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 Port Dover Wastewater Treatment Plant

Attached is the 2022 Annual Performance Report for the Port Dover Wastewater Treatment Plant located at 137 Hamilton Plank Road, Port Dover in Norfolk County. This report has been completed in accordance with:

- Section 11(4)(a) through (n) cited in Environmental Compliance Approval #7884-C94HQT issued on January 14, 2022 to the Corporation of Norfolk County

The previous ECA# 5437-BLYN9F, issued April 9, 2020 was in effect from January 1-14, 2022 and all components of Section 11(3)(a) through (m) has been considered when completing this report.

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
Dale LeBritton - Regional Hub Manager, OCWA
Jackie Muller - General Manager, OCWA
Kyle VanPaemel - Senior Operations Manager, OCWA
Maegan Garber - Safety, Process and Compliance Manager, OCWA

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Introduction:

The Port Dover WWTP is located at 137 Hamilton Plank Road, Ontario (Norfolk County). The plant is a conventional activated sludge plant with a rated capacity of 5,400 m^3/d, and is comprised of the following key components:

- Headworks and preliminary treatment facility comprising screening, raw sewage pumping and grit removal;
- Liquid train comprising three primary clarifiers, two aeration tanks and two secondary clarifiers;
- Hauled waste receiving facility;
- Chlorination/dechlorination based disinfection system;
- Anaerobic digester; and
- Biosolids storage facility.

Raw Wastewater Collection
There are eight (8) pumping stations with seven (7) in the Port Dover collections system and one, P.S. # 6, Woodhouse, being at the WWTP. The Bridge St pumping station is the largest station in the collection system and receives flow from Nelson St SPS, Lynn St. SPS and Harbour St, SPS as well as the surrounding gravity sewer system. This typically makes up more than 50% of the flow received at the Port Dover WWTP. The WWTP and the pumping stations serve the Town of Port Dover, which has a population of approximately 5,527 people.

Inlet Works

Traveling Screens
There are two (2) screens controlled by a Milltronics unit in the inlet channels and work on lead and lag set points. The screens are rated for a total of 18,000 m^3/d with screening going to a compactor then to the grit box.

Raw Sewage Pumping
The raw sewage is then pumped from the wet wells via three (3) raw sewage pumps, 2 variable speeds and one fixed speed. The pumps are SCADA controlled with one variable speed pump operating as the duty pump. If the influent flows exceed the capabilities of the variable speed pumps, the fixed speed pump will turn on and take the place of one of the variable speed pumps. The variable speed pumps are rotated weekly however all pumps are exercised routinely to ensure operation. The above sequence can be changed by the SCADA system.

Grit Cyclone
The raw sewage is pumped into the Grit Cyclone, which removes grit from the raw sewage. Grit, which is normally sand, gravel etc., has no “nutritional” valve for the activated sludge and harms pumps and other moving mechanism within a wastewater treatment plant due to its abrasiveness. The cyclone uses a paddle in the tank to keep the velocity in the cyclone constant. Air and water scour are used to separate the grit with the grit dropping out forcing the grit up to the classifier which in-turn separates the grit and water. Ferrous chloride is added immediately after the grit

cyclone for Phosphorous control. The water flows by gravity to the primary clarifier splitter-box and the grit is dumped into a grit box and hauled off to a landfill site.

Primary Clarification

Flows enter the primaries via a splitter box, which has three (3) sluice gate valves to direct flow to the individual primary tank. Waste activated sludge is also received at the primary splitter box to maintain balanced loadings on all primary clarifiers.

The flow velocity through this tank is very slow allowing heavier solids to settle to the bottom of the tank and lighter material (scum) to float to the surface. The scum is removed by the use of chain drive surface skimmers. The skimmers work two fold, on the up movement the skimmers "push" the scum to the front end of the clarifier and on the down movement they "scrape" the sludge on the bottom of the tank into the sludge collector system. Once the skimmers reach the end of the tank the debris is deposited into a "scum trough" which periodically is manually discharged to the scum pit. The sludge from the primary clarifiers, which can also include waste activated sludge from the secondary (final) clarifiers, is gathered at the bottom of the tank and is pumped to the digester.

Aeration Tanks

The Primary effluent flows into the aeration tanks through a Parshall flume.

The aeration tanks provides air (oxygen) into the wastewater to promote biological activity. Microorganisms live and grow by using the dissolved oxygen and colloidal matter (small solid particles that didn't settle out in the primary clarifier). This in-turn either breaks the waste into simpler compounds or increases the microorganisms' own mass. The microorganisms will clump together to form large particles known as floc, which will settle out later on in the process. This mixture is referred to as "mixed liquor". Oxygen is added to the mixed liquor with the use of mechanical aerators.

There are two (2) mechanical aeration tanks each with two (2) cells for a total of four (4) mechanical mixers. At present the Dissolved Oxygen (DO) is measured manually and the motor speeds are adjusted on SCADA to maintain a dissolved oxygen concentration of 2.0 mg/L. The aerator motors are Lincoln motors, 15 HP. 40 amp, 575 Volts and 1750 rpms.

Secondary Clarification

From the Aeration Tanks the mixed liquor discharges into the secondary/final clarifiers. The clarifiers are circular tanks, 17 m (56') in diameter and 4.3 m (14.11') in depth. The purpose of secondary clarifiers is to settle out any remaining solids from the effluent by gravity. As in primary clarification, the settled sludge is collected at the bottom of the tank and pumped back to the aeration basins as Return Activated Sludge. A portion of the RAS is sent to the primary clarifiers as waste activated sludge, which helps maintain the concentration of microorganisms at the desired level in the secondary treatment process.

The clarifiers have a gear drive on the "flights" which act as both skimmers and sludge collectors.

The effluent from both of these clarifiers is discharged into the common disinfection contact chamber channel.

Disinfection Phase

Chlorine Contact Chamber

The disinfection contact chamber is a baffled tank with chlorine (sodium hypochlorite) being used as the disinfectant. Chlorine was injected at the head of the contact chamber but was changed in April 2022 as part of the interim works identified in the ECA to the outlet of the secondary clarifier to increase the contact time. One sodium hypochlorite chemical feed pump is located in the chemical building adjacent to the chlorine contact chamber.

Dechlorination

Dechlorination utilizing Sodium Bisulphite was completed and operational on March 1, 2022 as part of the interim works identified in the ECA. A temporary building was constructed near the contact chamber to house the chemical and two (1 duty, 1 standby) sodium bisulphite chemical feed pumps. Sodium Bisulphite is injected at the outfall of the contact chamber prior to the discharge pipe.

Sludge Management System

Sludge Handling

The digester is an egg shaped tank approximately 18 m (59') high with a diameter of 8.5 m (28') with an approximate volume of 660 m^3 with two (2) recirculation pumps and a central draft tube to provide mixing. It also has a gas collection system, boiler, heat exchanger and gas flare.

The raw sludge which is a mix of primary and waste activated sludge is pumped to the digester. The digester is anaerobic meaning that the microorganisms do not require air.

Anaerobic bacteria (those living in the absence of oxygen) break down the solids in the sludge to form simpler compounds and gases. One of these gases is methane, which is a valuable fuel. The methane gas, which is produced, is explosive when mixed with air, so special operating precautions have to be taken. The methane gas is collected and stored in a storage tank and used to heat the boiler. The digested sludge is spread on land during the summer months and stored on site during the winter.

Standby Power

The emergency power for the plant is an Ivec-Aifo 140 HP diesel engine. The generator is comprised of a 140 HP diesel engine, 100kW/125KVA alternator. The fuel storage tank is 900L, allowing for a 30-hour emergency power supply with a full tank of fuel. The generator is sized and connected to provide partial power to the plant. Operational staff determine what equipment needs to run during a power failure to maintain plant operation.

Plant Facts:

Environmental Compliance Approvals

- ECA 7884-C94HQT (issued January 14, 2022 &
- ECA 5437-BLYN9F (issued April 9, 2020) – revoked in 2022.

Rated Capacity

- 5,400m^3/day

Receiving Water

- Lake Erie

For 2022, the Port Dover WWTP was operated in accordance with provincial regulations as required in ECA #7884-C94HQT and ECA #5437-BLYN9F. The following report is presented such that it corresponds with ECA #7884-C94HQT Section 11(4) (a) through (n).

