



**CITY OF
St. Catharines**

Water Distribution System

**Drinking Water Quality
Management System**

Operational Plan

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Acronyms

AWQI:	Adverse Water Quality Incident
AWWA:	American Water Works Association
ANSI:	American National Standards Institute
DWQMS:	Drinking Water Quality Management Standard
EFES:	Engineering, Facilities and Environmental Services
LSSC:	Lake Street Service Centre
MOU:	Memorandum of Understanding
MW:	Municipal Works Department
OIC:	Operator-In-Charge
ORO:	Overall Responsible Operator
USO:	Underground Service Operator
WDS:	Water Distribution System
WTP:	Water Treatment Plant

1. Quality Management System

The St. Catharines Drinking Water Quality Management System (QMS) is documented in this QMS Operational Plan as part of the City’s efforts to ensure that clean, safe, and reliable drinking water is supplied to all consumers served by the St. Catharines WDS. The development and continual improvement of the plan will help ensure that all regulatory requirements are met and that consumers can be confident that their drinking water will be protected through the effective application of the QMS.

This plan was developed to conform to the Ontario Drinking Water Quality Management Standard (the Standard).

2. Quality Management System Policy

The DWQMS Policy is shown below.

The City of St. Catharines is committed to:

- Ensuring a consistent supply of safe, high-quality drinking water;
- Maintaining and continuously improving its Quality Management System; and
- Meeting or surpassing applicable legislation and regulations.

3. Commitment and Endorsement

The City of St. Catharines supports the implementation, maintenance, and continual improvement of a Drinking Water QMS for the St. Catharines WDS, as documented in this QMS Operational Plan, and approved by Municipal Council. Endorsement by the Owner and Top Management is demonstrated by their signatures in the endorsement section of the QMS Operational Plan.

Identification of new and proposed applicable regulatory requirements (e.g., via e-Laws, newsletters, emails) is the responsibility of Top Management and associated actions tracked through the Continual Improvement Log.

4. Designated Quality Management System Representatives

The City of St. Catharines designated the Manager of Environmental Services as the QMS Representative. In their absence, the Senior Water Quality Technician will be the alternate.

5. Documents and Records Control

Details regarding QMS document identification, retention, storage, and disposal as well as record control are contained within the Document and Records Control Procedure.

6. Water Distribution System

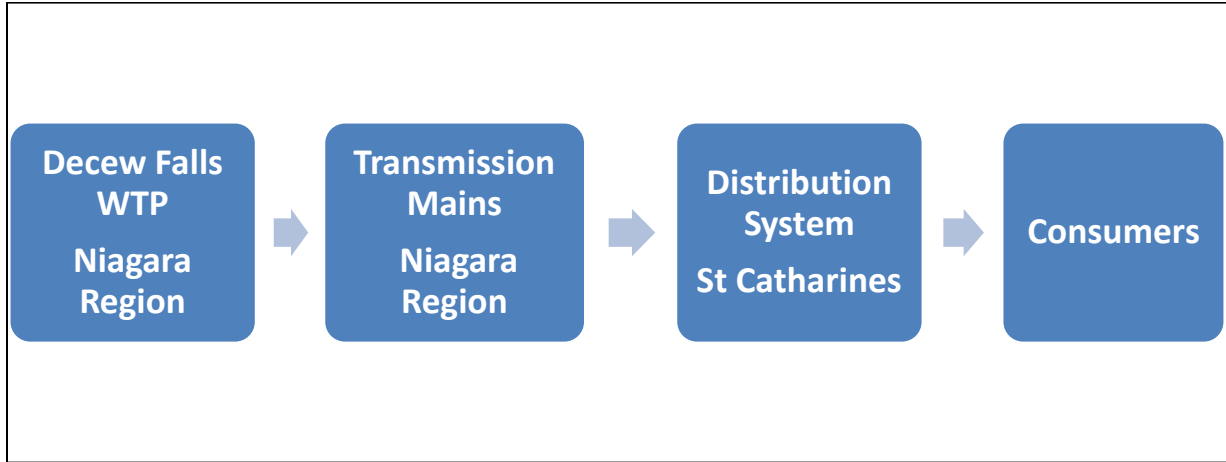
6.1 General

The St. Catharines WDS provides potable water to a population of approximately 145,000 residents and has approximately 37,800 residential and 4,200 Industrial/Commercial/Institutional accounts. The WDS is owned by the Corporation of the City of St. Catharines and operated through the EFES and MW Departments. The St. Catharines WDS is a stand-alone distribution system, one of several municipal networks supplied by the Decew Falls WTP, which is owned and operated by the Regional Municipality of Niagara ('Niagara Region' or 'Region').

