



## 2018 ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT Tillsonburg 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:	Tillsonburg Water System
Drinking Water System Number:	220000683
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, 2018 – December 31, 2018

#### 1.1. System Description

The Tillsonburg Water System is a Large Municipal Water system as defined by Regulation 170/03 and services a population of approximately 16,950. The system consists of ten well sources, seven of which are classified as GUDI (Groundwater Under Direct Influence of surface water) and three are secure groundwater wells. The treatment for each site is summarized below.

<i>Treatment Facility</i>	<i>Wells</i>	<i>Treatment</i>
Mall Road WTF	1A & 2	Filtration for iron removal and disinfection with ultraviolet (UV) and chlorine gas.
Fairview WTF	4, 5 & 7A	Disinfection with UV and chlorine gas. Sodium hypochlorite is added for secondary disinfection.
Plank Line WTF	6A	Disinfection with chlorine gas
Bell Mill Road WTF	9, 10 & 11	Filtration for iron removal and disinfection with UV and chlorine gas.
Rokeby Road WTF	12	Disinfection with chlorine gas.

The treatment facilities each house high lift pumps, monitoring and treatment equipment for the supply wells. Three standby generators are available to run facilities in the event of a power failure. Water storage is provided by a 9,100 m<sup>3</sup> reservoir located north of the Town.

In 2018, approximately 4.4 kg of chlorine gas and 1.4 m<sup>3</sup> of sodium hypochlorite were used in the water treatment process. The chemicals are certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

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 a failure of critical operational requirements.

## 1.2. Major Expenses

In 2018 The Tillsonburg Water System had forecasted operation and maintenance expenditures of approximately \$2,650,000. Capital expenditures were as follows:

- \$130,000 to develop Countywide SCADA Master Plan for all water systems
- \$58,000 on Asset Management valuation for all treatment, pumping and storage facilities
- \$90,000 Well 7A Facility
- \$600,000 Watermain replacements
- \$50,000 Well Rehab

## 2. MICROBIOLOGICAL TESTING

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

Bacteriological tests for *E. coli* and total coliforms are taken weekly from the raw and treated water at the facility and from 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, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2018 sampling program are shown on the table below. There was one adverse test result from 547 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	418	0 - 1	0 - 7
Treated	220	0	0 - 11
Distribution	327	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. 2018 results are shown in the table below.

	<i>Number of Samples</i>	<i>Range of HPC Min - Max</i>
Treated	216	0 - 29
Distribution	90	0 - >500

## 3. CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for approximately 50 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 and chemical parameters. 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. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

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

### **3.2. 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, sodium will not impair the taste of the water.

When sodium levels are above 20 mg/L the MECP and MOH are notified. Southwestern Public Health maintain an information page on sodium in drinking water at [https://www.swpublichealth.ca/sites/default/files/file-attachments/basic-page/adv\\_hia\\_sodium\\_20181023\\_0.pdf](https://www.swpublichealth.ca/sites/default/files/file-attachments/basic-page/adv_hia_sodium_20181023_0.pdf) in order to help people on sodium restricted diets control their sodium intake. The sodium levels in the Tillsonburg system range from 2.5 to 39 mg/L on the wells in use.

### **3.3. Fluoride**

Fluoride levels are sampled once every five years and levels above 1.5 mg/L must be reported to the MECP and MOH. Levels under 2.4 mg/L are considered safe for consumption however at levels between 15 and 2.4 mg/L fluoride may cause staining or pitting of teeth in children less than 6 years old. Further information on fluoride can be found on the Southwestern Public Health webpage at [https://www.swpublichealth.ca/sites/default/files/file-attachments/basic-page/adv\\_hia\\_fluoride\\_20181023\\_0.pdf](https://www.swpublichealth.ca/sites/default/files/file-attachments/basic-page/adv_hia_fluoride_20181023_0.pdf)

Oxford County does not add fluoride to the water at any of its drinking water systems; however the Tillsonburg well 6A at Plank Line has naturally occurring fluoride levels of 1.51 mg/L. When in use, Well 6A discharges into the large reservoir at Plank Line where it mixes with other water that has lower fluoride levels.

