

Whitechurch Annual Report

PREPARED BY:

Veolia Water
100 Cove Road
Goderich, ON
N7A 3Z2

TO:

Township of Huron-Kinloss
Box 130
21 Queen Street
Ripley, ON, N0G 2R0



Table of Contents

1.0	INTRODUCTION AND BACKGROUND	4
2.0	DESCRIPTION OF WATER SYSTEM.....	4
3.0	SUMMARY OF WATER QUALITY MONITORING	5
3.1	Water Treatment Equipment Operation and Monitoring	5
3.1.1	Treated Water (Point of Entry) Chlorine Residuals	5
3.1.2	Distribution (Grab) Free Chlorine Residuals	5
3.1.3	Turbidity	6
3.2	Microbiological Sampling as per Schedule 10, Ontario Regulation 170/03	6
3.2.1	Raw Water Samples (Schedule 10, Section 10-4)	6
3.2.2	Treated Water (Point of Entry) Samples (Schedule 10, Section 10-3)	7
3.2.3	Distribution Samples (Schedule 10, Section 10-2)	7
3.3	Chemical Sampling & Testing as per Schedule 13, Ontario Regulation 170/03	8
3.3.1	Inorganics (Schedule 13, Section 13-2; Schedule 23)	8
3.3.2	Organics (Schedule 13, Section 13-4; Schedule 24)	9
3.3.3	Trihalomethanes (Schedule 13, Section 13-6)	11
3.3.4	Haloacetic Acids (Schedule 13, Section 16.1)	11
3.3.5	Nitrate & Nitrite (Schedule 13, Section 13-7)	11
3.3.6	Sodium (Schedule 13, Section 13-8)	12
3.3.7	Fluoride (Schedule 13, Section 13-9)	12
3.3.8	Lead (Schedule 15.1)	12
3.3.9	Non-Regulatory Testing – Aesthetic Objectives and Operational Guidelines	13
4.0	WATER AND CHEMICAL USAGE	13
4.1	Chemical Usage	13
4.2	Annual Volumes	14
5.0	IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE.....	16
6.0	MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES	17
7.0	REGULATORY CHANGES	17
7.1	Arsenic Review	18
7.1.1	Arsenic Sampling Impact	18
8.0	WELL LEVELS	19

LIST OF TABLES

Table 1 –	Average Treated and Distribution Free Chlorine (Grab) Residuals	5
Table 2 –	Raw and Treated Water Turbidity	6
Table 3 –	Microbiological (Schedule 10, Section 10-4) Results for Raw Water	6
Table 4 –	Microbiological (Schedule 10, Section 10-3) Results for Treated Water (Point of Entry)	7
Table 5 –	Microbiological (Schedule 10, Section 10-2) Results for Distribution System	8
Table 6 –	Inorganics (Schedule 13, Section 13-2; Schedule 23) Results	8
Table 7 –	Organics (Schedule 13, Section 13-4; Schedule 24) Results	9
Table 8 –	Trihalomethanes (Schedule 13, Section 13-6) Results	11
Table 9 –	Haloacetic Acids (Schedule 13, Section 13-6.1) Results	11
Table 10 –	Nitrates and Nitrites (Schedule 13, Section 13-7) Results	12
Table 11 -	Sodium (Schedule 13, Section 13-8) and Fluoride (Schedule 13, Section 13-9) Results	12
Table 12 -	Lead Sampling Program (Schedule 15.1) Results	12
Table 13 -	Aesthetic Objectives and Operational Guidelines	13
Table 14 -	Sodium Hypochlorite Usage	14
Table 15 -	Treated Water Volumes	15
Table 16 -	Regulatory Requirements	17
Table 17 -	Historic Arsenic Values	18
Table 18 -	Well Levels	19

1.0 INTRODUCTION AND BACKGROUND

The Operating Authority, on behalf of the Owner, the Township of Huron-Kinloss, has prepared this report to satisfy the requirements of Section 11 (1) of Ontario Regulation 170/03. Section 11 (1) requires that the Owner of a drinking water system ensure that a report is prepared in accordance with Subsections (3) and (6) for the preceding calendar year, which covers from the period of January 1 to December 31, 2017. The annual report must be prepared no later than February 28 of each year. A copy of this report will be submitted to the Owner to be made available to the residents.