A "Memorandum of Understanding – Re: Water Servicing" (April 21, 2016) exists between the Region and the City of St. Catharines that documents activities and processes undertaken to ensure the continued supply (including pressure), operation, and delivery of water services to City residents and customers.

The MOU clarifies infrastructure ownership, specifying the Region owns and operates all transmission mains and the first valve off any connections. The City is responsible for the remaining water mains and providing water to consumers. This is shown in Figure 6-2.

Figure 6-2: St. Catharines Distribution System Process Flow Diagram



6.3 Decew Falls Water Treatment Plant

The St. Catharines WDS relies upon the Region’s Decew Falls WTP to ensure the provision of safe drinking water. The City receives its water from the Decew Falls WTP through transmission mains owned by the Region. While the City is not responsible for the treatment of water, a description of the Decew Falls WTP is included below for informational purposes.

Owned and operated by the Regional Municipality of Niagara, the Decew Falls WTP is a conventional surface water treatment plant which incorporates Zebra Mussel control, travelling screens, coagulation, flocculation, sedimentation, filtration and disinfection in its process consisting of three separate treatment trains; referred to as Plants 1, 2, and 3, with a combined rated capacity of 227,300 cubic meters per day. Primary disinfection is achieved utilizing Sodium Hypochlorite with Ultraviolet light as enhancement. The Decew Falls WTP supplies drinking water to the Cities of St. Catharines and Thorold, Towns of Niagara-on-the-Lake, and sections of Lincoln, and is also interconnected with the Niagara Falls WTP.

6.4 Decew Falls WTP - Source Water

The source of water for this plant is surface water, from Lake Erie via an intake from the Welland Canal located approximately six kilometres from the WTP, near Allanburg. The water is diverted to Decew’s own 5.4-kilometer-long supply channel which flows by gravity directly to the WTP.

6.5 City of St. Catharines WDS

The WDS consists of a network of approximately 600 kilometres of piping and related appurtenances up to and including the curb box, within the road allowance of St. Catharines. Distribution system piping typically ranges in size

from 37 to 400 mm, and may consist of cast iron, ductile iron, asbestos-cement (transite), copper, high density polyethylene (HDPE) or polyvinyl chloride (PVC), depending upon the location and date of installation. Within the system there are also approximately 5,600 mainline valves and approximately 3,500 fire hydrants. Refer to the most recent Annual Summary Report for current watermain, hydrant and valve numbers.

Generally, the St. Catharines WDS includes all watermains with a diameter of less than 400 mm and correspondingly Niagara Region owns all transmission watermains with a diameter of 400 mm and larger with a few exceptions as reflected in GIS.

The St. Catharines WDS includes three pressure zones and related Pressure Reducing Valves (PRVs). Figure 6-3 shows the pressure zone locations.

The St. Catharines WDS does not include any equipment that provides Primary or Secondary Disinfection. The City has procedures in place to maintain and monitor the disinfection residuals found in the Drinking Water System Monitoring Program – Sampling Plan.

The City owns one booster pumping station in the system located on Tremont Drive at 1 Allandale Dr. The pumping station is equipped with two pumps, a booster pump, and a fire pump. The smaller pump keeps running to boost water pressure downstream of the pumping station on Tremont Drive and Circle Heights. The larger standby pump provides fire flow and maintains sufficient pressure under fire flow conditions.

There are no City owned storage tanks in the system. All storage tanks and an elevated standpipe are owned and operated by Niagara Region.

The City does not complete any additional treatment or re-chlorination activities.

