

Annual Report

For the 2017 Operating Year

Wingham Drinking Water System 2017 Operation and Maintenance Annual Report

PREPARED BY

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Table of Contents

1.0 INTRODUCTION AND BACKGROUND	4
2.0 DESCRIPTION OF WATER SYSTEM	4
3.0 SUMMARY OF WATER QUALITY MONITORING	6
3.1 Water Treatment Equipment Operation and Monitoring as Per Schedule 7, O. Reg 170/03.....	6
3.1.1 Point of Entry Chlorine Residual	6
3.1.2 Distribution Chlorine Residual	6
3.1.3 Turbidity	7
3.2 Microbiological Sampling as per Schedule 10, O. Reg.170/03	8
3.2.1 Raw System	8
3.2.2 Treated Water Samples	9
3.2.3 Distribution Samples	10
3.3 Chemical Sampling & Testing as per Schedule 13, O. Reg.170/03	11
3.3.1 Inorganics	11
3.3.2 Lead	12
3.3.3 Organics	13
3.3.4 Trihalomethanes	15
3.3.5 Nitrate & Nitrite	15
3.3.6 Sodium	16
3.3.7 Fluoride	16
4.0 WATER AND CHEMICAL USAGE	17
4.1 Chemical Usage	17
4.2 Annual Flows	18
5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE.....	19
6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES	19
7.0 EMERGENT ISSUES.....	20
7.1.0 Arsenic Review.....	21
7.2.0 Emergent Issues Summary.....	21

List of Tables

Table 1 – Treated and Distribution Chlorine Residuals for Wingham Drinking Water System

Table 2 – Raw and Treated Water Turbidities for Wingham Drinking Water System

Table 3 – Microbiological Results for Raw Water Well 3 Wingham Drinking Water System

Table 3.1- Microbiological Results for Raw Water Well 4 Wingham Drinking water system

Table 4 – Microbiological Results for Point of Entry at Wingham Drinking Water System

Table 5 – Microbiological Results for Wingham Distribution System

Table 6 – Schedule 23 Results for Wingham Drinking Water System

Table 7 – Lead Sampling Program Results for Wingham Drinking Water System

Table 8 – Schedule 24 Results for Wingham Drinking Water System

Table 9 – Nitrate, Nitrite and THM Results at Wingham Drinking Water System

Table 10 – Chemical Usage at the Wingham Drinking Water System

Table 11 – Treated Water Flows for Wingham Drinking Water System

Table 12 –Regulatory Requirements

Table 13 – Historic Arsenic Values

Table 14 – Haloacetic Acids

1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2017 Annual Report is to document the operation and maintenance data for the Wingham 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 Wingham Drinking Water System (DWS # **220001502**), is characterized as a "secure ground water" system and is classified as a large municipal residential system. The system consists of two wells – Well 3 with a rated capacity of 6537 m³/day and Well 4 with a rated capacity of 5270 m³/d. Treatment at both sites consists of chlorination (sodium hypochlorite) and iron sequestration (sodium silicate) treatment. The Well 3 system is located at 200 Water St. Well #4 is located at 23 Albert St. The distribution system serves the community of Wingham with a population of approximately 2950 residents, 1150 customer services and 29 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 Well 3 supply system consists of a 323 mm drilled to a depth of 102.1m fitted with variable speed pump 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. 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 distribution/standpipe that maintains adequate system pressure. The well is cycled by a level controller that starts and stops the well 3/high lift pumps. Emergency power is supplied by a portable diesel generator that allows operation of the equipment during extended power interruptions. The treated drinking water is monitored for chlorine residual and turbidity by on-line equipment connected to SCADA/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 elevated storage 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.

Well #4 is a 356 mm drilled well, 98.65 m deep equipped with a submersible vertical turbine pump, well level sensor to measure static level and provide well level monitoring. The system has been designed to operate to alternate the duty wells between well 3 and 4.

Annual Report
For the 2017 Operating Year

The #4 well house is equipped with back-up diesel generator, sodium hypochlorite(2) and sodium silicate pump, a baffled chlorine contact tank equipped with 3 high lift pumps, on-line monitoring, alarm generation and auto-dialer.

Back-up power is supplied by one diesel standby generator with automatic transfer switch and double wall fuel tank.

