Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Matachewan Drinking Water System

2022 ANNUAL/SUMMARY REPORT

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

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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.

Matachewan Drinking Water System

Section 11

2022 Annual Report

Section 11 - ANNUAL REPORT

1.0 INTRODUCTION

Drinking-Water System Name:	**Matachewan Drinking Water System**
Drinking-Water System No.:	220003653
Drinking-Water System Owner:	The Corporation of the Township of Matachewan
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.matachewan.com/

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

Matachewan Township Office
1 Moyneur Avenue,
Matachewan Ontario P0K 1N0

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

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

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 Matachewan Drinking Water System and provided a copy to the system owner; the Township of Matachewan. The Matachewan 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 Town's website
- Notice in the Town's News Letter

2.0 MATACHEWAN DRINKING WATER SYSTEM (DWS No. 220003653)

The Matachewan Drinking Water System is a communal ground water well supply that services the Town of Matachewan. It is owned by the Corporation of the Township of Matachewan and is operated by the Ontario Clean Water Agency (OCWA). The system consists of Class 1 water treatment subsystem and a Class 1 water distribution subsystem. OCWA is the accredited operating authority and is designated the Overall Responsible Operator for both the water treatment and water distribution facilities.

Raw Water Supply

The water treatment system obtains its water from two production wells with a combined allowable daily volume of 908 m^3/day. The wells are located at 391 Bernard Street, adjacent to the Montreal River. The well head assembly for Well 1 is located within the main building for the water treatment plant while the well head assembly for Well 2 is located outside adjacent to the water treatment plant building. Both wells consist of a 150 mm diameter steel casing; Well 1 is drilled to a depth of 39.6 m and Well 2 is drilled to a depth of 55 m. Well 1 is equipped with a 30 hp vertical turbine pump assembly and a variable frequency drive (VFD) to pump at a maximum rate of 20 L/s. Well 2 is equipped with a 30 hp submersible pump (VFD compatible) rated at 20 L/s. Each well is equipped with a magnetic flow meter installed in a 150 mm diameter line that directs water into the treatment process. Also included are pump-to-waste capabilities from a common pump discharge line.

Water Treatment

The wells feed the water treatment plant that has a maximum rated capacity of 908 cubic meters per day (m^3/d). The wells operate on an alternating basis but can be adjusted as required.

The plant is controlled by a programmable logic controller (PLC) which communicates with the elevated water storage facility (EWSF) to control the plant start and stop cycles. There is a set point for both wells to prevent them from running more than the permit to take water allows. When the set point is reached, the operational well shuts down and the other well takes over.

The raw water discharges to a combined header in the water treatment plant which is directed to a Filtronics Inc. iron and manganese removal filtration system consisting of two reaction vessels fed with sodium hypochlorite and one pressure filter rated at 10.5 L/second. The filter is filled with Filtronic's Electromedia®, a proprietary media. Sodium hypochlorite solution is injected at the raw water header before the first reaction vessel to oxidize the iron and manganese so it can be removed by the filtration system and provide primary disinfection. The sodium hypochlorite system consists of duplicate chemical pumps (one duty, one back-up) with automatic switchover and a 400 L double walled chemical tank.

The filter is automatically backwashed, prior to shutdown to clean contaminants from the media. Manual backwashes can also be initiated when required. The backwash water is

pumped from a 22,700 L underground backwash water storage tank and the wastewater is discharged to the backwash reclaim water tank. A typical backwash time is four (4) minutes.

The system will also go through a purge cycle prior filtration when there is a call for water or after a backwash cycle if the call for water signal is still on. This step allows the filter to reform. Discharge water from the purge cycle goes to the reclaim tank. Normal purge time is from 1 to 10 minutes.

The backwash and purge discharge water stored in the reclaim tank are blended with raw well water to be reprocessed through the filter during filtration mode. The reclaim pump is rated at 1.04 L/second and when in operation, the reclaim water is continuously monitored for turbidity to ensure it will not cause fouling of the media. Settled sludge from the reclaim tank will be removed via hauling truck when needed.

Filtered water is continuously monitored using free chlorine residual analyzer that is alarmed and is measured by an in-line magnetic flow meter before entering the underground chlorine contact chamber pipe. The 23.87 m^3 chlorine contact pipe consists of a 750 mm diameter x 54 m long PVC constructed pressure pipe which provides appropriate contact time to ensure adequate primary disinfection of the water before entering the distribution system.

