

2017 Summary Report

Munster Well System

1.0 General overview

The City of Ottawa provides treatment, storage, and distribution of high quality drinking water to approximately 892,000 residents and industrial water users. The central water supply includes the Britannia and Lemieux Island Water Purification Plants which utilize the Ottawa River for their source water. Treated drinking water from both plants is distributed through a large network of water mains, pumping stations, reservoirs, and elevated tanks including a direct water supply to Russell Township. Outside of the central supply, the City operates (5) well systems that provide drinking water to rural communities located in Carp, Richmond (Kings Park subdivision), Munster, Greely (Shadow Ridge subdivision), and Vars.

This report deals specifically with the production and distribution of drinking water from the Munster Well System, which supplies water to the residents of Munster Hamlet (population served: 1,340). The report must review regulatory requirements, standards and drinking water license requirements as a means of demonstrating compliance with drinking water regulations and the provision of safe drinking water during 2017.

The report has been prepared in fulfillment of Schedule 22 of O.Reg.170/03, which requires that a Summary Report be prepared for each water supply system and given to the members of municipal council by March 31st of the following year. The report covers the period from January 1st to December 31st, 2017.

2.0 Drinking water regulations

The Safe Drinking Water Act (2002) was created in response to the events in Walkerton, as a means of ensuring the provision of safe drinking water throughout the province. Under the authority of the Safe Drinking Water Act, several key regulations have been defined in the last number of years:

- O.Reg.170/03 – Drinking Water Systems Regulation
- O.Reg.169/03 – Ontario Drinking Water Quality Standards
- O.Reg.248/03 – Drinking Water Testing Services
- O.Reg.128/04 – Certification of Drinking Water Systems Operators
- O.Reg.188/07 – Licensing of Municipal Drinking Water systems
- O.Reg.170/03 (Appendix) – Procedure for Disinfection of Drinking Water in Ontario
- O.Reg.170/03 (Sch.15.1) – Community Lead Testing Program
- O.Reg.284/07 – Source Water Protection Regulation

These regulations cover all aspects of municipal water supply, including treatment requirements, quality standards, test frequency, operations and maintenance, operator qualifications, laboratory testing, inspections, reports, and public notification.

3.0 System approval and accreditation

In addition to the regulations noted above, the Ministry of Environment and Climate Change (MOECC) requires all owners of municipal drinking water systems to obtain a Municipal Drinking Water License (MDWL) for each drinking water system. These licenses are comprised of five elements, as listed below:

- **Permit To Take Water**
- **Drinking Water Works Permit**
- **Operational Plan**
- **Accredited Operating Authority**
- **Financial Plan**

Ottawa's municipal water systems operate under a comprehensive quality management system which is required in Ontario through the *Safe Drinking Water Act, 2002*. The Drinking Water Quality Management System (DWQMS) was established in 2007 to ensure proper oversight and management of the drinking water supply. It is composed of 21 Elements that cover all aspects of drinking water supply including: plant operations, infrastructure, maintenance, risk assessment, water quality testing, staff training, documentation, and continual improvement.

The City of Ottawa is the Operating Authority for the Munster Well System and was awarded its third party accreditation on October 3rd, 2011. Since that time, the City has maintained its accreditation through annual external audits of the Quality Management System and re-accreditation audits on a triennial basis. Re-accreditation was awarded by NSF International Strategic Registrations on October 4, 2014 and October 2, 2017. Collectively, these elements help to ensure the provision of safe drinking water to the public.

4.0 Annual inspection

The Ministry of Environment and Climate Change (MOECC) carried out its annual inspection of the Munster Well System on September 14th, 2017. The inspection focused on regulatory compliance, plant operations, data records, operator certification, record keeping, and management practices for the period November 1st, 2016 to August 31st, 2017.

An inspection report was received on March 8th, 2018. There were (0) Provincial Orders, (0) Items of Non-Compliance, and (0) Best Practice Recommendations cited by the Inspector. A final inspection rating of 100% was given for the Munster Well System. The % rating is a risk-based score determined from 100 regulatory questions covering 15 inspection categories.

5.0 Compliance with drinking water regulations

During 2017, the Munster Well System was compliant with drinking water regulatory requirements, with any exceptions noted below in section 6.0. The table in Appendix I demonstrates the level of compliance by listing all key regulatory requirements for drinking water in comparison to the operational results achieved during 2017. The table illustrates both the comprehensive nature of provincial requirements and the diligence of drinking water staff in complying with drinking water regulations.

6.0 Items of non-compliance

There were (0) incidents of non-compliance observed during 2017.

