ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

2023 Annual/Summary Report for the Haileybury Drinking Water System

PREPARED BY

Ontario Clean Water Agency
on behalf of the City of Temiskaming Shores

Date: February 15, 2024
Rev: 0

Revision History

Rev. No.	Date	Prepared by:	Approved by:	Description
0	February 15, 2024	I. Bruneau, PCT	C. Mongrain, Operations Supervisor/ORO	Revision 0 issued

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Background

Municipalities throughout Ontario are required to comply with Ontario Regulation 170/03 made under the Safe Drinking Water Act (SDWA) since June 2003. 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 regulatory requirement 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 prepared by the Ontario Clean Water Agency (OCWA) on behalf of the Owner and presented to council as the 2023 Annual/Summary Report.

Section 11 – Annual Report

1. Introduction

Drinking-Water System Name	**Haileybury Drinking Water System**
Drinking-Water System Number	210000309
Drinking-Water System Owner	The Corporation of the City of Temiskaming Shores
Drinking-Water System Category	Large Municipal, Residential System
Municipal Drinking Water Licence No.	218-102-6 (issued July 23, 2021)
Drinking Water Work Permit No.	218-202-3 (issued July 23, 2021)
Permit to Take Water No.	P-300-1067513491 (issued February 13, 2020)
Reporting Period	January 1, 2023 to December 31, 2023

Does your Drinking-Water System serve more than 10,000 people? No

Is your annual report available to the public at no charge on a web site on the Internet?

Yes at: http://www.temiskamingshores.ca/en/index.asp

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

City of Temiskaming Shores Municipal Office
325 Farr Drive, P.O. Box 2050
Haileybury, ON P0J 1K0

Drinking Water Systems that receive drinking water from the Haileybury Drinking Water System

The Haileybury Drinking Water System provides drinking water to the communities of Haileybury and North Cobalt within the City of Temiskaming Shores.

The Annual Report was provided to all connected Drinking Water System Owners

The Ontario Clean Water Agency prepared the 2023 Annual/Summary Report for the Haileybury Drinking Water System and provided a copy to the system owner; the City of Temiskaming Shores.

System Users are notified that the Annual Report is available for viewing through:

- Notice on the City's Facebook page
- Notice in the local newspaper

2. Description of the Haileybury Drinking Water System

The Haileybury Drinking Water System is owned by the Corporation of the City of Temiskaming Shores and consists of a Class 3 water treatment subsystem and a Class 2 water distribution subsystem. It is a surface water system that services the communities of Haileybury and North Cobalt. The Ontario Clean Water Agency is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

Raw Water Supply

The water treatment plant is located at 322 Browning Street and obtains its raw water from Lake Temiskaming. A 197 m long, 450 mm diameter raw water intake pipe extends 168 m into the lake. The intake structure is an upturned bell inside a cribbed structure. The intake is approximately 12.5 m below the low recorded water level and 2 m above the lake bottom.

Water flows into the intake structure by gravity, through two removable inlet screens and is stored in the raw water wet well. The wet well contains a heated superstructure and has a storage volume of 37.2 m^3. The low lift pumping station is equipped with three low lift duty pumps; all are vertical turbine pumps which operate on an alternating basis. A magnetic flow meter is located in the water treatment plant to monitor raw water flows. The raw water is also continuously monitored for pH, turbidity and temperature.

Water Treatment

Raw water is pumped to the water treatment building where it is injected with sodium carbonate (soda ash) for pH and alkalinity adjustment and aluminum sulphate for the coagulation/flocculation process. The process water undergoes rapid mixing, flows into two flocculation basins, where polymer is added as a coagulant aid and pH is continuously monitored. It is then directed to a settling tank for clarification. The process water flows through three dual media filters consisting of anthracite and silica sand. The filter system is equipped with an automated backwash sequence, filter-to-waste capabilities, air blower and an underdrain system. The backwash wastewater and the settled solids from the settling tank are discharged to the municipal sanitary system. On-line turbidity analyzers are used to monitor the turbidity off each filter.

After filtration, the process water is chlorinated and pH adjusted with soda ash before entering the dual celled clearwell. Three high lift pumps equipped with variable frequency drives (VFDs) are located at the end of the clearwell, where a magnetic flow meter is used to measure flow on the discharge main. In a separate room, with outside access only, a gas chlorine system equipped

with automatic switchover is used for post-filtration chlorination in the clearwell. The water leaving the clearwell is continuously monitored for flow, pH, turbidity and free chlorine residual as it is directed to an off-site reservoir.

Water Storage

The Niven Street reservoir is a baffled contact tank consisting of two reservoirs and one pumping chamber that provide sufficient chlorine contact time to meet CT requirements. The water in the reservoir is monitored for free chlorine residual and level to ensure primary disinfection is achieved. An ammonium sulphate dosing system is used to chloraminate the treated water before being gravity fed or pumped to the distribution system by four high lift pumps equipped VFDs. The water directed to the pressure zones are continuously monitored for pH, turbidity, pressure and total chorine residual. The gravity fed zone is continuously monitored for flow.

Control System

The Haileybury Water Treatment System is controlled by a dedicated Programmable Logic Controller (PLC) and monitored through a Control System Supervisory Control and Data Acquisition (SCADA) system. All analyzing, monitoring and control module equipment information is routed through the SCADA system for operator monitoring and control. Control of equipment can be accomplished locally using the SCADA computer located at the Haileybury water treatment plant or remotely using operator computers and cell phones. Alarm capability and set point adjustment along with trend monitoring are also available through SCADA system controls.

Emergency Power

A 250 kW diesel generator with a 2000 L fuel tank is available outside of the main water treatment plant and is capable of supplying power to the facility during power failures.

A 200 kW diesel engine generator with a 1000 L fuel tanks is located outside of the Niven Street Reservoir to provide emergency power during emergencies.

Distribution System

The Haileybury drinking water system is classified as a Large Municipal Residential Drinking Water System that provides water to a population of approximately 4,200 residents. The distribution system has approximately 1940 service connections and is comprised of various pipe materials including 4" - 12" cast iron with lead joints or ductile iron, 10" and 12" asbestos cement, and PVC with mechanical joints. There are several isolation valves to allow for the repair and maintenance of selected sections of the distribution system, one air relief valve and four pressure reducing valves. Approximately 174 fire hydrants are connected to the system to aid in fire protection.

The system consists of four pressure zones. Zone 1 is a gravity fed area in downtown Haileybury, Zone 2 is an intermediate pressure region located at higher elevations along the west side of

Haileybury, Zone 3 is an controlled pressure system which is fed off of the high pressure system and is located in the central part of Haileybury and North Cobalt and Zone 4 is a high pressure zone in North Cobalt. The water distribution piping system is continuous between the four identified pressure zones; however the various zones are isolated from each other via closed valves.

