Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Matheson Drinking Water System

2024 Annual Summary Report

Prepared by the Ontario Clean Water Agency
On behalf of the Corporation of the Township of Black River-Matheson

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OVERVIEW

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

Section 11 of O. Reg. 170/03 requires the owner to produce an Annual Report which must include the following:

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

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

Schedule 22 of the regulation requires that a Summary Report for Municipalities be prepared which must be presented and accepted by Council by March 31 of each year for the preceding calendar year reporting period.

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

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

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

- A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
- 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 Annual and Summary Reports have been combined and presented to council as the Matheson Drinking Water System 2024 Annual Summary Report.

1.0 INTRODUCTION

Drinking-Water System Name:	**MATHESON DRINKING WATER SYSTEM**
Drinking-Water System No.:	220002574
Drinking-Water System Owner:	The Corporation of the Township of Black River - Matheson
DWS Operating Authority:	Ontario Clean Water Agency
Drinking-Water System Category:	Large Municipal, Residential System
Municipal Drinking Water Licence No.:	204-103 (Issue 6 - March 14, 2022)
Drinking Water Work Permit No.:	204-203 (Issue 4 - March 14, 2022)
Permit to Take Water No.:	300-1137081725 (Issued July 23, 2021)
Period being reported on:	January 1 to December 31, 2024

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? No

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

Black River - Matheson Municipal Office
367 Fourth Avenue,
Matheson ON P0K 1N0

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

Drinking Water System Name	Drinking Water System Number
Matheson Drinking Water System	220002574

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

The Ontario Clean Water Agency prepared the 2024 Annual Summary Report for the Matheson Drinking Water System and provided a copy to the system owner; the Township of Black River Matheson. The Matheson Drinking Water System is a stand-alone system that does not receive water from or send water to another system.

System users are notified that the Annual Report is available through:

- Public access/notice via newspaper/website

2.0 DESCRIPTION OF THE DRINKING WATER SYSTEM

The Matheson Drinking water system is classified as a large municipal residential system that is fed from four wells which are situated on the west shore of Belleek Lake.

Well No. 1 is a 150 mm diameter, 38.2 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 11.34 L/sec. Discharge from this well is through a 100 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Plant. This well commenced production in March/April 2000.

Well No. 2 is a 150 mm diameter, 43.6 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 5.70 L/sec. Discharge from this well is through a 75 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Plant. This well commenced production in March/April 2000.

Well No. 3 is a 200 mm diameter, 39.6 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 11.34 L/s. Discharge from this well is through a 100 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Works. This well commenced production in March/April 2000.

Well No. 4 is a 150 mm diameter, 35.3 m deep, drilled groundwater production well utilizing a submersible deep well pump rated at 2.66 L/s. Discharge from this well is through a 50 mm diameter discharge line connected to a well pump header which is located in the Matheson Treatment Plant. This well commenced production in March/April 2000.

The Matheson water treatment plant and four wells are situated on the west shore of Belleeck Lake. This facility commenced operation in 2000 and was later reclassified as a Water Distribution and Supply Subsystem Class 2 facility. Within the treatment works, the four individual well discharge pipes are metered for flow and then join into one common header where the water is injected with a sodium hypochlorite solution. Raw water sample taps are located on each of the four well discharge headers. The disinfection system consists of two chemical metering pumps, one duty and one on standby; and one 450 L chemical solution tank. One chlorine pump is capable of pumping sodium hypochlorite solution at a rate of 2.3 L/hr and the other at a rate of 1.3 L/hr. After the water is injected with sodium hypochlorite, it is metered then discharged from the treatment works through a 150 mm diameter pipe which runs 1250 metres in length to provide for the minimum 15 minute chlorine contact time. The 1250 m water main also serves as discharge to the reservoir and to the distribution system.

The single chamber reservoir is located on a high point of land and has a storage capacity of 450 cubic metres. A 1,250 m treated water main runs from the water treatment plant to a valve chamber at the reservoir. This watermain is the chlorine contact vessel. The valve chamber at the end of the watermain directs the treated water either to storage or directly into the distribution system, depending on the time of day and/or the system pressure. Throughout the day, treated water is discharged to the distribution system while the reservoir provides storage/emergency supply. When demand is low (i.e. at night), the water is directed into the reservoir.