Section A: Influent Monitoring Data

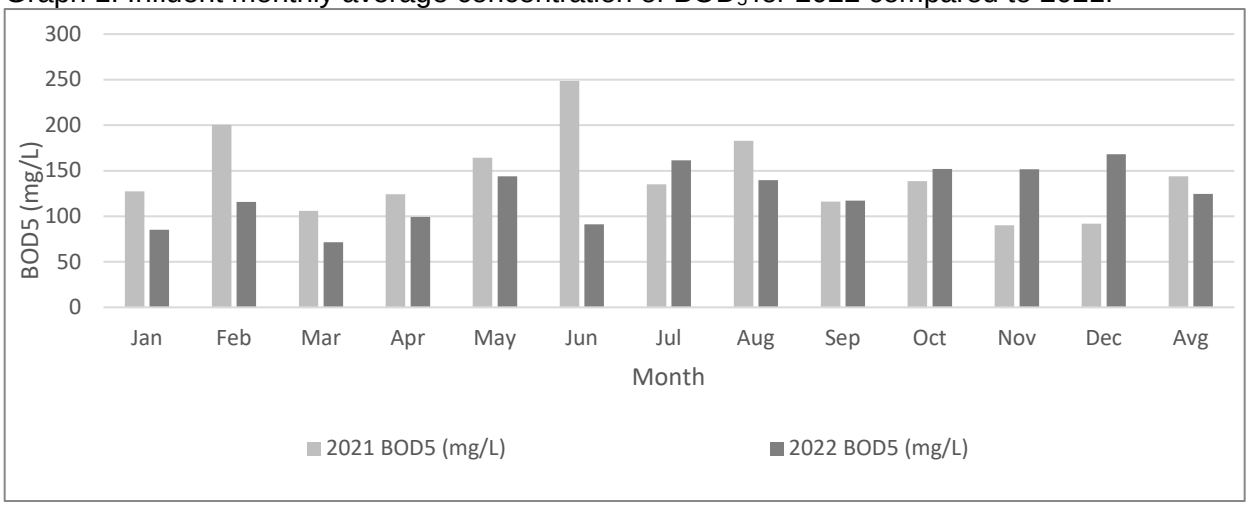
As outlined in ECA 7884-C94HQT issued January 14, 2022 Section 11(4)(a) the following is a summary and interpretation of all influent and imported sewage monitoring data and a review of the historical trend of the sewage characteristics.

(I) Influent Data

The raw wastewater (influent) is monitored for BOD_5, total suspended solids, total phosphorus and total kjeldahl nitrogen, pH and alkalinity at a minimum on a weekly basis by composite sample. Refer to *Appendix A* for more detailed monthly results.

The annual average for raw sewage BOD_5 concentration for 2022 to the plant was 124.7mg/L. This is a decrease from 2021 by 15%. Refer to Graph 1 for a comparison of the monthly concentrations for 2022 to 2021.

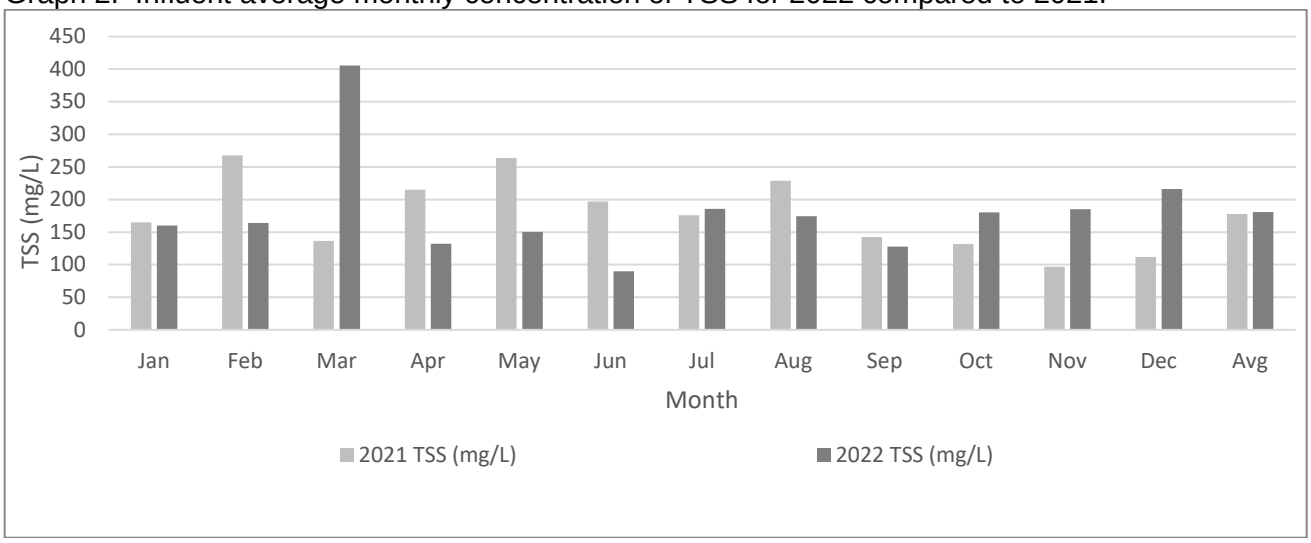
Graph 1. Influent monthly average concentration of BOD_5 for 2022 compared to 2021.



The annual average for influent total suspended solids (TSS) concentration for 2022 to the

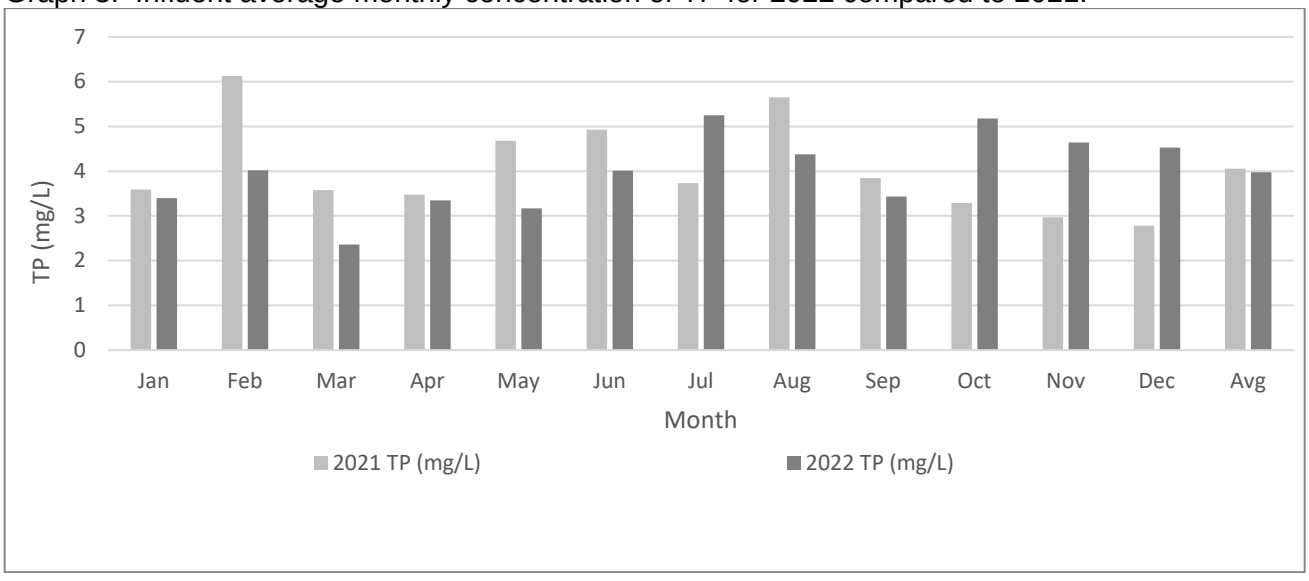
plant was 180.9mg/L. This is an increase from 2021 by 2%. Refer to Graph 2 for a comparison of the monthly concentrations for 2022 to 2021.

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



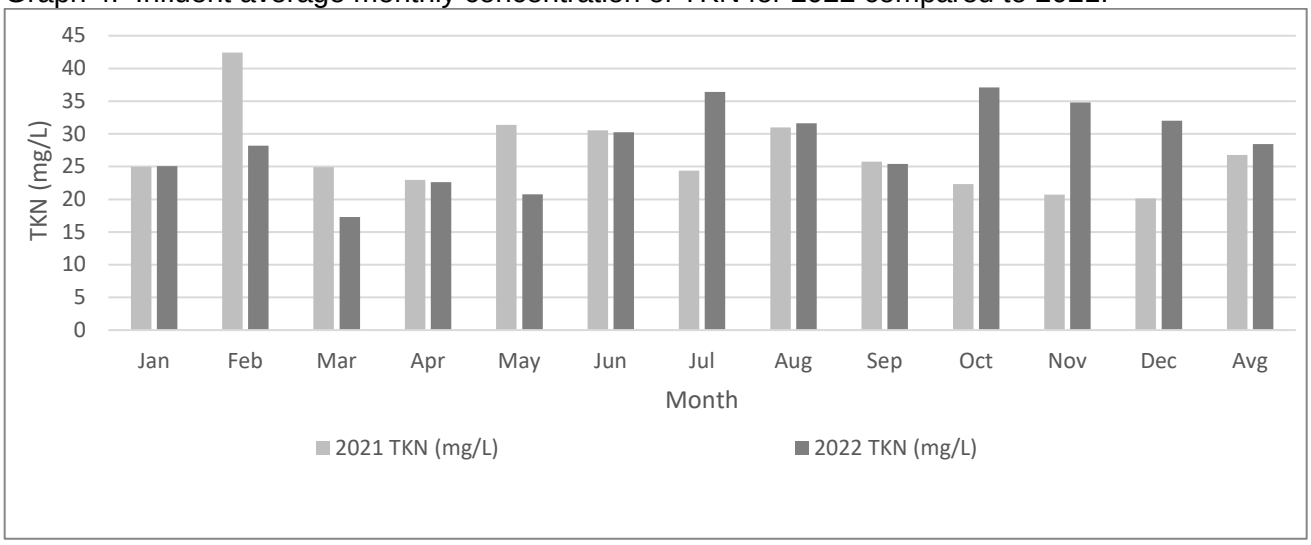
The annual average for the influent total phosphorus (TP) concentration for 2022 to the plant was 3.98mg/L. This is a decrease from 2021 by 2%. Refer to Graph 3 for a comparison of monthly concentrations for 2022 to 2021.

