

2024 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 information required for Annual Reports and Summary Reports under Ontario Regulation (O. Reg.) 170/03 of the *Safe Drinking Water Act*, 2002 including 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, 2024 – December 31, 2024

Drinking Water System Owner & Contact Information:

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1.1 System Description

The Thamesford Drinking Water System (DWS) is a large municipal residential water system as defined by O. Reg. 170/03 and serves a population of approximately 3,300 people. The system consists of four wells. Wells 1, 2 and 4 are classified as Groundwater Under the Direct Influence of surface water (GUDI) 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 Ultraviolet (UV) light and sodium hypochlorite at the Thamesford Water Treatment Facility (WTF). Well 3 can be operated independently of the Thamesford WTF with the addition of sodium hypochlorite for disinfection as it is a secure groundwater well. In 2024, approximately 11,685 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 m³ 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 O. Reg. 170/03. Alarms automatically notify operators in the event of failure of critical operational requirements. The Thamesford DWS does not supply drinking water to any other drinking water systems.

1.2 Major Expenses

Planning for major drinking water system expenses is included within Oxford County's Water Services Master Plan and managed according to our Asset Management and Capital Replacement Program.

The Thamesford Drinking Water System is one of 14 water systems with revenues and expenses pooled for economy-of-scale purposes. The systems are combined into the Township Water financial system and in 2024 had operating and maintenance expenditures of approximately \$4,100,000.

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:

- \$300,000 repair and maintenance on wells, water pump stations, and water treatment facilities;
- \$260,000 distribution replacements;
- \$250,000 for UV upgrades at the Thamesford Water Treatment Facility; and
- \$18,000 for facilities improvements.

Capital Improvement projects for all systems included:

- \$750,000 to develop Countywide SCADA Master Plan for all water systems.

2. MICROBIOLOGICAL TESTING

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 the Maximum Allowable Concentration (MAC) of 0 colonies per 100 mL in treated water samples must be reported to the Ministry of Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the annual sampling program are shown on the table below. There was one adverse test result from 215 treated water samples in this reporting period.

Source	Number of Samples	Range of <i>E. coli</i> Min - Max MAC = 0 (colonies / 100 mL)	Range of Total Coliform Min - Max MAC = 0 (colonies / 100 mL)
Raw	232	0 – 1	0 - 200
Treated	54	0	0 – 1
Distribution	161	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. Annual results are shown in the following table.

Source	Number of Samples	Range of HPC Min – Max (colonies / mL)
Treated	54	0 – 10
Distribution	41	0 – 20

3. CHEMICAL TESTING

The *Safe Drinking Water Act*, 2002 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 MAC under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by O. Reg. 170/03. 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 DWS 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, sodium will not impair the taste of the water. The latest test results are provided in Appendix 'A'.

When sodium levels are above 20 mg/L the MECP and the MOH are notified. Southwestern Public Health maintains an information page on sodium in drinking water at <https://www.swpublichealth.ca/news/posts/swph-issues-annual-reminder-about-fluoride-and-sodium-in-oxford-drinking-water/> in order to help people on sodium restricted diets monitor their sodium intake.

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 residents set the water softener at the level recommended by the manufacturer. Samples for hardness are collected at a minimum every three years from raw water. The Hardness for the Thamesford DWS was tested in 2022 and ranged from 366 – 402mg/L (21 - 24 grains/gallon)

3.3 Additional Testing Required by MECP

Under the Regulation, additional quarterly sampling is required when a parameter listed in Schedule 23 or 24 exceeds half of the MAC. Based on the latest test results no additional testing is required under O. Reg. 170/03.

No additional testing requirements are listed in the Municipal Drinking Water Licence (MDWL).

4. OPERATIONAL MONITORING

4.1 Chlorine Residual

Free chlorine levels in the treated water are continuously monitored at the discharge point of the WTF and in the distribution system. As a target, free chlorine residuals 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 following table. There were no reportable incidents in 2024.

