

January 20, 2020



The Mayor and Members of Council
City of Elliot Lake
Municipal Office
45 Hillside Drive North
Elliot Lake, Ontario P5A 1X5

ATTENTION: Mayor and Member of Council

**RE: ELLIOT LAKE WATER TREATMENT PLANT SUMMARY REPORT FOR
MUNICIPALITIES: Municipal Large Residential**

Your Worship Mayor Marchisella and Members of Council:

Please find attached, the 2019 Summary Report for the Elliot Lake Water Treatment Plant. This report has been prepared in accordance to the guidelines set out in Schedule 22 of the Safe Drinking Water Act, 2002 (Ontario Regulation 170/03).

The report covers the period from January 1, 2019 to December 31, 2019.

Please direct any questions or concerns to the undersigned.

Yours truly,

A handwritten signature in black ink, appearing to read "Daryl Halloch". The signature is written in a cursive style with a large initial "D".

Daryl Halloch
Director of Public Works

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Elliot Lake Water Treatment Plant 2019 Summary Report

1. PURPOSE

The purpose of the Water Treatment Plant Summary Report is to provide information to Council and Residents of the City of Elliot Lake, as well as satisfying the regulatory requirements of the Safe Drinking Water Act (SDWA) including the Drinking Water Quality Management System (DWQMS)

This report is prepared in accordance with Schedule 22 of Regulation 170/03 of Ontario's Safe Drinking Water Act and ensures that no later than March 31st a summary report is prepared and presented to Municipal Council and covers the reporting period from January 1, 2019 to December 31, 2019.

2. SYSTEM DESCRIPTION

The City of Elliot Lake Water Treatment Plant is classified as a Class 2 direct filtration plant. Water is drawn from Elliot Lake through an intake structure, located in approximately 12.2 m (40 ft.) of water and is gravity fed through a 295 m long marine pipeline to the low lift pumping station wet well. The water is then pumped to the main facility at 200 Spine Road. The raw water then passes through a flow meter and into reactor/mixing tanks. At this point Polyaluminum Chloride (PAC) is added to the process to aid in the production of floc. The water then continues into the hydraulic spiral flow flocculation tanks and afterwards passes through three rectangular filters with dual media (anthracite/sand). The filtered water is collected in an underdrain system and enters a 2,300 m³ Clearwell (storage reservoir) on site. Chlorine is added to the treated water as it leaves the filters to achieve required disinfection. Fluoride is also added at this point. Fluoride does not play a role in the treatment process, but rather acts as an agent in the prevention of tooth decay in young children. High Lift pumps pump the now treated water from the Clearwell through a flow meter and into the distribution system. This treated water makes its way to consumers' homes, either directly or from the standpipe storage facilities. Lime is added to the water as it leaves the plant to aid in the prevention of corrosion in the distribution system. The lime is also used for pH and alkalinity adjustment.

The City of Elliot Lake has highly trained staff that specializes in operating and maintaining a water treatment plant, distribution system, a booster station and two elevated water storage tanks (standpipes) with a total storage volume of approximately 9400 m³. Water is supplied to customers by approximately 130km of water main ranging from 150mm to 600mm pipe mainly through ductile iron and cast iron and areas with PVC piping. There are approximately 428 fire hydrants located within the system. As well there are 192 metered accounts and approximately 6500 service connections.

3. Compliance Reporting

The owner and operating authority shall ensure that any person authorized to carry out work on or to operate any aspect of the drinking water system has been informed of the SDWA, and all applicable regulations made in accordance with that act, as well as any other licenses or permits.

3.1 Elliot Lake Drinking Water System

Section 18 of the Safe Drinking Water Act requires the system operator to report adverse test results or conditions immediately after the result is obtained or situation identified. A test result is considered adverse when the sample being tested fails to meet the prescribed drinking water standards. Limits for all parameters being tested under the Acts and Regulations are identified under the various Regulations associated with the Safe Drinking Water Act, 2002.

The Elliot Lake Drinking Water System had a Ministry of Environment, Conservation and Parks (M.E.C.P.) inspection in 2019. The system received a mark of 90.39%. There were 4 non-compliances detected during the inspection:

- Operations manuals and SCADA system were required and needed to be updated
- Notifications of adverse water quality was not immediately reported
- Calibration of analyzers were not recorded
- Lead sampling test was missed in distribution system

All chemicals and materials used in the operation of the drinking water system that came into contact with water met all applicable standards set by American Water Works Association (AWWA) and the American National Standard Institute (ANSI) safety criteria standards NSF/60, NSF/61 and NSF/372.

