

<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 19, 2020</b>
<b>FROM:</b>	<b>KELLY SCHERR, P.ENG. MANAGING DIRECTOR ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>
<b>SUBJECT:</b>	<b>2019 DRINKING WATER ANNUAL REPORT AND SUMMARY REPORT FOR THE CITY OF LONDON DISTRIBUTION SYSTEM</b>

<b>RECOMMENDATION</b>
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That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the 2019 Drinking Water Annual Report and Summary Report for the City of London Distribution System **BE RECEIVED** for information.

<b>PREVIOUS REPORTS PERTINENT TO THIS MATTER</b>
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- [“2018 Drinking Water Annual Report and Summary Report for the City of London Distribution System”](#) presented to CWC on February 20, 2019.

<b>2019 – 2023 STRATEGIC PLAN</b>
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The 2019 – 2023 Strategic Plan identifies this objective under *Leading in Public Service: Measure and publicly report on corporate performance.*

<b>BACKGROUND</b>
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Ontario Regulation 170/03 (Drinking Water Systems) requires the owner of a municipal drinking water system to ensure that an Annual Report and a Summary Report be prepared, covering the period of January 1 through to December 31 of the previous year.

The Annual Report is to contain:

- A brief description of the drinking water system, including a list of water treatment chemicals used by the system;
- A summary of the results of required tests;
- A summary of any adverse test results reported and corrective actions taken; and
- A description of any major expenses incurred to install, repair or replace required equipment.

O. Reg. 170/03 further stipulates that:

- a) The Owner shall ensure that a copy of the Annual Report is given without charge to every person who requests a copy;
- b) Effective steps are taken to advise users of water from the system that copies of the Annual Report are available, without charge, and of how a copy may be obtained;
- c) The Owner of a large municipal residential system serving more than 10,000 people is required to post a copy of the Annual Report to the municipality’s website; and,
- d) A Summary Report is to be prepared and presented to the members of the Municipal Council by no later than March 31 of the following year.

The Summary Report is to contain:

- A list of any regulatory requirements applicable to the system that were not met at any time during the period covered by the report, the duration of the failure, and the measures that were taken to correct the failure; and,
- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows and compared to the rated capacity of the system.

Due to the large number of pages, the 2019 Drinking Water Summary Report for the City of London Distribution System has been provided to members of Council in electronic format, with the 2019 Annual Report attached as an appendix. The Summary Report (without appendices) is attached as Appendix 'A' to this report.

The Elgin-Middlesex Pumping Station (EMPS) is jointly owned by the City of St. Thomas, the Town of Aylmer, and the City of London, and is operated by the Ontario Clean Water Agency (OCWA). The Annual Report for the EMPS (London portion) was not yet available at the time of writing this report. Therefore, it will be provided to members of Council under separate memo prior to the reporting deadline of February 28, 2020.

<b>SUMMARY</b>
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Receipt of Appendix 'A' of this report by members of Council fulfils the reporting requirements of O. Reg. 170/03, Schedule 22. The 2019 Drinking Water Summary Report is available to members of the public by request, and will be posted on the City's website.

<b>PREPARED BY:</b>	<b>REVIEWED &amp; CONCURRED BY:</b>
<b>JOHN SIMON, P.ENG. DIVISION MANAGER, WATER OPERATIONS</b>	<b>SCOTT MATHERS, P.ENG. DIRECTOR – WATER &amp; WASTEWATER</b>
<b>RECOMMENDED BY:</b>	
<b>KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>	

Appendix 'A' – City of London 2019 Drinking Water Summary Report

- c.c. Cathy Saunders - City Clerk  
 John Simon – Division Manager – Water Operations  
 Aaron Rozentals - Division Manager – Water Engineering  
 Andrew Henry – Director – Regional Water Supply  
 Scott Koshowski, P. Eng. – Water Operations Engineer

Dan Huggins - Water Quality Manager

Dr. Christopher Mackie, Medical Officer of Health and Chief Executive Officer –  
Middlesex-London Health Unit

# CITY OF LONDON 2019 DRINKING WATER SUMMARY REPORT

System Name: City of London Distribution System

Mailing Address: Corporation of the City of London  
P.O. Box 5035, 300 Dufferin Ave.  
London, ON N6A 4L9



