

Ripley Annual and Summary Report

For the 2020 Operating Year

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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 Ripley 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 Ripley Drinking Water System:

Legislative Framework for the Ripley Drinking Water System

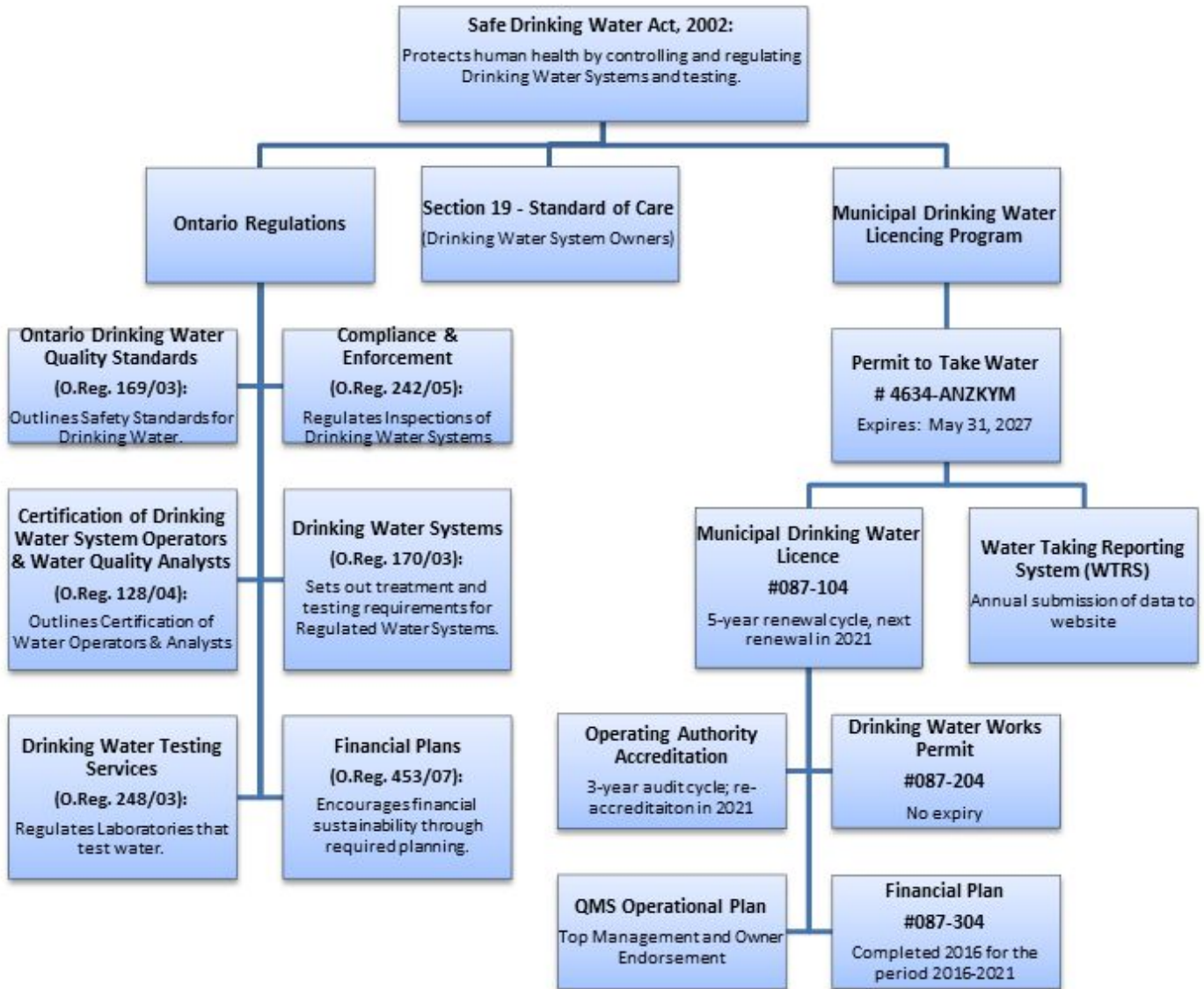


Figure 1

2.0 REPORTING REQUIREMENTS:

This report intends to provide relevant information to help the Township of Huron-Kinloss, its Council, as Owners of the Ripley 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
- 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 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 Licencing 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.

The Township of Huron-Kinloss is approved by the MECP to operate a Class 2 Distribution and Supply System through its MDWL # 087-104, and to alter the system through it DWWP # 087-204.

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 Ripley Drinking Water System description is outlined below:

Drinking Water System Number:	220002636
Drinking Water System Name:	Ripley 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 2
Drinking Water System Certificate No.:	1849
Daily Maximum Water Supply Capacity:	4,266 m ³
Disinfection Chemicals:	Sodium Hypochlorite, 12%
Population:	918
Total Number of Service Connections:	355
Estimated Seasonal Population:	923 (based on Census data of 2.6 persons per household)
Average Day Demand:	342.16 m ³
Peak Day Demand:	924.13 m ³ (April 7, 2020)
Average Capacity:	8.02%
Peak Capacity:	21.66%
Distribution Network:	4 km
Fire Hydrants:	30
Blow-offs:	4

The Ripley Drinking Water Distribution and Supply Subsystem (RDWDSS) is characterized as a “secure groundwater system”. It consists of two sub-systems (four wells), that deliver potable water to the Village of Ripley.

The two sub-systems are: Ripley Pumphouse (PH) and Ripley Elevated Tank (ET). Both of these sites are located within the Village of Ripley. The 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 two sub-systems are detailed as follows:

Site: Ripley Pumphouse - 74 Huron Street

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 2 (Well # 1 - 1947; Well # 2 - 1994)
- Depth of Wells: 84.4 m; 85.3 m
- Well Pumps: 7.5 hp; 15 hp (submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, contact watermain (1.0 BF)
- High Lift Pumps: 2 (25 hp each)
- Reservoir: 53 m³
- Permit To Take Water: 4634-ANZKYM, expires May 31, 2027

Site: Ripley Elevated Tank - 93C Huron Street

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 2 (#3, 2012, 10-inch; #4, 2011, 8-inch)
- Depth of Well: 89.9 m, 89.9 m
- Well Pumps: 2 (30 hp each, submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, 85 m x 600 mm \varnothing contact watermain (1.0 BF)
- Elevated Tank: 1,465 m³ total usable storage volume (636 m³ fire storage volume)
- Permit To Take Water: 4634-ANZKYM, expires May 31, 2027

The RDWDSS currently (December 2020) has a 4 km distribution network with a combination of cast iron and PVC water mains, in sizes varying between 4-inch and 6-inch diameter.

All the Ripley 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°C), turbidity is low, and the water is relatively hard. The raw water is also relatively **high in naturally-occurring sodium, and fluoride**, but the lead content of the raw water is well below the half-MAC (Maximum Allowable Concentration). Those who are supplied from the RDWDSS are made aware of the various concentrations in their drinking water by numerous means of communication from the Township of Huron-Kinloss.

A 250 kW diesel generator, located at the Ripley Fire Hall, adjacent to the Ripley Pumphouse, includes a 2,273 L capacity fuel storage tank and is used for emergency power supply. An Elevated Tank and is constructed of bolted steel (2019). The 42 m (138 ft) high Elevated Tank has a total usable storage volume of approximately 1,465 m³ to supply the Village of Ripley. Periodic inspections of the Elevated Tank (exterior and interior) are conducted. The next inspection is due in 2022. The wells located at the Ripley Elevated Tank site (Well # 3 and Well # 4), were officially put into service in August 2020. A 200 kW diesel generator, located behind the Ripley-Huron Community Centre, adjacent to the Elevated Tank site, includes a 1,423 L capacity fuel storage tank and is used for emergency power supply for the Community Centre as well as the Elevated Tank Water Supply.

