



Sunderland Water Pollution Control Plant 2018 Annual Performance Report





The Regional Municipality of Durham

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Environmental Compliance Approval (ECA): 9252-8CUNBZ Dated June 28, 2012

Amendment to ECA: 9252-8CUNBZ Dated June 28, 2017

The Sunderland Water Pollution Control Plant (WPCP) 2018 Annual Performance Report provides staff, stakeholders and customers an overview of the performance of the Sunderland WPCP. Further, this report fulfills the annual reporting requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP). This report demonstrates the commitment of ensuring that the WPCP continues to deliver wastewater services to our customers in an environmentally responsible manner.

Water Pollution Control Plant Process Description

General

The Sunderland WPCP located in the Community of Sunderland in the Township of Brock is owned and operated by the Regional Municipality of Durham (Region). The plant is operated according to the terms and conditions of the ECA and its amendment. This MECP Class One wastewater treatment plant is designed to treat wastewater at a rated capacity of 632 cubic metres per day (m³/d) and utilizes a seasonal wastewater stabilization lagoon system. The Sunderland WPCP has a service population of approximately 1,502 residents.

Raw Influent

Wastewater is collected through 8.3 km of sanitary sewers in the Sunderland service area and is conveyed to the treatment facility by a single sanitary sewage pumping station located on River Street.

Lagoon Treatment

The Sunderland WPCP is a two cell lagoon system where the wastewater enters a retention stabilization lagoon and overflows into an exfiltration cell giving a combined retention time of approximately 182.5 days. The ECA permits two seasonal discharges per year. Spring discharge is for 20 days in May and fall discharge is for 20 days in November. Prior to and during discharge to the Beaver River, samples are collected to verify the effluent meets the limits established in the ECA.

Environmental Compliance Approval

Under Condition 9 (4) of ECA #9252-8CUNBZ the Region must produce an annual performance report that must contain the following information:



a) Summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the works

The raw wastewater flowing into the lagoons is analyzed for its chemical and physical composition. Monitoring of the raw wastewater is performed in accordance with the conditions in the ECA. Table 2 summarizes the raw wastewater characteristics during the reporting period.

The Sunderland WPCP effluent was determined to be compliant with the approval limits during the reporting period. The plant operated at 80.3% of its rated capacity and received a maximum daily flow of 1,075 m³/d on February 21, 2018. The total treated effluent discharged to the Beaver River in 2018 was calculated to be 138,217 m³.

b) Description of any operating problems encountered and corrective actions taken

No operating problems were encountered in 2018.

c) Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the works

- A rehabilitation project to remove solids and re-establish Lagoon Cell #2 exfiltration properties was conducted from May to November 2018.
- Construction of the Maintenance Lagoon began in October 2017 and went into commission on July 25, 2018.
- A new pump was installed at River Street Pumping station in October 2018.

d) Summary of any effluent quality assurance or control measures undertaken in the reporting period

In-house lab test results are compared to the results of the Regional Environmental Laboratory on comparable samples to determine the in-house accuracy. Results were found to be within a comparable range.

e) Summary of the calibration and maintenance carried out on all effluent monitoring equipment

- Calibration of the influent flow meter located at River Street Pumping Station was conducted on May 30 and October 17, 2018.
- Temperature and pH are monitored in the field, all other routine process control tests are performed at the Lake Simcoe WPCP laboratory in Beaverton. All monitoring and laboratory equipment is calibrated and maintained according to manufacturer's specifications.



f) Estimate of sludge settling capacity of the lagoons and its annual depletion

The annual depletion of the sludge settling capacity is negligible. A rehabilitation project to remove solids and re-establish Lagoon Cell #2 exfiltration properties was conducted from May to November 2018.

g) Efforts made and results achieved in meeting the effluent objectives of Condition 4

- The Region strives to achieve the best effluent quality at all times consistently remaining well below ECA limits.
- All effluent objectives were met in 2018 except for the Suspended Solids objective of 15 mg/L which was exceeded twice, once during the spring discharge and again in the fall discharge.
- Best efforts will continue to be applied to maintain results below objectives.

h) Summary of any complaints received during the reporting period and any steps taken to address the complaint

A summary of complaints received from the public is administered through a central database. No complaints were received in 2018.

i) Summary of all By-pass, Spill or Abnormal Discharge Events

By-pass – June 18, 2018

A leak was detected in the effluent chamber on June 18 during plant operational checks. A seal failure had occurred in Lagoon Cell #1 between a newly installed isolation valve and the flange connecting to the valve. Lagoon effluent was leaking into the effluent chamber and making its way to the effluent discharge point. A temporary bladder was installed within the outfall sewer on the same day to stop the by-pass while repairs on the isolation valve were completed on the 20th. This event was reported to the MECP.

Early Discharge Event – August 30, 2018

An ECA amendment was granted to the Region to construct and utilize a smaller Maintenance Lagoon while rehabilitation work was conducted on Cell #2. The contents of Cell #2 were transferred to Cell #1 bringing it up to capacity. Influent from River Street Pumping Station was directed to the Maintenance Lagoon. Excessive rain and the continuous flow of influent caused the Maintenance Lagoon to fill up at an accelerated rate. With plant capacity achieved influent would once more need to be directed into Cell #2, delaying the rehabilitation work. MECP granted the Region approval to discharge effluent from Cell #1 before the commencement of the fall discharge period to increase plant capacity. Prior to the discharge, laboratory results had indicated the effluent quality met the ECA requirements. Discharge started on August 30, 2018 and ended on September 10, 2018.



