Ontario Clean Water Agency
Agence Ontarienne Des Eaux

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

March 28, 2025

Re: 2024 Annual Performance Report for the Waterford Water Pollution Control Plant, Sewage Pumping Stations and the Waterford Linear Infrastructure.

Attached is the 2024 Annual Performance Report for the Waterford Water Pollution Control Plant (WPCP) located at 678 Deer Park Road in Waterford, Norfolk County and all associated pumping stations (SPS's) and the Waterford linear infrastructure. This report has been completed in accordance with the following approvals:

- Section 11(4)(a) through (n) cited in Environmental Compliance Approval #7520-C7ZM73 issued on November 19, 2021 to the Corporation of Norfolk County.
- Schedule E, Section 4.6 cited in the Consolidated Linear Infrastructure – Environmental Compliance Approval #070-W601 issue number 1 issued on July 27, 2022 to the Corporation of Norfolk County

This report, as it pertains to the WPCP, the SPS's, and forcemains was prepared by the Ontario Clean Water Agency on behalf of Norfolk County, based on the information contained in our records. The information included in the reports on the Waterford gravity separate sewers was provided by Norfolk County.

The report covers the period from January 1, 2024 to December 31, 2024.

Sincerely,

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

Cc:
Stephanie Davis – Director, Environmental Services, Norfolk County
Shaun Earls - Manager, Water & Wastewater Compliance, Norfolk County
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*Appendices available by request

Introduction:

The Waterford Water Pollution Control Plant (WPCP) is a lagoon wastewater treatment system comprised of the following key components:

- Preliminary treatment – one (1) manually cleaned coarse bar screen, two (2) automatic bar screens in the distribution channel, two (2) manually raked bar screens in the bar screen/bypass channels that act primarily as backup for the automatic screens, two (2) shaftless conveyors in series discharging into the wash press. One (1) 3.0m diameter detritor.
- Secondary Treatment System – two (2) parallel Aerated Lagoons with fine bubble diffusers, one (1) Facultative Lagoon, two (2) parallel operated Submerged Attached Growth Reactor (SAGR)
- Post-Secondary Treatment System - Sand Filters **-** two (2) stage filtration system, each stage comprised of three (3) parallel filters
- Supplementary Treatment Systems - Phosphorus Removal - injecting solution upstream of each filter stage;
- Disinfection System - UV disinfection system comprised of two (2) banks of UV lamps (one standby)

The Nexom optAER System is a lagoon-based biological wastewater treatment system. Biological wastewater treatment is achieved through bacterial breakdown of organic matter in the waste stream. Using oxygen provided by the aeration system, a range of bacteria consume and degrade the contaminants in the wastewater (BOD5, NH3, and TSS) into carbon dioxide, water, and nitrates. Aerobic treatment systems effectively control odor, and provide for internal sludge digestion.
The Nexom optAER wastewater treatment system at the Waterford, ON facility uses a Submerged Attached Growth Reactor (SAGR) Aeration System. The Submerged Attached Growth Reactor (SAGR) is primarily designed to provide nitrification (ammonia removal) in cold to moderate climates. The SAGR follows the aerated lagoons in the process flow. The SAGR is essentially a clean gravel bed with evenly distributed wastewater flow across the width of the cell, and a collection chamber at the end of the treatment zone. LINEAR aeration throughout the floor of the SAGR provides aerobic conditions that are required for nitrification. The gravel bed is covered with a layer of wood chips or mulch for insulation.
Raw Wastewater Collection

Aerated Lagoons

Two (2) aerated lagoons operating in parallel with a total volume of approximately 19,256m3 equipped with suspended fine bubble diffuser systems and two (2) 30HP blower units for process air supply.

Facultative Lagoon

One (1) facultative lagoon with a volume of approximately 91,053m3 a pump chamber (named "SAGR Influent Pump Chamber"), equipped with two (2) 8.9 kW (12HP) submersible pumps (1 duty, 1 standby) with variable frequency drives, each rated at 51 L/sat a TDH of 11.6m, discharging the Facultative Lagoon's effluent to an Influent Splitter Box of the Submerged Attached Growth Reactor process Submerged Attached Growth Reactor (SAGR), one (1) flow distribution chamber directing flow to different locations in the SAGR system as required, via an Influent Splitter Box arrangement complete with four (4) 250mm long flat plate overflow weirs for flow distribution and SAGR cell isolation as required; two (2) parallel operated SAGR cells, each 75 m long with a liquid depth of 2m.

Post-Secondary Treatment

Sand Filters

one (1) Filter Influent Pumping Chamber equipped with two (2) 14.9 kW (20 HP) submersible pumps (1 duty 1 standby) with variable frequency drives, each pump rated at 51 L/s at a TDH of16.5 m, pumping flow to a Sand Filtration System; a Blue PRO® deep-bed Sand Filtration System, consisting of 2 stages in series, each stage comprising three (3) parallel filters (2 duty 1 standby), each filter has a Peak Hourly Flow Rate of 91.7 m3/h and is a moving bed with a media depth of 1.5 m, configured with continuous airlift backwash control; one (1) Reject / Drain Pump Chamber, equipped with two (2) 8.2 kW (11 HP) submersible pumps (1 duty 1 standby) with variable frequency drives, each pump rated at 12.7 L/s at a TDH of 10.1 m, returning backwash water and process drain flows back to the front end of the Facultative Lagoon (the returning point to be relocated to upstream of the Aerated Lagoons, see Proposed Work);

Supplementary Treatment

Phosphorus Removal

Two (2) chemical (ferric chloride solution, or equivalent) storage tanks, each with a working capacity of 13,200 L; Four (4) metering pumps (1 duty 1 standby for each stage 1 and 2), each rated at 0-120 L/h; Dual-point injection: the first injection point upstream of the first stage filters, the second injection point on the first stage filter effluent ahead of the second stage filters.

Disinfection Phase

One (1) floor-mounted UV disinfection package system (model: Trojan UV3000PTP, or equivalent), with a Peak Hourly Flow Rate of 183 m3/h, consisting of two (2) banks of low pressure UV lamps (1 duty 1 standby) configured in series: each bank capable of disinfecting the maximum pumped flow of 4,400 m3/d; installed in a single channel measured 5,842 mm length x 872 mm width (outer dimension) x 586 mm SWD; one (1) 300 mm diameter UV bypass pipe, located immediately upstream of the UV system and discharges immediately downstream of the UV channel;

Sludge Management System

Biosolids Removal and Disposal - sludge periodically removed from the lagoons by licensed hauler for offsite storage/disposal/land application;

Standby Power

The headworks building generator is a Cummins DFEJ-2140344:6500L Diesel.
The filter building generator is a Cummins DSGAC-1864989: 2000L Diesel with approximately 75 Hours of run-time at 50% load

Sewage Pumping Stations

The Norfolk County Municipal Wastewater Collection System is made up of five separate wastewater collection systems. The Waterford wastewater collection system (population 4,227) conveys sewage to the Waterford Wastewater Treatment Facility through a total of 33 kilometres of gravity separate sewers, 3.2 kilometres of forcemains and three (3) sewage pumping stations. For additional information on the individual SPS's listed below, please refer to CLI-ECA #070-W601 Issue #1

- WW479 – Blueline Road SPS located at 2270 Blueline Road in Waterford Ontario. Blueline Rd SPS is a duplex pumping station equipped with 2 pumps (1 duty, 1 standby), with a wet well of 28m^3 capacity. The station is connected to a 200 mm diameter forcemain discharging to manhole located at 225 St. James Street South.
- WW420 – Deer Park Road Main SPS located at 28 Deer Park Road in Waterford Ontario. Deer Park Rd Main SPS is a duplex pumping station equipped with 2 pumps (1 duty, 1 standby), with a wet well of 169m^3 capacity. The station is connected to a 350 mm diameter forcemain discharging to the Waterford WWTP located at 678 Deer Park Road in Waterford.
- WW422 – Deer Park Road Mini SPS located at 28 Deer Park Road in Waterford Ontario. Deer Park Rd Mini SPS is a duplex pumping station equipped with 2 pumps (1 duty, 1 standby), with a wet well of 3m^3 capacity. The station is connected to a 50 mm diameter forcemain discharging to the Deer Park Road Main SPS wet well located at 28 Deer Park Road in Waterford.

Waterford WPCP Facts:

Environmental Compliance Approval:	ECA 7520-C7ZM73 (issued November 19, 2021)
Rated Capacity:	2,200m^3/day
Receiving Water:	Nanticoke Creek

For 2024, the Waterford WPCP was operated in accordance with provincial regulations as required in ECA #7520-C7ZM73 (ECA) issued November 19, 2021. The following report is presented such that it corresponds with ECA #7520-C7ZM73 Section 11(4) (a) through (n) and satisfies the requirements for the sewage pumping stations and the Waterford linear infrastructure in CLI-ECA #070-W601 Issue #1 dated July 27, 2022.

