



# 2022 Annual Drinking Water System Summary Report

## Mount Elgin Drinking Water System

### 1. GENERAL INFORMATION

Oxford County (the County) prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the County website at [www.oxfordcounty.ca/drinkingwater](http://www.oxfordcounty.ca/drinkingwater) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the County at the address and phone number listed below or by email at [water@oxfordcounty.ca](mailto:water@oxfordcounty.ca).

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<b>Drinking Water System:</b>	Mount Elgin Drinking Water System
<b>Drinking Water System Number:</b>	220000629
<b>Reporting Period:</b>	January 1, 2022 – December 31, 2022

#### **Drinking Water System Owner & Contact Information:**

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### 1.1 System Description

The Mount Elgin Drinking Water System is a Large Municipal Water system as defined by Ontario Regulation (O.Reg.) 170/03 and serves a population of approximately 702. The water from Mount Elgin Well 3A was treated with approximately 1,720 L of sodium hypochlorite (liquid chlorine) for disinfection and the water from Well 5 was treated with approximately 880 L of sodium hypochlorite and 6,830 kg of carbon dioxide for pH adjustment. The chemical is certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The system consists of two secure groundwater wells and two water treatment facilities as follows:

<i>Treatment Facility</i>	<i>Well</i>	<i>Treatment</i>
Mount Elgin WTF	<b>3A</b>	Disinfection with sodium hypochlorite
Graydon WTF	<b>5</b>	Reduction of naturally occurring sulphide and methane in raw water through membrane filtration assisted by pH adjustment with carbon dioxide. Disinfection with sodium hypochlorite.

The treatment facilities each house pumps, monitoring and treatment equipment, and there is a 380 m<sup>3</sup> underground reservoir at the Mount Elgin WTF. Standby generators are available to run the both facilities in the event of a power failure. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

### 1.2 Major Expenses

The Mount Elgin Drinking Water System is one of 14 water systems that have revenues and expenses pooled for economy of scale purposes. The systems are combined into the Township Water financial system and in 2022 had an operating and maintenance expenditures of approximately \$3,300,000.

In addition to regular operational and maintenance expenditures, Capital Improvement Projects for the Townships systems totaled \$1,800,000 for improvements to water treatment systems and replacement of distribution mains in the Township System.

Township Capital Improvement Projects included:

- \$ 940,000 distribution replacements
- \$ 228,000 repair and maintenance on wells, water pump stations, and water treatment facilities
- \$ 225,000 for facilities improvements

Capital Improvement projects for all systems included:

- \$ 625,000 to develop Countywide SCADA Master Plan for all water systems
- \$ 150,000 to develop Countywide Water Servicing Master Plan for all water systems

## 2. MICROBIOLOGICAL TESTING

### 2.1 E. coli and Total Coliform

Bacteriological tests for *E. coli* and total coliforms are required weekly from the raw and treated water at the facility and from the distribution system. Extra samples are taken after major repairs or maintenance work. Any *E. coli* or total coliform results above 0 in treated water sample must be reported to the Ministry of Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2022 sampling program are shown on the table below. There were no adverse test results from 194 treated water samples in this reporting period.

	<i>Number of Samples</i>	<i>Range of E. coli Results Min - Max MAC = 0</i>	<i>Range of Total Coliform Results Min - Max MAC = 0</i>
Raw	<b>103</b>	<b>0</b>	<b>0 - 4</b>
Treated	<b>100</b>	<b>0</b>	<b>0</b>
Distribution	<b>104</b>	<b>0</b>	<b>0</b>

### 2.2 Heterotrophic Plate Count (HPC)

HPC analyses are required from the treated and distribution water. The tests are required weekly for treated water and for 25% of the required distribution system bacteriological samples. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. 2022 results are shown in the table below.

