

Tweed Wastewater Lagoon

Annual Report

Reporting period of January 1, 2017 – December 31, 2017

Prepared For: Municipality of Tweed

Prepared By:



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

This report is submitted in accordance with Conditions 10(5)(a) through 10(5)(l) of Environmental Compliance Approval No. # 9608-9ZLJ2E.

Condition 10(5) of Environmental Compliance Approval No. # 9608-9ZLJ2E states, *"The Owner shall prepare and submit a performance report to the Water Supervisor on an annual basis, within ninety (90) days following the end of the period being reported upon..."*

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ECA CONDITION 10(5)(A) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 6, including an overview of the success and adequacy of the Works;

Condition 6 is imposed to ensure that the effluent discharged from the Works to Moira Creek and there from to Stoco Lake meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver and to protect water quality, fish and other aquatic life in the receiving water body.

A summary of all monitoring data collected at the Tweed Lagoons during the reporting period is attached as Appendix I. The summary provides flow data, and analytical results of raw sewage, final effluent and upstream and downstream results.

Effluent limits are stipulated in Condition 6(1) as follows:

Tweed Lagoons – Seasonal Average Effluent Limits	
Effluent Parameter	Average Concentration (mg/L)
CBOD5	25.0
Total Suspended Solids	25.0
Total Phosphorus	1.0
pH of the effluent maintained between 6.0 and 9.5, inclusive, at all times	

Effluent non-compliance is based on the seasonal average concentration, calculated separately for the effluent from each lagoon, exceeding the maximum concentration specified.

Discharge periods are defined in Condition 9(1) as follows:

- Spring discharge commencing after the liquid surface in the lagoon has become free of ice cover, terminating within 45 days thereafter, and no later than May 1, and
- Fall discharge commencing not earlier than October 1 and terminating not later than December 1

2017 Spring Lagoon Discharge

The Tweed 2017 Spring Lagoon discharged under Provincial Officers Order #1-EWMK2 (appendix II) to allow for discharge under the cover of ice. The discharge commenced on March 21, 2017 and was terminated on May 9, 2017. The Ministry of the Environment was verbally notified prior to commencement of the discharge. A total effluent volume of 160,418m³ was discharged. No community complaints received for the entire duration of the discharge.

2017 Spring Cell Contents (Pre-discharge)			
03-Feb-17	CBOD (mg/L)	TSS (mg/L)	Total P (mg/L)
South Lagoon Cell Contents	13	44	0.22
North Lagoon Cell Contents	9	7	0.12

The MOE requested at least Five (5) sampling events during the discharge shall be collected for enhanced monitoring of the effluent including pH, Temp, 4N, un-ionized ammonia, dissolved oxygen, conductivity, TSS, CBOD, Total Phosphorus, Fecal Coliform and hydrogen sulphide for the discharge(s). In addition to existing final effluent monitoring requirements already stipulated in the Certificate of Approval. One toxicity sample event should be completed while lagoons are under ice cover and discharging.

Enhanced Sampling was performed as per the Provincial Officers Order and the results of the analysis are listed below.

Tweed Combined (Outfall) Lagoon Spring Discharge POO# 1-CJWTS	# of grab samples taken	Range of Results (min # - max #)	Seasonal Average Limits	Compliant Y/N
CBOD5	10	Seasonal Average = 4.6 mg/L	25 mg/L	Y
Total Suspended Solids	10	Seasonal Average = 6.7 mg/L	25 mg/L	Y
Total Phosphorus	10	Seasonal Average = 0.08 mg/L	1.00 mg/l	Y
pH	10	7.08 – 8.16	6.0-9.50	Y
Temperature	10	2.1– 22.60 °C	No Limit	Not Applicable
Dissolved Oxygen	08	4.9 – 7.9 mg/L	No Limit	Not Applicable
Ammonia + Ammonium	10	0.13 – 2.78mg/L	No Limit	Not Applicable
Unionized Ammonia	10	0.001 – 0.76 mg/L as N	No Limit	Not Applicable
Conductivity	9	7.3 – 1160 umhos/cm	No Limit	Not Applicable
H ₂ S	10	0.02 - 0.02 mg/L	No Limit	Not Applicable
Fecal Coliform	10	14 – 1320 cfu/100ml	No Limit	Not Applicable
E.coli	10	2- 1040 cfu/100ml	No Limit	Not Applicable
Toxicity - Daphnia Magna	3	0% Mean Mortality	No Limit	Not Applicable
Toxicity – Rainbow Trout	3	0% Mean Mortality	No Limit	Not Applicable

2017 Fall Lagoon Discharge

An overflow event began on September 8th and ended on October 31st as the fall discharge began. The 2017 fall discharge commenced on November 1st and terminated on December 4th. A total effluent volume of 188,160 m³ was discharged over the 31 day discharge period. The Ministry of the Environment was notified via email prior to commencement of the discharge and on the day the discharge ended.

