Drinking Water Quality Management System Operational Plan

James W. King Water Treatment Plant
And
Gananoque Distribution Subsystem

110 Kate St.
Gananoque, Ontario
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Original Copy:
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Table of Contents

Table of Contents	2
List of Appendices	2
Terms and Definitions	3
1. Introduction	5
2. Quality Management System Policy	5
3. Commitment and Endorsement	5
4. DWQMS Representative	6
5. Document and Records Control	6
6. Drinking Water System Process Description	6
7. Risk Assessment	10
8. Risk Assessment Outcomes	10
9. Organizational Structure, Roles Responsibilities and Authorities	11
10. Competencies	16
11. Personnel Coverage	16
12. Communications	17
13. Essential Supplies and Services	17
14. Review and Provision of Infrastructure and Resources	18
15. Infrastructure Maintenance, Rehabilitation and Renewal	18
16. Sampling, Testing and Monitoring	19
17. Measurement and Recording Equipment Calibration and Maintenance	19
18. Emergency Management	19
19. Internal Audit	20
20. Management Review	20
21. Continual Improvement	20

List of Appendices

Appendix A –Commitment and Endorsement
Appendix B –QMS Representative Appointment Letter
Appendix C – Document Control Procedure
Appendix D –Record Control Procedure
Appendix E – Sampling Procedure
Appendix F – Process Flow Diagram
Appendix G –Distribution Map
Appendix H –Hazard and Risk Assessment Procedure
Appendix I – Hazard and Risk Assessment Outcome
Appendix J- Communications Procedure
Appendix K – Essential Supplies and Services Procedure
Appendix L – Infrastructure Review Procedure
Appendix M – Calibration Procedure
Appendix N – Emergency Management Procedure
Appendix O – Internal Audit Procedure
Appendix P – Management Review Procedure
Appendix Q – Continual Improvement Procedure

Terms and Definitions in the DWQMS these terms have the following meaning:

Audit – a systematic and documented verification process that involves objectively obtaining and evaluating documents and processes to determine whether a Quality Management System conforms to the requirements of this Standard.

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

Consumer – the drinking water end user.

Corrective Action – action to eliminate the cause of a detected nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation.

Critical Control Limit – the point at which a Critical Control Point response procedure is initiated.

Critical Control Point – an essential step or point in the Subject System at which control can be applied by the Operating Authority to prevent or eliminate a Drinking Water Health Hazard or to reduce it to an acceptable level.

Document – has the same meaning as "document" defined in s. 2(1) of the Act.

Director – means the director appointed for the purposes of s.15 of the Act.

Distribution System – has the same meaning as "distribution system" defined in s. 2(1) of the Act.

Drinking Water Health Hazard – has the same meaning as "drinking water health hazard" defined in s. 2(1) of the Act.

Drinking Water Quality Management Standard (DWQMS or this Standard) - has the same meaning as Quality Management Standard for Drinking Water Systems approved under s. 21 of the Act.

Drinking Water System – has the same meaning as "drinking water system" defined in s. 2(1) of the Act.

Environmental Bill of Rights Registry – has the same meaning as "Registry" defined in s.2 (1) of the Act.

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

MECP or "the Ministry" - is the Ministry of the Environment, Conservation and Parks. This acronym will be used in all documentation related to the Drinking Water Quality Management System.

Municipal Drinking Water System – has the same meaning as "municipal drinking water system" defined in s. 2(1) of the Act.

Municipal Residential Drinking Water System – has the same meaning as "large municipal residential system" or "small municipal residential system" defined in s. 1(1) of O. Reg. 170/03.

Operating Authority – means, in respect of a Subject System, the person or entity that is given responsibility by the Owner for the operation, management, maintenance or alteration of the Subject System.

Operational Plan – means, in respect of a Subject System, the Operational Plan required by the Director's Direction.

Operational Subsystem – means a part of a Municipal Residential Drinking Water System operated by a single Operating Authority and designated by the Owner as being an Operational Subsystem.

Owner – has the same meaning as "owner" defined in s. 2(1) of the Act.

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

Primary Disinfection – has the same meaning as "primary disinfection" defined in s. 1(1) of O. Reg. 170/03.

Public – Subject System Consumers and stakeholders.

Quality Management System (QMS) – a system to:

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

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

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

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

Renewal – means the process of replacing the infrastructure element with new element(s).

Secondary Disinfection – has the same meaning as "secondary disinfection" defined in s. 1(1) of O. Reg. 170/03.

Subject System – means:

a) a Municipal Residential Drinking Water System where the system is operated by one Operating Authority, or
b) an Operational Subsystem where two or more parts of a Municipal Residential Drinking Water System are operated by different Operating Authorities.

Supplier – an organization or person that provides a product or service that affects 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.

Treatment System – has the same meaning as "treatment system" defined in s. 2(1) of the Act.

1 Quality Management System

The QMS Operational Plan defines and documents the Quality Management System (QMS) for the Town of Gananoque's Drinking Water System which is owned and operated by the Town of Gananoque. It sets out the policies and procedures with respect to quality management in accordance with the requirements of the Province of Ontario's Drinking Water Quality Management Standard (DWQMS).

The objectives of Town's Quality Management System (QMS) are:

- Ensure the effective management and operation of the water system
- Understand and control the risks associated with activities and processes related to the water system
- Achieve continuous improvement of the QMS and the water system performance

The QMS Operational Plan applies to all activities, processes, and practices related to the provision of safe drinking water by the Town of Gananoque.

2 Quality Management System Policy

Gananoque is committed to comply with all applicable legislation and regulatory requirements, as it pertains to drinking water quality, to supply consumers with safe drinking water and is committed to the maintenance and continual improvement of the Quality Management System.

We achieve these goals through the implementation of the management system comprised of policies, procedures, instructions and forms that demonstrate risk based treatment process evaluation, staff and Operating Authority personnel competency, open communications, appropriate contingency/incident response measures and response to consumers' concerns in a timely manner.

The drinking water system's owners, supervisors, managers and the employees who are directly involved in the supply of drinking water, share responsibilities of implementing, maintaining and contributing to the continual improvement of the QMS.

3 Commitments and Endorsement

The system owner, the Town of Gananoque, supports the ongoing development, implementation, maintenance, and continual improvement of the Drinking Water Quality Management System (DWQMS) for the Gananoque Public Utilities, as documented in this Operational Plan. Endorsement by the owner, (council, as represented by the Mayor), and top management, (represented by the CAO and Manager of Public Works), formally acknowledges the need for, and supports the provision of sufficient resources to maintain and continually improve the Town of Gananoque DWQMS.

Re-endorsement of the QMS Operational Plan is obtained from the Owner and/or Top Management when there is a change in Council (e.g. within 1 year of each new council elected) or Top Management personnel or where is a major change in the QMS Operational Plan. Appendix "A" includes the current records of Operational Plan endorsement.

Additionally, drinking water system-specific training or information is provided to describe Owner and Top Management roles, responsibilities and authorities as specified under s.19 of the Safe Drinking Water Act. For more information, see s.9 of this Operational Plan.

4 Quality Management System Representatives

Top Management has appointed the Utilities Compliance Coordinator's position to fulfill the duties of the QMS Representative. The QMS Representative is responsible and has the authorization to carry out the following duties.

- Administering the QMS by ensuring that processes and procedures needed for the QMS are established and maintained.
- Reporting to Top Management on the performance of the QMS and any needed improvements.
- Ensuring that current versions of documents required by the QMS are available and being used.
- Ensuring that through training and established processes, personnel obtains and maintains awareness of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the drinking water system.
- Promote awareness of the QMS throughout the Utilities Division, Top Management and the Owner.
- Coordinate internal and external audits and related duties.
- Provide Operating Authority personnel with technical and administrative consultation related to QMS documents and implementation.
- Implementing and overseeing the documents and records control procedure.

The Superintendent of Water and Wastewater has been designated as the alternate QMS Representative for times when the Utilities Compliance Coordinator is absent for an extended period. As the alternate, the Manager of Public Works has the same authority and responsibilities as the QMS Representative, as listed in this section.

A detailed description of the roles and responsibilities of the QMS Representative is included in Section 9, Organizational Structures, Roles, Responsibilities and Authorities. The QMS Representative appointment letter is included in Appendix "B".

5 Document and Records Control

Control of documents and records is essential to the QMS. Consistent control ensures the currency and ease of retrieval of each QMS related document and record. Proper maintenance of documents and records is critical for conformance with the QMS and compliance with the drinking water regulations.

Details regarding DWQMS document identification, retention, storage and disposal are contained within the Document Control Procedure, attached as Appendix "C". DWQMS records are retained according to the Records Control Procedure, attached as Appendix "D".

6 Gananoque Water Treatment Plant and Distribution Process Description

General

DRINKING WATER SYSTEM NUMBER: 220001254

DRINKING WATER SYSTEM NAME: James W. King Drinking Water System

DRINKING WATER SYSTEM OWNER:	Town of Gananoque
DRINKING WATER SYSTEM CATEGORY:	Large Municipal Residential System (LMRS)
DRINKING WATER SYSTEM CLASSIFICATION:	Water Treatment Class II Water Distribution Class II
PERMIT TO TAKE WATER:	85-P-4065 Issue Date: February 13, 1998
DRINKING WATER WORKS PERMIT:	156-201 Issue Date: August 4, 2016 Expiry Date: August 3, 2021
MUNICIPAL DRINKING WATER LICENCE:	156-101 Issue Date: February 22, 2017 Expiry Date: August 3, 2021
OPERATING AUTHORITY:	Town of Gananoque

The James W. King Water Treatment Plant and Gananoque Water Distribution Subsystem provide a potable water supply to residents and businesses of the Town of Gananoque.

The James W. King Water Treatment Plant is a Class II direct filtration water treatment plant having a design rated capacity of 10,220 m^3 per day.

The Gananoque Distribution system consists of approximately 48Km of pipe and reservoir storage for 1327 m^3 and is a Class II water distribution system.

Both systems are owned by the Town of Gananoque and operated by the Town of Gananoque Public Utilities Operating Authority personnel.

Potentially pathogenic organisms are removed from the raw water by the following process:
-Pre-chlorination
-Coagulation/Flocculation
-Filtration
-Post Chlorination
-Secondary Disinfection

These processes are part of a multi barrier approach to ensure potable water quality provided to the customers remains consistently compliant in order to protect the health of the public.

<u>Raw Water Source</u>

The Town of Gananoque draws its water from the St. Lawrence River via a 600mm intake pipe that is 416m long and terminating at an intake crib structure approximately 6m below the water surface. Chlorine solution is pumped to the

intake crib to provide some initial disinfection and for Zebra Mussel Control. The St. Lawrence River is considered to be a source of good quality surface water with minor seasonal variations in turbidity levels.

Raw water is passed through two removable stationary screens into the Raw Water/Low Lift Wells and is pumped by one or more of three vertical turbine pumps having a capacity of 60L/sec each. Pumps Feed the Rapid Mix Tank.

Coagulation/Flocculation

In the Rapid Mix Chamber process, water is mixed with Alum by the rapid mixer. Alum is a coagulant used to promote settling of particles in the water to enhance filtration. The Alum-Process water solution flows into the flocculation tanks where it is gently mixed to promote coagulation of suspended particles (floc). The Process water and floc particles then flow into the top of two dual media filters.

Filtration

The two dual media filters in the James W. King plant each contain 750mm of filter GAC over 250mm of silica sand. The filters stop floc that passes through the coagulation and flocculation process as the process water passes through the filter media and enters the clearwell. As this floc and debris accumulates in the filter beds, a process of reversing flow through the filter beds must clean them. This process referred to as backwashing and is accomplished by a designated backwash pump. This backwashed material and backwashed water is directed to two waste holding tanks. Backwash frequency and effectiveness is determined by parameters including headloss, turbidity and filter run duration. Backwash water is currently pumped into the Gananoque Wastewater Collection System. Filtered Water passing though the filter media travels into the under-drain system and into filter effluent wells located beneath the filters. These filter effluent wells feed the clearwell.

NOTE: Approved plan pending implementation includes:

- Redirecting clarified and potentially de-chlorinated backwash water to the St. Lawrence River while continuing to Pump settled backwash waste to the Gananoque Wastewater Collection System

Disinfection

Primary disinfection is achieved by the addition of chlorine gas to the filtered water. Disinfection, following filtration, allows for sufficient contact time in the clearwell attaining proper disinfection. Disinfection is to inactivate potentially pathogenic organisms that may have passed through the filtration process. A chlorine residual analyzer monitors disinfection effectiveness and consistency continuously. This analyzer is alarmed and in the event of a chlorine residual drop to below set points, an operator is notified by a WIN 911 alarm with the verbatim dialer acting as backup.
The Clearwell feeds four high lift pumps, two 100 HP pumps singly in operation with duties rotated by operators and two 200 HP fire pumps in the event of a major fire. The Gananoque Distribution System daily average flow is included in the Annual Reports.

Gananoque Distribution System

The Gananoque Distribution System supplied by the high lift pumps within the James W. King Water Treatment Plant consists of approximately 48 Km of water main varying in materials in size from 100mm to 350mm including Cast Iron, Ductile Iron and PVC. The system pressure varying from 45-65psi is supplied throughout the system by the high lift pumps and the Elevated Storage Tank.

The single pedestal spherical Elevated Storage Tank can contain approximately 1327 m^3 of treated water and is located near the Public Works Garage at 665 Charles St. N. Gananoque.

The System also contains approximately 230 Fire Hydrants, mostly Canada Valve Centurion Models.

Sampling

Sampling and monitoring throughout the James W. King Water Treatment Plant and the Gananoque Distribution System is governed by provincial regulations. Samples are taken from multiple locations throughout the plant and distribution system according to predetermined practices and procedures. When required, samples are submitted for testing by an accredited laboratory. See Appendix "E" – Sampling Procedure.

The James W. King Water Treatment Plant process flows are included in Appendix "F".

