



## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Drumbo Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Drumbo Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002479
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Drumbo Sequencing Batch Reactor (SBR) provided effective wastewater treatment in 2015 with an average plant flow of 234 m<sup>3</sup>/d, which represents 78% of the design capacity of 300 m<sup>3</sup>/d. The total flow in 2015 was 85,259 m<sup>3</sup>. The Drumbo WWTP rated capacity was increased from 272 m<sup>3</sup>/d to 300 m<sup>3</sup>/d as reflected in the amended Environmental Compliance Approval (ECA) issued by MOECC in February 2015.

The wastewater treatment plant is located at 93 Peterson Street, Drumbo, Ontario. The Facility description is provided below.

Facility	Drumbo Wastewater Treatment Plant
Design Capacity	300 m <sup>3</sup> /d (re-rated Feb. 2015)
2015 Average Daily Flow	234 m <sup>3</sup> /d
2015 Maximum Daily Flow	587 m <sup>3</sup> /d
2015 Total Volume of Wastewater	85,259 m <sup>3</sup> /year
Classification	WWT – II
Environmental Compliance Approval (ECA)	#8752-9Q4H96 (Feb 9, 2015)

The Drumbo SBR began operation in its present configuration in 1995. The SBR plant consists of two alternating reactors, pressure filters and ultra-violet radiation for disinfection, with an outfall pipe to the Cowan Drain. The plant adds aluminum sulphate into the reactors for phosphorus removal. Oxford County operates the plant, utilizing the staff located at the Woodstock WWTP. Biosolids are temporarily stored at the Drumbo WWTP and routinely transported to the Woodstock WWTP for digestion.

A standby generator is available to run the onsite water facility and the SBR in the event of a power failure. The system is maintained by licensed wastewater treatment system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## 1.2. Operating Expenses

In 2015, the Drumbo Wastewater Treatment Plant had forecasted annual operating and maintenance expenditures of \$74,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Influent samples are taken using a 24-hour composite sampler on a monthly basis from the transfer tank. This tank receives flow from the trash tank, which holds most of the daily flow.

Effluent samples are taken weekly using a 24-hour composite sampler installed so as to sample during periods of flow from either of the two reactors. Samples are taken on site and tested for pH, chlorine residual, dissolved oxygen, and temperature.

#### *Laboratory and Field Testing*

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, chlorine residual, and temperature.

### 2.2. Plant Performance & Effluent Quality

The Drumbo WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to the Cowan Drain. The Drumbo WWTP rated capacity was increased from 272 m<sup>3</sup>/d to 300 m<sup>3</sup>/d as reflected in the amended Environmental Compliance Approval (ECA) issued by MOECC in February 2015.

On a weekly basis, the Operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2015. Analyses results are summarized below.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
<b>Parameter</b>	<b>Concentration mg/L</b>	<b>Loading kg/d</b>
BOD <sub>5</sub>	124	29
Total Suspended Solids	86	20
Total Phosphorus	4	1
Total Kjeldahl Nitrogen	34	8

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
CBOD <sub>5</sub> (May 01 to November 30)	weekly	9.3	2 - 3.5	96.8 - 98.2
Total Suspended Solids	weekly	9.3	3.2 - 7.2	91.6 - 96.3
Total Phosphorus	weekly	0.46	0.2 - 0.3	92.5 - 95
Total Ammonia Nitrogen (May 1 to October 31)	weekly	2.7	1.3 - 2.6	--
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	4.5	0.7 - 2.9	--
E.coli (May 1 to October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 - 9	--
DO	weekly	5.0 or higher	6.3 - 9.5	--
pH any single sample	weekly	6.0 - 9.5	6.8 - 8.3	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives (summarized below) are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	4.7	2 - 3.5
Total Suspended Solids	weekly	4.7	3.2 - 7.2
Total Phosphorus	weekly	0.27	0.2 - 0.3
Total Ammonia Nitrogen (May 1 to October 31)	weekly	1.8	1.3 - 2.6
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	3.6	0.7 - 2.9
E.coli (May 1 to October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2 - 9
DO	weekly	6 or higher	6.3 - 9.5
pH any single sample	weekly	6.5 - 8.5	6.8 - 8.3

Drumbo SBR objective exceedances in 2015 included the following:

Month		Objective (mg/L)	Result (mg/L)
April	TSS	4.7	7.2
May	TSS	4.7	4.8
August	TSS	4.7	7.0
	TP	0.27	0.32
	NH <sub>3</sub> -N	1.8	2.6
September	NH <sub>3</sub> -N	1.8	1.92
October	TSS	4.7	6.7
	TP	0.27	0.3
	NH <sub>3</sub> -N	1.8	2.2
November	TSS	4.7	6.5
December	TSS	4.7	5.0

External engineering consultants are currently working with Oxford County wastewater treatment operations staff for developing an optimization plan for the Drumbo WWTP to try to meet effluent objectives going forward.

In addition, a Class Environmental Assessment (Class EA) is currently underway to investigate potential upgrade alternatives for the Drumbo WWTP to meet future wastewater treatment requirements for the community.

To date, Oxford County has re-rated the WWTP from 272 m<sup>3</sup>/day to 300 m<sup>3</sup>/day as an interim measure to ensure that wastewater flows do not exceed the rated capacity of the plant. This was approved by MOECC. The new ECA includes more stringent effluent discharge limits and objectives in order to maintain similar loadings to the receiving stream.

In addition, the following steps have been completed:

- A review of Unit Processes at the Drumbo WWTP has been completed that has determined that the plant could potentially be re-rated further to as high as 350 m<sup>3</sup>/day by implementing some process improvements, equipment upgrades, and minor construction works (Schedule C - Class EA).
- A background study and stream sampling has been completed on the receiving stream, the Cowan Drain, to support an assimilative capacity analysis for the increased effluent flows and loadings from the upgraded Drumbo WWTP.
- An investigation of the sanitary sewer collection system and a review of the influent flows to the Drumbo WWTP have been completed. Minor improvements to the flow monitoring equipment were completed as a result of this exercise.
- Future Flows and Loadings have also been calculated, confirmed, and summarized.
- Using the above background information, the next step is to host Public Consultation Centre #1 to present the project background, the work completed to date, potential alternative solutions, and the next steps. PCC1 is also an opportunity to receive comments and feedback from residents and stakeholders.
- PCC2 will incorporate and present public comments received to date and evaluate and compare/shortlist various alternative solutions.
- The ESR report will be posted for a period of 30 days for public review and comment

### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Drumbo WWTP in 2015.

### **4. Maintenance of Works**

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the wastewater treatment facility.

### **5. Monitoring Equipment Maintenance and Calibration**

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are kept on-site at the Plant.

### **6. Biosolids 2015**

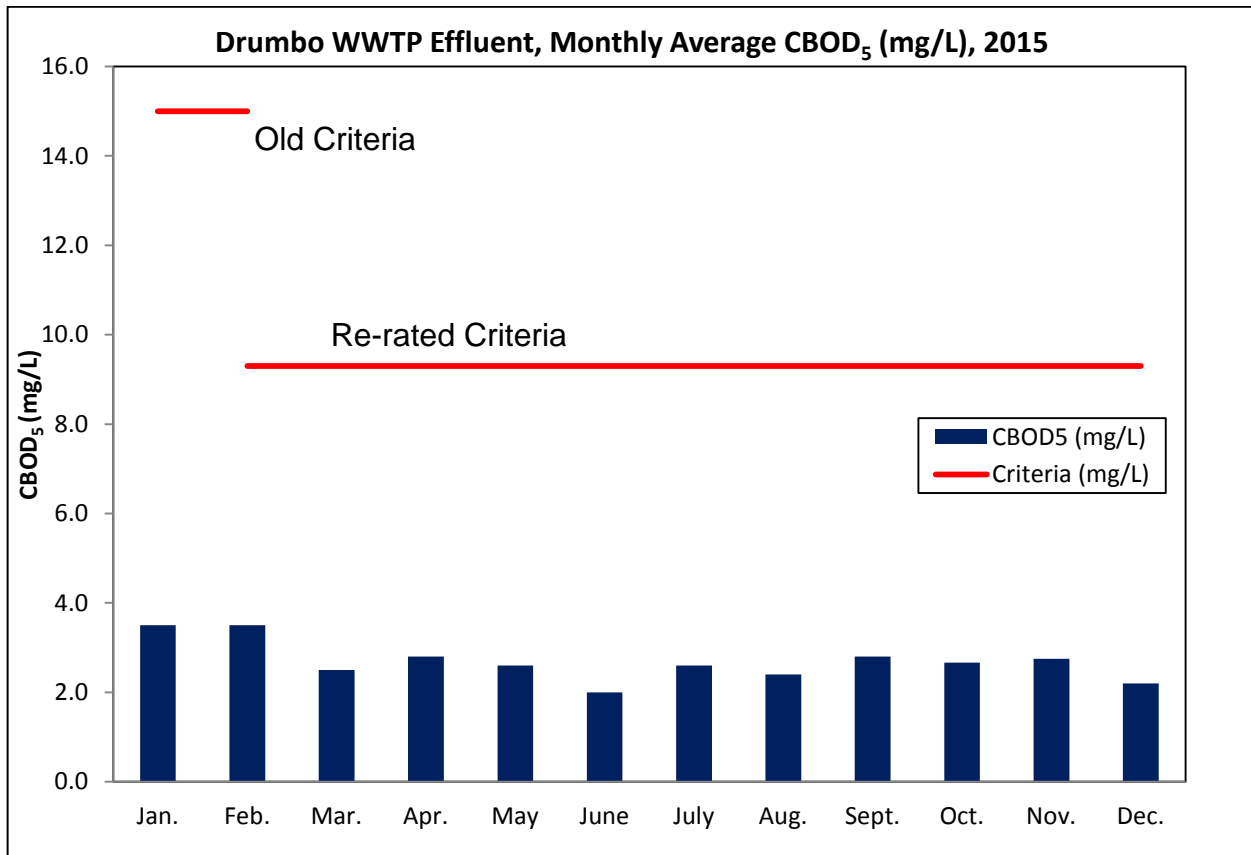
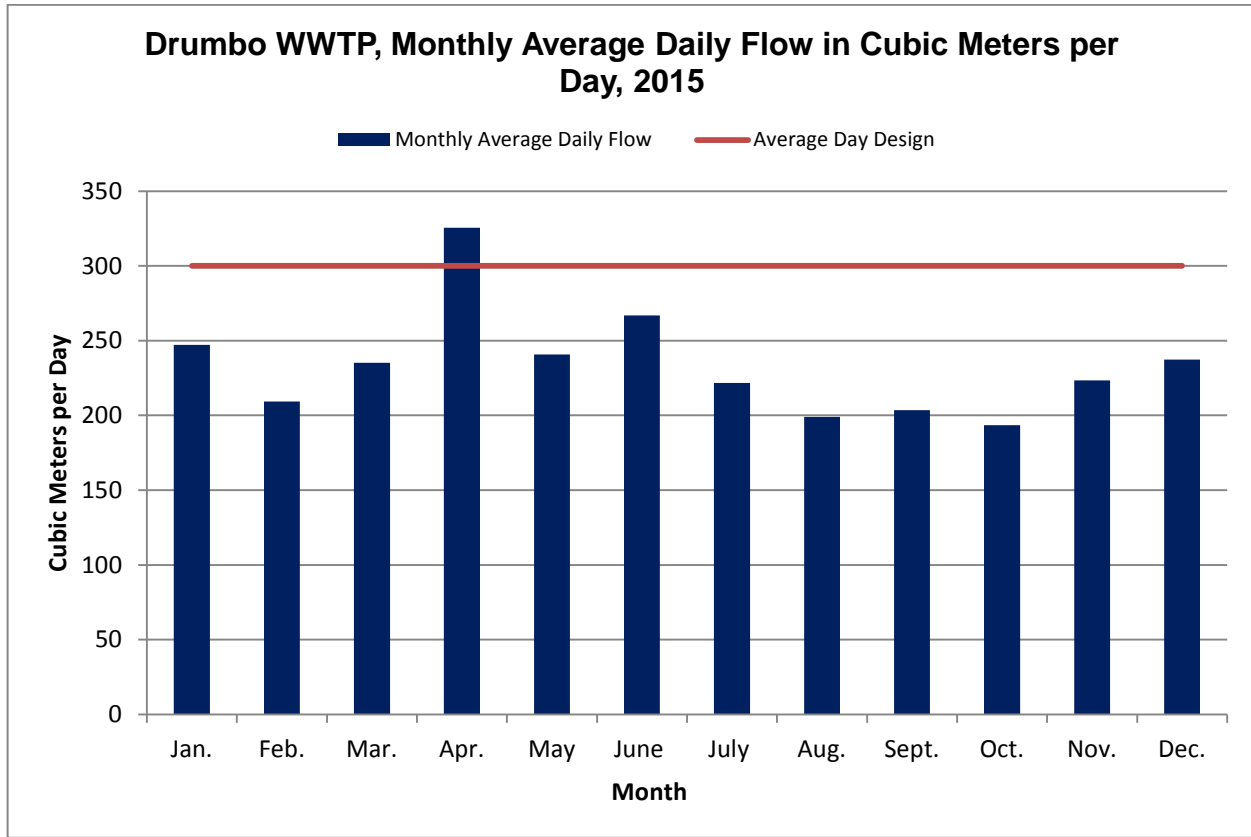
#### **Discussion:**

Co-thickened primary sludge is transported to Woodstock WWTP and dumped into the grit tank for treatment at that facility.

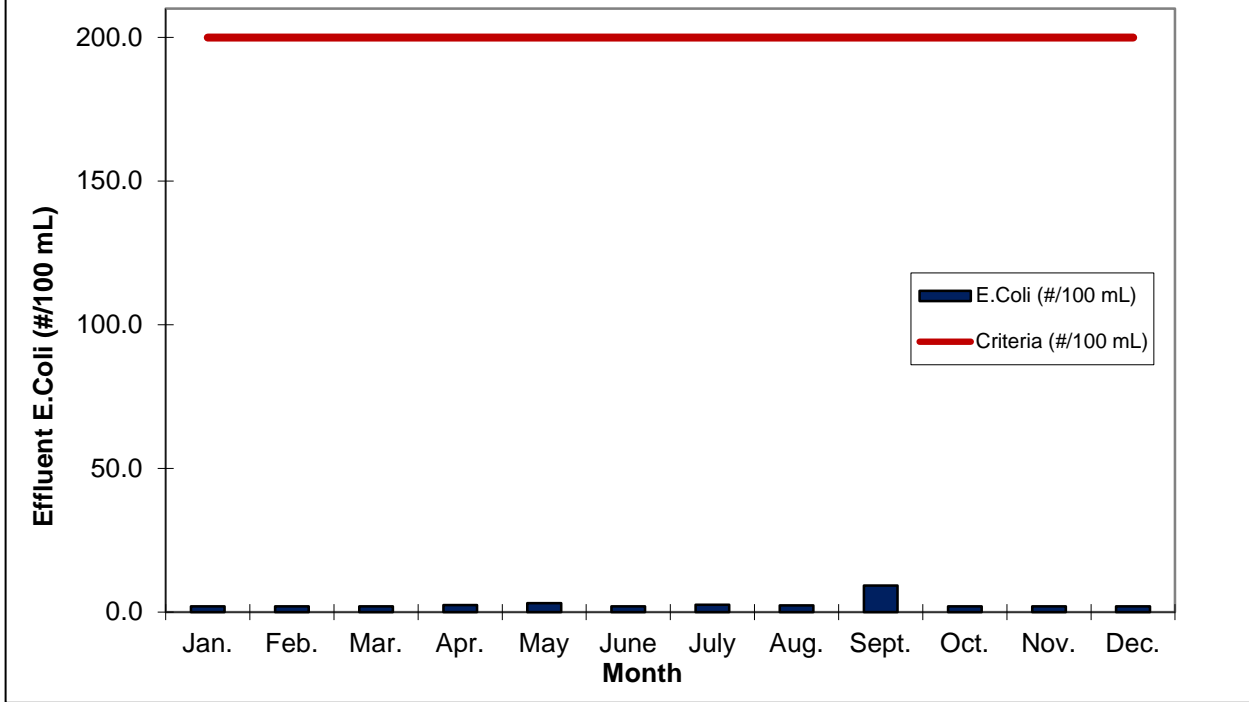
#### **Summary**

The Drumbo WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015. A Class Environmental Assessment (Class EA) is currently underway to investigate potential alternatives to upgrade the Drumbo WWTP and meet future wastewater treatment requirements for the community.

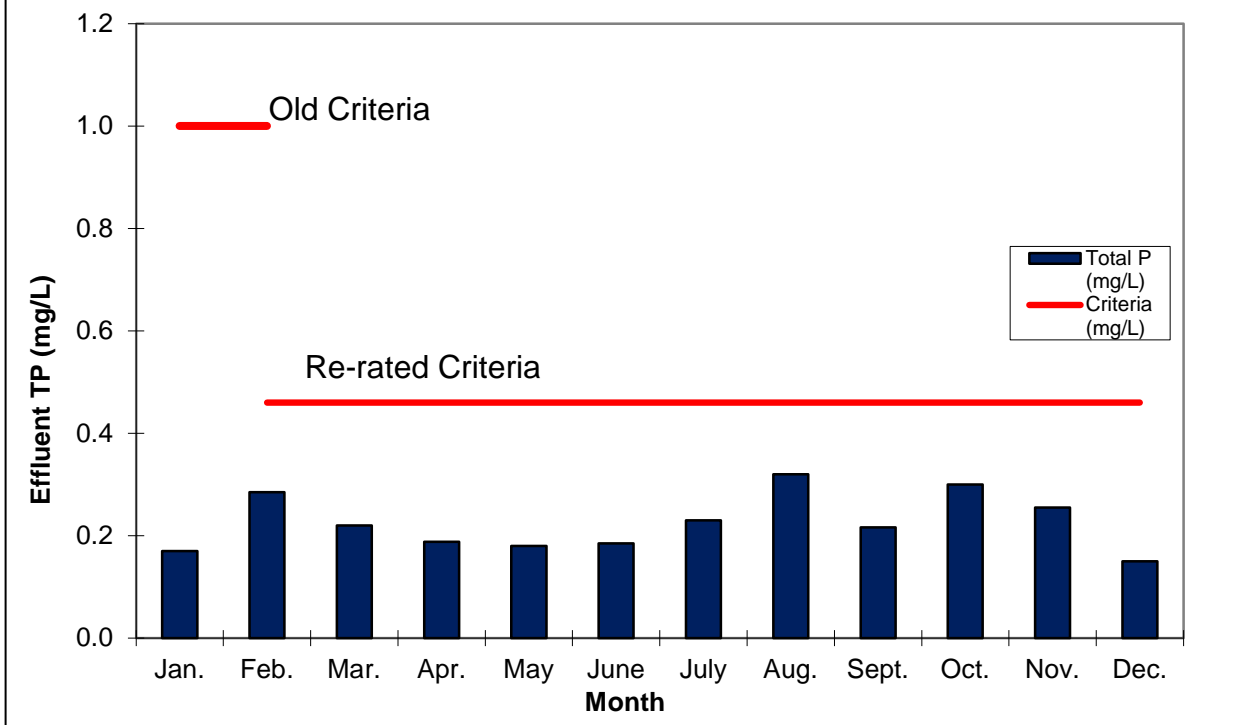
**APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS**



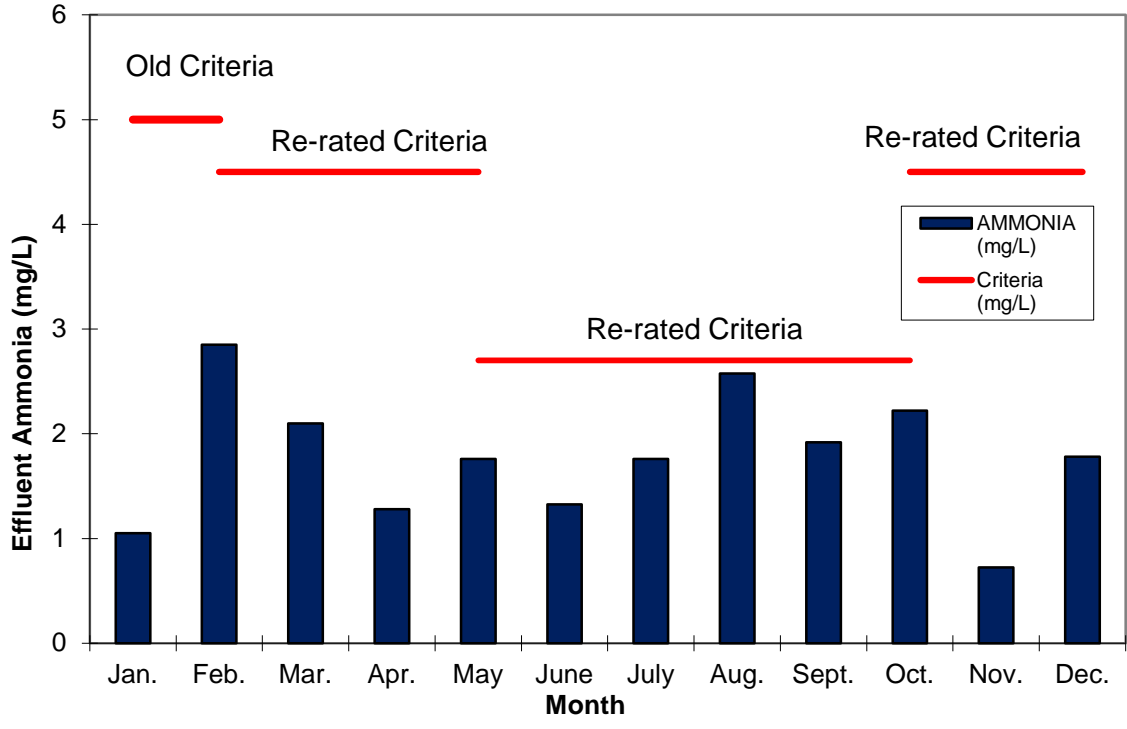
**Drumbo WWTP Effluent  
Monthly Geometric Mean Density E.Coli - 2015**



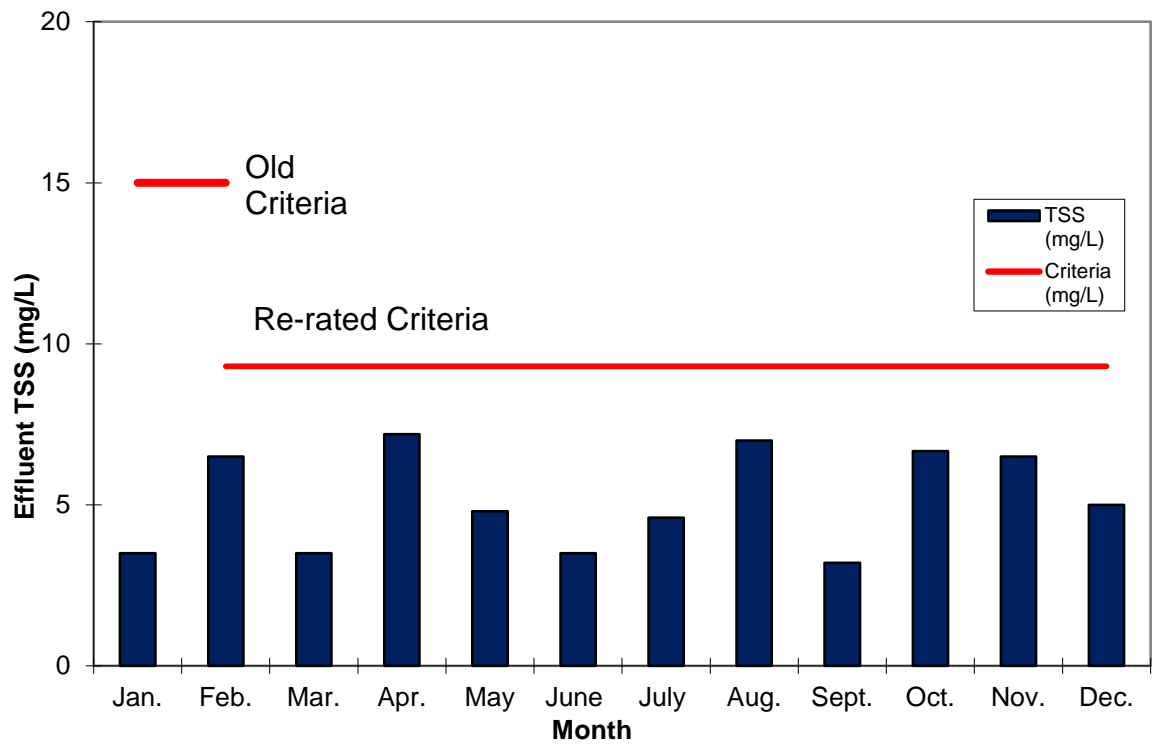
**Drumbo WWTP Effluent , Monthly Average TP - 2015**



**Drumbo WWTP Effluent, Monthly Average Ammonia - 2015**



**Drumbo WWTP Effluent. Monthly Average TSS - 2015**







## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Ingersoll Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

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Wastewater Treatment Plant:	Ingersoll Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110003969
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Ingersoll WWTP provides wastewater treatment for residential, commercial, and industrial users in the Town of Ingersoll. It also provides treatment for septic tank waste, hauled waste, holding tank waste, and landfill leachate from within Oxford County

The wastewater treatment plant is located at 56 McKeand St., Ingersoll, Ontario. The Facility description is provided below.