3. List of Water Treatment Chemicals Used

- Aluminum Sulphate – coagulation/flocculation
- Ammonium Sulphate – secondary disinfection
- Chlorine Gas – disinfection
- Polyelectrolyte (Polymer) - coagulant aid
- Soda Carbonate (Soda Ash) – pH and alkalinity adjustment

All treatment chemicals meet AWWA and NSF/ANSI standards.

4. Significant Expense Incurred in 2023

OCWA is committed to maintaining the assets of the drinking water system and sustains a program of scheduled inspection and maintenance activities using a computerized Work Management System (WMS).

Significant expenses incurred in the drinking water system include the following:

- Filter No. 1 and 3 rehabilitation,
    - removal of false floor and replace with pour in place concrete floor
    - sandblast and epoxy coat filter walls
    - installation of a new underdrain system
    - installation of new filter media
- Replaced oil and filters for Aerzen blowers,
- Purchased spare solenoids for filter valves,
- Replaced failed micro switch on Filter No. 2 e-valve
- Niven Reservoir - replaced faulty chlorine analyzer (Cl-17),
- Niven Reservoir – new sump pump,
- Water treatment chemicals,
- Albert Street reconstruction – approximately 700m of 150mm diameter PVC watermain and appurtenances were replaced. Two pressure reducing valves were added. All existing service lines were replaced and new services were added to vacant lots.

- Quality and Environmental Management System (QEMS) external surveillance audit conducted by SAI Global.

5. Details of Notices Reported & Submitted to the Spills Action Center

Based on information kept on record by OCWA, fourteen (14) adverse water quality incidents (AWQIs) were reported to the Ministry's Spills Action Centre in 2023.

- Eight (8) AWQIs occurred during Category 2 watermain breaks or planned repairs.
- Five (5) AWQIs had adverse bacteriological results. Four (4) incidents with total coliforms and one (1) with NDOGN – no data overgrown with non-target organism.
- One (1) AWQI resulted from loss of free chlorine monitoring.

Refer to *Appendix A* for a summary of AWQIs.

6. Microbiological Testing

Table 1: Summary of Microbiological Results

Sample Type	# of Samples	*Range of E.coli* Results *(min to max)*	Range of Total Coliform Results *(min to max)*	# of HPC Samples	Range of HPC Results *(min to max)*
Raw	52	< 2 to 80	2 to > 1000	N/A	N/A
Treated	52	0 to 0	0 to 0	52	< 10 to 60
Distribution	156	0 to 0	0 to 0	52	< 10 to 2000

Maximum Acceptable Concentration (MAC) for treated and distribution samples: *E. coli* = 0 CFUs/100 mL and MAC for Total Coliforms = 0 CFUs/100 mL

"<" denotes less than the laboratory's method detection limit

">" denotes greater than the laboratory's method detection limit

Note: One microbiological sample is collected and tested each week from the raw and treated water supply. A total of three microbiological samples are collected and tested each week from the distribution system. At least 25% of the distribution samples must be tested for HPC bacteria.

Refer to *Appendix B* for a monthly summary of the above microbiological data.

7. Operational Testing

Table 2: Continuous Monitoring in the Treatment Process

Parameter	# of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Turbidity (Filer No. 1)	8760	0.00 to 0.42	NTU	≤ 1.0 Note 2

Parameter	# of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Turbidity (Filer No. 2)	8760	0.00 to 0.74	NTU	
Turbidity (Filer No. 3)	8760	0.02 to 0.97	NTU	
Free Chlorine Residual	8760	1.27 to 3.06	mg/L	CT [Note 3]

Notes:

1. For continuous monitors 8760 is used as the number of samples.
2. Effective backwash procedures, including filter to waste and automatic filter shut down features are in place to ensure that the effluent turbidity requirements as described in the Filter Performance Criteria are met all times. Turbidity exceedances occur when two (2) readings are above 1 NTU for 15 minutes or more in a 24 hour period. Filters will backwash if turbidity reaches 0.7 NTU and will shut down and filter to waste at 1.0 NTU. The system performed as programmed and no high turbidity water was directed to the next phase of the process.
3. CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the Haileybury water plant if the free chlorine residual level drops below 0.3 mg/L to ensure primary disinfection is achieved.

Table 3: Summary of Chlorine Residuals in the Distribution System

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Combined Chlorine Residual	366	0.53 to 2.09	mg/L	$\geq$ 0.25 to < 3.0

Note: A total of seven operational checks for chlorine residual in the distribution system are collected each week. Four (4) samples are tested one day and three (3) on a second day. The sample sets are collected at least 48-hours apart and samples collected on the same day are from different locations.

Refer to *Appendix C* for a monthly summary of the above operational data.

8. Chemical Testing

Table 4: Summary of Nitrate & Nitrite Data from the Water Treatment Plant

Date of Sample	Nitrate Result	Nitrite Result	Unit of Measure	Exceedance
January 9	0.3	< 0.01	mg/L	No
April 11	< 0.1	< 0.01	mg/L	No
July 10	< 0.1	< 0.01	mg/L	No

Date of Sample	Nitrate Result	Nitrite Result	Unit of Measure	Exceedance
October 16	0.4	0.02	mg/L	No

Maximum Allowable Concentration (MAC) for Nitrate = 10 mg/L and for Nitrite = 1 mg/L

Table 5: Summary of Total Trihalomethane Results from the Distribution System

Date of Sample	THM Result	Unit of Measure	Running Average	Exceedance
January 9	48.9	ug/L	Q1 = 43.5	No
April 11	45.6	ug/L	Q2 = 44.9	No
July 10	69.0	ug/L	Q3 = 51.6	No
October 16	84.3	ug/L	Q4 = 61.9	No

Maximum Allowable Concentration (MAC) for Total Trihalomethanes = 100 ug/L (Four Quarter Running Average)

Table 6: Summary of Total Haloacetic Acid Results from the Distribution System

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 9	57	ug/L	Q1 = 64.3	No
April 11	63	ug/L	Q2 = 73.0	No
July 10	82	ug/L	Q3 = 70.0	No
October 16	82	ug/L	Q4 = 71.0	No

Maximum Allowable Concentration (MAC) for Total Haloacetic Acid = 80 ug/L (Four Quarter Running Average)

Table 7: Summary of Lead Results under Schedule 15.1 (from the distribution system)

Date of Sample	# of Samples	Field pH *(min to max)*	Field Temperature (°C) *(min to max)*	Alkalinity (mg/L) *(min to max)*	Lead (ug/L) *(min to max)*
March 7	3	7.26 to 7.68	2.2 to 3.2	32 to 33	N/A
September 13	3	7.29 to 7.33	16.6 to 18.1	35 to 37	N/A

Maximum Allowable Concentration (MAC) for Lead -10 ug/L

The system is required to test for total alkalinity and pH in three distribution samples collected during the period of December 15 to April 15 (winter period) and three distribution sample

during the period of June 15 to October 15 (summer period). This testing is required in every 12-month period with lead testing in every third 12-month period.

