Zurich Sewage Treatment Plant and Collection System Annual Performance Report

Prepared For:
The Municipality of Bluewater

Operating Authority:

OCWA
ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

Reporting Period of January 1 – December 31, 2024

Issued: March 28, 2025

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Overview

The following report was prepared by Ontario Clean Water Agency on behalf of The Municipality of Bluewater in accordance with:

- Condition 10(6) (a) through (i) cited in Environmental Compliance Approval (ECA) #4039-877J9R issued July 21, 2010, to The Corporation of the Municipality of Bluewater.
- Schedule E (4) cited in Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) #045-W601 issued June 20, 2023, to The Corporation of the Municipality of Bluewater.

System Process Description

The Zurich Sewage Treatment Plant (STP) is located at Lot 19, Concession 10, Zurich, Ontario. The facility has a rated capacity of 495 m^3/d and is comprised of the following components:

- Wastewater collection (WWC) system and pumping stations
- Four facultative lagoons (two aerated) with supplementary treatment
- Intermittent Sand Filters (ISF)

Raw Wastewater Collection

Raw sewage flows by gravity through the collection system. When gravity flow is not possible, there are two pumping stations. Both the Knell Crescent Sewage Pumping Station (SPS) and the Zurich Main SPS have two submersible pumps. Knell Crescent SPS pumps sewage to the Zurich Main SPS, which in turn, pumps sewage to the Zurich STP. The Zurich MPS has a 250 mm overflow that discharges into the Zurich Drain. Both stations have standby generators. The Zurich Main SPS has milltronics that monitor wet well levels and control the start/stop cycle of all pumps and alarms. Pumps and alarms at the Knell Crescent SPS operate off floats.

Sewage Lagoons

The lagoon system includes four cells; two cells are equipped with aerators (Cells 1 and 2) and two cells are conventional storage cells (Cells 3 and 4). Raw sewage enters the aeration cells from the inlet structure, which contains two weirs. Sewage flows over either or both of these weirs to enter the aerated lagoon cells. Stop-gates enable or block flow over the weirs. Typically, the four lagoon cells operate in series, with raw sewage entering Cell 1 first. Four separate transfer structures are used to control flow of sewage between cells.

The lagoon cells are designed to provide secondary treatment to the raw sewage entering the facility. The aeration cells are sized to provide a minimum total hydraulic retention time of 60 days (*i.e. 30 days per cell*). The aeration system includes blowers that provide air flow to both aeration cells. The additional oxygen from the air flow enhances reactions that cause decomposition of various contaminants, thus assisting in the sewage treatment. The conventional lagoon cells are sized to provide sufficient storage to store the inflow during the freezing period when the sand filters cannot operate.

Aluminum sulfate is added to the lagoons to coagulate suspended particles in the sewage. The coagulated particles grow to sufficient size where they readily settle. This assists in removing phosphorous from the wastewater before being discharged from the lagoon.

Intermittent Sand Filters

The ISF provides filtration and treatment of effluent from the lagoon cells during the non-freezing periods. The filters are a two-cell system designed to provide 100% excess capacity. This allows one of the filter cells to be operated at any time with the other cell removed from service, while maintaining the design capacity of the facility. The Outlet Works allow treated effluent from the ISF to be fed by gravity to a discharge chamber and discharged into the Zurich Drain.

System Facts:

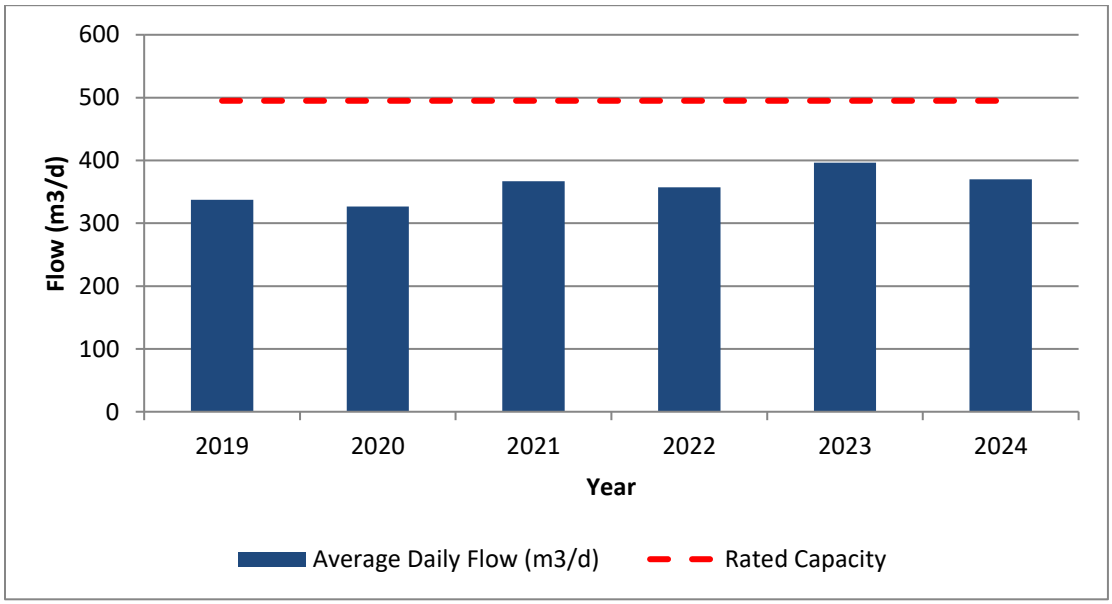
Environmental Compliance Approval	#039-877J9R (issued July 21, 2010)
CLI Environmental Compliance Approval	#045-W601 (issued June 20, 2023)
Rated Capacity	495 m^3/d
Receiving Water	Zurich Drain

The Zurich STP and WWC system was operated in accordance with the provincial regulations as required in ECA #039-877J9R and CLI-ECA #045-W601.

Influent and Effluent Flow Monitoring

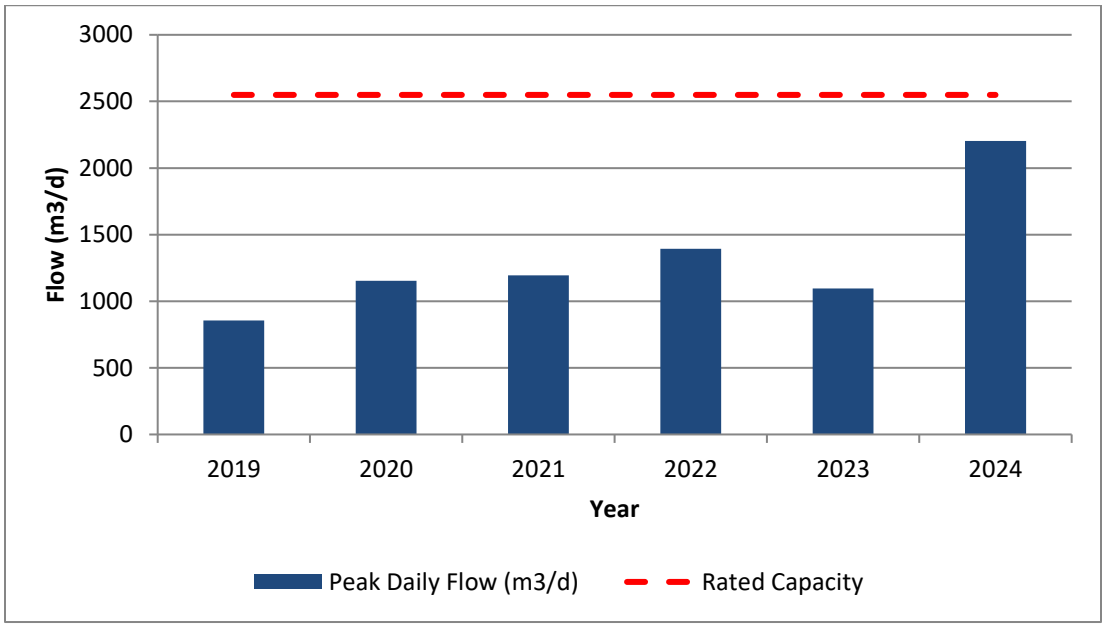
The Zurich STP is rated to treat an average daily flow of 495 m^3. Refer to Figure 1 for a comparison of the average daily flow for the last six years against the rated capacity. The Zurich STP is currently at 75% of the rated capacity.