The water supply/treatment/storage system is located in the community of Matheson and serves an estimated population of 900 persons with approximately 390 residential service connections. There are approximately 32 fire hydrants. Watermains range in size from 25 mm to 250 mm and are made of PVC, asbestos-cement or galvanized steel.

3.0 LIST OF ALL WATER TREATMENT CHEMICALS USED

- Sodium Hypochlorite for disinfection

4.0 SIGNIFICANT EXPENSES INCURRED

- DWQMS third party audit
- SCBA items purchase
- Heater replacement
- Eyewash solution
- Reservoir actuator install
- Chemical transfer pump
- Genset servicing
- Purchase pump 1 and 3 (shelf spares) did not install
- Well #3 flow meter
- Reservoir genset oil and oil heater replacement
- Sodium hypochlorite pump spare parts
- Confined space equipment purchase

5.0 NOTICES REPORTED & SUBMITTED TO THE SPILLS ACTION CENTER

There were no notices submitted

6.0 MICROBIOLOGICAL TESTING

Sample Type	No. of Samples	*E. coli* Results *(min to max)*	Total Coliform Results *(min to max)*	# of HPC Samples	HPC Results *(min to max)*
Raw - Well 1	34	0 to 0	0 to 0	N/A	N/A
Raw - Well 2	53	0 to 0	0 to 0	N/A	N/A
Raw - Well 3	53	0 to 0	0 to 0	N/A	N/A
Raw - Well 4	53	0 to 0	0 to 1	N/A	N/A
Treated	53	0 to 0	0 to 0	53	<10 to 80
Distribution	106	0 to 0	0 to 0	53	<10 to 2000

Maximum Allowable Concentration (MAC) for treated and distribution samples: *E. coli* = 0 Counts/100 mL and Total Coliforms = 0 Counts/100 mL
"<" denotes less 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 distribution system.

*Well 1 were out of service for several weeks due to maintenance, therefore sampling was not conducted every week.

7.0 OPERATIONAL TESTING

Raw Water Turbidity

Location	No. of Samples	Range of Results *(min to max)*	Unit of Measure
Well 1	9	0.21 to 0.66	NTU
Well 2	13	0.15 to 0.50	

Location	No. of Samples	Range of Results *(min to max)*	Unit of Measure
Well 3	13	0.27 to 0.88	
Well 4	13	0.24 to 0.87	

*Well 1 was out of service for several weeks in 2024 due to maintenance, therefore sampling was not conducted every month

Continuous Monitoring in the Treatment Process

Parameter	No. of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Free Chlorine	8760	0.28 to 1.00	mg/L	N/A

Notes**:** For continuous monitors 8760 is used as the number of samples.

Chlorine Residuals from the Distribution System

Parameter	No. of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Free Chlorine	367	0.70 to 1.30	mg/L	0.05

Notes: 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.

Nitrate & Nitrite Results from the Water Treatment Plant

Date of Sample	Nitrate Result Value (mg/L)	Nitrite Result Value (mg/L)	Exceedance
January 15	0.14	<0.05	No
April 15	0.15	<0.05	No
July 15	<0.05	<0.05	No
October 4	0.4	<0.01	No

Maximum Acceptable Concentration (MAC) for Nitrate = 10 mg/L MAC for Nitrite = 1.0 mg/L

Total Trihalomethane Results from the Distribution System

Date of Sample	Result Value (ug/L)	Four Quarter Running Average	Exceedance
January 15	1.8	2.00	No
April 15	1.6	2.05	No
July 15	1.0	1.80	No
October 7	1.5	1.48	No

Maximum Acceptable Concentration (MAC) = 100 ug/L (Four Quarter Running Average)

Total Haloacetic Acid Results from the Distribution System

Date of Sample	Result Value (ug/L)	Four Quarter Running Average	Exceedance
January 15	<8	8	No

Date of Sample	Result Value (ug/L)	Four Quarter Running Average	Exceedance
April 15	<8	8	No
July 15	<8	8	No
October 7	<8	<8	No