2.0 DESCRIPTION OF WATER SYSTEM

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
Total Number of Service Connections:	39
Estimated Potential Population:	96 (based on Census of 2.6 people per household)

The Whitechurch Drinking Water Distribution and Supply System is characterized as a “secure groundwater system”. It consists of two (2) wells and its equipment delivers 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 computer and server at the Ripley Municipal Office. As a redundancy, the pumphouse 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 iPhone, and to have control over operations.

The two (2) wells are described as follows:

Site: Whitechurch – 9A Whitechurch Street

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 2 (#1-South, drilled 2003; #2-North, drilled 2003)
- Depth of Wells: 73.2m, 54.9m
- Well Pump: 5hp motor, 3hp pump (both wells)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, contact watermain (1.0 BF)
- Iron Sequestering: Sodium Silicate (diluted 1:1)
- Permit To Take Water: 1124-A4DMYC, expires November 28, 2025
- Municipal Drinking Water Licence: 087-105, #2, expires May 19, 2021
- Drinking Water Works Permit: 087-205, #2, issued May 20, 2016

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°), 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. All samples collected in 2017 were below the MAC of 1,000 µg/L. The raw water is also relatively high in sodium and iron, but the fluoride and 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 water from the Whitechurch WDSS 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 has been installed 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 systems.

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation and Monitoring

3.1.1 Treated Water (Point of Entry) Chlorine Residuals

In 2017, a total of 365 treated water samples were collected and analyzed for Free Chlorine Residual at the Point of Entry (POE) water using a HACH pocket chlorine colorimeter. **Table 1** shows the grab sample monthly average of free chlorine residual values.

3.1.2 Distribution (Grab) Free Chlorine Residuals

In 2017, a total of 368 distribution residuals were collected: 359 daily grab residuals and an additional 9 grab residuals were taken in conjunction with the required weekly micro bacteriological sampling. A summary of all the residuals collected is presented in **Table 1**.

Table 1 – Average Treated and Distribution Free Chlorine (Grab) Residuals

Month	Whitechurch Treated Water	Whitechurch Distribution
Jan	1.55	1.42
Feb	1.69	1.55
Mar	1.69	1.53
Apr	1.72	1.58
May	1.75	1.52
Jun	1.62	1.23
Jul	1.66	1.26
Aug	1.73	1.26
Sep	1.74	1.30
Oct	1.73	1.25
Nov	1.66	1.32
Dec	1.70	1.41
Annual Min	1.37	0.63
Annual Max	2.20	1.96
Annual Avg	1.69	1.39
# Samples	365	368

3.1.3 Turbidity

Drinking water turbidity was measured by a portable turbidity analyzer. Raw and treated water grab samples were collected and analyzed for turbidity. **Table 2** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the raw water was 0.26 NTU and the maximum turbidity measured in the treated water was 0.31 NTU.

Table 2 – Raw and Treated Water Turbidity

Month	Whitechurch		
	Raw – Well # 1-South	Raw – Well # 2-North	Treated
Jan	0.19	0.21	0.24
Feb	0.16	0.21	0.29
Mar	0.14	0.17	0.21
Apr	0.11	0.14	0.16
May	0.13	0.19	0.18
Jun	0.14	0.17	0.16
Jul	0.16	0.26	0.16
Aug	0.17	0.15	0.18
Sep	0.19	0.17	0.20
Oct	0.18	0.21	0.24
Nov	0.11	0.15	0.17
Dec	0.14	0.18	0.19
Annual Min	0.11	0.14	0.16
Annual Max	0.20	0.26	0.31
Annual Avg	0.15	0.19	0.21
# Samples	15	15	15

3.2 Microbiological Sampling as per Schedule 11, Ontario Regulation 170/03

3.2.1 Raw Water Samples (Schedule 11, Section 11-3)

Raw water samples are collected every week. In 2017, a total of 104 samples were collected and analyzed for E. Coli and Total Coliform. **Table 3** provides a summary of bacteriological results performed on the raw water.

