



## 2016 ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT Bright Water System

### 1. GENERAL INFORMATION

Oxford County prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Oxford County website at [www.oxfordcounty.ca/drinkingwater](http://www.oxfordcounty.ca/drinkingwater) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the County of Oxford at the address and phone number listed below or by email at [publicworks@oxfordcounty.ca](mailto:publicworks@oxfordcounty.ca).

Drinking Water System:	Bright Water System
Drinking Water System Number:	220009050
Drinking Water System Owner & Contact Information:	Oxford County Public Works Department Water Services P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778 Email: <a href="mailto:publicworks@oxfordcounty.ca">publicworks@oxfordcounty.ca</a>
Reporting Period:	January 1, 2016 – December 31, 2016

#### 1.1. System Description

The Bright Water System is a Large Municipal Water system as defined by Regulation 170/03 and serves a population of approximately 436. The system consists of 2 well sources which are secure groundwater wells. The water is treated with sodium hypochlorite for disinfection and sodium silicate to sequester iron. In 2016, approximately 0.82 m<sup>3</sup> of sodium hypochlorite and 0.62 m<sup>3</sup> of sodium silicate were used in the water treatment process. These chemicals are certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The well facility houses pumps and treatment equipment. A separate pumping station houses high lift pumps, monitoring equipment, 86 m<sup>3</sup> in-ground reservoir and a 180 m<sup>3</sup> standpipe. A standby generator is available to run the pump station in the event of a power failure. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

#### 1.2. Major Expenses

The Bright Water System is one of 14 water systems that have revenues and expenses pooled for economy of scale purposes. The systems are combined into the Township Water financial system and in 2016 had forecasted operating and maintenance expenditures of approximately \$2,660,000. In addition to regular operational and maintenance expenditures approximately \$1,360,000 was spent to install or upgrade water meters in the Township systems.

## 2. MICROBIOLOGICAL TESTING

### 2.1. *E. coli* and Total Coliform

Bacteriological tests for *E. coli* and total coliforms are required weekly on the raw and treated water at the facility and in the distribution system. Extra samples are taken after major repairs or maintenance work. Any *E. coli* or total coliform results above 0 in treated water must be reported to the Ministry of Environment and Climate Change (MOECC) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2016 sampling program are shown on the table below. There was one adverse test result from 159 treated water samples in this reporting period.

	<i>Number of Samples</i>	<i>Range of E. coli Results Min - Max MAC = 0</i>	<i>Range of Total Coliform Results Min - Max MAC = 0</i>
Raw	98	0	0
Treated	53	0	0 - 1
Distribution	106	0	0

### 2.2. Heterotrophic Plate Count (HPC)

HPC analyses are required from the treated and distribution water. The tests are required weekly for treated water and for 25% of the required distribution system bacteriological samples. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. 2016 results are shown in the table below.

	<i>Number of Samples</i>	<i>Range of HPC Min - Max</i>
Treated	52	0 - 5
Distribution	27	0 - 73

## 3. CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for 70 different chemical parameters. The latest results for all parameters are provided in Appendix A. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation.

Information on the health effects and allowable limits of components in drinking water may be found on the MOECC web page through the link provided in Appendix A. Additional information on chemical parameters specific to the Bright system is provided below.

### 3.1. Sodium

Sodium levels in drinking water are tested once every five years. The aesthetic objective is 200 mg/L meaning at levels less than this, the sodium will not impair the taste of the water. When sodium levels are above 20 mg/L the MOECC and Medical Officer of Health are notified. Oxford County Public Health and Emergency Services maintain an information page on sodium in drinking water at [www.oxfordcounty.ca/healthyplaces/water/sodium.aspx](http://www.oxfordcounty.ca/healthyplaces/water/sodium.aspx) in order to help people on sodium restricted diets control their sodium intake. The sodium level in Bright is 64 mg/L.

### 3.2. Hardness and Iron

These are aesthetic parameters that may affect the appearance of the water but are not related to health. Well water commonly has high levels of hardness and other minerals from being in contact with

underground rock formations. Many households have water softeners to help reduce white calcium deposits, improve the efficiency of soaps and reduce iron levels. This information is included here to help set the water softener at the level recommended by the manufacturer. Levels of iron less than 0.30 mg/L (ppm) are not considered to cause aesthetic problems such as discoloured water. In Bright, sodium silicate is added to keep the iron in suspension.

- Hardness is 447 mg/L (equivalent to 31 grains)
- Iron level was measured at 0.63 mg/L (ppm).