Flow measurement equipment required to record the volume of water taken from the Intake and effluent discharged to the distribution system are verified on a monthly basis and calibrated on an annual basis by a third party.

On-Stream analyzers such as chlorine, pH and turbidity are verified and cleaned on a monthly basis and calibrated by a third party on an annual basis.

3.2 Elliot Lake Distribution System

The Elliot Lake Distribution System was maintained to ensure quality drinking water to consumers. The following operations were done in 2019:

- Annual water flushing in the spring and fall of 2019. Records of the flow test and pressures were recorded. As well valves were exercised and their locations recorded.
- There were 20 instances of adverse water quality incidents in 2019 where reports were made to the Health Unit and Spills Action Centre in accordance with Section 18 of the Safe Drinking Water Act. There were 13 for water main repairs/replacement, 2 for hydrant repairs causing low pressures, 1 for a low chlorine residual in the distribution system, 2 for microbiological sample adverse results and an ongoing adverse with the fluoride analyzer. **(See Table 3 adverse water reports)**
- There were 14 documented water quality complaints ranging from taste and odour to discoloration and pressure issues.

3.3 Permit to Take Water

- The Elliot Lake Water Treatment Plant was issued the current Permit to Take Water November 24, 2015 and expires on December 1st, 2025. This permit allows the maximum of 19,722 liters per minute and 18,184,000 liters per day. There were no exceedances to report for the 2019 summary report. **(See table 2 for flow rates)**

3.4 Drinking Water License

- The City of Elliot Lake Drinking Water License was issued on July 27th, 2016 and expires on June 26th, 2021. This license allows a maximum daily volume of treated water that flows from the treatment plant to the subsystem to not exceed 28,400 m³/day. This maximum rated capacity was not exceeded during the 2019 reporting period.

3.5 Lead Sampling

- Lead sampling was conducted as required by O. Reg 170/03 Schedule 15.1 in December at 4 locations in the distribution system. The results were not in exceedance.

4. Regulatory Inspection

The Ministry of Environment, Conservation and Parks (M.E.C.P) carried out a facility inspection September 24th, 2019. Below is a summary of Non-Compliance Issues under the Safe Drinking Water Act (SDWA), Municipal Drinking Water Licenses (MDWL), Drinking Water Works Permits (DWWPs), Permits to Take Water (PTTW) and the Ontario Water Resources Act (OWRA) As per the final inspection report received on November 20th 2019 the following Non-Compliance issues were found and part of our requirement is to determine a timeline and action as when they will be addressed. The final Inspection rating was 90.39%.

The following items will and/or have been addressed:

4.1. All continuous analyzers were not calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation. Schedule 6, Regulation 170 requires a check and calibration of continuous analyzers (chlorine and turbidity)

As per the regulation the checks of the analyzer is to be recorded whenever maintenance or calibration is performed.

As of November we have taken a course in log book entry as part of our mandatory training to ensure that staff revisits the importance of data entry. Staff is also now using a back-up system in a work order schedule and assigning the duties to operations staff.

This Non Compliance item has been addressed immediately.

4.2. The Operations and Maintenance manuals did not meet the requirements of the Drinking Water Works Permit and Municipal Drinking Water License issued.

The Standard Operating Procedures are currently being put together for the Water Plant and the SCADA system. The time frame of April 2020 will be sufficient to complete these.

The programmers have resolved the issue with data collection on the SCADA system and daily reports are printed out.

4.3. All required notifications of adverse water quality incidents were not reported immediately as per O.Reg170/03 16-6.

Operations staff has been made aware of the importance of both log book entry and reporting of exceedances to the proper authorities.

As for the addition of fluoride in our drinking water we have immediately shut the system down as we are not able to ensure the accuracy of the on-stream analyzer.

We have talked to the Algoma Health Unit as well as the Ministry of Environment about this issue and explained that there will be a "Town Hall Meeting" discussing the addition of fluoride in our drinking water. This is scheduled to happen in the first quarter of 2020.

4.4. Chemical addition compliance issues

- Lime Addition System

The lime as discussed during the inspection affects the reading of the fluoride analyzer. This has caused issues with readings greater than the 1.5 mg/L on the on-stream analyzer. The City of Elliot Lake Water Treatment Plant has decided to shut down the Fluoride System until we can ensure readings are accurate and not influenced by the addition of lime.

