# TABLE OF CONTENTS

1 Quality Management System ........................................................................................................... 3
   1.1 BACKGROUND .......................................................................................................................... 3
   1.2 THE DRINKING WATER QUALITY MANAGEMENT STANDARD .................................................. 3
   1.3 OPERATIONAL PLAN FOR HALTON REGION’S DRINKING WATER SYSTEMS ......................... 3
   1.4 DEFINITIONS ......................................................................................................................... 4

2 Drinking Water Quality Management System Policy .......................................................................... 7

3 Commitment and Endorsement ........................................................................................................ 7

4 Quality Management System Representative .................................................................................. 7

5 Document & Records Control ......................................................................................................... 7
   5.1 CONTROL OF DOCUMENTS ................................................................................................. 7
   5.2 CONTROL OF RECORDS .................................................................................................. 8

6 Drinking Water Systems .................................................................................................................. 8
   6.1 OVERALL DESCRIPTION OF DRINKING WATER SYSTEMS ...................................................... 8
   6.2 SOURCE WATER – SURFACE WATER SYSTEMS ..................................................................... 11
   6.3 SOURCE WATER – GROUNDWATER SYSTEMS ......................................................................... 11
   6.4 TREATMENT .......................................................................................................................... 11
   6.5 DISTRIBUTION ...................................................................................................................... 11

7 Risk Assessment ............................................................................................................................. 12

8 Risk Assessment Outcomes ........................................................................................................... 13

9 Organizational Structure, Roles, Responsibilities & Authorities ...................................................... 13

10 Competencies ............................................................................................................................... 15

11 Personnel Coverage ...................................................................................................................... 16

12 Communications ........................................................................................................................... 16

13 Essential Supplies and Services .................................................................................................... 17

14 Review and Provision of Infrastructure, Rehabilitation and Renewal ......................................... 17

15 Infrastructure Maintenance, Rehabilitation and Renewal .............................................................. 18
   15.1 MAINTENANCE – TREATMENT FACILITIES ....................................................................... 18
   15.2 MAINTENANCE – LINEAR DISTRIBUTION SYSTEMS ........................................................... 18
   15.3 MAINTENANCE – OUTLYING STATIONS .............................................................................. 19
   15.4 SAMPLING, TESTING AND MONITORING ........................................................................... 19

16 Measurement & Recording Equipment Calibration & Maintenance .............................................. 19

17 Emergency Management ............................................................................................................... 20

18 Internal Audits ............................................................................................................................. 21

19 Management Review .................................................................................................................... 21

20 Continual Improvement ................................................................................................................ 21

Signatures of Commitment and endorsement.
1 QUALITY MANAGEMENT SYSTEM

A Quality Management System is the policy and associated organizational structures, procedures, responsibilities, objectives and evaluation measures that ensure the capability of delivering a product to specified standards.

1.1 Background

The requirement for Owners and Operating Authorities of municipal residential drinking water systems to develop and implement Drinking Water Quality Management Systems was legislated under the Safe Drinking Water Act, 2002 (SDWA) and forms part of the Ministry of the Environment, Conservation and Parks (MECP) Municipal Drinking Water Licensing Program. The idea of mandated implementation of a Drinking Water Quality Management System (DWQMS) Standard (or the Standard) originated as recommendations in Part Two of the Walkerton Inquiry Report.

1.2 The Drinking Water Quality Management Standard

The MECP’s Drinking Water Quality Management Standard version 2.0 (the Standard), released in February 2017, sets out a framework for the operating authority to develop a Quality Management System (QMS) that is relevant and appropriate for the drinking water system and requires the Owner to endorse and accept the QMS. The QMS is the foundation for:

- establishing and documenting management procedures;
- achieving conformance with the procedures; and,
- demonstrating conformity through an auditing process.

The Standard includes elements from the ISO 9001 management standard and the Hazard and Critical Control Point (HACCP) approach to product safety used in the food industry. The Standard also includes a Risk Assessment approach which reflects the multi-barriers for drinking water safety and the need to continuously supply safe drinking water.

The Standard requires owners and operating authorities to formalize and document how they manage and operate their drinking water system in an Operational Plan, and also requires that there is documented commitment throughout the organization to continuously review and improve these practices.

The Standard is based on implementing a PLAN, DO, CHECK and IMPROVE operational methodology. PLAN requires various policies and procedures to be documented in an Operational Plan. DO requires these policies and procedures be implemented. CHECK and IMPROVE require Internal Audits and Management Reviews to ensure conformance with requirements and continual improvement of the DWQMS.

1.3 Operational Plan for Halton Region’s Drinking Water Systems

The Regional Municipality of Halton’s DWQMS, documented in this Operational Plan, was developed to ensure safe drinking water is reliably supplied to all customers served by the Region’s municipal residential drinking water systems. The development, implementation and continual improvement of the DWQMS will assist the Region in ensuring that all regulatory requirements are met and that consumers can be confident in the safety of their drinking water.

This Operational Plan is organized to follow the twenty-one elements of the Standard. The elements are as follows:

Element 1 - Quality Management System
Element 2 – Quality Management System Policy
Element 3 – Commitment and Endorsement
Element 4 – Quality Management System Representative
Element 5 – Document and Records Control
Element 6 – Drinking Water System(s)
Element 7 – Risk Assessment
Element 8 – Risk Assessment Outcomes
Element 9 – Organizational Structure, Roles, Responsibilities and Authorities
Element 10 – Competencies
Element 11 – Personnel Coverage
Element 12 – Communications
Element 13 – Essential Supplies and Services
Element 14 – Review and Provision of Infrastructure, Rehabilitation and Renewal
Element 15 – Infrastructure Maintenance, Rehabilitation and Renewal
Element 16 – Sampling, Testing and Monitoring
Element 17 – Measurement and Recording Equipment Calibration and Maintenance
Element 18 – Emergency Management
Element 19 – Internal Audits
Element 20 – Management Review
Element 21 – Continual Improvement