Table 3 – Microbiological (Schedule 11, Section 11-3) Results for Raw Water

Well # 1- South

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

*Note: One samples from Whitechurch well # 1-south raw water each tested positive for 2 Total Coliform on June 27, 2017. The treated samples collected from the same day were free of Total Coliform. Raw water is NOT reportable as an adverse water quality incident.

Well # 2- North

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

3.2.2 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 for Heterotrophic Plate Count (HPC). In 2017, a total of 52 treated water samples were collected and analyzed for the above parameters. Each E. Coli and Total Coliform result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 – 5 cfu/100 mL. **Table 4** provides a summary of all bacteriological results performed on treated water.

Table 4 – Microbiological Results for Treated Water (Point of Entry)

Month	E.Coli			Total Coliform			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	2	3
Feb	4	4	0	4	4	0	4	1	3
Mar	4	4	0	4	4	0	4	3	1
Apr	4	4	0	4	4	0	4	3	1
May	5	5	0	5	5	0	5	2	3
Jun	4	4	0	4	4	0	4	1	3
Jul	4	4	0	4	4	0	4	2	2
Aug	5	5	0	5	5	0	5	2	3
Sep	4	4	0	4	4	0	4	3	1
Oct	5	5	0	5	5	0	5	3	2
Nov	4	4	0	4	4	0	4	3	1
Dec	4	4	0	4	4	0	4	3	1
TOTAL	52	52	0	52	52	0	52	28	24

3.2.3 Distribution Samples (Schedule 11, Section 11-2)

Distribution samples are collected every week and tested for E. Coli, Total Coliform, and for Heterotrophic Plate Count (HPC). Ontario Regulation 170/03, Schedule 11, Section 11-2 requires 1 distribution samples every two weeks for systems serving fewer than 101 residences to be tested for E. Coli and Total Coliform, and 25% of those samples are tested for HPC. In 2017, a total of 58 distribution samples were collected and analyzed for the above parameters, which is above the required number of samples (n=26, based on 37 residences), and 52 of those samples were tested for HPC. Each E. Coli and Total Coliform result was 0 cfu/100 mL. The range of HPC results were 0 – 5 cfu/100 mL. **Table 5** provides a summary of all bacteriological samples taken in the distribution system.

Table 5 – Microbiological (Schedule 11, Section 11-2) Results for Distribution System

Month	E.Coli			Total Coliform			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	4	1
Feb	4	4	0	4	4	0	4	2	2
Mar	4	4	0	4	4	0	4	4	0
Apr	4	4	0	4	4	0	4	2	2
May	7	7	0	7	7	0	5	4	1
Jun	6	6	0	6	6	0	4	1	3
Jul	6	6	0	6	6	0	4	2	2
Aug	5	5	0	5	5	0	5	3	2
Sep	4	4	0	4	4	0	4	4	0
Oct	5	5	0	5	5	0	5	3	2
Nov	4	4	0	4	4	0	4	3	1
Dec	4	4	0	4	4	0	4	2	2
TOTAL	58	58	0	58	58	0	52	34	18

3.3 Chemical Sampling & Testing as per Schedule 13, Ontario Regulation 170/03

3.3.1 Inorganics (Schedule 13, Section 13-2; Schedule 23)

Treated water samples are collected every 36 months and tested for inorganics. The most recent samples were collected on June 10, 2015 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23. All parameters were found to be within compliance. Inorganics will be sampled and analyzed again on or before June 10, 2018. Results from the June 10, 2015 samples can be found in **Table 6**.