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

Disinfection is achieved on the Wingham 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 facilities at dosages high enough to achieve both primary and secondary disinfection objectives.

The 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 known lead services, of which have been sampled at the initial plumbing sampling program, where no elevated levels were found due to the service material. The iron sequestering also has dual purpose of corrosion control, coupled with very stable pH and substantial alkalinity and hardness that inhibits corrosion that controls lead corrosion. These services will be replaced when street reconstruction takes place.

The system has approximately 135 fire hydrants.

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 Wingham well supply has 1 PTTW (Permit To Take Water) # 7003-7GUHVA with an expiry date of July 24, 2018, which allows 11,807 cubic metres per day to be pumped from the combined wells.

The Wingham Drinking Water System (treatment Subsystem) has maximum flows as specified in the Municipal Drinking Water Licence (MDWL) 090-102, Issue 4 and Drinking Water Works Permit (DWWP) 090-202, Issue 4. The maximum total daily flow is 11,807 cubic meters per day.

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

Typical system pressure ranges from 40 psi to 85 psi.

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. **Table 1** shows the monthly average of the daily free chlorine residual value 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, 454 distribution chlorine residuals were recorded.

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

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Avg W3 Treated Chlorine Residual (mg/L)	1.2 4	1.31	1.24	1.1 9	1.29	1.19	1.1 0	1.15	1.2 4	1.25	1.3 3	1.3 0	1.24	0.91	1.67	365
Avg W4 Treated Chlorine Residual (mg/L)	1.1 2	1.13	1.10	1.1 0	1.17	1.20	1.0 8	1.06	1.1 1	1.04	1.0 7	1.1 0	1.12	0.82	1.83	365
Average Distributio n Chlorine Residual (mg/L)	0.9 9	1.05	1.05	1.0 3	1.00	0.97	0.9 1	0.90	0.9 3	0.95	0.9 4	0.9 4	0.97	0.29	1.47	454

Annual Report
For the 2017 Operating Year

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

3.1.3 Turbidity

Turbidity is measured daily using an online analyser. **Table 2.** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the treated water was 0.50 NTU.

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

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Avg W3 Raw Turbidity	0.20	0.21	0.22	0.16	0.20	0.23	0.19	0.20	0.23	0.22	0.15	0.19	0.20	0.02	0.30	42
Avg W3 Treated Turbidity	0.10	0.07	0.08	0.09	0.12	0.07	0.06	0.06	0.07	0.06	0.05	0.07	0.08	0.01	0.50	364
Avg W4 Raw Turbidity	0.27	0.28	0.18	0.16	0.18	0.18	0.11	0.15	0.22	0.21	0.19	0.10	0.19	0.01	0.38	44
Avg W4 Treated Turbidity	0.07	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.06	0.06	0.07	0.06	0.07	0.01	0.50	365

^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. In 2017, a total of 52 samples were collected and analyzed for E. coli and Total Coliforms from each well. Each E. coli and Total Coliform result obtained was 0 cfu/100 ml in the raw water. **Table 3 and Table 3.1** provides a summary of bacteriological results performed on the raw water.

Table 3 – Microbiological Results for Raw Water Well 3 at Wingham Drinking Water System ^a

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

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

Table 3 – Microbiological Results for Raw Water Well 4 at Wingham Drinking Water System ^a

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

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

3.2.2 Treated Water (Point of Entry) Samples

One treated water sample from the point of entry from Well 3 and Well 4 is taken every week and analyzed for E.Coli, Total Coliforms and for Heterotrophic Plate Count (HPC). A total of 104 treated water samples were collected and analyzed at Wells 3 and 4 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. Currently, there is no limit on HPC. Most (101) samples were found to be safe, with 3 deteriorating. The range of HPC results were <10 - 290 cfu/100 ml. 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.

Table 4. provides a summary of all bacteriological results performed on treated water.

