

Lakeshore Annual and Summary Report

For the 2022 Operating Year

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Photo circa Summer 2010

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1.0 EXECUTIVE SUMMARY

The purpose of this report is to provide information to system Owners and Stakeholders to satisfy the regulatory requirements of the following:

- *Safe Drinking Water Act (SDWA)*
- Drinking Water Quality Management Standard (DWQMS)
- Section 81 of the Clean Water Act (CWA)
- Reporting required under Ontario Regulation (O. Reg.) 170/03, Section 11
- Reporting required under O. Reg. 170/03, Schedule 22

The Operating Authority (Veolia), on behalf of the Owner (Township of Huron-Kinloss), has prepared this report as a compilation of information that demonstrates the ongoing provision of a safe, consistent supply of high quality drinking water to customers supplied by the Lakeshore Drinking Water System.

SAFE DRINKING WATER ACT

Following the Walkerton Tragedy in 2000, the Ontario Government developed a new, comprehensive legislative paradigm based on a source-to-tap, multi-barrier approach to the protection of drinking water. The *Safe Drinking Water Act (SDWA)*, 2002, and its Regulations, contain requirements for Municipalities that provide potable water to their residents.

Under Section 19 (Standard of Care of the *SDWA*), Owners of a Drinking Water System are required to:

- a) exercise the level of care, diligence and skill in respect of a Municipal Drinking Water System that a reasonably prudent person would be expected to exercise in a similar situation; and
 - b) act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the Municipal Drinking Water System.
- 2002, c. 32, s. 19(1).

The following chart outlines key aspects of the *SDWA* that relate to the Lakeshore Drinking Water System:

Legislative Framework for the Lakeshore Drinking Water System

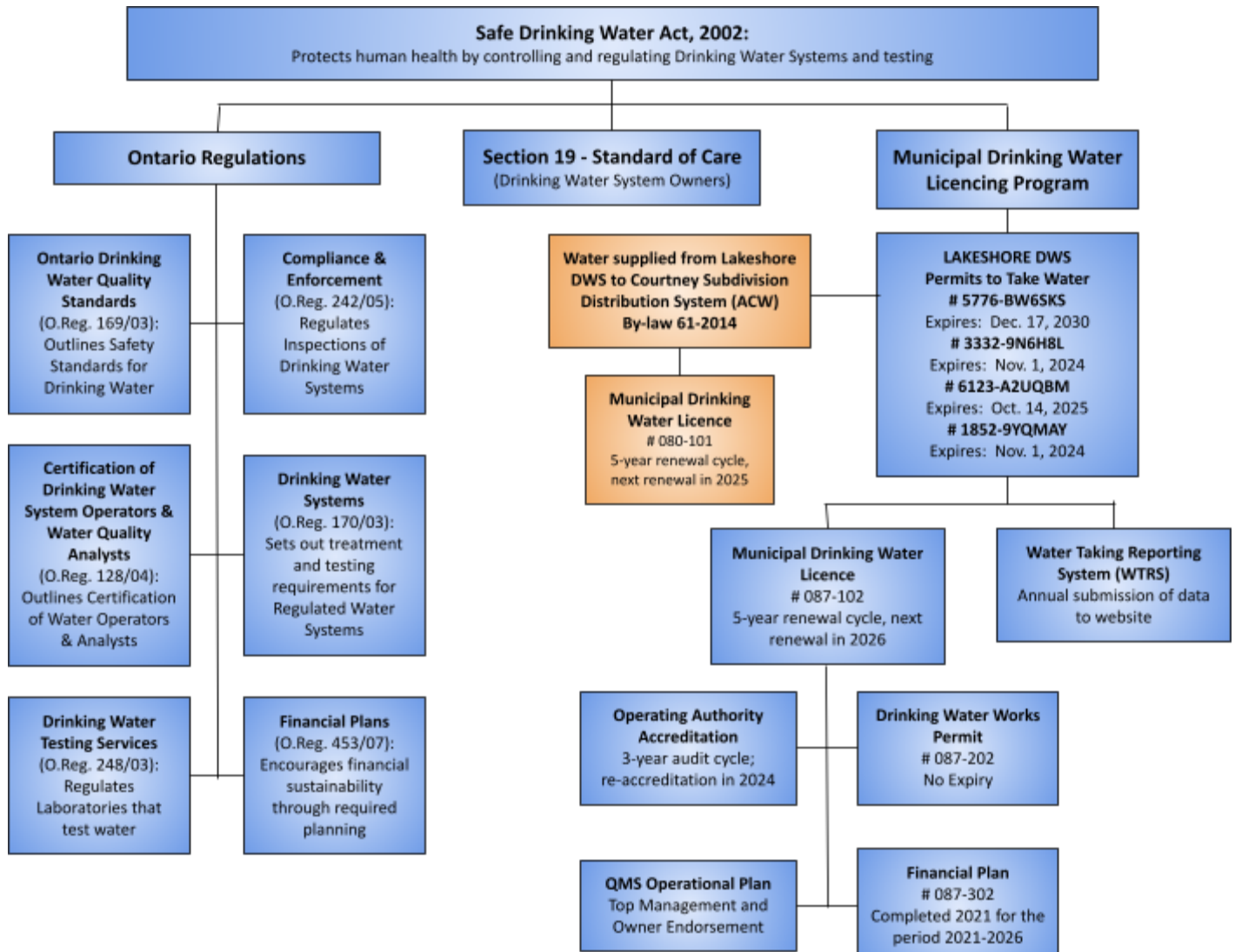


Figure 1

2.0 REPORTING REQUIREMENTS:

This report intends to provide relevant information to help the Township of Huron-Kinloss, its Council, as Owners of the Lakeshore Drinking Water System, meet the Standard of Care. Its contents are organized as follows, according to specific reporting requirements under the *SDWA*:

O. REG. 170/03, SECTION 11 - ANNUAL REPORT

- The Owner shall ensure an annual report is prepared as per O. Reg. 170/03, s. 11(1).
- The Owner of a Drinking Water System (DWS) that supplies water to another DWS shall provide a copy of the annual report to the system that receives the water (Courtney Subdivision - Ashfield-Colborne-Wawanosh).
- The annual report must cover the period of January 1 to December 31 in a year and must be prepared not later than February 28 of the following year.
- The annual report must:
 - Contain a brief description of the DWS, including a list of water treatment chemicals used.
 - Summarize any reports made to the Ministry under s.s. 18(1) of the *Act*, or Sch. 16 (16-4).
 - Summarize the results of tests made under O. Reg. 170/03 and the Municipal Drinking Water Licence (MDWL).
 - Describe any corrective actions taken under Sch. 17.
 - Describe any major expenses to install, repair or replace required equipment.
 - Include a statement of where a report prepared as per Sch. 22 will be available for inspection under s.s. 12(4).
 - Specify the number of points sampled as per s.s. 15.1-4(2) or s.s. 15.1-5(5), the number of samples taken, and the number of points where a sample exceeded the prescribed standard for lead.
- The Owner shall ensure that a copy of an annual report for a system is given, without charge, to every person who requests a copy.
- If a DWS is connected to and receives all of its drinking water from another DWS, the Owner of the system that receives the water shall ensure that a copy of an annual report for the DWS that supplies water is given, without charge, to every person who requests a copy.
- Every time that an annual report is prepared for a DWS, the Owner of the system shall ensure that effective steps are taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained.

O. REG. 170/03, SCHEDULE 22 - SUMMARY REPORT FOR MUNICIPALITIES

- The Owner of a DWS shall ensure that, not later than March 31 of each year, a report is prepared as per s.s. (2) and (3) for the preceding year and is given to:
 - in the case of a DWS owned by a Municipality, the members of the Municipal Council;
 - in the case of a DWS owned by a Municipal Service Board established under s. 195 of the *Municipal Act, 2001*, the members of the Municipal Service Board; or
 - in the case of a DWS owned by a Corporation, the Board of Directors of the Corporation
- The summary report must,
 - list the requirements of the *Act*, the Regulations, the system's approval, Drinking Water Works Permit (DWWP), MDWL, and any Orders applicable to the system that were not met at any time during the period covered by the report; and
 - for each requirement referred to above that was not met, specify the duration of the failure and the measures that were taken to correct the failure.
- The summary report must also include the following information for the purpose of enabling the Owner of the DWS to assess the capability of the system to meet existing and planned uses of the system:
 - A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows;
 - A comparison of the summary referred to above to the rated capacity and flow rates approved in the system's approval, DWWP or MDWL, or if the system is receiving all of its water from another system under an agreement pursuant to subsection 5(4), to the flow rates specified in the written agreement.
- If a report is prepared under s.s. (1) for a system that supplies water to a Municipality under the terms of the contract, the Owner of the DWS shall give a copy of the report to the Municipality by March 31.

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP) INSPECTION REPORT

- In 2006, the MECP introduced a comprehensive inspection program for Municipal Residential Drinking Water Systems. The objectives of this program are to determine compliance with the *SDWA* and associated regulations; to encourage the continuous improvement of the Drinking Water System; and to establish a process to measure these improvements.

MUNICIPAL DRINKING WATER MANAGEMENT REVIEW

- The *SDWA*, through the Municipal Drinking Water System Licensing Program, requires that the Township maintain an accredited Quality Management System (QMS) for its drinking water system. This review communicates to Council the key information related to the QMS and the Municipal Drinking Water Licensing Program.

QMS OPERATIONAL PLAN

- The *SDWA*, through the Municipal Drinking Water Licensing Program, requires that a Municipal Drinking Water System Owner (Council) endorse the most current version of the QMS Operational Plan. This document, once endorsed, is posted on the Township of Huron-Kinloss website and is available at the Operations Centre.
- An updated Operational Plan was submitted on May 24, 2022 - Revision 15, and can be found here:
<https://www.huronkinloss.com/en/live-here/resources/Operational-Plan---Huron-Kinloss---May-24-2022---Rev-15.pdf>

The Township of Huron-Kinloss is approved by the MECP to operate a Class 3 Distribution and Supply System through its MDWL # 087-102, and to alter the system through its DWWP # 087-202. The Township of Ashfield-Colborne-Wawanosh is approved by the MECP to operate a Class 1 Distribution System (Courtney Subdivision) through its MDWL # 080-101, and to alter the system through its DWWP # 080-201.

The MECP “Municipal Drinking Water Systems” web portal provides the most current version of the Act and its regulations and can be found:

<https://www.ontario.ca/page/municipal-drinking-water-systems-licencing-registration-and-permits>

3.0 DESCRIPTION OF WATER SYSTEM (O. Reg. 170/03, s. 11 (6) (a))

A summary of the Lakeshore Drinking Water System description is outlined below:

Drinking Water System Number:	220000425
Drinking Water System Name:	Lakeshore Well Water Distribution and Supply
Drinking Water System Owner:	Corporation of the Township of Huron-Kinloss
Drinking Water System Category:	Large Municipal Residential
Drinking Water System Classification:	Water Distribution and Supply Subsystem Class 3
Drinking Water System Certificate No.:	1808
Daily Maximum Water Supply Capacity:	11,636.26 m ³
Disinfection Chemicals:	Sodium Hypochlorite, 12%
Iron Sequestering Chemicals:	Sodium Silicate (N), undiluted
Population (Stats Can - 2021):	4,270
Total Number of Service Connections:	2,441
Estimated Seasonal Population:	6,103 (based on 2021 Census of 2.5 persons per household)
Average Day Demand:	1,889.93 m ³
Peak Day Demand:	5,062.58 m ³ (May 9, 2022)
Average Capacity:	16.24%
Peak Capacity:	43.51%
Distribution Network:	80.4 km (from County of Bruce GIS)
Watermain Valves:	683 (from County of Bruce GIS)
Fire Hydrants:	212 (from County of Bruce GIS)
Blow-offs:	49 (from County of Bruce GIS)
Auto-flushing Device:	1 (Camerons Lane)

The Lakeshore Drinking Water Distribution and Supply Subsystem (Lakeshore DWS) is characterized as a “secure groundwater system”. It consists of four sub-systems (well supplies), that deliver potable water to the Huron-Kinloss Lakeshore Community, extending from Point Clark in the south, to Huronville in the north, and to the Courtney/Amberley Beach subdivision in the Township of Ashfield-Colborne-Wawanosh. The Township of Huron-Kinloss has an agreement with The Township of Ashfield-Colborne-Wawanosh, where the Courtney/Amberley Beach Subdivision is treated as part of the Lakeshore Drinking Water System (By-Law 61-2014).