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



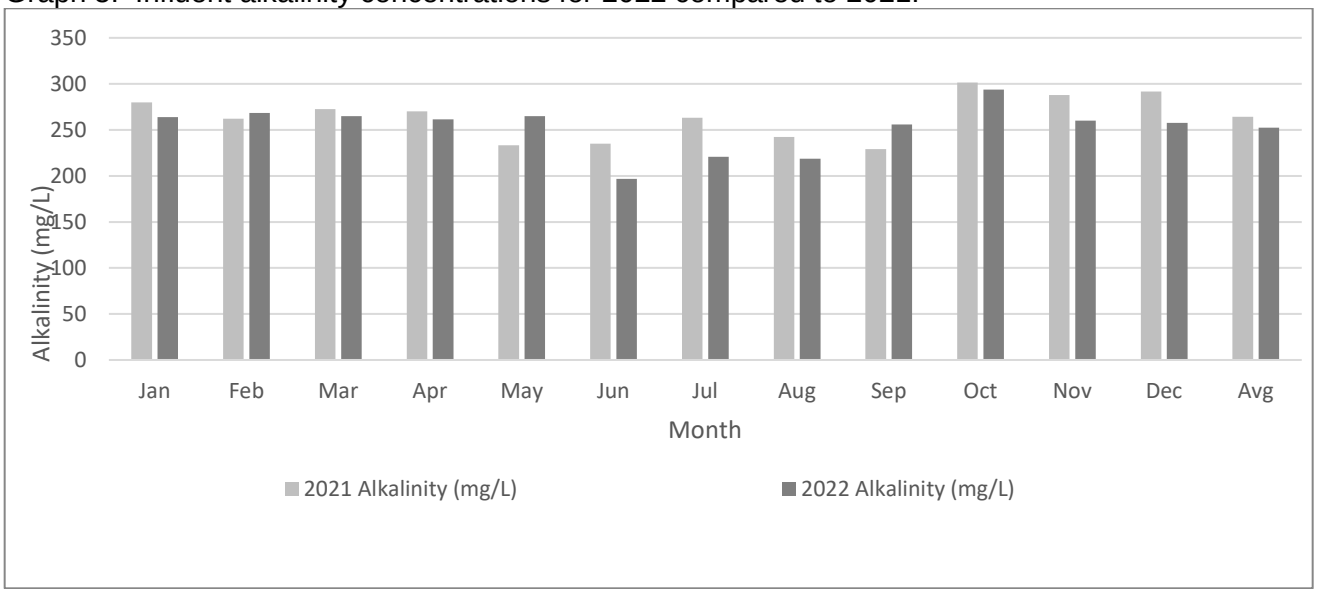
The annual average for the influent total kjeldahl nitrogen (TKN) concentration for 2022 to the plant was 28.5mg/L. This is an increase from 2021 by 5.9%. Refer to Graph 4 for a comparison of monthly concentrations for 2022 to 2021.

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



The annual average for the influent alkalinity concentration for 2022 to the plant was 252mg/L. This is a decrease from 2021 by 4.7%. Refer to Graph 5 for a comparison of monthly concentrations for 2022 to 2021.

Graph 5. Influent alkalinity concentrations for 2022 compared to 2021.



The influent characteristics have fluctuated marginally throughout the year. This is to be expected with the flow variations that are experienced at the Port Dover WWTP.

(II) Imported Sewage (Septage) Monitoring

As required by the ECA, imported sewage (septage) is sampled on a weekly 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 Port Dover WWTP in which flow rates would be captured once completed however, the Port Dover WWTP received an estimated total of 6,957.23m^3 in 2022 as broken down in Table 1 below.

Table 1. Total Volume of Imported Sewage to the Port Dover WWTP in 2022

Month	Holding Volume (m^3)	Septic Volume (m^3)	Portable Waste Volume (m^3)
January	508.33	-	-
February	699.47	-	-
March	845.57	7.57	-
April	570.78	-	-
May	479.94	-	-
June	554.88	15.14	-
July	311.13	-	-
August	722.94	9.84	-
September	705.9	-	0.38
October	385.31	7.57	-
November	510.6	-	-
December	621.12	-	0.76
Total	**6,915.97**	**40.12**	**1.14**

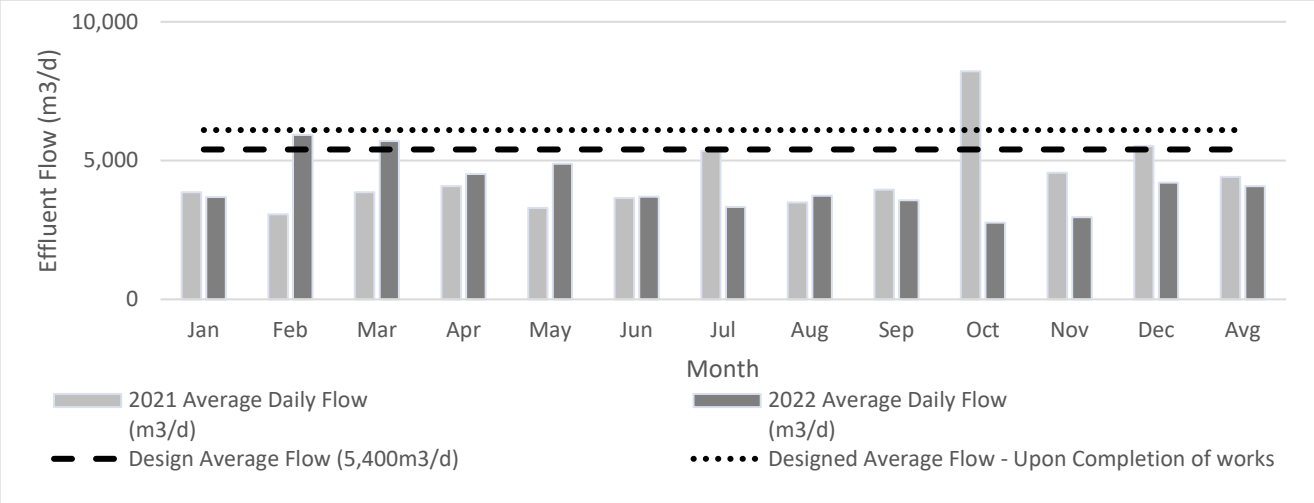
Section B: Effluent Monitoring Data

As outlined in ECA #7884-C94HQT 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. The completion of construction of the proposed works was not completed in 2022 and therefore all monitoring data is compared against "prior to completion of construction" objectives and limits. Detailed monitoring data is supplied in Appendix A.

(I) Effluent Flow Monitoring

The average daily flow of the effluent wastewater discharging from the Port Dover WWTP was 4,082m^3/d in 2022 which is 75.6% of the rated capacity of 5,400m^3/d. The 2022 average daily flow has decreased compared to the 2021 average daily flow of 4,410m^3/d. The following Graph 6 shows a comparison of the average daily flows per month for 2022 and 2021 compared to the rated capacity of the facility.

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



There were several instances where the daily flow exceeded the average daily rated capacity. These were all due to wet weather events. Refer to Table 2 for a summary of the rated capacity exceedances. Compliance is assessed on the annual average, therefore these exceedances are not reportable, but does indicate a possible inflow/infiltration issue in the collection system.

Table 2. Daily flow readings and ranges above the rated capacity of 5,400m^3/d in 2022.

Month	# of Exceedances	Flow Range (m^3/day)
February	10	5,820.34 – 14,108.94
March	11	5,736.80 – 14,695.03
April	5	5,504.76 – 7,374.39
May	7	5,401.45 – 12,787.75
June	1	7,381.37
July	1	7,842.37
September	1	7,498.03
November	1	5,646.69
December	6	5,413.91 – 10,063.99
TOTAL	**43**	**5,401.45 – 14,695.03**

(II) Effluent Data Monitoring

The final effluent is sampled on a weekly basis and tested for $cBOD_5$, total suspended solids, total phosphorus and total ammonia (TAN), total kjeldahl nitrogen, nitrate as nitrogen, and nitrite as nitrogen as a composite sample. A grab sample is collected weekly and tested for E. coli. A grab sample is also collected daily (during normal operating hours) and tested for pH, Temperature, Dissolved Oxygen, Total Residual Chlorine (TRC), and TRC post dechlorination. Unionized ammonia is calculated using the weekly laboratory TAN value with the corresponding in house pH and Temperature results. Detailed results are found in *Appendix A*. Table 3, 4 and 5 below show

the monthly average effluent results from the composite samples, the monthly average effluent results from the grab samples and a comparison to the loadings limits respectively.