The Gananoque distribution drawings are included in Appendix "G".

6.1 Gananoque Source Water Overview

General

Gananoque's sole drinking water source is the St. Lawrence River. The St. Lawrence River is typically very low in turbidity (<1 NTU), low in colour, and slightly basic. Temperature varies significantly on a seasonal basis from approximately 2°C to 22°C. Chemical and bacteriological analysis of the raw water done once every calendar year, quarterly, weekly and daily indicates a good quality source of raw water.

Events

Turnover(s) of raw water in the river caused by temperature fluctuation commonly in the spring and fall seasons, generally occurs over 2 to 3 days, and during that time raw water turbidities can increase due to additional previously settled particles suspended in the source. Operating Authority personnel make adjustments if necessary in the treatment process during these events to continue effective treatment of the source water.

Temperature changes throughout the year require additional adjustments to the treatment process, which can be temperature sensitive.

Threats

Threats to Gananoque's raw water source include threats to the source water itself, threats to the intake crib and threats to the intake pipe. Gananoque's Intake Crib is located approximately 400m offshore and at a depth of 6m offering protection from most potential damage by marine watercraft. Its largest potential threat comes from wastes and potential mishaps from marine freighters and recreational craft. The crib is threatened also by Zebra Mussel growth; however, it is protected by chlorinated water pumped directly to the intake. Contamination threats are the same as that of the St. Lawrence River itself including runoff from farms and businesses, spills and upstream sewage overflows. Protection from these occurrences is offered by existing spills reporting programs and procedures.

Operational Challenges

Operational Challenges from the source waters are relatively minimal. Operating Authority personnel are in constant availability to the plant in order to handle changes to the treatment of the raw water. Due to the location and age of the Intake Structure, its most significant issue is the general wear, tear and aging of the materials. This general wear, tear and aging are accounted for by using infrastructure improvements as required. Public challenges are minimal due to the nature of the area and location of pipe and crib. Neither is susceptible to arbitrary vandalism.

7 Gananoque Risk Assessment

Appendix "H", the procedure entitled "Hazard Analysis, Risk Assessment and Critical Control Point", describes the hazard identification, risk assessment, and critical control point determination for the drinking water system. The procedure consists of four main exercises: hazard identification, risk assessment, critical control point determination, and critical limit identification.

8 Gananoque Risk Assessment Outcomes

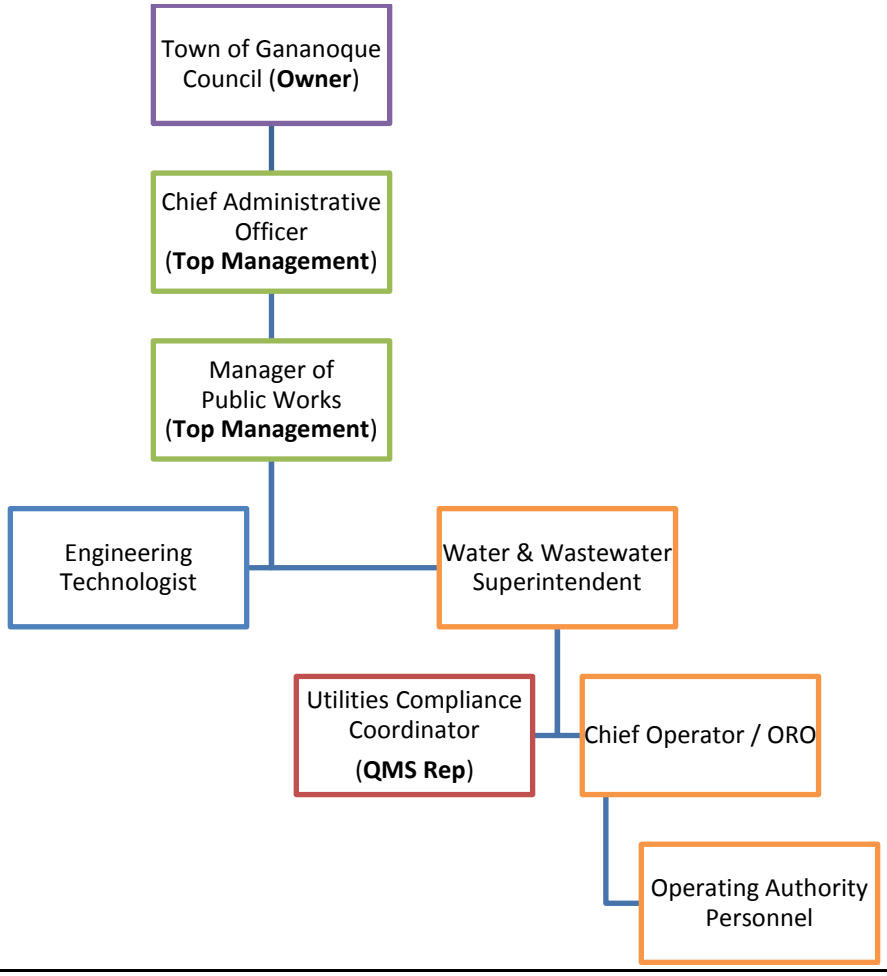
The risk assessment outcomes table documents the initial hazard identification exercise conducted. All hazards were identified and categorized according to the Drinking Water Hazard Analysis, Risk Assessment and Critical Control Point procedure. The Risk Assessment Outcomes are included in Appendix "I".

Justification of Critical Control Point Selection

Critical Control Points, as determined by the Hazard Assessment Committee, were any hazards with a total score of nine (9) or greater. However, a hazard with a total score less than 9 may be determined to be a Critical Control Point if determined to be significant by the Committee.

The Selected Critical Control Points are:
1- Distribution System Pressure (selected via risk assessment)
2 - Distribution System Free Chlorine Residual (selected via risk assessment)
3 - Filter Effluent Turbidity (selected due to O.Reg.170/03, even though score less than nine (9) when assessed).
4 – Adverse water quality (primary and secondary disinfection-related)

9 Organizational Role and Position Chart



9.1 Organizational Structure, Roles, Responsibilities and Authority

The purpose of this section is to outline the organizational structure of the drinking water system. It also defines the roles, responsibilities and authorities of personnel considered most directly related to the provision of a safe and reliable municipal drinking water for the Town of Gananoque as they relate to drinking water quality.

The Ministry Drinking Water Quality Management Standard defines the following:

"Owner" is every person who is a legal or beneficial owner of all or part of the drinking water system

"Operating Authority" is the person or entity that is given responsibility by the owner for the operation, management, maintenance or alteration of the drinking water system

"Top Management" is a person or group of persons that meet the following criteria:

- Work within the operating authority

- Make decisions about the QMS and DWS
- Make recommendations to the owner about the drinking water system
- They are the highest level of management within the operating authority making these decisions and recommendations

9.2 Owner – Town of Gananoque Council

The Town of Gananoque has ownership and oversight of the water system, including the treatment plant, storage and distribution watermains, individual water services up to the property line and water meters within the system.

The elected Council (the Owner) has the overall responsibility and authority to ensure that:

- requirements, as it pertains to drinking water quality are being met
- A Municipal Drinking Water License and Drinking Water Works Permit are obtained and maintained
- A quality management system is developed, implemented and maintained
- The operating authority is accredited

In addition, as such, Council is responsible for ensuring the delivery of a safe and reliable supply of drinking water to the consumers and residents connected to the drinking water system.

Council, as the owner, is made aware of their roles, responsibilities and authorities through drinking water system-specific training or information is provided to describe Owner and Top Management roles, responsibilities and authorities as specified under s.19 of the Safe Drinking Water Act.

9.3 Top Management (Corporate) – Chief Administrative Officer

The Chief Administrative Officer is responsible for and has the authority to perform the following:

- Report on the performance and oversight of municipal drinking water systems owned by the municipality based on information from Top Management (operations) and Operating Authority Personnel
- Endorse the ongoing development, implementation and improvement of the QMS
- Participate in management reviews as described in element 20
- Make recommendations to the owner to have management and Operating Authority personnel in place to ensure the municipal drinking water system owned by the municipality is supplying safe and reliable drinking water
- Approve payments for goods and services received in accordance with procurement limits
- Hire, discipline or termination of management and Operating Authority personnel.

9.4 Top Management (Operational) Manager of Public Works

The Manager of Public Works is responsible for and has the authority to perform the following for the drinking water system owned by the municipality:

- Ensure management of the system is performed according to regulatory requirements and the QMS
- Endorse the ongoing development, implementation and improvement of the QMS
- Ensure that the operating authority is accredited

- Make recommendations to the Owner and Top Management (Corporate) for system and QMS improvements or changes, based on information provided by Operating Authority personnel.
- Make recommendations to the Owner and Top Management (Corporate) for approval of bylaws, administrative and technical policies based on information provided by Operating Authority personnel
- Inform the Owner and Top Management (Corporate) of deficiencies, if any, in the drinking water system or the QMS
- Obtain from the Owner and provide to the Operating Authority resources or infrastructure as necessary
- Long term planning and budgeting
- Ensure management reviews of this Operational Plan are undertaken and participate in the meetings as described in element 20
- Communicate with the Owner, Top Management Corporate, the public, regulatory authorities, other utilities and various professional organizations on behalf of the Operating Authority
- Recommend the hiring or termination of Operating Authority personnel to the CAO, as authorized by the Owner
- Discipline Operating Authority personnel
- Approve payment for goods and services received in accordance with procurement limits

9.5 Water and Wastewater Superintendent

The Water and Wastewater Superintendent is responsible for and has the authority to perform the following for the drinking water system owned by the municipality:

- Ensure operations of the systems are performed according to regulatory requirements and the QMS
- Supervision of Operating Authority personnel for the system
- Coordinate the activities of the Utilities Operators in the planning and scheduling of work
- Provide guidance to and receive feedback from Operating Authority personnel on regular operations and future needs
- Report adverse water quality incidences to the Owner and Top Management
- Develop operations and capital budgets
- Evaluate and prioritize long-term rehabilitation and upgrading needs
- Assist Top Management (Operational) with long-term planning and budgeting
- Review and supervise contracts for system repairs, replacement and rehabilitation
- Prepare reports for capital expenditures, budgeting, maintenance activities, operations and infrastructure assessment to present to Top Management, the Owner, the Public and regulatory authorities, as required
- Develop and maintain a preventive maintenance program for the infrastructure, equipment and resources of the system
- Evaluate and select contractors, construction materials, process equipment, treatment chemicals and maintenance equipment
- Approve payment for goods and services received in accordance with procurement limits
- Discipline Operating Authority personnel
- Act as primary contact for investigation and response to customer complaints
- Maintain customer complaints records
- Issue work orders to Management and Operating Authority personnel as required
- Make appointments with residents, contractors and other agencies to investigate complaints or locate water service
- Assume the duties of the QMS, in his/her absence

9.6 Utilities Compliance Coordinator

The Utilities Compliance Coordinator is responsible for and has the authority to perform the following for the drinking water system owned by the municipality:

- Endorse the ongoing development, implementation and improvement of the QMS
- Undertake management reviews and chair Management Review Committee meetings as described in element 20
- Inform Top Management (Operational) of system and QMS performance and deficiencies
- Make recommendations to Top Management (Operational) for system and QMS improvements or changes, based on information provided by Operating Authority personnel, risk assessments, audit reports, management reviews and compliance inspection reports
- Develop and recommend to Top Management (Operational) necessary bylaws, administrative and technical policies to ensure the operations of the drinking water systems are performed according to regulatory requirements and the QMS
- Liaise with regulatory authorities regarding operational compliance of the systems and any other matters under the authorities' jurisdiction
- Report adverse water quality incidences to the Owner and Top Management
- Develop standard operating strategies, bylaws, policies and procedures
- Communicate standard operating strategies, bylaws, policies and procedures to Operating Authority personnel
- Review and approve QMS documentation

9.7 Chief Operator/ORO

The Chief Operator is responsible for and has the authority to perform the following:

- Maintain MOE Operator Certification at the required plant and distribution system certification level
- Communicate established standard operating strategies, bylaws, policies and procedures to Operating Authority personnel
- Coordinate daily work and provide technical direction to the Operator in charge, Utilities Operators and selected contractors so the operations of the system are performed according to regulatory requirements, the QMS and established policies and procedures
- Coordinate operations and maintenance activities of the drinking water system
- Respond to operational emergencies
- Report on operations and maintenance activities to the Utilities Supervisor
- Ensure the collection of operational data
- Endorse the ongoing development, implementation and improvement of the QMS
- Evaluate treatment process and distribution system operations, water quality data, water demand and other operations data to ensure operations of the system are performed according to regulatory requirements and the QMS
- Make recommendations to Utilities Supervisor regarding optimization and improvement of the system
- Inform Utilities Supervisor of system and QMS performance and deficiencies
- Assist with the implementation of standard operating strategies, bylaws and established policies and procedures
- Report adverse water quality and non-compliance incidences to the Utilities Supervisor

- Establish programs for the continuous supply of chemicals, materials and equipment required for the production and supply of potable water
- Ensure that proper documentation regarding certification and/or accreditation of treatment chemicals and laboratory service is received before the services are rendered or supplies delivered
- Assist in the development, implementation and maintenance of a preventive maintenance program for the infrastructure, equipment and resources of the system
- Conduct internal audits as requested
- Attend training
- Assume the duties of ORO for the Drinking water system owned by the municipality, as assigned

9.8 Operating Authority Personnel

The Utilities Operator is responsible for and has the authority to perform the following for the drinking water system he/she is assigned to:

- Maintain required MOE Operator Certification for water treatment and water distribution systems
- Carry out the daily duties for the treatment and distribution process to ensure operations are performed according to regulatory requirements and the QMS
- Collect samples, perform testing, rounds and maintenance in accordance with regulatory requirements, the QMS and established policies and procedures
- Carry out required operations and maintenance activities
- Endorse the ongoing development, implementation and improvement of the QMS
- Make data entries in the logbooks and on log sheets
- Follow established procedures and complete required forms
- File records
- Report and act upon non-conformance and non-compliance issues
- Respond to operational emergencies
- Communicate with the Chief Operator/ORO on all aspects of operations and maintenance of the drinking water system
- Attend training
- Conduct internal audits as requested
- Perform maintenance duties in accordance with applicable technical and safety codes of practice
- Communicate progress on maintenance activities and deficiencies to the Chief Operator/ORO

9.10 Maintenance Contractors

In support of the operations of the drinking water systems, maintenance contractors will be hired to carry out various maintenance activities from time to time. The Chief Operator/ORO or Operator in Charge will oversee the activities of all contractors while conducting business on the drinking water system's premises and therefore have no responsibilities or authorities under the scope of the QMS.

