



Water Operations

Annual Summary Report
~ Churchill Drinking Water System ~
DWS #220005063
~ Town of Innisfil ~

Reporting Year -2023

InnServices Utilities Inc.

Churchill DWS

Introduction

Effective January 1, 2016, the Town of Innisfil transferred ownership of its municipal Drinking Water Systems to InnServices Utilities Inc. (InnServices). InnServices is a municipal service corporation, wholly owned by the Town of Innisfil, charged with the responsibility to operate, maintain, and expand the municipal drinking water systems that service the Town of Innisfil.

The Churchill Drinking Water System (DWS) services a population of approximately 510, on 170 connections. The distribution system is comprised of approximately 6 kilometers of cast iron and PVC piping, 38 hydrants and 310 gate valves and curb stop valves. The system relies on 3 drilled wells as its source of groundwater. Wells #1 and 2 feed directly into the reservoir and run on an as-needed basis. Well #3 is the main source of raw water which feeds the distribution and can also fill the reservoir..

Well #1 (WWR 5709261) is located at 212 Valley View Drive at the northeast corner of Valley View Drive, approximately 20 meters South-West of the Churchill Reservoir and Booster Pumping Station and was constructed in 1972 by Snider Well Drilling. Well #2 (WWR 5725267) is located at 2216 Meadowland Street near the northwest corner of Highway No. 11 and Meadowland Street, approximately 390 meters North of Churchill Reservoir and Booster Pumping Station and was constructed in 1975 by Wilson Water Wells. Well #3 (WWR 5725579) is located at 2583 4th Line, approximately 50 m south of the 4th Line and 1.5km west of Highway 11 and was constructed in 1989 by Northern Well Drilling.

InnServices has prepared this Annual Summary Report for the operations conducted during the 2023 calendar year.

This Annual Summary Report has been prepared to meet the following commitments:

- To provide InnServices Utilities Inc. Board of Directors, as “Owners” of the DWS, a summary of the operations and maintenance of the Churchill DWS that took place during the reporting period of January 1 to December 31, 2023.
- To provide a status update of the systems capabilities and capacities as of December 31, 2023.
- To satisfy the requirements of O. Reg 170/03 Section 11
- To satisfy the requirements of O. Reg.170/03 Schedule 22
- Submitted to the InnServices Board of Directors and publicly posted in accordance with the Safe Drinking Water Act, 2002

The Annual Summary Report identifies specific details regarding the overall quality of the drinking water submitted to the Ministry of the Environment Conservation and Parks (MECP) for the Churchill DWS and is available on the InnServices website (<https://innservices.co/regulatory>) and at InnServices Headquarters at 7251 Yonge St., Innisfil, Ontario.

This report provides information to the InnServices Board of Directors related to the operations, maintenance, drinking water quality, and system capacities of the Churchill DWS, which aids decision making related to system expansion needs, and assists the

Board in meeting their Statutory Standard of Care requirements. This report is provided to the Board of Directors by March 31 annually.

MECP Approvals

The Churchill DWS is classified as a Large Municipal Residential DWS, as defined by Ontario Regulation 170/03.

The **Safe Drinking Water Act, 2002** requires that the Owner of a municipal DWS have MECP approvals in the form of a Drinking Water Works Permit (DWWP) and a Municipal Drinking Water Licence (MDWL). The DWWP provides a description of the overall system and provides the authority to establish or alter the DWS. The MDWL provides the authority to use or operate the system.

The Churchill DWS operated under the following:

DWWP # 120-206, Issue #4, issued December 15, 2020

MDWL # 120-106, Issue #3, issued December 15, 2020

For the reporting period covered in this report, InnServices Utilities Inc. was defined as the Operating Authority of the Churchill DWS.

InnServices Utilities Inc. has established and maintains accreditation to the Drinking Water Quality Management Standard Version 2-2017 (DWQMS) under Certificate of Accreditation # 0162550, issued December 13, 2023 by SAI Global.

The Churchill DWS (DWS) relies on 3 drilled wells as its source of groundwater. Well #3 is the main source of raw water. It has its own chlorine contact chamber which feeds the distribution and can also fill the reservoir.

Wells #1 and 2 feed directly into the reservoir and run on an as-needed basis.

Sodium hypochlorite is used for primary and secondary disinfection.

