Ministry of the Environment, Conservation and Parks

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Ministère de l'Environnement, de la Protection de la nature et des Parcs

Division de la conformité en matière d'eau potable et d'environnement
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Ontario

January 9, 2019 File no. SI-MI-LN-DU-540

The Corporation of the City of London
300 Dufferin Avenue
London, ON N6A 4L9

Attention: Mr. John Simon – Division Manager – Water Operations

Re: City of London Distribution System (WW# 260004917)
Inspection conducted on December 10, 2018

Dear Mr. Simon,

The enclosed Drinking Water Inspection Report outlines non-compliance, if any, with Ministry legislation, and policies for the above noted water system. Violations noted in this report, if any, have been evaluated based on community risk. These violations will be monitored for compliance with the minimum standards for drinking water in Ontario as set forth under the *Safe Drinking Water Act* and associated regulations. Where risk is deemed to be high and/or compliance is an ongoing concern, violations will be forwarded to this Ministry's Investigation and Enforcement Branch.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR) provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in *"Taking Care of Your Drinking Water: A guide for members of municipal council"* found under "Resources" on the Drinking Water Ontario website at www.ontario.ca/drinkingwater.

Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Mark Smith, Drinking Water Program Supervisor, at (519) 873-5122.

Please note that as of June 29, 2018 the Ministry of the Environment and Climate Change's name has changed to the Ministry of Environment, Conservation and Parks. This name change will take some time to be reflected in ministry materials and systems.

If you have any questions regarding the report, please feel free to call me at (519) 873-5065.

Yours truly,

Neville Rising, P.Eng.
Provincial Officer
London District Office

cc. Middlesex London Health Unit
Upper Thames River Conservation Area
London District File

Ontario

Ministry of the Environment, Conservation and Parks

CITY OF LONDON DISTRIBUTION SYSTEM

Inspection Report

Site Number:	260004917
Inspection Number:	1-I5JGA
Date of Inspection:	Dec 10, 2018
Inspected By:	Neville Rising

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Appendix A: Stakeholder References

Appendix B: Inspection Rating Record and Inspection Risk Methodology

OWNER INFORMATION:

Company Name: LONDON, THE CORPORATION OF THE CITY OF
Street Number: 300 **Unit Identifier:**
Street Name: DUFFERIN Ave
City: LONDON
Province: ON **Postal Code:** N6A 4L9

CONTACT INFORMATION

INSPECTION DETAILS:

Site Name: CITY OF LONDON DISTRIBUTION SYSTEM
Site Address: 300 Dufferin Avenue LONDON ON N6A 4L9
County/District: London
MECP District/Area Office: London District
Health Unit: MIDDLESEX-LONDON HEALTH UNIT
Conservation Authority:
MNR Office:
Category: Large Municipal Residential
Site Number: 260004917
Inspection Type: Announced
Inspection Number: 1-I5JGA
Date of Inspection: Dec 10, 2018
Date of Previous Inspection: Nov 29, 2017

COMPONENTS DESCRIPTION

Site (Name): London Water Distribution System
Type: Other **Sub Type:** Other
Comments:
As of 2017, the Water Distribution System for London consisted of approximately 1,601 km of pipe ranging from 50 mm to 1050 mm. The type of pipe is roughly 42% polyvinyl chloride (PVC), 26% cast iron, 21% ductile iron, 8% reinforced concrete pressure pipe, and 3% steel. Water is obtained from the Elgin Area Primary Water Supply System as well as the Lake Huron Primary Water Supply System, serving approximately 385,000 people.

Site (Name): John Gillies (Arva) Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 13966 Medway Road, R.R. 1, Arva ON

UTM Coordinates: NAD 83, Zone 17, Easting 4744384.92 m and Northing 4766239.87 m

Equipment: Three (3) fixed speed horizontal centrifugal pumps rated at 58,000 m3/d, 55 m TDH; One (1) fixed speed horizontal centrifugal pump rated at 55,000 m3/d, 33 m TDH; One (1) fixed speed horizontal centrifugal pump rated at 51,000 m3/d, 40 m TDH, One (1) fixed speed horizontal centrifugal pump rated at 140,000 m3/d, 37 m TDH

Fluoridation: Two (2) hydrofluorosilicic acid solution storage tanks, each 12.2 m3, two (2) day tanks, each 0.7 m3, online analyzer

Standby Power: 48 kW stationary diesel generator set

This main city pumping station conveys water to the City of London from the Lake Huron Primary Water Supply System reservoir in Arva. The pumping station is located adjacent to the Arva Reservoir. Pump discharge ball valves are used to modulate the discharge pressure. There are two parallel east and west pumping systems, with pumps 1, 2 and 3 on the west header, and pumps 4, 5 and 6 on the east header. Each discharge header has a magnetic flowmeter. A chlorine residual analyzer draws from the two headers. No chlorine is added at this location, but the distribution system is monitored on a continuous basis.

Fluoride is injected as 25% Hydrofluorosilicic Acid solution into the pump suction conduit. There is a flow-paced fluoride injection system which maintains the fluoride concentration at a consistent level. Fluoride concentration is monitored: continuously by an on-line analyzer, daily by bench test and weight consumed calculation, and weekly lab samples.

Site (Name): Elgin-Middlesex Pumping Station (London Portion)
Type: Other **Sub Type:** Booster Station
Comments:
Location: 490 South Edgeware Street, St. Thomas ON

UTM Coordinates: NAD 83, Zone 17, Easting 488296.00 m and Northing 4737955.00 m

Equipment: One (1) fixed speed horizontal centrifugal pump rated at 73,000 m3/d, 77.5 m TDH; Two (2) fixed speed horizontal centrifugal pumps rated at 45,000 m3/d, 46 m TDH

Surge Protection: One (1) 167 m3 hydro-pneumatic tank, with two (2) air compressors

Standby Power: None

Notes: A standby generator exists at this facility, but it is owned by the St. Thomas Secondary Water Supply System and the Aylmer Secondary Water Supply System. It is not part of the City of London Distribution System.

