Lake Huron
Primary Water Supply System

2017 COMPLIANCE REPORT

CONTACT INFO:

Owner:
Lake Huron Primary Water Supply System Board of Management
c/o City of London, Regional Water Supply Division
235 North Centre Road, Suite 200, London, ON N5X 4E7
519-930-3505

Operating Authority:
Ontario Clean Water Agency
P.O. Box 1409, Grand Bend, ON N0M 1T0
519-238-8466

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PROFILE

WHO WE ARE

The Lake Huron Primary Water Supply System Board of Management owns and governs the drinking water system. The Board of Management is made up of members appointed from each of the eight member municipalities that are currently supplied with water from the Lake Huron Primary Water Supply System (LHPWSS). One of these member municipalities, the City of London, acts as the Administering Municipality. Accordingly, the City of London provides all associated administrative and management services on behalf of the Board. The Board of Management currently utilizes the services of an independent contracted Operating Authority.

The water system is operated and maintained by Ontario Clean Water Agency (OCWA) under contract to the Joint Board of Management.

OPERATING AUTHORITY: ONTARIO CLEAN WATER AGENCY / AGENCE ONTARIENNE DES EAUX

Lake Huron
Primary Water Supply System

Joint Board Member Municipalities

City of London *(administering municipality)*
Municipality of Bluewater
Municipality of Lambton Shores
Township of Lucan-Biddulph
Municipality of Middlesex Centre
Municipality of North Middlesex
Municipality of South Huron
Municipality of Strathroy-Caradoc

WHAT WE DO

Water Treatment & Supply

The Lake Huron Primary Water Supply System is responsible for the treatment and transmission of drinking water to eight (8) municipalities in southwestern Ontario. The population served by this system is approximately 375,000. Water is provided bulk wholesale to the municipalities who then distribute it to their customers.

The Lake Huron Water Treatment Plant (WTP) employs pre-chlorination, screening, powder activated carbon addition (seasonally on an as-required basis), coagulation, flocculation, sedimentation, dual-media filtration, post-chlorination, and sodium hydroxide addition to treat raw water obtained from Lake Huron. After the water is treated it is pumped from the WTP to various communities or to storage reservoirs. The drinking water system is monitored at various locations throughout the system via a Supervisory Control and Data Acquisition (SCADA) system**.**

Lake Huron Primary Water Supply System: Assets

1 water treatment plant
1 residual management facility
3 water pumping stations
3 in-ground storage reservoirs
8 monitoring stations
151 km of watermain

Figure 1: McGillivray Booster Pumping Station

Figure 2: Pumps at the Lake Huron Water Treatment Plant

WHAT'S IMPORTANT

Values of the Water System

The values of the Lake Huron Primary Water Supply System are the inherent beliefs or moral standards that generally reflect what the Lake Huron Primary Water Supply System Joint Board of Management stands for and believes in:

- **Sustainable** - be financially, environmentally, socially, and physically sustainable;
- **Inclusive** - provide access to bulk drinking water for current and prospective members, in accordance with Board policy;
- **Fair and equitable** - balance the interests of individual members with the best interests of all members, as well as the needs of existing members with the needs of new members;
- **Vigilant** - ensure an adequate supply of safe and reasonably priced drinking water is available to members;
- **Innovative** - be receptive to and supportive of new ideas and opportunities for improvement;
- **Cooperative** – be supportive to the needs of the Lake Huron Primary Water Supply System;
- **Open and transparent –** conduct business in a manner that enables member municipalities and the public to review and provide input into major decisions as appropriate;
- **Public Ownership –** retain ownership of the water system in public hands.

LAKE HURON PRIMARY WATER SUPPLY SYSTEM: AT A GLANCE

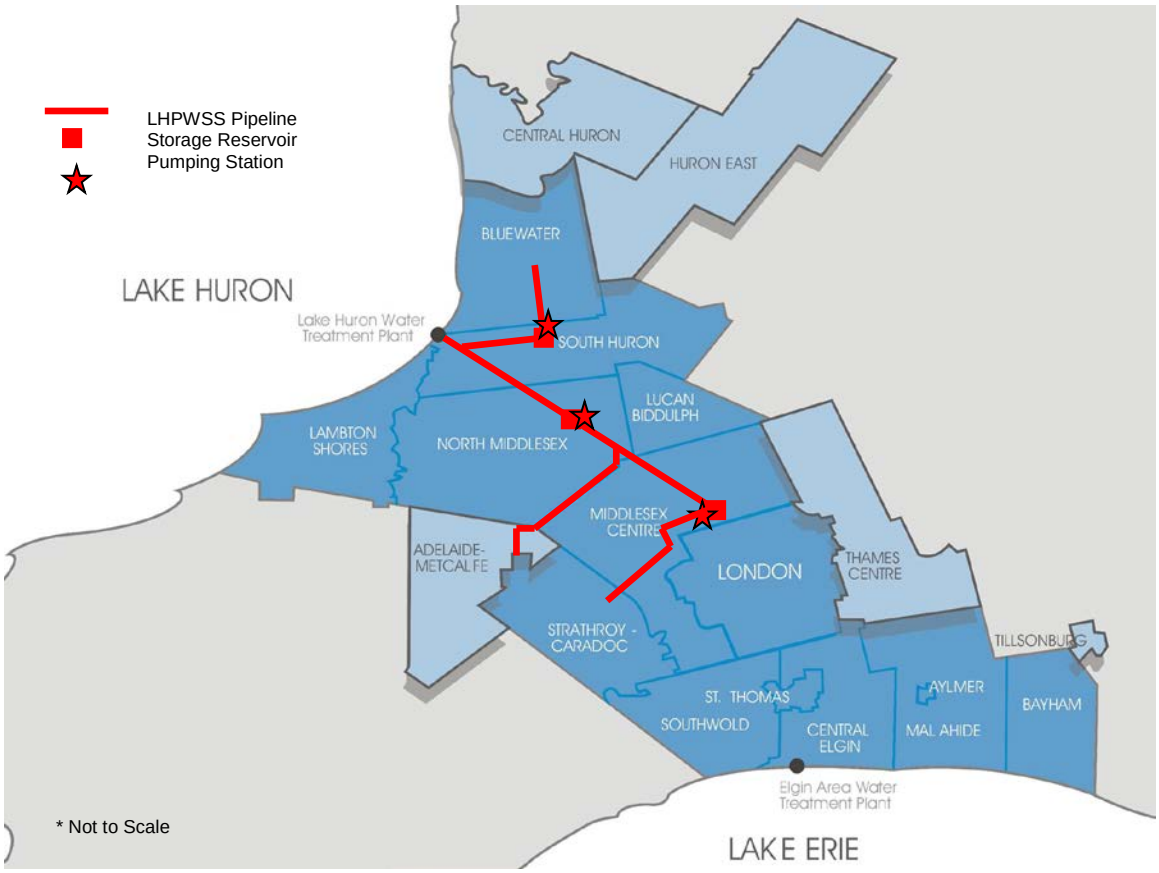

Figure 3: Lake Huron Primary Water Supply System Major Infrastructure Locations

THE WATER TREATMENT PROCESS

The following figure provides a general overview of the conventional water treatment process. The processes outlined below are very similar to the treatment at the Lake Huron Water Treatment Plant, although they are not an exact representation. Some details may vary. Step 9 (fluoridation) does not take place at the Lake Huron Water Treatment Plant.