Facility	Ingersoll Wastewater Treatment Plant
Design Capacity	10,230 m <sup>3</sup> /d
2015 Average Daily Flow	6,482 m <sup>3</sup> /d
2015 Maximum Daily Flow	12,970 m <sup>3</sup> /d
2015 Total Volume of Wastewater	2,365,576 m <sup>3</sup> /year
2015 Total Received Hauled Waste	15,397 m <sup>3</sup> /year
Classification	WWT – III
Environmental Compliance Approval (ECA)	#1614-A28P9L

The Old and New Plants within the Ingersoll WWTP began operation in 1947 and 1974, respectively. In late August 2015, the 1947 Plant was taken out of service and emptied out as it is being replaced as part of a major upgrade project. The two facilities are conventional activated sludge plants consisting of primary and secondary treatment; both plants share the same ultraviolet light disinfection system and a combined single discharge point. The facility adds aluminum sulphate into the reactors for total phosphorus reduction. The plant utilizes anaerobic digestion followed by dewatering of the biosolids to produce stabilized biosolids. The biosolids are then transported to dedicated offsite storage prior to beneficial reuse on agricultural land.

Ingersoll WWTP was under construction in 2015 under Contract A, the first of two phases of upgrades. This work was completed by the fall of 2015. Under Contract A, the 1974 Plant's secondary clarifiers were expanded to provide treatment capability through the demolition and re-construction of the 1947 plant (Contract B). Contract B was initiated before the end of 2015.

The Plant provided effective wastewater treatment in 2015, with an average flow of 4,137 m<sup>3</sup>/d for the 1974 Plant, and 2,345 m<sup>3</sup>/d for the 1947 Plant. The combined average flow of 6,482 m<sup>3</sup>/d represents 63.4% of the design capacity of 10,230 m<sup>3</sup>/d for both plants. The total combined volume treated in 2015 was 2,365,576 m<sup>3</sup>.

A standby generator is available to run the onsite Ingersoll Main Lift Station in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## **1.2. Operating Expenses**

In 2015 the Ingersoll Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$900,000.

## **2. Summary and Interpretation of Monitoring Data**

### **2.1. Effluent Quality Assurance and Control Measures**

#### ***Sampling Procedure***

Influent samples are collected monthly and effluent samples are collected weekly using a composite sampler over a 24-hour period. Raw sewage samples are collected at the main lift station located on-site; the sample is drawn after the lift station pumps and prior to the primary tanks of either plant. Effluent is sampled directly from the combined flow after it leaves the UV disinfection system prior to final discharge and comprises the final treated effluent sample for the entire facility.

#### ***Laboratory and Field Testing***

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control, the results of which are not included in this report.

### **2.2. Plant Performance & Effluent Quality**

The Ingersoll WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the Plant effluent discharged to the Thames River.

Approximately four times a week, the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6.0 - 9.5 in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	115	746
Total Suspended Solids	139	900
Total Phosphorus	2.3	15
Total Kjeldahl Nitrogen	21	136

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
CBOD <sub>5</sub>	weekly	25	3 - 10	91 - 97
Total Suspended Solids	weekly	25	4.8 - 13.5	90 - 97
Total Phosphorus	weekly	1	0.3 - 0.4	83 - 87
pH any single sample	weekly	6.0 - 9.5	6.6 - 7.9	--
E.coli	Weekly	200 organisms/100 mL (Monthly Geometric Mean Density)	1 - 13	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Ingersoll WWTP in 2015.

The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	15	3 - 10
Total Suspended Solids	weekly	15	4.75 - 13.5
Total Phosphorus	weekly	0.75	0.3 - 0.4
pH any single sample	weekly	6.5-9.0	6.6 - 7.9
E.coli	weekly	100 organisms/100 mL (Monthly Geometric Mean Density)	1 -13

### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Ingersoll WWTP in 2015; however, there was a spill during construction of Contract A on April 16, 2015. At 11 am on April 16th, a construction packer caused a leak of 223 liters of return activated sludge (RAS) at a flange in the pipe. A dewatering pump was used to transfer the material back into the process tank. The tank with the compromised pipe was isolated to complete the repairs. The event was reported to the MOECC at the time it occurred both verbally and in writing.

### **4. Maintenance of Works**

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

### **5. Monitoring Equipment Maintenance and Calibration**

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are kept on-site at the Plant.

### **6. Biosolids 2015**

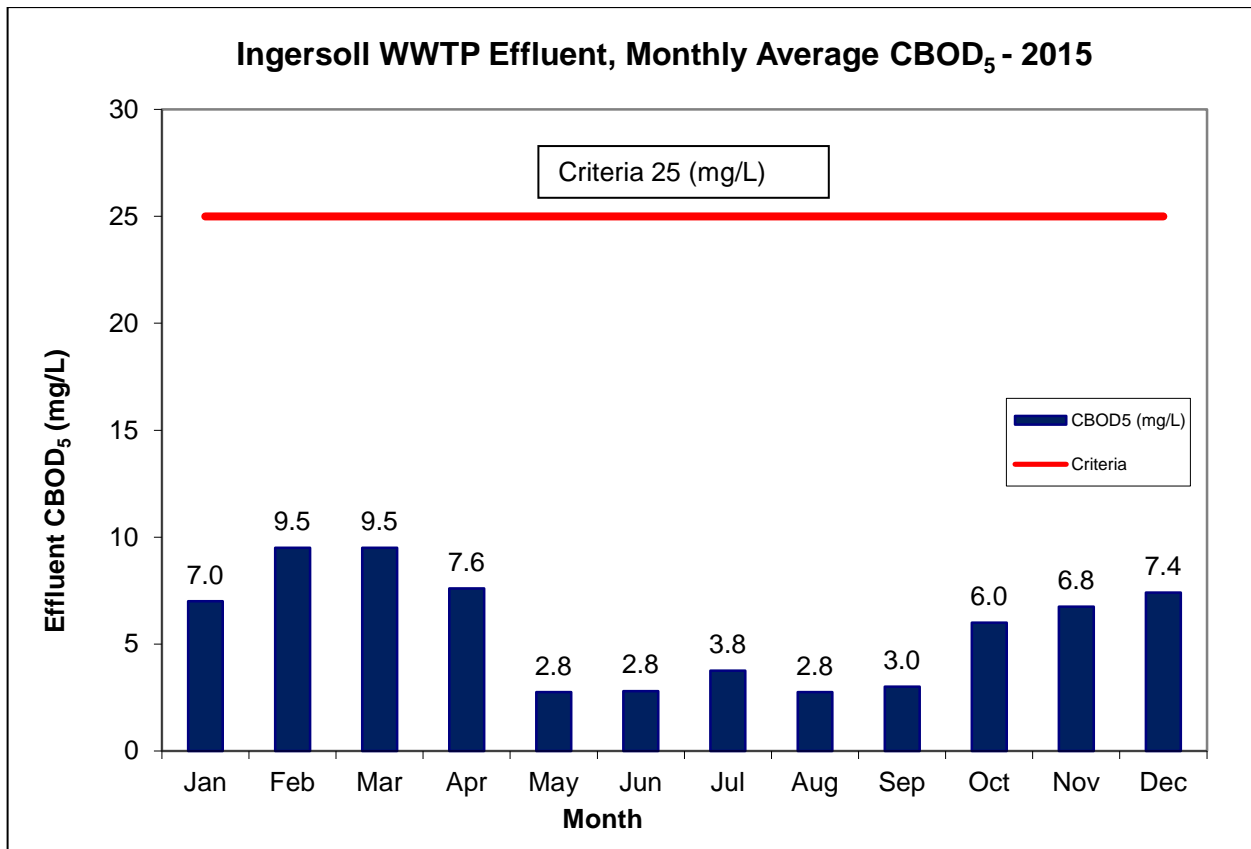
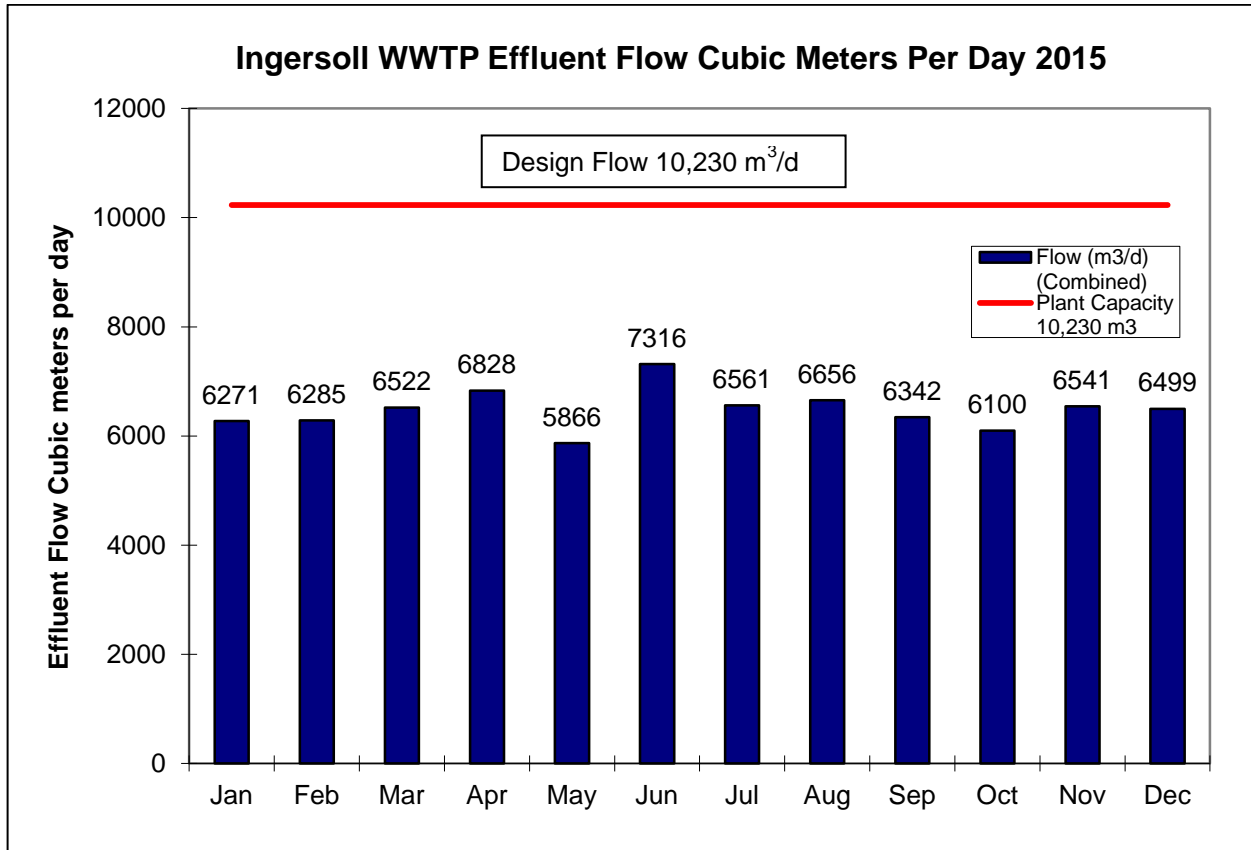
#### **Discussion:**

Biosolids are anaerobically digested and dewatered at the Ingersoll WWTP using an Alfa-Laval Centrifuge. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports)

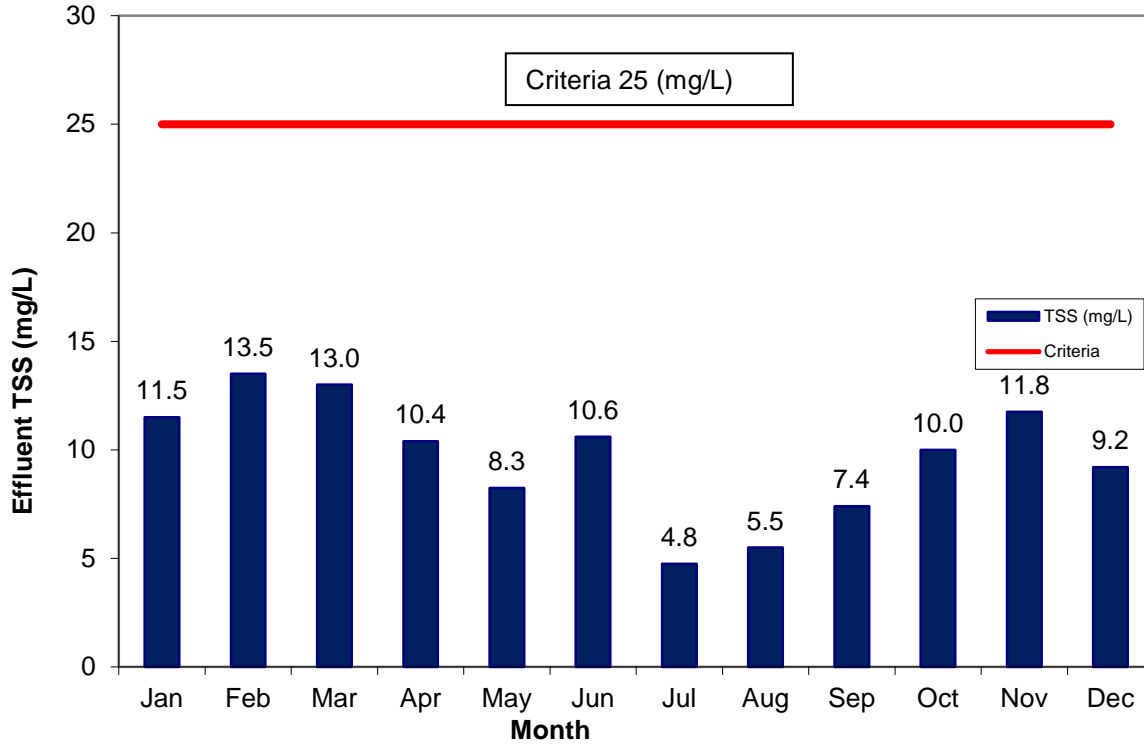
#### **Summary**

The Ingersoll WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015. The Biosolids generated were utilized for beneficial reuse on agricultural land as a Non-agricultural source material (NASM) as regulated under the Nutrient Management Act (NMA); details of which are included in a separate report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports)

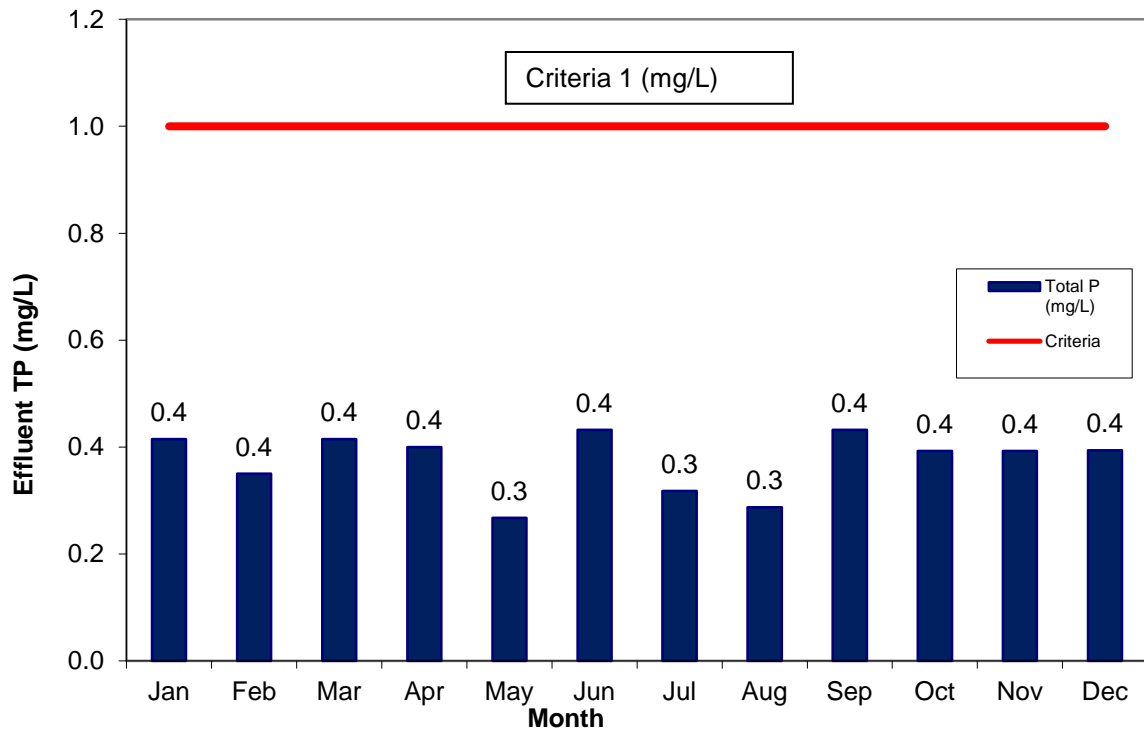
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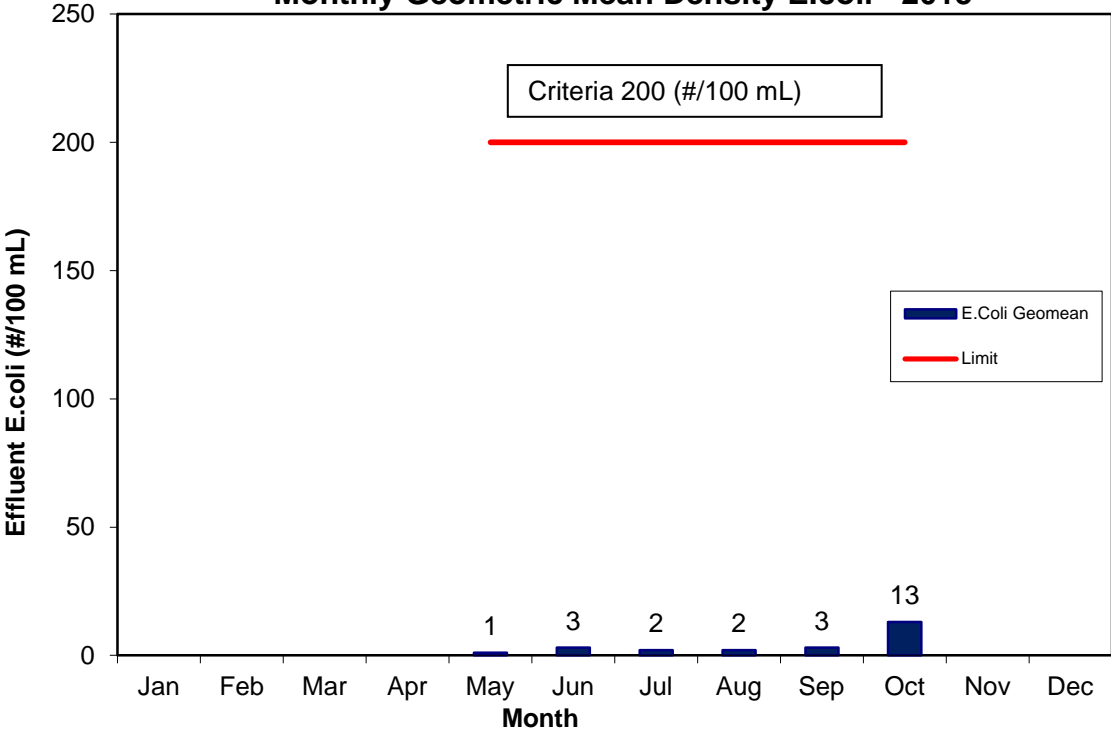
Ingersoll WWTP Effluent, Monthly Average TSS - 2015



Ingersoll WWTP Effluent, Monthly Average TP - 2015



### Ingersoll WWTP Effluent Monthly Geometric Mean Density E.coli - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Mount Elgin Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

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Wastewater Treatment Plant:	Mount Elgin Wastewater Treatment Plant
Wastewater Treatment Plant Number:	20002870
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Mount Elgin Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2015. The average daily flow for 2015 was 45 m<sup>3</sup>/d. This represents 23.6% of the design criteria of 190.6 m<sup>3</sup>/d.

The wastewater treatment plant is located at 324021 Mount Elgin Road, Township of South-West Oxford. The Facility description is provided below.

Facility	Mount Elgin Wastewater Treatment Plant
Design Capacity	190.5 m <sup>3</sup> /d
2015 Average Daily Flow	45 m <sup>3</sup> /d
2015 Maximum Daily Flow	51 m <sup>3</sup> /d
2015 Total Volume of Wastewater	16,545 m <sup>3</sup> /year
Classification	un-classified
Environmental Compliance Approval (ECA)	#0611-6Q3JQL



The Mount Elgin wastewater treatment system was expanded in 2015 to include two phases of the potentially four phases included within the ECA. Phase 1 and Phase 2 are identical and operate in parallel.

The central Recirculating Sand Filter (RSF) system is one component of the overall sewage treatment system. In septic tank effluent gravity (STEG) collection systems, the wastewater is collected from individual homes in septic tanks where it is pretreated to remove solids and grease before it drains by gravity to the small diameter collection mains. The small diameter collection mains direct the primary treated effluent to a pump station located near the Mount Elgin Road entrance of the wastewater treatment plant.

The primary treated effluent is the raw influent to the wastewater treatment system where it is pumped to the recirculation tanks. The influent is pumped to the recirculating sand filter and then collected and pumped to a splitter valve that allows 80% of the flow to recirculate and 20% to enter the dosing tank. From the dosing tank, treated effluent is pumped to the shallow buried trench drainfield that provides for the subsurface discharge of the treated effluent. Effluent samples are collected from the dosing tank ahead of the drainfield.

A standby generator plug-in is available with a manual switch in the event a prolonged power outage requires the use of a mobile generator.

## 1.2. Operating Expenses

In 2015, the Mount Elgin Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$29,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Grab samples are collected from the influent lift station on a quarterly basis. Samples are tested for Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>), Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are analyzed for CBOD<sub>5</sub>, TSS, TP, ammonia, TKN, nitrite, nitrate, pH, and E.coli at least quarterly.

Groundwater testing is done for nitrites, nitrates, and pH on a quarterly basis.

#### *Laboratory and Field Testing*

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, which is tested in the field during collection. These results are used in this report for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

### 2.2. Plant Performance & Effluent Quality

There are no effluent limits for the system, however, the ECA requires Oxford County to use best efforts to operate the sewage treatment facility with the objective that the concentrations of both CBOD<sub>5</sub> and Suspended Solids do not exceed 10 mg/L in the effluent ahead of the subsurface disposal system.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	92	4
Total Suspended Solids	48	2
Total Phosphorus	6.9	0.3
Total Kjeldahl Nitrogen	55	2.5

Ground Water Results

	2015						
	Well 1	Well 2	Well 3		Well 1	Well 2	Well 3
Parameter	March 12/15	March 12/15	March 24/15		June 23/15	June 23/15	June 23/15
Well Level (meters)	3.31	3.43	3.91		3.46	3.71	3.9
Nitrite (mg/L N)	<0.03	0.03	<0.03		<0.03	0.11	<0.03
Nitrate (mg/L N)	<0.06	34.9	<0.06		<0.06	11.7	<0.06
Nitrate+Nitrite (mg/L N)	<0.06	34.9	<0.06		<0.06	11.8	<0.06
pH	7.02	7.16	8.03		6.84	7.2	7.09
	Well 1	Well 2	Well 3		Well 1	Well 2	Well 3
Parameter	Sept 10/15	Sept 10/15	Sept 10/15		Dec 7/15	Dec 7/15	Dec 7/15
Well Level (meters)	2.38	3.11	3.39		3.11	3.21	3.55
Nitrite (mg/L N)	0.015	0.07	0.015		< 0.03	0.1	< 0.03
Nitrate (mg/L N)	0.06	9.13	0.03		< 0.06	19.6	< 0.06
Nitrate+Nitrite (mg/L N)	0.075	9.2	0.045		< 0.06	19.7	< 0.06
pH	7.55	7.16	7.17		6.92	7.27	7.07
Well depths	3.66m	3.96m	3.96m				

**2.3. Effluent Objectives**

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant’s ECA were met at the Mount Elgin WWTP in 2015.

The following table presents the range of effluent discharge values vs. ECA Objectives ahead of the subsurface disposal system.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	10	1
Total Suspended Solids	weekly	10	3.5

### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Mount Elgin WWTP in 2015.