The four sub-systems are: Point Clark, Blairs Grove, Huronville South, and Murdoch Glen. All of these sites are located within the Township of Huron-Kinloss along Lake Huron. All sites are controlled, monitored, and alarmed through a Supervisory Control and Data Acquisition (SCADA) system which is connected to the main controller, autodialer, and server at the Ripley Municipal Office. The desktop computer used by the system’s operators is located at the Ripley Township Shed and is connected remotely to the SCADA server. As a redundancy, each site is also equipped with an auto-dialer that is independent of the SCADA system, and is used to call out alarms in the event of communications/SCADA failure. This SCADA system provides the operator with the ability to monitor current operating status of the supply and treatment equipment throughout the water system at any given time via remote access by computer or Smartphone, and to have control over operations.

The Township of Huron-Kinloss also has an agreement with the Municipality of Kincardine, where Kincardine is the Operating Authority for a small area of Huron-Kinloss known as the Huronville Subdivision Distribution System (Plan M28). This subdivision received all their water from the Municipality of Kincardine Water System. There is an interconnecting valve between the Lakeshore DWS and Huronville Subdivision Distribution System, and the Town of Kincardine. This valve is normally closed and is used for emergency purposes only.

The four well supplies are detailed as follows:

Site: Point Clark - 603 Tuscarora Road

- | | |
|-------------------------------|--|
| ● Water Source: | Groundwater, Non-GUDI |
| ● Number of Production Wells: | 2 (Well # 2 - 1994; Well # 3 - 2015) |
| ● Depth of Wells: | 75.6 m; 82.3 m |
| ● Well Pumps: | 15 hp each (submersible) |
| ● Disinfection: | Sodium hypochlorite (12%) |
| ● CT Requirement: | 2-log, 5°C, baffled reservoir (0.5 BF) |
| ● Iron Sequestering: | Sodium silicate (undiluted) |
| ● High Lift Pumps: | 2 (25 hp each) |
| ● Reservoir: | 65 m ³ |
| ● Permit To Take Water: | 1852-9YQMAY, expires November 1, 2024 |

Site: Blairs Grove - 28 Cathcart Street

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 1 (Well # 3 - 1994, flowing artesian)
- Depth of Well: 69.5 m
- Well Pump: 10 hp (submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, baffled reservoir (0.5 BF)
- Iron Sequestering: Sodium silicate (undiluted)
- High Lift Pump: 1 (30 hp)
- Reservoir: 83 m³
- Permit To Take Water: 5776-BW6SKS, expires December 17, 2030

Site: Murdoch Glen - 815 Parkplace

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 1 (1992)
- Depth of Well: 80.5 m
- Well Pump: 25 hp (submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, contact watermain (BF 1.0)
- Iron Sequestering: Sodium silicate (undiluted)
- High Lift Pumps: 4 total; 2 (15 hp each), 2 (50 hp each)
- Reservoir: 400 m³
- Standby Power: 130 kW Diesel Generator (1,100 L fuel storage)
- Permit To Take Water: 6123-A2UQBM, expires October 15, 2025

Site: Huronville South - 39 Penetangore Row South

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 1 (1994)
- Depth of Well: 93.3 m
- Well Pump: 30 hp (submersible, soft-start)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, baffled reservoir (BF 0.5)
- Iron Sequestering: Sodium silicate (undiluted)
- High Lift Pumps: 2 (30 hp each)
- Reservoir: 65 m³
- Permit To Take Water: 3332-9N6H8L, expires November 1, 2024

The Lakeshore DWS currently (December 2022) has a distribution network with a combination of PVC and polyethylene water mains, in sizes varying between 1-inch and 10-inch diameter. The Lakeshore area has a large seasonal population of potentially 6,103 (based on Census data of 2.5 people per household connection x 2,441 connections), and therefore, the demands are significantly higher during the cottage season.

All the Lakeshore wells are secure, deep bedrock wells that penetrate limestone aquifers. Due to the depth and structure of the aquifers, the water temperature is relatively constant ($< 10^{\circ}\text{C}$), turbidity is low, and the water is relatively hard. The raw water is also relatively **high in naturally-occurring sodium, fluoride and iron**, but the lead content of the raw water is well below the half-MAC (Maximum Allowable Concentration). Iron sequestering is achieved by means of treating the water with sodium silicate. Sequestering does not remove iron, but instead it prevents the dissolved iron from precipitating. When iron is precipitated, it can lead to stained plumbing fixtures and appear as discolouration in the water. Sodium silicate can leave a slight metallic taste in the water. Those who are supplied from the Lakeshore DWS are made aware of the various concentrations in their drinking water by numerous means of communication from the Township of Huron-Kinloss.

A 130 kW diesel generator, located at the Murdoch Glen pumphouse, includes a 1,100 L capacity fuel storage tank and is used for emergency power supply. A standpipe is situated in the Point Clark area at 3405 Concession 2, and is constructed of bolted steel (1996). The 31 m (102 ft) high and 9.45 m (31 ft) diameter standpipe has an effective storage of approximately 1,500 m³ to supply the entire Lakeshore System in emergency situations. Additionally, a standby generator connection is available at the Point Clark pumphouse. Periodic inspections of the standpipe (exterior and interior) are conducted.

4.0 SUMMARY OF REPORTS MADE TO THE MINISTRY (O. Reg. 170/03, s. 11 (6) (b))

- There were four (4) Adverse Water Quality Indicators (AWQIs) in 2022, related to Fluoride exceedances (AWQI # 159912, 159913, 159914, and 159915). Fluoride is naturally occurring. Testing will be required again in 2027.
- A Fluoride Exceedance Report was submitted to the Grey Bruce Health Unit, Huron Perth Public Health, the Ministry, Source Water Protection/Ausable Bayfield Conservation Authority, and the Township of Huron-Kinloss on September 20, 2022. The Grey Bruce Health Unit issued a letter to the Township of Huron-Kinloss for the users of the Lakeshore DWS.
- One (1) non-compliance: a distribution residual was missed on December 25, 2022 due to blizzard conditions and road closures. This was reported to the MECP Inspector.

5.0 SUMMARY OF WATER QUALITY MONITORING (O. Reg. 170/03, s. 11 (6) (c))

The purpose of sampling and testing is to confirm that water is safe for human consumption and to provide a comprehensive track record.

Table 1 - Water Quality Monitoring Requirements

Parameter	Description	Required # of Samples	Requirement Source
Chlorine Residual (grab)	For monitoring amount of residual in system, and confirming of water quality following maintenance	365/year (1 daily)	O. Reg. 170/03, Sch. 7
Chlorine Residual (continuous monitoring)	Continuous monitoring equipment used to sample and test treated water at the location where intended contact time has been completed	5 minute intervals, minimum	O. Reg. 170/03, Sch. 7
Turbidity (NTU) - Raw	To measure the relative clarity or cloudiness of water	60/year (Raw)	O. Reg. 170/03, Sch. 7
E. Coli (EC) Total Coliform (TC) Heterotrophic Plate Count (HPC)	For testing presence of microbiological activity	168/year (Dist) 260/year (Raw) 208/year (Treated)	O. Reg. 170/03, Sch. 10
Inorganics and Organics	For testing presence of metals, pesticides and herbicides	36 month interval	O. Reg. 170, Sch 13, s. 13-2 (Sch 23), and s. 13-4 (Sch 24)
Arsenic (POINT CLARK only)	For testing presence of arsenic in the treated water at Point-of-Entry	4/year (quarterly)	O. Reg. 170, Sch 13-5 (increased frequency)
Trihalomethanes (THMs)	For testing presence of disinfection by-products (DBPs)	4/year (quarterly)	O. Reg. 170/03, Sch. 13, s. 13-6
Lead (Pb)	For testing presence of lead in the distribution system only - not private side	36 month interval (pH and alkalinity annually)	O. Reg. 170/03, Sch. 15; MDWL #087-102, Sch. D
Haloacetic Acids (HAAs)	For monitoring the formation of disinfection by-products (DBPs)	4/year (quarterly)	O. Reg. 170/03, Sch. 13, s. 13-6.1
Nitrate and Nitrite	For testing presence of nitrates and nitrites in the treated water at Point-of-Entry	4/year (quarterly)	O. Reg. 170/03, Sch. 13, s. 13-7
Sodium	For testing presence of sodium in the treated water at Point-of-Entry	60 month interval	O. Reg. 170/03, Sch. 13, s. 13-8
Fluoride	For testing presence of fluoride in the treated water at Point-of-Entry	60 month interval	O. Reg. 170/03, Sch. 13, s. 13-9

COMMUNICATIONS WHEN ADVERSE WATER SAMPLES ARE IDENTIFIED

Requirement - Laboratory

A water sample that does not meet Provincial water quality standards is considered “adverse”. When adverse water quality is detected, the accredited laboratory conducting the testing will immediately notify the Operating Authority, the Spills Action Centre (SAC), and the office of Grey Bruce Health Services, and occasionally the office of Huron-Perth Public Health (as necessary, if applicable). This notification is made by telephone through live communication to a person in authority. In addition to the phone calls, a fax of the sample results is sent to these agencies to verify the live communication made earlier.

Requirement - Drinking Water System Owner/Operating Authority

The SDWA also requires the Drinking Water System Owner/Operating Authority to immediately notify the MECP and the Grey Bruce Health Services office and the Huron-Perth Public Health office (if applicable), that the laboratory notice has been received and that “corrective actions” are being initiated. The method of contact is by telephone to a person of authority. The Operating Authority also faxes Form 2A - Notices of Adverse Test Results and Issue Resolution (Schedule 16) within 24 hours to both agencies first to verify previous live communication. Once the issue has been resolved and to confirm that corrective actions have been completed, the Operating Authority also faxes Form 2B - Notices of Adverse Test Results and Issue Resolution (Schedule 16) within 7 days to the agencies. This reporting system provides assurance that the DWS Owner is complying with the applicable regulations and that appropriate corrective actions are being taken and are being reported.

5.1 Water Treatment Equipment Operation and Monitoring

5.1.1 Treated Water (Point of Entry) Free Chlorine Residuals (Grab Samples)

In 2022, a total of 1,431 treated water grab samples were collected and analyzed for free chlorine residual at the point of entry (POE) using a Hach pocket chlorine colorimeter. **Table 2** shows the grab samples monthly average of free chlorine residual values. **Table 3** shows the on-line continuous samples monthly average (as collected by SCADA) of the free chlorine residual values.

5.1.2 Distribution Free Chlorine Residuals (Grab Samples)

In 2022, a total of 692 distribution residuals were collected: 364 daily grab residuals and an additional 328 weekly grab residuals were taken in conjunction with the required weekly microbiological sampling. A summary of all the residuals collected is presented in **Table 2**. Courtney Subdivision in ACW is included with the distribution residuals. One distribution sample was missed due to road closures (blizzard) on December 25, 2022.

Table 2 - Average Treated and Distribution Free Chlorine Residuals (Grab Samples)

Month	Blairs Grove	Huronville South	Murdoch Glen	Point Clark	Distribution
Jan	1.41	1.63	1.71	1.75	1.41
Feb	1.45	1.81	1.69	1.72	1.55
Mar	1.37	1.62	1.64	1.59	1.38
Apr	1.33	1.64	1.57	1.62	1.38
May	1.43	1.78	1.74	1.74	1.52
Jun	1.42	1.66	1.84	1.73	1.54
Jul	1.40	1.57	1.72	1.69	1.51
Aug	1.30	1.56	1.65	1.66	1.46
Sep	1.24	1.52	1.62	1.58	1.42
Oct	1.17	1.80	1.63	1.55	1.30
Nov	1.33	1.86	1.86	1.69	1.39
Dec	1.43	1.54	1.65	1.78	1.41
CT Requirement	0.22	0.40	0.26	0.32	0.20
Annual Min	0.91	1.19	1.00	1.25	0.58
Annual Max	2.11	2.21	2.04	1.98	1.98
Annual Avg	1.36	1.67	1.69	1.67	1.44
# Samples	363	341	364	361	692

Table 3 - Average Treated Free Chlorine Residuals (On-Line Continuous from SCADA)

Month	Blairs Grove	Huronville South	Murdoch Glen	Point Clark
Jan	1.42	1.63	1.72	1.78
Feb	1.48	1.81	1.70	1.73
Mar	1.37	1.61	1.68	1.62
Apr	1.34	1.64	1.59	1.63
May	1.46	1.80	1.88	1.75
Jun	1.46	1.66	1.85	1.73
Jul	1.43	1.57	1.73	1.69
Aug	1.33	1.55	1.67	1.65
Sep	1.30	1.54	1.64	1.59
Oct	1.22	1.89	1.65	1.58
Nov	1.39	1.84	1.88	1.73
Dec	1.46	1.55	1.68	1.79
CT Requirement	0.22	0.40	0.26	0.32
Annual Min	0.77	0.55	0.54	1.20
Annual Max	4.48	2.01	2.00	2.20
Annual Avg	1.39	1.67	1.72	1.69

5.1.3 Raw and Treated Water Turbidity

Raw water and treated water grab samples were collected and analyzed for turbidity using a portable turbidity analyzer. **Table 4** provides a summary of raw water turbidity results and **Table 5** provides a summary of treated water turbidity results. O. Reg. 170/03 requires raw turbidity samples to be analyzed at least once per month from each well for groundwater systems.

