Annual Report

For the 2017 Operating Year

Huron Sands Drinking Water System
2017 Operation and Maintenance
Annual Report

PREPARED BY

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TO

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1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2017 Annual Report is to document the operation and maintenance data for the Huron Sands Drinking Water System for review by the Ministry of the Environment in accordance with O. Reg. 170/03. This report covers January 1, 2017 to December 31, 2017. A copy of this report will be submitted to the owner to be uploaded to the township's website and can be supplied to interested parties upon request.

2.0 DESCRIPTION OF WATER SYSTEM

The Huron Sands Drinking Water System (DWS **#220007757**), is characterized as a "secure ground water" system and is classified as a small municipal residential system. It is owned by the Township of ACW and operated by Veolia Water
Canada, the Operating Authority. The system consists of one well with chlorination treatment and iron sequestering, and is operated seasonally between April and November.

The entire system is located on Front Concession, Lot 19, in the Huron Sands Subdivision of Ashfield-Colborne-Wawanosh Township. The Huron Sands well house is located at 85019 Michelle St. S, Huron Sands Subdivision, Ashfield-Colborne-Wawanosh. The distribution system serves the community of Huron Sands with a population of approximately 100 residents, with approximately 48 customer services.

Well # 1, drilled in 2001, is a secure deep bedrock well, 200 mm, 100 metres deep, equipped with a submersible pump with a rated capacity of 3.8 L/s, with instrumentation and control equipment, and 50 mm discharge line connected to the pump house. The well house and its equipment have a daily capacity to deliver 328 m^3 of potable water per day to the Huron Sands community.

The well house is equipped with a flow control valve, a chlorine pump, a chemical feed pump for iron sequestering, a chlorine contact watermain, on-line chlorine monitoring, alarm generation, data recorder and auto-dialer. A double throw manually operated transfer switch is available allowing the use of a portable gen set during extended power outages.

The water from the well is pumped to a chlorine contact main (900 mm x 6.1 metres long DR41 PVC) to provide adequate chlorine contact time at maximum flow and before the first consumer, complete with a sampling / service water connection feed back to the pump house. The distribution system is constructed with a combination of PVC piping with polyethylene services.

There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks and the well pump.

The system has no fire hydrants and lacks the capacity to provide fire flows.

Disinfection is achieved on the Huron Sands well supply through the use of 6% sodium hypochlorite. In the well house, this chemical is added prior to the water entering the chlorine contact main at dosages high enough to achieve both primary and secondary disinfection objectives.

The chlorine dosages range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/L and < 1.30 mg/L.

The limiting factor regarding flow is chlorine contact time in the chlorine contact main. In order to meet the regulatory CT requirements (CT value > 3.0), increased flows beyond 3.8 L/s must have an adequate free chlorine residual to counter the decreased retention time in the chlorine contact watermain.

The treated water is monitored by an on-line chlorine analyzer.

Distribution piping typically ranges in size from 50 mm to 100 mm, and consists of PVC piping, with polyethylene service connections.

A 100 mm diameter discharge watermain outside the pump house supplies treated water to the Huron Sands Estates Subdivision.

Typical system pressure ranges from 40 P.S.I to 60 P.S.I.

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation and Monitoring

3.1.1 Point of Entry Chlorine Residual

Chlorine residuals are continuously measured using a HACH CL17 online chlorine analyzer and verified for accuracy using hand-held HACH pocket colourimeters. **Table 1** shows the monthly average of free chlorine residual values on the treated water at the point of entry.

3.1.2 Distribution Chlorine Residual

Chlorine residuals in the distribution system are checked using a HACH pocket colourimeter. In 2017, 223 distribution chlorine residuals were recorded.

Table 1. – Treated and Distribution Chlorine Residuals for Huron Sands Drinking Water System

Date	Average Treated Chlorine Residual (mg/L)	Average Distribution Chlorine Residual (mg/L)
Jan	-	-
Feb	-	-
Mar	-	-
Apr	1.41	1.48
May	1.43	1.27
Jun	1.37	1.24
Jul	1.37	1.31
Aug	1.47	1.31
Sep	1.30	1.18
Oct	1.37	1.27
Nov	1.38	1.19
Dec	-	-
Average	**1.40**	**1.28**
Min	**0.73**	**0.86**
Max	**3.16**	**2.65**
# Samples	**8760**	**223**

3.1.3 Turbidity

Turbidity is measured using a pocket turbidimeter. **Table 2.** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the treated water was 0.68 NTU.

