



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

March 31, 2020

Mark Smith  
733 Exeter Road  
London, ON N6E 1L3

Attention: Mr. Smith

**RE: Annual Report 2019**  
**Glencoe Wastewater Treatment Plant**

The Ontario Clean Water Agency is the Operating Authority for the Glencoe Wastewater Treatment Plant on behalf of Municipality of Southwest Middlesex. The system is operated under Environmental Compliance Approval 8720-9NFLAB. Please find attached the 2019 Annual Report for the Glencoe Wastewater Treatment Plant.

Feel free to contact me should you require any additional information regarding the report. I can be reached at 519-312-0847.

Sincerely,

A handwritten signature in black ink, appearing to read 'TLT'.

Terri-Lynn Thomson  
Process and Compliance Technician  
Ontario Clean Water Agency

c.c. Greg Storms, Municipality of Southwest Middlesex  
Dale LeBritton, OCWA's Regional Hub Manager  
Sam Smith, OCWA's Senior Operations Manager  
Cindy Sigurdson, OCWA's Safety, Process and Compliance Manager

**Glencoe Wastewater Treatment Plant**

**2019 ANNUAL REPORT  
January 1 to December 31, 2019**

**MUNICIPALITY OF SOUTHWEST MIDDLESEX**

**Environmental Compliance Approval  
8720-9NFLAB**

Prepared by:



**Ontario Clean Water Agency  
Agence Ontarienne Des Eaux**

## Table of Contents

Section 1: Overview .....	1
Section 2: Monitoring Data .....	2
Section 3: Operating Problems and Corrective Actions, including Schedule B Modifications. ....	9
Section 4: Maintenance .....	10
Section 5: Effluent Quality Assurance.....	10
Section 6: Calibration and Maintenance.....	10
Section 7: Effluent Quality .....	10
Section 8: Biosolids Management.....	11
Section 9: Community Complaints.....	11
Section 10: Bypass, Spills, and Abnormal Discharges .....	11
Section 11: Summary .....	12

Appendix A: Analytical Data

## **Section 1: Overview**

The Glencoe Wastewater Treatment Plant (WWTP) operated under several Environmental Compliance Approvals in 2019, see table below.

<b>Environmental Compliance Approval #</b>	<b>Date of Issue</b>	<b>Area which it applies</b>	<b>Status of ECA</b>
<b>8720-9NFLAB</b>	May 26, 2016	WWTP	Current
<b>6996-8B9PJS</b>	November 30, 2010	Lagoon and new WWTP	Revoked May 26, 2016
<b>3-0062-94-006</b>	March 1, 1994	Alum System at Victoria St. PS	Current
<b>3-1154-92-006</b>	September 30, 1992	South St. PS	Current
<b>3300-7NKKP2</b>	January 27, 2009	Victoria St. PS	Revoked May 26, 2016

### **Collection System**

The gravity sewers collect the raw sewage into pump stations located in the Village of Glencoe. The South Street Pumping Station receives sewage and pumps to the Victoria Street Pumping Station. Victoria Street Pumping Station is equipped with a generator to provide backup power. Alum is also dosed at Victoria pump station. The 8" forcemain from Victoria Street Pumping Station leads to the Glencoe Lagoon. Industrial Road Pumping Station pumps to the Victoria Street forcemain to the lagoon. This Pumping Station also has back up power.

### **Wastewater Treatment Plant**

The flow from the 8" forcemain is metered and the raw sewage is then directed to the aerated lagoon. The existing lagoon was converted to a partially mixed aerated lagoon with three aeration zones separated by floating baffles. The three blowers provide air to the fine bubble diffusers in these aeration zones. The effluent from the aerated lagoon enters the Submerged Attached Growth Reactor (SAGR) system.

The SAGR system is designed primarily for nitrification (ammonia removal). It consists of an aerated gravel bed which accepts flow from the aerated lagoon. The gravel bed is covered with a layer of mulch for insulation. The gravel acts as media for the nitrifying bacteria to grow on, these bacteria convert the ammonia to nitrite and ultimately nitrate.

The effluent from the SAGR system flows by gravity to the flocculation tanks. There is an alum injection point and polymer injection point prior to the flocculation tanks. A static mixer is provided prior to the flocculation tanks to aid in the production of floc. The flocculation tanks contain two variable speed mixers. The effluent then flows by gravity to the clarifier where the floc settles. The sludge produced is pumped to the non-aerated lagoon for storage and digestion. This lagoon can be decanted into the aerated lagoon for processing through the plant.

The effluent from the clarifier is discharged to one of two disc filters. These are automatically backwashed. The reject water from the backwash is pumped to the non-aerated lagoon for processing.

From the filters, the effluent travels through the Parshall Flume for flow monitoring and discharged to Newbiggen Creek.

## **Section 2: Monitoring Data**

### **Sampling and Testing**

All samples are collected and tested as per the Environmental Compliance Approval requirements.

Raw sewage is sampled monthly and tested for BOD<sub>5</sub>, Total Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen. The raw samples are collected as a composite sample.

The WWTP effluent is sampled for CBOD<sub>5</sub>, Total Suspended Solids, Total Phosphorus, and Total Ammonia Nitrogen on a weekly basis as a composite sample. On a monthly basis a composite sample is collected and tested for Nitrates and Nitrites. A grab sample is also taken on a weekly basis and tested for E. coli, pH and Temperature. The requirement for Acute Lethality of Rainbow Trout and Daphnia Magna on a quarterly basis was terminated as of February 2014 by the MECP London District Office.