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

Month	$cBOD_5$ (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	TKN (mg/l)
January	3.1	6.8	0.65	18.5	0.93	0.56	21.3
February	3.3	5.3	0.38	17.5	0.17	0.71	21.3
March	2.2	4.6	0.38	12.9	0.21	0.72	14.3
April	2.1	2.2	0.27	13.9	0.87	3.02	15.3
May	2.1	3.5	0.54	6.4	1.33	3.63	7.9
June	2.3	3.0	0.77	12.8	1.27	3.66	14.8
July	2.5	3.8	0.59	18.5	1.17	1.90	20.3
August	2.2	3.0	0.47	17.3	1.11	2.11	17.1
September	2.0	1.8	0.41	7.7	1.04	8.29	8.4
October	2.2	1.8	0.61	5.9	0.94	11.84	7.2
November	2.9	6.4	0.67	9.8	1.21	6.93	11.6
December	6.0	9.8	0.55	9.2	7.31	0.78	11.6
Average	**2.7**	**4.3**	**0.52**	**12.5**	**1.46**	**3.68**	**14.2**
Objective	15.0	15.0	0.80	n/a	n/a	n/a	n/a
Limit	25.0	25.0	1.0	n/a	n/a	n/a	n/a

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

	E.coli (cfu/100mL)*	pH**	DO (mg/L)	TRC (min-max) (mg/L)	Temp (°C)	Unionized Ammonia (mg/L)***
January	112.6	7.49-8.00	4.29	0.00-0.02	9.9	0.1715
February	346.3	7.30-8.19	2.67	0.00-0.02	8.9	0.1502
March	203.0	7.49-7.84	3.46	0.00-0.02	8.2	0.1053
April	34.9	7.50-7.90	4.11	0.00-0.02	10.3	0.1364
May	147.5	7.42-7.76	2.21	0.00-0.02	13.6	0.0590
June	28.4	7.43-7.66	2.52	0.00-0.02	17.0	0.1393
July	62.1	7.37-7.70	2.43	0.00-0.02	19.8	0.2585
August	7.6	7.35-7.95	2.44	0.00-0.02	20.2	0.3579
September	18.4	7.20-7.70	2.47	0.00-0.02	19.1	0.0840
October	3.6	7.31-7.80	2.88	0.00-0.02	15.9	0.0628
November	11.7	7.34-7.74	2.93	0.00-0.01	13.6	0.0814
December	25.3	7.15-7.66	2.93	0.00-0.02	11.3	0.0448
Average	**38.5**	**7.15-8.19**	**2.94**	**0.00-0.02**	**14.0**	**0.1376**
Objective	100	6.5-8.5	n/a	n/a	n/a	n/a
Limit	n/a	6.0-9.5	n/a	n/a	n/a	n/a

*Geometric Mean

**Min and Max

***As calculated

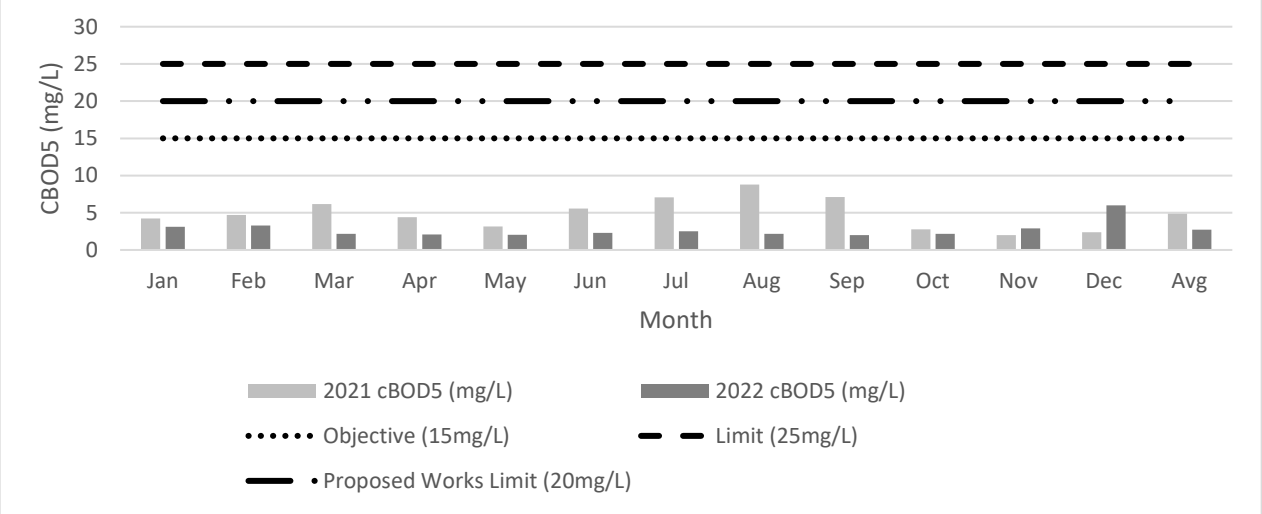
Table 5. Monthly average effluent loading results for 2022

	cBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)
January	11.43	25.07	2.40
February	19.56	31.12	2.25
March	12.33	26.26	2.17
April	9.41	10.17	1.22
May	10.01	17.09	2.64
June	8.43	11.09	2.85
July	8.31	12.46	1.96
August	8.05	11.18	1.75
September	7.14	6.25	1.46
October	5.95	4.85	1.69
November	8.60	18.98	1.99
December	25.12	40.95	2.31
Average	**11.19**	**17.96**	**2.06**
Limit	135.0	135.0	5.4

(III) Comparison to Compliance Limits and Objectives

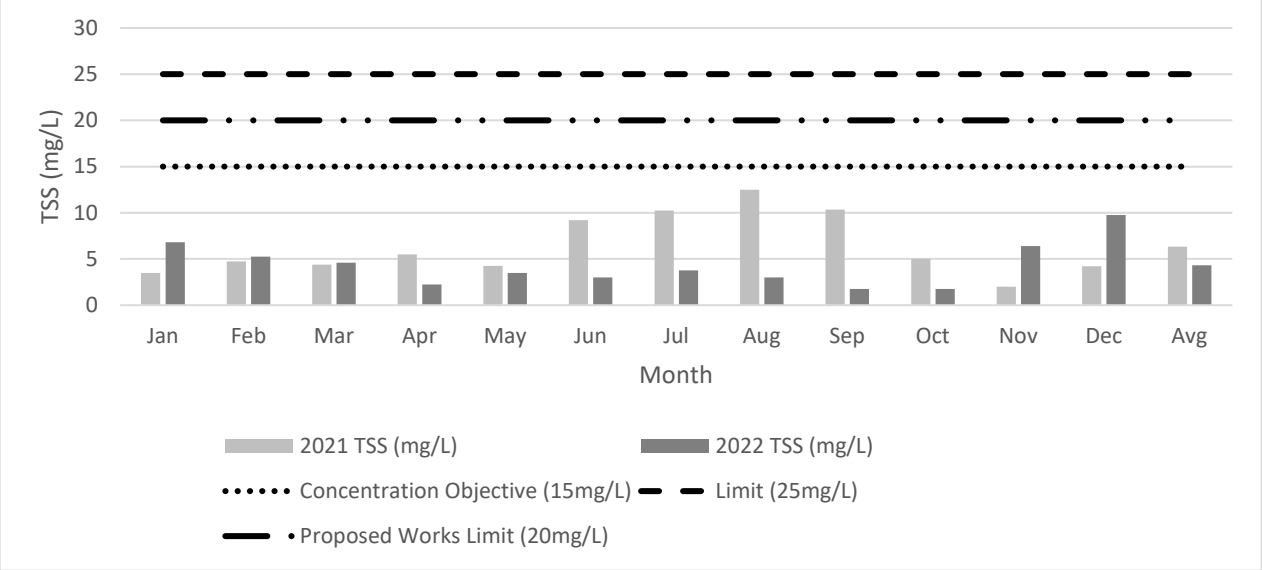
The annual average for effluent $cBOD_5$ in 2022 was 2.7mg/L; this value has decreased by 78.7% compared to 2021. The annual loading of $cBOD_5$ was 11.19kg/d. The effluent objective and the concentration and loading limits for $cBOD_5$ were not exceeded in 2022. Refer to Graph 7 for a comparison of effluent monthly average concentration of $cBOD_5$.

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



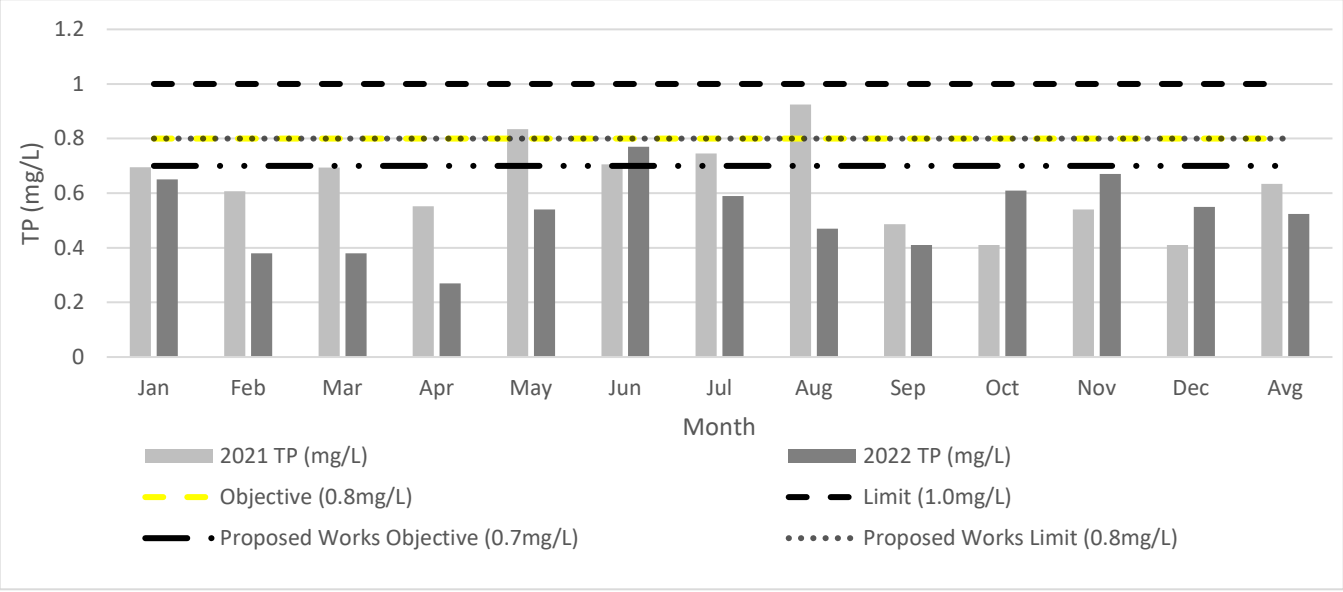
The annual average for effluent TSS in 2022 was 4.3mg/L; this value has decreased by 46.5% from the annual average in 2021.The annual loading of TSS was 17.96kg/d. The effluent objective and the concentration and loading limits for TSS were not exceeded in 2022. Refer to Graph 8 for the effluent monthly 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 0.52mg/L; this value has decreased by 20.9% from the annual average in 2021. The annual loading of TP was 2.06kg/d. The effluent objective and the concentration and loading limit for TP were not exceeded in 2022. 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.