2017 Fall Cell Contents (Pre-discharge)			
04-Oct-17	CBOD (mg/L)	TSS (mg/L)	Total P (mg/L)
South Lagoon Cell Contents	5	<2.00	<0.03
North Lagoon Cell Contents	10	8	0.10

All analytical effluent concentration results were below the maximum acceptable concentrations as specified in the facilities Certificate of Approval. A summary of the discharge data is below.

Tweed Combined (Outfall) Lagoon Fall Discharge	# of grab samples taken	Range of Results (min # - max #)	Seasonal Average Limits	Compliant Y/N
CBOD5	5	Seasonal Average = 3.00 mg/L	25 mg/L	Y
Total Suspended Solids	6	Seasonal Average = 2.00 mg/L	25 mg/L	Y
Total Phosphorus	6	Seasonal Average = 0.04 mg/L	1.00 mg/l	Y
pH	6	7.10 – 7.90	6.0-9.50	Y
Temperature	5	4.40– 10.40 °C	No Limit	Not Applicable
Ammonia + Ammonium	6	0.1 – 0.7 mg/L	No Limit	Not Applicable
H ₂ S	6	<0.02 - <0.02 mg/L	No Limit	Not Applicable
E.coli	6	18 - 3640 cfu/100ml	No Limit	Not Applicable
Toxicity - Daphnia Magna	1	0% Mean Mortality	No Limit	Not Applicable
Toxicity – Rainbow Trout	1	0% Mean Mortality	No Limit	Not Applicable

The lagoons operated both adequately and successfully with respect to operation of the wastewater treatment process. There were no exceedances with respect to effluent concentration during the 2017 reporting period.

ECA CONDITION 10(5)(B) a description of any operating problems encountered and corrective actions taken;

The following is a description of significant operating problems which occurred during 2017, and corrective actions taken.

2017 Tweed WSP Operational Challenges

MONTH	CHALLENGES	CORRECTIVE ACTIONS
March	Premature Spring Lagoon Discharge due to Hydraulic Overload	OCWA & Municipality received approval from MOECC under POO# 1EYMK2 to discharge early under the cover of ice.
May	Due to recent high levels of precipitation that have added significant volume to the lagoons. A request to MOECC for an extension of the discharge period to May 22 2017	The extension was approved by MOECC and the POO# 1EYMK2 was amended.
	Two (2) River Street Sewage Pumping Station Bypass Events due to heavy rainfall	Chlorine Pucks were added to the bypass to maintain adequate disinfection.
	Jamieson Street Sewage Pumping Station Bypass Event due to heavy rainfall	Chlorine Pucks were added to the bypass to maintain adequate disinfection.
September	Plant Overflow commenced due prolonged rainfall throughout the seasons	The overflow event began on September 8 th and ended on October 31 st . Enhanced sampling was conducted during the overflow event. The Municipality has applied for funding for Lagoon Expansion.

ECA CONDITION 10(5)(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;

Ontario Clean Water Agency (OCWA) maintenance activities are based on a computerized Work Management System (WMS) using the Hansen and Maximo applications. In its developmental stages, each piece of equipment at the operating facility was tagged with a unique bar code number, and this information was entered into the electronic WMS database. In addition, data regarding the description of the equipment, model number, serial number, the equipment type, location at the facility as related to process, serviceable status, manufacturer's suggested maintenance activities, all risk factor information and average monthly usage was also recorded.

Once the equipment inventory was established, preventive maintenance procedures and schedules were developed for each piece of equipment. Each work order generated by the Preventive Maintenance schedule includes materials and parts required, any special tool requirements, work protection, job safety planning, running checks, a preventive maintenance job procedure, and upon completion of the task, the work order is closed out.