### 3.3. Additional Testing Required by MOECC

None.

## 4. OPERATIONAL MONITORING

### 4.1. Chlorine Residual

Free chlorine levels of the treated water are monitored continuously at the discharge point of the pumping station and in the distribution system. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2016. A summary of the chlorine residual readings is provided in the table below.

### 4.2. Turbidity

Turbidity of treated water is continuously monitored at the pumping station, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from each well is checked weekly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2016 is below.

<i>Parameter</i>	<i>Number of Tests or Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
Chlorine residual in distribution (mg/L)	Continuous	(0.49 – 1.56) 1.00
Chlorine residual after treatment (mg/L)	“	(0.38 – 1.81) 1.23
Turbidity after treatment (NTU)	“	(0.17 – 3.99) 0.53

## 5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MOECC regulate the amount of water that can be utilized over a given time period. A summary of the 2016 flows are provided in the table below and presented graphically in Appendix B.

<i>Flow Summary</i>	<i>Quantity</i>
Permit to Take Water Limit	327 m <sup>3</sup> /d
Municipal Drinking Water License Limit	589 m <sup>3</sup> /d
2016 Average Daily Flow	84 m <sup>3</sup> /d
2016 Maximum Daily Flow	218 m <sup>3</sup> /d
2016 Total Amount of Water Supplied	30,676 m <sup>3</sup>

While the PTTW for the system is 327 m<sup>3</sup>/d, the wells are not capable of producing this quantity. A more realistic maximum capacity of the system is approximately 296 m<sup>3</sup>/d. The County has begun exploration for an additional source however has not been able to locate a nearby aquifer with acceptable water quantity and quality. The study will continue in conjunction with explorations for the Plattsville Water System.

## **6. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS**

This section documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the MOECC Drinking Water Inspectors. The issues and associated required actions are documented by the Inspectors in the system's Annual Inspection Report. All non-compliance issues are investigated, corrective actions taken and documented using the County's Drinking Water Quality Management System (DWQMS) procedures.

### **6.1. Non-Compliance Findings**

The annual MOECC Inspection for the Bright Water System took place in December 2016. There were no non-Compliance findings and the Inspection Report rating was 100%.

### **6.2. Adverse Results**

Any adverse results from bacteriological, chemical samples or observations of operational conditions that indicate adverse water quality are reported as required and corrective actions taken. There was one adverse result in 2016. A treated water sample collected on July 11, 2016 for bacteriological parameters, had a positive finding of 1 cfu/100mL for total coliforms. The result was reported to both the MOECC and MOH. The resample taken July 13, 2016, was negative for total coliforms.

## APPENDIX A: SUMMARY OF CHEMICAL RESULTS

### UNDERSTANDING CHEMICAL TEST RESULTS

The following tables summarize the laboratory results of the chemical testing Oxford County is required to complete. Different types of parameters are required to be tested for at different frequencies as noted below. Explanations on the health impacts of these parameters can be found at the MOECC web site <http://www.ontla.on.ca/library/repository/mon/14000/263450.pdf> document # 4449e01 titled “Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”.

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (ug/L). 1 mg/L is equal to 1000 ug/L. The Maximum Acceptable Concentration (MAC) is the highest amount of a parameter that is acceptable in Municipal drinking water and can be found in the MOECC Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of “ND” stands for “Not Detected” and means that the concentration of the chemical is lower than the laboratory’s equipment is capable of measuring.

Nitrate and nitrite samples are required every 3 months in normal operation.

<i>Parameter</i>	<i>Result Range Min – Max(mg/L)</i>	<i>Average Result (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Nitrite	ND – 0.008	0.006	1.0	0.003
Nitrate	0.626 – 0.690	0.644	10.0	0.006

A Trihalomethane (THM) sample is required 3 three months from the distribution system. THM is a by-product of the disinfection process.

<i>Parameter</i>	<i>Annual Average</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Trihalomethane (THM)	2016	14	100	0.37

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Sodium	June 9/14	64.0	20.0*	0.01
Fluoride	June 9/14	ND	1.5**	0.06

\*Sodium levels between 20 – 200 mg/L must be reported every 5 years.

