2021 ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT
Mount Elgin 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 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 publicworks@oxfordcounty.ca

Drinking Water System:	Mount Elgin Water System
Drinking Water System Number:	220000629
Drinking Water System Owner & Contact Information:	Oxford County Public Works Department Water Services P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778 Email: publicworks@oxfordcounty.ca
Reporting Period:	January 1, 2021 – December 31, 2021

1.1. System Description

The Mount Elgin Water System is a Large Municipal Water system as defined by Ontario Regulation (O.Reg.) 170/03 and serves a population of approximately 603. The system consists of two groundwater wells and two treatment facilities. The water from Mount Elgin Well 3A was treated with approximately 1,956 litres of sodium hypochlorite (liquid chlorine) for disinfection and the water from Well 5 was treated with approximately 310 litres of sodium hypochlorite and 6,142 kg of carbon dioxide for pH adjustment. These chemicals are certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The two treatment facilities house pumps, monitoring equipment, and there is a 380 m^3 underground reservoir at the Well 3A facility. A standby generator is available to run the Well 3A facility in the event of a power failure and a generator is planned to be installed at the Well 5 facility. 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 a failure of critical operational requirements.

1.2. Major Expenses

The Mount Elgin Water System is one of 14 water systems that have revenues and expenses pooled for the economy of scale purposes. The systems are combined into the Township Water financial system and in 2021 had operating and maintenance expenditures of approximately $3,000,000.

In addition to regular operational and maintenance expenditures, Capital Improvement Projects for the Townships systems totaled $1,500,000 for improvements to water treatment systems and replacement of distribution mains in the Township System.

Capital Improvement projects for the Township systems included:

- 65,000 for groundwater modelling
- 350,000 for facilities improvements
- 175,000 for the replacement of general operating equipment including well rehabilitations

Capital Improvement projects for all systems included:

- $720,000 to develop Countywide SCADA Master Plan for all water systems
- $14,000 for Updated Water Systems Modelling

Capital Construction project:

- $1,900,000 for the Graydon WTF 2021 construction costs

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 must be reported to the Ministry of the 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 2021 sampling program are shown in the table below. There were no adverse test results from 176 treated water samples in this reporting period.

	Number of Samples	*Range of E. coli Results Min - Max MAC = 0*	*Range of Total Coliform Results Min - Max MAC = 0*
Raw	74	0 - 0	0 - 2
Treated	75	0 - 0	0 - 0
Distribution	104	0 - 0	0 - 0

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. The 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. The 2021 results are shown in the table below.

	Number of Samples	*Range of HPC Min - Max*
Treated	75	0 - 9
Distribution	26	0 - 22

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 system is provided below.

3.1. 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 either raw or treated water. The average hardness for the Mount Elgin System is 231 mg/L (14 grains/gallon) based on samples collected from 2006 to 2019.

3.2. Sodium

Sodium levels in drinking water are tested once every five years. The aesthetic objective is 200 mg/L meaning at levels less than this, sodium will not impair the taste of the water.

When sodium levels are above 20 mg/L the MECP and MOH are notified. Southwestern Public Health Unit 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 in order to help people on sodium restricted diets control their sodium intake. The average sodium level in the Mount Elgin water system is 29.2 mg/L (ranging from 21.3 to 37.0 mg/L).

3.3. Fluoride

Fluoride levels are tested 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 Unit webpage at 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 however the Mount Elgin system has naturally occurring fluoride levels averaging 1.5 mg/L (ranging from 1.4 to 1.7 mg/L). The test results for each treatment facility are provided in Appendix A.

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 Facility. 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. A summary of the chlorine residual readings is provided in the table below. There was one incident reported to the MECP and MOH in 2021 the details of which are provided in Section 6.2.

4.2. Turbidity

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the well is checked weekly. Turbidity is measured in nephelometric turbidity units (NTU). Under O. Reg. 170/03 turbidity in groundwater 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 2021 is provided in the table below.

