

ELEMENT 15: INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

15.0 REQUIREMENT

PLAN: - The Operational Plan shall document:

- a) A summary of the Operating Authority's infrastructure maintenance, rehabilitation and renewal programs for the Subject System, and
- b) A long term forecast of major infrastructure maintenance, rehabilitation and renewal activities

DO: - The Operating Authority shall:

- a) Keep the summary of the infrastructure maintenance, rehabilitation and renewal programs current
- b) Ensure that the long term forecast is reviewed at least once every calendar year
- c) Communicate the programs to the Owner, and
- d) Monitor the effectiveness of the maintenance program

15.1 BACKGROUND

The replacement or rehabilitation of water infrastructure is based on a 5-year replacement programme. Priority is focused where attention is needed in regards to road condition, sewer replacement, water infrastructure, or for urbanization. Water infrastructure replacement is identified as part of the asset management process. The 5 year replacement programme will be reviewed once every calendar year during the management review in order to ensure the effectiveness of the programme and its' influence on drinking water quality.

Planned maintenance programmes include, but are not limited to:

- Enhanced monitoring program
- hydrant inspections/maintenance
- valve inspections/cycling
- watermain swabbing
- uni-directional flushing
- water meter replacements/installations
- flow testing

Unplanned maintenance refers to activities such as:

- emergency repairs to infrastructure (i.e. water main failures, hydrant repairs, leaking valves, water service leaks, curb stop repairs)

- unplanned system maintenance to assist with challenges in regards to water quality (i.e. ‘spot’ swabbing, uni-directional flushing)

15.2 RESPONSIBILITY

The Operations division of Public Works Services within the Town of Newmarket maintains all records of planned and unplanned maintenance.

The information gathered through maintenance activities and in regards to renewal and rehabilitation of the water infrastructure is communicated to the Engineering Services Department (as part of the annual infrastructure review), who incorporate it into the appropriate capital plan. This information is then brought forward to the owner of the system.

15.3 APPENDICES

Appendix 15a: Policy and Procedure for Water Distribution Maintenance Services

15.4 REFERENCES

- Implementing Quality Management: A Guide for Ontario’s Water Systems (July 2007)
- MOECC Safe Drinking Water Act, 2002

Appendix 15a: Policy & Procedure for Water Distribution Maintenance Services

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Unidirectional Flushing	Carry out unidirectional flushing as part of an annual maintenance program within a pre-determined area. Selection of the area will be based on system monitoring programs, consumer complaints and water age.	Low flow areas are prime locations for sediment build up, organic matter accumulation and biofilm. High velocity flow in one direction (against normal direction) provides for a cleaner water main and lower chlorine demand.	Yearly rotating Programs or as determined by monitoring.	Town of Newmarket Operations Staff
Dead End Flushing	Flushing of Dead End systems including pressure zone boundaries isolated by only a valve.	Dead ends prevent the flow of water resulting in sediment build up, organic matter accumulation and biofilm. Regular flushing of these areas will reduce accumulation, odour and discoloured water calls and lower chlorine demand.	Flushing schedule will be determined by monitoring. Some areas require weekly flushing while others on monthly basis	Town of Newmarket Operations Staff

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Swabbing	Carry out a swabbing contract as part of an annual maintenance program within a pre-determined area. Selection of the area will be based on system monitoring programs, consumer complaints and water age.	Low flow areas and larger pipes increase water retention time (high water age) causing sediment build up, organic matter accumulation and biofilm growth. Nitrifying bacteria are slow growing, so water age, and substrate in low flow provides good growth conditions. Clean mains have a lower chlorine demand.	Yearly rotating Programs or as determined by monitoring.	Contract

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Monitoring	Monitoring of free and total chlorine residuals, monochloramine and ammonia levels plus grab samples to YD lab.	Helps to predict areas of water quality concern. Provides early warning of concerns. Result levels can provide triggers for appropriate actions. To test for nitrate/nitrite NH3, temperature, pH to track changes in water quality and identify potential nitrification	System monitoring is performed daily in different areas. Problem areas will be monitored once or twice a day and continue until satisfactory levels are restored on consecutive days. ISCAN samples taken every second Monday.	Town of Newmarket Operations Staff
Residual Monitoring O.Reg 170/03	Monitoring chlorine residuals at a minimum of 3 locations (1 per zone).	To ensure protection to the water quality, preventing Physical, Chemical and microbiological contamination of the distribution system. Helps to predict areas of water quality concern. Provides early warning of concerns. Result levels can provide triggers for appropriate actions	Daily (7 days a week)	Town of Newmarket Operations Staff