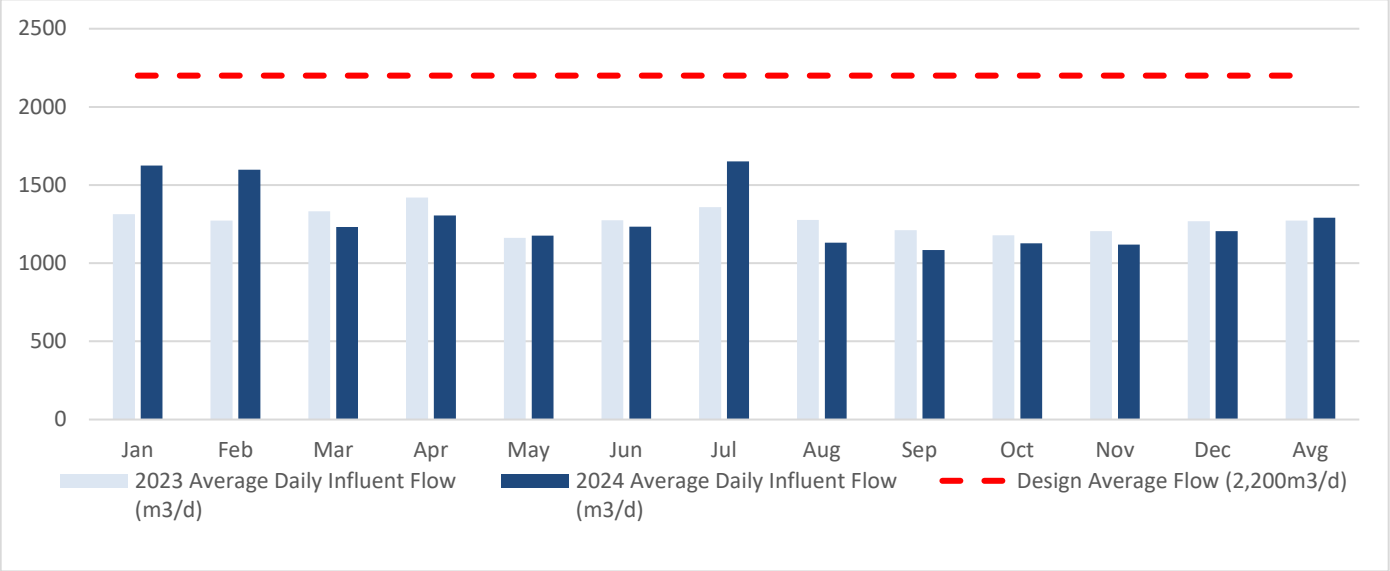
Section A: Influent Monitoring Data

In accordance with ECA#7520-C7ZM73 dated November 19, 2021 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

As the headworks is not fully commissioned with an influent flow meter, the average daily flow of raw wastewater (influent) to the Waterford WPCP was estimated to be 1,433m^3/d in 2024 based on an in house flow calculator. The following Graph 1 shows the average daily influent flows per month for 2024 compared to 2023.

Graph 1. Influent average daily flows for 2024 compared to 2023

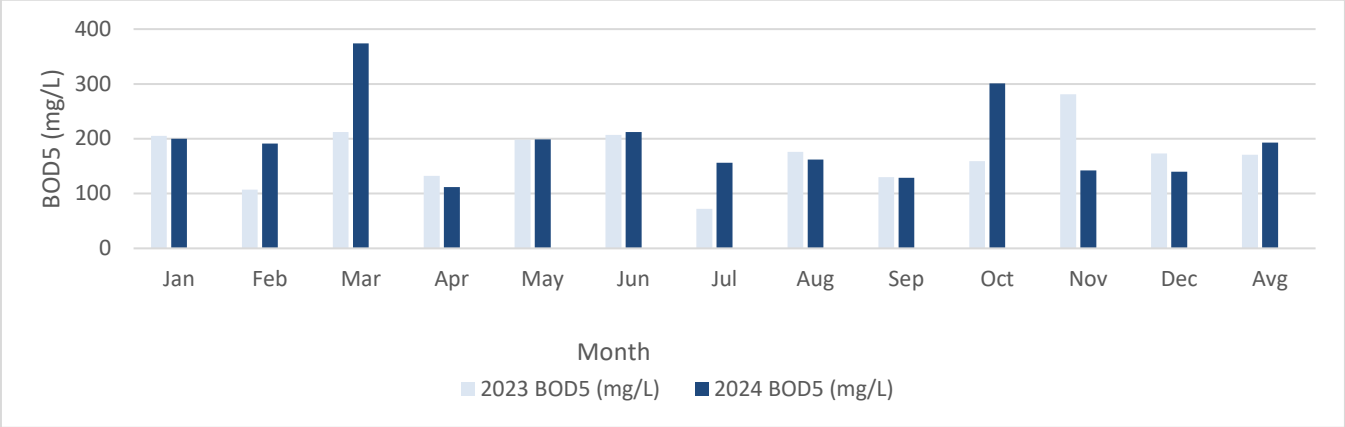


(II) Influent Data

The influent is monitored for BOD_5, total suspended solids (TSS), total phosphorus (TP) and total kjeldahl nitrogen (TKN) on a monthly basis (minimum) by means of a composite sample. The plant was designed to treat based on influent characteristics identified in the Operations Manual from the design engineers. Refer to Appendix A for more detailed monthly results.

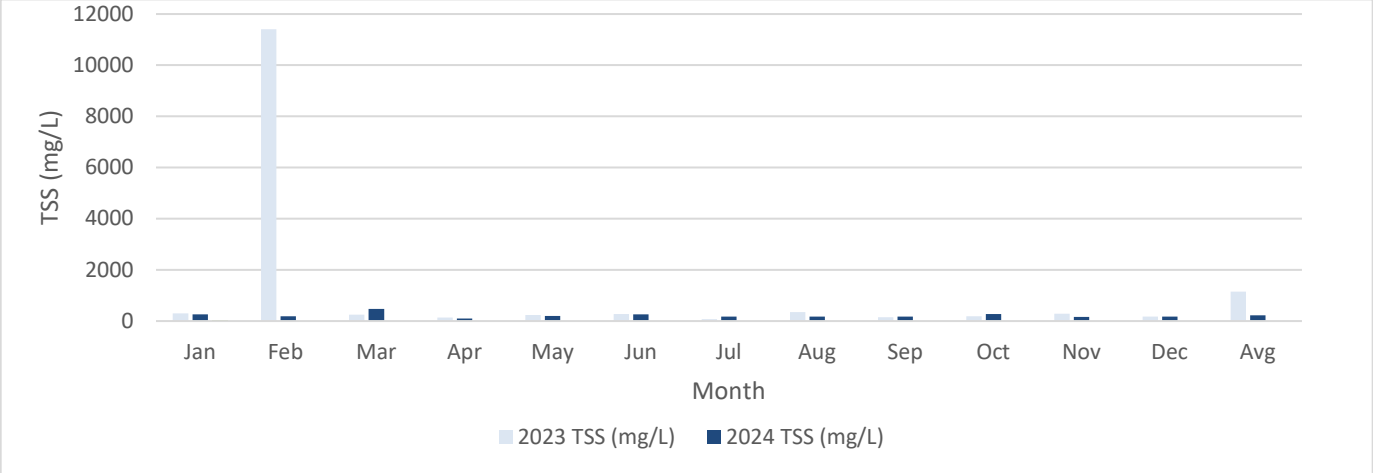
The annual average influent BOD_5 concentration to the plant in 2024 was 193mg/L. This is an increase from 2023 by 11.5%. Refer to Graph 2 for a comparison of monthly concentrations in 2024 and 2023.

Graph 2. Influent monthly average concentration of BOD_5 for 2024 compared to 2023.