	<i>Number of Samples</i>	<i>Range of HPC Min - Max</i>
Treated	<b>99</b>	<b>0 - 18</b>
Distribution	<b>26</b>	<b>0 - 42</b>

## 3. CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for approximately 60 different chemical parameters. The latest results for all parameters are provided in Appendix A. The sampling frequency varies for different types and sizes of water systems and chemical parameters. If the concentration of a parameter is above half of

the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Information on the health effects and allowable limits of components in drinking water may be found on the MECP web page through the link provided in Appendix A. Additional information on common chemical parameters specific to the Mount Elgin Drinking Water System is provided below.

### 3.1 Sodium

When sodium levels are above 20 mg/L the MECP and MOH are notified. Southwestern Public Health maintains an information page on sodium in drinking water at [https://www.swpublichealth.ca/en/partners-and-professionals/resources/Health-Care-Providers/Alerts-Advisories-Updates/Advisories/ADV\\_HIA-Sodium-20201203.pdf](https://www.swpublichealth.ca/en/partners-and-professionals/resources/Health-Care-Providers/Alerts-Advisories-Updates/Advisories/ADV_HIA-Sodium-20201203.pdf) in order to help people on sodium restricted diets control their sodium intake. The average sodium level in the Mount Elgin WTF is 21.3. The average sodium level from the Graydon WTF is 37.3.

### 3.2 Hardness

This is an aesthetic parameter that may affect the appearance of the water but is not related to health. Well water commonly has high levels of hardness and other minerals from being in contact with underground rock formations. Many households have water softeners to help reduce white calcium deposits and improve the efficiency of soaps. This information is included here to help set the water softener at the level recommended by the manufacturer. Samples for hardness are collected at a minimum every 3 years from raw water. The hardness for Mount Elgin Drinking Water System was tested in 2022 and ranged from 154 - 274mg/L (9 – 16 grains/gallon). Water in the Mount Elgin System falls within the hard (120 < 180 mg/L) to very hard range ( $\geq$  180 mg/L).

### 3.3 Fluoride

Fluoride levels are sampled once every five years and levels above 1.5 mg/L must be reported to the MECP and MOH. Levels under 2.4 mg/L are considered safe for consumption however at levels between 1.5 and 2.4 mg/L fluoride may cause staining or pitting of teeth in children less than 6 years old. Further information on fluoride can be found on the Southwestern Public Health web page at [https://www.swpublichealth.ca/en/partners-and-professionals/resources/Health-Care-Providers/Alerts-Advisories-Updates/Advisories/ADV\\_HIA-Fluoride-20201203.pdf](https://www.swpublichealth.ca/en/partners-and-professionals/resources/Health-Care-Providers/Alerts-Advisories-Updates/Advisories/ADV_HIA-Fluoride-20201203.pdf)

The County does not add fluoride to the water at any of its drinking water systems. The Graydon Water Treatment facility has naturally occurring fluoride levels that average 1.67 mg/L.

### 3.4 Additional Testing Required by MECP

None.

## 4. OPERATIONAL MONITORING

### 4.1 Chlorine Residual

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facilities. In the distribution system, free chlorine is checked twice weekly at various locations. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There was one low chlorine event in 2022. The corrective for which are summarized in section 6.2. A summary of the chlorine residual readings is provided in the table below in section 4.2.

### 4.2 Turbidity

Turbidity of treated water is continuously monitored at the treatment facility as a change in turbidity can indicate an operational problem. As a minimum, turbidity for each well is required to be tested monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under O.Reg. 170/03 turbidity in groundwater from a secure well or a well with effective in-situ filtration is not reportable however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2022 is provided.

<i>Parameter</i>	<i>Number of Tests or Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
<b>Mount Elgin Well 3A WTF</b>		
Chlorine residual after treatment (mg/L)	Continuous	(0.58 – 4.01) 1.33
Well 3A turbidity before treatment (NTU)	52	(0.10 – 0.72) 0.30
Turbidity after treatment (NTU)	Continuous	(0.04 – 5.00) 0.15
<b>Graydon Well 5 WTF</b>		
Chlorine residual after treatment (mg/L)	Continuous	(0.02 - 5.00) 1.25
Well 5 turbidity before treatment (NTU)	51	(0.12 – 0.65) 0.26
Turbidity after treatment (NTU)	Continuous	(0.06 – 5.00) 0.15
<b>Distribution System</b>		
Chlorine residual in distribution (mg/L)	365	(0.34 - 2.13) 1.26

## 5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the Water Treatment Facility into the distribution system is required by O.Reg. 170/03. The Municipal Drinking Water License and Permit to Take Water (PTTW)

issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2022 flows are provided in the table below and presented graphically in Appendix B.