Table 4 - Raw Water Turbidity Results

Month	Blairs Grove	Huronville South	Murdoch Glen	Point Clark W2	Point Clark W3
Jan	0.24	0.13	0.16	0.17	0.19
Feb	0.28	0.18	0.19	0.16	0.18
Mar	0.28	0.19	0.17	0.18	0.18
Apr	0.49	0.13	0.27	0.20	0.35
May	0.36	0.20	0.17	0.22	0.21
Jun	0.27	0.17	0.19	0.18	0.18
Jul	0.26	0.17	0.18	0.18	0.18
Aug	0.26	0.17	0.18	0.16	0.20
Sep	0.38	0.43	0.30	0.21	0.22
Oct	0.28	0.25	0.22	0.20	0.22
Nov	0.30	0.21	0.18	0.18	0.22
Dec	site off-line	0.19	0.19	0.19	0.21
Annual Min	0.18	0.06	0.15	0.11	0.15
Annual Max	0.83	0.75	0.47	0.28	0.48
Annual Avg	0.31	0.20	0.20	0.19	0.21
# Samples	41	49	46	46	45

Table 5 - Treated Water Turbidity Results

Month	Blairs Grove	Huronville South	Murdoch Glen	Point Clark
Jan	---	0.30	0.31	0.31
Feb	0.53	0.29	0.29	0.31
Mar	0.55	0.26	0.34	0.32
Apr	0.53	0.28	0.25	0.34
May	0.33	0.23	0.21	0.32
Jun	0.45	0.24	0.20	0.29
Jul	0.33	0.18	0.18	0.23
Aug	0.34	0.18	0.20	0.23
Sep	0.37	0.22	0.21	0.25
Oct	0.26	0.22	0.22	0.23
Nov	0.29	0.19	0.21	0.22
Dec	0.27	0.20	0.23	0.25
Annual Min	0.19	0.11	0.15	0.20
Annual Max	0.67	0.31	0.36	0.40
Annual Avg	0.38	0.23	0.24	0.28
# Samples	41	44	43	43

5.2 Microbiological Sampling as per Schedule 10, O. Reg. 170/03

5.2.1 Raw Water Samples

Raw water samples are collected every week. In 2022, a total of 251 samples were collected and analyzed for E. Coli and Total Coliform. **Tables 6, 7, 8, 9 and 10** provide summaries of microbiological results performed on the raw water.

Table 6 - Microbiological Results - BLAIRS GROVE - RAW

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	5	5	0	5	5	0
Feb	3	3	0	3	3	0
Mar	3	3	0	3	3	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	4	4	0	4	4	0
Oct	4	4	0	4	4	0
Nov	2	2	0	2	2	0
Dec	0 (off-line)	(off-line)	(off-line)	0 (off-line)	(off-line)	(off-line)
TOTAL	43	43	0	43	43	0

Table 7 - Microbiological Results - HURONVILLE SOUTH - RAW

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	5	5	0	5	5	0
Feb	4	4	0	4	4	0
Mar	4	4	0	4	4	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	6	5	1	6	6	0
Oct	4	4	0	4	4	0
Nov	4	3	1	4	4	0
Dec	4	4	0	4	4	0
TOTAL	53	51	2	53	53	0

Table 8 - Microbiological Results - MURDOCH GLEN - RAW

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	5	5	0	5	5	0
Feb	4	4	0	4	4	0
Mar	4	4	0	4	4	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	6	6	0	6	6	0
Oct	4	3	1	4	4	0
Nov	4	4	0	4	4	0
Dec	4	4	0	4	4	0
TOTAL	53	52	1	53	53	0

Table 9 - Microbiological Results - POINT CLARK WELL # 2 - RAW

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	5	5	0	5	5	0
Feb	4	4	0	4	4	0
Mar	4	4	0	4	4	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	4	4	0	4	4	0
Oct	4	4	0	4	4	0
Nov	4	3	1	4	4	0
Dec	4	4	0	4	4	0
TOTAL	51	50	1	51	51	0

Table 10 - Microbiological Results - POINT CLARK WELL # 3 - RAW

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	5	5	0	5	5	0
Feb	4	4	0	4	4	0
Mar	4	4	0	4	4	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	4	4	0	4	4	0
Oct	4	4	0	4	4	0
Nov	4	2	2	4	4	0
Dec	4	1	3	4	4	0
TOTAL	51	46	5	51	51	0

5.2.2 Treated Water (Point of Entry) Samples

One (1) treated water sample from each point of entry is taken every week and analyzed for E. Coli, Total Coliform, and Heterotrophic Plate Count (HPC). In 2022, a total of 201 treated water samples were collected and analyzed for the above parameters. Each EC and TC result from the treated water was 0 cfu/100 mL. The range of HPC results were < 10 - 70 cfu/1 mL. **Table 11, 12, 13, and 14** provide summaries of all microbiological results performed on treated water.

Table 11 - Microbiological Results - BLAIRS GROVE - TREATED

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples > 10
Jan	5	5	0	5	5	0	5	4	1
Feb	3	3	0	3	3	0	3	3	0
Mar	3	3	0	3	3	0	3	3	0
Apr	4	4	0	4	4	0	4	4	0
May	5	5	0	5	5	0	5	5	0
Jun	4	4	0	4	4	0	4	4	0
Jul	4	4	0	4	4	0	4	4	0
Aug	5	5	0	5	5	0	5	5	0
Sep	4	4	0	4	4	0	4	4	0
Oct	4	4	0	4	4	0	4	3	1
Nov	3	3	0	3	3	0	3	3	0
Dec	4	4	0	4	4	0	4	4	0
TOTAL	48	48	0	48	48	0	48	46	2

Table 12 - Microbiological Results - HURONVILLE SOUTH - TREATED

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples > 10
Jan	5	5	0	5	0	5	5	5	0
Feb	4	4	0	4	0	4	4	4	0
Mar	4	4	0	4	0	4	4	4	0
Apr	4	4	0	4	0	4	4	4	0
May	5	5	0	5	0	5	5	5	0
Jun	4	4	0	4	0	4	4	4	0
Jul	4	4	0	4	0	4	4	4	0
Aug	5	5	0	5	0	5	5	5	0
Sep	4	4	0	4	0	4	4	4	0
Oct	4	4	0	4	0	4	4	4	0
Nov	4	4	0	4	0	4	4	4	0
Dec	4	4	0	4	0	4	4	4	0
TOTAL	51	51	0	51	0	51	51	51	0

Table 13 - Microbiological Results - MURDOCH GLEN - TREATED

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples > 10
Jan	5	5	0	5	5	0	5	5	0
Feb	4	4	0	4	4	0	4	4	0
Mar	4	4	0	4	4	0	4	4	0
Apr	4	4	0	4	4	0	4	4	0
May	5	5	0	5	5	0	5	5	0
Jun	4	4	0	4	4	0	4	4	0
Jul	4	4	0	4	4	0	4	4	0
Aug	5	5	0	5	5	0	5	5	0
Sep	4	4	0	4	4	0	4	4	0
Oct	4	4	0	4	4	0	4	4	0
Nov	4	4	0	4	4	0	4	4	0
Dec	4	4	0	4	4	0	4	4	0
TOTAL	51	51	0	51	51	0	51	51	0

Table 14 - Microbiological Results - POINT CLARK - TREATED

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples > 10
Jan	5	5	0	5	5	0	5	5	0
Feb	4	4	0	4	4	0	4	4	0
Mar	4	4	0	4	4	0	4	4	0
Apr	4	4	0	4	4	0	4	4	0
May	5	5	0	5	5	0	5	5	0
Jun	4	4	0	4	4	0	4	4	0
Jul	4	4	0	4	4	0	4	4	0
Aug	5	5	0	5	5	0	5	5	0
Sep	4	4	0	4	4	0	4	4	0
Oct	4	4	0	4	4	0	4	3	1
Nov	4	4	0	4	4	0	4	4	0
Dec	4	4	0	4	4	0	4	4	0
TOTAL	51	51	0	51	51	0	51	50	1

5.2.3 Distribution Samples

Distribution samples are collected every week and tested for E. Coli, Total Coliform, and 25% of the samples are also analyzed for Heterotrophic Plate Count (HPC). Ontario Regulation 170/03 requires 8 distribution samples plus one additional sample for every 1,000 people served by the system. In 2022, a total of 357 distribution samples were collected and analyzed for TC and EC, which is above the required number of samples (n=168, based on 6,103 potential residents). A total of 202 distribution samples were analyzed for HPC (n=42, 25% of 168). A sample was collected each week from the Courtney Subdivision distribution system and the results are included in this section. Each TC and EC result from the distribution water was 0 cfu/100 mL. The range of HPC results were 0 - 140 cfu/1 mL. **Table 15** provides a summary of all microbiological samples taken in the distribution system.

Table 15 - Microbiological Results for Distribution System

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples 11 - 140
Jan	35	35	0	35	35	0	20	20	0
Feb	28	28	0	28	28	0	16	16	0
Mar	28	28	0	28	28	0	16	16	0
Apr	28	28	0	28	28	0	14	13	1
May	35	35	0	35	35	0	20	19	1
Jun	28	28	0	28	28	0	16	16	0
Jul	28	28	0	28	28	0	16	16	0
Aug	25	25	0	25	25	0	20	20	0
Sep	28	28	0	28	28	0	16	16	0
Oct	28	28	0	28	28	0	16	16	0
Nov	28	28	0	28	28	0	16	16	0
Dec	28	28	0	28	28	0	16	15	1
TOTAL	357	357	0	357	357	0	202	199	3

5.3 Chemical Sampling and Testing as per Schedule 13, O. Reg. 170/03

5.3.1 Inorganics (Schedule 13, s. 13-2; Schedule 23)

Treated water samples are collected every 36 months (years) and analyzed for inorganics. The most recent samples for the Lakeshore Drinking Water System were collected on June 28, 2021 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23 (see **Table 16**). All parameters were found to be within compliance, however, the Arsenic level at Point Clark exceeded the Half-Maximum Allowable Concentration (half-MAC). Any half-MAC exceedance must be sampled on a quarterly basis to comply with O. Reg. 170/03, Schedule 13-5(1) - Increased frequency under s.s 13-2 and 13-4. Inorganics will be sampled and analyzed again in June 2024.

Table 16 - Inorganics (Schedule 13, s. 13-2; Schedule 23) Results

Parameter	Blairs Grove (µg/L)	Huronville South (µg/L)	Murdoch Glen (µg/L)	Point Clark (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Antimony	0.9 <MDL	0.9 <MDL	0.9 <MDL	0.9 <MDL	6	No
Arsenic	3.1	0.4	1.6	5.4	10	No
Barium	4.4	26.8	26.7	25.5	1000	No
Boron	161	180	157	72	5000	No
Cadmium	0.003 <MDL	0.003 <MDL	0.01	0.003 <MDL	5	No
Chromium	0.15	0.26	0.20	0.14	50	No
Mercury	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	1	No
Selenium	0.04 <MDL	0.04 <MDL	0.04 <MDL	0.04 <MDL	50	No
Uranium	0.47	0.313	1.43	0.548	20	No

*MDL = Laboratory Minimum Detection Limit

5.3.2 Organics (Schedule 13, s. 13-4; Schedule 24)

Treated water samples are collected every 36 months (3 years) and tested for Schedule 24 organic parameters. The most recent samples were collected on June 28, 2021. All parameters were found to be within compliance. Organics will be sampled and analyzed again in June 2024. Samples results can be found in **Table 17**.