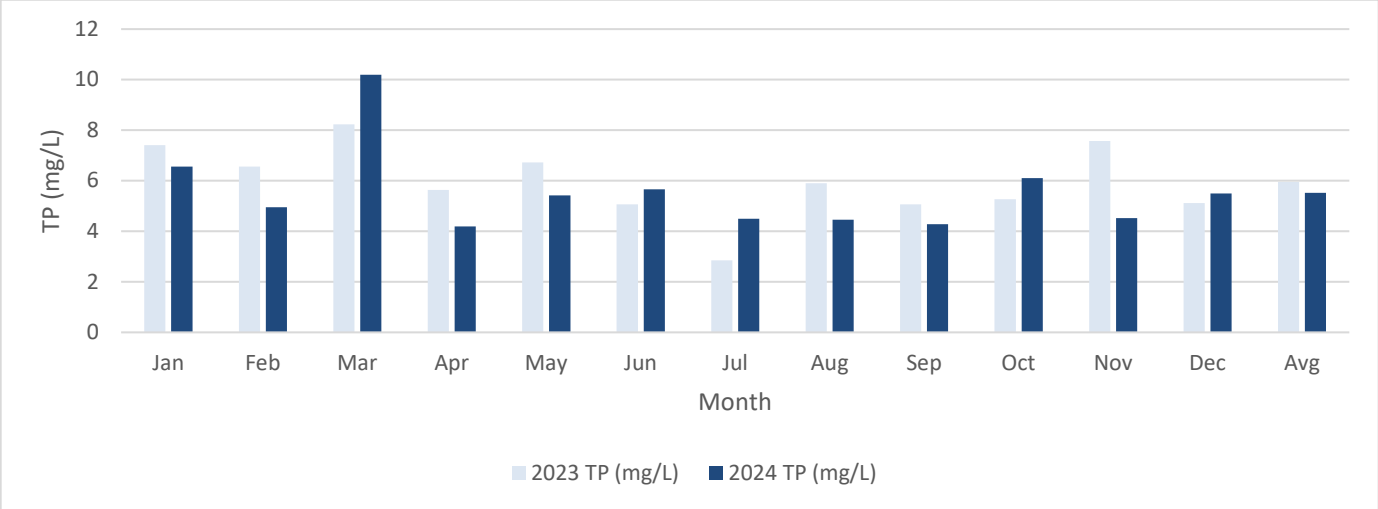
The annual average influent total suspended solids (TSS) concentration to the plant in 2024 was 220mg/L. This is a decrease from 2023 by 424% due to the high outlier result obtained in February of 2023 as discussed in the 2023 annual report. Refer to Graph 3 for a comparison of monthly concentrations in 2024 to 2023.

Graph 3. Influent average monthly concentration of TSS for 2024 compared to 2023



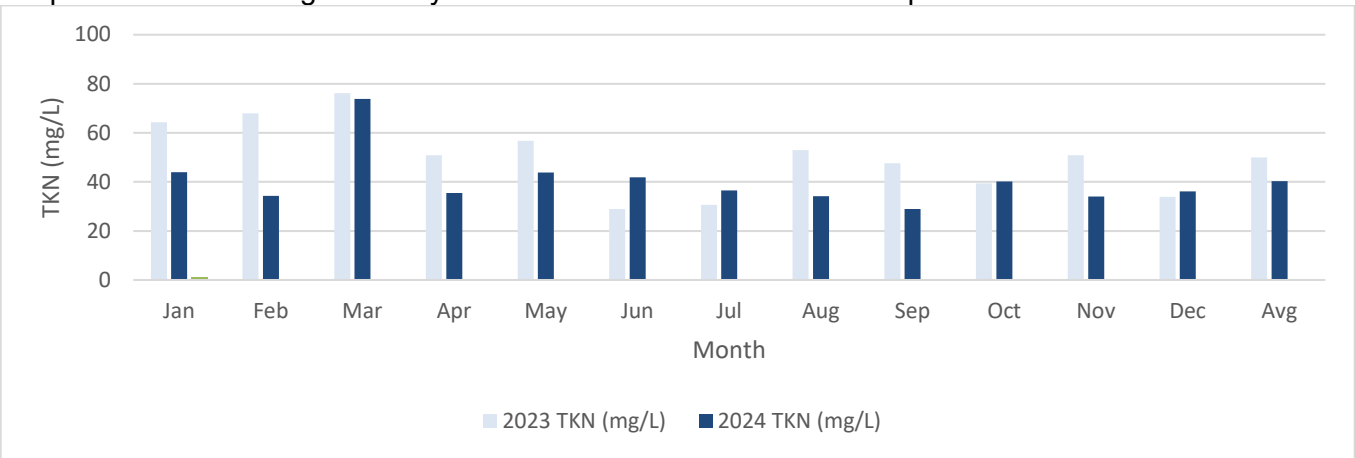
The annual average influent total phosphorus (TP) concentration to the plant in 2024 was 5.53mg/L. This is a decrease from 2023 by 7.6%. Refer to Graph 4 for a comparison of monthly concentrations in 2024 to 2023.

Graph 4. Influent average monthly concentration of TP for 2024 compared to 2023.



The annual average influent total kjeldahl nitrogen (TKN) concentration to the plant in 2024 was 40.3mg/L. This is a decrease from 2023 by 24.2%. Refer to Graph 5 for a comparison of monthly concentrations in 2024 compared to 2023.

Graph 5. Influent average monthly concentration of TKN for 2024 compared to 2023.



The influent characteristics have remained consistent throughout 2024 although a slight increase was noted on the BOD_5 concentrations while a slight decrease was noted on the TSS, TP and TKN concentrations when compared to 2023.

(III) Sewage Pumping Station Monitoring Data

As per the CLI-ECA Schedule E Condition 4.6.3, a summary and interpretation of monitoring data for the SPS's is included below. There are no flow meters at the Waterford SPS's. The following Tables 1 and 2, show the total pump run time hours for each station in 2024 compared to 2023. There is no additional monitoring data that required interpretation or conclusions for the Waterford sewage pumping stations in 2024. There is no need for future modifications to the sewage pumping stations at this time.

Table 1. Pump Run Hours for the Waterford SPS's in 2024 and 2023

Sewage Pumping Station (SPS)	Year	Pump #1 (hours)	Pump #2 (hours)
Blueline Road	2023	1015.90	951.20
	2024	1091.30	1018.10
Deer Park Road Main	2023	2098.65	2341.50
	2024	1729.15	1832.70
Deer Park Road Mini	2023	28.60	26.40
	2024	29.00	24.80

Table 2. Total Pump Run Hours for the Waterford SPS's in 2024 compared to 2023

Sewage Pumping Station (SPS)	Total Hours 2023 (hours)	Total Hours 2024 (hours)	Percent Change (%)
Blueline Road	1967.10	2109.40	+7.2%
Deer Park Road Main	4440.15	3561.85	-19.8%
Deer Park Road Mini	55.00	53.80	-2.2%

(IV) Imported sewage

There was no imported sewage received at the Waterford WPCP in 2024.

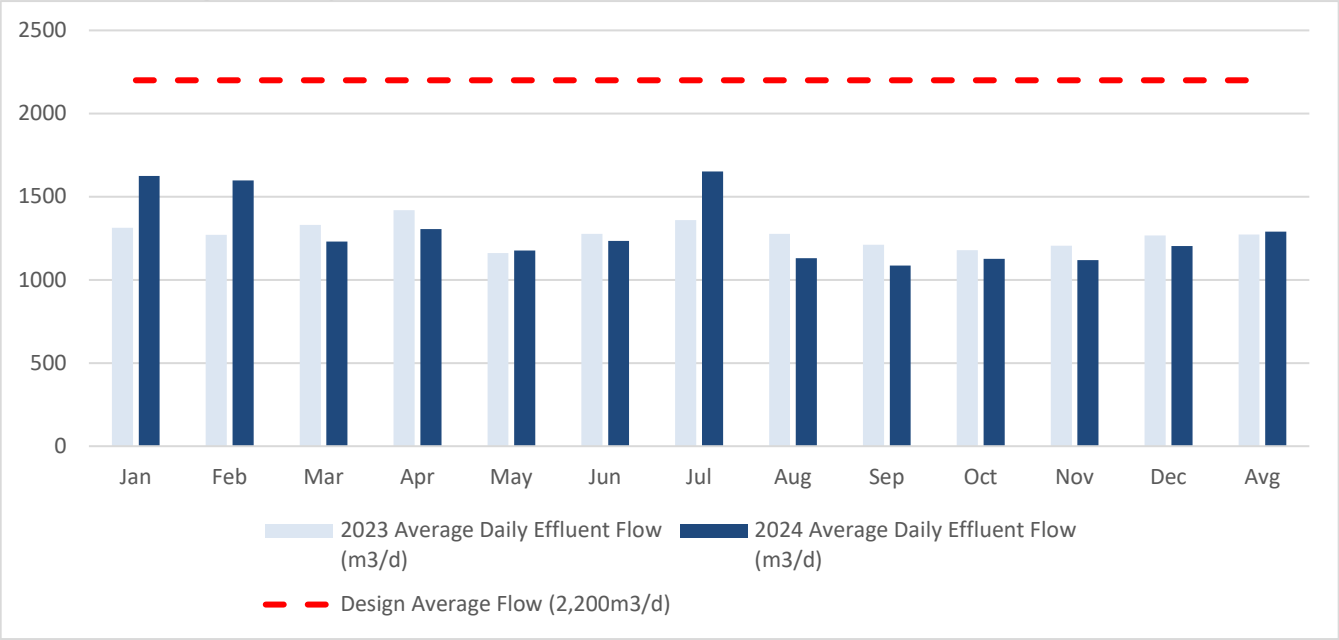
Section B: Effluent Monitoring Data

In accordance with ECA #7520-C7ZM73 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 Waterford WPCP was 1,291m^3/d in 2024 which is 58.7% of the rated capacity of 2,200m^3/d. This is a 1.4% increase in flow compared to the 2023 average daily flow of 1,273m^3/d. The following Graph 6 shows a comparison of the average daily flows per month for 2024 and 2023 compared to the rated capacity of the facility.