<i>Flow Summary</i>	<i>Municipal Drinking Water Licence (m<sup>3</sup>/day)</i>	<i>2022 Max Daily Flow (m<sup>3</sup>/day)</i>	<i>2022 Average Daily Flow (m<sup>3</sup>/day)</i>	<i>2022 Average Monthly Flow (m<sup>3</sup>/month)</i>	<i>2022 Total Yearly Flow (m<sup>3</sup>/year)</i>
Mount Elgin WTF	328	249	90	2,725	32,698
Graydon WTF	864	175	46	1,392	16,708
<b>Mount Elgin DWS*</b>	1,192	295	133	4,117	49,406

*\*DWS stands for Drinking Water System*

A review of the available supply capacity and the anticipated growth forecasted for the community indicates that the system has sufficient capacity over the 20 year planning horizon.

Firm Capacity of this system is rated at 428 m<sup>3</sup>/day. Firm Capacity is defined as the removal of the highest producing well in an emergency or operational / maintenance situation with the ability to transport a maximum of 100 m<sup>3</sup>/day if necessary to maintain system integrity. This system comprises of two supply wells. The MDWL limits pumping rate of either well to 1,192 m<sup>3</sup>/day for Firm Capacity calculations. In the first half of 2022, the Graydon WTF was offline for degasser maintenance and during this event the capacity of the system is reduced to 328 m<sup>3</sup>/day.

## 6. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS

This section documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. The issues and associated required actions are documented by the Inspectors in the system's Annual Inspection Report. All non-compliance issues are investigated, corrective actions taken and documented using the County's Drinking Water Quality Management System (DWQMS) procedures.

### 6.1 Non-Compliance Findings

The annual MECP inspection took place in June 2022 and the Inspection Report Rating was 95%. During the inspection, a non-compliance was for the summary of the raw water turbidity results not being included in the 2021 Annual Report. Raw water turbidity is not a reportable parameter in groundwater systems but is checked weekly by Water Services staff. The inclusion of raw water turbidity results in the Annual Report has been incorporated for 2022 for all County drinking water systems moving forward. Two other non-compliances for the Mount Elgin DWS were noted for the operations and maintenance manual. At the time of the inspection the operations and maintenance manual needed to be updated to include finalized information for the Graydon Water Treatment facility (commissioned September 2021). A corrective action was issued by

the MECP to provide the updated manual for review. The County provided the updated manual and no further action was required.

## 6.2 Adverse Results

Any adverse results from bacteriological, chemical samples or observations of operational conditions that indicate adverse water quality are reported as required and corrective actions are taken. There were three adverse or reportable occurrences in 2022 one of which resulted in a precautionary boil water advisory.

A low free chlorine residual of 0.02 mg/L was reported to the MECP and Medical Officer of Health (MOH) on January 24, 2021. The system was subsequently back flushed and the chlorine residual was tested and restored to an acceptable ODWS concentration (above 0.05 mg/L).

Damage to a watermain on February 9, 2022 by a third party contractor resulted in low water pressure in the distribution system and potential impact to secondary disinfection. The incident was reported to the MECP and Medical Officer of Health (MOH). A precautionary BWA was enacted for all residents. Distribution free chlorine residuals were collected immediately and found to be within acceptable levels. Additionally, two sets of bacteriological water samples were collected to confirm that there was no contamination to the drinking water system, and all results were found to be acceptable.

The failure of two high lift pumps during system flushing on October 31, 2022 resulted in potential low distribution pressure at higher elevations. The incident was reported to the MECP and MOH. The system was flushed at all dead ends and high elevations. The chlorine residual was tested and found to be within acceptable ODWS levels (above 0.05 mg/L).