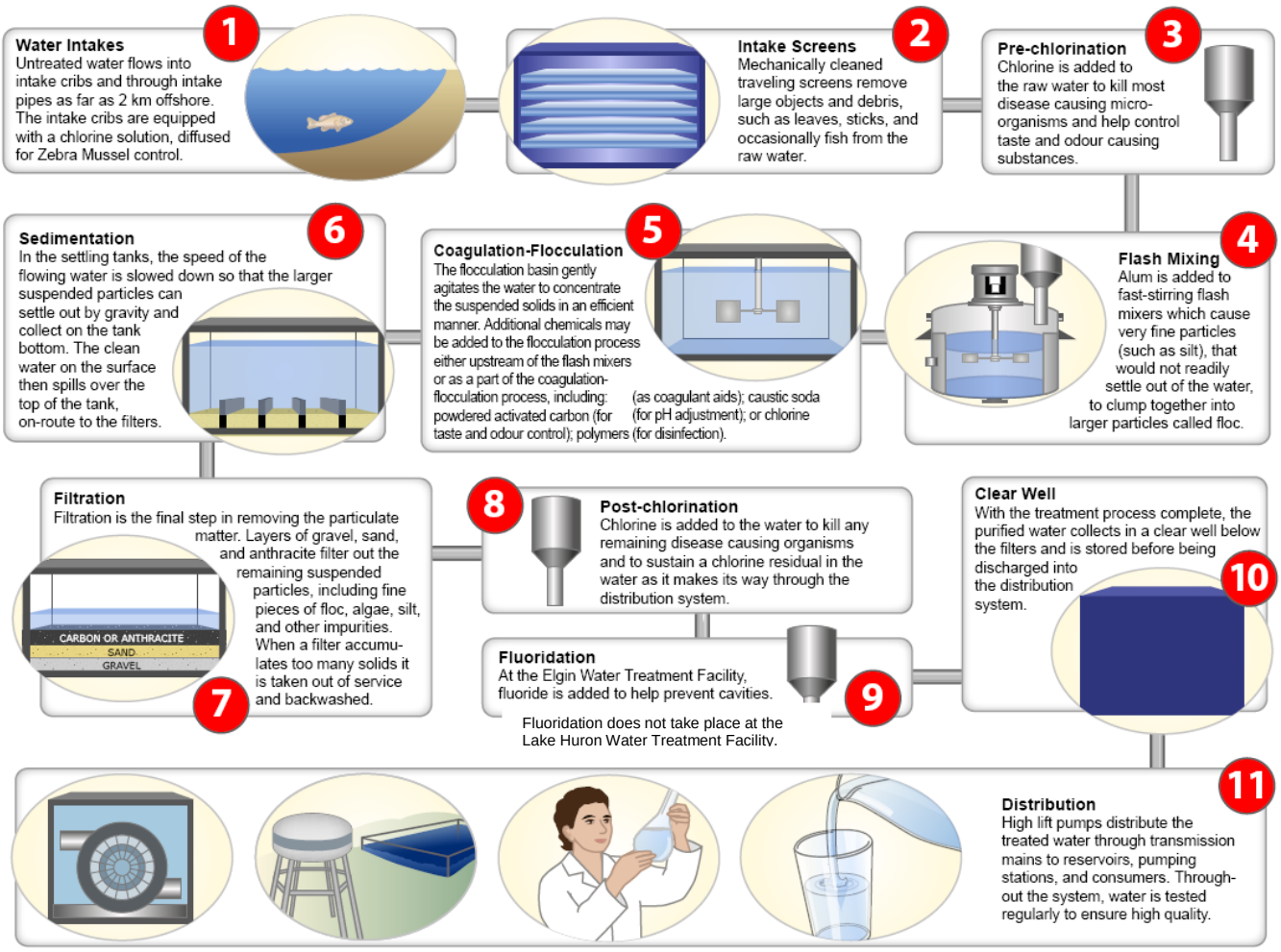

Figure 4: Overview of the Water Treatment Process

2017 HIGHLIGHTS

OPERATING CONTRACT RENEWAL

In 2012 the Board of Management for the Lake Huron Primary Water Supply System (LHPWSS), concurrently and jointly with the Board of Management for the Elgin Area Primary Water Supply System (EAPWSS), awarded the contract for the management, operation and maintenance of the drinking water systems to the Ontario Clean Water Agency (OCWA). OCWA began operating the regional water system on July 1, 2012 for an initial five year term, with an allowable five year term extension at the option of the Board. In 2017, the operating contract term was extended for another five years. An Amending Agreement was developed. The Agreement continues to outline minimum expectations and mutual commitments between the LHPWSS and OCWA, while providing an incentive for superior performance from minimum standards.

ALGAL TOXINS MONITORING PROGRAM

For several years, the Ministry of the Environment and Climate Change (MOECC) has conducted a special algal toxins monitoring program through their Drinking Water Surveillance Program (DWSP). Samples of raw source water and treated drinking are collected weekly from various drinking water systems throughout the province. The purpose of the research study is to determine the levels of microcystins and Anatoxin-a in drinking water. The LHPWSS has been participating in this monitoring program since 2016.

Participation in the study took place over a six month period, June through November. A total of 25 samples of both raw and treated water were submitted to the MOECC laboratory for analysis. Of these samples, there were no detectable results for microcystins (total) in either the raw or treated water.

PROCESS OPTIMIZATION AND RESEARCH DAY

On April 4, 2017, the Lake Huron & Elgin Area Primary Water Supply Systems co-hosted a Process Optimization and Research Day. The purpose was to share information on the research programs currently being undertaken by the water systems in affiliation with the two partner Natural Science and Engineering Council (NSERC) chairs at the University of Waterloo and University of Toronto, and Western University.

Although the NSERC chairs periodically hold “technology transfer days” to share information on their research projects with their contributing partners, this Research Day is unique in that it is hosted by a water system, and the water

systems' research partners presented their work on the Lake Huron and Elgin Area Water Supply Systems to associated guests. Guests included staff from the Ontario Clean Water Agency (OCWA), the Ministry of the Environment and Climate Change (MOECC), the Health Units in the region, Board staff, and staff of the benefiting municipalities supplied by the Lake Huron & Elgin Area Water Supply Systems.

Topics presented on Research Day included various investigations related to cyanobacteria and cyanotoxins, biofiltration, lead corrosion processes, pre-treatment studies and an overview of various ongoing research initiatives. It was an extremely valuable day of sharing project work, research and optimization for the water systems and an opportunity for attendees to network. The day ended with a review of the research program and how the individual projects fit together in the long-term proactive research and capital planning efforts of the water system.

ISO 14001:2015 CERTIFICATION

The LHPWSS has an Environmental Management System (EMS) which has been registered to the ISO 14001 standard since 2003. The latest revision of the international standard, ISO 14001:2015, was released in September 2015. All certified organizations were given a three-year period to transition to the new standard. The LHPWSS underwent an external audit in November 2017. It was determined that the EMS met the requirements of ISO 14001:2015, therefore the transition requirements were met. The LHPWSS was recommended for certification to the ISO 14001:2015 standard for a three-year period. The continued utilization and registration of the EMS to the ISO 14001 standard is a requirement of the Service Agreement with OCWA.

2017 CAPITAL PROJECT HIGHLIGHTS

CHLORINE EMERGENCY ACTUATED VALVES

The six (6) chlorine gas tonners were fitted with emergency electric actuated operators, so that in the event a chlorine gas leak is detected the units will automatically close the tonner isolation valves. The installation of this system was completed as a risk mitigation measure to reduce potential negative impacts to the environment and public in the event of an emergency. The system includes six (6) control panels, backup power supply and integration to the plant SCADA system for control and monitoring purposes.

Figure 5: The chlorine gas tonners, fitted with emergency electric actuated operators.

CONTROL SYSTEMS STUDY

A Control Systems Study was undertaken to review the intent of the overall control philosophy for the Lake Huron Water Treatment Plant (WTP). The study included a significant review of the WTP documentation including the process narratives, programming narratives, and operating manuals. Documents were reviewed for consistency and completeness. CH2M completed the Control Systems Study, and provided specific recommendations regarding deficiencies, as well as programming changes in the SCADA system which may be required to address identified issues. The proposed recommendations will address identified issues in the documentation and will improve reliability and consistency of plant control, performance and ease of operations. Staff are currently developing an action plan for 2018 to address the deficiencies and recommendations.

TRAVELLING SCREEN REPLACEMENT

The travelling screens located at the low lift pump station prevent debris, fish and other large suspended materials from entering the pump station. Two of the three travelling screens were from the original plant construction 50 years ago, were reaching the end of serviceable lifespan and required replacement. Travelling screen #2 was replaced in 2017 as part of a multi-year replacement program. Travelling screen #1 is scheduled to be replaced in 2018.

Figure 6: New travelling screen #2 in the low lift pump station.