Preventative Maintenance Work Orders Completed	55
Operational Maintenance Work Orders Completed	13
Capital Maintenance Work Orders Completed	0
Weekly Maintenance Work Orders Completed	108

Capital projects are listed and provided to the Municipality of Tweed in the form of a "Capital Forecast". This list is developed by facility staff and provides recommendations for facility components requiring upgrading or improvement. Annual and Emergency repair/maintenance is listed below:

- Spare River St. Pump
- Annual Diesel Inspection
- Annual Wet Well Clean-outs
- Additional toxicity sampling for daphnia magna & rainbow trout

ECA CONDITION 10(5)(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

Effluent control measures include in-house sampling and testing for operational parameters such as suspended solids, pH, soluble phosphorus, and dissolved oxygen. In-house testing provides real time results which are then used to enhance process and operational performance. All in-house sampling and analysis are performed by certified operations staff utilizing approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet ECA sampling requirements were submitted to SGS Lakefield Research Ltd. laboratory for analysis, with the exception of in-house lagoon quality monitoring. SGS Lakefield Research has been deemed accredited by the Canadian Association of Environmental and Analytical Laboratories (C.A.E.A.L.), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis.

ECA CONDITION 10(5)(E) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

As stated earlier, the Ontario Clean Water Agency's maintenance activities are based on a computerized Work Management System (WMS) using the Hansen application. The WMS is a proactive maintenance system, based on detailed risk assessment with respect to process.

The WMS database automatically populates work orders and schedules for the calibration and maintenance of a wide variety of equipment. The WMS also automatically tracks each individual maintenance event, calibration of all meters and certification of all devices.

Calibration and maintenance of the onsite flow measuring devices are calibrated by a certified third party qualified technician and performed on annual basis.

Flow meter and Chart Recorder

Calibration Date: May 10, 2017

Work Performed By: Flowmetrix Technical Services Inc.

ECA CONDITION 10(5)(F) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 5.

Condition 5 - Effluent Objectives, states "The Owner shall use best efforts to design, construct and operate the Works with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the Works."

EFFORTS MADE TO MEET THE EFFLUENT OBJECTIVES OF CONDITION 5
1. Sampling effluent as per ECA.
2. Visually inspecting effluent when performing rounds. during spring/fall discharge
3. Ensuring that alum is being dosed
4. Ensuring proper operation of River and Jamison Street Pump Stations
5. Perform inspection of lagoon quality during operation
6. Collected lagoon PH, temp, D.O, and conductivity during discharges
7. Calibrating pH/DO probes during spring/fall discharge.
8. Annual calibration of influent flow meter.

Tabulated below is a summary of the ECA effluent objectives, specified in Condition 5(1), in comparison to the actual effluent results obtained during the reporting period.

Tweed Lagoons - Effluent Objectives - 2017 (per ECA No. 9608-9ZLJ2E , Condition 5(1) & (2(a))			
Effluent Parameter	ECA Effluent Objective Concentration	Actual Spring Discharge Average Concentration – Outfall	Actual Fall Discharge Average Concentration - Outfall
CBOD ₅	20 mg/L	4.6	3.0
Suspended Solids	20 mg/L	6.7	2.0
Total Phosphorus	0.8 mg/L	0.08	0.04
pH	Min: 6.50 Max: 8.50	Min: 7.08 Max: 8.16	Min: 7.10 Max: 7.90

The following table provides a comparison of the rated capacity of the works to the actual flow data obtained during the 2017 reporting period.

Tweed Lagoons – Influent Capacity Flow Data for 2017 (per ECA No. 9608-9ZLJ2E , Condition 5(2)(b))		
Month	Avg. Daily Flow (m³)	ECA Rated Capacity (m³)
January	998	1,209
February	1129	1,209
March	1730	1,209
April	1850	1,209
May	2457	1,209
June	1287	1,209
July	1058	1,209
August	697	1,209
September	543	1,209
October	536	1,209
November	828	1,209
December	679	1,209

Hydraulic overloading occurred ahead of the spring discharge date. The Municipality of Tweed and OCWA requested MOECC approval to discharge the Lagoons prematurely, under the cover of ice, to avoid a potential spill/overflow of the lagoons.

The above table shows that the Tweed Influent rated capacity was exceeded during the months of March through to June. The high flows were attributed to the significant amount of rainfall throughout the reporting period. Although the rated capacity was exceeded the effluent quality remained well below the effluent concentration requirements as outlined on page 4 of this report.

The Ontario Clean Water Agency, on behalf of the owner, did use best efforts to ensure that the effluent was essentially free of floating and settleable solids and that it did not contain oil or any other substance in amounts sufficient to create a visible film, sheen, foam or discoloration on the receiving waters in accordance with this **objective**.

ECA CONDITION 10(5)(G) a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed.

There was no generation of sludge for the reporting period. It is anticipated that the volume for the next reporting period will be similar to the 2017 reporting period.