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

- There was one Adverse Water Quality Incident (AWQI #151411) in the RDWDSS: One Arsenic sample from the Ripley Pumphouse Treated Water was in exceedance (16.3 $\mu\text{g/L}$) of O. Reg. 169/03 maximum allowable concentration (10 $\mu\text{g/L}$). A resample was collected and was below the half-MAC (4.0 $\mu\text{g/L}$).

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 - 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
E. Coli (EC) Total Coliform (TC) Heterotrophic Plate Count (HPC)	For testing presence of microbiological activity	96/year (Dist) 52/year (Raw) 52/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)
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	reduced sampling in effect for 2020	O. Reg. 170/03, Sch. 15; MDWL #087-104, 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 2020, a total of 366 treated water grab samples from the Ripley Pumphouse were collected and analyzed for free chlorine residual at the point of entry (POE) using a Hach pocket chlorine colorimeter. A total of 70 treated water grab samples from the Ripley Elevated Tank site were collected and analyzed in the same manner. **Table 2** shows the grab samples monthly average of free chlorine residual values and 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 2020, a total of 422 distribution residuals were collected: 366 daily grab residuals and an additional 60 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**.

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

Month	Ripley Pumphouse (Grab)	Ripley Pumphouse (SCADA)	Ripley Elevated Tank (Grab)	Ripley Elevated Tank (SCADA)	Distribution (Grab)
Jan	1.68	1.71	1.57	1.83	1.54
Feb	1.69	1.71	1.68	1.49	1.49
Mar	1.66	1.68	1.58	1.50	1.39
Apr	1.68	1.71	1.46	1.44	1.42
May	1.64	1.65	1.44	1.46	1.43
Jun	1.52	1.54	1.48	1.38	1.35
Jul	1.59	1.58	1.57	1.40	1.38
Aug	1.53	1.56	1.73	1.46	1.40
Sep	1.53	1.54	1.81	1.54	1.40
Oct	1.61	1.65	1.88	1.57	1.52
Nov	1.66	1.68	1.97	1.47	1.59
Dec	1.68	1.71	2.03	1.55	1.55
CT Requirement	0.50	0.50	0.50	0.50	0.20
Annual Min	1.26	1.41	1.23	1.10	0.77
Annual Max	1.87	1.85	2.18	2.59	1.87
Annual Avg	1.62	1.64	1.68	1.51	1.45
# Samples	366	Continuous	70	Continuous	422

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 3** provides a summary of raw and treated water turbidity results.

Table 3 - Raw and Treated Water Turbidity Results

Month	Ripley Well # 1	Ripley Well # 2	Ripley Pumphouse Treated	Ripley Well # 3	Ripley Well # 4	Ripley Elevated Tank Treated
Jan	0.13	0.21	0.25	0.18	0.18	0.23
Feb	0.21	0.20	0.30	0.26	0.17	0.22
Mar	0.17	0.15	0.36	0.19	0.16	0.24
Apr	0.17	0.18	0.28	0.17	0.17	0.18
May	0.16	0.19	0.25	0.12	0.17	0.20
Jun	0.13	0.16	0.32	0.14	0.15	0.18
Jul	0.15	0.18	0.47	0.14	0.12	0.20
Aug	0.14	0.19	0.43	0.18	0.14	0.21
Sep	0.16	0.21	0.41	0.23	0.20	0.35
Oct	0.25	0.26	0.36	0.25	0.23	0.33
Nov	0.35	0.36	0.35	0.35	0.34	0.38
Dec	0.30	0.31	0.33	0.33	0.33	0.31
Annual Min	0.10	0.11	0.25	0.08	0.09	0.12
Annual Max	0.37	0.39	0.52	0.44	0.38	0.45
Annual Avg	0.19	0.21	0.35	0.21	0.19	0.23
# Samples	47	47	34	51	51	72

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

5.2.1 Raw Water Samples

Raw water samples are collected every week. In 2020, a total of 216 samples were collected and analyzed for E. Coli and Total Coliform. **Tables 4, 5, 6 and 7** provide a summary of microbiological results performed on each raw water source.

Table 4 - Microbiological Results for Raw Water - Well # 1

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

Table 5 - Microbiological Results for Raw Water - Well # 2

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

Table 6 - Microbiological Results for Raw Water - Well # 3

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	6	3	3	6	6	0
Feb	4	4	0	4	4	0
Mar	5	4	1	5	5	0
Apr	4	4	0	4	4	0
May	4	4	0	4	4	0
Jun	5	4	1	5	5	0
Jul	4	4	0	4	4	0
Aug	4	4	0	4	4	0
Sep	6	4	2	6	5	1
Oct	4	3	1	4	4	0
Nov	5	3	2	5	4	1
Dec	5	4	1	5	5	0
TOTAL	56	45	11	56	54	2

Jan 7: 1 TC; Jan 14: 3 TC; Jan 28: 1 TC
 Mar 10: 4 TC
 Jun 16: 1 TC
 Sep 15: 11 TC, 1 EC; Sep 22: 1 TC
 Oct 27: 2 TC
 Nov 10: 4 TC, 1 EC
 Dec 15: 1 TC

Table 7 - Microbiological Results for Raw Water - Well # 4

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	6	5	1	6	6	0
Feb	4	4	0	4	4	0
Mar	5	4	1	5	5	0
Apr	4	4	0	4	4	0
May	4	4	0	4	4	0
Jun	5	4	1	5	5	0
Jul	4	4	0	4	4	0
Aug	4	4	0	4	4	0
Sep	6	5	1	6	5	1
Oct	4	3	1	4	4	0
Nov	5	2	3	5	5	0
Dec	5	2	3	5	5	0
TOTAL	56	45	11	56	45	11

Jan 14: 2 TC
 Mar 10: 2 TC
 Jun 16: 2 TC
 Sep 15: 7 TC, 1 EC
 Oct 27: 3 TC
 Nov 3: 4 TC; Nov 10: 1 TC; Nov 24: 1 TC
 Dec 1: 1 TC; Dec 8: 1 TC; Dec 15: 1 TC

5.2.2 Treated Water (Point of Entry) Samples

One (1) treated water sample from the point of entry is taken every week and analyzed for E. Coli, Total Coliform, and Heterotrophic Plate Count (HPC). In 2020, a total of 52 treated water samples from the Ripley Pumphouse were collected and analyzed for the above parameters. A total of 86 treated water samples from the Ripley Elevated Tank were collected and analyzed for TC and EC, and 24 were analyzed for HPC. Each EC and TC result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 - 10 cfu/100 mL.

It should be noted that the Elevated Tank site was brought on-line on August 5, 2020. At that time, the first HPC analysis was missed. **Tables 8 and 9** provide a summary of all microbiological results performed on treated water.

Table 8 - Microbiological Results for Treated Water (Point of Entry) - Ripley Pumphouse

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	4	4	0	4	4	0	4	3	1
Feb	4	4	0	4	4	0	4	3	1
Mar	5	5	0	5	5	0	5	0	5
Apr	4	4	0	4	4	0	4	4	0
May	4	4	0	4	4	0	4	4	0
Jun	5	5	0	5	5	0	5	5	0
Jul	4	4	0	4	4	0	4	4	0
Aug	4	4	0	4	4	0	4	4	0
Sep	5	5	0	5	5	0	5	3	2
Oct	4	4	0	4	4	0	4	3	1
Nov	4	4	0	4	4	0	4	4	0
Dec	5	5	0	5	5	0	5	0	5
TOTAL	52	52	0	52	52	0	52	37	15

Table 9 - Microbiological Results for Treated Water (Point of Entry) - Ripley Elevated Tank

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	10	10	0	10	10	0	4	4	0
Feb	8	8	0	8	8	0	0	--	--
Mar	10	10	0	10	10	0	0	--	--
Apr	8	8	0	8	8	0	0	--	--
May	8	8	0	8	8	0	0	--	--
Jun	10	10	0	10	10	0	0	--	--
Jul	8	8	0	8	8	0	0	--	--
Aug	5	5	0	5	5	0	2	2	0
Sep	5	5	0	5	5	0	5	3	2
Oct	4	4	0	4	4	0	4	2	2
Nov	5	5	0	5	5	0	4	2	2
Dec	5	5	0	5	5	0	5	0	5
TOTAL	86	86	0	86	86	0	24	13	11

Note: RET was off-line until August 5, 2020.

