



## **Water Operations**

**Annual Summary Report**  
*~ Innisfil Lake Simcoe Drinking Water System ~*  
~ Town of Innisfil ~  
DWS #220007472

Reporting Year - 2021

## **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 Innisfil Lake Simcoe Drinking Water System (ILS DWS) services a population of approximately 26,600, on 8656 residential connections, with an additional 117 non-residential connections. The distribution system is comprised of approximately 183 kilometers of various sized ductile iron, concrete, asbestos cement and PVC piping, and approximately 821 hydrants and 1106 valves placed strategically throughout the system.

The system relies on surface water drawn directly from Lake Simcoe and processed at the Lakeshore Water Treatment Plant (WTP).

InnServices has prepared this Annual Summary Report for the operations conducted during the 2021 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 drinking water system, a summary of the operations and maintenance of the Innisfil Lake Simcoe Drinking Water System that took place during the reporting period of January 1, 2021 to December 31, 2021;
- To provide a status update of the systems capabilities and capacities as of December 31, 2021, and;
- To satisfy the requirements of O. Reg 170/03 Section 11
- To satisfy the requirements of O. Reg.170/03 Schedule 22

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 Innisfil Lake Simcoe Drinking Water System and is available on the Town of Innisfil website (<https://innisfil.ca/en/my-government/annual-water-performance-reports.aspx?mid=3185>) and at InnServices Headquarters at 7251 Yonge St., Innisfil, Ontario.

This report provides information to the InnServices Board of Directors and Town of Innisfil Mayor and Council related to the operations, maintenance, drinking water quality, and system capacities of the Innisfil Lake Simcoe Drinking Water System, which aids decision making related to system expansion needs, and assists Board and Council in meeting their Statutory Standard of Care requirements.

## MECP Approvals

The Innisfil Lake Simcoe Drinking Water System is classified as a Large Municipal Residential drinking water system, as defined within Ontario Regulation 170/03.

The **Safe Drinking Water Act, 2002** requires that the Owner of a municipal drinking water system 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 drinking water system. The MDWL provides the authority to use or operate the system. The Innisfil Lake Simcoe DWS operated under

**DWWP # 120-203, Issue #6 issued December 15, 2020**

**MDWL # 120-103, Issue #6 issued December 15, 2020**

For the reporting period covered in this report, InnServices Utilities Inc. was defined as the Operating Authority of the Innisfil Lake Simcoe Drinking Water System.

InnServices Utilities Inc. has established and maintains accreditation to the Drinking Water Quality Management Standard Version 2-2017 (DWQMS) under Certificate of Accreditation # 0136878, issued November 4, 2020 by SAI Global. The Certificate of Accreditation expires September 20, 2023.

## Drinking Water System

The System consists of a Surface Water Treatment Plant (WTP) and associated low lift pumping station, 3 in-ground storage facilities, 4 elevated storage facilities and 5 booster pumping stations.

Disinfection is achieved by two-stage membrane filtration trains equipped with primary UV treatment for Cryptosporidium and Giardia; Granular Activated Carbon Contactors (GACC) are used for taste and odour control; post chlorination achieves acceptable contact time (CT), and final chlorination to distribution maintains secondary chlorine residuals.

Sulphuric acid, sodium hypochlorite and citric acid are used for membrane clean-in-place (CIP) processing; sodium hydroxide and sodium bisulphite are used as neutralizing agents.

Expenses incurred in relation to installation, repair, or replacement of required equipment amounted to approximately \$ 54,685:

- Check Valve for LLP4                   \$ 17,380.32
- Chlorine PCM Panel                   \$ 6,707.68
- Power Monitor                         \$ 6,498.00
- Chlorine PCM & Parts                 \$ 6,877.32
- UV Parts                                 \$ 3,236.05
- 2 Grundfos Pumps                   \$ 4,321.30
- Steam Thawer                         \$ 2056.06
- Coupling & Restrainer               \$ 7608.29

# 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 of the level of microbiological contamination within the drinking water system.

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.

There was one (1) item of non-compliance with the Ontario Drinking Water Standards related to bacteriological analyses which occurred during the reporting period. This were reported to Spills Action Centre and the Simcoe Muskoka District Health Unit as required.