Table 2. – Raw and Treated Water Turbidities for Huron Sands Drinking Water System

Date	Average Raw Turbidity (NTU)	Average Treated Turbidity (NTU)
Jan	-	-
Feb	-	-
Mar	-	-
Apr	0.23	0.33
May	0.35	0.20
Jun	0.48	0.29
Jul	0.25	0.24
Aug	0.34	0.20
Sep	0.37	0.24
Oct	0.38	0.32
Nov	0.35	0.56
Dec	-	-
Average	**0.34**	**0.28**
Min	**0.23**	**0.13**
Max	**0.48**	**0.68**
# Samples	**8**	**143**

3.2 Microbiological Sampling

3.2.1 Raw Water Samples

Raw water samples are taken every two weeks. In 2017, a total of 18 samples were collected and analyzed for E. coli and Total Coliforms. Each E. coli and Total Coliform result obtained was 0 cfu/100 ml in the raw water. **Table 3.** provides a summary of bacteriological results performed on the raw water.

Table 3. – Microbiological Results for Raw Water at Huron Sands Drinking Water System

Date	E. coli			Total Coliform		
	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples ≥1
Jan	-	-	-	-	-	-
Feb	-	-	-	-	-	-
Mar	-	-	-	-	-	-
Apr	2	2	0	2	2	0
May	3	3	0	3	3	0
Jun	2	2	0	2	2	0
Jul	3	3	0	3	3	0
Aug	2	2	0	2	2	0
Sep	2	2	0	2	2	0
Oct	3	3	0	3	3	0
Nov	1	1	0	1	1	0
Dec	-	-	-	-	-	-
Total	**18**	**18**	**0**	**18**	**18**	**0**

3.2.2 Treated Water (Point of Entry) Samples

One treated water sample from the point of entry is taken every two weeks and analyzed for E.Coli, Total Coliforms and for Heterotrophic Plate Count (HPC). A total of 17 treated water sampled were collected and analyzed for the above parameters. All samples were found to be safe. Each E. coli and total coliform result from the treated water was 0 cfu/100 ml. The range of HPC results were 0 - 7 cfu/100 ml. **Table 4.** provides a summary of all bacteriological results performed on treated water.

Table 4. – Microbiological Results for Point of Entry at Huron Sands Drinking Water System

Date	E. coli			Total Coliform			HPC		
	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples ≥1	# Samples	Safe	Deteriorating
Jan	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-
Apr	2	2	0	2	2	0	2	2	0
May	3	3	0	3	3	0	3	3	0
Jun	2	2	0	2	2	0	2	2	0
Jul	2	2	0	2	2	0	2	2	0
Aug	2	2	0	2	2	0	2	2	0
Sep	2	2	0	2	2	0	2	2	0
Oct	3	3	0	3	3	0	3	3	0
Nov	1	1	0	1	1	0	1	1	0
Dec	-	-	-	-	-	-	-	-	-
Total	**17**	**17**	**0**		**17**	**0**		**17**	**0**

3.2.3 Distribution System

Distribution samples are collected every two weeks and tested for E.Coli, Total Coliform and for Heterotrophic Plate Count (HPC). In 2017, a total of 18 distribution samples were collected and analyzed for the above parameters. All E. coli and total coliform result from the treated water were 0 cfu/100 ml. The range of HPC results were 0 - 10 cfu/100 ml. **Table 5.** provides a summary of all bacteriological samples taken in the distribution system.

Table 5. – Microbiological Results for Huron Sands Distribution System

Date	E. coli			Total Coliform			HPC		
	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples ≥1	# Samples	Safe	Deteriorating
Jan	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-
Apr	2	2	0	2	2	0	2	2	0
May	3	3	0	3	3	0	3	3	0
Jun	2	2	0	2	2	0	2	2	0
Jul	3	3	0	3	3	0	3	3	0
Aug	2	2	0	2	2	0	2	2	0
Sep	2	2	0	2	2	0	2	2	0
Oct	3	3	0	3	3	0	3	3	0
Nov	1	1	0	1	1	0	1	1	0
Dec	-	-	-	-	-	-	-	-	-
Total	**18**	**18**	**0**	**18**	**18**	**0**	**18**	**18**	**0**

3.3 Chemical Sampling & Testing

3.3.1 Inorganics

One treated water sample is taken every 60 months and tested for inorganics. The most recent samples for the Huron Sands Drinking Water System were collected on June 21, 2016 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 21, 2021. Results from 2016 can be found in **Table 6.**

