2022 Annual Drinking Water System Summary Report

Thamesford 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 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.

Drinking Water System:	Thamesford Drinking Water System
Drinking Water System Number:	220000610
Reporting Period:	January 1, 2022 – December 31, 2022

Drinking Water System Owner & Contact Information:

Oxford County Public Works Department - Water Services
P.O. Box 1614
21 Reeve Street
Woodstock, ON N4S 7Y3
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Toll Free: 866-537-7778
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1.1 System Description

The Thamesford Water System is a Large Municipal Water system as defined by Ontario Regulation (O.Reg.) 170/03 and serves a population of approximately 3000. The system consists of four well sources, Wells 1, 2 and 4 are classified as GUDI (Groundwater Under the Direct Influence of surface water) with effective in-situ filtration. Well 3 is a secure groundwater well. The water is treated by filtration for iron and manganese removal followed by disinfection by Ultra Violet (UV) light and sodium hypochlorite at the Thamesford Water Treatment Facility. Well 3 can be operated independently of the Thamesford Water Treatment Facility with the addition of sodium hypochlorite for disinfection as it is a secure groundwater well. In 2022, approximately 9,335 L of sodium hypochlorite was used in the water treatment process. The chemical is certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The 2,050 m^3 water tower provides storage and maintains system pressure. A standby generator is available to run the facility 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 Thamesford 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:

- $228,000 R&M on Wells, Water Pump stations, and Water Treatment Facilities
- $940,000 distribution replacements
- $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 215 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	**208**	**0**	**0 - 7**
Treated	**52**	**0**	**0**
Distribution	**163**	**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. 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.

	Number of Samples	*Range of HPC Min - Max*
Treated	**52**	**0 - 31**
Distribution	**39**	**0 - 55**

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 Thamesford Drinking Water System is provided below.

3.1 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, the 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 maintains an information page on sodium in drinking water 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 Thamesford is 26.0 mg/L.

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 the Thamesford Drinking Water System was tested in 2022 and ranged from 366 – 402mg/L (21 - 24 grains/gallon)

3.3 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. There were no reportable incidents in 2022. 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 in the table below.

Parameter	*Number of Tests or Monitoring Frequency*	*Range of Results (Min – Max) and Average*
Chlorine residual after treatment (mg/L)	Continuous	(0.84 – 2.41) 1.40
Chlorine residual in distribution (mg/L)	Continuous	(0.72 – 1.66) 1.19
Well 1 turbidity before treatment (NTU)	52	(0.07 – 1.37) 0.43
Well 2 turbidity before treatment (NTU)	52	(0.05 – 1.18) 0.27
Well 3 turbidity before treatment (NTU)	52	(0.08 – 1.60) 0.57
Well 4 turbidity before treatment (NTU)	52	(0.08 – 1.06) 0.32
Turbidity after treatment (NTU)	Continuous	(0.03 – 3.98) 0.04

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.

Flow Summary	*Municipal Drinking Water Licence (m^3/day)*	*2022 Max Daily Flow (m^3/day)*	*2022 Average Daily Flow (m^3/day)*	*2022 Average Monthly Flow (m^3/month)*	*2022 Total Yearly Flow (m^3/year)*
Normal Operation*	5,391	1,746	686	20,872	250,461
Well 3 Only**	1,305	0	0	0	0
Thamesford DWS* **	**5,391**	**1,746**	**686**	**20,872**	**250,461**

**Normal operation includes the use of the Thamesford Water Treatment Facility by wells 1,2,3 and 4*
***Well 3 can operate direct to the tower independent of the Thamesford Water Treatment Facility if required.*
****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 2,765 m^3/day and the GUDI portion of this is 1,468 m^3/day. Firm Capacity is defined as the removal of the highest producing well in an emergency or operational / maintenance situation. This system comprises of four supply wells. Firm capacity could increase with confirmation of dam restoration.

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

At the time this report was drafted the results of the 2022 annual inspection by the MECP had not been finalized.

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 no adverse or reportable occurrences in 2022.

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.

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.

Parameter	*Number of Tests*	*Result Range Min – Max (mg/L)*	*Average Result (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Nitrite	4	ND	ND	1.0	0.003
Nitrate	4	1.95 – 3.66	2.86	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 (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Trihalomethane (THM)	2022	24.8	100	0.37
Haloacetic Acids (HAA)	2022	10.7	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	May 21, 2019	26.0	20*	0.01
Fluoride	May 21, 2019	0.89	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 2022	248 – 284	4	30 – 500mg/L
Distribution pH 2022	7.23 – 7.64	4	6.5 – 8.5
Distribution Lead 2021	ND – 1.58	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.

