

Annual Report

For the 2017 Operating Year

Blyth 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 Blyth 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, free of charge, to interested parties upon request.

2.0 DESCRIPTION OF WATER SYSTEM

The Blyth Drinking Water System (DWS # **220001496**), is characterized as a "secure ground water" system and is classified as a large municipal residential system. The system consists of three wells (1, 2 and 5) with a rated capacity of 2877 m³/day with the inclusion of Well 5 (1728 m³/d), put in operation December 21, 2016. Treatment consists of chlorination (sodium hypochlorite) and iron sequestration (sodium silicate) treatment. The Well 1 and 2 system is located at 201 Thuell St. Well #5 is located in the north east corner of 377 Gypsy Lane. The distribution system serves the community of Blyth with a population of approximately 1000 residents, 450 customer services, with 12.7 km of various size and material water main.

The system is owned by the Corporation of the Township of North Huron and operated by Veolia Water Canada, the Operating Authority.

The Wells 1 and 2 water supply system consists of two drilled wells fitted with pumps capable of pumping the volume specified in the MOE Permit to Take Water. The raw water consistently has substantial naturally occurring hardness and relatively high iron content that requires sequestering to prevent discoloration in the distribution system which is typical of all drilled wells in the area. The raw water also has fluoride concentrations that hover at or just above the maximum allowable concentration in O.Reg 169/03 which is typical of the drilled wells in the area. Chlorine, (a critical process) and an iron sequestering agent are added to the raw water prior to entry into a baffled contact tank that satisfies the chlorine contact time required with adequate chlorine residual to disinfect.

From the contact tank/reservoir the water flows to the high lift building that houses two electrically driven high lift pumps, as well as a diesel engine driven fire pump, that are capable of maintaining adequate system pressure. The water level in the reservoir is maintained by a level controller that starts and stops the well pumps. Also housed in the building is a manually operated standby emergency generator that allows operation of the equipment during extended power interruptions. The building contains cushion tanks that absorb hydraulic shocks and maintain pressure during brief power interruptions. The treated drinking water is monitored for chlorine residual and turbidity by on-line equipment connected to an auto dialer. The monitoring system will alert the on-call operator to respond if the set points are breached. The chlorine and turbidity analysis data levels are stored on a data logger.

The distribution system has no elevated storage and relies on the pumps and cushion tanks to maintain pressure. Critical processes to ensure safe water are adequate chlorination and maintenance of system pressure. The monitors activate an alarm through the auto dialer if the set points are breached.

The raw water has abnormally high chlorine demand, coupled with sequestering agent and high background sodium levels that result in elevated sodium in the treated water just above the maximum allowable concentrations in O.Reg 169/03.

Well # 5 was put into service in December 21, 2016, as a second isolated source. It is a 175 mm drilled well, 83.5 m deep. Well # 5 is equipped with a submersible vertical turbine pump, well level sensor to measure static level and provide well level monitoring. At this stage of development of the system (phase 1 of 3), Well 5 has been designed to operate on a time of day basis to run twice per day during peak demand times and controlled with a variable speed drive to maintain the desired pressure set point in the distribution system as well as to provide additional volume of water during periods of high water demand such as fire protection.

Although the well has not been in service long enough to have stabilized within the aquifer to determine average quality, it appears to be lower in fluoride, sodium and iron, chlorine demand with similar hardness and alkalinities.

The well house is equipped with back-up diesel generator, complete with auto transfer, sodium hypochlorite (2) and sodium silicate (2) pumps, a chlorine contact loop, on-line monitoring, alarm generation and auto-dialer.

The well house and its equipment have a daily maximum capacity to deliver 1728 m3 per day to the Blyth community.

The water from Well 5 is pumped through a main header where sodium hypochlorite and sodium silicate are added and directed to a chlorine contact loop to provide adequate chlorine concentration/contact time at maximum flow and before the first consumer.

The water quality is monitored and data-logged by a programmable logic controller with breaches of set-points going to an alarm dialer.