There is a dual-celled reservoir at this location that is shared amongst the City of St. Thomas, the Town of Aylmer and the City of London/County of Elgin - Middlesex, each cell with 27,300 m^3 capacities.

Site (Name): Springbank Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 848 Commissioners Road W, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 474731.50 m and Northing 4755576.72 m

Equipment: Two (2) fixed speed vertical turbine pumps rated at 11,768 m3/d, 35.1 m TDH; Two (2) variable speed vertical turbine pumps rated at 12,355 m3/d, 50.8 m TDH

Rechlorination: Sodium hypochlorite solution storage tank, 118.6 L, two (2) chemical metering pumps, one (1) operating on standby, rated at 3.6 L/h, with automatic switchover between pumps, online-chlorine analyzer

Standby Power: 450 kW stationary diesel generator set

The Springbank Pumping Station and Reservoir #3 are located adjacent to each other on the south side of Commissioners Road. Springbank Reservoir #1 and #2 are located to the north of the Springbank Pumping Station and Reservoir #3.

Site (Name): Westmount Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 603 Wonderland Road S, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 476275.11 m and Northing 4755700.82 m

Equipment: Four (4) variable speed vertical turbine pumps rated at 15,725 m3/d, 30 m TDH

Standby Power: 250 kW stationary diesel generator set

Site (Name): Pond Mills Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 1121 Commissioners Rd E, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 483865.44 m and Northing 4756577.00 m

Equipment: One (1) variable speed vertical turbine pump rated at 6,497 m3/d, 33.5 m TDH; Two (2) variable speed vertical turbine pumps rated at 10,454 m3/d, 33.5 m TDH

Standby Power: 200 kW stationary diesel generator set

Site (Name): Wickerson Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 2080 Wickerson Rd, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 471443.06 m and Northing 4755230.30 m

Equipment: Two (2) variable speed vertical turbine pumps rated at 11,578 m3/d, 38 m TDH; One (1) variable speed vertical turbine pump rated at 2,851 m3/d, 34 m TDH

Standby Power: 130 kW stationary diesel generator set

Site (Name): Hyde Park Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 1617 Hyde Park Rd, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 472944.70 m and Northing 4760841.25 m

Equipment: Two (2) variable speed vertical turbine pumps rated at 17,971 m3/d, 18.2 m TDH; One (1) variable speed vertical turbine pump rated at 8,208 m3/d, 14.0 m TDH

Standby Power: 230 kW stationary diesel generator set

Site (Name): Uplands Pumping Station
Type: Other **Sub Type:** Booster Station
Comments:
Location: 221 Sunningdale Rd E, London, ON

UTM Coordinates: NAD 83, Zone 17, Easting 477102.10 m and Northing 4765327.98 m

Equipment: Three (3) variable speed vertical turbine pumps rated at 9,072 m3/d, 18.4 m TDH; One (1) variable speed vertical turbine pump rated at 3,197 m3/d, 10.7 m TDH

Standby Power: 160 kW stationary diesel generator set

Site (Name): Springbank Reservoir #1
Type: Other **Sub Type:** Reservoir
Comments:
Location: 869 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474794.57 m and Northing 4755801.67 m

Description: In-ground reservoir

Dimensions: 117 m by 97 m, 11 m depth

Capacity: 81,800 m3 capacity

Notes: Rechlorination provided on-site and at Springbank Meterhouse No. 4

Site (Name): Springbank Reservoir #2
Type: Other **Sub Type:** Reservoir
Comments:
Location: 869 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474794.57 m and Northing 4755801.67 m

Description: In-ground reservoir

Dimensions: 105 m by 75.9 m at the top, 76 m by 44.2 m at the bottom, 9.23 m depth

Capacity: 45,400 m3 capacity

Notes: Reservoir has sloped sides and is equipped with a floating cover. Rechlorination provided on-site and at Springbank Meterhouse No. 4

Site (Name): Springbank Reservoir #3
Type: Other **Sub Type:** Reservoir
Comments:
Location: 848 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474731.50 m and Northing 4755576.72 m

Description: In-ground reservoir

Dimensions: 117 m by 97 m, 11 m depth

Dimensions: 81,800 m3 capacity

Notes: Connected to the Springbank Pumping Station, Rechlorination provided at Springbank Pumping Station and at Springbank Meterhouse No. 4

Site (Name): Elgin-Middlesex Terminal Reservoir - London Cell
Type: Other **Sub Type:** Reservoir
Comments:
Location: 490 South Edgeware St, St. Thomas ON

UTM Coordinates: NAD 83, Zone 17, Easting 488296.00 m and Northing 4737955.00 m

Description: One cell of an in-ground reservoir comprised of two (2) baffled cells in total

Dimensions : 71.7 m x 64.6 m, 5.9 m deep

Capacity: 27,300 m3 capacity

Notes: Treated water is supplied to this reservoir by the Elgin Area Primary Water Supply System. The Elgin-Middlesex Pumping Station (London Portion) draws water from this reservoir and pumps into the London Distribution System.

