Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Stephan Burt
District Manager
Hamilton District Office
Ministry of the Environment, Conservation and Parks

March 31, 2023

Re: 2022 Annual Performance Report for the Simcoe Wastewater Treatment Facility

Attached is the 2022 Annual Performance Report for the Simcoe Wastewater Treatment Facility located at 16 Oakwood Avenue in Simcoe, Ontario, Norfolk County. This report has been completed in accordance with:

- Section 11(4)(a) through (n) cited in Environmental Compliance Approval #5789-BDHNWH issued October 10, 2019 to the Corporation of Norfolk County.

This report was prepared by the Ontario Clean Water Agency on behalf of Norfolk County based on the information contained in our records. The report covers the period from January 1, 2022 to December 31, 2022.

Sincerely,

Allison Billingsley
Process and Compliance Technician
Ontario Clean Water Agency-Norfolk Cluster

Cc:
Stephanie Davis – Director, Environmental Services, Norfolk County
Shaun Earls - Manager, Water & Wastewater Compliance, Norfolk County
Karl VanHeyst - Water Inspector, MECP
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Contents

Introduction:

The Simcoe Wastewater Treatment Facility (WWTF) is a conventional activated sludge facility with a rated capacity of 15,400 m^3/d. Simcoe also has three pumping stations. The overall facility comprises of the following key components:

- A headworks and preliminary treatment facility comprising screening raw sewage pumping and grit removal;
- A hauled waste receiving facility;
- A leachate receiving facility;
- Two liquid trains called plant 1 and plant 2 with individual capacities of 2,671 m^3/d and 12,729 m^3/d respectively;
- Common chlorination/dechlorination based disinfection system;
- Common tertiary filtration system; and,
  Anaerobic digestion based sludge stabilization and storage facility.
- Recent Upgrades
- Plant 1 - Old abandoned liquid train called plant 1 was refurbished and recommissioned in 2008 with an individual rated capacity of 2,671 m^3/d.
- Plant 2 - Upgrades including aeration tank concrete repair, reconfiguration of the primary and secondary clarifier flow distribution and replacement of sludge removal mechanisms, completed in 2014.
- Aeration system with new blowers, fine bubble aeration system and DO control.
- Installation of screening and grit removal facilities.
- Addition of dechlorination process to the existing chlorination based disinfection system.

Raw Wastewater Collection

The east half of the pump house contains the dry well and the west half contains the wet well. A full height concrete wall running in the north-south direction divides the two wells. Above the wet well is an electrical equipment room, which houses the Motor Control Centers (MCCs) and Variable Frequency Drives (VFDs). The wet well is a reservoir situated below grade and includes a recessed section that extends underground to the west of the pump house building. Raw sewage enters the west side of the wet well through a 900mm pipe. A vertical steel bar screen in the wet well protects the raw sewage pump suction intakes from large debris. The clear spacing on the bars is 75mm. The bar screen is located across the width of the wet well on the east side of the pit. There are four raw sewage pumps located at the bottom of the pump house dry well. The floor of the dry well is approximately 9.88m below grade. The suction intakes for the pumps extend through the common wall between the wet well and the dry well such that sewage is drawn from the east side of the wet well.

Inlet Works

Primary influent is pumped from the raw sewage pump house and sent through a 400mm forcemain to the influent works, located to the south of the pump house. These works consist of a grit vortex chamber (TEACUP). The grit collection bin is approximately 1m^3 and this bin is emptied twice a week.

Primary Clarification

The degritted wastewater from the influent works flow through a 500mm pipe to the distributing chamber that is situated in the center of the four primary clarifiers. The operator may control the flow from the distributing chamber to each clarifier using a manually operated sluice gate on each clarifier inlet pipe. The primary clarifiers reduce the suspended solids content of the sewage by sedimentation.
The degritted wastewater to each primary clarifier flows from the distributing chamber through a 400mm pipe. The suspended solids with a specific gravity, which is higher than that of the liquid tend to settle to the bottom of the clarifier. The bottom of each clarifier is conical as it slopes toward the center of the tank.
The sludge collection mechanism slowly rotates around the bottom of the tank pushing the settled sediment. The sediment settles to the sludge thickening zone and subsequently into the sludge pocket. The sludge is periodically drawn from the sludge pocket by the raw sludge pumps. The suspended solids with a specific gravity, which is lower than that of the liquid tend to rise to the surface. As the skimmer arm slowly rotates, it sweeps the floating solids toward the periphery of the clarifier around to the scum trough. The solids flow down through the scum trough into the scum pit where it is collected and pumped out by the raw sludge pumps.

Aeration Tanks

Air Diffusion
The primary effluent from the primary clarifiers is collected on the outlet side of the distributing chamber and sent to the aeration tanks through a 750mm pipe. An influent channel distributes the liquid to the four parallel aeration tanks. Influent enters the tanks on the north side and effluent exits the tanks on the south side. Each aeration basin is equipped with fine bubble diffuser and air is supplied by 1 of 3 multi-stage centrifugal blowers powered by 100 HP electric motors.

Secondary Clarification

Ferrous chloride is added to the distribution chamber upstream of the primary clarifiers as well as to the aeration discharge channel. There is one adjacent ferrous chloride storage tanks located east of Plant #2. The capacity of the tank is approximately 20,000 liters. The activated wastewater produced from the aeration process flows into the four secondary clarifiers where most sludge is settled. The solids that settle to the bottom of the secondary clarifier are either returned to the aeration tanks or sent to the primary clarifiers for co-thickening.

Disinfection Phase

Chlorine Contact Chamber
The secondary effluent from the aeration tanks flow through a 750mm pipe and enters the northwest corner of the chlorine contact chamber. The chlorine contact chamber is a square basin containing 5 baffles which is designed to slow flow and prevent short circuiting of the tank to allow for a minimum of 30 minutes of chlorine contact time. A chemical feed pipe in the chlorine room of the chlorination building delivers a dose of 12% hypochlorite solution to the incoming effluent stream at the chamber inlet. The turbulence at the chamber inlet causes the

effluent and hypochlorite to mix. The mixture flows through the tank and finally passes through a 24 in Montana flume flow measuring device.

Sodium Bisulphite
Sodium Bisulphite is stored in a 2,000L chemical storage tank with adequate spill containment. It is dosed at the outlet from the tertiary disk filters by means of a feed pipe along with two (2) 5.5L/h metering pumps (one standby).

Tertiary Treatment

Tertiary treatment is provided by two (2) automatic disk filters which run together starting up based on the level in the tank and rotating to introduce clean filter media to the effluent. A backwash pump and spray bar are used to clean the filters as they rotate to backwash any captured solids. Solids are then returned to the headworks of the facility.

Anaerobic Digestion Facility

Primary Digester
The raw sludge removed in the primary clarification process is sent through a 200mm raw sludge line from the primary clarifiers to the primary digester. The primary digester has a fixed steel dome and a holding capacity of 2,507m^3. The sludge entering the primary digester is heated to an internal temperature of 35ºC. This temperature must be maintained for the process to work. The primary digester uses a gas mixing system. The compressor supplying the compressed air to the lances is located in the compressor room on the second floor of the digester control building. The sludge mixer is operated continuously throughout the year. The gas pressure in the digester is controlled using pressure switches. These switches indicate if the gas pressure is either too high or too low. The gas mixing system will shut down if either condition is detected.