### **3.4. Hardness**

This is an aesthetic parameter that may affect the appearance of the water but is 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 and improve the efficiency of soaps. This information is included here to help set the water softener at the level recommended by the manufacturer. The Hardness ranges from 222 to 342 mg/L (equivalent to 16-25 grains) depending on the wells in use.

### **3.4. Additional Testing Required by MECP**

None

## **4. OPERATIONAL MONITORING**

### **4.2. Chlorine Residual**

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is checked twice weekly at various locations. 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 2018. A summary of the chlorine residual readings is provided in the table below.

### **4.3. Turbidity**

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the 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 2018 is provided in the table below.

<i>Parameter &amp; Location</i>	<i>Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
Chlorine residual in distribution (mg/L)	Continuous	(0.42 – 1.57) 0.95
<b>Bell Mill Road WTF</b>		
Chlorine mg/L	Continuous	(0.44 – 2.42) 1.32
Turbidity NTU	Continuous	((0.03 – 3.03) 0.06
<b>Fairview WTF/North Street West</b>		
Chlorine mg/L	Continuous	(0.31 – 4.00) 1.21
Turbidity NTU	Continuous	(0.03 – 0.94) 0.05
<b>Mall Road WTF</b>		
Chlorine mg/L	Continuous	(0.67 – 2.01) 1.31
Turbidity NTU	Continuous	(0.03 – 2.55) 0.05
<b>Plank Line WTF (as distribution)</b>		
Chlorine mg/L	Continuous	(0.17 – 4.00) 1.36
Turbidity NTU	Continuous	(0.03 – 0.61) 0.06
<b>Rokeyby Road WTF</b>		
Chlorine mg/L	Continuous	(0.26 – 4.00) 1.11
Turbidity NTU	Continuous	(0.04 – 4.00) 0.14

#### 4.4. Ultra Violet (UV) Disinfection

Supply wells that have been classified as being GUDI require “enhanced disinfection” through ultra violet light (UV) followed by chlorination. A minimum UV dosage of 40 mj/cm<sup>2</sup> is maintained to inactivate any microorganisms that may be present from contact with surface water. Insufficient dosage of UV must be reported as inadequate disinfection. There were no occurrences of inadequate UV disinfection in 2018.

## 5. WATER QUANTITY

Continuous monitoring of flowrates 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 MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2018 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	17,913 m <sup>3</sup> /d
Municipal Drinking Water License Limit	17,440 m <sup>3</sup> /d
2018 Average Daily Flow	5,116 m <sup>3</sup> /d
2018 Maximum Daily Flow	8,565 m <sup>3</sup> /d
2018 Average Monthly Flow	155,574 m <sup>3</sup> /d
2018 Total Amount of Water Supplied	1,869,574 m <sup>3</sup>

In order to meet the long term growth need of the Town, the County intends to construct a transmission main from Tillsonburg to the Oxford South system in Springford. The construction is currently anticipated to occur within the 20 year planning horizon.

## 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 MECP 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.

### 6.2. Non-Compliance Findings

The annual MECP inspection took place in December 2018. There were no non-compliance findings and the 2018 Inspection Report rating was 100%.

### 6.3. Adverse Results

<i>Incident/Date</i>	<i>Corrective Action</i>	<i>Resolution/Date</i>
<b>Treated or Distribution Water Sample with Positive Test for Total Coliform</b>		
11 cfu/100mL – treated water sample April 18, 2018	Reported and resamples were taken	Resample results acceptable April 20, 2018

## 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 MECP 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 MECP 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 &amp; Location</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>
<b>Nitrite</b>			1.0	0.003
Bell Mill Road WTF	ND	ND		
Fairview WTF	ND	ND		
Mall Road WTF	ND	ND		
Plank Line WTF	ND	ND		
Rokeby Road WTF	ND	ND		
<b>Nitrate</b>			10.0	0.006
Bell Mill Road WTF	2.63 – 2.91	2.71		
Fairview WTF	7.33 – 8.91	8.12		
Mall Road WTF	1.81 – 2.30	2.08		
Plank Line WTF	ND	ND		
Rokeby Road WTF	4.67 – 5.01	4.91		