Table 4. – Microbiological Results for Point of Entry at Wingham Drinking Water System ^a

Date	#TC Samples	# Samples ≥1	#EC Samples	# Samples ≥1	#HPC Samples	Safe	Deteriorating =/ >50
Jan	10	0	10	0	10	10	0
Feb	8	0	8	0	8	8	0
Mar	8	0	8	0	8	7	1
Apr	8	0	8	0	8	8	0
May	10	0	10	0	10	9	1
Jun	8	0	8	0	8	8	0
Jul	8	0	8	0	8	8	0
Aug	10	0	10	0	10	9	1
Sep	8	0	8	0	8	8	0
Oct	10	0	10	0	10	10	0
Nov	8	0	8	0	8	8	0
Dec	8	0	8	0	8	8	0
Total	104	0	104	0	104	101	3

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

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 addition, a new water main was installed on North St where samples were taken prior to being put in service (isolated with no services) in November, In October there were 2 extra samples collected in the distribution for the installation of a new valve on North St, in May 1 extra sample of TC and EC were collected for the opening of the seasonal splash pad and in April an additional 3 samples were collected to TC and EC in the distribution for the opening of the seasonal trailer park. In 2017, a total of 164 distribution samples were collected and analyzed for the above parameters and all samples were found to be safe. All E. coli and total coliform result from the treated water were 0

cfu/100 ml. The range of HPC results were 0 - 20 cfu/100 ml. **Table 5** provides a summary of all bacteriological samples taken in the distribution system.

Table 5 – Microbiological Results for Wingham Distribution System ^a

Date	# Samples TC	# Samples ≥1	# Samples EC	# Samples ≥1	# Samples HPC	Safe	Deteriorating = />50
Jan	15	0	15	0	5	5	0
Feb	12	0	12	0	4	4	0
Mar	12	0	12	0	4	4	0
Apr	15	0	15	0	4	4	0
May	16	0	16	0	5	5	0
Jun	12	0	12	0	4	4	0
Jul	12	0	12	0	4	4	0
Aug	15	0	15	0	5	5	0
Sep	12	0	12	0	4	4	0
Oct	17	0	17	0	5	5	0
Nov	14	0	14	0	4	4	0
Dec	12	0	12	0	4	4	0
Total	164	0	164	0	52	52	0

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

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 samples for the Wingham Drinking Water System 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. Results from 2015 can be found in **Table 6**.

Table 6. – Schedule 23 Results for Wingham Drinking Water System ^a

Annual Report
For the 2017 Operating Year

Parameter	Well #4 (ug/L)	Well #4 (ug/L)	Well # 3 (ug/L)	Well #3 (ug/L)	MAC
Schedule 23	Mar 12-15	Jun 10-15	Mar 12-15	Jun 10-15	
Antimony	0.02	0.03	0.02	0.07	6
Arsenic	2.9	3.2	1.8	1.8	25
Barium	45.8	46.4	144	144	1000
Boron	31.7	30.4	22.3	19.1	5000
Cadmium	0.004	0.003	0.003	0.003	5
Chromium	0.03	0.03	0.03	0.03	50
Mercury	<0.02	0.01	<0.02	0.01	1
Selenium	1<	0.04	1<	0.1	10
Uranium	0.972	0.892	1.02	0.975	20

3.3.2 Lead

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 0.01 mg/L. These parameters are required to be sampled and analyzed between the months of December 2016 and April 2017 and again between June 2017 and October 2017. Results can be found in **Table 7**.

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

	pH	Alkalinity (mg/L)	Lead (ug/L)
Distribution			
Dec-Apr	7.53, 7.53	227, 222	0.76, 0.5, 0.08, 0.06
Jun-Oct	7.32, 7.35	224, 225	

^a – Samples collected on March 30, 2017 and September 19, 2017 respectively.

3.3.3 Organics

One treated water sample is taken 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. 2015 sample results can be found in **Table 8**.

