

2023 Annual Drinking Water System Summary Report

Dereham Centre 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* 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:	Dereham Centre Drinking Water System
Drinking Water System Number:	220001510
Reporting Period:	January 1, 2023 – December 31, 2023

Drinking Water System Owner & Contact Information:

Oxford County Public Works Department - Water Services
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1.1 System Description

The Dereham Centre Drinking Water System (DWS) is a Small Municipal Water system as defined by O. Reg. 170/03 and serves a population of approximately 84. The system consists of one secure groundwater well and a treatment facility. The water is treated with sodium hypochlorite for disinfection and in 2023 approximately 90 L of sodium hypochlorite was used. This chemical is certified to meet standards set by the Standards Council of Canada or American National Standards Institute. The water is filtered to remove arsenic.

The treatment facility houses pumps, MD-80 filters to improve water quality, treatment and monitoring equipment, and a 37 m³ underground reservoir. 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 Dereham Centre 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 Dereham Centre 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 2023 had an operating and maintenance expenditures of approximately \$4,100,000.

In addition to regular operational and maintenance expenditures, Capital Improvement Projects for the Township's systems totaled \$4,100,000 for improvements to water treatment systems and replacement of distribution mains in the Township System.

Township Capital Improvement Projects included:

- \$413,000 repair and maintenance on wells, water pump stations, and water treatment facilities;
- \$70,000 for facilities improvements; and
- \$50,000 distribution replacements.

Capital Improvement projects for all systems included:

- \$390,000 to develop Countywide SCADA Master Plan for all water systems;
- \$70,000 to develop Countywide Water Servicing Master Plan for all water systems; and
- \$38,000 to develop the County Development Charges Technical Study.

2. MICROBIOLOGICAL TESTING

2.1 E.coli and Total Coliform

Bacteriological tests for *E.coli* and *total coliforms* taken weekly from the raw water at the facility and from the distribution system. Samples of treated water are not required for Small Municipal systems but may be taken periodically. 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 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 were no adverse test results from 104 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	52	0	0
Treated	52	0	0
Distribution	52	0	0

2.2 Heterotrophic Plate Count (HPC)

HPC analyses are completed weekly from the distribution water for small systems. 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 table below.

Source	Number of Samples	Range of HPC Min – Max (colonies / mL)
Distribution	52	0 - 72

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. 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 Dereham Centre system is provided below.

3.1 Hardness

These are aesthetic parameters that may affect the appearance of the water but are 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 Dereham Centre Drinking Water System was 255 mg/L (14.9 grains/gallon) based on the sample collected in 2022.

3.2 Required Additional Testing

Under O. Reg. 170/03, 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.

Although Dereham Centre treated water does not exceed the half of the MAC for arsenic (10 µg/L), a requirement to test for arsenic levels quarterly in both the raw and treated water is listed in the Municipal Drinking Water Licence. Annual raw water and treated water results are summarized in the following table.

Source	Number of Samples	Range of Arsenic Min - Max (µg/L)	Average Arsenic (µg/L)	MAC (µg/L)	MDL (µg/L)
Raw	4	11.2 – 11.9	11.58	10	0.2
Treated	5	3.6 – 3.9	3.68	10	0.2

** Treated annual average also listed under Schedule 23 inorganic parameters in Appendix 'A'.*

4. OPERATIONAL MONITORING

4.1 Chlorine Residual

Free chlorine levels of the treated water are continuously monitored 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 actions taken. A summary of the chlorine residual readings is provided in the table below. There were no reportable incidents in 2023.

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	(0.35 - 1.43) 1.04
Chlorine residual in distribution (mg/L)	106	(0.59 - 1.27) 1.00
Well 2 turbidity before treatment (NTU)	52	(0.11 - 1.53) 0.50
Turbidity after treatment (NTU)	Continuous	(0.02 - 0.45) 0.05

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. A PTTW is not required where water taking is less than 50 m³/day as is the case for Dereham Centre. The Municipal Drinking Water License (MDWL) issued by the MECP regulates the amount of water that can be utilized over a given time period. Terms used to evaluate capacity and current values for the Dereham Centre 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.	50
Dynamic Supply Capacity	Accounts for any current constraints on the water supply (such as offline wells, reduced well capacity, water quality considerations).	50
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.	50
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.	50

This system is comprised of one supply well and does not have a permit to supply over 50 m³/day. As such all capacities are limited to 50 m³/day.

A summary comparing flows in 2023 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>
Dereham Centre Water Treatment Facility	50	50	38	9	269	3,229

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 that this report was drafted the 2023 Annual MECP Inspection for the Dereham Centre Drinking Water System had not yet taken place.

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 no reportable incidents in 2023.