Maximum Acceptable Concentration (MAC) = 80 ug/L (Four Quarter Running Average)

Lead, pH & Alkalinity Results (from the distribution system)

Date of Sample	# of Samples	Range of Results (min to max)		
		pH	**Alkalinity** (mg/L)	**Lead** (ug/L)
April 13, 2023	2	-	-	<0.1 to <0.1
April 2, 2024	2	8.12 – 8.35	127 – 127	-
October 5, 2023	2	-	-	0.1 to 0.1
September 23, 2024	2	8.61 – 8.61	133 – 133	-

MAC for Lead -10 ug/L

Note: *Every year the system is required to test for total alkalinity and pH in two distribution samples collected during the period of December 15 to April 15 and two distribution samples during the period of June 15 to October 15. This testing is required in every 12-month period with lead testing in every third 12-month period. The next round of lead sampling will be completed in April and October of 2026.*

Summary of Most Recent Schedule 23 Inorganic Results from the Water Treatment Plant

Sample Date: October 24, 2023

Parameter (ug/L)	Result Value	Maximum Acceptable Concentration	Exceedance
Antimony	< 0.5	6	No
Arsenic	3.0	10	No
Barium	8.0	1000	No
Boron	< 2.0	5000	No
Cadmium	< 0.1	5	No
Chromium	2.0	50	No
Mercury	0.1	0.001	No
Selenium	0.2	10	No
Uranium	< 1.0	20	No

Note: Sampling required once every 36 months (next sample scheduled for October 2026)

Summary of Most Recent Schedule 24 Organic Results from the Water Treatment Plant

Sample Date: October 24, 2023

Parameter	Result Value	Unit of Measure	Standard	Exceedance
1,1-Dichloroethylene	< 0.3	ug/L	14	No
1,2-Dichlorobenzene	< 0.2	ug/L	200	No
1,2-Dichloroethane	< 0.2	ug/L	5	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	No
2,3,4,6-Tetrachlorophenol	< 0.3	ug/L	100	No

Parameter	Result Value	Unit of Measure	Standard	Exceedance
2,4,6-Trichlorophenol	< 0.2	ug/L	100	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.2	ug/L	100	No
2-4 Dichlorophenol	< 0.384	ug/L	900	No
Alachlor	< 6.39	ug/L	5	No
Atrazine + N-dealkylated metobolites	< 0.306	ug/L	5	No
Azinphos-methyl	< 0.5	ug/L	20	No
Benzene	< 0.23	ug/L	1	No
Benzo(a)pyrene	< 0.1	ug/L	0	No
Bromoxynil	< 0.01	ug/L	5	No
Carbaryl	< 0.102	ug/L	90	No
Carbofuran	< 2.0	ug/L	90	No
Carbon Tetrachloride	< 3.0	ug/L	2	No
Chlorobenzene	< 0.2	ug/L	80	No
Chlorpyrifos	< 0.23	ug/L	90	No
Diazinon	< 0.23	ug/L	20	No
Dicamba	< 0.09	ug/L	120	No
Dichloromethane	< 1.0	ug/L	50	No
Diclofop-methyl	< 0.128	ug/L	9	No
Dimethoate	< 0.23	ug/L	20	No
Diquat	< 0.2	ug/L	70	No
Diuron	< 10.0	ug/L	150	No
Glyphosate	< 20.0	ug/L	280	No
Malathion	< 0.23	ug/L	190	No
MCPA	< 0.153	ug/L	230	N/A
Metolachlor	< 0.153	ug/L	50	No
Metribuzin	< 0.5	ug/L	80	No
Paraquat	< 0.2	ug/L	10	No
Pentachlorophenol	< 0.04	ug/L	3	No
Phorate	< 0.3	ug/L	60	No
Picloram	< 0.153	ug/L	2	No
Prometryne	< 0.09	ug/L	1	No
Simazine	< 0.077	ug/L	10	No
Terbufos	< 0.23	ug/L	1	No
Tetrachloroethylene	< 0.153	ug/L	10	No
Total PCB’s	< 0.3	ug/L	190	No
Triallate	< 0.153	ug/L	5	No
Trichloroethylene	< 0.2	ug/L	5	No
Trifluralin	< 0.153	ug/L	45	No
Vinyl Chloride	< 0.1	ug/L	1	No

Note: Sampling required once every 36 months (next sample scheduled for October 2026)

Most Recent Sodium Results from the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
September 21, 2020	1	2.47	mg/L	20	No

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

Most Recent Fluoride Results from the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
September 21, 2020	1	<0.05	mg/L	1.5	No

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

Inorganic or Organic Results that Exceeded Half the Standard

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.