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

<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)	2018	18.3	100	0.37
Haloacetic Acids (HAA)	2018	6.3	80	5.3

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 &amp; Location</i>	<i>Sample Date</i>	<i>Result Value (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
<b>Sodium</b>			20.0*	0.01
Bell Mill Road WTF	August 22/16	5.93		
Fairview WTF	June 2/14	31.3		
Mall Road WTF	August 22/16	11.5		
Plank Line WTF	August 22/16	39.3		
Rokeby Road WTF	August 22/16	2.46		
<b>Fluoride</b>			1.5**	0.06
Bell Mill Road WTF	August 22/16	0.10		
Fairview WTF	June 16/14	0.22		
Mall Road WTF	August 22/16	0.08		
Plank Line WTF	August 22/16	1.51		
Rokeby Road WTF	August 22/16	0.08		

\*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	178 – 226	8	30 – 500mg/L
Distribution pH	7.0 – 7.4	8	6.5 – 8.5
Distribution Lead 2018	0.02 – 2.85	8	10 ug/L MAC

The following Table summarizes the most recent test results for Schedules 23. Testing is required annually for GUDI wells at Bell Mill Road, Fairview and Mall Road.

<i>Parameter</i>	<i>Results (ug/L) Bell Mill Road WTF November 26/18</i>	<i>Results (ug/L) Fairview WTF November 26/18</i>	<i>Results (ug/L) Mall Road WTF November 26/18</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Antimony	0.03	0.02	0.08	6	0.02
Arsenic	ND	ND	ND	10	0.2
Barium	33.4	55.2	64.6	1000	0.01
Boron	13	45	16.0	5000	2.0
Cadmium	ND	0.021	0.008	5	0.003
Chromium	0.25	0.50	0.13	50	0.03
Mercury	ND	ND	ND	1	0.01
Selenium	0.15	0.46	0.07	5	0.04
Uranium	0.636	0.516	2.12	20	0.002

The following Table summarizes the most recent test results for Schedules 23. Testing is required every 3 years in secure, Non-GUDI wells at Plank Line and Rokeby Road.

<i>Parameter</i>	<i>Results (ug/L) Plank Line WTF June 6/16</i>	<i>Results (ug/L) Rokeby Road WTF May 24/16</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Antimony	ND	ND	6	0.02
Arsenic	10.0	0.2	10	0.2
Barium	52.4	24.4	1000	0.01
Boron	153	16	5000	2.0
Cadmium	ND	ND	5	0.003
Chromium	3.94	0.73	50	0.03
Mercury	ND	ND	1	0.01
Selenium	0.09	0.36	5	0.04
Uranium	0.185	1.48	20	0.002

Summary of Organic parameters in Schedule 24 sampled during this reporting period or the most recent sample results. Testing is required annually for GUDI wells at Bells Mill Road, Fairview and Mall Road.

<i>Parameter</i>	<i>Results (ug/L) Bell Mill Rd. WTF November 26/18</i>	<i>Results (ug/L) Fairview WTF November 26/18</i>	<i>Results (ug/L) Mall Road WTF November 26/18</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Alachlor	ND	0.01	ND	5	0.01
Atrazine + N-dealkylatedmetabolites	ND	0.01	ND	5	0.01
Azinphos-methyl	ND	ND	ND	20	0.01
Benzene	ND	ND	ND	1	0.32
Benzo(a)pyrene	ND	ND	ND	0.01	0.004
Bromoxynil	ND	ND	ND	5	0.33
Carbaryl	ND	ND	ND	90	0.05
Carbofuran	ND	ND	ND	90	0.01
Carbon Tetrachloride	ND	ND	ND	2	0.16
Chlorpyrifos	ND	ND	ND	90	0.02
Chlorpyrifos	ND	ND	ND	90	0.02
Diazinon	ND	ND	ND	120	0.02
Dicamba	ND	ND	ND	200	0.20