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 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	0.007 - 0.012	0.009	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)	2023	10.3	100	0.37
Haloacetic Acids (HAA)	2023	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 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	August 16, 2021	11.6	20*	0.01
Fluoride	August 16, 2021	0.59	1.5**	0.06

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

**Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every five 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 2023	233 mg/L	2	30 – 500 mg/L
Distribution pH 2023	7.30 – 7.70	2	6.5 – 8.5
Distribution Lead 2021	0.22 – 0.41 µg/L	2	10 µg/L MAC

The following table summarizes the most recent test results for Schedule 23. Testing is required every five years for secure groundwater wells in small systems.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Antimony	December 2, 2019	ND	6	0.09
Arsenic	2023 Annual Average	3.68	10	0.2
Barium	December 2, 2019	239	1000	0.02
Boron	December 2, 2019	29	5000	2
Cadmium	December 2, 2019	ND	5	0.003
Chromium	December 2, 2019	0.10	50	0.08
Mercury	December 2, 2019	0.01	1	0.01
Selenium	December 2, 2019	ND	50	0.04
Uranium	December 2, 2019	0.112	20	0.002

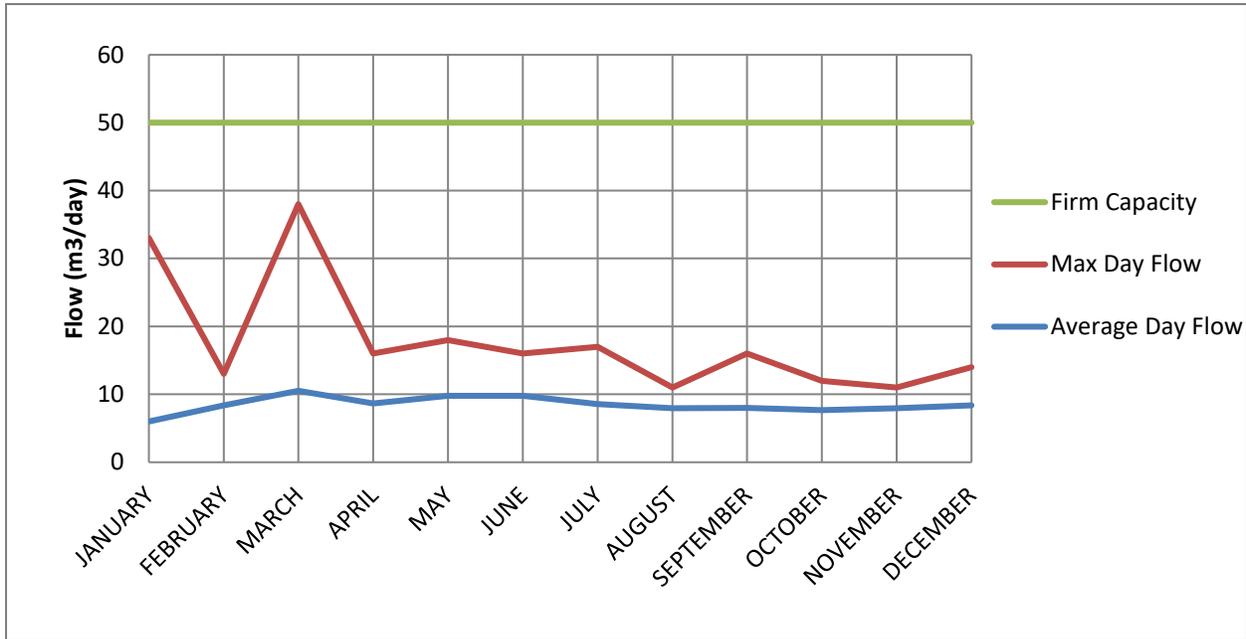
The following table summarizes the most recent test results for Schedule 24. Testing is required every five years for secure groundwater wells in small systems.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Alachlor	December 2, 2019	ND	5	0.02
Atrazine + N-dealkylatedmetabolites	December 2, 2019	ND	5	0.01
Azinphos-methyl	December 2, 2019	ND	20	0.05
Benzene	December 2, 2019	ND	1	0.32
Benzo(a)pyrene	December 2, 2019	ND	0.01	0.004
Bromoxynil	December 2, 2019	ND	5	0.33
Carbaryl	December 2, 2019	ND	90	0.05
Carbofuran	December 2, 2019	ND	90	0.01
Carbon Tetrachloride	December 2, 2019	ND	2	0.17
Chlorpyrifos	December 2, 2019	ND	90	0.02
Chlorpyrifos	December 2, 2019	ND	90	0.02
Diazinon	December 2, 2019	ND	20	0.02
Dicamba	December 2, 2019	ND	120	0.20
1,2-Dichlorobenzene	December 2, 2019	ND	200	0.41
1,4-Dichlorobenzene	December 2, 2019	ND	5	0.36
1,2-Dichloroethane	December 2, 2019	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	December 2, 2019	ND	14	0.33
Dichloromethane	December 2, 2019	ND	50	0.35
2-4 Dichlorophenol	December 2, 2019	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	December 2, 2019	ND	100	0.19
Diclofop-methyl	December 2, 2019	ND	9	0.40
Dimethoate	December 2, 2019	ND	20	0.06