7.0 Summary of annual water production

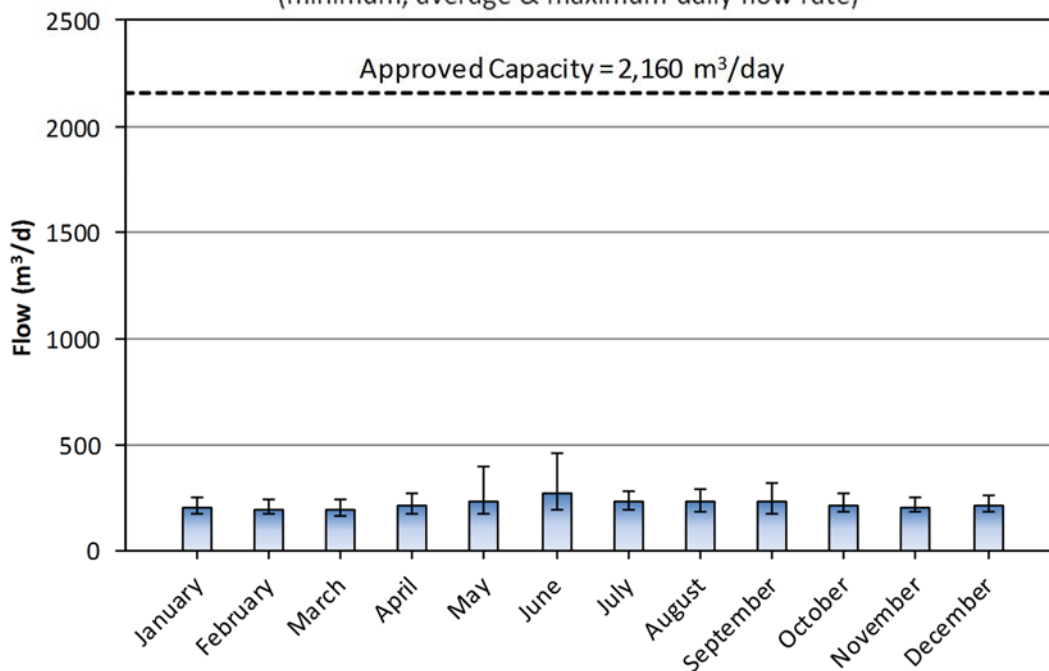
The Munster Well System treated and distributed an average of 215.7 (m³/day), which represents 10 % of the approved plant capacity. The daily flow rates ranged from a minimum of 165.8 (m³/day) to a maximum of 464.9 (m³/day). The table and graph below summarize the 2017 water production by month. The 2017 maximum daily flow rate of 464.9 (m³/day) was within the approved capacity of the treatment system, which is 2,160 (m³/day).

Munster Well System daily water production flow rates by month during 2017

	Average Daily Flow Rate	Minimum Daily Flow Rate	Maximum Daily Flow Rate
Month	(m³/d)	(m³/d)	(m³/d)
January	198.2	166.1	245.8
February	192.8	170.1	235.9
March	190.8	165.8	238.4
April	206.8	171.1	268.8
May	228.0	172.5	396.5
June	271.5	185.7	464.9
July	224.7	185.7	273.8
August	229.9	182.4	282.9
September	225.7	173.5	311.0
October	207.9	178.9	262.7
November	199.8	176.7	252.7
December	210.9	176.7	256.8
Year End	215.7	165.8	464.9
	(Average)	(Min. Day)	(Max. Day)

2017 Munster Water Production by month

(minimum, average & maximum daily flow rate)



8.0 Water quality report

The Ontario Drinking Water System Regulation O.Reg.170/03 defines requirements for water quality sampling and testing based on categories of test parameters: microbiological, operational, inorganic, and organic. In order to fully characterize drinking water quality, the City of Ottawa conducts additional testing for other trace organic, inorganic, and radiological substances. The table attached in Appendix II summarizes the test results for Munster treated water, which represents water as it enters into the distribution system. It is important to note that in addition to treated water, water quality testing is performed for raw (untreated) well water, treatment plant samples, and (2) routine sample locations in the distribution system (Munster Community Centre, Munster Elementary School).

For comparison against the water quality results, the Ontario Drinking Water Standards (O.Reg.169/03) are presented in the right column of the table to indicate the Maximum Acceptable Concentration (MAC) for various substances in drinking water. These standards are based on the Health Canada Guidelines for Canadian Drinking Water Quality. The MAC concentration limits are set at levels that are deemed to be protective of public health for daily water consumption over a lifetime.