### **4. Maintenance of Works**

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

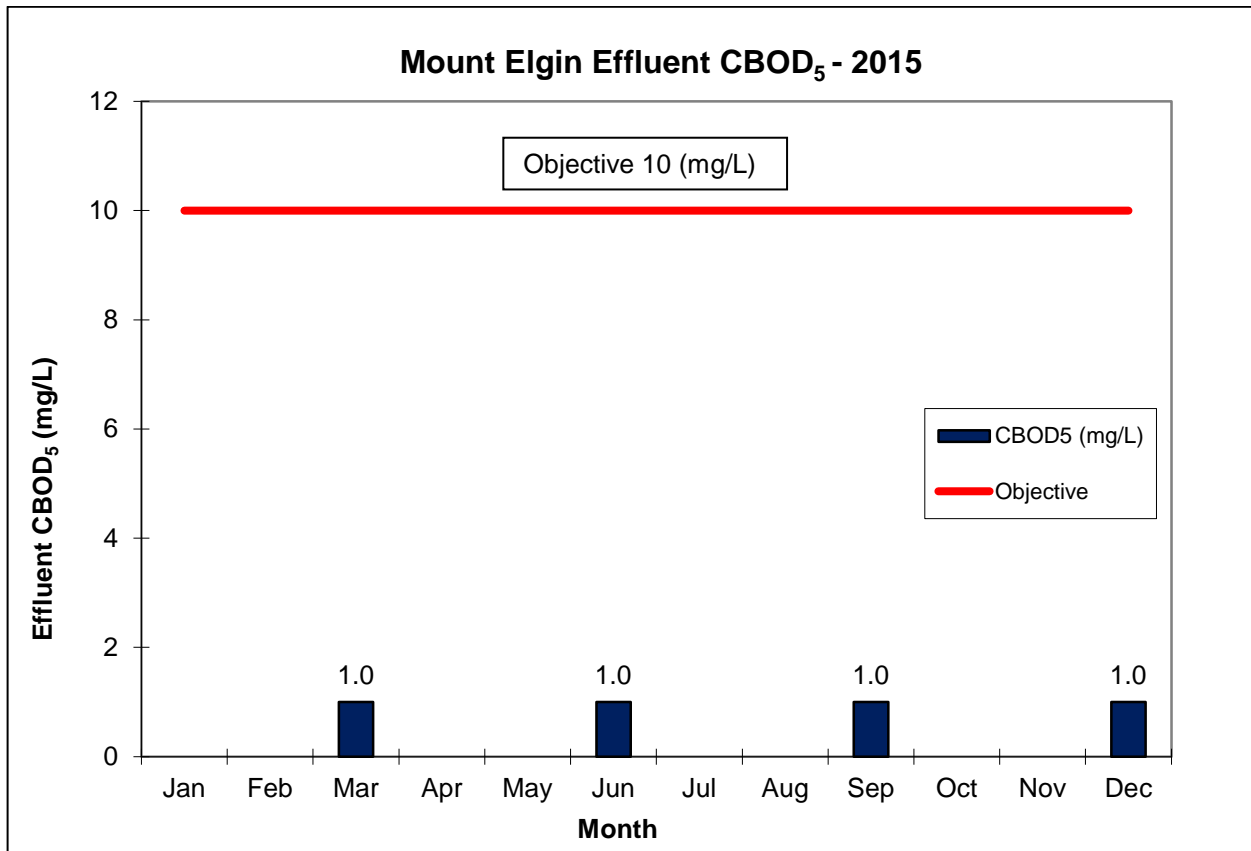
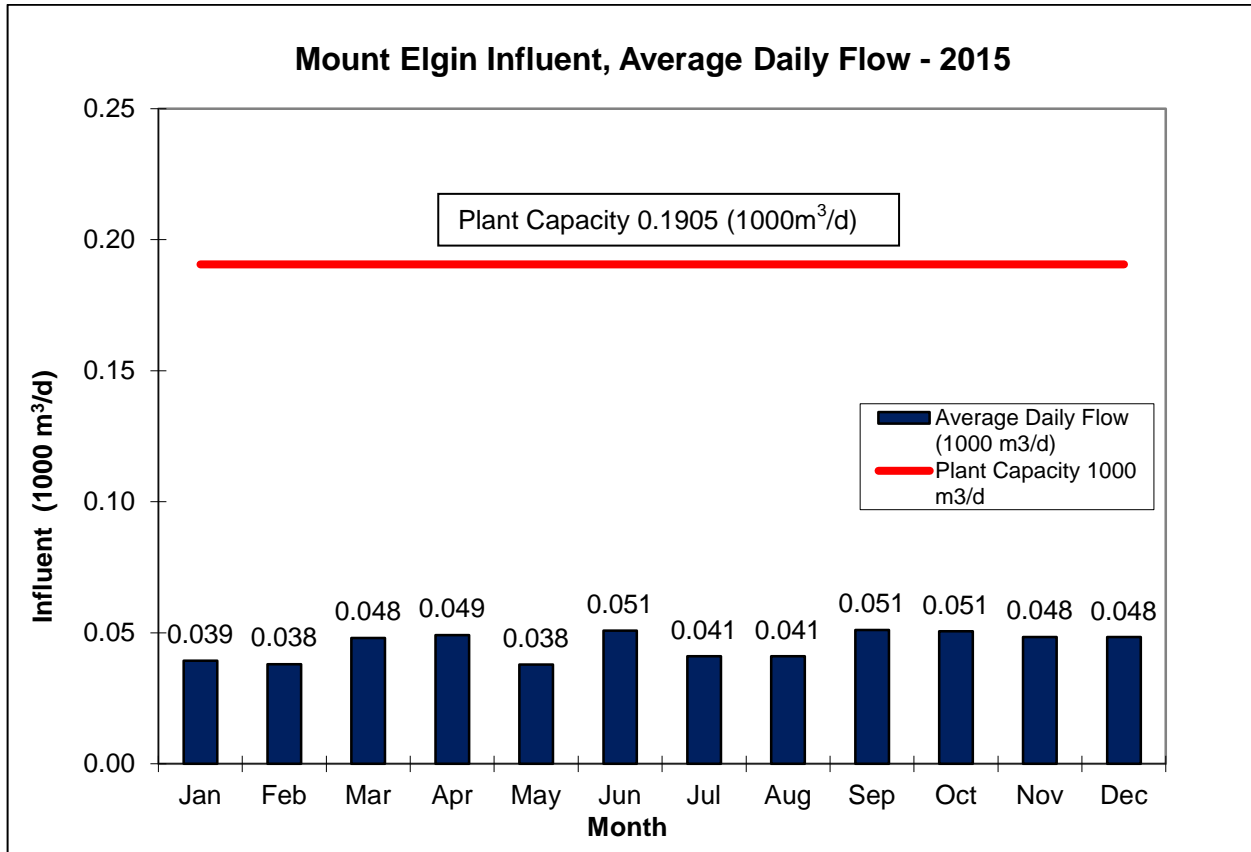
### **5. Monitoring Equipment Maintenance and Calibration**

Calibration of flow meters is conducted yearly by R&R Instrumentation. The operational monitoring equipment calibration records are kept on-site at the Plant.

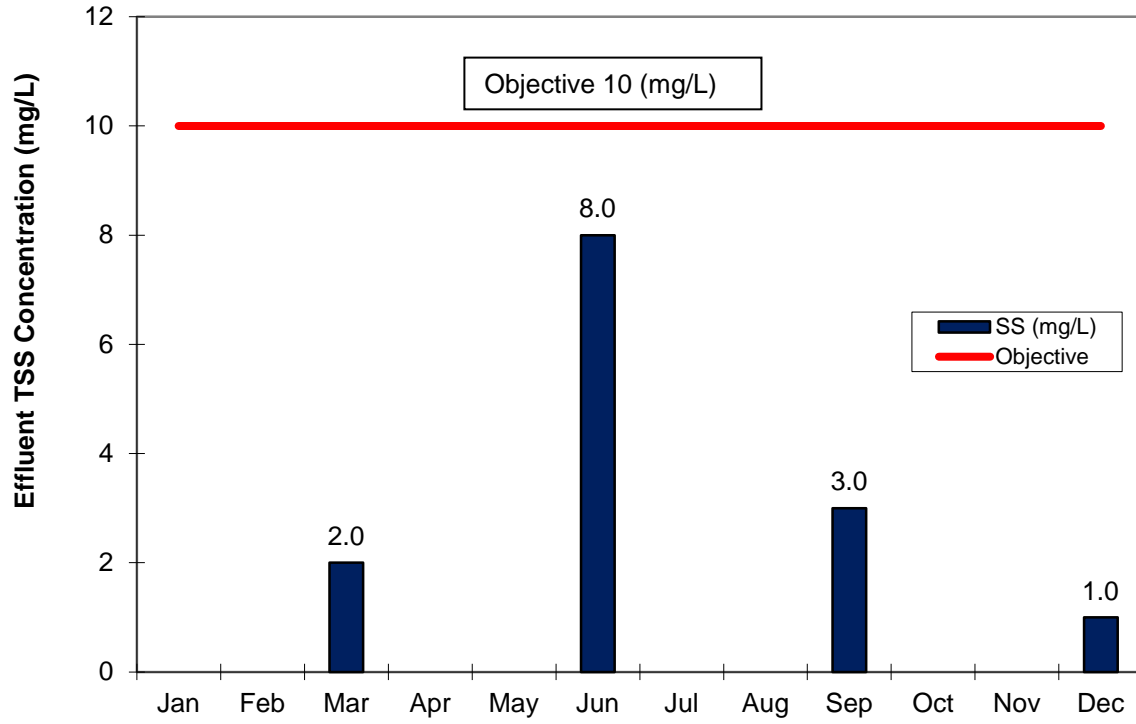
### **Summary**

The Mount Elgin WWTP operated within its design flow criteria and met all effluent discharge quality objectives in 2015.

**APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS**



### Mount Elgin Effluent, TSS Concentration - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Norwich Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Norwich Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110001480
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Norwich WWTP provided effective wastewater treatment in 2015. The average daily flow for 2015 was 856 m<sup>3</sup>/d. This represents 55.9% of the rated capacity of 1,530 m<sup>3</sup>/d.

The wastewater treatment plant is located at Lot 7, Conc. 5, Norwich Township. The Facility description is provided below.

Facility	Norwich Wastewater Treatment Plant
Design Capacity	1,530 m <sup>3</sup> /d
2015 Average Daily Flow	856 m <sup>3</sup> /d
2015 Maximum Daily Flow	2,305 m <sup>3</sup> /d
2015 Total Volume of Wastewater	312,423 m <sup>3</sup> /year
Classification	WWT – I
Environmental Compliance Approval (ECA)	#1680-6F6QR5

The Norwich WWTP is a lagoon wastewater treatment system serving the community of Norwich. The wastewater is pumped from two pump stations to a splitter box; then to either of two lagoon cells as determined by the operator. Typically the wastewater is directed to the North Cell which is operated in series with the South Cell, followed by filtering of the effluent through the sand filter beds performed for a period each day, as required.

The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## 1.2. Operating Expenses

In 2015 the Norwich Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$90,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Influent samples were taken from the Lagoon influent splitter box. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS) monthly, Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD<sub>5</sub> and TSS are sampled at least monthly. TP, ammonia, TKN, pH, and temperature samples are taken three times per week; E.coli and dissolved oxygen are tested at least weekly.

#### *Laboratory and Field Testing*

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, temperature, and dissolved oxygen which are tested in the field during collection. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

### 2.2. Plant Performance & Effluent Quality

The Norwich WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River.

The operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	234	200
Total Suspended Solids	194	166
Total Phosphorus	4.7	4
Total Kjeldahl Nitrogen	44	38

<b>Effluent Parameter</b>	<b>Sample Frequency</b> (when discharging)	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
BOD <sub>5</sub>	monthly	10	1 - 6	97.4 - 99.6
Suspended Solids	monthly	10	1 - 3	98.5 - 99.5
Total Phosphorus (non-freezing period)*	3/week	0.5	0.14 - 0.29	97 - 99.9
Total Phosphorus (freezing Period)*	3/week	1	0.33 - 0.33	93
Total Ammonia Nitrogen (non-freezing period)*	3/week	3	1 - 3	--
Total Ammonia Nitrogen (freezing period)*	3/week	5	1 - 1	--
E.coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	14 - 200	--
pH any single sample	3/week	6.0 - 9.5	6.6 - 6.9	--

\* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1 to April 30<sup>th</sup>.

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The following effluent discharge objectives listed in the Plant's ECA were not met at the Norwich WWTP: BOD<sub>5</sub> for April 2015 at 6 mg/L, Ammonia in May at 2.2 mg/L and in July at 2.6 mg/L, and E.coli in May at 200 (#/100 mL) and in July at 155.6 (3/100 mL). The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b> (when discharging)	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
BOD <sub>5</sub>	monthly	5	1 - 6
Total Suspended Solids	monthly	5	1 - 3
Total Phosphorus (non-freezing period) *	3/week	0.3	0.14 - 0.29
Total Phosphorus (freezing period)*	3/week	0.8	0.33 - 0.33
Total Ammonia Nitrogen (non-freezing period) *	3/week	2	1 - 2.6
Total Ammonia Nitrogen (freezing period)*	3/week	4	1 - 1
E.coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	14 - 200

\* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1 to April 30<sup>th</sup>.



### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Norwich WWTP in 2015.

On June 23, 2015 a regional power outage resulted in an overflow of approximately 5 m<sup>3</sup> from the Lossing Drive sewage pumping station. The after-hours on-call Operator responded to alarms and had a mobile generator dispatched to the site. A small amount of sewage overflowed before the generator was connected to the station.

This event was reported to the MOECC at the time it occurred.

### **4. Maintenance of Works**

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

### **5. Monitoring Equipment Maintenance and Calibration**

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are kept on-site at the Plant.

### **6. Biosolids 2015**

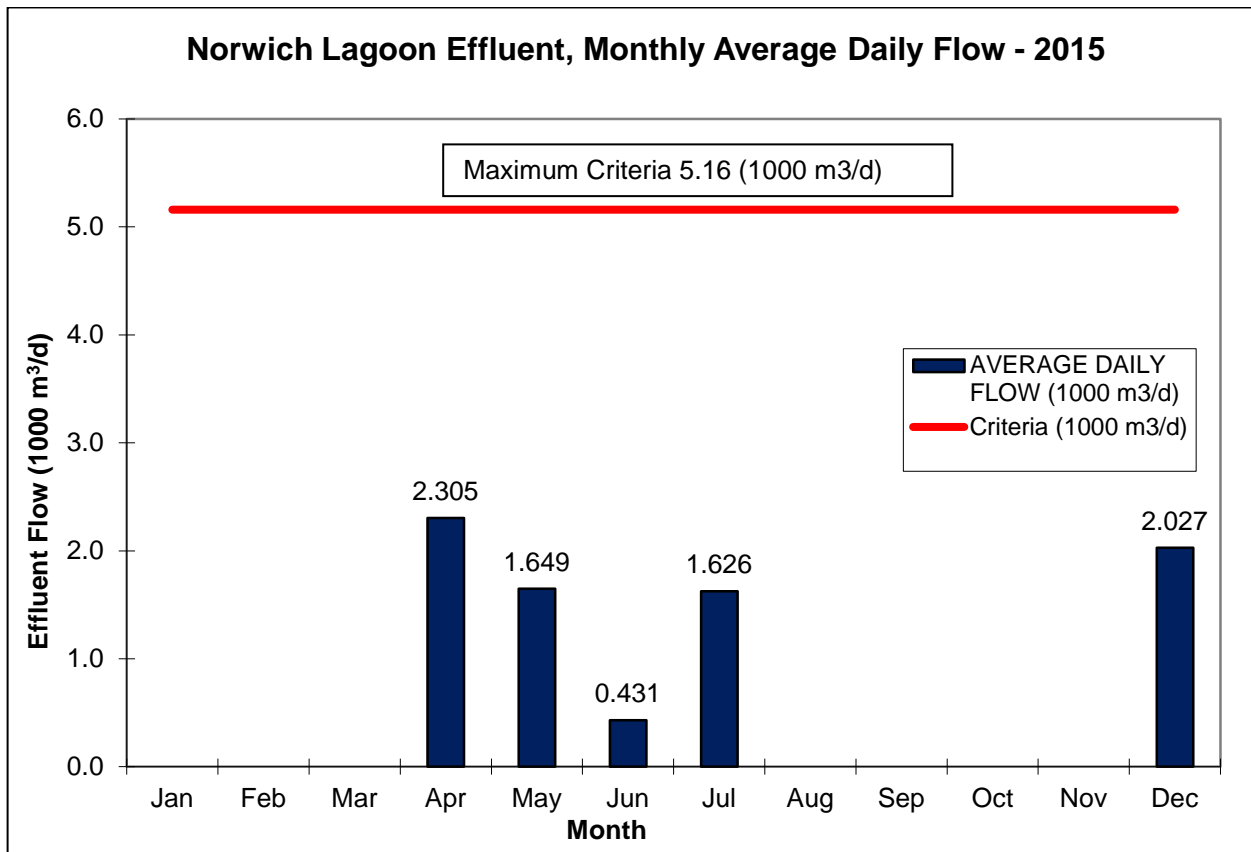
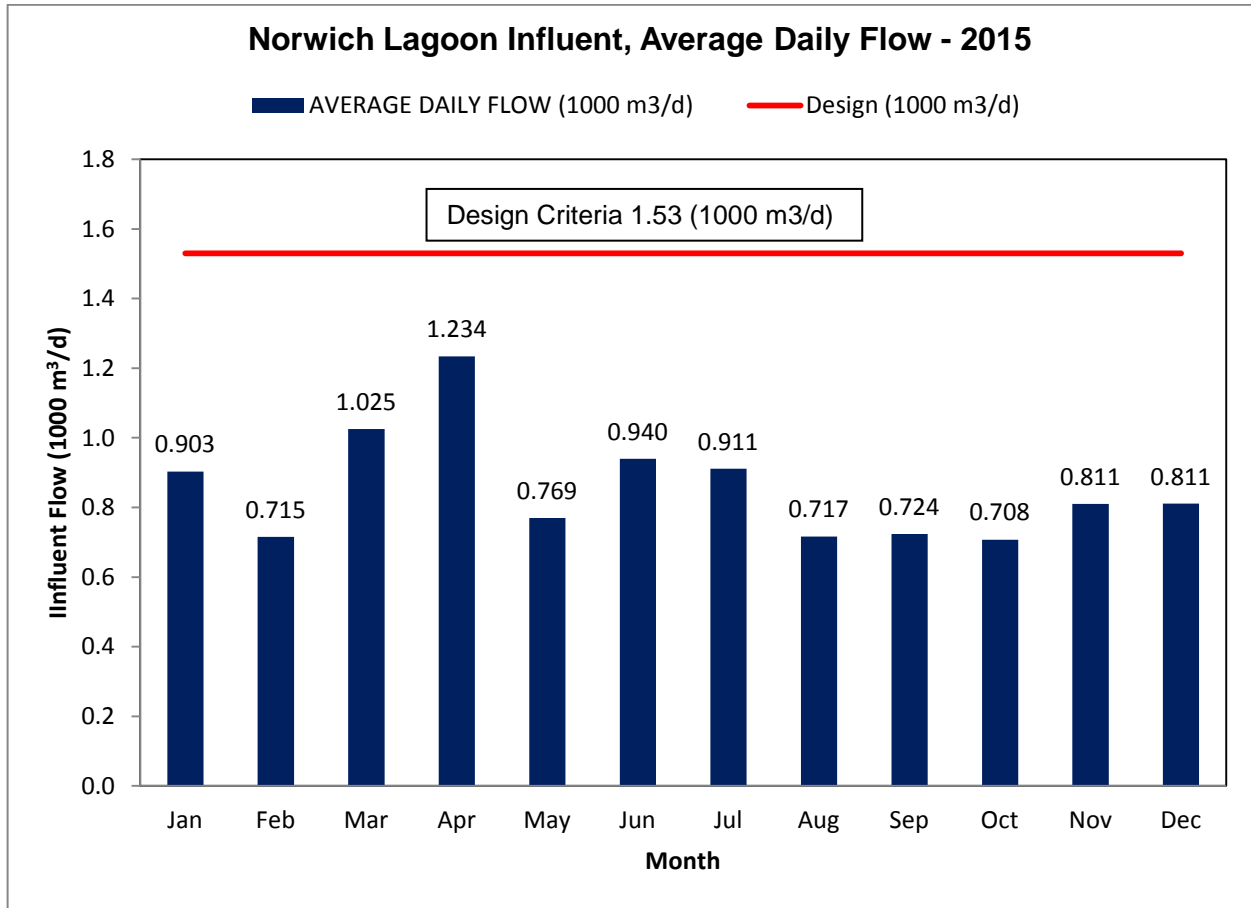
#### **Discussion:**

Biosolids are contained within the lagoon system until they are cleaned out (typically every 10-20 years). Preparations were made to the south lagoon to have it ready for biosolids removal in 2016 (i.e. by moving the material over to the inner side of the berms). During this process it was discovered that the incoming pipe was rusted off and a large depression was discovered in the bottom of the lagoon. The influent pipe was repaired and the depression was filled using clay under the supervision of a professional Hydrogeologist.

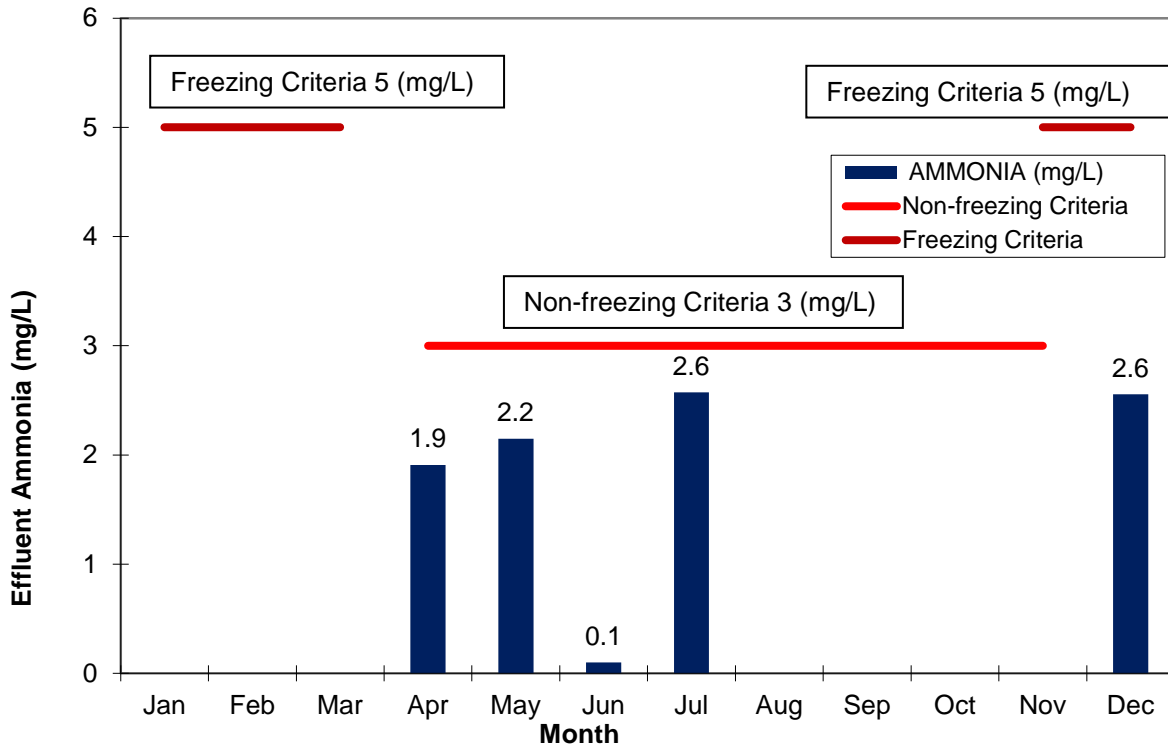
#### **Summary**

The Norwich WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015.