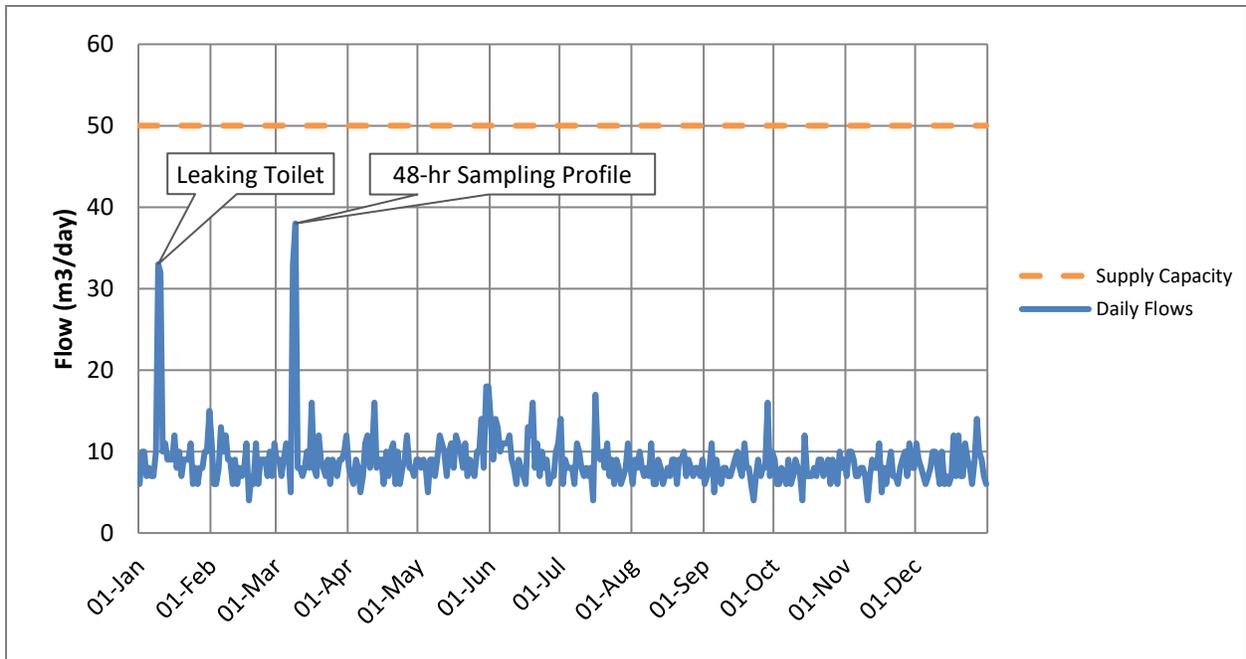
<i>Parameter</i>	<i>Sample Date</i>	<i>Result (µg/L)</i>	<i>MAC (µg/L)</i>	<i>MDL (µg/L)</i>
Diquat	December 2, 2019	ND	70	1
Diuron	December 2, 2019	ND	150	0.03
Glyphosate	December 2, 2019	ND	280	1
Malathion	December 2, 2019	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	December 2, 2019	ND	100	0.12
Metolachlor	December 2, 2019	ND	50	0.01
Metribuzin	December 2, 2019	ND	80	0.02
Monochlorobenzene	December 2, 2019	ND	80	0.30
Paraquat	December 2, 2019	ND	10	1
Pentachlorophenol	December 2, 2019	ND	60	0.15
Phorate	December 2, 2019	ND	2	0.01
Picloram	December 2, 2019	ND	190	1
Polychlorinated Biphenyls(PCB)	December 2, 2019	ND	3	0.04
Prometryne	December 2, 2019	ND	1	0.03
Simazine	December 2, 2019	ND	10	0.01
Terbufos	December 2, 2019	ND	1	0.01
Tetrachloroethylene	December 2, 2019	ND	10	0.35
2,3,4,6-Tetrachlorophenol	December 2, 2019	ND	100	0.20
Triallate	December 2, 2019	ND	230	0.01
Trichloroethylene	December 2, 2019	ND	5	0.44
2,4,6-Trichlorophenol	December 2, 2019	ND	5	0.25
Trifluralin	December 2, 2019	ND	45	0.02
Vinyl Chloride	December 2, 2019	ND	1	0.17

APPENDIX 'B': WATER QUANTITY SUMMARY

2023 Average vs Maximum Daily Flow Rates



2023 Daily Flow



In 2023, the Dereham Centre Supply Capacity, Dynamic Supply Capacity, and Firm Capacity were the same.