A compliance free chlorine residual analyzer is installed after the chlorine contact chamber to ensure water entering the distribution system meets primary disinfection requirements and has a sufficient chlorine to maintain a residual throughout the distribution system. The analyzer is pH compensated and equipped with alarms.

An ammonium sulphate system was installed downstream from the compliance free chlorine analyzer to convert the free chlorine residual to combined chlorine residual before entering the distribution system. The ammonium sulphate chemical addition is fully redundant having a duty backup system consisting of two chemical pumps. After the ammonia injection point there is a total chlorine analyzer to measure and record the total chlorine residual entering the distribution system. The ammonia sulphate solution is stored in a 350 L double walled storage tank. Currently the system is not in use, but may be required if trihalomethane (THM) and/or haloacetic acid (HAA) results increase in the distribution system.

Water Storage

An elevated water storage facility (EWSF) with a tank volume of 650 m^3 was constructed and put into operation on December 16, 2015. The EWSF is located at the South East corner of Anita Street and Amabilis Avenue in the community of Matachewan and has approximately two days of water storage. It is used to provide fire storage, equalization storage and emergency storage capability. The EWSF houses a sodium hypochlorite feed system consisting of two metering pumps (one duty and one spare), two sodium hypochlorite tanks and a chlorine residual analyzer. A flow meter, pressure gauge, process piping, valves, controls and instrumentation are also on-site.

Control System

The Matachewan 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 Matachewan 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 100 KW diesel powered generator is available at the water treatment building and is capable of supplying power to the entire facility during power failures.

A 15 KW diesel generator is also available outside the water tower to provide standby power during emergencies.

Distribution System

The Matachewan Drinking Water System is categorized as a Large Municipal Residential Drinking Water System and serves an estimated population of 266 residents. The distribution system consists of approximately 191 active residential service connections and 177 homes. A review of the distribution system drawings indicated that water mains are primarily six, eight and ten inch in diameter and constructed of ductile iron with PVC constructed pipe used in the upgraded sections of Town. Additionally, service connections to private residences consist primarily of ¾ inch copper pipe. There are an estimated 71 fire hydrants connected to the system for fire protection. An auto-flushing device at the end of Rye Street is programmed to flush at a certain time each day for a specified duration to help maintain the quality of the water.

3.0 LIST OF WATER TREATMENT CHEMICALS USED OVER THE REPORTING PERIOD

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

- Sodium hypochlorite – Oxidation and Disinfection

This treatment chemical meets 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:

- Installation of a flow switch to indicate when the contact pipe is flushed to waste
- Repairs to fire hydrants No. 7 and 8 and on Riverside and Roche Streets

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, Four (4) adverse water quality incidents were reported to the Ministry's Spills Action Centre in 2022.

Date	AWQI No.	Details
Q1 (January to March of 2022)	HAA RAA	January 31 - calculated the running annual average (RAA) to be 96.4 ug/L (Maximum Allowable Concentration – MAC = 80 ug/L). Two samples were collected in Q1 2022: January 10 HAA = 102 ug/L January 24 HAA = 81 ug/L (re-sample) January average = 91.2 ug/L Corrective Action: Optimize disinfection process and lowered sodium hypochlorite dosage at the plant to reduce free chlorine residual levels in the distribution system which in turn should reduce HAA levels. February 2 - reported exceedance using Section 2C of the form – Notices of Adverse Test Results and Issue Resolution (Schedule 16) to MOH, SAC and the Owner.
Q2 (April to June of 2022)	HAA RAA	April 27 - calculated the RAA to be 92.6 ug/L April 20 HAA = 69 ug/L Corrective Action: The system's disinfection process was adjusted and continues to be optimized. April 27 - reported exceedance using Section 2C of the form – Notices of Adverse Test Results and Issue Resolution (Schedule 16) to MOH, SAC and the Owner.

Date	AWQI No.	Details
Q3 (July to September of 2022)	HAA RAA	April 27 - calculated the RAA to be 96.4 ug/L July 11 HAA = 98 ug/L Corrective Action: Possible modifications at the plant are being considered to help lower the HAA results. Local Public Health Inspector was notified of the results on July 28, 2022 at 2:10 PM. July 28 - reported exceedance using Section 2C of the form – Notices of Adverse Test Results and Issue Resolution (Schedule 16) to MOH, SAC and the Owner.
Q4 (October to December of 2022)	HAA RAA	October 28 - calculated the RAA to be 85.13 ug/L October 11 HAA = 82 ug/L Corrective Action: Possible modifications at the plant are being considered to help lower the HAA results. An application for a pilot trial has been submitted to the MECP to use ENV PROQUEST which will sequester iron and manganese in the distribution system, lowering the demand for chlorine and therefore lower disinfection by-products (eg. THMs and HAAs) Local Public Health Inspector was notified of the results on October 28, 2022 at 3:20 PM. October 28 - reported exceedance using Section 2C of the form – Notices of Adverse Test Results and Issue Resolution (Schedule 16) to MOH, SAC and the Owner.