Disinfection is achieved on the Blyth well supply through the use of 12% sodium hypochlorite. In the well houses this chemical is added prior to the water entering the chlorine contact reservoir at a suitable dose rate to achieve both primary and secondary disinfection objectives.

The attached distribution system is constructed with a combination of ductile iron, cast iron, PVC and high density polyethylene piping with polyethylene, copper and galvanized steel services. There are no known lead services. There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks, 3 high lift pumps (2 electric and a diesel) and 1 variable speed submersible (Well 5).

The system has approximately 45 fire hydrants that with the additional 20L/s flow from the new Well 5 will provide much improved sustained fire flows. Coupled with the new well, flow testing of the hydrants will take place in 2017 to verify the degree of improvement to report to the Fire Chief.

The chlorine dosages range varies with the chlorine demand of the raw water.

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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 Blyth well supply has 1 PTTW (Permit To Take Water) # 6057-A3SJAU with an expiry date of November 30, 2025, which allows 3504.960 cubic metres per day to be pumped from the combined wells.

The Blyth Drinking Water System (treatment Subsystem) has maximum flows as specified in the Municipal Drinking Water Licence (MDWL) 090-101, Issue 2 and Drinking Water Works Permit (DWWP) 090-201, Issue 3. The maximum total daily flow is 2877 cubic meters per day. Authorization to operate Well 5 is in a Form C addendum to the DWWP. Well 5

The pre-chlorine entering the contact facilities and treated water (point of entry to distribution) is monitored by on-line chlorine analyzers.

Typical system pressure ranges from 40 psi at the higher elevations to 85 psi at Wells 1 and 2 which is the lowest elevation of the system.

Well 5 system pressure ranges between 53psi to 65psi under normal operating conditions

Permit to Take Water 6057-A3SJAU Compliance Report					
3.2 -Maximum Amount of Taking Permitted					
	Max/Day on Permit	Peak Flow	%of Limit		
Well #1 (in m3)	653 m3	341	52.2	%	
Well #2 (in m3)	1123 m3	356	31.7	%	
Well #5 (in M3)	1728 m3	310	17.9	%	
3.2 - Average Annual Amount of Taking Permitted					
	m3/year	m3/year			
Well #1 (in m3)	238345	58138	24.4	%	
Well #2 (in m3)	409968	52028	12.7	%	
Well #5 (in M3)	630720	61381	9.7	%	

Capacity Report					
Total Peak Flow					
	Maximum	Actual	%of Cap		
Capacity (m3/d)	3504	474	13.5	%	

Total Average Flow					
Capacity (m3/d) W1	653	13.3	2.0	%	
Capacity (m3/d) W2	1123	11.9	1.1	%	
Capacity (m3/d)W5	1728	14	0.8	%	

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 an online chlorine analyzer and verified for accuracy using hand-held HACH pocket colourimeters which accuracies are verified using known standards. **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 daily using a HACH pocket colourimeter. In 2017, 459 distribution chlorine residuals were recorded.

Table 1. – Treated and Distribution Chlorine Residuals for Blyth Drinking Water System ^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Wells 1 &2																
Average Treated FCR- mg/L	1.06	1.12	1.05	1.06	1.00	1.03	1.06	1.06	1.03	0.96	1.13	1.14	1.06	0.77	1.75	365
Average Distribution FCR – mg/L																
Average Distribution FCR – mg/L	0.94	0.97	0.92	0.89	0.82	0.91	0.86	0.89	0.83	0.92	1.00	0.91	0.91	0.50	1.45	459
Wells 5																
Average Treated FCR- mg/L	1.00	1.01	1.00	1.10	1.04	1.12	1.15	1.23	1.29	1.41	1.40	1.38	1.18	0.68	1.95	365

^a – Results collected from January 1, 2017 – December 31, 2017

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3.1.3 Turbidity

Turbidity is measured daily using a portable field turbidimeter at Well 5 and an on-line turbidimeter at Wells 1 and 2. **Table 2** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the treated water was 0.97 NTU.