Additional Testing Performed in Accordance with a Legal Instrument.

No additional testing was required in 2024.

8.0 REQUIREMENTS THE SYSTEM FAILED TO MEET

1. Incident #1 – DWIS Profile was not Updated

Legislation	**Section 10.1 (3) of O. Reg. 170/03**
Requirement(s) the System Failed to Meet	Changes to the system registration information were not provided within ten (10) days of the change. There are new staff at the Township of BRM and the DWIS profile was not updated accordingly. The inspector included the DWIS profile and form for updating to the client
Corrective Action	Within 10 days of receiving this report, the owner shall fill out the "Drinking Water System Profile Information Form" with the updated information and email it to waterforms@ontario.ca and Ministry's Water Compliance Officer Rachel Hamelin (rachel.hamelin@ontario.ca).
Status	To the best of OCWA's knowledge, the owner has submitted the information

9.0 SUMMARY OF FLOW RATES AND QUANTITIES

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

All raw water flow rate exceedances in 2024 were checked and determined to be inflated numbers due to momentary spikes on pump start up/shutdown that lasted less than 5 minutes and are not representative. The actual maximum flow rates have been depicted in the tables below. False spikes and dips are identified when there are not the same readings for the treated water flow.

Well 1 - Summary of Water Taking

Regulated by Permit to Take Water (PTTW) #300-1137081725 (Issued July 23, 2021)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	4291	4291	4393	3837	4373	4225	4557	3097	0	0	0	0	33064
Average Volume (m^3/d)	138	148	142	128	141	141	147	100	0	0	0	0	90
Maximum Volume (m^3/d)	223	165	168	152	188	179	193	189	0	0	0	0	223
PTTW - Maximum Allowable Volume (m^3/day)	980	980	980	980	980	980	980	980	980	980	980	980	980
Maximum Flow Rate (L/min)	668	667	680	664	665	667	667	665	0	0	0	0	680
PTTW - Maximum Allowable Flow Rate (L/min)	680	680	680	680	680	680	680	680	680	680	680	680	680

The system's Permits to Take Water allow the municipality to withdraw a maximum volume of 980 cubic meters from Well 1 each day. A review of the raw water flow data indicates that the system never exceeded this allowable limit having a maximum volume of 223 m^3.

The Permit also allows a maximum flow rate of 680 L/minute. The maximum flow rate was 680 L/min, which is within the limit.

Note: Well #1 was out of service for a couple months while repairs were completed to the foundation & piping.

Well 2 - Summary of Water Taking

Regulated by Permit to Take Water (PTTW) #300-1137081725 (Issued July 23, 2021)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	3927	4001	4230	3696	4228	4056	4315	4459	4053	4110	3950	4342	49367
Average Volume (m^3/d)	127	138	136	123	136	135	139	144	135	133	132	140	134.9
Maximum Volume (m^3/d)	174	155	149	138	175	169	164	172	292	173	154	154	292
PTTW - Maximum Allowable Volume (m^3/day)	500	500	500	500	500	500	500	500	500	500	500	500	500
Maximum Flow Rate (L/min)	321	322	324	358	342	324	324	326	328	325	328	306	358
PTTW - Maximum Allowable Flow Rate (L/min)	347	347	347	347	347	347	347	347	347	347	347	347	347

The system's Permits to Take Water allow the municipality to withdraw a maximum volume of 500 cubic meters from Well 2 each day. A review of the raw water flow data indicates that the system never exceeded this allowable limit having a maximum volume of 292 m^3.

The Permit also allows a maximum flow rate of 347 L/minute. The maximum flow rate was 358 L/min, which is due to a spike on start up.