6.0 MICROBIOLOGICAL TESTING PERFORMED DURING THE REPORTING PERIOD

Summary of Microbiological Data

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 (Well No. 1)	52	0 to 0	0 to 1	N/A	N/A
Raw (Well No. 2)	52	0 to 0	0 to 2	N/A	N/A
Treated	52	0 to 0	0 to 0	52	< 10 to 190
Distribution	104	0 to 0	0 to 0	52	< 10 to > 2000

Maximum Allowable Concentration (MAC) for *E. coli* = 0 Counts/100 mL
MAC for Total Coliforms = 0 Counts/100 mL
"<" denotes less than the laboratory's method detection limit
">" denotes greater than the laboratory's method detection limit

Notes:

1. One microbiological sample is collected and tested each week from the raw (each well) and treated water supply. A total of two microbiological samples are collected and tested each week from the Matachewan 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

Summary of Raw Water Turbidity Data

Parameter	# of Samples	Range of Results *(min to max)*	Unit of Measure
Turbidity (Well No. 1)	24	0.20 to 2.10	NTU
Turbidity (Well No. 2)	24	0.27 to 10.7	NTU

Note: Turbidity samples are required once every month.

Continuous Monitoring in the Treatment Process

Parameter	# of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Free Chlorine Residual	8760	0.18 to 5.02	mg/L	CT

Notes:

1. For continuous monitors 8760 is used as the number of samples.
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 Matachewan water plant if the free chlorine residual level drops below 0.15 mg/L 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
Free Chlorine Residual	364	0.44 to 3.00	mg/L	≥ 0.05

Note:

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 10	< 0.1	< 0.01	mg/L	No
April 20	< 0.1	< 0.01	mg/L	No
July 11	0.40	< 0.01	mg/L	No
October 11	0.40	< 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 10	73.0	ug/L	67.1	No
April 20	72.8	ug/L		
July 11	66.1	ug/L		
October 11	56.6	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)*

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 10	102	ug/L	85.1	YES
January 24	81*	ug/L		
April 20	69	ug/L		
July 11	98	ug/L		
October 11	82	ug/L		

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

Note:

* HAA samples are collected and tested quarterly as required under section 13-6 of Schedule 13, under O. Reg. 170/03. A re-sample was collected on January 24, 2022 after the running annual average (RAA) calculated on January 20th failed to meet the MAC of 80 ug/L.

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 Matachewan 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	# of Samples	Field pH	Field Temperature (°C)	Alkalinity (mg/L)	Lead (ug/L)
March 7	1	7.31	6.9	129	N/A
September 12	1	7.72	16.2	133	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	24.0	ug/L	1000	No	No
Boron	6.0	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	< 1.0	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 36 months (sample date = *October 5, 2020).* Next sampling scheduled for October 2023

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	< 0.233	ug/L	5	No	No
Atrazine + N-dealkylated metobolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.175	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	< 0.118	ug/L	5	No	No
Carbaryl	< 1.0	ug/L	90	No	No
Carbofuran	< 2.0	ug/L	90	No	No
Carbon Tetrachloride	< 0.2	ug/L	2	No	No
Chlorpyrifos	< 0.175	ug/L	90	No	No
Diazinon	< 0.175	ug/L	20	No	No
Dicamba	< 0.104	ug/L	120	No	No
1,2-Dichlorobenzene	< 0.3	ug/L	200	No	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	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
1,2-Dichloroethane	< 0.3	ug/L	5	No	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No	No
Dichloromethane	< 1.0	ug/L	50	No	No
2-4 Dichlorophenol	< 0.2	ug/L	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.444	ug/L	100	No	No
Diclofop-methyl	< 0.148	ug/L	9	No	No
Dimethoate	< 0.175	ug/L	20	No	No
Diquat	< 0.2	ug/L	70	No	No
Diuron	< 6.0	ug/L	150	No	No
Glyphosate	< 20.0	ug/L	280	No	No
Malathion	< 0.175	ug/L	190	No	No
Metolachlor	< 0.116	ug/L	50	No	No
Metribuzin	< 0.116	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	< 0.116	ug/L	2	No	No
Picloram	< 0.104	ug/L	190	No	No
Prometryne	< 0.058	ug/L	1	No	No
Simazine	< 0.175	ug/L	10	No	No
Terbufos	< 0.116	ug/L	1	No	No
Tetrachloroethylene	< 0.3	ug/L	30	No	No
2,3,4,6-Tetrachlorophenol	< 0.2	ug/L	100	No	No
Triallate	< 0.116	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	10	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA)	< 7.4	ug/L	100	No	No
Trifluralin	< 0.116	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Note: Sample required every 36 months (sample date = *October 5, 2020).* Next sampling scheduled for October 2023