Parameter	*Sample Date*	*Result Value (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Antimony	May 30, 2022	ND	6	0.6
Arsenic	May 30, 2022	ND	10	0.2
Barium	May 30, 2022	62.3	1000	0.02
Boron	May 30, 2022	74	5000	2
Cadmium	May 30, 2022	ND	5	0.003
Chromium	May 30, 2022	0.23	50	0.08
Mercury	May 30, 2022	ND	1	0.01
Selenium	May 30, 2022	0.26	50	0.04
Uranium	May 30, 2022	0.35	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.

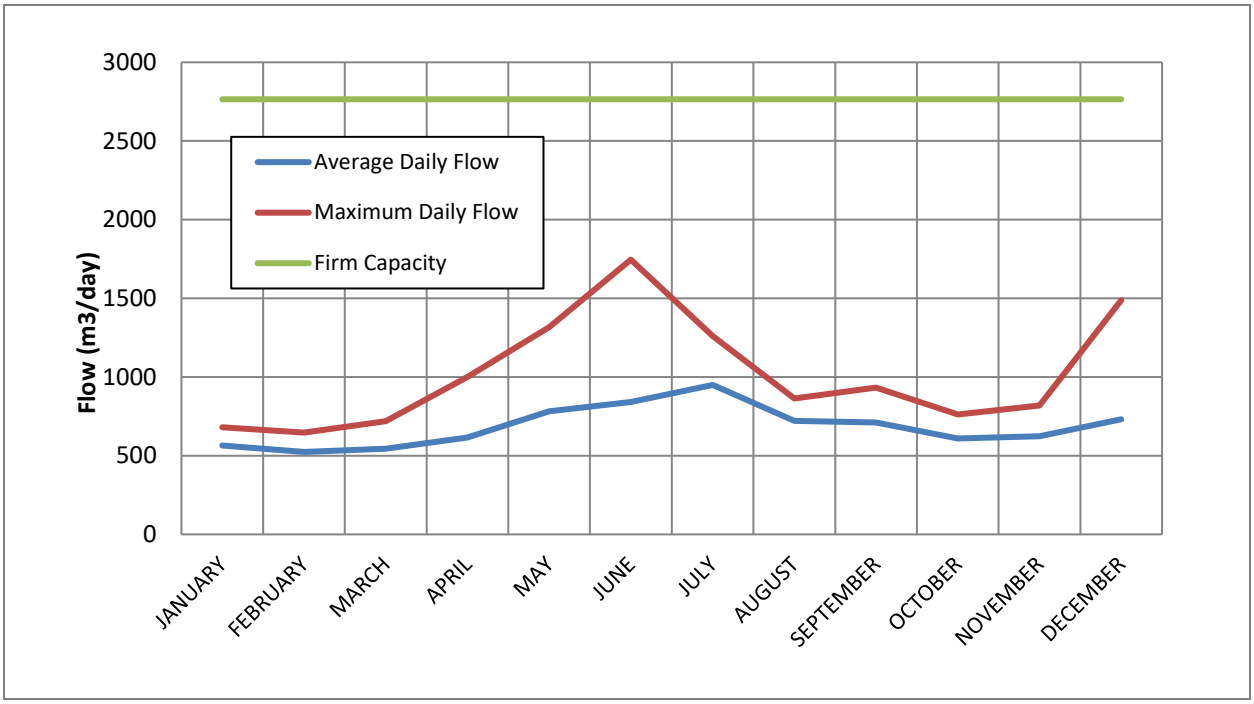
Parameter	*Sample Date*	*Result (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Alachlor	May 30, 2022	ND	5	0.02
Atrazine + N-dealkylatedmetobolites	May 30, 2022	ND	5	0.01
Azinphos-methyl	May 30, 2022	ND	20	0.05
Benzene	May 30, 2022	ND	1	0.32
Benzo(a)pyrene	May 30, 2022	ND	0.01	0.004
Bromoxynil	May 30, 2022	ND	5	0.33
Carbaryl	May 30, 2022	ND	90	0.05
Carbofuran	May 30, 2022	ND	90	0.01
Carbon Tetrachloride	May 30, 2022	ND	2	0.17
Chlorpyrifos	May 30, 2022	ND	90	0.02
Chlorpyrifos	May 30, 2022	ND	90	0.02
Diazinon	May 30, 2022	ND	20	0.02
Dicamba	May 30, 2022	ND	120	0.20
1,2-Dichlorobenzene	May 30, 2022	ND	200	0.41
1,4-Dichlorobenzene	May 30, 2022	ND	5	0.36
1,2-Dichloroethane	May 30, 2022	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	May 30, 2022	ND	14	0.33
Dichloromethane	May 30, 2022	ND	50	0.35
2-4 Dichlorophenol	May 30, 2022	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	May 30, 2022	ND	100	0.19
Diclofop-methyl	May 30, 2022	ND	9	0.40