During 2017, there were no test results that exceeded MAC levels for health-based parameters. The results demonstrate that drinking water supplied from the Munster Well System was of high

quality and met Ontario Drinking Water Standards (O.Reg.169/03) and the Health Canada Guidelines for Canadian Drinking Water Quality.

9.0 Summary

The operation of the Munster Well System complied with the requirements of Ontario drinking water regulations, permits, and licenses. The quality of treated and distributed drinking water remained high during 2017 and met all federal and provincial standards for safe drinking water.

Appendix I

Munster Well System

Regulatory requirements and compliance with Safe Drinking Water Act (2002)

Drinking water system: Munster Well System
Source Water: Groundwater - Well#1 and Well#2
Waterworks No.: 220008006
Date of report: March 31, 2018

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
Water Treatment						
T1	Raw (well) water taking	PTTW #4044-AASLU7	Ground water taking for combined wells must be <2,362 m ³ /d	Avg. intake flow = 219.6 m ³ /d Max. daily flow = 487.2 m ³ /d	yes	J.Guthmann
T2	Raw (well) water taking	PTTW #4044-AASLU7	Daily raw water taking flow rates for previous year must be submitted to MOECC by March 31	Daily water taking data submitted to MOECC Water Taking and Reporting System by March 31	yes	J.Guthmann
T3	Treated water production	MDWL #008-104 Sch.(C) 1.0	Treated water flow must be <2,160 m ³ /d	Average daily flowrate = 214.4 m ³ /d Max. daily flowrate = 466.5 m ³ /d	yes	J.Guthmann
T4	Well protection	O.Reg.170/03 Sch.1.2	Wells must be constructed and maintained to prevent surface water and contaminants from entering the well	Wells inspected by MOECC during annual inspection; no issues noted Ten-Year Inspection of Well #1 and Well #2 of the Munster Communal Well System (November, 2010)	yes	J.Guthmann

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
T5	Treatment barriers	O.Reg.170/03 Sch.1.2	Treatment barriers must be operated: (i) whenever water is being supplied, (ii) in accordance with the <i>Procedure for Disinfection</i> , & (iii) to achieve the design capability	During 2017, all treatment barriers were fully operational whenever the treatment plant was in production	yes	J.Guthmann
T6	Pathogen removal	MDWL #008-104 Sch.(E) 1.0; and O.Reg.170/03 Sch.1.3	Treatment must be designed and operated to achieve: >2-log (99%) reduction of Virus	Pathogen removal/inactivation targets were met at all times: Virus inactivation = >10-log (minimum 20.2-log during the year)	yes	J.Guthmann
T7	Secondary disinfection	O.Reg.170/03 Sch.1.5	Secondary disinfection equipment must be capable of providing 0.2 mg/L free chlorine throughout the distribution system	Secondary disinfection levels in treated water ranged from 0.76 mg/L - 1.31 mg/L	yes	P.Wilson
T8	Continuous analyzers	O.Reg.170/03 Sch.6.5, Sch.7.2	Must provide minimum testing frequency , alarm settings, operator response, data review within 72 hours, chlorine at CT outlet, calibration	(1) total chlorine analyzer – met all requirements	yes	J.Guthmann
T9	Chemicals and materials	MDWL #008-104 Section 14.0	Chemicals and materials in contact with drinking water must meet standards NSF/60, NSF/61, & NSF 372	NSF certification achieved for 6% sodium hypochlorite treatment chemical used for disinfection	yes	J.Guthmann
T10	Calibration of flow measuring devices	MDWL #008-104 Sch.(C) 2.0	Annual calibration for raw (well) water and treated water flow meters	Raw and treated water flow meters were calibrated during 2017	yes	J.Guthmann