FILTER MEDIA REPLACEMENTS

The twelve (12) dual-media filters at the Lake Huron Water Treatment Plant were original from the construction in the mid-1960s. All filters were showing signs of deterioration due to age. This project undertakes the systemic replacement of the media within the filter boxes, as well as the filter rate valves and control valves, with an allowance for any repairs to the existing filter block and drains as needed. The filter media replacement project is a multi-year project. The filter media is being replaced in two (2) filters per year over a six (6) year program, with 2017 being the third year of the replacement program. In 2017, filters #1 and #4 were replaced.

LOW LIFT PUMP MOTOR REPLACEMENTS

Low Lift Pump #3 and #4 motors were identical and original to the WTP. Since the 1980's, these motors were powered via a variable frequency drive (VFD) despite not being originally designed for VFD compatibility. As a result, the windings were failing and motors #3 and #4 were in need of replacement as they had reached the end of their service life. The new motors are designed to operate with new VFDs being installed. With the replacement of the motors and VFDs in 2017, the plant has now returned to a more efficient operating scenario, minimizing the risk of pump failure.

Figure 7: Low Lift Pump #3

DISTRESSED PIPE #32-48 REPLACEMENT

As part of the Acoustic Fiber Optic (AFO) monitoring system project that was commissioned in July 2015 by Pure Technologies, the LHPWSS determined in late 2016 that a pipe in an un-twinned high pressure section of the LHPWSS transmission main was in poor condition and consequently at high risk of failure. On this basis, with the concurrence of LHPWSS' contracted operating authority (OCWA) and Pure Technologies, Board staff initiated the proactive replacement of this pipe section.

On February 15, 2017, the LHPWSS coordinated the full replacement of a 1200mm (48-inch) diameter pre-stressed concrete cylinder pipe on the primary transmission main. The repair took nearly 20 hours to complete. Had the LHPWSS failed to replace this distressed pipe section, it could have resulted in a catastrophic failure of the pipeline causing extensive damage to agricultural lands in the area.

Figure 8a: Delivery of the repair pieces to the site

Figure 8b: Pure Technologies performs field confirmation of the distressed pipe location.

Figure 8c: Installation of the first repair piece.

2017 FLOW SUMMARY

As per the water system's current Permit To Take Water (PTTW), the amount of raw water taken into the Lake Huron Water Treatment Plant cannot exceed 454.98 million litres/day or 315,960 litres/minute. This converts to 5266 litres/second.

The water taking PTTW for 2017 was # 4725-87SS3J.

As per the water system's current Municipal Drinking Water License, the rated capacity of the Water Treatment Plant is 340.0 million litres/day, which converts to 3935 litres/second. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

The following table contains a flow summary, with comparison to the system's rated capacity and permit limits in order to assess the capability of the system to meet existing and planned uses.

	Total Daily Flow (ML/day)	Total Daily Flow (% of Capacity)	Daily Instantaneous Peak Flow (L/s)
Permit To Take Water (PTTW) – permitted raw water taking amount	454.98	100%	5266
Raw Water Flow – Average Day	128.2	28.18%	2681
Raw Water Flow – Max. Day	196.7	43.23%	3850
Water Treatment Plant Rated Capacity	340.0	100%	3935
Treated Water Flow – Average Day	121.7	35.79%	2148
Treated Water Flow – Max. Day	190.1	55.91%	4051

A complete flow summary for the Lake Huron Primary Water Supply System can be found in Appendix A.

The majority of the volume of treated drinking water from the LHPWSS is used by the City of London. As shown in Figure 9, London takes approximately 84.5% of the volume, with the other seven municipalities using the remaining 15.5%.

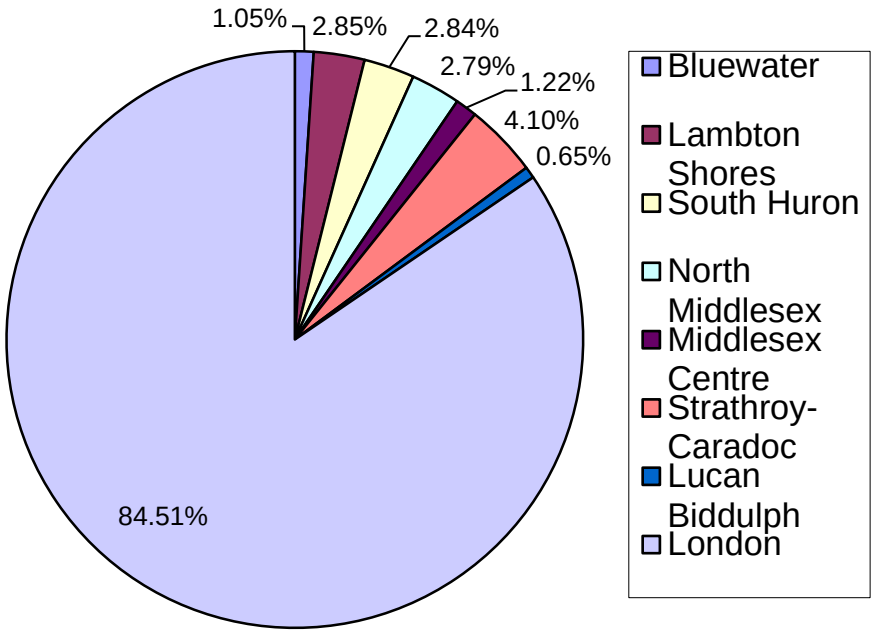

Figure 9: 2017 Treated Water Volumes per Municipality

2017 CHEMICAL CONSUMPTION

A variety of water treatment chemicals are used at the Lake Huron Water Treatment Plant or remote sites to ensure safe, clean drinking water. The following table outlines the chemicals most frequently used for the Lake Huron Primary Water Supply System. As part of the system's registered ISO14001 Environmental Management System, objectives and targets are currently in place to optimize chemical usage.

Chemical	Used for	Total Amount Used in 2017
Aluminum sulphate	Coagulation	1,059,384 kg
Powdered activated carbon	Taste and odour control (seasonally)	43,750 kg
Chlorine gas	Mussel control (seasonally)	29,648 kg
Chlorine gas	Primary disinfection	71,984 kg
Sodium hydroxide	pH adjustment for corrosion control	664,155 L
Sodium hypochlorite	Secondary disinfection	5,159 L

Chemical	Used for	Total Amount Used in 2017
Polymer	Filter aid (used on an as-required basis)	Not available
	Residual Management Facility	20,125 L
Sodium Bisulphite	Residual Management Facility - dechlorination	77,119 L

2017 WATER QUALITY SUMMARY

WATER QUALITY SAMPLING AND MONITORING

The Lake Huron Primary Water Supply System (LHPWSS) consistently provides treated drinking water with water quality above the standards required by provincial regulation. Where desirable, the LHPWSS standards are more stringent than what is required by regulation. For example, the target at the Lake Huron Water Treatment Plant for treated water turbidity (a measure of the cloudiness of water) is 10 times more stringent than the provincial standard. The LHPWSS is practicing continual improvement to ensure that high drinking water standards are maintained and enhanced where possible.

All water quality sampling at the Lake Huron Primary Water Supply System (LHPWSS) is performed in accordance with the *Safe Drinking Water Act* and its associated regulations. All samples are collected by licensed operating authority personnel and are submitted to Canadian Association for Laboratory Accreditation (CALA)/Standards Council of Canada (SCC) accredited laboratories for both bacterial and chemical analysis.

In 2017, a total of 611 microbiological samples were collected from raw, treated and distribution system water, and were tested for E Coli, total coliforms and heterotrophic plate count (HPC). There were no incidents of adverse microbiological test results in 2017.

Annual samples are collected and tested for inorganics (metals) and organics which include herbicides, pesticides and volatile organic parameters. Quarterly sampling is also conducted for trihalomethanes, haloacetic acids (a disinfection by-product), nitrates and nitrite.

In addition, the water treatment plant operator samples the raw, in-process and treated water six times per day and carries out a battery of physical and chemical tests for operational control.

As required by regulation, the LHPWSS also prepares an Annual Report which includes a summary of water quality test results and a maintenance report. The 2017 Annual Report can be found in Appendix B.