Table 8. – Schedule 24 Results for Wingham Drinking Water System

Parameter	Well #4	well #4	Well # 3	Well # 3	Maximum Allowable Level
	(ug/L)	(ug/L)	(ug/L)	(ug/L)	
Schedule 23 & 24	Mar 12-15	Jun 10-15	Mar 12-15	Jun 10-15	
Benzene	<0.32	<.32	<0.32	<.32	5
Carbon Tetrachloride	<0.16	<.16	<0.16	<0.16	5
1,2-Dichlorobenzene	<0.41	<.41	<0.41	<0.41	200
1,4-Dichlorobenzene	<0.36	<.36	<0.36	<0.36	5
1,1-Dichloroethylene	<0.33	<.33	<0.33	<0.33	14
1,2-Dichloroethane	<0.35	<.35	<0.35	<0.35	5
Dichloromethane	<0.35	<.35	<0.35	<0.35	50
Monochlorobenzene	<0.3	<.3	<0.3	<0.3	80
Tetrachloroethylene	<0.35	<.35	<0.35	<0.35	30
Trichloroethylene	<0.44	<.44	<0.44	<0.44	50
Vinyl Chloride	<0.17	<.17	<0.17	<0.17	2
Diquat	<1	<1	<1	<1	70
Paraquat	<1	<1	<1	<1	10
Glyphosate	<1	<1	<1	<1	280
Polychlorinated Biphenyls	<0.04	<.04	<0.04	<0.04	3
Benzo(a)pyrene	<0.004	<.004	<0.004	<0.004	0.01
2,4-dichlorophenol	<0.15	<.15	<0.15	<0.15	900
2,4,6-trichlorophenol	<0.25	<.25	<0.25	<0.25	5
2,3,4,6-tetrachlorophenol	<0.20	<.20	<0.20	<0.20	100
Pentachlorophenol	<0.15	<.15	<0.15	<0.15	60
Alachlor	<0.02	<.02	<0.02	<0.02	5
Aldicarb	<0.01	<.01	<0.01	<0.01	9
Aldrin+Dieldrin	<0.01	<.01	<0.01	<0.01	0.7
Aldrin	<0.01	<.01	<0.01	<0.01	
Dieldrin	<0.01	<.01	<0.01	<0.01	
Atrazine+N-dealkylated metabolites	<0.01	<.01	<0.01	<0.01	5
Atrazine	<0.01	<.01	<0.01	<0.01	
De-ethylated atrazine	<0.01	<.01	<0.01	<0.01	
Azinphos-methyl	<0.02	<0.05	<0.02	<0.05	20
Bendiocarb	<0.01	<.01	<0.01	<0.01	40

Annual Report
For the 2017 Operating Year

<u>Parameter</u>	Well #4 (ug/L)	Well #4 (ug/L)	Well # 3 (ug/L)	Well # 3 (ug/L)	Maximum Allowable Level (ug/L)
Chlordane	<0.01	<0.01	<0.01	<0.01	7
a-chlordane	<0.01	<0.01	<0.01	<0.01	
g-chlordane	<0.01	<0.01	<0.01	<0.01	
Oxychlordane	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos	<0.02	<0.02	<0.02	<0.02	90
Cyanazine	<0.03	<0.03	<0.03	<0.03	10
Diazinon	<0.02	<0.02	<0.02	<0.02	20
(DDT)+Metabolites	<0.01	<0.01	<0.01	<0.01	30
op-DDT	<0.01	<0.01	<0.01	<0.01	
pp-DDD	<0.01	<0.01	<0.01	<0.01	
pp-DDE	<0.01	<0.01	<0.01	<0.01	
pp-DDT	<0.01	<0.01	<0.01	<0.01	
Dimethoate	<0.03	<0.03	<0.03	<0.03	20
Diuron	<0.03	<0.03	<0.03	<0.03	150
Heptachlor-Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01	3
Heptachlor	<0.01	<0.01	<0.01	<0.01	
Heptachlor epoxide	<0.01	<0.01	<0.01	<0.01	
Lindane	<0.01	<0.01	<0.01	<0.01	4
Malathion	<0.02	<0.02	<0.02	<0.02	190
Methoxychlor	<0.01	<0.01	<0.01	<0.01	900
Metolachlor	<0.01	<0.01	<0.01	<0.01	50
Metribuzin	<0.02	<0.02	<0.02	<0.02	80
Parathion	<0.02	<0.02	<0.02	<0.02	50
Phorate	<0.01	<0.01	<0.01	<0.01	2
Prometryne	<0.03	<0.03	<0.03	<0.03	1
Simazine	<0.01	<0.01	<0.01	<0.01	10
Temephos	<0.01	<0.01	<0.01	<0.01	280
Terbufos	<0.01	<0.01	<0.01	<0.01	1
Triallate	<0.01	<0.01	<0.01	<0.01	230
Trifluralin	<0.02	<0.02	<0.02	<0.02	45
2,4-dichlorophenoxyacetic acid	<0.19	<0.19	<0.19	<.19	100
2,4,5-trichlorophenoxyacetic acid	<0.22	<0.22	<0.22	<.22	280
Bromoxynil	<0.33	<0.33	<0.33	<.33	5
Dicamba	<0.20	<0.20	<0.20	<.20	120
Diclofop-methyl	<0.40	<0.40	<0.40	<0.40	9
Dinoseb	<0.36	<0.36	<0.36	<0.36	10
Picloram	<1	<1	<1	<1	190

