

Whitechurch Annual and Summary Report

For the 2019 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 Whitechurch 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 Whitechurch Drinking Water System:

Legislative Framework for the Whitechurch Drinking Water System

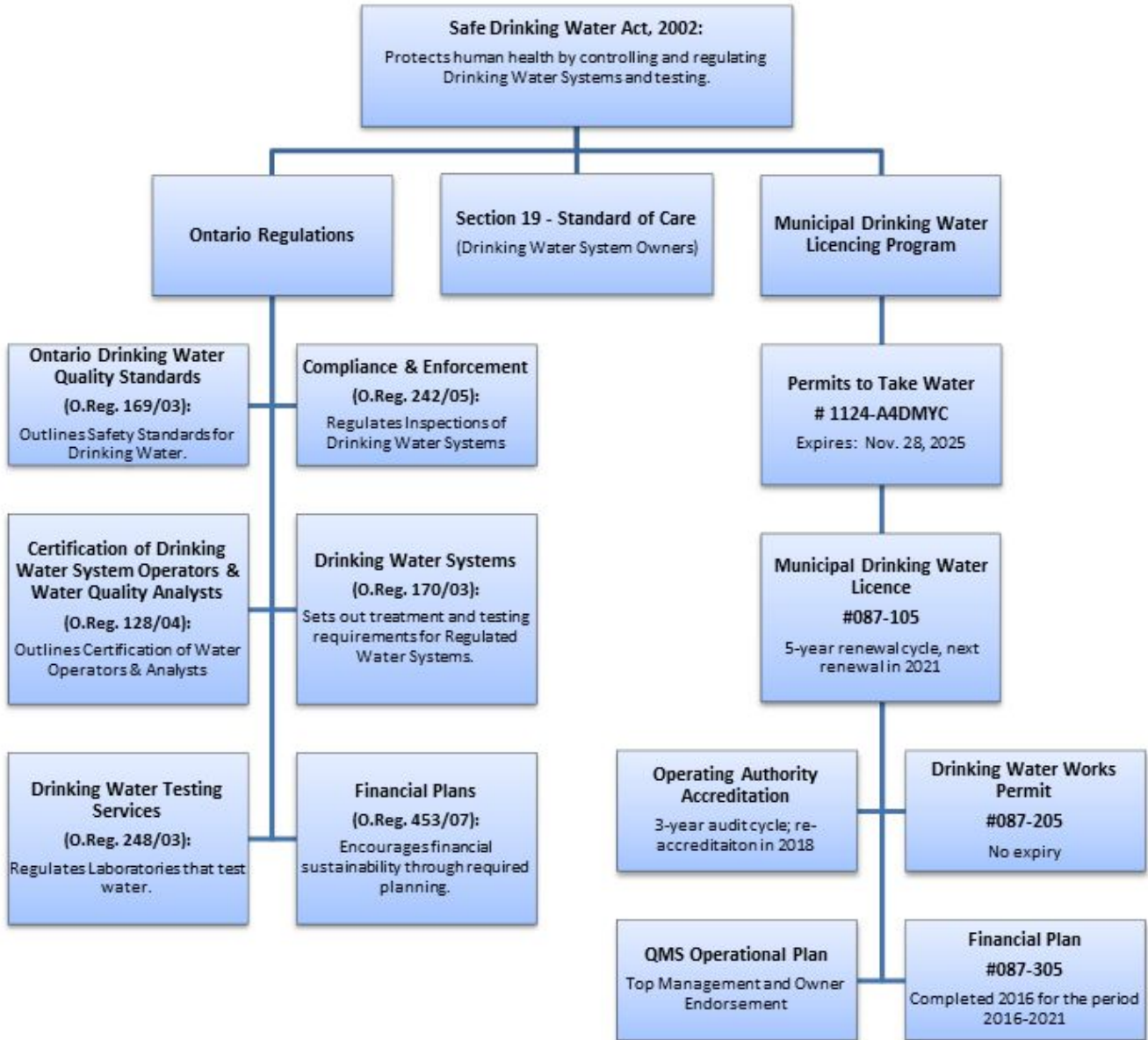


Figure 1

2.0 REPORTING REQUIREMENTS:

This report intends to provide relevant information to help the Township of Huron-Kinloss, its Council, as Owners of the Whitechurch 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 Limited System through its MDWL # 087-105, and to alter the system through it DWWP # 087-205.