Site (Name): Elgin-Middlesex Pumping Station Hydro-Pneumatic Surge Tank
Type: Other **Sub Type:** Other
Comments:
Location: 490 South Edgeware St, St. Thomas ON

UTM Coordinates: NAD 83, Zone 17, Easting 488296.00 m and Northing 4737955.00 m

Description: Steel pressure vessel

Dimensions: 167 m3 nominal capacity

Notes: Equipped with two (2) positive displacement air compressors rated at 7.4 m3/min at 1,380 kPa

Site (Name): Springbank Meterhouse No. 4 Rechlorination System
Type: Other **Sub Type:** Secondary Treatment
Comments:
Location: 809 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474932.59 m and Northing 4755630.50 m

Equipment: Two (2) booster pumps, one (1) duty and one (1) standby, gas chlorinator rated at 24 kg/d, two (2) chlorine cylinders on electronic scales, one (1) chlorine leak detector, one (1) portable standby chlorinator connection

Notes: Chlorine gas system. Compound loop control re-chlorination system with an on-line chlorine analyzer

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Site (Name): Springbank Reservoirs No.1 & 2 - Rechlorination System
Type: Other **Sub Type:** Secondary Treatment
Comments:
Location: 869 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474794.57 m and Northing 4755801.67 m

Equipment: Two (2) booster pumps, one (1) for the injector and one (1) for the analyser, gas chlorinator rated at 24 kg/d, two (2) chlorine cylinders on electronic scales, one (1) chlorine leak detector, one (1) portable standby chlorinator connection

Notes: Chlorine gas system. Compound loop control re-chlorination system with an on-line chlorine analyzer

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Site (Name): Springbank Pumping Station Rechlorination System
Type: Other **Sub Type:** Secondary Treatment
Comments:
Location: 848 Commissioners Rd W, London ON

UTM Coordinates: NAD 83, Zone 17, Easting 474731.50 m and Northing 4755576.72 m

Equipment: Two (2) Sodium Hydroxide metering pumps, one (1) duty, one (1) standby, rated at 3.6 L/h, one (1) Sodium Hydroxide plastic storage tank having 118.6 L capacity

Notes: 12% Sodium Hydroxide system. PID control re-chlorination system with an on-line chlorine analyzer

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Site (Name): Southeast Reservoir and Pumping Station
Type: Other **Sub Type:** Reservoir
Comments:
Approval was granted to construct a 113 ML reservoir and pumping station to primarily service the southeast area of the City of London. It will consist of the following major components:
- an in-ground reservoir consisting of two (2) baffled cells each approximately 57 ML in volume complete with all necessary inlet, outlet and inter cell piping and valving as per the contract drawings.
- four (4) horizontal-split case water pumps each rated at 434 L/s at 62 m Total Dynamic Head (TDH) complete with all necessary piping, valves and controls as per the contract drawings.

- two (2) pumps, each rated at 125 L/s at a TDH of 58 m and equipped with adjustable speed drives;
- a gas chlorination system consisting of two (2) nominal 70 kg gas chlorine cylinders stored within two (2) containment vessels in a separate chlorination room for the purpose of re-chlorinating water as it enters the reservoir system and/or on the pumping station discharge, on an as-needed basis, and three (3) wall mounted gas chlorinators, each rated at 45 kg/d; one (1) for re-chlorination of the common reservoir inlet pipe and one (1) for each of the two (2) pumping station discharge pipes. System complete with chlorine analyzers, scales, chlorine gas detection equipment and controls for flow pacing and/or compound loop control.
- a 1,250 kW diesel generator set complete with fuel tank, electrical, and controls.
- all additional mechanical, structural, architectural, and electrical components designed for the facility to be constructed as per the contract drawings.

Site (Name): MOE DWS Mapping
Type: DWS Mapping Point **Sub Type:**

INSPECTION SUMMARY:

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period.**

  This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O. Reg.170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

  This report is based on an inspection of a "stand alone connected distribution system". This type of system receives treated water from a separately owned "donor" system. This report contains the elements required to assess key compliance and conformance issues associated with a "receiver" system. This report does not contain items associated with the inspection of the donor system, such as source waters, intakes/wells and treatment facilities.

  This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

  This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

  As part of the inspection, several documents were reviewed to support the conclusions and inferences presented within this report. Generally, these include but are not limited to:

  1. Drinking Water Works Permit # 006-201, Issue #4 dated September 21, 2017
  2. Municipal Drinking Water Licence # 006-101, Issue #5 dated September 21, 2017
  3. "Waterworks Operations and Maintenance Manual" prepared by the City of London and dated March 2018.

  Other documents reviewed include microbiological and chemical testing results, logsheets, etc. It should be noted that this inspection covers the period from November 1, 2017 to November 30, 2018.

  The City of London water distribution system receives treated water from the Lake Huron Primary Water Supply System (WW# 210000791) and the Elgin Area Primary Water Supply System (WW# 210000871).

Treatment Processes

- **The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.**

  At the time of the site inspection, the Fanshawe and Hyde Park well fields and treatment systems were physically disconnected from the City of London drinking water system. In addition, the Southeast Reservoir and Pumping Station became operational on September 11, 2017. The aforementioned changes to the system are not referenced in the current Drinking Water Works Permit #006-201 - Issue #4, dated September 21, 2017, however, the Owner / Operating Authority did complete the appropriate Director's Notification Forms and Form 2 documents to account

Treatment Processes

for the changes. It is inferred these changes will be present in the next issued Drinking Water Works Permit.

- **The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.**

  Over the course of the inspection period, the Operating Authority provided a total of 27 Form 1 documents for review associated with the installation of new watermains and the replacement / extension of existing watermains.

- **The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.**

  Over the course of the inspection period, the Operating Authority provided one Form 2 document for review associated with modifications to the impeller on High Lift Pump #6 at the Arva Pumping Station. A Director's Notification form was also completed in association with the modification to this pump.

- **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

  The City of London Distribution System is equipped with permanent rechlorination systems and multiple online free chlorine analyzers throughout the distribution system through which the free chlorine is continually monitored. In addition, the Operating Authority also uses portable chlorine analyzers to measure the concentration of free chlorine at various locations throughout the distribution system when collecting microbiological samples.

  According to the manual grab samples collected, there were no events when the concentration of free chlorine was less than 0.05 mg/L. In addition, according to the alarm summaries associated with the online free chlorine analyzers, there were no occasions when the concentration of free chlorine was less than 0.05 mg/L with the exception of short, acceptable periods of time during which power outages, equipment calibrations, etc., occurred.

Treatment Process Monitoring

- **The secondary disinfectant residual was measured as required for the distribution system.**

  Ontario Regulation 170/03 – Schedule 7-2(3) and 7-2(4) stipulates that at least seven distribution samples are collected for testing each week for free chlorine residual. A sample for chlorine residual testing can be collected each day, otherwise at least four samples must be collected on one day, and at least three samples must be collected on another day in the same week, at least 48 hours apart.