NON-COMPLIANCE: In August, when the site was brought on-line, the very first Treated Water HPC sample was missed.

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 2020, a total of 104 distribution samples were collected and analyzed for TC and EC, which is above the required number of samples (n=96, based on 918 residents). A total of 52 distribution samples were analyzed for HPC (n=24, 25% of 96). Each TC and EC result from the distribution water was 0 cfu/100 mL. The range of HPC results were 0 - 10 cfu/100 mL. **Table 10** provides a summary of all microbiological samples taken in the distribution system.

Table 10 - Microbiological Results for Distribution System

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples 1 - 10
Jan	8	8	0	8	8	0	4	2	2
Feb	8	8	0	8	8	0	4	3	1
Mar	10	10	0	10	10	0	5	4	1
Apr	8	8	0	8	8	0	4	3	1
May	8	8	0	8	8	0	4	4	0
Jun	10	10	0	10	10	0	5	3	2
Jul	8	8	0	8	8	0	4	2	2
Aug	8	8	0	8	8	0	4	4	0
Sep	10	10	0	10	10	0	5	2	3
Oct	8	8	0	8	8	0	4	2	2
Nov	8	8	0	8	8	0	4	4	0
Dec	10	10	0	10	10	0	5	0	5
TOTAL	104	104	0	104	104	0	52	33	19

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 and analyzed for inorganics. The most recent samples for the Ripley DWS were collected on June 4, 2018 at the Ripley Pumphouse and submitted to the laboratory for analysis of inorganics as listed in Schedule 23 (see **Table 11**). All parameters were found to be within compliance, however, the Arsenic level 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.

NON-COMPLIANCE: In 2020, the May Arsenic sampling was missed with the normal quarterly sampling, so it was not collected within the 60 - 120 days between the samples (161 days).

ADVERSE: In 2020, one Arsenic sample was in exceedance of the O. Reg. 169/03 maximum allowable concentration. **Table 25** (Section 7.1 - Regulatory Changes, Arsenic Results) provides a summary of the increased Arsenic sampling.

Inorganics will be sampled and analyzed again in June 2021.

Table 11 - Inorganics (Schedule 13, s. 13-2; Schedule 23) Results

Parameter	Ripley Pumphouse (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Antimony	0.12	6	No
Arsenic	6.7	10	No
Barium	73.3	1000	No
Boron	131	5000	No
Cadmium	0.021	5	No
Chromium	0.08	50	No
Mercury	0.01<MDL	1	No
Selenium	0.40	50	No
Uranium	5.06	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 and tested for Schedule 24 organic parameters. The most recent samples were collected on June 4, 2018. All parameters were found to be within compliance. Organics will be sampled and analyzed again in June 2021. Samples results can be found in **Table 12**.

Table 12 - Organics (Schedule 13, s. 13-4; Schedule 24) Results

Parameter	Ripley Pumphouse (µg/L)	Maximum Allowable Concentration (µg/L)	Aesthetic Objective / Operational Guideline (µg/L)	Exceedance
Benzene	0.32<MDL	1	--	No
Carbon Tetrachloride	0.16<MDL	2	--	No
1,2-Dichlorobenzene	0.41<MDL	200	3	No
1,4-Dichlorobenzene	0.36<MDL	5	1	No
1,1-Dichloroethylene	0.33<MDL	14	--	No
1,2-Dichloroethane	0.35<MDL	5	--	No
Dichloromethane	0.35<MDL	50	--	No
Monochlorobenzene	0.3<MDL	80	30	No
Tetrachloroethylene	0.35MDL	10	--	No
Trichloroethylene	0.44<MDL	5	--	No
Vinyl Chloride	0.17<MDL	1	--	No

*MDL = Laboratory Minimum Detection Limit

Table 12 - Organics (Schedule 13, s. 13-4; Schedule 24) Results - Continued

Parameter	Ripley Pumphouse (µg/L)	Maximum Allowable Concentration (µg/L)	Aesthetic Objective / Operational Guideline (µg/L)	Exceedance
Diquat	1<MDL	70	--	No
Paraquat	1<MDL	10	--	No
Glyphosate	1<MDL	280	--	No
Polychlorinated Biphenyls	0.04<MDL	3	--	No
Benzo(a)pyrene	0.004<MDL	0.01	--	No
Alachlor	0.02<MDL	5	--	No
Atrazine+N-dealkylated metabolites	0.01<MDL	5	--	No
Atrazine	0.01<MDL	--	--	No
Desethyl Atrazine	0.01<MDL	--	--	No
Azinphos-methyl	0.05<MDL	20	--	No
Carbaryl	0.05<MDL	90	--	No
Carbofuran	0.01<MDL	90	--	No
Chlorpyrifos	0.02<MDL	90	--	No
Diazinon	0.02<MDL	20	--	No
Dimethoate	0.03<MDL	20	--	No
Diuron	0.03<MDL	150	--	No
Malathion	0.02<MDL	190	--	No
Metolachlor	0.01<MDL	50	--	No
Metribuzin	0.02<MDL	80	--	No
Phorate	0.01<MDL	2	--	No
Prometryne	0.03<MDL	1	--	No
Simazine	0.01<MDL	10	--	No
Terbufos	0.01<MDL	1	--	No
Triallate	0.01<MDL	230	--	No
Trifluralin	0.02<MDL	45	--	No
2,4-Dichlorophenoxyacetic acid	0.19<MDL	100	--	No
Bromoxynil	0.33<MDL	5	--	No
Dicamba	0.20<MDL	120	--	No
Diclofop-methyl	0.40<MDL	9	--	No
MCPA	0.00012<MDL	0.1	--	No
Picloram	1<MDL	190	--	No
2,4-Dichlorophenol	0.15<MDL	900	0.3	No
2,4,6-Trichlorophenol	0.25<MDL	5	2	No
2,3,4,6-Tetrachlorophenol	0.20<MDL	100	1	No
Pentachlorophenol	0.15<MDL	60	30	No

*MDL = Laboratory Minimum Detection Limit

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

One distribution sample is collected every three months from a representative point in the distribution system and tested for Trihalomethanes (THMs). In 2020, 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 100 µg/L for this parameter and it is expressed as a running annual average (RAA). Refer to **Table 13** for the summary of Trihalomethane results and the RAA.

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

Month	THMs (µg/L)	Bromodichloro methane (µg/L)	Bromoform (µg/L)	Chloroform (µg/L)	Dibromochloro methane (µg/L)
Feb	5.4	1.80	<0.34	2.6	1.0
May	10.0	3.2	<0.34	5.7	1.4
Aug	13.0	4.0	<0.34	6.9	1.8
Nov	9.4	3.1	<0.34	5.0	1.4
RAA	9.5	3.03	<0.34	5.1	1.4
Maximum	13.0	4.0	<0.34	6.9	1.8
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). One distribution sample is collected every three months from a representative point in the distribution system and tested for Haloacetic Acids (HAAs). In 2020, samples were collected during the months of February, May, August, and November and results are expressed as a running annual average (RAA). Results and RAA are summarized in **Table 14**.

Table 14 - Haloacetic Acid (Schedule 13, s. 13-6.1) Results

Month	Total HAAs (µg/L)	Bromo acetic acid (µg/L)	Chloro acetic acid (µg/L)	Dichloro acetic acid (µg/L)	Dibromo acetic acid (µg/L)	Trichloro acetic acid (µg/L)
Feb	<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
RAA	<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	---	---	---	---	---

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

Treated water samples are collected every three months and tested for nitrate and nitrite. In 2020, 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 **Table 15**.