Table 6 – Inorganics (Schedule 13, Section 13-2; Schedule 23) Results

Parameter	Whitechurch Treated Water (µg/L)	Maximum Allowable Concentration (µg/L)	Exceedance
Antimony	<0.2	6	No
Arsenic	0.2 <MDL	25*	No
Barium	904 801 877 883	1000	No
Boron	15	5000	No
Cadmium	0.012	5	No
Chromium	<0.5	50	No
Mercury	<0.02	1	No
Selenium	1 <MDL	10	No
Uranium	0.095	20	No

Note *: The Arsenic standard changes from a MAC of 25 µg/L to 10 µg/L in January 2018.

O. Reg. 170/03, Schedule 13: Increased frequency under ss. 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 Drinking Water Quality Standards, the frequency of sampling and testing for that parameter under that section shall be **increased** so that at least one water sample is taken and tested **every three months**.

3.3.2 Organics (Schedule 13, Section 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 10, 2015. All parameters were found to be within compliance. Organics will be sampled and analyzed again on or before June 10, 2018. Sample results can be found in **Table 7**.

Table 7 - Organics (Schedule 13, Section 13-4; Schedule 24) Results

Parameter	Whitechurch Treated Water	Maximum Allowable Concentration (µg/L)	Aesthetic Objective / Operational Guideline (µg/L)	Exceedance
Benzene	0.32 <MDL	5	--	No
Carbon Tetrachloride	0.16 <MDL	5	--	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	0.35 <MDL	30	--	No
Trichloroethylene	0.44 <MDL	50	--	No
Vinyl Chloride	0.17 <MDL	2	--	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
2,4-dichlorophenol	0.15 <MDL	900	0.3	No
2,4,6-trichlorophenol	0.25 <MDL	5	2	No
2,3,4,5-tetrachlorophenol	0.20 <MDL	100	1	No
Pentachlorophenol	0.15 <MDL	60	30	No
Alachlor	0.02 <MDL	5	--	No
Aldicarb	0.01 <MDL	9	--	No
Aldrin+Dieldrin	0.01 <MDL	0.7	--	No
Aldrin	0.01 <MDL	--	--	-
Dieldrin	0.01 <MDL	--	--	-
Atrazine+N-dealkylated metabolites	0.01 <MDL	5	--	No
Atrazine	0.01 <MDL	--	--	-
De-ethylated atrazine	0.01 <MDL	--	--	-
Azinphos-methyl	0.05 <MDL	20	--	No
Bendiocarb	0.01 <MDL	40	--	No
Carbaryl	0.05 <MDL	90	--	No
Carbofuran	0.01 <MDL	90	--	No
Chlordane	0.01 <MDL	7	--	No
a-chlordane	0.01 <MDL	--	--	-
g-chlordane	0.01 <MDL	--	--	-
Oxychlordane	0.01 <MDL	--	--	-

Table 7 - Organics (Schedule 13, Section 13-4; Schedule 24) Results Continued

Parameter	Whitechurch Treated Water	Maximum Allowable Concentration (µg/L)	Aesthetic Objective / Operational Guideline (µg/L)	Exceedance
Chlorpyrifos	0.02 <MDL	90	--	No
Cyanazine	0.03 <MDL	10	--	No
Diazinon	0.02 <MDL	20	--	No
(DDT)+Metabolites	0.01 <MDL	30	--	No
op-DDT	0.01 <MDL	--	--	-
pp-DDD	0.01 <MDL	--	--	-
pp-DDE	0.01 <MDL	--	--	-
pp-DDT	0.01 <MDL	--	--	-
Dimethoate	0.03 <MDL	20	--	No
Diuron	0.03 <MDL	150	--	No
Heptachlor-Heptachlor Epoxide	0.01 <MDL	3	--	No
Heptachlor	0.01 <MDL	--	--	-
Heptachlor epoxide	0.01 <MDL	--	--	-
Lindane	0.01 <MDL	4	--	No
Malathion	0.02 <MDL	190	--	No
Methoxychlor	0.01 <MDL	900	--	No
Metolachlor	0.01 <MDL	50	--	No
Metribuzin	0.02 <MDL	80	--	No
Parathion	0.02 <MDL	50	--	No
Phorate	0.01 <MDL	2	--	No
Prometryne	0.03 <MDL	1	--	No
Simazine	0.01 <MDL	10	--	No
Temephos	0.01 <MDL	280	--	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
2,4,5-trichlorophenoxyacetic acid	0.22 <MDL	280	20	No
Bromoxynil	0.33 <MDL	5	--	No
Dicamba	0.20 <MDL	120	--	No
Diclofop-methyl	0.40 <MDL	9	--	No
Dinoseb	0.36 <MDL	10	--	No
Picloram	1 <MDL	190	--	No