Table 2 – Raw and Treated Water Turbidities for Blyth Drinking Water System ^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Average Well 1																
Raw Water	0.21	0.19	0.15	0.12	0.17	0.22	0.16	0.18	0.17	0.19	0.18	0.19	0.18	0.12	0.22	40.00
Turbidity(NTU)																
Average Well 2																
Raw Water	0.19	0.22	0.20	0.18	0.20	0.20	0.21	0.20	0.21	0.20	0.22	0.19	0.20	0.18	0.22	46.00
Turbidity(NTU)																
Average																
Treated (1&2)	0.06	0.06	0.05	0.08	0.14	0.06	0.10	0.08	0.10	0.12	0.06	0.10	0.08	0.03	0.97	365
Turbidity(NTU)																
Average Well 5																
Raw Water	0.73	0.44	0.22	0.24	0.16	0.15	0.15	0.23	0.22	0.21	0.21	0.20	0.26	0.15	0.73	46.00
Turbidity																
Average																
Treated (5)	0.28	0.19	0.15	0.11	0.09	0.10	0.16	0.18	0.10	0.10	0.11	0.09	.14	0.07	0.48	48
Turbidity(NTU)																

^a – Results collected from January 1, 2017 – December 31, 2017

3.2 Microbiological Sampling

3.2.1 Raw Water Samples

Raw water samples are taken every week from each of Well 1, 2 and well 5. In 2017, a total of 156 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.

3.2.2 Treated Water (Point of Entry) Samples

One treated water sample from the point of entry is taken every week and analyzed for E.Coli, Total Coliforms and Heterotrophic Plate Count (HPC) at Wells 1, 2 and Well 5. A total of 104 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. Currently, there is no limit on HPC. 103 samples were found to be safe, with 1 deteriorating. The range of HPC results were 0 - 380 cfu/100 ml and excluding 1 abnormal results of February 28, 2017 of 380, (following sample on Mar 7, 2017 <10). Given no abnormal results in the distribution or subsequent samples, it is suspected to be sampling error where the sample lines were not flushed properly or, since it is not common practice to sterilize sample port, debris in sample port.

3.2.3 Distribution System

Distribution samples are collected every week and tested for E.Coli, Total Coliform and for Heterotrophic Plate Count (HPC) in at least 25% of the samples. In 2017, a total of 168 distribution samples were collected and analyzed for the above parameters and all samples were found to be safe except for 1 sample where there was an incident of a 1 TC on August 15, 2017. This location, along with an upstream and downstream resample was done with those results at zero. The range of HPC results were <10 - 270 cfu/100 ml in all 52 samples. All E. coli results from the treated water were 0 cfu/100 ml.

3.3 Chemical Sampling & Testing

3.3.1 Inorganics

One treated water sample is taken every 36 months and tested for inorganics. The most recent sample for the Blyth Drinking Water System was collected on November 28, 2016 from Well 5 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 May 2018 from all 3 wells to coordinate the sample event. Results from 2016 can be found in **Table 6**.

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Table 6. – Schedule 23 Results for Blyth Drinking Water System – Well 5 ^a

Parameter	Result (µg/L)	Maximum Allowable Concentration (µg/L)
Antimony	0.08	6
Arsenic	6.0	25
Barium	212	1000
Boron	57	5000
Cadmium	0.015	5
Chromium	0.38	50
Mercury	<0.01	1
Selenium	<0.04	10
Uranium	0.478	20

^a – Samples collected on Nov 28, 2016.

3.3.2 Lead

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 Maximum Allowable Concentration for Lead is 10 µg/L. In the two previous lead sampling seasons, pH and alkalinity samples were taken in March 2017 and one pH and alkalinity sample on September 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 is scheduled to be sampled again in the 2018 sampling season. 2017 results can be found in **Table 7**.

Table 7. – Lead Sampling Program Results for Blyth Drinking Water System ^a

	pH	Lead	Alkalinity (mg/L)
Dec-Apr	7.71, 7.20	2.59, 7.0, 0.19, 0.05	208, 213
Jun-Oct	7.52, 7.44		198, 210

^a – Samples collected on March 30, 2017 and September 28, 2017 respectively.