RESEARCH & PARTNERSHIPS

The Lake Huron Primary Water Supply System acknowledges the importance of scientific research on water quality and the effects on human health. The LHPWSS has partnered with the Natural Sciences and Engineering Research Council (NSERC) Chair in Drinking Water Research at the University of Waterloo and University of Toronto to pursue research opportunities, and is a member of the Water Research Foundation (WRF). In addition, the LHPWSS continues to evaluate and conduct specific research on the efficacy of the existing treatment processes, optimizing and improving treatment systems, and evaluating the potential and need of more advanced treatment alternatives. The LHPWSS also participates in the Ministry of the Environment and Climate Change's Drinking Water Surveillance Program (DWSP) and intake monitoring studies.

MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE INSPECTION

ANNUAL INSPECTION

The Ontario Ministry of the Environment and Climate Change (MOECC) conducts an inspection of the Lake Huron Primary Water Supply System annually. A MOECC inspection took place in September 2017. The final inspection report was issued on January 18, 2018. A total of two (2) non-compliances were identified in the inspection report. The final inspection rating received for the 2017-2018 reporting year was 90.71%.

Regional Water Supply Division
235 North Centre Road
Suite 200
London, ON N5X 4E7
519-930-3505 (ext. 2714)

www.watersupply.london.ca

APPENDIX A – 2017 FLOW SUMMARY

1. RAW WATER INTAKE – FLOW (ML/DAY)

MONTH DAY	January ML	February ML	March ML	April ML	May ML	June ML	July ML	August ML	September ML	October ML	November ML	December ML	
1	128.01	101.05	112.98	118.62	116.77	141.77	137.04	188.28	151.13	144.36	117.04	135.61	
2	101.82	102.76	111.78	115.08	116.31	128.24	131.69	177.75	137.15	139.15	124.13	103.71	
3	101.78	107.82	117.14	112.19	113.72	137.04	134.11	152.85	167.58	146.79	119.44	131.93	
4	128.92	125.27	110.91	115.68	115.25	124.77	163.66	141.23	119.52	176.17	127.47	107.78	
5	102.05	106.07	117.61	117.91	106.17	117.00	110.00	124.17	141.23	110.86	127.52	127.86	
6	107.96	136.84	116.54	117.91	113.76	152.58	196.66	131.10	135.45	142.04	104.64	116.85	
7	134.22	104.53	116.54	114.42	111.04	114.84	132.71	135.78	132.67	129.47	132.28	126.33	
8	102.03	129.06	132.59	113.70	114.96	138.49	146.54	136.68	139.46	120.17	113.32	133.01	
9	127.97	104.58	133.43	119.43	119.66	153.03	133.95	159.74	140.27	131.79	109.62	136.42	
10	100.09	104.26	117.18	120.99	130.11	158.77	129.70	141.85	145.83	130.71	118.34	113.65	
11	105.28	124.35	119.02	111.75	125.33	162.73	131.33	161.23	140.16	134.83	101.56	138.34	
12	134.94	103.71	112.17	110.01	119.82	150.49	132.39	159.36	128.92	123.45	134.31	135.27	
13	100.97	136.47	115.13	108.69	122.42	169.43	140.61	137.43	144.49	121.90	135.10	116.17	
14	135.14	131.68	102.07	135.46	123.18	158.78	143.67	179.13	139.18	106.67	114.66	127.31	
15	101.13	13.66	76.13	115.84	123.18	194.36	144.16	173.00	139.89	129.65	148.04	121.78	
16	141.19	139.93	135.00	99.52	108.85	132.28	142.85	143.30	147.87	122.65	99.41	116.86	
17	89.02	108.75	99.42	111.06	141.90	165.76	136.31	128.09	155.86	117.67	109.68	117.87	
18	132.72	116.49	123.55	119.81	139.46	140.98	183.75	150.50	148.53	137.08	133.10	139.98	
19	117.01	107.79	119.15	120.30	126.79	136.68	119.53	144.56	144.53	149.03	107.52	120.3	
20	113.04	105.97	122.99	114.95	127.21	131.32	190.85	137.11	141.42	120.19	134.48	107.39	
21	101.95	116.82	135.67	108.25	124.53	109.88	139.31	162.50	146.72	135.85	104.83	124.41	
22	146.79	99.81	136.83	115.02	109.80	154.98	141.55	114.40	174.59	132.69	119.00	130.90	
23	128.53	116.38	116.21	115.92	135.79	134.12	139.46	143.65	161.44	167.60	133.84	106.99	
24	70.63	102.95	125.38	117.87	167.26	131.78	135.95	147.78	131.45	13.87	101.13	112.5	
25	123.58	104.11	107.56	118.83	143.20	125.07	173.80	142.62	175.14	123.11	139.12	114.36	
26	102.19	115.83	117.62	124.58	140.49	119.86	111.25	138.75	181.27	146.29	117.34	114.4	
27	101.86	118.84	119.05	123.01	141.99	121.94	181.34	179.08	155.13	133.98	108.33	117.86	
28	137.31	117.31	106.14	113.97	149.79	118.22	145.32	114.36	138.56	128.24	123.55	111.73	
29	102.54		115.29	107.00	131.80	141.89	154.76	175.41	134.81	131.58	123.31	112.18	
30	102.25		97.41	123.22	144.67	131.02	188.23	133.33	141.31	101.96	110.43	112.27	
31	177.31		119.62		147.42		158.23	118.84		133.23		125.85	
Total	3600.2	3103.1	3608.1	3481.0	3952.6	4198.1	4550.7	4573.9	4381.6	3983.0	3592.5	3757.9	46782.7
Minimum	70.6	13.7	76.1	99.5	106.2	109.9	110.0	114.4	119.5	13.9	99.4	103.7	13.7
Maximum	177.3	139.9	136.8	135.5	167.3	194.4	196.7	188.3	181.3	176.2	148.0	140.0	196.7
Average	116.1	110.8	116.4	116.0	127.5	139.9	146.8	147.5	146.1	128.5	119.8	121.2	128.2

Note: (i) As per the water system's current Permit To Take Water (PTTW), the amount of raw water taken into the Lake Huron Water Treatment Plant cannot exceed 454.98 million litres/day.