3.3.4 Trihalomethanes

One distribution sample is taken every three months from a point in the distribution system and tested for Trihalomethanes (THMs). 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 6.7 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. 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 Wingham Drinking Water System

Treated Drinking Water - Nitrites and Nitrates					Well #3					
Date	Jan 31-17	Apr 11-17	Jul 11-17	Oct 3-17	Min	Max	Avg	O.Reg 169		
NO2	< 0.003	< 0.01	< 0.003	< 0.003	0.003	0.010	0.005	MAC	1	1/2 MAC
NO3	< 0.006	< 0.008	< 0.007	< 0.008	0.006	0.008	0.007	10	5	
NO2+NO3	< 0.006	< 0.018	< 0.007	< 0.008	0.006	0.018	0.010	10	5	
Treated Drinking Water - Nitrites and Nitrates					Well #4					
Date	Jan 31-17	Apr 11-17	Jul 11-17	Oct 3-17	Min	Max	Avg	O.Reg 169		
NO2	< 0.003	< 0.02	< 0.003	< 0.003	0.003	0.020	0.007	MAC	1	1/2 MAC
NO3	< 0.006	< 0.006	< 0.006	< 0.006	0.006	0.006	0.006	10	5	
NO2+NO3	< 0.006	< 0.02	< 0.006	< 0.006	0.006	0.020	0.010	10	5	
Distribution Drinking Water - Trihalomethanes										
THMs (total)	4.2	5	9.9	7.5	4.2	9.9	6.7	100	50	
Bromodichloromethane	1.1	1.2	1.6	1.6	1.1	1.6	1.4			
Bromoform	0.34	0.34	0.34	0.34	0.340	0.340	0.340			
Chloroform	2.7	3.4	7.9	5.4	2.7	7.9	4.9			
Dibromochloromethane	0.37	0.41	0.45	0.52	0.37	0.52	0.44			

^a – Samples collected on January 3, 2017, April 11, 2017, July 11, 2017 and October 3, 2017 respectively.

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 January 30, 2013 and were found to be 11.9 mg/L at Well 3 and 15.6 mg/L at Well 4, which is within compliance. Sodium will be collected and analyzed on or before January 30, 2018.

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. These samples were last collected on January 30, 2013 and were found to be 0.91 mg/L at Well 3 and 0.89 mg/L at Well 4, which is within compliance. The next water sample for Fluoride will be collected and analyzed on or before January 30, 2018.

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

Refer to **Table 10**. From January 1, 2017 to December 31, 2017, 913.6 kg of sodium hypochlorite was used to ensure proper disinfection in the distribution system with an average dosage of 2.21 mg/L.