The below-grade, twin-cell concrete reservoir has a total volume of approximately 1100 cubic meters and provides fire protection for the community.

A 200-kilowatt standby generator ensures that the system is provided with water in the event of a power failure.

Significant expenses incurred in relation to installation, repair, or replacement of required equipment during this reporting period:

Item	Cost
Churchill Water System Upgrade	\$1.7 M
Flow Meter Replacement	\$18,013.29
Swabbing	\$23,800.00
Turbidity analyzer replacement	14,400

Analytical Laboratory Water Quality Monitoring

Bacteriological Analysis

Bacteriological testing is completed to verify that no microbiological contamination of the treated drinking water can be detected. Raw water is also analyzed to inform operations if there is microbiological contamination in the DWS. Bacteriological monitoring for the reporting period was conducted as required by Ontario Regulation 170/03.

SGS Environmental Services, Lakefield, Ontario, conducted the bacteriological analysis of the drinking water.

Zero (0) items of non-compliance with the Ontario Drinking Water Standards related to bacteriological analyses occurred during the reporting period.

Below is a summary of microbiological testing done under Schedule 10 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E. coli Results (Min #)- (Max #) CFU/100mL	Range of Total Coliform Results (Min #)- (Max #) CFU/100mL	Number of HPC Samples	Range of HPC Results (Min #)-(Max #) CFU/1mL
Raw	151	0-0	0-0	n/a	n/a
Treated	99	0-0	0-0	99	0-21
Distribution	208	0-0	0-0	208	0-161

Chemical Analysis

Chemical analysis of this water supply is conducted as required by Ontario Regulation 170/03.

SGS Environmental Services, Lakefield, Ontario, conducted the required chemical analyses for the DWS during the reporting period. This lab, as well as any laboratories to which they sub-contract certain types of analyses, are licensed by the MECP and accredited by the Canadian Association for Laboratory Accreditation (CALA) and/or Standard Council Canada (SCC).

With the issuance of the new Municipal Drinking Water Licence December 15, 2020, the Ministry has added a requirement to increase testing and monitoring of the health-related parameter for THM from quarterly to monthly, beginning in January 2021. InnServices engaged the Walkerton Clean Water Centre to undertake a study to investigate THM (Trihalomethanes) formation in the Churchill DWS. Raw water quality was assessed, which identified bromide reaction time with chlorine and organics contributed to an increase in THM formation. Bench scale testing was conducted in 2020; pilot studies for treatment options (using Well #3) were undertaken during 2021. Using the information from the study, Operations has come up with short-term strategies to lower the THM levels. This includes closely monitoring chlorine levels and reservoir circulation time, and putting Well #2 into more frequent rotation, increased frequency of dead-end flushing and uni-directional flushing (UDF) performed on the distribution system.

The long-term mitigation strategy is to upsize the well pump and add Granular Activated Carbon (GAC) process at Well 3 pumphouse which is underway, and loop the water distribution system at Meadowlands and Yonge St. This watermain extension was commissioned in November 2023.

There were zero out-of-compliance events related to the THM levels in 2023.

Sodium in drinking water is tested every 60 months (latest test November 2021). Results were above the Maximum Allowable Concentration, but below the Aesthetic Objective. This is not a concern for most people. The Simcoe Muskoka District Health Unit was advised, and they share this information with physicians who may need to consider the potential impact on their patients. InnServices has posted this information on their website, in billing inserts, and will share the information from time to time on social media.

A summary of all analytical results for Organic and Inorganic testing is attached in Appendix A.

Continuous Water Quality Monitoring

Free Chlorine Residual

The Churchill DWS utilizes NSF® certified 12% sodium hypochlorite to meet primary disinfection requirements and provide an adequate chlorine residual for secondary disinfection requirements.

A requirement of O.Reg. 170/03 and the Procedure for Disinfection of Drinking Water in Ontario is that the chlorine residual must be recorded at the point directly after primary disinfection is achieved, at a frequency of every 5 minutes. Grab samples are taken and analyzed for free chlorine residual (FCR) when microbiological samples are taken throughout the distribution system. Ontario Regulation 170/03 requires that sufficient residual be available in the water to achieve a residual of greater than 0.05 mg/L at all points in the distribution system.

During the reporting period covered by this report there were zero (0) incidents of non-compliance with these requirements.