Table 17 - Organics (Schedule 13, s. 13-4; Schedule 24) Results

Parameter	Blairs Grove (µg/L)	Huronville South (µg/L)	Murdoch Glen (µg/L)	Point Clark (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Benzene	0.32 <MDL	0.32 <MDL	0.32 <MDL	0.32 <MDL	1	No
Carbon Tetrachloride	0.17 <MDL	0.17 <MDL	0.17 <MDL	0.17 <MDL	2	No
1,2-Dichlorobenzene	0.41 <MDL	0.41 <MDL	0.41 <MDL	0.41 <MDL	200	No
1,4-Dichlorobenzene	0.36 <MDL	0.36 <MDL	0.36 <MDL	0.36 <MDL	5	No
1,1-Dichloroethylene	0.33 <MDL	0.33 <MDL	0.33 <MDL	0.33 <MDL	14	No
1,2-Dichloroethane	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	5	No
Dichloromethane	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	50	No
Monochlorobenzene	0.3 <MDL	0.3 <MDL	0.3 <MDL	0.3 <MDL	80	No
Tetrachloroethylene	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	10	No
Trichloroethylene	0.44 <MDL	0.44 <MDL	0.44 <MDL	0.44 <MDL	5	No
Vinyl Chloride	0.17 <MDL	0.17 <MDL	0.17 <MDL	0.17 <MDL	1	No
Diquat	1 <MDL	1 <MDL	1 <MDL	1 <MDL	70	No
Paraquat	1 <MDL	1 <MDL	1 <MDL	1 <MDL	10	No
Glyphosate	1 <MDL	1 <MDL	1 <MDL	1 <MDL	280	No
Polychlorinated Biphenyls	0.04 <MDL	0.04 <MDL	0.04 <MDL	0.04 <MDL	3	No
Benzo(a)pyrene	0.004 <MDL	0.004 <MDL	0.004 <MDL	0.004 <MDL	0.01	No

*MDL = Laboratory Minimum Detection Limit

Table 17 - Organics (Schedule 13, s. 13-4; Schedule 24) Results - Continued

Parameter	Blairs Grove (µg/L)	Huronville South (µg/L)	Murdoch Glen (µg/L)	Point Clark (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Alachlor	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	5	No
Atrazine+N-dealkylated metabolites	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	5	No
Atrazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	--	No
Desethyl Atrazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	--	No
Azinphos-methyl	0.05 <MDL	0.05 <MDL	0.05 <MDL	0.05 <MDL	20	No
Carbaryl	0.05 <MDL	0.05 <MDL	0.05 <MDL	0.05 <MDL	90	No
Carbofuran	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	90	No
Chlorpyrifos	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	90	No
Diazinon	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	20	No
Dimethoate	0.06 <MDL	0.06 <MDL	0.06 <MDL	0.06 <MDL	20	No
Diuron	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	150	No
Malathion	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	190	No
Metolachlor	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	50	No
Metribuzin	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	80	No
Phorate	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	2	No
Prometryne	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	1	No
Simazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	10	No
Terbufos	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	1	No
Triallate	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	230	No
Trifluralin	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	45	No
2,4-Dichlorophenoxyacetic acid	0.19 <MDL	0.19 <MDL	0.19 <MDL	0.19 <MDL	100	No
Bromoxynil	0.33 <MDL	0.33 <MDL	0.33 <MDL	0.33 <MDL	5	No
Dicamba	0.20 <MDL	0.20 <MDL	0.20 <MDL	0.20 <MDL	120	No
Diclofop-methyl	0.40 <MDL	0.40 <MDL	0.40 <MDL	0.40 <MDL	9	No
MCPA	0.00012 <MDL	0.00012 <MDL	0.00012 <MDL	0.00012 <MDL	0.1	No
Picloram	1 <MDL	1 <MDL	1 <MDL	1 <MDL	190	No
2,4-Dichlorophenol	0.15 <MDL	0.15 <MDL	0.15 <MDL	0.15 <MDL	900	No
2,4,6-Trichlorophenol	0.25 <MDL	0.25 <MDL	0.25 <MDL	0.25 <MDL	5	No
2,3,4,6-Tetrachlorophenol	0.20 <MDL	0.20 <MDL	0.20 <MDL	0.20 <MDL	100	No
Pentachlorophenol	0.15 <MDL	0.15 <MDL	0.15 <MDL	0.15 <MDL	60	No

*MDL = Laboratory Minimum Detection Limit

5.3.3 Trihalomethanes (Schedule 13, s. 13-6)

Distribution samples are taken every three months from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2022, samples were collected during the months of January, May, August, and November. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average (RAA). Refer to **Tables 18, 19, 20, and 21** for the summary of Trihalomethane results and **Table 26** for the RAA.

Table 18 - Trihalomethane (Schedule 13, s. 13-6) Results - BLAIRS GROVE

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)
Jan	13.0	4.7	< 0.34	5.5	3.0
May	12.0	4.2	< 0.34	5.4	2.4
Aug	13.0	4.5	< 0.34	6.2	2.7
Nov	18.0	6.0	0.47	7.6	3.6
Average	14.0	4.9	0.37	6.2	2.9
Maximum	18.0	6.0	0.47	7.6	3.6
MAC (µg/L)	100				
Exceedance	No				

Table 19 - Trihalomethane (Schedule 13, s. 13-6) Results - HURONVILLE SOUTH

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)
Jan	11.0	3.7	< 0.34	4.7	2.6
May	11.0	3.4	< 0.34	4.6	2.7
Aug	5.7	1.8	< 0.34	2.7	1.2
Nov	13.0	4.2	0.83	4.0	3.8
Average	10.2	3.3	0.46	4.0	2.6
Maximum	13.0	4.2	0.83	4.7	3.8
MAC (µg/L)	100				
Exceedance	No				

Table 20 - Trihalomethane (Schedule 13, s. 13-6) Results - MURDOCH GLEN

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)
Jan	12.0	4.4	0.42	3.9	3.7
May	12.0	4.0	0.61	3.7	3.5
Aug	12.0	4.1	0.52	3.9	3.4
Nov	18.0	6.3	0.81	5.9	5.3
Average	13.5	4.7	0.59	4.4	4.0
Maximum	18.0	6.3	0.81	5.9	5.3
MAC (µg/L)	100				
Exceedance	No				

Table 21 - Trihalomethane (Schedule 13, s. 13-6) Results - POINT CLARK

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)
Jan	9.5	3.4	< 0.34	4.0	2.2
May	13.0	4.6	< 0.34	6.2	2.8
Aug	9.4	3.1	< 0.34	4.4	1.9
Nov	18.0	5.8	0.38	8.2	3.5
Average	12.5	4.2	0.35	5.7	2.6
Maximum	18.0	5.8	0.38	8.2	3.5
MAC (µg/L)	100				
Exceedance	No				

5.3.4 Haloacetic Acids (Schedule 13, s. 13-6.1)

Ontario Regulation 170/03 has been amended to include quarterly testing for Haloacetic Acids (HAAs). Four (4) distribution samples are taken every three months from representative points in the distribution system and tested for Haloacetic Acids (HAAs). In 2022, samples were collected during the months of January, May, August, and November and results are expressed as a running annual average (RAA). Results are summarized in **Tables 22, 23, 24, and 25** and the RAA can be found in **Table 26**. HAAs do not apply to the Courtney Subdivision distribution system.

Table 22 - Haloacetic Acid (Schedule 13, s. 13-6.1) Results - BLAIRS GROVE

Month	Total HAAs (µg/L)	Bromoacetic acid (µg/L)	Chloroacetic acid (µg/L)	Dichloroacetic acid (µg/L)	Dibromoacetic acid (µg/L)	Trichloroacetic acid (µg/L)
Jan	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
May	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Aug	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Nov	<5.3	<2.9	<4.7	3.4	<2.0	<5.3
Avg	<5.3	<2.9	<4.7	2.8	<2.0	<5.3
Max	<5.3	<2.9	<4.7	3.4	<2.0	<5.3
MAC (µg/L)	80					
Exceedance	No					

Table 23 - Haloacetic Acid (Schedule 13, s. 13-6.1) Results - HURONVILLE SOUTH

Month	Total HAAs (µg/L)	Bromoacetic acid (µg/L)	Chloroacetic acid (µg/L)	Dichloroacetic acid (µg/L)	Dibromoacetic acid (µg/L)	Trichloroacetic acid (µg/L)
Jan	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
May	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Aug	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Nov	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Avg	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Max	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
MAC (µg/L)	80					
Exceedance	No					

Table 24 - Haloacetic Acid (Schedule 13, s. 13-6.1) Results - MURDOCH GLEN

Month	Total HAAs (µg/L)	Bromoacetic acid (µg/L)	Chloroacetic acid (µg/L)	Dichloroacetic acid (µg/L)	Dibromoacetic acid (µg/L)	Trichloroacetic acid (µg/L)
Jan	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
May	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Aug	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Nov	9.8	<2.9	<4.7	9.8	<2.0	<5.3
Avg	6.4	<2.9	<4.7	4.4	<2.0	<5.3
Max	9.8	<2.9	<4.7	9.8	<2.0	<5.3
MAC (µg/L)	80					
Exceedance	No					

Table 25 - Haloacetic Acid (Schedule 13, s. 13-6.1) Results - POINT CLARK

Month	Total HAAs (µg/L)	Bromoacetic acid (µg/L)	Chloroacetic acid (µg/L)	Dichloroacetic acid (µg/L)	Dibromoacetic acid (µg/L)	Trichloroacetic acid (µg/L)
Jan	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
May	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Aug	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Nov	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Avg	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
Max	<5.3	<2.9	<4.7	<2.6	<2.0	<5.3
MAC (µg/L)	80					
Exceedance	No					

Table 26 - THMs and HAAs - Rolling Annual Average Summary

Location	Sample Date	RAA - THMs (µg/L)	RAA - HAAs (µg/L)
BLAIRS GROVE	Jan	13.0	< 5.3
	May	12.5	< 5.3
	Aug	12.7	< 5.3
	Nov	14.0	< 5.3
HURONVILLE SOUTH	Jan	11.0	< 5.3
	May	11.0	< 5.3
	Aug	9.2	< 5.3
	Nov	10.2	< 5.3
MURDOCH GLEN	Jan	12.0	6.4
	May	12.0	6.4
	Aug	12.0	6.4
	Nov	13.5	< 5.3
POINT CLARK	Jan	9.5	< 5.3
	May	11.3	< 5.3
	Aug	10.6	< 5.3
	Nov	12.5	< 5.3
RAA		11.7	5.5
MAC		100 (RAA)	80 (RAA)

5.3.5 Nitrate and Nitrite (Schedule 12, s. 13-7)

Four treated water samples are taken every three months and tested for nitrate and nitrite. In 2022, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 10 mg/L for nitrates and 1 mg/L for nitrites. The results were found to be within compliance. Refer to **Tables 27, 28, 29, and 30**.