Table 15 - Nitrate and Nitrite (Schedule 13, s. 13-7) Results

Month	RIPLEY PUMPHOUSE		RIPLEY ELEVATED TANK	
	Nitrite (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)
Feb	<0.003	0.095	<0.003	1.096
May	<0.003	0.112	<0.003	0.503
Aug	<0.003	0.147	<0.003	0.299
Nov	<0.003	0.093	<0.003	0.603
Average	<0.003	0.112	<0.003	0.683
Maximum	<0.003	0.147	<0.003	1.300
MAC (mg/L)	1	10	1	10
Exceedance	No	No	No	No

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

One (1) water sample is collected from the Point of Entry (treated water) every 60 months 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.” This sample was collected on June 21, 2016. The Sodium result exceeded 20 mg/L and was reported to the Grey Bruce Health Unit and the Ministry’s Spills Action Centre (AWQI # 129989). Results can be found in **Table 16**. The next sampling date for Sodium will be on or before June 21, 2021.

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

One (1) water sample is collected from the Point of Entry (treated water) every 60 months and analyzed for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 1.5 mg/L. On August 15, 2017, a sample was collected for this analysis. The fluoride result exceeded the MAC due to naturally occurring fluoride in the aquifers. This exceedance was reported to the Grey Bruce Health Unit and the Ministry’s Spills Action Centre (AWQI # 135640). The results are summarized in **Table 16**. The next sampling date for Fluoride will be on or before August 15, 2022.

It should be noted that the Ripley Elevated Tank Point of Entry (treated water) was not tested for Sodium or Fluoride in 2020. These parameters will be tested in 2021. Results in **Table 16** for this site are from the original Raw Water Quality testing on December 14, 2011 and May 2, 2012.

Table 16 - Sodium (Schedule 13, s. 13-8) and Fluoride (Schedule 13, s. 13-9) Results

Location	Sodium	Fluoride
	Result (mg/L)	Result (mg/L)
Ripley Pumphouse Treated Water	30.8	2.10
Ripley Elevated Tank	26.0	2.10
MAC (mg/L)	20	1.50
Exceedance	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. The Ripley Drinking Water System is currently under a reduced sampling program for lead where lead, pH and alkalinity are sampled in each season every 36 months (3 years). In the interim, pH and alkalinity are tested during each sampling season. Two (2) were collected on January 27, 2020 and two (2) samples were collected on July 13, 2020. These parameters are required to be sampled and analyzed again between the months of December 2020 and April 2021, and again between June and October 2021. Lead samples are required next in the 2023 sampling season. Results for 2020 can be found in **Table 17**.

Table 17 - Lead Sampling Program (Schedule 15.1) Results

Season	Alkalinity (mg/L)	pH	Lead (µg/L)
Dec-Apr	2.08	7.73	0.33
	2.04	7.75	0.03
Jun-Oct	200	7.19	0.17
	202	7.21	0.03
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 18** for information purposes.

Table 18 - Aesthetic Objectives and Operational Guideline Results

Parameter	AO/OG	Ripley Pumphouse Treated
pH	6.5 - 8.5	7.86
Alkalinity (mg/L as CaCO ₃)	30 - 500	204
Colour (TCU)	5	3 <MDL
Total Dissolved Solids (mg/L)	500	377
Organic Nitrogen (mg/L)	0.15	0.05 <MDL
Total Kjeldahl Nitrogen (mg/L)	---	0.05 <MDL
Ammonia + Ammonium (mg/L)	---	0.07
Hydrogen Sulphide (mg/L)	0.05	0.006 <MDL
Sulphide (mg/L)	0.05	0.006 <MDL
Chloride (mg/L)	250	21
Sulphate (mg/L)	500	83
Hardness (mg/L as CaCO ₃)	80 - 100	212
Aluminum (µg/L)	100	1.3
Copper (µg/L)	1000	1.65
Iron (µg/L)	300	197
Manganese (µg/L)	50	16.3
Zinc (µg/L)	5000	34
Dissolved Organic Carbon (mg/L)	5	1 <MDL
Methane (L/m ³)	3	0.02 <MDL
Ethylbenzene (µg/L)	2.4	0.33 <MDL
Toluene (µg/L)	24	0.36 <MDL
Xylene (µg/L)	300	0.43 <MDL
m/p-xylene (µg/L)	---	0.43 <MDL
o-xylene (µg/L)	---	0.17 <MDL

*NOTE: AO/OG - aesthetic objective / operational guideline
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 2020, the total amount of 12% sodium hypochlorite (NaOCl) used to treat the water that was provided to the distribution system is tabulated in **Table 19** with the average chlorine dosage.

Table 19 - Sodium Hypochlorite Usage

Month	Ripley Pumphouse Treated Water		Ripley Elevated Tank Treated Water	
	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	29.85	3.05	2.24	3.95
Feb	29.15	3.06	1.96	7.84
Mar	27.75	2.97	2.52	4.75
Apr	24.25	3.06	1.82	2.82
May	29.99	2.95	1.82	2.81
Jun	36.02	3.34	1.54	2.68
Jul	43.59	3.21	1.68	3.37
Aug	21.30	3.26	14.72	5.00
Sep	8.97	3.32	26.63	3.12
Oct	9.39	3.16	22.15	3.80
Nov	14.02	3.17	11.49	2.41
Dec	7.01	3.00	23.13	3.26
TOTAL	281.30	---	111.71	---
Average	---	3.13	---	3.82

Sodium Hypochlorite Grand Total Usage: 393.01 kg

Sodium Hypochlorite Average Dosage: 3.47 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 2020 from each well supply is provided in **Tables 20, 21, 22, and 23**. The volumes reported for the Ripley well supply are taken from the SCADA continuous monitoring system. The flow meter was verified on the following date:

Ripley Pumphouse:	Raw water flow meter	June 30, 2020
Ripley Elevated Tank:	Raw Well # 3 flow meter	June 30, 2020
Ripley Elevated Tank:	Raw Well # 4 flow meter	June 30, 2020

NOTE: The company that performed the annual verifications did not follow the manufacturer's instructions for testing at three different flow rates within the operating range of the meter, but rather they measured the operational flow using a magnetic clamp-on device. This was identified as a Non-Compliance during the MECP Drinking Water Inspection. When contacted, the Flow Meter Manufacturer (Sensus) did not have a procedure for verifying the mechanical flow meters used at the Ripley Pumphouse, as it is deemed obsolete. Due to the COVID-19 Pandemic, we were unable to arrange for another flow meter company to perform the retest of the meter verifications. This testing will be conducted in 2021 as COVID restrictions are lifted.

Table 20 - Flow Rates, Annual Volumes, and Capacities - Ripley Pumphouse

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Capacity Monthly Max (%)
Jan	18.89	17.10	9,926.14	699.10	320.20	80.91
Feb	30.55	17.77	10,190.26	809.15	351.39	93.65
Mar	20.25	18.16	8,753.68	699.93	282.38	81.01
Apr	20.29	18.25	8,644.76	783.20	288.16	90.65
May	20.89	17.90	10,254.69	786.58	330.80	91.04
Jun	20.41	17.94	11,201.80	785.44	373.39	90.91
Jul	20.58	18.47	13,394.67	818.00	432.09	94.68
Aug	20.40	17.97	6,506.27	633.04	209.88	73.27
Sep	21.88	17.85	3,249.41	648.66	108.31	75.08
Oct	20.40	18.33	2,558.45	660.71	82.53	76.47
Nov	20.94	18.30	4,426.20	727.11	147.54	84.16
Dec	20.28	17.71	2,362.14	629.97	76.20	72.91
PTTW Max	30.30	30.30	26,352.00	864.00	---	---
Annual Max	30.55	---	13,394.67	818.00	---	94.68
Annual Avg	---	17.98	7,622.37	---	357.41	28.93
Annual Total	---	---	91,468.47	---	---	---

* NOTE: The flow exceedance in February was a false peak at pump start up.

