QMS-APP-08-01
Risk Assessment Outcomes

January 26, 2024 Attendees: Jack Graziosi, Matt Sullivan, Chris Leney, Jeff Thomson, James Ainsworth, Travis Bosscher

January 30, 2025 Attendees: Jack Graziosi, Matt Sullivan, Chris Leney, Jeff Thomson, James Ainsworth, Peter Pound, Victor Matanovic

February 3, 2026 Attendees: Jack Graziosi, Matt Sullivan, Chris Leney, Patrick Ward, James Ainsworth, Corey Thomson

Activity or Process Step	Description of Hazardous Event	Description of Hazard	Control Measures	Monitoring Procedures	Response Procedures	Controllable (Yes /No)	Likelihood	Severity	Detectability	Total (CPP Threshold >= 7)	Critical Control Point (Yes/No)	Critical Control Limit
Drinking Water Supply												
Treated Water Supply Interruption from York Region ** Highway 48 system part of Stouffville WDS with no redundancy. Due to uniqueness of situation, this zone has been assessed separately*	York Region owns and maintains the wells, pumps, and reservoirs required for the supply of the Town's potable water. York Region is an accredited Operating Authority and must comply with the DWQMS, including performing a risk assessment. Failure of any of these components can create long-term adverse effects to the source, requiring York Region to stop supply on a temporary or permanent basis. Short and long-term	Microbiological: • E. Coli • Total Coliform • HPC Physical: • Colour • Turbidity • Low pressure Chemical: • List contained in O. Reg 169/03	-No control measures by the Town. -York Region has communication protocols in place in the event of a failure.	-York Region SCADA system -Resident complaints -Sampling within distribution system	-Water restriction by-law -Isolation of distribution system -Emergency response escalation procedures (Annex J) -Emergency supply of bulk water (bottled, trucks, etc.)	Ballantrae/Musselman's Lake						
						No	1	4	2	7	No	None
						Stouffville						
						No	2	5	2	9	No	None
						*Stouffville (Highway 48)						
						No	2	3	1	6	No	None

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	adverse effects to the quantity of supply include, but are not limited to: • power failures • equipment failure • well levels • scheduled & unscheduled maintenance • long-term impacts to climate change (10 years or greater) • shortfall in water supply • extreme weather events • sustained extreme temperatures • Chemical spills impacting source water • terrorist & vandalism actions • sustained pressure loss				-Closing of valve VA4047 at Lakeshore affects water supply between the Region's tower and Lakeshore as there is no redundancy in the system. Region to be notified if any shutdown is required in this area. -Sampling within distribution system							
Distribution System Infrastructure												
Failure of Distribution Piping, Valves and Appurtenances	Mechanical failure of distribution system piping, valves and appurtenances can create adverse effects to water quantity and quality. Adverse effects include, but are not limited to: • long-term impacts to climate change (10 years or greater) • shortfall in water supply • scheduled & unscheduled maintenance • extreme weather events • sustained extreme temperatures • terrorist & vandalism actions	Routine and Unplanned repairs always pose a risk of: Microbiological: • E. Coli • Total Coliform • HPC Physical: • Colour • Turbidity • Pressure loss	-None	-Routine inspection -Resident complaints -Preventative Maintenance program -Lifecycle replacement -General observation	-MECP Watermain Disinfection Procedure -Direction from York Region Health Connection -QMS-SOP-15-01 – Unscheduled Repairs	Ballantrae/Musselman's Lake						
						No	2	2	1	5	No	None
						Stouffville						
						No	3	3	1	7	No	None