Figure 1: *Influent Flows 2019-2024*



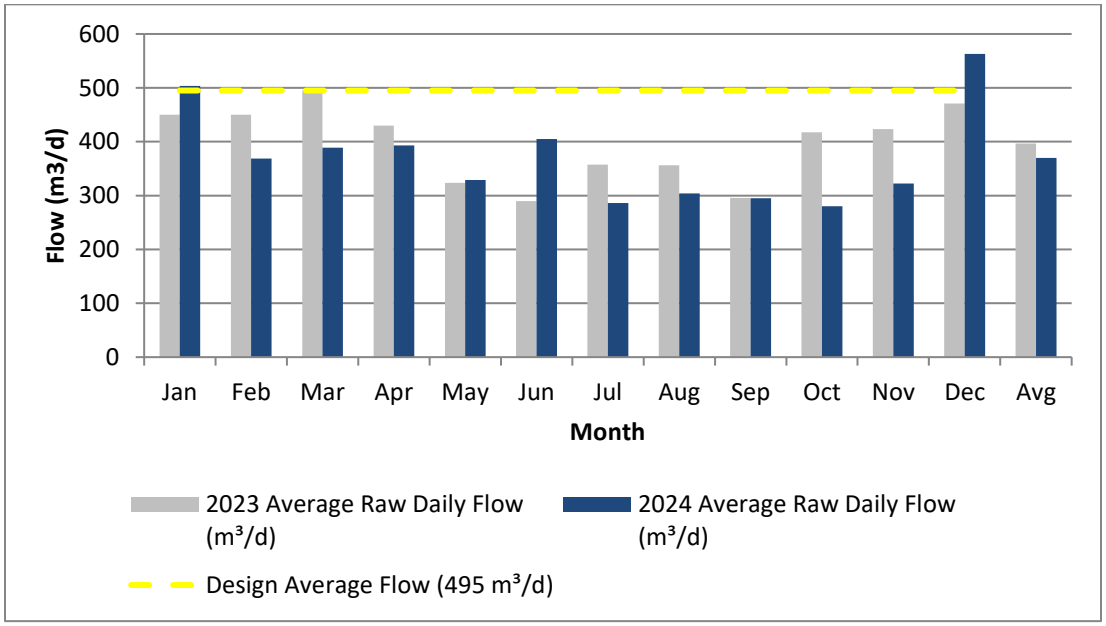
The rated capacity for peak daily flow is 2549 m^3/d. Refer to Figure 2 for a comparison of the peak daily flow for the last six years against the corresponding rated capacity. Variations in peak flow are attributed to changing amounts of heavy precipitation.

Figure 2: *Peak Daily Flows 2019-2024*



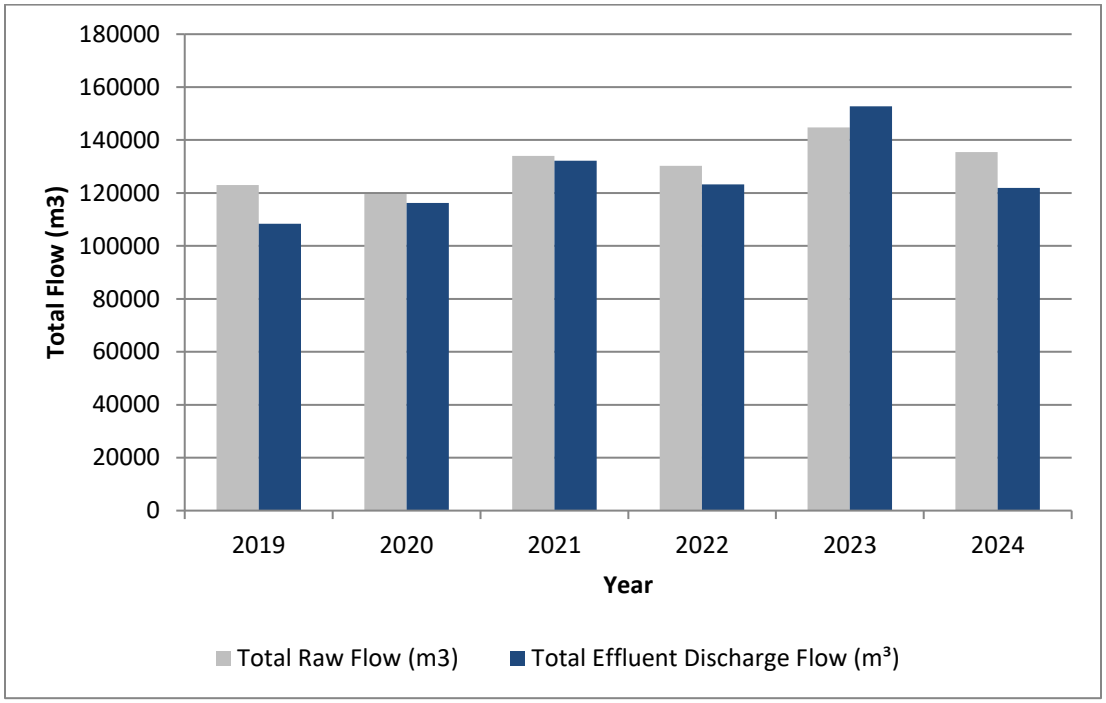
The raw sewage average daily flow was 370 m^3/d in 2024, a 7% decrease from 2023. Refer to Figure 3 for 2024 average daily flows by month and the corresponding annual average.

Figure 3: *Average Daily Flows by Month*



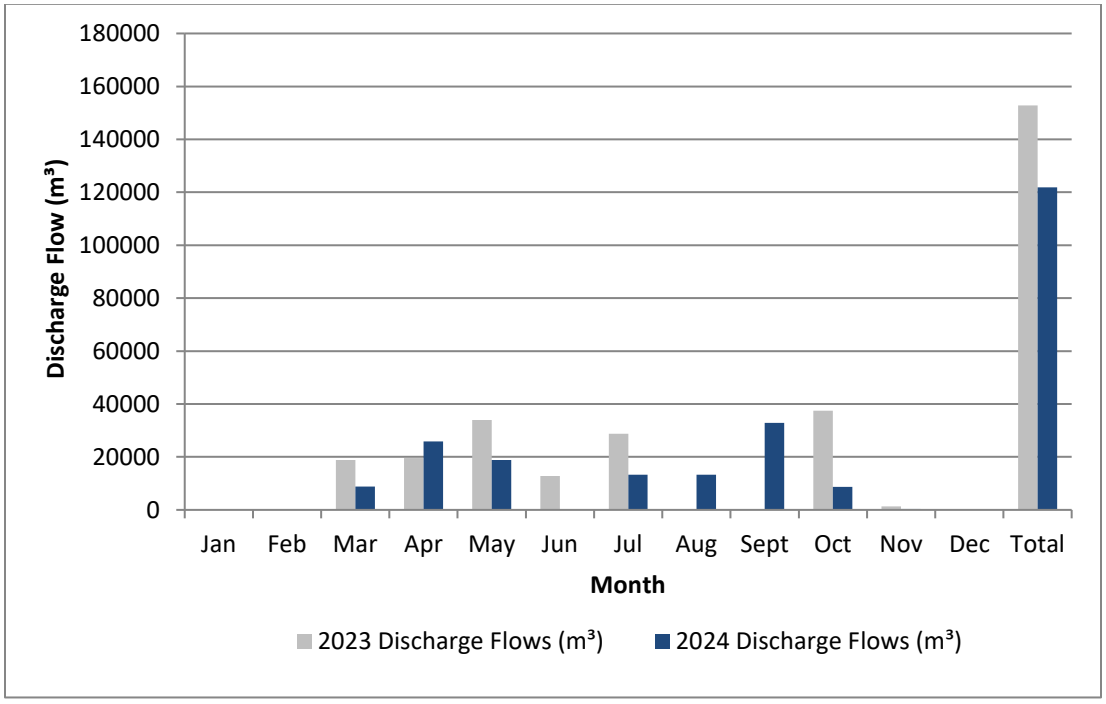
Refer to Figure 4 for the total raw and effluent flow in 2023 and 2024. Variances in effluent flow are due to raw incoming flow volumes and the corresponding amount of contents in the lagoons.

Figure 4: *Total Raw and Effluent Flows 2019-2024*



In 2024, the lagoons discharged 121 884 m^3 of effluent from March to November with the exception of June when the filters were off for a period of maintenance/rest. This 20% decrease from 2023 is consistent with lower annual flows seen in 2024. Refer to Figure 5 for final effluent total monthly flows for 2023 and 2024.