Secondary Digesters
The content in the primary digester will gradually rise and flow into an overflow chamber. The sludge in the chamber will continue to flow by gravity into the secondary digesters for additional thickening of the digested sludge. Flow to each digester is equally distributed. The two secondary digesters each have a floating steel dome and a combined holding capacity of 2,437m3. There is no assisted mixing in the secondary digesters. Sludge is either emptied onto a tanker truck or transferred to the primary digester using the transfer pump. The digested sludge from the two secondary digesters are emptied and hauled to the Townsend Lagoons for interim storage or directly land applied to agricultural fields.

Standby Power

The emergency power for the entire plant is supplied from:

SDMO X700UC2 Supplied by GAL Power
4353 L Diesel fuel tank
700KW 1045HP

Plant Facts:

Environmental Compliance Approval	ECA 5789-BDHNWH (issued October 10, 2019)
Rated Capacity	15,400m^3/day
Receiving Water	Lynn River

For 2022, the Simcoe WWTF was operated in accordance with provincial regulations as required in ECA #5789-BDHNWH (ECA) issued October 10, 2019.The following report is presented such that it corresponds with ECA #5789-BDHNWH Section 11(4) (a) through (n).

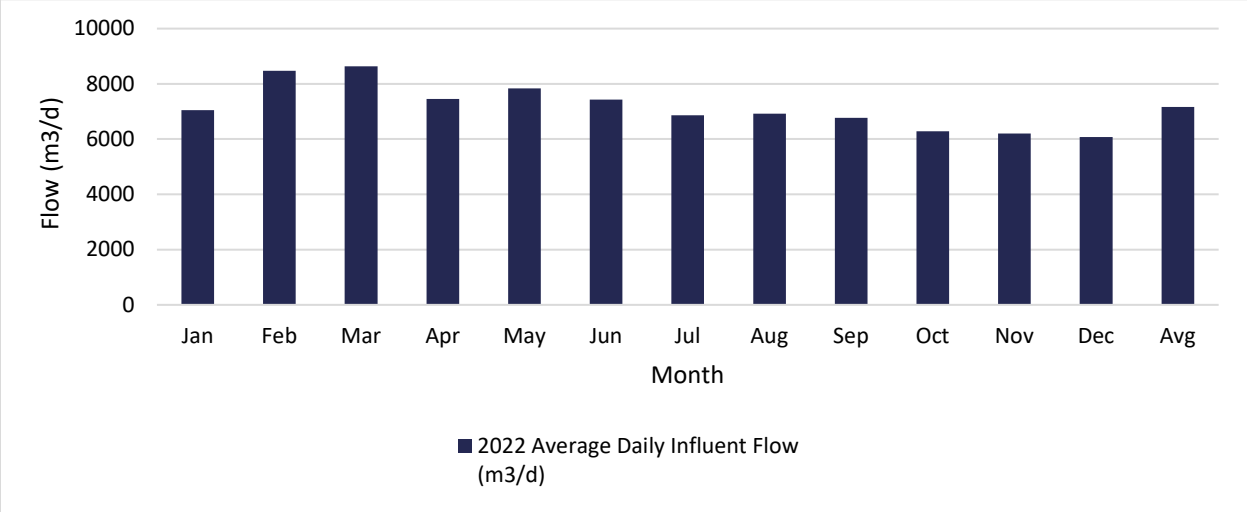
Section A: Influent Monitoring Data

As outlined in ECA#5789-BDHNWH Section 11(4)(a) the following is a summary and interpretation of all influent and imported sewage monitoring data and a review of the historical trend of the sewage characteristics.

(I) Influent Flow Monitoring

The average daily flow of raw wastewater (influent) to the Simcoe WWTF was 7,334m^3/d in 2022. The following Graph 1 shows the average daily influent flows per month for 2022.

Graph 1. Influent average daily flows for 2022

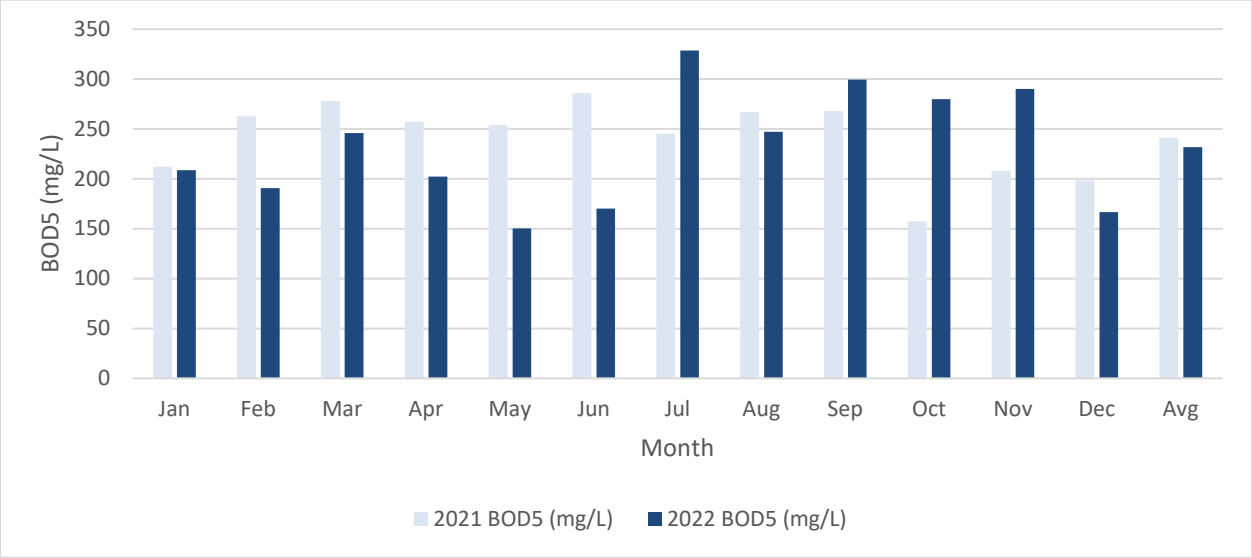


(II) Influent Data

The influent is monitored for BOD_5, total suspended solids, total phosphorus and total kjeldahl nitrogen, at a minimum on a weekly basis by means of a composite sample. Refer to Appendix A for more detailed monthly results.