1.4 Definitions

The following definitions are derived from the MECP’s Drinking Water Quality Management Standard and guidance materials and relate specifically to drinking water systems and DWQMS processes:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit</td>
<td>A systematic and documented verification process that involves objectively obtaining and evaluating documents and processes to determine whether a Quality Management System conforms to the requirements of this Standard.</td>
</tr>
<tr>
<td>Competence</td>
<td>The combination of observable and measurable knowledge, skills and abilities which are required for a person to carry out assigned responsibilities.</td>
</tr>
<tr>
<td>Corrective Action</td>
<td>Action taken to eliminate the cause of a detected nonconformity of the Quality Management System with the requirements of the Drinking Water Quality Management System or other undesirable situation.</td>
</tr>
<tr>
<td>Critical Control Limit (CCL)</td>
<td>The point at which a Critical Control Point response procedure is initiated.</td>
</tr>
<tr>
<td>Critical Control Point (CCP)</td>
<td>An essential step or point in the Subject System at which control can be applied by the Operating Authority to prevent or eliminate a Drinking Water Health Hazard or to reduce it to an acceptable level.</td>
</tr>
<tr>
<td>Document</td>
<td>Includes, but not limited to a policy, procedure, work instruction, form, sound recording, video tape, film, photograph, chart, graph, map, plan, survey, book of account, and information recorded or stored by means of any device.</td>
</tr>
<tr>
<td>Drinking Water</td>
<td>means (a) water intended for human consumption, or (b) water that is required by an Act, regulation, order, municipal by-law or other document issued under the authority of an Act, (i) to be potable,</td>
</tr>
</tbody>
</table>

Printed copies (unless noted) are uncontrolled. Do Not Photocopy.
| 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. |
| Drinking Water System (DWS) | means a system of works, excluding plumbing, that is established for the purpose of providing users of the system with drinking water and includes,  
|                            | (a) any thing used for the collection, production, treatment, storage, supply or distribution of water,  
|                            | (b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and  
|                            | (c) a well or intake that serves as the source or entry point of raw water supply for the system. |
| Emergency                  | A potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers. |
| Emergency Response         | The effort to mitigate the impact of an emergency on consumers. |
| HAACCP                     | Hazard Analysis and Critical Control Points is a management system approach to product safety used in the food industry. |
| Harm                       | The cause of ill-health, injury, or physical damage. |
| Hazard                     | A source of danger or a characteristic that may cause drinking water to be unsafe for human consumption. The hazard may be biological, chemical, physical or radiological in nature. |
| Hazardous Event            | An incident or situation that can lead to the presence of a hazard. |
| Infrastructure             | The set of interconnected structural elements that provide the framework for supporting the operation of the drinking water system, including buildings, workspace, process equipment, hardware and software, and supporting services, such as transportation or communication. |
| Monitoring                 | Includes any checks or systems that are available to detect hazards or the potential for hazards. |
| Non-Conformity             | The non-fulfillment of a DWQMS requirement. |
| Operating Authority        | The person or entity given responsibility by the Owner for the operation, management, maintenance or alteration of the subject system. |
| Operational Plan           | A component of the documented QMS that is required under the Safe Drinking Water Act and the Municipal Drinking Water Licensing Program in Ontario. |
| **Owner** | Includes every person who is a legal or beneficial owner of all or part of the drinking water system, not including the Ontario Clean Water Agency or any of its predecessors where the Agency or predecessor is registered on title as the Owner of the system. |
| **Preventive Action** | Action to prevent the occurrence of nonconformity of the Quality Management System with the requirements of the Drinking Water Quality Management System or other undesirable situation. |
| **Quality Management System (QMS)** | A system to:  
  a) Establish policy and objectives, and to achieve those objectives, and  
  b) Direct and control an organization with regard to quality. |
| **Record** | A document stating results achieved or providing proof of activities performed. Once created, a record cannot be changed. |
| **Rehabilitation** | The process of repairing or refurbishing an infrastructure element. |
| **Renewal** | The process of replacing the infrastructure element with new elements. |
| **Risk** | The probability of identified hazards causing harm including the magnitude of that harm or its consequences. |
| **Risk Assessment** | An orderly methodology of identifying hazards or hazardous events that may affect the safety of drinking water and evaluating their significance. |
| **Subject System** | A municipal residential drinking water system where the system is operated by one Operating Authority. |
| **Top Management** | A person or group of people at the highest level of management within an Operating Authority that make(s) decisions about the QMS and makes recommendations to the Owner about the Subject Systems. |

**Other Definitions**

| **CAR** | Corrective Action Request |
| **CMMS** | Computerized Maintenance Management System |
| **MECP** | Ministry of the Environment, Conservation and Parks |
| **DWQMS** | Drinking Water Quality Management System |
| **HRCERP** | The Halton Region Community Emergency Response Plan |
| **OIC** | Operator—in-Charge |
| **PM** | Preventive Maintenance |
| **SDWA** | Safe Drinking Water Act |
| **QUEST** | An Intelex software system including Document Control, Corrective Action Reporting and Permits modules. This system includes the DWQMS, documents and processes.  
  - Document Control module is designed to ensure that documents are controlled, reviewed, approved, retained, readily available and easily retrievable. |
Corrective Action Reporting module is designed to ensure non-conformances, non-compliances and associated corrective and preventive actions are investigated, documented, tracked to completion and monitored for effectiveness in order to support continual improvement.

Permits module is designed to ensure PW legal instruments (licenses, permits, approvals etc.) and related conditions and activities are centrally stored, readily available, easily retrievable, managed, tracked and reported on in accordance with legislated requirements.

<table>
<thead>
<tr>
<th>SAP</th>
<th>Systems Applications and Products software</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>WPP</td>
<td>Water Purification Plant</td>
</tr>
</tbody>
</table>

## 2 DRINKING WATER QUALITY MANAGEMENT SYSTEM POLICY

Halton Region is committed to:

- Providing customers with safe drinking water
- Complying with applicable legislation and regulations
- Maintaining and continually improving the Drinking Water Quality Management System

## 3 COMMITMENT AND ENDORSEMENT

Top Management endorse this Operational Plan and support the Drinking Water Quality Management System (DWQMS) in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks’ Drinking Water Quality Management Standard and other applicable legislation and regulations.