A summary of the chlorination monitoring that took place directly after primary disinfection is achieved is depicted below:

	Number of Grab Samples	Range of Results (Min #)-(Max #)	Unit of Measure
Chlorine – Well #3	8760	0.00 – 5.00	mg/L
Chlorine – Well # 1 and 2	8760	0.00– 5.00	mg/L

All instances where Free Chlorine Residual (FCR) was less than 0.60 mg/L were investigated and confirmed to be isolated instantaneous readings, or coincide with a power outage, equipment malfunction, calibration activities, and/or appropriate corrective actions were taken to remove non-compliant water from the system.

Plant Flow Monitoring

Raw Water Takings

The Churchill DWS utilizes groundwater wells as its raw water source. The raw water takings from groundwater wells are authorized by the MECP through a Permit to Take Water (PTTW # 0557-B4HNR7)

Raw water takings are reported to the electronic Water Taking Recording System (WTRS).

Table 1 on the following page provides a summary of the raw water takings for the reporting period.

There were zero (0) incidents of non-compliance related to water takings for the reporting period.

Table 1: Summary of Raw Water Takings

	Units	Well #1	Well #2	Well #3	System
PTTW Daily Maximum	(m ³ /day)	262.08	295.2	743	743
Maximum Day	(m ³ /day)	112	161.61	413	413
Average Day	(m ³ /day)	8.69	38.76	93.22	109.41
Total Annual Takings	(m ³)	3173.14	14145.73	34,027.01	39,932.83

System Performance Summary

The volume of daily treated water delivered to the distribution system is authorized by the MECP through the designation of a Rated Capacity within the Municipal Drinking Water License (MDWL). The Treated Water volume is essentially the same as the Raw Water Takings.

The Wells #1 & 2 subsystem is operating at approximately 8.51% of the rated capacity of 557 m³/day. At the maximum flow, treated water demand flow for the reporting period was at 49.10% of the rated capacity.

The Well #3 subsystem is operating at approximately 12.55% of the rated capacity, 743m³/day. At the maximum flow, treated water demand flow for the reporting period was at 55.59% of the rated capacity.

The Treated Water Demand is summarized in Table 2 below.

There were zero (0) incidents of non-compliance related to rated capacity for the reporting period.

Table 2: Summary of Treated Water Demand

	Wells #1 & 2	Well #3
System Rated Capacity (m ³ /day)	557.28	743
Maximum Day (m ³ /day)	273.61	413
Average Day (m ³ /day)	47.45	93.22
Total Annual Demand (m ³)	17,318.87	34,027.01
System Performance- rated capacity	8.51%	12.55%
System Performance- at Maximum Flow	49.10%	55.59%

Distribution Flow Monitoring

The Churchill DWS produces water for distribution to homes and businesses in the village of Churchill in the Town of Innisfil.

The following table and graph demonstrate the monthly water system demand.

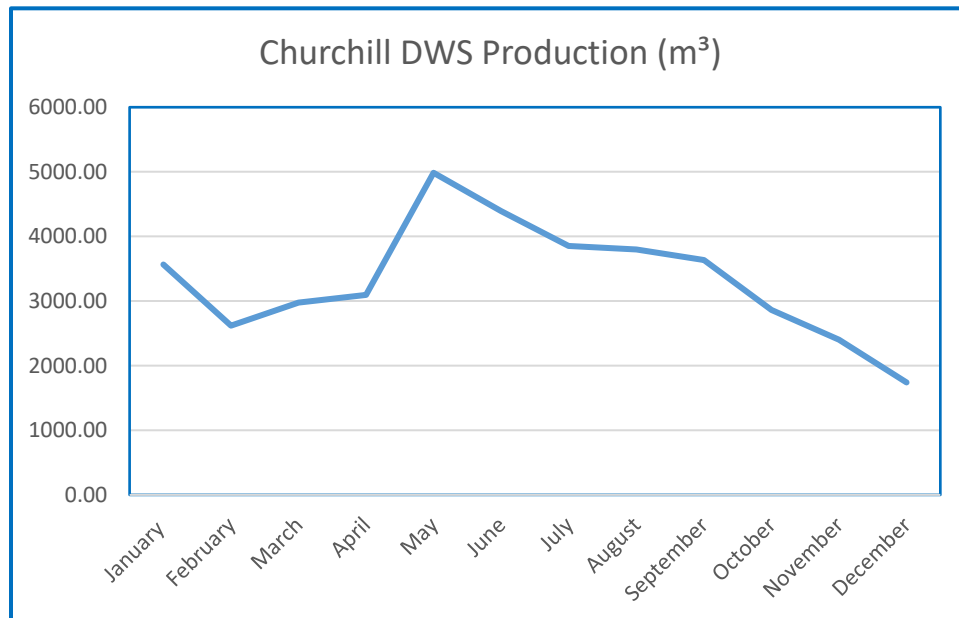
Table 3 demonstrates the monthly volumes of drinking water directed toward the Churchill distribution systems for the reporting period.