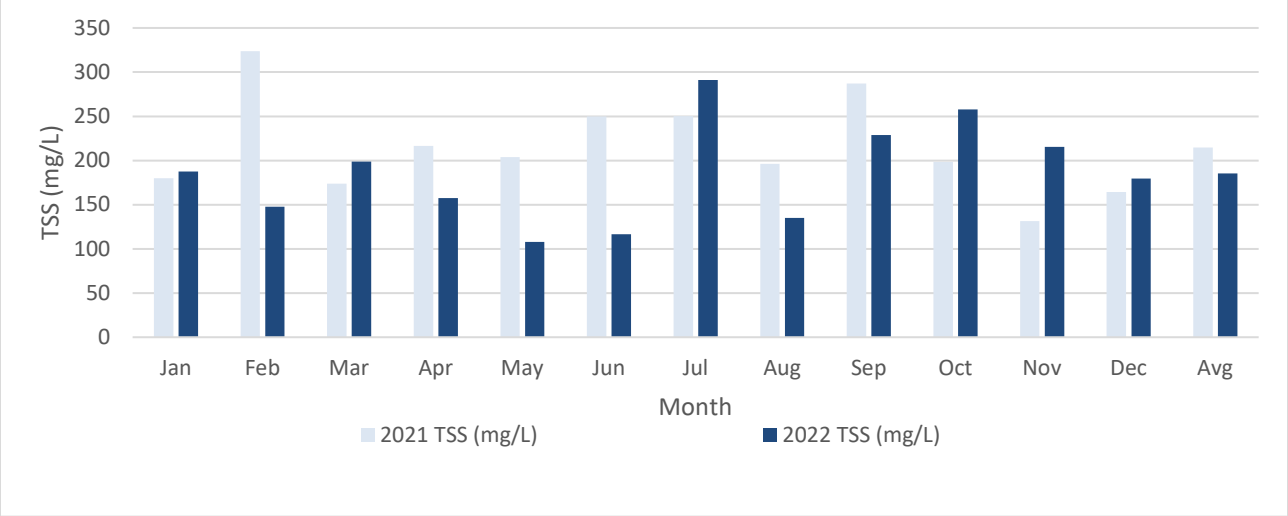
The annual average for influent BOD_5 concentration to the plant was 231.6mg/L. This is a decrease from 2021 by 3.9%. Refer to Graph 2 for a comparison of monthly concentrations in 2022 and 2021.

Graph 2. Influent monthly average concentration of BOD_5 for 2022 compared to 2021.



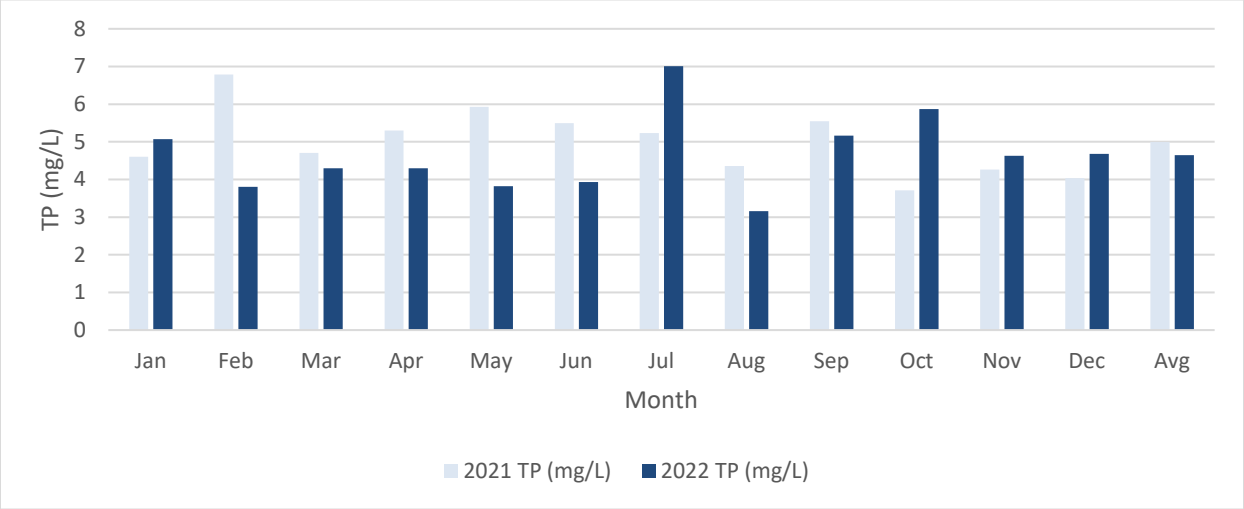
The annual average for influent total suspended solids (TSS) concentration to the plant was 185.3mg/L. This is a decrease from 2021 by 13.6%. Refer to Graph 3 for a comparison of monthly concentrations in 2022 to 2021.

Graph 3. Influent average monthly concentration of TSS for 2022 compared to 2021.



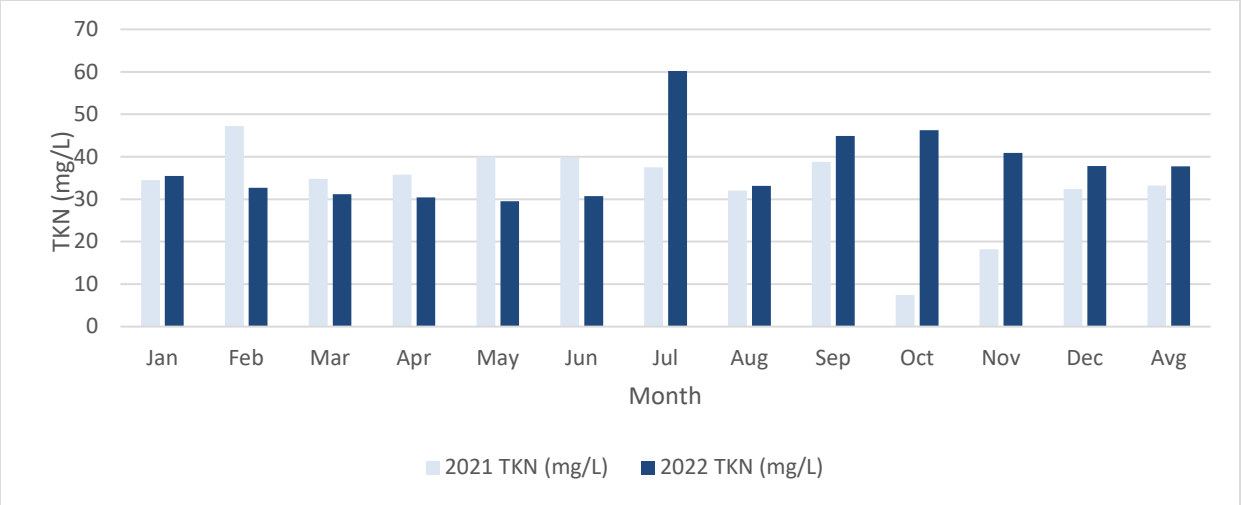
The annual average for influent total phosphorus (TP) concentration to the plant was 4.64mg/L. This is a decrease from 2021 by 7.0%. Refer to Graph 4 for a comparison of monthly concentrations in 2022 to 2021

Graph 4. Influent average monthly concentration of TP for 2022 compared to 2021.



The annual average for influent total kjeldahl nitrogen (TKN) concentration to the plant was 37.8mg/L. This is an increase from 2021 by 13.8%. Refer to Graph 5 for a comparison of monthly concentrations in 2022 to 2021

Graph 5. Influent average monthly concentration of TKN for 2022 compared to 2021.



The influent characteristics have remained fairly consistent for all parameters with BOD_5, TSS and TP decreasing and TKN increasing in 2022 compared to the 2021 data. Influent data is subject to fluctuation as expected with the flow variations that are experienced.

(III) Imported sewage

As required by the ECA, imported sewage (septage) is to be sampled on a monthly basis and tested, at a minimum, for BOD_5, total suspended solids, total phosphorus, total kjeldahl nitrogen, pH and alkalinity. The addition of an imported sewage receiving station is part of the proposed upgrades for the Simcoe WWTF. The Simcoe WWTF received a total of 1,370.65m^3 in 2022 as broken down in Table 1 below.

