



CHAPLEAU DRINKING WATER SYSTEM

2022 ANNUAL COMPLIANCE AND SUMMARY REPORT



Prepared by the Ontario Clean Water Agency
on behalf of the Township of Chapleau

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INTRODUCTION

Municipalities throughout Ontario are required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act, 2002*. The Act was passed following recommendations made by Commissioner O'Conner after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking-water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

O. Reg. 170/03 requires the owner to produce an Annual Report, under Section 11. This report must include the following:

1. Description of system and chemical(s) used
2. Summary of any adverse water quality reports and corrective actions
3. Summary of all required testing
4. Description of any major expenses incurred to install, repair or replace equipment

This Annual Report must be completed by February 28 of each year.

The regulation also requires a Summary Report which must be presented and accepted by Council by March 31 of each year for the preceding calendar year reporting period.

The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any Provincial Officer Order the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The *Safe Drinking Water Act, 2002* and the drinking water regulations can be viewed at the following website: <http://www.e-laws.gov.on.ca>.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report.

1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The two reports have been combined and presented to council as the Annual Compliance and Summary Report.

SECTION 11 ANNUAL REPORT**SYSTEM INFORMATION**

Drinking-Water System Name	CHAPLEAU DRINKING WATER SYSTEM
Drinking-Water System Number	220003494
Drinking-Water System Owner	The Corporation of the Township of Chapleau
Drinking-Water System Category	Large Municipal, Residential System
Population:	1,964
Reporting Period	January 1 to December 31, 2022

REPORT AVAILABILITY

Hard Copy Available at:	Township of Chapleau Municipal Office; 20 Pine Street, P.O. Box 129; Chapleau, ON P0M 1K0
Electronic Copy Available:	http://www.chapleau.ca
Public Notification via:	Public access/notice

DESCRIPTION OF THE DRINKING WATER SYSTEM

The Chapleau Drinking Water System is owned by the Corporation of the Township of Chapleau. The treatment system is operated by the Ontario Clean Water Agency and the distribution system is operated by the Township of Chapleau Public Works Department. This subject system is not interconnected to any other drinking-water systems owned by different owners.

The Chapleau Water Treatment Plant, built in 1975, draws raw water for the municipal system from the Kepsquasheshing River (Chapleau River). Water passes through a concrete screening chamber and then through one of three 500 Imp. Gal. /min low lift pumps in the raw water well. There are no critical upstream or downstream processes relied upon to ensure the provision of safe drinking water.

The raw water is directed to a pre-contact tank where aluminum sulphate (alum) is added as a coagulant, polyelectrolyte (polymer) is added as a coagulant aid and sodium carbonate (soda ash) is added for pH and alkalinity adjustment. The pre-contact tank is also equipped with a chlorine injection line for pre-chlorination if required. After a short residence time, water flows by gravity to one of two clarifier tanks, which are equipped with 30-degree tube settlers and sludge scrapers. Clarified water passes through the upflow settlers and directed into two dual media filters, each comprised of silicate sand and anthracite coal. The filters backwash automatically based on filter runtime or head pressure.

The filtered water is then chlorinated and directed to a series of three reservoirs and three clearwells to provide adequate contact time. The combined storage volume is 1 818 400 litres. Water levels in the clearwells are used to control the plant's production. Two 20 hp high lift

pumps and four 60 hp high lift pumps are utilized in clearwell 1 and 2 to direct treated water to the distribution system. Before entering the distribution system the treated water is dosed with soda ash for pH adjustment and ammonium sulphate to provide secondary disinfection through chloramination.

A diesel generator is connected to allow the treatment plant to remain in operation should a power failure occur. The water treatment process is controlled by a dedicated PLC and monitored through the SCADA computer system.

The distribution system is constructed primarily of ductile iron, and provides fire protection to the Township of Chapleau as well as drinking water. There are no water storage facilities in the distribution system, as storage is incorporated within the treatment plant. Based on the number of service connections, the system is classified as a Large Municipal Drinking Water System.

WATER TREATMENT CHEMICALS USED

The following chemicals were used in the Chapleau Drinking Water System treatment process:

- Aluminum Sulphate (Alum) – Coagulation/Flocculation
- Ammonium Sulfate – Secondary Disinfection
- Chlorine Gas – Primary Disinfection
- Polyelectrolyte (Polymer) - Coagulant Aid
- Sodium Carbonate (Soda Ash) – pH and Alkalinity Adjustment

All treatment chemicals are NSF/ANSI approved.