10 Competencies

According to O. Reg. 128/04, all operators (not including the ORO) are required to possess, at a minimum, a valid OIT certificate in Water Treatment and Water Distribution. The ORO must hold, at a minimum, a certificate matching the class of the drinking water system.

Operator Training Hours

- For an operator to maintain his/her certificate, a certain number of training hours are needed. This is dependent on the class of facility. Refer to MECP Guideline 4.5.
- Training can be provided by the OA or a qualified third-party contractor.

Satisfying Competencies

- Water & Wastewater Superintendent is responsible for determining training needs and ensuring competencies for employees with duties affecting drinking water quality.
- On-the-Job training is provided by the township and other contractors.
- Relevant on-the-job training sessions are determined by the Water & Wastewater Superintendent or designate.
- Resources are provided by the township for external training.
- Competency is demonstrated by having appropriate education, training, skills and experience required for relevant position.
- It is the responsibility of both the operator and the township to ensure competency expectations are met
- If an employee is hired without the full competency requirements, they are not assigned full duties (as a condition of employment), and then regular internal / external training is conducted to acquire the competency requirements.
- Water & Wastewater Superintendent or designate reviews performance to determine when full competency requirements have been met and employee can be assigned full duties.

Relevance of Duties/Training Needs

- Personnel are made aware of the relevance of their duties on providing safe drinking water through the Water & Wastewater Superintendent.
- The QMS policy is posted at a central operations location.
- Relevant procedures are reviewed by all staff as they pertain to their duties at least once per calendar year.
- The QMS Representative tracks the training planned, the training completed and related hours for Operator Certifications.
- Operators-in-training (OIT) designation is the minimum requirement for working with the drinking water system and only under the direction of a certified operator.

11 Personnel Coverage

Gananoque Public Utilities employs certified operators, all of whom are required to hold operator certification for water treatment, water distribution, wastewater treatment and wastewater collection. In the event of a Union strike or lockout, the Town would prepare a Ministry-required contingency plan for business continuity for their review and approval.

Gananoque Public Utilities employs certified operators, all of whom are required to hold certificates for water treatment and water distribution. Gananoque Public Utilities provides sufficient daily coverage, typically from 07:00-15:30 during the week. Off-hours standby coverage is also provided 24 hours a day.

The Town has designated the Chief Operator as the Overall Responsible Operator (ORO) for the James W. King WTP and subsequent subsystems. In the event the ORO is absent, an alternate ORO is named from eligible Utilities Operators. The Town of Gananoque has one designated Operator from Monday to Sunday, 24/7. The operator on standby rotation is responsible for after hours, weekends and holidays.

Standby Coverage

- Off-hours emergencies are addressed by the designated standby operator.
- The on-call schedule is typically set by the Water and Wastewater Superintendent, or designate.
- Typical on-call emergencies can be handled by the standby operator with support from other Operators.

All Gananoque Public Utilities facilities are monitored with alarm systems and set points. When alarm conditions are encountered, the alarm system calls the standby phone and sends an email to all operators, supervisor and ORO through WIN 911. If alarm calls remain unacknowledged, the Verbatim Dialer takes over and automatically dispatches the alarm. If the dialer remains unacknowledged, it begins calling Operating Authority personnel starting with the supervisor, ORO and then cell/residences of the Operating Authority personnel through a preprogrammed list. Alliance Alarms answers any calls made to the Town's emergency number. Alliance calls the standby operator to relay the message. A record of this call is also text to the Supervisor.

12 Communications

The procedure for communicating relevant Drinking Water Quality Management System information to the Owner, Operating Authority personnel, suppliers that have been identified as Essential under element 13 of this Standard, and to the public is documented in Appendix "J" Communications Procedure.

13 Essential Supplies and Services

Quality Assurance of Essential Supplies and Services is achieved through documentation of applicable accreditation, licenses and certifications. The Town of Gananoque requires that suppliers of process chemicals verify the quality of each product through documented references like Certificates of Analysis, Referenced Standards or Standards Organizations, or use of Pre-qualification process.

Through the town's purchasing processes, requests for bids, tenders, quotes, and proposals include specifications as they related chemicals, labs used, parts purchased, contractors used, etc.

Methods of Procurement

Procurement is conducted under the Town's Procurement Policy/By-Law.

Quality of Supplier Products and Services

Quality Assurance for the Town's interest is attained by confirming accreditation, third party contract administration, and certifications of product as required.

See Appendix “K” – Essential Supplies and Services Procedure and List

14 Review and Provision of Infrastructure

Throughout the year, the Town of Gananoque regularly reviews the adequacy of its infrastructure by utilizing a variety of methods and programs. Information collected with these programs is recorded by the appropriate staff and is used in preparation of the annual budget. This information assists staff in identifying and prioritizing a list of required infrastructure projects. This list of infrastructure projects is then included in the 10 Year Capital Plan in accordance with O.Reg 588/17, for consideration by Council. Projects not selected by Council are documented and placed back in the rolling ten-year capital plan. The Infrastructure Review Procedure is attached as Appendix “L”.

15 Infrastructure Maintenance, Rehabilitation and Renewal

Infrastructure maintenance, rehabilitation and renewal are addressed by the following:

Planned Maintenance

Planned Maintenance is sourced from manufacturers’ manuals, consultation and/or past experiences. Scheduled tasks are either by internal standard operating procedure followed by the Operator in Charge while on duty, or by the issuance of work orders by the Public Utilities Supervisor or Chief Operator/ORO.

Unplanned Maintenance

Unplanned maintenance can occur for many reasons including equipment malfunction, equipment failure, accident, or any other incident or combination of scenarios; This could mean replacement or repair of infrastructure or equipment which is either unplanned for that term of its lifespan or at the end of its lifespan. The Town of Gananoque’s Operating Authority personnel maintains preparedness for repairing or expediting the repair by maintaining spares, replacements or back-ups for units.

The Water and Wastewater Superintendent, Manager of Public Works and/or the Overall Responsible Operator of the system authorize unplanned maintenance. The Operator in Charge typically responds to this work and such repairs are made under the direction of the Operator in Charge or designated individual. If deemed necessary additional Operating Authority personnel are called in and Public Works staff is contacted in the event excavation work is required. If the Public Works Department is unable to provide the excavation, work, a third party contractor is contacted.

Renewal / Capital Upgrades

The Utilities Division in conjunction with the Manager of Public Works and the Asset and Infrastructure Plan, plans renewal and Capital upgrades of infrastructure and equipment. All major items are budgetary and as such must be approved by the Town of Gananoque’s Council.

The Manager of Public Works or designate presents the annual operating and capital budgets to the Mayor and council once every calendar year. The Treasurer prepares the budget schedule.

Appendix “L” – Infrastructure Review outlines the procedure for infrastructure review

16 Sampling, Testing and Monitoring

Gananoque Public Utilities Division uses a sampling program for the James W. King Water Treatment Plant and the Gananoque Distribution System based on legislative requirements. This sampling and monitoring program is conducted using sampling and monitoring practices and procedures as per Ministry guidelines, laboratory direction and additional training.

Throughout any maintenance or infrastructure renewal project undertaken within the Gananoque Distribution System, operators ensure sampling, recording and testing according to the AWWA Standards for Disinfecting Water Mains and any other applicable legislation.

Laboratory results are acquired from in-house analyses, as well as from a selected accredited laboratory. In-house laboratory results are monitored, recorded and stored by the operating authority and copies are kept in the Water Treatment Plant (WTP) Control room. Bacteriological and chemical results from the accredited laboratory are emailed to the WTP, the Utilities Supervisor and copies are kept at the WTP.

Copies of bacteriological and chemical analytical results are available to members of the public by request. In-house laboratory results are available to members of the public and may be provided upon request. All analytical results are summarized in tables at the end of the calendar year and are discussed in the James W. King WTP Annual Report. This annual report is also made available to the Owner and any interested member of the public upon request and is available on the town's website http://www.gananoque.ca/community-services/public-works-utilities/water-and-sewer/annual-reports,

17 Measurement and Recording Equipment calibration and Maintenance

A certified instrumentation technician performs calibrations once every 12 months. The results of the calibrations are maintained as records. Appendix "M" describes the procedure used to perform Maintenance and Calibration on measurement and recording devices.

18 Emergency Management

The Emergency Response Procedure, Appendix "N", describes the general response and recovery processes to be followed when dealing with a drinking water emergency and evaluating the effectiveness of completed response and recovery operations. The procedure also identifies the requirements for and the processes used to identify potential future drinking water emergencies, develop contingencies to respond to potential emergencies, and evaluate the effectiveness of those contingencies.

The Town of Gananoque has an Emergency Plan, which is supplementary to the Utilities Emergency Procedures. These plans identify the Town's overall role during municipal emergencies and the internal mechanisms to fulfill that role. Specific to drinking water emergencies, the Utilities Emergency Procedures contain response plans for drinking water system critical infrastructure failure, which outlines the response and recovery actions, considerations, and corporate level responsibilities for major drinking water emergencies.

19 Internal Audits

Internal Audits are conducted at least once every calendar year to verify conformity of the QMS to the requirements of the DWQMS. Internal Audits are a "check" activity of the DWQMS that provides a formal process for evaluating the effectiveness of the DWQMS.

A detailed procedure for conducting internal audits is attached as Appendix "O".

20 Management Review

Management Reviews are conducted at least once every calendar year to report the status of the DWQMS to Owner Representatives and Top Management and to provide the information needed to make decisions on the maintenance and continual improvement of the DWQMS.

DWQMS Committee Members: • Utilities Compliance Coordinator • Chief Operator/ORO • Manager of Public Works • Engineering Technologist	▪ Provide input at committee meetings regarding the development and maintenance of the DWQMS ▪ Assist as needed and as directed by the Manager of Public Works with any of the duties of the Designated DWQMS Representative(s) ▪ Provide technical and administrative consultation and/or approval for DWQMS document preparation ▪ Assist as needed with DWQMS internal audits

A detailed procedure for completing management reviews is attached as Appendix "P".

21 Continual Improvements

Continual Improvements are a commitment made by both operating authority personnel and management.

Operating Authority personnel within the Town of Gananoque are all licensed in Water Treatment and Water Distribution and Supply. As part of being licensed, operators are required to maintain knowledge with mandated courses and training hours to improve knowledge and understanding of the water treatment and supply process and Gananoque's Water System.

Continuous improvement of the DWQMS shall be achieved by:

Tracking Continuous Improvement

- ✓ Review and document all continuous improvements in the management review summary report
- ✓ Continual improvements to be reviewed at the annual management review meeting

Implementing Best Practices

- ✓ Review and consider best practice recommendations from MECP every 36 months with Top Management at the annual management review meeting and document in meeting minutes

Identify and Management of Corrective Actions

- ✓ Corrective Action Request form will identify;
    - Root cause of non-conformity
    - Corrective immediate short term action to be taken
    - Auditor statement verifying corrective actions are effective

Identifying and Implementing Preventive Actions and Potential Non-Conformities

- ✓ Corrective Action Request form will identify;
    - Operating Authority personnel or other staff to identify and eliminate the occurrence of potential non-conformities
    - Potential non-conformities will be submitted to QMS rep for review
    - All potential non-conformities will be documented in the annual summary report and reviewed and the annual DWQMS Management Review Meeting

A detailed procedure for Continual Improvement is attached as Appendix “Q”.

Appendix A

PROCEDURE TITLE: Commitment and Endorsement		PROCEDURE NO: 1001 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REV DATE: July 30, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: July 14, 2015

The system owner, the Town of Gananoque, supports the ongoing development, implementation, maintenance, and continual improvement of the Drinking Water Quality Management System (DWQMS) for the Gananoque Public Utilities, as documented in this Operational Plan. Endorsement by the owner, (represented by the Mayor), and top management, (represented by the CAO and Manager of Public Works), formally acknowledges the need for, and supports the provision of sufficient resources to maintain and continually improve the Town of Gananoque DWQMS.

November 20, 2019
Date

Town of Gananoque (Owner)
Mayor / CLERK

November 20, 2019
Date

Town of Gananoque (Top Management)
CAO

Nov 20, 2019
Date

Town of Gananoque (Top Management)
Manager of Public Works

Re-endorsement of the QMS Operational Plan shall be obtained from the Owner and/or Top Management when there is a change in Mayor/Council/Top Management personnel or where is a major change in the QMS Operational Plan.

The Corporation of Town of

GANANOQUE

MOTION / RESOLUTION OF COUNCIL

DATE: November 19, 2019	MOTION NO. 2019 – 244
Subject: Drinking Water Quality Management Standard (DWQMS) Operations Plan	
MOVED BY:	Deputy Mayor Osmond
SECONDED BY:	Councillor O'Connor

AS RECOMMENDED BY THE COMMITTEE OF THE WHOLE, BE IT RESOLVED THAT THE COUNCIL OF THE TOWN OF GANANOQUE, ENDORSES THE OPERATIONAL PLAN (V2.0 2019) IN ACCORDANCE WITH THE SAFE DRINKING WATER ACT, 2002 (SDWA) AND THE REGULATIONS AND OTHER INSTRUMENTS MADE UNDER THAT ACT, AS PRESENTED IN COW REPORT UTIL-2019-04.