Table 27 - Nitrate and Nitrite (Schedule 13, s. 13-7) Results - BLAIRS GROVE

Month	Nitrite (mg/L)	Nitrate (mg/L)
Jan	< 0.003	< 0.006
May	0.006	< 0.006
Aug	< 0.003	< 0.006
Nov	< 0.003	< 0.006
Average	0.004	< 0.006
Maximum	0.006	< 0.006
MAC	1	10
Exceedance	No	No

Table 28 - Nitrate and Nitrite (Schedule 13, s. 13-7) Results - HURONVILLE SOUTH

Month	Nitrite (mg/L)	Nitrate (mg/L)
Jan	< 0.003	< 0.006
May	< 0.003	< 0.006
Aug	< 0.003	0.01
Nov	< 0.003	< 0.006
Average	< 0.003	0.007
Maximum	< 0.003	0.01
MAC	1	10
Exceedance	No	No

Table 29 - Nitrate and Nitrite (Schedule 13, s. 13-7) Results - MURDOCH GLEN

Month	Nitrite (mg/L)	Nitrate (mg/L)
Feb	< 0.003	< 0.006
May	< 0.003	< 0.006
Aug	< 0.003	< 0.006
Nov	< 0.003	< 0.006
Average	< 0.003	< 0.006
Maximum	< 0.003	< 0.006
MAC	1	10
Exceedance	No	No

Table 30 - Nitrate and Nitrite (Schedule 13, s. 13-7) Results - POINT CLARK

Month	Nitrite (mg/L)	Nitrate (mg/L)
Feb	< 0.003	< 0.006
May	< 0.003	< 0.006
Aug	< 0.003	< 0.006
Nov	< 0.003	< 0.006
Average	< 0.003	< 0.006
Maximum	< 0.003	< 0.006
MAC	1	10
Exceedance	No	No

5.3.6 Sodium (Schedule 13, s. 13-8)

One (1) water sample is collected from each of the four (4) Points of Entry (treated water) every 60 months (5 years) and analyzed for Sodium. The *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, PIBS 4449e01, June 2006*, states: “The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.” These samples were collected on July 27, 2021. All four (4) POE (TW) samples exceeded 20 mg/L and were reported to the Grey Bruce Health Unit and the Ministry’s Spills Action Centre (AWQI # 154967-154970). Results can be found in **Table 31**. The next sampling date for Sodium is due in July 2026.

5.3.7 Fluoride (Schedule 13, s. 13-9)

One (1) water sample is collected from each of the four (4) Points of Entry (treated water) every 60 months (5 years) and analyzed for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 1.5 mg/L. On September 6, 2022, samples were collected for this analysis. All four samples exceeded the MAC due to naturally occurring fluoride in the aquifers. These exceedances were reported to the Grey Bruce Health Unit and the Ministry’s Spills Action Centre (AWQI # 159912, 159913, 159914, and 159915). The results are summarized in **Table 31**. The next sampling date for Fluoride is due in September 2027.

Table 31 - Sodium (Schedule 13, s. 13-8) and Fluoride (Schedule 13, s. 13-9) Results

Location	Sodium		Fluoride	
	Sample Date: June 28, 2021		Sample Date: September 6, 2022	
	Result (mg/L)	Resample Result (mg/L)	Result (mg/L)	Resample Result (mg/L)
Blairs Grove	100	96.9	1.70	1.87
Huronville South	54.3	54.2	2.05	2.28
Murdoch Glen	63.2	62.6	2.09	2.05
Point Clark	21.8	25.3	2.05	2.19
MAC (mg/L)	20	20	1.50	1.50
Exceedance	Yes	Yes	Yes	Yes

5.3.8 Lead (Schedule 15.1) - (O. Reg. 170/03, s. 11 (6) (g))

Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken during two seasons: once between December 15 and April 15, and once between June 15 and October 15. In 2022, the Lakeshore Drinking Water System was sampled for lead, pH and alkalinity. Four (4) samples were collected on January 17, 2022 and four (4) were collected on July 4, 2022. Results for 2022 can be found in **Table 32**.

Table 32 - Lead Sampling Program (Schedule 15.1) Results

Season	Location	Alkalinity (mg/L)	pH	Lead (µg/L)
Dec-Apr (Jan 11)	Lakeshore	184	7.75	0.30
	Lakeshore	167	7.81	0.07
	Lakeshore	195	7.81	1.34
	Lakeshore	193	7.58	0.06
Jun-Oct (Jul 12)	Lakeshore	160	7.49	0.07
	Lakeshore	183	7.60	0.34
	Lakeshore	181	7.29	0.64
	Lakeshore	182	7.32	0.08
MAC (µg/L)		---	---	10
Exceedance		---	---	No

5.3.9 Non-Regulatory Testing - Aesthetic Objectives and Operational Guidelines (AO/OG)

Samples were collected from each of the four (4) Points of Entry (treated water) on November 21, 2016 and tested for parameters listed in the *MOECC Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, June 2006, PIBS 4449e01*. These results are included in **Table 33** for information purposes.

Table 33 - Aesthetic Objectives and Operational Guideline Results

Parameter	AO/OG	Blairs Grove	Huronville South	Murdoch Glen	Point Clark
pH	6.5 - 8.5	7.89	8.10	8.17	8.07
Alkalinity (mg/L as CaCO ₃)	30 - 500	174	156	171	190
Conductivity (µS/cm)	---	1,720	694	771	709
Colour (TCU)	5	3 < MDL	3 < MDL	3 < MDL	7
Total Dissolved Solids (mg/L)	500	1,350	494	511	534
Organic Nitrogen (mg/L)	0.15	0.05 < MDL	0.05 < MDL	0.05 < MDL	0.05 < MDL
Total Kjeldahl Nitrogen (mg/L)	---	0.05 < MDL	0.07	0.05 < MDL	0.05 < MDL
Ammonia + Ammonium (mg/L)	---	0.04 < MDL	0.04	0.07	0.05
Hydrogen Sulphide (mg/L)	0.05	< 0.006	< 0.006	< 0.006	< 0.006
Sulphide (mg/L)	0.05	0.006 < MDL	0.006 < MDL	0.006 < MDL	0.006 < MDL
Chloride (mg/L)	250	150	18	37	13
Sulphate (mg/L)	500	620	170	170	170
Hardness (mg/L as CaCO ₃)	80 - 100	765	237	246	308
Aluminum (µg/L)	100	25.5	1.0	2.8	3.3
Copper (µg/L)	1000	0.08	0.12	5.80	0.22
Iron (µg/L)	300	581	150	102	311

*MDL = Laboratory Minimum Detection Limit

Table 33 - Aesthetic Objectives and Operational Guideline Results

Parameter	AO/OG	Blairs Grove	Huronville South	Murdoch Glen	Point Clark
Manganese (µg/L)	50	3.70	2.02	3.07	4.11
Zinc (µg/L)	5000	2	4	20	4
Dissolved Organic Carbon (mg/L)	5	1 < MDL	1 < MDL	1 < MDL	1 < MDL
Methane (L/m³)	3	0.02 < MDL	0.02 < MDL	0.02 < MDL	0.02 < MDL
Ethylbenzene (µg/L)	2.4	0.33 < MDL	0.33 < MDL	0.33 < MDL	0.33 < MDL
Toluene (µg/L)	24	0.36 < MDL	0.36 < MDL	0.36 < MDL	0.36 < MDL
Xylene (µg/L)	300	0.43 < MDL	0.43 < MDL	0.43 < MDL	0.43 < MDL
m/p-xylene (µg/L)	---	0.43 < MDL	0.43 < MDL	0.43 < MDL	0.43 < MDL
o-xylene (µg/L)	---	0.17 < MDL	0.17 < MDL	0.17 < MDL	0.17 < MDL

*MDL = Laboratory Minimum Detection Limit

6.0 WATER AND CHEMICAL USE (O. Reg. 170/03, s. 11 (6) (a); Schedule 22-2 (3))

6.1 Chemical Usage (O. Reg. 170/03, s. 11 (6) (a))

In 2022, the total amount of 12% sodium hypochlorite (NaOCl) used to treat the water supplied by the five wells in the Lakeshore Drinking Water System is tabulated in **Table 34** with the average chlorine dosage. During the same period, the total amount of undiluted sodium silicate (Na₂SiO₃) for iron sequestering is tabulated in **Table 35** with the average silicate dosage.

Table 34 - Sodium Hypochlorite (12%) Usage

Month	BLAIRS GROVE		HURONVILLE SOUTH		MURDOCH GLEN		POINT CLARK	
	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	0.28	3.08	33.92	3.37	12.05	3.61	57.89	3.41
Feb	0.56	3.48	29.71	3.56	9.81	3.46	53.40	3.33
Mar	0.56	5.61	32.94	3.41	10.51	3.39	48.07	3.25
Apr	0.56	4.15	42.19	3.47	10.09	3.59	58.59	3.37
May	0.14	2.92	212.62	3.57	47.23	3.62	93.21	3.38
Jun	0.28	2.08	101.20	3.31	33.78	3.65	121.24	3.37
Jul	1.40	6.52	121.24	3.42	40.23	3.76	158.94	3.37
Aug	1.26	6.28	104.56	3.44	25.37	3.44	142.54	3.40
Sep	0.70	3.96	63.91	3.60	54.94	3.57	124.60	3.36
Oct	0.84	8.58	131.19	3.39	42.19	3.68	70.50	3.44
Nov	0.14	2.30	184.59	3.49	21.58	3.60	48.07	3.54
Dec	0.00	0.00	17.10	3.22	16.26	3.56	46.67	3.41
TOTAL	6.73	---	1,075.17	---	324.05	---	1,023.73	---
Average	---	4.45	---	3.44	---	3.58	---	3.39

Sodium Hypochlorite Grand Total Usage: 2,429.67 kg

Sodium Hypochlorite Average Dosage: 3.71 mg/L

Table 35 - Sodium Silicate Usage

Month	BLAIRS GROVE		HURONVILLE SOUTH		MURDOCH GLEN		POINT CLARK	
	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	0.80	8.76	15.55	1.54	16.35	4.90	48.24	2.84
Feb	0.40	2.48	15.55	1.86	13.16	4.64	45.45	2.84
Mar	0.40	3.99	16.74	1.74	13.95	4.50	41.86	2.83
Apr	0.80	5.91	21.93	1.81	12.36	4.40	49.44	2.84
May	0.00	0.00	112.03	1.88	70.97	5.44	77.34	2.81
Jun	1.20	8.83	52.23	1.71	50.63	5.47	99.67	2.77
Jul	0.80	3.71	39.47	1.11	63.39	5.92	132.36	2.81
Aug	0.80	3.97	34.29	1.13	42.66	5.79	124.79	2.98
Sep	0.40	2.25	19.14	1.08	80.14	5.21	112.43	3.03
Oct	0.40	4.07	35.48	0.92	56.21	4.90	61.80	3.02
Nov	0.40	6.54	43.46	0.82	29.10	4.85	39.07	2.88
Dec	0.00	0.00	7.18	1.35	20.33	4.45	40.27	2.94
TOTAL	6.38	---	413.04	---	469.25	---	872.72	---
Average	---	4.59	---	1.41	---	5.04	---	2.88

Sodium Silicate Grand Total Usage: 1,761.39 kg

Sodium Silicate Average Dosage: 3.48 mg/L

6.2 Summary of Flow Rates, Annual Volumes and Capacities (O. Reg. 170/03, Schedule 22-2 (3))

A summary of the water supplied to the distribution system in 2022 from each well supply is provided in **Tables 36, 37, 38, and 39**. The volumes reported for each well supply are taken from the SCADA continuous monitoring system, with the exception of Huronville, which was having issues with the SCADA RTU (scheduled for replacement in 2023). The volume readings reported here for Huronville South are taken from the on-site flow totalizer. All volumes are reported to the Ministry's Water Taking Reporting System (WTRS) portal. Flow meters were calibrated on June 20, 2022, however, calibration reports were not received for the following flow meters:

Blairs Grove:	Raw water flow meter
Huronville South:	Treated water flow meter
Murdoch Glen:	Treated water flow meter - Zone 2
Murdoch Glen:	Treated water flow meter - Zone 3

Table 36 - Flow Rates, Annual Volumes and Capacities - BLAIRS GROVE

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m³)	Raw Volume Daily Max (m³)	Raw Volume Monthly Avg (m³)	Capacity Monthly Max (%)
Jan	29.33	26.96	95.65	56.58	3.09	0.1%
Feb	29.09	25.62	155.41	16.53	5.55	0.2%
Mar	29.19	26.37	106.17	26.16	3.42	0.1%
Apr	29.18	27.33	123.01	15.38	4.10	0.2%
May	29.13	26.38	48.07	13.75	1.55	0.1%
Jun	28.99	26.04	135.98	52.58	4.53	0.2%
Jul	28.90	27.23	208.02	30.10	6.71	0.3%
Aug	28.70	26.86	210.12	29.00	6.78	0.3%
Sep	28.61	26.25	177.66	23.29	5.92	0.2%
Oct	28.62	26.66	88.59	18.12	2.86	0.1%
Nov	28.52	27.17	57.95	27.56	1.93	0.1%
Dec	32.74	32.74	0.16	0.08	0.01	0.0%
PTTW Max	30.33	30.33	79,722.08	2,621.00	---	---
Annual Max	32.74*	---	210.12	1,457.40	---	2.2%
Annual Avg	---	26.64	117.23	---	3.87	0.2%
Annual Total	---	---	1,406.79	---	---	---

*Exceedance was due to instantaneous spike (site was not in service).