  The City of London uses a portable meter to collect free chlorine residual readings throughout the distribution system in conjunction with the collection of microbiological samples. Based on the sampling regime, the City of London collects at least four samples on one day in a week, and at least three samples on another day in the same week, separated by at least 48 hours.

  In addition, there are several locations throughout the distribution system where online free chlorine meters are utilized for operational purposes. These online analyzers are fitted with alarms to notify the Operating Authority in the event that the free chlorine concentrations are less than the alarm setpoints. They are not considered regulatory meters.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

  The Operating Authority typically reviews the online data on a daily basis by way of the SCADA system.

- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or**

Treatment Process Monitoring

shut-off mechanisms that satisfy the standards described in Schedule 6.

The City of London Distribution system is equipped with online operational chlorine analysers at each of its major components. At these locations, the concentration of free chlorine is continuously monitored and recorded. Although the Operating Authority does not rely on these online meters to meet with the regulatory requirements for free chlorine monitoring, they have been set up with alarms to aid with the operation of the system. Generally stated, the current free chlorine alarms setpoints are as follows:

1. Low Low Alarm = 0.20 mg/L
2. Low Alarm = 0.25 to 0.30 mg/L
3. High Alarm = 1.5 mg/L (Shut Down)
4. High High Alarm = 2.0 mg/L

There are two operational online fluoride analyzers located at the Arva Reservoir and the Southeast Reservoir and Pumping Station. The alarm setpoints for these meters are as follows:

1. Low Low Alarm = 0.40 mg/L
2. Low Alarm = 0.50 mg/L
3. High Alarm = 0.80 mg/L
4. High High Alarm = 1.00 mg/L (Shut Down at 0.90 mg/L)

In addition, the Operating Authority also uses a portable chlorine analyzer to measure the concentration of free chlorine at various locations throughout the distribution system.

- **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**

  The City of London utilizes several online free chlorine analyzers throughout the distribution system at major components for operational purposes. In addition, there are two online fluoride analyzers used to measure the fluoride concentrations from the Arva Reservoir and from the Southeast Reservoir and Pumping Station. As part of the City of London maintenance and calibration procedures, their portable meters are verified on a quarterly basis and these portable meters are used to assess the accuracy of the operational (non-regulatory) online meters throughout the system. In the event that the measurements from the online analyzers relative to the portable meters exceeds an acceptable range, adjustments are made to ensure their accuracy. The Operating Authority advised that records of all adjustments are maintained on logsheets.

Distribution System

- **Existing parts of the distribution system that are taken out of service for inspection, repair or other activities that may lead to contamination, and all new parts of the distribution system that come in contact with drinking water, were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit, or an equivalent procedure (i.e. the Watermain Disinfection Procedure).**

  The Operating Authority provided some representative documents as related to the installation of new watermains and the maintenance of watermains. The provided documents met with the requirements of the current Watermain Disinfection Procedure. Further details are provided in the best management practices of this report.

Operations Manuals

- **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.**

Operations Manuals

- **The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

  Since the issuance of the previous annual inspection of the water system, the Owner / Operating Authority was required to prepare an up to date Operations and Maintenance Manual to account for certain changes including but not limited to the decommissioning of the back up well system, and the commissioning of the new South East Reservoir Pumping Station. The required modifications to the Operations and Maintenance Manual were required to be completed by March 31, 2018. On March 28, 2018, the Owner / Operating Authority provided an updated Operations and Maintenance Manual which meets with the requirements prescribed by Section 16.3 of Municipal Drinking Water Licence #006-101 - Issue #5.

Logbooks

- **Logbooks were properly maintained and contained the required information.**

  The Operating Authority maintains logsheets at each of the components of the system in which daily entries are made as related to the operations of the system, while logbooks are used to record unusual activities. The identification of the Operator making entries to the logsheets and logbooks is noted. In addition, digital logs are maintained of any alarm or unusual activity noted with the review of the online data from the continuous free chlorine analyzers.

- **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**

  The City of London employs Certified Operators to conduct any tests not completed by online continuous monitoring equipment.

Security

- **The owner had not provided security measures to protect components of the drinking water system.**

  The component buildings associated with the City of London water distribution system remain locked at all times and are equipped with entry alarms which are connected to a dialing system to alert the Operating Authority / Owner of unathourized entry.

  As part of the previous annual inspection of the water system, it was recommended that the Owner / Operating Authority retrofit the hatch seals associated with Springbank Reservoir #3 and the Southeast Reservoir Pumping Station to ensure they are functioning properly. At the time of the inspection, all of the hatches associated with the Southeast Reservoir Pumping Station were fitted with new seals, and the Operating Authority installed two new hatches with seals and screens at Springbank Reservoir #3.

  At the time of the site inspection, there was evidence of insect nests within the three vents associated with Springbank Reservoir #1 and #2. Closer examination revealed that the screen grates over the vents were a large sized mesh / aperture exceeding the recommended #24 mesh size as prescribed by the Ten States Standards (2012 Edition).

Certification and Training

- **The overall responsible operator had been designated for each subsystem.**

  The City of London currently has two qualified Operators that have been designated as the Overall Responsible Operators for the water systems. Each of these Operators rotate their duty as the ORO on a monthly basis. This combination of staff members provides continuity in the event of absenteeism.

Certification and Training

- **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**

- **Only certified operators made adjustments to the treatment equipment.**

Water Quality Monitoring

- **All microbiological water quality monitoring requirements for distribution samples were being met.**

  Ontario Regulation 170/03 – Schedule 10-2 stipulates that distribution water samples are required to be collected for testing every week within the frequency prescribed by Ontario Regulation 170/03 – Schedule 6-1.1 (1). Testing of the samples collected from the distribution system must include E. coli, total coliforms on all samples, and 25% of the required samples must be tested for general bacteria population expressed as colony counts on a heterotrophic plate count.