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	• sustained pressure loss • Backflow	Chemical: • List contained in O. Reg 169/03			-QMS-SOP-16-02 Adverse Water Quality Reporting -Asset management (i.e. replacement of iron pipe)							
Distribution Piping, Valves and Appurtenances – Tuberculation and sedimentation	Tuberculation and sedimentation can create adverse effects to water quantity and quality. Adverse effects include, but are not limited to: • scheduled & unscheduled maintenance	Microbiological: • Biofilm • Iron eating bacteria • Total Coliform Physical: • Turbidity • Colour • Solids (suspended or dissolved)	-None	-Routine water quality sampling -Resident Complaints -Water Quality Flushing (Dead Ends)	-Pipe cleaning (i.e. flushing, swabbing) -Asset management (i.e. replacement or rehabilitation of iron pipe)	Ballantrae/Musselman's Lake						
						Yes	3	1	3	7	Yes	Restricted flow, Discolored water
						Stouffville						
						Yes	3	1	3	7	Yes	Discolored water
Pressure Reducing Valve	Pressure reducing valves are required between Stouffville Zones 2 & 3 to ensure high pressure does not cause damage to the water distribution system or private plumbing. • scheduled & unscheduled maintenance • terrorist & vandalism actions • sustained pressure loss	Physical: • Turbidity • Colour • Property damage (high pressure)	-Preventative maintenance -Lifecycle replacement	-Monthly visual inspection of PRVs and Zone 3 water pressure, recorded on Annual Valve Inspection Web-based Form -Annual PRV calibration and maintenance by contractor	-Repair/ replacement of PRV	Ballantrae/Musselman's Lake						
						N/A						
						Stouffville						
						No	2	2	2	6	No	Pressure above 100psi

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Infrastructure Commissioning (new or replacement)	Watermain commissioning can create adverse effects to water quality. Adverse effects include, but are not limited to: • terrorist & vandalism actions • Backflow	Microbiological: • E. Coli • Total Coliform • HPC Chemical: • List contained in O. Reg 169/03	-MECP Watermain Disinfection Procedure -New Watermain Commissioning Procedure (Town Standard)	-QMS-SOP-16-01 Collection and Handling of Drinking Water Samples -Oversight by Town Licensed Operator (OIC) -New infrastructure physically separated from system	-QMS-SOP-16-02 Adverse Water Quality Reporting	Ballantrae/Musselman's Lake						
						Yes	1	1	1	3	No	None
						Stouffville						
						Yes	2	2	1	5	No	None
Distribution System - Operational Activities												
Adverse Water Quality	Adverse water quality can be created by one or a combination of the activities outlined in this risk assessment. It can also be caused from failure of control measures and/or monitoring procedures, as well as damage to infrastructure. • long-term impacts to climate change • shortfall in water supply • extreme weather events • sustained extreme temperatures • Chemical spills impacting source water • terrorist & vandalism actions • sustained pressure loss • Backflow	Microbiological: • E. Coli • Total Coliform Chemical: • List contained in O. Reg 169/03 • Loss of Free Chlorine Residual	-Water Quality Sampling and Testing -Water quality flushing	-QMS-SOP-12-01 Inter-Municipal Communication Protocol -QMS-SOP-15-01 Unscheduled Repairs -QMS-SOP-15-06 Water and Sewer Connections -QMS-SOP-16-01 Collection and Handling of Drinking Water Samples	-QMS-SOP-16-02 Adverse Water Quality Reporting -Maximum acceptable concentration (MAC) outlined in O. Reg 169/03. Town initiates response at half the maximum acceptable concentration (MAC) -Direction from York Region Health Connection	Ballantrae/Musselman's Lake						
						No	2	2	3	7	Yes	• E. Coli & TC= Presence/ Absence • List contained in O. Reg 169/03 =half the maximum acceptable concentration (MAC) • Loss of Free Chlorine Residual – Low=0.3 mg/l, high = 2.0 mg/l
						Stouffville						