The following are timelines for the Fluoride System:

Fluoride System was shut down October 21st 2019 AWQI #148664

Costing for a new analyzer was obtained and is \$15000.

Discussions were held regarding the elimination of fluoride and a Town Hall Meeting will be held in the first quarter of 2020.

- Poly Aluminum Chloride

The bench testing for aluminum was performed daily during the month of November. Testing will continue on a minimum of a weekly basis.

- Lead Sampling

Lead sampling has been scheduled and as of December 3rd the first round has been completed from four locations in the distribution system for Lead, pH and alkalinity. The second round will be in the June-October 2020 period.

5. Identified Terms and Conditions

The Elliot Lake Water Treatment Plant meets the requirement of the Ontario “Drinking Water Standards.” Disinfection of treated water is achieved as per Ministry Procedure B13-3. Required CT was continuously monitored and met at all times ensuring that appropriate levels of disinfection were attained.

Backwash water discharge suspended solids sampling was conducted monthly. The annual average was 17.6 mg/L, which is below the required 25 mg/L annual average.

6. Drinking Water Quality management System (DWQMS)

The Quality Management System (QMS) consists of an Operational Plan that defines and documents the various policies and procedures with respect to water quality management which were established to meet the Province of Ontario standards as identified within the Safe Drinking Water Act. The Internal and Managerial Reviews along with a SAI-Global Audit were all completed in 2019 per the requirements outlined in the Operational Plan found in the Drinking Water Quality Management System.

There were 7 non-conformances found during the external audit and they were completed and resolved. **(See Table 4 for Non-Conformance Resolutions)**

The Corporation of the City of Elliot Lake conforms to the requirements and reaccreditation was issued on August 26, 2019 with an expiry date of April 27, 2021.

6.1 Operations and Maintenance:

Review and Provision of Infrastructure:

Element 14 of the DWQMS 2.0 requires that an annual review of the Drinking Water System’s infrastructure is completed. This pertains to the maintenance necessary in order to operate and maintain the City of Elliot Lake Drinking Water system. This review involves information from a ten year Capital Plan that was revised in 2016, that prioritized road projects by the shape of the infrastructure below them such as water mains. Element 14 requires that the Operating Authority carry out the review and provide a report to the owner. This ensures that the owner is regularly informed of infrastructure needs and can plan accordingly.

Element 15 of the DWQMS maintains a program of the maintenance, rehabilitation and renewal for the infrastructure. The effectiveness of the maintenance system is relayed to the owner in a summary report under Section 22 of Ont. Reg 170/03. Monitoring the effectiveness of the maintenance program is achieved by periodically reviewing the maintenance program and ensuring its effectiveness.

7. Documentation:

Contingency plans, Standard Operating Procedures, the Operational Plan and the Drinking Water Quality Management Standard documents which provide guidance in the event of emergencies, upset conditions and breakdowns are located in the office at the Elliot Lake Water Treatment Plant. Detailed drawings of the facility are centrally located in the control room.

8. Conclusion

The Elliot Lake Water plant has sufficient capacity to treat and distribute projected flows for the foreseeable future. Ongoing plant improvement will likely be necessary during the 2020 planning period due to structure and equipment age. There were no instances of treated water flows exceeding the rated capacity in the Municipal Drinking Water License.

The Elliot Lake Water Treatment Plant was operated in compliance within the conditions of the Municipal Drinking Water License (MDWL), Permit to Take Water (PTW), Drinking Water Works Permit (DWWP) as well as other regulations.

Table 1: Treated Water Annual Quantities and Flow Rates: Maximum 28,400 (m3) per day

MONTH	Minimum Flow / Day (M ³)	Maximum Flow / Day (M ³)	Average Flow / Day (M ³)	Instantaneous Peak flow (L/s)	Total Flow (M ³)
January	6,261	10,154	8,132	180.27	264,383
February	8,006	10,607	9,263	168.47	272,024
March	8,072	11,137	9,022	180.79	293,010
April	7,660	10,769	9,357	161.36	295,212
May	6,112	9,887	8,406	239.48	275,656
June	5,472	9,802	8,127	175.77	256,795
July	5,853	10,011	8,385	183.16	272,728
August	5,041	9,115	7,719	174.03	250,063
September	5,086	8,486	6,630	197.47	209,058
October	5,217	8,340	7,022	170.39	229,577
November	6,053	8,271	7,210	162.32	228,658
December	6,632	9,259	7,992	183.66	253,173
Minimum	5,041	8,271	6,630	161.36	209,058
Maximum	8,072	11,137	9,357	239.48	295,212
Average	6,289	9,653	8,105	181.43	258,361
Total Flow for 2019					3,100,337