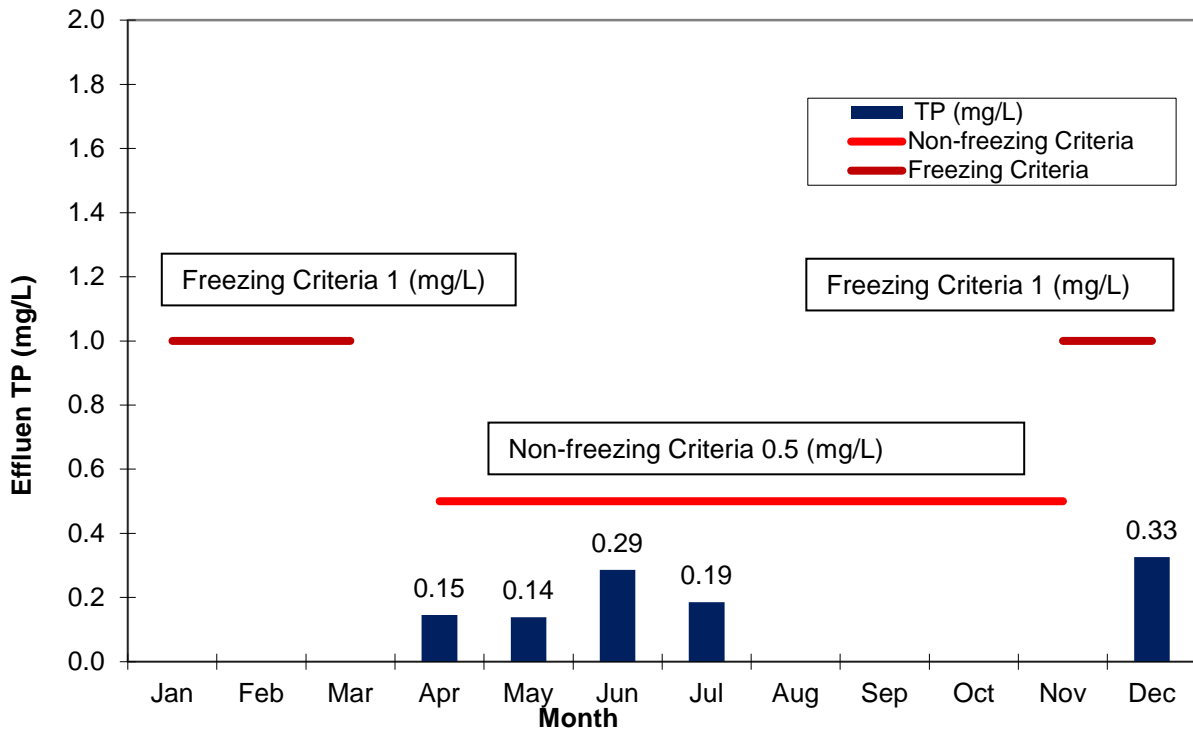
APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



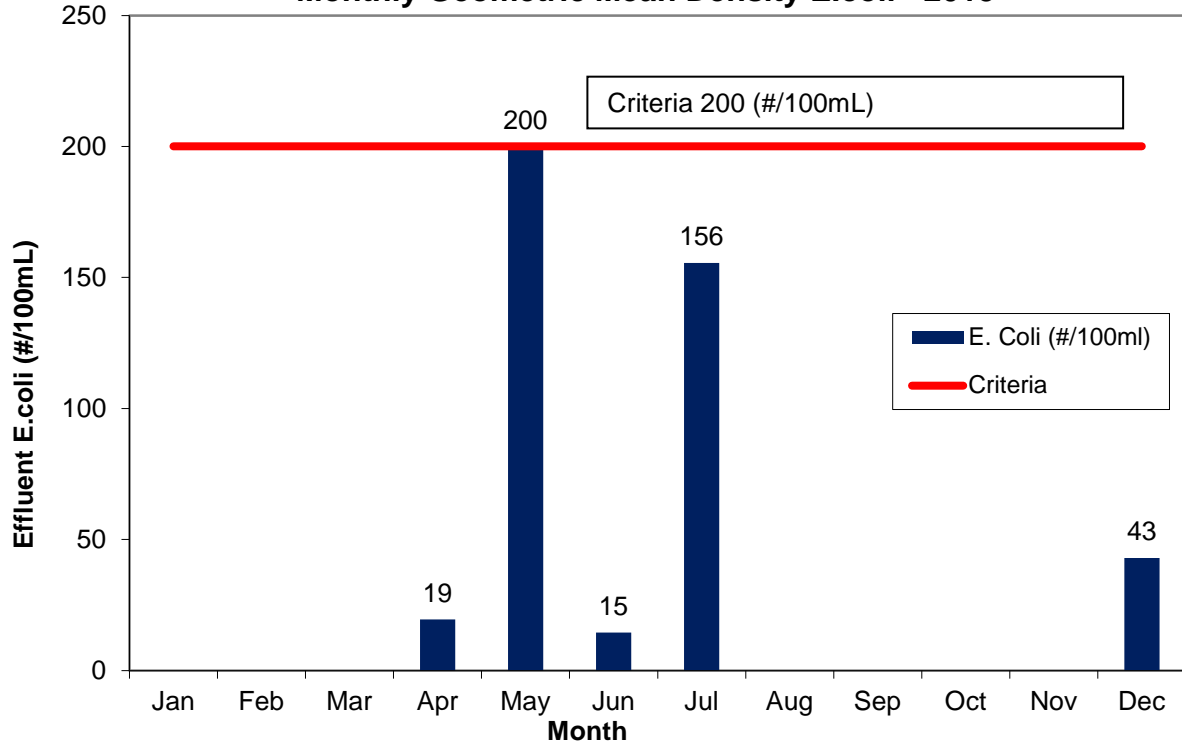
Norwich Lagoon Effluent, Monthly Average Ammonia - 2015



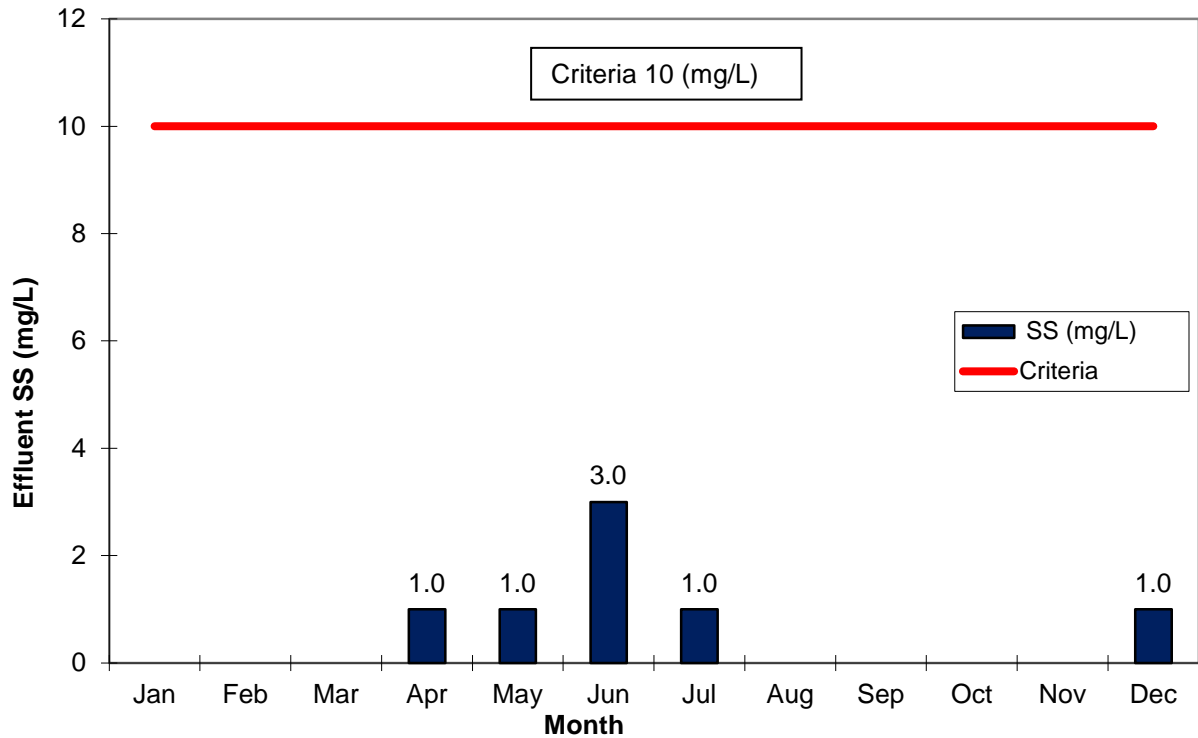
Norwich Lagoon Effluent, Monthly Average TP - 2015



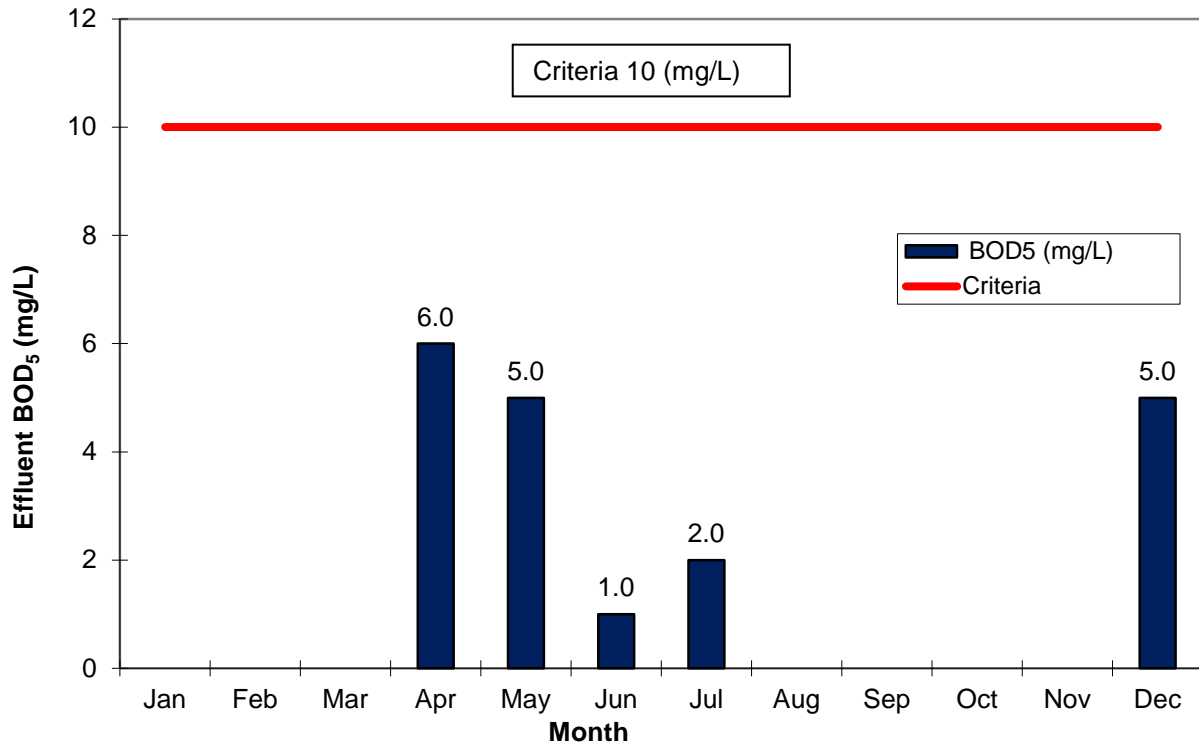
Norwich Lagoon Effluent  
Monthly Geometric Mean Density E.coli - 2015



Norwich Lagoons Effluent, Monthly Average SS - 2015



### Norwich Lagoons Effluent, Monthly Average BOD<sub>5</sub> - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Plattsville Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Plattsville Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110003022
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Plattsville WWTP provided effective wastewater treatment in 2015 and all effluent concentration limits were met on a monthly basis. The annual average daily flow rate was 668 m<sup>3</sup>/d; this represents 83.5% of the WWTP rated capacity of 800 m<sup>3</sup>/d.

The wastewater treatment plant is located at Lot 16, Conc. 12, Township of Blandford-Blenheim. The Facility description is provided below.

Facility	Plattsville Wastewater Treatment Plant
Design Capacity	800 m <sup>3</sup> /d
2015 Average Daily Flow	668 m <sup>3</sup> /d
2015 Maximum Daily Flow	1,519 m <sup>3</sup> /d
2015 Total Volume of Wastewater	243,843 m <sup>3</sup> /year
Classification	WWT – I
Environmental Compliance Approval (ECA)	#3133-7QWH4N

Wastewater is treated at the Plattsville WWTP, which includes two aerated lagoon cells and two conventional wastewater stabilization ponds. Phosphorus removal is accomplished through the flow paced continuous dosing of aluminum sulphate into the splitter box prior to the wastewater entering the stabilization ponds and/or when required by batch dosing via a return pump pond mixing system, which can dose either cell and recirculate the contents. Treated wastewater is pumped to an intermittent sand filter designed for ammonia removal prior to discharge to the Nith River.

Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

## 1.2. Operating Expenses

In 2015 the Plattsville Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$100,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### **Sampling Procedure**

Raw influent wastewater is sampled on a monthly basis and is analyzed for BOD<sub>5</sub>, TSS, TKN, TP and pH. Effluent discharge samples are collected bi-weekly or monthly and at an interval to meet the percentage of drawdown of the lagoon cell as stipulated in the ECA during discharge periods and analyzed for CBOD<sub>5</sub>, TSS, Total Ammonia Nitrogen, TP, E.coli, temperature and pH.

#### **Laboratory and Field Testing**

Laboratory analyses are performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house laboratory testing is done for process control and is not included in this report.

#### **Groundwater Testing**

Groundwater monitoring requires that an annual sample be collected and tested for Total Organic Carbon, Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite and Nitrate.

A further evaluation of the results over the last few years was conducted by a professional Hydrogeologist and a report prepared. It concluded that there was no clear evidence of an adverse effect on groundwater quality from the Plattsville WWTP. This was forwarded to the MOECC to determine if further sampling is required.

Two samples were collected in 2015 and are referred to as the shallow well sample and deep well sample:

PLATTSVILLE WWTP GROUNDWATER SAMPLING					
	09-Jun-15	09-Jun-15		22-Sept-15	22-Sept-15
	Shallow	Deep		Shallow	Deep
Parameter					
TOC (mg/L)	1.9	< 1.0		2.2	2.4
Total P (mg/L)	< 0.03	0.54		< 0.03	0.51
TKN (mg/L N)	< 0.5	< 0.5		< 0.5	< 0.5
Ammonia/ium (mg/L)	< 0.1	< 0.1		< 0.1	< 0.1
Nitrite (mg/L)	< 0.03	< 0.03		< 0.03	< 0.03
Nitrate (mg/L)	0.25	< 0.06		0.25	0.11
Nitrate + Nitrite (mg/L N)	0.25	< 0.06		0.25	0.11
Chloride (mg/L)	3	19		3	21

## 2.2. Plant Performance & Effluent Quality

The Plattsville WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to the Nith River.

On a bi-weekly basis (as a minimum) the operator measures pH of the effluent streams during discharge. There was no single pH result for the effluent outside the discharge limit of 6-9.5 in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	164	110
Total Suspended Solids	177	118
Total Phosphorus	5.3	3.5
Total Kjeldahl Nitrogen	52	35

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)	Percentage Removal
CBOD <sub>5</sub>	weekly	10	2 - 2.8	98.3 - 98.8
Total Suspended Solids	weekly	10	2.3 - 4	97.7 - 98.7
Total Phosphorus	weekly	0.5	0.03 - 0.05	99 - 99.4
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	2	0.1 - 0.1	99.8
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	5	1-1	91.3
E.coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 - 90	--
pH any single sample	weekly	6.0-9.5	6.7 - 8.5	--

## 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Plattsville WWTP in 2015.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.



The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	5	2 - 2.8
Total Suspended Solids	weekly	5	2.3 - 4
Total Phosphorus	weekly	0.3	0.03 - 0.05
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	1	0.1 0.1
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	3	1-1
E.coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2 - 90

### 3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no bypasses or overflows from the Plattsville WWTP in 2015.

### 4. Maintenance of Works

The operating and maintenance staff at the Plattsville WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

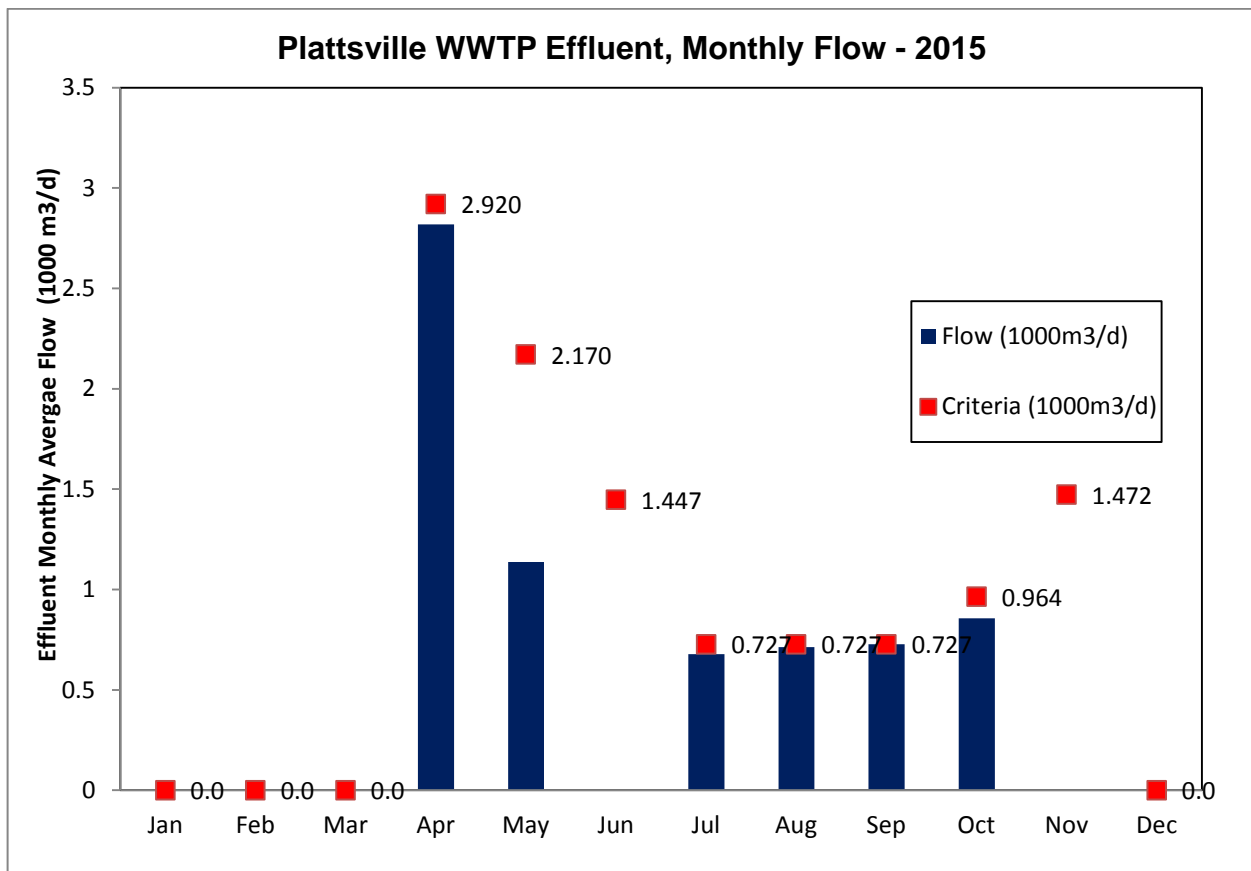
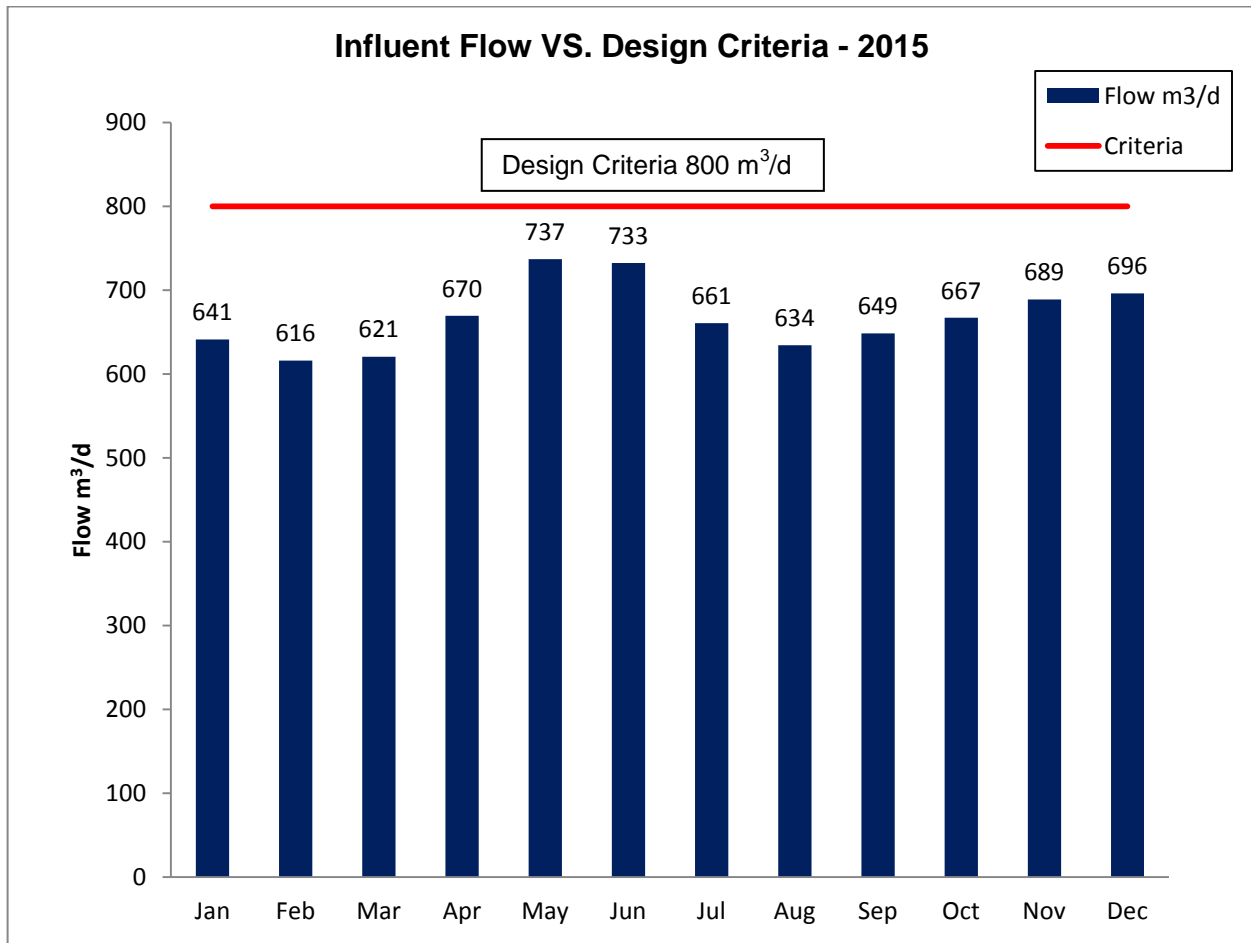
### 5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by R&R Instrumentation. The operational monitoring equipment calibration records are kept on-site at the Plant.

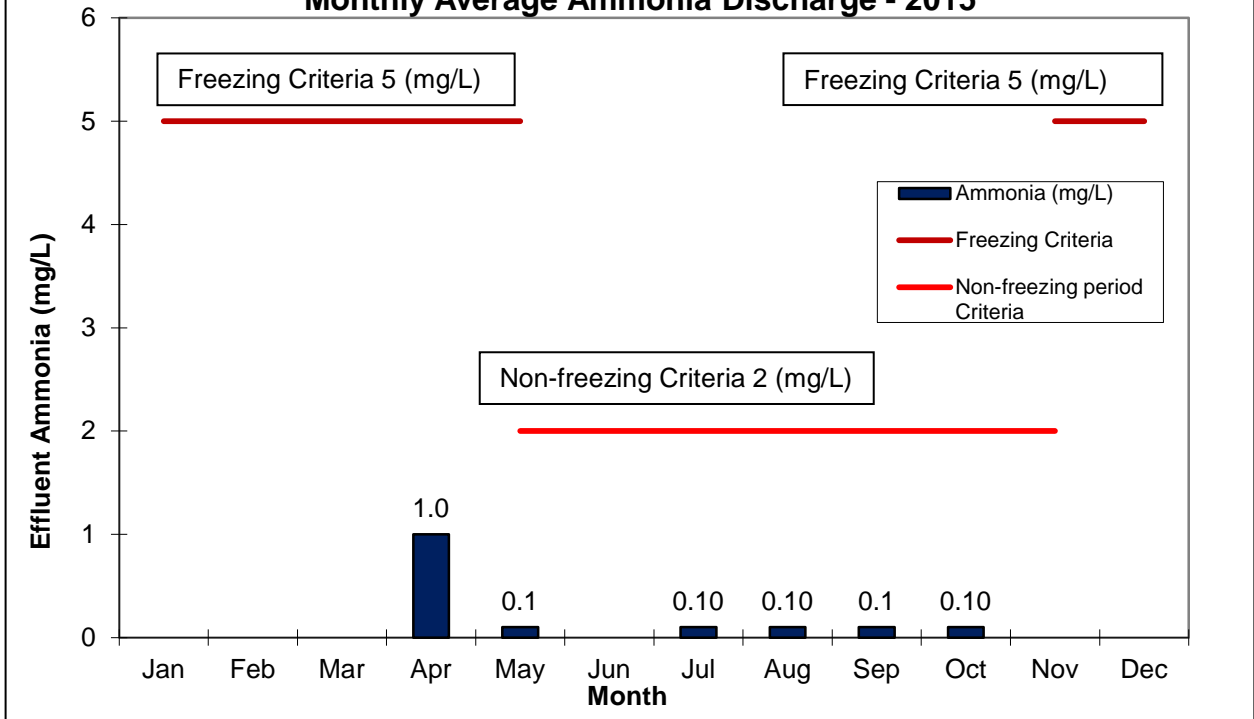
### Summary

The Plattsville WWTP met all effluent discharge quality limits in 2015.