In 2019, all chemical and microbiological sample analyses were conducted by SGS Lakefield Research. Temperature, pH and dissolved oxygen were conducted by the operators of the plant.

### **Raw Sewage Quality**

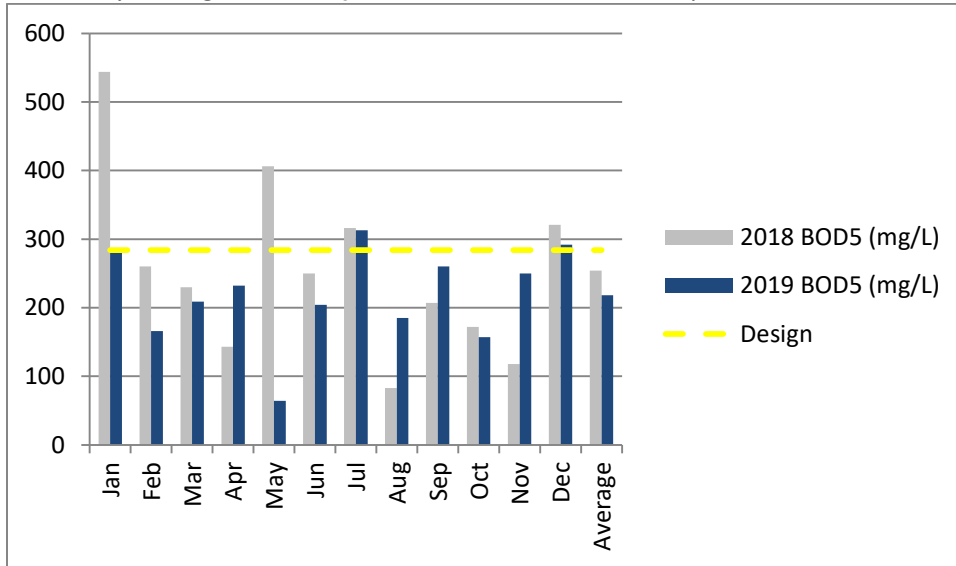
The following table represents the raw sewage (influent) quality, taken on a monthly basis. See Appendix A for more detailed analytical data.

Table 1. Raw sewage annual average concentrations.

<b>Parameter</b>	<b>Annual Average Concentration (mg/L)</b>
<b>BOD<sub>5</sub></b>	218
<b>TSS</b>	179
<b>TP</b>	4.3
<b>TKN</b>	43.6

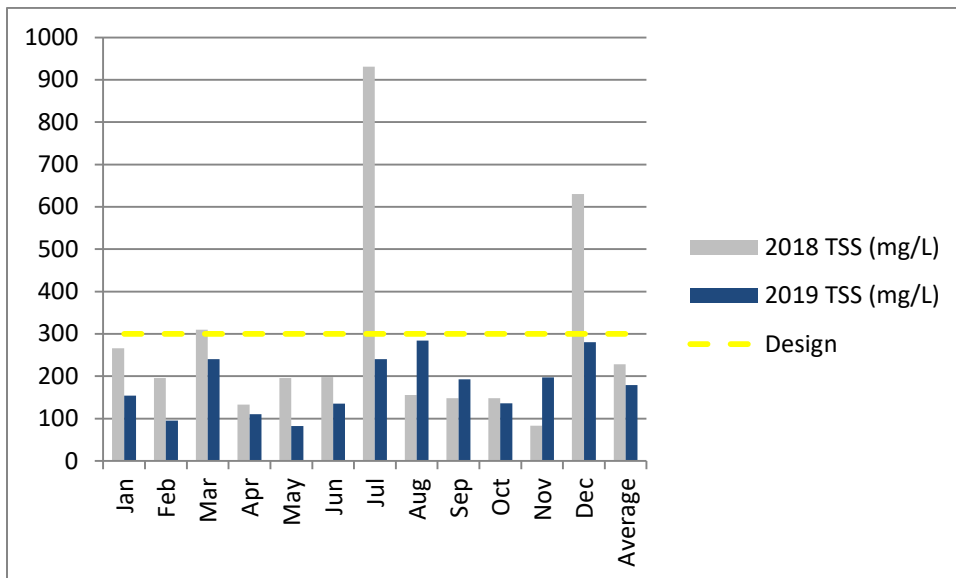
The annual average raw sewage BOD<sub>5</sub> concentration to the plant was 218mg/L, which is a 14% decrease from 2018 (refer to Chart 1). The average BOD<sub>5</sub> loading to the plant was 150.9kg/d for 2019. There were two months in 2019 where the design criteria were exceeded. Despite these exceedances there were no monthly average effluent limit exceedances as a result.

Chart 1. Monthly average raw BOD<sub>5</sub> concentration for 2019 compared to 2018.