3.3.3 Trihalomethanes (Schedule 13, Section 13-6)

Distribution samples are taken every three months from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2017, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average. In 2017, the average THM was found to be 21.0 µg/L, which is within compliance. Refer to **Table 8** for the summary of trihalomethane results. In 2018, samples will be collected in February, May, August, and November.

Table 8 - Trihalomethane (Schedule 13, Section 13-6) Results

Month	THMs	Bromodichloro methane	Bromoform	Chloroform	Dibromochloro methane	Maximum Allowable Concentration	Exceedance
	Result (µg/L)	Result (µg/L)	Result (µg/L)	Result (µg/L)	Result (µg/L)	(µg/L)	
Feb	15.0	2.6	<0.34	12.0	0.54	100	No
May	18.0	3.7	<0.34	13.0	0.69	100	No
Aug	26.0	5.0	<0.34	20.0	1.1	100	No
Nov	25.0	5.2	<0.34	18.0	1.1	100	No
Average	21.0	4.1	<0.34	15.8	0.9		
Maximum	26.0	5.2	<0.34	20.0	1.1		

3.3.4 Haloacetic Acids (Schedule 13, Section 13-6.1)

Ontario Regulation 170/03 has been amended to include quarterly testing for Haloacetic acids (HAAs). One distribution sample are taken every three months from representative points in the distribution system and tested for Haloacetic Acids (HAAs). In 2017, samples were collected during the months of February, May, August, and November and results are expressed as a running annual average. Results are summarized in **Table 9**.

Table 9 - Haloacetic Acid (Schedule 13, Section 13-6.1) Results

Month	Total HAAs	Bromoacetic Acid	Chloroacetic Acid	Dichloroacetic Acid	Dibromoacetic Acid	Trichloroacetic Acid	Maximum Allowable Concentration	Exceedance
	Result (µg/L)	Result (µg/L)	Result (µg/L)	Result (µg/L)	Result (µg/L)	Result (µg/L)	(µg/L)	
Feb	5.4	<2.9	<4.7	5.4	<2.0	<5.3	80	No
May	<5.3	<2.9	<4.7	3.8	<2.0	<5.3	80	No
Aug	19.4	<2.9	<4.7	8.6	<2.0	10.8	80	No
Nov	20.8	<2.9	<4.7	8.2	<2.0	12.6	80	No
Average	12.7	<2.9	<4.7	6.5	<2.0	8.5		
Max	20.8	<2.9	<4.7	8.6	<2.0	12.6		

3.3.5 Nitrate & Nitrite (Schedule 13, Section 13-7)

One treated water sample is collected every three months and tested for nitrate and nitrite. In 2017, samples were collected during the months of February, May, August, and December. The Ontario Drinking Water Quality Standard (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 10**. In 2018, samples will be collected in February, May, August, and December.

Table 10 – Nitrate and Nitrite (Schedule 13, Section 13-7) Results

Month	Nitrite	Maximum Allowable Concentration	Exceedance	Nitrate	Maximum Allowable Concentration	Exceedance
	Result (mg/L)	(mg/L)		Result (mg/L)	(mg/L)	
Feb	<0.003	1	No	<0.006	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			<0.006		
Maximum	<0.003			<0.006		

3.3.6 Sodium (Schedule 13, Section 13-8)

One water sample is collected from the point of entry every 60 months and tested for Sodium. The Ontario Drinking Water Standards (ODWQS) have set a Maximum Acceptable concentration (MAC) of 200 mg/L for Sodium and requires the Medical Officer of Health be notified if the concentration exceeds 20 mg/L. This sample was collected on December 27, 2012. Refer to **Table 11**. The next water sample for Sodium will be collected and analyzed before March 2018.