Table 21 - Flow Rates, Annual Volumes, and Capacities - Ripley Elevated Tank - Well # 3

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Capacity Monthly Max (%)
Jan	22.28	21.68	50.99	50.99	1.65	2.53
Feb	24.42	21.47	331.29	76.01	11.42	3.77
Mar	23.08	21.70	280.38	68.68	9.04	3.41
Apr	21.78	21.39	345.78	108.08	11.53	5.36
May	21.93	21.25	322.35	104.67	10.40	5.19
Jun	21.63	21.29	285.29	75.29	9.51	3.73
Jul	39.20	21.32	261.63	79.31	8.44	3.93
Aug	21.59	20.01	2,005.64	602.58	64.70	29.89
Sep	22.65	15.58	2,271.72	608.28	75.72	30.17
Oct	22.79	19.32	2,645.19	699.73	85.33	34.71
Nov	21.99	20.37	1,506.03	564.61	50.20	28.01
Dec	22.13	19.45	2,141.07	595.50	69.07	29.54
PTTW Max	23.33	23.33	61,488.00	2,016	---	---
Annual Max	39.20	---	2,645.19	699.73	---	34.71
Annual Avg	---	20.40	1,037.28	---	33.92	1.69
Annual Total	---	---	12,447.36	---	---	---

* NOTE: Well 3 was put into service on August 5, 2020. The flow exceedances in February and July were false peaks at pump start up.

Table 22 - Flow Rates, Annual Volumes, and Capacities - Ripley Elevated Tank - Well # 4

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Raw Max Hours Daily Runtime (h)	Capacity Monthly Max (%)
Jan	22.38	21.54	577.45	209.37	18.63	2.70	15.11
Feb	22.40	20.75	250.39	57.63	8.63	0.90	4.16
Mar	27.92	21.07	250.39	55.05	8.08	0.70	3.97
Apr	21.69	21.22	301.92	86.90	10.06	1.20	6.27
May	21.93	20.82	343.55	127.06	11.08	1.60	9.17
Jun	21.51	21.25	291.82	71.92	9.73	0.90	5.19
Jul	21.45	21.01	237.33	77.47	7.66	1.00	5.59
Aug	22.33	20.73	2,036.53	493.56	65.69	6.40	35.61
Sep	22.84	21.55	5,248.97	624.92	174.97	8.10	45.09
Oct	22.74	21.48	4,746.85	627.94	153.12	8.20	45.31
Nov	27.10	21.73	2,925.27	652.61	97.51	8.30	47.09
Dec	23.04	21.90	4,281.52	595.35	138.11	7.50	42.95
PTTW Max	23.33	23.33	42,273.00	1,386.00	---	17.0	---
Annual Max	27.92	---	5,248.97	652.61	---	8.30	47.09
Annual Avg	---	21.25	1,791.00	---	58.61	---	4.22
Annual Total	---	---	21,491.99	---	---	---	---

* NOTE: Well 4 was put into service on August 5, 2020. The flow exceedances in March and November were false peaks at pump start up.

Table 23 - Flow Rates, Annual Volumes and Capacities - RIPLEY WELLS COMBINED (1, 2, 3 and 4)

Month	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Capacity Monthly Max (%)
Jan	10,554.58	722.99	340.47	16.95
Feb	10,771.86	852.95	371.44	19.99
Mar	9,284.34	713.93	299.49	16.74
Apr	9,292.31	924.13	309.74	21.66
May	10,695.80	827.09	345.03	19.39
Jun	11,778.92	815.86	392.63	19.12
Jul	13,893.64	880.48	448.18	20.64
Aug	10,548.43	639.89	340.27	15.00
Sep	10,770.10	648.66	359.00	15.21
Oct	9,950.50	699.73	320.98	16.40
Nov	8,857.50	748.82	295.25	17.55
Dec	8,784.73	629.97	283.38	14.77
PTTW Max	130,113.00	4,266.00	---	---
Annual Max	13,893.64	924.13	---	21.66
Annual Avg	10,431.89	---	342.16	8.02
Annual Total	125,182.71	---	---	---

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 24**. The visual representations of each well and the Ripley total capacity is presented in Figures 2, 3, 4 and 5.

Table 24 - Total Volumes of All Well Supplies

Location (Well Supply)	Total Volume for 2020 (m ³)
Ripley Pumphouse (Well #1 and #2)	91,486.47
Ripley Elevated Tank (Well #3)	12,447.36
Ripley Elevated Tank (Well # 4)	21,491.99
Total Annual Rated Capacity, PTTW (m³)	1,561,356.00*
Grand Total Water Taking (m ³)	125,182.71
Overall Operating Capacity, Actual %	8.02%

*Calculated based on 366 days (leap year)

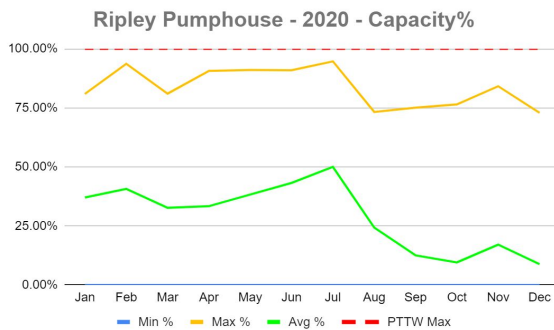


Figure 2

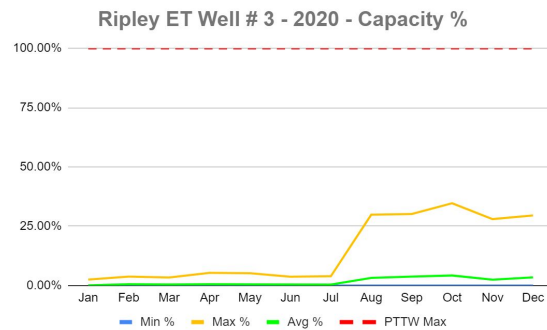


Figure 3

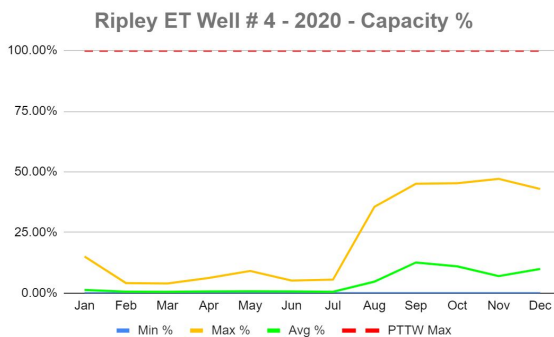


Figure 4

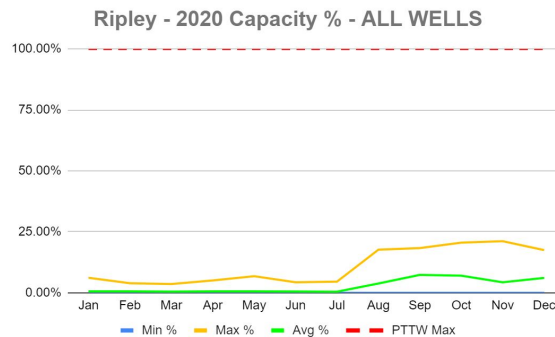


Figure 5

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 Ripley Drinking Water System Supply:

Ripley Drinking Water System:

Routine and preventative maintenance performed as per Jobs Plus schedule.
Flow meter calibrations completed.
Georgian Bay Fire and Safety inspections completed.
Sommers Generators on-site for annual servicing.
Semi-annual flushing and annual valve turning completed.
Backflow preventer testing completed.