**System Rating:** Water Distribution Subsystem Class IV  
Water Treatment Subsystem Class II  
Average Day Demand: 128.864 MLD  
Peak Day Demand: 158.922 MLD (July 4, 2019)  
Population Served: 385,000 (approx.)  
Source Water: Surface Water (Lake Huron, Lake Erie)  
Drinking Water System Number: 260004917  
Municipal Drinking Water Licence: 006-101

**CONTACT INFO:**  
Owner:  
Corporation of the City of London  
300 Dufferin Avenue, London, Ontario N6A 4L9  
Contact: Mr. John Simon, P.Eng. Division Manager Water  
Operations  
519-661-2489 ext. 4938



**London**  
CANADA

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## **Reporting Requirements**

Ontario Regulation 170/03 requires that municipalities prepare a Summary Report for their drinking-water system for the preceding calendar year and submit it to the members of the Municipal Council by March 31 of each year. This report, presented to Municipal Council's Civic Works Committee on February 19, 2020 fulfills that requirement.

O. Reg 170/03 also requires the preparation of an Annual Report on the operation of the drinking-water system to be made available to members of the public.

Before February 28, 2020, a copy of the 2019 Annual Report and Summary Report for the City of London's water works will be provided to the local office of the Ministry of the Environment, Conservation and Parks (MECP) as a courtesy for information purposes.

The Elgin-Middlesex Pumping Station (EMPS) is jointly owned by the St. Thomas Secondary Water Supply System, the Aylmer Secondary Water Supply System, and the City of London. EMPS is operated by the Ontario Clean Water Agency (OCWA). As required, the Annual Report for the EMPS (London portion) is attached as an appendix to this report for members of Council.

## **Water Budget**

The 2020-2023 operating and capital budgets represent financial sustainability for Londoners, whereby annual rate increases are approximately the average of the Consumer Price Index (CPI) and the Non-Residential Building Construction Price Index (NRBCPI). The 2020-2023 water operating and capital budgets support four core business objectives:

- Compliance
- Financial Management
- Customer Service
- Continuous Improvement

The total Water budget for 2019 was \$79.9 million, which includes long term infrastructure improvements. The Water Budget helps maintain London's Advantage of a safe, clean and secure water supply. The Water Service Area remains proactive in initiatives to ensure that this service continues to meet the demands and expectations of customers. Existing infrastructure requires ongoing renewal (replacement and rehabilitation) activities to manage the infrastructure gap, ensuring that future generations are not faced with a water system that is failing, unreliable, and expensive to maintain.

## **Notable Initiatives**

### ***Bulk Water System Replacement***

The City of London has 8 bulk water filling station locations that allow commercial, residential, and bulk water contractors to obtain bulk water. These 8 locations are the only authorized locations where bulk filling is allowed in the City, and are situated and designed to help minimize the risk and attempts of theft of water from fire hydrants.

In 2018, these stations were renewed with modern technology, were well received, and have been very successful. Users are able to add value to their account any time of day by logging in, and have numerous reporting abilities to enhance their business functionality, providing the "who, when and where" for water takings.

City staff now have the ability to easily monitor and report water consumption at each station from the office environment, by knowing who has purchased water, when it was purchased, and the volume purchased. The system also provides the ability to transmit

messages to various stations for users to readily see (for example, in the event a station needs to be closed for maintenance); or alternatively, shut down a station remotely so that water taking can be temporarily halted at that location. However, the biggest benefit has been the ability to assist our customers in real time when they encounter difficulties. Full monitoring function is utilized at any given station 24/7 without needing to go onsite. This major customer service improvement has proven invaluable.

The bulk water station enhancements will continue, with additional upgrades for 3 stations slated for 2020 to help improve accessibility, water flow, and demand.

### ***Downtown Leak Detection Fixed Network***

The City consists of over 1,600 km of water main and associated hydrants, control valves, water service connections, and other appurtenances. London experiences, on average, 120 water main breaks a year, although the last several years have been below this norm. London's water loss level is relatively low (between 10% to 12%; or an internationally recognized Infrastructure Leakage Index (ILI) factor of around 2.0), placing us amongst the best municipalities in North America.

Permanent leakage monitoring is a practice that has been gaining popularity in North America, and London has been using it for several years. In 2018, the Water Service Area deployed Acoustic Leak Loggers on our metallic water mains in the core downtown area. They log noise levels nightly (during a quiet period), and through automatic software analysis of this data, the system provides the probability of leakage based on the level and consistency of the noise. If a high leak probability is found, the data is correlated and the leak location is pin-pointed. The data is displayed on a map, and colour codes depict the probability and locations of leaks. All of this is done prior to anyone going out to the field to investigate.