## APPENDIX A: SUMMARY OF CHEMICAL RESULTS

### UNDERSTANDING CHEMICAL TEST RESULTS

The following tables summarize the laboratory results of the chemical testing the County is required to complete. Different types of parameters are required to be tested for at different frequencies as noted below. Explanations on the health impacts of these parameters can be found in the MECP document PSIB 4449e01 titled “Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines” available at [https://cvc.ca/wp-content/uploads/2011/03/std01\\_079707.pdf](https://cvc.ca/wp-content/uploads/2011/03/std01_079707.pdf).

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (µg/L). 1 mg/L is equal to 1000 µg/L. The Maximum Acceptable Concentration (MAC) is the highest amount of a parameter that is acceptable in Municipal drinking water and can be found in the MECP Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of “ND” stands for “Not Detected” and means that the concentration of the chemical is lower than the laboratory’s equipment is capable of measuring. In the event that some samples results are ND, and other results are above the MDL, the value of the MDL will be used in place of the ND where an average result must be calculated. Where all collected samples are ND the average sample result will be assumed to be ND.

Nitrate and nitrite samples are required every 3 months in normal operation.

<i>Parameter</i>	<i>Number of Tests</i>	<i>Result Range Min – Max (mg/L)</i>	<i>Average Result (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Nitrite	8	ND	ND	1.0	0.003
Nitrate	8	0.006 – 0.021	0.018	10.0	0.006

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

<i>Parameter</i>	<i>Annual Average</i>	<i>Result Value (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Trihalomethane (THM)	2022	13.3	100	0.37
Haloacetic Acids (HAA)	2022	5.2	80	5.3

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Sodium	May 28, 2019	21.3	20*	0.01
Fluoride	August 18, 2021	1.62	1.5**	0.06

\*Sodium levels between 20 – 200 mg/L must be reported every 5 years.

\*\*Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.



The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken every 3 years. Levels of alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

<i>Parameter</i>	<i>Result Range (Min - Max)</i>	<i>Number of Samples</i>	<i>Acceptable Level</i>
Distribution Alkalinity 2022	184 - 230	4	30 – 500mg/L
Distribution pH 2022	7.80 – 8.12	4	6.5 – 8.5
Distribution Lead 2021	0.13 – 1.19	4	10 µg/L MAC

The following Table summarizes the most recent test results for Schedule 23. Testing is required every 3 years for secure groundwater wells in large systems.

<i>Parameter</i>	<i>Result Value (µg/L)</i>		<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
	<i>Mount Elgin WTF (February 24, 2020)</i>	<i>Graydon WTF (August 18, 2021)</i>		
Antimony	ND	ND	6	0.6
Arsenic	ND	ND	10	0.2
Barium	142	139	1000	0.02
Boron	80	117	5000	2
Cadmium	0.003	0.007	5	0.003
Chromium	0.65	0.27	50	0.08
Mercury	ND	ND	1	0.01
Selenium	ND	ND	50	0.04
Uranium	0.011	0.013	20	0.002

The following Table summarizes the most recent test results for Schedule 24. Testing is required every 3 years for secure groundwater wells in large systems.

<i>Parameter</i>	<i>Result Value (µg/L)</i>		<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
	<i>Mount Elgin WTF (February 24, 2020)</i>	<i>Graydon WTF (August 18, 2021)</i>		
Alachlor	ND	ND	5	0.02
Atrazine + N-dealkylatedmetabolites	ND	ND	5	0.01
Azinphos-methyl	ND	ND	20	0.05
Benzene	ND	ND	1	0.32
Benzo(a)pyrene	ND	ND	0.01	0.004
Bromoxynil	ND	ND	5	0.33
Carbaryl	ND	ND	90	0.05
Carbofuran	ND	ND	90	0.01
Carbon Tetrachloride	ND	ND	2	0.17
Chlorpyrifos	ND	ND	90	0.02
Chlorpyrifos	ND	ND	90	0.02
Diazinon	ND	ND	20	0.02
Dicamba	ND	ND	120	0.20
1,2-Dichlorobenzene	ND	ND	200	0.41
1,4-Dichlorobenzene	ND	ND	5	0.36
1,2-Dichloroethane	ND	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	ND	ND	14	0.33