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 Whitechurch Drinking Water System description is outlined below:

Drinking Water System Number:	220008863
Drinking Water System Name:	Whitechurch Water Distribution and Supply
Drinking Water System Owner:	Corporation of the Township of Huron-Kinloss
Drinking Water System Category:	Small Municipal Residential
Drinking Water System Classification:	Limited System
Drinking Water System Certificate No.:	n/a
Daily Maximum Water Supply Capacity:	260 m ³
Disinfection Chemicals:	Sodium Hypochlorite, 12%
Iron Sequestering Chemicals:	Sodium Silicate (diluted 1:1)
Population:	96 (based on Census of 2.6 people per household)
Total Number of Service Connections:	39
Average Day Demand:	17.44 m ³
Peak Day Demand:	54.80 m ³ (April 29, 2019)
Average Capacity:	6.8%
Peak Capacity:	21.1% (April 29, 2019)
Distribution Network:	1 km, 100 mm ∅ DR18 PVC
Blow-offs:	2
Sample Stations:	2

The Whitechurch Drinking Water System (WDWS) is characterized as a “secure groundwater system”. It consists of two (2) wells that deliver potable water to the Hamlet of Whitechurch.

Both wells are located at the well house property. This site is 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 wells are detailed as follows:

Site: Whitechurch - 9A Whitechurch Street

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 2 (Well # 1-South, 2003; Well # 2-North, 2003)
- Depth of Wells: 73.2 m; 54.9 m
- Well Pumps: 5 hp motor, 3 hp pump, submersible (both pumps)
- Disinfection: Sodium Hypochlorite (12%)
- Iron Sequestering: Sodium Silicate (diluted 1:1)
- CT Requirement: 2-log, 5°C, contact watermain (1.0 BF)
- Permit To Take Water: 1124-A4DMYC, expires November 28, 2025

Both Whitechurch 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. Both wells contain Barium concentrations that exceed the Half-MAC (maximum allowable concentration) of 500 µg/L, requiring samples to be collected quarterly. In 2019, there was one (1) sample that exceeded the MAC (1,050 µg/L) and was reported as an adverse drinking water incident.

The Whitechurch MDWL #087-105 requires that the Barium results are to be reported to the office of Grey Bruce Health Services annually. A letter was submitted to GBHS by the Operating Authority, and the Township of Huron-Kinloss generated a letter that was sent to their residents. The letter states: *“Most treatment methods used for water softening are effective for Barium removal. However, softening is not an option at the Municipal treatment facility due to its removal of any measurable chlorine residual in the distribution which is required to be present by regulation. Therefore, you may wish to install a personal treatment system.”*

The raw water is also relatively **high in naturally-occurring iron and hardness**, 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 chlorinated water with sodium silicate. Sequestering does not remove iron, but instead it prevents the dissolved iron from precipitating, which can stain plumbing fixtures and appear as discoloration in the water. Sodium silicate can leave a slight metallic taste in the water. Those who are supplied from the WDWS are made aware of the various concentrations in their drinking water by numerous means of communication from the Township of Huron-Kinloss.

A 15 kW diesel generator and fuel system is located outside, adjacent to the well house in a sound attenuated, weather-proof enclosure. There is a fence around the generator to prevent unwarranted entry. The diesel generator provides emergency backup power for the water system in the event of a power failure. A stand-by propane generator is also located at the Ripley Municipal Office for back-up power requirements for the Municipal Office and SCADA system.

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 #145641) in the WDWS: Barium exceedance of 1,050 µg/L on May 13, 2019. Resamples were collected and they were all below the MAC but exceeded the half-MAC.

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	104/year (2/week)	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	26/year (Dist) 12/year (Raw) 12/year (Treated)	O. Reg. 170/03, Sch. 11
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 2019	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
Barium	For testing presence of Barium in the treated water at Point-of-Entry	4/year (quarterly)	MDWL #087-104, Sch. D, 2.0
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 and SCADA Samples)