Table 37 - Flow Rates, Annual Volumes and Capacities - HURONVILLE SOUTH

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m³)	Raw Volume Daily Max (m³)	Raw Volume Monthly Avg (m³)	Capacity Monthly Max (%)
Jan	6.86	2.08	10,072	477	324.9	8.7%
Feb	5.92	1.96	8,358	443	298.5	8.0%
Mar	10.79	2.13	9,649	430	311.3	8.4%
Apr	24.86	3.58	12,144	1,589	404.8	10.9%
May	28.82	16.70	59,563	3,588	1,921.4	51.5%
Jun	20.55	9.16	30,605	1,792	1,020.2	24.4%
Jul	19.78	10.29	35,421	1,907	1,142.6	30.7%
Aug	19.00	8.60	30,375	1,396	979.84	26.3%
Sep	20.43	5.78	17,733	1,982	591.1	15.9%
Oct	28.23	11.80	38,732	3,470	1,249.4	33.5%
Nov	28.65	16.23	52,841	3,319	1,761.4	47.3%
Dec	18.54	1.92	5,308	389	171.2	4.6%
PTTW Max	45.47	45.47	119,468.76	3,927.74	---	---
Annual Max	28.82	---	59,563	1,275.01	---	91.4%
Annual Avg	---	7.67	25,900	---	900.39	22.7%
Annual Total	---	---	310,801	---	---	---

Table 38 - Flow Rates, Annual Volumes and Capacities - MURDOCH GLEN

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m³)	Raw Volume Daily Max (m³)	Raw Volume Monthly Avg (m³)	Capacity Monthly Max (%)
Jan	22.14	17.03	3,303.82	137.04	106.57	5.9%
Feb	20.83	17.16	2,838.09	125.61	101.36	5.6%
Mar	20.86	16.99	3,117.54	117.60	100.57	5.5%
Apr	22.81	17.20	3,110.19	395.67	103.67	5.7%
May	18.83	16.51	12,838.51	908.20	414.15	22.8%
Jun	21.00	17.35	10,590.28	839.92	353.01	19.5%
Jul	21.08	15.78	10,781.49	505.48	347.79	19.2%
Aug	19.88	16.18	7,174.94	348.98	231.45	12.8%
Sep	23.00	18.75	15,660.83	1,252.79	522.03	28.8%
Oct	20.43	17.83	11,460.01	633.80	369.68	20.4%
Nov	20.12	19.19	5,904.63	308.90	196.82	10.8%
Dec	20.11	19.09	4,897.41	368.43	157.98	8.7%
PTTW Max	21.00	21.00	55,188.00	1,814.40	---	---
Annual Max	23.00*	---	15,660.83	1252.79	---	69.1%
Annual Avg	---	17.40	7,639.81	---	251.17	13.8%
Annual Total	---	---	91,677.74	---	---	---

*Exceedances were due to start up spikes (1 minute duration). A flow meter wiring problem occurred Jun 20 - 27. Volumes were estimated based on max flow for that period.

Table 39 - Flow Rates, Annual Volumes and Capacities - POINT CLARK

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m³)	Raw Volume Daily Max (m³)	Raw Volume Monthly Avg (m³)	Capacity Monthly Max (%)
Jan	34.32	31.58	15,722.08	669.60	507.16	15.5%
Feb	34.32	31.68	15,166.48	670.89	541.66	16.5%
Mar	34.56	31.51	13,919.82	578.70	449.03	13.7%
Apr	34.92	31.97	16,822.07	961.96	560.74	17.1%
May	35.67	32.11	26,020.41	1,324.07	839.37	25.6%
Jun	35.88	32.11	34,432.73	2,250.74	1,147.76	35.1%
Jul	34.61	31.70	45,109.94	2,103.16	1,455.16	44.5%
Aug	36.06	31.56	39,010.31	1,644.19	1,258.40	38.4%
Sep	34.41	31.45	34,550.75	2,087.83	1,151.69	35.2%
Oct	34.70	31.47	19,160.11	879.03	618.07	18.9%
Nov	41.20	27.57	12,782.43	783.55	426.08	13.0%
Dec	58.12	30.87	13,240.62	564.22	427.12	13.0%
PTTW Max	37.88	37.88	99,557.40	3,273.12	---	---
Annual Max	58.12*	---	45,109.94	2,250.74	---	68.8%
Annual Avg	---	31.30	23,828.15	---	783.39	23.9%
Annual Total	---	---	285,937.75	---	---	---

*Exceedances were due to start up spikes (1 minute duration).

6.3 System Capacity (O. Reg. 170/03, Schedule 22-2 (3) Continued)

The following is a comparison of the annual volumes to the rated capacity and flow rates approved in the systems' PTTW, DWWP and MDWL. The total system capacity represents the percentage capacity of the sum of all the water produced in relation to the total system volume permitted. A summary of the totals for all the well supplies is presented in **Table 40**. The visual representations of each well and the Lakeshore total capacity are presented in Figures 3 through 7.

Table 40 - Total Volumes of All Well Supplies

Location (Well Supply)	Total Volume for 2022 (m³)
Blairs Grove	1,406.79
Huronville South	310,801.00
Murdoch Glen	91,677.74
Point Clark	285,937.75
Total Rated Capacity, PTTW (m³)	4,247,234.90
Grand Total (all well supplies), Actual (m³)	689,823.28
Overall Operating Capacity, Actual %	16.2%

Blairs Grove - Capacity 2022

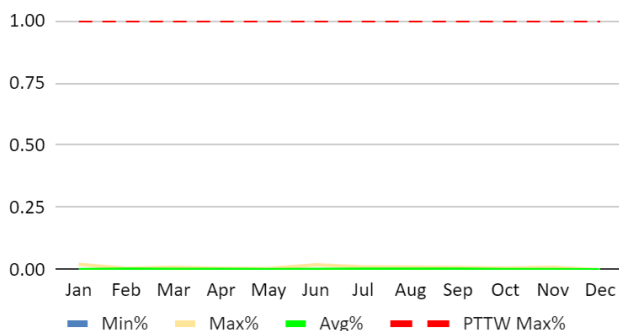


Figure 2

Huronville South - Capacity 2022

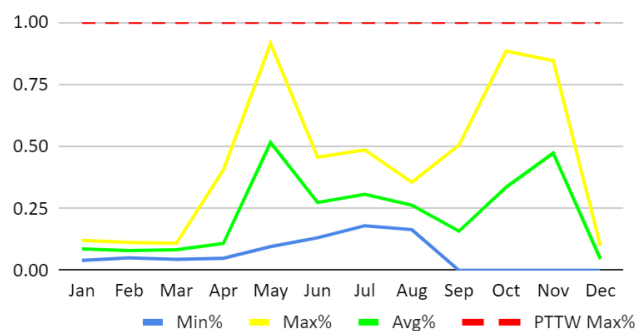


Figure 3

Murdoch Glen - Capacity 2022

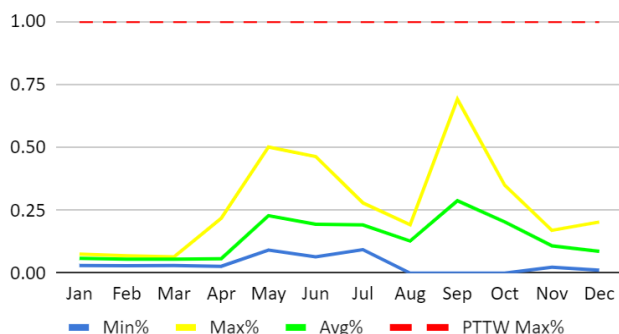


Figure 4

Point Clark - Capacity 2022

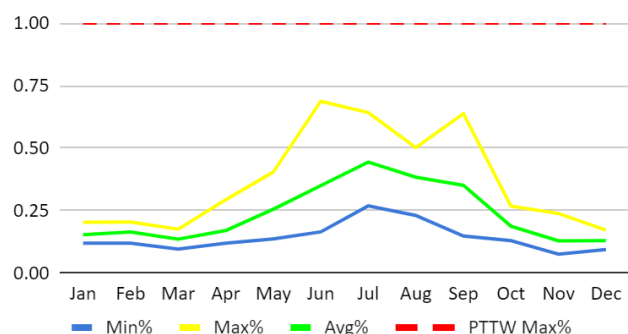


Figure 5

Lakeshore Capacity - 2022

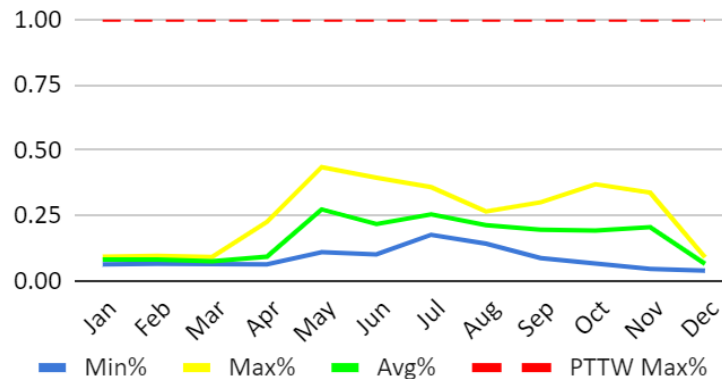


Figure 6

7.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE (s. 11 (6) (e))

The following summarizes water system improvements and routine and preventative maintenance for the Lakeshore Drinking Water System Supply:

All Sites / Distribution System:

Routine and preventative maintenance performed as per Jobs Plus schedule.
Flow meter calibrations completed.
Georgian Bay Fire and Safety inspections completed.
Semi-annual flushing completed.
Annual valve turning completed.
Backflow preventer testing completed.
Monthly health and safety inspections of each facility.

Blairs Grove:

January: Installed receptacle and heater for well head structure.
February: Abandonment of the old well.
March: Pumped well to waste after abandonment.
July: Replaced lights in the pumphouse.
Installed new Sensaphone 800 Autodialer.
September: Ministry inspection.
October: High lift pump failed - site offline for remainder of 2022

Huronville South:

April: Water supply to Kincardine (April 29 - May 19). Experiencing a lot of equipment control problems during this duration.

July: Installed new Sensaphone 800 Autodialer, repair to phone line.

August: Installed new Hach CL17SC analyzer with Hach SC4500 controller.

September: Ministry inspection.

October: Supplied water to Kincardine (Oct 17 - Nov 19). Experienced a lot of equipment control problems during this duration.

November: Continual equipment control issues. Replaced flow sensor.

December: High lift pump failed - site offline for remainder of 2022.

Murdoch Glen:

May: Electrical issues - electrician onsite.

August: Installed new Sensaphone 800 Autodialer.

September: Well inspection (down the hole video).

December: New contactor installed for High Lift Pump 4.

Point Clark:

January: Installed a new Sensaphone 800 Autodialer.

September: Ministry inspection.

November: Pump testing performed on Well 3.

December: Power outage - portable generator was used.

Courtney Subdivision:

September: Ministry inspection.

8.0 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS INSPECTIONS AND REGULATORY ISSUES (Schedule 22-2 (2))

- MECP Drinking Water Inspection was conducted on September 14, 2022 and awarded a rating of 100% (previous rating was 100%).
- A list of Capital Items for 2022 was submitted to the Township of Huron-Kinloss on November 28, 2022.
- DWQMS Management Review was conducted on May 25, 2022.
- DWQMS Internal Audit was conducted between September 9 - September 30, 2022.
- DWQMS External Audit (Re-accreditation) was conducted on July 21, 2022.
- DWQMS Complete Risk Assessment was not conducted in 2022 due to staffing issues.
- Emergency Response Exercise was conducted by the Township on June 8, 2022 but Veolia was not asked to participate.