Graph 6. Average monthly flows in 2024 compared to 2023.



(II) Effluent Data

The final effluent at the Waterford WPCP is sampled on a weekly basis and tested for $cBOD_5$, total suspended solids, total phosphorus, total ammonia, total kjeldahl nitrogen, nitrate as nitrogen, and nitrite as nitrogen by means of a composite sample. A grab sample is collected weekly and tested for E.coli, pH and temperature. The un-ionized ammonia is calculated using the total ammonia concentration and the pH and temperature determined in the field at the time of sampling for TAN.
Detailed results of the data can be found in Appendix A. The following Tables 3, 4 and 5 show the

monthly average effluent results of the composite samples, the monthly geomean and ranges of the grab samples, and a comparison to the loading limits respectively.
Acronyms: n/a = not applicable

Table 3. Monthly average effluent results for 2024 obtained from weekly composite sampling.

Month	cBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)	NO2 (mg/L)	NO3 (mg/L)	TKN (mg/L)
January	2.0	3.0	0.09	0.03	0.005	15.1	1.0
February	2.0	2.4	0.07	0.03	0.005	13.9	0.9
March	2.0	1.5	0.06	0.03	0.004	10.9	0.8
April	2.0	1.8	0.08	0.03	0.005	10.4	0.8
May	2.0	2.8	0.07	0.03	0.015	12.4	0.7
June	2.0	2.0	0.06	0.04	0.006	8.8	0.6
July	2.0	3.8	0.04	0.03	0.006	3.3	0.7
August	2.0	1.0	0.04	0.03	0.042	1.6	0.5
September	2.0	1.0	0.03	0.03	0.006	2.8	0.6
October	2.1	1.6	0.04	0.13	0.037	5.3	0.8
November	2.0	1.5	0.04	0.03	0.004	8.1	0.7
December	2.0	2.5	0.05	0.10	0.013	10.7	1.1
Average	**2.0**	**2.1**	**0.06**	**0.05**	**0.012**	**8.6**	**0.8**
Objective	4.0	7.0	0.08	*0.6, 1.0, 3.0	n/a	n/a	n/a
Limit	6.0	10.0	0.1	*0.7, 2.0, 5.0	n/a	n/a	n/a

*The TAN objectives and limits are based on temperature as per the ECA

Table 4. Monthly effluent geomean and ranges for 2024 obtained from weekly grab samples.

Month	E. coli (cfu/100mL) Geometric Mean	pH Min – Max Range	Temperature (°C)	Un-ionized Ammonia (mg/L) As calculated
January	1.4	7.53-8.09	6.9	0.0002
February	1.0	7.15-7.97	8.6	0.0002
March	1.0	7.14-7.58	9.7	0.0001
April	1.0	7.14-7.64	12.4	0.0001
May	1.0	7.06-7.28	18.2	0.0001
June	1.0	7.04-7.76	21.3	0.0004
July	1.0	7.22-7.61	23.5	0.0004
August	1.0	7.23-7.47	23.4	0.0003
September	1.0	7.18-7.78	21.8	0.0003
October	1.5	7.22-7.99	17.7	0.0016
November	1.0	7.34-7.83	13.7	0.0003
December	1.0	7.20-7.79	7.8	0.0004
Average	**1.1**	**7.04-8.09**	**15.4**	**0.0004**
Objective	100	6.0-8.5	n/a	n/a
Limit	200	6.0-9.5	n/a	n/a

Table 5. Monthly average loadings for 2024.

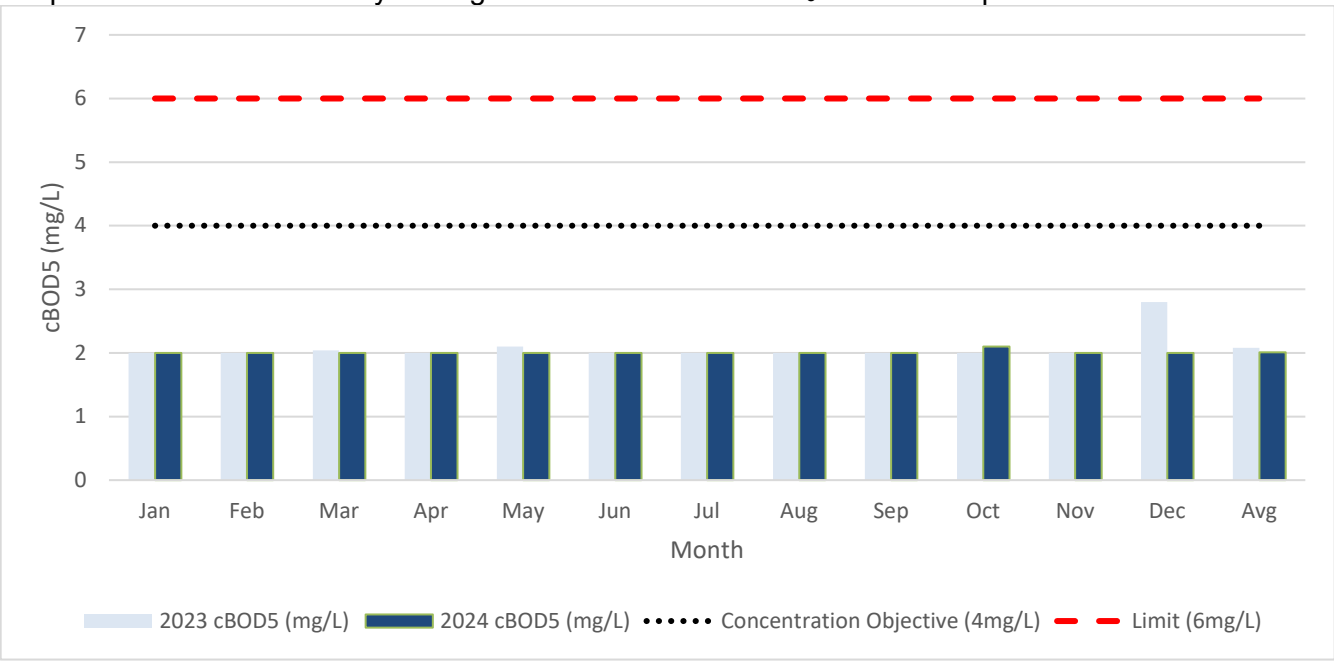
Month	cBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	TAN (kg/d)
January	3.25	4.87	0.15	0.05
February	3.20	3.84	0.11	0.05
March	2.46	1.85	0.07	0.04
April	2.61	2.35	0.10	0.04
May	2.35	3.29	0.08	0.04
June	2.47	2.47	0.07	0.05
July	3.30	6.19	0.07	0.05
August	2.26	1.13	0.05	0.03
September	2.17	1.09	0.03	0.03
October	2.37	1.80	0.05	0.15
November	2.24	1.68	0.04	0.03
December	2.41	3.01	0.06	0.12
Average	**2.59**	**2.80**	**0.07**	**0.06**
Limit	12.3	22.0	0.22	1.5, 4.4, 11.0