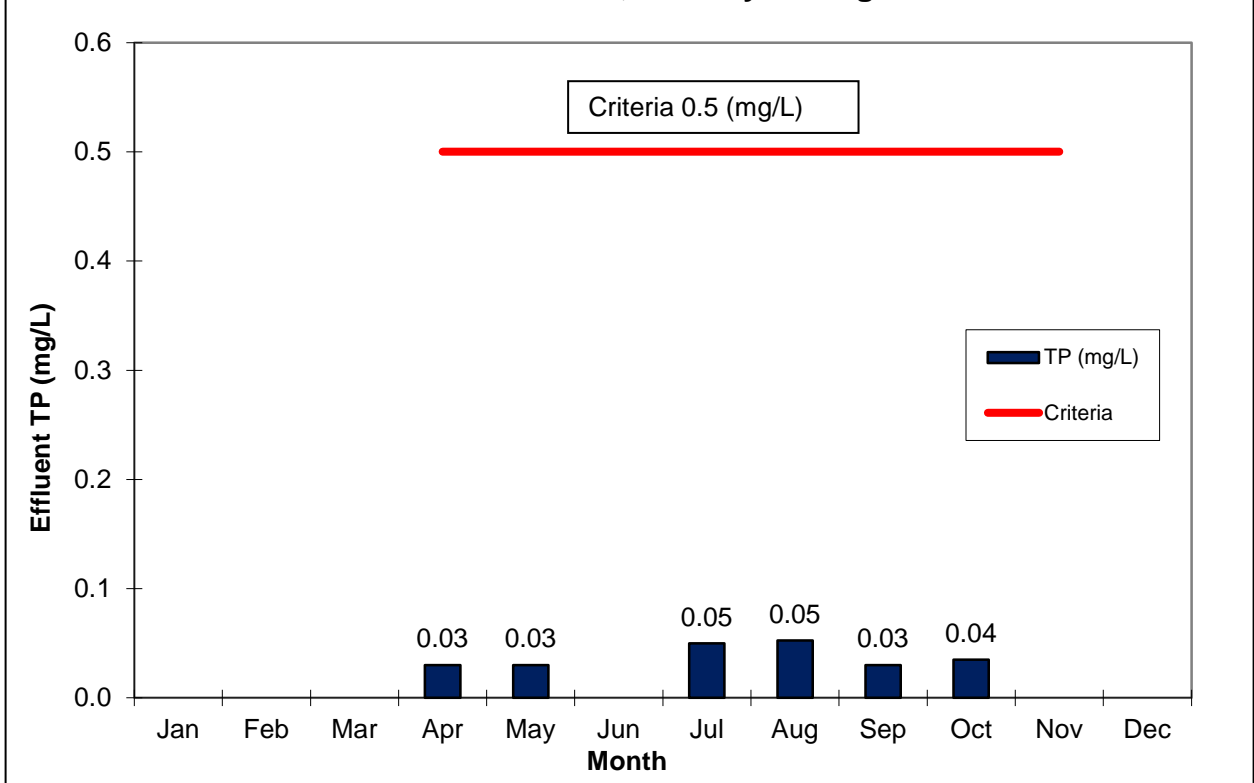
**APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS**



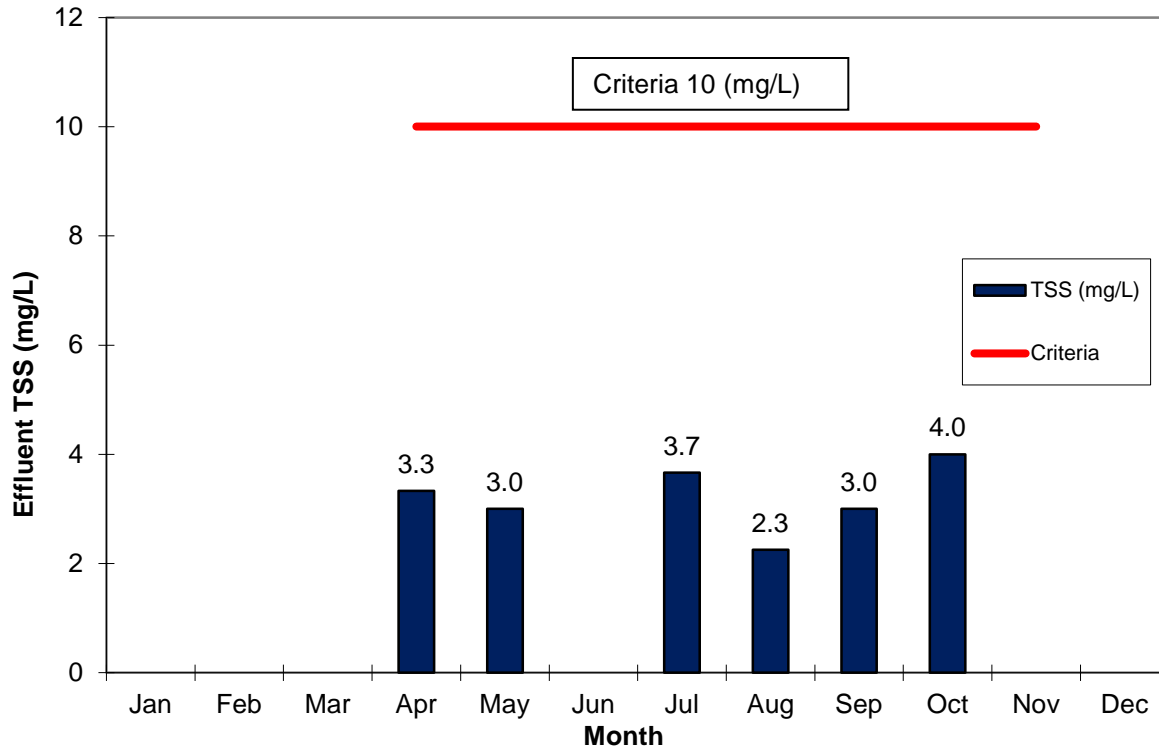
### Plattsville WWTP Effluent Monthly Average Ammonia Discharge - 2015



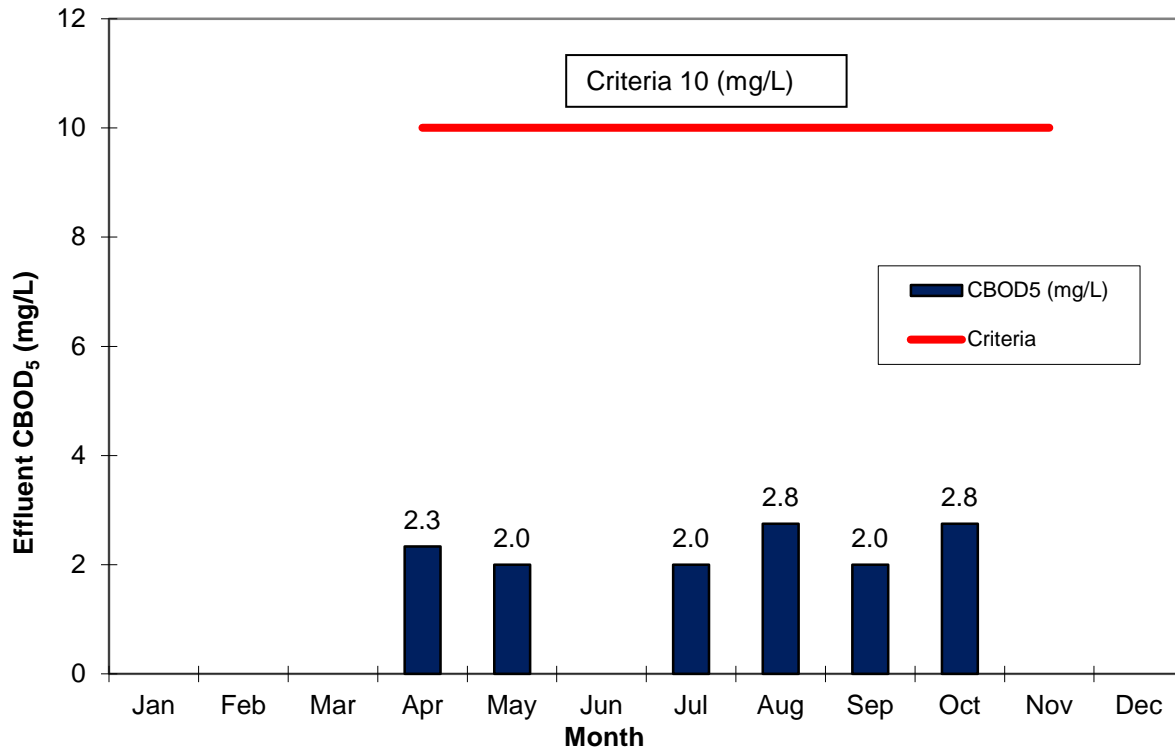
### Plattsville WWTP Effluent, Monthly Average TP - 2015



**Plattsville WWTP Effluent, Monthly Average TSS - 2015**



**Plattsville WWTP Effluent, Monthly Average CBOD<sub>5</sub> - 2015**





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Tavistock Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Tavistock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110000720
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Tavistock WWTP provided effective wastewater treatment in 2015 and all effluent concentration limits, as specified by the ECA, were met. The annual average daily flow in 2015 was 1,589 m<sup>3</sup>/d, which represents 62.9% of the rated capacity of 2,525 m<sup>3</sup>/d.

The wastewater treatment plant is located at 381 William St., Tavistock, Ontario. The Facility description is provided below.

Facility	Tavistock Wastewater Treatment Plant
Design Capacity	2,525 m <sup>3</sup> /d
2015 Average Daily Flow	1,589 m <sup>3</sup> /d
2015 Maximum Daily Flow	4,209 m <sup>3</sup> /d
2015 Total Volume of Wastewater	580,442 m <sup>3</sup> /year
Classification	WWT – I
Environmental Compliance Approval (ECA)	#7789-8AKJL5

The Tavistock WWTP consists of 3 aerated lagoon cells, one polishing pond and an Intermittent Sand Filter (ISF). The first three cells are equipped with Mat Aerators, and there are an additional six 15 HP aspirating surface aerators in Cell 1 to provide the necessary dissolved oxygen for the lagoons.

There is also the provision for continuous aluminum sulphate addition for phosphorus removal. The wastewater is dosed with aluminum sulphate as it enters Cell 1 and as it enters Cell 2.

Effluent from Cell 1 overflows to Cell 2, then into Cell 3 and/or Cell 4 where it is pumped through the filter beds and/or stored prior to discharge.

Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

## 1.2. Operating Expenses

In 2015 the Tavistock Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$360,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Raw sewage is sampled a minimum of once monthly for CBOD<sub>5</sub>, suspended solids, TKN, total phosphorous, pH and temperature.

Automatic composite samplers are used to collect raw sewage samples from Chamber 3 as the flow enters Cell 1. Automated composite samples are also taken at the same time from a major cheese processor in Tavistock. The cheese company can discharge significant loadings to the Tavistock Lagoon system and is under a surcharge agreement with Oxford County.

#### *Laboratory and Field Testing*

Grab samples of final effluent are taken weekly during effluent discharge and tested for CBOD<sub>5</sub>, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen and ammonia nitrogen. Un-ionized ammonia, BOD<sub>5</sub>, and E.coli were also included under the recent ECA amendment. SGS Lakefield Research Ltd. performs all sample analyses with the exception of pH, temperature, and dissolved oxygen which are measured in the field.

### 2.2. Plant Performance & Effluent Quality

The Tavistock WWTP provided effective treatment in 2015, meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River.

On a weekly basis (minimum), the operator measures pH of the effluent stream when discharging. There was no single pH result for the effluent outside the discharge limit of 6 – 9.5 in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
CBOD <sub>5</sub>	318	505
Total Suspended Solids	367	583
Total Phosphorus	12	19
Total Kjeldahl Nitrogen	33	52

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
CBOD <sub>5</sub>	weekly	15	2.0 - 4.3	98.6 - 99.4
Suspended Solids	weekly	15	2.3 - 6.0	98.4 - 99.4
Total Phosphorus (May-Nov.)	weekly	0.5	0.03 - 0.21	98.3 - 99.8
Total Phosphorus (Dec.-Apr.)	weekly	0.8	0.05 - 0.28	97.7 - 99.6
Total Ammonia Nitrogen (January)	weekly	7	1.7	-
Total Ammonia Nitrogen (February)	weekly	10	3.1	-
Total Ammonia Nitrogen (March)	weekly	8.5	-	-
Total Ammonia Nitrogen (April)	weekly	8.0	1.3	-
Total Ammonia Nitrogen (May-Nov.)	weekly	1.0	0.1 - 0.55	-
Total Ammonia Nitrogen (December)	weekly	3.0	0.4	-
pH any single sample	weekly	6.5 - 9.0	6.7 – 8.6	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Tavistock WWTP in 2015. The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	10	2.0 - 4.3
Suspended Solids	weekly	10	2.3 - 6.0
Total Phosphorus (May-Nov.)	weekly	0.3	0.03 - 0.21
Total Phosphorus (Dec.-Apr.)		0.5	0.05 - 0.28
Total Ammonia Nitrogen (January)	weekly	6.0	1.7
Total Ammonia Nitrogen (February)	weekly	9.0	3.1
Total Ammonia Nitrogen (March)	weekly	7.5	-
Total Ammonia Nitrogen (April)	weekly	7.0	1.3
Total Ammonia Nitrogen (May-Nov.)	weekly	0.8	0.1 - 0.6
Total Ammonia Nitrogen (December)	weekly	1.5	0.4
pH any single sample	weekly	6.5 - 9.0	6.7 - 8.6

### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Tavistock WWTP in 2015.

### **4. Maintenance of Works**

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

### **5. Monitoring Equipment Maintenance and Calibration**

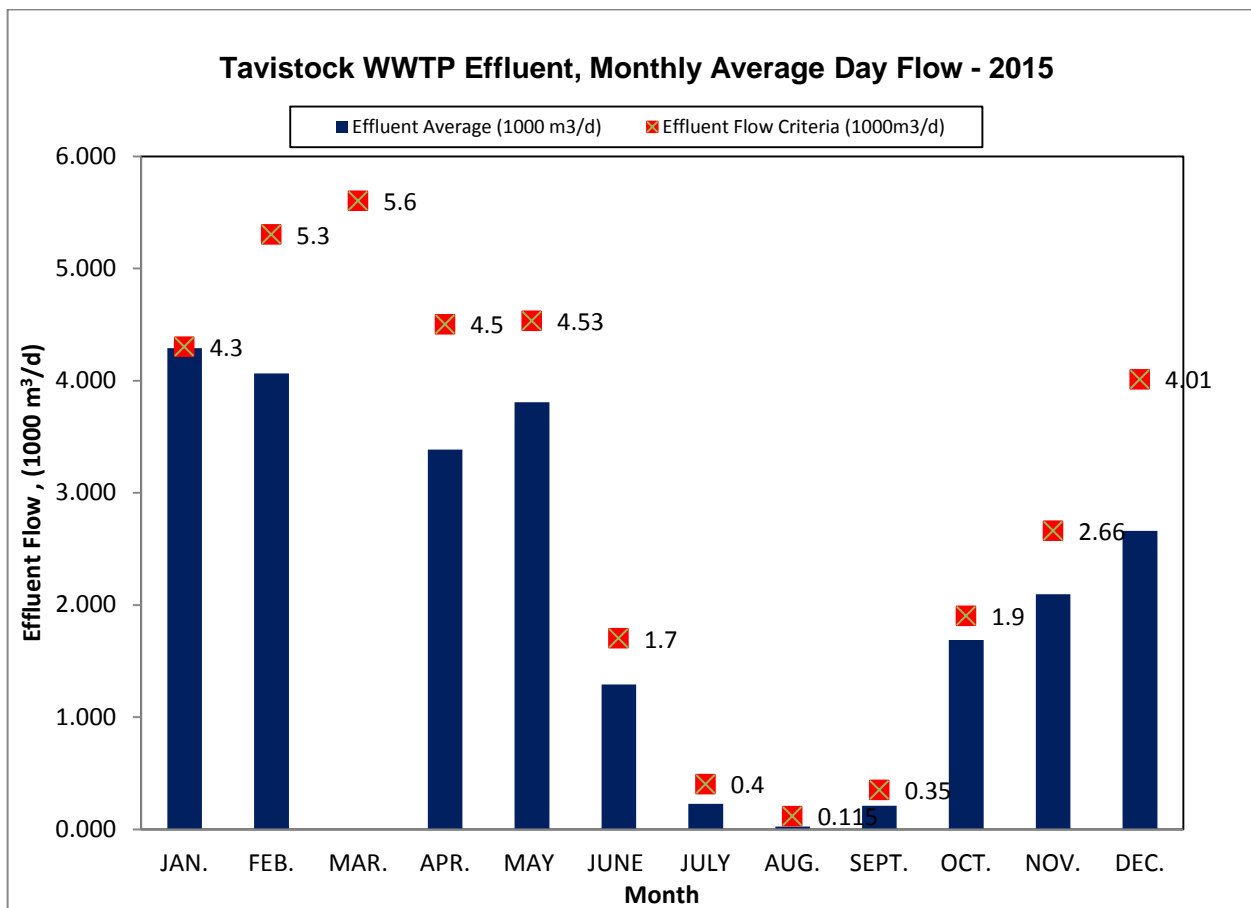
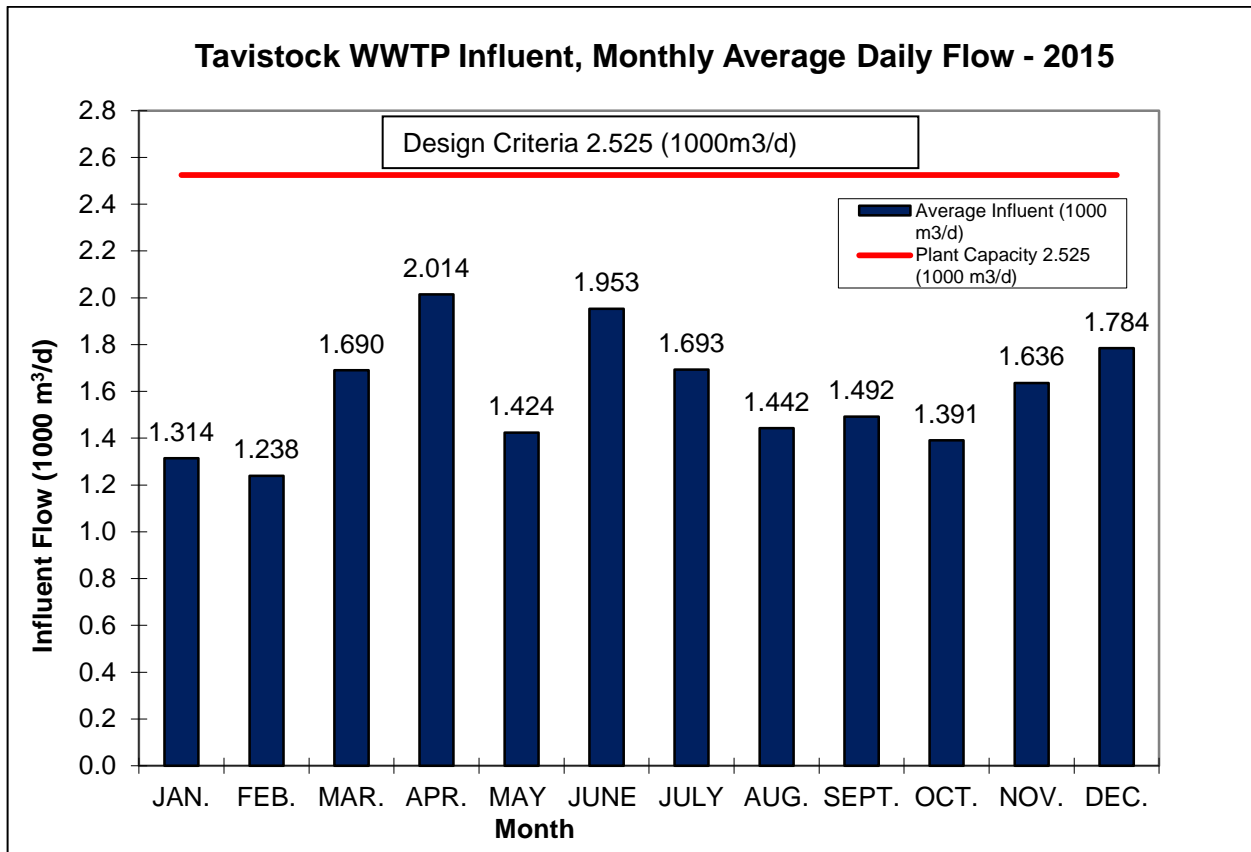
Calibration of flow meters is conducted yearly by R&R Instrumentation. The operational monitoring equipment calibration records are kept on-site at the Plant.

### **Summary**

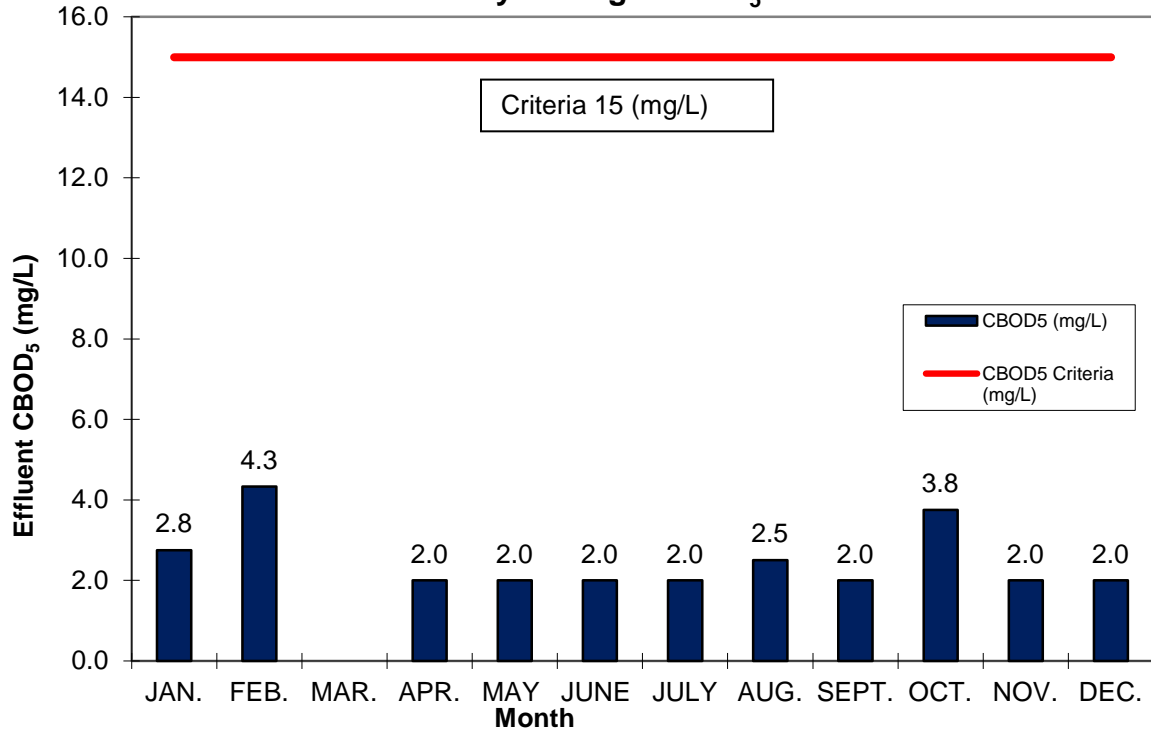
The Tavistock WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015.