Lead testing was not required this reporting period, but was done in 2021. The results were <0.1, <0.1 and <0.1 ug/L sampled on March 8th and 0.7, 0.1 and 0.3 ug/L sampled on September 22nd. Next lead sampling is scheduled for 2024.

Table 8: Most Recent Schedule 23 Inorganic Results from the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Antimony	< 0.5	ug/L	6	No	No
Arsenic	< 1.0	ug/L	10	No	No
Barium	8	ug/L	1000	No	No
Boron	< 2	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	< 1	ug/L	50	No	No
Mercury	< 0.1	ug/L	1	No	No
Selenium	0.5	ug/L	50	No	No
Uranium	< 1	ug/L	20	No	No

Note: Sample required every 12 months (sample date = *October 16, 2023)*

Table 9: Most Recent Schedule 24 Organic Results from the Water Treatment Plant

Parameter	Result Value	Unit of Measure	Standard	MAC Exceedance	½ MAC Exceedance
Alachlor	< 0.279	ug/L	5	No	No
Atrazine + N-dealkylated metobolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.209	ug/L	20	No	No
Benzene	< 0.1	ug/L	1	No	No
Benzo(a)pyrene	< 0.01	ug/L	0.01	No	No
Bromoxynil	< 0.0978	ug/L	5	No	No
Carbaryl	< 3	ug/L	90	No	No
Carbofuran	< 4	ug/L	90	No	No

Parameter	Result Value	Unit of Measure	Standard	MAC Exceedance	½ MAC Exceedance
Carbon Tetrachloride	< 0.2	ug/L	2	No	No
Chlorpyrifos	< 0.209	ug/L	90	No	No
Diazinon	< 0.209	ug/L	20	No	No
Dicamba	< 0.0855	ug/L	120	No	No
1,2-Dichlorobenzene	< 0.2	ug/L	200	No	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	No	No
1,2-Dichloroethane	< 0.2	ug/L	5	No	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No	No
Dichloromethane	< 1	ug/L	50	No	No
2-4 Dichlorophenol	< 0.2	ug/L	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.367	ug/L	100	No	No
Diclofop-methyl	< 0.122	ug/L	9	No	No
Dimethoate	< 0.209	ug/L	20	No	No
Diquat	< 0.2	ug/L	70	No	No
Diuron	< 10	ug/L	150	No	No
Glyphosate	< 20	ug/L	280	No	No
Malathion	< 0.209	ug/L	190	No	No
Metolachlor	< 0.14	ug/L	50	No	No
Metribuzin	< 0.14	ug/L	80	No	No
Monochlorobenzene	< 0.5	ug/L	80	No	No
Paraquat	< 0.2	ug/L	10	No	No
Polychlorinated Biphenyls (PCBs)	< 0.06	ug/L	3	No	No
Pentachlorophenol	< 0.3	ug/L	60	No	No
Phorate	< 0.14	ug/L	2	No	No
Picloram	< 0.0855	ug/L	190	No	No
Prometryne	< 0.0698	ug/L	1	No	No

Parameter	Result Value	Unit of Measure	Standard	MAC Exceedance	½ MAC Exceedance
Simazine	< 0.209	ug/L	10	No	No
Terbufos	< 0.14	ug/L	1	No	No
Tetrachloroethylene	< 0.3	ug/L	10	No	No
2,3,4,6-Tetrachlorophenol	< 0.3	ug/L	100	No	No
Triallate	< 0.14	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	5	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA)	< 6.11	ug/L	100	No	No
Trifluralin	< 0.14	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Note: Sample required every 12 months (sample date = *October 16, 2023)*

Inorganic or Organic Parameter(s) that Exceeded Half the Standard Prescribed in Schedule 2 of Ontario Drinking Water Quality Standards

No inorganic or organic parameter(s) listed in Schedule 23 and 24 of Ontario Regulation 170/03 (parameters listed in Table 8 and Table 9 of this report) exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg.169/03) during the reporting period.

Table 10: Most Recent Sodium Data (from the Water Treatment Plant)

Date of Sample	# of Samples	Result Value	Unit of Measure	MAC	Exceedance
October 17, 2022	1	21.3	mg/L	20	Yes
October 25, 2022 (resample)	1	24.8	mg/L	20	Yes

Note: Sample required every 60 months. Next sampling scheduled for October 2027.

The aesthetic objective for sodium in drinking water is 200 mg/L at which it can be detected by a salty taste. It is required that the local Medical Officer of Health be notified when the concentration exceeds 20 mg/L so that persons on sodium restricted diets can be notified by their physicians. The adverse

sodium result was reported to the Ministry's SAC and the Timiskaming Health Unit on October 25, 2022 as required under Schedule 16 of Ontario Regulation 170/03 (AWQI No. 160432).

Table 11: Most Recent Fluoride Data Sampled at the Water Treatment Plant

Date of Sample	# of Samples	Result Value	Unit of Measure	MAC	Exceedance
October 22, 2022	1	< 0.05	mg/L	1.5	No

Note: Sample required every 60 months. Next sampling scheduled for October 2027.

9. Additional Testing Performed in Accordance with a Legal Instrument

1. Nitrosodimethylamine (NDMA)

Condition 5.0 (5.1) of Schedule C to Municipal Drinking Water Licence (MDWL) #218-102 issued on July 23, 2021 requires sampling, testing and monitoring of Nitrosodimethylamine (NDMA). The sample is to be collected each quarter from the farthest point in the distribution system and not exceed the maximum allowable concentration (MAC) of 0.009 ug/L.

Table 12: Summary of NDMA Results

Date of Sample	NDMA Result	Unit of Measure	Exceedance
January 9	< 0.0009	ug/L	No
April 11	< 0.0009	ug/L	No
July 10	0.0017	ug/L	No
October 16	0.0012	ug/L	No

Maximum Allowable Concentration (MAC) for NDMA = 0.009 ug/L.