In 2019, a total of 365 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 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 2019, a total of 367 distribution residuals were collected: 365 daily grab residuals and an additional 2 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	Whitechurch Treated (Grab)	Whitechurch Treated (SCADA)	Distribution (Grab)
Jan	1.69	1.72	1.72
Feb	1.64	1.66	1.66
Mar	1.62	1.65	1.65
Apr	1.68	1.70	1.70
May	1.61	1.62	1.62
Jun	1.59	1.63	1.63
Jul	1.62	1.66	1.66
Aug	1.61	1.62	1.62
Sep	1.66	1.68	1.68
Oct	1.61	1.65	1.65
Nov	1.65	1.68	1.68
Dec	1.68	1.68	1.68
CT Requirement	0.47	0.47	0.20
Annual Min	1.35	0.68	0.68
Annual Max	2.03	2.07	2.07
Annual Avg	1.64	1.66	1.66
# Samples	365	365	367

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	Whitechurch Well # 1	Whitechurch Well # 2	Whitechurch Treated
Jan	0.23	0.25	0.27
Feb	0.20	0.26	0.28
Mar	0.22	0.24	0.32
Apr	0.15	0.17	0.20
May	0.19	0.16	0.22
Jun	0.25	0.18	0.17
Jul	0.13	0.13	0.21
Aug	0.08	0.11	0.18
Sep	0.12	0.13	0.21
Oct	0.08	0.14	0.15
Nov	0.14	0.26	0.22
Dec	0.15	0.18	0.19
Annual Min	0.08	0.11	0.15
Annual Max	0.25	0.26	0.32
Annual Avg	0.16	0.18	0.22
# Samples	12	12	12

5.2 Microbiological Sampling per Schedule 11, O. Reg. 170/03

5.2.1 Raw Water Samples

Raw water samples are collected every week, even though O. Reg. 170/03, Sch. 11 states one sample is required every two weeks. In 2019, a total of 106 samples were collected and analyzed for E. Coli and Total Coliform. **Table 4** provides a summary of microbiological results performed on the raw water.

Table 4 - Microbiological Results for Raw Water

Month	Total Coliform			E. Coli		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	10	10	0	10	10	0
Feb	8	8	0	8	8	0
Mar	8	8	0	8	8	0
Apr	10	10	0	10	10	0
May	8	8	0	8	8	0
Jun	8	8	0	8	8	0
Jul	10	10	0	10	10	0
Aug	8	8	0	8	8	0
Sep	8	8	0	8	8	0
Oct	10	10	0	10	10	0
Nov	8	8	0	8	8	0
Dec	10	10	0	10	10	0
TOTAL	106	106	0	106	106	0

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 2019, a total of 53 treated water samples were collected and analyzed for TC and EC, but only 52 HPC results. Each EC and TC result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 - 5 cfu/100 mL. **Table 5** provides a summary of all microbiological results performed on treated water.

Table 5 - Microbiological Results for Treated Water (Point of Entry)

Month	Total Coliform			E. Coli			HPC		
	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1	# Samples	# Samples "0"	# Samples ≥ 1
Jan	5	5	0	5	5	0	5	4	1
Feb	4	4	0	4	4	0	4	2	2
Mar	4	4	0	4	4	0	4	3	1
Apr	5	5	0	5	5	0	5	4	1
May	4	4	0	4	4	0	4	2	2
Jun	4	4	0	4	4	0	4	3	1
Jul	5	5	0	5	5	0	5	5	0
Aug	4	4	0	4	4	0	4	4	0
Sep	4	4	0	4	4	0	4	3	1
Oct	5	5	0	5	5	0	4*	1	3
Nov	4	4	0	4	4	0	4	3	1
Dec	5	5	0	5	5	0	5	5	0
TOTAL	53	53	0	53	53	0	52	40	13

*NOTE: On October 1, 2019, one (1) treated water sample was reported as NDLA for the HPC (no data laboratory accident).

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 2019, a total of 54 distribution samples were collected and analyzed for TC and EC, which is above the required number of samples (n=96, based on 96 residents). A total of 53 distribution samples were analyzed for HPC (n=24, 25% of 96). Each TC and EC result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 - 5 cfu/100 mL. **Table 6** provides a summary of all microbiological samples taken in the distribution system.

Table 6 - 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 - 5
Jan	5	5	0	5	5	0	5	5	0
Feb	4	4	0	4	4	0	4	3	1
Mar	4	4	0	4	4	0	4	4	0
Apr	5	5	0	5	5	0	5	3	2
May	4	4	0	4	4	0	4	2	2
Jun	4	4	0	4	4	0	4	4	0
Jul	5	5	0	5	5	0	5	4	1
Aug	4	4	0	4	4	0	4	4	0
Sep	4	4	0	4	4	0	4	3	1
Oct	6	6	0	6	6	0	5	3	2
Nov	4	4	0	4	4	0	4	3	1
Dec	5	5	0	5	5	0	5	3	2
TOTAL	54	54	0	54	54	0	53	41	12

*NOTE: On October 1, 2019, one (1) distribution sample was reported as NDLA for the HPC (no data laboratory accident).