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
Water Quality						
W1	Microbiological sampling & testing	O.Reg.170/03 Sch.10.2, 10.3, & 10.4	Raw water – weekly TC/EC (n=52x2) Treated water – weekly TC/EC (n=52) Treated water – weekly HPC (n=52) Distrib. – 9/month TC/EC (n=108) Distrib. – 2/month HPC (n=24)	Raw water – TC/EC (n=206) Treated water – TC/EC (n=103) Treated water – HPC (n=103) Distrib. – TC/EC (n=202) Distrib. – HPC (n=202)	yes	P.Wilson
W2	Chemical sampling & testing	O.Reg.170/03 Sch.13.2, Sch.13.3	Inorganics (9 metals): 1 every 3 years Organics (56 chemicals): 1 every 3 years	Inorganics – in 2017, 16 samples analyzed for trace metals Organics – In 2017 , 1 sample analyzed for trace organics	yes	P.Wilson
W3	Turbidity in source wells	O.Reg.170/03 Sch.7.3	Monthly turbidity measurements in each source well (12 x 2 wells = 24 tests required per year)	Turbidity was measured twice per week in each source well. 205 tests completed during 2017	yes	P.Wilson
W4	Trihalomethanes, haloacetic acids, nitrate, nitrite, sodium, fluoride	O.Reg.170/03 Sch.13.6, 13.6.1, 13.7, 13.8, 13.9	Trihalomethanes – 4/year (dist.) haloacetic acids – 4/year (dist.) nitrate/nitrite – 4/year sodium – 1 sample every 5 yrs fluoride – 1 sample every 5 yrs	Trihalomethanes – in 2017, 12samples haloacetic acids – in 2017, 12 samples nitrate/nitrite – in 2017, 12 samples sodium – in 2017, 16 samples taken fluoride – In 2017, 6 samples taken	yes	P.Wilson
W5	Chlorine residual testing in distribution system	O.Reg.170/03 Sch.7.2.3	At least 7 samples per week, either daily or 4/3 at least 48 hours apart with multiple locations	Met through operation of (1) continuous chlorine analyzer in distribution system located at the Munster Community Centre	yes	P.Wilson
W6	Chlorine readings for bacteriological samples	O.Reg.170/03 Sch.6.3	Chlorine residual must be measured and recorded for every required bacteriological sample	305 bacteriological samples taken during the year; all samples had a chlorine residual measured and recorded	yes	P.Wilson

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
W7	Increased frequency of testing for chemicals	O.Reg.170/03 Sch.13.5	Increase test frequency to quarterly if test result exceeds half the Ontario Drinking Water Quality Standard	Test frequency at least quarterly for parameters that exceeded half the MAC concentration	yes	P.Wilson
W8	Lead testing in consumer tap water	O.Reg.170/03 Sch.15.1	Twice per year, conduct 30-minute stagnation sampling in 20 homes with lead service pipes, 1 buildings, and 2 distribution locations, unless exempt; 90 th percentile lead concentrations for Litre-1 and Litre-2 must be <10.0 ppb	Munster well system received exemption from lead testing in homes due to low lead concentrations observed during initial testing; pH and alkalinity measurements taken at 2 locations during 2016 as required by regulation.	yes	P.Wilson
W9	Duty to report adverse water quality test results	O.Reg.170/03 Sch.16.3, 16.4, 16.6, 16.7, 16.8, 16.9	Report immediately to MOH, MOECC, written report within 24 hours, take corrective actions, provide resolution notice within 7 days	During 2017 there was (1) adverse water quality reports for the Munster Well System. The adverse events were reported, investigated and resolved according to O. Reg. 170/03	yes	P.Wilson
W10	Corrective actions for adverse water quality	O.Reg.170/03 Sch.17.2 – 17.13	Specific corrective actions are required for each type of Adverse Water Quality event : improper disinfection, filter turbidity, chlorine residual, E.coli, total coliforms, <i>Aeromonas</i> , MAC, pesticide, sodium	For the (1) adverse water quality report, the required corrective actions were taken	yes	P.Wilson
W11	Retention of records	O.Reg.170/03 Section 13	2 years – operational checks & microbiological testing 6 years – chemical testing, lead testing, corrective actions, annual & summary reports 15 years – sodium, fluoride, Engineer Reports	All records retained as per the regulation: 2 years required– 5 years retained 6 years required– 8 years retained 15 years required– 15 years retained	yes	P.Wilson

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
W12	Notification of laboratory testing	O.Reg.170/03 Sch.6.9	Must provide written notification to the MOECC for the identity of the Laboratory performing regulatory testing of water samples	Written notifications were provided to MOECC in 2008 with an update in 2016 & 2017 for regulatory testing at the ROPEC, Caduceon & SGS Lakefield (& subcontracted) Laboratories	yes	P.Wilson
W13	Laboratory testing of drinking water samples	O.Reg.248/03 Section 1	Analysis of parameters with a health-based drinking water quality standard must be performed by a licensed and accredited laboratory	ROPEC, Caduceon & SGS Lakefield (& subcontracted) Laboratories are all licensed and accredited labs	yes	P.Wilson
W14	Research - laboratory testing of water samples	O.Reg.248/03 Section 5	Provide written notification to MOECC for research samples being analyzed in non-licensed laboratories	(1) research notification form updated, signed, and on-site for inspection: radiological testing for tritium in treated water sample;	yes	I.Douglas
Water Distribution						
D1	Disinfection of watermains	DWWP #008-204; Sch.B 2.3	All watermains or related fixtures that come in contact with drinking water must be disinfected as per the MOECC Watermain Disinfection Procedure and/or AWWA Standard C651 before being put into service	During 2017, all new water mains and repairs were disinfected as per requirements of AWWA Standard C651 and the MOECC Watermain Disinfection Procedure;	yes	C.Hall
Operator Certification						
O1	Overall Responsible Operator (ORO)	O.Reg.128/04	Overall Responsible Operator must be certified to level of the system: Level-1 (Treatment) & Level-2 (Distribution); can be one level lower for up to 150 days per year	During 2017, Overall Responsible Operators held Class-3/4 license (treatment) and Class-2/3 license (distribution) as required by regulation O.Reg.128/04	yes	J.Guthmann / C.Hall