Table 1. Total Volume of Imported Sewage to the Simcoe WWTF in 2022

Month	Holding Volume (m^3)	Septic Volume (m^3)	Portable Waste Volume (m^3)
January	127.18		
February	164.65	8.71	
March	109.37	11.36	
April	57.15	3.03	
May	129.35		
June	99.47		
July	86.30		2.27
August	166.92		5.34
September	139.29	0.68	0.38
October	45.46	24.60	0.64
November	73.05	64.35	
December	50.72		0.38
Total	**1,248.91**	**112.73**	**9.01**

(IV) Leachate Monitoring

As required by the ECA, Leachate is to be sampled on a quarterly basis. The addition of a leachate receiving station is part of the proposed upgrades for the Simcoe WWTF. The Simcoe WWTF received a total of 38,869.9m^3 in 2022 as shown in Table 2 below.

Table 2. Total Leachate received at the Simcoe WWTF in 2022

Month	Leachate Volume (m^3)
January	2,161.5
February	2,415.9
March	4,461.5
April	3,901.0
May	4,091.5
June	4,159.1
July	4,010.0
August	4,531.6
September	3,066.3

Month	Leachate Volume (m^3)
October	2,282.6
November	2,386.3
December	1,402.6
Total	**38,869.9**

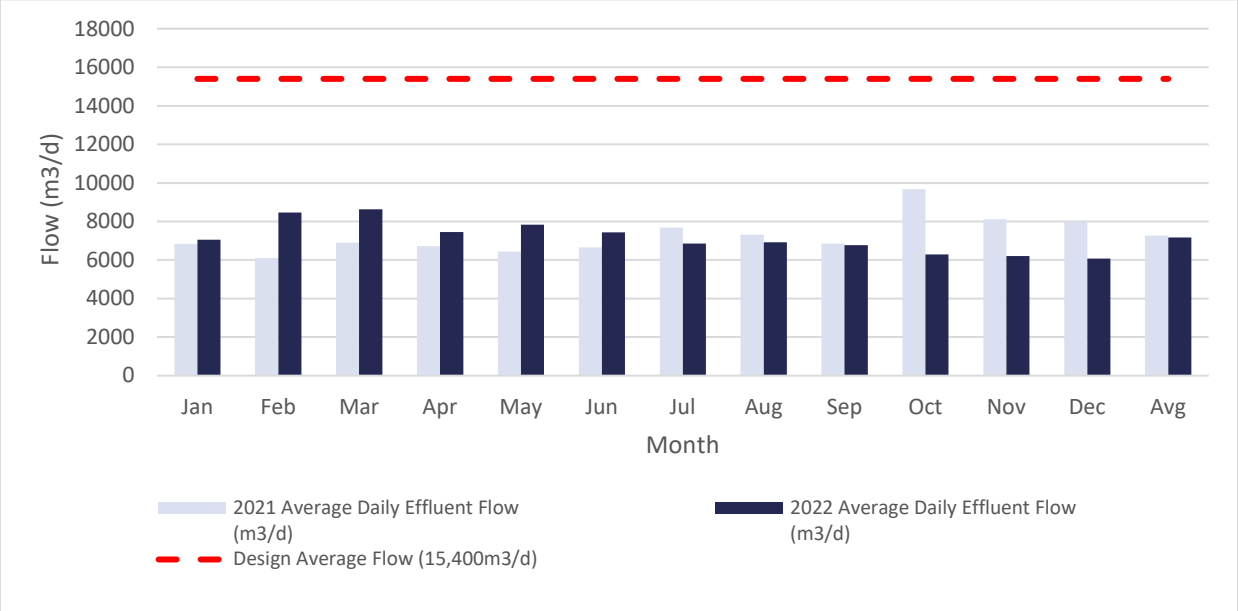
Section B: Effluent Monitoring Data

As outlined in the ECA #5789-BDHNWH Section 11(4)(b) the following is a summary and interpretation of all effluent monitoring data including concentrations and flow rates. Also included is a comparison of effluent concentrations to the design objectives and compliance limits in the approval and an overview of the success and adequacy of the Works

(I) Effluent Flow Monitoring

The average daily flow of effluent wastewater discharging from the Simcoe WWTF was 7,164m^3/d in 2022 compared to 7,274m^3/d in 2021. The rated capacity identified in the ECA is 15,400m^3/d. As depicted in Graph 6, the WWTF is currently at 47% of the rated design capacity as identified in the ECA.

Graph 6. Average monthly effluent flows for 2022 compared to 2021



(II) Effluent Data

The final effluent is sampled on a weekly basis and tested for $cBOD_5$, total suspended solids, and total kjeldahl nitrogen, as a composite sample. With grab samples collected weekly and

tested for E. coli. Three times a week composite samples are obtained for total phosphorus and total ammonia nitrogen, un-ionized ammonia as calculated, pH and temperature. Total residual chlorine is tested daily with the exception of weekends and statutory holidays when the plant is not staffed. Detailed results are found in Appendix A. Table 3 below shows the monthly average effluent results and loadings.

Table 3. Monthly average effluent results for 2022 obtained from composite sampling.

Month	cBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)
January	2.0	3.8	0.31	0.21
February	3.3	1.8	0.13	1.74
March	2.0	1.8	0.21	0.13
April	2.0	2.9	0.33	0.07
May	2.0	2.3	0.14	0.05
June	2.1	1.2	0.15	0.09
July	2.0	2.0	0.20	0.40
August	2.0	2.0	0.20	0.17
September	2.0	2.3	0.16	0.15
October	2.0	2.0	0.14	0.15
November	2.1	2.0	0.17	0.16
December	2.3	2.0	0.17	0.06
Average	**2.2**	**2.2**	**0.19**	**0.28**
Objective	5.0	7.5	0.15	0.75 (3.0)*
Limit	10.0	15.0	0.45	1.0(5.0)*

*value in brackets is the limit from Nov 1 to Apr 31

Table 4. Monthly average effluent ranges for 2022 obtained from weekly grab samples.

Month	Unionized Ammonia (mg/L)***	Temp (C)	E. coli (cfu/100mL)*	pH **	TCR (mg/L)
January	0.0009	11.1	37.0	7.23-7.51	0.02
February	0.0095	11.8	19.8	7.25-7.59	0.01
March	0.0008	10.9	50.9	7.23-7.66	0.02
April	0.0005	13.1	57.7	7.31-7.83	0.02
May	0.0005	15.9	5.9	7.30-7.67	0.02
June	0.0008	17.7	10.9	7.25-7.64	0.02
July	0.0036	20.4	35.4	7.06-7.53	0.01
August	0.0015	20.4	44.4	7.14-7.52	0.02
September	0.0012	18.7	4.4	7.10-7.58	0.01
October	0.0012	15.9	7.4	7.33-7.61	0.01
November	0.0009	14.7	6.5	7.15-7.52	0.01
December	0.0003	11.4	2.3	7.16-7.83	0.01
Average	**0.0018**	**11.1**	**14.8**	**7.06-7.83**	**0.01**
Objective	n/a	n/a	150	6.5-8.0	0.02****
Limit	n/a	n/a	200	6.5-8.5	0.02

*expressed as geometric mean
**minimum and maximum result range
***As calculated
**** non-detect = 0.02mg/l due to the limitations of in house colorimeters.

