



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Charlton Drinking Water System

2022 ANNUAL/SUMMARY REPORT

Prepared by the Ontario Clean Water Agency
on behalf of the Municipality of Charlton and Dack

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INTRODUCTION

Municipalities throughout Ontario have been required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act* (SDWA) since June 2003. The Act was enacted 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.

Section 11 of Regulation 170/03 requires the owner to produce an Annual Report. This report must include the following:

1. Description of system & 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 28th of each year.

Schedule 22 of the regulation also requires a Summary Report which must be presented & accepted by Council by March 31st of each year for the preceding calendar year.

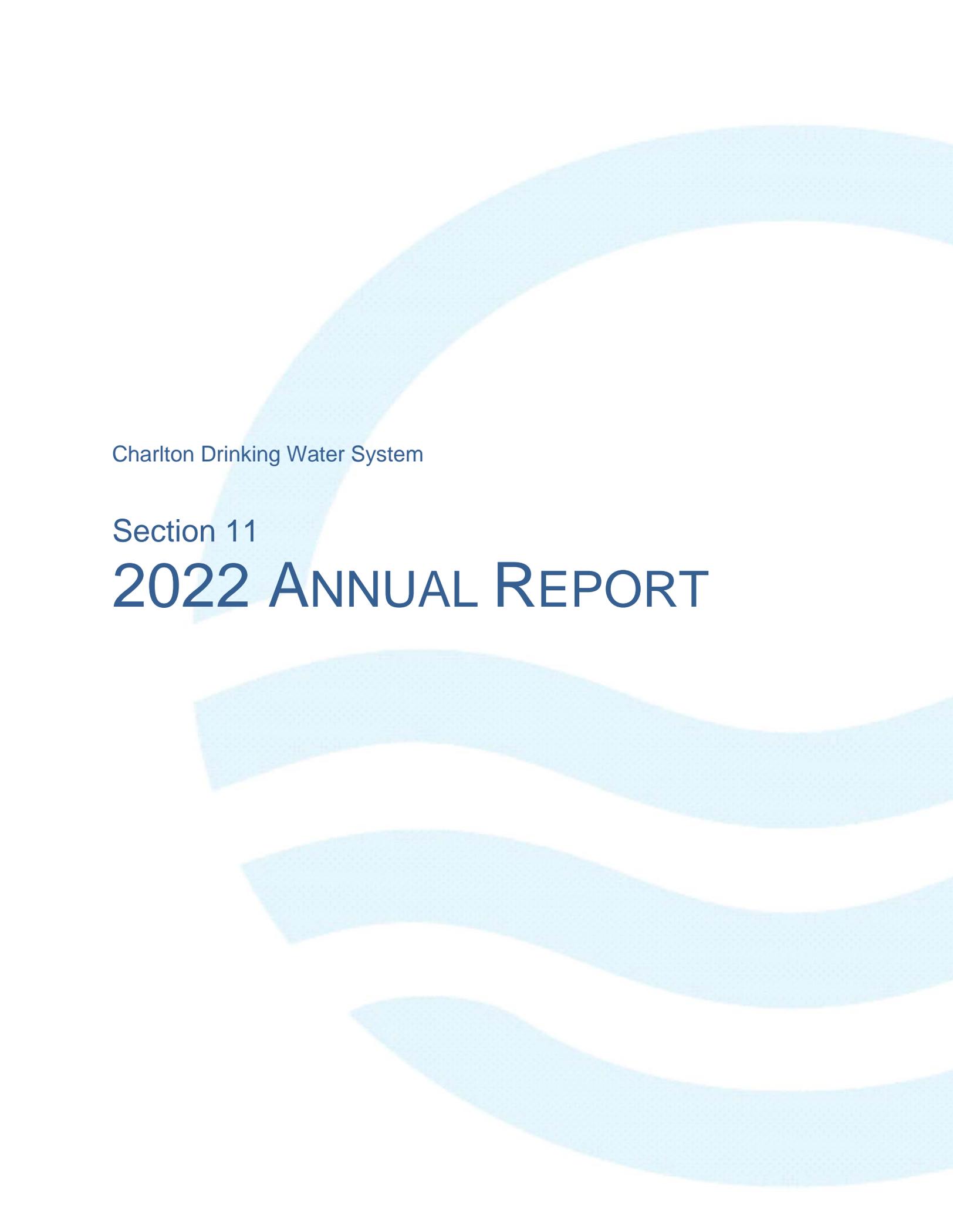
The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any regulatory requirements the system failed to meet during the reporting period. The report must 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 reports have been prepared by the Ontario Clean Water Agency (OCWA) on behalf of the Owner and presented to council as the 2022 Annual/Summary Report.



Charlton Drinking Water System

Section 11

2022 ANNUAL REPORT



Section 11 - ANNUAL REPORT

1.0 INTRODUCTION

Drinking-Water System Name:	Charlton Drinking Water System
Drinking-Water System No.:	220005768
Drinking-Water System Owner:	The Corporation of the Municipality of Charlton & Dack
Drinking-Water System Category:	Large Municipal, Residential System
Period being reported:	January 1, 2022 to December 31, 2022

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.charltonanddack.com/>

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

Municipality of Charlton & Dack
#287237 Spruce Grove Road
Englehart ON P0J 1H0

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

The Charlton Drinking Water System provides all drinking water to the community of Charlton.

The Annual Report was not provided to any other Drinking Water System Owners.

The Ontario Clean Water Agency prepared the 2022 Annual/Summary Report for the Charlton Drinking Water System and provided a copy to the system owner; the Municipality of Charlton & Dack. The Charlton Drinking Water System is a stand-alone system that does not receive water from or send water to another system.

Notification to system users that the Annual Report is available for viewing is accomplished through:

- Notice on the municipality's Facebook page
- Discussions during public council meetings.



2.0 CHARLTON DRINKING WATER SYSTEM (DWS No. 220005768)

The Charlton Drinking Water System is owned by the Corporation of the Municipality of Charlton and Dack and consists of a Class 2 water treatment subsystem and a Class 1 water distribution subsystem. 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 on the west bank of the Englehart River on Bay Street in the Town of Charlton and has a maximum rated capacity of 561 m³/day. The raw water intake system consists of an 83 m long, 200 mm diameter pipe that extends approximately 70 meters into the Englehart River. The pipe is equipped with a vertical intake riser, with manual height adjustment and perforated with 150 mm diameter holes which are covered with 20 mm diameter high density polyethylene mesh. A sand bag weighted drum secures the pipe to the river bed. The intake pipe supplies a 13.6 cubic meter low lift pumping station equipped with three submersible pumps each rated at 3.25 litres per second (L/s).