2. Harmful Algae Bloom Monitoring

Condition 6.0 (6.1) of Schedule C to MDWL No. 218-102 requires a Harmful Algae Bloom (HAB) monitoring, reporting and sampling plan. The plan must be implemented during the harmful algae bloom season, during but not limited to the warm seasonal period between June 1st and October 31st of each year, or as otherwise directed by the Medical Officer of Health. A Plan has been developed and is in effect for the Haileybury Drinking Water System during the HAB season. The Plan includes visual inspection of the HAB monitoring area at least once per week. Sampling for microcystins on the raw and treated water each week. Reporting to the local Health Unit and the Ministry's Spills Actions Center (SAC) if a suspected bloom is observed or if microcystins are detected in either the raw or treated water samples.

Table 13: Summary of Microcystin Results

Sample Type	# of Samples	*Range of Microcystin* Results *(min to max)*	Unit of Measure	Exceedance
Raw	23	0.15 to < 0.15	ug/L	No
Treated	23	< 0.15 to < 0.15	ug/L	No

Maximum Allowable Concentration (MAC) for Microcystin-LR = 1.5 ug/L

One (1) event of suspected and/or confirmed blue green algae blooms was reported to the Medical Officer of Health and the Ministry's SAC during the reporting period (Event No. 162225).

Event No.	162225
Date	June 16, 2023
Details	Total microcystins were detected in a raw water sample collected on June 12, 2023 at 11:14 AM. Result = 0.15 ug/L. The treated water was also tested on June 12th at 9:01 AM and no microcystins were detected (result = < 0.15 ug/L). No blooms were observed in the HAB monitoring area.
Corrective Actions	Filtration and disinfection processes were optimized and closely monitored. Raw and treated water samples were collected and tested weekly for total microcystins. Incident was resolved when 3 sets of consecutive results were non-detectable (<0.15 ug/L) for microcystins and there was no visible algae bloom. Daily checks of the HAB monitoring area occurred until the event was resolved and then weekly observations resumed. Weekly sampling of the raw and treated water continued throughout the HAB season with no further detectable microcystin results.

Schedule 22 – Summary Reports for Municipalities

10. 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. The duration of the failure and details of the actions that were taken to correct the failure must be described.

According to information kept on record by OCWA, the Haileybury Drinking Water System failed to meet the following requirements.

Table 14: Requirements the System Failed to Meet

Legislation	Requirement(s) not Met	Duration	Corrective Action(s)
O. Regulation 170/03, Municipal Drinking Water License (MDWL) No. 218-102, Drinking Water Works Permit (DWWP) No. 218-202	Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg.170/03 and/or was not recording data with the prescribed format. Due to an analyzer fault, the free chlorine residual used to measure primary disinfection dropped from 1.77 mg/L to 0.00 mg/L for 1 hour and 18 minutes.	October 31st from 1634 to 1752 hours	The on-call operator repaired the analyzer and restored monitoring. Free chlorine residuals were tested manually from 1700 hours to 1752 hours. 1700 hours = 1.99 mg/L 1705 hours = 2.00 mg/L 1710 hours = 1.99 mg/L 1715 hours = 1.99 mg/L 1720 hours = 2.00 mg/L 1725 hours = 1.99 mg/L 1730 hours = 1.97 mg/L 1735 hours = 1.98 mg/L 1740 hors = 1.99 mg/L 1745 hours = 1.97 mg/L 1750 hours = 1.97 mg/L 1750 hours = 1.96 mg/L 1752 – analyzer back on-line The analyzer was back in operation at 1752 hours. Operator monitored analyzer to ensure proper operation. The incident was reported to the local Health Unit, Ministry's Spills Action Center (SAC) and Owner as required. No further action required.

Fourteen (14) adverse water quality incidents were also reported to the Ministry's Spills Action Center during the reporting period. Refer to *Section 5* - Details of Notices Reported & Submitted to the Spills Action Center on page 6 of this report for details.

11. Summary of Quantities and Flow Rates

11.1 Flow Monitoring

Municipal Drinking Water Licence (MDWL) #218-102 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,
- the flow rate and daily volume of water conveyed into the treatment system.

The systems' Permit to Take Water (PTTW) #P-300-1067513491 requires that on each day water is taken from the source, the date, the volume of water taken on that date and the rate at which it was taken be recorded.

The Haileybury drinking water system has one flow meter to monitor the raw water entering the treatment plant and one to monitor the treated water leaving the plant and entering an off-site reservoir. These flow metering devices are calibrated in accordance to manufacturers' specifications on an annual basis and are operating as required.

11.2 Rated Capacity & Flow Rates

The system's Permit to take Water (PTTW) No. P-300-1067513491 allows the plant to withdraw a maximum volume of 6816 cubic meters from Lake Temiskaming each day. A review of the raw water flow data indicates that the system did not exceed this allowable limit having a maximum volume of 3561 m^3.

The Permit also allows a maximum flow rate of 4733 L/minute which was not exceeded during the reporting period having a maximum flow rate of 4728 L/min.

Condition 1.0 (1.1) to Schedule C of MDWL No. 218-102 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system not exceed a maximum flow of 6820 m^3 on any calendar day. The Haileybury DWS complied with this limit having a recorded maximum volume of 2969 m^3/day, which is 44 % of the rated capacity.

The following tables (Table 15 and Table 16) indicate the quantities and flow rates of water taken and produced during the reporting period, including monthly average flows, maximum daily flows and total monthly volumes. A comparison of the water data is made to the rated capacity and flow rates specified in the system's Permit to Take Water and the Municipal Drinking Water License.

Figure 1 is a comparison of the rate specified in the system's Municipal Drinking Water Licence to the average and maximum flows entering the treatment system.

Table 17 lists historical maximum raw and treated flows from 2018 to 2023.

Table 15: 2023 – Monthly Summary of Water Takings from the Source (Lake Temiskaming)

Regulated by Permit to Take Water (PTTW) #P-300-1067513491, issued February 13, 2020

Lake Temiskaming	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total Volume (m^3)	58499	59482	69771	67045	72727	81226	73893	71273	66830	71552	66949	69680	828927
Average Volume (m^3/d)	1887	2124	2251	2235	2346	2708	2384	2299	2228	2308	2232	2248	2271
Maximum Volume (m^3/d)	2200	2413	2626	3561	3000	3106	3282	2737	2524	2574	2520	2391	3561
PTTW - Maximum Allowable Volume (m^3/day)	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816
Maximum Flow Rate (L/min)	4453	4583	4728	4284	4380	4692	4704	4713	4434	4380	4427	4579	4728
PTTW - Maximum Allowable Flow Rate (L/min)	4733	4733	4733	4733	4733	4733	4733	4733	4733	4733	4733	4733	4733