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				-QMS-SOP-16-02 Adverse Water Quality Reporting -QMS-SOP-18-01 Contamination of the Drinking Water System -QMS-EMP-01 – Boil Water Advisory -QMS-EMP-02 – Drinking Water Advisory -QMS-SOP-18-03 Cross Connections	-Increase flushing and utilize auto-flusher to increase Free Chlorine residuals	No	2	2	3	7	Yes	• E. Coli & TC= Presence/ Absence • List contained in O. Reg 169/03 =half the maximum acceptable concentration (MAC) Loss of Free Chlorine Residual – Low=0.3 mg/l, high = 2.0 mg/l
Operation of Valves – Valve Position Incorrect	Incorrect valve position can cause a low-pressure event or unexpected watermain shutdown, which could create adverse effects to water quality and quantity. • shortfall in water supply • terrorist & vandalism actions	Microbiological: • E. Coli • Total Coliform • HPC Loss of Free Chlorine Residual Sustained system pressure loss (<20psi)	-QMS-FRM-15-03 - Water Shutdown Notification Information -Web-Based app: Water Shutdown Notification Information -On the Job Training	-QMS-FRM-15-03 - Water Shutdown Notification (Internal Document) -Water Shutdown Notification Information (Online App) -Specific training courses, on the job -Lockout devices	-QMS-SOP-15-01 Unscheduled Repairs -QMS-SOP-15-05 Valve Inspections	Ballantrae/Musselman's Lake						
						Yes	2	3	3	9	Yes	Visual Inspections
						Stouffville						
						Yes	3	3	3	9	Yes	Visual Inspections

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				Valve turning/ maintenance program								
Temporary Connection to Buildings	Temporary connections to buildings due to service break or frozen service can create adverse effects to water quality and quantity • long-term impacts to climate change • sustained extreme temperatures • terrorist & vandalism actions • Backflow • Lack of serviceable connection (ICI)	Microbiological: • E. Coli • Total Coliform Chlorination/Chloramination mixing	-MECP Watermain Disinfection Procedure -Free Chlorine Residual grab sample	-QMS-SOP-16-01 Collection and Handling of Drinking Water Samples	-Site specific requirements	Ballantrae/Musselman's Lake						
						No	2	1	1	4	No	None
						Stouffville						
						No	2	1	1	4	No	None
Temporary Watermains	Temporary watermains for construction or emergency purposes can create adverse effects to water quality and quantity • long-term impacts to climate change • sustained extreme temperatures • terrorist & vandalism actions • Backflow	Microbiological: • E. Coli • Total Coliform Chemical: • List contained in O. Reg 169/03	-MECP Watermain Disinfection Procedure -Regular Visual inspection -Free Chlorine Residual Grab samples	-QMS-SOP-16-01 Collection and Handling of Drinking Water Samples -Free Chlorine Residual checks -Visual inspections	-Site specific requirements	Ballantrae/Musselman's Lake						
						No	1	3	1	5	No	None
						Stouffville						
						No	2	3	1	6	No	None
Testing and Monitoring Equipment	Failure of equipment can cause inaccurate sampling results, and lead to adverse water quality. • Backflow • terrorist & vandalism actions	Microbiological: • E. Coli • Total Coliform Chemical: • Loss of Free Chlorine Residual	-Calibration of units by manufacturer -Verification monthly of HACH units	-Specific equipment training -Verification of units by Operators	-Operational Plan: Element 17 – Equipment Calibration and Maintenance	Ballantrae/Musselman's Lake						
						Yes	1	3	1	5	No	None
						Stouffville						
						Yes	1	3	1	5	No	None

Activity or Process Step	Description of Hazardous Event	Description of Hazard	Control Measures	Monitoring Procedures	Response Procedures	Controllable (Yes /No)	Likelihood	Severity	Detectability	Total (CPP Threshold >= 7)	Critical Control Point (Yes/No)	Critical Control Limit
			-Redundancy (spare units/other Operators) -Lifecycle replacement of Colorimeters (5-7 years) -Lifecycle and expiry of testing materials (DPD, pH and Standards)									
Labour Shortage	Shortage of Employee resources can limit the ability to fulfill regulatory requirements of O.Reg. 170/03. Can be caused by labour dispute or pandemic (ToWS, YR, Lab staff) • Sustained pressure loss (Distribution Systems) • Inability to respond to emergency • Inability to carry out daily responsibilities	Microbiological: • E. Coli • Total Coliform Chemical: • Free Chlorine Residual Regulatory requirements and compliance	-Redundancy: Including two level 1 licensed operators, licensed Operations Technologist, and third-party contractor	-Labour-Management Relations -Corporate Health and Safety Policies and Procedures	-Utilize licensed contractors retained for water quality sampling in unassumed subdivisions and emergency infrastructure repairs -Member of ONWARN	Ballantrae/Musselman's Lake						
						Yes	3	2	1	6	No	None
						Stouffville						
						Yes	3	2	1	6	No	None
Distribution System – Other Unclassified Hazardous Events												
Unauthorized Connection to system or appurtenances	Unauthorized connections can damage infrastructure and create adverse effects to water quality and quantity	Microbiological: • E. Coli • Total Coliform Chemical:	-Anti-tampering devices for hydrants where needed -King Locks	-Resident complaints -York Region SCADA monitoring	-QMS-SOP-15-02 Supply of Bulk Water	Ballantrae/Musselman's Lake						
						No	2	4	2	8	Yes	Dependent on situation
						Stouffville						