Ripley Pumphouse:

January: Repair to sump pump.
February: Repair to unit heater.
Replace HLP1 check valve.
Retubing of chlorine analyzer.
Replace leaking fitting on HLP2 gauge.
Watermain break on McGill Street - 4-inch cast iron ring shear.
August: Arsenic exceedance on August 17, 2020 - (Treated Water: 16.3 µg/L)
September: Watermain repair on William St.

Ripley Elevated Tank:

January: Chlorine pump set up (RET offline).
Controls and engineering set up (RET offline).
February: Site Acceptance Testing (RET offline; BM Ross, Landmark, Eramosa onsite).
August: RET online on August 5, 2020.

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

- MECP Drinking Water Inspection was conducted on October 15, 2020 and awarded a rating of 98.14% (previous rating was 98.42%).
- A list of Capital Items for 2021 was submitted to the Township of Huron-Kinloss on November 1, 2020.
- DWQMS Management Review was conducted on June 3, 2020.
- DWQMS Internal Audit was conducted between May 8 - 11, 2020.
- DWQMS External Audit (off-site) was conducted on May 26, 2020.
- DWQMS Complete Risk Assessment was conducted on October 29, 2020.
- Emergency Response Exercise was not required in 2020 due to the State of Emergency declaration regarding the COVID-19 Pandemic.

9.0 REGULATORY CHANGES

Changes to Ontario Regulation 170/03 and Ontario Regulation 169/03 that strengthen standards and clarify testing requirements, new sampling and testing parameters, reporting and resampling requirements, and the removal of the 13 pesticides came into effect January 1, 2016. Updates to the standards and reporting requirements for Arsenic came into effect January 1, 2018. In 2020, the following amendment was added:

- Effective **January 1, 2020**, a standard for HAAs is introduced. The standard is 0.08 mg/L (80 µg/L) and must be expressed as a Running Annual Average (RAA).

9.1 Arsenic Sampling

In January 2018, O. Reg. 169/03 - Ontario Drinking Water Quality Standard for Arsenic was changed to 0.010 mg/L from 0.025 mg/L, making the new Half-MAC (Maximum Allowable Concentration) 0.005 mg/L. The Ripley Pumphouse supply has had some Arsenic levels in exceedance of the Half-MAC and therefore, this site must be sampled on a quarterly basis to satisfy O. Reg. 170/03, Schedule 13-5(1) - Increased frequency under s.s 13-2 and 13-4. See **Table 25** for Ripley Arsenic results.

It should be noted that the May quarterly sample was missed and was reported as a Non-Compliance. One quarterly sample was in exceedance of the MAC and was reported as an Adverse (AWQI # 151411).

Table 25 - Arsenic Results

Sample Date	Arsenic Concentration (µg/L)
Feb 10, 2020	4.2
Jul 20, 2020	5.2
Aug 10, 2020	16.3
Aug 18, 2020	4.0
Nov 16, 2020	4.1
MAC (µg/L)	10
Exceedance	Yes

NOTE:

O. Reg. 170/03, Schedule 13: Increased frequency under s.s 13-2 and 13-4

*13-5. (1) If a test result obtained under section 13-2 or 13-4 for a parameter exceeds half of the standard prescribed for the parameter in Schedule 2 to the Ontario Water Quality Standards, the frequency of sampling and testing for that parameter under that section shall be **increased** so that at least one sample is taken and tested **every three months**.*

10.0 WELL LEVELS (PTTW)

The Permit To Take Water (PTTW) 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 at the Ripley Pumphouse (Well 1 and Well 2) to monitor the performance of the aquifer. The well levels at the Ripley Elevated Tank site are continuously monitored, therefore the monthly average of the minimum levels are reported (i.e highest recovered level below grade). **Table 26** provides a summary of the static well levels recorded in 2020.

Table 26 - Static Well Levels (PTTW)

Month	Ripley Pumphouse Well 1 (m)	Ripley Pumphouse Well 2 (m)	Ripley Elevated Tank Well 3 Minimum level (m)	Ripley Elevated Tank Well 4 Minimum level (m)
Jan	16.46	18.59	19.53	18.12
Feb	16.46	16.45	18.12	16.63
Mar	16.46	14.63	19.02	17.75
Apr	18.89	14.78	15.92	16.54
May	17.37	15.55	11.49	13.05
Jun	17.67	15.40	10.60	12.04
Jul	18.59	16.78	9.00	10.19
Aug	17.67	17.25	8.16	9.02
Sep	17.67	16.78	8.89	9.62
Oct	17.37	17.23	8.90	9.70
Nov	14.63	15.94	10.73	11.85
Dec	14.93	16.10	11.92	13.21
Min	14.63	14.63	8.16	9.02
Max	18.89	18.59	19.53	18.12
Avg	17.01	16.29	12.69	13.14
# Readings	12	12	Continuous	Continuous

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

A Drinking Water Source Protection Assessment (DWSPA) Report 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/wp-content/uploads/2018/12/SVSPA_Ch4_2017_Clean.pdf

The Well Head Protection Areas (WHPAs) within the Ripley 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 Ripley wells are NOT classified as groundwater under direct influence of surface water (GUDI).

The DWSPA report states: “A WHPA for the Ripley System was first developed as part of the Grey Bruce Groundwater Study (WHI, 2003). The initial WHPA was updated using the existing groundwater model for the area, in order to account for revised pumping rates as part of the Round 1 Technical Study for the Saugeen Grey Sauble Northern Bruce Peninsula Source Protection Region (CRA, 2007). The WHPA for Well Nos. 3 and 4 was developed after the Township decided to increase capacity by drilling new wells. The groundwater study and delineations were completed by Matrix Solutions Inc. in 2016.”

This report also states: “ The intrinsic susceptibility index for the Ripley WHPA is low to moderate due to the approximately 30 metres of low permeability overburden overlying the bedrock aquifer, which provides natural protection to the aquifer. Review of the water well records confirms the presence of approximately 30 m of low permeable overburden (e.g., clay, hardpan) throughout the area. There are 88 significant drinking water threats in the Ripley (Well Nos. 1, 2, 3 and 4) wellhead protection area A-D. These threats include 28 activities related to contamination with hazardous chemicals and 60 activities related to DNAPLs. The total number of properties with threats is 69, of which 29 are residential, 30 are agricultural and 9 are other land uses.” **Table 27** summarizes the significant threats identified.

Table 27 - Ripley 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
WHPA A-D	28	60	0	88	29	31	9	69

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.”

11.1 Source Water Protection - Municipal Drinking Water Licence Requirements

The Municipal Drinking Water Licence (MDWL) has stipulations regarding the fuel storage for the standby generator located in the Fire Hall adjacent to the Ripley Pumphouse since it is in the WHPA and is considered to be a significant drinking water threat. The fuel tank is below grade and contains 2,273 L of diesel fuel. These stipulations from Schedule C, Sec. 6, Table 8 are:

6.0 Source Protection

Table 8: Fuel Oil Systems in Source Protection Areas Considered a Significant Drinking Water Threat

Storage Location	Storage Location Description of Fuel	Protection Plan & Effective Date	Source Protection Area
74 Huron Street, Ripley NAD 83: Zone 17 0453640 m Em 4879808 m N	Below Grade Storage Tank Capacity: 2,273 L Diesel	Saugeen Valley Grey Sauble Northern Bruce Peninsula, July 1, 2016	Saugeen Valley

- 6.1** The owner shall implement risk management measures for the fuel oil systems identified in Table 8, that ensure fuel is appropriately stored and managed to protect the raw water source of supply for the drinking water system or subsystem. The measures shall include the following:
- 6.1.1** The storage tank(s) associated with the fuel oil systems shall be inspected on or before June 15, 2018 and at least once every twelve months thereafter, or more frequently as recommended by the manufacturer or required by the Technical Standards and Safety Act (TSSA) (2000, and applicable regulations, codes and standards).