Ayes 7 **Nays** Ø

Carried: ✓

Defeated: _____

Tabled/Postponed: _____

Ted Lojko, Mayor

MA s. 246 - When a recorded vote is requested, the Clerk will call for each Councillors vote (Aye or Nay), mark the recorded vote as indicated by the member, and announce whether the motion is carried or defeated. The Mayor will then sign the motion.

RECORDED VOTE:	Aye	Nay
Anderson, D.		
Haird, A.		
Harper, M.		
Kench, M.		
O'Connor, D.		
Osmond, D.		
Lojko, T.		
TOTALS		

Appendix B

GANANOQUE

Canadian Gateway to the 1000 Islands

August 12, 2019

Letter of Appointment

Christine Brennan is appointed and authorized by Top Management as the Quality Management System ("QMS") representative under the Drinking Water Quality Management System for the Gananoque Water Treatment Facility.

The QMS Representative, irrespective of other duties shall:

- Administer the Quality Management System by ensuring that processes and procedures needed are established and maintained.
- Report to Top Management on the performance of the Quality Management System and any need for improvement.
- Ensure that current versions of documents required by the Quality Management System are being used at all times.
- Ensure that personnel are aware of all applicable legislative and regulatory requirements which pertain to their duties for the Gananoque Water Treatment Facility.
- Promote awareness of the Quality Management System throughout the Operating Authority.

Signed,
The Corporation of the Town of Gananoque

Shellee Fournier, CAO /Human Resources

Appendix C

PROCEDURE TITLE: Document Control		PROCEDURE NO: 1002 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REV. DATE: July 30, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: November 15, 2010

1.0 Procedure Description

This procedure outlines the methods used by the Gananoque Operating Authority to control the creation, approval, distribution and revision of all documents related to the Quality Management System (QMS).

2.0 Reason for Procedure

Consistent control ensures the currency, accuracy and ease of retrieval of each QMS document. Proper maintenance of documents is critical for conformance with the Drinking Water Quality Management Standard and for compliance with drinking water legislation.

3.0 Critical Set points

The designated QMS representative or alternate representative shall be responsible for control of all QMS documents. All documents must meet the approval of the QMS representative before initial or revision issuance. The presence of a signature in the QMS header on the document indicated this approval.

4.0 Instructions

4.1 Documents requiring control within Quality Management Standard include:

- Internal Documents
  - Operational Plan
  - Procedures
  - Instructions
  - Forms (Excluding work orders)
- External Documents
  - Applicable Drinking Water Regulations
  - Applicable Municipal Bylaws
  - Applicable Industry Standards
  - Equipment Manuals

The methods by which control over records will be exercised are described in the Record Control Procedure

4.2 The QMS Representative shall maintain a current list of all internal and external documents. This list consists of the document title, QMS reference, retention time and date of last revision for each document.

4.3 Internal Documents

4.3.1 All QMS internal documents shall contain a standard header containing the Title, Document #, Issue/Revise Date and QMS Representative Signature.

4.3.2 All QMS original documentation shall be stored in hard copy at the Public Works Office and on the central computer. The electronic copy shall be password protected and limited access to the QMS Representatives.

4.3.3 The currency of each internal document is ensured by comparison of the revision date in the document header to that of the original stored in the Public Works Office.

4.3.4 New or changed internal documents will be presented to all affected employees.

4.4 External Documents

4.4.1 All controlled copies of external QMS documents shall be stored at the Public Works Office.

4.4.2 Current equipment manuals, operational manuals and contingency manuals shall be kept up to date and stored in a known and accessible location at the James W. King Water Treatment Plant

4.5 Obsolete internal and external QMS documents are promptly removed from use. Paper copies are disposed via shedding and electronic copies are deleted from the database. Only the current version is maintained.

4.6 Internal and external documents shall be reviewed at least once every calendar year, as a component of the annual internal audit and management review. A review may also take place when a significant change occurs in operations such as a change in the type of process chemical or a change in equipment.

5.0 Associated Documents

- Record Control Procedure
- Document Control List

Appendix D

PROCEDURE TITLE: Records Control		PROCEDURE NO: 1003 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REV. DATE: July 30, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: October 15, 2010

1.0 Procedure Description

This procedure provides guidance for the identification, use, retention and protection of all records generated that are related to the Quality Management System (QMS).

2.0 Reason for Procedure

Consistent control ensures the ease of retrieval of each record generated by Operating Authority personnel. Proper maintenance of records is critical for conformance with the Drinking Water Quality Management Standard and for compliance with drinking water legislation.

3.0 Responsibility

The designated QMS representative or alternate representative shall be responsible for ensuring that an effective method for controlling all QMS records is maintained.

4.0 Procedure

4.1 Records may be retained electronically and/or in hard copy.

4.2 Minimum retention times for all Ministry of the Environment's records shall be as per applicable legislation.

4.3 In those circumstances where a minimum record retention time is not specified by any legislation, including those required demonstrating conformance to the DWQMS, records shall be retained for a minimum of 5 years.

4.4 Filing and storage of hard copy records shall be in such a way that they are protected from damage and are readily retrievable.

4.5 Electronic records stored on the Gananoque Water Treatment Plant folder are backed up each day

4.6 Records shall be made available to the public where required by legislation.

5.0 Associated Documents

- Document Control Procedure
- Document Control List

Appendix E

PROCEDURE TITLE: Drinking Water Sampling, Testing, Monitoring and Analysis		**PROCEDURE NO: 1004**
		ISSUED BY: C. Brennan
AUTHORIZED BY: Utilities Compliance Coordinator	**REV. DATE: July 30, 2019** **REVIEWED BY:** **C. Brennan**	**ISSUE DATE: January 13, 2005**

1.0 Procedure Description

This procedure describes the sampling schedule and analytical program used for monitoring water quality at the James W. King Water Treatment Plant. It also outlines the responsibilities of Operating Authority personnel and outside agencies in regards to analyses performed and reporting duties.

2.0 Reason for Procedure

Regular and strict adherence to a schedule is required to meet legislated requirements and to ensure that all Operating Authority personnel involved are aware of their responsibilities and the required timing. All sampling and analysis is performed to comply with Ontario Regulation 170/03 as amended or to monitor additional parameters that affect water quality monitoring or aid in process control.

3.0 Responsibility

Operating Authority personnel, under the direction of the ORO and/or Supervisor. All Operating Authority personnel who have been issued a valid Ontario Drinking-Water Operator Certificate are permitted to carry out drinking water sampling and conduct laboratory analyses. The Operating Authority personnel perform all drinking water sampling, as well as the daily analyses. All other analyses must be performed by the staff of an accredited laboratory.

4.0 Procedure

4.1 Sampling, testing and monitoring upstream

4.2 Sampling, testing and monitoring of the upstream raw water source is conducted by the Ministry of the Environment Drinking Water Surveillance Program (DWSP). Upstream sampling of the intake line is completed by The City of Kingston and not the responsibility of the Town of Gananoque. No additional upstream sampling, testing or monitoring is conducted.

4.3*Continuous monitoring* - The following process areas are monitored continuously with on-line analyzers:

- ✓ Intake crib: temperature, pH, and turbidity
- ✓ Low lift header: pre-filter free chlorine residual
- ✓ Filter #1&2: turbidity
- ✓ Discharge header: free chlorine residual, turbidity, pH, temperature and pressure. SCADA system, which provides Operating Authority personnel with the capability to continuously monitor all measurable plant parameters, is currently in place. Alarm System is tested weekly

4.4*Daily sampling and analysis:*

- ✓ Routine laboratory tests are generally conducted daily at the plant by the Operating

Authority personnel on duty.

- ✓ Routine laboratory tests are recorded on the daily lab log sheet with parameters uploaded to the Water Trax database. The daily log sheets are saved on the GWTP server.

4.5 *Weekly sampling and analysis*

- ✓ Weekly bacteriological analysis is performed on raw water and treated water from various points in the Gananoque distribution systems as indicated in Microbiological Sampling Procedure 204 as per O.Reg 170/03.
- ✓ Bacteriological samples shall be delivered in designated coolers to the accredited laboratory within 36 hours after sample is taken. Our accredited laboratory provides pickup and delivery services. If the laboratory is unable to pick up and deliver samples, Town staff shall arrange to deliver samples to the lab within the required timeline.

4.6 *Quarterly sampling and analysis*

- ✓ On a quarterly basis, drinking water from the Gananoque distribution systems shall be tested for Trihalomethanes (THM's) and Haloacetic Acids (HAA's). Nitrates/Nitrites samples are collected from the treated water discharge.

4.7 *Annual sampling and analysis*

- ✓ Annual samples are typically collected as per Ontario guidelines and must be analyzed for inorganics (Schedule 23) and organics (Schedule 24). Samples to be analyzed under Schedule 23 and Schedule 24 shall be collected from the treated water discharge tap.

4.8 *Additional sampling requirements*

- ✓ Lead Sampling: lead sampling will be conducted in the Gananoque distribution systems as per Ontario regulations.

4.9 *Adverse Sample Results*

- ✓ Reference procedure for Adverse Water Quality - EP 1107

4.10 *Chain of Custody and Certificate of Analysis Records Control*

- ✓ Chain of Custody (C of C) form shall be completed and submitted to the laboratory with all samples.
- ✓ All emailed lab Certificate of Analysis shall be stored in a binder at the GWTP. Once original certificate of analysis is received, the completed C of C form must be attached to the corresponding certificate of analysis and filed.
- ✓ All other regulatory sampling, testing, and monitoring results shall be compiled using WaterTrax database into a monthly report. The monthly report shall be forwarded to the Supervisor who communicates the sampling, testing and monitoring results to the owner.

5.0 *Associated Documents*

- ✓ Adverse Water Quality Procedures
- ✓ Sampling Calendar

	Raw Water Sample	Treated Water Sample	Distribution Sample
Continuous		• Turbidity (on each filter effluent line)	
Daily			• Free chlorine residual
Weekly	• E. Coli *or* Fecal Coliforms • Total Coliforms	• E. Coli *or* Fecal Coliforms • Total Coliforms • Heterotrophic Plate Count	• E. Coli *or* Fecal Coliforms (13 samples/month) • Total Coliforms (13 samples / month) • Heterotrophic Plate Count (Only 25% of the samples require this test, i.e. 4 samples/month)
Every Three Months		• Nitrate & Nitrite	• Trihalomethanes and Haloacetic Acids (On water from a point in the distribution system likely to be high)
Every Year		• Organics and Inorganics (parameters listed in Schedules 23 & 24 of O.Reg. 170/03)	• Lead (Distribution system points likely to be high in lead)
Every Five years		• Sodium • Fluoride	

6.0 Notes:

- ✓ When treated or distribution microbiological samples are taken, another sample must be taken at the same time from the same location and tested immediately for free chlorine residual
- ✓ General bacteria population should be expressed as:
  - -Background colony counts on a total coliform membrane filter, or
  - -Colony counts on a heterotrophic plate count
- ✓ Samples meant to be taken every three months (Nitrates, Nitrites, Haloacetic Acids and Trihalomethanes) should be taken on January 1, April 1, July 1 and October 1 of every year, or within two weeks after the specified date.
- ✓ Annual samples and 'Every Five years' samples should be taken on January 1, or within two weeks after that date.

7.0 For all sampling (except continuous monitoring), records must be kept of:

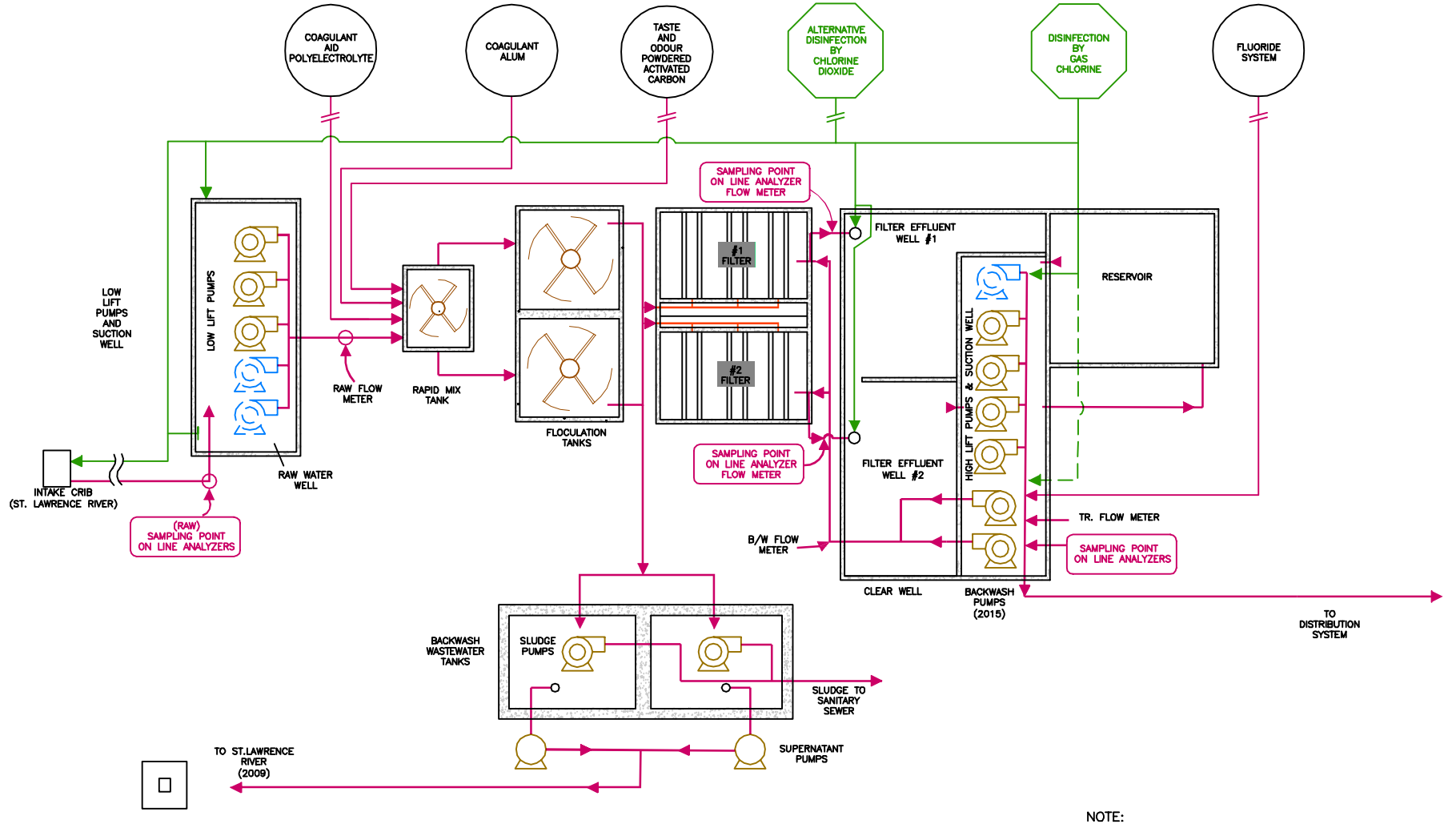
- ✓ Date and time sample was taken, name of person who took the sample.
- ✓ For operational checks, must also record the date and time of testing and name of person who performed test.
- ✓ All results received from the lab must be retained and reported in the Town's annual report

8.0 If a test result obtained for inorganics (Schedule 23), lead or organics (Schedule 24) exceeds half of the standard in ODWS Schedule 2, the frequency of sampling and testing for that parameter must be increased to one every three months. Regular sampling & testing can resume if the parameter doesn't exceed half of the ODWS standard.