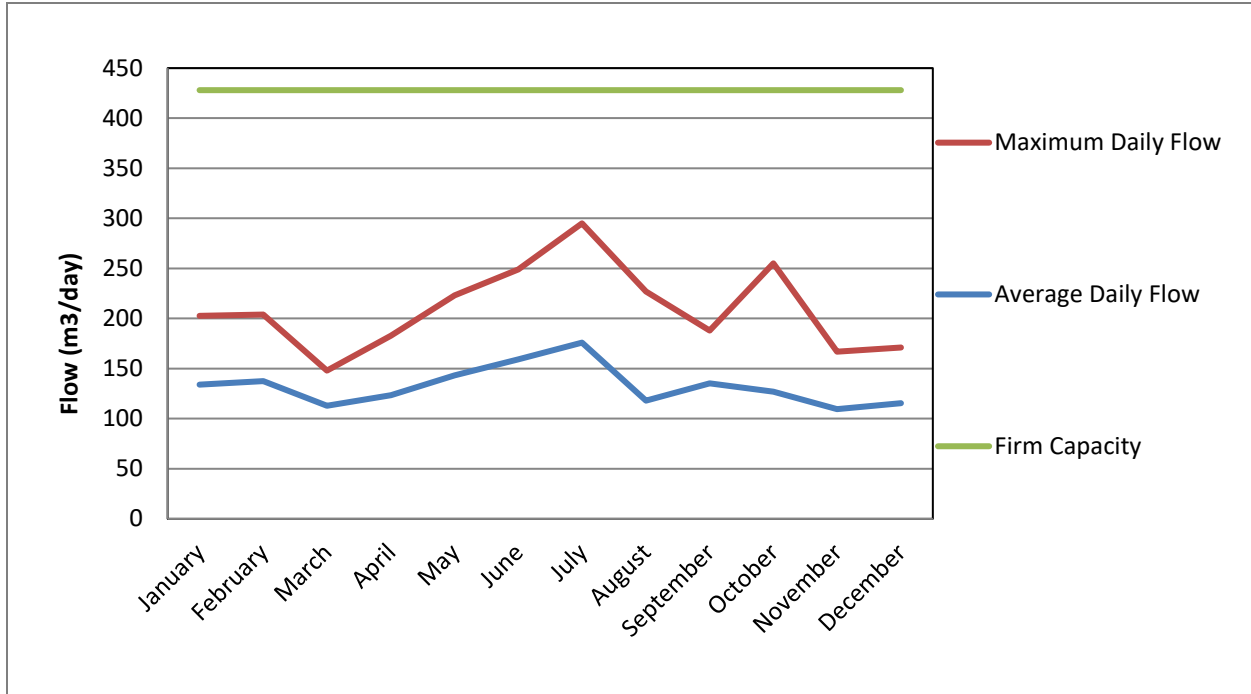
Parameter	Result Value ( $\mu\text{g/L}$ )		MAC ( $\mu\text{g/L}$ )	MDL ( $\mu\text{g/L}$ )
	Mount Elgin WTF (February 24, 2020)	Graydon WTF (August 18, 2021)		
Dichloromethane	ND	ND	50	0.35
2-4 Dichlorophenol	ND	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	ND	ND	100	0.19
Diclofop-methyl	ND	ND	9	0.40
Dimethoate	ND	ND	20	0.06
Diquat	ND	ND	70	1
Diuron	ND	ND	150	0.03
Glyphosate	ND	ND	280	1
Malathion	ND	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	ND	ND	100	0.12
Metolachlor	ND	ND	50	0.01
Metribuzin	ND	ND	80	0.02
Monochlorobenzene	ND	ND	80	0.30
Paraquat	ND	ND	10	1
Pentachlorophenol	ND	ND	60	0.15
Phorate	ND	ND	2	0.01
Picloram	ND	ND	190	1
Polychlorinated Biphenyls(PCB)	ND	ND	3	0.04
Prometryne	ND	ND	1	0.03
Simazine	ND	ND	10	0.01
Terbufos	ND	ND	1	0.01
Tetrachloroethylene	ND	ND	10	0.35
2,3,4,6-Tetrachlorophenol	ND	ND	100	0.20
Triallate	ND	ND	230	0.01
Trichloroethylene	ND	ND	5	0.44
2,4,6-Trichlorophenol	ND	ND	5	0.25
Trifluralin	ND	ND	45	0.02
Vinyl Chloride	ND	ND	1	0.17