Well 3 - Summary of Water Taking

Regulated by Permit to Take Water (PTTW) #300-1137081725 (Issued July 23, 2021)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	4071	4130	4357	3887	4369	4119	4286	5965	7217	8173	7967	8855	67396
Average Volume (m^3/d)	131	142	141	130	141	137	143	192	241	264	266	286	184
Maximum Volume (m^3/d)	155	163	155	175	205	175	177	314	274	343	312	311	343
PTTW - Maximum Allowable Volume (m^3/day)	980	980	980	980	980	980	980	980	980	980	980	980	980
Maximum Flow Rate (L/min)	708	680	643	644	643	673	640	679	680	642	644	642.6	708
PTTW - Maximum Allowable Flow Rate (L/min)	680	680	680	680	680	680	680	680	680	680	680	680	680

The system's Permits to Take Water allow the municipality to withdraw a maximum volume of 980 cubic meters from Well 3 each day. A review of the raw water flow data indicates that the system never exceeded this allowable limit having a maximum volume of 343 m^3.

The Permit also allows a maximum flow rate of 680 L/minute. The maximum flow rate was 708 L/min, which is due to a spike on start up.

Well 4 - Summary of Water Taking

Regulated by Permit to Take Water (PTTW) #300-1137081725 (Issued July 23, 2021)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	9	5	5	6	6	4	6	4	145	5	3	6	204
Average Volume (m^3/d)	0.29	0.17	0.16	0.20	0.19	0.13	0.19	0.13	4.83	0.16	0.10	0.19	0.56
Maximum Volume (m^3/d)	3	2	2	2	2	1	2	2	111	2	1	2	111
PTTW - Maximum Allowable Volume (m^3/day)	230	230	230	230	230	230	230	230	230	230	230	230	230
Maximum Flow Rate (L/min)	152	159	159	265	156	150	150	154	150	149	149	155	265
PTTW - Maximum Allowable Flow Rate (L/min)	160	160	160	160	160	160	160	160	160	160	160	160	160

The system's Permits to Take Water allow the municipality to withdraw a maximum volume of 230 cubic meters from Well 4 each day. A review of the raw water flow data indicates that the system never exceeded this allowable limit having a maximum volume of 111 m^3.

The Permit also allows a maximum flow rate of 160 L/minute. The maximum flow rate was 265 L/min, which is due to a spike on pump start up.

Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #204-103 Issue 6 (March 14, 2022)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Year to Date
Total Volume (m^3)	12375	12525	13030	11454	13006	12439	13327	13442	11345	12227	11891	13231		150292
Average Volume (m^3/d)	399	432	420	382	420	415	430	434	378	394	396	427		411
Maximum Volume (m^3/d)	535	476	458	425	535	515	505	519	475	515	467	467		435
MDWL - Rated Capacity (m^3/day)	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710		1710
% Rated Capacity	31	28	27	25	31	30	30	30	28	30	27	27		25

Schedule C, Section 1.1 of MDWL No. 204-103 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed a maximum flow rate of 1,710 m^3 on any calendar day. The Matheson DWS complied with this limit having a recorded maximum volume of 435 m^3, which is only 25% of the rated capacity.