Table 16: 2023 – Monthly Summary of Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #218-102-3, issued July 23, 2021

Treatment Plant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total Volume (m^3)	55009	55805	65155	60223	65592	75969	68650	66665	62494	66993	62589	65165	770309
Average Volume (m^3/d)	1774	1993	2102	2007	2116	2532	2215	2150	2083	2161	2086	2102	2110
Maximum Volume (m^3/d)	2017	2275	2460	2597	2718	2969	2867	2662	2326	2459	2286	2300	2969
MDWL - Rated Capacity (m^3/day)	6820	6820	6820	6820	6820	6820	6820	6820	6820	6820	6820	6820	6820

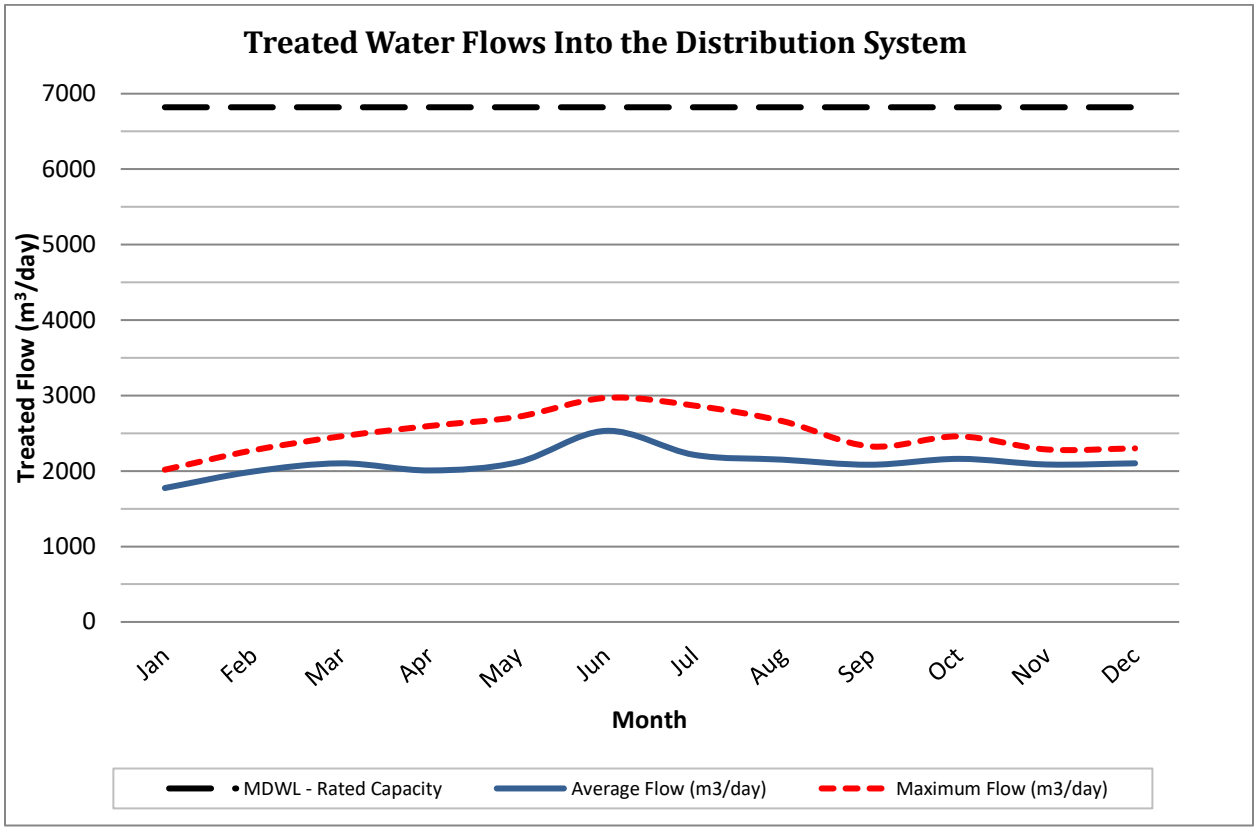

Figure 1: Comparison of Treated Flows to the Maximum Rated Capacity

Table 17: 2023 – Historical Maximum Flows (2018 to 2023)

Year	Maximum Raw Flow (m^3/d)	Max. Day % of PTTW Allowable (6816 m3/d)	Maximum Treated Flow (m^3/d)	Max. Day % of MDWL Capacity (6820 m^3/d)
2023	3561	52%	2969	44%
2022	4088	60%	3836	56%
2021	3487	51%	3372	49%
2020	3788	56%	3565	52%
2019	4154	61%	3486	51%
2018	4427	65%	4220	62%

System Performance

The following information is provided to enable the Owner to assess the capability of the system to meet existing and future water usage needs:

Rated Capacity of the Plant (MDWL)	6820 m^3/day	
Average Daily Flow for 2023	2110 m^3/day	34 % of the rated capacity
Maximum Daily Flow for 2023	2969 m^3/day	44 % of the rated capacity
Total Treated Water Produced in 2023	770,309 m^3	

Conclusion

The water quality data collected in 2023 demonstrates that the Haileybury drinking water system provided high quality drinking water to its users.

The system was able to operate in accordance with the terms and conditions of the Permit to Take Water and in accordance with the rated capacity of the Municipal Drinking Water Licence while meeting the community's demand for water use.

All Adverse Water Quality Incidents were reported to the Ministry's Spills Action Center and the corrective actions were completed as required. All non-compliances that were identified during the reporting period were addressed as soon as possible.

APPENDIX A

Summary of Adverse Water Quality Incidents (AWQIs)

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Haileybury DWS

Notices Reported & Submitted to the Spills Action Center

Incident #1: Category 2 - Emergency Watermain Repair / Loss of Pressure / BWA

AWQI No.	161331
Date	February 13, 2023
Details	The isolation of a watermain break on Lawlor Street and Rorke Avenue in the community of Haileybury resulted in a loss of pressure to 20 homes. A precautionary boil water advisory (BWA) was issued by the local Health Unit for the affected area on February 13th at approximately 9:00 PM.
Corrective Actions	The repair was completed and the line was re-pressurized which caused additional breaks and a valve to blow on the same pipe. The same 20 homes were affected. After the line was repaired and pressure restored, the area was flushed until an acceptable combined chlorine residual was achieved (1.68 & 1.79 mg/L). Two sets of 3 bacteriological samples were collected 24 hours apart (upstream, downstream and at the site of the break) on February 15th and 16th. Sample results were acceptable having no total coliforms or *E.coli*. The BWA was lifted on February 18th at approximately 11:30 AM.