No.	Description	Legislation	Regulatory Requirement	Results Achieved	Regulatory Compliance ?	Lead Person
O2	Treatment operators	O.Reg.170/03 Sch.1.2	All adjustments to water treatment and distribution system must be carried out by certified operators	The treatment plant and distribution system was operated and/or supervised by certified operators at all times during the reporting period	yes	J.Guthmann / C.Hall
O3	Water quality testing	O.Reg.170/03 Sch.7.5	All drinking water tests must be performed by a Certified Operator or Water Quality Analyst	Field testing performed by Process Operators, Remote Facility Operators, & Water Distribution Operators (all certified by MOECC)	yes	P.Wilson
Reports & Record-keeping						
R1	Summary reports	O.Reg.170/03 Sch.22.2	Prepare and transmit Summary Report for each water system to municipal council by March 31 st of the next calendar year	Summary Report was prepared and transmitted by March 31 st , 2018	yes	T.Rose
R2	Annual reports	O.Reg.170/03 Section 11	Prepare Annual Report for each water system and make available to public by February 28 th of the next calendar year	Annual Report was prepared and posted on www.ottawa.ca website on February 14 th , 2018	yes	T.Rose
R3	Alterations to the system	DWWP #008-204; Sch.B 4.0	Any alteration of the treatment system must be documented in Forms 2/3 – Record of Minor Modification, retained on-site for 10 years	All minor modifications carried out during 2017 were recorded in Forms 2 and 3, stored on City Intranet Site: <i>Munster gas generator project</i>	yes	J.Guthmann
R4	Alterations to the system	DWWP #008-204; Sch.B 4.0	Any alteration of the water mains must be documented in Form 1 – Record of Water Mains Authorized as a Future Alteration, retained on-site for 10 years	All water main alterations carried out during 2017 were recorded in Form 1 documents, stored on City Intranet Site	yes	C.Hall

Regulations, Licenses, & Permits:

MDWL – Municipal Drinking Water License

DWWP – Drinking Water Works Permit

PTTW – Permit To Take Water

O.Reg.170/03 – Drinking Water Systems Regulation

O.Reg.169/03 – Ontario Drinking Water Quality Standards

O.Reg.248/03 – Drinking Water Testing Services

O.Reg.128/04 – Certification of Drinking Water Systems Operators

O.Reg.188/07 – Licensing of Municipal Drinking Water systems

O.Reg.170/03 (Appendix) – Procedure for Disinfection of Drinking Water in Ontario

O.Reg.170/03 (Sch.15.1) – Community Lead Testing Program

AWWA – American Water Works Association

Glossary:

NOTE: water quality testing refers to treated water samples unless otherwise stated

ML/d = mega-Litres per day = million Litres per day

WPP = Water Purification Plant

TC = Total Coliform bacteria, units of (cfu/100mL)

EC = E.coli bacteria, units of (cfu/100mL)

HPC = Heterotrophic Plate Count bacteria, units of (cfu/mL)

MAC = maximum acceptable concentration for Ontario Drinking Water Standards

MOH – Medical Officer of Health

MOECC – Ministry of Environment and Climate Change



City of Ottawa

Munster Well System - 2017 Drinking Water Quality

physical, microbiological, chemical, & radiological test results

Physical			
Test Parameter	units	Treated water results	Drinking water standard*
Colour	TCU	0.9	5 (A)
Turbidity	NTU	0.38	5 (A)
Temperature	°C	10.3	<15 (A)
Conductivity	m-mhos/cm	874	
UV254 absorbance	abs/cm	0.016	

Microbiological			
Test Parameter	units	Treated water results	Drinking water standard*
Total Coliforms	cfu/100mL	0 of 103 tests >0	0
E.coli	cfu/100mL	0 of 103 tests >0	0
Heterotrophic Plate Count (HPC)	cfu/mL	range: <10 - 20	500 (O)