Figure 5: *Final Effluent Total Monthly Flows*

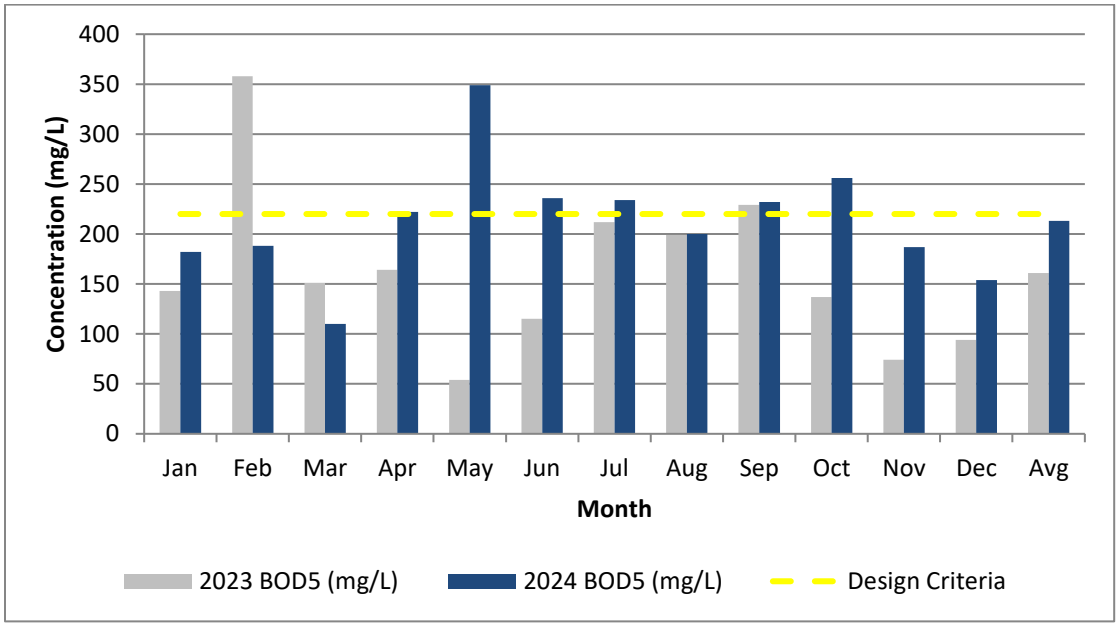


Influent Data

Influent is monitored for Biological Oxygen Demand (BOD_5), Total Suspended Solids (TSS), Total Phosphorous (TP), and Total Kjeldahl Nitrogen (TKN) on a monthly basis. These parameters are measured through a grab sample with the exception of the months of May, June, July, and November, which are composite samples. These parameters are measured against the design criteria of the Zurich STP. Values above design concentration can result in ineffective treatment of raw sewage and can lead to effluent limit exceedances. With the exception of TP, all parameters were higher than their 2023 values; this is attributed to overall drier weather and less dilution. There were also multiple months where all parameters except for TP exceeded the design criteria.

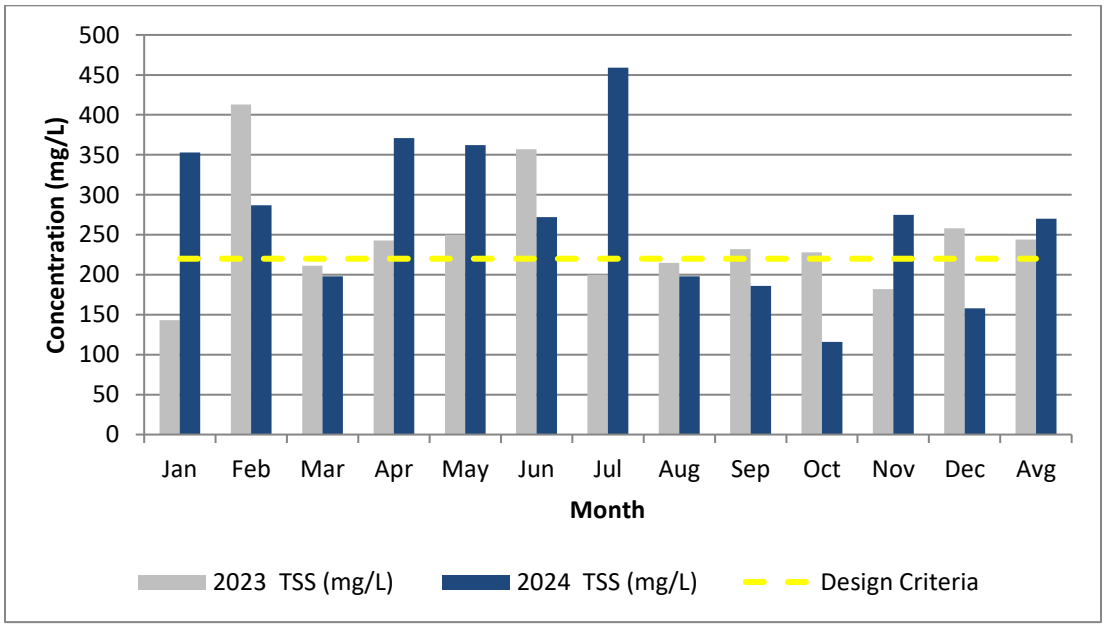
In 2024, the monthly average raw BOD_5 concentration was 213 mg/L, a 32% increase from 2023. Refer to Figure 6 for a comparison of 2024 monthly raw BOD_5 concentrations to 2023 concentrations.

Figure 6: *Raw BOD_5 Concentrations*



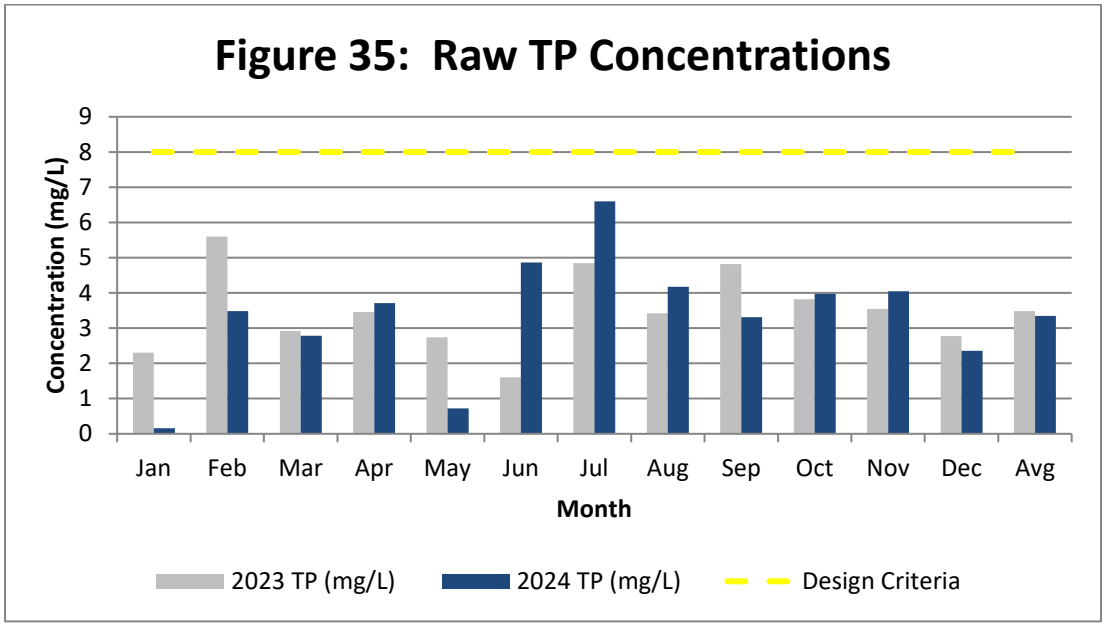
In 2024, the monthly average raw TSS concentration was 270 mg/L, a 10% increase from 2023. Refer to Figure 7 for a comparison of 2024 monthly raw TSS concentrations to 2023 concentrations.

Figure 7: *Raw TSS Concentrations*



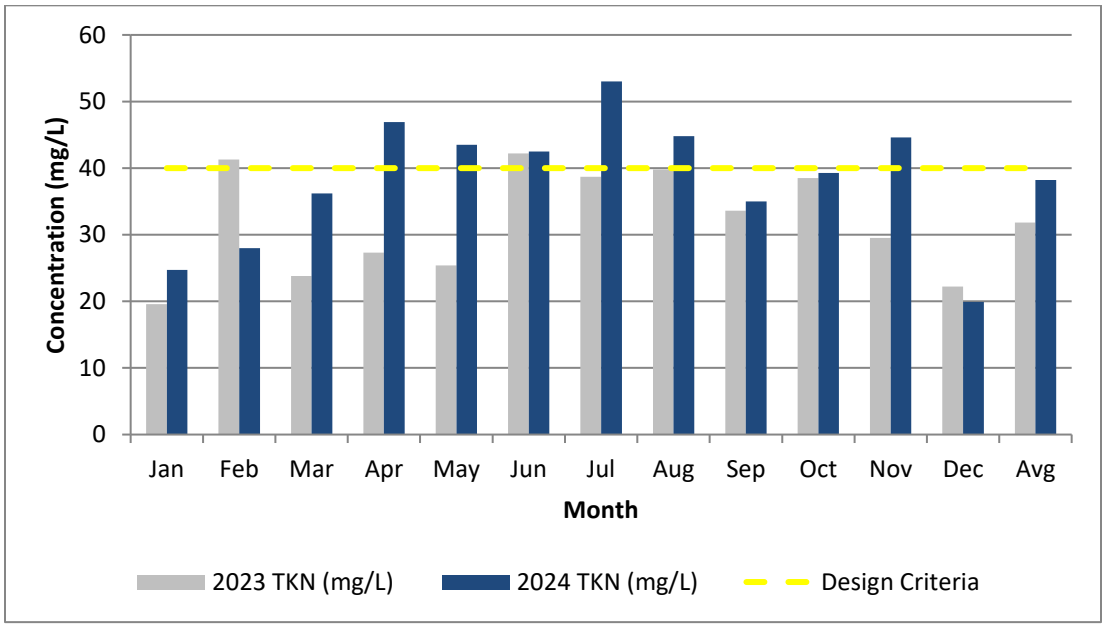
In 2024, the monthly average raw TP concentration was 3 mg/L, a 4% decrease from 2023. Refer to Figure 8 for a comparison of 2024 monthly raw TP concentrations to 2023 concentrations.