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 60 months and analyzed for inorganics. The most recent samples for the Whitechurch DWS were collected on October 11, 2017 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23 (see **Table 7**). All results for the parameters tested in 2017 were found to be within compliance. Inorganics are scheduled to be sampled again in October 2021.

Table 7 - Inorganics (Schedule 13, s. 13-2; Schedule 23) Results

Parameter	Whitechurch Treated (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Antimony	0.02 <MDL	6	No
Arsenic	0.3	10	No
Barium	887	1000	No
Boron	16	5000	No
Cadmium	0.003 <MDL	5	No
Chromium	0.64	50	No
Mercury	0.01 <MDL	1	No
Selenium	0.04 <MDL	50	No
Uranium	0.093	20	No

*MDL = Laboratory Minimum Detection Limit

REGULATORY RELIEF FOR BARIUM: Barium concentration is consistently in exceedance of the Half-MAC and therefore is sampled on a quarterly basis as required by MDWL #087-105, Schedule D - Conditions for Relief from Regulatory Requirements. MDWL #087-105 states:

2.0 Other Regulatory Relief

2.1 Barium

Notwithstanding the provisions of O. Reg. 170/03, the Owner is not required to comply with the following:

- *Schedule 13, Section 13-5, Subsections (1) and (2-b) with respect to the chemical standard for Barium (1.0 mg/L) under Schedule 2 of O.Reg. 169/03, Ontario Drinking-water Quality Standards.*
- *Condition in exchange for relief from regulatory requirements:*
 - *Barium sample reports shall be forwarded to the Grey Bruce Health Unit for review annually.*

Table 8 provides a summary of the Barium sampling, and a historical review of the Barium trending can be found in **12.0 - OBSERVATIONS AND HISTORICAL TRENDS**.

Table 8 - Barium Results

Sampling Quarter	Whitechurch Treated - Barium (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
February	939	1000	No
May	1050 972	1000	Yes No
August	965	1000	No
November	806	1000	No

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.

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

Treated water samples are collected every 60 months and tested for Schedule 24 organic parameters. The most recent samples were collected on October 11, 2017. All parameters were found to be within compliance. Organics will be sampled and analyzed again in October 2021. Samples results can be found in **Table 9**.

Table 9 - Organics (Schedule 13, s. 13-4; Schedule 24) Results

Parameter	Whitechurch Treated (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
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

*MDL = Laboratory Minimum Detection Limit

Table 9 - Organics (Schedule 13, s. 13-4; Schedule 24) Results - Continued

Parameter	Whitechurch Treated (µg/L)	Maximum Allowable Concentration (µg/L)	Aesthetic Objective / Operational Guideline (µg/L)	Exceedance
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 2019, 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). In 2019, the average THM was found to be 31.3 µg/L, which is within compliance. Refer to **Table 10** for the summary of Trihalomethane results and the RAA. In 2020, samples will be collected in February, May, August, and November.

Table 10 - 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)	Maximum Allowable Concentration (µg/L)	Exceedance
Feb	24.0	5.1	<0.34	18.0	1.1	100	No
May	39.0	6.7	<0.34	31.0	1.1	100	No
Aug	41.0	7.6	<0.34	32.0	1.4	100	No
Nov	21.0	4.8	<0.34	15.0	1.0	100	No
Average	31.3	6.1	<0.34	24.0	1.2		
Maximum	41.0	7.6	<0.34	32.0	1.4		

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 2019, 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 11**.

Table 11 - 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)	Maximum Allowable Concentration (µg/L)	Exceedance
Feb	9.4	<2.9	<4.7	3.8	<2.0	5.7	80	No
May	<5.3	<2.9	<4.7	3.5	<2.0	<5.3	80	No
Aug	17.2	<2.9	<4.7	7.9	<2.0	9.2	80	No
Nov	<5.3	<2.9	<4.7	3.8	<2.0	<5.3	80	No
Avg	9.3	<2.9	<4.7	4.8	<2.0	6.4		
Max	17.2	<2.9	<4.7	7.9	<2.0	9.2		

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

One treated water sample is collected every three months and tested for nitrate and nitrite. In 2019, 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 12**. In 2020, samples will be collected in February, May, August, and November.