3.3.7 Fluoride (Schedule 13, Section 13-9)

One water sample is collected from the point of entry at least once in every 60 months and tested for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L. On May 7, 2015, a sample was collected for this analysis. The next water sample for Fluoride will be collected and analyzed before August 2020. Refer to **Table 11**.

Table 11 – Sodium (Schedule 13, Section 13-8) and Fluoride (Schedule 13, Section 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	17.6	20.0	No	1.00	1.50	No

3.3.8 Lead (Schedule 15.1)

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 DWSS is currently under a reduced sampling program for lead where lead, pH and alkalinity are sampled in each season every 3 years. In the interim, pH and alkalinity are tested during each sampling season. One lead, pH and alkalinity samples were taken on March 29, 2017, and one lead, pH and alkalinity samples on September 12, 2017. These parameters are required to be sampled and analyzed again between the months of December 2017 and April 2018 and again between June and October 2018. Lead samples are required next in the 2020 sampling season. 2017 results can be found in **Table 12**.

Table 12 - Lead Sampling Program (Schedule 15.1) Results

Season	Alkalinity (mg/L)	pH	Lead (mg/L)	Maximum Allowable Concentration - Lead (mg/L)	Exceedance
Dec-Apr	267	7.41	0.00016	0.010	No
Jun-Oct	265	7.64	0.00005	0.010	No

3.3.9 Non-Regulatory Testing – Aesthetic Objectives and Operational Guidelines

Samples were collected 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*. Refer to **Table 13** for Aesthetic Objective/Operational Guideline results.

Table 13 – Aesthetic Objectives and Operational Guideline Results

Parameter	AO/OG	Whitechurch Treated Water
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	1.0
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 method detection limit

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

In 2017, 12% sodium hypochlorite (NaOCl) was used to treat the water that was provided to the distribution system. During the same time period, sodium silicate (Na₂SiO₃) was used for iron sequestering. Refer to **Table 14** for sodium hypochlorite usage and **Table 15** for sodium silicate usage.

Table 14 – Sodium Hypochlorite Usage

Month	Whitechurch	
	Usage (kg)	Average Dosage (mg/L)
Jan	4.08	5.24
Feb	2.86	5.47
Mar	2.86	5.39
Apr	3.09	5.02
May	4.67	6.09
Jun	3.45	5.49
Jul	3.45	5.64
Aug	3.55	5.77
Sep	2.92	5.83
Oct	3.07	6.03
Nov	2.86	5.39
Dec	2.94	5.86
TOTAL	39.80	--
Average	--	5.60

Table 15 – Sodium Silicate Usage

Month	Whitechurch	
	Usage (kg)	Average Dosage (mg/L)
Jan	21.43	27.51
Feb	13.91	26.60
Mar	14.32	26.97
Apr	14.64	23.80
May	20.60	26.86
Jun	13.91	22.15
Jul	15.41	25.18
Aug	15.79	25.67
Sep	14.01	27.96
Oct	13.70	26.92
Nov	14.32	26.97
Dec	13.70	27.29
TOTAL	185.74	--
Average	--	26.16

4.2 Annual Volumes

A summary of the water supplied to the distribution system in 2017 is provided in **Table 15**. This Table provides a breakdown of the monthly raw volumes provided to the treatment system. Each well has a flow meter, but there is no treated water meter. The annual calibration was performed by Corix Water Meter Service on July 11, 2017.