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	# of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2020	1	9.9	mg/L	20	No

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

Most Recent Fluoride Data Sampled at the Water Treatment Plant

Date of Sample	# 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

No additional regulatory sampling and testing was required for the Matachewan Drinking Water System during the 2022 reporting period.

Matachewan Drinking Water System

Schedule 22

2022 SUMMARY REPORT

FOR MUNICIPALITIES

Schedule 22 - SUMMARY REPORTS FOR MUNICIPALITIES

1.0 INTRODUCTION

Drinking-Water System Name:	**Matachewan Drinking Water System**
Municipal Drinking Water Licence (MDWL) No.:	279-101-4 (issued September 24, 2020)
Drinking Water Work Permit (DWWP) No.:	279-201-4 (issued September 24, 2020)
Permit to Take Water (PTTW) No.:	3106-9E5LKA (issued January 6, 2014)
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 Matachewan 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
Section 6-5(1) 10(i) of Schedule 6 of O. Reg. 170/03	All continuous analysers were not calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation. Chlorine analyzer calibrations were not done properly. The operator would take a handheld reading and adjust the on-line analyzer to a different value than the handheld. This was done at least eight time throughout the inspection period (June 1, 2021 to June 30, 2022). Failure to ensure that the treated continuous free chlorine analyzer was calibrated correctly is a violation of O. Reg. 170/03 which requires that the continuous monitoring equipment must be checked and calibrated as often as necessary to ensure that test results are within the following margin of error of 0.05 mg/L, if the concentrations usually measured by the equipment are less than or equal to 1.0 mg/L, and proportionally higher if the concentrations usually measured are greater than 1.0 mg/L.	Discovered: July 19, 2022	September 9th - a training session was held with all operators to ensure proper checks and verification of the on-line analyzer is being done. A review of the Chlorine Analyzer Verification and Calibration procedure and a hands-on demonstration was done as part of the training. Training records were submitted to MECP Water Inspector Rachel Hamelin on September 9, 2022.	Complete

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
Schedule 6-1.1 (3 of O. Reg. 170/03	Turbidity was not being tested at least once every month from each well that is supplying water to the system. The samples collected on September 27, 2021 and October 13, 2021 do not meet the minimum requirement of 20 days (16 days apart). Also, the samples collected on October 13, 2021 and November 25, 2021 exceed the maximum 40 days requirement (43 days apart). The owner and operating authority are required to ensure that samples are collected and tested within the minimum and maximum frequencies specified in Schedule 6-1.1 (3) of O. Reg. 170/03. It is strongly recommended that sampling frequency requirements be reviewed with operators to prevent future non-compliance.	Discovered: July 19, 2022	The facility round sheet clearly indicates that turbidity testing is required twice per month. This sampling procedure was implemented several years ago to prevent missed turbidity testing and to ensure the testing was performed within the required regulatory time frame. Improved training is required for new operators in the field to make sure they conduct the required testing. A discussion was held with all operators at the end of 2021 after the issued was discovered during data review. No further issues occurred after this time. A second refresher discussion was held with operators on August 19, 2022 after the receipt of the draft MECP Report.	Complete

It should be mentioned that four (4) adverse water quality incidents were reported to the Ministry's Spills Action Center during the reporting period. 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 6 of this report for details.

3.0 SUMMARY OF FLOWS AND COMPARISON TO REGULATORY LIMITS

Flow Monitoring

MDWL No. 279-101 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 (Well No. 1 and Well No. 2)

Regulated by Permit to Take Water (PTTW) #3106-9E5LKA, issued January 6, 2014

Well No. 1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	10327	8154	9983	10929	9560	9735	9882	8849	8591	9819	9762	12874	118463
Average Volume (m^3/d)	333	291	322	364	308	324	319	285	286	317	325	415	325
Maximum Volume (m^3/d)	454	454	454	454	454	454	454	454	454	454	454	454	454
PTTW - Maximum Allowable Volume (m^3/day)	454	454	454	454	454	454	454	454	454	454	454	454	454
Maximum Flow Rate (L/min)	1234	1397	1232	1346	1323	1266	1206	1373	1356	1243	1247	1254	1397
PTTW - Maximum Allowable Flow Rate (L/min)	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400

Note: The system's PTTW allows the flow rate of 1500 L/min upon well pump start-up.