Incident #2: Category 2 - Planned Distribution Repair / Loss of Pressure / BWA

AWQI No.	162517
Date	July 11, 2023
Details	Loss of pressure occurred during the replacement of a hydrant, 20 feet of a 6" watermain and the installation of a new valve on Albert Street. A precautionary BWA was issued by the local Health Unit on July 11th for the affected area (8 homes on Albert Street)
Corrective Actions	After the work was complete and pressure restored, the area was flushed until an acceptable combined chlorine residual was achieved (1.27 mg/L).

Haileybury DWS

Notices Reported & Submitted to the Spills Action Center

	Two sets of 3 bacteriological samples were collected 24 hours apart (upstream, downstream and near the site of the work) on July 11th and 13th. Sample results indicated no total coliforms or *E.coli*. The BWA was lifted on July 17th at approximately 10:50 AM.

Incident #3: Category 2 - Planned Watermain Repair / Loss of Pressure / BWA

AWQI No.	162529
Date	July 12, 2023
Details	Watermain and valve replacement at the intersection of Bruce Street and Albert Street resulted in a loss of pressure for 6 homes and the Extendicare Nursing Home. The local Health Unit issued a precautionary BWA for the affected area.
Corrective Actions	After the work was complete and pressure was restored, the area was flushed until an acceptable combined chlorine residual was achieved (1.34 mg/L). Two sets of 3 bacteriological samples were collected 34 hours apart (upstream, downstream and at the site of the work) on July 13th and 14th. Sample results indicated no total coliforms or *E.coli*. The BWA was lifted on July 17th at approximately 12:00 PM (noon).

Incident #4: Category 2 – Planned Watermain Repair / Loss of Pressure / BWA

AWQI No.	163026
Date	August 15, 2023
Details	A valve replacement on Meridian Avenue (between Albert Street and Little Street) resulted in a loss of pressure to approximately 3 homes. The local Health Unit issued a precautionary BWA of the affected residences.

Corrective Actions	After the work was complete and pressure was restored, the area was flushed until an acceptable combined chlorine residual was achieved (1.12 mg/L). Two sets of 3 bacteriological samples were collected 24 hours apart (upstream, downstream and at the site of the work) on August 15th and 16th. The upstream sample collected on August 15th at 1405 hours from a hydrant located on the corner of Little and Meridian Streets had a result of one (1) total coliform (AWQI 163058). Sample results from August 16th were acceptable having zero total coliforms and *E.coli.* The BWA was lifted on August 21st at approximately 10:00 AM after acceptable bacteriological results were received.

Incident #5: Category 2 – Planned Watermain Repair / Loss of Pressure / BWA

AWQI No.	163027
Date	August 16, 2023
Details	A valve replacement on Meridian Avenue (between Albert Street and Algonquin Drive) resulted in a loss of pressure to approximately 16 homes. The local Health Unit issued a precautionary BWA of the affected residences.
Corrective Actions	Valves and repair parts were disinfected as required. After the work was complete and pressure was restored, the area was flushed until an acceptable combined chlorine residual was achieved (1.21 mg/L). Two sets of 3 bacteriological samples were collected 24 hours apart (upstream, downstream and at the site of the work) on August 16th and 17th. The upstream sample collected on August 16th at 316 Albert St. had a result of NDOGN-TC & EC (AWQI 163081). The sample collected August 16th at 320 Albert St.; the site of the work, had 2 total coliforms (AWQI 163082). A sample collected on August 17th at 316 Albert St. had a result of 1 total coliform (AWQI 163099). All corrective actions were performed as required by O. Reg. 170/03 and instructions provided by the MOH. All re-samples

	results were acceptable having zero total coliforms and *E.coli*. The BWA was lifted on August 21st at approximately 4:00 PM.

Incident #6: Adverse Total Coliform Result

AWQI No.	163058
Date	August 17, 2023
Details	One (1) total coliform was detected in a sample collected from a hydrant located on Little Street and Meridian Avenue. The sample was collected in response to a category 2 watermain repair (replacement of a valve) on August 15th (AWQI No. 163026). A precautionary BWA is already in place for the area which was issued by the local MOH on August 15th. The sample was collected on August 15th at 14:05 hours. The combined chlorine residual = 1.18 mg/L.
Corrective Actions	Re-samples were collected (upstream, downstream and the site of the adverse result) on August 17th and results were acceptable having zero total coliforms and *E.coli*. The BWA for AWQI No. 163026 was lifted on August 21, 2023 at 10:00 AM.

Incident #7: NDOGN (No Data, Overgrown with Non-target – Exceedance for Total Coliform/*E.coli*)

AWQI No.	163081
Date	August 18, 2023
Details	A result of NDOGN (TC & EC) was detected for a sample collected at 316 Albert Street in the community of Haileybury. The sample was collected in response to a category 2 watermain repair (replacement of a valve) on August 16th (AWQI No. 163027). A precautionary BWA was already in place for the area which was issued by the local MOH on August 16th.

	The sample was collected on August 16th at 1217 hours. The combined chlorine residual = 1.46 mg/L.
Corrective Actions	The chlorine dose was immediately increased to ensure the combined chlorine residual in the distribution system was at or above 1.0 mg/L (290 Albert - upstream = 1.30 mg/L, 340 Albert - downstream = 1.14 mg/L, 316 Albert - site = 1.32 mg/L) Collected 2 sets of 3 re-samples (upstream, downstream and at the site of the adverse result) on August 18th and 19th (24 hours after the first set is collected). All corrective actions were performed as required by O. Reg. 170/03 and the MOH and all re-samples results were acceptable having zero total coliforms and *E.coli*. The BWA for AWQI No. 163027 was lifted on August 21st at approximately 4:00 PM.

Incident #8: Adverse Total Coliform Result

AWQI No.	163082
Date	August 18, 2023
Details	Two (2) total coliforms were detected in a sample collected at 320 Albert Street in the community of Haileybury. The sample was collected in response to a category 2 watermain repair (replacement of a valve) on August 16th (AWQI No. 163027). A precautionary BWA is already in place for the area which was issued by the local MOH on August 16th. The sample was collected on August 16th at 1227 hours. The combined chlorine residual = 1.41 mg/L.
Corrective Actions	Re-samples (upstream, downstream and the site of the adverse result) were collected on August 18th and results indicated zero total coliforms and *E.coli*. The BWA for AWQI No. 163027 was lifted on August 21st at approximately 4:00 PM.