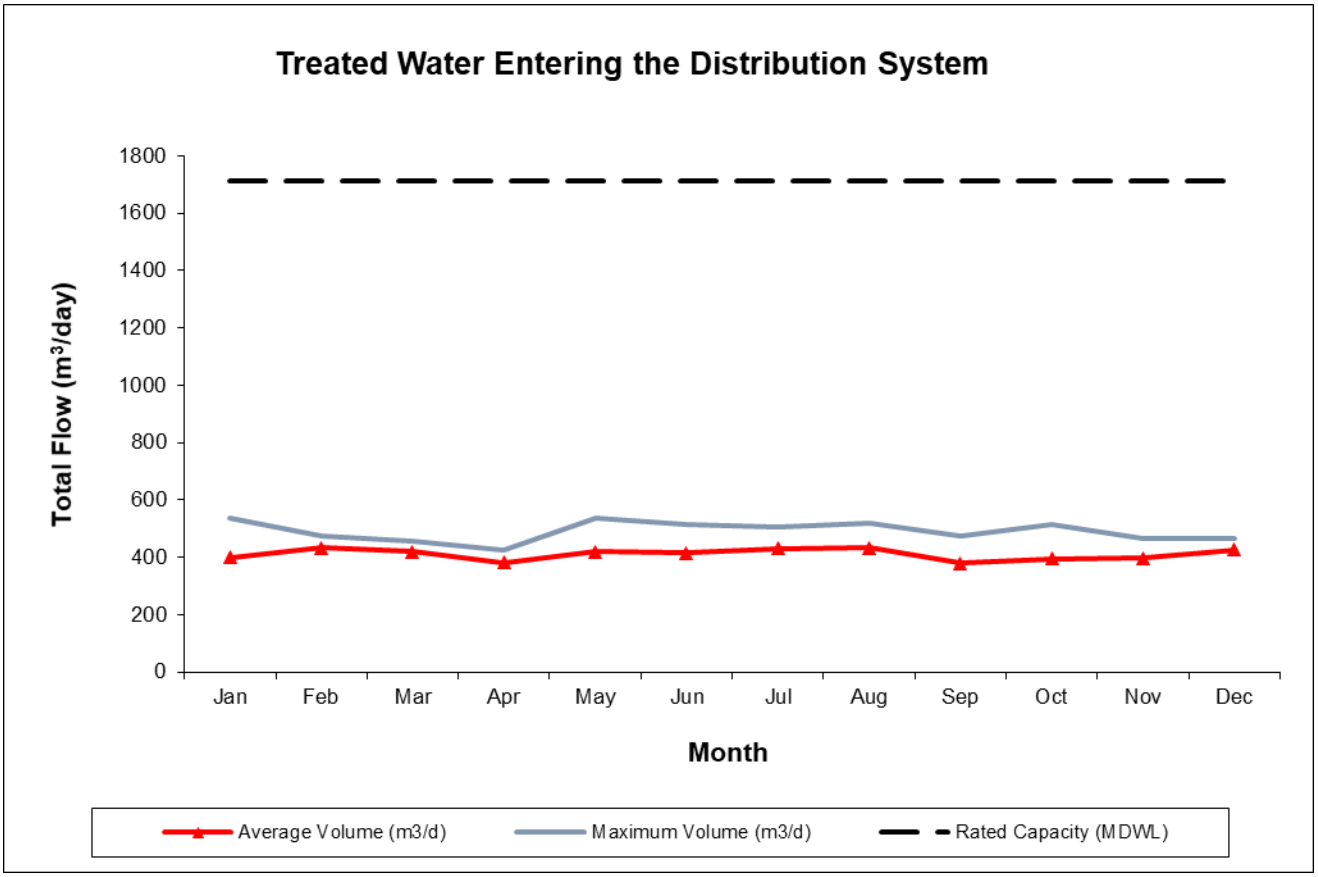

Figure 1: Daily Volumes of Treated Water Supplied to the Distribution System. A comparison of the rate specified in the system's Municipal Drinking Water Licence to the average and maximum volumes entering the distribution system.

Comparison of the Flow Summary to Systems Licence & Permit

Rated Capacity of the Plant (MDWL)	1,710 m^3/day	
Average Daily Flow for 2024	411 m^3/day	24% of the rated capacity
Maximum Daily Flow for 2024	435 m^3/day	25% of the rated capacity
Total Treated Water Produced in 2024	159,321 m^3	

The Matheson water treatment plant is rated at 1,710 cubic meters of water per day as specified in the system's Municipal Drinking Water Licence. The average daily flow was 411 m^3 per day, which is 24% of the rated capacity. This information clearly shows that the plant is well within its rated capacity and is able to meet current demands of consumers.

10.0 CONCLUSION

The Matheson Drinking Water System was able to meet the community's demand for drinking water while complying with the terms and conditions outlined in its Drinking Water Works Permit and Municipal Drinking Water Licence and the regulatory requirements of the Safe Drinking Water Act and its Regulations with the exception of the one incident listed in section 8.0 *Requirements the System Failed to Meet*.