  According to the Operating Authority, the City of London Distribution system serves a total population of approximately 385000 people. Given this information, a minimum of 138 microbiological samples are required to be collected for testing each month. Over the course of the inspection period, the Operating Authority typically collected over 200 microbiological samples per month for testing which meets with the requirements of Ontario Regulation 170/03 – Schedule 10-2.

- **All haloacetic acid water quality monitoring requirements prescribed by legislation are being conducted within the required frequency and at the required location.**

  Ontario Regulation 170/03 – Schedule 13-6.1 stipulates that haloacetic acids are required to be collected and tested every three months from the distribution water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). According to documentation provided for review from the Owner / Operating Authority, samples were collected on the following days from the distribution system:

  1. December 13, 2017 – HAA = 18.1 ug/L, 8.6 ug/L, 5.3 ug/L, 5.3 ug/L
  2. January 16, 2018 – HAA = 5.3 ug/L
  3. March 15, 2018 – HAA = 22.3 ug/L, 23.9 ug/L, 19.4 ug/L, 17.3 ug/L
  4. April 5, 2018 – HAA = 6.8 ug/L
  5. June 27, 2018 – HAA = 18.8 ug/L, 22.3 ug/L, 14.0 ug/L, 6.2 ug/L
  6. July 24, 2018 – HAA = 17.9 ug/L
  7. September 17, 2018 – HAA = 6.1 ug/L, 25.3 ug/L
  8. September 18, 2018 – HAA = 13.2 ug/L, 28.7 ug/L
  9. September 19, 2018 – HAA = 11.4 ug/L, 12.2 ug/L, 11.4 ug/L
  10. October 16, 2018 – HAA = 9.5 ug/L

  Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting haloacetic acids water quality samples as prescribed on Ontario Regulation 170/03 – Schedule 13-6.1.

- **All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location.**

  Ontario Regulation 170/03 – Schedule 13-6 stipulates that trihalomethanes are required to be collected and tested every three months from the distribution water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). According to documentation provided for review from the Owner / Operating Authority, samples were collected from the distribution system on the following dates:

Water Quality Monitoring

1. December 13, 2017 – THM = 32 ug/L, 26 ug/L, 20 ug/L, 17 ug/L
2. January 16, 2018 – THM = 12 ug/L
3. March 15, 2018 – THM = 24 ug/L, 27 ug/L, 25 ug/L, 20 ug/L
4. April 5, 2018 – THM = 13 ug/L
5. June 27, 2018 – THM = 30 ug/L, 35 ug/L, 25 ug/L, 19 ug/L
6. July 24, 2018 – THM = 26 ug/L
7. September 17, 2018 – THM = 23 ug/L, 43 ug/L
8. September 18, 2018 – THM = 29 ug/L, 51 ug/L
9. October 16, 2018 – THM = 26 ug/L

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting trihalomethane water quality samples as prescribed by Ontario Regulation 170/03 – Schedule 13-6.

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit were being met.**

  Schedule C - Section 5 of the Municipal Drinking Water Licence #006-101 (Issue #5 dated 21 Sept 2017) stipulates that a study is required to assess the effectiveness of the corrosion control plan implemented by the City of London. Generally stated, the study involves the collection and analysis of lead, alkalinity, pH, etc., samples from the distribution system and residential and non-residential sampling locations. Section 5.3 stipulates that a Corrosion Control Evaluation Report be prepared and submitted to the Director by March 31, annually. In addition, Section 5.4 of stipulates that the sampling data outlined in Section 5.1.3 be submitted to the Director by January 31, annually.

  Specific testing requirements presented in the Schedule C, Table 1 include the following:

  Point of Entry at SERPS and Arva Pumping Station:
  a. Lead Sampling – Quarterly
  b. Alkalinity – Monthly
  c. pH - Weekly

  Distribution Samples:
  a. Lead, Alkalinity and pH – 5 samples annually (From Jan 1 to Dec 31)

  Residential / Non-Residential Taps:
  a. Lead, Alkalinity and pH – 25 samples annually (From Jan 1 to Dec 31)

  Over course of the inspection period (November 1, 2017 to November 30, 2018) the Operating Authority collected a significant proportion of the required samples for lead, alkalinity and pH samples as prescribed by Schedule C - Section 5 of the Municipal Drinking Water Licence #006-101. Generally stated, all of the required quarterly, monthly and weekly samples from the Point of Entries to the water system (i.e. SERPS and Arva Pumping Station) were being collected as required. In addition, samples from the distribution system and residential / non-residential taps were collected, however, additional samples beyond this inspection period (i.e. November 30, 2018) were still required at the time of preparing this report. It is understood that the Owner / Operating Authority is continuing their efforts with regards to lead sampling through the month of December 2018 to meet with the Section C requirements. As such, compliance will be assessed during the next annual inspection of the water system.

  In addition, Schedule D – Section 2.0 of Municipal Drinking Water Licence #006-101 (Issue #5 dated 21 Sept 2017) stipulates certain relief conditions associated with the operation of the Fanshawe and Hyde Park Emergency Well

Water Quality Monitoring

System. However, in October 2017, the Fanshawe and Hyde Park well systems were physically disconnected from the City of London distribution system, and as such, this testing is no longer possible. A Director's Notification form was submitted with regard to these changes.

- **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

Water Quality Assessment

- **Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O.Reg. 169/03).**

  Over the course of the inspection period, there were a total of 9 adverse water quality incidents ("AWQI"). Seven of the AWQIs were related to microbiological contamination based on testing performed by the laboratory. Two of the incidents were related to Lead Exceedances from plumbing samples in association with the testing requirements in the system's Corrosion Control Plan. It should be further noted that although there were only two reported Lead Exceedance Notifications, there were a total of six actual lead exceedance locations based on the reported samples.