<i>Incident Date</i>	<i>Parameter</i>	<i>Result</i>	<i>Unit of Measure</i>	<i>Corrective Action</i>	<i>Corrective Action Date (dd/mm/yyyy)</i>
August 30, 2021	Total Coliform	1	Cfu/100mL	Resample test	September 3, 2021

Microbiological testing done under the Schedule 10 of Regulation 170/03, during this reporting period:

	<i>Number of Samples</i>	<i>Range of E.coli Results min.-max.</i>	<i>Range of Total Coliform Results min.-max.</i>	<i>Number of HPC Samples</i>	<i>Range of HPC Results min.-max.</i>
<b>Raw</b>	52	0 - 0	0 - 31	n/a	n/a
<b>Treated</b>	52	0 - 0	0 - 0	52	0 - 85
<b>Distribution</b>	490	0 - 0	0 - 1	489	0 - 500

## 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 drinking water system 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).

One (1) incident of non-compliance with Ontario Drinking Water Standards related to chemical analysis was reported during 2021. Sodium in the drinking water is tested every 60 months. 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 completed during the reporting period is attached in Appendix A.

# Continuous Water Quality Monitoring

## Filter Effluent Turbidity

The Procedure for Disinfection of Drinking Water in Ontario requires turbidity of 0.10 NTU (100 mNTU) in 99% of monthly measurements of filtered water turbidity. This criterion was met in 2021 with a monthly average measurement of 99.97%.

## Free Chlorine Residual

The Innisfil Lake Simcoe Water Filtration Plant utilized NSF® certified chlorine gas to meet post 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 chlorine residual must be recorded at the point directly after primary disinfection is achieved, at a frequency of every 5 minutes.

<i>5-minute data collection</i>	<i>Compliance</i>	<i>Results</i>	<i>Unit of Measure</i>
Chlorine	0.05	0.04 – 5.00	Mg/L

All instances where Free Chlorine Residual (FCR) was less than 1.00 mg/L were investigated and confirmed to be isolated instantaneous readings, or coincide with a power outage, calibration activities, and/or disinfection calculations were completed to confirm CT was met.

## Harmful Algal Bloom (HAB)

InnServices has implemented a proactive program for the monitoring of Harmful Algal Bloom (Blue-green algae), which can have mild to serious health effects.

The program includes weekly sampling of raw and treated water to test for Microcystin, a toxin produced by the algae bloom, from June 1 – October 31.

All sample results for microcystin were below the detectable limit of 0.1 µg/Liter. Maximum allowable concentration is 1.5 µg/Liter.

## UV Disinfection – Ultra Filtration Membrane

UV disinfection is provided as a primary barrier to inactivate *Giardia* and *Cryptosporidium*. Water flows through fine strainers, then splits into two separate UV reactor feed lines. These operate one at a time. A minimum continuous pass-through dose of 5.2 mJ/cm<sup>2</sup> (milliJoules per square centimeter) must be maintained.

The flow then discharges to the Ultra Filtration membranes.

Membrane filtration is a pressure-driven, liquid-phase separation process which uses microporous membranes to remove contaminants from the water. The membrane treatment process forces the pre-treated water through the UF membrane, leaving contaminants behind on the feed side of the membrane. The filtered water (or permeate) can pass through the pores of the membrane and continue through to the next treatment process.

The flow can be directed to the GAC Contactors (granular active carbon, for taste and odour control) then to the Chlorine Contact Tanks (CCT); or it can bypass the GACC and go directly to the CCT.

Post chlorination is provided in the CCT after the membranes and to provide disinfection against viruses. It then flows to clearwells where additional chlorine can be added, if necessary, before being pumped into the distribution system.

### Secondary Disinfection

Within the distribution system NSF® certified 12% sodium hypochlorite can be added to the water at the Alcona or Lefroy Reservoirs or Goldcrest standpipe to ensure adequate levels of chlorine are available to protect the water from microbiological contamination as it moves through the distribution system and is delivered to homes and businesses.

Chlorine residual is continuously monitored in numerous locations throughout the distribution system. Additionally, grab samples are taken and analyzed for free chlorine residual 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 related to Continuous Water Quality Monitoring.

## Plant Flow Monitoring

### Raw Water Takings

The Innisfil Lake Simcoe Water Filtration Plant (ILS WTP) utilizes Lake Simcoe as its raw water source. The raw water takings from Lake Simcoe are authorized by the MECP through a Permit to Take Water (PTTW) # 3220-A6HJR4. Raw water takings for 2021 were reported to the electronic Water Taking Recording System (WTRS).

Table 1 below provides a summary of the ILS WTP raw water takings from Lake Simcoe in 2021.

*Table 1: Summary of 2021 Raw Water Takings*

	Units	Takings under PTTW # 3220-A6HJR4
<b>PTTW Daily Maximum</b>	(m <sup>3</sup> /day)	45,000
<b>Maximum Day</b>	(m <sup>3</sup> /day)	35,085
<b>Average Day</b>	(m <sup>3</sup> /day)	13,904
<b>Total Annual Takings</b>	(m <sup>3</sup> )	5,074,882

### Performance Summary

The volume of daily treated water production is authorized by the MECP through the designation of a Plant Rated Capacity within the Municipal Drinking Water Licence (MDWL). The system is operating at approximately 35% of the rated capacity of 38 MLD. At the maximum flow, treated water demand flow in 2021 was 69% of the rated capacity.