- ✓ When sending a water sample to a lab for testing of a new parameter required by Reg. 170 that you have not tested for before, before the test is done you must notify the Director of the Approvals Branch at MECP which lab will do the testing. There is a form provided on the MECP website for this purpose.
- ✓ Eight distribution samples must be taken per month for bacterial testing, plus 1 distribution sample for every 1,000 people served by the system, with at least one of the samples being taken in each week (Population of Gananoque = about 5,000, so thirteen (13) samples are required per month.
- ✓ Distribution samples should be tested for:

  E.Coli or Fecal Coliforms
  Total Coliforms
  Heterotrophic Plate Count (only 25% of samples require this test- i.e. four samples)

Appendix F



NOTE:
UPDATED FROM TSH/AECOM PROCESS FLOW DIAGRAM
PROJECT NO. 108466 – 6/16/2009

*DASHED LINES FOR FUTURE USE.

NOT IN SERVICE OR REMOVED

PROJECT:

WATER TREATMENT FACILITIES

GANANOQUE, ONTARIO

DRAWING:

PROCESS FLOW DIAGRAM

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ENGINEERS · ARCHITECTS · PLANNERS
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DESIGN:	SS/OTHERS
DRAWN:	KTK/OTHERS
CHECKED:	
JLR #:	27038-07

DRAWING #:

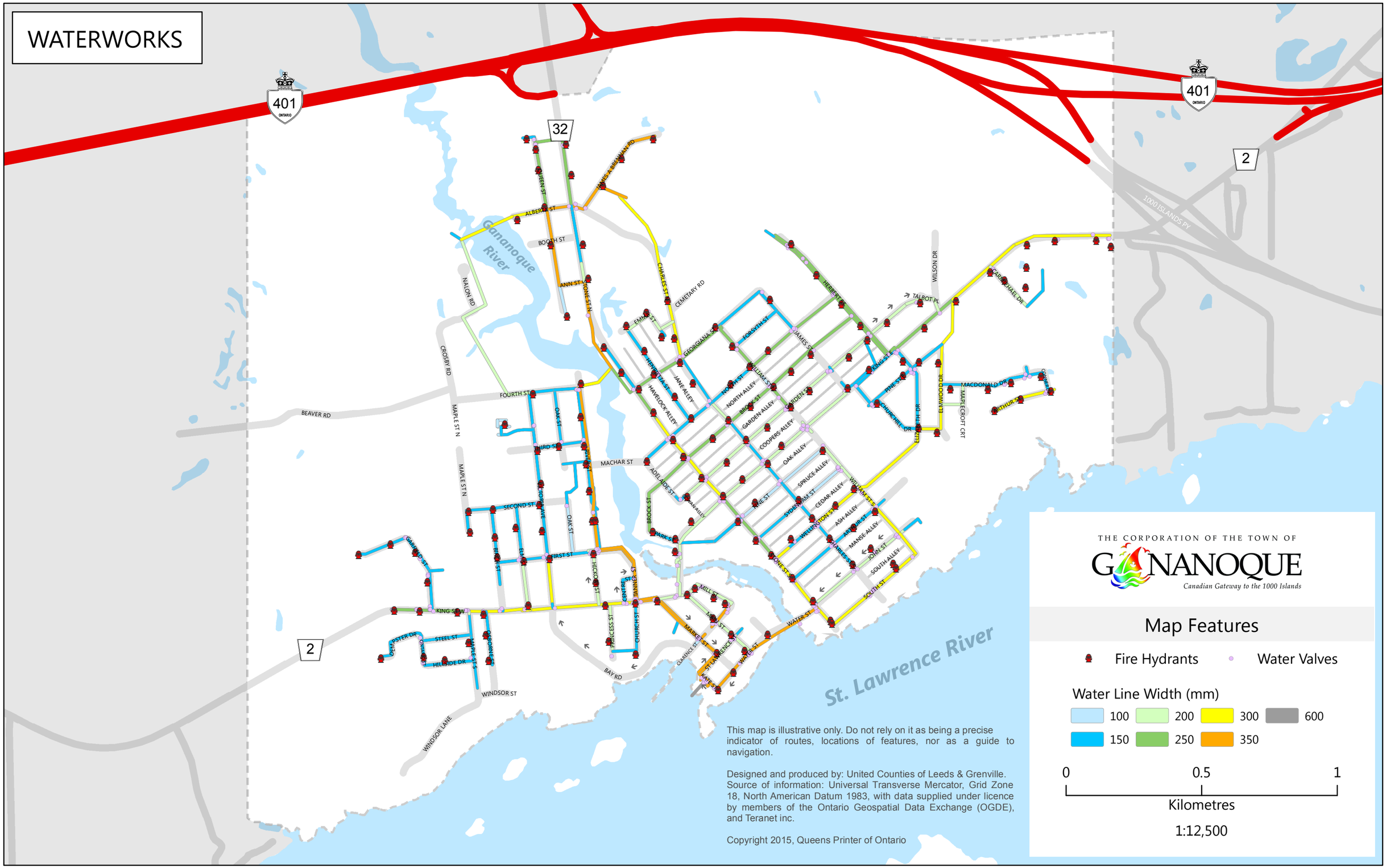
FIGURE 1

File Location: R:\27000\27038-06 Gananoque Assest Inventory\JLR DWG\Civil\Process Flow Chart.dwg

PLOT DATE: February 2, 2017 2:21:50 PM

Appendix G

WATERWORKS



This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.

Designed and produced by: United Counties of Leeds & Grenville. Source of information: Universal Transverse Mercator, Grid Zone 18, North American Datum 1983, with data supplied under licence by members of the Ontario Geospatial Data Exchange (OGDE), and Teranet inc.

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THE CORPORATION OF THE TOWN OF
GANANOQUE
Canadian Gateway to the 1000 Islands

Map Features

Fire Hydrants Water Valves

Water Line Width (mm)

100 200 300 600
150 250 350

0 0.5 1
Kilometres

1:12,500

February 25,2019 Rev

Appendix H

PROCEDURE TITLE: Hazard Analysis, Risk Assessment and Critical Control Points		PROCEDURE NO: 1005 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REV. DATE: July 31, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: October 20, 2010

1.0 Procedure Description

This procedure describes the method used by Operating Authority personnel to identify hazards to the drinking water quality, create or update a risk assessment and determine Critical Control points.

Definitions

- ✓ Hazard: Potential risk to public health and safety, and surrounding environment
- ✓ Critical Control Point: 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.
- ✓ Critical Control Limit: the point at which a Critical Control Point response procedure is initiated.

2.0 Reason for Procedure

- ✓ Identifying risks and hazards to drinking water quality.

3.0 Responsibility

The designated QMS representative and hazard assessment team shall be responsible for ensuring the hazard assessment plans, procedures and determinations are conducted. The hazard assessment committee shall consist of all Operating Authority personnel, the DWQMS Rep and Manager of Public Works (as required).

4.0 Procedure

4.1 Setting up a Hazard Assessment team or committee consisting of at least 4 members with knowledge of the water treatment system, its equipment and what constitutes an adverse water quality indicator.

4.2 The Hazards Assessment Committee with assistance from personal knowledge, manufacturers' specs and diagrams and senior Operating Authority personnel creates a hazard assessment list.

4.3 From the Hazard Assessment with the assistance of the Hazard Assessment Committee a list of hazards is made that require a Risk Assessment along with reviewing the hazards documented by the MECP.

4.4 Those identified are assessed based on Detectability, Severity and Likelihood. With a Critical Control Set-point determination, response procedures are created if required. Detectability, Severity, and Likelihood for each hazard are each assessed a point value from 1 to 5. Critical Control Points, as determined by the Hazard Assessment Committee, are any hazards with a

total score of 9 or greater when added together. However, a hazard with a total score less than 9 may be determined to be a Critical Control Point if determined to be significant or mandatory by the Committee (i.e.: legislative requirements or importance to the specific operation in Gananoque's drinking water facility).

4.5 Response procedures or references to them are kept with the DWQMS Plan as required with the Record Control Procedure.

4.6 The hazard analysis procedure is conducted at least once per audit cycle (once every 36 months) and validated once every calendar year (risk assessment review), prior to the management review meeting.

Justification of Critical Control Point Selection

Critical control points (CCP), as determined by the Hazard Assessment Committee, is any hazards with a total score of 9 or greater. However, a hazard with a total score less than 9 may be determined to be a CCP if determined to be significant by the Committee.

For the above CCP, response procedures have been developed that define respective critical control limits.

Risk Assessment

Detectability - is a measure of the ability to detect the presence of certain hazards. The risk becomes greater as appropriate responses cannot be taken to control or mitigate the risk because the hazard cannot be readily and/or easily detected.	**Severity - is the potential impact to health or impact on operations if the risk is not controlled (assumes control measures did not work).**	**Likelihood - Captures the idea that something is likely to happen or to have happened, considers the age, reliability and redundancy of equipment.**
1- very high - defect is obvious	1 - very low or none - minor nuisance	1 - highly unlikely - may occur in exceptional circumstances
2- high - can be detected only by alarm	2 - low or minor - system operational at reduced performance with limited public exposure	2 - unlikely - has occurred within the past 5 to 10 years, newer equipment present.
3 - moderate - current methods identify the failure - procedures are designed to increase the likelihood of detection	3 - moderate or significant - gradual system performance degradation with minor public exposure	3 - moderate likelihood - minor public exposure
4 - low - failures are detected with a high degree of probability	4- high - loss of system function with major public exposure and serious illness but not death	4 - likely - has and may occur again
5 - very low - no controls in place designated to detect a defect or failure	5 - very high or catastrophic - long term loss of system function with a major impact, serious risk of death.	5 - very likely - one of more occurrences on a monthly or more frequent basis , aged equipment, no back up present.

5.0 Associated Documents

- Town of Gananoque Emergency Plan/Standard Operating Procedures
- James W. King Operations Manual
- Equipment Manuals

Appendix I

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
Intake / River	Failure of intake pipe - Equitment Failure	Set-up portable pump	2	2	1	5	No	Low level alarm at 4.0 m	Visual inspection; SCADA alarms	EP 1103	New in 2004
	Source water contamination eg. Chemical Spill	Low lift shutdown; SAC, alternate water supply sources; public health advisories; additional treatment, increased sampling, flush, root cause analysis, isolate; source , emergency response, spills response / clean-up	3	4	1	8	No	Raw pH, turbidity alarms	SCADA alarms, Daily labs, Reports, Spills		EP 1109
	Sudden changes to raw water characteristics	change, clean, rotate filters more frequently, monitor process, increase dosage, chemicals, and treatment	1	1	4	6	No				
	Long term impacts of climate change - increase / decrease water levels (flooding / drought); increased population / demand	water conservation and water use restrictions; increase PTTW limit; increase in water production and capacity	1	3	4	8	No	Record daily raw water levels; low level raw well 5 M; low low 4M	daily walk around; constantly monitored through SCADA - appears on daily report signed off by operator		Highest water levels in the past 2-3 years

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
	Water supply shortfall	CRCA - St. Lawrence, increase storage; decrease water usage; plans for infrastructure redundancy (i.e. alternate sources); increase monitoring, proactive vs. reactive; public education and outreach; increase water cost; treatment consideration and adjustments re: turbidity, organics; long-term water conservation measures for growth	1	4	3	8	No	low-level alarm setpoints; monitor SCADA	Maintain relationship with Emergency Control Group	EP 1103 EP 1106	
Low-lift pumping	Intake screens blocked	Manual screens	1	1	1	3	No	Low level alarm at 4.0 m	Visual inspection; SCADA alarms		
	Low-lift pump failure - Equitment Failure	Redundancy	2	1	3	6	No	Low lift pump alarms	SCADA alarms	EP 1110	
	Low-lift valve failure - Equitment Failure	Manual operation, Redundancy	1	1	2	4	No	Low lift pump alarms	SCADA alarms		
Coagulation /	Alum dosage pump failure / loss of coagulant	Redundancy	3	2	2	7	No	Chemical feed alarm; turbidity alarm at 0.2 NTU	Chem. feed & flow alarm on SCADA	EP 1112; EP 1107	Pipes are older
	Alum Bulk Tank failure	Spills procedure	3	1	1	5	No			EP 1101	