- 6.1.2 *The inspection required by condition 6.1.1 shall be performed by a person certified for that purpose under the TSSA and shall include, at a minimum,*
- A. *Visual inspection of the fuel oil tank, tubing, and piping for leaks:*
 - a. *where the tank is below grade (underground), visible components of the tank should be inspected, including the fill pipe and vent;*
 - B. *Visual inspection of any grade-level secondary containment;*
 - C. *Inspection of any equipment installed to monitor or measure fuel levels;*
 - D. *Inspection of any cut-off or control valves and associated equipment;*
 - E. *Visual inspection of any fuel pumps and/or sumps and testing of such devices for proper operation;*
 - F. *Inspection of any installed corrosion protection systems;*
 - G. *Testing for water at the bottom of storage tanks that are not bottom outlet tanks; and*
 - H. *Inspection of any installed electronic or mechanical leak-detection equipment.*
- 6.1.3 *A record of the inspections performed in accordance with condition 6.1.1 and a record of any associated repairs, maintenance or upgrades shall be kept on-site and available for review by Ministry staff.*
- 6.1.4 *Spill or leak detection and spill response procedures shall be incorporated into the Operations and Maintenance Manual required under condition 16 of this licence.*
- 6.2 *The owner shall undertake alterations and/or develop operating procedures as appropriate to ensure that the storage and handling of fuel is adequately managed to protect the source of drinking water.*

11.2 Source Water Protection - Risk Management Plan Requirements

A Risk Management Plan for the Handling and Storage of Dense Non-Aqueous Phase Liquids (DNAPLs) and the Storage of Fuel has been agreed to under the authority of the Risk Management Official appointed for the Township of Huron-Kinloss. This Risk Management Plan was developed in accordance with the *Clean Water Act, 2006*, Section 58, O. Reg. 287/07 and the Saugeen Valley Source Protection Plan.

This document states: *“Note that the generator is considered an “appliance” and, therefore, does not fall under Section 14 of the CAN/CSA-B139-00 Installation Code for Oil Burning Equipment and does not require an annual inspection of the storage tank.”*

The generator is tested regularly for functionality and the spill containment area around the fuel storage tank is checked visually during each test. These tests are documented as required by the Risk Management Plan and the MDWL.

NOTE: The 2020 MECP Drinking Water Inspection Report has issued the following Non-Compliance:

1. **Measures were not in place to protect the groundwater and/or GUDI source in accordance with any the Municipal Drinking Water Licence and Drinking Water Works Permit issued under Part V of the SDWA.**
 - Insufficient fuel tank inspection

Action(s) Required:

By March 1, 2021, the owner will provide the author of this report documentation that the Ripley DWS fuel storage tank has been inspected as per MDWL 087-104, Issue 3, Schedule C Condition 6.

Sommers Generators has been contacted to arrange for a TSSA fuel tank inspection in 2021.

12.0 OBSERVATIONS AND HISTORICAL TRENDS

Raw Water Quality

- Microbiological:
 - Ripley Pumphouse: There were no positive microbiological test results in 2020.

Table 28 - 10-Year Historical results:

Year	Well Source	Positive microbiological Result
2009 - 2019	Ripley Well # 1	None
2009 - 2019	Ripley Well # 2	None

There are no concerns regarding the Ripley Pumphouse wells at this time.

- Microbiological:
 - Ripley Elevated Tank: There is no historical data for Well # 3 or Well # 4. There were several positive results for Total Coliform in 2020, as well as 3 positive results for E. Coli.

Table 29 - 2020 Summary of Positive TC and EC Results

Date	Ripley Elevated Tank Well # 3		Ripley Elevated Tank Well # 4	
	Total Coliform	E. Coli	Total Coliform	E. Coli
Jan 7	1	0	0	0
Jan 14	3	0	2	0
Jan 28	1	0	0	0
Mar 10	4	0	2	0
Jun 16	1	0	2	0
Sep 15	11	1	7	1
Sep 22	1	0	0	0
Oct 27	2	0	3	0
Nov 3	5	0	4	0
Nov 10	4	1	1	0
Nov 24	0	0	1	0
Dec 1	0	0	1	0
Dec 8	0	0	1	0
Dec 15	1	0	1	0

RECOMMENDATIONS:

In 2020, the increased frequency of Total Coliforms in both wells illuminates the need for investigation of the well heads or internal wellhouse piping.

12.0 OBSERVATIONS AND HISTORICAL TRENDS - Continued

- Chemical Parameters:
 - Ripley Pumphouse: There was one exceedance for Arsenic in 2020, and historically, Sodium and Fluoride are always in exceedance. Sodium and Fluoride are tested every 60 months and were not required in 2020. These parameters will be sampled again in 2021.
 - Ripley Elevated Tank: It should be noted that Sodium and Fluoride samples were not collected from the Ripley Elevated Tank site in 2020. They will be sampled in 2021.

Table 30 - 10-Year Historical results:

Year	Ripley Pumphouse		
	Sodium	Fluoride	Arsenic
2009	--	1.92	5.7
2010	--	2.13, 2.24	5.0, 4.8, 5.0
2011	23.9	2.07, 2.23	5.0, 4.9
2012	--	2.02, 2.11	4.8, 5.1, 4.6
2013	--	2.14, 2.22	4.9, 4.5
2014	--	2.02, 2.07	4.9, 5.5
2015	--	2.03	4.4
2016	30.8	--	---
2017	--	2.10	---
2018	---	---	6.7, 5.6
2019	---	---	4.9, 7.4, 4.8, 4.7, 3.9

Ripley Pumphouse - Historical Arsenic (ug/L)

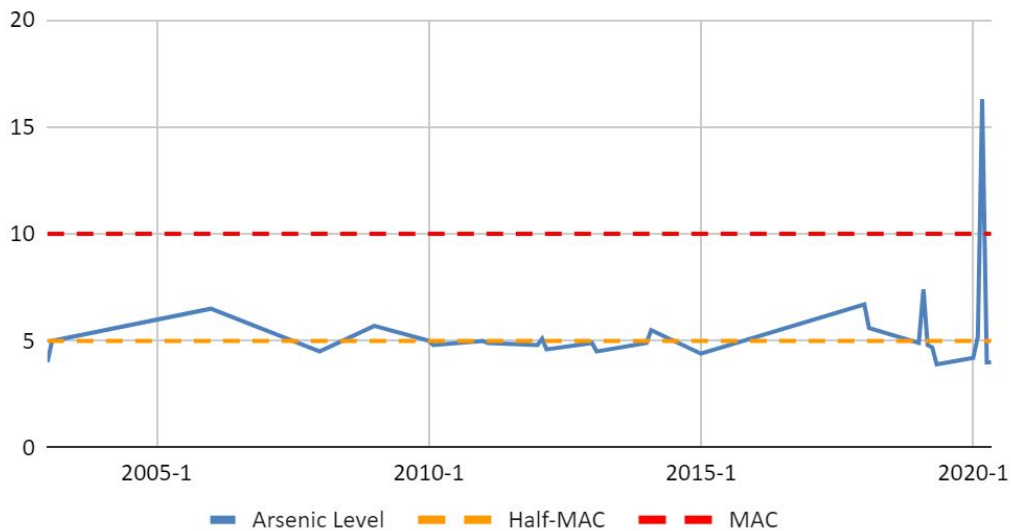


Figure 6

12.0 OBSERVATIONS AND HISTORICAL TRENDS - Continued

- Raw Turbidity:

Table 31 - 10-Year Historical results:

Well Source	10-Year Historical Average (2010 to 2019) (NTU)	2020 Average (NTU)	Comments
Ripley Well # 1	0.20	0.19	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.
Ripley Well # 2	0.21	0.22	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.
Ripley Well # 3	---	0.21	There is no historical data for Well # 3.
Ripley Well # 4	---	0.20	There is no historical data for Well # 4.