Chemical - general			
Test Parameter	units	Treated water results	Drinking water standard*
pH	log ₁₀	7.67	² 7.0 - 10.5 (O)
Alkalinity	mg/L CaCO ₃	267	30 - 500 (O)
Bromate	mg/L	<0.003	0.01
Bromide	mg/L	0.046	
Calcium	mg/L	61.6	
Chlorate	mg/L	0.11	1.0
Chloride	mg/L	78.4	250 (A)
Chlorine (total)	mg/L	1.05	>0.05 ³
Chlorite	mg/L	<0.01	1.0
Cyanide	mg/L	<0.002	0.2
Fluoride	mg/L	0.60	1.5
Iodide	mg/L	0.003	
Lithium	mg/L	0.037	
Magnesium	mg/L	32.1	
Potassium	mg/L	5.21	
Silicon	mg/L	4.50	
Sodium	mg/L	75.5	⁵ 20, 200 (A)
Sulphate	mg/L	74.1	500 (A)
Total Hardness**	mg/L CaCO ₃	286.2	80 - 100 (A)
Calcium Hardness**	mg/L CaCO ₃	153.9	
Magnesium Hardness**	mg/L CaCO ₃	132.2	
Ammonia	mg/L N	<0.01	
Total Kjeldahl Nitrogen	mg/L N	0.08	
Organic Nitrogen**	mg/L N	0.08	³ 0.15 (O)
Nitrate	mg/L N	<0.02	10
Nitrite	mg/L N	<0.02	1
Phosphate	mg/L as P	<0.002	
Dissolved Organic Carbon	mg/L	1.67	5 (A)

Chemical - inorganic metals

Test Parameter	units	Treated water results	Drinking water standard*
Aluminum	mg/L	0.0017	0.1 (O)
Antimony	mg/L	0.0002	0.006
Arsenic	mg/L	<	² 0.010/ ³ 0.025
Barium	mg/L	0.0700	1.0
Beryllium	mg/L	<	
Bismuth	mg/L	<	
Boron	mg/L	0.4093	5.0
Cadmium	mg/L	<	0.005
Chromium	mg/L	0.0004	0.05
Chromium VI	mg/L	<	
Cobalt	mg/L	0.0001	
Copper	mg/L	0.0009	1.0 (A)
Iron	mg/L	0.2799	0.3 (A)
Lead	mg/L	<	0.01
Manganese	mg/L	0.0078	0.05 (A)
Mercury	mg/L	<	0.001
Molybdenum	mg/L	0.0010	
Nickel	mg/L	0.0008	
Selenium	mg/L	<	0.05
Silver	mg/L	<	
Strontium	mg/L	3.325	
Thallium	mg/L	0.0001	
Tin	mg/L	<	
Titanium	mg/L	0.0004	
Tungsten	mg/L	<	
Uranium	mg/L	0.0004	0.02
Vanadium	mg/L	0.0001	
Zinc	mg/L	<	5.0 (A)
Zirconium	mg/L	<	

Chemical - organics

Test Parameter	units	Treated water results	Drinking water standard*
1,1,1 -Trichloroethane	µg/L	<	
1,1,1,2-Tetrachloroethane	µg/L	<	
1,1,2 -Trichloroethane	µg/L	<	
1,1,2,2-Tetrachloroethane	µg/L	<	
1,1-Dichloroethane	µg/L	<	
1,1-Dichloroethylene	µg/L	<	14
1,1-Dichloropropene	µg/L	<	
1,2,3-Trichlorobenzene	µg/L	<	
1,2,3-Trichloropropane	µg/L	<	
1,2,4-Trichlorobenzene	µg/L	<	
1,2,4-Trimethylbenzene	µg/L	<	
1,2-Dibromo-3-chloropropane / DBCP	µg/L	<	
1,2-Dichlorobenzene	µg/L	<	200, 3(A)
1,2-Dichloroethane	µg/L	<	5
1,2-Dichloroethylene - cis	µg/L	<	
1,2-Dichloroethylene -trans	µg/L	<	
1,2-Dichloropropane	µg/L	<	
1,3-Dichlorobenzene	µg/L	<	
1,3-Dichloropropene - cis	µg/L	<	
1,3-Dichloropropene - trans	µg/L	<	
1,3-Dichloropropane	µg/L	<	
1,3,5-Trimethylbenzene	µg/L	<	