# APPENDIX B: WATER QUANTITY SUMMARY

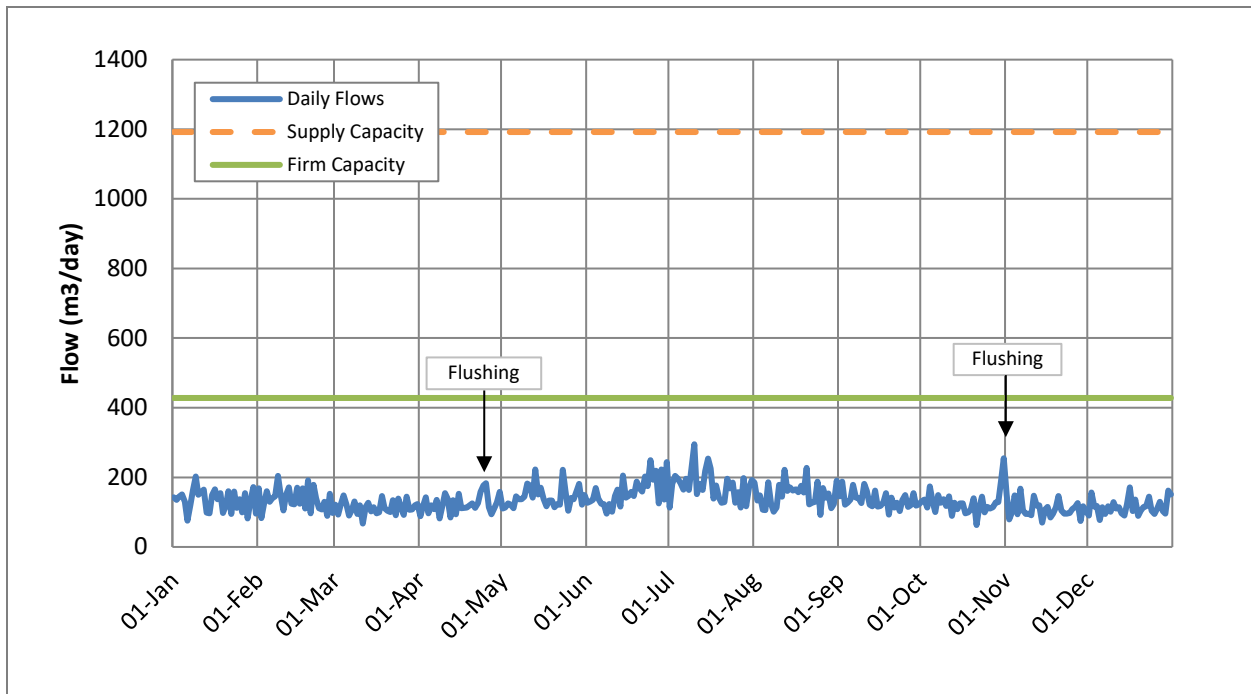
Mount Elgin Drinking Water System Firm Capacity 1,192 m<sup>3</sup>/ day

Mount Elgin Drinking Water System Supply Capacity 428 m<sup>3</sup>/ day

## 2022 Average vs Maximum Daily Flow Rates



## 2022 Daily Flow



# 2022 Total Production by Well

