Sunderland Water Pollution Control Plant

2020 Annual Performance Report

The Regional Municipality of Durham
Sunderland Water Pollution Control Plant 2020 Annual Performance Report

Environmental Compliance Approval (ECA): 9252-8CUNBZ Dated June 28, 2012
The Sunderland Water Pollution Control Plant (WPCP) 2020 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 1 wastewater treatment plant is designed to treat wastewater at a rated capacity of 632 cubic metres per day (m^3/d) and utilizes a seasonal wastewater stabilization lagoon system. The Sunderland WPCP has a service population of approximately 1,558 residents.

Raw Influent

Wastewater is collected through 9.5 kilometres of sanitary sewers in the Sunderland service area and is conveyed to the treatment facility by a sanitary sewage pumping station (SSPS) 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 lagoon 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;

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 74.6% of its rated capacity and received a maximum daily flow of 1,103 m3/d on January 11, 2020. The total treated effluent discharged to the Beaver River in 2020 was calculated to be 95,443 m3.

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

A Request for Pandemic Related Temporary Relief (Alternative Arrangement) for Municipal Wastewater Systems was submitted to the MECP on March 31, 2020. The request was made for relief of influent sampling to assist in managing workload and for the health and safety of staff.

The Director granted relief on April 29, 2020. Sunderland WPCP returned to normal sampling practices on June 1, 2020.

In 2019, the Region contacted the MECP office after 2 of the 5 newly installed groundwater monitoring wells showed elevated ammonia and total kjeldahl nitrogen values when compared to historical results from decommissioned wells. The wells are used for monitoring of groundwater level and water quality analysis around the lagoons. In 2020, ground penetrating radar technology was used to map water movement between the lagoon and groundwater to detect if the lagoon infrastructure was possibly breached or if elevated results are due to a historical release that was identified when new wells were installed. The raw influent chamber was inspected and repaired as part of the Region's investigation to determine the source of the ammonia and total kjeldahl nitrogen levels in the monitoring well samples. Staff continue to monitor wells.

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

Major maintenance items in 2020 included:

- Inspected and repaired the raw influent chamber,
- Performed wet well cleanouts at River Street Sanitary Sewage Pumping Station (SSPS),
- Replaced uninterrupted power supply (UPS) at River Street SSPS.

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 SSPS was conducted on May 6 and October 7, 2020.
- 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 at Lake Simcoe WPCP.

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

The annual depletion of the sludge settling capacity is negligible. There was no removal of solids from the lagoons in 2020.

g) Efforts made and results achieved in meeting the effluent objectives;

The Region continually strives to achieve the best effluent quality at all times and remain below the objectives specified in the ECA.

- The total suspended solids objective of 15 mg/L was exceeded in 4 of 19 samples (21.0%)
- The maximum effluent pH objective of 8.0 was exceeded in 5 of 13 samples (38.5%)

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 complaints;

A summary of complaints received from the public is administered through a central database.

No complaints were received in 2020.

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

Drainage from the Maintenance Lagoon – April 2020

The Region requested and received permission from the MECP in April to conduct a controlled drain of stormwater in the nonoperational Sunderland Maintenance Lagoon (Lagoon). Stormwater in the form of snowmelt and precipitation partially filled the previously empty Lagoon. The contents were tested before a controlled drain process was initiated. The amount removed was estimated to be 9,692m^3. The conditions in the marsh and river were monitored and no adverse environmental effects were observed as a result of the drainage event.

j) Status Update of the Initial Effluent Characterization;

The initial effluent characterization report was submitted to Ministry of the Environment, Conservation and Parks (MECP) 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 12, 2018.