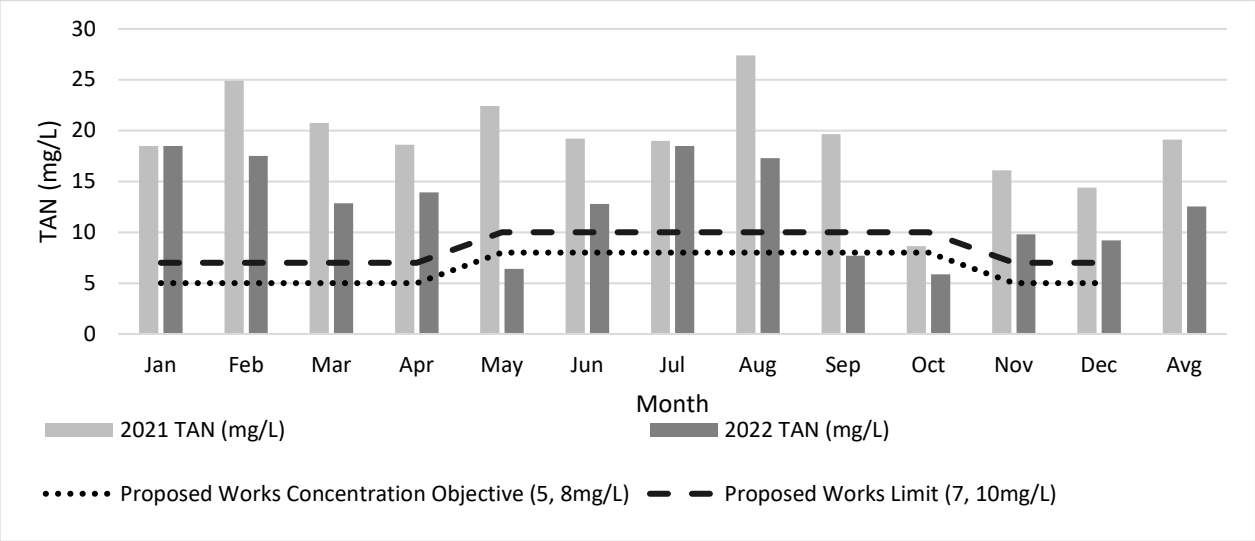


The annual average concentration for effluent Total Ammonia Nitrogen (TAN) in 2022 was 12.5mg/L. The annual loading of TAN was 52kg/d. There are currently no limits or objectives for TAN prior to construction of the proposed works. The proposed limits and objectives (upon completion of all proposed works) for TAN vary based on the freezing period:

- November 1st to April 30th - the objective is 5.0mg/L and the limit is 7.0mg/L.
- May 1st to October 31st - the objective is 8.0mg/L and the limit is 10.0mg/L.

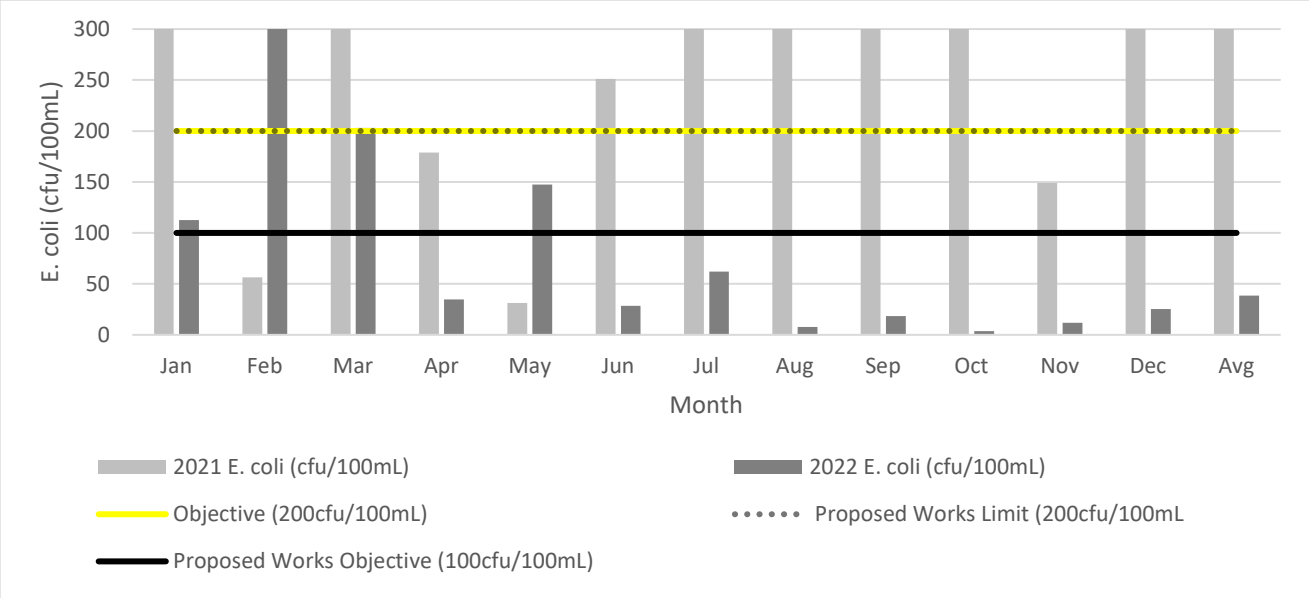
Once the proposed works are completed, the TAN concentrations will have to be monitored to ensure compliance of these limits and objectives. Refer to Graph 10 for the effluent monthly average concentrations of TAN for 2022 and 2021.

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 38.5cfu/100mL; this value has decreased by 692% from the annual geometric mean in 2021 (304.8cfu/100mL). The objective was exceeded during the months of February and March, 2022. Note: there is only an objective of 200cfu/100mL as stated in the ECA. Refer to Graph 11 for the effluent geometric mean for effluent E.coli for 2022 and 2021.

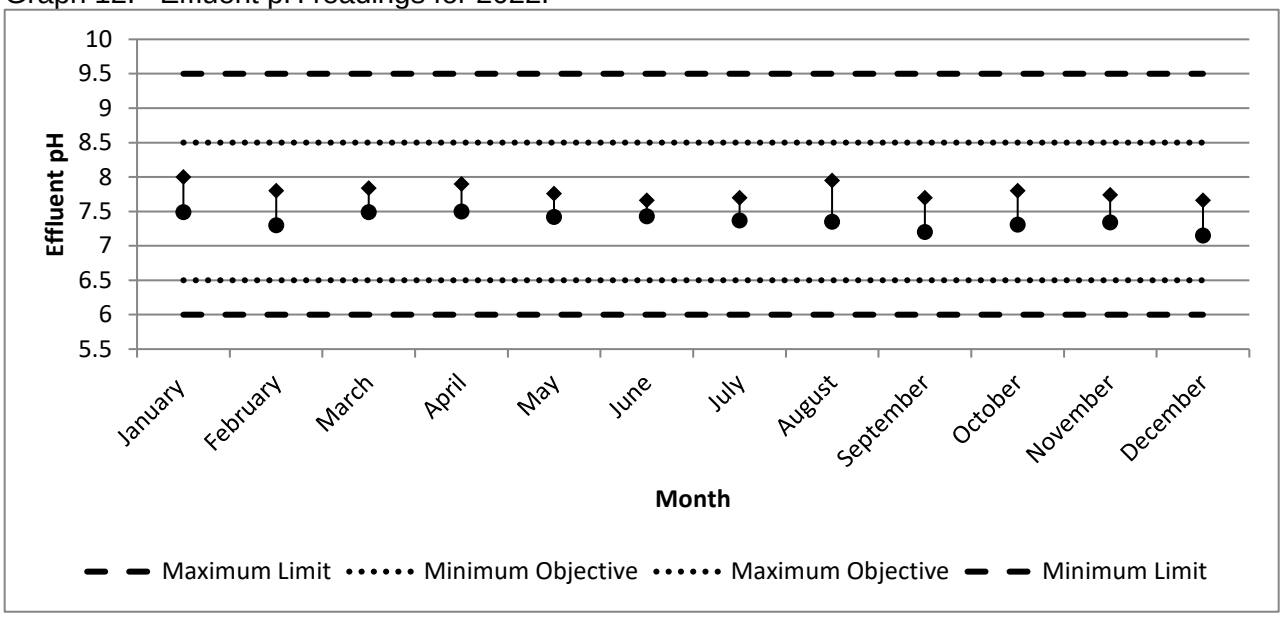
Graph 11. The effluent monthly geometric mean concentration of E.coli in 2022 compared to 2021.