<i>Parameter</i>	<i>Results (ug/L) Bell Mill Rd. WTF November 26/18</i>	<i>Results (ug/L) Fairview WTF November 26/18</i>	<i>Results (ug/L) Mall Road WTF November 26/18</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
1,2-Dichlorobenzene	ND	ND	ND	5	0.41
1,4-Dichlorobenzene	ND	ND	ND	30	0.36
1,2-Dichloroethane	ND	ND	ND	14	0.35
1,1-Dichloroethylene (vinylidene chloride)	ND	ND	ND	50	0.33
Dichloromethane	ND	ND	ND	900	0.35
2-4 Dichlorophenol	ND	ND	ND	100	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	ND	ND	ND	9	0.19
Diclofop-methyl	ND	ND	ND	20	0.40
Dimethoate	ND	ND	ND	10	0.03
Diquat	ND	ND	ND	150	1
Diuron	ND	ND	ND	280	0.03
Glyphosate	ND	ND	ND	3	1
Malathion	ND	ND	ND	900	0.02
2-methyl- 4chlorophenoxyacetic acid (MCPA)	ND	ND	ND	100	0.12
Metolachlor	ND	ND	ND	80	0.01
Metribuzin	ND	ND	ND	80	0.02
Monochlorobenzene	ND	ND	ND	10	0.30
Paraquat	ND	ND	ND	50	1
Pentachlorophenol	ND	ND	ND	2	0.15
Phorate	ND	ND	ND	190	0.01
Picloram	ND	ND	ND	3	1
Polychlorinated Biphenyls(PCB)	ND	ND	ND	1	0.04
Prometryne	ND	ND	ND	10	0.03
Simazine	ND	ND	ND	280	0.01
Terbufos	ND	ND	ND	30	0.01
Tetrachloroethylene	ND	ND	ND	100	0.35
2,3,4,6- Tetrachlorophenol	ND	ND	ND	230	0.14
Triallate	ND	ND	ND	5	0.01
Trichloroethylene	ND	ND	ND	5	0.43
2,4,6-Trichlorophenol	ND	ND	ND	280	0.25
Trifluralin	ND	ND	ND	2	0.02
Vinyl Chloride	ND	ND	ND	1	0.17

Summary of Organic parameters in Schedule 24 sampled during this reporting period or the most recent sample results. Testing is required every 3 years in secure, Non-GUDI wells at Plank Line and Rokeby Road.