Chemical - organics

Test Parameter	units	Treated water results	Drinking water standard*
1,4-Dichlorobenzene	µg/L	<	5, 1(A)
2,2-Dichloropropane	µg/L	<	
2,3,4,6-Tetrachlorophenol	µg/L	<	100, 1(A)
2,4,5-Trichlorophenoxyacetic acid / 2,4,5-T	µg/L	<	
2,4,6-Trichlorophenol	µg/L	<	5, 2(A)
2,4-Dichlorophenol	µg/L	<	900, 0.3(A)
2,4-DDT	µg/L	<	
2,4-Dichlorophenoxyacetic Acid (2,4-D)	µg/L	<	100
2-Chlorotoluene	µg/L	<	
2-Hexanone (MPK)	µg/L	<	
4,4-DDD (pp-DDD)	µg/L	<	
4,4-DDE (pp-DDE)	µg/L	<	
4,4-DDT (pp-DDT)	µg/L	<	
4-Chlorotoluene	µg/L	<	
Acetone	µg/L	<	
Alachlor	µg/L	<	5
Aldicarb	µg/L	<	
Aldrin	µg/L	<	
Aldrin + dieldrin	µg/L	<	
Atrazine	µg/L	<	
Atrazine + N-dealkylated metabolites	µg/L	<	5
Atrazine-desethyl (DEA)	µg/L	<	
Azinphos-methyl	µg/L	<	20
Bendiocarb	µg/L	<	
Benzene	µg/L	<	² 5.0 / ³ 1.0
Benzo(a)pyrene	µg/L	<	0.01
Bromobenzene	µg/L	<	
Bromoxynil	µg/L	<	5
Carbaryl	µg/L	<	90
Carbofuran	µg/L	<	90
Carbon Tetrachloride	µg/L	<	2
Chlorobenzene	µg/L	<	80, 30(A)
Chloroethane	µg/L	<	
Chlorpyrifos	µg/L	<	90
Cyanazine	µg/L	<	
DDT + metabolites	µg/L	<	
Diazinon	µg/L	<	20
Dicamba	µg/L	<	120
Dichlorodifluoromethane / Freon 12	µg/L	<	
Dichloromethane	µg/L	<	50
Diclofop - methyl	µg/L	<	9
Dieldrin	µg/L	<	
Dimethoate	µg/L	<	20
Dinoseb	µg/L	<	
Diquat	µg/L	<	70
Diuron	µg/L	<	150
Ethylbenzene	µg/L	<	140, 1.6(A)
Ethylene dibromide	µg/L	<	
Glyphosate	µg/L	<	280
Heptachlor	µg/L	<	
Heptachlor & heptachlor epoxide	µg/L	<	
Heptachlor epoxide	µg/L	<	
Hexane	µg/L	<	
Isopropylbenzene	µg/L	<	
Lindane	µg/L	<	
Malathion	µg/L	<	190

Chemical - organics

Test Parameter	units	Treated water results	Drinking water standard*
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MCPA	µg/L	<	100
Methoxychlor	µg/L	<	
Methyl ethyl ketone (MEK) (2-Butanone)	µg/L	<	
Methyl isobutyl ketone (MIBK)	µg/L	<	
Methyl tert-butyl ether / MTBE	µg/L	<	15 (A)
Metolachlor	µg/L	<	50
Metribuzin	µg/L	<	80
Microcystin-LR ⁶	µg/L	<	1.5
Nitrilotriacetic Acid	µg/L	<	400
N - Nitrosodimethylamine (NDMA)	µg/L	<	³ 0.009 / ² 0.040
n-Butylbenzene	µg/L	<	
n-Propylbenzene	µg/L	<	
Paraquat	µg/L	<	7
Parathion	µg/L	<	
Pentachlorophenol	µg/L	<	60, 30(A)
Phorate	µg/L	<	2
Picloram	µg/L	<	190
p-Isopropyltoluene	µg/L	<	
Polychlorinated Biphenyls (PCBs)	µg/L	<	3
Prometryne	µg/L	<	1
sec-Butylbenzene	µg/L	<	
Simazine	µg/L	<	10
Styrene	µg/L	<	
Temephos	µg/L	<	
Terbufos	µg/L	<	1
tert-Butylbenzene	µg/L	<	
Tetrachloroethylene	µg/L	<	10
Toluene	µg/L	<	60, 24 (A)
Total Chlordane	µg/L	<	
Triallate	µg/L	<	³ 230
Trichloroethylene / TCE	µg/L	<	5
Trifluralin	µg/L	<	45
Vinyl Chloride	µg/L	<	² 2.0 / ³ 1.0
Xylene - meta & para	µg/L	<	
Xylene - ortho	µg/L	<	
Xylenes - total	µg/L	<	90, 20(A)
2,3,7,8,-Tetra-Dibenzo-p-Dioxin	µg/L	<	
1,2,3,7,8,-Penta-Dibenzo-p-Dioxin	µg/L	<	
1,2,3,4,7,8,-Hexa-Dibenzo-p-Dioxin	µg/L	<	
1,2,3,6,7,8,-Hexa-Dibenzo-p-Dioxin	µg/L	<	
1,2,3,7,8,9-Hexa-Dibenzo-p-Dioxin	µg/L	<	
1,2,3,4,6,7,8,-Hepta-Dibenzo-p-Dioxin	µg/L	<	
2,3,7,8-Tetra-Dibenzofuran	µg/L	<	
1,2,3,7,8,-Penta-Dibenzofuran	µg/L	<	
2,3,4,7,8,-Penta-Dibenzofuran	µg/L	<	
1,2,3,4,7,8,-Hexa-Dibenzofuran	µg/L	<	
1,2,3,6,7,8,-Hexa-Dibenzofuran	µg/L	<	
2,3,4,6,7,8,-Hexa-Dibenzofuran	µg/L	<	
1,2,3,7,8,9,-Hexa-Dibenzofuran	µg/L	<	
1,2,3,4,6,7,8-Hepta-Dibenzofuran	µg/L	<	
1,2,3,4,7,8,9,-Hepta-Dibenzofuran	µg/L	<	
Total Tetrachlorodibenzo-p-Dioxins	µg/L	<	
Total Pentachlorodibenzo-p-Dioxins	µg/L	<	
Total Hexachlorodibenzo-p-Dioxins	µg/L	<	
Total Heptachlorodibenzo-p-Dioxins	µg/L	<	
Total Octachlorodibenzo-p-Dioxins	µg/L	<	