Water Treatment

The treatment process consists of chemically assisted filtration using a single train “*Ecodyne Monoplant*” package treatment system housed in a 15 m by 16 m building. The process involves pH adjustment with soda ash, flash mixing/coagulation with alum, flocculation with the assistance of polymer, upflow clarification using settling tubes, pre-chlorination using sodium hypochlorite (which is used as needed) and dual media filtration through two sand and anthracite filters. As the water exits the common filter underdrain the water is post-chlorinated using sodium hypochlorite (primary disinfection). An on-line turbidimeter is used to monitor the turbidity off the filters.

Water Storage and Pumping Capabilities

The filtered water enters a 133 m³ chlorine contact chamber then flows to a 227 m³ clearwell. Free chlorine residual is continuously monitored at this point to ensure primary disinfection is achieved. Ammonium sulphate is added at the discharge of the chlorine contact tank to produce a combined chlorine residual before entering the distribution system (secondary disinfection).

There are three high lift pumps each rated at 4.85 L/s that can direct water to the distribution system. High lift pump #1 is not in service and locked out because it is located in the chlorine contact tank. Water pumped from this location does not meet chlorine contact time (CT) requirements. High lift pumps # 2 and #3 are located in the clearwell and are equipped with variable frequency drives (VFDs). A hydro-pneumatic tank having a volume of 1500 L provides pressure to the distribution system. The treated water is monitored for flow and total chlorine residual using continuous on-line analyzers.



Waste Management

Residue management consists of one 50 cubic meter wastewater/backwash surge tank, equipped with a sludge pump rated at 5.1 L/s and a 29.7 cubic meter waste settling tank with a sludge transfer pump.

The process waste is generated from clarifier blowdown, filter backwash effluent and clean-up water which are gravity fed to the surge tank. The wastewater level in the surge tank is controlled by a float operated submersible pump which transfers the wastewater to the waste settling tank. The tank allows for solids to settle before the supernatant is discharged to the Englehart River. An effluent weir permits the discharge of the supernatant to the river via an effluent outfall sewer. The built-up sludge is pumped to a tanker truck for disposal.

Composite samples of the effluent are collected monthly and tested for total suspended solids (TSS). Grab samples are also collected monthly and tested for total chlorine residual (TCR).

Emergency Power

An 80 kW standby diesel generator set is available on-site to provide power to the water treatment facility during power failures.

Distribution System

The Charlton Water Supply System is classified as a Large Municipal Residential Drinking Water System which serves a population of approximately 250 residents through an estimated 123 service connections. The distribution system is comprised of 6" PVC-constructed ("Blue Brute") lines which were approved for installation in 1988. Other than the clearwell in the water plant, there is no off-site water storage facility associated with the system. There is only one fire hydrant within the distribution system and it's located on the property of the water treatment plant.

3.0 LIST OF CHEMICALS USED OVER THE REPORTING PERIOD

The following chemicals were used in the treatment process at the Charlton Water Treatment Plant.

- Sodium Hypochlorite – Disinfection
- Ammonium Sulphate – Chloramination
- Sodium Carbonate (Soda Ash) - pH Adjustment
- Alum (Aluminum Sulphate) - Coagulation/Flocculation
- Poly Electrolyte - Coagulant Aid

All treatment chemicals meet AWWA and NSF/ANSI standards.



4.0 SIGNIFICANT EXPENSES INCURRED IN THE DRINKING WATER SYSTEM

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

Significant expenses incurred in the drinking water system include:

- Installed a new system control and data acquisition (SCADA) system and upgraded the existing programmable logic controller (PLC). Various continuous on-line analyzers and monitors which are used for process control and monitoring are now tied into the new SCADA system.
- Purchased new flash mixer motor and slow mixer motor.
- Replaced the filter backwash piping with new 6” Schedule 80 PVC. New hardware was installed and valves replaced with ¼ turn PVC ball valves.
- Fabricated and installed a lift gantry for high lift pumps
- SAI Global Quality and Environmental Management System (QEM) surveillance and re-accreditation audits. Accreditation achieved on October 18, 2022.

5.0 DETAILS ON NOTICES OF ADVERSE TEST RESULTS AND OTHER PROBLEMS REPORTED TO & SUBMITTED TO THE SPILLS ACTION CENTER

Based on information kept on record by OCWA, one (1) adverse water quality incident was reported to the Ministry’s Spills Action Centre in 2022.

<i>Date</i>	<i>AWQI No.</i>	<i>Details</i>
Q4 2022 (October to December)	N/A	<p>December 8 - calculated the running annual average (RAA) to be 84 ug/L (Maximum Allowable Concentration – MAC = 80 ug/L).</p> <p>Two samples collected in the fourth quarter of 2022 October 11 = 137 ug/L November 16 = 133 ug/L. Q4 2022 average = 135 ug/L</p> <p><u>Corrective Action:</u> increased treated water pH to try and lower HAA levels.</p> <p>December 20 - reported exceedance using Section 2C of the form – Notices of Adverse Test Results and Issue Resolution (Schedule 16) to MOH, SAC and the Owner.</p>



6.0 MICROBIOLOGICAL TESTING PERFORMED DURING THE REPORTING PERIOD

Summary of Microbiological Data

Sample Type	# of Samples	Range of <i>E. coli</i> Results (min to max)	Range of Total Coliform Results (min to max)	# of HPC Samples	Range of HPC Results (min to max)
Raw (Englehart River)	52	0 to 65/NDOGT	0 to > 1000/NDOGT	N/A	N/A
Treated	52	0 to 0	0 to 0	52	< 10 to > 2000
Distribution	104	0 to 0	0 to 0	52	< 10 to 70

Maximum Allowable Concentration (MAC) for *E. coli* = 0 Counts/100 mL

MAC for Total Coliforms = 0 Counts/100 MI

NDOGT = No Data, Overgrown with Target

NDOGN = No Data, Overgrown with Non-target

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

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

Notes:

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

Refer to [Appendix A](#) for a monthly summary of microbiological test results.