APPENDIX A – 2017 FLOW SUMMARY

2. RAW INSTANTANEOUS PEAK FLOW (L/s)

MONTH DAY	January L/s	February L/s	March L/s	April L/s	May L/s	June L/s	July L/s	August L/s	September L/s	October L/s	November L/s	December L/s	
1	2859.84	1973.03	2193.17	1965.97	2845.02	2887.73	2949.77	2976.04	2996.99	2936.69	2860.65	2904.40	
2	1961.69	1942.36	2380.09	1975.58	2865.97	2865.97	2891.20	3015.39	2917.48	2921.76	2850.23	2887.73	
3	1943.29	2215.86	2235.07	2793.40	2285.76	2918.40	2882.52	2974.31	2920.02	2968.98	2858.91	2843.98	
4	2802.08	2862.38	2159.14	2905.21	3094.79	2875.46	2955.90	2886.00	2880.67	2914.81	2865.97	2232.52	
5	1947.57	2204.51	2826.62	2811.00	2303.24	3071.30	2895.60	2920.95	3158.56	2908.68	2110.19	2948.84	
6	2242.94	2152.08	2410.76	3284.38	2800.46	2987.38	2921.76	2191.44	2886.92	2880.79	2114.58	1950.23	
7	2908.68	2278.82	2870.25	2253.47	2860.65	2962.04	2877.31	2761.11	2940.16	2914.00	2858.91	2954.17	
8	1953.82	2229.86	2232.52	2792.59	2849.31	3059.03	2893.75	3350.81	2888.66	2933.10	2098.84	2225.46	
9	2894.79	2854.51	2276.97	2854.51	2331.25	2989.93	2977.78	2889.47	2987.38	3119.33	2843.17	2960.19	
10	1942.36	1949.42	2835.30	2178.24	2863.31	3031.13	2967.25	2939.35	3090.39	2865.05	1958.10	1943.29	
11	1946.76	2781.13	2443.06	1975.69	2500.81	2962.85	2899.19	2972.45	3303.59	3042.36	1934.49	2961.11	
12	2871.99	1958.10	2221.06	2108.45	2142.48	2950.69	3013.54	3124.42	2879.86	2862.50	2920.14	2793.29	
13	2124.07	2202.78	2781.13	2190.63	2392.36	3346.41	2894.79	2775.93	2979.51	3216.20	2845.02	2363.54	
14	2882.52	1923.96	2180.09	2221.06	2232.52	3299.31	2928.82	3084.38	2901.74	2191.44	2430.79	2677.20	
15	1948.61	1923.96	2971.64	2690.28	2688.43	2984.72	3342.94	2965.51	2958.56	2878.13	2845.83	2704.17	
16	2850.12	2860.65	2208.91	2127.66	2662.27	2948.03	3337.73	3032.75	2878.13	2249.07	2594.21	1814.81	
17	2088.43	2222.92	2118.87	2768.06	2668.52	2964.58	2898.61	2972.45	2867.59	2738.31	2906.13	2730.44	
18	2843.17	2236.00	2255.21	3006.60	2671.99	3073.84	2958.56	2984.72	3279.17	3334.26	3116.67	2953.24	
19	2845.83	2805.67	2193.17	2851.97	2726.85	2912.15	3070.37	3225.93	2886.92	3294.91	2242.01	2825.69	
20	2083.91	2116.20	2806.48	2698.15	2178.24	2986.46	3024.88	2998.73	3301.97	2864.12	2900.00	2029.75	
21	1960.76	2229.86	2842.36	2789.00	2138.19	3182.99	2898.26	2908.68	3080.90	2556.60	2685.88	2436.92	
22	2860.65	2131.13	2828.24	2903.47	2164.35	2954.17	2887.73	2354.75	3145.49	2560.07	3051.97	2840.51	
23	2853.70	2843.17	2824.07	2287.50	2707.75	2884.26	2970.83	2998.61	2951.50	2875.46	2469.33	1938.08	
24	2862.38	2723.50	2803.01	2214.12	2735.65	2933.22	2898.26	2601.16	2997.80	1959.03	1941.55	1939.00	
25	2679.05	1937.96	2182.75	2837.96	3455.21	2277.08	2972.57	3023.15	3018.87	2617.25	2862.38	1937.15	
26	1933.68	2200.12	2720.83	2927.08	2888.66	2882.52	3495.83	2886.00	3061.57	2856.25	2123.26	1939.81	
27	1946.76	2229.05	2385.42	2234.26	2882.52	2886.92	3045.83	3003.13	2926.16	2858.91	2860.76	2796.88	
28	2848.38	2236.81	2139.81	2256.94	2871.99	3849.65	3337.73	2906.94	2865.05	2868.52	2593.29	2120.60	
29	1955.44		2265.63	2156.48	2870.25	3028.47	2895.49	2903.47	2119.79	3053.70	3073.84	2062.04	
30	2036.69		2156.48	2884.26	3065.16	3013.54	2892.94	2871.18	2934.95	2855.56	3070.37	2063.89	
31	2869.33		2130.21		3078.24		2976.85	2945.37		2860.65		2065.51	
Minimum	1,934	1,924	2,119	1,966	2,138	2,277	2,877	2,191	2,120	1,959	1,934	1,815	1,815
Maximum	2,909	2,862	2,972	3,284	3,455	3,850	3,496	3,351	3,304	3,334	3,117	2,961	3,850
Average	2,411	2,294	2,448	2,531	2,672	2,999	2,995	2,918	2,967	2,837	2,630	2,447	2,681

Note: (i) As per the water system's current Permit To Take Water (PTTW), the amount of raw water taken into the Lake Huron Water Treatment Plant cannot exceed 454.98 million litres/day. This converts to 5266 litres/second.

APPENDIX A – 2017 FLOW SUMMARY

3. TREATED WATER FLOW (ML/DAY)

MONTH DAY	January ML	February ML	March ML	April ML	May ML	June ML	July ML	August ML	September ML	October ML	November ML	December ML	
1	122.10	94.31	105.59	113.24	109.49	135.00	130.43	181.94	144.79	132.62	110.60	129.41	
2	95.71	96.47	105.67	108.63	108.34	122.12	124.95	172.30	132.18	131.18	117.82	96.95	
3	95.33	100.14	110.84	104.77	108.88	130.71	128.67	146.22	161.57	140.71	113.87	126.51	
4	122.78	119.30	105.15	108.66	108.59	119.77	155.39	134.48	112.94	169.23	117.93	100.37	
5	95.80	99.71	111.81	111.77	98.63	110.68	105.00	118.36	132.33	104.17	121.62	133.48	
6	101.52	130.98	110.22	103.28	107.83	146.50	189.15	125.06	129.90	134.14	103.03	111.29	
7	128.81	96.37	107.12	106.54	104.88	109.47	124.13	129.70	126.15	123.20	125.64	119.16	
8	95.93	123.24	128.22	106.52	121.20	132.51	140.05	130.43	133.26	113.47	107.02	127.74	
9	121.67	98.03	125.96	113.34	114.05	148.62	127.27	153.60	133.58	125.62	103.10	130.93	
10	95.01	97.55	111.51	114.31	124.32	153.10	121.61	135.76	141.15	123.61	111.62	106.42	
11	95.39	118.51	113.00	104.98	118.75	157.46	123.16	155.19	131.31	128.07	95.38	132.16	
12	128.92	97.66	106.07	104.12	113.88	144.23	122.82	153.19	123.60	116.77	128.54	129.61	
13	96.15	130.43	109.16	102.11	116.48	163.77	133.70	130.85	137.64	115.11	129.09	110.04	
14	129.46	124.71	95.90	129.49	116.68	152.33	138.43	173.54	131.63	100.45	106.99	121.24	
15	95.68	9.97	68.83	109.93	111.50	190.11	136.83	166.57	133.95	130.43	142.31	116.04	
16	134.46	134.57	130.38	93.19	102.27	126.14	137.79	136.16	141.68	115.68	93.16	110.87	
17	82.32	102.41	94.73	104.48	135.72	160.47	130.86	120.89	150.09	109.53	81.49	112.02	
18	126.29	110.29	117.72	113.98	133.62	135.17	177.34	142.54	140.94	130.86	127.55	133.88	
19	110.50	101.70	111.48	114.28	121.55	131.20	112.47	137.41	136.00	142.48	101.30	113.93	
20	106.97	99.80	117.52	108.03	120.74	124.58	184.56	131.83	134.26	113.90	128.27	101.31	
21	95.87	110.47	129.67	101.72	118.63	103.67	133.03	156.57	141.17	130.09	98.54	118.21	
22	141.13	94.08	130.90	108.80	104.90	149.36	135.43	107.18	168.49	123.35	112.31	124.68	
23	120.90	110.17	110.22	109.89	129.17	127.38	134.47	137.87	154.83	160.20	127.12	100.61	
24	65.03	96.39	119.60	110.99	161.32	125.08	127.92	137.01	123.70	8.78	94.88	106	
25	117.50	97.80	101.11	112.51	138.57	118.31	165.62	134.37	167.08	116.02	133.00	107.87	
26	95.89	109.71	112.23	117.99	133.33	112.57	101.89	134.65	170.88	139.19	111.36	108.19	
27	95.73	113.00	111.19	116.39	137.65	115.44	174.66	168.80	140.26	127.94	102.06	111.52	
28	131.79	112.20	98.10	108.06	143.92	108.93	139.06	106.85	126.94	122.61	117.55	105.39	
29	96.65		108.78	100.46	125.58	135.21	148.50	169.24	124.88	125.48	116.97	105.95	
30	95.86		89.57	117.12	138.49	124.90	183.50	128.37	131.53	95.25	104.19	105.9	
31	171.87		112.91		142.62		149.95	112.30		127.42		119.44	
Total	3409.0	2930.0	3411.2	3279.6	3771.6	4014.8	4338.6	4369.2	4158.7	3777.6	3384.3	3577.1	44421.7
Minimum	65.0	10.0	68.8	93.2	98.6	103.7	101.9	106.9	112.9	8.8	81.5	97.0	8.8
Maximum	171.9	134.6	130.9	129.5	161.3	190.1	189.2	181.9	170.9	169.2	142.3	133.9	190.1
Average	110.0	104.6	110.0	109.3	121.7	133.8	140.0	140.9	138.6	121.9	112.8	115.4	121.7

Note: (i) As per the water system's current Municipal Drinking Water Licence, the rated capacity of the Water Treatment Plant is 340.0 million litres/day. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