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

Month	Nitrite (mg/L)	Maximum Allowable Concentration (mg/L)	Exceedance	Nitrate (mg/L)	Maximum Allowable Concentration (mg/L)	Exceedance
Feb	<0.003	1	No	0.015	10	No
May	<0.003	1	No	<0.006	10	No
Aug	<0.003	1	No	0.006	10	No
Nov	<0.003	1	No	<0.006	10	No
Average	<0.003			0.108		
Maximum	<0.003			0.119		

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 January 8, 2018. Results can be found in **Table 13**. The next sampling date for Sodium will be on or before January 2023.

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 November 18, 2019, a sample was collected for this analysis. The results are summarized in **Table 13**. The next sampling date for Fluoride will be on or before November 2024.

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

Location	Sodium			Fluoride		
	Result (mg/L)	Maximum Allowable Concentration (mg/L)	Exceedance	Result (mg/L)	Maximum Allowable Concentration (mg/L)	Exceedance
Whitechurch Treated Water	17.9	20	No	1.09	1.5	No

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 Whitechurch 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) pH and alkalinity samples were collected on February 6, 2019 and two (2) pH and alkalinity samples were collected on July 15, 2019. These parameters are required to be sampled and analyzed again between the months of December 2019 and April 2020, and again between June and October 2020. Lead samples are required next in the 2020 sampling season. Results for 2019 can be found in **Table 14**.

Table 14 - Lead Sampling Program (Schedule 15.1) Results

Season	Alkalinity (mg/L)	pH	Lead (mg/L)	Maximum Allowable Concentration - Lead (mg/L)	Exceedance
Dec-Apr	268	7.57	Not required in 2019	0.010	n/a
Jun-Oct	271	7.33	Not required in 2019	0.010	n/a

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 15** for information purposes.

Table 15 - Aesthetic Objectives and Operational Guideline Results

Parameter	AO/OG	Whitechurch Treated
pH	6.5 - 8.5	7.96
Alkalinity (mg/L as CaCO ₃)	30 - 500	271
Colour (TCU)	5	5
Total Dissolved Solids (mg/L)	500	354
Organic Nitrogen (mg/L)	0.15	0.05 <MDL
Total Kjeldahl Nitrogen (mg/L)	---	0.05 <MDL
Ammonia + Ammonium (mg/L)	---	0.05
Hydrogen Sulphide (mg/L)	0.05	0.006 <MDL
Sulphide (mg/L)	0.05	0.006 <MDL
Chloride (mg/L)	250	30
Sulphate (mg/L)	500	23
Hardness (mg/L as CaCO ₃)	80 - 100	292
Aluminum (µg/L)	100	2.9
Copper (µg/L)	1000	1.00
Iron (µg/L)	300	744
Manganese (µg/L)	50	11.0
Zinc (µg/L)	5000	2
Dissolved Organic Carbon (mg/L)	5	1
Methane (L/m ³)	3	0.09
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 2019, the total amount of 12% sodium hypochlorite (NaOCl) used to treat the water that was provided to the distribution system is tabulated in **Table 16** with the average chlorine dosage. During the same period, the total amount of sodium silicate (Na₂SiO₃), diluted 1:1, for iron sequestering is tabulated in **Table 16** with the average silicate dosage.

Table 16 - Sodium Hypochlorite and Sodium Silicate Usage

Month	Whitechurch Treated Water			
	Sodium Hypochlorite		Sodium Silicate	
	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	3.05	5.49	3.62	6.52
Feb	2.63	5.12	3.26	6.35
Mar	2.67	5.21	3.23	6.31
Apr	2.88	5.35	3.47	6.45
May	2.61	5.82	2.99	6.66
Jun	2.50	5.30	3.35	7.10
Jul	3.13	5.49	4.57	8.01
Aug	3.11	5.59	4.49	8.05
Sep	2.90	5.58	4.10	7.88
Oct	2.86	5.45	4.19	7.97
Nov	2.86	5.11	4.13	7.38
Dec	3.20	5.31	4.78	7.95
TOTAL	24.40	--	46.17	--
Average	--	5.40	--	7.22