Chemical - organics

Test Parameter	units	Treated water results	Drinking water standard*
Total Tetrachlorodibenzofurans	µg/L	<	
Total Pentachlorodibenzofurans	µg/L	<	
Total Hexachlorodibenzofurans	µg/L	<	

Total Heptachlorodibenzofurans	µg/L	<	
Total Octachlorodibenzofuran	µg/L	<	
2,3,7,8-TCDD Toxicity Equivalents	µg/L	<	³ 0.000015

Chemical - disinfection by-products

Test Parameter	units	Treated water results	Drinking water standard*
Chloroform	µg/L	1.9	
Bromodichloromethane	µg/L	5.5	
Dibromochloromethane	µg/L	11.9	
Bromoform	µg/L	8.1	
Total Trihalomethanes (TTHMs)	µg/L	27.4	
Monochloroacetic Acid	µg/L	<	
Monobromoacetic Acid	µg/L	1.9	
Dichloroacetic Acid	µg/L	1.0	
Dibromoacetic Acid	µg/L	4.3	
Trichloroacetic Acid	µg/L	<	
Bromochloroacetic Acid	µg/L	2.8	
Bromodichloroacetic Acid	µg/L	2.5	
Chlorodibromoacetic Acid	µg/L	<	
Tribromoacetic Acid	µg/L	<	
Total Haloacetic Acids (HAA5)	µg/L	7.2	
Total Haloacetic Acids (HAA9)	µg/L	13.9	
Total Trihalomethanes (TTHMs) ¹ in distribution	µg/L	34.7	100
Total Haloacetic Acids (HAA5) ¹ in distribution	µg/L	8.1	80

Radiological

Test Parameter	units	Treated water results	Drinking water standard*
Gross-Alpha Radioactivity	Bq/L	0.15	⁴ 0.5
Gross-Beta Radioactivity	Bq/L	0.22	⁴ 1.0
Radon	Bq/L	12.0	
Tritium ⁶	Bq/L	<3	7000

Glossary and notes:

reported values represent average concentrations measured in treated water

< indicates less than detection limit

mg/L = milligram per Litre = part per million (ppm)

µg/L = microgram per Litre = part per billion (ppb)

cfu = colony forming units

*Ontario Drinking Water Standards O.Reg.169/03 and/or Health Canada Guidelines for Canadian Drinking Water Quality

*Drinking water standards are health-based MAC (Maximum Acceptable Concentration) values, unless otherwise noted

(A) indicates aesthetic objective, not health related but may affect taste, odour, or appearance

(O) indicates an operational guideline, to ensure efficient treatment and distribution system operation

¹The reported THM and HAA result is an annual average concentration measured in the distribution system.

² Health Canada Drinking Water Guideline only

³ Ontario Drinking Water Quality Standard only

⁴Radioactivity screening values = 0.5 Bq/L for gross alpha and 1.0 Bq/L for gross beta

⁵Sodium health advisory level of 20 mg/L for people on sodium-restricted diets only

⁶Result from 2016

**calculated parameter based on individual analytes

***the lead values reported do not include the Ontario Ministry of Environment Community Lead Testing Program results