectiveness (s. 3.4). Added s. 3.2 and s. 3.3 to describe who is participating in the Management Review process. Added clarification on including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented when reviewing audit results (s. 3.4.e). Added Best Management Practices (BMPs) as a standing agenda item (s. 3.4.q). Added s. 3.5 to include consideration of BMPs and link OP-20 to OP-21 Continual Improvement. |



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

QEMS Proc.: OP-21  
Rev Date: 2018-09-21  
Rev No: 0  
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## CONTINUAL IMPROVEMENT

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

### 1. Purpose

To describe the procedure for tracking and measuring continual improvement of the Quality & Environmental Management System (QEMS) for the Township of Springwater Drinking Water Systems.

### 2. Definitions

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

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

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

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

### 3. Procedure

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

#### 3.2 Corrective Actions

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

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

3.2.2 The QEMS Representative (in consultation with Operations Management and/or the SPC Manager) investigates the need for a corrective action to eliminate the root cause(s) so as to prevent the non-conformance from recurring. The investigation may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

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



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Township of Springwater Drinking Water Systems

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**CONTINUAL IMPROVEMENT**

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

3.2.4 The QEMS Representative ensures corrective actions are documented using the “Implementation Action Plan” form/table. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Top Management.

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

### 3.3 Preventive Actions

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

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

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

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

3.3.4 The implementation of preventive actions are tracked by the QEMS Representative using the “Implementation Action Plan” form/table.

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

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



# OPERATIONAL PLAN

Township of Springwater Drinking Water Systems

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## CONTINUAL IMPROVEMENT

Reviewed by: Process & Compliance Technician

Approved by: Senior Operations Manager

subsequent Management Review meetings.

### 3.5 Best Management Practices (BMPs)

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

3.5.2 BMPs may include, but are not limited to:

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

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

## 4. Related Documents

- OP-05 Document and Records Control
- OP-20 Management Review
- Management Review Minutes
- Internal Audit Records
- Implementation Action Plan form/table

## 5. Revision History

| Date       | Revision # | Reason for Revision   |
|------------|------------|---|
| 2018-09-21 | 0          | Procedure issued – Some of the information within OP-21 was originally set out in the main body of OCWA's Operational Plan (last revision 7 dated 2017-09-25). Information from QP-10 Internal Audit (s. 5.7 and s. 5.8) was incorporated into s. 3.2 and s. 3.3 of OP-21 but was modified to address non-conformances identified from additional inputs other than internal audits and preventive actions resulting from means other than OFIs from internal audits. In addition R&Rs were revised to include the SPC Manager, and to clarify the role of the QEMS Representative in investigating and determining corrective and preventive actions needed. A section on Best Management Practices (s. 3.5) was added to meet the new requirements of DWQMS v. 2.0. |
|            |            |   |

## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

Fields marked with an asterisk (\*) are mandatory.

Owner of Municipal Residential Drinking Water System \*  
**The Corporation of the Township of Springwater**

Name of Municipal Residential Drinking Water System \*  
**SPRINGWATER DRINKING WATER SYSTEMS**

### Subject Systems

Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in the below table.

|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Minesing Drinking Water System                | Ontario Clean Water Agency    | 220005465       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

#### Contact Information 1

|                                 |                |                |
|---------------------------------|----------------|----------------|
| Last Name *                     | First Name *   | Middle Initial |
| Neal                            | Michelle       |                |
| Title *                         | Phone Number * |                |
| Process & Compliance Technician | 705 429-2525   |                |
| Email Address *                 |                |                |
| mneal@ocwa.com                  |                |                |

#### Contact Information 2

|                           |                |                |
|---------------------------|----------------|----------------|
| Last Name *               | First Name *   | Middle Initial |
| Eagle                     | Richard        |                |
| Title *                   | Phone Number * |                |
| Senior Operations Manager | 705 429-2525   |                |
| Email Address *           |                |                |
| reagle@ocwa.com           |                |                |

## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

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Owner of Municipal Residential Drinking Water System \*

The Corporation of the Township of Springwater

Name of Municipal Residential Drinking Water System \*

SPRINGWATER DRINKING WATER SYSTEMS

### Subject Systems

Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in the below table.

|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Anten Mills Drinking Water System             | Ontario Clean Water Agency    | 220005447       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

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The Corporation of the Township of Springwater

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SPRINGWATER DRINKING WATER SYSTEMS

### Subject Systems

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Elmvale Drinking Water System                 | Ontario Clean Water Agency    | 220000700       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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**Schedule C – Director’s Directions for  
Operational Plans (Subject System  
Description Form)  
Municipal Residential Drinking Water System**

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The Corporation of the Township of Springwater

Name of Municipal Residential Drinking Water System \*

SPRINGWATER DRINKING WATER SYSTEMS

**Subject Systems** Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in the below table.

|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Hillsdale Drinking Water System               | Ontario Clean Water Agency    | 220003911       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.**Contact Information 1**

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## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

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The Corporation of the Township of Springwater

Name of Municipal Residential Drinking Water System \*

SPRINGWATER DRINKING WATER SYSTEMS

### Subject Systems

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Del Trend Drinking Water System               | Ontario Clean Water Agency    | 220009149       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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

### Municipal Residential Drinking Water System

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SPRINGWATER DRINKING WATER SYSTEMS

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Vespra Downs Drinking Water System            | Ontario Clean Water Agency    | 260001786       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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SPRINGWATER DRINKING WATER SYSTEMS

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Midhurst Drinking Water System                | Ontario Clean Water Agency    | 220005474       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

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The Corporation of the Township of Springwater

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SPRINGWATER DRINKING WATER SYSTEMS

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Snow Valley Drinking Water System             | Ontario Clean Water Agency    | 260048204       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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## Schedule C – Director’s Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System

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The Corporation of the Township of Springwater

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SPRINGWATER DRINKING WATER SYSTEMS

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|   | Name of Operational Subsystems(if Applicable) | Name of Operating Authority * | DWS Number(s) * |
|---|---|-------------------------------|-----------------|
| 1 | Phelpston Drinking Water System               | Ontario Clean Water Agency    | 260048282       |

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

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