\*\*Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken every 3 years. Levels of alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

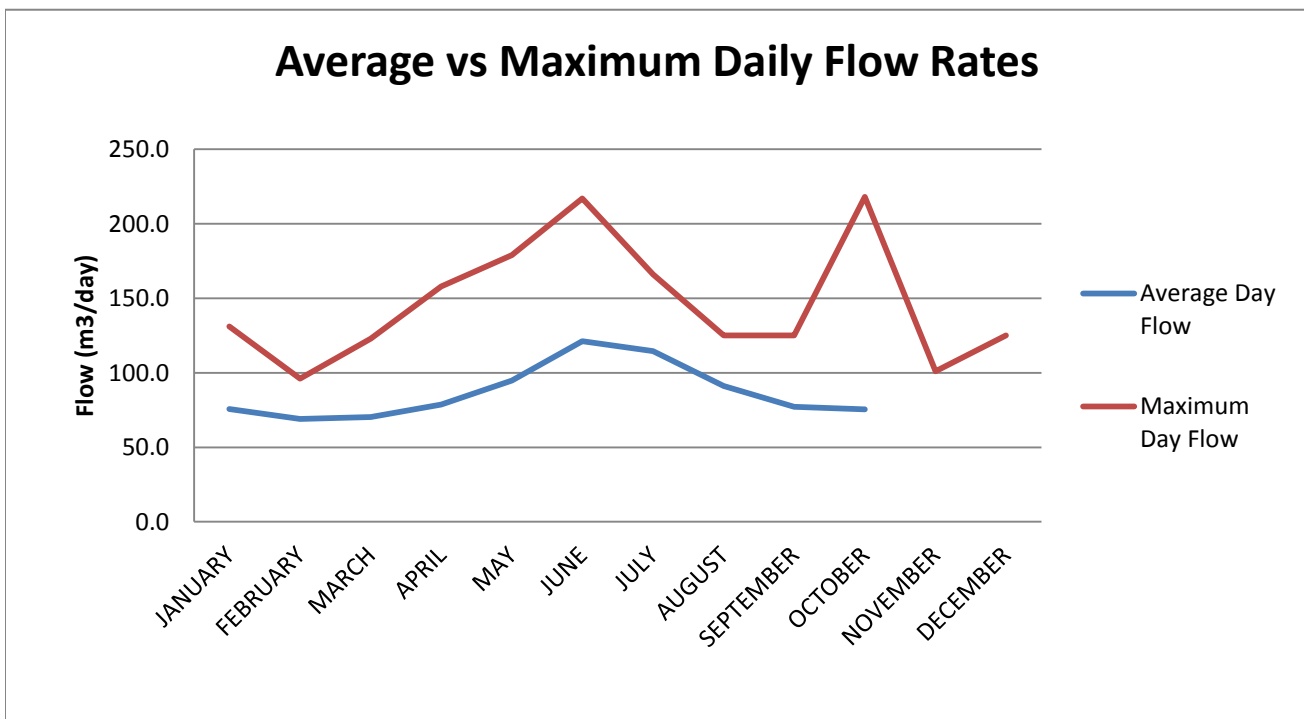
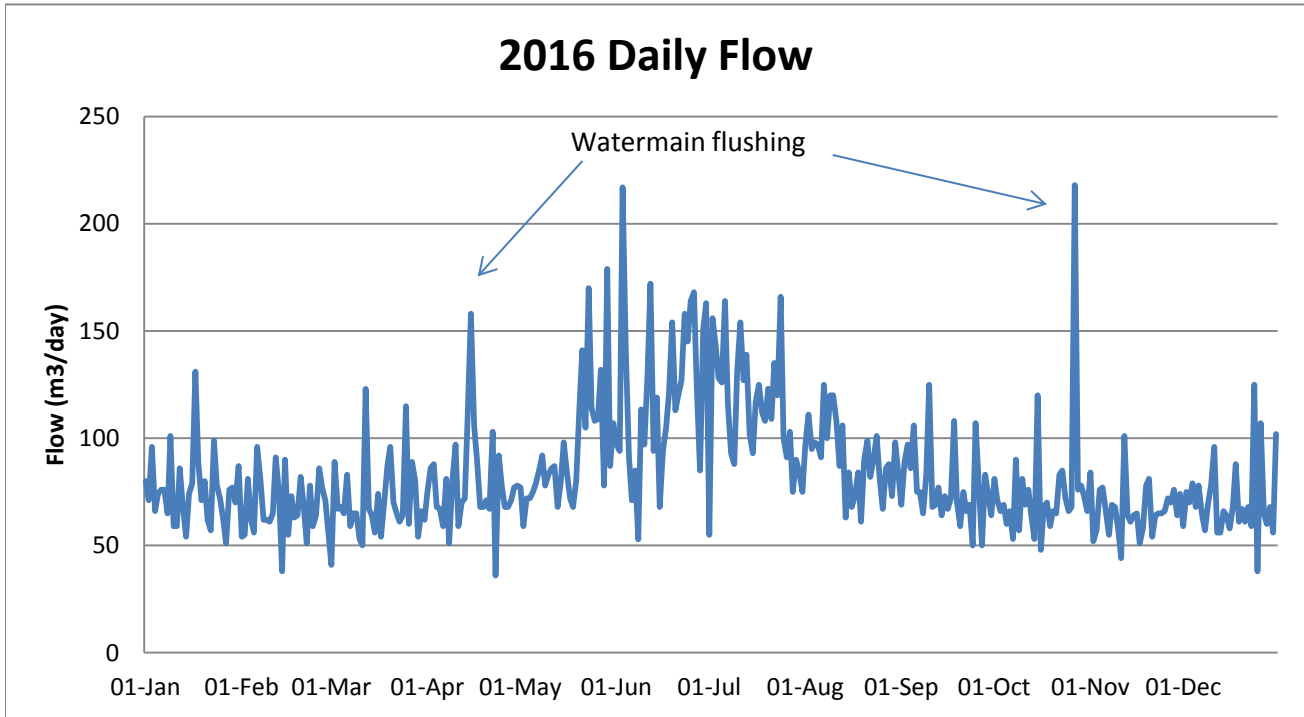
<i>Parameter</i>	<i>Result Range (Min – Max)</i>	<i>Number of Samples</i>	<i>Acceptable Level</i>
Distribution Alkalinity	334 – 351	2	30 – 500 mg/L
Distribution pH	6.9 – 7.2	2	6.5 – 8.5
Distribution Lead 2015	0.18 – 3.0	2	10 ug/L MAC