Tweed WWTF		
Year	Total Raw Sewage Flow (m ³)	Volume of Sludge Hauled (m ³)
2008	418,081	12,880
2009	502,948	0.00
2010	381,500	0.00
2011	407,431	0.00
2012	313,693	0.00
2013	357,607	0.00
2014	421,576	0.00
2015	341,988	0.00
2016	339,399	0.00
2017	419,644	0.00

ECA CONDITION 10(5)(H) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

There were no Community Complaints received for the 2017 reporting period

ECA CONDITION 10(5)(i) a summary of all By-pass, spill or abnormal discharge events;

Summarized below are the bypass and overflow events that occurred in the 2017 reporting period, specific details regarding each event will be provided in Appendix III of this report.

Summary of Bypass and Overflow Events - 2017									
Date 2017	Location	Type of Event	Start Time (24hr)	End Time (24hr)	Duration (hrs)	Total Volume (m3)	Disinfect (Y/N)	Samples Collected (Y/N)	Reason
May 1, 2017	River St SPS	Bypass	11:50	23:48	4hrs 25min	113	Y	Y	Heavy Rainfall
May 5 – May 12	River St SPS	Bypass	13:13	09:30	165hrs 40min	4,142	Y	Y	Heavy Rainfall
May 5 – May 9	Jamieson St SPS	Bypass	14:55	11:00	92hrs 05min	920	Y	Y	Heavy Rainfall
Sept. 9 – Nov. 1	Tweed Lagoon	Overflow	03:25	08:05	54 Days	29,441	Y	Y	Prolonged rainfall throughout the season

Note: During the lagoon overflow event the MOE requested minimum of two (2) grab samples analyzed for parameters in Condition 6, the District is instructing OCWA to sample the overflow at least weekly and test for CBOD5, TSS, TP and add E.coli, Total Ammonia Nitrogen and field pH & temperature to the list of parameters.

ECA CONDITION 10(5)(j) A copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification

There were no “Notice of Modifications” submitted to the Water Supervisor for the year 2017.

ECA CONDITION 10(5)(k) a report summarizing all modifications completed as a result of Schedule B, Section 3:

As per Schedule B, Section 3, a repair is considered a normal or emergency operational modification, that does not require Notice of Modification; is defined as “Normal or emergency operational modifications, such as repairs, reconstructions, or other improvements that are part of maintenance activities, including cleaning, renovations to existing approved sewage works equipment, provided that the modification is made with Equivalent Equipment, are considered pre-approved”.

There were no modifications completed as a result of Schedule B Section 3 for the year 2017

ECA CONDITION 10(5)(L) any other information the Water Supervisor requires from time to time.

The Water Supervisor has not requested any other information to be included in this report at this time

Wastewater System Effluent Regulations

The Wastewater Systems Effluent Regulations (WSER) is a federal wastewater regulation under the Fisheries Act that was released in July 2012 but not in effect until January 1, 2013.

These regulations apply to a wastewater system that:

- Is designed to collect an average daily volume (ADV) of 100m³ or more of influent, or
- Collects an average daily volume (ADV) of 100m³ or more of influent during any calendar year.

An owner or operator must calculate, for each calendar year, the Average Daily Volume of effluent deposited via the system’s final discharge point according to the following formula:

$$\text{Sum of daily effluent volumes deposited (m}^3\text{)} \div \text{number of days in that calendar year (365 days)}$$

Note: The formula uses the number of days in the calendar year not the number of days discharging.

Sampling and reporting requirements are dependent on the system type and its annual average daily volume of effluent. In 2017 The Tweed Wastewater Treatment Lagoon deposited approximately 811.0 m³ of daily effluent volumes.

The Annual Monitoring Report (due by February 14 each year) was submitted to Environment Canada on February 2018. The Tweed Lagoon met all of the quality standards in 2017.

<u>Monitoring Report</u>			
Effluent Monitoring Data:		<u>Tweed Wastewater Treatment Lagoon</u>	
System Type: Intermittent	Reporting Period: Annually	Avg Daily Effluent: 811.0	
Averaging Period: Annually	Reporting Period: January - December	Reporting Year: 2017	
Was effluent deposited in this reporting period? Yes			
For each month indicated, was effluent deposited?			
January:	No	February:	No
April:	Yes	May:	Yes
July:	No	August:	No
October:	Yes	November:	Yes
		March:	Yes
		June:	No
		September:	Yes
		December:	Yes

# of days effluent was deposited? (days)	Total Volume of Effluent deposited? (m ³)	Average CBOD (mg/L)	Average SS (mg/L)
		Limits	
		25	25
162	427,918	4.0	5.1