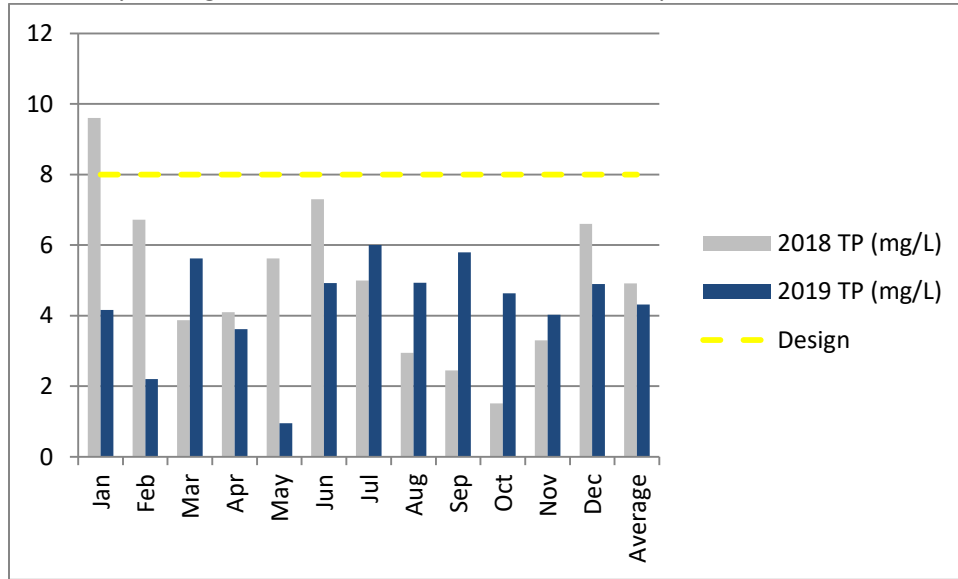
The annual average raw sewage Total Suspended Solids (TSS) concentration to the plant was 178.8mg/L, which is a 22% decrease from 2018 (refer to Chart 2). The average TSS loading to the plant was 123.8kg/d for 2019. There were no months where the design criteria was exceeded in 2019.

Chart 2. Monthly average raw TSS concentration for 2019 compared to 2018.



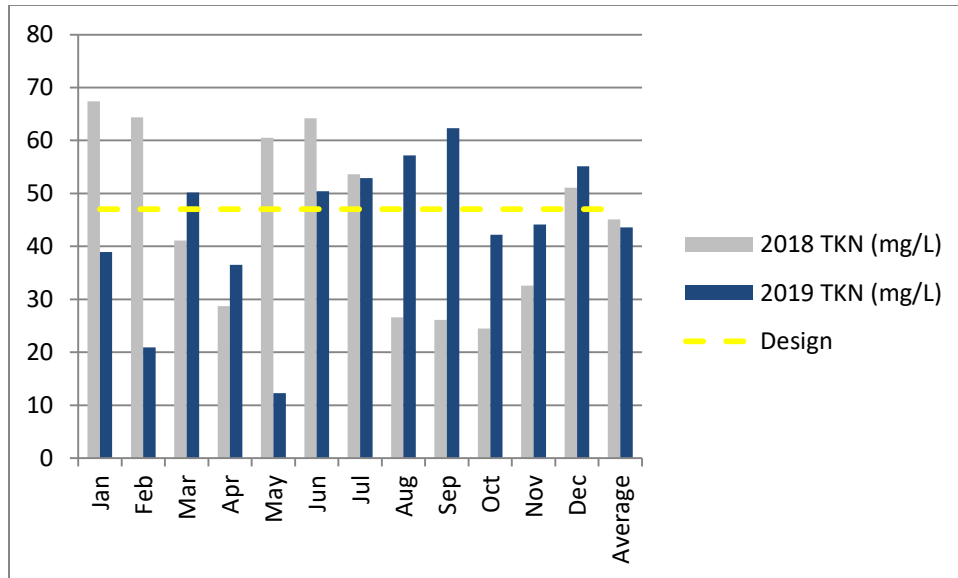
The annual average raw sewage Total Phosphorus (TP) concentration to the plant was 4.3mg/L, which is a 12.3% decrease from 2018 (refer to Chart 3). The average TP loading to the plant was 2.98kg/d for 2019. There were no months where the design criteria was exceeded in 2019.

Chart 3. Monthly average raw TP concentration for 2018 compared to 2019.



The annual average raw sewage Total Kjeldahl Nitrogen (TKN) concentration to the plant was 43.6mg/L, which is a 3.3% decrease from 2018 (refer to Chart 4). The average TKN loading to the plant was 30.2kg/d for 2019. There were six months where the design criteria was exceeded in 2019. Despite these exceedances there were no monthly average effluent limit exceedances as a result.

Chart 4. Monthly average raw TKN concentration for 2019 compared to 2018.