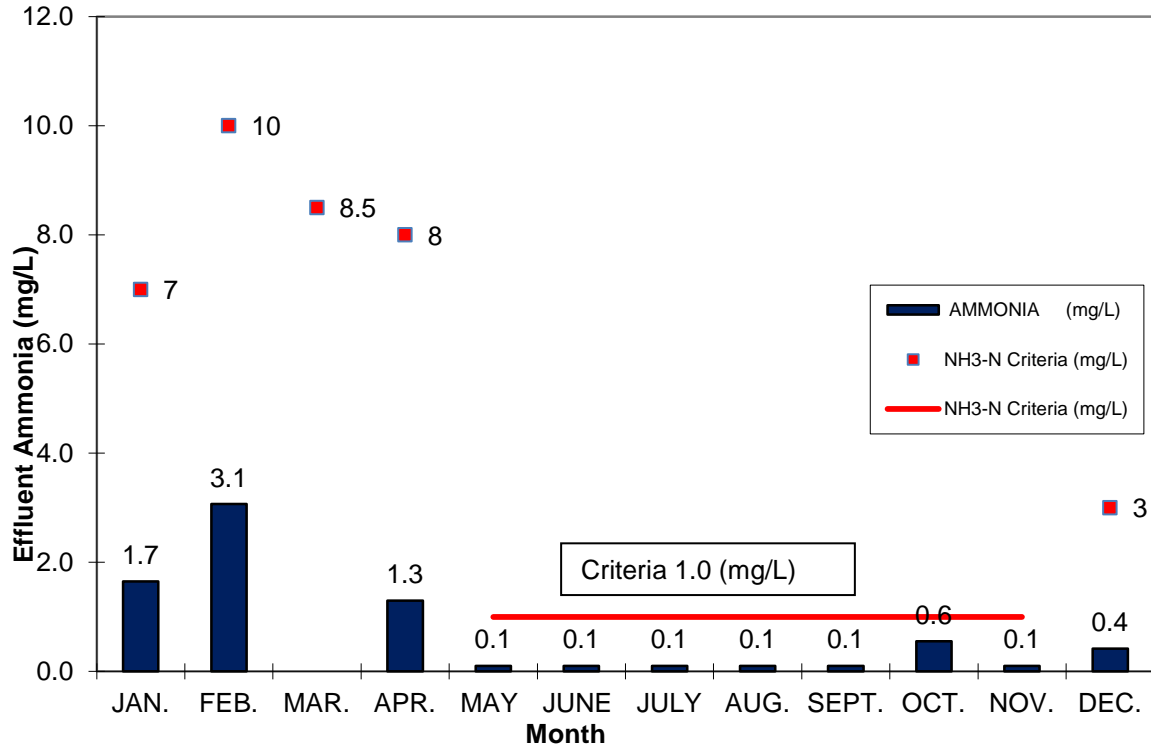
APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



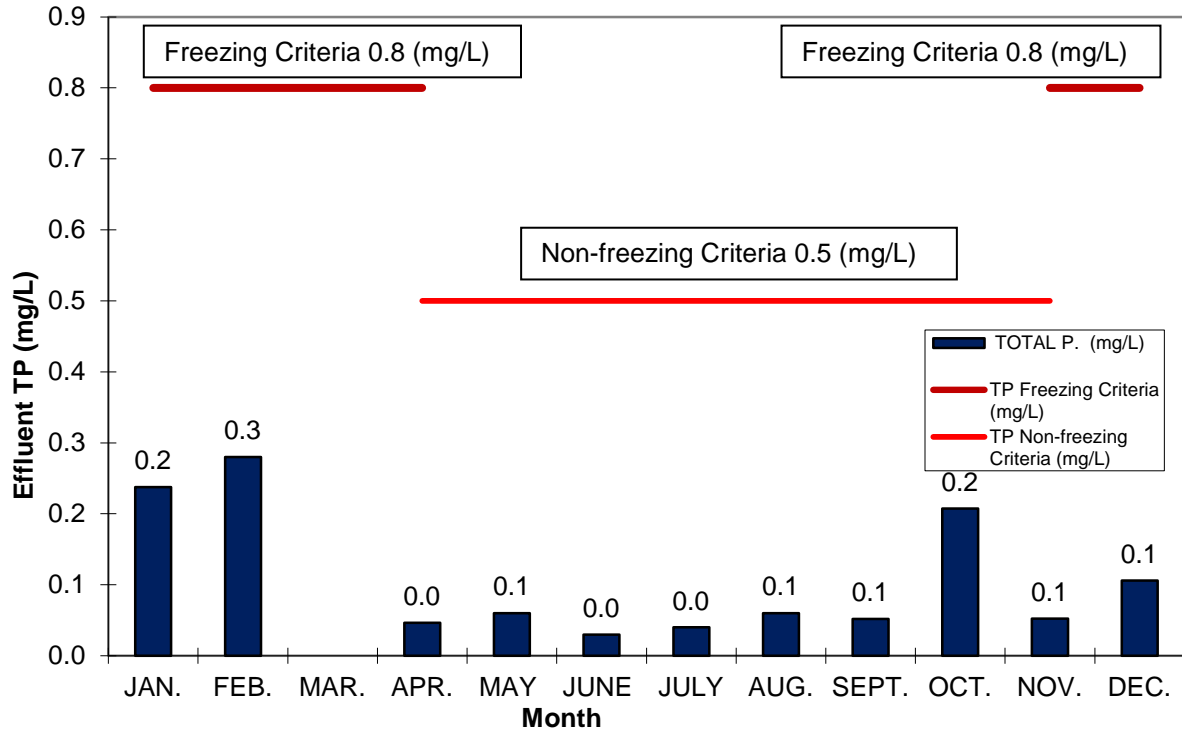
### Tavistock Wastewater Effluent Monthly Average CBOD<sub>5</sub> - 2015



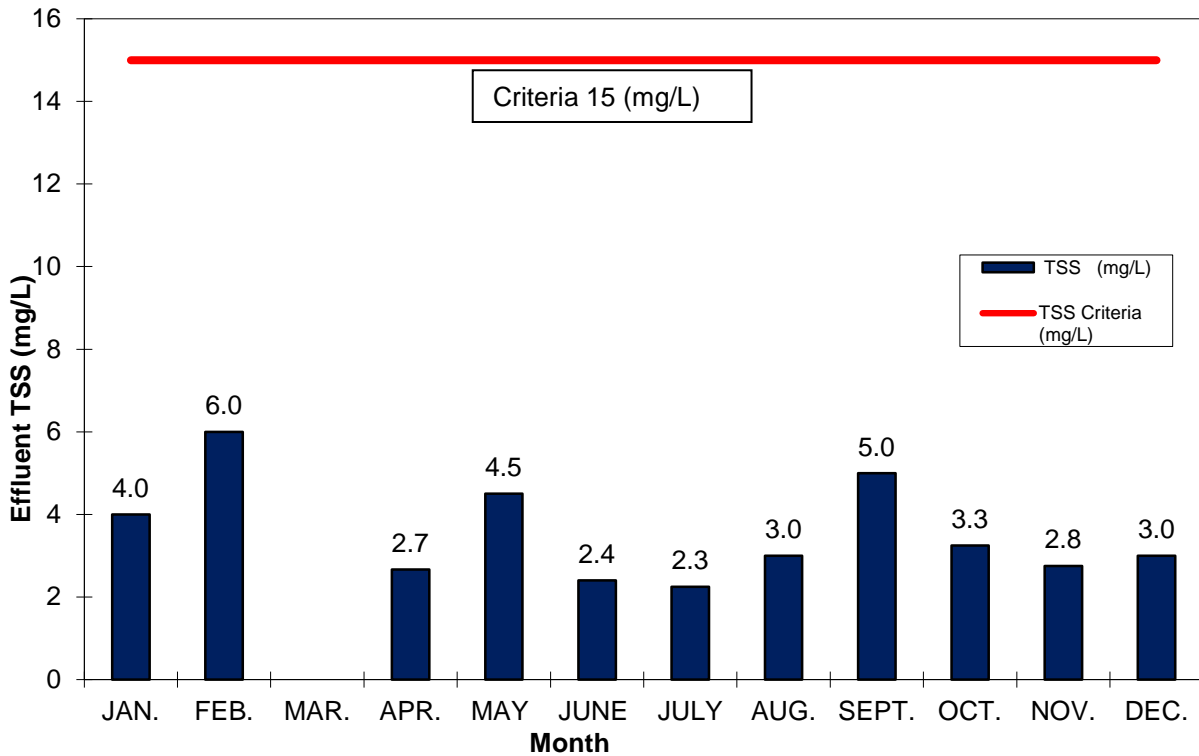
### Tavistock WWTP Effluent, Monthly Average Ammonia - 2015



### Tavistock WWTP Effluent, Monthly Average TP - 2015



### Tavistock WWTP Effluent, Monthly Average TSS - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Thamesford Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Thamesford Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002601
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Thamesford Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2015 for residential, commercial, and industrial users in the Village of Thamesford. The average daily flow for 2015 was 1,425 m<sup>3</sup>/d. This represents 57% of the Plant rated capacity of 2,500 m<sup>3</sup>/d. The total annual flow was 520,238 m<sup>3</sup>.

A new blower was installed at the Plant which necessitated an updated ECA. The blower change and the use of a variable frequency drive (VFD) integrated into a SCADA control loop using dissolved oxygen feedback, was intended to reduce electrical consumption. One of the two existing 40 HP blowers was replaced with a new more efficient 100 HP blower which could then be used in combination with the other 40 HP blower and the two existing 200 HP blowers for a more flexible and efficient operation of the oxygen delivery system to the biological system. In addition to increased energy efficiency, this proactive change would result in lower GHG emissions to the atmosphere. An updated ECA was received in October 2015. The blower installation will be complete in 2016.

The wastewater treatment plant is located at 10 Middleton St., Thamesford, Ontario. The Facility description is provided below.

Facility	Thamesford Wastewater Treatment Plant
Design Capacity	2,500 m <sup>3</sup> /d
2015 Average Daily Flow	1,425 m <sup>3</sup> /d
2015 Maximum Daily Flow	2,139 m <sup>3</sup> /d
2015 Total Volume of Wastewater	520,238 m <sup>3</sup> /year
Classification	WWT – III
Environmental Compliance Approval (ECA)	#6974-6FKKAY & 1897-9YAKKF

The Thamesford WWTP is an extended air activated sludge plant equipped with tertiary sand filters and receives significant wastewater flows from a local major poultry processing plant; however, the treatment plant also receives domestic wastewater from the Community of Thamesford. The wastewater from the poultry processing plant is collected from various on-site business units and pumped to a pretreatment system comprised of an equalization silo and a Dissolved Air Flotation (DAF) unit. The company's effluent enters a lift station dedicated to their wastewater flow at the Wastewater Treatment Plant where it is pumped to the complete mix aeration basin prior to a plug flow reactor. The extended aeration system is comprised of two tanks: the complete mix basin and the plug flow reactor. After the plug flow reactor, the wastewater flows into one of two clarifiers where the settled activated sludge is either returned or wasted and the supernatant flows to either the old or the new sand filter, prior to disinfection and direct discharge to the Middle Thames River. Wasted biosolids are processed/stabilized in two aerobic digesters, and held on-site in a storage tank for eventual removal. Biosolids are applied to agricultural land application sites with appropriate Nutrient Management Plans for Non-Agricultural Source Material (NASM).

For purposes of calculating loading to the River, the treated effluent flow is measured at the Parshall flume located after the stilling well just before discharge to the re-aeration chamber and the Middle Thames River. The flow readings used to apportion the loading to the plant is from two meters: one on each lift station. The influent and all other meters are calibrated annually.

A standby generator is available to run the onsite lift stations and a blower in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## **1.2. Operating Expenses**

In 2015, the Thamesford Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$800,000.

## **2. Summary and Interpretation of Monitoring Data**

### **2.1. Effluent Quality Assurance and Control Measures**

#### ***Sampling Procedure***

Influent samples were taken from sampling ports located in-line after the influent pumps. Two 24-hour composite samplers take a sample every 15 minutes for a 24-hour period concurrent with effluent sampling. A sampler is installed on each of the municipal and the food processing company's influent lines. The two influent streams are separately tested, and then the results are mathematically combined, based on flow ratios.

In 2015, effluent samples were taken using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. Samples were drawn from a stilling well prior to the Parshall flume immediately before the discharge. Total residual chlorine (TRC) samples are taken daily from the stilling well prior to the Parshall flume. The stilling well follows the chlorination and de-chlorination chambers. The pH of the final effluent composite sample is also measured.

Following the Parshall flume, effluent flows through a discharge pipe and drops approximately 0.75 m into a discharge well, where dissolved oxygen samples are taken. This discharge well aerates the effluent prior to discharge to the River, as reflected in the DO sample results.

#### ***Laboratory and Field Testing***

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples, except for TRC, DO, and pH which are tested in the field. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

## 2.2. Plant Performance & Effluent Quality

The Thamesford WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River.

There was no single laboratory pH result for the effluent outside the discharge limit of 6 - 9.5 in 2015.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2015, the monthly average results at all times met the Monthly Average TRC limit of 0.02 mg/L or less and, therefore, were in compliance.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	358	510
Total Suspended Solids	161	229
Total Phosphorus	9.2	13
Total Kjeldahl Nitrogen	71	101
Oil and Grease	21	30

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)	Percentage Removal
BOD <sub>5</sub> (May 01 to November 30)	weekly	10	1 - 1.3	99.6 - 99.7
BOD <sub>5</sub> (December 01 to April 30)	weekly	15	1.2 - 2.3	99.4 - 99.7
Total Suspended Solids (May 01 to November 30)	weekly	10	1 - 1.8	98.9 - 99.4
Total Suspended Solids (December 01 to April 30)	weekly	15	1.2 - 1.8	98.9 - 99.3
Total Phosphorus (May 01 to November 30)	weekly	0.20	0.06 - 0.13	98.6 - 99.3
Total Phosphorus (December 01 to April 30)	weekly	0.50	0.06 - 0.11	98.8 - 99.3
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.05 - 0.08	--
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.05 - 0.06	--
Total Chlorine Residual	weekly	0.02	0.001	--
E.coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1 - 2	--
pH any single sample	weekly	6.0 - 9.5	6.2 - 7.5	--
Dissolved Oxygen	weekly	5 and above	5.6 - 8	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Thamesford WWTP in 2015 except for a single pH value at 6.2 on March 18<sup>th</sup>. In addition, we are unable to declare a non-detect on TRC.

The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
BOD <sub>5</sub>	weekly	5	1 - 2.3
Total Suspended Solids	weekly	5	1 - 1.8
Total Phosphorus	weekly	0.10	0.06 - 0.13
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.2	0.05 - 0.08
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.05 - 0.06
Total Chlorine Residual	weekly	non-detect	detected
E.coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1 - 2
pH any single sample	weekly	6.5 - 9.0	6.2 - 7.5

### 3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no bypasses or overflows from the Thamesford WWTP in 2015, however, there were odour issues reported by the neighboring residents. It was concluded that, while not all the odours reported by the neighbours originated from the WWTP, some events were related to receiving the Dissolved Air Flotation (DAF) sludge material from the poultry processing plant's pre-treatment system into the biosolids storage tank at the WWTP. Acceptance of the DAF material at the Plant was discontinued in July 2015 and odours related to the plant were not reported after the storage tank containing them was emptied in the fall.

Oxford County Public works communicated regularly with the residents and kept them informed of Plant operations and odour mitigation measures that were being taken by the County during this period.

### 4. Maintenance of Works

The operating and maintenance staff at the Thamesford WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

### 5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are also kept on-site at the Plant.

### 6. Biosolids 2015

#### Discussion:

Biosolids are aerobically digested and stored as liquid at the Thamesford WWTP. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).

## 6.1. DAF Biosolids Activity

### January to December 2015

The local poultry processing plant operates its own wastewater pretreatment system which includes a Dissolved Air Flotation (DAF) treatment unit that generates a residual sludge stream. The material is transported to the Thamesford WWTP where it is combined with the WWTP stored Biosolids. There is an existing letter from the MOECC indicating that this practice is acceptable; however, due to emergent odour issues, this practice was discontinued in July 2015 and will not be re-established in the future.

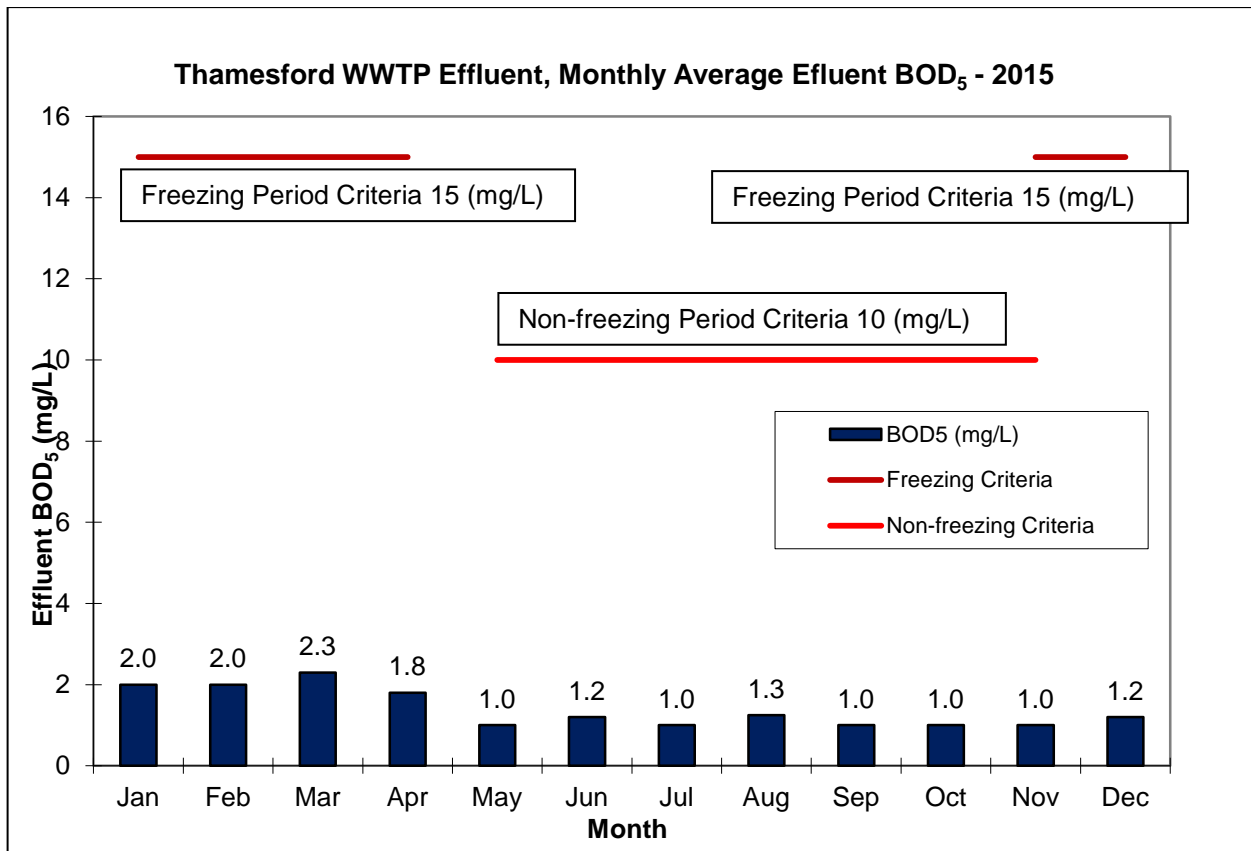
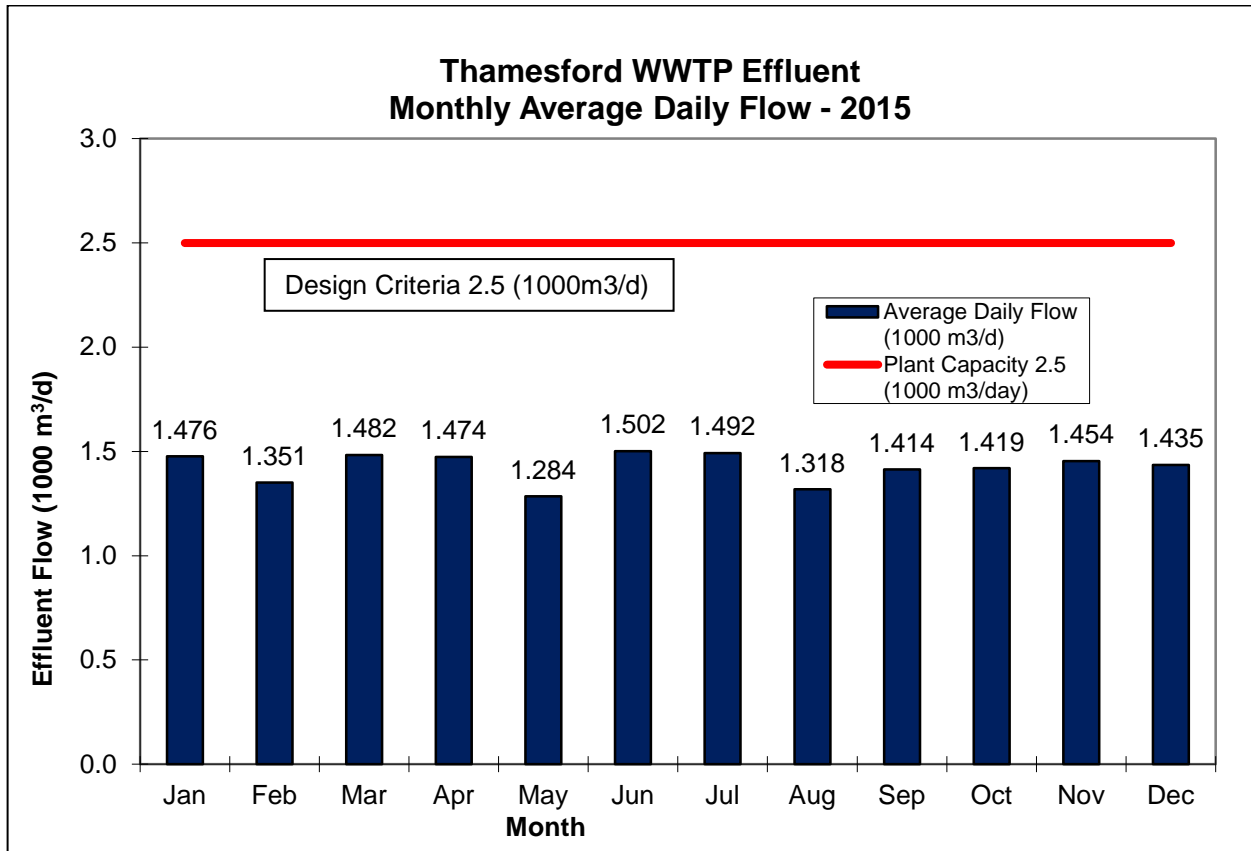
DAF Sludge	
Month	Volume (m <sup>3</sup> )
January	158
February	111
March	132
April	105
May	135
June	163
July	0
August	0
September	0
October	0
November	0
December	0
Total	804

### Summary

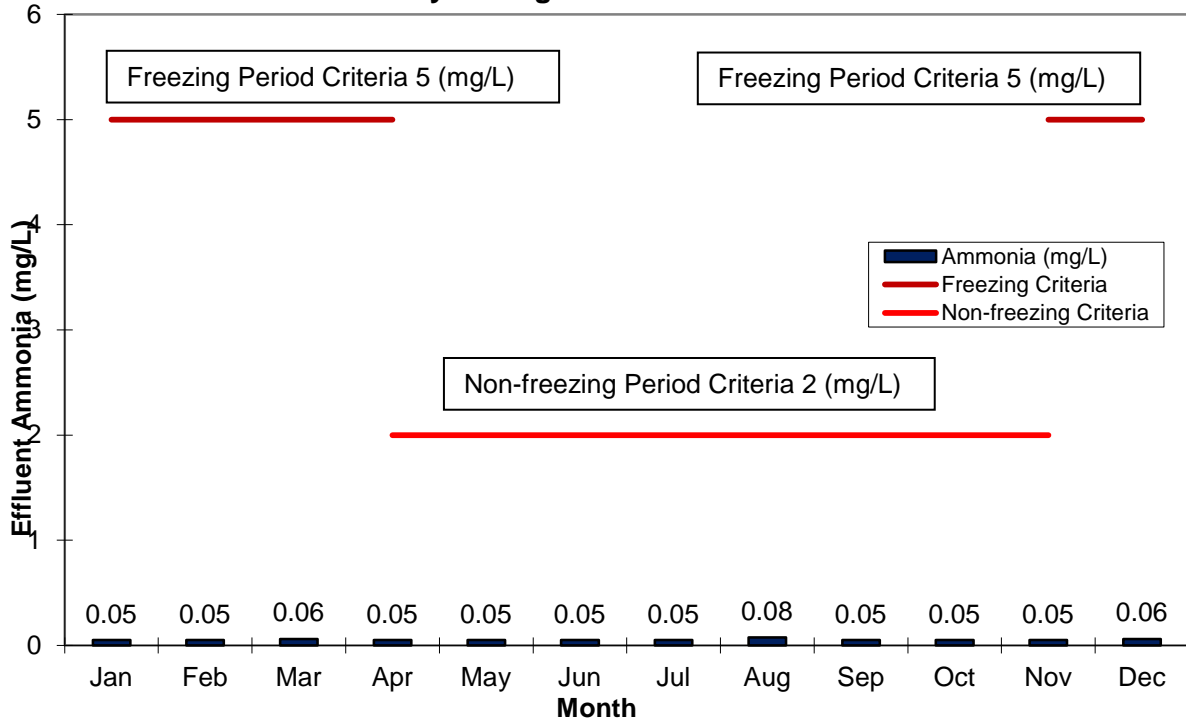
The Thamesford WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015. The Biosolids generated were utilized for beneficial reuse on agricultural land as a Non-agricultural source material (NASM) as regulated under the Nutrient Management Act (NMA); details of which are included in a separate report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).