The following Table summarizes the most recent test results for Schedules 23 and 24 which are required every 5 years.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Antimony	May 24/16	0.03	6	0.02
Arsenic	“	2.3	25	0.2
Barium	“	129	1000	0.01
Boron	“	66	5000	2
Cadmium	“	ND	5	0.003
Chromium	“	0.29	50	0.03
Mercury	“	ND	1	0.01
Selenium	“	0.14	10	0.04
Uranium	“	1.98	20	0.002

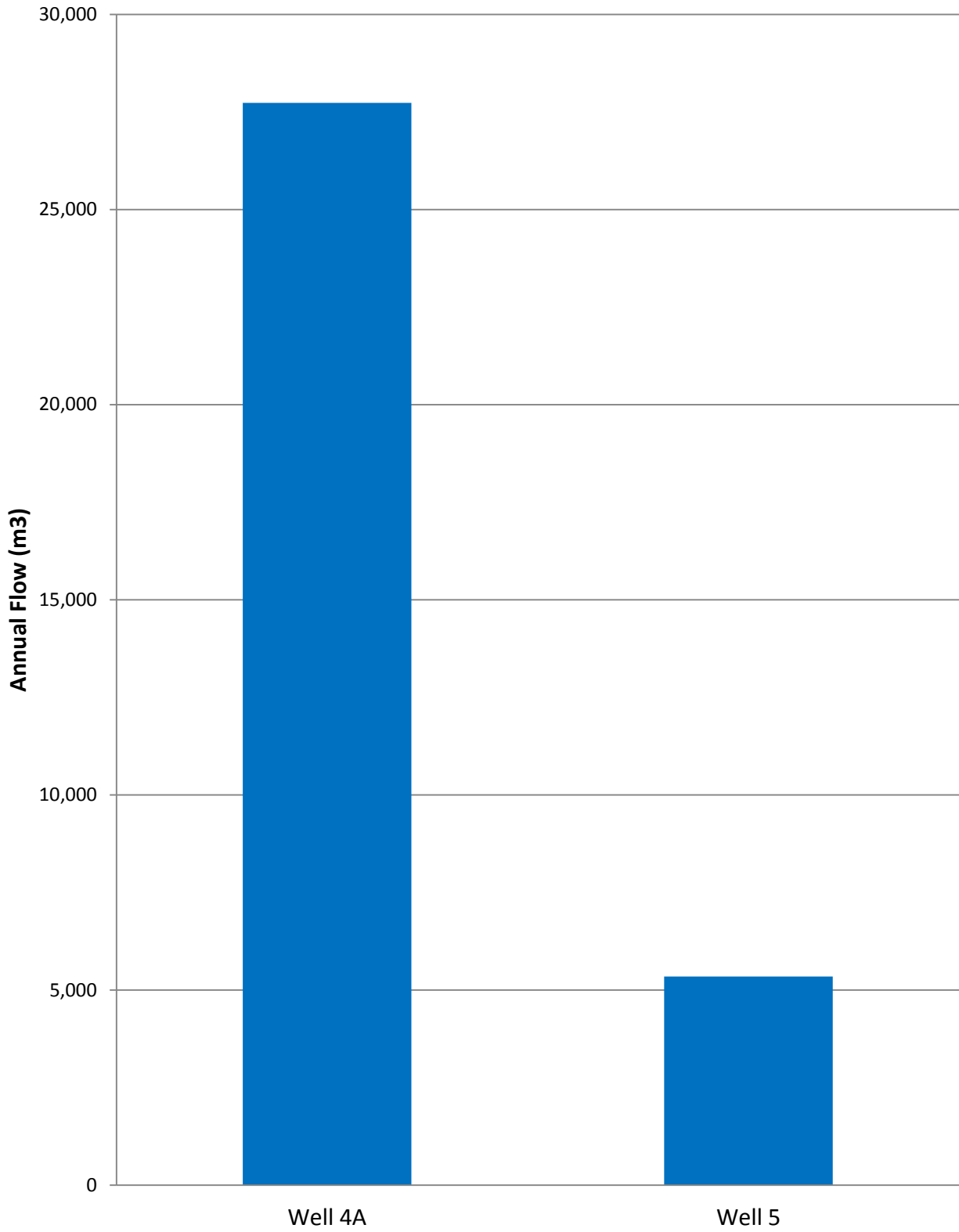
<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Aldicarb	June 15/15	ND	9	0.30
Aldrin + Dieldrin	"	ND	0.7	0.067
Atrazine + N-dealkylatedmetabolites	"	ND	5	0.12
Azinphos-methyl	"	ND	20	0.21
Bendiocarb	"	ND	40	0.13
Benzene	"	ND	5	0.37
Benzo(a)pyrene	"	ND	0.01	0.004
Bromoxynil	"	ND	5	0.33
Carbaryl	"	ND	90	0.16
Carbofuran	"	ND	90	0.37
Carbon Tetrachloride	"	ND	5	0.41
Chlordane (Total)	"	ND	7	0.11
Chlorpyrifos	"	ND	90	0.18
Cyanazine	"	ND	10	0.18
Diazinon	"	ND	20	0.081
Dicamba	"	ND	120	0.20
1,2-Dichlorobenzene	"	ND	200	0.50
1,4-Dichlorobenzene	"	ND	5	0.21
Dichlorodiphenyltrichloroethane (DDT) + metabolites	"	ND	30	0.14
1,2-Dichloroethane	"	ND	5	0.43
1,1-Dichloroethylene(vinylidene chloride)	"	ND	14	0.41
Dichloromethane	"	ND	50	0.34