Acting on behalf of the Corporation of the Regional Municipality of Halton, (the Owner of Halton Region’s drinking water systems), Halton’s Regional Council, as represented by the Regional Chair, endorse this Operational Plan and support the Drinking Water Quality Management System in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks’ Drinking Water Quality Management Standard (DWQMS) and other applicable legislation and regulations.

Signatures of endorsement are located within document Signatures of Commitment and Endorsement (DW-Water-PO-DWQMS-1229). Administrative amendments to the Operational Plan may be made from time to time without re-signing by Top Management and the Owner. All changes will be documented within the version history section of the DWQMS website.

## 4 QUALITY MANAGEMENT SYSTEM REPRESENTATIVE

Top Management has appointed the Project Manager, Regulatory Compliance - DWQMS as Quality Management System Representative.

The responsibilities of the Quality Management System Representative are documented in procedure 9 - Organizational Structure Roles Responsibilities and Authorities (DW-Water-PR-DROLS-1215).

## 5 DOCUMENT & RECORDS CONTROL

A document and records control process is required to ensure documents are kept up-to-date with changes in the operation of the drinking water systems and with changes in applicable legislation and regulations.

Documents and records must be legible, easily retrievable and readily identifiable. Documents and records must also be stored so that they are protected from damage or loss, retained for an appropriate period of time (in some cases the retention period is legislated) and disposed of properly after the retention period.

### 5.1 Control of Documents

Halton Region has established procedures for the creation, modification, review, approval, distribution, retrieval and protection of drinking water system documentation. The Document and Records Control of
Documents procedure 5 - Document and Records Control (DW-Water-PR-DWQMS-1209) describes measures developed to control internally-created and externally-generated documentation relating to the Region’s drinking water systems. Documentation created by or managed by Halton Region’s Laboratory is maintained according to the Laboratory Quality Manual Policies and Procedures and falls outside of the scope of this procedure.

DWQMS documents are each identified with a unique document number. Internally-developed documentation is formatted using a standard header and footer, wherever possible. The standard formatting measures help to ensure that documentation is readily identifiable.

Documents may be stored and accessed electronically on the QUEST software system, and may be made available in hardcopy at select controlled locations where required. When a document is revised, the old version of the document is removed from circulation and replaced with the newly revised and approved version. The QMS Representative is responsible for overseeing the document control program for the Operating Authority.

5.2 Control of Records

Halton Region has established procedures for the management of its drinking water system records. 5 - Document and Records Control (DW-Water-PR-DWQMS-1209) describes measures developed to control drinking water system-related records under the control of Halton Region’s Operating Authority. Records created by or managed by Halton Region’s Laboratory are maintained according to the laboratory’s Quality Manual policies and procedures and fall outside of the scope of this procedure.

Drinking water system-related records are maintained to demonstrate conformance with the DWQMS Standard, to demonstrate compliance with specified legislative and regulatory requirements and to provide a historical view of drinking water system operation & performance.

The QMS Representative is responsible for the management of the Operating Authority’s record control program. Records are kept legible and are filed and stored such that they are readily identifiable. Record Retention Matrix (DW-Water-LI-DWQMS-1192) lists the drinking water system records that are managed under this procedure. For each record listed within the Matrix, the name of the record, the owner of the record, the form of storage of the record, the minimum retention time and the method of destruction of the record are provided. Retention times specified in the Matrix are designated in consultation with relevant legislation, regulations or other requirements, where applicable.

6 DRINKING WATER SYSTEMS

The purpose of this section is to provide a description of each drinking water system and its source water.

6.1 Overall Description of Drinking Water Systems

Halton Region owns and operates eleven (11) drinking water systems which treat and/or distribute drinking water to urban areas of the City of Burlington, the Town of Oakville, the Town of Milton including part of the village of Campbellville, and the Town of Halton Hills (communities of Georgetown and Acton). Halton Region operates all components of its drinking water treatment and distribution systems including wells, outlying reservoirs and elevated tanks and pumping stations. The drinking water systems are depicted in Figure 6-1.

Figure 6-1 Halton Region’s Drinking Water Systems

---

1 The Hamilton Water System is owned by the Mayor and Council of the City of Hamilton. The City of Hamilton’s Operating Authority has been defined as the City of Hamilton, Hamilton Water Division.

2 The South Peel Water System is owned by the Regional Municipality of Peel. The Regional Municipality of Peel’s Operating Authority has been defined as the Regional Municipality of Peel.
Everything within the dashed line is owned and operated by Halton Region

Acton Groundwater Supply
Including Distribution System
DWS 220001673

Campbellville Groundwater Supply
Including Distribution System
DWS 220012162

Georgetown Groundwater Supply
Including Distribution System
DWS 220001655

Milton Groundwater Supply
Including Distribution System
DWS 220001646

Burlington WPP
DWS 220001664

Burloak WPP
DWS 260085436

Oakville WPP
DWS 220001637

South Peel Water System
Lorne Park WTP DWS 210001317

Bridgeview Distribution System
DWS 260068419

North Aldershot Distribution System (Waterdown Rd)
DWS 260086762

South Halton Distribution System
(includes Milton lake-based area)
DWS 260085462

Connection is normally closed

Connection is normally closed

Connections are normally closed

Under the MECP licensing program, the drinking water systems are grouped according to connections between systems. Halton Region has four Municipal Drinking Water Licenses. Table 6-1 lists the licences and the individual systems:
Table 6-1: Summary of Halton Region’s Drinking Water Systems