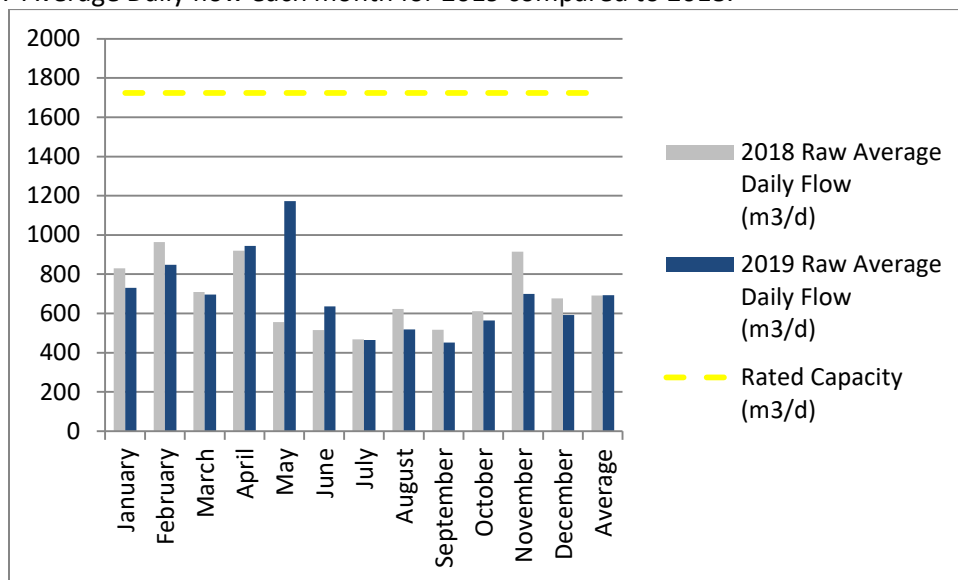
Overall, the plant has operated well with only no non-compliances. These parameters will continue to be monitored to ensure the plant can adequately treat the raw wastewater to the objectives and limits identified in the ECA.

### Flows

Detailed monthly flow information is summarized in Appendix A.

The raw flow total to the plant was 252,599m<sup>3</sup>, which corresponds to a 0.34% increase from the 2018 raw flow volume. The daily average raw flow was 692m<sup>3</sup>/day. Refer to Chart 5 for the average daily flow per month.

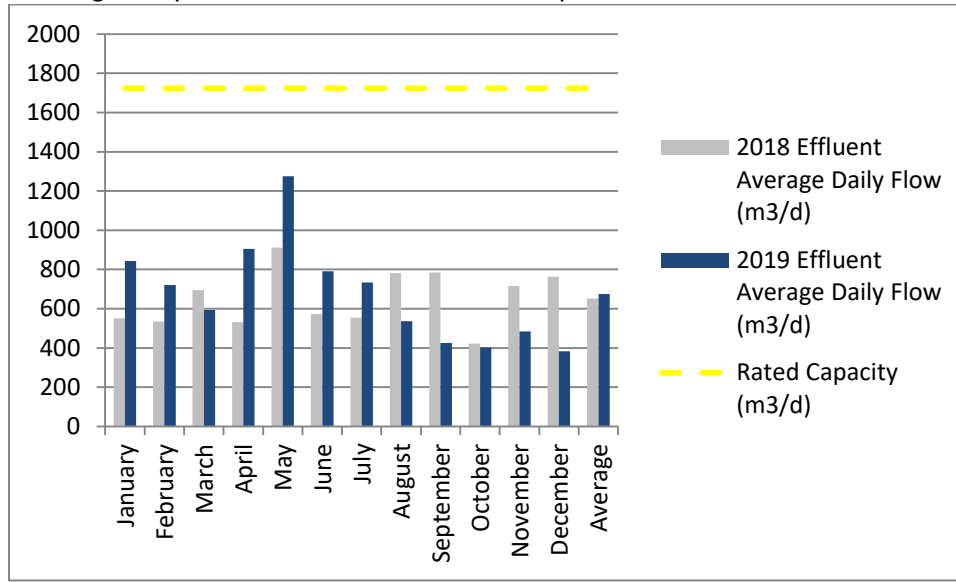
Chart 5. Average Daily flow each month for 2019 compared to 2018.





The effluent flow total discharged from the plant was 232,466m<sup>3</sup> in 2019. The daily average effluent flow was 636.89m<sup>3</sup>/day, this corresponds to a 3.5% increase from 2018. Refer to Chart 6 for the average daily flow per month. The effluent flow is controlled by the operator based on effluent quality and level in the lagoon.

Chart 6. Average Daily flow each month for 2019 compared to 2018.



### Effluent Limits

Detailed analytical data is provided in Appendix A for the WWTP effluent. The following table summarizes the monthly average concentrations and annual average loadings compared to the Environmental Compliance Approval Limits.

Table 2. Monthly average effluent results and the annual average loadings compared to the effluent limits prescribed in the Environmental Compliance Approval.

Parameter	Monthly Average Effluent Limit (mg/L)	Monthly Average Effluent Result Ranges (mg/L)	Annual Average Loading Limit (kg/d)	Annual Average Loading Results (kg/d)
<b>CBOD<sub>5</sub></b>	13.7	<2 - 3	23.6	1.6
<b>TSS</b>	13.7	2.4 – 8	23.6	3.0
<b>TP</b>	0.55	0.04 - 0.49	0.95	0.1
<b>TAN</b>	3.0	<0.1 – 0.54	5.17	0.1
<b>E. coli</b>	200cfu/100mL	2.0 – 5.6		
<b>pH</b>	6-9.5	6.52 – 7.95		