7.0 OPERATIONAL TESTING PERFORMED DURING THE REPORTING PERIOD

Continuous Monitoring in the Treatment Process

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Turbidity	8760	0.00 to 2.00*	NTU	≤ 1.0
Free Chlorine (contact chamber)	8760	0.42** to 4.73	mg/L	CT

Notes:

- For continuous monitors 8760 is used as the number of samples.
- * Effective backwash procedures and automatic pump 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. The water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds or 4 minutes after a backwash. In 2022, the system shut down during all high turbidity events.
 - June 13 - high turbidity occurred as a results of the PLC failure. Lost coagulation and plant shut down until issue resolved.
 - December 6 - operators drained the backwash piping and refilled the plant. The turbidity spiked for a short duration (approx. 1 minute). Turbidity exceedances occur when two (2) readings are above 1 NTU for 15 minutes or more in a 24 hour period.
- ** 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 Charlton water plant if the free chlorine residual level drops below 0.90 mg/L (in the winter months) and 0.40 mg/L (in the summer months) to ensure primary disinfection is achieved.

Summary of Chlorine Residual Data in the Distribution System

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Combined Chlorine Residual	364	0.31 to 2.13	mg/L	≥ 0.25

Notes:

1. 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 B](#) for a monthly summary of the above operational data.

Summary of Nitrate & Nitrite Data (sampled at the plant's point of entry into the distribution every quarter)

Date of Sample	Nitrate Result Value	Nitrite Result Value	Unit of Measure	Exceedance
January 11	0.4	< 0.01	mg/L	No
April 11	0.3	< 0.01	mg/L	No
July 11	0.3	< 0.01	mg/L	No
October 11	0.2	< 0.01	mg/L	No

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

Summary of Total Trihalomethane Data (sampled in the distribution system every quarter)

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 11	45.1	ug/L		
April 11	26.4	ug/L		
July 11	42.1	ug/L	45.2	No
October 11	67.2	ug/L		

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

Summary of Total Haloacetic Acid Data (sampled in the distribution system every quarter)

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 11	85	ug/L		
April 11	29	ug/L		
July 11	87	ug/L	84	Yes
October 11	137	ug/L		
November 16	133	ug/L		

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

Summary of Most Recent Lead Data under Schedule 15.1

(applicable to the following drinking water systems; large municipal residential systems, small, municipal residential systems, and non-municipal year-round residential systems)

The Charlton Drinking Water System was eligible to follow the “Exemption from Plumbing Sampling” as described in section 15.1-5(9) and 15.1-5(10) of Schedule 15.1 of Ontario Regulation

170/03. The exemption applies to a drinking water system if, in two consecutive periods at reduced sampling, not more than 10% of all samples from plumbing exceed the maximum allowable concentration (MAC) of 10 ug/L for lead. As such, the system was required to test for total alkalinity and pH in one distribution sample collected during the periods of December 15 to April 15 (winter period) and 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 samples were last collected in 2020 and results were well below the MAC. Two rounds of alkalinity and pH testing were carried out on March 7th and September 12th of 2022. Results are summarized in the table below.

Summary of Lead Data (sampled in the distribution system)

Date of Sample	No. of Samples	Field pH	Field Temperature (°C)	Alkalinity (mg/L)	Lead (ug/L)
March 7	1	7.29	5.5	102	N/A
September 12	1	7.11	19.4	70	N/A

Note: Next lead sampling scheduled for 2023

Most Recent Schedule 23 Inorganic Data Tested at 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	12.0	ug/L	1000	No	No
Boron	< 2.0	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	2.0	ug/L	50	No	No
Mercury	< 0.1	ug/L	1	No	No
Selenium	0.3	ug/L	50	No	No
Uranium	< 1.0	ug/L	20	No	No

Note: Sample required every 12 months (sample date = October 11, 2022)

Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Alachlor	< 0.226	ug/L	5	No	No
Atrazine + N-dealkylated metabolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.169	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	< 0.0923	ug/L	5	No	No
Carbaryl	< 4	ug/L	90	No	No
Carbofuran	< 5	ug/L	90	No	No
Carbon Tetrachloride	< 0.2	ug/L	2	No	No



Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Chlorpyrifos	< 0.169	ug/L	90	No	No
Diazinon	< 0.169	ug/L	20	No	No
Dicamba	< 0.0808	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)	< 0.346	ug/L	100	No	No
Diclofop-methyl	1.5	ug/L	9	No	No
Dimethoate	< 0.169	ug/L	20	No	No
Diquat	< 0.2	ug/L	70	No	No
Diuron	< 20	ug/L	150	No	No
Glyphosate	< 20	ug/L	280	No	No
Malathion	< 0.169	ug/L	190	No	No
Metolachlor	< 0.113	ug/L	50	No	No
Metribuzin	< 0.113	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	3.0	No	No
Pentachlorophenol	< 0.3	ug/L	60	No	No
Phorate	< 0.113	ug/L	2	No	No
Picloram	0.33	ug/L	190	No	No
Prometryne	< 0.0565	ug/L	1	No	No
Simazine	< 0.169	ug/L	10	No	No
Terbufos	< 0.113	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	< 0.113	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	50	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA)	< 5.77	ug/L	100	No	No
Trifluralin	< 0.113	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Note: Sample required every 12 months (sample date = October 11, 2022)

Inorganic or Organic Test Results that Exceeded Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

No inorganic or organic parameter(s) listed in Schedule 23 and 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.

Most Recent Sodium Data Sampled at the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2020	1	28.7	mg/L	20	Yes
October 9, 2020 (resample)	1	30.6	mg/L	20	Yes

Note: Sample required every 60 months. Next sampling scheduled for October 2025

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 SAC and the Timiskaming Health Unit on October 9, 2020 as required under Schedule 16 of O. Reg. 170/03 (AWQI# 152515).

Most Recent Fluoride Data Sampled at the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2020	1	< 0.05	mg/L	1.5	No

Note: Sample required every 60 months. Next sampling scheduled for October 2025

Additional Testing Performed in Accordance with an Approval, Order or Legal Instrument

Total Suspend Solids

Condition 1 (1.5) of Schedule C to Municipal Drinking Water Licence (MDWL) #271-101 requires that the annual average concentration of total suspended solids (TSS) from the effluent discharged to the Englehart River not exceed 25 mg/L. Further, Condition 5 (5.4) of Schedule C to the MDWL requires that composite samples are collected every month. The Charlton water treatment plant did not exceed this limit in 2022.

*Note: Monthly sampling was missed for September and was reported as a Non-Compliance.