Table 15 – Raw Water Volume

Well # 1- South

Month	Avg Daily Volume (m ³)	Max Daily Volume (m ³)	Total Monthly Volume (m ³)
Jan	12.38	14.99	383.84
Feb	9.35	13.83	261.93
Mar	8.62	17.03	267.18
Apr	10.15	20.89	304.64
May	12.39	28.06	384.16
Jun	10.12	18.66	303.53
Jul	9.83	12.35	304.71
Aug	9.87	11.69	305.84
Sep	8.72	11.98	261.45
Oct	8.34	15.11	258.62
Nov	7.63	11.54	228.76
Dec	8.37	10.92	259.33
TOTAL	---	---	3,523.99
Average	9.65	---	---
Maximum	---	28.06	---
PTTW	---	260.00	---

Well # 2- North

Month	Avg Daily Volume (m ³)	Max Daily Volume (m ³)	Total Monthly Volume (m ³)
Jan	12.42	15.35	385.03
Feb	9.31	14.10	260.54
Mar	8.59	16.73	266.28
Apr	9.91	19.09	297.15
May	12.32	34.20	382.00
Jun	10.71	18.14	321.22
Jul	9.71	12.37	301.06
Aug	9.72	11.38	301.44
Sep	8.70	11.79	261.13
Oct	8.33	14.07	258.31
Nov	7.58	11.23	227.30
Dec	8.43	10.59	261.24
TOTAL	---	---	3,522.70
Average	9.64	---	---
Maximum	---	34.20	---
PTTW	---	260.00	---

Combined (Well # 1-South + Well # 2- North)

Month	Avg Daily Volume (m ³)	Max Daily Volume (m ³)	Total Monthly Volume (m ³)
Jan	24.80	30.12	768.87
Feb	18.66	27.93	522.47
Mar	17.21	33.76	533.46
Apr	20.06	39.98	601.79
May	24.71	54.05	766.16
Jun	20.83	36.80	624.75
Jul	19.54	24.72	605.77
Aug	19.59	23.05	607.28
Sep	17.42	23.77	522.58
Oct	16.68	29.18	516.93
Nov	15.20	22.77	456.06
Dec	16.62	21.06	515.33
TOTAL	---	---	7,041.45
Average	19.28	---	---
Maximum	---	54.05	---
PTTW	---	260.00	---

Parameters	Total Volume for 2017
Annual Total Flow, Actual (m ³)	7,041.45 m³
Annual Rated Capacity, PTTW (m ³)	94,900.00 m ³
Operating Capacity, Actual %	7.42%

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

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

Routine and preventative maintenance performed as per Jobs Plus schedule.

Semi-annual flushing in April and again in September.

January 2017: UPS power problems related to power outages
Generator transfer failure (Sommers and T&T serviced the generator)
Sample stations frozen

February 2017: Water supply to the POE analyzer was modified (Form 2)
Power outage

March 2017: communications failure

April-May 2017: Eramosa visited sites for SCADA system field audit
New watermain project

May 2017: AWQI # 132996 – UPS failure; UPS was replaced
Watermain rupture during construction – repaired live
Eramosa on-site for field audit

June 2017: SCADA Field Audit Report delivered to Township
AWQI # 133587 – Well Pump # 1 controller failure; control panel replaced by Hopper Well Drillers
MOECC Drinking Water Inspection

July 2017: Flow meter calibrations
Data gap due to a clock sync
Communications failure
SCADA Field Audit review meeting with Eramosa
Chlorine Pump # 1 replaced and Sodium Silicate Pump # 1 replaced

- August 2017: Georgian Bay Fire and Safety on-site for annual service of fire extinguishers and emergency lights
Backflow preventers were certified
- October 2017: Eramosa delivered SCADA upgrade progress report
- November 2017: Eramosa visited sites with HVAC engineer
- December 2017: Internal audit completed
Sample stations frozen

6.0 MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE INSPECTIONS AND REGULATORY ISSUES

- An MOECC Drinking Water Inspection was conducted on June 26, 2017 and awarded a rating of 99.19% (previous rating was 94.92%).
- Flow meter calibration was conducted on July 11th, 2017.
- A list of Capital Items was submitted to the Township of Huron-Kinloss of October 31st, 2017.
- DWQMS Internal Audit was conducted on December 5th and 6th, 2017.
- Emergency Response Exercise was conducted on December 20th, 2017, and related to chemical spills around the wellhead.
- A 36-month Risk Assessment was completed on October 20, 2016. The annual review was not started until January 2018.