Table 10 – Chemical Usage at Wingham Drinking Water System

Well 3						Well 4					
Month	Chlorine used (Kg)	Cl Dosage	TDW Cl Free Res	Silicate (L)	Silicate Dosage	Month	Chlorine used (Kg)	Cl Dosage	TDW Cl Free Res	Silicate (L)	Silicate Dosage
January	31.7	2.31	1.39	126.4	4.16	January	42.2	2.38	1.12	85.6	2.17
February	27.5	2.10	1.31	120.5	3.50	February	36.6	2.23	1.13	87.4	2.75
March	23.7	1.91	1.14	146.9	2.62	March	40.5	2.14	1.10	200.2	6.17
April	31.7	2.06	1.19	148.1	3.71	April	42.4	2.20	1.10	233.0	4.72
May	36.7	2.06	1.29	170.6	3.76	May	54.0	2.32	1.17	262.8	4.36
June	28.8	2.06	1.19	137.1	3.71	June	55.2	2.38	1.20	266.9	4.53
July	33.6	2.06	1.10	152.7	3.75	July	53.3	2.41	1.08	99.6	4.50
August	30.3	2.23	1.15	163.7	4.18	August	46.4	2.35	1.06	242.8	4.89
September	37.4	2.24	1.24	157.4	3.65	September	40.3	2.33	1.11	207.7	4.74
October	48.6	2.28	1.25	199.6	3.70	October	34.7	2.15	1.04	202.5	4.66
November	31.8	2.30	1.33	131.0	3.70	November	37.7	2.17	1.07	276.0	7.20
December	26.6	2.23	1.30	100.0	3.27	December	41.7	2.21	1.10	243.8	5.04
Total	388.5	25.85	14.88	1754.1	43.72	Total	525.1	27.25	13.28	2408.3	55.72
Min	23.7	1.91	1.10	100.0	2.62	Min	34.7	2.14	1.04	85.6	2.17
Max	48.6	2.31	1.39	199.6	4.18	Max	55.2	2.41	1.20	276.0	7.20
Avg	32.4	2.15	1.24	146.2	3.64	Avg	43.8	2.27	1.11	200.7	4.64

^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 21, 2017 by ICS and were found to be acceptable. The Flow meters will be calibrated again by August 21, 2018.

Table 11. – Treated Water Flows for Wingham Drinking Water System ^a

Permit to Take Water 7003-7GUHVA Compliance Report - 2017				
3.2 -Maximum Amount of Taking Permitted				
	Max/Day on Permit	Peak Flow	%of Limit	
Well #3 (in m3)	6537 m3	1454	22.2	%
Well #4 (in m3)	5270 m3	1584	30.1	%
3.2 - Average Annual Amount of Taking Permitted				
Well #3 (in m3)	6537 m3	504	7.7	%
Well #4 (in m3)	5270 m3	628	11.9	%
Municipal Drinking Water License 090-102 Issue 4 - Capacity Report				
	Total Peak Flow			
	Maximum	Actual	%of Cap	
Capacity (m3/d)	11808 m3	2241	19.0	%
Total Average Flow				
Capacity (m3/d)	11808 m3	1132	9.6	%

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

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

- Pre-contact and POE analyzer replaced at Well 4 (\$3500)
- New water main on North St
- New Chlorine Pump installed at Well 3 (\$4200)
- Maintenance as per computerized maintenance system

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

The most recent Ministry of Environment inspection was completed by Matt Shannon on September 14, 2017.

There were no non-compliances noted and the final inspection rating was 100%

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 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 2015 and are shown in Table 13.

Table 13 – Historic Arsenic Values

Date	Well #3	Well #4
Mar 2015	2.9	1.8
Jun 2006	3.2	1.8

Table 14 Total Haloacetic Acids

Date	Location	HAA5 DW 2017 ug/L					Trichloroacetic Acid
		Total HAA5	Chloroacetic Acid	Bromoacetic Acid	Dichloroacetic Acid	Dibromoacetic Acid	
Feb 28-17	435 Minnie	5.3	4.7	2.9	2.6	2	5.3
	Royal homes	5.3	4.7	2.9	2.6	2	5.3
Apr 11-17	Royal homes	5.3	4.7	2.9	2.6	2	5.3
	435 Minnie	5.3	4.7	2.9	2.6	2	5.3
Jul 11-17	Wingham Arena	5.3	4.7	2.9	3	2	5.3
	The Cooperators	5.3	4.7	2.9	2.6	2	5.3
Oct 3-17	J Reavie Workshop	5.3	4.7	2.9	2.6	2	5.3
	The Cooperators	5.3	4.7	2.9	2.6	2	5.3
	Min	5.3	4.7	2.9	2.6	2	5.3
	Max	5.3	4.7	2.9	3	2	5.3
	Ave	5.3	4.7	2.9	2.65	2	5.3
	Ave mg/L	0.0053	0.0047	0.0029	0.00265	0.002	0.0053

7.2.0 EMERGENT ISSUES SUMMARY

Annual Report
For the 2017 Operating Year

A review of the sample results in 2015 indicates that Arsenic is not likely to be in exceedance of the amended ½ MAC requirements.

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**.

Report Completed by: Kyllie McDonagh, Administrative Assistant

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