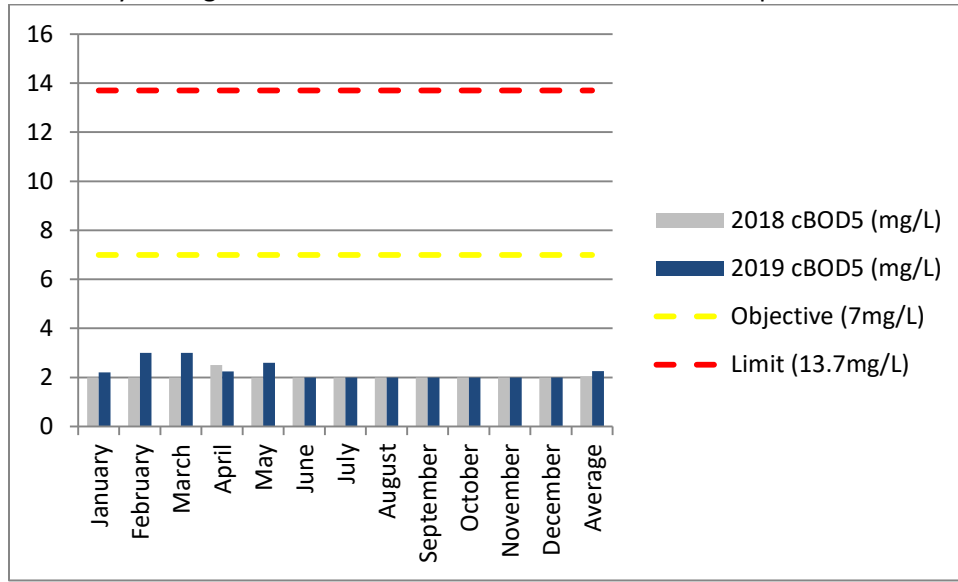
Note: pH range is minimum and maximum readings for the year.

### Discussion on Monitoring Data as Compared to the Effluent Limits

All compliance monthly average limits and annual loadings were met in 2019.

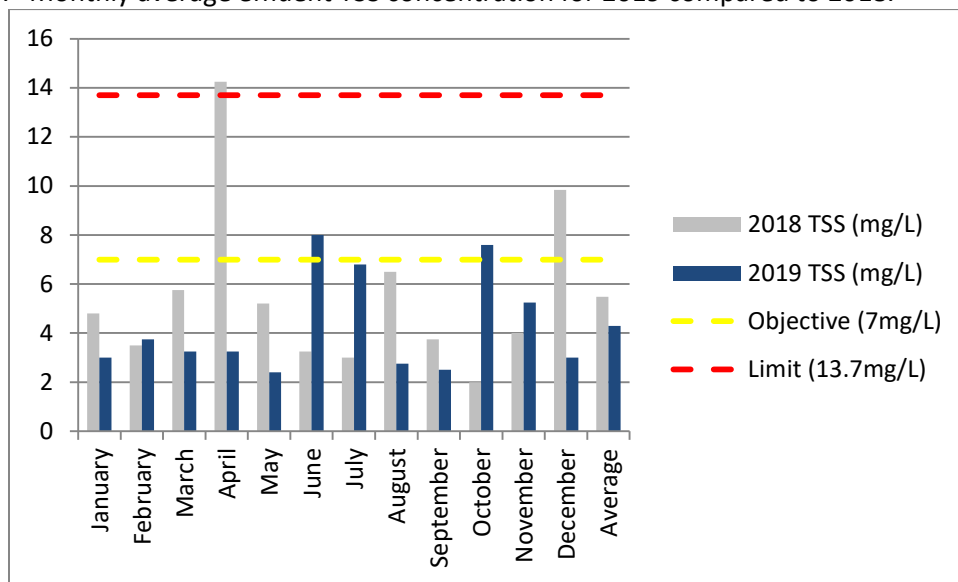
The annual average effluent CBOD<sub>5</sub> concentration was 2.3mg/L, which is a 10.4% increase from 2018 (refer to Chart 7). The average cBOD<sub>5</sub> loading was 1.6kg/d for 2019. There were no objective or limit exceedances for cBOD in 2019.

Chart 7. Monthly average effluent cBOD<sub>5</sub> concentration for 2019 compared to 2018.



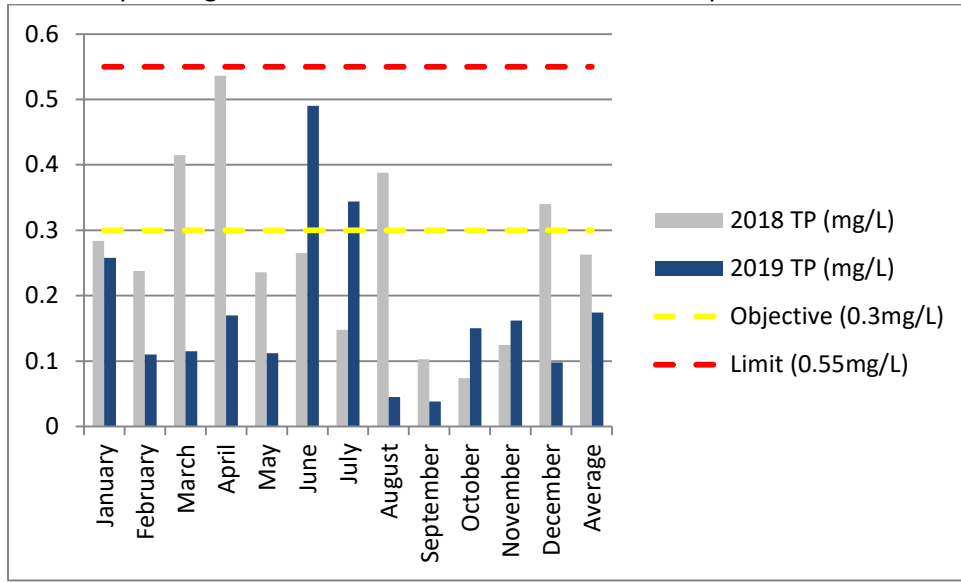
The annual average effluent Total Suspended Solids (TSS) concentration was 4.3mg/L, which is a 21.7% decrease from 2018 (refer to Chart 8). There were objective exceedances in June and October and no limit exceedances in 2019, refer to Section 7. The average TSS loading was 3.0kg/d for 2019.