3.3.3 Organics

One treated water sample is taken every 36 months and tested for organics. The most recent sample for the Blyth Drinking Water System was collected on November 28, 2016 from Well 5 and submitted to the laboratory for analysis of inorganics as listed in Schedule 24. All parameters were found to be within compliance. Organics will be sampled and analyzed again on or before May 2018, at the same time as Well 1 and 2 to coordinate the sample event. 2016 sample results can be found in **Table 8**.

Table 8. – Schedule 24 Results for Blyth Drinking Water System ^a

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	<0.44	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

^a – Samples collected on June 21, 2016.

3.3.4 Trihalomethanes

One distribution sample is taken every three months from a point in the distribution system and tested for Trihalomethanes (THMs). In 2017, samples were collected during the months of February, April, July and October. 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 11.8 µg/L, which is within compliance. Refer to **Table 9**, for the summary of trihalomethane 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, April, July and October. 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 and THM Results at Blyth Drinking Water System ^a

Treated Drinking Water - Nitrites and Nitrates					POE Well 1& 2									
													O.Reg 169	
Date		Feb 3-17		Apr 11-17		July 11-17		Oct 3-17		Min	Max	Avg	MAC	1/2 MAC
NO2	<	0.003	<	0.012	<	0.003	<	0.003		0.003	0.012	0.005	1	0.5
NO3	<	0.006	<	0.007	<	0.012	<	0.01		0.006	0.012	0.009	10	5
NO2+NO3	<	0.006	<	0.019	<	0.012	<	0.01		0.006	0.019	0.012	10	5

Treated Drinking Water - Nitrites and Nitrates					POE Well 5									
													O.Reg 169	
Date		Feb 3-17		Apr 11-17		Jul 11-17		Oct 3-17		Min	Max	Avg	MAC	1/2 MAC
NO2	<	0.003	<	0.009	<	0.003	<	0.003		0.003	0.009	0.005	1	0.5
NO3	<	0.006	<	0.008	<	0.007	<	0.017		0.006	0.017	0.010	10	5
NO2+NO3	<	0.006	<	0.017	<	0.007	<	0.017		0.006	0.017	0.012	10	5

Distribution Drinking Water - Trihalomethanes														
		Feb 3-17		Apr 11-17		Jul 11-17		Oct 3-17		Min	Max	Avg	MAC	1/2 Mac
THMs (total)		12		11		10		14		10.0	14.0	11.8	100	50
Bromodichloromethane		2.2		1.9		1.7		2.5		1.7	2.5	2.1		
Bromoform		0.34		0.34		0.34		0.34		0.340	0.340	0.340		
Chloroform		9.8		8.1		8.2		11.0		8.1	11.0	9.3		
Dibromochloromethane		0.47		0.48		0.45		0.58		0.45	0.58	0.50		

^a – Results collected from January 1, 2017 – December 31, 2017

3.3.6 Sodium

One water sample is collected annually for raw water at Wells 1, 2 and 5 and tested for Sodium due to naturally elevated levels. O. Reg 170/03 has set a Maximum Acceptable concentration (MAC) of 20 mg/L on the Treated Water for Sodium which requires the Medical Office of Health be notified if the concentration exceeds the MAC. These samples were collected on August 8, 2017 at Wells 1, 2 and 5 (Raw Water), found to be 21.1 mg/L at Well 1, 16.1 at Well 2 and 16.1 at well 5. Treated water samples will be collected in 2018.

3.3.7 Fluoride

One water sample is collected annually and tested for Fluoride due to naturally elevated levels. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L on Treated Water. On August 8, 2017, samples were collected for this analysis. The samples were found to have a concentration of 1.67 mg/L at Well 1, 1.86 mg/L at Well 2 and 1.36 mg/L at well 5, Wells 1 & 2 raw water is greater than the treated water MAC 1.5 mg/L. Treated Water samples will be collected in 2018.

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

Refer to **Table 10**. From January 1, 2017 to December 31, 2017, 907.9 kg of chlorine (in sodium hypochlorite) was used to ensure proper disinfection in the distribution system with an average dosage of 5.26 mg/L.