<table>
<thead>
<tr>
<th>Licence</th>
<th>System Components</th>
<th>MECP Drinking Water System Number</th>
<th>System Classification</th>
<th>Inter-system Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington WPP</td>
<td>MECP Drinking Water</td>
<td>DWS 220001664</td>
<td>Treat Class 4</td>
<td>Supply treated water to the South Halton Distribution System (DWS 260085462)</td>
</tr>
<tr>
<td>Oakville WPP</td>
<td>System</td>
<td>DWS 220001637</td>
<td>Treat Class 4</td>
<td></td>
</tr>
<tr>
<td>Burloak WPP</td>
<td>MECP Drinking Water</td>
<td>DWS 260085436</td>
<td>Treat Class 4</td>
<td></td>
</tr>
<tr>
<td>South Halton</td>
<td>Distribution</td>
<td>DWS 260085462</td>
<td>Dist Class 4</td>
<td>Normally closed connections with Peel Region (Lorne Park WTP DWS 210001317)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Normally closed connection with Milton Ground water (DWS 220001646)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Normally closed connection to North Aldershot DS (DWS 260086762)</td>
</tr>
<tr>
<td>Milton Ground water</td>
<td>Treatment &amp; Distribution</td>
<td>DWS 220001646</td>
<td>Treat Class 2 Dist</td>
<td>Normally closed connection with South Halton Distribution System (DWS 260085462)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridgeview Distribution</td>
<td></td>
<td>DWS 260068419</td>
<td>Dist Class 1</td>
<td>Treated water supplied from City of Hamilton (Woodward Ave. WTP, DWS 220003118)</td>
</tr>
<tr>
<td>North Aldershot</td>
<td>Distribution</td>
<td>DWS 260086762</td>
<td>Dist Class 1</td>
<td>Normally closed connection between North Aldershot and South Halton Distribution System (DWS 260085462)</td>
</tr>
<tr>
<td>Snake Road Distribution</td>
<td></td>
<td>DWS 260086775</td>
<td>Dist Class 1</td>
<td></td>
</tr>
<tr>
<td>Georgetown</td>
<td></td>
<td>DWS 220001655</td>
<td>Treat Class 2 Dist</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acton</td>
<td></td>
<td>DWS 220001673</td>
<td>Treat Class 2 Dist</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campbellville</td>
<td>Treatment &amp; Distribution</td>
<td>DWS 220012162</td>
<td>Limited Groundwater</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subsystem</td>
<td>Dist Class 1</td>
<td></td>
</tr>
</tbody>
</table>

Additional details regarding the Region’s drinking water systems are available in the following procedures:

- **South Halton**: 6 - Drinking Water Systems - South Halton (DW-Water-PR-DWQMS-1211)
- **Georgetown**: 6 - Drinking Water Systems - Georgetown (DW-Water-PR-DWQMS-1210)
- **Acton**: 6 - Drinking Water Systems Acton (DW-Water-PR-DWQMS-1213)
- **Campbellville**: 6 - Drinking Water Systems Campbellville (DW-Water-PR-DWQMS-1212)
6.2 Source Water – Surface Water Systems

Raw water for the Burlington, Burloak and Oakville WPPs is obtained from Lake Ontario (surface water source). Treated water from these WPPs feeds the South Halton Distribution System. The raw water from Lake Ontario is monitored on a regular basis; chemical and bacteriological analysis of the raw water indicates a source of relatively good quality.

The Bridgeview, North Aldershot and Snake Road distribution systems are supplied treated water from the City of Hamilton’s Woodward Avenue WTP (see Section 6.1). Lake Ontario serves as the raw water source for the Woodward Avenue WTP (surface water). Woodward Avenue WTP processes fall outside of the scope of Halton Region’s DWQMS and are documented in the City of Hamilton’s DWQMS procedures.

Halton’s surface water sources are being actively studied through the Source Water Protection Program under the Clean Water Act. Relevant Source Protection Plans identify potential threats and provide for the protection of the drinking water sources.

6.3 Source Water – Groundwater Systems

The Milton, Georgetown, Acton and Campbellville systems draw from groundwater and include distribution systems. Each of these systems is self-contained.

Source groundwater is taken from both overburden and bedrock aquifers at nine (9) well fields located across the Milton, Acton and Georgetown areas. The well fields are identified as follows:

- Town of Milton: Kelso, Walkers Line
- Town of Milton (Campbellville): Campbellville
- Town of Halton Hills (Acton): Prospect Park, Fourth Line and Davidson
- Town of Halton Hills (Georgetown): Lindsay Court, Princess Anne and Cedarvale

All production wells in Acton and the Cedarvale well field in Georgetown are classified as groundwater under the direct influence of surface water (GUDI) sources with effective in-situ filtration. The remaining production wells in Georgetown and those in Campbellville and Milton are considered “true” groundwater wells that are not under the direct influence of surface water.

Halton’s groundwater sources are continually studied through the Source Water Protection Program under the Clean Water Act. The relevant Source Protection Plans identify potential threats and provide for the protection of the drinking water sources. A network of sentry wells allows the groundwater quality upstream of the drinking water production wells to be monitored so that any threats can be identified before the raw water is impacted.

6.4 Treatment

In operating each of the Region’s seven (7) water treatment systems, treatment is provided to meet or surpass the drinking water quality requirements of O. Reg.170/03 under the Safe Drinking Water Act (SDWA). Treatment for aesthetic parameters is also provided.

Water treatment systems are controlled through a computerized Supervisory Control and Data Acquisition (SCADA) system that is monitored 24 hours a day, 7 days a week.

6.5 Distribution

Halton Region’s treated water is distributed to customers via water mains, reservoirs, elevated tanks, booster pumping stations and other types of infrastructure. Re-chlorination is provided, as needed, to ensure that secondary disinfection is maintained throughout each of the distribution systems. Water Treatment staff are responsible for the operation of the treatment facilities. Reservoirs, elevated tanks, booster pumping stations and the linear infrastructure (water mains, valves, etc.) are the responsibility of Water Distribution staff.

Figure 6-2 is an overview the municipal water mains in Halton Region.
7 RISK ASSESSMENT

A Risk Assessment is a means of systematically identifying potential hazardous events and associated hazards in the drinking water system and the control measures which are in place to address those hazards. Hazardous events and hazards can result from natural or technological causes or from human activities. Risk
is the probability of identified hazards\(^3\) causing harm, including the magnitude of that harm or the consequences.

In the Risk Assessment process, the most critical process steps in terms of drinking water safety are identified. If control is possible at these steps, they are Critical Control Points (CCP). Control limits for the CCPs are set, as well as monitoring and response procedures to follow when a control limit is reached.

In summary, the Risk Assessment procedure consists of:

- hazard identification;
- risk assessment, based on severity, likelihood and detectability;
- critical control point identification;
- critical limit determination; and
- establishment of procedures for deviations from critical control limits.