Parameter	*Sample Date*	*Result (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Dimethoate	May 30, 2022	ND	20	0.06
Diquat	May 30, 2022	ND	70	1
Diuron	May 30, 2022	ND	150	0.03
Glyphosate	May 30, 2022	ND	280	1
Malathion	May 30, 2022	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	May 30, 2022	ND	100	0.12
Metolachlor	May 30, 2022	ND	50	0.01
Metribuzin	May 30, 2022	ND	80	0.02
Monochlorobenzene	May 30, 2022	ND	80	0.30
Paraquat	May 30, 2022	ND	10	1
Pentachlorophenol	May 30, 2022	ND	60	0.15
Phorate	May 30, 2022	ND	2	0.01
Picloram	May 30, 2022	ND	190	1
Polychlorinated Biphenyls(PCB)	May 30, 2022	ND	3	0.04
Prometryne	May 30, 2022	ND	1	0.03
Simazine	May 30, 2022	ND	10	0.01
Terbufos	May 30, 2022	ND	1	0.01
Tetrachloroethylene	May 30, 2022	ND	10	0.35
2,3,4,6-Tetrachlorophenol	May 30, 2022	ND	100	0.20
Triallate	May 30, 2022	ND	230	0.01
Trichloroethylene	May 30, 2022	ND	5	0.44
2,4,6-Trichlorophenol	May 30, 2022	ND	5	0.25
Trifluralin	May 30, 2022	ND	45	0.02
Vinyl Chloride	May 30, 2022	ND	1	0.17

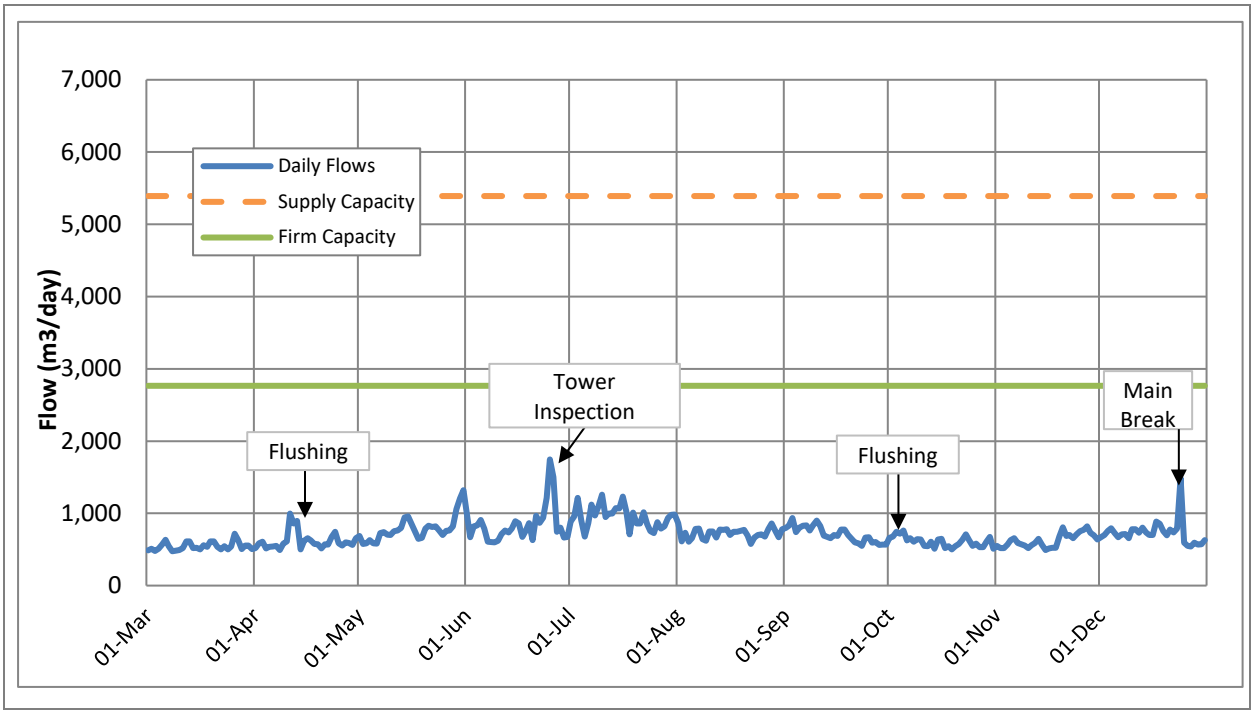
APPENDIX B: WATER QUANTITY SUMMARY

Thamesford Drinking Water System Firm Capacity 5,391 m^3/ day
Thamesford Drinking Water System Supply Capacity 2,765 m^3/ day

2022 Average vs Maximum Daily Flow Rates



2022 Daily Flow



2022 Total Production by Well