Table 5. Monthly average loadings for 2022.

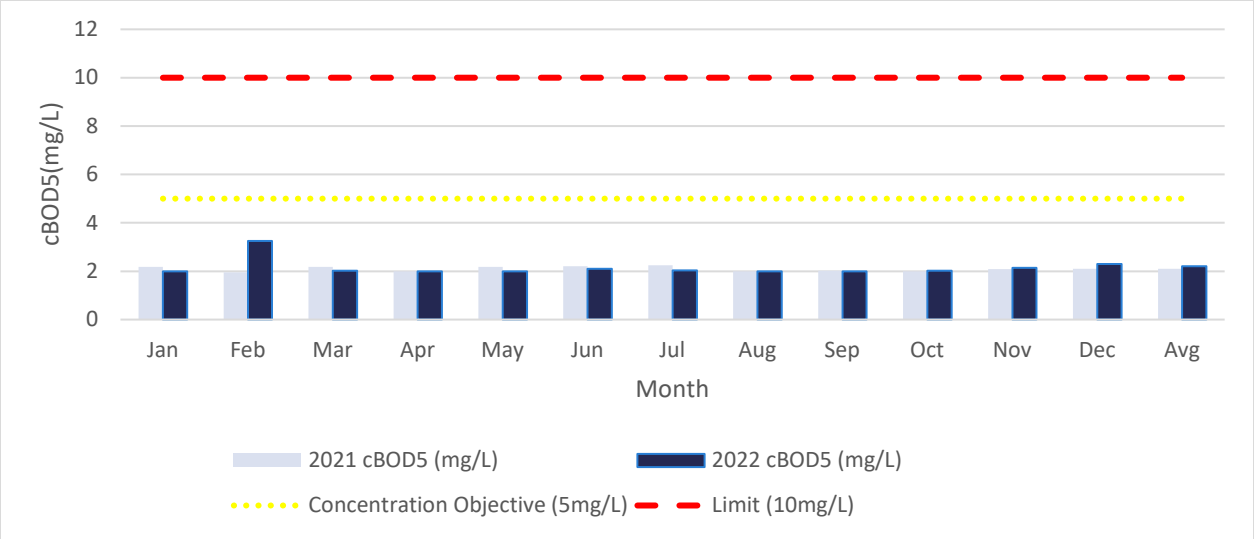
Month	cBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	TAN (kg/d)
January	14.09	26.78	2.18	1.48
February	27.54	14.83	1.09	14.78
March	17.44	15.54	1.81	1.12
April	14.91	21.61	2.46	0.52
May	15.67	17.63	1.10	0.39
June	15.61	8.92	1.11	0.67
July	13.92	13.72	1.37	2.74
August	13.83	13.83	1.38	1.18
September	13.55	15.24	1.08	0.98
October	12.72	12.57	0.88	0.94
November	13.27	12.40	1.05	0.99
December	13.96	12.14	1.03	0.36
Average	**15.54**	**15.43**	**1.38**	**2.18**
Limit	154	231	6.93	15.4 (77.0)

*value in brackets is the limit from Nov 1 to Apr 31

(I) Comparison to Compliance Limits and Objectives

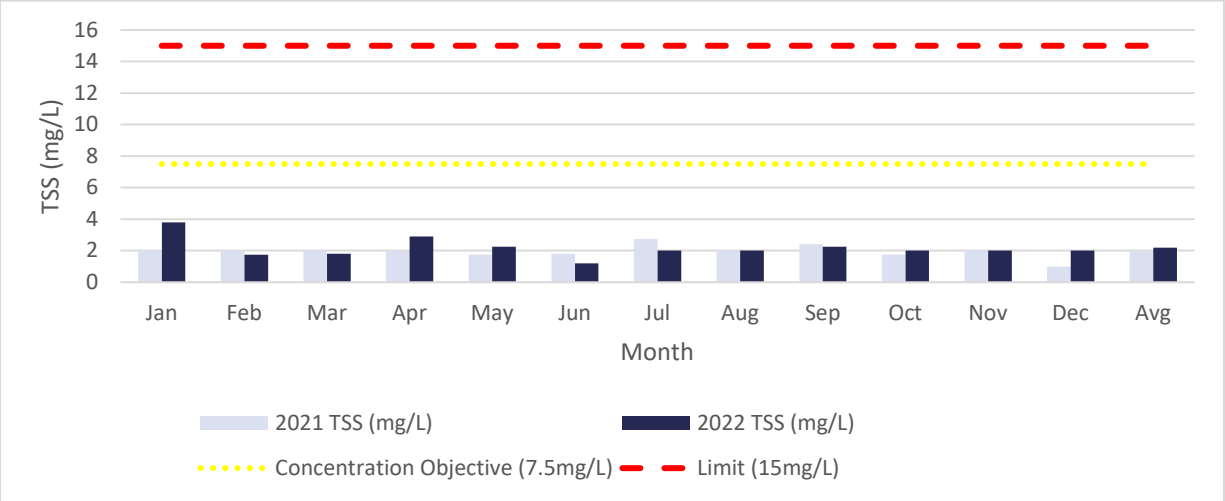
The annual average for effluent $cBOD_5$ in 2022 was 2.2mg/L; this value has increased by 4.8% from the annual average in 2021. The annual loading of $cBOD_5$ was 15.5kg/d. The concentration objectives, limits and loading limit for $cBOD_5$ were not exceeded in 2022. Refer to Graph 7 for a comparison of effluent monthly average concentration of $CBOD_5$.

Graph 7. The effluent monthly average concentration of $cBOD_5$ in 2022 compared to 2021.



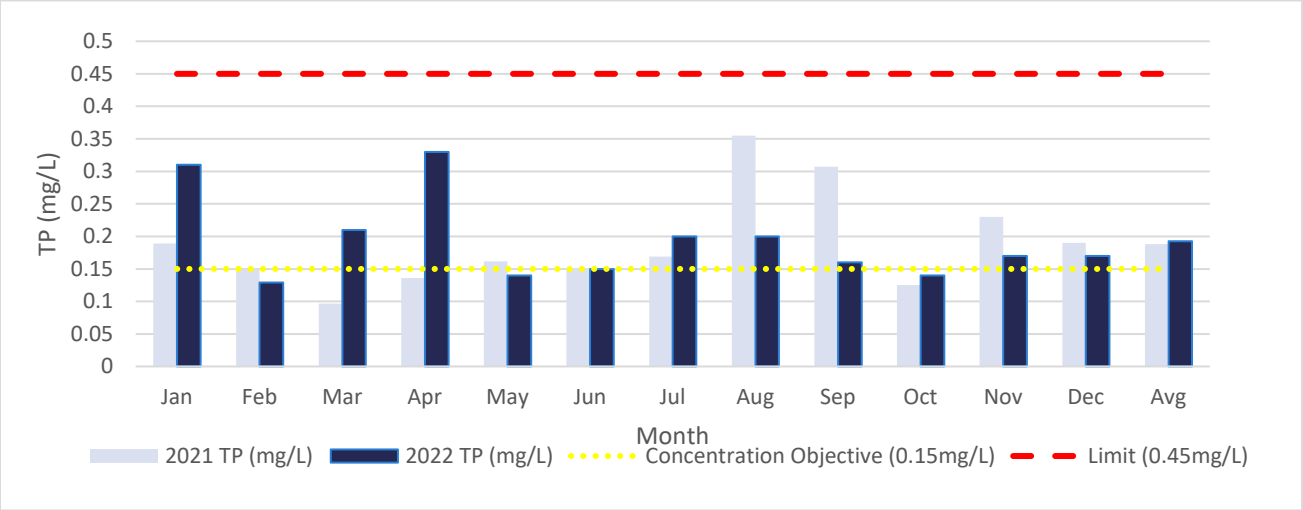
The annual average for effluent TSS in 2022 was 2.2mg/L; this value has increased by 11% from the annual average in 2021.The annual loading of TSS was 15.4kg/d. The concentration objectives, limits and loading limits were not exceeded in 2022. Refer to Graph 8 for the effluent monthly average concentration of TSS.