Table 6. – Schedule 23 Results for Huron Sands Drinking Water System

Parameter	Result (µg/L)	Maximum Allowable Concentration (µg/L)
Antimony	<0.02	6
Arsenic	4.5	25
Barium	30.2	1000
Boron	94	5000
Cadmium	0.004	5
Chromium	0.29	50
Mercury	<0.01	1
Selenium	<0.04	10
Uranium	1.43	20

3.3.2 Lead

Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken once between June 15 and October 15. The Maximum Allowable Concentration for Lead is 0.01 mg/L. In the previous lead sampling seasons, pH, lead and alkalinity samples were taken on August 28, 2017. 2017 results can be found in **Table 7.**

Table 7. – Lead Sampling Program Results for Huron Sands Drinking Water System

	Lead (mg/L)	pH	Alkalinity (mg/L)
Jun-Oct	0.00014	7.63	184

3.3.3 Organics

One treated water sample is taken every 60 months and tested for schedule 24 organic parameters. The most recent samples were collected on June 21, 2016. All parameters were found to be within compliance. Organics will be sampled and analyzed again on or before June 21, 2016, 2021. 2016 sample results can be found in **Table 8.**

Table 8. – Schedule 24 Results for Huron Sands Drinking Water System

Parameter	Result (µg/L)	Maximum Allowable Concentration (µg/L)
Benzene	<0.32	5
Carbon Tetrachloride	<0.16	5
1,2-Dichlorobenzene	<0.41	200
1,4-Dichlorobenzene	<0.36	5
1,1-Dichloroethylene	<0.33	14
1,2-Dichloroethane	<0.35	5
Dichloromethane	<0.35	50
Monochlorobenzene	<0.3	80
Tetrachloroethylene	<0.35	30
Trichloroethylene	<0.43	50
Vinyl Chloride	<0.17	2
Diquat	<1	70
Paraquat	<1	10
Glyphosate	<1	280
Polychlorinated Biphenyls	<0.04	3
Benzo(a)pyrene	<0.004	0.01
2,4-dichlorophenol	<0.15	900
2,4,6-trichlorophenol	<0.25	5
2,3,4,6-tetrachlorophenol	<0.20	100
Pentachlorophenol	<0.15	60
Alachlor	<0.02	5
Atrazine+N-dealkylated metabolites	<0.01	5
Atrazine	<0.01	-
De-ethylated atrazine	<0.01	-
Azinphos-methyl	<0.05	20
Carbaryl	<0.05	90
Carbofuran	<0.01	90
Chlorpyrifos	<0.02	90
Diazinon	<0.02	20
Dimethoate	<0.03	20
Diuron	<0.03	150
Malathion	<0.02	190
Methoxychlor	<0.01	900
Metolachlor	<0.01	50
Metribuzin	<0.02	80
Phorate	<0.01	2
Prometryne	<0.03	1
Simazine	<0.01	10
Terbufos	<0.01	1
Triallate	<0.01	230

Trifluralin	<0.02	45
2,4-dichlorophenoxyacetic acid	<0.19	100
Bromoxynil	<0.33	5
Dicamba	<0.20	120
Diclofop-methyl	<0.40	9
MCPA	<0.00012	0.00012
Picloram	<1	190

3.3.4 Trihalomethanes and Haloacetic Acids

One distribution sample is taken every three months from a point in the distribution system and tested for Trihalomethanes (THMs) and Haloacetic Acids (HAAs). In 2017, samples were collected during the months of May, August and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for THMs and it is expressed as a running annual average. Currently there is no MAC for HAAs. In 2017, the average THM was found to be 8.73 µg/L, which is within compliance. Refer to **Table 9.** for the summary of trihalomethane and haloacetic acid results.

3.3.5 Nitrate & Nitrite

One treated water sample is taken every three months and tested for nitrate and nitrite. 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 1 mg/L for nitrites and 10 mg/L for nitrates. The results were found to be within compliance. Refer to **Table 9.**

Table 9. – Nitrate, Nitrite, THM and HAA Results at Huron Sands Drinking Water System

	Nitrate		**Nitrite**		**THMs**		**HAAs**	
Date	# Samples	Result (mg/L)	# Samples	Result (mg/L)	# Samples	Result (µg/L)	# Samples	Result (µg/L)
May	1	<0.006	1	<0.003	1	8.4	1	<5.3
Aug	1	<0.006	1	<0.003	1	9.0	1	<5.3
Nov	1	<0.006	1	<0.003	1	8.8	1	<5.3
Total	3		3		3		3	
Average		<0.006		<0.003		8.73		<5.3
Maximum		<0.006		<0.003		9.0		<5.3

3.3.6 Sodium

One water sample is collected every 60 months and tested for Sodium. O. Reg 170/03 has set a Maximum Acceptable concentration (MAC) of 20 mg/L for Sodium which requires the Medical Office of Health be notified if the concentration exceeds the MAC. These samples were last collected on June 21, 2016 and were found to be 18.2 mg/L, which is within compliance. The next water sample for Sodium will be collected and analyzed on or before June 21, 2021.