*The TAN objectives and limits are based on temperature as per the ECA

(III) Comparison to Compliance Limits and Objectives

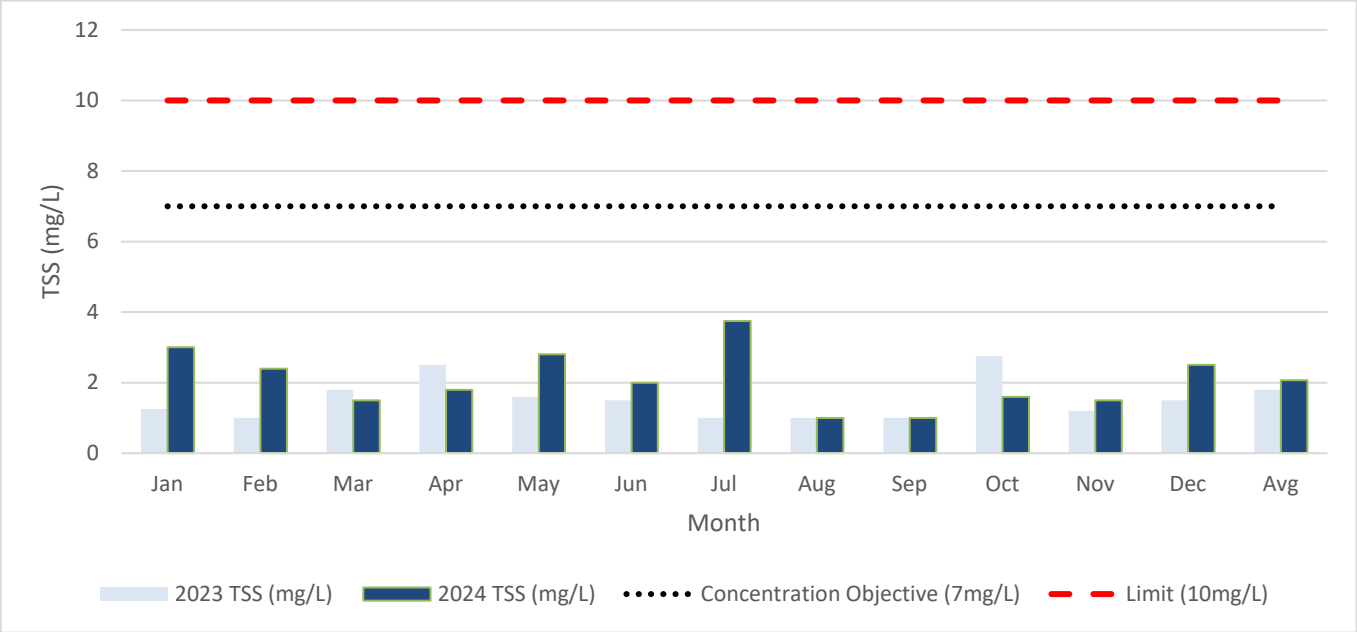
The annual average for effluent $cBOD_5$ in 2024 was 2.0mg/L; this value has decreased by 3.5% compared to 2023. The annual loading of $cBOD_5$ was 2.59kg/d. The design objective, compliance limit and the loading limit for $cBOD_5$ were not exceeded in 2024. Refer to Graph 7 for a comparison of effluent monthly average concentration of $CBOD_5$.

Graph 7. The effluent monthly average concentration of $cBOD_5$ in 2024 compared to 2023.



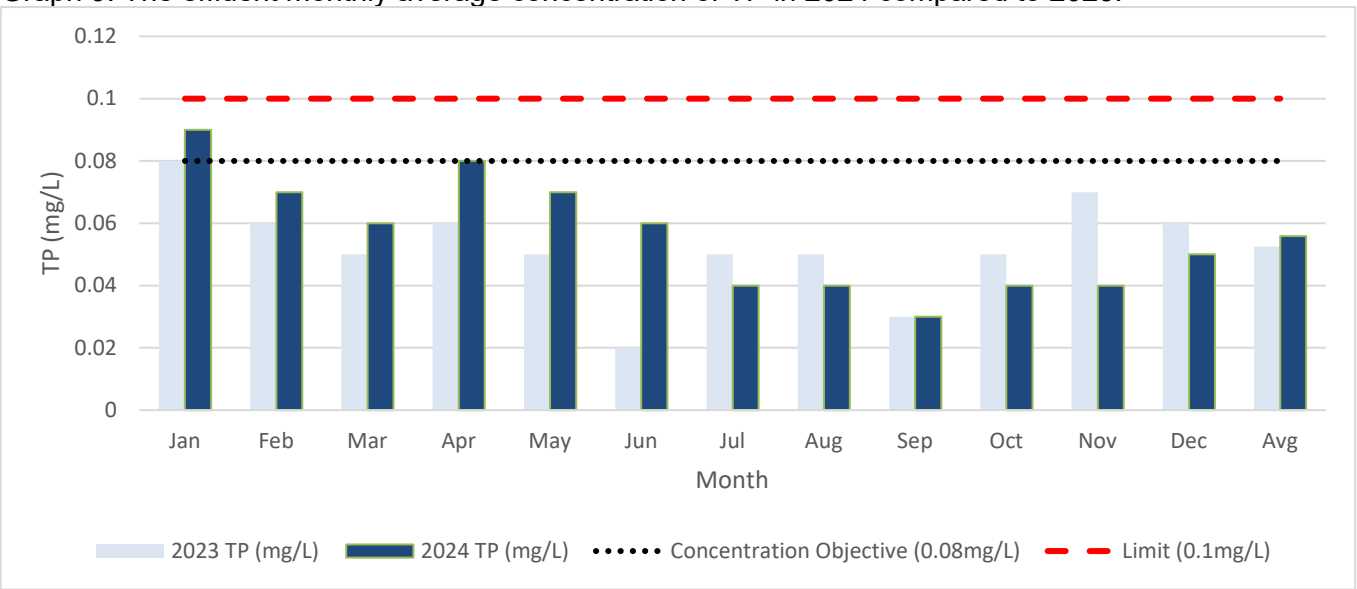
The annual average for effluent TSS in 2024 was 2.1mg/L; this value has increased by 13% compared to 2023.The annual loading of TSS was 2.80kg/d. The design objective, compliance limit and the loading limit for TSS were not exceeded in 2024. Refer to Graph 8 for the effluent monthly average concentration of TSS.

Graph 8. The effluent monthly average concentration of TSS in 2024 compared to 2023.



The annual average for effluent TP in 2024 was 0.06mg/L.; this value has increased by 6% compared to 2023. The annual loading of TP was 0.07kg/d. The compliance limit and the loading limit for TP were not exceeded in 2024. The concentration objective was exceeded one (1) time in 2024 as discussed below in ***Section F: Objective Exceedances & Best Efforts.*** 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 2024 compared to 2023.

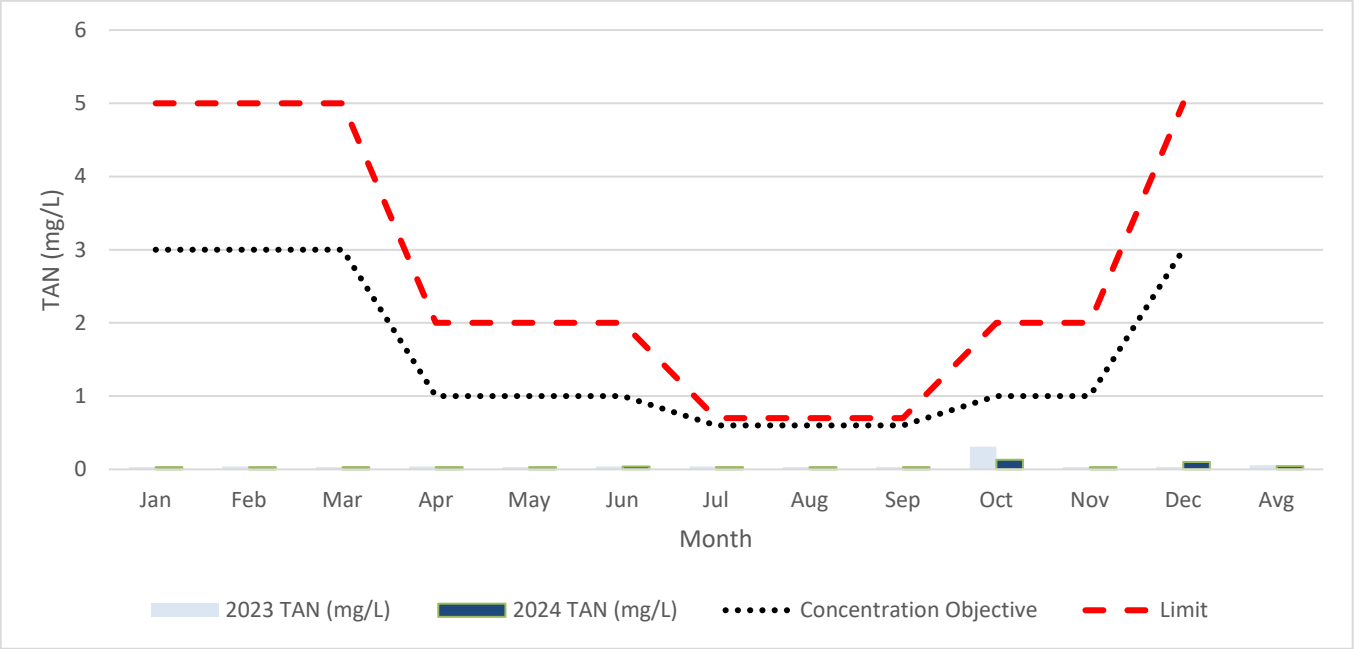


The annual average for effluent Total Ammonia Nitrogen (TAN) in 2024 was 0.05mg/L. The annual loading of TAN was 0.06kg/d. The limits and objectives for TAN are based on temperature:

- Dec 1st to March 31st – limit is 5.0mg/L, objective is 3.0mg/L
- April 1st to June 30th & Oct 1st to Nov 30th - limit is 2.0mg/L, objective is 1.0mg/L.
- July 1st to Sept 30th – limit is 0.7mg/L, objective is 0.6mg/L

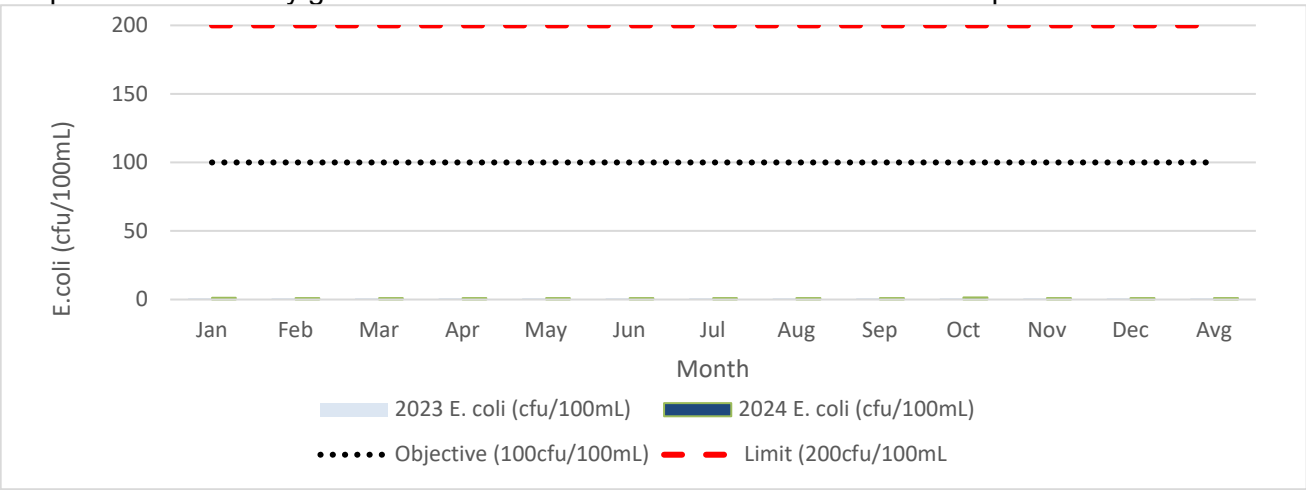
The design objective, compliance limit and the loading limit for TAN were not exceeded in 2024. Refer to Graph 10 for the effluent monthly average concentrations.

Graph 10. The effluent monthly average concentration of TAN in 2024 compared to 2023.



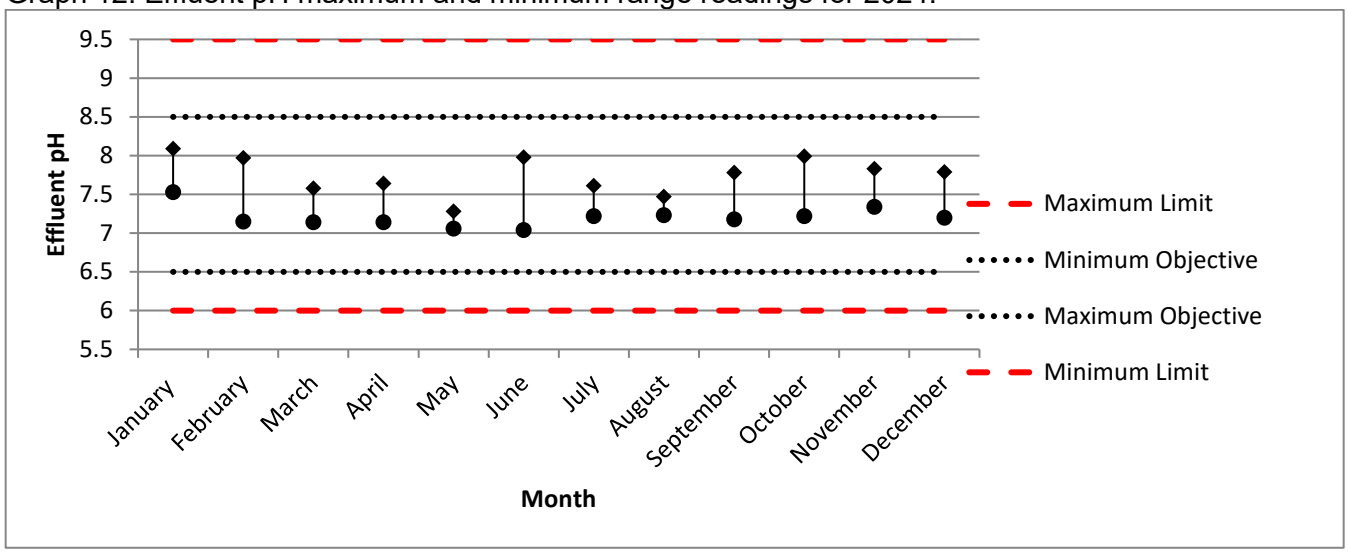
The annual geometric mean for effluent E. coli in 2024 was 1.1cfu/100mL; this value has increased by 6% compared to 2023. The design objective and compliance limit for E.Coli was not exceeded in 2024. The objective for E.coli is 100cfu/100mL and the limit is 200cfu/100mL.

Graph 11. The monthly geometric mean concentration of E. coli in 2024 compared to 2023.



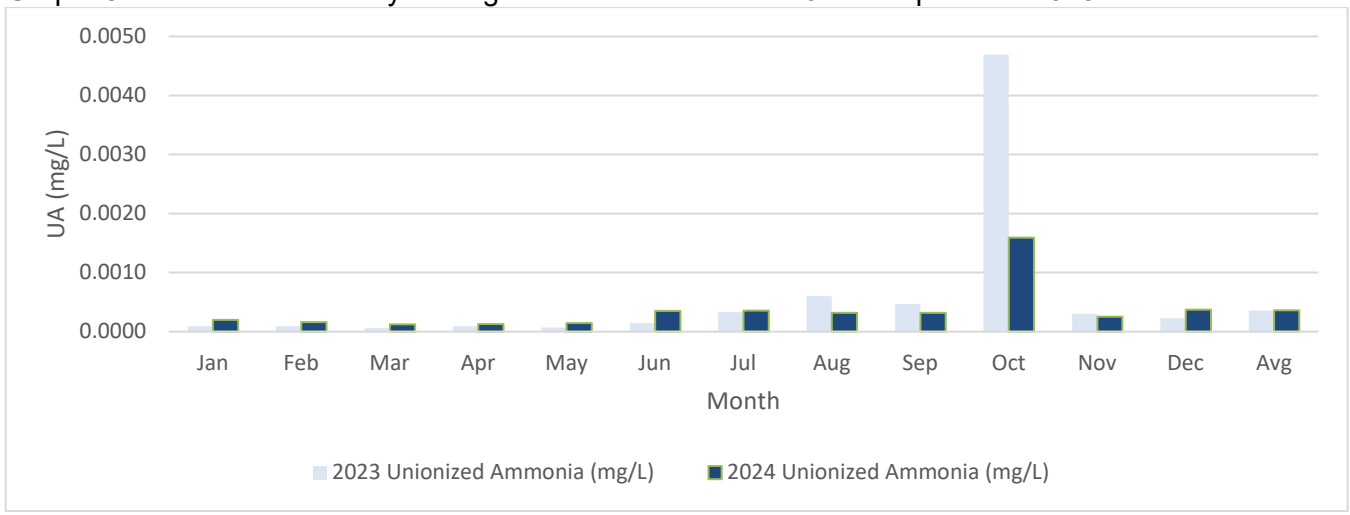
The effluent pH is monitored weekly, at a minimum, at the Waterford WWTP. Overall the plant has provided effective treatment as there were no results below or above the design objectives of 6.5-8.5 or the compliance limits of 6.0-9.5 in 2024. Refer to Graph12 for the monthly minimum and maximum ranges for the 2024 pH readings.