Well No. 2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	1965	2633	3293	1403	1540	868	1521	2152	3368	2659	2422	2622	26446
Average Volume (m^3/d)	63.4	94.0	106.2	46.8	49.7	28.9	49.1	69.4	112.3	85.8	80.7	84.6	72.5
Maximum Volume (m^3/d)	286	288	288	288	259.4	237	291	287	288	293	291	296	296
PTTW - Maximum Allowable Volume (m^3/day)	454	454	454	454	454	454	454	454	454	454	454	454	454
Maximum Flow Rate (L/min)	1100	1077	1094	1072	1054	1061	1065	1077	1068	1119	1065	1068	1119
PTTW - Maximum Allowable Flow Rate (L/min)	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400

Combined Water Taking (Well No. 1 and Well No. 2)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	12292	10787	13275	12332	11100	10603	11403	11001	11958	12478	12184	15496	144908
Average Volume (m^3/d)	397	385	428	411	358	353	368	355	399	403	406	500	397
Maximum Volume (m^3/d)	517	591	564	542	590	634	577	492	525	587	543	750	750
PTTW - Maximum Allowable Volume (m^3/day)	908	908	908	908	908	908	908	908	908	908	908	908	908

The system's Permit to Take Water #3106-9E5LKA, allows the Township to withdraw water at the following rates:

Well No. 1: 454 m^3/day 1400 L/minute (1500 L/min during pump start-ups and shut downs)

Well No. 2: 454 m^3/day 1400 L/minute (1500 L/min during pump start-ups and shut downs)

Total Combined Daily Volume: 908 m^3/day

A review of the raw water flow data indicates that the system did not exceed the maximum allowable volumes during the reporting period.

Treated Water

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

Regulated by Municipal Drinking Water Licence (MDWL) #279-101 (issue 4), issued September 24, 2020

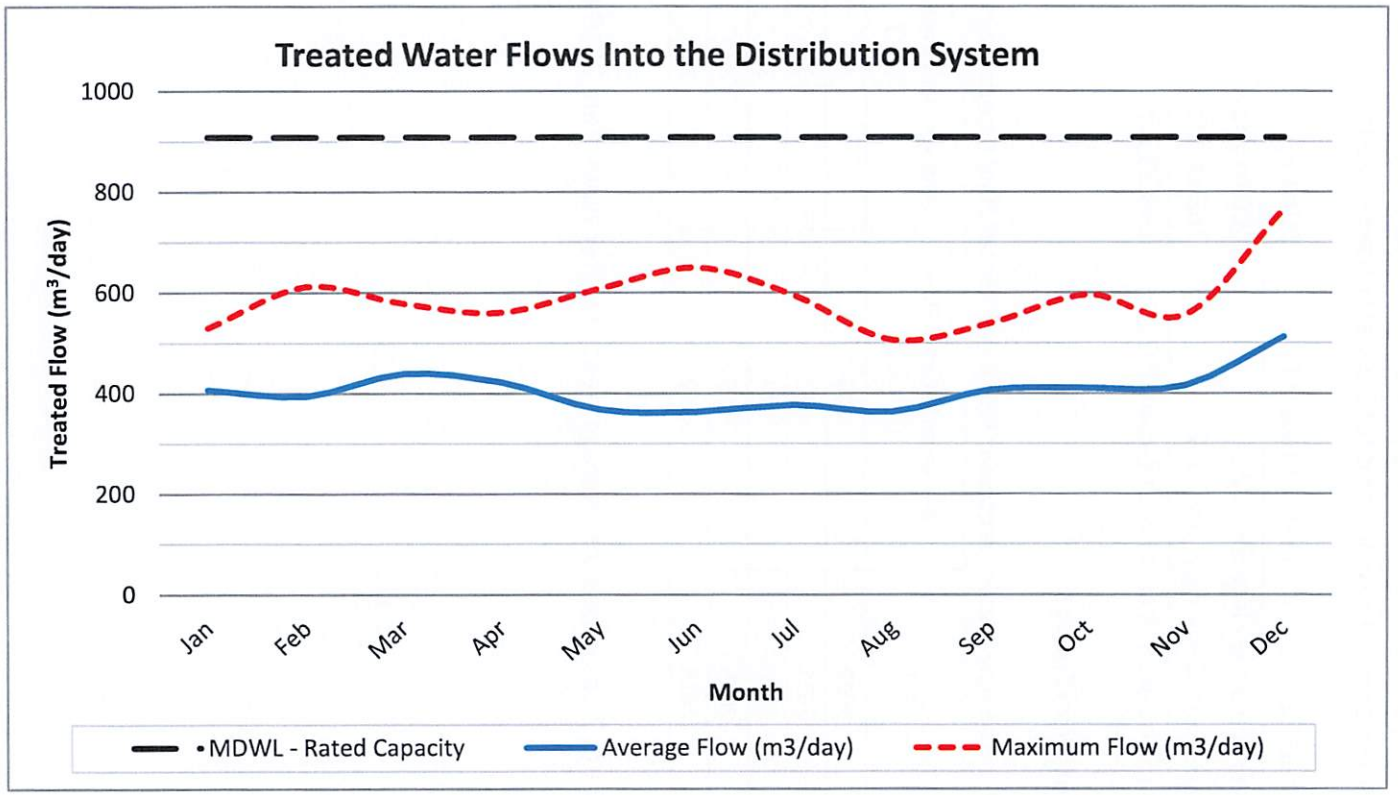
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	12604	11035	13589	12645	11393	10887	11674	11259	12194	12723	12452	15881	148335
Average Volume (m^3/d)	407	394	438	422	368	363	377	363	406	410	415	512	406
Maximum Volume (m^3/d)	530	611	578	560	607	649	594	505	539	595	556	766	766
MDWL - Rated Capacity (m^3/day)	908	908	908	908	908	908	908	908	908	908	908	908	908