Sodium Hypochlorite Grand Total Usage: 24.40 kg
Sodium Hypochlorite Average Dosage: 5.40 mg/L

Sodium Silicate Grand Total Usage: 46.17 kg
Sodium Silicate Average Dosage: 7.22 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 2019 from each well supply is provided in **Table 17**. The volumes reported for each well supply are taken from the SCADA continuous monitoring system. The flow meters were calibrated on the following dates:

Whitechurch:	Raw water flow meter # 1	June 19, 2019
Whitechurch:	Raw water flow meter # 2	June 19, 2019

Table 17 - Flow Rates, Annual Volumes, and Capacities

Whitechurch Well #1 - South

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	3.21	2.64	278.50	12.56	8.98	4.83
Feb	2.97	2.64	255.13	16.35	9.11	6.29
Mar	2.91	2.61	259.06	13.22	8.36	5.08
Apr	3.70	2.62	270.79	27.43	9.03	10.55
May	3.22	2.65	232.21	10.09	7.49	3.88
Jun	2.91	2.62	238.02	11.95	7.93	.60
Jul	3.32	2.61	291.60	13.21	9.41	5.08
Aug	2.91	2.62	288.53	12.69	9.31	4.88
Sep	4.88	2.62	266.41	12.53	8.88	4.82
Oct	2.97	2.61	272.61	10.69	8.79	4.11
Nov	2.98	2.60	281.87	12.78	9.40	4.92
Dec	2.95	2.62	313.35	12.93	10.11	4.97
PTTW Max	3.283	3.283	7,908.33	260.00	---	---
Annual Max	4.88	---	313.35	27.43	---	10.55
Annual Avg	---	2.62	270.67	---	8.90	3.42
Annual Total	---	---	3,248.08	---	---	---

NOTE: Flow exceedances were due to maintenance activities.

Whitechurch Well #2 - North

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	2.98	2.59	276.42	12.12	8.92	4.66
Feb	2.79	2.60	257.45	16.02	9.19	6.16
Mar	2.79	2.57	259.54	13.01	8.37	5.00
Apr	2.79	2.59	270.20	27.37	9.01	10.53
May	2.79	2.60	231.16	10.11	7.46	3.89
Jun	3.05	2.60	234.72	11.68	7.82	4.49
Jul	2.91	2.60	292.51	13.83	9.44	5.32
Aug	2.78	2.56	288.50	12.78	9.31	4.92
Sep	2.82	2.56	267.21	11.55	8.91	4.44
Oct	2.79	2.58	269.12	10.21	8.68	3.93
Nov	2.84	2.58	283.35	12.34	9.45	4.75
Dec	2.79	2.57	309.17	12.07	9.97	4.64
PTTW Max	3.283	3.283	7,908.33	260.00	---	---
Annual Max	3.05	---	309.17	27.37	---	10.53
Annual Avg	---	2.58	269.95	---	8.88	3.41
Annual Total	---	---	3,239.35	---	---	---

Table 17 - Flow Rates, Annual Volumes, and Capacities - Continued

Whitechurch Well #1 and Well # 2 Combined

Month	Combined Volume Daily Max (m ³)	Combined Volume Daily Average (m ³)	Combined Volume Monthly Total (m ³)	Capacity Monthly Max (%)
Jan	24.68	17.90	554.90	9.49
Feb	32.37	18.31	512.54	12.45
Mar	36.23	16.73	518.62	13.93
Apr	54.80	18.03	541.00	21.08
May	20.20	14.95	463.38	7.77
Jun	23.63	15.76	472.75	9.09
Jul	27.04	18.84	584.12	10.40
Aug	25.47	18.61	577.01	9.80
Sep	24.08	17.79	533.62	9.26
Oct	20.72	17.48	541.73	7.97
Nov	25.12	18.84	565.22	9.66
Dec	24.79	20.08	622.52	9.53
PTTW Max	260.00	260.00	7,908.33	---
Annual Max	54.80	---	622.52	21.08
Annual Avg	---	17.78	540.62	6.84
Annual Total	---	---	6,487.41	---

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

The following is a comparison of the 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 both well supplies is presented in **Table 18**. The visual representations of each well and the Whitechurch total capacity are presented in Figures 2 through 4.