Halton’s Risk Assessment Procedure is described in 7 - Risk Assessment (DW-Water-PR-DRISK-1214). Members of the Region’s Risk Assessment Team(s) are outlined in the Risk Assessment Procedure. Before a risk assessment is initiated, the Risk Assessment Team reviews the description of the subject system (see Section 6) in order to ensure that any specific or unique requirements are taken into account in completing the risk assessment.

The Risk Assessment Team examines the subject system for potential hazards that could compromise the performance of the system and/or the quality of the drinking water. Hazards identified by the Ministry of the Environment, Conservation and Parks are also considered at this time. The Risk Assessment Team evaluates each identified hazard against the criteria outlined in the Risk Assessment Procedure and a Risk Rating is determined for each hazard. Hazards with Risk Ratings above a set threshold value are evaluated to determine whether a CCP can be established at the hazard location. Critical control limits and monitoring or response procedures are developed for those hazards whose risk ratings exceed the threshold value and for which applied controls will be effective in reducing or preventing the drinking water hazard. Regardless of Risk Rating, any hazards relating to disinfection processes are identified as CCPs.

The processes defined within the DWQMS Risk Assessments are verified once every calendar year and the risk ratings are assessed at least once every thirty-six months for each subject system. Equipment reliability and redundancy is also considered at this time. In the event that a new risk has been identified, the DWQMS Risk Assessment is reviewed and updated to include the newly identified risk as required.

### 8 RISK ASSESSMENT OUTCOMES

Potential hazards for each drinking water system have been identified, rated and assessed according to Section 7 of this Operational Plan. Risk Assessment Outcome Risk Analysis (DW-Water-LI-DRISK-1249) includes:

- identified potential hazardous events and associated hazard;
- assessed risks associated with the occurrence of hazardous events;
- ranked hazardous events;
- identified control measures to address the potential hazards/ hazardous events;
- identified critical control points and their respective critical control limits;
- procedures and/or processes to monitor the critical control limits and to respond to, report and record deviations from the critical control limits.

### 9 ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES & AUTHORITIES

The DWQMS Organizational Structure is defined in Figure 9-1. Respective roles, responsibilities and

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\(^3\) For the purposes of this Section, “hazard” is understood to mean “hazard and/or hazardous event”. 

authorities have been described in procedure 9 - Organizational Structure Roles Responsibilities and Authorities (DW-Water-PR-DROLS-1215).

The roles that have been defined in 9 - Organizational Structure Roles Responsibilities and Authorities (DW-Water-PR-DROLS-1215) include, but are not limited to, the:

- Owner,
- Owner Representative,
- Top Management,
- Operating Authority, and
- Quality Management System Representative.
10 COMPETENCIES

Element 10 of the Drinking Water Quality Management Standard requires that Owners/Operating Authorities document the knowledge, skills and abilities that personnel whose jobs affect drinking water quality must have, and the activities necessary to ensure that competency requirements are met.

Halton has established, defined and documented competencies required for personnel performing duties directly affecting drinking water quality. The Personnel Competency Procedure 10 – Competencies (DW-Water-PR-DCOMP-1216) describes minimum competency requirements for training and development for selected roles within the Operating Authority and outlines activities undertaken to develop and/or maintain
competencies for these roles. The Personnel Competency Chart Drinking Water Personnel Competency Chart (DW-Water-LI-DCOMP-1245) lists the roles that directly affect drinking water quality and outlines the required competencies for each role.

New employees undergo comprehensive on-the-job training to ensure that they achieve competency in all required work areas. This includes an Onboarding Program which communicates corporate policies and relevant legislation to all new employees. The Operating Authority encourages staff to maintain and upgrade required competencies by communicating training opportunities and offering training identified by Supervisors/ Superintendents. Training opportunities include Director-Approved training, On-the-Job training, and facility- or position-specific training. Records of all types of training are maintained by the Region.

11 PERSONNEL COVERAGE

The DWQMS must include a procedure which describes how sufficient personnel who meet the identified competencies are available for duties that directly affect drinking water quality.

Halton Region employs licensed operators, all of whom are required to hold operator certification for water treatment and/or water distribution. The Region’s personnel coverage measures are documented in the Operating Authority’s Personnel Coverage Procedure, 11 - Personnel Coverage (DW-Water-PR-DWQMS-1217).

Halton Region has appointed each system’s Supervisor/ Superintendent as the Overall Responsible Operator (ORO) for that drinking water treatment facility or distribution system. Coverage during off-hours is provided by a rotating on-call system for Supervisors/ Superintendents.

Operators-in-Charge (OICs) are on duty in each system each day. Every certified operator (Level 1 to 4) is considered to be an Operator-in-Charge while on shift.

Halton Region ensures that competent employees are available for coverage as needed through its collective agreement with the Canadian Union of Public Employees (CUPE), Local 2620. The Collective Agreement addresses shift coverage requirements, staff licensing requirements, response times to call-out emergency operations, on-call rotations and other measures taken by the Region and its unionized staff to ensure that personnel coverage is maintained.

Halton has a Standby Policy and Call-out / Overtime procedure to ensure that qualified personnel are called for overtime in accordance with the Collective Agreement. The current on-call/stand-by list is available to any staff person at all times from Access Halton.

Halton’s Burlington, Burloak and Oakville WPPs are staffed 24 hours per day, 7 days per week with alternating 12-hour shifts. North Halton’s water treatment operations (Milton, Georgetown, Acton and Campbellville) are staffed from 7:30am to 4:00pm, Monday to Friday. Regional treatment plants are equipped with SCADA systems to monitor treatment processes. SCADA systems can be accessed remotely by staff and critical alarms will contact a designated member of staff in the event of an emergency.

Distribution staff includes certified distribution operators and heavy equipment operators. These personnel are available on an on-call basis during off-hours.

Maintenance of the water systems (treatment and distribution systems) is provided a full complement of trade disciplines (i.e., millwrights, electricians, instrument technicians). These personnel provide support to all facilities/systems during regular hours and on an on-call basis during off-hours.

The Region has developed and maintains a contingency plan that documents measures to be taken by the Operating Authority in the event of a labour disruption affecting drinking water system operation. This is a confidential document.

12 COMMUNICATIONS

The DWQMS must be communicated to others. The QMS Communication Procedure is documented in 12 – Communications (DW-Water-PR-DWQMS-1218). The procedure addresses how the QMS is communicated from Top Management to the Owner, Operating Authority personnel, vendors, the public and how these groups communicate with the Owner and Operating Authority.