Parameter	*Number of Tests or Monitoring Frequency*	*Range of Results (Min – Max) and Average*
Chlorine residual in distribution (mg/L)	360	(0.03 – 2.40) 1.20
Mount Elgin Well 3A WTF		
Chlorine residual after treatment (mg/L)	Continuous	(0.53 – 2.63) 1.31
Turbidity after treatment (NTU)	Continuous	(0.04 – 4.53) 0.14
Graydon Well 5 WTF		
Chlorine residual after treatment (mg/L)	Continuous	(0.23 – 4.64) 1.29
Turbidity after treatment (NTU)	Continuous	(0.19 – 5.00) 0.55

5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the facility into the distribution system is required by O. Reg. 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2021 flows are provided in the Table below and presented graphically in Appendix B.

Flow Summary	*Quantity*
Permit to Take Water Limit	1,649 m^3/d
Municipal Drinking Water License Limit	1,192 m^3/d
2021 Average Daily Flow	129 m^3/d
2021 Maximum Daily Flow	314 m^3/d
2021 Average Monthly Flow	3,916 m^3
2021 Total Amount of Water Supplied	46,991 m^3

Construction of the Mount Elgin Graydon Well 5 treatment facility started in 2020 and was operational in September 2021. With this facility now operational there will be sufficient supply capacity to meet the community's long term growth needs.

Firm Capacity of this system is rated at 428 m3/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^3/day to maintain system integrity. This system comprises of two supply wells with a 380 m^3 underground reservoir at the Well 3A facility.

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 2021 MECP annual inspection of the Mount Elgin drinking water system took place on July 15, 2021. There were no non-compliance findings and the 2021 Inspection Report rating was 100%.

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 taken. Below is a summary of the adverse/reportable occurrence in 2021 along with the corresponding resolution.

Incident / Date	*Corrective Action*	*Resolution / Date*
Treated Water Sample with Chemistry Exceedance		
Fluoride of 1.62 mg/L taken Aug 24, 2021 at the Graydon Well 5 WTF	Reported, sample collected for confirmation	Sample result was confirmed (1.71 mg/L) Sep 7, 2021
Chlorine Residual in Distribution System < 0.05 mg/L		
Chlorine residual = 0.03 mg/L on November 26, 2021	Report, flush and retest	Acceptable chlorine residual restored November 26, 2021

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 https://cvc.ca/wp-content/uploads/2011/03/std01_079707.pdf PIBS 4449e01 titled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines".

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (ug/L). ario Drinking Water Standards, Objectives and Guidelines". 1 mg/L is equal to 1000 ug/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.

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

Parameter	*Result Range* Min – Max *(mg/L)*	*Average Result (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Nitrite				
Mount Elgin WTF	ND	ND	1.0	0.003
Graydon WTF	ND	ND	1.0	0.003
Nitrate				
Mount Elgin WTF	0.013 – 0.020	0.017	10.0	0.006
Graydon WTF	0.010 – 0.012	0.011	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.

Parameter	*Annual Average*	*Result Value (ug/L)*	*MAC (ug/L)*	*MDL (ug/L)*
Trihalomethane (THM)	2021	12	100	0.37
Haloacetic Acids (HAA)	2021	ND	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.

Parameter	*Sample Date*	*Result Value (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Sodium				
Mount Elgin WTF	May 28, 2019	21.3	20.0*	0.01
Graydon WTF	Aug 18, 2021	37.0	20.0*	0.01
Fluoride				
Mount Elgin WTF	May 28, 2019	1.39	1.5**	0.06
Graydon WTF	Aug 18, 2021	1,62	1.5**	0.06
Graydon WTF	Aug 26, 2021	1,71	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.