Summary of Total Suspended Solids Data from the Effluent Discharge

Date of Sample	No. of Samples	Result Value	Unit of Measure	Annual Average	Limit
January 11	1	< 1	mg/L	13.7	≤ 25
February 7	1	7			



Summary of Total Suspended Solids Data from the Effluent Discharge

Date of Sample	No. of Samples	Result Value	Unit of Measure	Annual Average	Limit
March 11	1	19			
April 19	1	3.5			
May 9	1	2.5			
June 6	1	4			
July 11	1	26.5			
August 8	1	28.5			
September	0	N/A*			
October 11	1	13.5			
November 7	1	25			
December 12	1	20			

Total Chlorine Residual

Condition 1 (1.5) of Schedule C to Municipal Drinking Water Licence (MDWL) #271-101 requires that the annual maximum concentration of total chlorine residual (TCR) from the effluent discharged to the Englehart River not exceed 0.02 mg/L. Further, Condition 5 (5.4) of Schedule C to the MDWL requires that grab samples are collected every month. The Charlton water treatment plant did not exceed this limit in 2022.

*Note: Monthly sampling was missed for September and was reported as a Non-Compliance.

Summary of Total Chlorine Residual Data from the Effluent Discharge

Date of Sample	No. of Samples	Result Value	Unit of Measure	Annual Maximum	Limit
January 11	1	0.00			
February 7	1	0.01			
March 11	1	0.01			
April 19	1	0.01			
May 9	1	0.00			
June 6	1	0.02			
July 11	1	0.02	mg/L	0.01	≤ 0.02
August 8	1	0.00			
September	0	N/A*			
October 11	1	0.01			
November 7	1	0.02			
December 12	1	0.01			

Microcystins

Condition 6.0 (6.1) of Schedule C to Municipal Drinking Water Licence (MDWL) #271-101 issued on January 6, 2021 requires the development of a Harmful Algae Bloom (HAB) monitoring, reporting and sampling plan by July 26, 2021. 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 was developed for the Charlton Drinking Water System in May 2021 and is implemented during the summer seasons. The Plan includes visual monitoring of the HAB monitoring area at least once per week, weekly sampling of the raw and treated water for microcystins if a bloom is suspected or confirmed and reporting to the Health Unit and the Ministry's Spills Actions Center if microcystins are detected in either the raw or treated samples or if a suspected bloom is observed.

No incidents of suspected and/or confirmed blue green algae blooms occurred in the source water (Englehart River) during the monitoring period.



Charlton Drinking Water System

Schedule 22

2022 SUMMARY REPORT

FOR MUNICIPALITIES



Schedule 22 - SUMMARY REPORT FOR MUNICIPALITIES

1.0 INTRODUCTION

Drinking-Water System Name:	Charlton Drinking Water System
Municipal Drinking Water Licence (MDWL):	271-101-3 (issued January 6, 2021)
Drinking Water Work Permit (DWWP):	271-201-3 (issued January 6, 2021)
Permit to Take Water (PTTW):	6225-AC9GWP (issued July 27, 2016)
Period being reported:	January 1, 2022 to December 31, 2022

2.0 REQUIREMENTS THE SYSTEM FAILED TO MEET

According to information kept on record by OCWA, the Charlton Drinking Water System failed to meet the following requirements during the 2022 reporting period:

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
Condition 5 (5.4) of Schedule C to Municipal Drinking Water Licence (MDWL) #271-101	The monthly sampling and testing of waste discharge from the sludge tank for total suspended solids and total chorine residual was missed in September 2022.	September 2022	All operators were made aware of the incident and reminded of the requirements of the MDWL during a meeting held on Friday, October 21, 2022. An additional check system was implemented on November 1st. A designated person will check all laboratory chain of custody forms every Wednesday and Friday to ensure all required samples submitted to the lab.	Complete
Schedule E, Section 1.0 of MDWL 271-101 (issue 3)	The intended contact time is achieved using the contact tank. Primary disinfection chlorine monitoring should be conducted on water at/near the overflow weir from the chlorine contact chamber to the clearwell. However, it is believed that the peristaltic pump that draws the sample for the continuous free chlorine analyzer draws water from directly below the pump, which is located in a corner of the clearwell that is not near the overflow weir. This location may also be a 'dead zone' in the clearwell.	Discovered: May 31, 2022	By September 1, 2022, the owner and operating authority shall ensure primary disinfection chlorine monitoring is being conducted at a location at/near where the intended CT has just been achieved (the overflow weir). August. 16 - moved feed line to closer to the weir outfall into contact tank. Since the line was moved on August 16 th , the free chlorine residuals have been dropping between plant runs.	Complete

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
			Operators tried to resolve this issue by doing the following: 1. Lowered the feed line deeper into the contact tank to ensure it was not too close to the overflow 2. Installed 7 feet of rigid pipe to ensure the feed line maintained a consistent depth. 3. Shorten plant run times to help prevent the drops in chlorine residual between plant runs 4. Moved the feed line approx. 8 feet from the initial location on September 15th. This seemed to address the issue. MECP was made aware of the change and approved.	
Section 10(3) of O. Reg. 170	All changes to the system registration information were not provided within ten (10) days of the change. The Ministry's Drinking Water Information System profile contains an outdated email address for the alternate contact for the owner (the Public Works Superintendent). The previous email address no longer works. (Identified in the Bradley Subdivision MECP inspection report dated August 9, 2022)	Discovered: May 31, 2022	The Public Works Superintendent email was changed, but the Owner failed to update the DWIS profile with this information within the 10 day time frame. On behalf of the Owner, a DWIS Profile application was completed and submitted to the MECP on August 3 rd and the Profile was updated by the Ministry on August 9 th . Owner to notify OCWA of any changes to contact information.	Complete

It should be mentioned that, one (1) adverse water quality incident was reported to the Ministry's Spills Action Center. Refer to Section 5.0 – *Details on Notices of Adverse Test Results and Other Problems Reported to & Submitted to the Spills Actions Center* on page 5 of this report for details.

3.0 SUMMARY OF FLOWS AND COMPARISON TO REGULATORY LIMITS

Flow Monitoring

MDWL No. 271-101 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 treated water that flows from the treatment subsystem the distribution system, and the flow rate and daily volume of water that flows into the treatment subsystem.

The flow monitoring equipment identified in the MDWL is present and operating as required. These flow meters are calibrated on an annual basis as specified in the manufacturers' instructions.

Water Usage

The following water usage tables summarize the quantities and flow rates of water taken and produced during the 2022 reporting period, including total monthly volumes, average monthly volumes, maximum monthly volumes, and maximum flow rates.