Graph 12. Effluent pH maximum and minimum range readings for 2024.



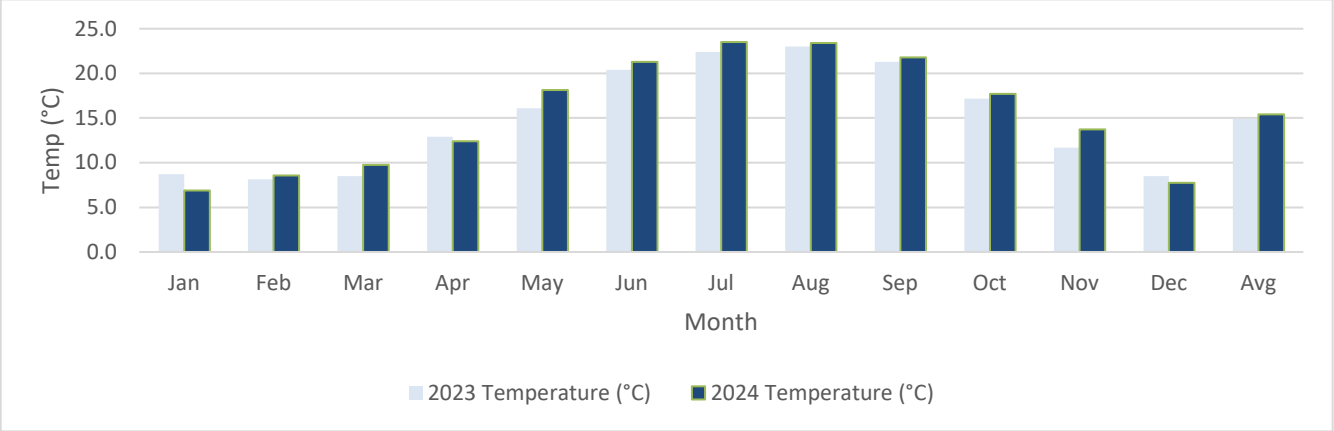
The annual average for effluent unionized ammonia (UA) was 0.0004mg/L in 2024. There is no limit or objective for unionized ammonia however, the Provincial Water Quality Objective is 0.02 mg/L The Waterford WPCP met this objective in 2024.

Graph13. The effluent monthly average unionized ammonia 2024 compared to 2023.



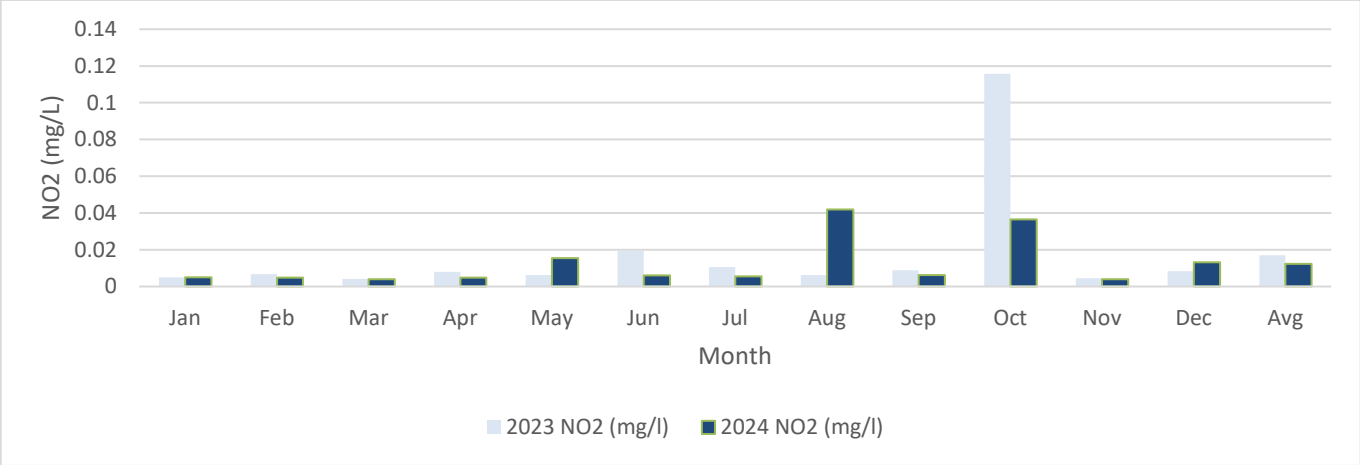
The annual average for effluent temperature was 15.4°C in 2024. There are no limits or objectives for temperature.

Graph 14. The effluent monthly average temperature in 2024 compared to 2023.



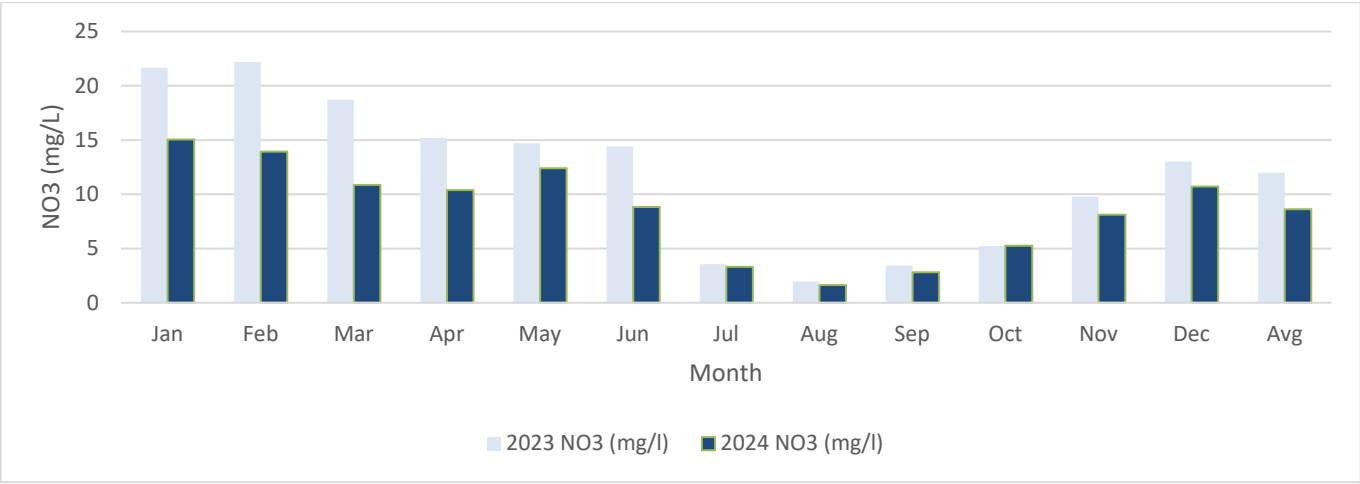
The annual average for effluent NO_2 in 2024 was 0.012mg/L. There are no limits or objectives for NO_2.

Graph 15. The effluent monthly average concentration of NO_2 in 2024 compared to 2023.



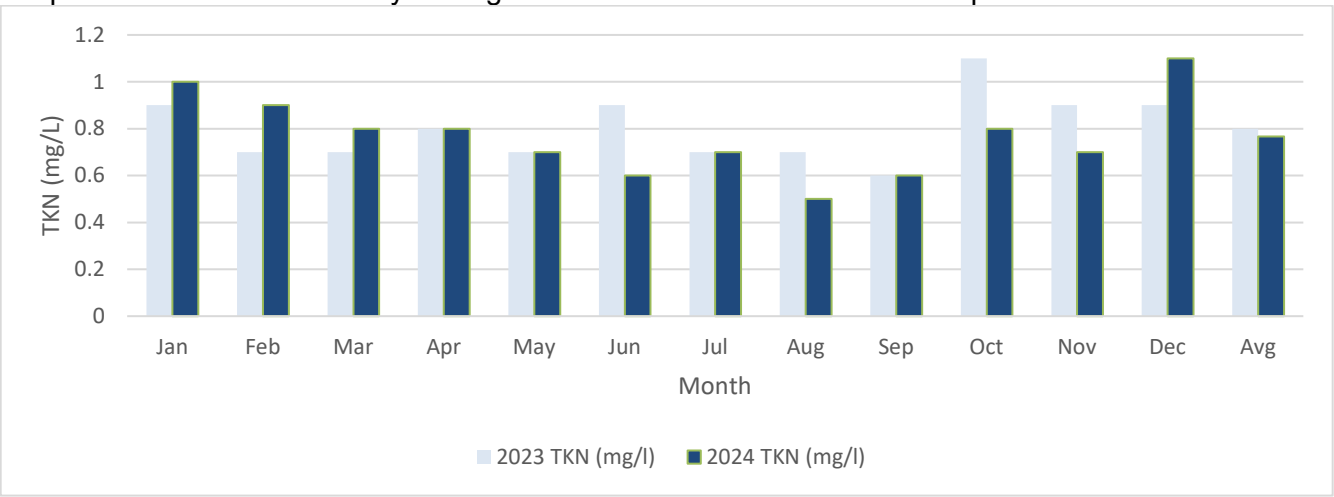
The annual average for effluent NO_3 in 2024 was 8.6mg/L. There are no limits or objectives for NO_3.