Figure 8: *Raw TP Concentrations*



In 2024, the monthly average raw TKN concentration was 38 mg/L, a 20% increase from 2023. Refer to Figure 9 for a comparison of 2024 monthly raw TKN concentrations to 2023 concentrations.

Figure 9: *Raw TKN Concentrations*



Imported Sewage

In 2024, the Zurich STP received 34.08 m^3 of septage. Refer to Table 1 below for details.

Table 1: *Imported Sewage*

Date Septage Received	Origin	Hauler
January 16, 2024	33715 Grainger Court, Bayfield 72461 Bluewater Highway, Zurich 74119 Bluehaven Beach Drive, Zurich	Grand Bend Sanitation
February 21, 2024	71305 Elm Street, Dashwood 72837 Blind Line, Zurich	Grand Bend Sanitation
February 27, 2024	Sugarbush Campground, Bayfield	Grand Bend Sanitation

Effluent Monitoring

The Zurich STP is permitted to discharge year round. However, discharge typically occurs during non-freezing months. In 2024, discharge began on March 18 and ran until May 31. The discharge was turned off for the month of June for a period of rest/maintenance, restarted on July 2 and ran until November 1.

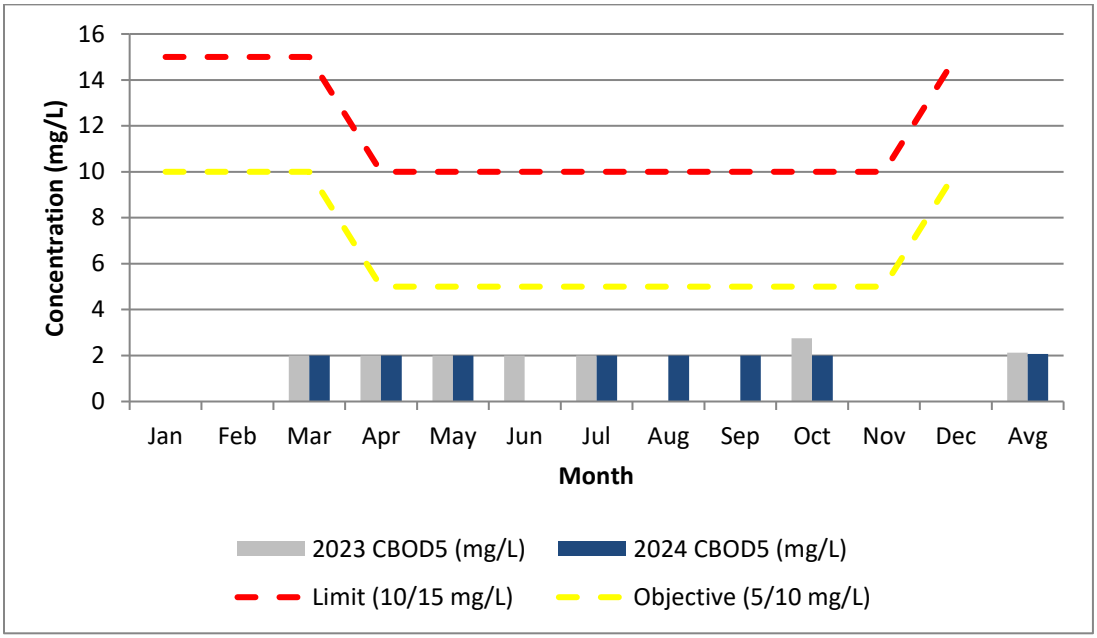
There are two discharge seasons specified in the Zurich STP ECA: April 16 to December 14 and December 15 to April 15. Each of these periods has separate ECA objectives and limits for each parameter. The objectives and limits are more stringent in the April 16 to December 14 discharge period due to effluent loading having a greater impact on receiving streams during warmer weather. The specific objectives and limits are noted in the figures below.

Effluent from the Zurich STP is sampled weekly through grab samples and analyzed for Carbonaceous Biological Oxygen Demand ($CBOD_5$), TSS, TP, Total Ammonia Nitrogen (TAN), Unionized Ammonia, E. coli, pH, and Temperature. For details on objective and limit exceedances, refer to 'Summary of Efforts Made to Achieve Design Objectives'**.**

Comparison to Compliance Limits and Objectives

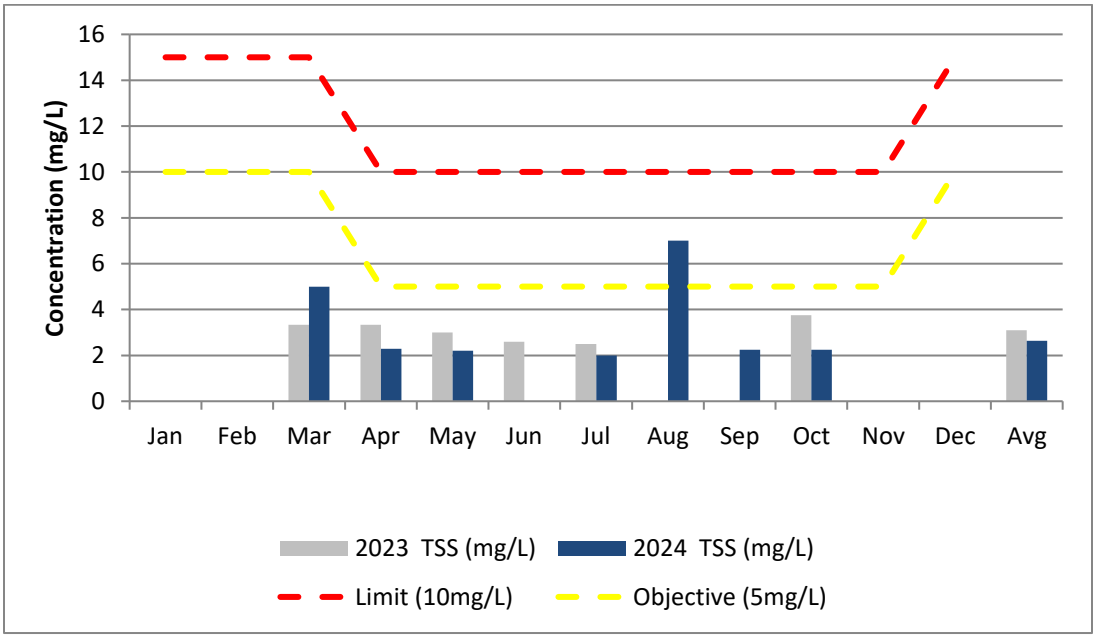
In 2024, the average monthly effluent $CBOD_5$ concentration was 2 mg/L, equal to the 2023 value. Limits and objectives were met. Refer to Figure 10 for a comparison of 2024 monthly effluent $CBOD_5$ concentrations to 2023 concentrations.

Figure 10: *Effluent $CBOD_5$ Concentrations*



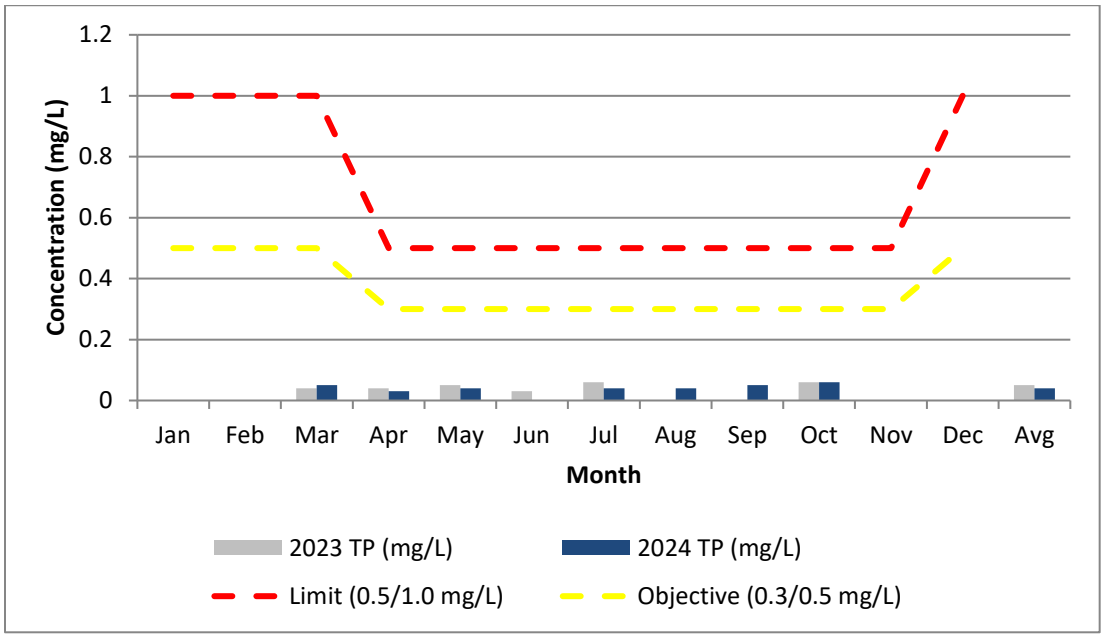
In 2024, the average monthly effluent TSS concentration was 3 mg/L, a 14% decrease from 2023. There was an objective exceedance in August. The limits were met. Refer to Figure 11 for a comparison of 2024 monthly effluent TSS concentrations to 2023 concentrations.