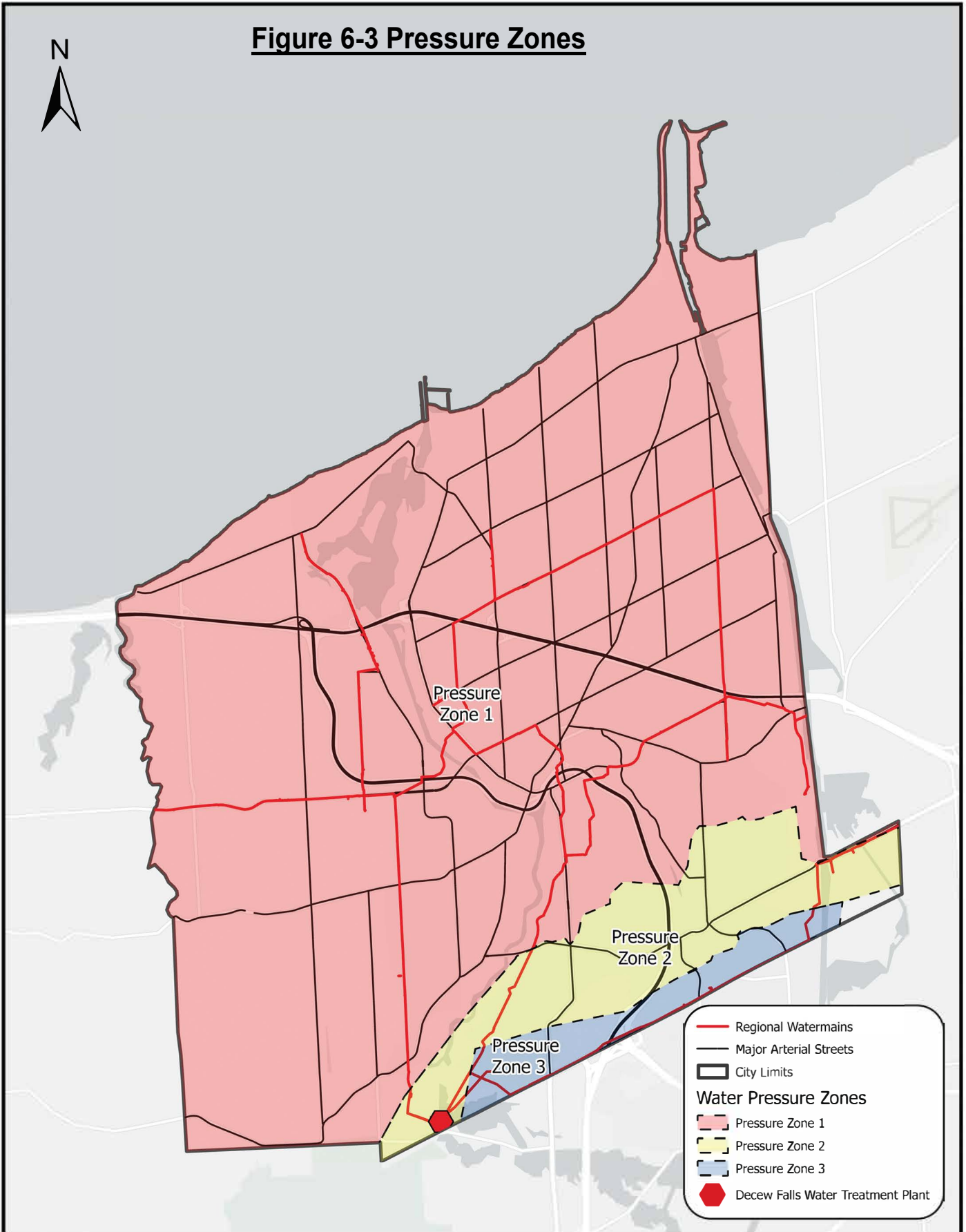
6.6 Water Source: Description of Decew Falls WTP

Treated water from the Decew Falls WTP serves as the drinking water source for the St. Catharines WDS. The quality of the drinking water leaving the WTP must meet or exceed all regulatory requirements. Regional data is provided to the City on an as requested basis.

6.7 Water Source: Common Event-Driven Fluctuations

As St. Catharines is not responsible for water treatment, the City's operations are not directly impacted by fluctuations in raw water quality. Event-driven fluctuations affecting raw water quality, such as storms, do not typically affect the City's operation of the drinking-water distribution system as the impacts of these fluctuations are managed by the Region at the treatment stage.

Figure 6-3 Pressure Zones



- Regional Watermains
- Major Arterial Streets
- City Limits
- Water Pressure Zones**
- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- ◆ Decew Falls Water Treatment Plant

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Water volume has not been an issue in the past for the City. The Welland Canal/Lake Erie serves as the raw water source for the Decew Falls WTP, and water levels do not fluctuate to a degree that would compromise WTP operations. A Regionally owned and operated treated water storage facility, the Allanburg Road standpipe, provides a limited backup supply of treated water for the distribution system.

6.8 Water Source: Operational Challenges and Threats

The City does not experience any significant operational challenges or threats related to the fluctuations identified in Section 6.7.

7. Risk Assessment

The Risk Assessment Procedure describes the method of hazard identification, risk assessment, and Critical Control Point (CCP) determination for the St. Catharines WDS.

8. Risk Assessment Outcomes

Risk Assessment Outcomes

The results of the risk assessment for the St. Catharines WDS are recorded in Risk Assessment Outcomes Table. All hazards were identified and categorized according to the Risk Assessment Procedure.

