QMS-APP-08-01
Risk Assessment Outcomes

January 26, 2021 Attendees: Brian Kavanagh, Patrick Ward, James Ainsworth, Luigi Colangelo, Matt Sullivan, Peter Wyllie

January 26, 2022 Attendees: Brian Kavanagh, Peter Pound, James Ainsworth, Jeff Thomson, Matt Sullivan, Peter Wyllie

January 27, 2023 Risk Assessment Review Attendees: Brian Kavanagh, Matt Sullivan, Jeff Thomson, Peter Wyllie, James Ainsworth, Patrick Ward, 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	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	Water restriction by-law Isolation of distribution system Emergency response escalation procedures Emergency supply of bulk water (bottled, trucks, etc.) Closing of valve VA4047 at	Ballantrae/Musselman's Lake						
						No	2	4	1	7	No	None
						Stouffville						
						No	2	4	1	7	No	None
						*Stouffville (Highway 48)						
						No	3	2	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				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.							
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 Chemical:	None	Routine inspection Resident complaints Preventative Maintenance program Lifecycle replacement General observation	MECP Disinfection Procedure Direction from York Region Health Department QMS-SOP-15-01 – Unscheduled Repairs QMS-SOP-16-02 Adverse Water Quality Reporting	Ballantrae/Musselman's Lake						
						No	1	2	1	4	No	None
						Stouffville						
						No	3	3	1	7	No	None

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	• sustained pressure loss • Backflow	• List contained in O. Reg 169/03			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	Pipe cleaning (i.e. flushing, swabbing) Asset management (i.e. replacement or rehabilitation of iron pipe) Deviations of Critical Control Limits are recorded in the Summary of Sampling Results (by year) spreadsheet, under the CCL tab	Ballantrae/Musselman's Lake						
						Yes	4	1	3	8	Yes	Restricted flow, Discolored water
						Stouffville						
						Yes	4	1	3	8	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 Annual PRV calibration and maintenance by contractor	Repair/ replacement of PRV Deviations of Critical Control Limits are recorded in the Summary of Sampling Results (by year) spreadsheet, under the CCL tab	Ballantrae/Musselman's Lake						
						N/A						
						Stouffville						
						No	2	1	2	5	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 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	1	1	1	3	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. • long-term impacts to climate change • shortfall in water supply • extreme weather events • sustained extreme temperatures • Chemical spills impacting source water • terrorist & vandalism actions	Microbiological: E. Coli Total Coliform Chemical: • List contained in O. Reg 169/03 • Loss of Chlorine Residual	Water Quality Sampling and Testing	QMS-SOP-08-01 Deviations from Critical Control Points QMS-SOP-12-01 Inter-Municipal Communication Protocol QMS-SOP-15-01 Unscheduled Repairs	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)	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 Chlorine Residual – Low=0.4

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
	• sustained pressure loss • Backflow			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 QMS-SOP-18-01 Contamination of the Drinking Water System QMS-SOP-18-02 Boil Water and Drinking Water Advisory QMS-SOP-18-03 Cross Connections	Direction from York Public Health Deviations of Critical Control Limits are recorded in the Summary of Sampling Results (by year) spreadsheet, under the CCL tab						mg/l, high = 2.1 mg/l
						Stouffville						
						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 Chlorine Residual – Low=0.4 mg/l, high = 2.1 mg/l
Operation of Valves – Valve Position incorrect	Incorrect valve position can create adverse effects to water quality and quantity. • shortfall in water supply • terrorist & vandalism actions	Microbiological: • E. Coli • Total Coliform • HPC	QMS-FRM-15-03 - Water Shutdown Notification Information Training	QMS-FRM-15-03 - Water Shutdown Notification Information Training	QMS-SOP-15-01 Unscheduled Repairs QMS-SOP-15-05 Valve Inspections	Ballantrae/Musselman's Lake						
						Yes	2	1	3	6	No	None
						Stouffville						
						Yes	3	2	3	8	Yes	Visual Inspections

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
				Lockout devices Valve turning/ maintenance program	Deviations of Critical Control Limits are recorded in the Summary of Sampling Results (by year) spreadsheet, under the CCL tab							
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	Microbiological: • E. Coli • Total Coliform	MECP Watermain Disinfection Procedure,	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	MECP Watermain Disinfection Procedure,	QMS-SOP-16-01 Collection and Handling of Drinking Water Samples	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 lead to adverse water quality. • Backflow	Microbiological: • E. Coli • Total Coliform	Calibration of units by manufacturer Redundancy	Training verification of units by Operators	Operational Plan System Procedure QMS-SYS-17	Ballantrae/Musselman's Lake						
						Yes	1	3	1	5	No	None
						Stouffville						

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	• terrorist & vandalism actions •	Chemical: • Chlorine Residual (free)	Lifecycle replacement of colorimeters (5-7 years)			Yes	1	3	1	5	No	None
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 • Sustained pressure loss (Distribution Systems) • Backflow (Distribution Systems)	Microbiological: • E. Coli • Total Coliform Chemical: • Chlorine Residual (free)	Redundancy	Labour-Management Relations Corporate Health and Safety Policies and Procedures	Utilize contractors retained for water quality sampling in unassumed subdivisions and emergency infrastructure repairs Member of ONWARN	Ballantrae/Musselman's Lake						
						Yes	3	1	1	3	No	None
						Stouffville						
						Yes	3	1	1	3	No	None
Distribution System – Other Unclassified Hazardous Events												
Unauthorized Connection to system or appurtenances	Unauthorized connections can create adverse effects to water quality and quantity • Backflow • terrorist & vandalism actions	Microbiological: • E. Coli • Total Coliform	Anti-tampering devices for hydrants where needed	Resident complaints York Region SCADA monitoring Visual inspections	QMS-SOP-15-02 Supply of Bulk Water QMS-SOP-18-03 Cross Connections Water by-law 2018-054 (as amended) Bulk water station available 24/7 with account setup	Ballantrae/Musselman's Lake						
						No	2	4	2	8	Yes	Depend on situation
						Stouffville						
						No	3	4	2	9	Yes	Depend on situation

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					Hydrant permit system Deviations of Critical Control Limits are recorded in the Summary of Sampling Results (by year) spreadsheet, under the CCL tab							
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	• Paper backup/ flash drive of maps and forms • Cybersecurity training • IT test emails (phishing)	• Staff complaints • IT security measures	• IT Helpdesk notification • Revert to utilizing pen and paper or flash drive data	Ballantrae/Musselman's Lake						
						No	1	4	1	6	No	None
						Stouffville						
						No	1	4	1	6	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.

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