SIGNIFICANT EXPENSES INCURRED TO THE DRINKING WATER SYSTEM

The following work was completed in 2022:

- Generator servicing
- Sommers Generator repair
- Lifting device inspections
- Header upgrade project
- PLC failure repairs
- SI Lamp Assembly
- Distribution flushing and hydrant maintenance
- Rebuild kits for the chlorinators
- Filter pressure switches
- Chemical mixers
- Spare clearwell venting fans
- Supernatant pump
- Backflow preventer certification
- Turbidity meter repairs
- Fall arrest equipment inspection

- SCBA inspections
- DWQMS third party – External audit
- Clearwell low water issues
- Hot water tank replacement

REPORTED ADVERSE TEST RESULTS AND OTHER PROBLEMS

Sample Date	Details (Parameter, Limit, Result, Corrective Action, Date, etc.)
FEBRUARY 2022	<p>Filter Efficiency Failed (AWQI 157903)</p> <p>Filter 1 turbidity readings were less than or equal to 0.3 NTU in only 94.8% of the measurements in the month</p> <p>Filter 2 turbidity readings were less than or equal to 0.3 NTU in only 94.2% of the measurements in the month</p> <p>Did not meet the performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month (from the Procedure for Disinfection in Drinking Water in Ontario).</p> <p>There was a process upset following a break in the alum pump suction line which required the pumps to be connected to the secondary tank (February 15). The plant did not run without alum addition. From approximately 17:00 on Feb 15 to 14:30 on Feb 20 there were multiple spikes above 0.3 NTU. Turbidity returned to normal on February 23.</p>
MAY 2022	<p>Filter Efficiency Failed (AWQI 158550)</p> <p>Filter 1 turbidity readings were less than or equal to 0.3 NTU in only 80.6% of the measurements in the month</p> <p>Filter 2 turbidity readings were less than or equal to 0.3 NTU in only 78.7% of the measurements in the month</p> <p>Did not meet the performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month (from the Procedure for Disinfection in Drinking Water in Ontario).</p> <p>There was a process upset following spring turnover which was exacerbated by low alkalinity and sub optimal process pH values.</p> <p>There were multiple spikes above 0.3 NTU from May 4 to 10 and again on May 25 & 26. There were no reportable turbidity exceedances over 1.0 NTU 15 minutes apart while water was directed to the next stage of treatment</p> <p>Adjustments made to chemical dosages for pre-soda ash, aluminum sulphate; desludge valves, desludge frequency</p> <p>Monitoring of sludge blanket, waste pit levels, floc pH and size</p> <p>Run water to waste instead of clearwell to prevent a turbidity exceedance</p> <p>Installed wastepump</p> <p>The process and turbidity had recovered on May 10, with a few adjustments needed on May 25 & 26</p>

Sample Date	Details (Parameter, Limit, Result, Corrective Action, Date, etc.)
OCTOBER 2022	<p>Filter Efficiency Failed (AWQI 160547)</p> <p>Filter 1 turbidity readings were less than or equal to 0.3 NTU in only 70.8% of the measurements in the month</p> <p>Filter 2 turbidity readings were less than or equal to 0.3 NTU in only 78.7% of the measurements in the month</p> <p>Did not meet the performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month (from the Procedure for Disinfection in Drinking Water in Ontario).</p> <p>Turbidity issues at the beginning of the month affected the efficiency</p> <p>Oct 1-5th - Several times at the start of the month the desludge valves were stuck open causing the desludge water to overflow into the raw well. This caused swings in pH and dosages that lead to the clarifier beds being weak and higher turbidity.</p> <p>Adjustments were made to dosages, we had slowly increased Pre-Soda and Alum dosages several times based on raw colour, dosages and pH at multiple steps in the process. Adjustments were made to desludge frequency and back wash times. Backwash tanks were drained and cleaned multiple times. Turbidity meters were cleaned multiple times.</p> <p>We reached out to other OCWA employees, and managers for advice.</p> <p>Oct 6th, approx., adjustments were made to the desludge valves to close further and prevent getting stuck fully open.</p> <p>Oct 7th, the filter efficiency started to increase daily until the end of the month but it was not possible to get back to over 95%</p>
Q4 2022 OCTOBER TO DECEMBER	<p>AWQI – Haloacetic Acid (HAA) Running Annual Average (RAA) Exceedance</p> <p>The HAA RAA calculated on December 16 was 89.1 ug/L, which is higher than the limit of 80 ug/L. The individual test results for July 11 (157 ug/L) and October 11 (143 ug/L) were quite high.</p>

Please refer to the original Notices of Adverse Test Results and Issue Resolution (Schedule 16) for full details

SCHEDULE 7 – OPERATIONAL TESTING

Continuous Flow Analyzers in Treatment Process

Parameter	Number of Samples	Range of Results (min to max)	Unit of Measure
Turbidity (Filter 1)	8760	0 to 2.0	NTU
Turbidity (Filter 2)	8760	0 to 2.0	NTU
Free Chlorine	8760	0.89 to 2.54	mg/L

Note: For continuous monitors use 8760 as the number samples for one year.