Haileybury DWS

Notices Reported & Submitted to the Spills Action Center

Incident #9: Adverse Total Coliform Result

AWQI No.	163099
Date	August 19, 2023
Details	One (1) total coliform was detected in a sample collected at 316 Albert Street in the community of Haileybury. The sample was collected on August 17th at 1303 hours. The combined chlorine residual = 0.76 mg/L. A precautionary BWA is already in place for the area which was issued by the local MOH on August 16th for a loss of pressure event caused by watermain repairs (AWQI No. 163027) A sample collected on August 16th at his location had a result of NDOGN (AWQI 163081)
Corrective Actions	The chlorine dose was immediately increased to ensure the combined chlorine residual in the distribution system was at or above 1.0 mg/L Collected 2 sets of 3 re-samples (upstream, downstream and at the site of the adverse result) on August 19th and 20th (24 hours after the first set is collected). Sample results indicated zero total coliforms and *E.coli*. The BWA for AWQI No. 163027 was lifted on August 21st at approximately 4:00 PM.

Incident #10: Category 2 - Planned Watermain Repair / Loss of Pressure / BWA

AWQI No.	163399
Date	September 13, 2023
Details	Valve replacement on Georgina Avenue resulted in a loss of pressure to approximately 20 homes. A precautionary BWA was issued for the affected residents by the local MOH.
Corrective Actions	A section of pipe was replaced. Pipe and repair parts were disinfected. Flushing performed at Dixon and Broadway (FCR = 1.20 mg/L).

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Notices Reported & Submitted to the Spills Action Center

	After the work was complete and pressure was restored, the area was flushed and residuals collected. Two sets of 3 bacteriological samples were collected (upstream, downstream and at the site of the work) on September 13th and 14th. The sample collected near the site of the repair had a result of one (1) total coliform (AWQI No. 163460). The second set of samples collected on September 14th had acceptable results with no total coliforms or *E. coli*. The third set of samples collected on September 15th also had zero total coliforms and zero *E. coli*. The MOH lifted the BWA on September 18th at approximately 11:00 AM after acceptable results were received.

Incident #11: Adverse Total Coliform Result

AWQI No.	163460
Date	September 15, 2023
Details	One (1) total coliform was detected in a sample collected at 211 Georgina Avenue in the community of Haileybury. The sample was collected on September 13th at 1254 hours. The combined chlorine residual = 0.65 mg/L. A precautionary BWA was already in place for the area which was issued by the local MOH on September 13th for a loss of pressure event caused by watermain repairs (AWQI No. 163399).
Corrective Actions	Re-samples (upstream, downstream and the site of the adverse result) were collected on September 14th & 15th and results indicated zero total coliforms and *E.coli*. The BWA for AWQI No. 163399 was lifted on September 18th at approximately 11:00 AM.

Incident #12: Category 2 - Planned Watermain Repair / Loss of Pressure / BWA

AWQI No.	163541
Date	September 21, 2023

Haileybury DWS

Notices Reported & Submitted to the Spills Action Center

Details	Replacement of a valve on Georgina Avenue and Albert Street resulted in a loss of pressure to approximately 20 homes. The local Health Unit was notified on September 20th of the planned work and issued a precautionary BWA for the affected residences. The BWA went into effect on September 21st.
Corrective Actions	Valves and repair parts were disinfected as required. After the work was complete and pressure was restored, the area was flushed until an acceptable chlorine residual was achieved. Two sets of 3 bacteriological samples were collected 24 hours apart (upstream, downstream and at the site of the work) on September 21st and 22nd. All results were acceptable having zero total coliforms *and E.coli.* The MOH lifted the BWA on September 25th at approximately 10:30 AM.

Incident #13: Category 2 – Emergency Watermain Repair / Loss of Pressure / BWA

AWQI No.	163710
Date	October 4, 2023
Details	A watermain break (a broken valve) at Rorke Avenue and 455 Amwell resulted in a loss of pressure to approximately 400 homes. The local Health Unit issued a precautionary BWA for the affected residences. After consultation with OCWA and the Health Unit, the advisory was later extended to homes North of Albert Street (including Albert St.) and East for Rorke Avenue.
Corrective Actions	After the repair was complete and pressure was restored, the area was flushed until an acceptable chlorine residual was achieved (CCR = 1.46 mg/L). Two sets of 6 bacteriological samples were collected as per the Health Units instructions on October 5th and 6th. All results were acceptable having zero total coliforms and *E.coli.* The MOH lifted the BWA on October 7th at approximately 5:00 PM

Haileybury DWS

Notices Reported & Submitted to the Spills Action Center

Incident #14: Loss of Free Chlorine Residual Monitoring

AWQI No.	163936
Date	October 31, 2023
Details	Loss of free chlorine monitoring (0.00 mg/L) for 1 hour and 18 minutes (1637 to 1752 hours) due to an analyzer fault.
Corrective Actions	On-call operator repaired the analyzer and restored monitoring. Free chlorine residuals were tested manually every 5 minutes from 1700 hours to 1752 hours. The analyzer was back in operation at 1752 hours. Operator monitored analyzer to ensure proper operation. The local Health Unit and the Ministry's Spills Action Center were notified. 1700 hours = 1.99 mg/L 1705 hours = 2.00 mg/L 1710 hours = 1.99 mg/L 1715 hours = 1.99 mg/L 1720 hours = 2.00 mg/L 1725 hours = 1.99 mg/L 1730 hours = 1.97 mg/L 1735 hours = 1.98 mg/L 1740 hours = 1.99 mg/L 1745 hours = 1.97 mg/L 1750 hours = 1.96 mg/L 1752 hours – analyzer back on-line = 1.07 mg/L

APPENDIX B

Monthly Summary of Microbiologcal Test Results

HAILEYBURY DRINKING WATER SYSTEM
2023 Summary of Microbiological Test Results

Raw Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
Lake Timiskaming / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	85	58	< 52	> 1000	340	195	160	65	16	> 400	> 400	194			1000	
Mean Lab	60.25	39	< 31	> 339	142.8	77.5	68	30.75	11	> 270.2	> 253	160.75		123.22		
Min Lab	30	30	< 2	> 6	44	15	10	6	6	> 20	> 74	122			<	2
Lake Timiskaming / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	< 8	< 5	< 2	80	< 5	< 5	< 20	< 5	< 8	30	< 40	< 5			80	
Mean Lab	< 4	< 2.75	< 2	30.5	< 3	< 4.25	< 7.4	< 3.5	< 5.75	16.4	< 16.667	< 3.25		< 8.16		
Min Lab	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2	4	8	< 2	< 2			<	2

Treated Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
Treated Water / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water / HPC - cfu/mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	< 30	< 20	< 10	< 10	< 20	< 20	< 10	< 10	< 30	< 30	60	< 40			60	
Mean Lab	< 18	< 12.5	< 10	< 10	< 12	< 12.5	< 10	< 10	< 17.5	< 14	30	< 17.5		< 14.423		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	< 10			<	10