Based on total annual raw water takings and treated water production values, the ILS WTP operated at an efficiency of 96%.

Table 2 below provides a summary of the ILS WTP treated water production in 2021. Zero (0) incidents of non-compliance related to the plant's rated capacity were reported in 2021.

*Table 2: Summary of 2021 Treated Water Production*

System Rated Capacity (m <sup>3</sup> /day)	38,000
Maximum Day (m <sup>3</sup> /day)	26,320
Average Day (m <sup>3</sup> /day)	13,370
Total Annual Demand (m <sup>3</sup> )	4,879,340
System Performance-rated capacity	35%
System Performance – at Maximum Flow	69%

### Distribution Flow Monitoring

The ILS WTP produces water for distribution to homes and businesses within the Town of Innisfil (TOI) and transmits water to the Town of Bradford West Gwillimbury (BWG) to help meet the drinking water needs of their residents.

Approximately 48% of the water produced at ILS WTP was supplied to Bradford-West Gwillimbury (BWG) in 2021.

The following table and graph demonstrate the volume of the ILS WTP production that was directed to Town of Innisfil and Town of BWG during 2021.

*Table 3: Monthly volumes (MLD = 1000 m3) of drinking water directed toward TOI and BWG distribution systems in 2021:*

Month	Treated Water Production (MLD)	BWG Use (MLD)	TOI Use (MLD)
January	401.79	215.67	186.12
February	383.14	204.04	179.10
March	394.60	188.12	206.48
April	361.62	138.60	223.02
May	430.25	204.27	225.88
June	487.29	232.62	254.67
July	432.29	210.19	222.10
August	474.17	233.98	240.19
September	391.92	1887.13	204.79
October	376.82	185.52	191.30
November	364.20	180.85	183.35
December	381.25	182.62	198.60
<b>Total</b>	<b>4,879.34</b>	<b>2,363.74</b>	<b>2,515.60</b>

## **MECP Annual Inspection**

An Announced Focused inspection was conducted on November 5, 2021, by the Ministry of the Environment Conservation & Parks. The inspection covered the period of October 29, 2020, to November 5, 2021.

### **Items of Non-Compliance**

There were zero (0) items of non-compliance identified during the inspection period.

### **Provincial Officer's Orders**

No Provincial Officer's Orders were issued in the Report as a result of the 2021 inspection.

### **Inspection Risk Rating**

This year the Innisfil Lake Simcoe 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 12 months from a raw water supply that is surface water.

<i>Inorganic Parameter</i>	<i>Sample Date (dd/mm/yy)</i>	<i>Result Value</i>	<i>Unit of Measure</i>	<i>Exceedance</i>
Antimony	22-Nov-2021	<0.6	µg/L	No
Arsenic	22-Nov-2021	0.4	µg/L	No
Barium	22-Nov-2021	24.5	µg/L	No
Boron	22-Nov-2021	24	µg/L	No
Cadmium	22-Nov-2021	<0.003	µg/L	No
Chromium	22-Nov-2021	0.92	µg/L	No
Mercury	22-Nov-2021	< 0.01	µg/L	No
Selenium	22-Nov-2021	0.07	µg/L	No
Uranium	22-Nov-2021	0.395	µg/L	No

<i>Parameter</i>	<i>Sample Date (dd/mm/yy)</i>	<i>Result Value</i>	<i>Unit of Measure</i>	<i>Exceedance</i>
Alachlor	22-Nov-2021	<0.02	µg/L	No
Atrazine + N-dealkylated metabolites	22-Nov-2021	<0.01	µg/L	No
Azinphos-methyl	22-Nov-2021	<0.05	µg/L	No
Benzene	22-Nov-2021	<0.32	µg/L	No
Benzo(a)pyrene	22-Nov-2021	<0.004	µg/L	No
Bromoxynil	22-Nov-2021	<0.32	µg/L	No
Carbaryl	22-Nov-2021	<0.05	µg/L	No
Carbofuran	22-Nov-2021	<0.01	µg/L	No
Carbon Tetrachloride	22-Nov-2021	<0.17	µg/L	No
Chlorpyrifos	22-Nov-2021	<0.02	µg/L	No
Diazinon	22-Nov-2021	<0.02	µg/L	No
Dicamba	22-Nov-2021	<0.20	µg/L	No
1,2-Dichlorobenzene	22-Nov-2021	<0.41	µg/L	No
1,4-Dichlorobenzene	22-Nov-2021	<0.36	µg/L	No
1,2-Dichloroethane	22-Nov-2021	<0.35	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	22-Nov-2021	<0.33	µg/L	No
Dichloromethane	22-Nov-2021	<0.35	µg/L	No
2-4 Dichlorophenol	22-Nov-2021	<0.15	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	22-Nov-2021	<0.19	µg/L	No
Diclofop-methyl	22-Nov-2021	<0.40	µg/L	No
Dimethoate	22-Nov-2021	<0.03	µg/L	No
Diquat	22-Nov-2021	<1	µg/L	No
Diuron	22-Nov-2021	<0.03	µg/L	No
Glyphosate	22-Nov-2021	<1	µg/L	No
Malathion	22-Nov-2021	<0.02	µg/L	No
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	22-Nov-2021	<0.00012	µg/L	No
Metolachlor	22-Nov-2021	<0.01	µg/L	No