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	• Backflow • terrorist & vandalism actions	• List contained in O. Reg 169/03 System/infrastructure damage	-Bulk Water station	-Visual inspections	-QMS-SOP-18-03 Cross Connections -Water By-law 2018-054 (as amended) -Bulk water station available 24/7 with account setup -Hydrant permit system	No	3	4	2	9	Yes	Dependent on situation
Network Interruption/ Cyber Attack	An interruption of network services or VPN to laptops or unauthorized use/ cyber attack on Town networks. Includes failure of cellular service. • terrorist & vandalism actions	-Ransomware -Network Disruption -Loss of digital inspection forms and records	-Paper backup/ flash drive of maps and forms -Cybersecurity training -IT test emails (phishing) -Explore redundant technology information availability	-Staff complaints -IT security measures	-IT Helpdesk notification -Revert to utilizing pen and paper or flash drive data	Ballantrae/Musselman's Lake						
						No	3	5	1	9	No	None
						Stouffville						
						No	3	5	1	9	No	None

The following potential hazardous events were identified by the MECP as requirements to consider in the DWQMS Risk Assessment. Each activity or process above were reviewed against the potential hazardous events and listed below if the activity or process is impacted by the potential hazardous event.

Long Term Impacts of Climate Change (all systems) – Climate change trends of 10 years or greater.

Water Supply Shortfall (all systems) – York Region required to implement water conservation and restrictions.

Extreme Weather Events (all systems) – 25, 50 and 100-year storm events.

Sustained Extreme Temperatures (all systems) – Temperatures greater than 35 Celsius or below minus 25 Celsius for a period of 14 days or more.

Chemical Spill impacting source water (all systems) – Accidental chemical spills at the water supply as reported by York Region.

Terrorist and Vandalism Actions (all systems) – Intentional sabotage of the drinking water supply and/or distribution systems, including through cyberattacks.

Sustained pressure loss (Distribution Systems) – Pressure in the system drops below 140 kpa (20psi) for longer than 24 hours.

Backflow (Distribution Systems) – Any event that causes a foreign substance to enter the water distribution system as a result of pressure gradient.

Sudden Changes to raw water characteristics (Treatment Systems) – Not applicable for the Ballantrae/Musselman's Lake or Stouffville Water Distribution Systems.

Failure of equipment or process associated with primary disinfections (Treatment Systems) – Not applicable for the Ballantrae/Musselman's Lake or Stouffville Water Distribution Systems.

Failure of Equipment or process associated with secondary disinfection (Treatment Systems and Distribution Systems providing secondary disinfection) – Not applicable for the Ballantrae/Musselman's Lake or Stouffville Water Distribution Systems.

Algal Blooms (Treatment Systems using Surface Water) – Not applicable for the Ballantrae/Musselman's Lake or Stouffville Water Distribution Systems.

Document Change History

Revision Number	Date	Revision Description	Revision Made By:	Revision Approved By
6	January 26, 2021	Full Risk Assessment conducted	Peter W	
7	January 26, 2022	Annual Risk Assessment Review	Peter W	Brian K
8	January 27, 2023	Annual Risk Assessment Review	Peter W	Peter W
9	January 26, 2024	Full Risk Assessment Conducted	Jeff T	Jeff T, Matt S
10	January 30, 2025	Annual Risk Assessment Review	Jeff T	Jeff T, Matt S
11	May 2, 2025	Updated Free Chlorine Residual CCL	Jeff T	Jeff T, Matt S
12	February 3, 2026	Annual Risk Assessment	Patrick W	Patrick W, Matt S