Ripley Pumphouse - Historical Turbidity (NTU)

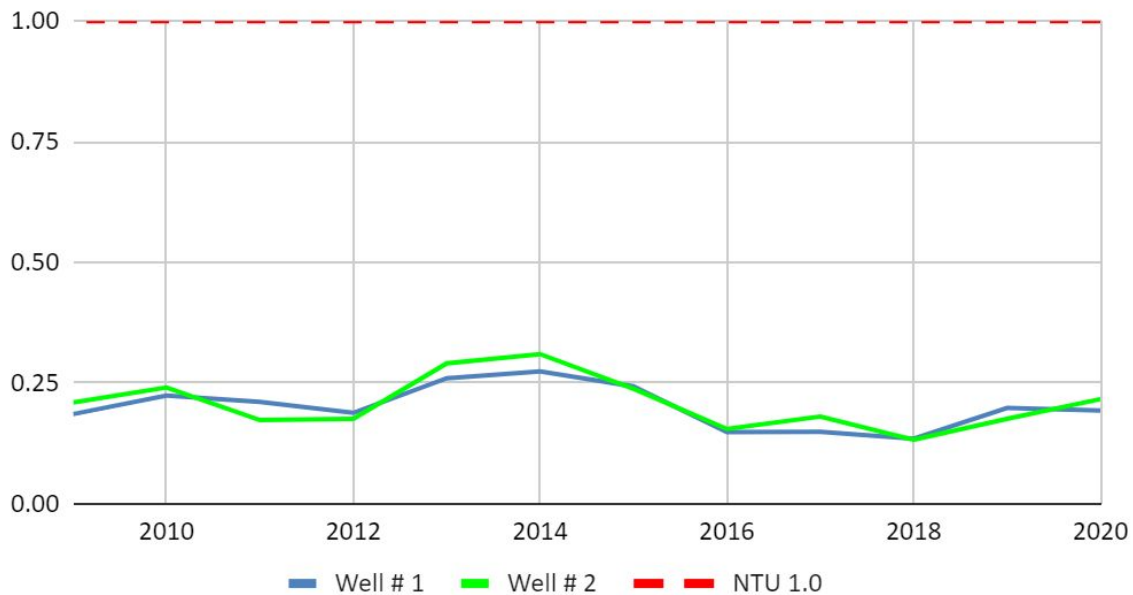


Figure 7

12.0 OBSERVATIONS AND HISTORICAL TRENDS - Continued

- Well Levels:

Table 32 - 10-Year Historical Results:

Well Source	10-Year Historical Average (2010 to 2019) (m)	2020 Average (m)	Comments
Ripley Well # 1	16.98 m below grade	16.53 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Ripley Well # 2	17.23 m below grade	17.42 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Ripley Well # 3	---	12.69 m below grade	There is no historical data for Well # 3.
Ripley Well # 4	---	13.14 m below grade	There is no historical data for Well # 4.

Ripley Pumpouse - Historical Well Levels (m below grade)

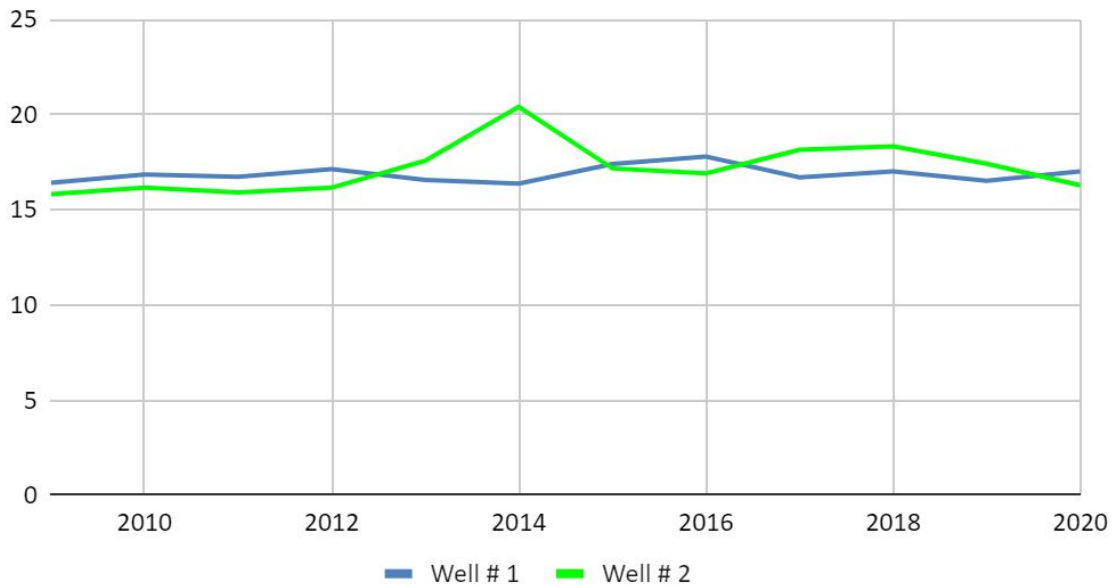


Figure 8

12.0 OBSERVATIONS AND HISTORICAL TRENDS - Continued

- Well Flows and Pump Performance:

Table 33 - 5-Year Historical Results

Well Source	5-Year Historical Average (2015 to 2019)	2020 Average	Comments
Ripley Pumphouse (Well # 1 and # 2 combined)	Avg flow: 5.11 L/s Capacity: 33.56%	Avg flow: 17.98 L/s Capacity: 28.93%	Flows are consistent based on the 5-year historical average. The operation of the well cycling has been changed with the addition of the Elevated Tank and the average flows are reflective of this change. There are no concerns at this time.
Ripley Well # 3	---	Avg flow: 20.40 L/s Capacity: 1.69%	There is no historical data for Well # 3.
Ripley Well # 4	---	Avg flow: 21.25 L/s Capacity: 4.22%	There is no historical data for Well # 4.

Ripley Pumphouse - Historical Flows (L/s)

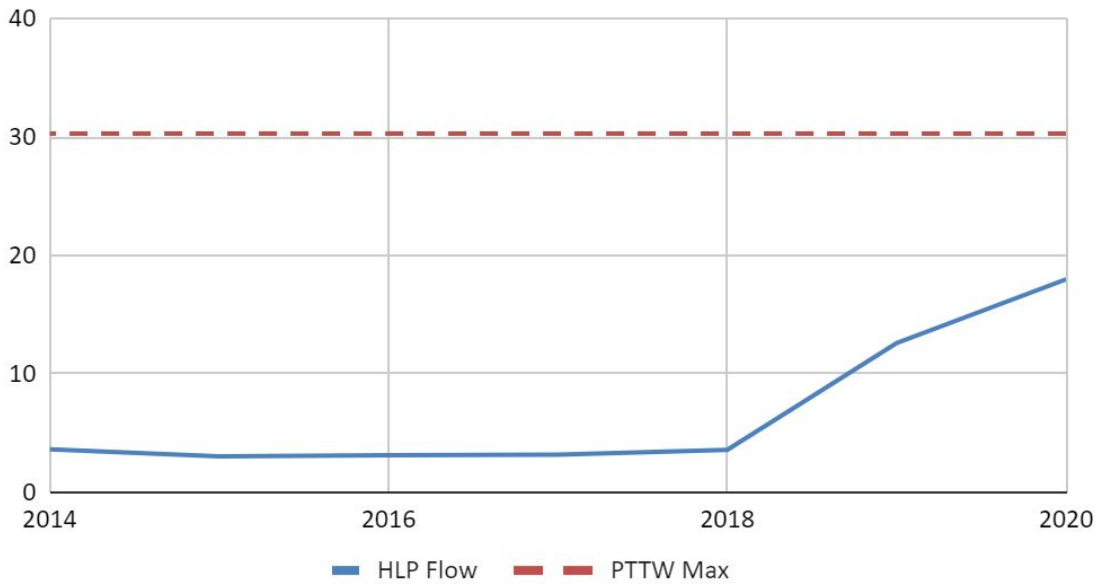


Figure 9