Figure 11: *Effluent TSS Concentrations*



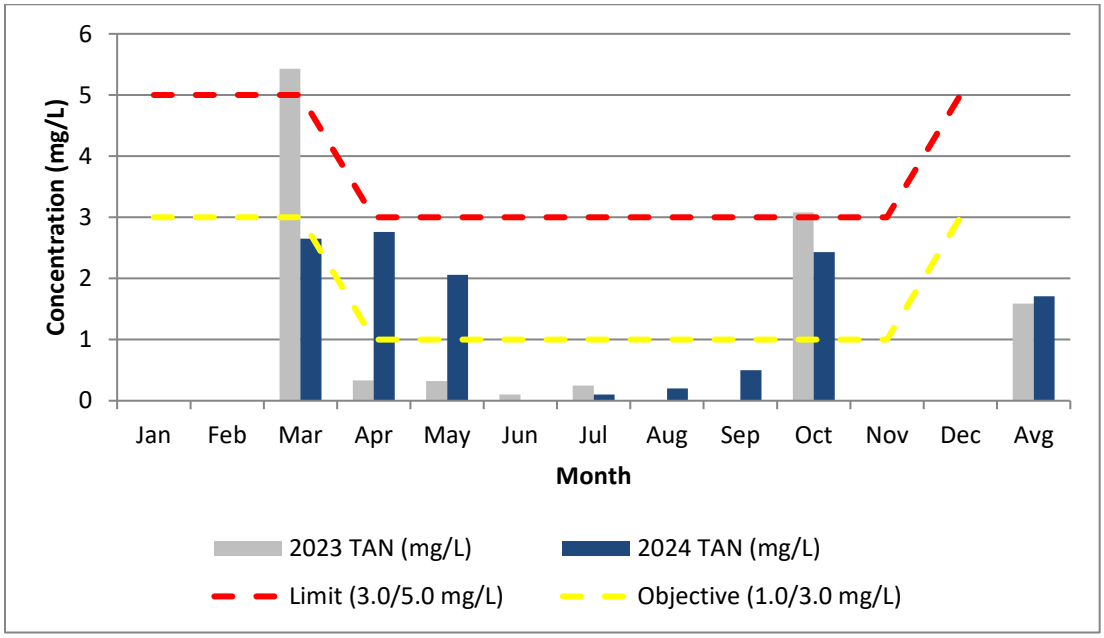
In 2024, the average monthly effluent TP concentration was 0.04 mg/L, a 20% decrease from 2023. Limit and objectives were met. Refer to Figure 12 for a comparison of 2024 monthly effluent TP concentrations to 2023 concentrations.

Figure 12: *Effluent TP Concentrations*



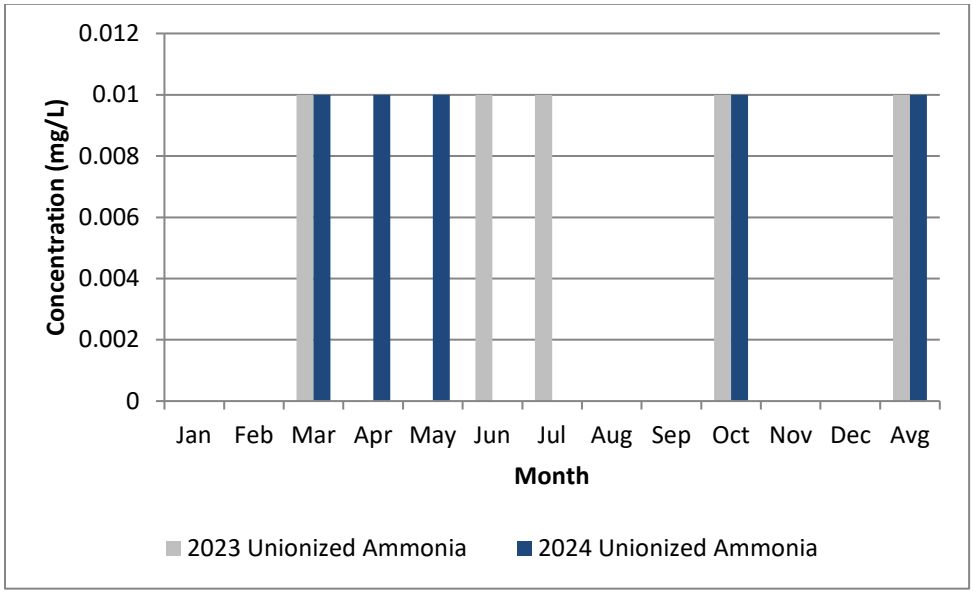
In 2024, the average monthly effluent TAN concentration was 1.6 mg/L, a 7% increase from 2023. The objective was not met in April, May and October. See 'Summary of Efforts Made to Achieve Design Objectives' for more information. Refer to Figure 13 for a comparison of 2024 monthly effluent TAN concentrations to 2023 concentrations.

Figure 13: *Effluent TAN Concentrations*



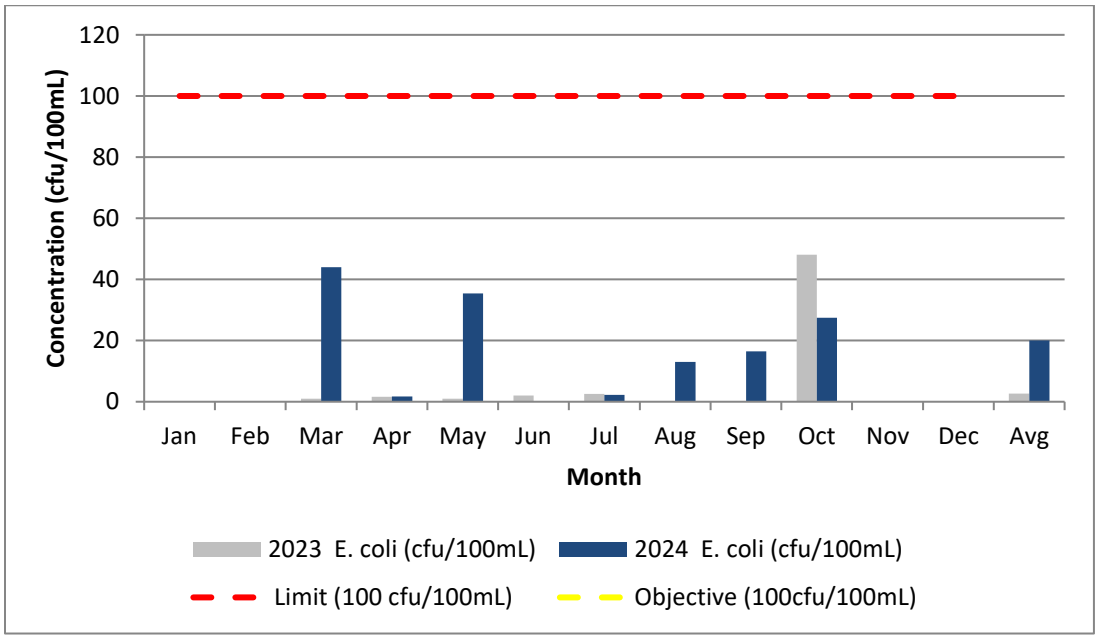
In 2024, the average monthly effluent Unionized Ammonia concentration was 0.01 mg/L, equal to the 2023 value. There are no objectives or limits for Unionized Ammonia but the 2024 values meet the Provincial Water Quality Objective (PWQO) of 0.02 mg/L. Refer to Figure 14 for a comparison of 2024 monthly effluent Unionized Ammonia concentrations to 2023 concentrations.