Graph 8. The effluent monthly average concentration of TSS in 2022 compared to 2021.



The annual average for effluent TP in 2022 was 0.19mg/L; this value has increased by 2.1% from the annual average in 2021. The annual loading of TP was 1.38kg/d. The concentration limit and loading limit were not exceeded in 2022. There were eight objective exceedances in 2022 as discussed below in ***Section G: Summary of Efforts Made to Achieve Design Objectives.*** (refer to Table 5). Refer to Graph 9 for a comparison of the effluent monthly average concentration of TP.

Graph 9. The effluent monthly average concentration of TP in 2022 compared to 2021.

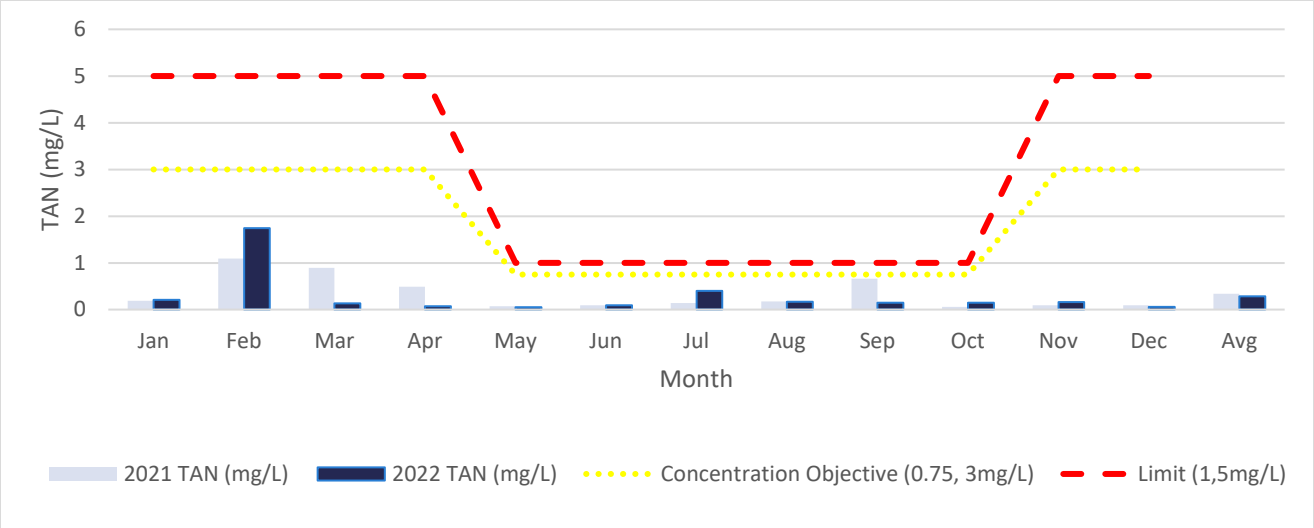


The annual average for effluent Total Ammonia Nitrogen (TAN) in 2022 was 0.28mg/L; this value has decreased by 19.8% from the annual average in 2021. The annual loading of TAN was 2.18kg/d. The limits and objectives for TAN vary based on the freezing period:

- November 1st to April 30th - the objective is 3.0mg/L and the limit is 5.0mg/L.
- May 1st to October 31st - the objective is 0.75mg/L and the limit is 1.0mg/L.

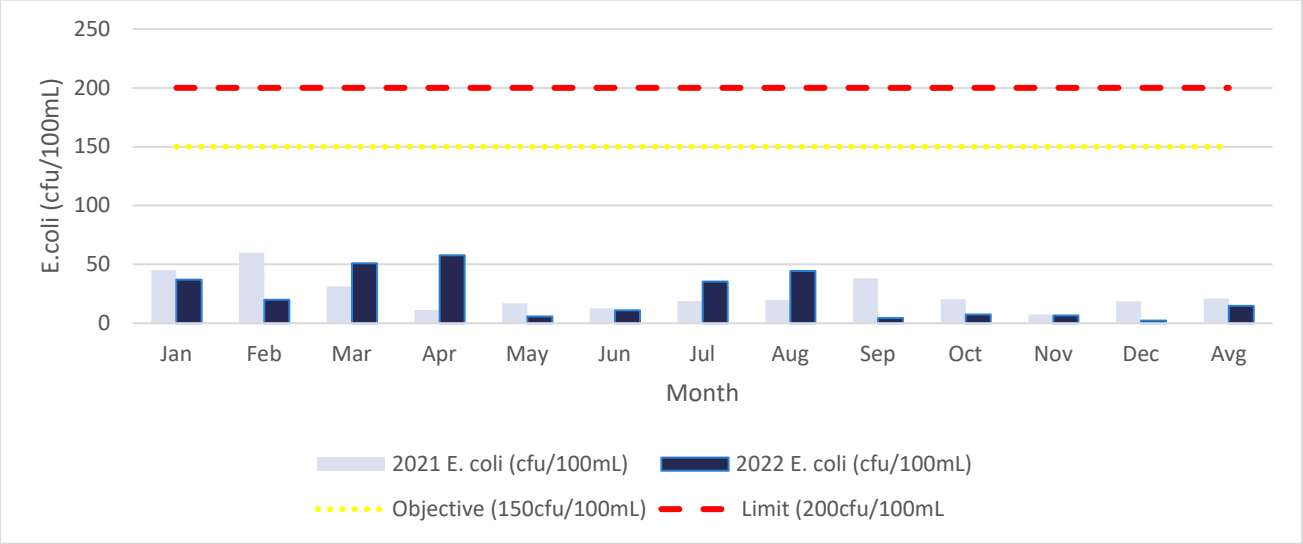
There were no objective or limit exceedances for TAN in 2022. Refer to Graph 10 for a comparison of the effluent monthly average concentrations.

Graph 10. The effluent monthly average concentration of TAN in 2022 compared to 2021.