Chart 8. Monthly average effluent TSS concentration for 2019 compared to 2018.



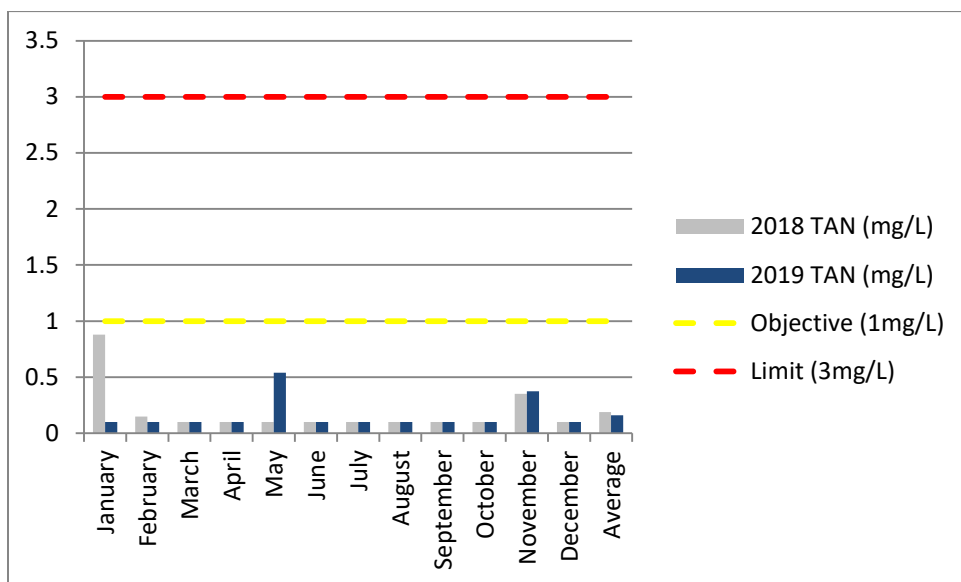
The annual average effluent Total Phosphorus (TP) concentration was 0.17mg/L, which is a 34% decrease from 2018 (refer to Chart 9). The average TP loading was 0.1kg/d for 2019. There were objective exceedances in June and July for 2019, refer to Section 7. There were no limit exceedances for TP in 2019.

Chart 9. Monthly average effluent TP concentration for 2019 compared to 2018.



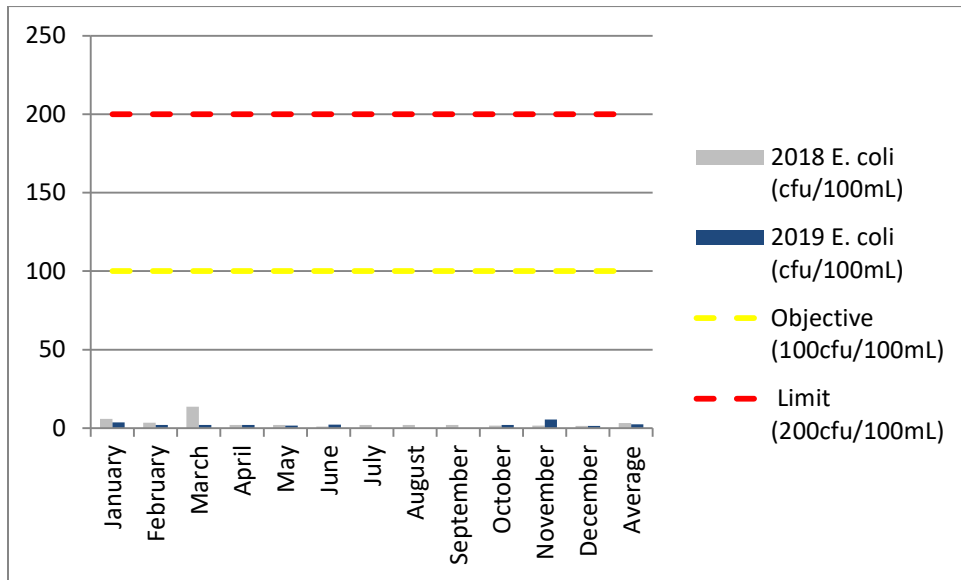
The annual average effluent Total Ammonia Nitrogen (TAN) concentration was 0.16mg/L, which is a 16% decrease from 2018 (refer to Chart 10). The average TAN loading was 0.1kg/d for 2019. There were no objective or limit exceedances for TAN in 2019.

Chart 10. Monthly average effluent TAN concentration for 2019 compared to 2018.



The annual geometric mean effluent E. coli concentration was 2.5cfu/100mL, which is a decrease of 22% from 2018 (refer to Chart 11). There were no objective or limit exceedances for E. coli in 2019.

Chart 11. Monthly geometric mean effluent E. coli concentration for 2019 compared to 2018.