Table 1 Raw Influent Flows

Month	Total Flow to Plant -metered at the River Street Pumping Station cubic metre (m^3)	Average Daily Flow cubic metre per day (m^3/d)	Maximum Daily Flow m^3/d
January	20,869	673	1,103
February	14,880	513	612
March	21,094	680	872
April	18,917	631	730
May	15,521	501	544
June	12,391	413	468
July	10,759	347	373
August	11,229	362	430
September	11,094	370	442
October	11,111	358	406
November	11,183	373	410
December	13,463	434	576
Total	172,511		
Annual Average	14,376	471	
Minimum	10,759		
Maximum	21,094		1,103
ECA Limit		632*	
Met Compliance		Yes	

*Annual average daily flow

Table 2 Raw Influent Analyses continued

Month	Total Ammonia Nitrogen average (avg.) concentration milligram per litre	pH minimum	pH maximum	Temperature Degree Celsius avg.
January	17.8	7.8	8.1	9.6
February	22.8	7.8	8.2	9.9
March	22.7	7.8	8.1	9.0
April	21.8	8.0	8.2	11.6
May	33.3	8.3	8.4	11.7
June	36.4	7.7	8.3	15.0
July	45.7	8.1	8.6	16.6
August	40.6	7.8	8.2	17.8
September	35.3	7.8	8.2	17.5
October	40.0	7.9	8.3	15.6
November	34.6	8.1	8.2	15.3
December	38.3	8.1	8.4	13.3
Average	32.4			14
Minimum	17.8	7.7		9.0
Maximum	45.7		8.6	17.8
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes

Table 2 Raw Influent Analyses continued

Month	Total Ammonia Nitrogen average (avg.) concentration milligram per litre	pH minimum	pH maximum	Temperature Degree Celsius avg.
January	17.8	7.8	8.1	9.6
February	22.8	7.8	8.2	9.9
March	22.7	7.8	8.1	9.0
April	21.8	8.0	8.2	11.6
May	33.3	8.3	8.4	11.7
June	36.4	7.7	8.3	15.0
July	45.7	8.1	8.6	16.6
August	40.6	7.8	8.2	17.8
September	35.3	7.8	8.2	17.5
October	40.0	7.9	8.3	15.6
November	34.6	8.1	8.2	15.3
December	38.3	8.1	8.4	13.3
Average	32.4			14
Minimum	17.8	7.7		9.0
Maximum	45.7		8.6	17.8
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes

Table 3 Calculated Effluent Flows

Month	Effluent Flow cubic metre
January	
February	
March	
April	9,692
May	48,797
June	
July	
August	
September	
October	
November	36,954
December	
Total	95,443
Annual Average	31,814
Minimum	9,692
Maximum	48,797

Table 4 Final Effluent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average (avg.) concentration (conc.) milligram per litre (mg/L)	Biochemical Oxygen Demand avg. conc. mg/L	Total Suspended Solids avg. conc. mg/L	Total Phosphorus (TP) avg. conc. mg/L	TP loading kilogram per month
January					
February					
March					
April	1.1	1.2	2.2	0.03	0
May	7.4	7.3	10.5	0.08	4
June					
July					
August					
September					
October					
November	2.6	5.3	14.0	0.13	5
December					
Total					9**
Average	3.7	4.6	8.9	0.08	2
Minimum	1.1	1.2	2.2	0.03	0
Maximum	7.4	7.3	14.0	0.13	5
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	

*Annual Average Concentration

**Total Annual Loading (kg/year)

Table 4 Final Effluent Analyses continued

Month	Total Ammonia Nitrogen average (avg.) concentration (conc.) milligram per litre (mg/L)	Unionized ammonia avg. conc. mg/L	pH minimum	pH maximum	Temperature Degree Celsius avg.
January					
February					
March					
April	0.07	0.00	7.7	8.0	7.6
May	9.94	0.19	7.4	8.3	12.2
June					
July					
August					
September					
October					
November	4.34	0.05	7.7	8.1	7.1
December					
Average	4.78	0.08			9.0
Minimum	0.07	0.00	7.4		7.1
Maximum	9.94	0.19		8.3	12.2
ECA Limit			6.0	9.5	
ECA Objective			6.5	8.0	
Within Compliance			Yes	Yes	
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes	Yes