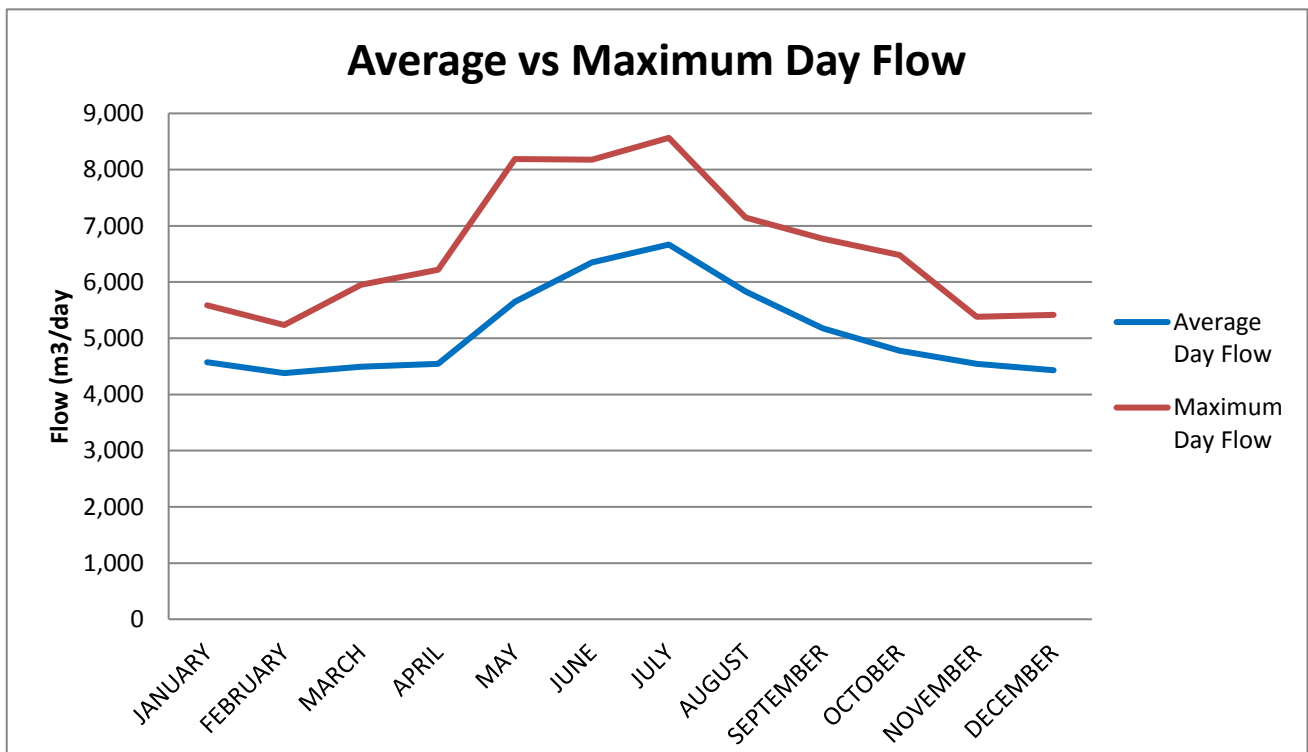
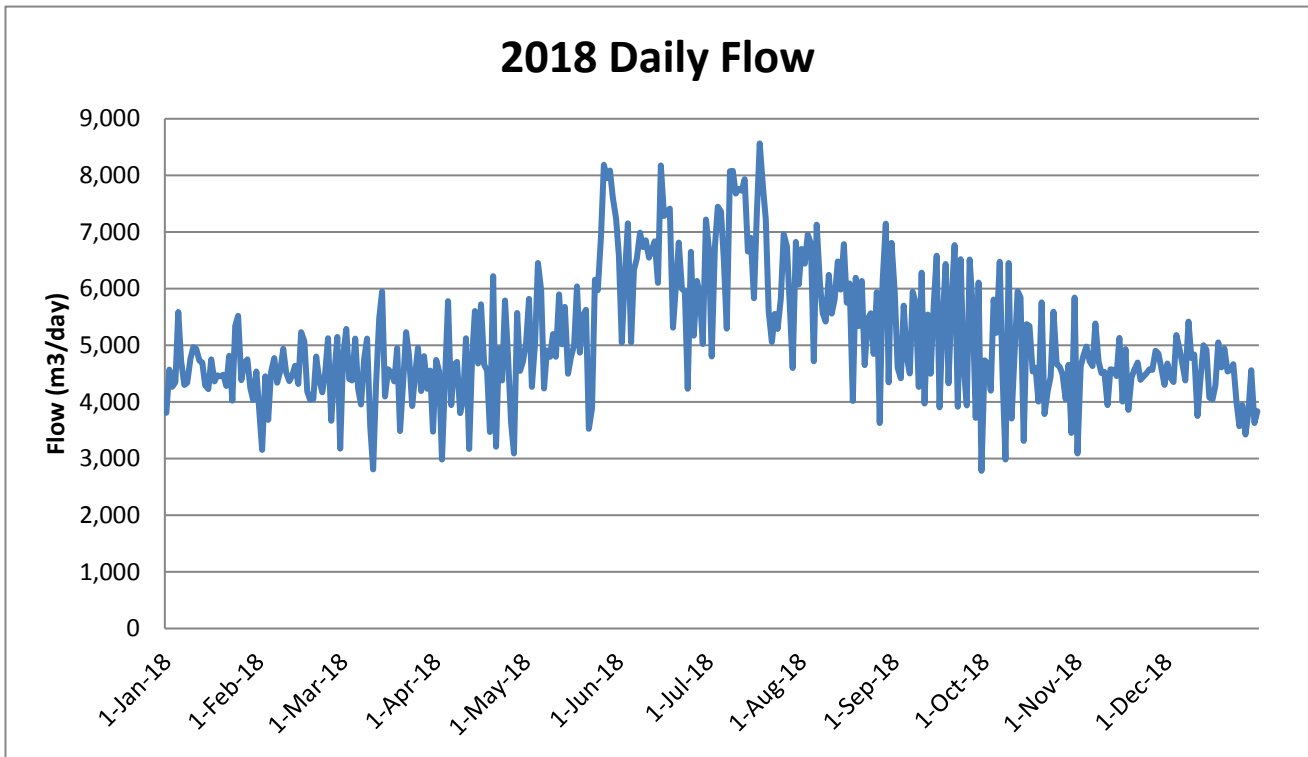
<i>Parameter</i>	<i>Results (ug/L) Plank Line WTF June 6/16</i>	<i>Results (ug/L) Rokeby Road WTF June 4/18</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Alachlor	ND	ND	5	0.02
Atrazine + N-dealkylatedmetabolites	ND	0.02	5	0.01
Azinphos-methyl	ND	ND	20	0.01
Benzene	ND	ND	1	0.32
Benzo(a)pyrene	ND	ND	0.01	0.004
Bromoxynil	ND	ND	5	0.33
Carbaryl	ND	ND	90	0.05
Carbofuran	ND	ND	90	0.01
Carbon Tetrachloride	ND	ND	2	0.16
Chlorpyrifos	ND	ND	90	0.002
Chlorpyrifos	ND	ND	20	0.02