Reporting & Corrective Actions

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

  Over the course of the inspection period, there were a total of seven adverse water quality incidents ("AWQI"). Each of these AWQIs were related to microbiological contamination based on testing performed by the laboratory. During these events, the appropriate corrective actions were completed and the Spills Action Centre and the Medical Officer of Health (i.e. Health Unit) were contacted.

- **Corrective actions as directed by the Medical Officer of Health had been taken by the owner and operating authority to address exceedances of the lead standard.**

  Over the course of the inspection period, there were two lead exceedance notification ("LEN") forms completed by the Owner \ Operating Authority. These two LENs represented a total of six reported lead exceedances taken from the plumbing of residential homes connected to the drinking water system. As part of these incidents, the Owner / Operating Authority provided written correspondence to each of the building occupants, which included a copy of the analytical results, a letter explaining the results, information from the local Health Unit on lead, and contact numbers for further information.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**

- **All changes to the system registration information were provided within ten (10) days of the change.**

Other Inspection Findings

- **The following instance(s) of non-compliance were also noted during the inspection:**

  Ontario Regulation 170/03 – Schedule 15.1-9 (5) stipulates that the Owner / Operating Authority shall report any lead exceedances to the Medical Officer of Health within 24 hours of receiving the report from the testing laboratory. According to documentation provided by the Operating Authority, certain lead exceedances for samples

Other Inspection Findings

collected in December 2017, and associated with Lead Exceedance Notification # 138449, were not reported by the Owner / Operating Authority to the Medical Officer within 24 hours as prescribed by Ontario Regulation 170/03 – Schedule 15.1-9 (5). The Operating Authority recognized this issue after the 24 hour period expired.

- **The following issues were also noted during the inspection:**

  The forms associated with the installation of new watermains at the drinking water system include several fields that are pertinent to satisfying the requirements of the "Watermain Disinfection Procedure, November 2015". Additional, pertinent information not included on these forms, is presented within logsheets provided by the Operating Authority. It is understood that the current 2015 Watermain Disinfection Procedure document is being reviewed for possible modifications.

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

1. The following instance(s) of non-compliance were also noted during the inspection:

Ontario Regulation 170/03 – Schedule 15.1-9 (5) stipulates that the Owner / Operating Authority shall report any lead exceedances to the Medical Officer of Health within 24 hours of receiving the report from the testing laboratory. According to documentation provided by the Operating Authority, certain lead exceedances for samples collected in December 2017, and associated with Lead Exceedance Notification # 138449, were not reported by the Owner / Operating Authority to the Medical Officer within 24 hours as prescribed by Ontario Regulation 170/03 – Schedule 15.1-9 (5). The Operating Authority recognized this issue after the 24 hour period expired.

Action(s) Required:

From herein, the Owner / Operating Authority shall ensure that all lead exceedances associated with plumbing samples are reported to the Medical Officer within 24 hours after the receipt of the results from the testing laboratory as prescribed by Ontario Regulation 170/03 – Schedule 15.1-9 (5).

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

1. **The owner had not provided security measures to protect components of the drinking water system.**
The component buildings associated with the City of London water distribution system remain locked at all times and are equipped with entry alarms which are connected to a dialing system to alert the Operating Authority / Owner of unathourized entry.

   As part of the previous annual inspection of the water system, it was recommended that the Owner / Operating Authority retrofit the hatch seals associated with Springbank Reservoir #3 and the Southeast Reservoir Pumping Station to ensure they are functioning properly. At the time of the inspection, all of the hatches associated with the Southeast Reservoir Pumping Station were fitted with new seals, and the Operating Authority installed two new hatches with seals and screens at Springbank Reservoir #3.

   At the time of the site inspection, there was evidence of insect nests within the three vents associated with Springbank Reservoir #1 and #2. Closer examination revealed that the screen grates over the vents were a large sized mesh / aperture exceeding the recommended #24 mesh size as prescribed by the Ten States Standards (2012 Edition).

   Recommendation:

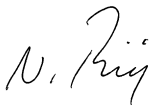
   It is recommended that the Owner / Operating Authority modify the current vent screens associated with Springbank Reservoir #1 and #2 to conform with the Ten States Standards (2012 Edition) and ensure the size of the vent screen are at least #24 mesh and composed of a non-corrodible material.

2. **The following issues were also noted during the inspection:**
The forms associated with the installation of new watermains at the drinking water system include several fields that are pertinent to satisfying the requirements of the "Watermain Disinfection Procedure, November 2015". Additional, pertinent information not included on these forms, is presented within logsheets provided by the Operating Authority. It is understood that the current 2015 Watermain Disinfection Procedure document is being reviewed for possible modifications.

   Recommendation:

   It is recommended that the Owner / Operating Authority review their documentation as associated with the installation of new watermains and consolidate this information into a form that includes all of the pertinent requirements as presented in the "Watermain Disinfection Procedure, November 2015". In addition, in the event of any forthcoming modifications to the "Watermain Disinfection Procedure, November 2015", it is recommended that the forms be re-visited by the Owner / Operating Authority to ensure any required modifications are completed.

SIGNATURES

Inspected By:	Signature: (Provincial Officer)
Neville Rising	
Reviewed & Approved By:	Signature: (Supervisor)
Mark Smith	 Mark Smith Digitally signed by Mark Smith DN: cn=Mark Smith, o, ou, email=mark.smith@ontario.ca, c=CA Date: 2019.01.09 11:56:24 -05'00'
Review & Approval Date:	January 9, 2019

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.