APPENDIX A – 2017 FLOW SUMMARY

4. TREATED WATER INSTANTANEOUS PEAK FLOW (L/s)

MONTH DAY	January L/s	February L/s	March L/s	April L/s	May L/s	June L/s	July L/s	August L/s	September L/s	October L/s	November L/s	December L/s	
1	2121.41	1955.21	2107.64	1977.89	2151.85	2184.61	2156.25	2200.35	2245.49	2220.72	2120.14	2103.24	
2	1184.84	1218.75	2152.89	1929.28	2118.98	2135.88	4050.93	2426.27	2206.02	2176.74	2140.51	2076.16	
3	1268.52	2161.92	2155.21	2138.31	2131.48	2137.15	2148.38	2604.63	2152.89	2434.26	2113.43	2106.71	
4	2150.69	2197.11	1983.56	2147.22	2184.49	2120.14	2680.44	2169.91	2085.19	2375.35	2117.94	1251.50	
5	1146.53	2166.44	2068.29	2146.18	1293.29	2164.24	2675.93	2191.32	2329.05	2129.28	2102.08	2130.21	
6	2111.11	2218.40	2120.14	2152.89	2148.38	2224.07	2647.69	2196.99	2212.73	2155.09	2091.90	1335.19	
7	2207.18	1283.10	2062.50	2052.31	2084.03	2227.43	2116.78	2069.33	2132.64	2183.45	2120.14	2121.30	
8	1162.27	2152.89	2143.87	2122.45	2148.26	2195.83	2151.74	2594.44	2280.44	2180.09	2109.95	2120.02	
9	2204.98	2141.67	2201.50	2149.54	2157.29	2215.05	2687.15	2653.13	2279.40	2125.81	2097.57	2140.51	
10	1172.45	1289.81	2136.00	2128.01	2618.29	2640.86	2681.48	2648.61	2285.07	2128.13	1946.30	1293.29	
11	1215.39	2134.72	2128.01	1963.19	2505.32	2583.33	2644.10	2177.66	2613.77	2466.90	1134.03	2093.06	
12	2126.85	1249.31	2116.78	1964.35	2106.71	2680.44	2636.34	2614.81	2640.74	2103.24	2675.93	2130.32	
13	1280.79	2152.78	2099.77	2137.15	2198.26	2684.95	2675.93	2611.46	2223.96	2484.95	2142.82	2168.75	
14	2137.04	2147.11	2137.15	2141.67	2121.30	2643.06	2133.68	2220.72	2149.54	2102.20	2080.67	2442.13	
15	1249.31	1886.46	2166.55	2117.82	2653.36	2643.06	2585.42	2142.71	2226.27	2173.15	2097.57	2226.27	
16	2123.61	2194.68	2176.74	2115.63	2631.83	2181.13	2657.64	2630.67	2138.19	2153.94	2081.71	1266.20	
17	2085.19	2139.35	2112.50	2093.06	2131.48	2265.74	2146.18	2647.69	2200.23	2549.42	2160.88	2165.28	
18	2132.64	2089.58	2191.32	2145.95	2141.67	2212.73	2164.24	2139.24	2402.55	2571.88	2219.44	2107.75	
19	2135.88	2112.27	2143.75	2168.75	2128.01	2185.65	2261.34	2196.99	2313.31	2199.19	2120.25	2043.29	
20	2138.19	2137.04	2126.97	2165.28	2194.56	2592.25	2218.40	2542.59	2339.24	2210.53	2190.16	1984.61	
21	1146.53	2180.09	2199.19	2051.16	2270.25	2647.57	2622.57	2160.88	2582.18	2113.43	2583.22	2172.11	
22	2184.61	2097.57	2169.91	2158.56	2160.88	2637.38	2618.17	1932.64	2621.64	2090.86	2535.88	2172.11	
23	2153.94	2099.88	2112.27	2126.97	2126.85	3108.33	2164.24	2354.05	1922.57	2534.61	2081.71	1267.36	
24	2036.57	2045.60	2157.41	2178.94	2059.26	2203.70	2150.69	4050.93	2086.34	501.50	1203.01	1285.42	
25	2006.13	1174.77	2095.37	2649.88	2111.23	2170.95	2174.42	2343.87	2081.83	2575.35	2141.67	1269.68	
26	1197.34	2166.55	2132.64	2591.20	2149.54	2093.06	2643.17	2264.70	2136.00	2577.55	2063.66	1278.70	
27	1152.08	2160.88	2140.51	2133.68	2238.66	2152.78	2203.70	2185.65	2107.64	2096.53	2128.13	2072.69	
28	2163.08	2116.67	2101.04	2132.64	2165.28	2212.85	2643.06	2177.78	2062.50	2130.32	2132.64	1406.25	
29	1304.63		2184.38	2116.78	2185.76	2186.81	2623.84	2178.94	1947.45	2166.44	2106.60	1253.70	
30	1215.39		2177.66	2225.23	2136.92	2213.77	2636.34	2163.08	2439.70	2118.98	2152.89	1257.18	
31	2219.56		2051.27		2216.20		2621.64	2229.75		2127.89		2078.36	
Total	54,135	55,071	66,053	64,322	67,670	70,545	77,222	73,722	67,445	68,158	62,993	56,819	784,153
Minimum	1,147	1,175	1,984	1,929	1,293	2,093	2,117	1,933	1,923	502	1,134	1,252	502
Maximum	2,220	2,218	2,202	2,650	2,653	3,108	4,051	4,051	2,641	2,578	2,676	2,442	4,051
Average	1,746	1,967	2,131	2,144	2,183	2,351	2,491	2,378	2,248	2,199	2,100	1,833	2,148

Note: (i) As per the water system's current Municipal Drinking Water Licence, the rated capacity of the Water Treatment Plant is 340.0 million litres/day. This converts to 3935 litres/second. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

Drinking-Water System Number:	210000791
Drinking-Water System Name:	**Lake Huron Primary Water Supply System**
Drinking-Water System Owner:	Lake Huron Primary Water Supply System Joint Board of Management
Drinking-Water System Operating Authority:	Ontario Clean Water Agency (OCWA)
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2017 through December 31, 2017

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people?
Yes [X] No [ ]

Is your annual report available to the public at no charge on a web site on the Internet?
Yes [X] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

Lake Huron and Elgin Area Water Supply Systems
c/o Regional Water Supply Division
235 North Centre Road, Suite 200
London, ON N5X 4E7
https://huronelginwater.ca/

Lake Huron Water Treatment Plant
71155 Bluewater Hwy.
Grand Bend, ON

Complete for all other Categories.

Number of Designated Facilities served: N/A

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to: N/A

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Systems that receive their drinking water from the LHPWSS:

Drinking Water System Name	Drinking Water System Number
City of London	260004917
Municipality of Bluewater	260006542
Municipality of Lambton Shores (East Lambton Shores Water Distribution System)	260006568
Township of Lucan-Biddulph	260003071
Municipality of Middlesex Centre (Middlesex Centre Distribution System)	260004202
Municipality of North Middlesex	260006529
Municipality of Strathroy-Caradoc (Strathroy- Caradoc Distribution System)	260080106
Municipality of South Huron (South Huron Water Distribution System)	220001520

Systems that may receive their drinking water from the LHPWSS:

Drinking Water System Name	Drinking Water System Number
Municipality of Lambton Shores (West Lambton Shores Distribution System) *Normally supplied by the Lambton Area Water Supply System (LAWSS) but a connection to the LHPWSS exists	260006581

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [X] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

[X] Public access/notice via the web
[X] Public access/notice via Government Office
[ ] Public access/notice via a newspaper
[X] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[X] Public access/notice via other method ____News Release

Describe your Drinking-Water System

The Lake Huron Water Treatment Plant (WTP) employs pre-chlorination, screening, powder activated carbon addition (seasonally on an as-required basis), coagulation, flocculation, sedimentation, dual-media filtration, post-chlorination, and pH adjustment using sodium hydroxide to treat raw water obtained from Lake Huron. The WTP intake crib and raw water intake pipe have an estimated gross capacity of 454.6 Megalitres/day (MLD). The WTP rated capacity is 340.0 MLD.