Parameter	*Result Range (Min – Max)*	*Number of Samples*	*Acceptable Level*
Distribution Alkalinity	216 – 224	2	30 – 500mg/L
Distribution pH	7.71 – 7.85	2	6.5 – 8.5
Distribution Lead 2021	0.22 – 0.49	2	10 ug/L MAC

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

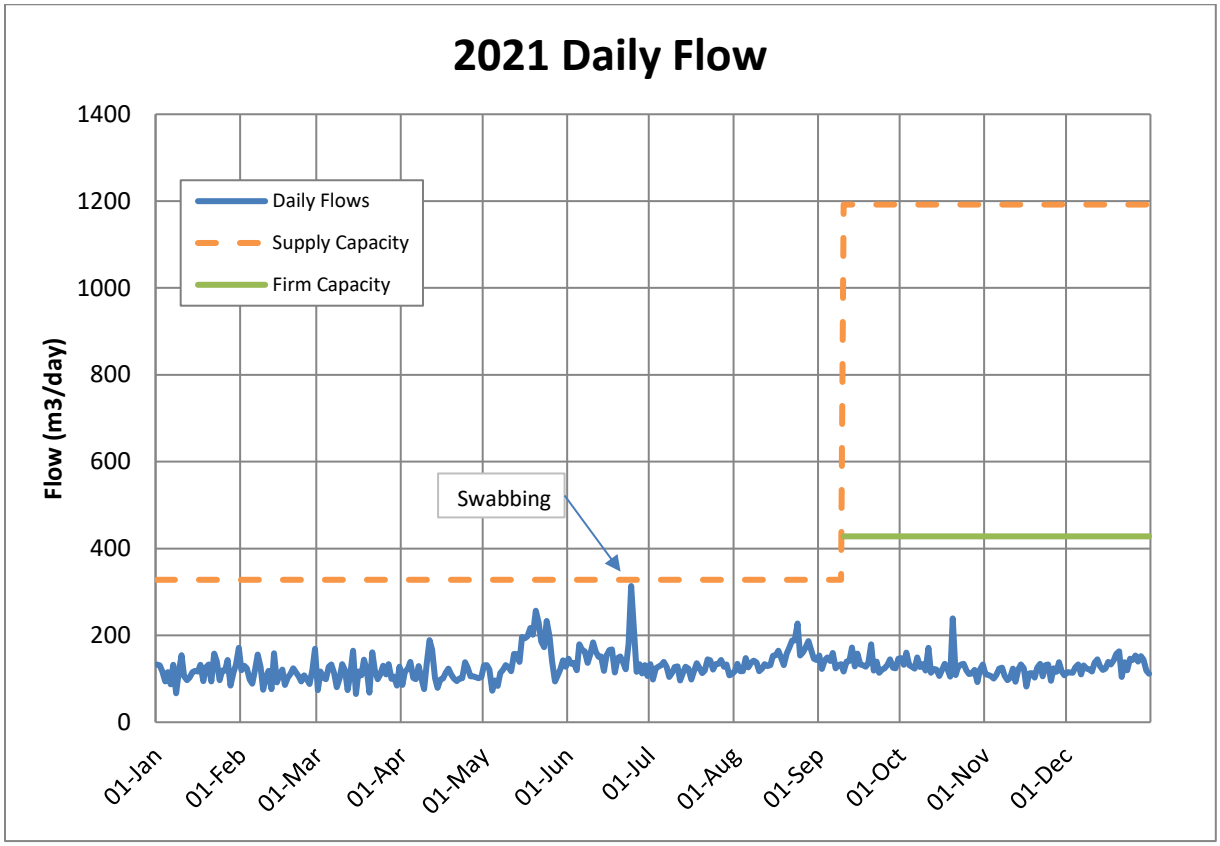
Parameter	***Mt Elgin Well 3A WTF*** *Result Value (ug/L)* Feb 24, 2020	***Graydon Well 5 WTF*** *Result Value (ug/L)* Aug 18, 2021	*MAC (ug/L)*	*MDL (ug/L)*
Antimony	ND	ND	6	0.9
Arsenic	ND	ND	10	0.2
Barium	142	139	1000	0.02
Boron	80	117	5000	2
Cadmium	0.003	0.007	5	0.003
Chromium	0.65	0.27	50	0.08
Mercury	ND	ND	1	0.01
Selenium	ND	ND	50	0.04
Uranium	0.011	0.013	20	0.002