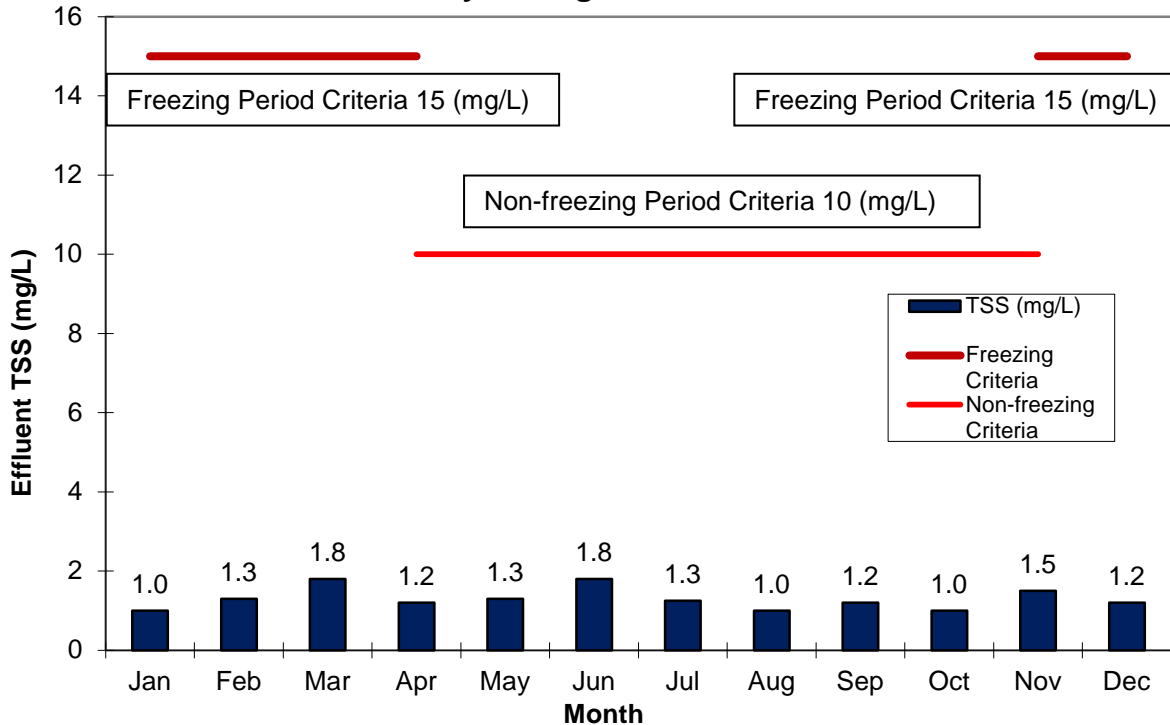
APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



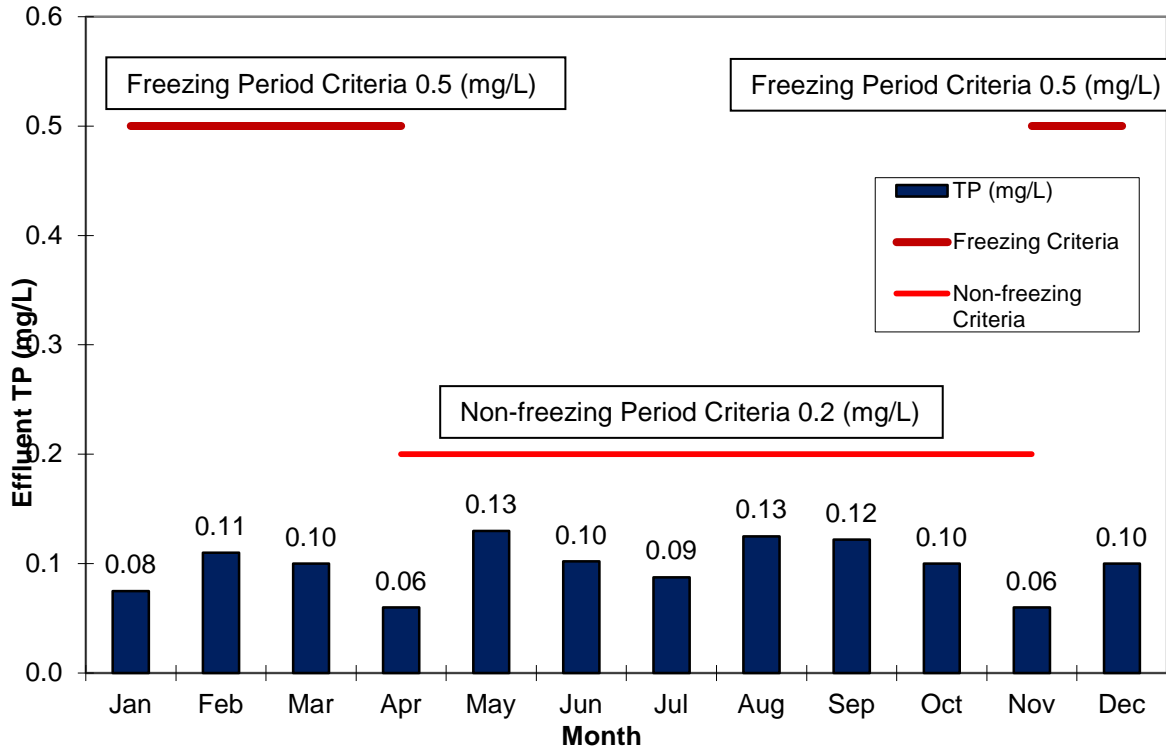
**Thamesford WWTP Effluent  
Monthly Average Effluent Ammonia - 2015**



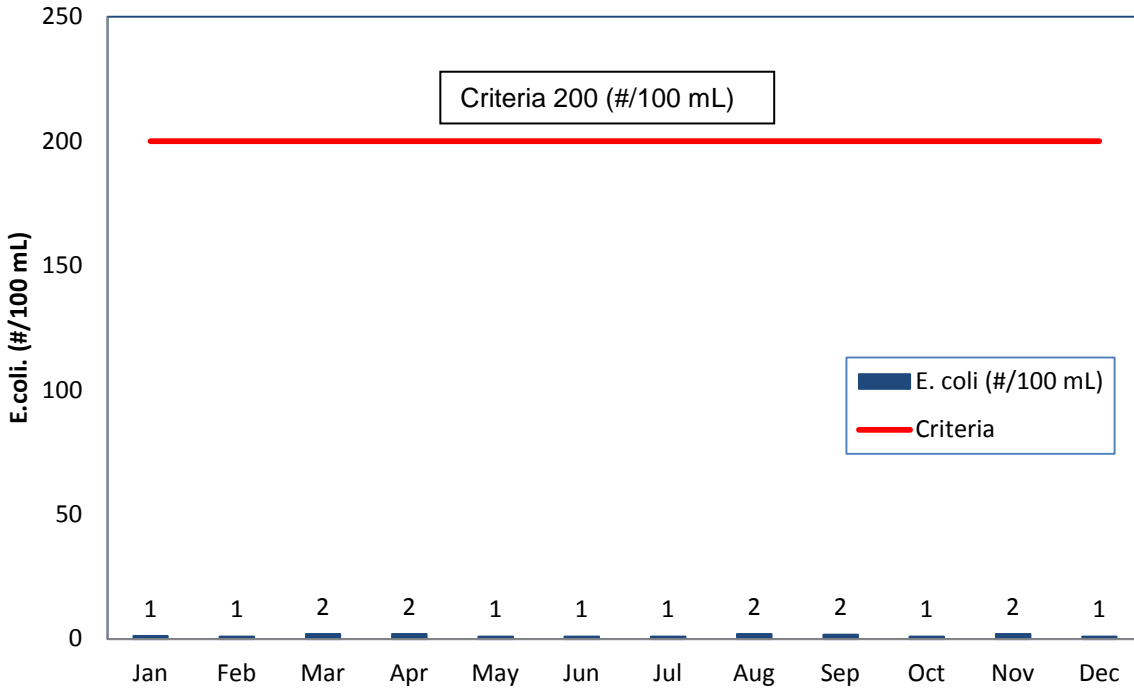
**Thamesford WWTP Effluent  
Monthly Average Effluent TSS - 2015**



### Thamesford WWTP Effluent, Monthly Average Effluent TP - 2015



### Thamesford WWTP Effluent Monthly Geometric Mean Effluent E. coli. - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Tillsonburg Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Tillsonburg Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110000757
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Tillsonburg WWTP provides wastewater treatment for residential, commercial, and industrial users in the Town of Tillsonburg.

The wastewater treatment plant is located in Coronation Park, Tillsonburg, Ontario. The Facility description is provided below.

Facility	Tillsonburg Wastewater Treatment Plant
Design Capacity	8,180 m <sup>3</sup> /d
2015 Average Daily Flow	5,159 m <sup>3</sup> /d
2015 Maximum Daily Flow	7,738 m <sup>3</sup> /d
2015 Total Volume of Wastewater	1,882,968 m <sup>3</sup> /year
Classification	WWT – III
Environmental Compliance Approval (ECA)	#9997-82RS5A

The Tillsonburg WWTP is a conventional activated sludge plant consisting of primary and secondary treatment, with an outfall pipe to the Big Otter Creek. The facility adds aluminum sulphate into the reactors for phosphate reduction and ultraviolet light for seasonal disinfection.

The facility provided effective wastewater treatment in 2015, with an average flow for the plant of 5,149 m<sup>3</sup>/d which represents 62.9% of the design capacity of 8,180 m<sup>3</sup>/d. The peak daily flow was 7,738 m<sup>3</sup>/d. The total flow through the Plant for 2015 was 1,882,968 m<sup>3</sup>.

A standby generator is available to run the main influent pump station (John Pound Rd. lift station) in the event of a power failure.

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## 1.2. Operating Expenses

In 2015 the Tillsonburg Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$800,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Raw sewage samples are collected where the influent streams combine before entering the sewage works. A composite sampler collects samples over a 24-hour duration on a bi-weekly basis.

The final effluent 24-hour composite sample is collected on a weekly basis after secondary treatment and disinfection, and prior to the effluent discharge to Big Otter Creek.

#### *Laboratory and Field Testing*

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control, results of which are not included in this report.

### 2.2. Plant Performance & Effluent Quality

The Tillsonburg WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to Big Otter Creek.

On a bi-weekly basis, the operator measures pH of the influent stream and on a weekly basis, measures pH of the effluent stream. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
CBOD <sub>5</sub>	179	923
Total Suspended Solids	234	1207
Total Phosphorus	5	26
Total Kjeldahl Nitrogen	30	155

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min.-Max.</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
CBOD <sub>5</sub>	weekly	25	1 - 3	88 - 96
Total Suspended Solids	weekly	25	4.5 - 9.2	63 - 82
Total Phosphorus	weekly	1	0.3 - 0.6	40 - 70
E.coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1 - 12	--
pH any single sample	weekly	6.0 - 9.5	6.8 - 8.1	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Tillsonburg WWTP in 2015 except for a single sample pH of 8.1 on August 19<sup>th</sup>. The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	15	1 - 3
Total Suspended Solids	weekly	15	4.5 - 9.2
Total Phosphorus	weekly	0.8	0.3 - 0.6
E.coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	1 - 12
pH any single sample	weekly	6.5 - 8.0	6.8 - 8.1

## 3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypasses, upsets, spills, or abnormal conditions at the Tillsonburg WWTP in 2015.

## 4. Maintenance of Works

The operating and maintenance staff at the Tillsonburg WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

## 5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are kept on-site at the Plant.

## 6. Biosolids 2015

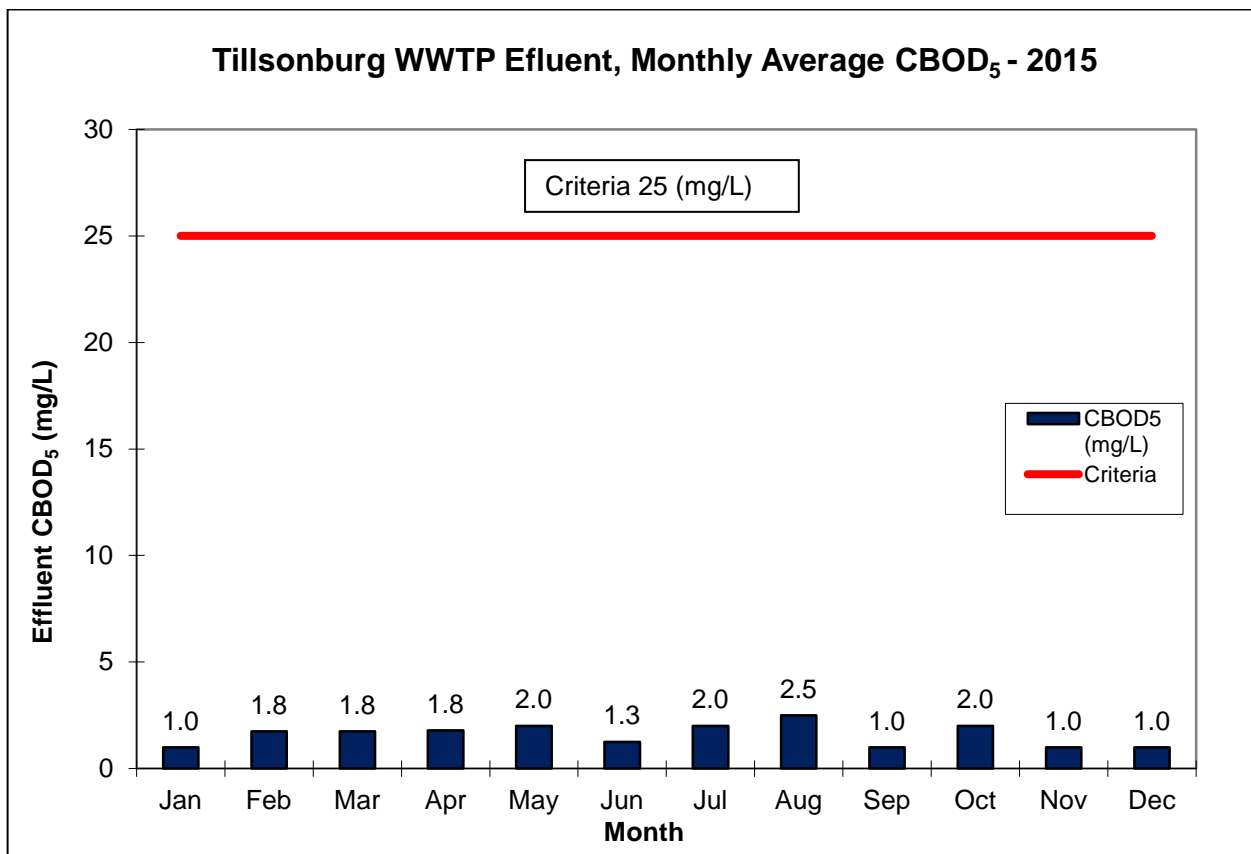
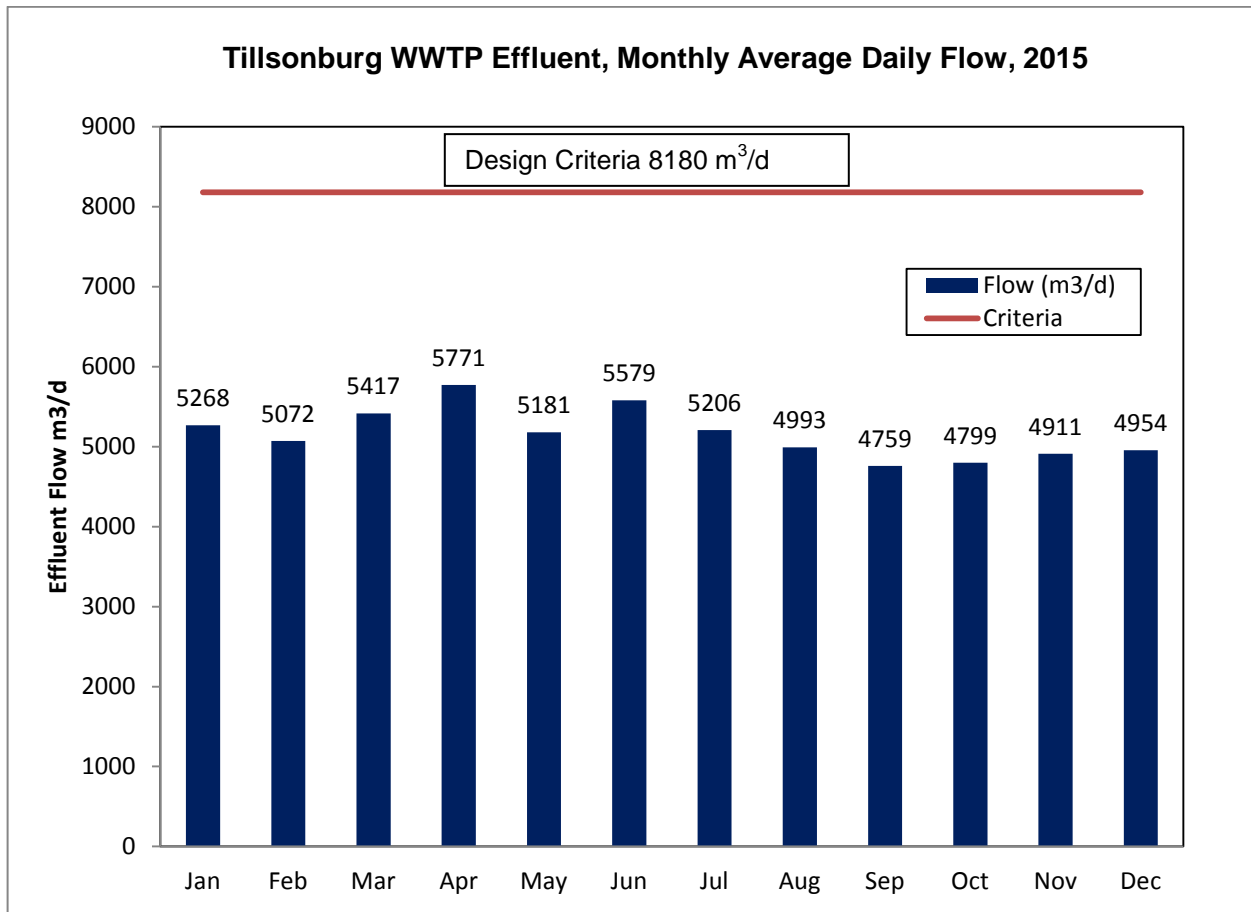
### Discussion:

Biosolids are aerobically digested and dewatered at the Tillsonburg WWTP using an Alfa-Laval Centrifuge. The Biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).

### Summary

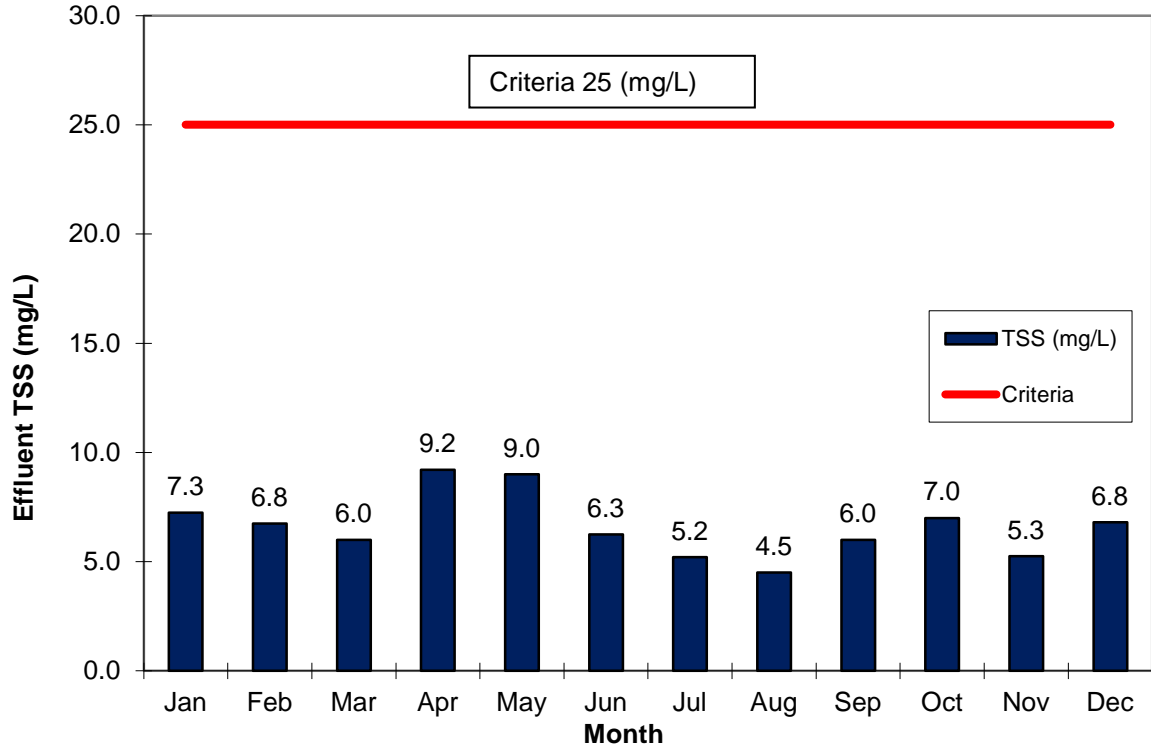
The Tillsonburg WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015. The Biosolids generated were utilized for beneficial reuse on agricultural land as a Non-agricultural source material (NASM) as regulated under the Nutrient Management Act (NMA); details of which are included in a separate report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).

**APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VERSUS EFFLUENT DISCHARGE LIMITS**

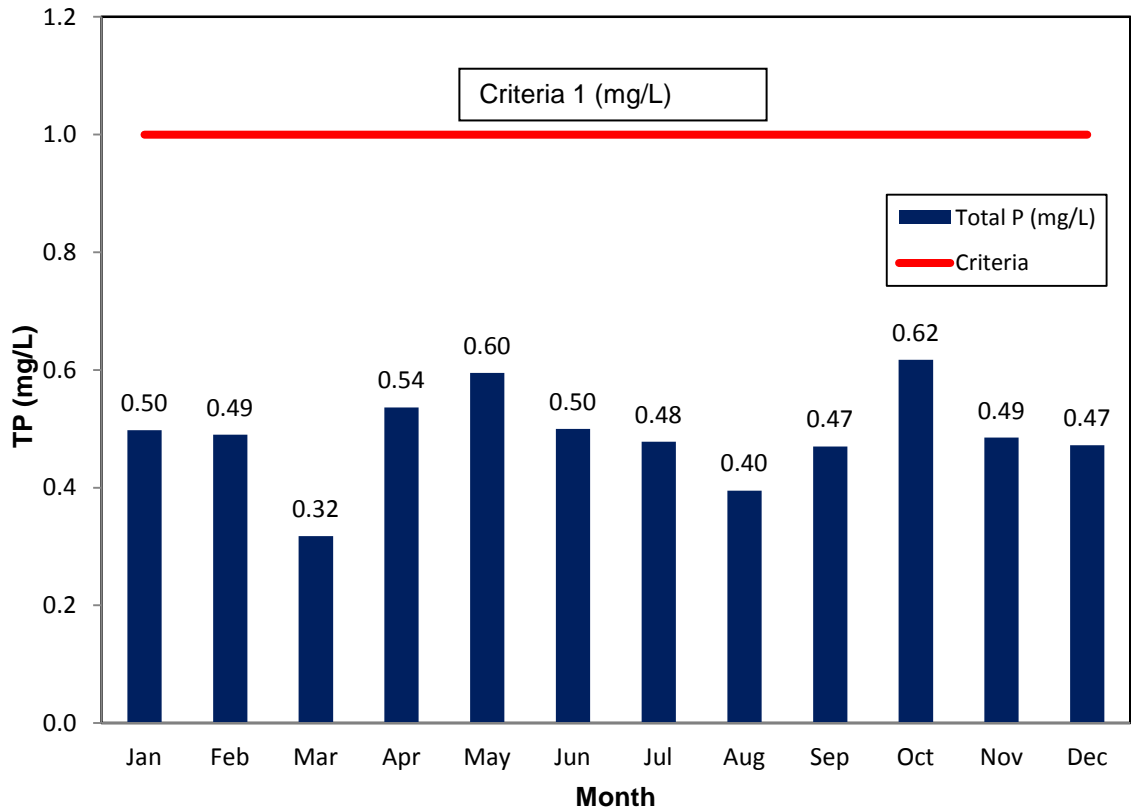




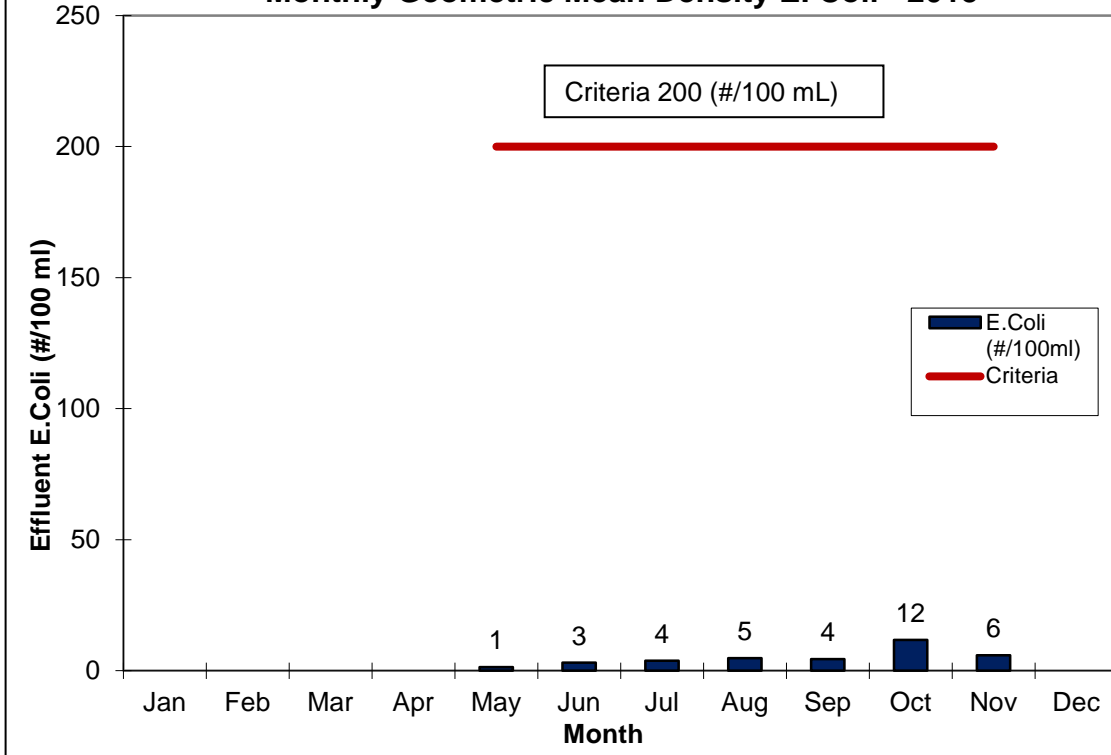
**Tillsonburg WWTP Effluent, Monthly Average TSS - 2015**



**Tillsonburg WWTP Effluent, Monthly Average TP - 2015**



### Tillsonburg WWTP Effluent Monthly Geometric Mean Density E. Coli - 2015





## 2015 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT Woodstock Wastewater Treatment Plant

### 1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. 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).

Wastewater Treatment Plant:	Woodstock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120000685
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department Wastewater Services P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800   Toll Free: 866-537-7778
Reporting Period:	January 1, 2015 – December 31, 2015

#### 1.1. System Description

The Woodstock WWTP provides wastewater treatment for residential, commercial, and industrial users in the City of Woodstock and for the communities of Embro and Innerkip. It also provides treatment for septic tank waste, hauled waste, and holding tank waste from within Oxford County. In 2009, the plant completed a hydraulic capacity upgrade increasing the plant capacity from 25,000 m<sup>3</sup>/d to the current approved average daily flow capacity of 33,000 m<sup>3</sup>/d, with a peak flow capacity of 66,000 m<sup>3</sup>/d.

The wastewater treatment plant is located at 195 Admiral Street Woodstock, Ontario. The Facility description is provided below.

Facility	Woodstock Wastewater Treatment Plant
Design Capacity	33,000 m <sup>3</sup> /d
2015 Average Daily Flow	16,858 m <sup>3</sup> /d
2015 Maximum Daily Flow	25,020 m <sup>3</sup> /d
2015 Total Volume of Wastewater	6,159,391 m <sup>3</sup> /year
2015 Total Received Hauled Waste	15,628 m <sup>3</sup> /year
Classification	WWT – IV
Environmental Compliance Approval (ECA)	#5950-7XQKXS

The Woodstock WWTP is a conventional activated sludge system consisting of primary and secondary treatment, with an outfall pipe to the Thames River. The facility adds ferrous chloride into the reactors for phosphorous removal. Sodium hypochlorite is added seasonally for disinfection along with sodium bisulfite for de-chlorination. The facility provided effective wastewater treatment in 2015, with an average flow for the plant of 16,858 m<sup>3</sup>/d which represents 51% of the design capacity of 33,000 m<sup>3</sup>/d. In 2015, the peak daily flow was 25,020 m<sup>3</sup>/d. The total flow through the Plant for 2015 was 6,159,391 m<sup>3</sup>.

A standby generator is available to run the onsite Thames Valley Lift Station in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

## 1.2. Operating Expenses

In 2015 the Woodstock Wastewater Treatment Plant had forecasted operating and maintenance expenditures of \$1,700,000.

## 2. Summary and Interpretation of Monitoring Data

### 2.1. Effluent Quality Assurance and Control Measures

#### *Sampling Procedure*

Wastewater samples are collected on a weekly basis. Raw sewage samples are collected at a location where the sewer trunks combine before entering the sewage works. A composite sampler collects samples over a 24-hour period. Following primary treatment, a second 24-hour composite sample is collected.

#### *Laboratory and Field Testing*

A final effluent 24-hour composite sample is collected following secondary treatment, disinfection and de-chlorination but prior to the effluent discharge to the Thames River.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance, except for pH, DO, chlorine residual and temperature, which are field collected. All in-house testing is done for process control and is not included in this report.

### 2.2. Plant Performance & Effluent Quality

The Woodstock WWTP provided effective treatment in 2015 meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River.

On a weekly basis (minimum), the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2015.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2015, the monthly average results at all times met the Monthly Average TRC limit and were less than 0.05 mg/L and, therefore, were in compliance. The Federal Government's P2 target for TRC of 0.02 mg/L was met in 2015.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

<b>Influent Wastewater Characteristics</b>		
Parameter	Concentration mg/L	Loading kg/d
BOD <sub>5</sub>	132	2225
Total Suspended Solids	196	3304
Total Phosphorus	3.1	52
Total Kjeldahl Nitrogen	24.1	406

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>ECA Effluent Limit (Monthly Average)</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min.-Max.</b> (milligram per liter unless otherwise indicated)	<b>Percentage Removal</b>
CBOD <sub>5</sub> (May 01 to November 30)	weekly	15	2.0 - 2.8	97.5 - 98
CBOD <sub>5</sub> (December 01 to April 30)	weekly	20	2.0 - 4.0	97 - 98
Total Suspended Solids	weekly	15	2.0 - 6.2	97 - 99
Total Phosphorus	weekly	0.75	0.2 - 0.49	84 - 94
Total Ammonia Nitrogen (May 1 to November 30)	weekly	3	0.1 - 0.5	97 - 99
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1 - 0.7	96 - 99.5
Total Chlorine Residual (May 1-October 31)	weekly	<0.05	0.02 - 0.02	--
E.coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.0 - 26	--
pH any single sample	weekly	6.0 - 9.5	6.5 - 8.1	--

### 2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Woodstock WWTP in 2015. The following table presents the range of effluent discharge values vs. ECA Objectives.

<b>Effluent Parameter</b>	<b>Sample Frequency</b>	<b>Monthly Average Objective Concentration</b> (milligram per liter unless otherwise indicated)	<b>Monthly Average Result Min-Max</b> (milligram per liter unless otherwise indicated)
CBOD <sub>5</sub>	weekly	12	2.0 - 2.8
Total Suspended Solids	weekly	12	2.0 - 4.0
Total Phosphorus	weekly	0.5	0.2 - 0.49
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 - 0.5
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	3.0	0.1 - 0.7
E.coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.0 - 26
pH any single sample	weekly	6.0 - 8.5	6.5 - 8.1

### **3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions**

There were no bypasses or overflows from the Woodstock WWTP in 2015, however, there was a single event upset condition noted during the year. On May 4<sup>th</sup>, there was some minor foaming going to the River due to multiple electrical failures. A generator was rented to run the blower building and an outside consulting electrical engineer was brought in to troubleshoot the issues and provide guidance.

There were several issues identified: one was associated with the current grounding between the substation and the blower building MCC. In addition, the switchgear was not resetting. The fusing and trip protection required adjustment.

The current grounding was caused by scoring of the buried wire making contact with groundwater as the underground conduit had flooded. The scoring had likely occurred during installation at the last upgrade and was made worse as the freeze and thaw caused a shifting of the conduit. Two of the switch gears at the substation were identified as problem units and were rebuilt as they would not reset or hold once tripped. A short circuit protective device coordination study was completed and a report was prepared with recommendations for adjustments to the fusing between the blower building and the substation. Corrective measures were implemented for all these items.

A report was prepared by the consulting engineer on long-term alternatives for possible upgrade options for the substation due to its age and condition.

The MOECC was notified at the time and follow-up reports were submitted to the Ministry during the repairs.

### **4. Maintenance of Works**

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

### **5. Monitoring Equipment Maintenance and Calibration**

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the Plant.

Operational monitoring equipment calibration records are kept on-site at the Plant.

### **6. Biosolids 2015**

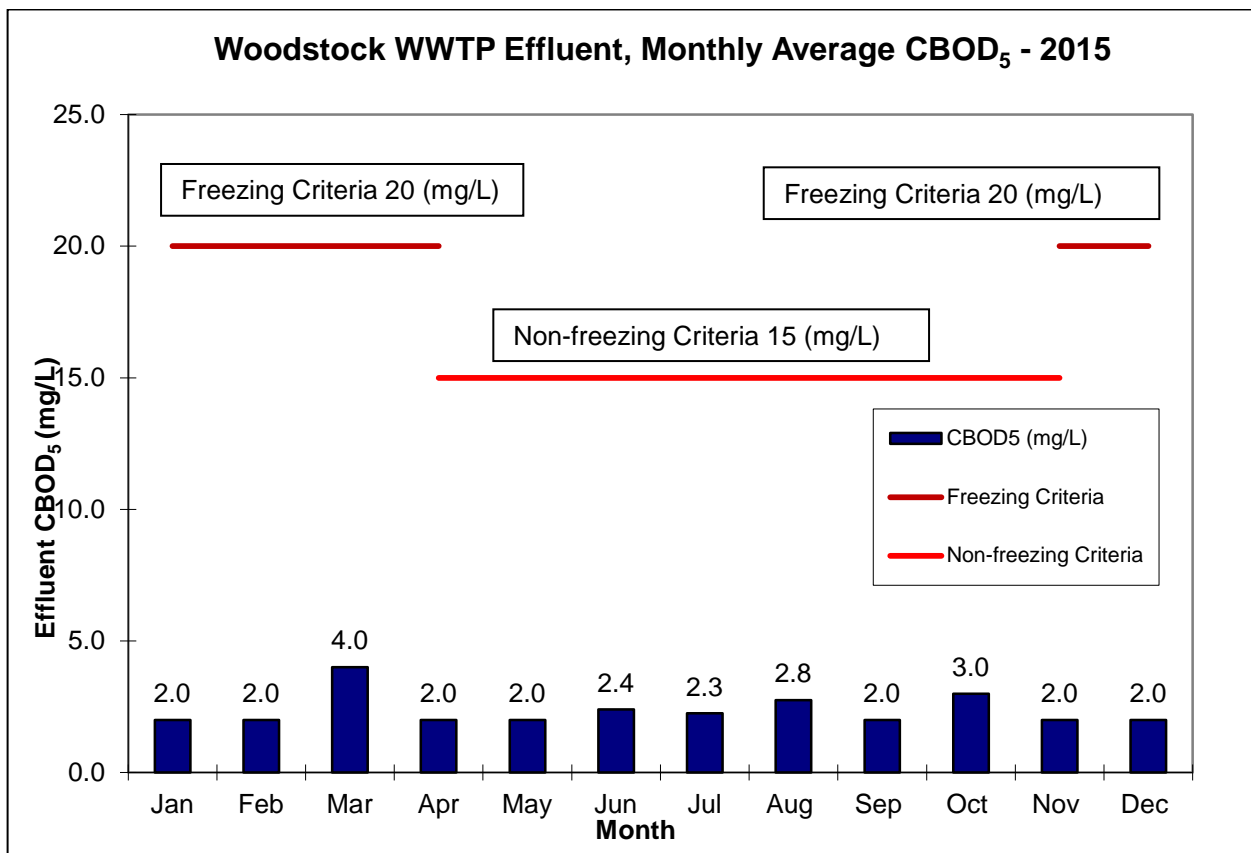
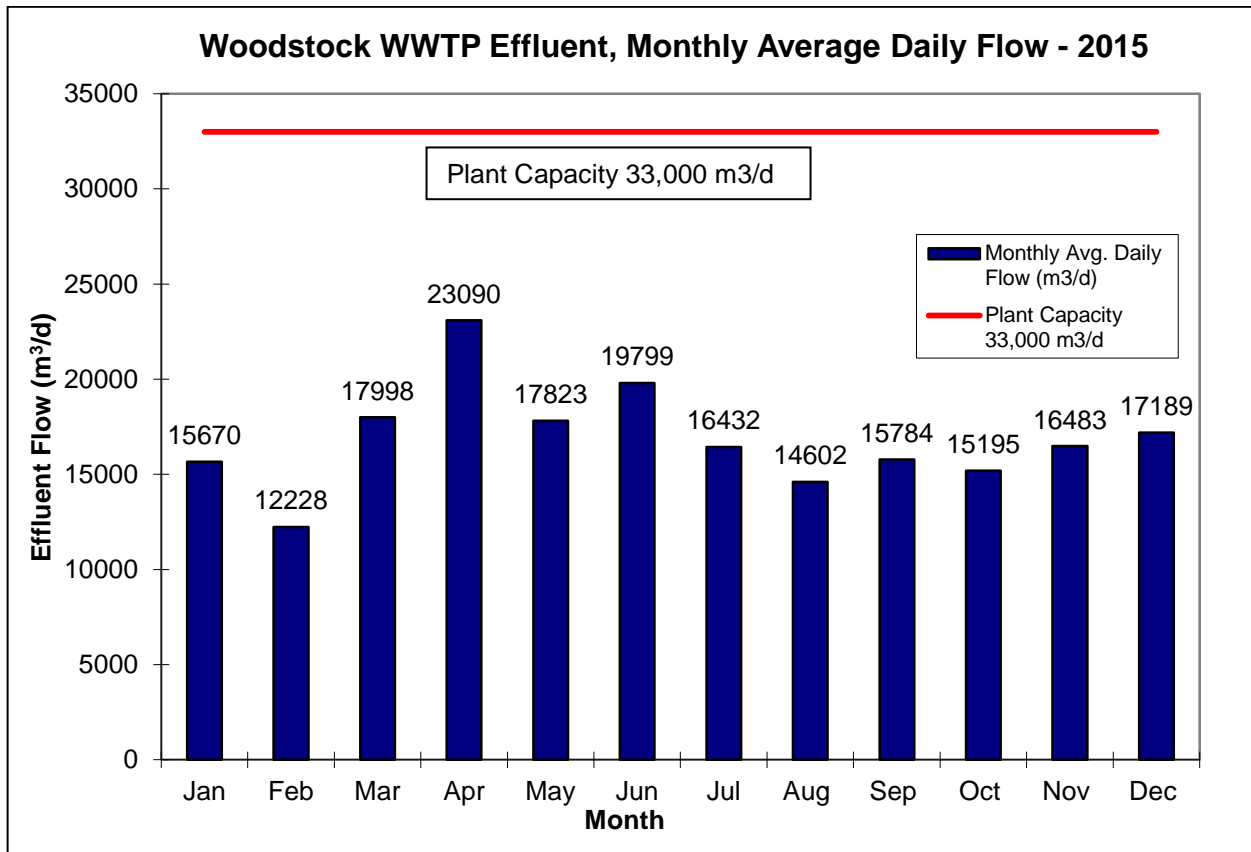
#### **Discussion:**

Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa-Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).

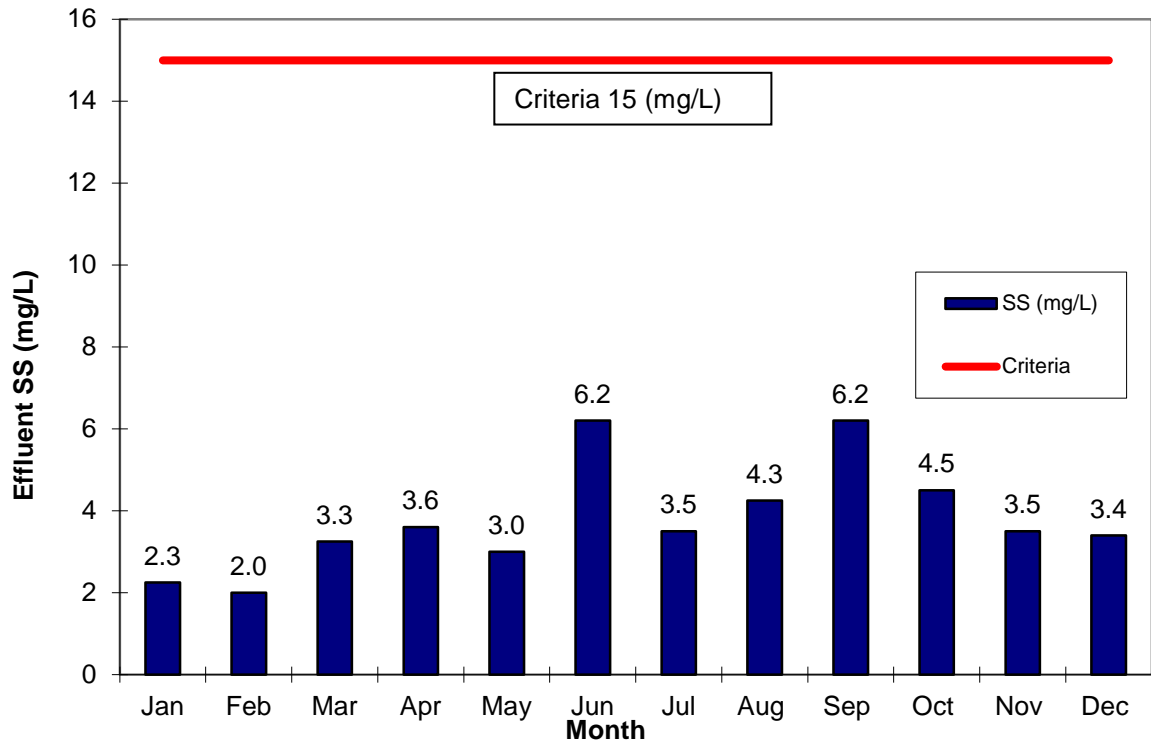
#### **Summary**

The Woodstock WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2015. The Biosolids generated were utilized for beneficial reuse on agricultural land as a Non-agricultural source material (NASM) as regulated under the Nutrient Management Act (NMA); details of which are included in a separate report, available at [www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports](http://www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports).

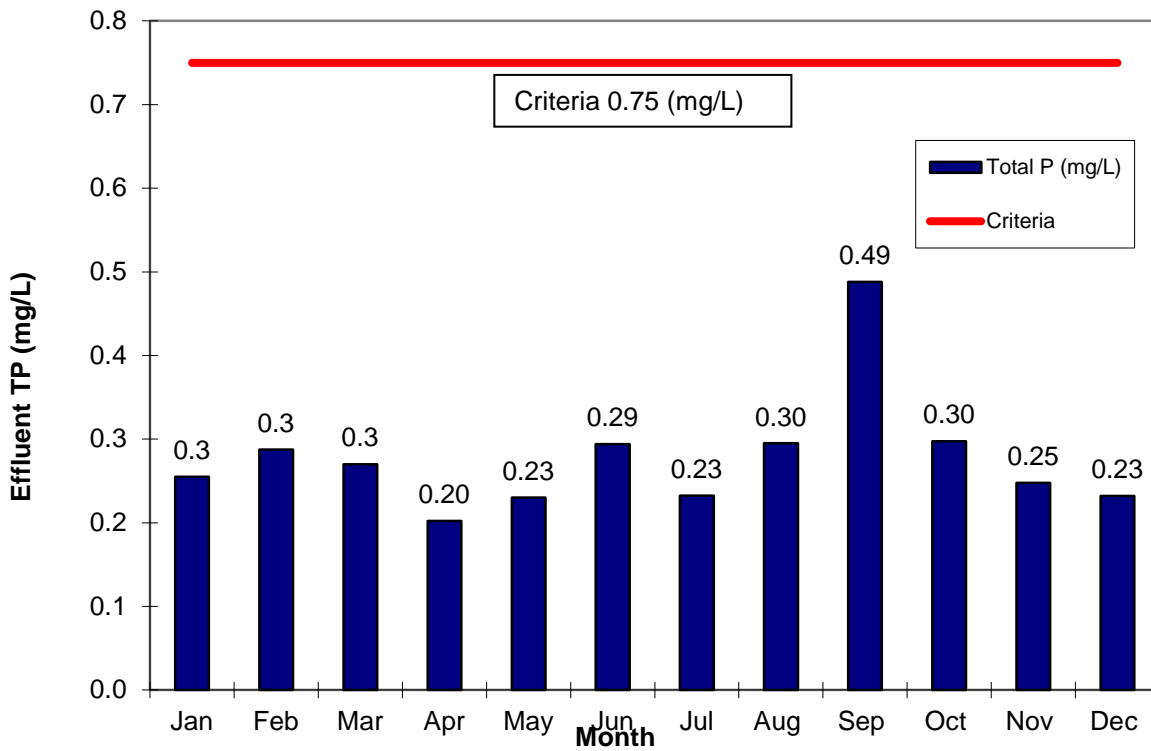
**APPENDIX A: GRAPHS OF 2015 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS**



### Woodstock WWTP Effluent, Monthly Average SS - 2015

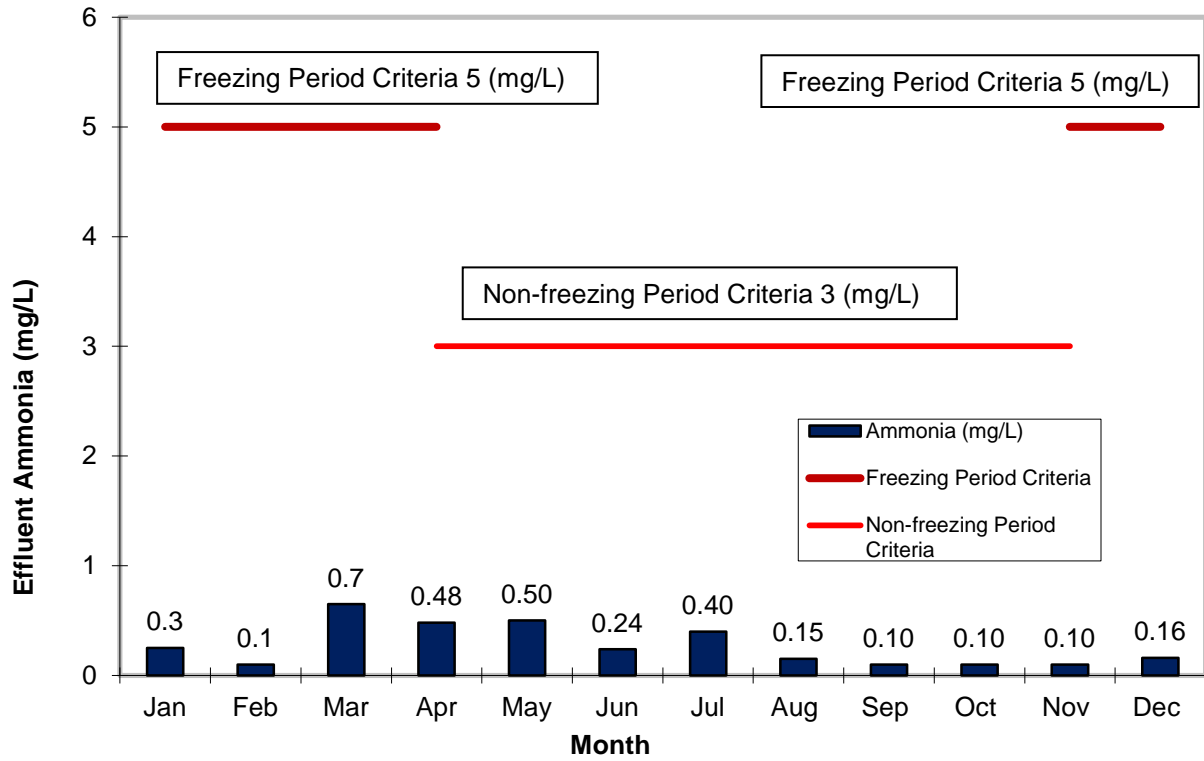


### Woodstock WWTP Effluent, Monthly Average TP - 2015





Woodstock WWTP Effluent, Monthly Average Ammonia - 2015



Woodstock WWTP Effluent, Monthly Geomean E.coli - 2015