Raw Water

2022 - Monthly Summary of Water Takings from the Source (Englehart River)

Regulated by Permit to Take Water (PTTW) #6225-AC9GWP, issued July 27, 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	1760	1595	3571	2399	2498	2356	2760	3033	2686	2480	2405	2665	30208
Average Volume (m ³ /d)	57	57	115	80	81	79	89	98	90	80	80	86	83
Maximum Volume (m ³ /d)	79	85	244	231	115	136	165	187	128	95	103	116	244
PTTW - Maximum Allowable Volume (m ³ /day)	842	842	842	842	842	842	842	842	842	842	842	842	842
Maximum Flow Rate (L/min)	189	250	189	191	190	249	194	216	194	244	197	242	250
PTTW - Maximum Allowable Flow Rate (L/min)	585	585	585	585	585	585	585	585	585	585	585	585	585

The system's Permit to Take Water #6225-AC9GWP allows the municipality to withdraw a maximum volume of 842.4 cubic meters from the Englehart River each day. A review of the raw water flow data indicates that the system did not exceed the maximum allowable volume or maximum flow rate during the reporting period.

Treated Water

2022 - Monthly Summary of Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #271-101 (issue 3), issued January 6, 2021

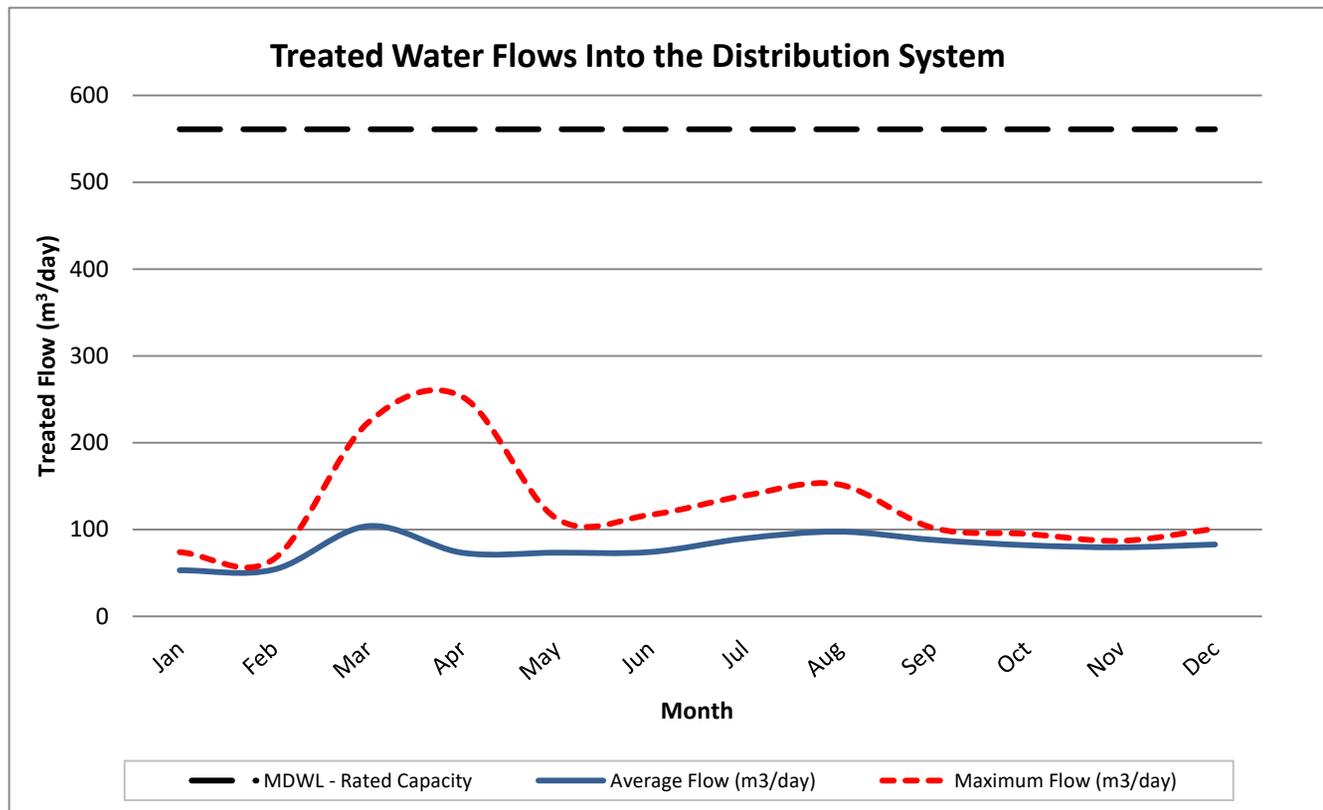
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	1645	1509	3222	2199	2275	2224	2779	3025	2645	2540	2387	2566	29016
Average Volume (m ³ /d)	53	54	104	73	73	74	90	98	88	82	80	83	80
Maximum Volume (m ³ /d)	74	66	223	253	113	117	139	152	102	95	87	101	253
MDWL - Rated Capacity (m ³ /day)	561	561	561	561	561	561	561	561	561	561	561	561	561

Schedule C, Section 1.0 (1.1) of MDWL No. 271-101 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 561 m³/day. The Charlton DWS complied with this limit having a recorded maximum volume of 253 m³/day on April 4th. This represents 45.1% of the rated capacity. Higher flows in March and April when water was being used by the pipeline.

Figure 1 compares the average and maximum flow rates into the distribution system to the rated capacity of the system identified in the MDWL.

Figure 1: 2022 - Comparison of Treated Water Flows to the Rated Capacity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Flow (m ³ /day)	53	54	104	73	73	74	90	98	88	82	80	83
Maximum Flow (m ³ /day)	74	66	223	253	113	117	139	152	102	95	87	101
MDWL - Rated Capacity	561	561	561	561	561	561	561	561	561	561	561	561
% Rated Capacity	13	12	40	45	20	21	25	27	18	17	16	18





Summary of 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)	561 m ³ /day	
Average Daily Flow for 2022	80 m ³ /day	14.3 % of the rated capacity
Maximum Daily Flow for 2022	253 m ³ /day	45.1 % of the rated capacity
Total Treated Water Produced in 2022	29,016 m ³	