Metribuzin	22-Nov-2021	<0.02	µg/L	No
Monochlorobenzene	22-Nov-2021	<0.3	µg/L	No
Paraquat	22-Nov-2021	<1	µg/L	No
Pentachlorophenol	22-Nov-2021	<0.15	µg/L	No
Phorate	22-Nov-2021	<0.01	µg/L	No
Picloram	22-Nov-2021	<1	µg/L	No
Polychlorinated Biphenyls(PCB)	22-Nov-2021	<0.04	µg/L	No
Prometryne	22-Nov-2021	<0.03	µg/L	No
Simazine	22-Nov-2021	<0.01	µg/L	No
Terbufos	22-Nov-2021	<0.01	µg/L	No
Tetrachloroethylene	22-Nov-2021	<0.35	µg/L	No
2,3,4,6-Tetrachlorophenol	22-Nov-2021	<0.20	µg/L	No
Triallate	22-Nov-2021	<0.01	µg/L	No
Trichloroethylene	22-Nov-2021	<0.44	µg/L	No
2,4,6-Trichlorophenol	22-Nov-2021	<0.25	µg/L	No
Trifluralin	22-Nov-2021	<0.02	µg/L	No
Vinyl Chloride	22-Nov-2021	<0.17	µg/L	No

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

<i>Parameter</i>	<i>Result Value</i>	<i>Unit of Measure</i>	<i>Date of Sample</i>
N/A			

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

<i>Parameter</i>	<i>Date of Sample</i>	<i>Result</i>	<i>Unit of Measure</i>	<i>Exceedance</i>
Sodium *	22-Nov-2021	30.8	mg/L	Yes
Sodium re-sample	29-Nov-2021	33.4	mg/L	Yes
Fluoride	22-Nov-2021	<0.06	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**

<i>Parameter</i>	<i>Date of latest Sample</i>	<i>Result</i>	<i>Unit of Measure</i>	<i>Exceedance</i>
Nitrite	23-Nov-2021	< 0.003	mg/L	No
Nitrate	23-Nov-2021	0.119	mg/L	No

### Distribution Sampling (Lead, THM and HAA)

Based on results of community lead sampling conducted, the Innisfil Lake Simcoe 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 four (4) sampling points for each summer and winter period. Lead is tested every third 12-month period.

<i>Location Type</i>	<i>Number of Samples</i>	<i>Range of Alkalinity Results Minimum – maximum, 2021</i>	<i>Range of Lead Results- 2020</i>	<i>Number of Exceedances</i>
		Aesthetic Objective 30-500 Mg/L	Maximum Concentration 10 µg/L	
Distribution	8	100-122 Mg/L	0.02 – 0.73 µg/L	0

Trihalomethanes (THMs) and Haloacetic Acids (HAAs) are sampled on a quarterly basis in accordance with O. Reg.170/03 Schedule 13. The most recent sample results:

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value</i>	<i>Unit of Measure</i>	<i>Maximum Allowable Concentration</i>
THM (NOTE: show latest annual average)	18-Nov-2021	71.88	µg/L	100 µg/L
HAA (NOTE: show latest annual average)	18-Nov-2021	32.64	µg/L	80 µg/L

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards. (Lead, THM and HAA)

<i>Parameter</i>	<i>Result Value</i>	<i>Unit of Measure</i>	<i>Date of Sample</i>
THM (Rolling Annual Avg.)	Q1 – 68.88	µg/L	5-Feb-2021
	Q2 – 66.94	µg/L	10-May-2021
	Q3 – 66.69	µg/L	12-Aug-2021
	Q4 – 71.88	µg/L	18-Nov-2021