3.3.7 Fluoride

One water sample is collected 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 August 22, 2017 and August 25, 2017 a sample was collected for this analysis. The first sample was found to have a concentration of 2.13 mg/L and the second set came back at 2.19 mg/L, which are both greater than the MAC. This is due to high levels of naturally occurring fluoride in the aquifer. For more information see:
http://www.acwtownship.ca/wordpress/wp-content/uploads/2013/09/HuronSands.pdf.
The next water sample for Fluoride will be collected and analyzed on or before August 22, 2022.

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

Refer to **Table 10.** From January 1, 2017 to December 31, 2017, 13.09 kg of sodium hypochlorite was used to ensure proper disinfection in the distribution system with an average dosage of 5.33 mg/L. 58.38 kg of sodium silicate was used in 2017 to reduce the concentration of dissolved iron.

Table 10. – Chemical Usage at Huron Sands Drinking Water System

Date	Sodium Hypochlorite		Sodium Silicate
	Usage (kg)	Average Dosage (mg/L)	Usage (kg)
Jan	-	-	-
Feb	-	-	-
Mar	-	-	-
Apr	1.28	4.58	2.51
May	1.62	4.48	2.00
Jun	1.52	4.16	1.97
Jul	2.60	4.48	0.97
Aug	2.54	3.80	0.86
Sep	1.47	4.60	2.26
Oct	1.14	5.30	4.62
Nov	0.93	11.22	5.49
Dec	-	-	-
Total	**13.09**		**58.38**
Average		**5.33**	

4.2 Annual Flows

A summary of the water supplied to the distribution system in 2017 is provided in **Table 11.** This Table provides a breakdown of the monthly flow provided to the distribution system.

Flow meters were calibrated on July 17, 2017 by Corix and were found to be acceptable.

Table 11. – Treated Water Flows for Huron Sands Drinking Water System

Date	Average Daily Flow (m^3)	Maximum Daily Flow (m^3)	Total Monthly Flow (m^3)
Jan	-	-	-
Feb	-	-	-
Mar	-	-	-
Apr	11.16	48	279
May	11.68	23	362
Jun	12.17	32	365
Jul	18.77	35	582
Aug	21.52	40	667
Sep	10.63	31	319
Oct	6.94	38	215
Nov	5.19	33	83
Dec	-	-	-
Average	**13**		
Max		**48**	
Total			**2872**

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

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

- New auto dialer installed on April 11, 2017
- New Hach CL17 chlorine analyzer installed on July 26th, 2017.
- Backflow preventer checked on August 22, 2017

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

The Huron Sands Drinking Water System was not inspected in 2017.

Instances of adverse water quality:

AWQI #134626 - on July 25 and 26th, 2017, Huron Sands was subject to an extended power outage which caused a chlorine analyzer failure. Distribution chlorine residuals throughout the system were at normal levels. The chlorine analyzer was replaced. The residents were placed on a Precautionary Boil Water Notice until distribution samples came back clear.

AWQI #135891 – on August 24, 2017 a treated water fluoride sample was received which came back as 2.13 mg/L which is over the Maximum Acceptable Concentration (MAC). A re-sample was taken that came back over the MAC at 2.19 mg/L. The Huron County Health Unit drafted a letter to residents informing them of the health effects of high fluoride in drinking water.

7.0 MOECC Regulatory Changes

It should be noted that there will be some upcoming changes to Ontario Regulation 170/03 and Ontario Regulation 169/03 that strengthen standards and clarify testing requirements as follows:

- Strengthen standards for Arsenic, 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.

The aforementioned amendments will be phased in over the next four years to allow system owners and/or operators the opportunity to collect baseline information and complete required system upgrades. Currently, the new sampling, testing, reporting and re-sampling requirements, and the removal of 13 pesticides came into effect January 1, 2016. As well, testing requirements for HAAs and updates to standards for Carbon Tetrachloride, Benzene, Vinyl Chloride, Chlorate, Chlorite, and MCPA came into effect January 2017. Refer to **Table 12** 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 12 – Regulatory Requirements

Parameter	**Current Requirement**		**Amended Requirement**	
	MAC	**½ MAC**	**MAC**	**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