A Residuals Management Facility (RMF) providing equalization, clarification, sludge thickening and dechlorination is also housed in the main complex where thickened sludge is dewatered by centrifuges and sludge cake is sent to the landfill for final disposal. Clarified and dechlorinated liquid streams are sent back to Lake Huron through the plant drain via the Diversion Chamber.

The distribution system is comprised of the McGillivray Booster Pumping Station and Reservoir, the Exeter-Hensall Booster Pumping Station and Reservoir, the Arva Terminal Reservoir, the Komoka-Mt. Brydges Booster Pumping Station (PS#4) and the associated interconnecting transmission water mains, which includes the primary, Strathroy, Exeter-Hensall, and Komoka-Mt. Brydges transmission water mains.

The drinking water system is monitored at various locations throughout the system via a Supervisory Control and Data Acquisition (SCADA) system.

List all water treatment chemicals used over this reporting period

Filter Aid Polymer (on an as-required basis)
Aluminum Sulphate
Powder Activated Carbon
Chlorine Gas
Sodium Hydroxide
Sodium Hypochlorite (Exeter Hensall Pumping Station)
Dewatering Polymer (Residuals Management Facility)
Sodium Bisulphite (Residuals Management Facility)

Were any significant expenses incurred to?

[X] Install required equipment
[X] Repair required equipment
[X] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Capital Projects:

- Electrical upgrade and primary transformers replacement
- Residuals Management Facility (RMF) HVAC upgrade
- Instrumentation replacements
- Travelling screen #2 replacement
- Low lift motors #3 and #4 replacement
- Installed chlorine tonner automatic actuators
- Filters #1 and #4 rebuilds

- Distribution flow meter replacements
- Powder activated carbon (PAC) dust collector replacement
- SCADA hardware and software upgrade
- Concrete crack injection
- Drain piping replacement
- Distressed Pipe #32-48 replacement and Acoustic Fiber Optic (AFO) monitoring cable retrieval

Maintenance Projects:

- Low lift grit pump drain manifold and valves replacement
- Installed RMF sludge pump traps
- Gore Road pressure reducing valve (PRV) rebuild
- Reservoir hatch replacements (McGillivray and Arva Reservoir)
- Security camera replacement
- Replaced air relief valves at various chambers
- Air valve chamber restoration
- Installed new motors on powder activated carbon (PAC) pumps #1 and #3
- Replaced raw water sample pump
- Installed actuator on south centrifuge auger
- Installed new inlet pressure readouts at Monitoring Station #1 – Strathroy-Caradoc
- Backwash pump #1 rebuild
- Replaced chlorine injector quills at Exeter Hensall Pumping Station
- High pressure caustic soda pump rebuild and motor replacement
- PAC pump variable frequency drive (VFD) replacement
- Service water pump #2 rebuild
- Rebuilding of RMF sludge transfer pumps
- Modifications to generators to meet Technical Standards and Safety Authority (TSSA) requirements

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
NA	NA	NA	NA	NA	NA

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Results (CFU/100mL) (min #)-(max #)	Range of Total Coliform Results (CFU/100mL) (min #)-(max #)	Range of HPC Results (CFU/1mL) (min #)-(max #)
Raw Water	101	(0)-(<100)	(0)-(40,000)	(<10)-(>2,000)
Treated Water (WTP)	250	(0)-(0)	(0)-(0)	(<10)-(730)
Distribution (McGillivray PS)	52	(0)-(0)	(0)-(0)	(<10)-(20)
Distribution (North Exeter)	52	(0)-(0)	(0)-(0)	(<10)-(20)
Distribution (South Exeter)	52	(0)-(0)	(0)-(0)	(<10)-(10)
Distribution (Exeter-Hensall Reservoir)	52	(0)-(0)	(0)-(0)	(<10)-(110)
Distribution (Komoka-Mt. Brydges PS)	52	(0)-(0)	(0)-(0)	(<10)-(240)

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

Parameter	Number of Grab Samples	Range of Results (min #)-(max #)
Treated Water Free Chlorine (mg/L)	Continuous Monitoring	(0.57) – (1.79)
	2116	(0.86) - (1.63)
Treated Water Turbidity (NTU)	Continuous Monitoring	(0.019) – (2.00)
	2117	(0.018) - (0.099)
Filter #1 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.007) - (0.306)
Filter #2 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.015) - (0.393)
Filter #3 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.021) - (0.249)
Filter #4 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.019) - (0.192)
Filter #5 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.021) - (0.255)

Filter #6 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.019) - (0.186)
Filter #7 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.021) - (0.437)
Filter #8 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.017) - (0.165)
Filter #9 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.020) - (0.249)
Filter #10- Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.019) - (0.144)
Filter #11- Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.012) - (0.608)
Filter #12- Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.009) - (0.723)
Combined Filtered Water Turbidity (NTU)	2114	(0.018) - (0.100)

Summary of Inorganic parameters tested during this reporting period
*(*All tests were conducted on treated water leaving the WTP unless otherwise noted)*

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	January 12, 2017	0.00012	mg/L	NO
Arsenic	January 12, 2017	0.0002	mg/L	NO
Barium	January 12, 2017	0.0148	mg/L	NO
Boron	January 12, 2017	0.013	mg/L	NO
Cadmium	January 12, 2017	0.000005	mg/L	NO
Chromium	January 12, 2017	0.00065	mg/L	NO
Lead *(Komoka Mt-Brydges Monitoring Station #2)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected 0.00005 Not Detected 0.00002	mg/L mg/L mg/L mg/L	NO
Mercury	January 12, 2017	Not Detected	mg/L	NO
Selenium	January 12, 2017	0.00011	mg/L	NO

Sodium	January 12, 2017	11.4	mg/L	NO
Uranium	January 12, 2017	0.000024	mg/L	NO
Fluoride	NA	Not Tested	mg/L	--
Nitrite	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected Not Detected Not Detected Not Detected	mg/L mg/L mg/L mg/L	NO
Nitrate	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	0.290 0.700 0.346 0.281	mg/L mg/L mg/L mg/L	NO

Summary of Organic parameters sampled during this reporting period or the most recent sample results
*(*All tests were conducted on treated water leaving the WTP unless otherwise noted)*

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	January 12, 2017	Not Detected	mg/L	NO
Atrazine + N-dealkylated metabolites	January 12, 2017	0.00003	mg/L	NO
Azinphos-methyl	January 12, 2017	Not Detected	mg/L	NO
Benzene	January 12, 2017	Not Detected	mg/L	NO
Benzo(a)pyrene	January 12, 2017	Not Detected	mg/L	NO
Bromoxynil	January 12, 2017	Not Detected	mg/L	NO
Carbaryl	January 12, 2017	Not Detected	mg/L	NO
Carbofuran	January 12, 2017	Not Detected	mg/L	NO
Carbon Tetrachloride	January 12, 2017	Not Detected	mg/L	NO
Chlorpyrifos	January 12, 2017	Not Detected	mg/L	NO
Diazinon	January 12, 2017	Not Detected	mg/L	NO
Dicamba	January 12, 2017	Not Detected	mg/L	NO
1,2-Dichlorobenzene	January 12, 2017	Not Detected	mg/L	NO
1,4-Dichlorobenzene	January 12, 2017	Not Detected	mg/L	NO
1,2-Dichloroethane	January 12, 2017	Not Detected	mg/L	NO

1,1-Dichloroethylene (vinylidene chloride)	January 12, 2017	Not Detected	mg/L	NO
Dichloromethane	January 12, 2017	Not Detected	mg/L	NO
2-4 Dichlorophenol	January 12, 2017	Not Detected	mg/L	NO
2,4-Dichlorophenoxy acetic acid (2,4-D)	January 12, 2017	Not Detected	mg/L	NO
Diclofop-methyl	January 12, 2017	Not Detected	mg/L	NO
Dimethoate	January 12, 2017	Not Detected	mg/L	NO
Diquat	January 12, 2017	Not Detected	mg/L	NO
Diuron	January 12, 2017	Not Detected	mg/L	NO
Glyphosate	January 12, 2017	Not Detected	mg/L	NO
Haloacetic Acids (HAA's) *(Arva Reservoir)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected Not Detected 0.0074 0.0070	mg/L mg/L mg/L mg/L	NO
Haloacetic Acids (HAA's) *(Arva Reservoir)* **Annual Running Average**	2017	0.0036	mg/L	NO
Haloacetic Acids (HAA's) *(Exeter-Hensall Monitoring Station #3)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected 0.0131 0.0173 0.0237	mg/L mg/L mg/L mg/L	NO
Haloacetic Acids (HAA's) *(Exeter-Hensall Monitoring Station #3)* **Annual Running Average**	2017	0.0135	mg/L	NO
Haloacetic Acids (HAA's) *(Komoka Mt-Brydges Monitoring Station #2)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected Not Detected 0.0084 0.0158	mg/L mg/L mg/L mg/L	NO