The plant upgrades that are in the works are going to eliminate the chlorine dosing in replace of a UV system however, the interim works that were completed in April 2022 included moving the sodium hypochlorite line to the outlet of the existing secondary clarifiers. This modification increased the contact time and resulted in no objective exceedances for E.Coli for the remainder of 2022.

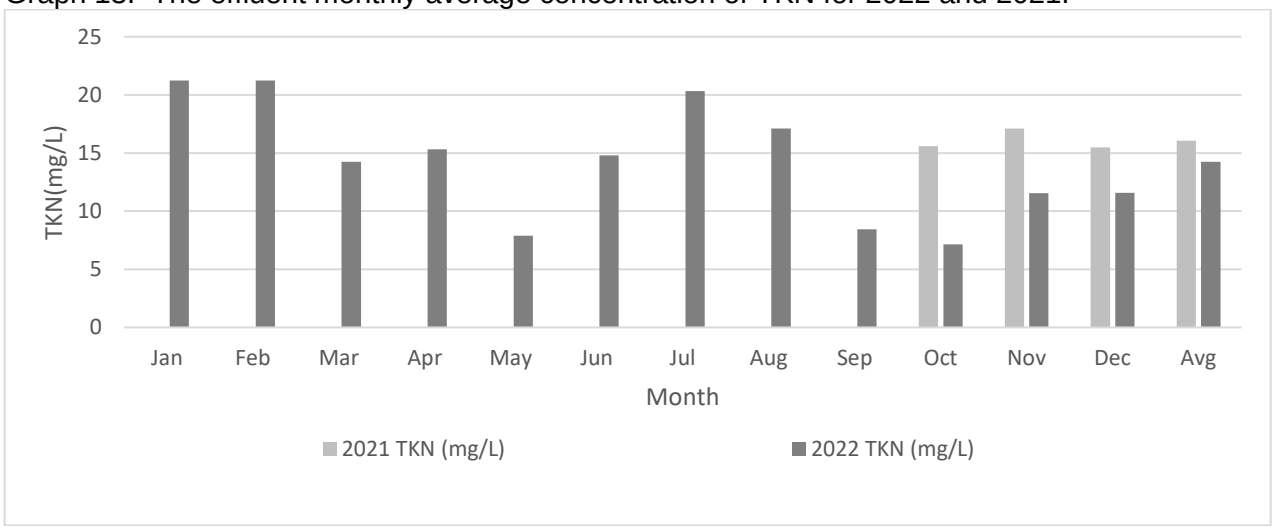
The effluent pH is monitored daily at a minimum at the Port Dover WWTP. Overall the plant has provided effective treatment as there have been no results below or above the compliance objectives or limits of 6.5-9.0 and 6.0-9.5 respectively in 2022. The pH is required to be maintained between 6.0-9.5 at all times. Refer to Graph 12 for the monthly minimum and maximum pH readings.

Graph 12. Effluent pH readings for 2022.



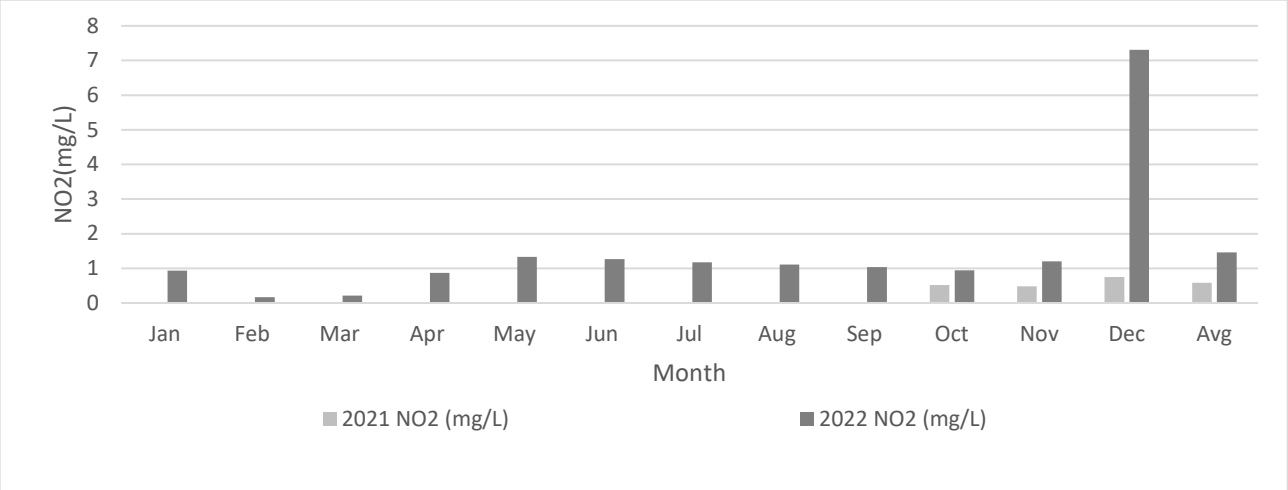
The annual average for effluent TKN in 2022 was 14.2mg/L. In 2021, TKN samples were only collected after OCWA started operating the facility in October. There are no limits or objectives for TKN. Refer to Graph 13 for the monthly TKN concentrations for 2022 and 2021

Graph 13. The effluent monthly average concentration of TKN for 2022 and 2021.

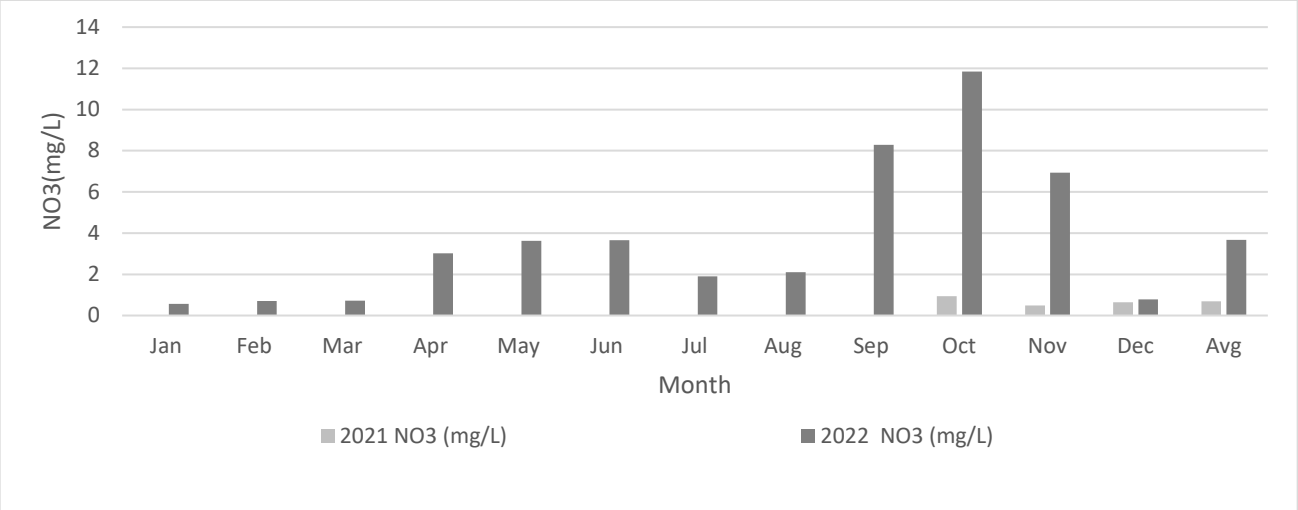


The annual average for effluent NO_2 in 2022 was 0.58mg/L and the average for effluent NO_3 was 0.69mg/L in 2022. In 2021, NO_2 and NO_3 samples were only collected after OCWA started operating the facility in October. There are no limits or objectives for NO_2 and NO_3. Refer to Graphs 14 and 15 for the NO_2 and NO_3 comparison for 2022 and 2021.

Graph 14. The effluent monthly average concentration of NO_2 in 2022 compared to 2021.