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 annual monitoring results is provided in the following table:

<i>Parameter</i>	<i>Number of Tests or Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
Chlorine residual after treatment (mg/L)	Continuous	(0.66 - 2.19) 1.41
Chlorine residual in distribution (mg/L)	Continuous	(0.61 - 3.63) 1.13
Well 1 turbidity before treatment (NTU)	55	(0.10 - 3.19) 0.36
Well 2 turbidity before treatment (NTU)	54	(0.08 - 1.01) 0.24
Well 3 turbidity before treatment (NTU)	53	(0.20 - 1.74) 0.57
Well 4 turbidity before treatment (NTU)	54	(0.10 - 1.46) 0.30
Turbidity after treatment (NTU)	Continuous	(0.03 - 1.13) 0.05

4.3 Ultraviolet (UV) Disinfection

Supply wells that have been classified as being GUDI require “enhanced disinfection” through ultraviolet light (UV) followed by chlorination. A minimum UV dosage of 40 mJ/cm² is maintained to inactivate any microorganisms that may be present from contact with surface water. Insufficient dosage of UV lasting more than 10 minutes must be reported as inadequate disinfection. There were no occurrences of inadequate UV disinfection in 2024.

5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the WTF into the distribution system is required by O. Reg. 170/03. The Permit to Take Water (PTTW) and Municipal Drinking Water License (MDWL) issued by the MECP regulate the amount of water that can be utilized over a given time period. Terms used to evaluate capacity and current values for the Thamesford DWS are provided in the following table.

<i>Capacity Term</i>	<i>Description</i>	<i>Capacity (m³/day)</i>
Supply Capacity	The limiting capacity of either the PTTW or MDWL.	5,391
Dynamic Supply Capacity	Accounts for any current constraints on the water supply (such as offline wells, reduced well capacity, water quality considerations).	5,391
Firm Capacity	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 if appropriate.	5,391
Dynamic Firm Capacity	Considers the removal of the largest production well and other current system constraints. Trucked in water may be considered for some systems.	4,320

This system consists of four supply wells. For Firm Capacity scenarios, Well 4 is removed and trucked in water is not considered for this system. Dynamic Capacity scenarios consider current reduced well yields for Wells 1, 2, and 4. The same capacity can still be achieved by when all wells are in service even considering reduced well yields as shown in the Dynamic Supply Capacity scenario. The Dynamic Firm Capacity considers the reduced well yields and that Well 4 is not in service which results in a lower capacity.

A summary comparing flows in 2024 to current capacities is provided in the table below and presented graphically in Appendix 'B'.

<i>Flow Summary</i>	<i>Supply Capacity (m³/day)</i>	<i>Dynamic Supply Capacity (m³/day)</i>	<i>Max Daily Flow (m³/day)</i>	<i>Average Daily Flow (m³/day)</i>	<i>Average Monthly Flow (m³/month)</i>	<i>Total Yearly Flow (m³/year)</i>
Normal Operation*	5,391	5,391	1,362	773	23,580	282,965
Well 3 Only**	1,305	1,296	Configuration not used in 2024			
Thamesford DWS <i>*values may not sum</i>	5,391	5,391	1,362	773	23,580	282,965

**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.*

6. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS

This section documents any known incidents of non-compliance or adverse results and the associated corrective 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 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 August 2024. There were no non-compliance findings, and the 2024 Inspection Report Rating was 100%.

6.2 Adverse Results

Any adverse bacteriological or chemical results or observations of operational conditions that may indicate adverse water quality are reported as required and corrective actions are taken. There were two adverse water quality results in 2024.

- A treated water sample for sodium collected on May 27, 2024, had a concentration of 27.1 mg/L. Although drinking water is considered safe for consumption at sodium levels up to 200 mg/L, water containing levels greater than 20 mg/L are required to be reported to the MECP and the MOH. A confirmatory resample was taken and had sodium concentration of 27.0 mg/L.
- A bacteriological sample result taken from the treatment facility on July 8, 2024 was found to have total coliforms of 1 CFU/100 mL. The result was reported to the MECP and the MOH. Resamples were collected at the site and from two downstream locations. All re-samples were determined to be acceptable by Ontario Drinking Water Standards.

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) where 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 three 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	4	ND	ND	1.0	0.003
Nitrate	4	2.80 – 3.68	3.318	10.0	0.006

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every three 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)	2024	27.5	100	0.37
Haloacetic Acids (HAA)	2024	9.6	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 five 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 27, 2024	27.1	20*	0.01
Fluoride	May 27, 2024	0.71	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 three 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 2024	252 – 272 mg/L	6	30 – 500 mg/L
Distribution pH 2024	7.34 – 7.58	6	6.5 – 8.5
Distribution Lead 2024	ND – 0.28	6	10 µg/L MAC