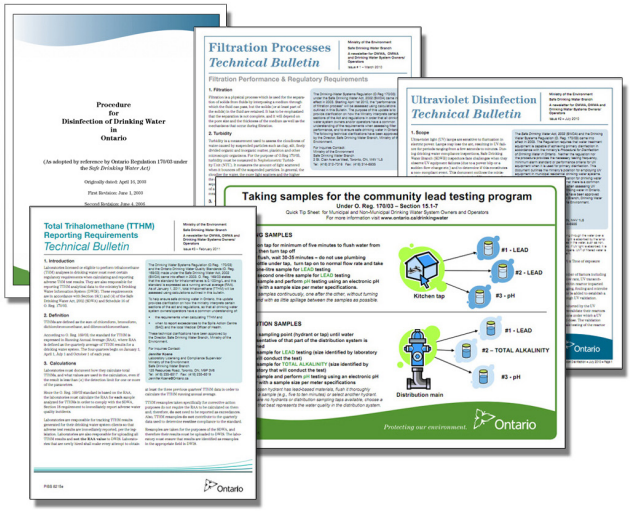
Stakeholder References

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.

To access these materials online click on their titles in the table below or use your web browser to search for their titles. Contact the Public Information Centre if you need assistance or have questions at 1-800-565-4923/416-325-4000 or **picemail.moe@ontario.ca**.

For more information on Ontario's drinking water visit **www.ontario.ca/drinkingwater** and email **drinking.water@ontario.ca** to subscribe to drinking water news.



PUBLICATION TITLE	PUBLICATION NUMBER
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	7889e01
FORMS: Drinking Water System Profile Information, Laboratory Services Notification, Adverse Test Result Notification Form	7419e, 5387e, 4444e
Procedure for Disinfection of Drinking Water in Ontario	4448e01
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	7152e
Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)	8215e
Filtration Processes Technical Bulletin	7467
Ultraviolet Disinfection Technical Bulletin	7685
Guide for Applying for Drinking Water Works Permit Amendments, Licence Amendments, Licence Renewals and New System Applications	7014e01
Certification Guide for Operators and Water Quality Analysts	
Guide to Drinking Water Operator Training Requirements	9802e
Taking Samples for the Community Lead Testing Program	6560e01
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	7423e
Guide: Requesting Regulatory Relief from Lead Sampling Requirements	6610
Drinking Water System Contact List	7128e
Technical Support Document for Ontario Drinking Water Quality Standards	4449e01

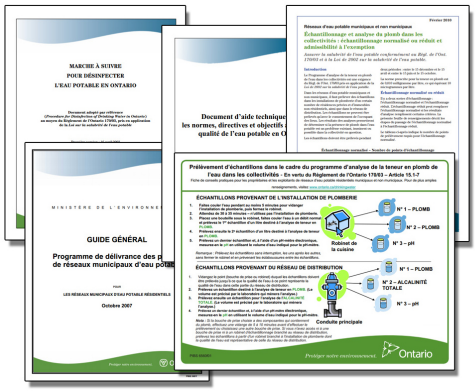
PIBS 8990b01

Ontario

Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment.

Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le Centre d'information au public au 1 800 565-4923 ou au 416 325-4000, ou encore à **picemail.moe@ontario.ca** si vous avez des questions ou besoin d'aide.



Pour plus de renseignements sur l'eau potable en Ontario, consultez le site **www.ontario.ca/eaupotable** ou envoyez un courriel à **drinking.water@ontario.ca** pour suivre l'information sur l'eau potable.

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Prendre soin de votre eau potable – Un guide destiné aux membres des conseils municipaux	7889f01
Renseignements sur le profil du réseau d'eau potable, Avis de demande de services de laboratoire, Formulaire de communication de résultats d'analyse insatisfaisants et du règlement des problèmes	7419f, 5387f, 4444f
Marche à suivre pour désinfecter l'eau potable en Ontario	4448f01
Strategies for Minimizing the Disinfection Products Thrihalomethanes and Haloacetic Acids (en anglais seulement)	7152e
Total Trihalomethane (TTHM) Reporting Requirements: Technical Bulletin (février 2011) (en anglais seulement)	8215e
Filtration Processes Technical Bulletin (en anglais seulement)	7467
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	7685
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable, de modification du permis de réseau municipal d'eau potable, de renouvellement du permis de réseau municipal d'eau potable et de permis pour un nouveau réseau	7014f01
Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable	
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802f
Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités	6560f01
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	7423f
Guide: Requesting Regulatory Relief from Lead Sampling Requirements (en anglais seulement)	6610
Liste des personnes-ressources du réseau d'eau potable	7128f
Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario	4449f01

PIBS 8990b01

Ontario

Inspection Rating Record and Inspection Risk Methodology

APPLICATION OF THE RISK METHODOLOGY USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS

The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection results since fiscal year 2008-09. The primary goals of this assessment are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains up to 14 inspection modules and consists of approximately 120 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

PIBS 6797e

Ontario

The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system's operation can improve. The ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry's annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario's Risk Management Framework. Risk management is a systematic approach to identifying potential hazards, understanding the likelihood and consequences of the hazards, and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

RISK = LIKELIHOOD × CONSEQUENCE
(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

TABLE 1:

Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 – 10% (Unlikely)	L = 1
11 – 49% (Possible)	L = 2
50 – 89% (Likely)	L = 3
90 – 100% (Almost Certain)	L = 4

TABLE 2:

Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8

The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

Table 3 presents a sample question showing the risk rating determination process.

TABLE 3:

Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?							
Risk = Likelihood × Consequence							
C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	**Major** Administrative Consequence	**Minor** Environmental Consequence	**Minor** Health Consequence	**Medium** Environmental Consequence	**Major** Environmental Consequence	**Medium** Health Consequence	**Major** Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely	L=3 (Likely)	L=2 (Possible)
R=4	**R=2**	**R=6**	**R=12**	**R=15**	**R=6**	**R=21**	**R=16**

Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions related to regulatory compliance and input their "yes", "no" or "not applicable" responses into the Ministry's Laboratory and Waterworks Inspection System (LWIS) database. A "no" response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone); type of inspection (i.e., focused, detailed); and source type (i.e., groundwater, surface water).