Three adverse water quality events occurred at the Lucknow DWS during 2017:

- **AWQI # 132996:** May 4, 2017 – UPS and controller failure
- **AWQI # 133587:** June 25, 2017 – Well Pump controller failure

7.0 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 re-sampling requirements, and the removal of 13 pesticides came into effect January 1, 2016. These are:

- Strengthen standards for Carbon Tetrachloride, Benzene, and Vinyl Chloride;
- Adopt new standards for Chlorate, Chlorite, 1-Methyl-4-Chlorophenoxyacetic acid (MCPA) and Haloacetic Acids (HAAs); (NOTE: Chlorate and Chlorite testing is only required for Municipal Drinking Water Systems using Chlorine Dioxide treatment equipment.)
- Clarify/optimize testing, sampling and reporting requirements for Trihalomethanes (THMs) and HAAs; and
- Remove 13 pesticides from testing requirements.

Some of the aforementioned amendments have been phased in, and over the next few years, the following amendments will be added. Refer to **Table 16** for the new Regulatory Requirements. Subsequent phase-in dates are:

- January 1, 2018: Updates to standards for Arsenic come into effect / require reporting
- January 1, 2020: New standards for HAAs and HAAs testing optimization rule for smaller systems will come into effect / require reporting.

Table 16 – Regulatory Requirements

Parameter	Current Requirement		Amended Requirement	
	MAC	½ MAC	*New MAC	*New ½ MAC
Arsenic	25 µg/L	12.5 µg/L	10 µg/L	5 µg/L
Benzene	5 µg/L	2.5 µg/L	1 µg/L	0.5 µg/L
Carbon Tetrachloride	5 µg/L	2.5 µg/L	2 µg/L	1 µg/L
Vinyl Chloride	2 µg/L	1 µg/L	1 µg/L	0.5 µg/L

7.1 ARSENIC REVIEW

Historic Arsenic values were reviewed from 2003 to 2015 and are shown in **Table 17**.

Table 17 – Historic Arsenic Values

Date	Whitechurch Treated Water (µg/L)
Feb 2003	<2
Jun 2003	<2
Jun 2006	0.8
Jan 2008	0.6
Jun 2009	0.5
Nov 2010	0.5
Dec 2010	0.5
Aug 2011	0.6
Nov 2011	0.5
Aug 2012	0.6
Nov 2012	0.5
Sep 2013	0.6
Nov 2013	0.4
Sep 2014	0.5
Dec 2014	0.4
Jun 2015	0.2

7.1.1 ARSENIC SAMPLING IMPACT

A review of the sample results between 2003 and 2015 indicates that Arsenic should not exceed the amended ½ MAC requirements at the Whitechurch facility. Historic values of the other parameters (Benzene, Carbon Tetrachloride, and Vinyl Chloride), are all below the amended standards prescribed as well.

Arsenic testing will commence in the first quarter of 2018.

NOTE:

O. Reg. 170/03, Schedule 13: Increased frequency under ss. 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 Drinking Water Quality Standards, the frequency of sampling and testing for that parameter under that section shall be increased so that at least one water sample is taken and tested every three months.

8.0 WELL LEVELS

Whitechurch's Permit To Take Water, which dictates the capacity in which each well supply is permitted to supply, indicates specific monitoring parameters. In addition to flow, static well levels are taken on a monthly basis to monitor the performance of the aquifer. **Table 18** provides a summary of the well levels recorded for 2017.

Table 18 - Well Levels

Month	Well # 1- South (ft)	Well # 2- North (ft)
Jan	41.70	40.08
Feb	40.50	39.17
Mar	41.00	39.40
Apr	41.40	39.80
May	40.20	39.00
Jun	41.10	40.00
Jul	40.20	38.92
Aug	42.00	41.00
Sep	42.70	41.50
Oct	43.50	42.00
Nov	41.00	40.83
Dec	41.40	39.83
Min	40.20	38.92
Max	43.50	42.00
Avg	41.39	40.13