The following table summarizes annual test results for Schedule 23 parameters. Testing is required annually for water treatment facilities with GUDI wells.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Antimony	May 27, 2024	ND	6	0.6
Arsenic	May 27, 2024	0.2	10	0.2
Barium	May 27, 2024	59.2	1000	0.02
Boron	May 27, 2024	58	5000	2
Cadmium	May 27, 2024	ND	5	0.003
Chromium	May 27, 2024	0.22	50	0.08
Mercury	May 27, 2024	ND	1	0.01
Selenium	May 27, 2024	0.22	50	0.04
Uranium	May 27, 2024	0.347	20	0.002

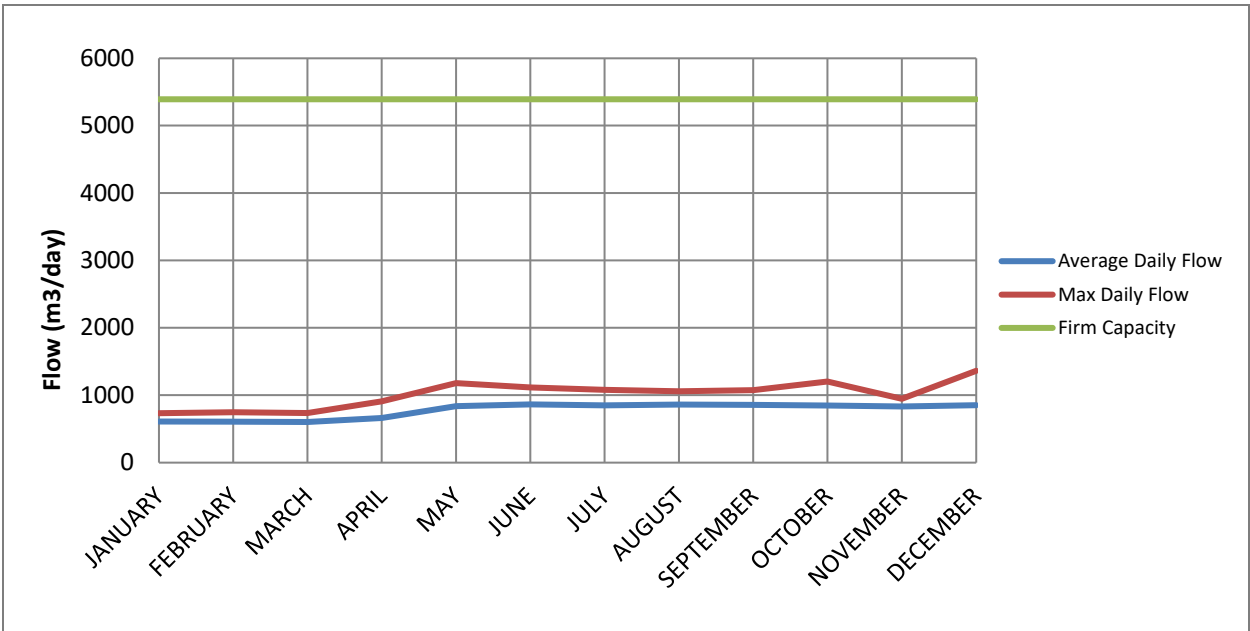
The following table summarizes annual test results for Schedule 24 parameters. Testing is required annually for water treatment facilities with GUDI wells.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Alachlor	May 27, 2024	ND	5	0.02
Atrazine + N-dealkylatedmetabolites	May 27, 2024	ND	5	0.01
Azinphos-methyl	May 27, 2024	ND	20	0.05
Benzene	May 27, 2024	ND	1	0.32
Benzo(a)pyrene	May 27, 2024	ND	0.01	0.004
Bromoxynil	May 27, 2024	ND	5	0.33
Carbaryl	May 27, 2024	ND	90	0.05
Carbofuran	May 27, 2024	ND	90	0.01
Carbon Tetrachloride	May 27, 2024	ND	2	0.17
Chlorpyrifos	May 27, 2024	ND	90	0.02
Diazinon	May 27, 2024	ND	20	0.02
Dicamba	May 27, 2024	ND	120	0.20
1,2-Dichlorobenzene	May 27, 2024	ND	200	0.41
1,4-Dichlorobenzene	May 27, 2024	ND	5	0.36
1,2-Dichloroethane	May 27, 2024	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	May 27, 2024	ND	14	0.33
Dichloromethane	May 27, 2024	ND	50	0.35
2-4 Dichlorophenol	May 27, 2024	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	May 27, 2024	ND	100	0.19
Diclofop-methyl	May 27, 2024	ND	9	0.40
Dimethoate	May 27, 2024	ND	20	0.06