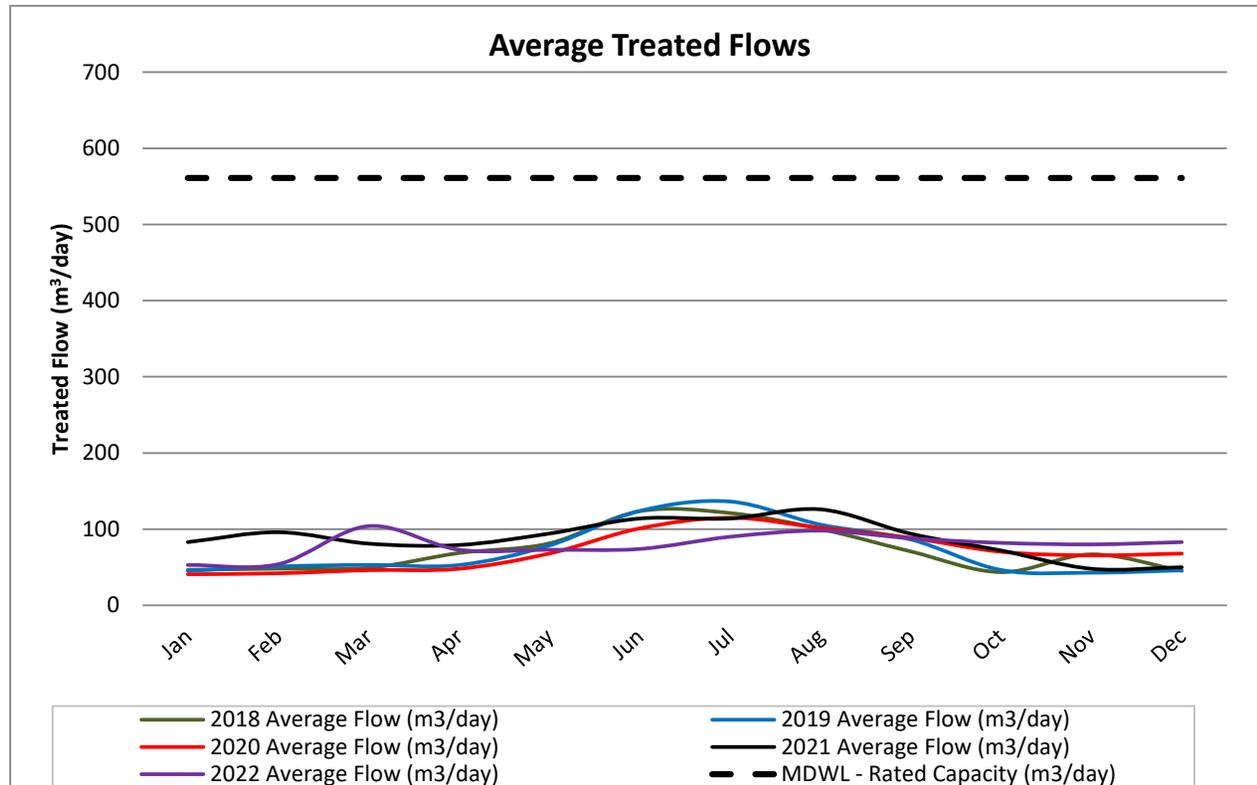
Historical Flows

Year	Maximum Treated Flow (m ³ /d)	Average Daily Treated Flow (m ³ /d)	Average Day % of Rated Capacity (561 m ³ /d)
2022	253	80	14.3%
2021	209	88	15.7%
2020	205	72	12.8%
2019	234	72	12.8%
2018	234	72	12.8%

Figure 2 compares the average treated water flows from 2018 to 2022.

Figure 2: Charlton Water Treatment System - Average Treated Water Flows from 2018 to 2022

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018 Average Flow (m ³ /day)	47	48	49	69	81	124	121	100	71	44	67	45
2019 Average Flow (m ³ /day)	45	51	53	53	79	124	136	106	87	46	43	46
2020 Average Flow (m ³ /day)	41	42	46	48	68	101	115	102	89	70	66	68
2021 Average Flow (m ³ /day)	83	96	81	79	94	114	114	126	94	72	48	50
2022 Average Flow (m ³ /day)	53	54	104	73	73	74	90	98	88	82	80	83
MDWL - Rated Capacity (m ³ /day)	561	561	561	561	561	561	561	561	561	561	561	561