Table 3: Monthly Water Production

Month	Treated Water Produced (m ³)
January	3568.09
February	2618.79
March	2977.01
April	3097.00
May	4985.64
June	4392.32
July	3855.06
August	3800.98
September	3632.98
October	2862.34
November	2402.06
December	1740.56
Annual Total	39,932.83

The following graph provides a visual display of the information provided in Table 3

Graph 1: Monthly Water Demand



Distribution Sampling

Section 7-2, Schedule 7 of O. Reg. 170/03 requires the owner of a large municipal residential system that provides secondary disinfection and the operating authority for the system shall ensure that at least seven distribution samples are taken each week with at least four distribution samples obtained at different locations on one day of the week and at least three of the samples obtained at different locations taken on a second day of the week, with at least 48 hours after from the first set.

There was one (1) item of non-compliance related to this requirement. It was discovered that the second set of disinfectant residuals were not sampled the week of May 21-27, 2023. Upon discovery it was immediately reported to the MECP (incident # 1-3HGW1S). Corrective action was prescribed, preventive measures were put in place.

Based on results of community lead sampling program conducted, Churchill DWS has qualified for reduced sampling protocol as per O. Reg. 170/03 Schedule 15.1. Under this protocol, only alkalinity and pH are required from 2 sampling points for each summer and winter period. Lead is tested every **third** 12-month period.

Location Type	Number of Samples	Range of Alkalinity Results Minimum - maximum	Range of Lead Results	Number of Exceedances
		Aesthetic Objective 30-500 Mg/L	Maximum Concentration 10 µg/L (2023)	
Distribution	4	131-175 Mg/L	0.01 – 0.19 µg/L	0

Haloacetic Acids (HAAs) were sampled on a quarterly basis in accordance with O. Reg. 170/03 Schedule 13.

Trihalomethanes (THMs) are sampled monthly in accordance with the Municipal Drinking Water License #120-106, Issue #3.

The most recent sample results:

Parameter	Sample Date	Result Value	Maximum Allowable Concentration
THM (latest rolling annual average)	Dec 4,2023	82.15µg/L	100 µg/L
HAA (latest rolling annual average)	Nov 22,2023	10.21 µg/L	80 µg/L

Lead, Haloacetic Acids or Trihalomethanes results that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards

Parameter	Result Value	Unit of Measure	Date of Sample
THM (running annual average)	Q1 – 72.84	µg/L	Mar 3,2023
	Q2 –75.84	µg/L	June 5,2023

	Q3 –80.35	µg/L	Sep 8,2023
	Q4 – 82.15	µg/L	Dec 4,2023

Service Disruptions

There were three service disruptions in the drinking water system affecting seventeen residences during the reporting year. All three disruptions were service repairs. There were intermittent disruptions during the construction of the watermain on Yonge Street.

MECP Annual Inspection

The primary focus of the inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices

MECP inspection was conducted on January 17, 2024, which covered the period of January 4, 2023, to January 17, 2024.

There were zero items of noncompliance identified during the inspection.

No Provincial Officer's Orders were issued in the report as a result of the conducted inspection.

This year the Churchill drinking water system received an Inspection Risk Rating of 0%, resulting in a Compliance Rating of 100%.

Appendix A – Chemical Analysis

Organic and Inorganic parameters testing is required at least once every 36 months from a raw water supply that is ground water.