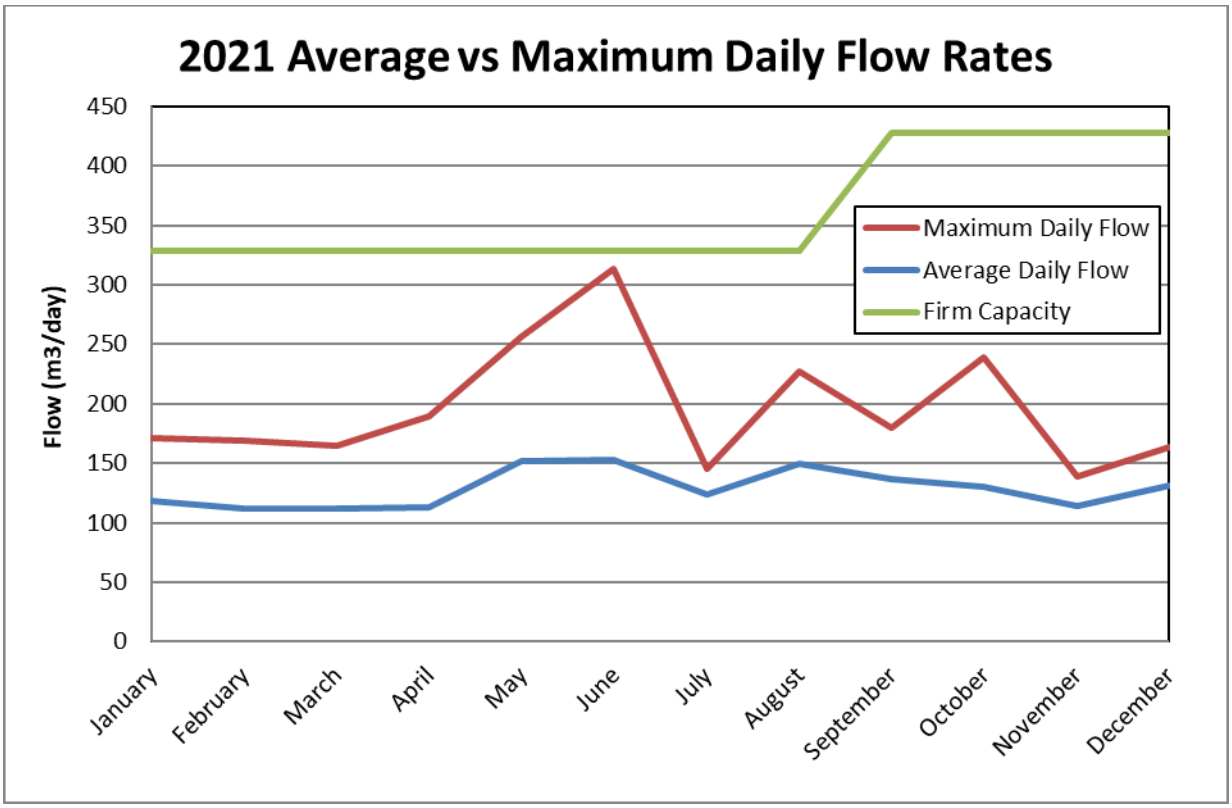
The following Table summarizes the most recent test results for the Organic parameters in Schedule 24. Testing is required every 3 years for secure groundwater wells.

Parameter	***Well 3A WTF*** *Result Value (ug/L)* Feb 24, 2020	***Well 5 WTF*** *Result Value (ug/L)* Aug 18, 2021	*MAC (ug/L)*	*MDL (ug/L)*
Alachlor	ND	ND	5	0.02
Atrazine + N-dealkylatedmetobolites	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	0.16
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
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	0.03
Diquat	ND	ND	70	1
Diuron	ND	ND	150	0.03
Glyphosate	ND	ND	280	1
Malathion	ND	ND	190	0.02
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