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Bacteriological Sampling 0.Reg 170/03	Obtain regulated number of bacterial samples testing for E coli, fecal Coliforms, Heterotrophic Plate Count and Total Coliform. Residuals to be take each sample	Designed to enable proper supervision of the bacteriological quality of the water in the entire distribution system from source to tap.	Once per week or as directed by the Medical Officer of Health.	Town of Newmarket Operations Staff
ATP Sampling	Test for ATP (adenosine Triphosphate) levels in drinking water samples using in house kits – Photonmaster by Luminultra	To get a true representation of organic activity in drinking water samples. *tests for ATP levels in the water column – not pipe wall	Weekly for routine sample locations – biweekly for additional locations	Newmarket licenced/qualified operators

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Hydrant Inspections	As regulated by the Fire Marshalls Act, each municipal hydrant is to be inspected at least once per year. A program to this act will be carried out.	To ensure proper operation of each hydrant for fire protection. To provide system information such as pressures, available flow and water quality monitoring. Good operational hydrants provide a location to improve water quality by means of flushing and swabbing.	Yearly	Contract
Valve Inspections	Inspect valves for proper operation and cycle each one to ensure continuous operation. Ensure valve box is at grade and accessible	Valves need to be readily available and operational in emergency situations and provide a means of directing water flow for water quality.	Year rotating program to ensure each valve has been operated over a 4 year period	Town of Newmarket Operations Staff

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Lead Testing O.reg. 170/03	Carry out residential, non-residential and distribution system lead testing as required under O.reg. 170/03	According to Health Canada, research shows that exposure to human health, especially for young children, infants and pregnant women. Long-term chronic exposure to lead may increase the risk of subtle impairments to intellectual development.	As per the regulation, lead sampling to be carried out twice a year (Dec 15th - April 15 and June 15 - October 15 *see Element 16: Sampling, Testing, and Monitoring – Table 2 (Sampling Periods for Regulatory Relief from Lead Sampling)	Town of Newmarket Operations Staff
Emergency Infrastructure Repair	Repair all system failures in a safe, timely manner, following all applicable regulations/legislation, and Policies and Procedures	To reinstate water service to consumers To protect public health and safety To protect property	As required by necessity.	All certified operators under the Operating Authority.

OPERATION	ACTIONS	REASONS (WHY?)	SCHEDULE	RESPONSIBILITY (WHO?)
Measurement/recording equipment calibration and maintenance – ph testers	All pH/temp testers in use MUST be calibrated on a regular basis	<p>To ensure that our Water Quality data is as accurate as possible at all times.</p> <p>To ensure compliance with our QMS</p> <p>To ensure compliance with MOECC regulations</p>	<p>Ph/temp pen calibration is the responsibility of the operator to which the tester belongs. They are to be calibrated at a frequency that ensures accuracy at all times. Depending on frequency of use, this may be as often as daily, or up to a maximum of monthly</p>	<p>Calibration of pH/temp testers is the responsibility of the Operator in possession of the equipment.</p>
Measurement/recording equipment calibration and maintenance – colorimeters, turbidimeters, etc	All test kits MUST be calibrated on a regular basis	<p>To ensure that our Water Quality data is as accurate as possible at all times.</p> <p>To ensure compliance with our QMS</p> <p>To ensure compliance with MOECC regulations</p>	<p>Every 6 months by a qualified external contractor</p> <p>In between calibrations, staff should be checking their kits against a set of standards (in drawer in sample room)</p>	<p>Manager of Water/Wastewater schedules HACH technician to come in to calibrate test kits</p> <p>It is always the responsibility to ensure that the testing equipment they are using is calibrated and functioning properly at all times.</p>

Element No.	Document	Change	Reason	Date
15	Appendix V: Policy and Procedure for Water Distribution Maintenance Services	New		9 Dec 2013
15	OP: Element 15 Infrastructure Maintenance Rehabilitation and Renewal	The replacement or rehabilitation of water infrastructure is based on a 5 year plan not a 10 year plan	It allows for updates and ensures currency	9 Nov 2018
15	OP: Element 15 Infrastructure Maintenance Rehabilitation and Renewal	Maintenance programs updated to include Enhanced Monitoring	It allows for updates and ensures currency	9 Nov 2018
15	OP: Element 15	Updated Section 15.1 (Background) to better reflect language within DWQMS (i.e. once every Calendar Year)	It allows for updates and ensures currency	18 Feb 2021

