



# **Sunderland Water Pollution Control Plant 2023 Annual Performance Report**





## **The Regional Municipality of Durham**

### **Sunderland Water Pollution Control Plant 2023 Annual Performance Report**

**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) 2023 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<sup>3</sup>/d) and utilizes a seasonal retention wastewater stabilization lagoon system. The Sunderland WPCP has a service population of approximately 1,581 residents.

##### **Raw Influent**

Wastewater is collected through 9.53 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 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. Additional discharges may be granted by the MECP. 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 contains 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 sampled and analyzed for its chemical and physical composition. Monitoring of the raw wastewater is performed in accordance with the conditions in the ECA. Table 2 Raw Influent Analyses 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 65.1% of its rated capacity and received a maximum daily flow of 700 cubic metres per day (m<sup>3</sup>/d) on March 31, April 1, April 2, April 5, and April 6, 2023. The total treated effluent discharged to the Beaver River in 2023 was calculated to be 103,967 cubic metres (m<sup>3</sup>).

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

In 2019, the Region contacted the MECP after two of the five newly installed groundwater monitoring wells showed elevated ammonia and total kjeldahl nitrogen (TKN) values when compared to historical results from decommissioned wells. The wells are used for the monitoring of groundwater levels and water quality 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 the elevated results are due to a historical release that was not identified until the new wells were installed. In 2022, a third-party consultant was provided with all data collected to date to propose next steps. They proposed further studies to determine if the eastern containment structures of the lagoons could be contributing to the elevated ammonia and TKN results. The Region examined its operations at its other existing lagoons in Cannington. In the case of Cannington, a partial clean out of the lagoon around the influent inlet pipe was conducted. Sampling of the monitoring wells around the lagoon revealed that levels of ammonia and TKN decreased after the partial clean out. Based on the success in Cannington, a partial clean out of the inlet area of the Sunderland facultative lagoon was carried out in October 2022. Monthly sampling of the monitoring wells has been conducted and no visible trends have been observed in the upgradient wells since the clean out in 2022. Lagoon well 3 is located downgradient from the facultative lagoon and has shown increasing total ammonia, TKN, and BOD. Lagoon well 2 is located downgradient from the exfiltration lagoon and has shown a downward trend in total ammonia and TKN and an upward trend for total phosphorous. Further investigation will continue and include dye testing the sewer from the sanitary sewer pumping station to the lagoon.

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

No maintenance was performed on major equipment during the reporting period.



**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. Temperature and pH are monitored in the field, all other routine process control tests are performed at the Lake Simcoe WPCP laboratory in Beaverton.

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

Calibration of the influent flow meter located at River Street Sanitary Sewage Pumping Station was conducted on June 29 and November 30, 2023.

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 sludge during the reporting period.

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

The Region strives to achieve the best effluent quality at all times consistently remaining well below ECA limits:

- The maximum pH objective of 8.0 was exceeded in 5 of 9 samples (55.6%). pH is monitored three times per week to ensure values are within compliance.

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

All complaints received from the public are administered and tracked through a central database. No complaints were received in 2023.

**i) Summary of all By-pass, spill or abnormal discharge;**

No by-passes, spills or abnormal discharges occurred during the reporting period.

**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 September 21, 2023.



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**Table 1 Raw Influent Flows**

Month	Total Flow to Plant* cubic metre (m <sup>3</sup> )	Average Daily Flow cubic metre per day (m <sup>3</sup> /d)	Maximum Daily Flow m <sup>3</sup> /d
January	14,519	468	593
February	13,056	466	549
March	15,326	494	700
April	16,807	560	700
May	13,982	451	509
June	12,282	409	584
July	12,349	398	419
August	11,353	366	447
September	9,832	328	377
October	9,672	312	367
November	9,365	312	346
December	11,616	375	568
Total	150,159		
Annual Average	12,513	411	
Minimum	9,365		
Maximum	16,807		700
ECA Limit		632**	
Met Compliance		Yes	

\*Metered at River Street Pumping Station

\*\*Annual average



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**Table 2 Raw Influent Analyses**

Month	Carbonaceous Biochemical Oxygen Demand average (avg.) concentration (conc.) milligrams per litre (mg/L)	Biochemical Oxygen Demand avg. conc. mg/L	Total Suspended Solids avg. conc. mg/L	Total Phosphorous avg. conc. mg/L
January	104	140	180	4.5
February	142	209	200	5.0
March	109	157	183	4.7
April	85	103	150	3.5
May	151	200	350	5.0
June	116	122	217	5.4
July	146	161	237	5.8
August	129	185	273	6.3
September	124	189	292	6.1
October	198	205	358	6.9
November	161	232	438	6.9
December	175	214	231	6.1
Average	137	176	259	5.5
Minimum	85	103	150	3.5
Maximum	198	232	438	6.9
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



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**Table 2 Raw Influent Analyses continued**

Month	Total Ammonia Nitrogen average (avg.) concentration milligrams per litre	pH minimum	pH maximum	Temperature Degree Celsius avg.
January	24.3	8.1	8.2	11.0
February	26.0	7.9	8.4	9.6
March	24.6	8.1	8.3	9.2
April	21.2	8.0	8.1	9.6
May	26.7	8.0	8.5	11.8
June	29.8	8.5	8.6	14.3
July	35.0	8.0	8.5	15.8
August	37.0	8.1	8.2	16.8
September	33.0	8.1	8.2	17.6
October	40.3	8.1	8.3	16.2
November	38.3	8.2	8.3	14.3
December	34.3	8.1	8.3	13.1
Average	30.9			
Minimum	21.2	7.9		9.2
Maximum	40.3		8.6	17.6
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



Table 3 Calculated Effluent Flows

Month	Effluent Flow cubic metres
January	
February	
March	
April	
May	49,405
June	
July	
August	
September	
October	
November	54,562
December	
Total	103,967
Annual Average	51,984
Minimum	49,405
Maximum	54,562





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**Table 4 Final Effluent Analyses**

Month	Carbonaceous Biochemical Oxygen Demand average (avg.) concentration (conc.) milligrams per litre (mg/L)	Biochemical Oxygen Demand avg. conc. mg/L	Total Suspended Solids avg. conc. mg/L	Total Phosphorous (TP) avg. conc. mg/L	TP loading kilogram per month
January					
February					
March					
April					
May	4.0	4.5	6.6	0.09	4
June					
July					
August					
September					
October					
November	1.0	3.4	5.9	0.06	3
December					
Annual Loading					7**
Average	2.5	4.0	6.3	0.08*	
Minimum	1.0	3.4	5.9		
Maximum	4.0	4.5	6.6		
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, kilogram per year (kg/year)



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**Table 4 Final Effluent Analyses continued**

Month	Total Ammonia Nitrogen average (avg.) concentration (conc.) milligrams per litre (mg/L)	Unionized ammonia avg. conc. mg/L	pH minimum	pH maximum	Temperature Degree Celsius avg.
January					
February					
March					
April					
May	12.84	0.27	7.3	8.2	15.5
June					
July					
August					
September					
October					
November	1.55	0.03	8.0	8.2	5.6
December					
Average	7.20	0.15			10.6
Minimum	1.55	0.03	7.3		5.6
Maximum	12.84	0.27		8.2	15.5
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