Graph 16. The effluent monthly average concentration of NO_3 in 2024 compared to 2023.



The annual average for effluent TKN in 2024 was 0.8mg/L; this value has remained the same compared to the annual average in 2023. Refer to Graph 17 for the effluent monthly average concentration of TKN.

Graph 17. The effluent monthly average concentration of TKN in 2024 compared to 2023.



The Waterford Water Pollution Control Plant performed well in 2024 producing quality effluent meeting all limits for all required parameters. There was one (1) objective exceedance during the reporting period for total phosphorus.

Section C: Operating Problems and Corrective Actions

The Waterford headworks upgrades are ongoing at this time but have been delayed as a result of the damage sustained to the west aeration lagoon liner as reported in the 2023 Annual Report. The condition of the liner remains idem at this time. Resolution strategies and repair procedures are ongoing. For more information on the upgrades completed, refer to **Section M: Changes or Updates for Construction at Plant**

As per the CLI-ECA Schedule E Condition 4.6.4, there were no operating problems at the sewage pumping stations or with the linear infrastructure that required corrective actions for 2024.

Section D: Maintenance Activities

Regular scheduled monthly preventative maintenance for the Waterford WPCP and associated SPS's (as per the CLI-ECA Schedule E Condition 4.6.5) are assigned and monitored using the Workplace Management System (WMS) program. Refer to Appendix B for preventative maintenance schedule. Norfolk County's preventative maintenance of the gravity separate sewers involves a sanitary flushing program (including manhole inspections), aiming to flush 20% of each system on an annual basis. Items that were repaired or replaced in 2024 were as follows:

Table 6. Waterford WPCP Major Maintenance Completed in 2024

Date	Maintenance Activities
January 5	Contractor onsite to troubleshoot wash press – VFD and press level radar level modified
January 10	Contractor flushed/cleaned out SAGR bed line
March 18	Mechanical contractor welded the air compressor tank
April 2	Contractor installed a davit base to lift bar screens
May 16	Contractor onsite to install new VFD for filter influent pump #2
June 10	Mechanical Contractor installed access platform for generators at the filter/headworks building
June 26	Installed new air compressor
July 23	Contractor flushed/cleaned out SAGR bed line and clean out the lagoon discharge lines
August 7	Generator serviced by third party
August 23	Contractor replaced fuses in the headworks blower VFD
September 1	Electrical Contractor wired new float at SAGR wet well
October 1	Electrical Contractor installed plant equipment to ATS to run in a power failure
October 18	Contractor onsite to fix building siding on the east side of the filter building
November 19	Electrical Contractor installed the power monitor to the wash press panel top
December 13	Contractor replaced propane tank level transmitter at the headworks
December 24	Contractor installed a new radiator and inspected the air compressor

Table 7. Blueline Road SPS Major Maintenance Completed in 2024

Date	Maintenance Activities
April 9	Installed new UPS for network equipment
May 22	Generator serviced by third party
July 15	Storm resulted in a contactor onsite to clean out wet well so pumps could keep up.
November 15	Generator inline heater replaced

Table 8. Deer Park Road Main SPS Major Maintenance Completed in 2024

Date	Maintenance Activities
January 4	Contractor inspected pressure sensor
May 7	Contractor completed wet well cleanout
May 31	Generator serviced by third party
June 21	Replaced belt on generator
November 4	Contractor completed wet well cleanout
November 27	Replaced generator battery

Table 9. Deer Park Road Mini SPS Major Maintenance Completed in 2024

Date	Maintenance Activities
November 4	Contractor completed wet well cleanout

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 SAGR beds. These tests

include pH, temperature, ammonia, total suspended solids and total phosphorus 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 effluent flow meter was calibrated by JBF Controls Ltd. on May 9, 2024. In- house meters for pH and dissolved oxygen were calibrated by JBF Controls Ltd on October 17, 2024 as per manufacturer's instructions.

As per the CLI-ECA Schedule E Condition 4.6.5 - There are no flow meters at the Waterford sewage pumping stations that required calibration in 2024.

Section G: Summary of Efforts Made to Achieve Design Objectives

As per Table 10 below, the Waterford WPCP produced quality effluent meeting all effluent objectives except one. In January, 2024 the effluent objective for TP was not met. In order to ensure compliance, the operators continue to closely monitor the treatment process and utilize best operating practices.

Table 10. 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 Objective Exceedances
$cBOD_5$	4.0	2.0-2.1	0	13.2	2.17-3.30	0
TSS	7.0	1.0-3.8	0	22.0	1.09-6.19	0
TP	0.08	0.03-0.09	1	0.22	0.03-0.15	0
TAN	0.6(1.0,3.0)	0.03-0.13	0	1.5(4.4,11.0)	0.03-0.15	0
E. coli (cfu/100mL)*	100	1.0-1.5	0	n/a	n/a	n/a
pH**	6.5 – 8.5	7.04-8.09	0	n/a	n/a	n/a

*effluent objectives and limits are seasonal first value Jul 1-Sept 30, second value Apr 1-Jun 30 and Oct 1-Nov 30, third value Dec 1-Mar 31
**expressed as geometric mean

Table 11. Objective exceedances in 2024.

Date	Parameter	Concentration mg/L	Loadings kg/d	Issue and Proactive Actions Taken
01/2024	TP	0.09	0.15	Increased ferric chloride dosage

Section H: Sludge Handling and Generation

There was no sludge haulage during the 2024 reporting period. The estimated sludge volume generated

in 2024 is not quantifiable as it is a lagoon system, therefore the sludge volume expected to be generated in 2025 is unknown.

Section I: Complaints

There were no complaints received for the Waterford WPCP in 2024.

As per the CLI-ECA Schedule E Condition 4.6.6 - there were no community complaints received for the Waterford sewage pumping stations or gravity separate sewers in 2024.

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

There were no bypasses, overflows, spills or abnormal discharge events at the Waterford WPCP in 2024.

As per CLI-ECA Schedule E Condition 4.6.3, 4.6.8 and 4.6.9 - There were no overflow events (raw sewage spills) at the Waterford SPS's, or linear infrastructure in 2024.

Section J(b): Summary of efforts to reduce CSOs, Spills, STP Overflows, STP Bypasses

In 2023, Norfolk County conducted a flow monitoring, inflow and infiltration (I&I) reduction study to assist in the evaluation for potential higher flows to the facility. There were no concerns identified that would require additional monitoring and evaluation at this time.

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

There were no notice of modifications to the Waterford WPCP completed in the 2024 reporting year. The newly constructed headworks facility was connected on June 27, 2023. Completion and commissioning of this project has been delayed due to the damage sustained in the west aerated lagoon basin. The construction and commissioning schedule can be found in Appendix C.

As per the CLI-ECA Schedule E Condition 4.6.7 – There were no alterations to the Waterford SPS's in 2024 and there was one(1) SS#1 form completed for a completed alteration to the linear infrastructure for Brown Street in 2024

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

The Waterford WPCP secondary and post-secondary treatment is provided by two aerated lagoons, two submerged activated growth reactor cells and a Blue PRO deep-bed sand filtration system with final disinfection provided by ultraviolet light. Supplementary phosphorus removal is also achieved with the addition of a ferric chloride solution. The treatment components are capable of producing effluent quality that exceeds the effluent design objectives specified in F-5-1. The Waterford WPCP is required to achieve higher effluent quality standards than the Effluent guideline criteria as specified in the ECA.

The Corporation of Norfolk County completes the following in the sanitary sewer system to eliminate bypass and overflows:

- CCTV flushing and camera inspections
- Manhole inspections

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 Waterford WPCP in 2024.

Section N: Summary of Deviations from Monitoring Schedule

Compliance samples were collected on Thursdays in 2024. As per the 2025 sampling schedule samples will be collected on Tuesdays. There was one (1) deviation from the monitoring schedule at the Waterford WPCP in 2024 as detailed below. Refer to Appendix D for the monitoring schedule for 2025.

Date Sample Required: Thursday December 26, 2024
Date Sampled: Tuesday December 24, 2024
Reason: Laboratory was closed December 25, 2024-December 30, 2024