9.0 REGULATORY CHANGES

- Proposed amendments to drinking water operator and water quality analyst certification regulations have been issued to address the impacts of emergencies. These include:
 - allowing the Ministry to act quickly to ensure the Province's drinking water is protected during an emergency
 - extending Operator certificates and allowing certain qualified but non-certified staff to temporarily maintain system operations, and would only be enacted during an emergency
 - allowing temporary relief from training and certification requirements

This proposal was registered with the Environmental Registry of Ontario and the consultation process closed on July 2, 2021. The outcome of this proposal can be found here:

<https://ero.ontario.ca/index.php/notice/019-3513>

- Updates to the Director's Directions for Operational Plans can be found here:
<https://www.ontario.ca/page/directors-directions-minimum-requirements-operational-plans>

10.0 WELL LEVELS (PTTW)

Each of the four sub-systems have a Permit To Take Water (PTTW), which dictates the capacity that each well is permitted to supply, as well as specific monitoring parameters. In addition to flow, static well levels are taken on a monthly basis to monitor the performance of the aquifer. **Table 41** provides a summary of the static well levels recorded in 2022. It should be noted that four (4) of the wells have static levels that are below grade. One of the wells, Blairs Grove, is a flowing artesian well that has a well level that is above grade and the well level is a calculation based on its corresponding pressure reading.

Table 41 - Static Well Levels (PTTW)

Month	Blairs Grove (above grade, m)	Huronville South (m)	Murdoch Glen (m)	Point Clark Well 2 (m)	Point Clark Well 3 (m)
Jan	2.64	10.05	9.26	5.48	9.14
Feb	2.46	10.05	9.35	4.26	7.92
Mar	2.64	10.05	9.31	4.57	7.62
Apr	2.82	10.05	9.10	4.57	7.62
May	2.81	10.97	9.78	10.97	7.31
Jun	2.60	10.97	9.30	8.84	7.92
Jul	2.11	9.75	10.00	8.53	7.31
Aug	2.11	10.05	10.15	7.31	8.53
Sep	2.17	10.36	9.85	6.40	8.53
Oct	2.11	10.97	10.54	6.70	8.23
Nov	1.76	12.19	10.78	7.01	4.65
Dec	1.76	10.05	9.78	7.01	7.92
Min	1.76	9.75	9.10	4.26	4.56
Max	2.82	12.19	10.78	10.97	9.14
Avg	2.33	10.46	9.77	6.80	7.73

11.0 SOURCE WATER PROTECTION (*Clean Water Act, 2006*)

A Drinking Water Source Protection Assessment (DWSPA) Report (Feb 2019) was generated for the Saugeen Valley Source Protection Area by the Conservation Authority Source Protection Office. This report identifies vulnerable areas, recharge areas, and potential threats to help protect existing and future sources of drinking water from contamination and overuse. This report can be found on-line at:

<http://home.waterprotection.ca/source-protection-plan/assessment-reports/saugeen-valley/>

The Well Head Protection Areas (WHPAs) within the Lakeshore Drinking Water System have 4 designations:

WHPA-A: 100 m radius around the well head

WHPA-B: 2-year time-of-travel capture zone

WHPA-C: 5-year time-of-travel capture zone

WHPA-D: 25-year time-of-travel capture zone

The Lakeshore wells are NOT classified as groundwater under direct influence of surface water (GUDI).

The DWSPA report states: “The WHPAs within the Township of Huron-Kinloss vary significantly in their vulnerability to contamination. A large percentage of the total area within the Blairs Grove, Murdoch Glen and Point Clark WHPAs has a low intrinsic vulnerability to contamination. Blairs Grove and Point Clark have low vulnerability in over 94% of their area. Huronville South has a slightly higher vulnerability to contamination and a larger portion of moderate vulnerability.” **Table 42** shows a summary of significant drinking water threats within the Lakeshore Drinking Water System.

Table 42 - Lakeshore WHPA: Summary of Significant Drinking Water Threats

WHPA A-D	Number of “are or would be significant” threats				Number of properties with “are or would be significant” threats			
	Chemical	DNAPL	Pathogen	Total	Agricultural	Residential	Others	Total
Blairs Grove	32	0	22	54	0	22	0	22
Huronville South	84*	0	2*	86	0	82	2**	84
Murdoch Glen	12	4	10	26	1	10	0	11
Point Clark	22	4	15	41	0	14	1	15

* One threat of the stated threats count is found in the Municipality of Kincardine.

** One property of the stated property count is found in the Municipality of Kincardine.

In conclusion, as stated in the DWSPA Report: “Based on available data and knowledge on raw water quality, no drinking water quality issues were identified for this water system that would result from ongoing or past activities. Also, no conditions resulting from past activities were identified within the WHPA.”

12.0 OBSERVATIONS AND HISTORICAL TRENDS

Raw Water Quality

- Microbiological: There were 9 positive microbiological test results in 2022.

Table 43 - 10-Year Historical Results - Microbiological:

Year	Well Source	Positive microbiological Result
2013	Point Clark Well # 2	1 Total Coliform (TC)
2015	Huronville South	4 TC
2015	Point Clark Well # 2	1 TC
2017	Huronville South	1 TC
2018	Blairs Grove	1 TC
2022	Huronville South Murdoch Glen Point Clark Well # 2 Point Clark Well # 3	1 TC, 1 TC 2 TC 1 TC 11 TC, 4 TC, 4 TC, 6 TC, 2 TC

Point Clark Well # 3 has been experiencing positive TC results after flow testing was completed. Further investigation will be required if positive TC results continue to occur.

- Raw Turbidity:

Table 44 - 10-Year Historical Results - Raw Turbidity

Well Source	10-Year Historical Average (2012 to 2021) (NTU)	2022 Average (NTU)	Comments
Blairs Grove	0.34* 2-year avg	0.31	This is a new well so historical data is not available before 2021.
Huronville South	0.21	0.20	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.
Murdoch Glen	0.23	0.20	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.
Point Clark Well # 2	0.23	0.19	The raw turbidity is slightly elevated from the 10-year historical average, but is still relatively low.. There is no concern at this time.
Point Clark Well # 3	0.21* 5-year avg	0.21	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time. (PC 3 was new in 2015).

Lakeshore - Historical Turbidity (NTU)

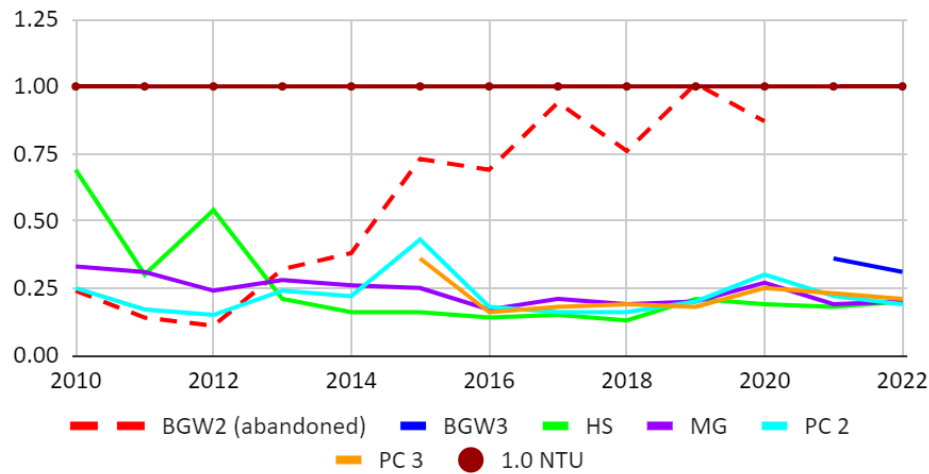


Figure 7

Treated Water Quality

- Chemical Parameters: Sodium and Fluoride are naturally occurring and are tested every 60 months. The results remain consistent since 2006.
 - **Fluoride:** All Lakeshore sites were sampled for Fluoride in 2022 and all the results (and subsequent resamples) were reported as exceedances. The next required sampling is due in 2027.
 - **Sodium:** All Lakeshore sites were sampled for Sodium in 2021 and are not due to be sampled again until 2026.

Table 45 - 10-Year Historical Results - Sodium and Fluoride

Year	Blairs Grove		Huronville South		Murdoch Glen		Point Clark	
	Sodium	Fluoride	Sodium	Fluoride	Sodium	Fluoride	Sodium	Fluoride
2006	98.0	2.01	43.9	2.07	43.7	2.06	17.9	2.12
2011	86.4	1.83	46.6	2.32	49.7	2.15	16.0	2.22
2016	101.0	1.71	52.7	2.19	68.4	2.12	19.8	2.04
2021	100	—	54.3	—	63.2	—	25.3	—
2022	—	1.70	—	2.05	—	2.09	—	2.05

- **Arsenic:** Point Clark: Arsenic is being monitored at Point Clark quarterly, since it is just above half of the maximum allowable concentration (MAC). The results remain consistent since 2008.

Table 46 - 10-Year Historical Results - Arsenic

Year	Arsenic (µg/L)
2012	5.2, 5.8
2013	5.5, 5.1
2014	5.9, 6.0
2015	5.5
2018	5.6, 5.3
2019	5.8, 5.6, 5.6, 5.0
2020	5.9, 5.6, 4.9, 4.7
2021	6.3, 5.3, 5.5, 5.4
2022	5.8, 6.1, 6.8, 6.7

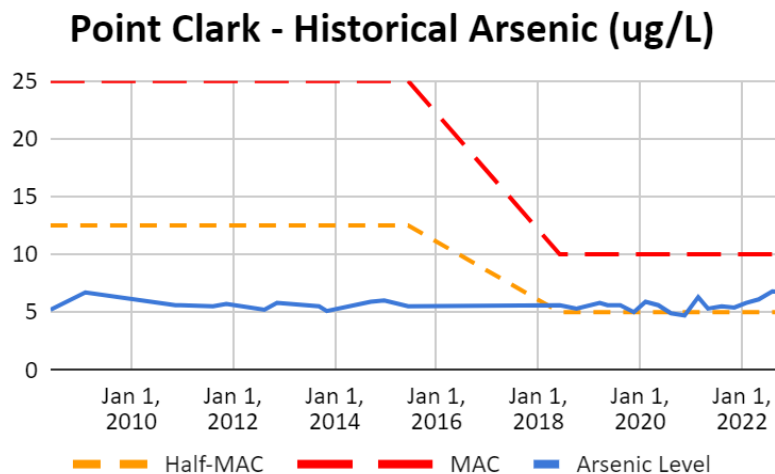


Figure 8

- **Well Levels:** Each Permit to Take Water (PTTW) requires static water levels to be taken monthly at each well. All levels have remained consistent since 2012.

Table 47 - 10-Year Historical Results - Well Levels

Well Source	10-Year Historical Average (2012 to 2021) (m)	2022 Average (m)	Comments
Blairs Grove	2.12 m above grade* 2-year avg	2.33 m above grade	This is a new well so historical data is not available before 2021.
Huronville South	10.61 m below grade	10.46 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Murdoch Glen	9.77 m below grade	9.34 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Point Clark Well # 2	6.80 m below grade	5.63 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Point Clark Well # 3	7.73 m below grade	8.03 m below grade	The well level has remained consistent based on the 5-year historical average. There is no concern at this time. (PC 3 was new in 2015).

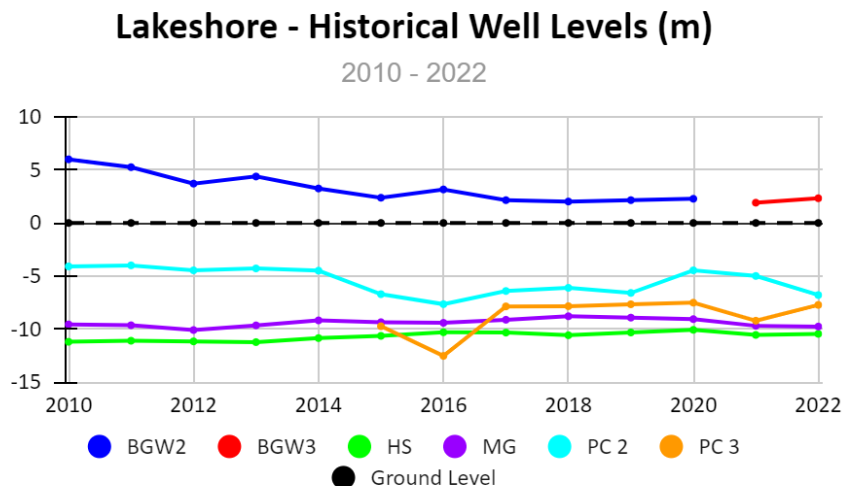


Figure 9

- Well Flows and Pump Performance: Well flow rates are monitored through the SCADA system. All sites continue to remain within capacity. Historical flows are shown in Figures 11 - 14. The historical capacities are shown in Figure 15.