Churchill Well 1 & 2

Inorganic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	18-Nov-2021	<0.06	µg/L	No
Arsenic	18-Nov-2021	<0.2	µg/L	No
Barium	18-Nov-2021	194	µg/L	No
Boron	18-Nov-2021	65	µg/L	No
Cadmium	18-Nov-2021	<0.003	µg/L	No
Chromium	18-Nov-2021	0.25	µg/L	No
Mercury	18-Nov-2021	<0.01	µg/L	No
Selenium	18-Nov-2021	<0.04	µg/L	No
Uranium	18-Nov-2021	0.051	µg/L	No

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	18-Nov-2021	<0.02	µg/L	No
Atrazine + N-dealkylated metabolites	18-Nov-2021	<0.01	µg/L	No
Azinphos-methyl	18-Nov-2021	<0.05	µg/L	No
Benzene	18-Nov-2021	<0.32	µg/L	No
Benzo(a)pyrene	18-Nov-2021	<0.004	µg/L	No
Bromoxynil	18-Nov-2021	<0.33	µg/L	No
Carbaryl	18-Nov-2021	<0.05	µg/L	No
Carbofuran	18-Nov-2021	<0.01	µg/L	No
Carbon Tetrachloride	18-Nov-2021	<0.17	µg/L	No
Chlorpyrifos	18-Nov-2021	<0.02	µg/L	No
Diazinon	18-Nov-2021	<0.02	µg/L	No
Dicamba	18-Nov-2021	<0.20	µg/L	No
1,2-Dichlorobenzene	18-Nov-2021	<0.41	µg/L	No
1,4-Dichlorobenzene	18-Nov-2021	<0.36	µg/L	No

1,2-Dichloroethane	18-Nov-2021	<0.35	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	18-Nov-2021	<0.33	µg/L	No
Dichloromethane	18-Nov-2021	<0.35	µg/L	No
2-4 Dichlorophenol	18-Nov-2021	<0.15	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	18-Nov-2021	<0.19	µg/L	No
Diclofop-methyl	18-Nov-2021	<0.40	µg/L	No
Dimethoate	18-Nov-2021	<0.03	µg/L	No
Diquat	18-Nov-2021	<1	µg/L	No
Diuron	18-Nov-2021	<0.03	µg/L	No
Glyphosate	18-Nov-2021	<1	µg/L	No
Malathion	18-Nov-2021	<0.02	µg/L	No
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	18-Nov-2021	<0.0001 2	Mg/L	No
Metolachlor	18-Nov-2021	<0.01	µg/L	No
Metribuzin	18-Nov-2021	<0.02	µg/L	No
Monochlorobenzene	18-Nov-2021	<0.3	µg/L	No
Paraquat	18-Nov-2021	<1	µg/L	No
Pentachlorophenol	18-Nov-2021	<0.15	µg/L	No
Phorate	18-Nov-2021	<0.01	µg/L	No
Picloram	18-Nov-2021	<1	µg/L	No
Polychlorinated Biphenyls(PCB)	18-Nov-2021	<0.04	µg/L	No
Prometryne	18-Nov-2021	<0.03	µg/L	No
Simazine	18-Nov-2021	<0.03	µg/L	No
Terbufos	18-Nov-2021	<0.01	µg/L	No
Tetrachloroethylene	18-Nov-2021	<0.35	µg/L	No
2,3,4,6-Tetrachlorophenol	18-Nov-2021	<0.2	µg/L	No
Triallate	18-Nov-2021	<0.01	µg/L	No
Trichloroethylene	18-Nov-2021	<0.44	µg/L	No

2,4,6-Trichlorophenol	18-Nov-2021	<0.25	µg/L	No
Trifluralin	18-Nov-2021	<0.02	µg/L	No
Vinyl Chloride	18-Nov-2021	<0.17	µg/L	No

Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
N/A			

One water sample is taken every 60 months to test for Sodium and Fluoride

Parameter	Date of Sample	Result	Unit of Measure	Exceedance
Sodium*	18-Nov-2021	22.3	mg/L	Yes
Sodium re-sample	29-Nov-2021	21.8	mg/L	Yes
Fluoride	18-Nov-2021	0.22	mg/L	No

*Sodium result was reported to both the MECP and the Simcoe Muskoka District Health Unit.