To date, this system has pin-pointed with high accuracy 1 watermain break, 16 leaks (on services, hydrants or valves), and 3 leaks that were occurring within customers internal plumbing (toilets, faucets). The early detection of these failures allowed repair efforts to be coordinated as non-emergency events during normal working hours, minimizing both the financial and public impact.

The City continues to investigate leak detection technologies in an effort to enhance our proactive leak monitoring/detection program, striving to bring down our water loss level to an economical and environmentally reasonable amount.

### **Sampling & Water Quality Monitoring**

In 2019, the MECP required large municipal drinking water systems to test for 70 different organic, inorganic and chemical parameters. The City of London's water sampling regime includes monthly testing for microbiological indicators and chlorine residuals from 57 standard locations across the City, as well over 2,400 random grab samples. Analysis is also performed for up to 117 parameters, including organics, inorganics, chemicals, pesticides and metals at 13 standard locations around the City. This level of testing far exceeds the MECP's minimum sampling requirements.

London also has 10 locations throughout the City where continuous in-line sampling of chlorine residual and pH is monitored. Staff also perform approximately 4,000 additional chlorine tests each year related to construction and maintenance activities. All of these efforts help ensure that the water within the distribution system is always of high quality and completely safe to consume.

### **2019 Water Quality Sampling Summary**



Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>REGULATED INORGANICS</b>					
Antimony	6	ug/L	0.09	0.12 - 0.15	No
Arsenic	25	ug/L	0.2	0.3 - 0.3	No
Barium	1000	ug/L	0.02	13.7 - 20.3	No
Boron	5000	ug/L	2	15 - 21	No
Cadmium	5	ug/L	0.003	0.003 - 0.005	No
Chromium	50	ug/L	0.08	0.17 - 0.22	No
Fluoride	1.5	mg/L	0.06	0.13 - 0.87	No
Free Chlorine Residual	--	mg/L		0.1 - 3.00	No
Lead	10	ug/L	0.01	0.01 - 0.02	No
Mercury	1	ug/L	0.01	0.01 <MDL	No
Selenium	10	ug/L	0.04	0.12 - 0.13	No
Sodium	*20	mg/L	0.01	9.35 - 16.4	No
Uranium	20	ug/L	0.002	0.028 - 0.068	No

Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>REGULATED ORGANICS</b>					
Atrazine	--	ug/L	0.01	0.02 - 0.04	No
Atrazine + N-dealkylated metabolites	5	ug/L	0.01	0.03 - 0.06	No
De-ethylated Atrazine	--	ug/L	0.01	0.01 - 0.02	No
Azinphos-methyl	20	ug/L	0.05	<MDL	No
Benzene	5	ug/L	0.32	<MDL	No
Benzo(a)pyrene	0.01	ug/L	0.004	<MDL	No
Bromoxynil	5	ug/L	0.33	<MDL	No
Carbaryl	90	ug/L	0.05	<MDL	No
Carbofuran	90	ug/L	0.01	<MDL	No
Carbon tetrachloride	5	ug/L	0.17	<MDL	No
Chlorpyrifos	90	ug/L	0.02	<MDL	No
Diazinon	20	ug/L	0.02	<MDL	No
Dicamba	120	ug/L	0.2	<MDL	No
1,2-Dichlorobenzene	200	ug/L	0.41	<MDL	No
1,4-Dichlorobenzene	5	ug/L	0.36	<MDL	No
1,2-Dichloroethane	5	ug/L	0.35	<MDL	No
Dichloromethane	50	ug/L	0.35	<MDL	No
2,4-dichlorophenol	900	ug/L	0.15	<MDL	No
2,4-dichlorophenoxyacetic acid (2,4-D)	100	ug/L	0.19	<MDL	No
Diclofop-methyl	9	ug/L	0.4	<MDL	No
Dimethoate	20	ug/L	0.06	<MDL	No
Diquat	70	ug/L	1	<MDL	No
Diuron	150	ug/L	0.03	<MDL	No
Glyphosate	280	ug/L	1	<MDL	No
Malathion	190	ug/L	0.02	<MDL	No
MCPA	--	mg/L	0.00012	<MDL	No
Metolachlor	50	ug/L	0.01	0.01 - 0.03	No
Metribuzin	80	ug/L	0.02	<MDL	No
Monochlorobenzene	80	ug/L	0.3	<MDL	No
Paraquat	10	ug/L	1	<MDL	No
Pentachlorophenol	--	ug/L	0.15	<MDL	No
Phorate	2	ug/L	0.01	<MDL	No
Picloram	190	ug/L	1	<MDL	No
Polychlorinated Biphenyls (PCBs)	3	ug/L	0.04	<MDL	No
Prometryne	1	ug/L	0.03	<MDL	No
Simazine	10	ug/L	0.01	<MDL	No
Terbufos	1	ug/L	0.01	<MDL	No
2,3,4,6-tetrachlorophenol	100	ug/L	0.2	<MDL	No
Triallate	230	ug/L	0.01	<MDL	No
Trichloroethylene	50	ug/L	0.44	<MDL	No
2,4,6-trichlorophenol	5	ug/L	0.25	<MDL	No
Trifluralin	45	ug/L	0.02	<MDL	No
Vinyl Chloride	2	ug/L	0.17	<MDL	No



Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>NITRATES</b>					
Nitrate (as nitrogen)	--	mg/L	0.006	0.12 - 0.532	No
Nitrate + Nitrite (as nitrogen)	--	mg/L	0.006	0.12 - 0.532	No
Nitrite (as nitrogen)	--	mg/L	0.003	0.005 - 1.7	No

Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>TRIHALOMETHANES &amp; HALOACETIC ACIDS</b>					
Total Haloacetic Acids	--	ug/L	5.3	5.3 - 20.6	No
Dibromoacetic Acid	--	ug/L	2	2.9 - 4.7	No
Dichloroacetic Acid	--	ug/L	2.6	2.9 - 4.7	No
Monobromoacetic acid	--	ug/L	2.9	3.5 - 11.6	No
Monochloroacetic Acid	--	ug/L	4.7	2 - 2	No
Trichloroacetic Acid	--	ug/L	5.3	5.3 - 9.1	No
Trihalomethanes (total)	--	ug/L	0.37	16 - 48	No
Bromodichloromethane	--	ug/L	0.26	4.2 - 12	No
Bromoform	--	ug/L	0.34	<MDL	No
Chloroform	--	ug/L	0.29	10 - 32	No
Dibromochloromethane	--	ug/L	0.37	1.4 - 4.7	No

Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>MICROBIOLOGICAL</b>					
E. coli	0	cfu/100 mL	0	0 - 1	Yes
Total Coliform	0	cfu/100 mL	0	0 - 195	Yes
Heterotrophic Plate Count	N/A	cfu/1 mL	10	10 - 2000	No

Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>NON-REGULATED INORGANICS/ORGANICS</b>					
Alkalinity	--	mg/L as CaCO3	2	84 - 101	No
Aluminum	--	ug/L	1	12 - 38	No
Ammonia+Ammonium (N)	--	mg/L	0.04	0.06 - 0.08	No
Calcium	--	mg/L	0.01	26.7 - 32.6	No
Chloride	--	mg/L	0.04	10 - 19	No
Cobalt	--	ug/L	0.004	0.008 - 0.01	No
Colour	--	TCU	3	<MDL	No
Conductivity	--	uS/cm	2	243 - 316	No
Copper	--	ug/L	0.2	1 - 1.9	No
Cyanide	0.2	mg/L	0.002	<MDL	No
1,1-Dichloroethylene (vinylidene chloride)	14	ug/L	0.33	<MDL	No
Dissolved Organic Carbon	--	mg/L	1	<MDL	No
Ethylbenzene	--	ug/L	0.33	<MDL	No
Hardness	--	mg/L as CaCO3	0.05	97.3 - 116	No
Iron	--	ug/L	7	7 - 11	No
Magnesium	--	mg/L	0.001	7.44 - 8.32	No
Manganese	--	ug/L	0.01	0.1 - 0.77	No
Nickel	--	ug/L	0.1	0.4 - 0.6	No
Nitrogen-Kjeldahl (N)	--	mg/L	0.05	0.05 - 0.17	No
Organic Nitrogen	--	mg/L	0.01	0.05 - 0.11	No
pH	--	no unit	0.05	8.04 - 8.14	No
Phosphorus	--	mg/L	0.003	<MDL	No