Table 48 - 5-Year Historical Results - Average Flow and Capacity

Well Source	5-Year Historical Average (2017 to 2021)	2022 Average	Comments
Blairs Grove	Avg flow: 26.91 L/s* Capacity: 4.19%* 2-year avg	Avg flow: 26.64 L/s Capacity: 0.15%	This is a new well in 2021. This site was not used much in 2022.
Huronville South	Avg flow: 5.53 L/s Capacity: 12.80 %	Avg flow: 7.67 L/s Capacity: 16.06%	Flows are consistent based on the 5-year historical average. Huronville South was used to supply Kincardine on 2 occasions in 2022, which resulted in a higher average flow and capacity. There are no concerns at this time.
Murdoch Glen	Avg flow: 17.92 L/s Capacity: 6.58%	Avg flow: 17.40 L/s Capacity: 13.84%	Flows are consistent based on the 5-year historical average. While Huronville South was supplying Kincardine, Murdoch Glen was supplying both Zone 2 and Zone 3, which resulted in a higher capacity. There are no concerns at this time.
Point Clark Wells	Avg flow: 20.30 L/s Capacity: 35.08%	Avg flow: 31.30 L/s Capacity: 23.93%	The average flow has increased due to the new configuration of the well pump programming. The total volume pumped was much less in 2022, which is a result of a watermain repair in December 2021.

Blairs Grove - Historical Flow (L/s)

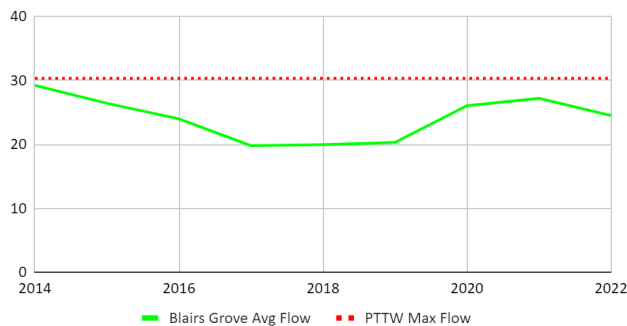


Figure 10

Huronville South - Historical Flow (L/s)

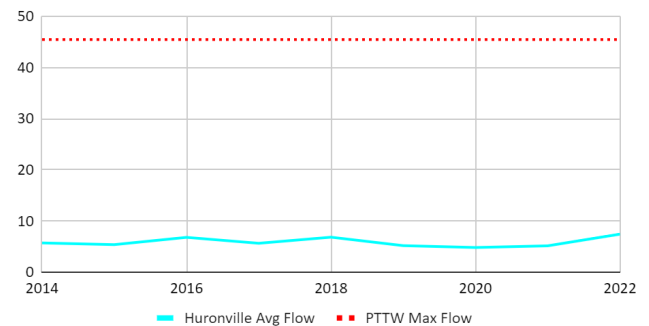


Figure 11

Murdoch Glen - Historical Flow (L/s)

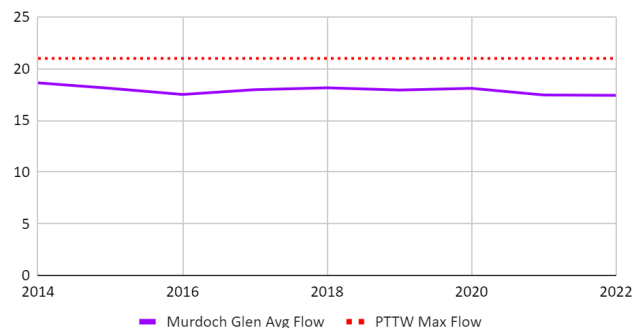


Figure 12

Point Clark - Historical Flow (L/s)

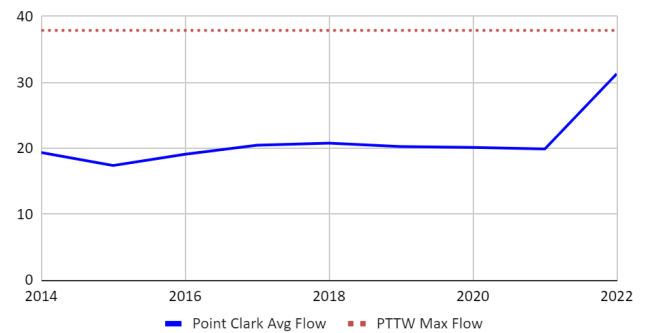


Figure 13

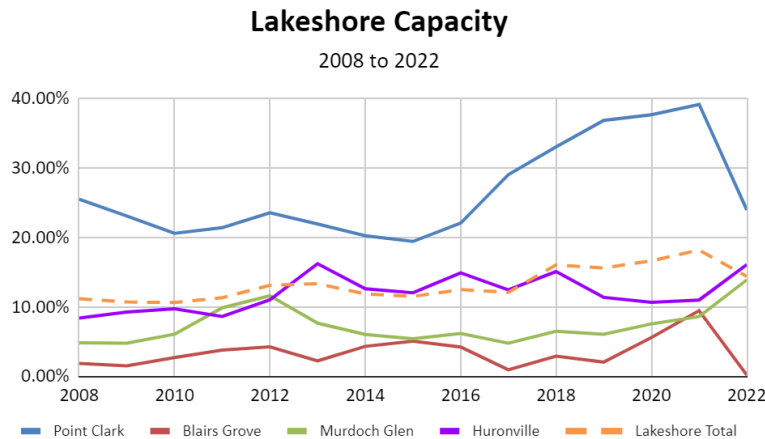


Figure 14

13.0 COURTNEY SUBDIVISION - SUMMARY OF DATA

13.1 Water Treatment Equipment, Operation and Monitoring

13.1.1 Distribution Free Chlorine Residuals (Grab Samples)

In 2022, a total of 52 distribution residuals were collected in conjunction with weekly microbiological sampling. A summary of all the residuals collected is presented in **Table 49**.

Table 49 - Average Distribution Free Chlorine Residuals - COURTNEY SUBDIVISION (ACW)

Month	Residual (mg/L)
Jan	1.47
Feb	1.58
Mar	1.39
Apr	1.44
May	1.55
Jun	1.62
Jul	1.61
Aug	1.53
Sep	1.46
Oct	1.42
Nov	1.58
Dec	1.63
CT REQUIREMENT	0.20
Annual Min	1.24
Annual Max	1.74
Annual Avg	1.53

13.1.2 Microbiological Results for Distribution System

Distribution samples are collected every week and tested for E. Coli (EC), Total Coliform (TC), and at least 25% of the samples are also analyzed for Heterotrophic Plate Count (HPC). Courtney Subdivision is regarded as part of the Lakeshore Drinking Water System as outlined in ACW Municipal By-Law 61-2014. Results are shown in **Table 50**.

Table 50 - Microbiological Results - Distribution - SOUTH LUCKNOW (ACW)

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples ≤ 10	# Samples > 10
Jan	5	5	0	5	5	0	2	2	0
Feb	4	4	0	4	4	0	3	3	0
Mar	4	4	0	4	4	0	1	1	0
Apr	4	4	0	4	4	0	1	1	0
May	5	5	0	5	5	0	1	1	0
Jun	4	4	0	4	4	0	1	1	0
Jul	4	4	0	4	4	0	1	1	0
Aug	5	5	0	5	5	0	0	–	0
Sep	4	4	0	4	4	0	0	–	0
Oct	5	5	0	5	5	0	1	1	0
Nov	4	4	0	4	4	0	1	1	0
Dec	4	4	0	4	4	0	1	1	0
TOTAL	52	52	0	52	52	0	13	13	0

13.2 Chemical Sampling and Testing as per Schedule 13, O. Reg. 170/03

13.2.1 Trihalomethane (Schedule 13, s. 13-6)

Distribution samples are taken quarterly (every 3 months) from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2022, samples were collected during the months of January, May, August, and November. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a Running Annual Average (RAA). Refer to **Table 51** for the summary of the THM results and RAA for the Courtney Subdivision samples.

Table 51 - Trihalomethane (Schedule 13, s. 13-6) - COURTNEY SUBDIVISION (ACW)

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)	RAA - THMs
Jan	8.1	2.8	< 0.34	3.5	1.9	8.1
May	6.7	2.2	< 0.34	2.9	1.6	7.4
Aug	6.2	2.0	< 0.34	2.8	1.4	7.0
Nov	8.9	3.0	< 0.34	3.7	2.2	7.5
Average	7.5	2.5	< 0.34	3.2	1.8	7.5
Maximum	8.9	3.0	< 0.34	3.7	2.2	8.1
MAC (µg/L)	100					100
Exceedance	No					No

13.2.2 Lead (Schedule 15.1) - O. Reg. 170/03, s. 11 (6) (g)

Schedule 15.1 of Ontario Regulation 170/03 requires that the samples be taken during two (2) seasons: once between December 15 and April 15, and once between June 15 and October 15. By-Law 60-2014 was amended in November 2015 to ensure that this lead sampling requirement is included in the Agreement between Ashfield-Colborne-Wawanosh and Huron-Kinloss. In 2022, samples were collected from Courtney Subdivision and analyzed for lead, pH, and alkalinity. These results are presented in **Table 52**.

Table 52 - Lead Sampling Program (Schedule 15.1) Results

Season	Location	Alkalinity	pH	Lead (µg/L)
Dec - Apr (Jan 17)	Courtney Subdivision (ACW)	187	7.61	0.62
Jun - Oct (Jul 4)	Courtney Subdivision (ACW)	182	7.36	0.51
MAC (µg/L)		–	–	10
Exceedance		–	–	No

13.3 Summary of Flow Rates, Annual Volumes and Capacities (O. Reg. 170/03, Schedule 22-2(3))

Water supplied to Courtney Subdivision is monitored by a flow meter located in an underground vault at the municipal boundary on Ashfield-Huron Road. There are approximately 141 properties supplied by this line. Another flow meter is located at the Amberley Store. These meters are viewed quarterly. A summary of the volumes is provided in **Table 53**. The historical usage for Courtney Subdivision is presented in **Figure 15**.

Table 53 - FLOW METER READINGS (ACW) - COURTNEY SUBDIVISION AND AMBERLEY STORE

Reading	ACW Boundary Meter	Amberley Store
Previous Quarter	91814.3	2043.776
1st Quarter	93955.8	2201.736
2nd Quarter	96157.7	2201.736
3rd Quarter	102048.4	2619.157
4th Quarter	102842	2773.616
TOTAL USED	11,027.7 m³	729.84 m³
GRAND TOTAL USED	11,757.54 m³	

Courtney Subdivision - Historical Usage, m3

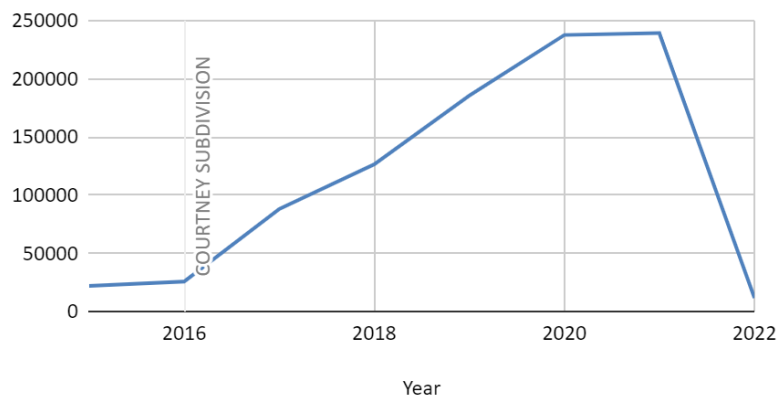


Figure 15

14.0 OTHER SYSTEM OCCURRENCES

Supply to Kincardine:

In 2022, there were two (2) occasions in which water was supplied to Kincardine to facilitate repairs to their reservoir. The first duration was April 29 - May 19, and the second duration was October 18 - November 19. During both occasions, the Huronville South pumphouse was isolated from the rest of the Lakeshore system and was used to supply Kincardine and the Inverlyn Estates subdivision. A summary of the water supplied is provided in **Table 55**.

Table 55 - Supply to Kincardine

Start Date	End Date	Number of Days	Total Volume Supplied
Apr 29, 2022	May 19, 2022	20	51,266 m3
Oct 17, 2022	Nov 18, 2022	32	85,384 m3
GRAND TOTAL SUPPLIED			136,650 m3