Figure 14: *Effluent Unionized Ammonia Concentrations*



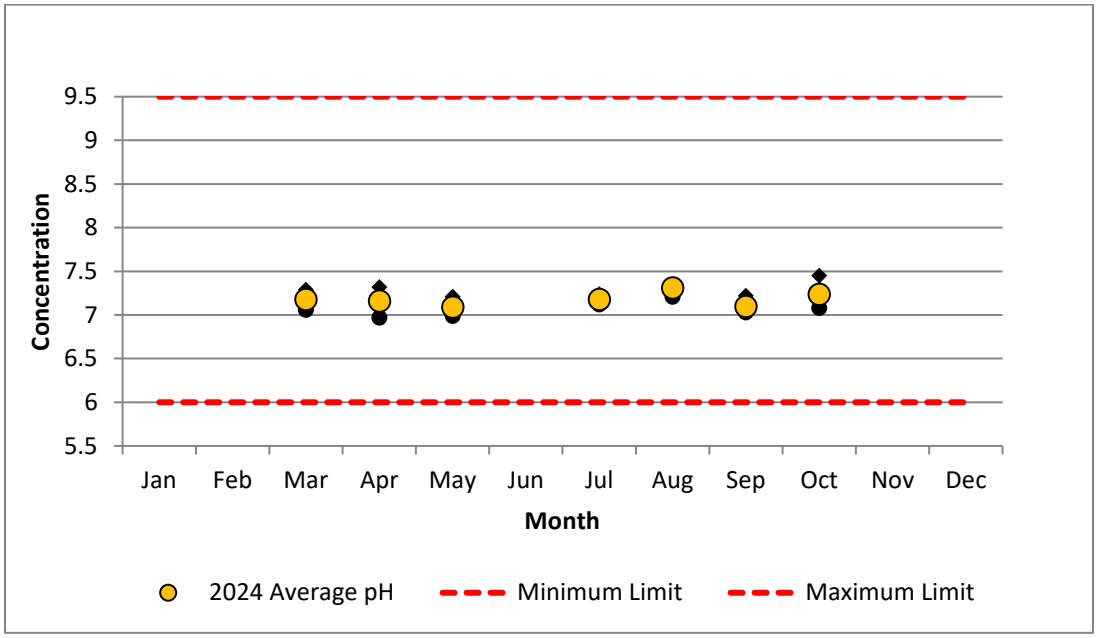
In 2024, the average monthly effluent E. coli concentration was 20 cfu/100mL, a significant increase from 2023. Nonetheless, the objective/limit was met. Refer to Figure 15 for a comparison of 2024 annual effluent E. coli concentrations to 2023 concentrations.

Figure 15: *Effluent E. coli Concentrations*



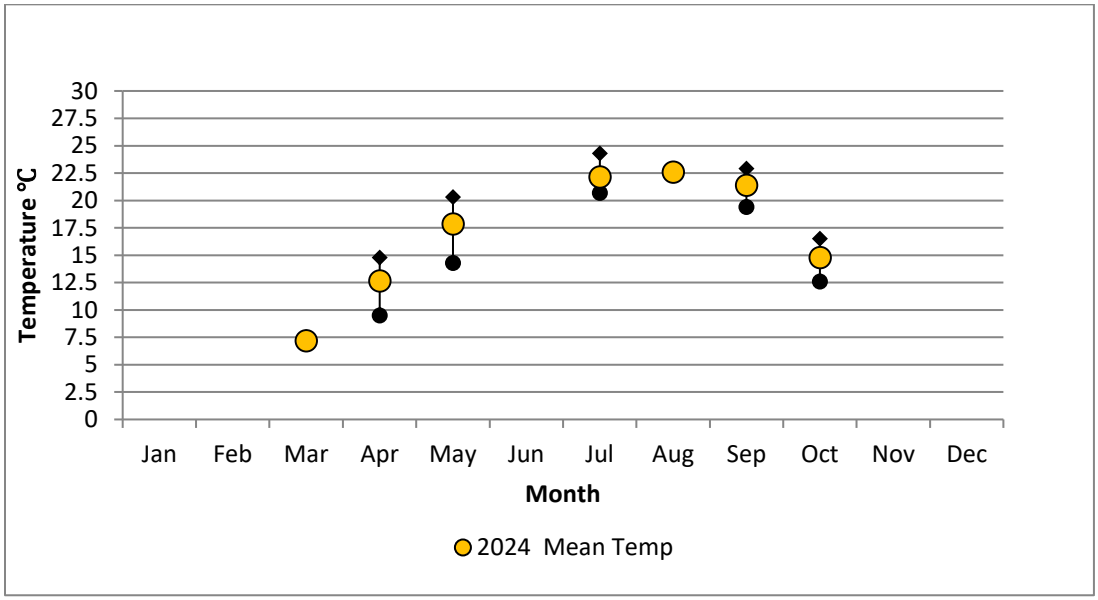
In 2024, effluent pH ranged from 6.97 to 7.45. All values met the limit/objective. Refer to Figure 16 for a comparison of 2024 monthly effluent pH values to the objective/limit.

Figure 16: *Effluent pH Values*



In 2024, effluent Temperatures ranged from 6.9 °C to 24.3 °C. There are no objectives or limits for Temperature. Refer to Figure 17 for monthly effluent Temperature values in 2024.

Figure 17: *Effluent Temperatures*



Effluent Quality Assurance

Effluent quality assurance is evaluated by monitoring parameters and changes in the lagoons. Operational staff monitor plant performance by conducting in-house tests on dissolved oxygen, pH, and temperature. Staff also monitor and record chemical dosages and any adverse observations in the lagoon cells. 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.

Summary of Efforts Made to Achieve Design Objectives

In 2024, the objective for Total Ammonia Nitrogen (TAN) was exceeded in April and May due to pooling on the sand filter bed and in October due to deteriorating effluent quality at the end of the season. There was also an objective exceedance of Total Suspended Solids in August, cause unknown. There were no limit exceedances for any parameters in 2024. Refer to Table 2 for details.

Design objectives were not exceeded more then 50% of the time in 2024. The average influent flow did not exceed 80% of the rated capacity.

Table 2: *Summary of Objective and Limit Exceedances*

Month	Parameter	Concentration (mg/L)	Objective (mg/L)	Limit (mg/L)
April	TAN	2.8	1.0	3.0
May	TAN	2.1	1.0	3.0
October	TAN	2.4	1.0	3.0
August	TSS	7	5	10

Operating Problems and Corrective Actions

The biggest challenge for the Zurich STP continues to be managing flows through the ISF. Although limits were not exceeded for TAN as they were in 2023, thus indicating improved management of discharge flows, there is a need to further reduce flows through the ISF at a steadier rate to reduce the probability of objective and limit exceedances.

Capital and major maintenance recommendations have been submitted by OCWA to the Municipality of Bluewater to address ongoing maintenance requirements for the collection system and sewage lagoons to continue to produce high quality effluent. Items on the list for 2025 include:

- Float replacements – Knell Crescent SPS
- Pump rebuilds – Knell Crescent SPS and Zurich Main SPS
- Platform repair – Knell Crescent SPS
- Check valve rebuild – Zurich Main SPS
- Gate valve rebuild or replacement – Zurich Main SPS
- Wet well wizard replacement – Zurich Main SPS
- Heater rebuild or replacement – Zurich Main SPS
- Filter pump rebuild – Zurich STP

- Multiple lagoon valve and pump rebuilds or replacements – Zurich STP
- Auto-control installation - Zurich STP blowers
- Alum pump rebuild – Zurich STP

Maintenance Activities

Preventative and corrective maintenance is assigned and monitored within the Workplace Management System (WMS) program. Refer to Appendix A for the 2024 maintenance summary. Refer to Table 3 for a list of repairs and replacements that occurred in 2024.

Table 3: *Major Maintenance in 2024*

Major Maintenance Wastewater
Alum pump repairs – Stenner tube, roller assembly
Pump hour meter installed – Zurich Main SPS
Pipe replacement – Zurich Main SPS Pumps
Flushing/Camera work on manhole #15 and Zurich Hensall Road/Main Street West
Deep clean of inlet structure – Zurich STP
Lowered sewer clean out – Zurich WWC system
Sewer main and laterals relined – Zurich Hensall Road/Main Street West

Calibration Records

Pierce Services and Solutions Inc. calibrated influent and effluent flow meters and the wet well level sensor on March 18, 2024. Flow meters met the accuracy tolerance of being within 15% of the actual flow rate. Operational staff complete routine pH meter calibrations and verifications. Refer to Appendix B for 2024 Calibration Records.

Sludge Generation

In 2024, the Zurich STP generated 108 m^3 of sludge. No sludge was hauled in 2024. It is estimated that approximately 120 m^3 of sludge will be generated in 2025.

Complaints

No complaints were received in 2024 for the Zurich STP or WWC system.

Bypass, Overflows, Spills & Abnormal Discharge Events

The ECA requires additional daily sampling for bypass, overflow or spill events. There were no bypass, overflow or spill events in 2024.

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

The Municipality of Bluewater has a separated collection system, therefore a Pollution Prevention Control Program is not required to be established or maintained.

In 2024, there were no bypass or overflow events. Nonetheless, there was flushing/camera inspection work completed for parts of the WWC system in 2024. These projects are undertaken to provide overall overflow/bypass/spill reduction or elimination.

Notice of Modification to the Works

There were no 'Notice of Modification to Sewage Works' forms completed in 2024.

Additional Information the Water Supervisor Requires

The Zurich STP received an amended ECA to accept imported sewage, ECA#A-500-7203229685 issued March 11, 2025. Condition 10(2) requires the prediction of the maximum volume of imported sewage for which the Zurich STP can co-treat the following year. This calculation is presented in Appendix C. The volume of Imported Sewage that can be co-treated on a weekly basis in 2025 is 43 m^3, with no imported sewage being received from the last 6 weeks before the end of the discharge.