Refer to **Table 10** – due to elevated iron content, sodium silicate is used to maintain the iron in a non-oxidized state to prevent excessive discoloration. The average dose rate as active silicate was 3.33 mg/L.

Table 10. – Chemical Usage at Blyth Drinking Water System ^a

	Well #1						
Month	Well 1 Flow (m3)	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose	Pump Hrs	RWW Turb
January	7228	37.9	5.23	51.46	2.7	284.90	0.21
February	5597	27.9	4.82	40.59	2.8	225.40	0.19
March	5482	29.6	5.40	39.57	2.8	223.00	0.15
April	4364	23.8	5.43	33.21	2.9	177.30	0.12
May	5017	28.0	5.56	39.36	3.1	205.10	0.17
June	6810	38.5	5.71	53.92	2.7	270.10	0.22
July	4105	23.2	5.65	26.45	2.5	164.80	0.16
August	3974	21.1	5.30	25.83	2.5	158.00	0.18
September	4057	22.0	5.44	25.83	2.4	161.80	0.17
October	4119	22.9	5.56	25.01	2.4	165.50	0.19
November	4083	23.2	5.68	26.45	2.5	163.00	0.18
December	3302	18.7	5.67	21.12	5.7	132.10	0.19
Total	58138	316.7	65.47	408.77	35.0	2331.00	2.12
Min	3302	18.7	4.82	21.12	2.4	132.10	0.12
Max	7228	38.5	5.71	53.92	5.7	284.90	0.22
Avg	4845	26.4	5.46	34.06	2.9	194.25	0.18

	Well #2							
Month	Well 2 Flow (m3)	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose	Pump Hrs	RWW Turb	Well 2 Static
January	4634	26.4	5.50	73.79	2.2	185.70	0.19	7.72
February	3784	20.7	5.20	65.39	2.3	147.90	0.22	7.21
March	4508	23.3	5.11	72.61	2.3	179.50	0.20	7.24
April	4008	21.9	5.40	65.86	2.3	160.40	0.18	7.29
May	3692	21.0	5.68	23.27	1.8	145.00	0.20	7.09
June	5786	30.6	5.23	75.67	1.8	229.30	0.20	7.58
July	4081	24.1	5.95	51.07	1.9	160.10	0.21	7.79
August	4664	27.8	5.88	61.38	1.9	183.60	0.20	7.77
September	4319	24.4	5.59	64.36	2.2	171.10	0.21	8.15
October	4015	22.8	5.63	60.93	2.1	161.20	0.20	0.00
November	4396	25.6	5.75	65.18	2.1	160.80	0.22	7.76
December	4141	23.7	5.68	171.58	2.1	151.00	0.19	7.48
Total	52028	292.3	66.62	851.09	25.0	2035.60	2.41	83.05
Min	3692	20.7	5.11	23.27	1.8	145.00	0.18	0.00
Max	5786	30.6	5.95	171.58	2.3	229.30	0.22	8.15
Avg	4336	24.4	5.55	70.92	2.1	169.63	0.20	6.92

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Township of North Huron - Blyth Well Supply - 2017 Summary								
	Well #5							
Month	Well 5 Flow (m3)	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose	Pump Hrs	RWW Turb	Well 5 Static
January	1487	6.5	6.90	19.76	10.0	74.40	0.73	26.91
February	2022	8.7	5.23	24.64	6.6	104.80	0.44	26.52
March	3340	15.0	4.64	39.04	4.7	163.00	0.22	25.94
April	5024	22.4	4.47	60.51	4.9	225.20	0.24	25.89
May	4905	21.9	4.43	69.05	5.4	219.40	0.16	25.19
June	6213	30.5	4.83	66.61	4.3	243.20	0.15	24.83
July	6405	32.8	5.12	62.22	3.7	268.40	0.15	24.51
August	6347	32.7	5.08	66.29	4.1	259.70	0.23	24.24
September	6651	34.4	5.06	69.05	4.0	255.60	0.22	24.22
October	6375	32.5	5.14	60.76	3.8	265.10	0.21	24.33
November	6623	32.9	4.85	70.52	4.1	269.80	0.21	24.65
December	5989	28.5	4.76	63.44	4.1	274.10	0.20	24.76
Total	61381	298.9	60.51	671.90	59.7	2622.70	3.15	301.99
Min	1487	6.5	4.43	19.76	3.7	74.40	0.15	24.22
Max	6651	34.4	6.90	70.52	10.0	274.10	0.73	26.91
Avg	5115	24.9	5.04	55.99	5.0	218.56	0.26	25.17