**Section 3: Operating Problems and Corrective Actions, including Schedule B Modifications.**

Typically inflow and infiltration issues have been noted in the collection system, which causes excessive flow at the pump stations during wet weather conditions. In 2019 there was not a need for vacuum trucks but the station needed to be monitored during high flow times.

Due excess flow in June, July and October issues arose with our alum/polymer dosages causing an increase in suspended solids and Phosphorus in the effluent that did not meet ECA Objectives. Adjustments were made to the polymer and alum dose.

There have been ongoing issues with reaching capacity at the WWTP while maintaining compliance with the effluent limits. An additional alum feed point was re-instated on the raw flow at Victoria Street Pump Station (ECA 3-0062-94-006).

There have been no modifications under Schedule B, Section 3 in 2019.

## **Section 4: Maintenance**

Regular scheduled monthly preventative maintenance is assigned and monitored using the Workplace Management System (WMS) program. The following is a summary of maintenance performed other than WMS work orders:

- Replaced Wasting pump check valve
- Replaced poly mixer
- Repaired exhaust fans
- New Alum system installed at Victoria St Pump Station
- Main Pump Station pump switch repairs
- Disk Filter #1 pump repairs
- Gearbox repairs
- Seals replaced on disk filters
- Disk Filter #2 repairs
- Carrier water pump repairs
- Repaired/Replaced 3 West Lagoon aerators

## **Section 5: Effluent Quality Assurance**

Effluent quality assurance is evaluated by monitoring parameters within the lagoon cells, SAGR influent, SAGR effluent and the effluent discharge. In house tests include: dissolved oxygen, pH, temperature, total phosphorus, total ammonia nitrogen, alkalinity, and total suspended solids.

## **Section 6: Calibration and Maintenance**

Annual maintenance on the generators at the Pump Stations was completed in July by Albert's Generator Service. Flow Metrix Technical Services Inc. performed the annual calibration on the flow meter in April.

In house meters for pH and dissolved oxygen are calibrated by OCWA operators as per manufacturer's instructions.

## **Section 7: Effluent Quality**

### **Effluent Objectives**

Detailed analytical data is provided in the excel spreadsheet in Appendix A. The following table summarizes the monthly average concentration ranges.

Table 3. Monthly effluent ranges compared to the objectives set out in the Environmental Compliance Approval.

Parameter	Effluent Objective	Effluent Monthly Average Ranges
-----------	--------------------	---------------------------------

	(mg/L)	(mg/L)
<b>CBOD<sub>5</sub></b>	<b>7</b>	<2 - 3
<b>TSS</b>	<b>7</b>	2.4 – 8
<b>TP</b>	<b>0.3</b>	0.04 - 0.49
<b>TAN</b>	<b>1.0</b>	<0.1 – 0.54
<b>E. coli</b>	<b>100cfu/100mL</b>	2.0 – 5.6
<b>pH</b>	<b>6.5-8.5</b>	6.52 – 7.95

In 2019, there were objectives exceeded in the effluent of the WWTP. Refer to Table 4 for a list of objectives and possible cause.

Table 4. Objectives that were exceeded in 2019.

Date	Parameter	Results	Comment/Cause
<b>June 2019</b>	TSS	8	Increase in flows, adjusting alum and Polymer dosage
<b>June 2019</b>	TP	0.49	Increase in flows, adjusting alum and Polymer dosage
<b>July 2019</b>	TP	0.34	Increase in flows, adjusting alum dosage
<b>October 2019</b>	TSS	7.6	Increase in flows, adjusting alum dosage

### **Discussion on Effluent Objectives**

There have been 4 objectives that have been exceeded with the operation of the WWTP in 2019, compared to 7 in 2018. The plant is mostly having issues with meeting total phosphorus and suspended solids objective; however, there have been improvements since 2018. As mentioned in Section 3, a pilot study was initiated to determine whether a change in alum dosing point will provide more effective treatment, in 2019 the permanent dosing point at Victoria pump station was re-instated. This has shown to have improvements since 2018.

### **Section 8: Biosolids Management**

The sludge from the clarifier is directed to the east lagoon where it is allowed to settle at the bottom of the lagoon. The amount of sludge is currently manageable, and will not require dredging at this time. The estimated quantity of sludge transferred back to the lagoon in 2019 was 21,750m<sup>3</sup>. It is estimated that a similar amount, 22,000m<sup>3</sup>, will be transferred in 2020.

### **Section 9: Community Complaints**

There was no community complaints received for the Glencoe Wastewater Treatment Plant in 2019.

### **Section 10: Bypass, Spills, and Abnormal Discharges**

There was no bypass, spills or abnormal discharge events for the Glencoe Wastewater Treatment Plant for the reporting period.

## **Section 11: Summary**

The Glencoe Wastewater Treatment Plant provided effective treatment meeting compliance limit criteria's. A secondary alum dosing point have shown to have a greater effect on effluent results while maintaining higher flows that were unable to be reached the previous year. There are ongoing issues with meeting regulatory objectives at high flows, which are being addressed and will continue to be addressed in to 2020.