Table 18 - Total Volumes of All Well Supplies

Location (Well Supply)	Total Volume for 2019 (m ³)
Whitechurch Well # 1	3,248.08
Whitechurch Well # 2	3,239.35
Well # 1 and Well # 2 Combined	6,487.43
Total Rated Capacity, PTTW (m³)	94,900.00
Overall Operating Capacity, Actual %	6.84%

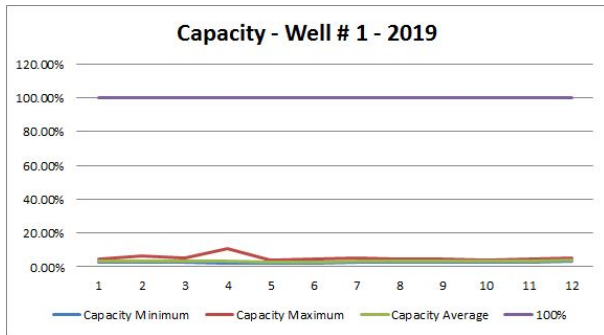


Figure 2

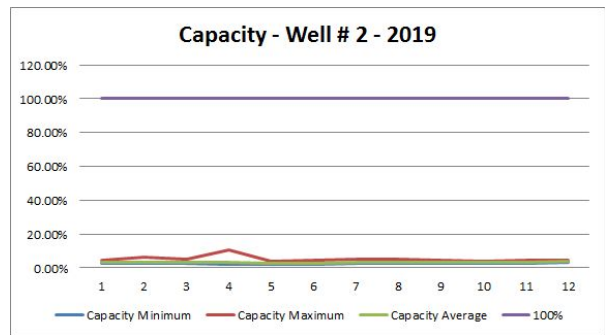


Figure 3

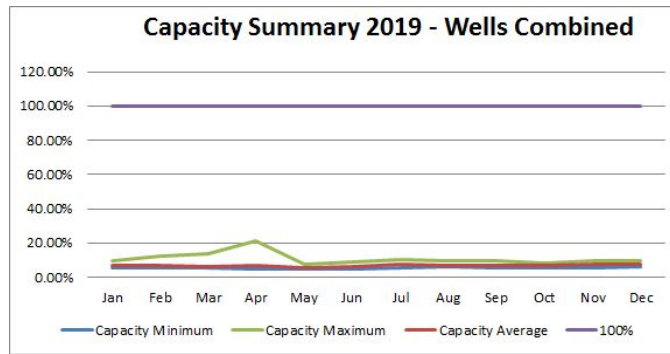


Figure 4

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 Whitechurch Drinking Water System Supply:

Whitechurch Pumphouse:

- Routine and preventative maintenance performed as per Jobs Plus schedule.
- Flow meter calibration completed.
- Georgian Bay Fire and Safety inspections completed.
- Semi-annual flushing and annual valve turning completed.

- March: Eramosa replaced the UPS for the SCADA RTU.
- April: A house fire resulted in a broken water service line and high flows.

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

- MECP Drinking Water Inspection was conducted on July 24, 2019 and awarded a rating of 100.00% (previous rating was 100.00%).
- A list of Capital Items for 2019 was submitted to the Township of Huron-Kinloss on November 1, 2018.
- DWQMS Management Review was conducted on June 6, 2019.
- DWQMS Internal Audit was conducted between May 15 - June 11, 2019.
- DWQMS External Audit (off-site) was conducted on June 14, 2019.
- Emergency Response Exercise was conducted as a follow-up response to a temporary water main break that happened in Goderich on May 23, 2019, where many utilities were involved. An “After Action Report” was submitted to the utilities involved following the tabletop incident review.

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. Over the next year, the following amendment will be added. The subsequent phase-in date is:

- January 1, 2020: New standards for HAAs and HAAs testing optimization rule for smaller systems will come into effect/require reporting.

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 to monitor the performance of the aquifer. **Table 19** provides a summary of the static well levels recorded in 2019.