Schedule C, Section 1.0 (1.1) of MDWL No. 279-101 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 908 m^3/day. The Matachewan DWS complied with this limit having a recorded maximum volume of 766 m^3/day on December 28th. This represents 84.4% of the rated capacity.

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)	407	394	438	422	368	363	377	363	406	410	415	512
Maximum Flow (m^3/day)	530	611	578	560	607	649	594	505	539	595	556	766
MDWL - Rated Capacity	908	908	908	908	908	908	908	908	908	908	908	908
% Rated Capacity	58	67	64	62	67	71	65	56	59	66	61	84



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)	908 m^3/day	
Average Daily Flow for 2022	406 m^3/day	44.7 % of the rated capacity
Maximum Daily Flow for 2022	766 m^3/day	84.4 % of the rated capacity
Total Treated Water Produced in 2022	148,335 m^3	

Historical Flows

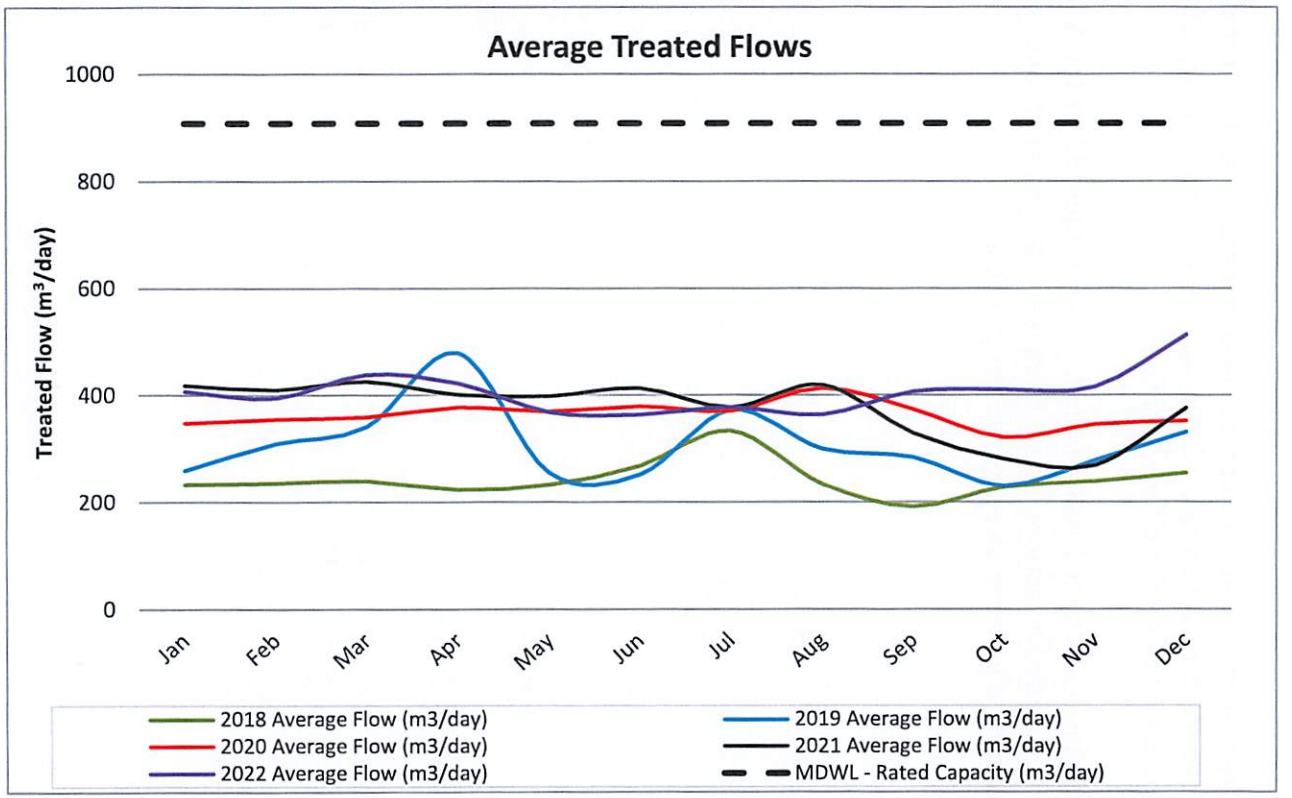
Matachewan Water Treatment Plant – Historical Flow Comparison