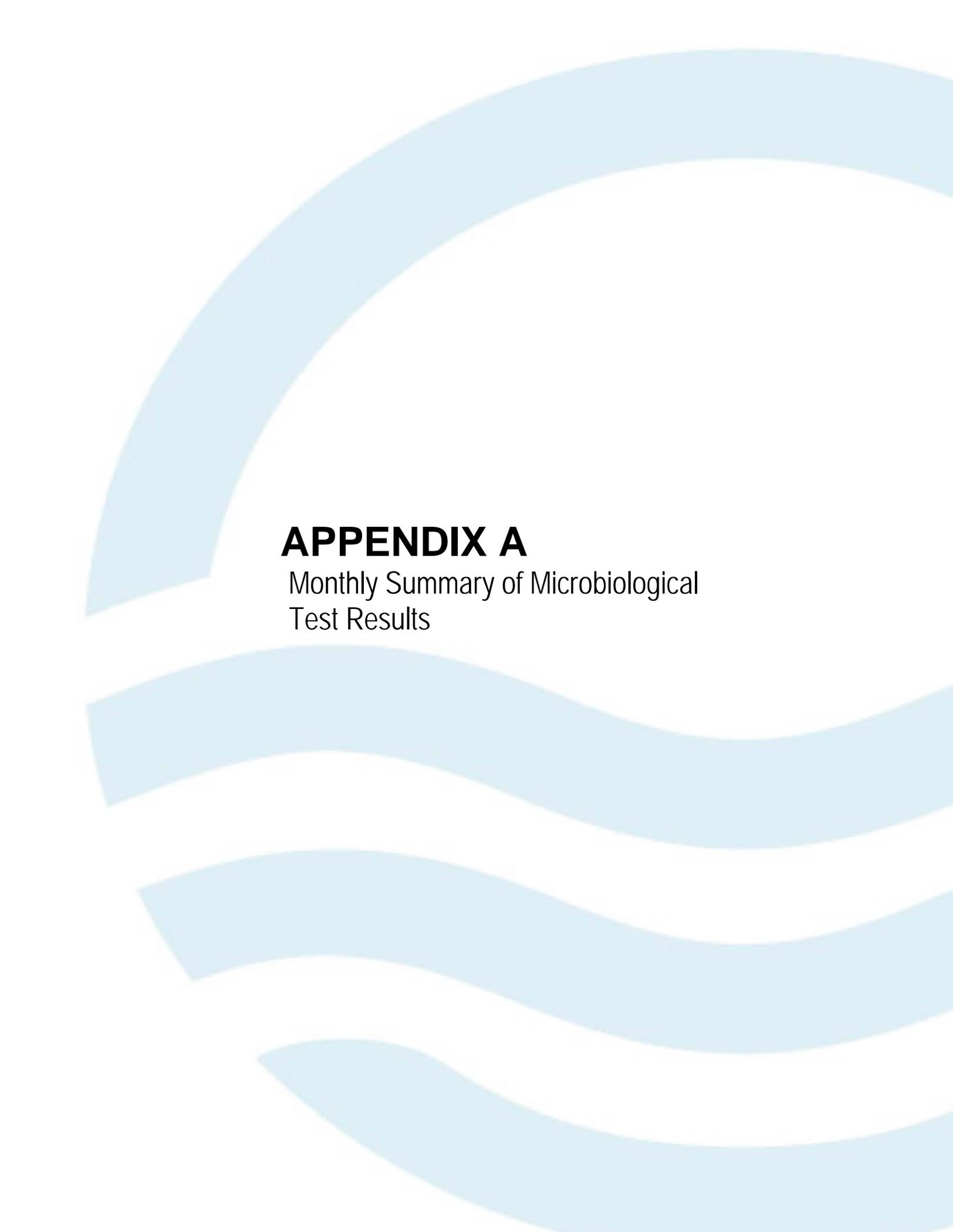


CONCLUSION

The water quality data collected in 2022 demonstrates that the Charlton 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 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 and any non-compliances that were identified were resolved as soon as possible.



APPENDIX A

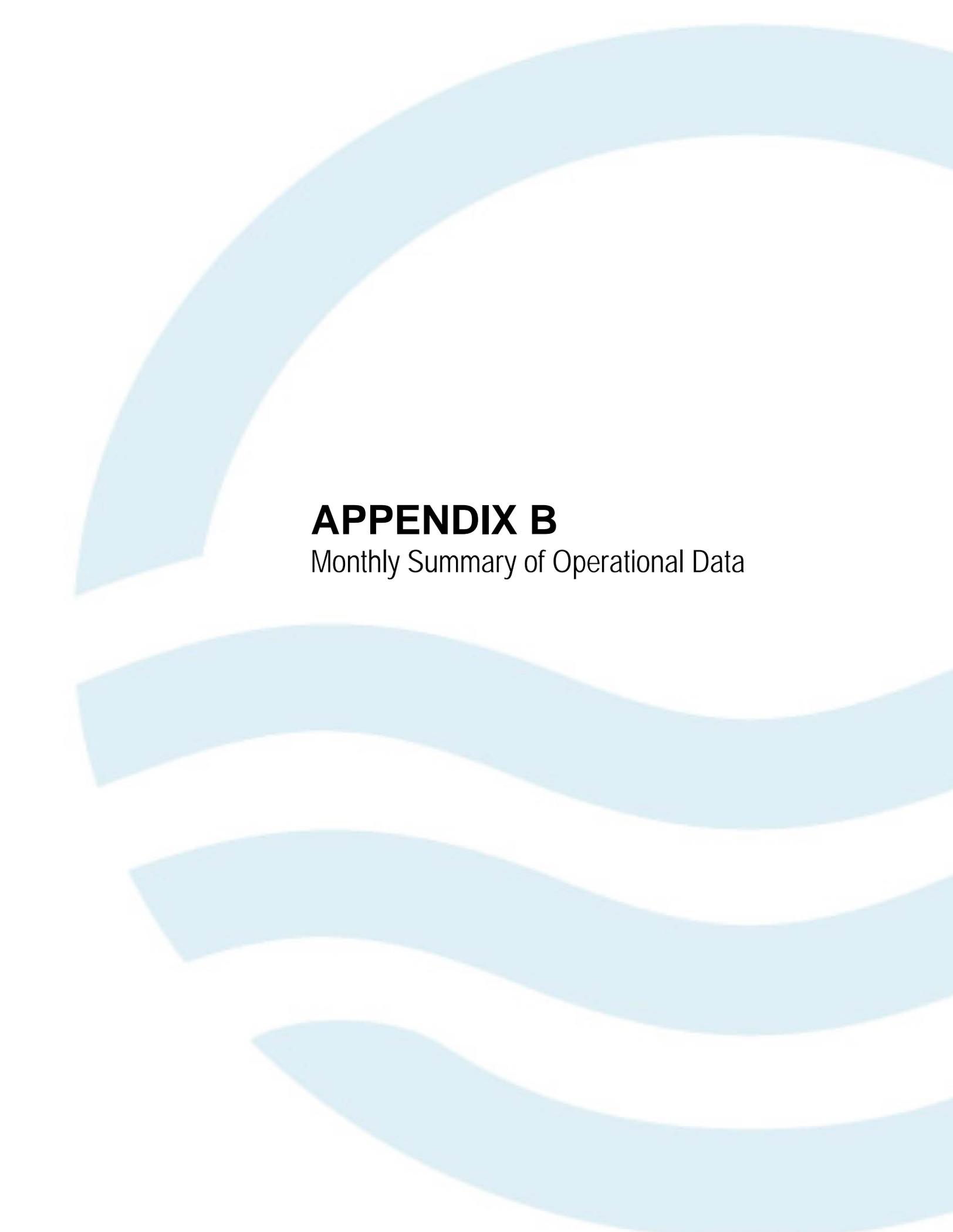
Monthly Summary of Microbiological
Test Results

**CHARLTON DRINKING WATER SYSTEM
2022 SUMMARY OF MICROBIOLOGICAL TEST RESULTS**

Facility Works Number: 220005768
 Facility Owner: Municipality of Charlton and Dack
 Facility Classification: Class 2 Water Treatment