Effective backwash procedures are in place to ensure that the effluent turbidity requirements are met all times.

Combined Chlorine Residual in the Distribution System

Number of Samples	Combined Chlorine (min to max)	Unit of Measure	Standard
364	0.55 to 2.63	mg/L	≥ 0.25 and <3.0

Note: A total of seven operational checks for chlorine residual in the distribution system are required each week. The owner/operating authority can continue to test one sample per day or test four (4) samples one day and three (3) on a second day. The sample sets must be collected at least 48-hours apart and samples collected on the same day must be from different locations.

SCHEDULE 10 – MICROBIOLOGICAL TESTING

Sample Type	Number of Samples	<i>E.coli</i> Results (min to max)	Total Coliform Results (min to max)	Number of HPC Samples	Range of HPC Results (min to max)
Raw	52	<2 – 10	2 – 355	N/A	N/A
Treated	52	0 – 0	0 – 0	52	<10 – NDOGHPC
Distribution	156	0 – 0	0 – 0	104	<10 – 220
MAC	-	0	0	-	-

Maximum Acceptable Concentration (MAC) applies only to treated or distribution samples
 NDOGHPC – No data, overgrown with HPC

SCHEDULE 13 - NITRATE AND NITRITE AT THE WATER TREATMENT PLANT

Date of Sample	Nitrate Result (mg/L)	Nitrite Result (mg/L)	Exceedance
January 10, 2022	0.2	<0.01	No
April 5, 2022	0.4	<0.01	No
July 11, 2022	0.3	<0.01	No
October 11, 2022	0.2	<0.01	No
MAC	10	1	-

SCHEDULE 13 – TOTAL TRIHALOMETHANES IN THE DISTRIBUTION SYSTEM

Date of Sample	THM Result (ug/L)	Four Quarter Running Average	Exceedance
January 4, 2022	52	61.8	No
April 5, 2022	30.2	60.1	No
April 19, 2022	47	52.8	No
July 11, 2022	68.7	56.0	No
October 11, 2022	72		
October 13, 2022	57.2		

MAC for Trihalomethanes = 100 ug/L (Four Quarter Running Average)

SCHEDULE 13 – HALOACETIC ACIDS (HAA) IN THE DISTRIBUTION SYSTEM

Date of Sample	HAA Result (ug/L)	Four Quarter Running Average	Exceedance
January 4, 2022	65	69.0	No
April 5, 2022	24	62.0	No
July 11, 2022	157	77.0	No
October 11, 2022	143	89.1	Yes - AWQI
November 7, 2022	78		

MAC for Haloacetic acids = 80 ug/L (Four Quarter Running Average)

SCHEDULE 13 – SODIUM AT THE WATER TREATMENT PLANT

Date of Sample	Number of Samples	Result Value (mg/L)	MAC	Exceedance
October 9, 2018	1	26.7	20	Yes (AWQI 143653)
October 22, 2018	1	23.5	20	N/A Re-sample

Note: Sample required every 60 months.

Sodium exceedances are reported if there has not been an adverse reported in the previous 57 months.

SCHEDULE 13 – FLUORIDE AT THE WATER TREATMENT PLANT

Date of Sample	Number of Samples	Result Value (mg/L)	MAC	Exceedance
October 9, 2018	1	<0.025	1.5	No

Note: Sample required every 60 months.

SCHEDULE 15.1 – LEAD IN THE DISTRIBUTION

The Chapleau Drinking Water System qualified for the 'Exemption from Plumbing Sampling' as described in section 15.1-5 (9-10) of Ontario Regulation 170/03.

As such, the system is required to test for total alkalinity and pH in two distribution samples collected during the periods of December 15 to April 15 and June 15 to October 15. This testing is required in every 12-month period with lead testing in every third 12-month period.