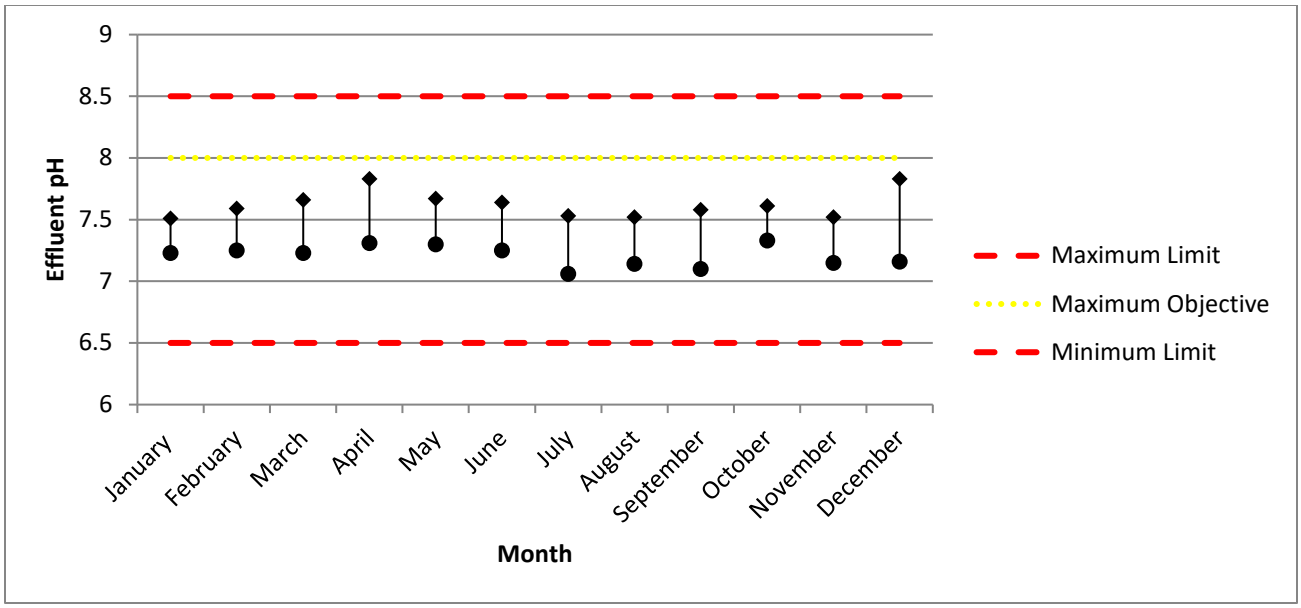
The annual geometric mean for effluent E.coli in 2022 was 14.7cfu/100mL; this value has decreased by 40% from the annual average in 2021. There were no objective or limit exceedances in 2022 for E. coli. Refer to Graph 11 for a comparison of the monthly effluent geometric mean concentration (geomean) of E.coli

Graph 11. The effluent monthly geomean of E.coli in 2022 compared to 2021.



The effluent pH is monitored three times/week at a minimum at the Simcoe WWTF. Overall the plant has provided effective treatment as there have been no results below or above the compliance limits of 6.5-8.5 in 2022. The pH is required to be maintained between 6.5-8.5 at all times. Refer to Graph 12 for the monthly minimum and maximum range for the pH readings.

Graph 12. Effluent pH readings for 2022.



The Simcoe Wastewater Treatment Facility performed well in 2022 producing quality effluent meeting all limits for all required parameters, with eight objective exceedance for TP as discussed below in ***Section G: Summary of Efforts Made to Achieve Design Objectives.***

Section C: Operating Problems and Corrective Actions

In 2022, there were challenges in meeting the Total Phosphorus objectives for greater than 50% of the time. Operations staff continued to make adjustments to chemical feed rates strictly based on the ferrous chloride dosing calculator provided by Blue Sky as part of the phosphorous optimization study undertaken by the Corporation of Norfolk County. More information on these objective exceedances is included in ***Section G: Summary of Efforts Made to Achieve Design Objectives.***

Section D: Maintenance Activities

Regular scheduled monthly preventative maintenance is assigned and monitored using the Workplace Management System (WMS) program. Refer to Appendix B for preventative maintenance schedule. Items that were repaired or replaced in 2022 were:

Table 6. Major Maintenance Completed in 2022

Date	Major Maintenance
January 14	Rebuilt and reinstalled raw sewage pump #1 motor
January 20	Electrical Contractor on site to hook up raw sewage pump #1
February 15	Electrical Contractor completing items from the ESA inspection
February 24	Contractor on site to repair leaking backflow preventer

Date	Major Maintenance
March 11	Electrical Contractor on site to repair leachate valve
March 17	Contractor on site to install overload switch on disk filter #2 panel
March 29	Contractor on site to complete gas monitor inspections
March 31	Replaced compressor oil fill piping to eliminate a leak
April 12	Approved planned bypass to complete contact chamber clean out
April 21	Repaired clogged bar screen
April 22	Contractor on site completing flow meter calibrations
May 11	Fuse blown in PLC card 1. Replaced fuse and regained control of pumps through SCADA
May 12	Mechanical Contractor on site to install replacement for the digester compressor
May 18	Talbot Street Pump Station Wetwell Manhole cover secured with lock after break in
May 28	Main hydro pole fuses replaced by Hydro One
June 21	Completed disk filter cleans
July 22	Repaired pipe in basement of the digester and repaired access points due to a break in.
July 27	Replaced raw sampler with the spare
July 28	Replaced wheel and mount on final clarifier 4 and put back in service
August 4	Mechanical Contractor on site to install AC unit in blower building #2
August 10	New Decou Road Pumping station pressure tested
August 24	Electrical Contractors on site to look into electrical deficiencies in the centrifuge building
August 24	Mechanical Contractors made adjustments to the septage bar screen
September 2	Septage hauler on site cleaning out backwash wet well
September 7	Replaced water line from digester building
September 16	Contractor completed lab equipment calibrations
September 23	Electrical Contractor on site to install power monitor at Second Ave Pump station
September 26	Brought new pumping station on line at Decou
September 28	Contractor on site to inspect plant generator
October 4	Contractor troubleshooting gas detection system
October 13	Septage hauler on site for sludge line clean out
October 17	Contractor replaced effluent water pressure system controls.
October 17	Mechanical contractor removed water line pumps for rebuilds and replaced motor on final clarifier #2 until old one could be rebuilt
October 16	Contractor replaced both disk filter drive chains
November 2	Operations installed new emergency light in digester building
November 15	Contractor on site for annual back flow preventer inspections
December 1	Contractor on site for plant and pump station Generator inspections
December 6	ESA Inspection completed
December 29	Electrical Contractor found water in motor of primary clarifier #4. Replaced with the temporary motor installed in final clarifier #2.

Section E: Effluent Quality and Assurance

Effluent quality assurance is evaluated by monitoring parameters and changes throughout the plants processes. The operators monitor the basin by performing weekly tests on the mixed liquor. These tests include dissolved oxygen, pH, temperature, settling tests and Mixed Liquor Suspended Solids (MLSS). As well, monitoring of chemical dosages and wasting volumes are completed. Data collected from these tests provide valuable information to the operators to make the appropriate adjustments in the treatment process and take corrective actions before the plant reaches its effluent limits.

Section F: Calibration Records

The influent and effluent flow meters were calibrated by SCG Flowmetrix on April 21st and 22nd 2022 respectively. In-house meters for pH and dissolved oxygen were calibrated by JBF Controls Ltd. on September 16, 2022 as per manufacturer's instructions.

Section G: Summary of Efforts Made to Achieve Design Objectives

Table 7. Individual sample results compared against the effluent objectives and loading limits.