Haloacetic Acids (HAA's) *(Komoka Mt-Brydges Monitoring Station #2)* **Annual Running Average**	2017	0.0061	mg/L	
Haloacetic Acids (HAA's) *(Strathroy-Caradoc Monitoring Station #2)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	Not Detected Not Detected 0.0089 0.0096	mg/L mg/L mg/L mg/L	NO
Haloacetic Acids (HAA's) *(Strathroy-Caradoc Monitoring Station #2)* **Annual Running Average**	2017	0.0046	mg/L	NO
Malathion	January 12, 2017	Not Detected	mg/L	NO
2-Methyl-4-chlorophenoxyacetic acid	January 12, 2017	Not Detected	mg/L	NO
Metolachlor	January 12, 2017	Not Detected	mg/L	NO
Metribuzin	January 12, 2017	Not Detected	mg/L	NO
Monochlorobenzene	January 12, 2017	Not Detected	mg/L	NO
Paraquat	January 12, 2017	Not Detected	mg/L	NO
Pentachlorophenol	January 12, 2017	Not Detected	mg/L	NO
Phorate	January 12, 2017	Not Detected	mg/L	NO
Picloram	January 12, 2017	Not Detected	mg/L	NO
Polychlorinated Biphenyls (PCB)	January 12, 2017	Not Detected	mg/L	NO
Prometryne	January 12, 2017	Not Detected	mg/L	NO
Simazine	January 12, 2017	Not Detected	mg/L	NO
Total Trihalomethanes *(Arva Reservoir)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	0.014 0.016 0.030 0.027	mg/L mg/L mg/L mg/L	NO
Total Trihalomethanes (THMs) *(Arva Reservoir)* **Running Annual Average**	2017	0.0218	mg/L	NO

Total Trihalomethanes *(Exeter-Hensall Monitoring Station #3)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	0.026 0.024 0.046 0.054	mg/L mg/L mg/L mg/L	NO
Total Trihalomethanes *(Exeter-Hensall Monitoring Station #3)* **Running Annual Average**	2017	0.0375	mg/L	NO
Total Trihalomethanes *(Komoka Mt-Brydges Monitoring Station #2)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	0.017 0.017 0.036 0.037	mg/L mg/L mg/L mg/L	NO
Total Trihalomethanes *(Komoka Mt-Brydges Monitoring Station #2)* **Running Annual Average**	2017	0.0268	mg/L	NO
Total Trihalomethanes *(Strathroy-Caradoc Monitoring Station #2)*	January 12, 2017 April 13, 2017 July 17, 2017 October 5, 2017	0.017 0.017 0.033 0.031	mg/L mg/L mg/L mg/L	NO
Total Trihalomethanes *(Strathroy-Caradoc Monitoring Station #2)* **Running Annual Average**	2017	0.0245	mg/L	NO
Terbufos	January 12, 2017	Not Detected	mg/L	NO
Tetrachloroethylene	January 12, 2017	Not Detected	mg/L	NO
2,3,4,6-Tetrachlorophenol	January 12, 2017	Not Detected	mg/L	NO
Triallate	January 12, 2017	Not Detected	mg/L	NO
Trichloroethylene	January 12, 2017	Not Detected	mg/L	NO
2,4,6-Trichlorophenol	January 12, 2017	Not Detected	mg/L	NO
Trifluralin	January 12, 2017	Not Detected	mg/L	NO
Vinyl Chloride	January 12, 2017	Not Detected	mg/L	NO

NOTE: *During 2017, no Inorganic or Organic parameter(s) exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.*

APPENDIX C - MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE INSPECTION SUMMARY

Ministry of the Environment Climate Change (MOECC) Inspection Report – Issued January 18, 2018

Summary of Non-compliance

#	MOECC Inspection Module	MOECC Non-compliance (Summary)	Corrective Action Required by MOECC (Summary)
NC #1	Treatment Process Monitoring	During review of the sampling and testing records made by continuous monitoring equipment at the LHPWSS for those parameters set out in O. Reg. 170/03 Schedule 6-4 (2), it was found that continuous monitoring had typically been performed to meet the requirements of O. Reg.170/03 Schedule 6-5. However, the Owner/Operating Authority failed to ensure that continuous monitoring and recording met with the minimum testing frequency as prescribed by O. Reg.170/03 Schedule 6-5. Documentation provided indicates that on May 9, 2017 the OIC acknowledged a turbidity effluent meter fault alarm on filter number 8 at 18:20. Records provided demonstrate that the filter was operational directing water flow through the treatment train, and not recording any data due to a lamp failure from approximately 18:20 to 23:35. At 23:35 the OIC discovered the loss of data during the review and took corrective actions to removed filter 8 from service.	In accordance with O. Reg. 170/03, Schedule, 6-5 (1) the Owner/Operating Authority of the LHPWSS shall forthwith ensure that all continuous monitoring equipment used for sampling and testing that is required under this regulation is monitoring, testing, and recording the parameter with at least the minimum frequency specified, including the date, time and location of the sample. The Owner/Operating Authority has implemented clear and concise protocols to ensure staff responsible for the operations and maintenance of the drinking water system is provided with direction regarding the following: • provide adequate training to all operations and maintenance staff to include all regulatory compliance related issues; record keeping mechanisms and continuous monitoring requirements as prescribed in the Municipal Drinking Water Licence or other applicable legislation. The Owner/Operating Authority forwarded a copy of the aforementioned protocols to the author of this report on May 29, 2017. No further actions required.

#	MOECC Inspection Module	MOECC Non-compliance (Summary)	Corrective Action Required by MOECC (Summary)
NC #2	Reporting & Corrective Actions	On May 9, 2017 the OIC acknowledged a turbidity effluent meter fault alarm at 18:20 on filter number 8. The OIC failed to take corrective action at the time to inspect the operation of the turbidity unit. Documentation provided indicates that on May 9, 2017 the OIC acknowledged a turbidity effluent meter fault alarm on filter number 8 at 18:20. Records provided demonstrate that the filter was operational directing water flow through the treatment train, and not recording any data due to a lamp failure from approximately 18:20 to 23:35. At 23:35 the OIC discovered the loss of data during the review and took corrective actions to removed filter 8 from service. Based on these findings the OIC failed to take appropriate corrective actions as per O. Reg. 170/03 Schedule 6-5. (1) s. 5. "The continuous monitoring equipment must be designed and operated in accordance with the standards described in subsection, ii. if the continuous monitoring equipment malfunctions or loses power or a test result for a parameter is above the maximum alarm standard or below the minimum alarm standard specified in the Table to this section for the parameter, a person who is qualified to examine test results under paragraph 3 takes appropriate action at the location where tests are conducted before water is	In accordance with O. Reg. 170/03, Schedule, 6-5 (1) the Owner/Operating Authority of the LHPWSS shall forthwith ensure that all continuous monitoring equipment used for sampling and testing that is required under this regulation is monitoring, testing, and recording the parameter with at least the minimum frequency specified, including the date, time and location of the sample. The Owner/Operating Authority has implemented clear and concise protocols to ensure staff responsible for the operations and maintenance of the drinking water system is provided with direction regarding the following: • provide adequate training to all operations and maintenance staff to include all regulatory compliance related issues; record keeping mechanisms and continuous monitoring requirements as prescribed in the Municipal Drinking Water Licence or other applicable legislation. The Owner/Operating Authority forwarded a copy of the aforementioned protocols to the author of this report on May 29, 2017. No further actions required.

#	MOECC Inspection Module	MOECC Non-compliance (Summary)	Corrective Action Required by MOECC (Summary)
		again directed to users of water sampled by the equipment."	