2-4 Dichlorophenol	"	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	"	ND	100	0.19
Diclofop-methyl	"	ND	9	0.40
Dimethoate	"	ND	20	0.12
Dinoseb	"	ND	10	0.36
Diquat	"	ND	70	1
Diuron	"	ND	150	0.87
Glyphosate	"	ND	280	6
Heptachlor + Heptachlor Epoxide	"	ND	3	0.11
Lindane (Total)	"	ND	4	0.056
Malathion	"	ND	190	0.091
Methoxychlor	"	ND	900	0.014
Metolachlor	"	ND	50	0.092
Metribuzin	"	ND	80	0.12
Monochlorobenzene	"	ND	80	0.58
Paraquat	"	ND	10	1
Parathion	"	ND	50	0.18
Pentachlorophenol	"	ND	60	0.15
Phorate	"	ND	2	0.11
Picloram	"	ND	190	0.25
Polychlorinated Biphenyls(PCB)	"	ND	3	0.04
Prometryne	"	ND	1	0.23
Simazine	"	ND	10	0.15
Temephos	"	ND	280	0.31
Terbufos	"	ND	1	0.12
Tetrachloroethylene	"	ND	30	0.45
2,3,4,6-Tetrachlorophenol	"	ND	100	0.14
Triallate	"	ND	230	0.10
Trichloroethylene	"	ND	5	0.38
2,4,6-Trichlorophenol	"	ND	5	0.25
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	"	ND	280	0.22
Trifluralin	"	ND	45	0.12
Vinyl Chloride	"	ND	2	0.17

## APPENDIX B: 2016 WATER QUANTITY SUMMARY



Bright Water System Capacity 327 m<sup>3</sup>/d

### 2016 Total Production per Well



Bright Water System Capacity 327 m<sup>3</sup>/d