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
Flocculation	high winds and wind direction can impact turbidity	increase in alum dosage - generator for back-up power	1	3	2	6					
	Alum Day Tank failure - Equitment Failure	Redundancy	1	1	1	3	No			EP 1101	
Filters	Filter breakthrough	Maintenance / inspections and redundancy	2	3	2	7	Yes	SCADA turbidity alarm 0.2 NTU	online turbidity analyzers alarmed; Watertrax alert	EP 1105	
	Backwash pump failure - Equitment Failure	Maintenance / inspections	1	3	4	8	No	Alarms for fault, high temp	Second backwash not functioning		Lack of redundancy
	Filter effluent / backwash valve failure - Equitment Failure	Operate manually; second filter	1	2	2	5	No				Butterfly valves aging
	Backwash blower failure - Equitment Failure	Backwash without blower	1	3	4	8	No				No redundancy, blower motor needs overhaul
Post-filter chlorination (primary disinfection)	Gas chlorination system failure / loss of chlorination - Equitment Failure	Redundancy	2	4	3	9	No	Low free chlorine residual alarm setpoint through SCADA	Chlorine on-line analyzers alarmed and trended thorugh SCADA; pressure alarms	EP 1107; EP 1104; EP 1113	Pipes are older
	Chlorine feed line failure - Equitment Failure	staff response, repair/ restore	1	4	3	8	No				Lines not serviced or calibrated
Clearwell / Reservoir	Structural issues - i.e. concrete failure, contamination in reservoir	visual inspection, treatment plant	4	3	2	9	No	Security alarms	SCADA alarms (level)	EP 1109	

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
High-lift pump	high-lift pump failure - mechanical / electrical - Equitment Failure	"danger" for overhaul per vibration analysis; maintenance / replacement programs	1	3	4	8	No	Flow, pressure, pump failure	SCADA alarms	EP 1111	Vibration analysis
Unmanned automated control	SCADA alarming systems operator notification, operator response	Redundancy for SCADA alarms; remote SCADA login	2	3	1	6	No	Back-up auto-dialer system and WIN911 SCADA alarm system	Alliance		
PLC Failure	Unable to operate or monitor treatment or distribution system	Control operation	2	3	2	7	No	Failure alarms	Alliance	Essential Supplies / Services	
SCADA Communications	Terrorism and Vandalism	Security measures, increased water quaility monitoring	2	5	1	8	No	Alarm on reservoir; ability to operate manually without SCADA			
	Unable to operate or monitor treatment or distribution system	Operate manually; 24/7 manned operation; Redundant SCADA computers	2	3	3	8	No	Communication alarms	SCADA alarms; Alliance	ISI Controls (Essential Supplies / Services for SCADA)	Occasional issue with remote connection of laptop
Plant effluent chlorination	Difficulty maintaining chlorine residual in distribution system	regular dead end flushing, samples	3	3	3	9	Yes	Chlorine on-line analyzers alarmed and trended thorugh SCADA - low chlorine alarm 1.70	SCADA alarms	EP 1104	troubles keeping up with flushing requirements

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
Feedermain	Lack of ability to clean and inspect; unknown valve condition (including relief valve)	redundant feeder main; maintenance / replacement; condition assessment; restrict construction methods in high risk areas; implementation of inspection program	1	5	2	8	No	pressure alarms - high and low	SCADA alarms		
Feedermain	Main break on feedermain (no water, restriction of water flow)	redundant feeder main; maintenance / replacement; condition assessment; restrict construction methods in high risk areas; implementation of inspection program	1	5	2	8	No	pressure alarms - high and low; high flow alarms	SCADA alarms		
feedermain valves	gate valve failure - age / condition of valves; air relief valves (no water, restriction of water flow) - Equitment Failure	preventive replacement program; preventive valve operational maintenance program	3	1	3	7	No	Pressure alarms - high and low	SCADA alarms; valve exercising program		Valve exersizing program needs to be in effect

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
Distribution system	backflow or sabotage (no water, BWA)	no control; require backflow prevention by-law	3	4	4	11	No	Customer complaints; weekly sampling	public comments		By-law required; currently applies as per the building code; by-law to address existing buildings
	Sustained pressure loss - increased potential for backflow / cross-connection;	infrastructure planning; public health advisories (BWA, do not use - depending on if bacti or chemical); flushing sampling - testing; alternate water source.	2	3	2	7	No				
	Dead ends in system (bacteriological contamination, low chlorine residual)	Capital planning; flushing program	3	2	4	9	No	Minimum free chlorine residual - 0.20 mg/L	portable chlorine analyzer for field testing; portable turbidity meter	SOP 403 Watermain flushing; EP 1107 Adverse Drinkign Water Quality Results	Lack of flushing activity
	Main breaks or leaks	leak detection; capital replacement;	2	2	4	8	No	Minimum free chlorine residual - 0.20 mg/L	portable chlorine analyzer for field testing	SOP 401 - WM Repair	

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
	Terrorism and Vandalism	Alarms, fencing, training, auto shutdown system; increased water quality monitoring, public education and outreach; emergency response plans; environmental emergency plans	2	5	1	8	No	Alarms			
	Sustained extreme temperatures - Freeze issues: ice storm frozen services / mains; increase in WMB's; reduced functionality of frozen hydrants (fire protection) heat wave: decreased chlorine residual; drought; water quality and microbiology	Emergency plan, back-up power, training, OnWARN; track historical freezes; run taps, infrastructure upgrades, lower services / mains, in; increase in sampling; increase in redundancy in twinning infrastructure where possible.	1	3	2	6	No				
	Communication failure	Staffing at WTP (24 hours)	2	3	3	8	No	Overhead tank level alarms	SCADA alarms	SOP 402 Tower out of service	

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
Tower	Sustained extreme temperatures - Frozen water tower	increase water cycling and decrease time in water tower (to keep temps up)	1	3	2	6	No				
	Loss of pressure	Manual pressure gauge	1	4	2	7	Yes	Critical control low limit set at 425 kpa on high lift header	Manual pressure guage that can be read	EP 1106	
Uncontrolled bulk water loading	Cross-contamination	Hydrant at 665 Charles St. N is designated for bulk water loading	3	2	2	7	No		Backflow or air gap required		backflow preventer is required
Construction service	Private contractors contaminating public water distribution system - pressure testing, disinfection, filling	subdivision and site plan control agreements to include terms and conditions	3	3	3	9	No		Subdivision and site plan control agreements to include terms and conditions	DWWP	
Security	Breach of security; lack of security; sabotage to system; vandalism (contamination, water theft)	security inspections, alarms, locks, fencing	2	4	1	7	No		alarms		

Hazard Analysis, Risk Assessment and Critical Control Points

Revision date: 2019-08-01

Process step	Risks / Hazards		Risk Eval.				Control				Notes
	Hazard	Control Measure	D	S	L	RPN	CCP?	CCL	Monitoring	Response procedures	
All processes	Extreme weather events (tornado / ice storm) - increased demand; infrastructure damage; transportation issues for staff response; treatability; personnel coverage; loss of service; operational - fuel supply; power failure; loss of communications; loss of facilities; flooding / drought	OnWARN; Emergency response plan; contingencies; back-up power with diesel; priority for fuel and hydro; plant restarts and BWA's; essential suppliers on standby; capital infrastructure investment; potable water supplier; water supply for firefighting; alternate water sources	1	3	2	6	No				

Appendix J

PROCEDURE TITLE: Communication		PROCEDURE NO: 1006 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REVIEW DATE: August 26, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: January 13, 2005

1.0 Procedure Description

This procedure outlines the methods of internal and external communication of relevant aspects of the Town of Gananoque Drinking Water Quality Management System (DWQMS).

2.0 Reason for Procedure

Consistent and efficient methods of communication are essential to ensure that all relevant quality management system information is adequately transferred to all involved parties. This includes Top Management, Owner, Operating Authority personnel, Public Utilities/Engineering Division, Suppliers/Contactors and the Public.

3.0 Responsibility

The Designated DWQMS Representative is responsible for implementing and monitoring the DWQMS Communications Procedure.

4.0 Procedure

4.1 Communications shall be conducted by any or all of the following:

Internal Communications

The Town uses several methods of communicating new information among staff including:

- log books/minutes
- staff meetings
- memorandums
- email

Information communicated internally may include, but is not limited to:

- emerging and existing legal requirements
- introduction or changes to Town policies, procedures, or other instructional documents
- equipment installation or replacement
- notice of projects or studies
- temporary process abnormalities

External Communications

The Town of Gananoque uses a variety of methods to communicate drinking water information to customers.

- Printed information may be included with customer water bills
- Annual reports containing summaries of the drinking water system description, condition, and performance are available to interested members of the public at the Public Works office and also may be downloaded on the Town of Gananoque website.
- Current water quality results are available on request from the Public Works office.
- Verbal and written communications with customers as per the Customer Complaint Procedure

4.2 Information pertaining to the operation of the municipal drinking water system must also be communicated to the owner as represented by the Town of Gananoque Council (Mayor).

- All Annual Reports and Compliance Inspection Reports are presented to Council by the Utilities Supervisor or Manager of Public Works
- Incidents of non-compliance are immediately reported to the Manager of Public Works
- Council is represented on the DWQMS Management Review Committee and takes part in the annual management review as required by the DWQMS Management Review Procedure.
- Adequacy of infrastructure necessary t operate and maintain the system(s).

4.3 Essential Supplies and Services Procedure outlines how the relevant aspects of the QMS are communicated to Suppliers/Contractors.

5.0 Summary Table Describing Communication of the DWQMS

Target Audience	Method of Communication
Owner (Council)	Internal and external DWQMS Audit Reports are provided and received at regular meetings of Council on a quarterly basis. Council provides representation on the Management Review Committee who review all audit reports. Hard copies of all reports and other correspondence are retained in accordance to the Records Control Procedure Council are kept aware of the condition and performance of the DWQMS through reports received from the CAO and other Town staff presented at, or provided as reference materials at regular Operations and/or Council meetings.
Town Staff	Substantial revisions/additions, and a review of audit results will be provided annually to all relevant staff. New employees are provided an overview of the Operational Plan during orientation. Details of DWQMS communications are documented in DWQMS files.
Public	Summary descriptions of the DWQMS, DWQMS Policy and related benefits may be provided on the Town of Gananoque website.
Suppliers	Top Management has directed Environmental Services staff to communicate the relevant aspects of the Quality Management System to suppliers. Relevant aspects include the requirements for quality and supply of essential supplies and services.

6.0 Associated Documents

Records and Document Control Procedures
Management Review Procedure

Appendix K

PROCEDURE TITLE: Essential Supplies/Services		PROCEDURE NO: 1007 ISSUED BY: S. Ogilvie
AUTHORIZED BY: C. Brennan	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: January 21, 2019

1. Purpose

The purpose of this procedure is to identify the supplies and services that are essential to the ability of the Town of Gananoque to provide safe drinking water to residents, and the methods by which the Town ensures the procurement and quality of the supplies and services.

2. Responsibilities

The Utilities Supervisor and the Overall Responsible Operator (ORO) are responsible for determining the specifications and requirements for:

- ordering materials, such as chemicals, laboratory supplies and services, distribution parts
- various contracted services
- procurement of other goods and services required.

The ORO is also responsible for communicating these requirements directly to the service providers, and is responsible for reviewing all purchase requisitions to ensure requirements are stated.

The Supervisor is responsible for ensuring all suppliers are aware of any specific requirements (i.e. Certificate of Analysis etc.) stated by the ORO, and ensures these requirements are stated on the purchase order (if applicable). Additionally, the Supervisor/ORO is responsible for verifying the items received meet the stated requirements prior to adding the items to inventory.

Operating Authority personnel are responsible for ensuring that the ORO is informed of any non-conformance with supplies or services, and shall inform the ORO when reagent/calibration standard inventory is running low. Operating Authority personnel are also responsible for overseeing any watermain repair activities to ensure the contractors (if applicable) are performing the repair in a manner that meets the requirements, and shall complete sampling activities prior to a new watermain being commissioned.

The Engineering Technologist, in consultation with the Manager of Public Works, is responsible for determining the applicable standards and/or specifications that apply to new watermain projects, based on drawings, and shall state the specifications in the tender document. The Engineering Technologist is part of the tender review team, and as such, ensures that the successful submission has addressed the specifications/standards. The Engineering Technologist is also responsible for performing a field inspection of the materials/methods specified to ensure they meet the tender requirements. The Engineering Technologist may take the field inspection of materials and methods specified under advisement of the ORO.

The QMS Rep is responsible for ensuring that the Essential Supplies and Services Table is reviewed once every calendar year, or as required, to ensure that all essential supplies and services have been captured.

3. Procurement and Quality Requirements

Procurement and scope of supply for all essential supplies and services have been summarized in the Essential Supplies and Services Table, provided in this Appendix.

4. Recordkeeping and Verification

For essential supplies and services, records of all requested quality requirements (i.e., Certificates of analysis, certificates of laboratory accreditation, certificates of calibration etc.) shall be maintained in project files (for new builds) or with the Supervisor for anything not required for new builds. Records of verification activities (checking the material received against the packing slip or checking the material used against the tender requirements) shall be maintained in project files (for new builds) and/or in purchasing records (packing slip).

5. Supplier/Contractor Non-conformances

In the event that the supplies/services provided do not meet stated requirements, as per the verification activities stated in section 4 above, a NCAR shall be completed and issued to the supplier/contractor for corrective action. Unsatisfactory resolution may result in the supplier/contractor being marked as "unapproved" or may result in the QMS Rep conducting surveillance audits of the supplier/contractor.