Discharge from the Maintenance Lagoon – November 19, 2018

The ECA amendment mandated the contents of the Maintenance Lagoon be returned to Lagoon Cell #1 or #2 prior to being discharged. In November 2018, MECP granted the Region permission to discharge effluent from the Maintenance Lagoon to the discharge chamber while bypassing both treatment cells. This measure was deemed necessary to avoid compromising the effluent quality with sediment from the other two cells and would allow the discharge to occur within the stipulated fall discharge period in November. Laboratory samples demonstrated the effluent met the ECA requirements. The discharge was initiated on November 19, 2018 and completed on November 26, 2018.

j) Status Update of the Initial Effluent Characterization

The initial effluent characterization report was submitted in April 2016.

k) Information Required by MECP District Manager

No additional information was requested.

MECP Inspection

The plant was inspected by the MECP on June 12th, 2018. No compliance items were identified in the report. The MECP did however, recommend that the Region design and implement a sludge monitoring program to be conducted on a regular basis, or as required by operation of the lagoon site.

Lagoon Cell #2 rehabilitation project to remove solids and re-establish its exfiltration properties was carried out between May to November 2018.



Table 1 Raw Influent Flows

Month	Total Flow to Plant -metered at the River Street Pumping Station cubic meter (m ³)	Average Daily Flow cubic metre per day (m ³ /d)	Maximum Daily Flow m ³ /d
January	15,314	494	621
February	15,783	564	1,075
March	15,390	497	597
April	22,723	757	1,069
May	18,793	607	758
June	15,464	515	606
July	13,380	432	494
August	12,277	396	449
September	11,206	374	546
October	11,765	379	471
November	15,959	515	689
December	17,190	555	638
Total	185,244		
Annual Average	15,437	508	
Minimum	11,206		
Maximum	22,723		1,075
ECA Limit		632*	
Met Compliance		Yes	

*Annual average daily flow



Table 2 Raw Influent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Biochemical Oxygen Demand average conc. mg/L	Total Suspended Solids average conc. mg/L	Total Phosphorous average conc. mg/L
January	136	178	157	4.2
February	118	124	167	4.0
March	101	129	151	4.4
April	57	100	106	2.7
May	71	87	93	3.0
June	81	92	92	3.5
July	132	159	169	5.6
August	138	162	151	5.2
September	140	133	182	5.3
October	123	158	165	5.4
November	100	129	167	4.0
December	78	100	161	3.6
Average	106	129	147	4.2
Minimum	57	87	92	2.7
Maximum	140	178	182	5.6
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



Table 2 Raw Influent Analyses continued

Month	Total Phosphorous average loading kilogram per day	Total Ammonia Nitrogen average concentration milligram per litre	pH minimum	pH maximum	Temperature average Degree Celsius
January	2.1	24.3	7.8	8.1	10.5
February	2.2	16.5	7.2	8.0	9.0
March	2.2	20.3	7.7	7.9	9.5
April	2.0	16.2	7.6	7.9	9.5
May	1.8	16.8	7.5	7.7	12.1
June	1.8	21.1	7.6	7.9	14.0
July	2.4	30.7	6.6	8.1	19.1
August	2.1	26.6	7.2	7.8	17.9
September	2.0	27.5	6.8	7.8	18.0
October	2.0	27.9	7.5	8.1	16.1
November	2.1	21.3	6.8	7.6	13.0
December	2.0	22.1	7.0	7.8	11.5
Average	2.2	22.6			13
Minimum	1.8	16.2	6.6		9.0
Maximum	2.4	30.7		8.1	19.1
Sampling Frequency Requirement Met		Yes	Yes	Yes	Yes



Table 3 Calculated Effluent Flows

Month	Effluent Flow cubic metres
January	
February	
March	
April	
May	89,618
June	
July	
August	3,634
September	21,333
October	
November	23,632
December	
Total	138,217
Annual Average	34,554
Minimum	3,634
Maximum	89,618



Table 4 Final Effluent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Biochemical Oxygen Demand average conc. mg/L	Total Suspended Solids average conc. mg/L	Total Phosphorous (TP) average conc. mg/L	TP average loading kilogram per day	TP loading kilogram per month
January						
February						
March						
April						
May	3.8	4.3	6.3	0.05	0.24	4.38
June						
July						
August	2.5	3.2	7.8	0.08	0.19	0.30
September	4.5	10.6	10.6	0.10	0.23	2.23
October						
November	4.0	4.2	6.3	0.02	0.08	0.56
December						
Total						7.5**
Average	3.7	5.6	7.8	0.07	0.2	0.9
Minimum	2.5	3.2	6.3	0.02	0.1	0.3
Maximum	4.5	10.6	10.6	0.10	0.2	4.4
ECA Limit	10*		15*	0.3*		69**
ECA Objective	10		15	0.5		
Lake Simcoe Phosphorus Reduction Strategy				0.25*		58**
Within Compliance	Yes		Yes	Yes		Yes
Sampling Frequency Requirement Met	Yes		Yes	Yes		Yes

*Annual Average Concentration

**Total Annual Loading (kg/year)



Table 4 Final Effluent Analyses continued

Month	Total Ammonia Nitrogen concentration (conc.) milligram per litre (mg/L)	Unionized ammonia average conc. mg/L	pH minimum	pH maximum	Temperature Degree Celcius
January					
February					
March					
April					
May	8.81	0.05	6.5	7.5	18.7
June					
July					
August	6.90	0.04	7.1	7.1	22.4
September	8.01	0.08	6.7	7.6	22.3
October					
November	3.15	0.00	6.6	6.9	3.8
December					
Average	6.72	0.04			16.8
Minimum	3.15	0.00	6.5		3.8
Maximum	8.81	0.08		7.6	22.4
ECA Limit			6.0	9.5	
ECA Objective			6.5	8.0	
Within Compliance			Yes	Yes	
Sampling Frequency Requirement Met	Yes		Yes	Yes	Yes