9. Organizational Structure, Roles, Responsibilities & Authorities

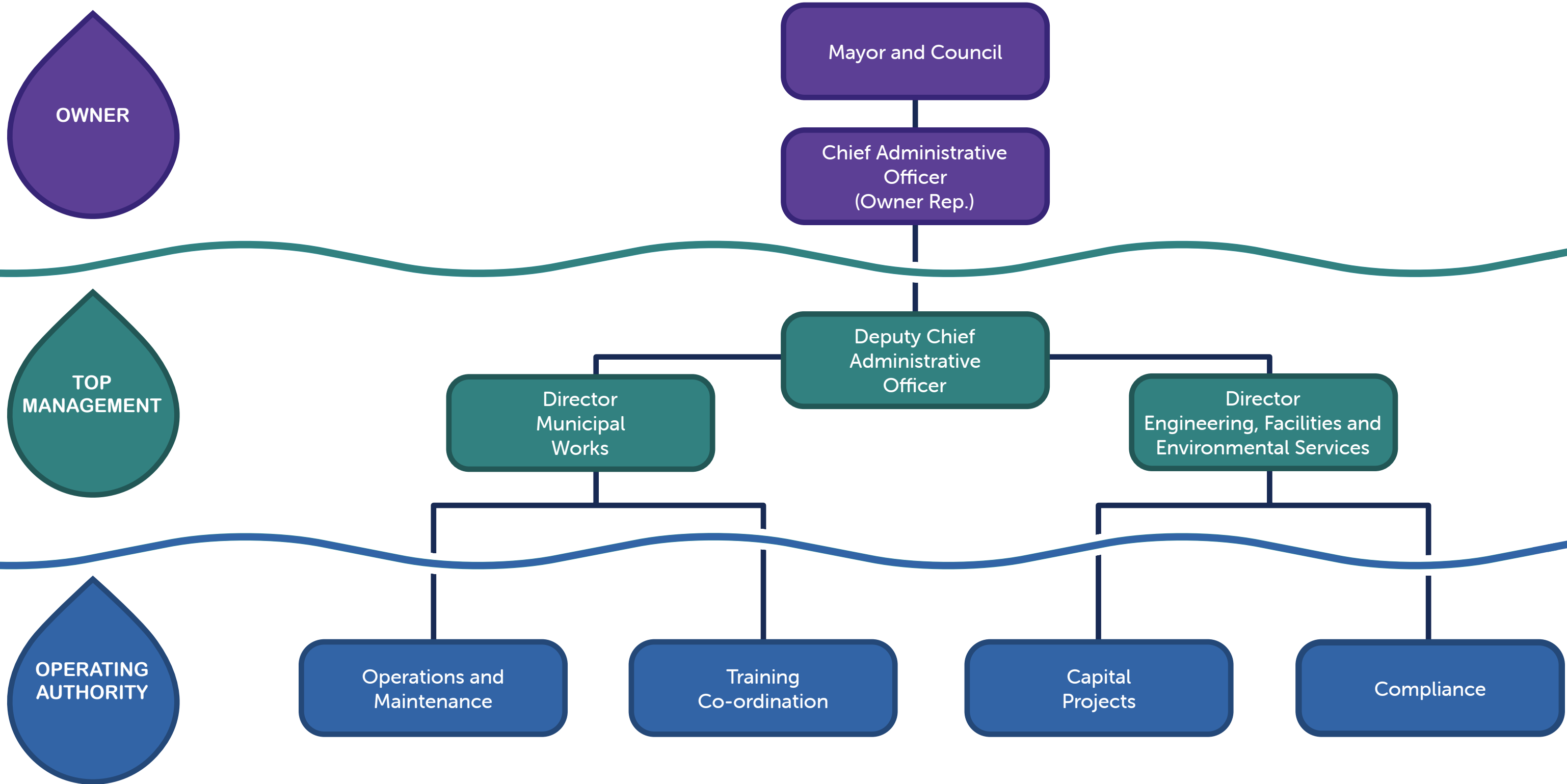
9.1 Organizational Chart

The St. Catharines Organization Chart is found in Figure 9.1 - St. Catharines Water Distribution System Organizational Chart.

10. Competencies

Details regarding the competencies of personnel performing duties directly affecting drinking water quality are contained within the Competencies and Training Procedure.

Water Distribution System Organizational Chart



11. Personnel Coverage

11.1 Distribution System

The St. Catharines WDS is typically staffed Monday through Friday, 7:00 am to 10:30 pm, and with a Supervisor at all times.