^a – Results collected from January 1, 2017 – December 31, 2017

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 August 23, 2017 by ICS and were found to be acceptable.

Table 11. – Treated Water Flows for Blyth Drinking Water System

Month	Well 1 Flow (m3)	Well 2 Flow (m3)	Well 5 Flow (m3)
January	7228	4634	1487
February	5597	3784	2022
March	5482	4508	3340
April	4364	4008	5024
May	5017	3692	4905
June	6810	5786	6213
July	4105	4081	6405
August	3974	4664	6347
September	4057	4319	6651
October	4119	4015	6375
November	4083	4396	6623
December	3302	4141	5989
Total	58138	52028	61381
Min	3302	3692	1487
Max	7228	5786	6651
Average	4845	4336	5115

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

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

- Preventative maintenance performed as per the computerized maintenance program
- Westmoreland Street reconstruction project- Water expense \$109,819.90

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

The most recent Ministry of Environment inspection was completed by Matt Shannon on November 4, 2016.

There were no non-compliances noted.

One (1) adverse water quality event occurred in 2017 due to a 1 TC count on a distribution sample, was resampled and results were clear.

7.0 EMERGENT ISSUES

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 limit for arsenic is to be lowered to 10 µg/L, bringing the ½ MAC to 5. Well 5 may be effected by these changes.

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. Refer to **Table 12** for the new Regulatory Requirements. Subsequent phase-in dates are:

- January 1, 2017: Testing requirements for HAAs and updates to standards for Carbon Tetrachloride, Benzene, Vinyl Chloride, Chlorate, Chlorite, and MCPA come into effect / require reporting
- 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

7.1.0 ARSENIC REVIEW

Historic Arsenic values were reviewed from 2003 to 2015 and are shown in **Table 13**.

Table 13 – Historic Arsenic Values

Date	Well #1&2	Well #5
Nov 28 2016		6.0
Jan 8 2015		4.46
Jun 10 2015	3.2	
Mar 12 2015	0.9	

Table 14- Haloacetic Acids

		HAA5 ug/L					
Date	Location	Total HAA5	Chloroacetic Acid	Bromoacetic Acid	Dichloroacetic Acid	Dibromoacetic Acid	Trichloroacetic Acid
Apr 11-17	DW howson Flour mill	5.3	4.7	2.9	2.7	2	5.3
	DW Blyth Arena	5.3	4.7	2.9	2.6	2	5.3
July 11-17	DW Howson Transport	5.3	4.7	2.9	2.9	2	5.3
	DW 182 Thuell	12.3	4.7	2.9	6	2	6.3
Oct 3-17	DW Lions Park	5.3	4.7	2.9	2.8	2	5.3
	DW 182 Thuell	5.3	4.7	2.9	3.3	2	5.3
	MIN	5.3	4.7	2.9	2.6	2	5.3
	MAX	12.3	4.7	2.9	6	2	6.3
	AVERAGE	6.47	4.7	2.9	3.38	2	5.47

7.2.0 EMERGENT ISSUES SUMMARY

A review of the sample results between 2015 and 2016 indicates that Arsenic is not likely to be in exceedance of the amended $\frac{1}{2}$ MAC requirements at Wells 1&2, however, concentrations are elevated at Well 5 to near the $\frac{1}{2}$ MAC of 5 ug/L.

Historic values of the other parameters (Benzene, Carbon Tetrachloride, and Vinyl Chloride), are all below the amended standards prescribed.

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**.

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