One water sample is taken every 3 months and tested for nitrate and nitrite

Parameter	Date of latest Sample	Result	Unit of Measure	Exceedance
Nitrite	Nov. 22, 2023	0.003	mg/L	No
Nitrate	Nov. 22, 2023	0.017	mg/L	No

Churchill Well 3

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	18-Nov-2021	0.02	µg/L	No
Arsenic	18-Nov-2021	<0.2	µg/L	No
Barium	18-Nov-2021	29.6	µg/L	No
Boron	18-Nov-2021	163	µg/L	No
Cadmium	18-Nov-2021	<0.003	µg/L	No
Chromium	18-Nov-2021	0.09	µg/L	No
Mercury	18-Nov-2021	<0.01	µg/L	No
Selenium	18-Nov-2021	<0.04	µg/L	No
Uranium	18-Nov-2021	<0.002	µg/L	No

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	18-Nov-2021	<0.02	µg/L	No
Atrazine + N-dealkylated metabolites	18-Nov-2021	<0.01	µg/L	No
Azinphos-methyl	18-Nov-2021	<0.05	µg/L	No

Benzene	18-Nov-2021	<0.32	µg/L	No
Benzo(a)pyrene	18-Nov-2021	<0.004	µg/L	No
Bromoxynil	18-Nov-2021	<0.33	µg/L	No
Carbaryl	18-Nov-2021	<0.05	µg/L	No
Carbofuran	18-Nov-2021	<0.01	µg/L	No
Carbon Tetrachloride	18-Nov-2021	<0.17	µg/L	No
Chlorpyrifos	18-Nov-2021	<0.02	µg/L	No
Diazinon	18-Nov-2021	<0.02	µg/L	No
Dicamba	18-Nov-2021	<0.2	µg/L	No
1,2-Dichlorobenzene	18-Nov-2021	<0.41	µg/L	No
1,4-Dichlorobenzene	18-Nov-2021	<0.36	µg/L	No
1,2-Dichloroethane	18-Nov-2021	<0.35	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	18-Nov-2021	<0.33	µg/L	No
Dichloromethane	18-Nov-2021	<0.35	µg/L	No
2-4 Dichlorophenol	18-Nov-2021	<0.15	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	18-Nov-2021	<0.19	µg/L	No
Diclofop-methyl	18-Nov-2021	<0.4	µg/L	No
Dimethoate	18-Nov-2021	<0.03	µg/L	No
Diquat	18-Nov-2021	< 1	µg/L	No
Diuron	18-Nov-2021	<0.03	µg/L	No
Glyphosate	18-Nov-2021	< 1	µg/L	No
Malathion	18-Nov-2021	<0.02	µg/L	No
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	18-Nov-2021	<0.00012	Mg/L	No
Metolachlor	18-Nov-2021	<0.01	µg/L	No
Metribuzin	18-Nov-2021	<0.02	µg/L	No
Monochlorobenzene	18-Nov-2021	<0.3	µg/L	No
Paraquat	18-Nov-2021	<1	µg/L	No

Pentachlorophenol	18-Nov-2021	<0.15	µg/L	No
Phorate	18-Nov-2021	<0.01	µg/L	No
Picloram	18-Nov-2021	< 1	µg/L	No
Polychlorinated Biphenyls(PCB)	18-Nov-2021	<0.04	µg/L	No
Prometryne	18-Nov-2021	<0.03	µg/L	No
Simazine	18-Nov-2021	<0.01	µg/L	No
Terbufos	18-Nov-2021	<0.01	µg/L	No
Tetrachloroethylene	18-Nov-2021	<0.35	µg/L	No
2,3,4,6-Tetrachlorophenol	18-Nov-2021	<0.20	µg/L	No
Triallate	18-Nov-2021	<0.01	µg/L	No
Trichloroethylene	18-Nov-2021	<0.44	µg/L	No
2,4,6-Trichlorophenol	18-Nov-2021	<0.25	µg/L	No
Trifluralin	18-Nov-2021	<0.02	µg/L	No
Vinyl Chloride	18-Nov-2021	<0.17	µg/L	No

Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
N/A			

One water sample is taken every 60 months to test for Sodium and Fluoride

Parameter	Date of Sample	Result	Unit of Measure	Exceedance
Sodium*	20-Nov-2021	53.3	Mg/L	Yes
Sodium re-sample	29-Nov-2021	60.1	Mg/L	Yes
Fluoride	20-Nov-2021	0.48	mg/L	No

*Sodium result was reported to both the MECP and the Simcoe Muskoka District Health Unit.

One water sample is taken every 3 months and tested for nitrate and nitrite

Parameter	Date of latest Sample	Result	Unit of Measure	Exceedance
Nitrite	Nov. 22, 2023	0.003	mg/L	No
Nitrate	Nov. 22, 2023	0.006	mg/L	No