Halton Region communicates its DWQMS Policy in several ways, including but not limited to:

- Reports to Council
• Posting on the Halton Region website/intranet
• Posting within Halton Region facilities
• During DWQMS Overview Training.

The Operating Authority communicates with the Owner via the Planning and Public Works Committee and Council meetings and the preparation of associated reports. In turn, Council communicates with the Operating Authority through the approval of Reports to Council and to the Planning and Public Works Committee. Council can also communicate with the Operating Authority through the “Access Halton” service.

Top Management of the Operating Authority communicates with staff on a regular basis. The task of communicating DWQMS-related information may be delegated to other members of Management or the DWQMS representative. Methods of communication include memos, e-mails, tailgate meetings, the Intranet (“Halton Central”), internal staff newsletters, etc. In turn, Operating Authority staff is encouraged to voice any questions or concerns to Top Management within these forums.

The Operating Authority communicates with essential DWQMS vendors and service providers. This may be accomplished through provision of tender documents, mail-outs to vendors, purchase order specifications or through other means. The Essential Supplies & Services Procedure 13- Essential Supplies and Services (DW-Water-PR-DWQMS-1219) provides the details of this program.

The Operating Authority communicates relevant aspects of the DWQMS to the public. Members of the public can contact Access Halton to request information or provide comments, feedback or complaints. Halton Region also publicizes its Drinking Water System Annual Water Quality Reports and its Annual Flow Report following O. Reg.170/03 requirements.

13 ESSENTIAL SUPPLIES AND SERVICES

Supplies and services, both goods and people, coming from outside of the drinking water system can introduce risks. Supplies and services essential to the production and delivery of safe drinking water must be identified, and means to procure them at all times documented. Methods to ensure quality must also be documented. Documenting the quality expectations and continuing to assess whether or not the products meet the requirements, helps to minimize the risk to the drinking water system.

Halton subscribes to strict purchasing policies, procedures and bylaws. These must be followed by all parts of the organization including those related to the delivery of safe drinking water. The Essential Supplies and Services Procedure, 13- Essential Supplies and Services (DW-Water-PR-DWQMS-1219) outlines methods used by Halton Region in identifying the supplies and services that are essential for the delivery of safe drinking water, and provides details of the methods in place for ensuring their procurement and quality.

Essential supplies and services are identified in the Essential Supplies and Services Lists. These lists are compiled and maintained. Essential supplies and services can include, but are not limited to, the following:

• treatment chemicals,
• proprietary process equipment, and
• fuel.

The Essential Supplies and Services Procedure provides details of relevant procurement processes. All quality, delivery and procurement expectations are communicated to vendors and service providers on tender documents, purchasing agreements, purchase orders or blanket orders. Quality expectations are specified. For equipment and calibration items, the appropriate personnel determine quality requirements for the good or service. Vendor evaluations are completed periodically to ensure that goods and services comply with quality requirements.

14 REVIEW AND PROVISION OF INFRASTRUCTURE, REHABILITATION AND RENEWAL

Halton reviews infrastructure requirements annually utilizing the Region of Halton Asset Management Framework. This process ensures that the infrastructure needed to operate and maintain the subject systems is in place. The 14- Review and Provision of Infrastructure Procedure (DW-Water-PR-DWQMS-1220) provides details of this practice.

The infrastructure review evaluates current drinking water system infrastructure and helps in the formulation of recommendations and action plans for renewal projects, rehabilitation efforts or installation of new
infrastructure. Within this review process, staff examine all infrastructure required to operate the drinking water systems; this includes intake, treatment and distribution infrastructure as well as supporting infrastructure such as buildings, workspaces and associated equipment. The outputs of the DWQMS Risk Assessment documented under Element 8 are also considered at this time.

Operating Authority staff complete an assessment of infrastructure to develop a summary of recommendations for renewal, rehabilitation and/or provision projects. Applicable staff from Water and Wastewater Treatment, Water and Wastewater System Services and Infrastructure Planning and Policy within Public Works may participate to communicate infrastructure needs.

Critical inputs to the Infrastructure Review include (but are not limited to) water quality data, operations and maintenance data (i.e., fire flow testing, water main break data), facility assessment studies, Master Servicing Plan updates, hydraulic modelling data, etc. Previous results of infrastructure reviews are also considered.

The Infrastructure Review Team reviews these inputs and generates a list of infrastructure needs. Needs are prioritized according to Regional growth projections, regulatory requirements and alignment of initiatives with other Departmental areas (i.e., sewer improvement initiatives) or lower-tier Municipal initiatives (i.e., roads projects) including application of asset management principals.

Results of the Infrastructure Review are discussed with Top Management, Finance Department (Financial Planning and Budgets) representatives and relevant Operating Authority managers and are used to update the Region’s Infrastructure requirements and, in turn, the on-going 10-Year Capital Budget. Infrastructure Review results are communicated to Council via the Asset Management Reports and the Annual Budget and Business Plan.

15 INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

A summary of the programs in place to maintain, rehabilitate and renew infrastructure are documented in the DWQMS. Maintenance includes both planned (preventive) and unplanned activities and the maintenance program is monitored for effectiveness. The 15- Infrastructure Maintenance, Rehabilitation and Renewal Procedure (DW-Water-PR-DWQMS-1221) outlines the planned and unplanned maintenance activities. Infrastructure rehabilitation and renewal activities are documented within the Master Plan, the Asset Management Program, Asset Management Plan and the Budget and Business Plan.

15.1 Maintenance – Treatment Facilities

Planned (preventive) maintenance at treatment facilities, including activities relating to process equipment, emergency generators and building maintenance, is completed by staff within the Water Treatment section of the Water and Wastewater Treatment division. Maintenance Planners develop a Planned Maintenance (PM) Plan on an annual basis that consists of electrical, mechanical, instrumentation, SCADA and other types of preventive maintenance activities. Maintenance tasks are generated on a per-asset basis and are stored and managed in SAP. The Maintenance Superintendent/Subforepersons are responsible for the distribution of these maintenance tasks, and may distribute these to internal staff or may acquire contractor assistance for specialized tasks. Any maintenance activities completed by operations staff are recorded and provided to maintenance staff for updating in SAP.