Year	Maximum Treated Flow (m^3/d)	Average Daily Treated Flow (m^3/d)	Average Day % of Rated Capacity (908 m^3/d)
2022	**766**	**406**	**44.7%**
2021	642	376	41.4%
2020	827	363	39.9%
2019	995	308	33.9%
2018	850	243	26.8%

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

Figure 2: Matachewan 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)	234	236	240	224	233	268	334	234	192	228	239	255
2019 Average Flow (m^3/day)	260	309	341	478	255	252	372	300	284	231	278	331
2020 Average Flow (m^3/day)	348	355	359	377	369	379	370	413	373	321	345	352
2021 Average Flow (m^3/day)	418	410	425	401	398	413	377	419	329	281	269	376
2022 Average Flow (m^3/day)	407	394	438	422	368	363	377	363	406	410	415	512
MDWL - Rated Capacity (m^3/day)	908	908	908	908	908	908	908	908	908	908	908	908



CONCLUSION

The water quality data collected in 2022 demonstrates that the Matachewan drinking water system provided good 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

MATACHEWAN DRINKING WATER SYSTEM
2022 SUMMARY OF MICROBIOLOGICAL TEST RESULTS

Facility Works Number: 220003653
Facility Owner: Municipality: Township of Matachewan
Facility Classification: Class 1 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
Well 1 / 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	1	0	0	0	0	0	0	0	0			1	
Mean Lab	0	0	0	0.25	0	0	0	0	0	0	0	0		0.019		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Well 1 / 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
Well 2 / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	1	0	0	0	0	0	0	0	1	0	0	2			2	
Mean Lab	0.2	0	0	0	0	0	0	0	0.25	0	0	0.5		0.077		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Well 2 / 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	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	< 30	20	< 10	< 10	< 10	< 30	< 10	150	< 30	< 30	< 60	< 190			190	
Mean Lab	< 14	< 12.5	< 10	< 10	< 10	< 10	< 15	< 10	< 60	< 17.5	< 14	< 25	< 55	< 21.346		
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
MW-3 (Bacti) / 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
MW-3 (Bacti) / 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
MW-3 (Bacti) / HPC - cfu/mL																
Count Lab	2	2	2	2	2	2	2	2	2	3	1	2	24			
Max Lab	< 10	< 10	< 10	< 10	< 10	80	> 2000	< 30	< 10	80	< 10	10			> 2000	
Mean Lab	< 10	< 10	< 10	< 10	< 10	< 45	> 1005	< 20	< 10	36.667	< 10	10		100		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	< 10	10				< 10
MW-4 (Bacti) / 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
MW-4 (Bacti) / 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
MW-4 (Bacti) / HPC - cfu/mL																
Count Lab	3	2	2	2	3	2	2	3	2	2	3	2	28			
Max Lab	< 10	120	90	< 10	< 20	50	< 10	< 120	< 30	90	< 20	< 10			120	
Mean Lab	< 10	65	75	< 10	13.333	45	< 10	< 56.667	< 20	65	< 13.333	< 10		< 31.429		
Min Lab	< 10	10	60	< 10	< 10	40	< 10	< 10	< 10	40	< 10	< 10				< 10