Appendix A

Maintenance Summary

				Workorder Details			
WO #	Asset ID	Asset Description	Location Description	Work Order Description	Status	Schedule Start	Actual Finish
3714291	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	1/1/24 12:00 AM	1/4/24 03:14 PM
3714929	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	1/1/24 12:00 AM	1/5/24 02:46 PM
3748142			5876, Zurich WWTL & CS,	RP03 Annual Report ECA (1y) 5876	CLOSE	1/1/24 12:00 AM	3/26/24 08:41 AM
3761975			5876, Zurich WWTL & CS,	WSER Quarterly Reporting (1y) 5876	CLOSE	1/12/24 12:00 AM	2/9/24 01:50 PM
3769947	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	2/1/24 12:00 AM	2/12/24 01:48 PM
3770489	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	2/1/24 12:00 AM	2/6/24 02:08 PM
3806022	0000249102	METER FLOW 01 FINAL EFFLUENT	5876, Zurich WWTL & CS, Process, Process Control &	Meter Flow 01 Final Effluent Calibration (1y) 6676	CLOSE	4/1/24 12:00 AM	3/22/24 08:36 AM
3806025	0000249226	METER FLOW FIT100 RAW	5876, Zurich WWTL & CS, Process, Process Control &	Meter Flow FIT-100 Raw Calibration (1y) 6676	CLOSE	4/1/24 12:00 AM	3/22/24 08:39 AM
3812195	0000249058	METER LEVEL	5876, Zurich WWTL & CS, Process, Process Control &	Meter Level Insp/Service (1y) 5876	CLOSE	3/1/24 12:00 AM	4/12/24 09:08 AM
3812200	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	3/1/24 12:00 AM	3/11/24 01:17 PM
3812763	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	3/1/24 12:00 AM	3/5/24 03:25 PM
3830363			5876, Zurich WWTL & CS	Blower VFD Inspection/ Freq Increase (1y) 5876	CLOSE	3/1/24 12:00 AM	4/8/24 02:16 PM
3846385			Zurich Wastewater Treatment Lagoons & Collection	5876 Zurich SPS check valve cleaning 1 and 2 - February 29	CLOSE		3/4/24 10:08 AM
3848979			Zurich Wastewater Treatment Lagoons & Collection	Alum pump 1 stenner tube	CLOSE		3/12/24 03:00 PM
3850434			5876, Zurich WWTL & CS	Pump 1 check valve	CLOSE		3/21/24 09:20 AM
3857346	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	4/1/24 12:00 AM	4/15/24 11:52 AM

3857916	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	4/1/24 12:00 AM	4/5/24 03:06 PM
3901423			5876, Zurich WWTL & CS, Process, Process Control &	Replaced faulty exterior lighting at the Zurich lagoon 5876	CLOSE		4/11/24 03:03 PM
3902284	0000249049	PUMP SUBMERSIBLE WASTE WATER	5876, Zurich WWTL & CS, Process, Headworks	Replaced and tested faulty hour meter @ Zurich main PS 5876	CLOSE		4/15/24 03:10 PM
3909511	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	5/1/24 12:00 AM	5/17/24 10:31 PM
3910069	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	5/1/24 12:00 AM	
3957998	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	6/1/24 12:00 AM	
3958027	0000249049	PUMP SUBMERSIBLE WASTE WATER	5876, Zurich WWTL & CS, Process, Headworks	Pump Subm Zurich PS Insp/ Service (1y) 5876	CLOSE	6/1/24 12:00 AM	
3958036	0000249051	PUMP SUBMERSIBLE WASTE WATER	5876, Zurich WWTL & CS, Process, Headworks	Pump Subm Zurich PS Insp/ Service (1y) 5876	CLOSE	6/1/24 12:00 AM	
3958756	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	6/1/24 12:00 AM	
3958943			5876, Zurich WWTL & CS	Operation SOP Manual Review and Update (2y) 5876	CLOSE	6/1/24 12:00 AM	
4007725	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	7/1/24 12:00 AM	
4008267	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	7/1/24 12:00 AM	
4046738			Zurich Wastewater Treatment Lagoons & Collection System	Replace alum pump 2 stenner tube	CLOSE		
4051304			5876, Zurich WWTL & CS, Process, Process Piping & Valves	Zurich Sewer Main Zurich/Hensall Road (MH 15 - MH 13) 5876	CLOSE		
4056428			5876, Zurich WWTL & CS	Fan Route Insp/Service (1y) 5876	CLOSE	8/1/24 12:00 AM	11/22/24 08:39 AM

4056729	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	8/1/24 12:00 AM	8/1/24 02:15 PM
4057312	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	8/1/24 12:00 AM	8/9/24 02:21 PM
4101426	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	9/1/24 12:00 AM	9/11/24 04:52 PM
4102180	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	9/1/24 12:00 AM	9/11/24 10:58 AM
4117336			5876, Zurich WWTL & CS	Engine Diesel Knell Crescent PS Insp/Service (1y) 5876	CLOSE	9/1/24 12:00 AM	10/7/24 01:59 PM
4117375			5876, Zurich WWTL & CS	Filter Sand 01 Insp/ Service (1y) 5876	CLOSE	9/1/24 12:00 AM	9/23/24 03:45 PM
4117378			5876, Zurich WWTL & CS	Filter Sand 02 Insp/ Service (1y) 5876	CLOSE	9/1/24 12:00 AM	9/23/24 03:46 PM
4117387			5876, Zurich WWTL & CS	Lagoon 01 Insp/Service (1y) 5876	CLOSE	9/1/24 12:00 AM	9/23/24 03:50 PM
4117390			5876, Zurich WWTL & CS	Lagoon 02 Insp/Service (1y) 5876	CLOSE	9/1/24 12:00 AM	9/23/24 03:51 PM
4152298	0000249057	PANEL ALARM/ DIALER VERBATIM	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer Zurich Lift Testing (1m) 5876	CLOSE	10/1/24 12:00 AM	10/8/24 03:06 PM
4152303	0000249083	VALVE BACKFLOW PREVENTER ZURICH	5876, Zurich WWTL & CS, Process, Process Piping & Valves	Valve Backflow Insp/Service (1y) 5876	CLOSE	10/1/24 12:00 AM	11/13/24 07:16 AM
4152898	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process, Process Control &	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	10/1/24 12:00 AM	10/4/24 12:09 PM
4202381	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS,	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	11/1/24 12:00 AM	11/4/24 09:13 AM
4244299	0000249076	PANEL ALARM/ DIALER 01	5876, Zurich WWTL & CS, Process	Alarm Dialer 01 Zurich LagoonTesting (1m) 5876	CLOSE	12/1/24 12:00 AM	

Appendix B

2024 Calibration Records

Pierce Services & Solutions Inc.

PO Box 26027
Guelph, ON N1E 6W1

Phone: 519.820.4853
Fax: 519.824.9402

Flowmeter Report

Verification: X Calibration:

Client: OCWA Bluewater
Description: Mag Meter
Manufacturer: ABB
Model: Magmaster
Inventory No.: 249226

Location: Zurich Lift Station SPS
Date: 24-Mar-18
Checked By: Greg Pierce
Serial No.: 9726

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
2.033 m/s	15.95 l/s	15.95 l/s	15.95 l/s	Pass
6.36 m/s	50.00 l/s	50.00 l/s	50.00 l/s	Pass

Confirmed Run Mode: X Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 100 mm
Pipe Material: Cast Steel
Liner Material: PU
Range: 0-50 l/s
Tag Number: FIT 201

Comments:
Verification of original calibration

Signature:
Greg Pierce, CCST

Pierce Services
& Solutions Inc.

519.820.4853 Fax 519.824.9402

Instrument Verification Sheet

Client Name: Ontario Clean Water Agency

Date: March 18, 2024

Equipment Description: Level Sensor

Assigned Number: Wet Well Level

Area Located: Zurich Pumping Station

Inventory Number: 249058

Instrument Data

Manufacturer: Milltronics

Model Number: MultiRanger Plus

Type: Ultrasonic

Serial Number: N/A

Range: 0 - 2.050 m

Accuracy: +/- 5%

Method Of Calibration: Standard Measurement

Application: Waste Water

Calibration Data

Input %	Input	As Found	As Left	% Error
	15.99 mA	1.59 m	1.59 m	
48.59%	11.96mA	0.99 m	0.99 m	

Confirmed Run Mode: ✓

Placed back in service: ✓

Comments:

Checked By: Greg Pierce CCST

Signature:

Pierce Services & Solutions Inc.

PO Box 26027
Guelph, ON N1E 6W1

Phone: 519.820.4853
Fax: 519.824.9402

Flowmeter Report

Verification: X **Calibration:**

Client: OCWA Bluewater
Description: Mag Flow Meter
Manufacturer: Krohne
Model: Aquaflux
Inventory No.:

Location: Zurich Lagoons
Date: 24-Mar-18
Checked By: Greg Pierce
Serial No.: C103696

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
1.05 m/s	33.11 l/s	33.0 l/s	33.0 l/s	Pass
4.77 m/s	150.00 l/s	150.00 l/s	150.00 l/s	Pass

Confirmed Run Mode: X

Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 200 mm
Pipe Material: Stainless Steel
Liner Material: PU
Range: 0-150 l/s
Tag Number: FIT 107

Comments:
Verification of original calibration

Operation HRS - 94383
Coil Temp - 480.6 F
Electrode Temp -89.3 F
Conductivity - 2765 uS/cm
Coil Resistance - 1113.9 Ω

Signature:
Greg Pierce, CCST

Appendix C

Imported Sewage Volume

2025 Imported Sewage Capacity

The ability of the Zurich WWTF to accept Imported Sewage will decline over time as loadings from normal wastewater loads increase.