6. Essential Supplier and Services List

The QMS Rep shall maintain a list of approved essential suppliers and services (contractors). All personnel placing orders shall consult the list of Essential Service Providers prior to placing the order to ensure the supplier/contractor is approved. If the supplier/contractor is not on the list, or is marked as "unapproved", personnel shall either select another supplier/contractor (in the case of an "unapproved" ranking), or shall request that the supplier/contractor be added to the approved List. For initial inclusion on the list, a standard acknowledgement letter, prepared by the QMS Rep, shall be forwarded to the supplier/contractor, and they shall be required to return a signed copy of the Agreement and Acknowledgement Form, which the QMS Rep shall file.

7. Annual Supplier and Contractor Evaluation

On an annual basis, the QMS Rep shall summarize all NCARs issued to suppliers and/or contractors, and shall organize a supplier and contractor evaluation meeting with all personnel involved with ordering supplies and/or services. The agenda shall include: review of the Essential Supplies and Services Table, review of all supplier/contractor non-conformances, review of any internal or external audit findings that related to suppliers/contractors, review of the performance of all suppliers/contractors (i.e. on time delivery, safety incidents, number of returns, etc.) and suggestions for supplier/contractor improvement.

Outcomes from the meeting will be compared to the outcomes of the previous evaluation to determine supplier/contractor performance based on the previous year. Suppliers or contractors identified during this review as having quality issues shall be targeted for development. Development activities with suppliers/contractors may include re-issuing quality program acknowledgement, surveillance audits (of contractors while performing work, random audit of supplies received, site audit of supplier/contractor facility etc.), requiring verbal confirmation of quality requirements every time order submitted.

8. Related Documents and Records

Operational Plan
Essential Supplier and Services List
FORM 045 – Action Item Request
Internal Audits
External Audits
Work Record
Purchase Requisitions
Purchase Orders
Packing Slips
Tenders

9. Essential Supplies/Services

Supply or Service	Primary Supplier	Scope of Supply
Accredited Laboratory Services (Obtain lab accreditation certificate)	Caduceon Environmental Laboratories 285 Dalton Ave. Kingston ON K7K 6Z1 613-544-2001	Supply and Delivery of Emergency Orders within 24 hours of order placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip). Laboratories must be accredited for required analysis.
Auxiliary Power Supply Service (Diesel Gen Sets)	Tandet Industrial 244 Dalton Ave., Unit 160 Kingston, ON K7K 6C3 (613) 417-6125	Supply and Delivery of Emergency Service within 1 hour of service request placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip).
Coagulant (Aluminum Sulfate)	Kemira SUCC. CENTRE VILLE PO BOX 11800, Montreal, QC H3C 0E5 1-800-465-6171	Supply and Delivery of Aluminum Sulfate as per delivery schedule. Supply and Delivery of Emergency Orders within 24 hours of order placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip). All chemicals and materials used in the alteration of operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set out by both American Water Works Association (AWWA) and the American National Standards Institute (ANSI) safety criteria standards NSF/60, NSF/61 and NSF/372.. All above documentation must be supplied to an authorized Town of Gananoque representative prior to product being offloaded.
Chlorine	Brenntag	Supply and Delivery of Chlorine Gas in 68 kg cylinders as per

Disinfectant (Must meet NSF or ANSII standard as per the procedure for disinfection of drinking water in Ontario)	2900 J.-B.-Deschamps Blvd. Lachine, Quebec H8T 1C8 (514) 636-9230 Fax (514) 636-8229	delivery schedule. Supply and Delivery of Emergency Orders within 24 hours of order placement. Provide emergency response for extensive chlorine gas leaks. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip).
Distribution Parts	Evans Supply Limited 338 Neptune Cres. London, ON Canada N6M 1A1 Phone: (519) 453-6515 Fax: (519) 453-7756 Toll Free: 1-800-268-8309	Supply and Delivery of Emergency Orders and Service Within 24 hours of order/service request placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip). Specifically, with the products that your company provides to the Town, we now require the following be provided: Hydrants, valves, fittings, piping etc. for the drinking water system must conform to the relevant AWWA Standard. Hydrants, valves, fittings, piping etc. must be clearly marked with the relevant AWWA Standard number. If the part is not marked with the AWWA Standard number then the item must be shipped to the Town with documentation stating that the part shipped conforms to the relevant AWWA Standard Items manufactured to a Standard equivalent to AWWA may be supplied, provided the supporting documentation is shipped with the item purchased In addition, all items (excluding fire hydrants, but including joining and sealing materials) must be certified to NSF/ANSI Standard 61: Drinking Water System Components -- Health Effects.
Fuel Supplies	MacEwen Petroleum 25 Henry St. Athens ON K0E 1B0 613-382-4525	Supply and Delivery of Emergency Orders and Service Within 24 hours of order/service request placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip).
SCADA Instrumentation and Controls	ISI Controls 1-113 Prescott Street Kemptville, Ontario 613-345-1502 1-877-338-1562 Emergency after hour service	Supply and Delivery of Emergency Orders and Service within 24 hours of order/service request placement. All Deliveries of Restock and Emergency Order Products will have documented verification of product delivered to product ordered (i.e. packing slip).
Construction Contractor	Robert Nash Excavating 33 Railway Street PO Box 126 Lansdowne, ON K0E 1L0	Supply of Emergency Service within 2 hours of order/service request placement.

Appendix L

PROCEDURE TITLE: Infrastructure Review		PROCEDURE NO: 1008 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: April 30, 2013

1.0 Procedure Description

This procedure defines the process used by the Town of Gananoque to review the adequacy of the infrastructure and resources necessary to operate and maintain the drinking water system safely and effectively.

2.0 Reason for Procedure

The Infrastructure Review procedure ensures evaluation of the condition and capacity of infrastructure components are reviewed once every calendar year. The results of the evaluation are used to prioritize future resource allocation.

3.0 Responsibility

The Manager of Public Works, in consultation with the Utilities Supervisor is responsible for the administration of the infrastructure review and its preparation.

4.0 Procedure

4.0 This procedure is applicable to all Town of Gananoque infrastructure components that fall under the scope of the DWQMS.

4.1 Ensure that the long term forecast is reviewed at least once every calendar year.

4.2 The above named staff shall consider previous infrastructure review summary reports, input from other Operating Authority personnel, MOE Compliance Inspection Reports, flow data trends, water quality reports, and maintenance records and Risk Assessment Outcomes documented under element 8 to determine priority needs.

4.3 The list of identified infrastructure work shall be prepared on an annual basis for consideration and inclusion in the capital budget presented to the owner (Mayor and Council).

4.4 Any infrastructure work not approved by Council during the capital budget proceedings shall be documented and included for consideration in future years.

4.5 The operating authority shall keep a summary of the infrastructure maintenance, rehabilitation and renewal programs current and monitor the effectiveness of the maintenance program.

5.0 Associated Documents

- *Hydrant Inspections*
- *10 Year Capital Plan*
- *Valve Inspections*
- *Plant Monthly Reports*
- *Ten Year Capital Plan*
- *Engineering Reports*
- *Risk Assessment Summary*
- *Inspection Reports*

Appendix M

PROCEDURE TITLE: Measurement and Recording Equipment Calibration and Maintenance		PROCEDURE NO: 1009 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REVIEW DATE: August 8, 2019 REVISED BY: C. Brennan	ISSUE DATE: April 30, 2013

1.0 Procedure Description

This procedure provides guidance for the calibration of online analyzers and meters.

2.0 Reason for Procedure

Calibration of online analyzes is critical to ensuring that correct information is used in the adjustment of drinking water processes. Calibration procedures are based on legislation and manufacturers recommendations in order to satisfy the commitment to safe drinking water.

3.0 Responsibility

The Operating Authority personnel and the Utilities Supervisor are responsible for ensuring calibrations are done to legislative requirements and manufacturers specifications.

4.0 Procedure

4.1 Calibrations for online analyzers done in house are according to their manuals found electronically on the work station computer and/or within the process binders located on the hall shelf.

- ✓ In house calibrations include; All Online Turbidity Meters, All Online pH Meters, in house Lab pH meter, in house lab Turbidity meter.

4.2 Calibrations for other analyzers and meters done by outside contractor.

- ✓ Contracted calibrations include; Pocket Colorimeters, Magnetic Flow Meters, Pressure & Level transmitters, Differential Pressure transmitters, pH meters, Desktop Colorimeter, Chart Recorders and Temperature transmitters.

4.3 Records of calibration are noted in the Chief Operator's Monthly Report and filed.

5.0 Associated Documents

- Record Control Procedure

Appendix N

PROCEDURE TITLE: Emergency Management		PROCEDURE NO: 1010 ISSUED BY: S. Ogilvie
AUTHORIZED BY:C. Brennan	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: April 30, 2013

1.0 Procedure Description

Gananoque has documented contingency plans, which identify possible response to emergency events related to water quality and detailed contacts specific to incidents.

Gananoque's Contingency Emergency Procedures Manual serves as an internal response procedure within the James W. King Water Treatment Plant and the distribution subsystem. It is stored within the plant and is incorporated within the James W. King Water Treatment Plant Manual. It is specific to the Water Utilities Emergency and covers hazards defined within the plant and subsystem. The manual is to serve as a list of potential emergency situations, service interruptions and include the processes for response and recovery for the same.

The Overall Responsible Operator (ORO) or Utilities Supervisor would determine employee direction during an emergency situation. Also Gananoque's Emergency Plan is used if it is determined by the Public Utilities Supervisor or Utilities Operator in Overall Responsibility that the emergency requires additional services, equipment, personnel, or notification. This plan is separate but includes the Utilities Division Contingency Plan and is maintained at the Gananoque Emergency Services Building.

2. Emergency Response, Training and Testing:

Emergency training is completed on a yearly basis according to regulatory requirement for both the James W. King Water Treatment Plant Contingency Emergency plan and the Gananoque Emergency Plan. Through this training, Gananoque will ensure that all appropriate personnel working within the drinking water system are aware of:

- Individual roles and responsibilities;
- Relevant procedures;
- Existing threats and hazards and associated protective actions; and
- Information related to emergency equipment.

PROCEDURE TITLE: Emergency Management		PROCEDURE NO: 1010 ISSUED BY: S. Ogilvie
AUTHORIZED BY:C. Brennan	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: April 30, 2013

The James W. King Water Treatment Plant Emergency Plan is reviewed and updated on an annual basis or as required and where possible are tested and emergency equipment inspected, maintained and replaced as needed. The Gananoque Emergency Plan is updated annually, with mock training provided.

3. Associated Documents

Emergency Contact List – FORM 014

EP 1101	Aluminum Sulfate Spill
EP 1102	Diesel Spill
EP 1103	Disruption of Water Service -DRAFT
EP 1104	Low Chlorine Residual
EP 1105	High Filter Effluent Turbidity
EP 1106	Low System Pressure
EP 1107	Adverse Water Quality
EP 1108	Chlorine Gas Leak
EP 1109	Contaminated Clearwell/Reservoir
EP 1110	Low Lift Pump and Motor Failure
EP1111	High Lift Pump and Motor Failure
EP1112	Chemical Feed System Failure
EP1113	Chlorination System Failure
EP1114	Filter Failure

Gananoque Emergency Response Plan-By-law No. 2017-088-21Nov2018

Appendix O

PROCEDURE TITLE: Internal Audit		PROCEDURE NO: 1011 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: April 30, 2013

1.0 Purpose

This procedure describes the Internal Auditing process used by the operating authority to verify the effectiveness of the DWQMS.

2.0 Scope

This procedure is applicable to and shall be followed by all Internal Auditors, regardless of origin, for the Town's internal audits.

3.0 References, Definitions and Acronyms

- ✓ DWQMS Element 19 – Internal Audits
- ✓ CAR – Corrective Action Request
- ✓ DWQMS – Drinking Water Quality Management Standard
- ✓ QMS – Quality Management System

4.0 Procedure

Resources

4.1 The DWQMS Representative shall assign the responsibility of conducting internal audits only to qualified persons.

4.2 The DWQMS Representative shall create and maintain a list of Qualified Internal Auditors including names, titles, and qualifications.

4.2.1 Internal Auditors shall have completed the applicable Internal Auditing Training Audit Course, to be qualified to conduct Internal Audits.

4.2.2 Auditors may be sourced from other municipalities, consultants, etc., provided that evidence of their qualifications is made available to the DWQMS Representative.

Frequency and Scope

4.3 The DWQMS Representative shall prepare an Internal Audit Schedule once every calendar year.

4.4 Internal audits shall be conducted on each element of the DWQMS at least once every calendar year. Additional audits may be scheduled based on previous audit results, or commensurate with the impact of the requirement on the operations.

Audit Team Roles and Responsibilities

4.5 Lead Auditor:

- Open the audit file
- Conduct the audit according to the procedure and the audit schedule
- Develop the audit plan and checklists
- Notify the auditee of the scope and objectives of the internal audit.
- Set and conduct opening meetings, as appropriate
- Prepare and distribute the opening meeting agenda
- Collect objective evidence
- Report audit results clearly and concisely
- Set and conduct closing meeting
- Report non-conformances and issue CARS
- Prepare audit report
- Follow-up on corrective actions
- Close the audit file

4.6 Auditor:

- Follow the direction/instructions of the Lead Auditor
- Be fully prepared for the audit
- Conduct the audit according to the procedure and the audit schedule
- Report audit results clearly and concisely

Audit Results

4.7 The final Internal Audit Report and any associated CAR's shall be submitted to the DWQMS Representative.

4.8 CAR's shall be logged by the DWQMS Representative on the Corrective Action Request Form and database.

4.9 Responses to CARS shall be designated to the responsible individual by the DWQMS Representative.

4.10 When all CARs have been addressed, verified, and signed off by the Lead Auditor, the internal audit shall be considered closed.

4.11 The DWQMS Representative shall retain the Internal Audit Report, copy of the completed internal audit checklists, field reports and all related CARs.