Comparison of Maximum Daily Flow to Rated Capacity 2019 for Treated Water

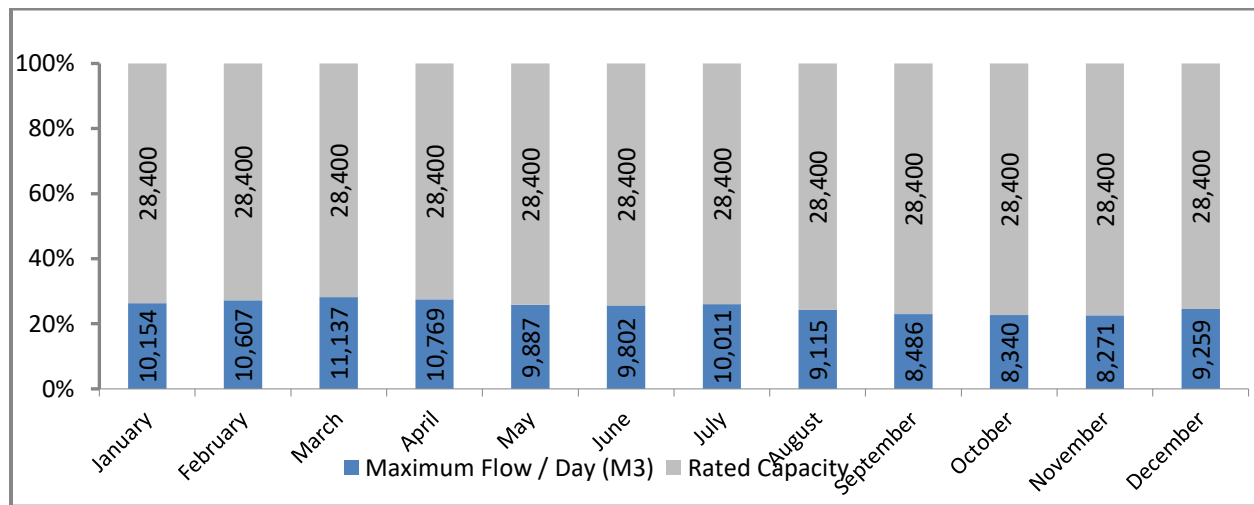


Table 2: Raw Water Annual Quantities and Flow Rates: Maximum 18,184 (m3) per day

MONTH	Minimum Flow / Day (M ³)	Maximum Flow / Day (M ³)	Average Flow / Day (M ³)	Instantaneous Peak flow (L/s)	Total Flow (M ³)
January	7272.00	11201.35	9257.60	242.76	286985.75
February	8899.92	11712.47	10127.08	239.38	283558.22
March	8849.04	10795.14	9792.05	252.02	303553.57
April	8702.50	11583.38	10336.85	251.18	310105.48
May	6969.53	11060.69	9308.35	238.22	288558.84
June	6165.28	10669.00	8936.85	232.86	268105.54
July	6561.70	11077.90	9098.30	244.11	282047.80
August	5733.80	9854.30	8374.50	299.88	259608.10
September	5742.20	9335.80	7387.70	243.39	221630.70
October	5750.30	9002.15	7743.78	210.26	240057.10
November	6655.33	9381.00	8028.81	214.22	240864.30
December	7156.70	10313.80	8839.51	268.48	266868.00
Minimum	5733.80	9002.15	7387.70	210.26	221630.70
Maximum	8899.92	11712.47	10336.85	299.88	310105.48
Average	7038.19	10498.92	8935.95		270995.28
Total Annual Flow in (M3) For 2019					3,251,943.40