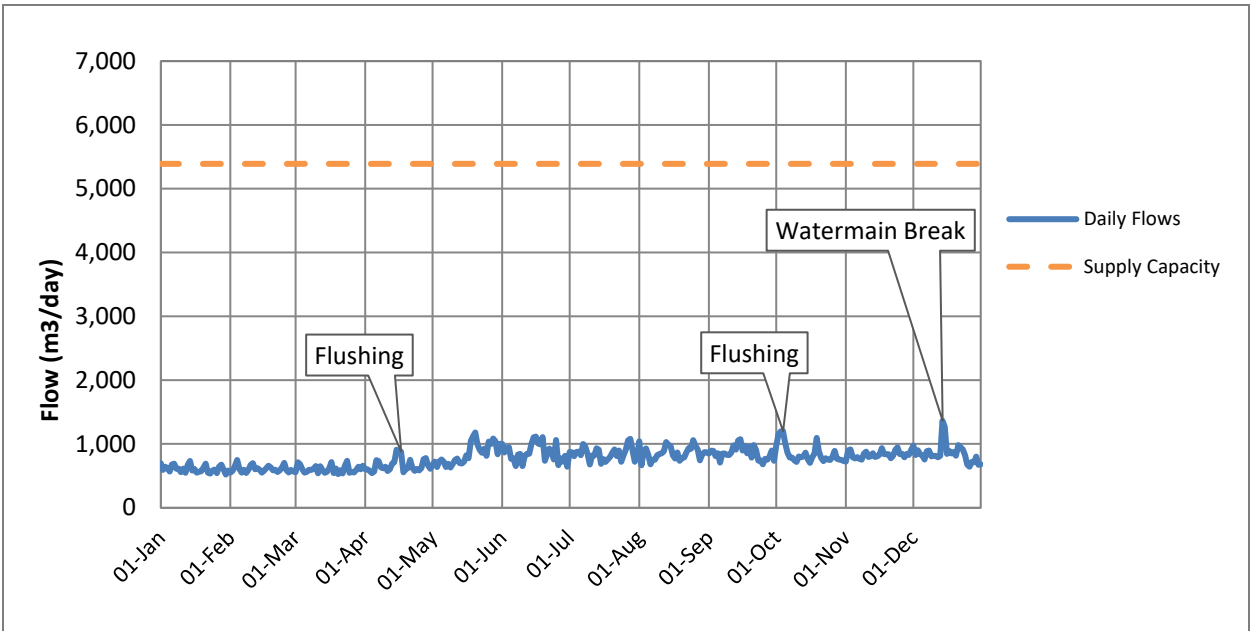
<i>Parameter</i>	<i>Sample Date</i>	<i>Result (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Diquat	May 27, 2024	ND	70	1
Diuron	May 27, 2024	ND	150	0.03
Glyphosate	May 27, 2024	ND	280	1
Malathion	May 27, 2024	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	May 27, 2024	ND	100	0.12
Metolachlor	May 27, 2024	ND	50	0.01
Metribuzin	May 27, 2024	ND	80	0.02
Monochlorobenzene	May 27, 2024	ND	80	0.30
Paraquat	May 27, 2024	ND	10	1
Pentachlorophenol	May 27, 2024	ND	60	0.15
Phorate	May 27, 2024	ND	2	0.01
Picloram	May 27, 2024	ND	190	1
Polychlorinated Biphenyls(PCB)	May 27, 2024	ND	3	0.04
Prometryne	May 27, 2024	ND	1	0.03
Simazine	May 27, 2024	ND	10	0.01
Terbufos	May 27, 2024	ND	1	0.01
Tetrachloroethylene	May 27, 2024	ND	10	0.35
2,3,4,6-Tetrachlorophenol	May 27, 2024	ND	100	0.20
Triallate	May 27, 2024	ND	230	0.01
Trichloroethylene	May 27, 2024	ND	5	0.44
2,4,6-Trichlorophenol	May 27, 2024	ND	5	0.25
Trifluralin	May 27, 2024	ND	45	0.02
Vinyl Chloride	May 27, 2024	ND	1	0.17

APPENDIX 'B': WATER QUANTITY SUMMARY

2024 Average vs Maximum Daily Flow Rates



2024 Daily Flow



In 2024 the Thamesford Supply Capacity, Dynamic Supply Capacity, and Firm Capacity were the same.

2024 Total Production by Well