Table 19 - Static Well Levels (PTTW)

Month	Whitechurch Well # 1 - South (m)	Whitechurch Well # 2 - North (m)
Jan	12.35	11.95
Feb	12.55	12.05
Mar	12.25	11.85
Apr	12.14	11.72
May	12.00	11.67
Jun	12.20	11.95
Jul	12.70	12.39
Aug	13.10	12.84
Sep	13.60	13.15
Oct	13.57	13.22
Nov	13.40	13.05
Dec	13.00	12.52
Min	12.00	11.67
Max	13.60	13.22
Avg	12.74	12.36

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/source-protection-plan/assessment-reports/saugeen-valley/>

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

The DWSPA report states: “The WHPA extends about 1 km to the north east. A vulnerability score of 10 applies to WHPA-A, the 100 m radius around the well. Most of WHPA-B has a vulnerability score of 8, with the remainder having a score of 6. WHPA-C and WHPA-D have vulnerability scores of 6 or less.” **Table 20**, taken from the report, shows a summary of significant drinking water threats within the Whitechurch Drinking Water System.

Table 20 - Whitechurch WHPA: Summary of Significant Drinking Water Threats

No.	Threat (numbered according to <i>Clean Water Act, 2006</i>)	Significant Instances		
		Chemicals	Pathogens	DNAPLs
1	Waste Disposal Site	1		
2	Sewage System		14	
10	Pesticide Application	1		
15	Fuel Handling/Storage	4		
16	Dense Non-Aqueous Phase Liquid Handling/Storage			1
21	Grazing/Pasturing Livestock	1	1	
TOTAL		7	15	1

In conclusion, as stated in the DWSPA Report: “No issues with wells or conditions resulting from past activities were identified within the WHPA.”

12.0 OBSERVATIONS AND HISTORICAL TRENDS

Raw Water Quality

- Microbiological: There were no positive microbiological test results in 2019.

10-Year Historical results:

Year	Whitechurch Well # 1		Year	Whitechurch Well # 2	
	Total Coliform	E. Coli		Total Coliform	E. Coli
2011	4	0	2011	1	0
2011	1	0	2014	2	2
2011	2	0	2014	1	0
2013	1	0	2015	1	0
2013	5	0	2015	10	0
2014	1	0	2015	8	0
2015	1	0	2015	2	0
2015	8	0	2015	4	0
2015	1	0	2015	2	0
2015	3	0	2015	2	0
2015	9	0	2015	1	0
2015	1	0			
2015	3	0			
2015	3	0			
2016	1	0			
2017	2	0			
2019	1	0			

Since repairs were made to the Whitechurch well caps in 2015, and abandonment of the observation well, the Total Coliforms have been significantly reduced.

- Chemical Parameters: There were no exceedances for any of the chemical parameters tested in 2019, however, historically, Barium samples are always in exceedance of the Half-MAC, and occasionally in exceedance the MAC. Barium is tested every 3 months.

10-Year Historical results:

Quarter	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Feb	970	1160	1180	938	1040	901	864	792	904	985	939
May	1090	1060	891	914	912	875	811	818	801	875	1050
Aug	1180	1150	881	910	822	908	855	898	877	945	965
Nov	1080	1140	854	928	864	884	805	924	887	861	806

Barium results have been fairly consistent so there are no concerns at this time.

12.0 OBSERVATIONS AND HISTORICAL TRENDS - Continued

- Raw Turbidity:

Well Source	10-Year Historical Average (2015 to 2018) (NTU)	2019 Average (NTU)	Comments
Whitechurch Well # 1	0.20	0.22	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.
Whitechurch Well # 2	0.27	0.18	The raw turbidity has remained consistent based on the 10-year historical average. There is no concern at this time.

- Well Levels:

Well Source	10-Year Historical Average (2015 to 2018) (m)	2019 Average (m)	Comments
Whitechurch Well # 1	12.75 m below grade	12.75 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.
Whitechurch Well # 2	12.37 m below grade	12.36 m below grade	The well level has remained consistent based on the 10-year historical average. There is no concern at this time.

- Well Flows and Pump Performance:

Well Source	4-Year Historical Average (2015 to 2018)	2019 Average	Comments
Whitechurch Well # 1	Avg flow: 2.20 L/s Capacity: 4.41%	Avg flow: 2.62 L/s Capacity: 3.42%	Flows are consistent based on the 4-year historical average. There are no concerns at this time.
Whitechurch Well # 2	Avg flow: 2.15 L/s Capacity: 4.43%	Avg flow: 2.58 L/s Capacity: 3.41%	Flows are consistent based on the 4-year historical average. There are no concerns at this time.
Well # 1 and # 2 Combined	Capacity: 8.77%	Capacity: 6.84%	The capacity has remained low over the past 4 years and there are no concerns at this time.