Distribution Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
1st Bacti/Residual / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
1st Bacti/Residual / E. Coli - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / E. Coli - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / HPC - cfu/mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	< 10	< 30	< 50	< 10	< 10	< 50	< 20	< 40	< 10	> 2000	< 60	< 40			2000	
Mean Lab	< 10	< 17.5	< 20	< 10	< 10	< 32.5	< 12	< 17.5	< 10	> 410	< 22.5	< 20		54.038		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	> 10	< 10	< 10			<	10
3rd Bacti/Residual / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
3rd Bacti/Residual / E. Coli - cfu/100mL																
Count Lab	5	4	4	4	5	4	5	4	4	5	4	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0

APPENDIX C

Monthly Summary of Operational Results

HAILEYBURY DRINKING WATER SYSTEM
2023 Summary of Operational Test Results

Filtered Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
Filter #1 / Turbidity (Max 1 NTU) - NTU																
Max OL					0.42	0.15	0.12	0.09	0.12	0.18	0.30	0.25			0.42	
Mean OL	Filter off-line until May 17, 2023				0.52	0.04	0.04	0.03	0.03	0.05	0.07	0.06		0.11		
Min OL					0.04	0.00	0.03	0.00	0.03	0.03	0.00	0.04				0.00
Filter #2 / Turbidity (Max 1 NTU) - NTU																
Max OL	0.36	0.31	0.34	0.71	0.29	0.48	0.19	0.20	0.16	0.26	0.39	0.74			0.74	
Mean OL	0.04	0.04	0.04	0.04	0.06	0.05	0.03	0.03	0.03	0.05	0.07	0.08		0.05		
Min OL	0.00	0.03	0.03	0.03	0.04	0.00	0.02	0.00	0.02	0.02	0.05	0.04				0.00
Filter #3 / Turbidity (Max 1 NTU) - NTU																
Max OL	0.68	0.32	0.76	0.94	0.85	0.97	0.36	0.16	0.35	0.56	0.67	Filter off-line on Nov 6, 2023			0.97	
Mean OL	0.05	0.05	0.07	0.06	0.07	0.05	0.04	0.04	0.04	0.07	0.13			0.06		
Min OL	0.03	0.03	0.03	0.02	0.04	0.03	0.03	0.02	0.02	0.03	0.10					0.02

Treated Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
Reservoir / Cl Residual: Free (Min 0.3 mg/L) - mg/L																
Max OL	2.00	1.97	2.12	3.06	2.09	2.01	1.91	2.35	2.80	2.30	2.38	2.47			3.06	
Mean OL	1.76	1.87	1.97	1.85	1.78	1.83	1.69	1.91	2.09	2.04	2.07	1.88		1.89		
Min OL	1.54	1.71	1.73	1.29	1.58	1.57	1.27	1.59	1.92	1.85	1.76	1.70				1.27

Distribution Water	01/2023	02/2023	03/2023	04/2023	05/2023	06/2023	07/2023	08/2023	09/2023	10/2023	11/2023	12/2023	Total	Avg	Max	Min
1st Bacti/Residual / Cl Residual: Combined - mg/L																
Count IH	10	8	9	8	10	8	9	9	8	9	9	8	105			
Total IH	15.73	13.93	14.8	13.57	16.7	13.78	13.64	13.89	13.88	16.05	16.89	13.57	176.43			
Max IH	1.82	1.88	1.91	2.04	1.9	1.81	1.69	1.98	1.88	1.9	2.09	1.93			2.09	
Mean IH	1.573	1.741	1.644	1.696	1.67	1.723	1.516	1.543	1.735	1.783	1.877	1.696		1.68		
Min IH	0.62	1.3	1.14	1.5	1.28	1.55	1.22	0.78	1.41	1.35	1.58	1.42				0.62
2nd Bacti/Residual / Cl Residual: Combined - mg/L																
Count IH	10	8	9	8	10	8	9	9	8	9	9	8	105			
Total IH	12.99	10.8	10.63	9.12	12.47	9.67	10.17	8.51	6.81	10.29	11.06	10.17	122.69			
Max IH	1.84	1.68	1.78	1.39	1.76	1.51	1.5	1.47	1.08	1.32	1.55	1.6			1.84	
Mean IH	1.299	1.35	1.181	1.14	1.247	1.209	1.13	0.946	0.851	1.143	1.229	1.271		1.168		
Min IH	0.61	1.17	0.84	0.78	0.82	1.03	0.65	0.53	0.67	1.04	0.93	0.89				0.53
3rd Bacti/Residual / Cl Residual: Combined - mg/L																
Count IH	9	8	9	8	10	8	9	9	8	9	9	8	104			
Total IH	13.72	12.46	12.47	13.02	15.67	10.47	10.15	11.73	11.31	14.35	15.39	12.86	153.6			
Max IH	1.71	1.81	1.69	1.96	1.75	1.53	1.55	1.72	1.73	1.88	1.93	1.72			1.96	
Mean IH	1.524	1.558	1.386	1.628	1.567	1.309	1.128	1.303	1.414	1.594	1.71	1.608		1.477		
Min IH	0.98	1.09	0.99	1.19	1.39	1.05	0.77	0.71	0.98	1.03	1.38	1.22				0.71
4th Residual / Cl Residual: Combined - mg/L																
Count IH	5	4	4	4	5	4	5	4	4	5	4	4	52			
Total IH	7.7	6.36	6.76	6.16	7.7	6.43	7.37	6.19	6.71	8.1	7.47	6.55	83.5			
Max IH	1.84	1.78	1.78	1.77	1.83	1.63	1.52	1.85	1.76	1.77	2.09	1.76			2.09	
Mean IH	1.54	1.59	1.69	1.54	1.54	1.608	1.474	1.547	1.678	1.62	1.868	1.637		1.606		
Min IH	0.96	1.34	1.63	1.18	1.21	1.59	1.38	1.29	1.61	1.4	1.74	1.4				0.96

NOTES:

1. Filter No. 1 was taken off-line on October 17, 2022 for refurbishment and put back into service on May 17, 2023.
   Filter No. 3 was removed form service on November 6, 2023 for refurbishment. Work in on-going into 2024

2. Filters will backwash if turbidity reaches 0.7 NTU and will shut down (callout and filter to waste) at 1.0 NTU. In 2022, the filters shut down during all high turbidity events.

3. CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the Haileybury water plant if the free chlorine residual level drops below 0.30 mg/L to ensure primary disinfection is achieved. No CT calculations were required during the reporting period.