<i>Parameter</i>	<i>Results (ug/L) Plank Line WTF June 6/16</i>	<i>Results (ug/L) Rokeby Road WTF June 4/18</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Diazinon	ND	ND	20	0.02
Dicamba	ND	ND	120	0.20
1,2-Dichlorobenzene	ND	ND	200	0.41
1,4-Dichlorobenzene	ND	ND	5	0.36
1,2-Dichloroethane	ND	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	ND	ND	14	0.33
Dichloromethane	ND	ND	50	0.35
2-4 Dichlorophenol	ND	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	ND	ND	100	0.19
Diclofop-methyl	ND	ND	9	0.40
Dimethoate	ND	ND	20	0.03
Diquat	ND	ND	70	1
Diuron	ND	ND	150	0.03
Glyphosate	ND	ND	280	1
Malathion	ND	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	+	ND	100	0.12
Metolachlor	ND	ND	50	0.01
Metribuzin	ND	ND	80	0.02
Monochlorobenzene	ND	ND	80	0.30
Paraquat	ND	ND	10	1
Pentachlorophenol	ND	ND	60	0.15
Phorate	ND	ND	2	0.01
Picloram	ND	ND	190	1
Polychlorinated Biphenyls(PCB)	ND	ND	3	0.04
Prometryne	ND	ND	1	0.03
Simazine	ND	ND	10	0.01
Terbufos	ND	ND	1	0.01
Tetrachloroethylene	ND	ND	10	0.35
2,3,4,6-Tetrachlorophenol	ND	ND	100	0.14
Triallate	ND	ND	230	0.01
Trichloroethylene	ND	ND	5	0.43
2,4,6-Trichlorophenol	ND	ND	5	0.25
Trifluralin	ND	ND	45	0.02
Vinyl Chloride	ND	ND	1	0.17

+ MCPA was added in 2017

## APPENDIX B: 2018 WATER QUANTITY SUMMARY



Tillsonburg Water System Capacity 17,440 m<sup>3</sup>/d

## 2018 Total Flow by Well