Parameter	Effluent Objective (mg/L)	Monthly Effluent Result Ranges (mg/L)	# of Objective Exceedances	Effluent Loading Limit (kg/d)	Monthly Loadings Result Ranges (kg/d)	# of Limit Loading Exceedances
$cBOD_5$	5.0	2.0-3.3	0	154	12.7-27.5	0
TSS	7.5	1.2-3.8	0	231	8.9-26.8	0
TP	0.15	0.13-0.33	8	6.93	0.88-2.46	0
TAN*	0.75 (3.0)	0.05-1.74	0	15.4 (77.0)	0.4-14.8	0
E. coli (cfu/100mL)**	150	2.34-57.7	0	n/a	n/a	n/a
TRC	0.02	0.01-0.02	0	n/a	n/a	n/a
pH***	6.5 – 8.5	7.06-7.83	0	n/a	n/a	n/a

*effluent objectives and limits are seasonal
**expressed as geometric mean
***minimum and maximum result (not monthly averages)

Table 8. Objective exceedances in 2022.

Date	Parameter	Concentration mg/L	Loadings kg/d	Issue and Proactive Actions Taken
01/2022	TP	0.31	2.18	Monitored/Adjusted Chemical Feed
03/2022	TP	0.21	1.81	Monitored/Adjusted Chemical Feed
04/2022	TP	0.33	2.46	Monitored/Adjusted Chemical Feed
07/2022	TP	0.20	1.37	Monitored/Adjusted Chemical Feed
08/2022	TP	0.20	1.38	Monitored/Adjusted Chemical Feed
09/2022	TP	0.16	1.08	Monitored/Adjusted Chemical Feed
11/2022	TP	0.17	1.05	Monitored/Adjusted Chemical Feed
12/2022	TP	0.17	1.03	Monitored/Adjusted Chemical Feed

Total Phosphorus did not meet design objectives more than 50% of the time, refer back to ***Section C: Operating Problems and Corrective Actions*** for more information.

Section H: Sludge Handling and Generation

Sludge sampling results can be found in Appendix C. Sludge is removed from the Simcoe WWTF and sent to the Townsend Lagoon for processing or taken to field for land application. The total volume generated in 2022 was 12,449m^3, refer to Table 9 below for a breakdown and Table 10 for the sludge disposal locations.

It is expected that 2023 will be similar to 2022 with approximately 13,000m^3 of sludge being removed from the Simcoe WWTF.

Table 9. Volume Hauled from the Simcoe WWTF - Sludge Generation 2022.

Month	Townsend Lagoon (m^3)	Field (m^3)	Total (m^3)
January	830	0	830
February	1,327	0	1,327
March	765	0	765
April	270	1,280	1,550
May	1,125	0	1,125
June	990	135	1,125
July	540	315	855
August	941	0	941
September	270	0	270
October	900	0	900
November	564	1,337	1,901
December	860	0	860
Total	**9,382**	**3,067**	**12,449**

Table 10. Sludge Disposal Locations 2022.

Site	NASM#	Expiry	Lot	Concession	Township	Area Spread (ha)	Simcoe WWTF	Dates Spread
OX1110	24975	2026	6	12	Norwich	20.73	810	April 5 & 6
HN1331	23484	2022	13 & 14	12	Townsend	11.14	470	April 8,11,18,22
HN1122	23414	2022	14 to 18	2	Onieda	4.83	135	20-Jun
HN1197	25112	2026	17 & 18	5	Woodhouse	9.56	90	July 26 & 27
HN1370	23693	2023	13 & 14	3	Townsend	1.8	225	28-Jul
HN1084	25183	2026	9 to 12	6 & 7	Townsend	17.1	417	Nov 10-18
HN1347	25183	2026	17 & 18	2	Townsend	22.3	739.5	Nov 19,21,22
HN1036	25253	2026	16	8	Townsend	0.5	45	Nov 23 & 24
HN1305	23696	2023	1	16	Walpole	1.0	135	Nov 26 & 29
TOTAL						**88.96**	**3066.5**	

Section I: Complaints

There were no complaints received for the Simcoe WWTF in 2022.

Section J: By-pass, Overflow, Spill or Abnormal Discharge Events

There was one (1) digested sludge spill and one (1) approved planned bypass event at the Simcoe WWTF in 2022. All communication and notifications were provided as required.

1. February 2 Spill Event (reference #1-1KZS17): During the plant checks the operator of the facility noticed that the overflow pipe on the digester had a blockage causing the spill to occur. Approximately 114L were estimated to have been spilled. The overflow pipe was assessed and cleared of the blockage. There was a vacuum truck onsite at approximately 10:00am to remove the digested sludge from the ground as well as the snow in the vicinity of the spill. Once cleaned, the property was inspected by the operator to ensure the spill was contained to the one location and that it was cleaned up appropriately. As a result of this spill, a preventative maintenance work order for regular inspection and clean out of the overflow pipe was implemented into the facilities preventative maintenance plan going forward.

2. April 12-13 Planned Bypass Event (reference #1-1RCKN0): The event started on April 12th, 2022 at approximately 08:55 and ended on April 13th, 2022 at approximately 09:55 with an estimated discharge volume of 9,000m^3. Effluent had undergone all treatment with the exception of sufficient contact time with chlorine. Effluent was chlorinated and de-chlorinated prior to the outfall to the Lynn River with minimal contact time. Due to the required maintenance, there were no concerns. All treatment had been maximized with the exception of limited contact time for disinfection.
   The final effluent met the ECA limits for $CBOD_5$, TSS, TP, TAN and E.Coli.

Section K: Notice of Modification to the Works and Construction and Commissioning of Proposed Works

The Simcoe WWTF's construction scheduling time frame has not changed and there are no new updates at this time. The scope of the upgrade remains as stated in the most recent Simcoe ECA #5789-BDHNWH issued on October 10, 2019.

Section L: Summary of Efforts made to achieve conformance with F-5-1

The Simcoe WWTF is a conventional activated sludge treatment facility and is comprised of two liquid trains both equipped with primary treatment, aeration basins, and secondary clarification with a combined chlorination/dechlorination based disinfection system and a tertiary filtration system. Supplementary phosphorus removal is also achieved with the addition of a ferrous chloride solution. The treatment components are capable of producing effluent quality that exceeds the effluent design objectives specified in F-5-1. The Simcoe WWTF is required to achieve higher effluent quality standards than the Effluent guideline criteria as specified in the ECA.

There were no bypasses or overflow events in the collections system for 2022.
The Corporation of Norfolk County completes the following:

- CCTV flushing and camera inspections
- Manhole inspections
- Flow monitoring and trending at pump stations.

Section M: Changes or Updates for Construction at Plant

There were no changes or updates to the schedule for the completion of construction and commissioning operations of major process(es) / equipment groups in the Proposed Works at the Simcoe WWTF in 2022.

Section N: Summary of Incidences of Shock Loading and Impacts on performance

There was one (1) incident of shock loading by an industrial establishment in December, 2022. An influent sample was collected at the time of the event and analyzed for BOD_5, TSS, TP, TKN pH and Ammonia. Effluent quality was maintained within the compliance limits and there were no incidents of non-compliance that resulted from this event.

The Corporation of Norfolk County continues to monitor any potential events by means of the sewer use bylaw and any overuse agreements created between industrial establishments and the County.

APPENDIX A – Simcoe WWTF Monitoring Data

APPENDIX B – Maintenance Schedule

APPENDIX C – Sludge Monitoring Data