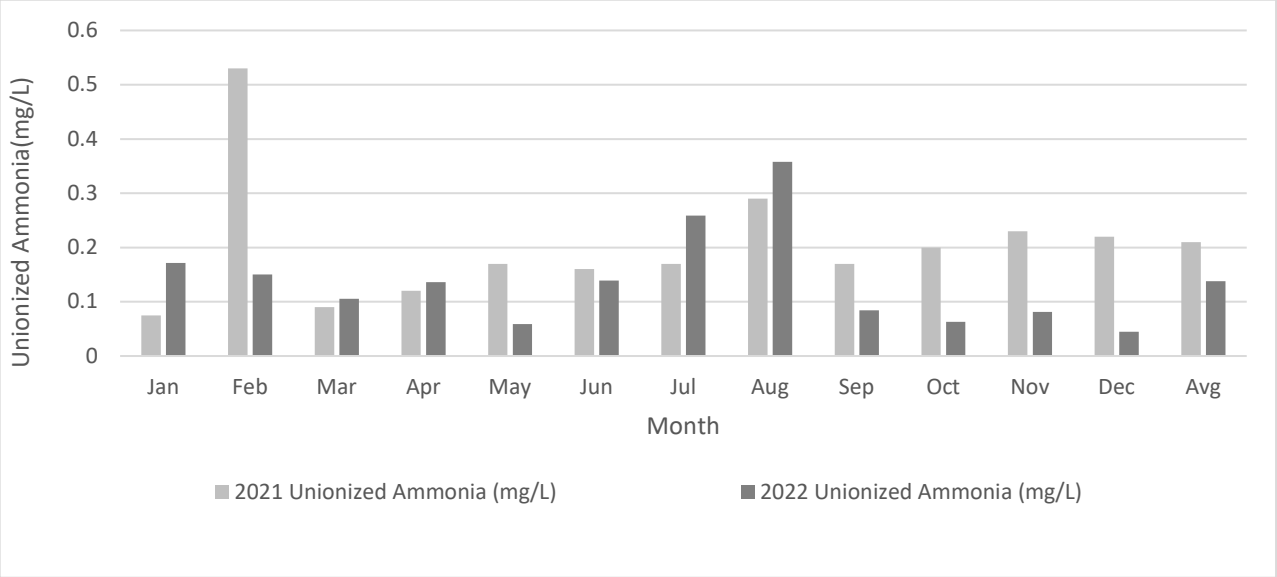


Graph 15. The effluent monthly average concentration of NO_3 in 2022 compared to 2021.



The annual average effluent concentration of unionized ammonia (as calculated) was 0.14mg/L in 2022. There is no limit or objective specified for unionized ammonia.

Graph 16. The effluent monthly average unionized ammonia in 2022 compared to 2021.



The Port Dover WWTP performed well in 2022 producing quality effluent meeting almost all the objectives and limits for all required parameters. As specified in the ECA, objectives are based on monthly average effluent concentrations. There were two (2) monthly geometric mean objective exceedances for E.coli. Refer below to Table 9 for a summary of objectives compared against the effluent results ranges. Each objective exceedance is identified in Table 10.

Section C: Operating Problems and Corrective Actions

1. The collection system is experiencing inflow and infiltration issues during rain and snow melt events. There were forty-three (43) days in 2022 where the daily flow rate exceeded the rated capacity. There are plant upgrades that will be taking place which include a higher design capacity for the facility. As part of the new CLI-ECA issued for the collections system, Norfolk County will be conducting inflow and infiltration studies to assist in the evaluation of the higher flows to the facility.

2. There were challenges in meeting E. coli objectives in the first quarter of 2022. The plant upgrades that are in the works are going to eliminate the chlorine disinfection system and replace it with a UV system. In the interim, works were completed in April which included moving the sodium hypochlorite line to the outlet of the existing secondary clarifiers. This modification increased the contact time and resulted in no objective exceedances for E.Coli for the remainder of 2022.

3. There were five (5) Dissolved Oxygen samples that were missed in 2022 and reported, as required, to the MECP. As per the ECA, daily sampling is required prior to the commencement of operation of the UV disinfection system. As a result of these missed samples, documentation has been updated to highlight the ECA requirements on the

laboratory in-house sampling sheets and the sample calendar. Training was provided on November 29th, 2022 to all operations staff on the Port Dover WPCP ECA and the changes completed on the in house documentation.

4. As required by the Environment Canada Wastewater System Effluent Regulations (WSER) acute lethality samples are required on a quarterly basis until four (4) consecutive samples pass (<50% mortality), then sampling can move to an annual basis. Any samples that resulted in >50% mortality were required to be reported to Environment Canada and sampled twice a month for three (3) consecutive samples in order to revert back to the quarterly sampling frequency.

   In 2022, the Port Dover WWTP collected the required acute lethality samples and continues to strive for four (4) consecutive quarterly samples. The table below shows every Acute Lethality sample collected in 2022 and the corresponding results.

   Table 6. Acute Lethality Results for 2022

Date	% Mortality	SAC Ref#
January 5	100	5007-CANHZ7
January 19	100	2875-CG7P4A
February 2	100	3805-CBHHG
February 16	20	-
March 2	100	0137-CCDMOX
March 16	100	4544-CCUBM
March 30	100	8488-CDGNYH
April 13	100	383-CDPM7T
April 27	0	-
May 11	0	-
May 25	0	-
July 27	100	7810-CGXP4K
August 10	100	6257-CHRTAX
August 24	40	-
September 7	0	-
September 21	0	-
November 23	0	-

5. There was an MECP Inspection conducted at the Port Dover WWTP on March 2, 2022 resulting in four non-compliances and three best management practices as outlined below. The identified items are being address/considered.

Table 7. Items Identified during the 2022 MECP Inspection

Item #	Issue Identified in Report/Order	Action/ Recommendation Identified in Report	Status (Complete or In Progress)
945100	Notices and written reports of all bypasses/overflows were not provided to the Ministry in accordance with the Environmental Compliance Approval. Section 6 of ECA Number 5437-BLYN9F issued April 9, 2020 states that, "The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient." It was noted that between August 15, 2020 and June 15, 2021 the quarterly reports were not submitted as required. The previous Operating Authority did not notice the changes in the ECA issued on April 9, 2020, they were only reporting on an annual basis as required by the previous ECA. The current operating authority has submitted the 3rd and 4th quarterly reports as required for 2021. The current Operating Authority is in compliance with the reporting requirements in Section 6 of the ECA (reporting on a quarterly basis).	N/A	N/A
940600	The owner was not in conformance with the designed rated capacity for average daily flow into the sewage works. The plant is a conventional activated sludge plant with a design rated capacity of 5,400 m3/d. There were several instances where the daily flow exceeded the average daily rated capacity. These incidents were due to wet weather events. In 2021 there were days that the designed capacity was exceeded. Compliance is assessed on the annual average, therefore these exceedances are not reportable, but does indicate a possible inflow/infiltration issue in the	**Action Required:** It is recommended that Norfolk County should consider initiating plant optimization studies and/or measures to assess and mitigate any Inflow and Infiltration impacts within the collection system	In Progress Norfolk County is looking at conducting inflow/infiltration studies to fulfill both this requirement as well as requirements established under the new CLI-ECA. Norfolk County is currently looking at the installation of flow meters within the collection system as

Item #	Issue Identified in Report/Order	Action/ Recommendation Identified in Report	Status (Complete or In Progress)
	collection system.		part of their 2023 capital projects to identify areas of concern in regards to I&I so that they can better focus their efforts.
940800	Flow measuring devices were not installed, calibrated and maintained in accordance with the requirements of the Environmental Compliance Approval. The Port Dover WWTP does not have a raw flow meter installed as required by ECA NUMBER 5437-BLYN9F. A flow meter is only installed on the effluent of the Waste Water Treatment Plant. The Port Dover WWTP does not have a raw flow meter installed as required by ECA NUMBER 5437- BLYN9F. A flow meter is only installed on the effluent of the Waste Water Treatment Plant. The effluent flow meter is utilized for the purpose of estimating influent flows.	**Action Required:** No further action required at this time. A flow meter is to be installed during the upcoming plant upgrades. Once the upgrades are commissioned the owner is to notify the Ministry that the work is complete.	In progress
942800	The sewage works effluent sample results did not meet the effluent objectives stated in the Environmental Compliance Approval. During 2021 there were two monthly average concentration objective exceedances for total phosphorus and 10 E-coli monthly geometric mean objective exceedance. During 2020 there were three monthly average concentration objective exceedances for total phosphorus and 4 E-coli monthly geometric mean objective exceedance. The objective for total phosphorus is 0.80 mg/l and the E.coli objective is 200 CFU/100 mL The ferrous chloride dosing strategy was reviewed in October 2021 and adjustments were made to target a lower effluent total phosphorous concentration well below the facilities effluent objective of 0.80 mg/L. In March 2022, the chlorine dose	N/A	N/A

Item #	Issue Identified in Report/Order	Action/ Recommendation Identified in Report	Status (Complete or In Progress)
	point has been relocated to the secondary clarifier outfall in order to maximize the chlorine contact time and improve the disinfection of the effluent to address the E-coli monthly geometric mean objective exceedances. Effluent objectives are not reportable.		
943500	All sewage works effluent sampling requirements prescribed by the Environmental Compliance Approval were not met. The weekly sampling requirements for Total Kjeldahl Nitrogen (TKN) was not from September 1, 2020 through September 2021 under the previous Operating Authority. The current Operating Authority is meeting all the effluent sampling requirements.	**Action Required:** No further action required at this time.	N/A
943600	All sewage works influent (raw sewage) sampling requirements prescribed by the Environmental Compliance Approval were not met. The current amended ECA states that imported sewage sampling is to be taken of a weekly basis. Between April 2020 and December 2021 the imported sewage sampling was only taken on a bi-weekly basis. Only half the required samples were taken during this time period. In January 2022 the Operating authority noted the changes in the ECA issued in April 2020 and began sampling the imported sewage as required.	**Action Required:** No further action is required at this time.	N/A
949000 (a)	During the inspection it was noted that the methane boiler was very old and that is has reached its life expectancy. The boiler uses methane gas produced from the sludge bio-digester located at the Port Dover WWTP and is used to heat all the buildings at the WWTP. The boiler was not included in the upcoming upgrades to the WWTP. It appears that this may have been an oversight by Norfolk County.	Actions Required: a) It is highly recommended that the owner (Norfolk County) considers installing a new methane boiler during the plant upgrades. It may be very difficult and expensive to replace the methane boiler	In Progress: R.V. Anderson and Associates have assessed the condition of the boiler and have recommended that the boiler be “pre-purchased” a head of the scheduled upgrades for the Port Dover WWTP.