The capacity at any given time will be estimated based on the system's aeration capacity (Design O_2 available) less the 3-year average combined loadings for BOD_5 and TKN.

The volume of imported sewage that can received on a weekly basis (Monday to Friday) at the Zurich WWTF will be applicable for the period April 1 of the current year to March 31 of the following year. A new value will be provided in the Annual Report each year for the year going forward. NOTE: No Imported Sewage should be received from six (6) weeks before the end of the discharge season to the end of the filter discharge.

Design O_2 Available

The existing aeration system in both Cells 1 and 2 was designed on the following basis. It assumes 2 of 3 blowers operating.

AADF = 530 m^3/day
BOD5 = 235 mg/L
TKN = 25 mg/L

Design O_2 Available = (1.5 x 530 x 235/1000) + (4.6 x 530 x 25/1000)
= 186.8 + 61.0
= **246.8 kg O_2 per day**

O_2 Required for Sewage

Wastewater Loading Calculation

Year	AADF (m^3/day)	BOD5 mg/L	BOD5 kg/day	TKN mg/L	TKN kg/day
2022	357	189	67.473	36.4	12.9948
2023	397	161	63.917	31.8	12.6246
2024	370	213	78.81	38.2	14.134
3 Year Average	374.6667	187.6667	70.31244	35.46667	13.28818

O_2 Required for Sewage= 1.5 x BOD Load + 4.6 x TKN Load
166.5943 kg O_2 per day

Assumed Strength of Hauled Waste (per m^3)

BOD_5 6500 mg/L
TKN 700 mg/L

O_2 Load per m^3 = 13 **kg O_2 per day**

Maximum Weekly Volume Calculation

Allowable Loading per week = 7 x (O_2 Available - O_2 Required for Sewage)
= 561.44

Maximum Volume of Hauled Sewage per Week =	**43**	**m^3**

Appendix D

Monitoring Data

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Performance Assessment Report

From 1/1/2024 to 12/31/2024 11:59:59 PM

5876 ZURICH WASTEWATER TREATMENT LAGOON 110001444

	1 / 2024	2/ 2024	3/ 2024	4/ 2024	5/ 2024	6/ 2024	7/ 2024	8/ 2024	9/ 2024	10/ 2024	11/ 2024	12/ 2024	<--Total-->	<--Avg-->	<--Max-->	<-Criteria->
Flows																
Raw Flow: Total - Raw Sewage m³/d	15,615.60	10,690.40	12,052.70	11,785.40	10,197.70	12,149.30	8,865.20	9,415.30	8,852.60	8,680.60	9,669.60	17,454.90	135,429.30			0.00
Raw Flow: Avg - Raw Sewage m³/d	503.73	368.63	388.80	392.85	328.96	404.98	285.97	303.72	295.09	280.02	322.32	563.06		370.03		495.00
Raw Flow: Max - Raw Sewage m³/d	1,372.20	514.10	542.20	699.60	433.70	2,203.20	395.00	366.90	351.50	372.50	392.80	1,550.40			2,203.20	0.00
Raw Flow: Count - Raw Sewage m³/d	31.00	29.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	31.00	30.00	31.00	366.00			0.00
Eff. Flow: Total - Effluent m³/d	0.00	0.00	8,796.40	25,884.10	18,854.10	0.00	13,262.80	13,275.60	32,827.80	8,680.60	302.50	0.00	121,883.90			0.00
Eff. Flow: Avg - Effluent m³/d	0.00	0.00	628.31	862.80	608.20	0.00	427.83	1,475.07	1,094.26	280.02	302.50	0.00		688.61		
Eff. Flow: Max - Effluent m³/d	0.00	0.00	659.00	1,137.00	1,303.10	0.00	919.00	1,817.90	1,902.00	372.50	302.50	0.00			1,902.00	0.00
Eff Flow: Count - Effluent m³/d	0.00	0.00	14.00	30.00	31.00	0.00	31.00	9.00	30.00	31.00	1.00	0.00	177.00			0.00
Carbonaceous Biochemical Oxygen Demand: CBOD																
Eff: Avg cBOD5 - Effluent mg/L	0.00	0.00	< 2.00	< 2.00	< 2.00	0.00	< 2.00	< 2.00	< 2.00	2.00	0.00	0.00		< 2.07	<	15.00
Eff: # of samples of cBOD5 - Effluent	0.00	0.00	2.00	7.00	5.00	0.00	5.00	1.00	4.00	4.00	0.00	0.00	28.00			0.00
Loading: cBOD5 - Effluent kg/d	0.000	0.000	< 1.257	< 1.726	< 1.216	0.000	< 0.856	< 2.950	< 2.189	< 0.560	0.000	0.000		< 1.43	< 2.95	
Biochemical Oxygen Demand: BOD5																
Raw: Avg BOD5 - Raw Sewage mg/L	182.00	188.00	110.00	222.00	349.00	236.00	234.00	200.00	232.00	256.00	187.00	154.00		212.50	349.00	0.00
Raw: # of samples of BOD5 - Raw Sewage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00			0.00
Total Suspended Solids: TSS																
Raw: Avg TSS - Raw Sewage mg/L	353.00	287.00	198.00	371.00	362.00	272.00	459.00	198.00	186.00	116.00	275.00	158.00		269.58	459.00	0.00
Raw: # of samples of TSS - Raw Sewage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00			0.00
Eff: Avg TSS - Effluent mg/L	0.00	0.00	5.00 <	2.29 <	2.20	0.00 <	2.00	7.00 <	2.25 <	2.25	0.00	0.00		2.64	7.00	15.00
Eff: # of samples of TSS - Effluent	0.00	0.00	2.00	7.00	5.00	0.00	5.00	1.00	4.00	4.00	0.00	0.00	28.00			0.00
Loading: TSS - Effluent kg/d	0.000	0.000	3.142 <	1.972 <	1.338	0.000 <	0.856	10.325 <	2.462 <	0.630	0.000	0.000		1.82	10.33	
Percent Removal: TSS - Raw Sewage %	0.00	0.00	97.47	99.38	99.39	0.00	99.56	96.46	98.79	98.06	0.00	0.00		98.45	99.56	0.00
Total Phosphorus: TP																
Raw: Avg TP - Raw Sewage mg/L	0.16	3.48	2.78	3.71	0.72	4.86	6.60	4.17	3.31	3.97	4.05	2.36		3.35	6.60	0.00
Raw: # of samples of TP - Raw Sewage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00			0.00
Eff: Avg TP - Effluent mg/L	0.00	0.00	0.05 <	0.03 <	0.04	0.00	0.04	0.04	0.05	0.06	0.00	0.00		0.04	0.06	1.00
Eff: # of samples of TP - Effluent	0.00	0.00	2.00	7.00	5.00	0.00	5.00	1.00	4.00	4.00	0.00	0.00	28.00			0.00
Loading: TP - Effluent kg/d	0.000	0.000	0.031 <	0.028 <	0.026	0.000	0.015	0.059	0.052	0.015	0.000	0.000		0.03	0.06	
Percent Removal: TP - Raw Sewage %	0.00	0.00	98.20	99.11	94.17	0.00	99.45	99.04	98.56	98.61	0.00	0.00		98.17	99.45	0.00
Nitrogen Series																
Raw: Avg TKN - Raw Sewage mg/L	24.70	28.00	36.20	46.90	43.50	42.50	53.00	44.80	35.00	39.30	44.60	19.90		38.20	53.00	0.00
Raw: # of samples of TKN - Raw Sewage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00			0.00
Eff: Avg TAN - Effluent mg/L	0.00	0.00	2.65	2.76	2.06	0.00 <	0.10	0.20 <	0.50	2.43	0.00	0.00		1.71	2.76	5.00
Eff: # of samples of TAN - Effluent	0.00	0.00	2.00	7.00	5.00	0.00	5.00	1.00	4.00	4.00	0.00	0.00	28.00			0.00
Loading: TAN - Effluent kg/d	0.000	0.000	1.665	2.379	1.253	0.000 <	0.043	0.295 <	0.547	0.679	0.000	0.000		1.18	2.38	
Disinfection																
Eff: GMD E. Coli - Effluent cfu/100mL	0.00	0.00	43.99	1.72	35.39	0.00	2.19	13.00	16.44	27.49	0.00	0.00				100.00
Eff: # of samples of E. Coli - Effluent	0.00	0.00	2.00	7.00	5.00	0.00	5.00	1.00	4.00	4.00	0.00	0.00	28.00			0.00