Comparison of Maximum Daily Flow to Rated Capacity 2019 for Raw Water

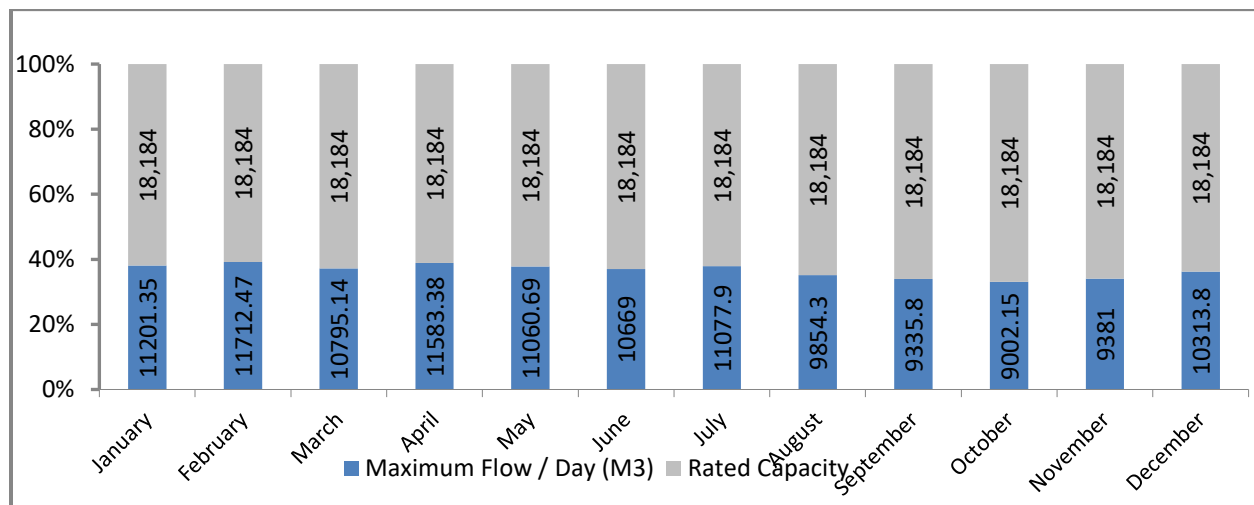


Table 3: Adverse Water Quality Incidents:

Incident Date	Parameter	Results	Unit of Measure	Corrective Action	Corrective Action Date
April-17-19	Sample Result - Microbiological	1 Total Coliform	CFU/100 mL	Re-sample Residence, sample upstream and downstream	April-23-19
May-06-19	Watermain Repair	Pressure Loss	PSI	Drinking Water Advisory – Flush and Two Sets of Samples	May-13-19
June-14-19	Watermain Repair	Pressure Loss	PSI	Drinking Water Advisory – Flush and Two Sets of Samples	June-25-19
June-18-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Aug-16-19
June-24-19	Hydrant Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	June-28-19
July-02-19	Water Isolated for Private Building Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	July-08-19
July-08-19	Installation of Two Hydrants	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	July-15-19
Aug-10-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Aug-16-19
Aug-23-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Aug-29-19
Sept-11-19	Watermain Installation	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Sept-16-19
Sept-26-19	Low Chlorine Residual	0.04	Mg/L	Boil Water Advisory – Flush and Two Sets of Samples	Nov-19-19
Oct-01-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Oct-07-19
Oct-03-19	Sample Result - Microbiological	2 Total Coliform	CFU/100 mL	Boil Water Advisory - Re-sample Residence, sample upstream and downstream	Oct-11-19
Oct-07-19	Watermain Installation	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Oct-12-19
Oct-21-19	Fluoride Analyzer Reading	Analyzer Reading 1.74	Mg/L	Handheld read 0.64 – Fluoride Shut Off	Ongoing
Oct-23-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Oct-31-19
Oct-28-19	Watermain Installation	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Nov-08-19
Oct-31-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Nov-08-19
Nov-29-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of Samples	Dec-09-19
Dec-16-19	Watermain Repair	Pressure Loss	PSI	Boil Water Advisory – Flush and Two Sets of	Dec-20-19

Table 4: Non-Conformance Resolutions

NCR No.	Clause	Description	Status
2019-01	7	Risk Assessment and Risk Assessment Outcomes	Closed
2019-02	8	Risk Assessment and Risk Assessment Outcomes	Closed
2019-03	14	Review and Provision of Infrastructure	Closed
2019-04	15	Infrastructure Maintenance, Rehabilitation and Renewal	Closed
2019-05	19	Internal Audits	Closed
2019-06	20	Management Review	Closed
2019-07	21	Continual Improvement	Closed