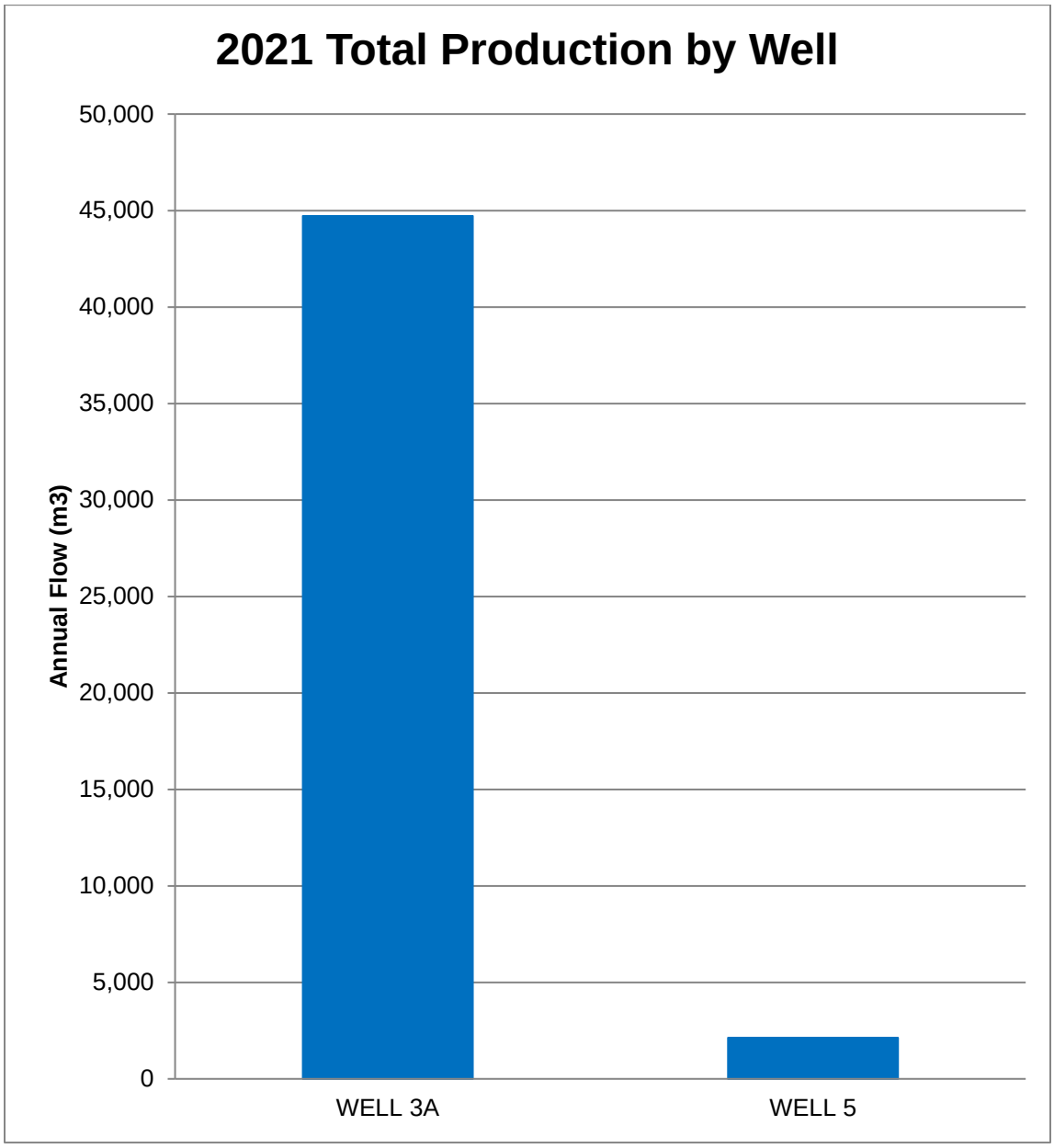




Mount Elgin Water System Supply Capacity 1,192m^3/day

Mount Elgin Water System Firm Capacity 428 m^3/day

APPENDIX B: WATER QUANTITY SUMMARY



Mount Elgin Water System Supply Capacity 1,192m^3/day

Mount Elgin Water System Firm Capacity 428 m^3/day