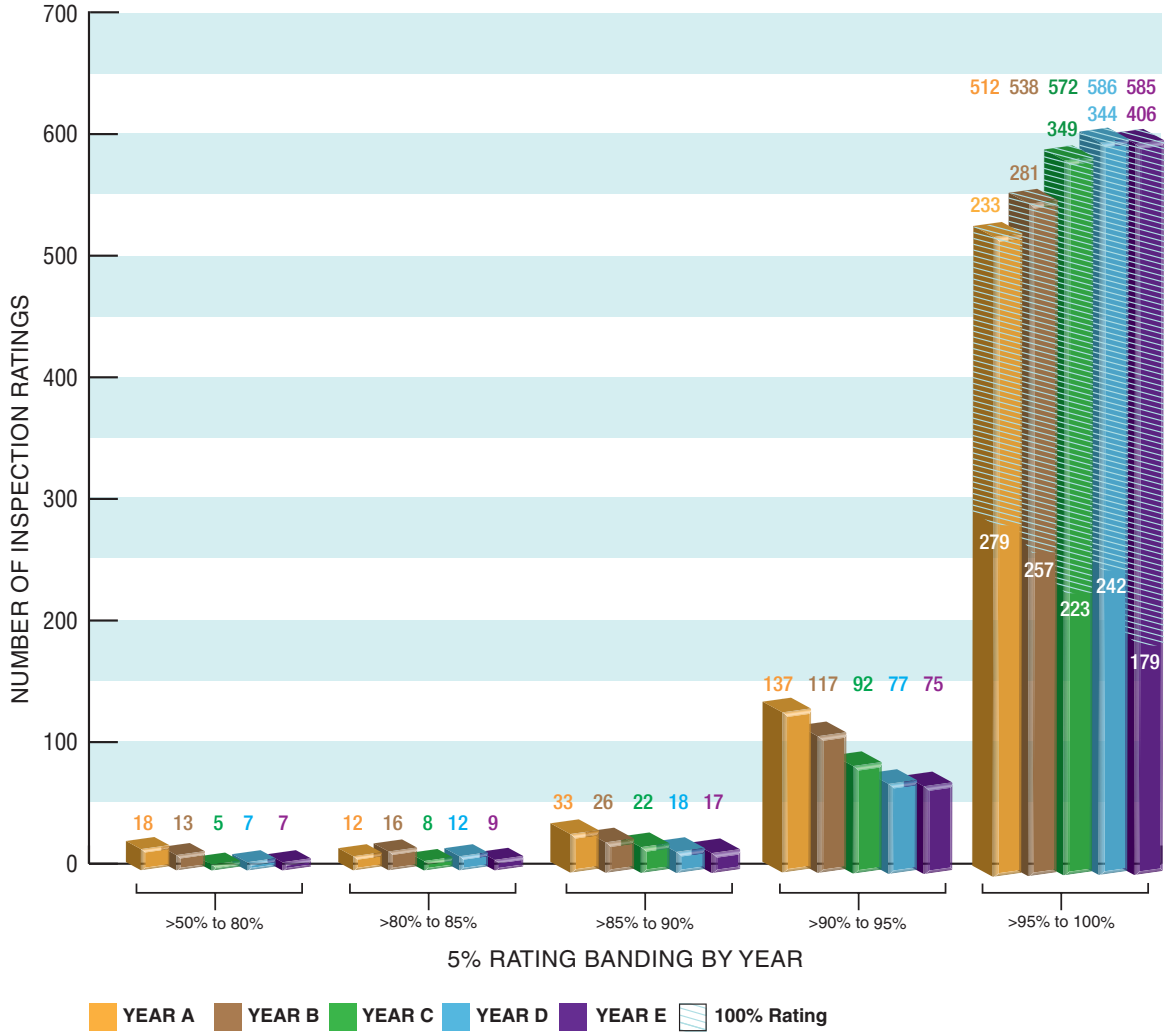
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry's Chief Drinking Water Inspector's Annual Report.

Figure 1 presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

Figure 1: Year Over Year Distribution of MRDWS Ratings



Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 14 possible modules of the inspection protocol, which would provide the system owner/operator with information on the areas where they need to improve. The 14 modules are:

1. Source
2. Permit to Take Water
3. Capacity Assessment
4. Treatment Processes
5. Process Wastewater
6. Distribution System
7. Operations Manuals
8. Logbooks
9. Contingency and Emergency Planning
10. Consumer Relations
11. Certification and Training
12. Water Quality Monitoring
13. Reporting, Notification and Corrective Actions
14. Other Inspection Findings

For further information, please visit **www.ontario.ca/drinkingwater**

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2018-2019)

DWS Name:	CITY OF LONDON DISTRIBUTION SYSTEM
DWS Number:	260004917
DWS Owner:	London, The Corporation Of The City Of
Municipal Location:	London
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Adhoc
Inspection Date:	December 10, 2018
Ministry Office:	London District

Maximum Question Rating: 334

Inspection Module	Non-Compliance Rating
Treatment Processes	0 / 43
Distribution System	0 / 21
Operations Manuals	0 / 28
Logbooks	0 / 18
Certification and Training	0 / 28
Water Quality Monitoring	0 / 63
Reporting & Corrective Actions	0 / 63
Other Inspection Findings	0 / 0
Treatment Process Monitoring	0 / 70
TOTAL	**0 / 334**

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 09-JAN-19 (Inspection ID: 1-I5JGA).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2018-2019)

DWS Name:	CITY OF LONDON DISTRIBUTION SYSTEM
DWS Number:	260004917
DWS Owner:	London, The Corporation Of The City Of
Municipal Location:	London
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Adhoc
Inspection Date:	December 10, 2018
Ministry Office:	London District

Non-compliant Question(s)	Question Rating
Other Inspection Findings	
In the event that an issue of non-compliance outside the scope of this inspection protocol is identified, a "No" response may be used if further actions are deemed necessary (and approved by the DW Supervisor) to facilitate compliance.	0
TOTAL QUESTION RATING	0

Maximum Question Rating: 334

Inspection Risk Rating	**0.00%**
FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 09-JAN-19 (Inspection ID: 1-I5JGA).