APPENDIX B

Monthly Summary of Operational Data

MATACHEWAN DRINKING WATER SYSTEM
2022 SUMMARY OF OPERATIONAL TEST RESULTS

Facility Works Number: 220003653
Facility Owner: Municipality: Township of Matachewan
Facility Classification: Class 1 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
Well 1 / Turbidity - NTU																
Count IH	2	2	2	2	2	2	2	2	2	2	2	2	24			
Max IH	2.1	0.38	0.244	0.35	0.47	0.28	1.66	2.1	0.31	0.29	0.68	0.62			2.1	
Mean IH	2.01	0.365	0.223	0.33	0.43	0.245	1.237	1.355	0.28	0.285	0.61	0.6		0.664		
Min IH	1.92	0.35	0.202	0.31	0.39	0.21	0.813	0.609	0.25	0.28	0.54	0.58				0.202
Well 2 / Turbidity - NTU																
Count IH	2	2	2	2	2	2	2	2	2	2	2	2	24			
Max IH	3.14	0.61	0.559	0.51	0.58	0.5	10.7	1.25	2.63	0.5	1.53	0.69			10.7	
Mean IH	3.125	0.565	0.472	0.49	0.545	0.45	5.86	0.974	1.45	0.475	0.92	0.67		1.333		
Min IH	3.11	0.52	0.385	0.47	0.51	0.4	1.02	0.697	0.27	0.45	0.31	0.65				0.27

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) / Cl Residual: Free (0.15 mg/L) - mg/L																
Max OL	4.1	3.047	2.027	4.148	5.013	5.015	3.04	3.088	2.908	5.021	3.626	5.021			5.021	
Mean OL	1.73	1.726	1.418	1.584	1.741	1.619	1.827	1.73	1.886	2.204	1.946	2.432		1.82		
Min OL	0.25	0.836	0.828	0.295	0.451	0.759	0.43	1.057	1.21	0.44	0.34	0.18				0.18

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: Free - mg/L																
Count IH	9	8	9	8	9	9	8	9	9	9	9	8	104			
Max IH	1.77	1.83	1.28	1.29	1.58	1.58	1.32	1.52	3.00	2.02	2.20	2.33			3.00	
Mean IH	1.28	1.25	0.91	0.89	1.29	1.22	0.93	0.81	1.29	1.27	1.67	1.46		1.19		
Min IH	0.76	0.89	0.74	0.58	1.09	0.75	0.70	0.56	0.49	0.64	0.93	0.98				0.49
Residual No. 2 / Cl Residual: Free - mg/L																
Count IH	9	8	9	8	9	9	8	9	9	9	9	8	104			
Max IH	1.55	1.54	1.37	1.22	1.73	1.75	1.46	1.50	1.61	1.39	2.02	1.65			2.02	
Mean IH	1.20	1.31	1.00	1.05	1.31	1.32	1.10	0.86	1.03	1.14	1.60	1.39		1.19		
Min IH	0.82	1.08	0.64	0.69	1.04	0.64	0.70	0.44	0.59	0.78	0.89	1.21				0.44
Residual No. 3 / Cl Residual: Free - mg/L																
Count IH	9	8	9	8	9	9	8	9	9	9	9	8	104			
Max IH	1.48	1.81	1.28	1.21	1.62	1.67	1.69	1.57	1.64	1.52	2.13	1.98			2.13	
Mean IH	1.09	1.26	1.10	0.89	1.07	0.99	1.39	1.04	0.85	1.00	1.31	1.53		1.12		
Min IH	0.80	0.86	0.72	0.59	0.69	0.71	1.00	0.46	0.49	0.71	0.82	1.20				0.46
Residual No. 4 / Cl Residual: Free - mg/L																
Count IH	5	4	4	4	5	4	4	5	4	5	4	4	52			
Max IH	1.44	1.56	1.45	1.31	1.38	0.80	2.07	1.76	1.55	1.16	2.09	2.12			2.12	
Mean IH	1.33	1.24	1.24	1.11	0.95	0.76	1.72	1.33	1.19	0.96	1.53	1.71		1.25		
Min IH	1.06	0.93	1.03	0.73	0.78	0.70	1.49	0.60	0.88	0.83	1.00	1.24				0.60

NOTES:
* 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 calculations are performed for the Matachewan water plant if the free chlorine residual level drops below 0.15 mg/L to ensure primary disinfection is achieved.