Unplanned maintenance activities may arise as a result of process equipment inspections by operations staff. When deficiencies are noted, the Supervisor, Water Treatment (or designate) is informed. If the issue cannot be addressed by treatment operations staff, a notification is issued to maintenance staff by means of the SAP system.

The effectiveness of facility maintenance activities is tracked using Service Reports, Deficiency Reports and Recommendations that are generated by maintenance personnel in the completion of maintenance tasks. The SAP system also monitors and reports equipment performance trends; changes to PM programs may be made based on these trends.

15.2 Maintenance – Linear Distribution Systems

Planned linear distribution system maintenance is managed by Water and Wastewater Linear Systems staff. Planned maintenance activities include a valve exercising program, water main flushing, and hydrant maintenance.

When unplanned distribution system deficiencies are identified, the Superintendent, Water and Wastewater...
Linear Systems (or designate) is informed and he/she delegates the repair to a member of Water and Wastewater Linear Systems staff. If the issue cannot be addressed by Water and Wastewater Linear Systems staff, the work may be outsourced as described in 13- Essential Supplies and Services (DW-Water-PR-DWQMS-1219). The Computerized Maintenance Management System (CMMS) is used to assign, track and manage work orders and maintenance activities relating to distribution system maintenance. CMMS data is reviewed annually to assess the effectiveness of distribution system PM programs.

15.3 Maintenance – Outlying Stations

Planned (preventive) maintenance at Outlying Stations, including booster pumping stations and reservoirs, is managed by Water and Wastewater Stations staff. This includes activities relating to process equipment, emergency generators and building maintenance. Maintenance Planners develop a Planned Maintenance (PM) Plan on an annual basis that consists of electrical, mechanical, instrumentation, SCADA and other types of preventive maintenance activities. Maintenance tasks are generated on a per-asset basis and are stored and managed in SAP. The Maintenance Superintendent is responsible for the distribution of these maintenance tasks, and may distribute these to internal staff or may acquire contractor assistance for specialized tasks. Any maintenance activities completed by operations staff are recorded and provided to maintenance staff for updating in SAP.

Unplanned maintenance activities may arise as a result of process equipment inspections by Operations Staff. If the issue cannot be addressed by operations staff, the Superintendent of Operations and Maintenance is informed and a notification is issued to maintenance staff by means of the SAP system. The effectiveness of facility maintenance activities is tracked using Service Reports, Deficiency Reports and Recommendations that are generated by maintenance personnel in the completion of maintenance tasks. The SAP system also monitors and reports equipment performance trends; changes to PM programs may be made based on these trends.

15.4 Sampling, Testing and Monitoring

The focus of this element is to monitor conditions within the drinking water systems, maintain control and confirm the quality of the treated drinking water.

Halton Region conducts sampling, testing and monitoring activities on its processes and drinking water at raw water source/intake points, throughout its treatment processes, and within its distribution systems. Raw, process and treated water are all sampled, tested and monitored at various intervals and locations. 16 - Sampling Testing & Monitoring (DW-Water-PR-DSAMP-1314) outlines Halton Region’s drinking water sampling, testing and monitoring programs for each of its drinking water systems. The drinking water systems are monitored through regulatory programs under the guidance of Halton Region’s Laboratory and also through process monitoring and sampling programs at each facility to control the treatment processes.

Halton Region’s Laboratory is an accredited facility with its own QMS. Under its QMS, the Lab has developed sampling, testing and monitoring procedures governing various aspects of the Region’s sampling program. While these procedures fall outside of the scope of the DWQMS, references to the procedures may be included in the Sampling, Testing and Monitoring Procedure.

Sampling schedules for all regulatory parameters and locations are developed by the Halton Region’s Laboratory. The Lab ensures the sampling points are representative of the assortment of conditions observed throughout the drinking water systems including challenging conditions. The Laboratory staff reviews and updates its sampling points as required to ensure that the sampling program continues to be representative of all drinking water system conditions.

Results of sampling, testing and monitoring programs are summarized in the Annual Water Quality Reports which are posted on the Region’s website. As required by O. Reg.170/03, adverse water quality incidents (AWQIs) are reported to the Owner and presented in summary within the Annual Flow Report.

16 MEASUREMENT & RECORDING EQUIPMENT CALIBRATION & MAINTENANCE

Closely linked to Section 16, this element documents the calibration and maintenance of equipment used in sampling, testing and monitoring of treatment processes and treated water quality.
Halton calibrates and maintains all of its measurement and recording equipment associated with its drinking water systems. **17 - Measurement Recording Equipment Calibration and Maintenance (DW-Water-PR-DWQMS-1223)** outlines requirements for the calibration and verification of measurement and recording equipment used for sampling, testing and monitoring of the drinking water systems.

Measurement and recording equipment governed by this procedure may include, but is not limited to:

- chlorine analyzers (hand-held and continuous),
- pH meters (hand-held and process),
- turbidimeters (hand-held and process),
- thermometers,
- flow meters,
- data recorders (e.g. pressure).

Calibration and maintenance processes are documented for each piece of measurement/recording equipment. The **17 - Measurement Recording Equipment Calibration and Maintenance (DW-Water-PR-DWQMS-1223)** provides a summary of the relevant equipment and instrumentation and outlines the responsibility for calibration, the frequency required, the methods to be used and provisions for the storage of results & records.

### 17 EMERGENCY MANAGEMENT

Emergency preparedness means identifying what could happen in a drinking water system to cause an emergency and having processes and procedures in place to prepare for and respond to those emergencies. The DWQMS includes emergency procedures for communication, response and recovery, emergency training and testing of procedures, documented responsibilities for owner and operating authority personnel, links to municipal emergency planning measures and up-to-date contact lists.

Halton Region has several types of Emergency Plans. The Halton Region Community Emergency Response Plan (HRCERP), Halton Community Emergency Response Plan By-Law No. 56-14 supports the Region’s Health, Human Resources and Emergency Evacuation Centre plans. The Public Works Emergency Response Plan is a sub-plan to the Regional Emergency Response Plan. It outlines the duties and responsibilities of Halton Region Public Works Department staff during an event that impacts either the Region’s ability to deliver Regional services and programs or to execute response and recovery efforts during a potential, imminent or actual emergency.