Item #	Issue Identified in Report/Order	Action/ Recommendation Identified in Report	Status (Complete or In Progress)
		after upgrades are complete.	
949000 (b)	During the inspection period Norfolk County/ Operating Authority notified MECP on Acute lethality exceedances in accordance with their duties to notify, take corrective measures and report unauthorized deposits under subsections 38(5) to (7) of the Fisheries Act. Acute lethality is not a sampling requirement under the current ECA.	b) It is highly recommended that the owner ensure that all the Acute Lethality issues are addressed in the upcoming upgrades to the Port Dover WWTP.	In Progress: The Port Dover WWTP has had some recent success in passing the Acute Lethality Test as shown above in Table 6. The proposed upgrades should greatly improve the facilities ability to reduce effluent ammonia.

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 8. Major Maintenance Completed in 2022

Date	Maintenance Activities
January 13	Woodhouse pump station pump 2 breaker overload readjusted to prevent tripping
January 21	Replaced sodium hypochlorite dosing line
February 11	Septage hauler on site for wet well clean out at Donjon pump station
March 28	Contractor on site to complete lifting device inspections
March 28	Contractor on site to complete the gas meter calibrations
March 30	Contractor replaced gas valves on boiler
April 6	New support chains installed on sludge loading tower
April 6	Contractor at Lynn St pump station installing new float in dry well
April 8	Conveyor auger broken. Mechanical contractor re-welder, operations reinstalled.
April 14	Electrical contractor replaced GFCI outlet at hypo pump
April 20	Digester clean out
April 21	Replaced the raw sludge hose
April 26	Flow meter calibrations
May 9	Primary Clarifier #1 chain sprocket was pushed off shaft – replaced shear pin and realigned chain on August 19
June 20-24	Boiler tubes replaced by mechanical contractor.
July 12	Generator oil change and new fuel filter
July 21	Pump station wet well clean outs

Date	Maintenance Activities
August 16	Contractor replaced O2 and H2S sensor in pump gallery
August 22	Primary Clarifier #1 shear pin broken – sprocket worn out
August 30	Ryerse pump station contractor installed backflow preventer
September 9	Mechanical contractor re-aligned the drive chain on Final Clarifier #2
September 27	Contractors on site to replace the flare actuator
September 28	Pump station wet well clean out – Bridge Street
September 30	Contractors on site to install support wheels on Final Clarifier #2
October 21	Contractor on site to replace gas monitoring sensors
October 24	Mechanical contractor on site to install primary clarifier #1 drive chain and replace shear pin on primary clarifier #3
November 15	Contractor on site to complete backflow preventer inspections
December 1	Mechanical contractor on site to fix heat tracing for sodium hypochlorite line
December 2	Mechanical Contractor completed rebuild and re-install of return activated sludge pump #2
December 5	Plant Outfall relocation was completed as per the proposed works in the ECA.
December 5	ESA inspection completed
December 7	Contractor on site to install exhaust fan in sodium bisulphite pump room
December 12	Mechanical contractor on site to replace valve and piping on potable water line
December 15	Operations staff completed the chlorine contact chamber clean out
December 22	Mechanical Contractor replaced digester recirculation valves

Section E: Effluent Quality 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 and Maintenance on Effluent Monitoring Equipment

The Port Dover WWTP does not have an influent meter installed and utilizes the effluent flow meter for the purpose of estimating influent flows. The effluent flow meter was calibrated by SCG Flowmetrix on April 26, 2022. 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: Objective Exceedances & Best Efforts

Table 9. Effluent 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
$cBOD_5$	15.0	2.0-5.98	0	135.0	5.95-25.12	0
TSS	15.0	1.75-9.75	0	135.0	4.85-40.95	0
TP	0.80	0.27-0.77	0	5.4	1.22-2.85	0
E. coli (cfu/100mL)	200	3.6-346.3	2	n/a	n/a	n/a
pH*	6.5 – 9.0	7.15-8.00	0	n/a	n/a	n/a

*minimum and maximum result (not monthly averages)

Table 10. Effluent objective exceedances in 2022.

Date	Parameter	Concentration mg/L	Loadings kg/d	Issue and Proactive Actions Taken
02/2022	E.Coli	346.3*	n/a	Monitored Chemical Feed
03/2022	E.Coli	203.0*	n/a	Monitored Chemical Feed

*expressed as geometric mean (cfu/100mL)

The Port Dover WWTP performed well in 2022 producing quality effluent. There were two (2) objective exceedances in 2022 for E.coli. In order to ensure compliance, the operators continue to use best operating practices.

Section H: Sludge Handling and Generated

Sludge sampling results can be found in Appendix C. Sludge is removed from the Port Dover WWTP and taken to field for land application. The total volume generated in 2022 was 3,280.5m^3, refer to Table 11 below for the sludge disposal locations in April and November 2022.

It is expected that sludge generation and disposal in 2023 will be similar to 2022 with approximately 3,500m^3 being required to be removed from the Port Dover WWTP.

Table 11 Sludge Disposal Locations 2022.

Site	NASM#	Expiry	Lot	Con.	Township	Area Spread (ha)	Port Dover WWTP (m^3)	Dates Spread
OX1110	24975	2026	6	12	Norwich	20.73	610.0	April 5 & 6
HN1331	23484	2022	13 & 14	12	Townsend	11.14	620.5	April 8,11,18,22
HN1084	25183	2026	9 to 12	6 & 7	Townsend	17.1	625.0	Nov 10-18
HN1347	25183	2026	17 & 18	2	Townsend	22.3	1,425.0	Nov 19, 21,22
Total						**71.27**	**3,280.5**	

Section I: Complaints

There were no complaints received for the Port Dover WWTP in 2022. There was one (1) odour complaint made at the Brown Street Sewage pumping station on October 31, 2022. Operations staff investigated. There was no unusual activity that would have caused the odours at the station at the time of the complaint.

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

There were three (3) overflow events at the Bridge Street pumping Station in 2022, and one (1) overflow event at the Port Dover WWTP. Details of the events are as follows:

February 17, 2022

- Incident #1-1M97K: Bridge Street Pumping Station
- Volume: 760m^3
- Verbal and written notification sent to SAC for overflow at Bridge St. Sewage Pumping Station due to heavy rainfall overloading the facility.

February 22-23, 2022

- Incident #1-1MN9Q6: Bridge Street Pumping Station
- Volume: 439m^3
- Verbal and written notification sent to SAC for overflow at Bridge St. Sewage Pumping Station due to heavy rainfall overloading the facility.

March 23-24, 2022

- Incident #1-1P8336: Bridge Street Pumping Station
- Volume: 324m^3
- Verbal and written notification sent to SAC for overflow at Bridge St. Sewage Pumping Station due to heavy rainfall overloading the facility.

August 22, 2022

- Incident #1-235R95: Port Dover WWTP
- Volume: 1.1m^3
- Verbal and written notification sent to SAC for overflow at the Port Dover WWTP due to heavy rainfall overloading the facility.

Section K: Copy of Notice of Modifications Submitted

There were two (2) modifications to the process at the Port Dover WWTP that required a Notice of Modification to Sewage Works in 2022. The modifications were part of the interim works/proposed works for ECA#7884-C94HQT (Issued January 14, 2022). Communication and notifications were submitted to the MECP as required.

April 26, 2022 – Chlorination and Dechlorination

- The relocation of the sodium hypochlorite line from the chlorine contact chamber inlet to the outlet of the existing secondary clarifiers; and

- The addition of dechlorination chemical to the discharge of the existing chlorine contact chamber.

December 16, 2022 – Outfall Pipe Relocation

- The relocation of the 600mm diameter outfall pipe

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

The Port Dover WWTP is a conventional activated sludge treatment plant providing treatment by preliminary screening, primary clarification, aeration basins and secondary clarification. The final disinfection is provided by common chlorination/dechlorination. 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 Port Dover WWTP is required to achieve higher effluent quality standards than the Effluent guideline criteria as specified in the ECA.

There were no bypasses, three (3) overflow events in the collections system (at Bridge Street Pumping Station), and one (1) overflow event at the Port Dover WWTP for 2022 as discussed above in **Section J: By-pass, Spill or Abnormal Discharge Events**

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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 operation of major process(es) / equipment groups in the Proposed Works at the Port Dover WWTP in 2022.

Section N: Summary of Deviations from Monitoring Schedule

The current weekly sampling, as per the 2023 schedule, is completed on Thursdays.
There were two (2) deviations made to the monitoring scheduled in January 2022 due to a missed communication. The first two weeks of January were collected based on the 2021 sampling schedule on Wednesdays (January 5th and 12th) however, this was changed by the third week.

Refer to *Appendix D* for the monitoring schedule for 2023.

Appendix A: Port Dover WWTP Monitoring Data

Appendix B: Preventative Maintenance Schedule

Appendix C: Sludge Sampling Monitoring Data

Appendix D: 2023 Sampling Calendar