Parameter	Ontario Maximum Acceptable Concentration (MAC)	Units	Lab's Method Detection Limit (MDL)	Measured Concentrations	MAC Exceedance (Y/N)
				2019	
<b>NON-REGULATED INORGANICS/ORGANICS CONT</b>					
Potassium	--	mg/L	0.009	<b>0.991 - 1.39</b>	No
Silicon; reactive silicate	--	mg/L	0.02	<b>0.43 - 1.4</b>	No
Silver	--	ug/L	0.05	<b>&lt;MDL</b>	No
Solids (Total Dissolved)	--	mg/L	30	<b>134 - 189</b>	No
Sulphate	--	mg/L	0.04	<b>24 - 31</b>	No
Sulphide	--	mg/L	6	<b>&lt;MDL</b>	No
Surr 1,2-Dichloroethane-d4	--	Surr Rec %	--	<b>101 - 102</b>	No
Surr 4-Bromofluorobenzene	--	Surr Rec %	--	<b>90 - 90</b>	No
Surr Decachlorobiphenyl	--	%	--	<b>92 - 100</b>	No
Tetrachloroethylene (perchloroethylene)	30	ug/L	0.35	<b>&lt;MDL</b>	No
Toluene	--	ug/L	0.36	<b>&lt;MDL</b>	No
Total Chlorine-Field	--	mg/L	--	<b>1.05 - 1.17</b>	No
2,4,5-TP (Silvex)	--	ug/L	0.18	<b>&lt;MDL</b>	No
Turbidity	1	NTU	0.1	<b>0.33 - 0.34</b>	No
Xylene (Total)	--	ug/L	0.43	<b>&lt;MDL</b>	No
m/p-xylene	--	ug/L	0.43	<b>&lt;MDL</b>	No
o-xylene	--	ug/L	0.17	<b>&lt;MDL</b>	No
Zinc	--	ug/L	2	<b>&lt;MDL</b>	No

In 2019, there were six (6) adverse microbiological results out of 2,426 samples taken. All involved the detection of Total Coliform bacteria (ranging from 1 to 195 cfu/100 mL). One involve the detection of 1 cfu/100 mL of E. Coli. In each case, staff implemented the mandatory adverse response procedure, which included notifying the MECP and the Middlesex-London Health Unit, and immediately re-sampled at each location. The re-sample results revealed no adverse indicators.

In all instances it is highly unlikely that there were 'actual' water quality issues at these sites, as all adverse samples were identified as having free chlorine residuals which were well above the minimum acceptable level at the time of the sampling (ranging between 0.30 to 0.98 mg/L). E. coli and Coliform bacteria cannot survive in chlorinated water; therefore, it is suspected that post-sampling contamination occurred. The re-sampling results support this conclusion. The microbiological testing procedure is extremely sensitive; accidental sample contamination can occur through operator or laboratory error, despite the specific procedures and precautions being adhered to while processing samples.

## **System Statistics and Major Events**

During the period from January 1, 2019 through to December 31, 2019 a total of 47,103,998,000 litres of water were purchased, at a cost of more than \$26,159,000, from the Joint Water Boards and subsequently pumped into London via the Arva Pumping Station and the London components within the Elgin Middlesex Pumping Station. Average day demand was 128,864,000 litres. Peak day consumption of 158,922,000 litres occurred on July 4, 2019.

A summary of system pumpage can be found in the full version of the Summary Report. The data includes monthly average and maximum daily flows. These values are also compared to the rated flow rate capacities identified in London's Municipal Drinking Water Licence. There were no occurrences of flow rate exceedance during the specified time period.

Listed below are some 2019 statistics for the City of London Distribution System:

<b>Approximate Replacement Value of Drinking Water System</b>	<b>\$5,869,000,000</b>
<b>Number of Pumping Stations</b>	<b>8</b>
<b>Number of Fire Hydrants</b>	<b>9,455</b>
<b>Number of Watermain Valves</b>	<b>13,629</b>
<b>Total Number of Water Services</b>	<b>116,211</b>
<b>Length of Watermain</b>	<b>1,601 km</b>
<b>Number of Watermain Breaks</b>	<b>98</b>
<b>Number of Water Service Leaks</b>	<b>240</b>

### **Municipalities Receiving London Water**

In the Municipality of Middlesex Centre, the villages of Arva, Ballymote, and Delaware continued to receive their drinking water under contract from the City of London during 2019. The Municipality of Middlesex Centre has been provided a copy of the Annual Report as per O. Reg 170/03.

Several residences within Central Elgin also continued to receive drinking water from the transmission watermain that supplies the City of London from the EMPS. For this reason, Central Elgin has also been provided a copy of the report.