Sampling Dates	Number of Samples	Range of Results (min to max)		
		Lead (ug/L)	pH	Alkalinity (mg/L)
Winter Period				
April 8, 2020	2	0.1 – 0.1	-	-
April 12, 2022	2	-	7.30 – 7.41	71 – 72
Summer Period				
October 5, 2020	2	<0.1 – 0.1	-	-

October 11, 2022 2 - 6.62 – 6.73 63 – 64

MAC for lead is 10 ug/L

SCHEDULE 23 – INORGANIC PARAMETERS AT THE WATER TREATMENT PLANT

Sample Date: October 25, 2022

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
Antimony	<0.5	6	No	No
Arsenic	<1	25	No	No
Barium	12	1000	No	No
Boron	<2	5000	No	No
Cadmium	<0.1	5	No	No
Chromium	<1	50	No	No
Mercury	<0.1	1	No	No
Selenium	<0.2	10	No	No
Uranium	<1	20	No	No

MAC – Maximum Acceptable Concentration

No inorganic parameter(s) exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standards (ODWS) during the reporting period

SCHEDULE 24 – ORGANIC PARAMETERS AT THE WATER TREATMENT PLANT

Sample Date: October 25, 2022

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
1,1-Dichloroethylene	<0.3	14	No	No
1,2-Dichlorobenzene	<0.2	200	No	No
1,2-Dichloroethane	<0.2	5	No	No
1,4-Dichlorobenzene	<0.3	5	No	No
2,3,4,6-Tetrachlorophenol	<0.3	100	No	No
2,4,6-Trichlorophenol	<0.2	5	No	No
2,4-Dichlorophenol	<0.354	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	<0.2	100	No	No
Alachlor	<0.233	5	No	No
Atrazine + N-dealkylated metabolites	<0.5	5	No	No
Azinphos-methyl	<0.175	20	No	No

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
Benzene	<0.1	1	No	No
Benzo(a)pyrene	<0.01	0.01	No	No*
Bromoxynil	<0.0943	5	No	No
Carbaryl	<3	90	No	No
Carbofuran	<5	90	No	No
Carbon Tetrachloride	<0.2	2	No	No
Chlorobenzene (Monochlorobenzene)	<0.5	80	No	No
Chlorpyrifos	<0.175	90	No	No
Diazinon	<0.175	20	No	No
Dicamba	<0.0825	120	No	No
Dichloromethane (Methylene Chloride)	<1	50	No	No
Diclofop-methyl	<0.118	9	No	No
Dimethoate	<0.175	20	No	No
Diquat	<0.2	70	No	No
Diuron	<20	150	No	No
Glyphosate	<20	280	No	No
Malathion	<0.175	190	No	No
MCPA (2-methyl-4-chlorophenoxyacetic acid)	<5.89	100	No	No
Metolachlor	<0.116	50	No	No
Metribuzin	<0.116	80	No	No
Paraquat	<0.2	10	No	No
Pentachlorophenol	<0.3	60	No	No
Phorate	<0.116	2	No	No
Picloram	<0.0825	190	No	No
Prometryne	<0.0582	1	No	No
Simazine	<0.175	10	No	No
Terbufos	<0.116	1	No	No
Tetrachloroethylene	<0.3	10	No	No
Total PCB	<0.06	3	No	No
Triallate	<0.116	230	No	No
Trichloroethylene	<0.2	5	No	No
Trifluralin	<0.116	45	No	No
Vinyl Chloride	<0.1	1	No	No

Note*: Benzo(a)pyrene – Schedule 13-5 of O. Reg. 170/03 requires increased frequency of sampling if an analytical result obtained for any of the parameters listed in Schedule 24 exceeds one half of the MAC. The Ministry has set the reporting detection limit (RDL) for Benzo[a]pyrene at 50 per cent or more of the MAC, due to the limitations of the current analytical methods to achieve lower detection limits. The RDL for benzo[a]pyrene is 0.01 ug/L. For this parameter, a licenced laboratory must be able to achieve a method detection limit (MDL) at least equal to the RDL. A positive result above their MDL would trigger increased frequency of sampling, but a result equal to their MDL would not

No organic parameter(s) listed in 24 of Ontario Regulation 170/03 exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg. 169/03) during the reporting period.

ADDITIONAL TESTING AND SAMPLING

No additional sampling and testing was required during the reporting year.

SCHEDULE 22 – SUMMARY REPORTS FOR MUNICIPALITIES

This report is a summary of water quality information for the Chapleau Water Treatment System. It is published in accordance with Schedule 22 of Ontario’s Drinking Water Systems Regulation 170/03 for the reporting period of January 1 to December 31, 2022 and must be submitted to members of council.

The report must list the requirements of the Safe Drinking Water Act (2002) and the drinking water regulations which can be viewed at the following website:

<http://www.e-laws.gov.on.ca>.