## **APPENDIX A**

### **Analytical Data**



		Objectives	Compliance Limits	Loading Limit	Jan	Feb	March	April	May	June	July	August	September	October	November	December	Summary	Loading
Raw Flow	Avg				729.94	847.79	696.48	943.67	1172.16	636.47	465.55	518.42	451.57	564.52	700.2	591.45	692.02	
	Max	1723			1423	1624	1470	2290	8778	930	589	1149	541	1752	1752	721	8778	
	Min				521	541	513	566	577	497	397	281	352	425	517	488	281	
	Sum				22628	23738	21591	28310	36337	19094	14432	16070.98	13547	17500	21006	18335	252588.98	
Raw Samples	BOD5 (mg/L)	284			284	166	209	232	64	204	313	185	260	157	250	292	218.0	150.9
	TSS (mg/L)	300			154	95	240	110	82	135	240	284	193	136	197	280	178.8	123.8
	TP (mg/L)	8			4.16	2.2	5.62	3.62	0.95	4.92	6	4.93	5.79	4.63	4.03	4.9	4.31	2.98
	TKN (mg/L)	47			38.9	20.9	50.2	36.5	12.3	50.4	52.9	57.2	62.3	42.2	44.1	55.1	43.6	30.2
Effluent Flow	Avg		1723		842.94	721.71	594.39	672.14	1056.08	790.53	734.23	537.35	425.87	403.54	483.87	382.61	636.89	
	Max	1723			1072	842	838	967	967	1582.33	997	1257	938	565.8	597	938	520	
	Min				586	488	460	440	235	485	407	324	316	56.8	312	270	56.8	
	Sum				26131.28	20208	18426.2	20164.28	32738.4	23716	22761.17	16658	12776	12509.8	14516	11861	232466.13	
Effluent CBOD5 (mg/L)	Avg	7	13.7	23.6	< 2.2	< 3	< 3	< 2.25	< 2.6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2.245	1.6
	Max				3	6	4	3	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	6	
	Min				< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
Effluent TSS (mg/L)	Avg	7	13.7	23.6	< 3	< 3.75	< 3.25	< 3.25	< 2.4	< 8	< 6.8	< 2.75	< 2.5	< 7.6	< 5.25	< 3	< 4.321	3.0
	Max				4	5	5	7	3	24	13	5	4	14	6	5	24	
	Min				< 2	< 3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 4	< 2	< 2	
Effluent TP (mg/L)	Avg	0.3	0.55	0.95	< 0.258	< 0.11	< 0.115	< 0.17	< 0.112	< 0.49	< 0.344	< 0.045	< 0.038	< 0.15	< 0.162	< 0.098	< 0.176	0.1
	Max				1.08	0.22	0.3	0.44	0.16	1.46	0.89	0.09	0.06	0.31	0.32	0.23	1.46	
	Min				< 0.03	< 0.05	< 0.03	< 0.06	< 0.08	< 0.06	< 0.04	< 0.03	< 0.03	< 0.03	< 0.07	< 0.03	< 0.03	
Effluent TAN (mg/L)	Avg	1	3	5.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.54	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.375	< 0.1	< 0.162	0.1
	Max				< 0.1	< 0.1	< 0.1	< 0.1	< 1.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1.2	< 0.1	< 1.3	
	Min				< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Eff. NO3 (mg/L)	Avg			7.96	11.1	11.7	11.8	6.5	10.3	7.49	4.68	5.48	4.66	9.65	5.79	8.093		
Eff. NO2 (mg/L)	Avg			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.13	< 0.03	< 0.038	
Eff. E. Coli (cfu/100mL)	Geo Mean	100	200		3.744	2	2	2	1.741	2.213	1.516	1.414	2	2	5.623	1.516	2.314	
	Max				46	< 2	< 2	< 2	< 2	< 6	< 2	< 2	< 2	< 2	125	< 2	125	
	Min				< 2	< 2	< 2	< 2	0	0	0	0	< 2	< 2	< 2	0	0	
Effluent DO (mg/L)	Avg				12.905	12.26	12.107	10.184	8.169	8.837	8.094	8.3	8.264	9.054	9.836	10.597	9.746	
	Max				13.73	12.52	13.14	11.06	8.93	9.1	8.22	8.54	8.78	9.98	11.24	10.99	13.73	
	Min				12.21	12.01	11.52	9.19	6.8	8.43	7.95	8.04	6.17	7.94	8.26	9.89	6.17	
Effluent pH	Avg				7.74	7.296	7.273	7.19	7.519	7.522	7.372	7.149	7.011	7.121	7.536	7.591	7.341	
	Max	8.5	9.5		7.89	7.95	7.44	7.31	7.79	7.74	7.7	7.41	7.38	7.41	7.84	7.8	7.95	
	Min	6.5	6		7.63	7.09	6.98	6.8	7.25	7.23	7.15	6.68	6.62	6.52	6.98	7.22	6.52	
Effluent Temp. (oC)	Avg				1.775	2.643	2.767	7.438	15.414	18.8	25.63	24.133	21.738	17.238	9.189	6.033	13.33	
	Max				3.3	3.2	4	10.6	17.5	19.7	27.1	28.6	23.2	21	13	8.5	28.6	
	Min				0.9	2	0.3	4	12.9	17.5	23	18.5	20.4	13.8	6.1	4.5	0.3	
Eff. Unionized Amm. (mg/L)	Avg				0.001	0	0.000	0	0.006	0.002	0.001	0.001	0.001	0	0.002	0.001	0.001	
	Max				0.001	0	0.000	0	0.011	0.002	0.002	0.001	0.001	0	0.006	0.001	0.011	
	Min				0.001	0	0.000	0	0.001	0.002	0.001	0	0.000	0	0.001	0	0.000	