5 **Associated Documents and Records**

- Internal Audit Schedule
- DWQMS Internal Audit Checklists
- DWQMS Internal Audit Field Reports
- Audit Report
- Corrective Action Item Database
- Corrective Action Item Requests (Form)
- Completed Corrective Action Requests

Appendix P

PROCEDURE TITLE: Management Review		PROCEDURE NO: 1012 ISSUED BY: S. Ogilvie
AUTHORIZED BY: Utilities Compliance Coordinator	REVIEW DATE: August 2, 2019 REVIEWED BY: C. Brennan	ISSUE DATE: April 30, 2013

1. Management Review

Members of the Top Management team will review the appropriate information in order to evaluate the continued suitability, adequacy and effectiveness of the DWQMS and that it includes consideration of the following:

a) Incidents of regulatory non-compliance.
b) Incidents of adverse drinking water tests.
c) Deviations from critical control limits and response actions.
d) The effectiveness of risk assessment process.
e) Internal and third-party audit results.
f) Results of emergency response testing.
g) Operational performance.
h) Raw water supply and drinking water quality trends.
i) Follow-up on action items from previous management reviews.
j) The status of management action items identified between reviews.
k) Changes that could affect the Quality Management System.
l) Consumer feedback
m) The resources need to maintain the Quality Management System.
n) The results of the infrastructure review.
o) Operational Plan currency, content and updates.
p) Staff suggestions.

The Management review Committee shall review and discuss all information presented at least once every calendar year. The Committee shall make recommendations and initiate action, as appropriate, to improve the content and implementation of the Operational Plan and related procedures and to ensure the provision of adequate resources.
Minutes of management review meetings shall be documented and include, at a minimum, the:

- List of attendees.
- Summary of issues discussed and decisions made, and
- Record of new and outstanding action items, including an indication of responsibility and proposed timeline.

Meeting minutes will be maintained by the DWQMS Representative

Appendix Q

PROCEDURE TITLE: Continual Improvement		PROCEDURE NO: 1013
		ISSUED BY: S. Ogilvie
AUTHORIZED BY: S. Utilities Compliance Coordinator	REVIEW DATE: August 2, 2019 REVISED BY: C. Brennan	ISSUE DATE: February 25, 2019

1.0 PURPOSE

The purpose of this procedure is to describe how continual improvement is tracked and measured by:

a. Reviewing and considering applicable best management practices, including those (when) published by the Ministry of the Environment and Climate Change, at least once every thirty-six months;

b. Documenting a process for identification and management of Quality Management System Corrective Actions; and,

c. Documenting a process for identifying and implementing Preventive Actions to eliminate the occurrence of potential non-conformities in the Quality Management System.

2.0 SCOPE

This procedure applies to the QMS, as defined in the Operational plan for the Town of Gananoque.

3.0 DEFINITIONS AND ACRONYMS

AIR – Action Item Request

BMP – Best Management Practice

Corrective Action - action to eliminate the cause of a detected QMS non-compliance or nonconformity with the requirements of the DWQMS or other undesirable situation.

CAR - Corrective Action Request

OFI – Opportunity for Improvement

Effectiveness-assessment – the assessment of work conducted by the person directly responsible for overseeing and/or performing the work and the QMS Representative.

Preventive Action – action to eliminate or prevent the cause of potential QMS non-compliance or nonconformity with the requirements of the DWQMS or other undesirable situation.

4.0 PROCEDURE

4.1 Compliance and Continual Improvement

4.1.1 Issues of compliance and continual improvement shall be achieved through the use of action items by addressing non-compliance, non-conformances and opportunities for improvement within the QMS as it applies to the drinking water systems.

4.1.2 Corrective and preventative actions may be initiated via the following avenues; each process has its own documentation process:

- Internal or external audits;
- Adverse Water Quality Incidents; and,
- Customer complaints.

4.2 Initiating an Action Item Request

4.2.1 Action Items shall be initiated through the identification of non-conformities/non-compliance CARs, OFIs and/or BMP within the QMS as it applies to the water systems. AIRs may be identified by any number of methods including:

- Internal or external audits;
- MECP inspections;
- MECP's best management practices document (when published, at least once every thirty-six months)
- Other BMPs review, e.g., other municipalities, conferences, workshops (at least once every thirty-six months);
- End user complaints;
- Management reviews, risk assessment reviews, infrastructure reviews;
- Training sessions;
- Incident debriefing;
- Action item effectiveness completion assessment;
- Annual Drinking Water Quality Report; and,
- Operator or staff feedback.

4.2.2 Non-conformance/non-compliance CARs, OFIs and/or BMP issues shall be reported to the QMS Representative.

4.2.3 Within four weeks of receipt of MECP inspection report and external audit reports, the QMS Representative shall review and communicate to Top Management non-conformance/noncompliance CARs, OFIs and/or BMP issues identified through MECP inspection reports and external audit reports.

4.2.4 The QMS Rep shall determine if action items are required to address the non-conformance/non-compliance CARs, OFIs and BMP issues.

4.2.5 The QMS Rep shall review potential non-conformities that are identified to determine if preventive actions are necessary. The process of applying preventative action is the same as the application of corrective action and shall be documented using the AIR form.

4.2.6 A high, medium or low priority level is to be assigned to each action item. The criteria for each designation are based on origin of the OFI, the impact to Water Services, the resources required to complete the action item and timeline considerations.

4.3 Completing an Action Item Request

4.3.1 The QMS Representative shall assign the action item to an employee (can be at any level) using the Action Item Request form and notifying the assigned employee via email.

4.3.2 The AIR shall be completed with the following information:

PART A – *completed by the AIR initiator:*

- AIR number;
- Date the AIR was initiated;
- Priority – high, medium or low, based on such classifications like urgency, resources available, time commitment, how in-depth the issue is, etc.;
- The source of the AIR – such sources include internal audit, management review, risk assessment, infrastructure review, or other, such as external audit, staff suggestion, etc.;
- AIR type: CAR (conformance, compliance), OFI, BMP, preventive action;
- Description of the OFI/deficiency (describe the cause of the identified issue) – generally determined by the person/group of people bringing the issue forward either as an observation or a comment made, e.g., during an audit or review meeting; Description of the required action– in some cases the action is predetermined by the person(s) that identified the OFI/deficiency, in other cases it is up to the person assigned the AIR to determine what the action is to rectify the OFI/deficiency;
- Name of the person AIR is assigned to – can be one person or a group of people that have the ability to correct or improve the deficiency;
- Estimated completion due date – of the action item as well as the AIR form;

PART B – *completed by the personnel AIR is assigned to:*

- Completed by;
- Resolution:
  - ✓ **Corrective action** – describe the action(s) that will be taken to correct the issue and prevent it from re-occurring; this is an explanation or list of steps taken to resolve the OFI/deficiency;
  - ✓ **Preventive Action** – describe the action(s) that will be taken to eliminate or prevent causes of potential issues; independently of corrective actions that could be applied elsewhere.
- Location of supporting information – to verify an AIR any supporting information needs to be reviewed; this can be in the form of drawings, meeting minutes, emails, procedural updates, etc.; this information can be saved with this completed form in GWTP;

PART C – *completed by the QMS Representative:*

- AIR complete;
- Has required information been provided;
- Does this AIR prompt a new Action Item? If yes, new AIR number;
- Is an effectiveness assessment (follow-up verification) required? If yes, due date; AIR Verified and Closed? If no, complete parts D and E; and,
- Approval of part C: QMS Representative Signature and verification date.

PART D - *Action Item Effectiveness Assessment – completed by the person assigned the AIR in Part A:*

- AIR effectiveness assessment is complete, if required;
- List of criteria to evaluate the corrective action outcomes;
- Reasons for an unacceptable outcome and next steps; and,
- Assigned To person's signature and date.

PART E - *Effectiveness Assessment Review - completed by the QMS Representative*:

- Effectiveness review – measures taken to ensure that the resolution (from Part B) has been fully implemented and the actions taken to correct, prevent or improve the identified issue are determined to be effective in correcting and/or preventive re-occurrence of the issue;
- Required information provided – has all the required information been provided to verify, assess and close the AIR;
- Additional comments;
- Effectiveness assessment verification completed;
- AIR closed, AIR reissued, and new number; and,
- QMS Representative's signature and closing date.

4.3.3 Completed action items shall be reviewed and considered closed once it was validated by the QMS Rep. The purpose of validation is to verify that the corrective action(s) are implemented and are effective in correcting and preventing the re-occurrence of the non-conformity, and that the provided information is satisfactory evidence.

4.3.4 Verified and closed action items will be saved as a pdf document. To maintain independence in the verification/closing process, the QMS Representative cannot validate their own AIR; it is to be validated by the QMS Representative alternate, as identified in DWQMS 4 QMS Representative.

4.4 Tracking Action Item Requests

4.4.1 The QMS Representative shall maintain a list of all action items on the Action Item Master List for the given year. The Action Item Master List shall include: AIR number, AIR type, OFI/deficiency description, action item generated, action item origin (i.e. risk assessment, external audit), person

assigned, priority level, status, initiation date, due dates, effectiveness assessment, associated new AIR, completion date, and closing date.

4.4.2 The QMS Representative shall establish a due date in consultation with the assigned personnel for completing the action item. The QMS Representative shall send the due date to the assigned personnel using the Microsoft Outlook Calendar.

4.4.3 Approaching the completion deadline, the QMS Representative will follow up with the assigned personnel to determine if the due date can be met; if not a new due date will be set.

4.4.4 Once Part B is completed, the employee shall notify the QMS Representative; the QMS Representative will conduct the follow up to determine if an effectiveness assessment is required. If one is not required, the AIR can be verified and closed by the QMS Representative. If there is missing information or the resolution cannot be confirmed, the QMS Representative will notify the employee via email and request the AIR be completed in a more fulsome manner.

4.4.5 If an effectiveness assessment is required, the person assigned the AIR will be notified by the QMS Representative; a due date will be determined as specified in section 4.5.3. Once the effectiveness assessment is completed, the employee shall notify the QMS Representative to have the AIR verified and closed.

4.4.6 Upon completing the AIR verification, the QMS Representative will notify the assigned personnel that the AIR has been verified and closed or reissued.

4.4.7 The QMS Representative will track the status of each AIR to report to Top Management. The status terms are as follows:

- Outstanding – the action item has not been completed and the deadline is past due;
- On Time – the action item has not been started, but the deadline has not passed;
- In Progress – the action item is in the development stage;
- Completed – the action item and the AIR have been completed;
- Effectiveness – the action item requires an effectiveness assessment;
- Closed – the AIR has been validated and closed;
- Superseded – the AIR has been replaced with a new AIR; and,

4.4.8 Not Necessary – the AIR was evaluated by the Chief Operator/ORO and deemed not necessary. For outstanding AIRs that are past due, the QMS Representative will send a reminder to the assigned employee, and the Manager of Public Works, on a monthly basis; at this time a new deadline will be established.

4.4.9 For AIRs where the deadline repeatedly is not met or the assigned to person has reservations, Chief Operator/ORO will re-evaluate the action item for relevancy, priority, feasibility and resources needed to complete during the Management Review meeting. This re-evaluation will be documented in the meeting minutes and on the associated AIR.

4.4.10 The QMS shall file all completed Action Item Request Forms as per the Master List of Documents and Records and retain as per Record Control Procedure

4.5 EFFECTIVENESS ASSESSMENT

4.5.1 When applicable, an assessment to determine the effectiveness of the action item resolution in successfully resolving and preventing recurrence of identified deficiencies shall be performed.

4.5.2 The person responsible for the AIR and the QMS Representative shall evaluate the outcome of the resolution and determine whether these outcomes are acceptable or unacceptable.

4.5.3 The time frame to perform this assessment shall be determined based on:

- Allow relatively less time (4-6 weeks) after implementing the resolution when there is:
  - ✓ Higher opportunity for occurrence and observation
  - ✓ Higher probability of detection
  - ✓ Changes to processes/procedures are not required
  - ✓ Staff training is not required

- Allow relatively more time (2-3 months) after implementing the corrective action when there is:
  - ✓ Lower opportunity for occurrence and observation
  - ✓ Lower probability of detection
  - ✓ Changes to processes/procedures are required
  - ✓ A behavioural or training solution is required

4.5.4 Part D of the Action Item Request form, provides a series of criteria to rate the AIR effectiveness:

- Does the resolution address the root cause?
- Does the resolution prevent recurrence of similar issues due to similar causes?
- Has the resolution been implemented as intended?
- Does the resolution demonstrate endurance and sustainability?
- Has the resolution introduced negative unintended consequences?
- Has the resolution improved the program/process performance?

4.5.5 The rating definitions, i.e., yes, no, partially, and not applicable, are**:**

- Effective (Yes): resolution is implemented as intended; have addressed the causes of the issue / finding; will prevent recurrence of the issue/ finding; and, demonstrates sustainability. No new corrective actions are recommended.
- Ineffective (No): resolution was not implemented as intended; does not address the causes of the issue /finding; does not effectively prevent recurrence of the issue / finding; and/or, does not demonstrate sustainability. New resolution is recommended to enhance its effectiveness.
- Partially Effective (Partially): resolution is implemented as intended and have partially addressed the causes of the issue / finding, but does not prevent recurrence or demonstrate sustainability. Revised or new resolution in recommended to enhance its effectiveness.

4.5.6 In the event of an unacceptable outcome or recurrence, the assigned person may continue all or part of the AIR resolution, initiate a new AIR, or reissue the AIR. Reasons for ineffective resolution may include:

- Identified deficiency not fully understood or adequately stated
- The causal factors (root cause) was not identified and addressed;
- The causal factors were all correctly identified but inadequate or insufficient resolution was developed in response
- The causal factors were all correctly identified and addressed but further implementation outside the AIR's scope is required
- The resolution was not adequately closed or not implemented as intended (e.g. the revised procedure was published but not adequately communicated or understood by the staff / users)
- The resolution was not implemented in a timely manner

5.0 ASSOCIATED DOCUMENTS AND RECORDS

- Form 045 – Action Item Request
- All completed Action Item Request, with supporting documentation
- Action Item Master List
- Record Control Procedure