PERMITS AND LICENCES

Municipal Drinking Water Licence (MDWL)	222-101 (issued March 3, 2021)
Drinking Water Works Permit (DWWP)	222-201 (issued March 3, 2021)
Permit to Take Water (PTTW)	3048-B74SEA Issued December 5, 2018

REQUIREMENTS THE SYSTEM FAILED TO MEET

The following table lists the requirements of the Safe Drinking Water Act (2002), the drinking water regulations, the system’s approval, drinking water works permit, municipal drinking water works licence, and any other orders applicable to the system that were not met at any time during the reporting period. This table is based on documentation available to the Ontario Clean Water Agency. The duration of the failure and details of the actions that were taken to correct the failure must be described.

Legislation	Requirement(s) the System Failed to Meet, Corrective Actions and Status
O. Reg. 675/98	February 15 – Alum Spill in Plant Spill of approximately 310 gallons in the plant when the suction line on the alum tank was broken. The suction line had been repaired. SAC Ref: 1-1M143A

SUMMARY OF QUANTITIES AND FLOW RATES

For the purpose of enabling the owner of the system to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report. Under schedule 22-2(3) of Ontario Regulation 170/03, the Summary Report must include the following:

1. A summary of the quantities and flow rates of water supplied, including the monthly average and the maximum daily flows

2. A comparison of both the average and maximum flow rate summary to the rated capacity approved in the systems approval, drinking water works permit or municipal drinking water licence

The following tables and graphs indicate the quantities and flow rates of water taken and produced during the reporting period, including monthly average flows, maximum daily flows and the total monthly volumes. A comparison of the water data is made to the rated capacity and flow rates specified in the system's Municipal Drinking Water Licence.

MONTHLY SUMMARY OF WATER TAKINGS FROM THE KEBSQUASHESHING RIVER

	Maximum (L/min)	Maximum (m ³ /d)	Average (m ³ /d)	Total Usage (m ³)
January	1,961	1,760	1,385	42,938
February	1,942	1,604	1,434	40,138
March	2,183	1,529	1,394	43,206
April	2,016	1,597	1,388	41,634
May	2,292	2,198	1,419	43,990
June	2,393	1,367	1,226	36,792
July	2,263	1,381	1,207	36,202
August	2,013	1,376	1,108	34,357
September	2,000	1,471	1,026	30,771
October	2,236	1,967	1,099	34,058
November	2,109	1,311	1,198	35,945
December	2,249	1,474	1,289	39,953

MONTHLY SUMMARY OF TREATED WATER SUPPLIED TO THE DISTRIBUTION SYSTEM

	Total Usage (m ³)	Average (m ³ /d)	Maximum (m ³ /d)	% Rated Capacity
January	36,675	1,183	1,474	18.7
February	34,714	1,240	1,344	19.6
March	36,629	1,182	1,215	18.7
April	34,136	1,138	1,318	18.0
May	31,404	1,013	1,268	16.0
June	28,659	955	1,165	15.1
July	29,337	946	1,087	14.9
August	28,428	917	1,112	14.5
September	24,971	832	884	13.1
October	24,568	793	858	12.5

	Total Usage (m ³)	Average (m ³ /d)	Maximum (m ³ /d)	% Rated Capacity
November	26,424	881	964	13.9
December	31,334	1,011	1,115	16.0

FLOW MONITORING

Municipal Drinking Water Licence (MDWL) requires the owner to install a sufficient number of flow measuring devices to permit the continuous measurement and recording of:

- the flow rate and daily volume of water conveyed from the treatment system to the distribution system, and
- the flow rate and daily volume of water conveyed into the treatment system.

The Chapleau drinking water system has two flow meters as listed in the MDWL; one installed to monitor raw water entering the treatment plant and one installed to monitor treated water entering the distribution system. Flow metering devices were calibrated in accordance to manufacturers' specifications on an annual basis and are operating as required.

SUMMARY OF FLOW COMPARISON

COMPARISON OF RAW FLOWS TO SYSTEM'S PERMIT TO TAKE WATER

Permit to Take Water Limits (PTTW) - maximum	4,400 m³/day	4,419 L/min
Average Daily Flow for 2022	1,264 m ³ /day	876 L/min
Maximum Daily Flow for 2022	2,198 m ³ /day	2,393 L/min
Total Raw Water Used in 2022	459,985 m ³	-

COMPARISON OF TREATED FLOWS TO SYSTEM'S MUNICIPAL DRINKING WATER LICENCE

Rated Capacity of the Plant (MDWL)	6,333 m³/day	
Average Daily Flow for 2022	1,008 m ³ /day	15.9 % of the rated capacity
Maximum Daily Flow for 2022	1,474 m ³ /day	23.3 % of the rated capacity
Total Treated Water Produced in 2022	367,278 m ³	

Based on the information above, the plant is able to meet the demands of the consumers.