RAW WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
Englehart River / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	75 <	58 <	202	845	76	26	110/NDOGT	35/NDOGT >	1000	185	440	300			> 1000	
Mean Lab	55.4 <	41.5 <	86	428.25	58 <	8.75	65	21.667 >	288.75	105	355	167		139.857		
Min Lab	30 <	2 <	2	198	32 <	2	10	10	0	35	305	58				0
Englehart River / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	< 5 <	< 2 <	6	6	6	8	15/NDOGT <	10/NDOGT <	65 <	10 <	10 <	5			65	
Mean Lab	< 2.6 <	< 2 <	3	3.75 <	2.8 <	4.25	8.333 <	6.667 <	21.25 <	6 <	6 <	4.25		< 5.714		
Min Lab	< 2 <	< 2 <	2	2	< 2 <	2	5 <	5 <	0 <	5 <	4 <	2				0
TREATED WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
Treated Water (POE) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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 (POE) / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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 (POE) / HPC - cfu/mL																
Count Lab	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	< 10 <	< 10 <	< 10 <	< 10 <	20 <	< 10 >	2000	30 <	10 <	< 10 <	< 20 <	< 10			> 2000	
Mean Lab	< 10 <	< 10 <	< 10 <	< 10 <	14 <	< 10 >	510	< 14 <	10 <	< 10 <	12.5 <	< 10		49.423		
Min Lab	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 >	10 <	< 10 <	10 <	< 10 <	< 10 <	< 10				< 10
DISTRIBUTION WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
C-3 (Bact) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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
C-3 (Bact) / E. Coli - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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
C-3 (Bact) / HPC - cfu/mL																
Count Lab	2	2	2	2	2	2	2	2	2	2	3	1	2	24		
Max Lab	< 10 <	< 10 <	< 10 <	< 10 <	30 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 20 <	< 10 <	< 10			30
Mean Lab	< 10 <	< 10 <	< 10 <	< 10 <	20 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	13.333 <	< 10 <	< 10	< 11.25		
Min Lab	< 10 <	< 10 <	< 10 <	< 10 <	10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10			< 10
C-4 (Bact) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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
C-4 (Bact) / E. Coli - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	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
C-4 (Bact) / HPC - cfu/mL																
Count Lab	3	2	2	2	3	2	2	3	2	2	3	2	28			
Max Lab	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	30 <	< 40 <	40	70 <	< 10 <	< 10				70
Mean Lab	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	20 <	< 20 <	25	60 <	< 10 <	< 10		< 16.429		
Min Lab	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	< 10 <	10 <	< 10 <	10 <	50 <	< 10 <	< 10				< 10

NOTES:
 NDOGT = No Data, Overgrown with Target



APPENDIX B

Monthly Summary of Operational Data

**CHARLTON DRINKING WATER SYSTEM
2022 SUMMARY OF OPERATIONAL RESULTS**

Facility Works Number: 220005768
 Facility Owner: Municipality of Charlton and Dack
 Facility Classification: Class 2 Water Treatment

FILTERED WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
Filtration / Turbidity (1 NTU) - NTU																
Max OL	0.516	0.819	0.167	0.980	0.762	1.998	0.801	0.342	0.724	0.651	0.437	1.261			1.998	
Mean OL	0.051	0.053	0.053	0.055	0.057	0.070	0.066	0.053	0.072	0.087	0.062	0.074		0.063		
Min OL	0.031	0.037	0.035	0.000	0.037	0.039	0.043	0.039	0.047	0.042	0.039	0.000				0.000
TREATED WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
Contact Chamber / Cl Residual: Free (0.90 W/0.40 S) - mg/L																
Max OL	2.364	4.067	3.802	1.843	4.724	4.725	2.798	2.593	4.080	4.722	4.096	4.682			4.725	
Mean OL	2.069	1.765	1.670	1.525	1.685	1.678	1.426	1.514	1.428	1.639	1.763	1.872		1.670		
Min OL	1.666	1.524	1.325	1.204	0.840	0.802	0.611	0.415	0.667	0.510	1.150	1.000				0.415
DISTRIBUTION WATER	01/2022	02/2022	03/2022	04/2022	05/2022	06/2022	07/2022	08/2022	09/2022	10/2022	11/2022	12/2022	Total	Avg	Max	Min
Residual No. 1 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	8	9	9	8	10	8	9	9	8	104			
Max IH	2.02	1.9	2.01	1.59	1.32	1.58	1.32	2.12	1.25	1.98	1.76	1.73			2.12	
Mean IH	1.638	1.748	1.597	1.379	1.193	1.327	0.975	1.282	0.899	1.262	1.374	1.575		1.355		
Min IH	1.08	1.64	1.05	0.94	1.11	0.93	0.42	0.81	0.39	0.7	0.85	1.42				0.39
Residual No. 2 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	8	9	9	8	10	8	9	9	8	104			
Max IH	2.13	2.02	2.09	1.8	1.42	1.8	1.49	1.78	1.59	1.95	1.97	2.02			2.13	
Mean IH	1.581	1.705	1.808	1.128	0.927	1.363	1.186	1.05	0.878	1.246	1.441	1.333		1.304		
Min IH	0.84	1.53	1.62	0.79	0.53	1.11	0.94	0.45	0.31	0.36	0.71	0.51				0.31
Residual No. 3 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	8	9	9	8	10	8	9	9	8	104			
Max IH	2.00	1.96	1.96	1.69	1.54	2.03	1.55	1.43	1.32	2.08	1.82	1.87			2.08	
Mean IH	1.68	1.74	1.59	1.40	1.29	1.38	1.22	0.95	1.04	1.36	1.66	1.56		1.40		
Min IH	0.94	1.41	1.11	0.83	1.04	1.01	0.64	0.40	0.56	0.69	1.42	1.36				0.40
Residual No. 4 / Cl Residual: Combined - mg/L																
Count IH	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max IH	1.83	1.92	1.78	1.48	1.31	1.38	1.24	1.84	1.74	1.51	1.88	1.47			1.92	
Mean IH	1.526	1.797	1.438	1.33	1.128	1.075	1.118	1.106	1.213	0.94	1.185	1.288		1.255		
Min IH	1.32	1.65	1.08	1.13	0.57	0.78	0.91	0.62	0.81	0.37	0.46	0.86				0.37

NOTES:

1. The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds or 4 minutes after a backwash. In 2022, the system shutdown during all high turbidity events:
 June 13 - high turbidity occurred as a result of the PLC failure. Lost coagulation and plant shut down until issue resolved.
 December 6 - operators drained the backwash piping and refilled the plant. The turbidity spiked for a short duration (approx. 1 minute). Turbidity exceedances occur when two (2) readings are above 1 NTU for 15 minutes or more in a 24 hour period.

2. 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 Charlton water plant if the free chlorine residual level drops below 0.90 mg/L in winter months and 0.40 mg/L in summer months to ensure primary disinfection is achieved. In October the temperature dropped below 15C, which triggered the requirement to perform CT calculations for values below 0.90 mg/L. CT calculations were done for all low residual readings, and all CT calculations verified proper disinfection.