**18-Emergency Management Procedure (DW-Water-PR-DEMRG-1224)** has been developed as a guidance tool for response, management and recovery in emergencies affecting any or all of the Region’s drinking water systems. The document includes a list of potential emergency situations or service interruptions and corresponding procedures for response and recovery in the event of one of these emergencies, including linkages with lower-tier Municipal Response Procedures where required. Emergency events or conditions in the manual may include, but are not limited to:

- contamination of the raw water supply,
- structural damage to a water treatment facility,
- contamination of a water distribution system,
- major watermain break resulting in loss of supply for an extended period.

The procedure also includes a summary of relevant roles and responsibilities in emergency situations, including those of the Owner and of key Operating Authority staff. Emergency Contact list **Emergency Contact List - Water Treatment (DW-Water-LI-DEMRG-1207)** and **Emergency Contact List - Distribution North and South (DW-Water-LI-DEMRG-1206)** have been linked to the procedure and is updated as required.

It is possible that an emergency situation can initiate at the Operating Authority level but expand or increase in severity thus requiring the assistance of other departments. Where the potential for this condition exists, the emergency response procedures include references to the Public Works and Regional Emergency Response Plans.
18 INTERNAL AUDITS

Internal audits are required by the DWQMS Standard to ensure conformity of the QMS to the Standard. Internal Audits, as well as third-party audits, are mechanisms used to fulfill the “check” and “improve” imperatives of the quality management system. The internal audit procedure describes audit criteria, frequency, scope, methodology and record-keeping. It also includes consideration of previous audit results, and how QMS corrective actions are identified and initiated.

A process has been developed for internal auditing and is defined in 19 - Internal Audit (DW-Water-PR-DAUDT-1225).

Internal audits are used to evaluate two types of conformance:

- conformance of documented DWQMS procedures with the requirements of the Drinking Water Quality Management Standard,
- conformance of implemented processes with documented DWQMS procedures.

17- Internal Audit Procedure (DW-Water-PR-DAUDT-1225) outlines requirements for the scheduling, execution and documentation of internal audits including the development of an Internal Audit Schedule, the definition of an audit scope, and the creation of an Internal Audit Report and addressing of any required non-conformities. Internal auditors must be provided with appropriate auditor training.

System non-conformities may be identified as a result of audit findings. These non-conformities are issued when a systematic problem, gap or discrepancy is identified through the internal audit process. System non-conformities are documented and resolved as per 21 - Continual Improvement Procedure (DW-Water-PR-DWQMS-1227). Findings and documented system non-conformities serve as input to the creation of an Internal Audit Report that is subsequently communicated to selected Operating Authority staff.

A summary of internal audit results is presented to Top Management as an input to Management Review (see Section 20 of this Operational Plan).

19 MANAGEMENT REVIEW

Management Reviews are conducted to determine the effectiveness of the DWQMS and to explore opportunities for improvement. Management Reviews are an additional mechanism used to fulfill the “check” and “improve” imperatives of the quality management system. The DWQMS Management Review procedure 20 - Management Review (DW-Water-PR-DMGRV-1226) includes a summary of required inputs to this review.

A Management Review meeting is conducted at least once every calendar year and, wherever possible, is scheduled to follow the completion of the DWQMS Internal Audit. Management Review participants include; Top Management Representatives, Operating Authority Managers, the QMS Representative and other participants as required.

The QMS Representative is responsible for scheduling and facilitating this Review and for ensuring all required input data is compiled and prepared for presentation at the meeting. At the meeting, Top Management reviews the information provided and identifies any deficiencies requiring further action. Minutes are kept of these meetings and the deficiencies and action items are documented as per the DWQMS Management Review procedure.

On completion of the Management Review meeting, the QMS Representatives compiles and summarizes the results and findings in an annual Report to Council. The Report includes a summary of the identified deficiencies along with a discussion of proposed actions to resolve the deficiencies.

20 CONTINUAL IMPROVEMENT

21- Continual Improvement Procedure (DW-Water-PR-DWQMS-1227) outlines a process for the identification, documentation and resolution of non-conformities. This procedure addresses the ‘improve’ requirement of the Standard.

Best Management Practices including any published by the Ministry of the Environment, Conservation and Parks are reviewed and considered for implementation at least once every thirty-six months.

Halton Region has developed a Corrective Action process to address non-conformities that occur in the
operation of its drinking water systems. Non-conformities can be identified by any staff member as a part of daily operations, through internal audits, or through management reviews. When a non-conformity is identified, it is documented on a Corrective Action Request (CAR) form and analyzed to identify its root cause. Corrective action measures are developed and implemented and verification activities are completed to ensure that the root cause has been effectively eliminated or controlled.

Preventive Action Requests are documented records of actions taken to prevent potential non-conformities. The Preventive Action Request process includes; a review to determine the necessary action and the documenting of the actions taken so they can later be reviewed for effectiveness.

Other continual improvement processes are completed on a regular basis in Regional operations. Examples of these processes include but are not limited to Adverse Water Quality Incident reporting, general operational troubleshooting and customer complaint recording.
Appendix A
Signatures of Endorsement

SIGNATURES OF COMMITMENT AND ENDORSEMENT

Top Management

Top Management endorse this Operational Plan and support the Drinking Water Quality Management System in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks’ Drinking Water Quality Management Standard (DWQMS) and other applicable legislation and regulations.

Top Management:

Jim Harnum, Commissioner of Public Works

Date

Nitti Subramaniam, Director of Water and Wastewater Treatment

Date

Lisa De Angelis, Director of Infrastructure Planning and Policy

Date

Marek Braczek, Director, Engineering and Construction

Date

Kiyoshi Oka, Director of Water and Wastewater System Services

Date

Owner

Acting on behalf of The Regional Municipality of Halton, the Regional Chair has the authority to endorse the Operational Plan on behalf of Halton Regional Council in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks’ Drinking Water Quality Management Standard (DWQMS) and other applicable legislation and regulations.

Gary Carr, Regional Chair

Date