After hour emergency calls are forwarded to the on-duty Supervisor, who assesses the problem and calls out appropriate personnel according to approved call-out lists. An additional midnight shift is added during the winter season.

11.2 Designation for ORO & OIC

Details regarding the designation for the ORO and OIC are contained within the ORO/OIC Procedure.

11.3 Strikes and/or Lockouts

In the event of a strike or lockout certified management staff and Contractors will fulfill the roles of unionized staff, during emergency situations, as per the Contingency Plan.

12. Communications

The Communication Procedure describes the process for ensuring that relevant aspects of the QMS are communicated between Top Management and the Owner, City Personnel, suppliers, and customers/consumers.

13. Essential Supplies and Services

A Method of Purchasing and Quality Requirements for service providers and supplies has been developed and is contained in Essential Supplies and Services Procedure and Contact List where contact information for the various supplies and services can be found. This list is reviewed annually to ensure it is up-to-date and all quality requirements have been met.

14. Review and Provision of Infrastructure

Details regarding the annual review of the St. Catharines WDS' infrastructure is contained in the Annual Infrastructure Review Procedure. This review documents

the condition of the distribution system infrastructure components based on performance and maintenance records.

15. Infrastructure Maintenance, Rehabilitation, and Renewal

The following routine planned maintenance is conducted on the WDS:

- Valve inspection/exercising
- Summer and Winter hydrant inspections and maintenance
- Hydrant flow testing

All planned maintenance is scheduled and communicated to staff by the Manager of Linear Infrastructure Operations and/or Supervisors. Unplanned maintenance is conducted as required. All records are maintained as required in the Record Control Procedure.

The infrastructure maintenance, rehabilitation and renewal are described in greater detail in the Infrastructure Maintenance Procedure.

16. Sampling, Testing and Monitoring

The St. Catharines Drinking Water Surveillance Program is based on legislative requirements under the [Safe Drinking Water Act's Ontario Regulation 170/03](#).

All samples are taken following the City's Standard Operating Procedures and in accordance with the [Ministry of Environment's Practices for the Collection & Handling of Drinking Water Samples](#), and when applicable, any manufacturers' recommendations.

A detailed set of instructions for sampling and monitoring can be found in the Drinking Water Monitoring Program – Sampling Plan.

All microbiological, chemical, and chlorine residual results are available to the Public upon request. All sample results are summarized quarterly and annually. All results are incorporated into the City's Annual and Summary Reports which are available upon request and at: www.stcatharines.ca/water-utilities-and-services/water-quality/

All required treated water sampling is conducted by the Niagara Region at the DeCew Falls Water Treatment Plant, prior to entering the City's WDS. Annual and Summary reports detailing these sample results are shared with the City of St. Catharines and are available on-line.

17. Measurement Equipment Calibration, Verification and Maintenance

All analyzers and meters are calibrated according to the manufacturers' specifications for frequency and method of calibration as per:

- pH Sampling and Calibration Procedure;
- Verification Chlorine Meters Secondary Standards; and
- Calibration of Hach Chlorine Meters.

All calibration results are recorded and filed in accordance with the Record Control Procedure.

When calibrations are not completed in-house, calibration sub-contractors are used. A list of contractors can be found on the Essential Supplier and Services list.

18. Emergency Management

The document entitled Contingency Plan for a Major Disruption to the Water Distribution System outlines the conditions in the Water Distribution System that are considered to be major emergencies. This document also lists the person(s) responsible for initiating the response and recovery measures, as well as the process to be followed as emergencies escalate.

All drinking water system Operators are required to review the Contingency Plan at least every three years.

When practical, emergency procedures will be tested at least every three years.

19. Internal Audits / 20. Management Review

Internal Audits and Management Reviews are conducted at least once every Calendar year to determine the effectiveness of the QMS, and to explore opportunities for improvement. Internal Audits and Management Reviews, in addition to Third-Party Audits, are mechanisms used to fulfill the *check* and *improve* essential elements of the QMS. Refer to the procedures for conducting Internal Audits and Management Reviews.

21. Continuous Improvement

The City of St. Catharines shall strive to continually improve the effectiveness of its QMS through the use of Corrective Actions, Preventative Actions and Best Management Practices, from the annual audits, staff suggestions, regulatory inspections and Management Reviews. All potential continual improvements must be evaluated; the procedure outlining this process can be found in the Continual Improvement Procedure.

When appropriate, the City of St. Catharines will modify and update processes and procedures to improve operations and consumer satisfaction.