Hensall Sewage Lagoon 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 1st – December 31st, 2023

Issued: March 27,2024

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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 11(6) (a) through (k) cited in Environmental Compliance Approval (ECA) #3636-9B3NMA issued September 25, 2013, 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 Hensall Sewage Lagoon is located at 39868 Rodgerville Road, Hensall, Ontario. The facility has a rated capacity of 980 m^3/d and is comprised of the following components:

- Wastewater collection (WWC) system and pumping station
- Three facultative lagoons with supplementary treatment
- Intermittent Sand Filters (ISF)

Raw Wastewater Collection

Raw sewage flows by gravity through the collection system to the Richmond Street Sewage Pumping Station (SPS). The Richmond Street SPS has two submersible pumps that pump sewage to the Hensall Sewage Lagoon through a 200 mm forcemain. Milltronics monitors wet well levels, which control the start/stop cycle of all pumps and alarms. The station has a 250 mm overflow that discharges into a municipal drain and a standby generator.

Sewage Lagoons

Sewage comes through an inlet structure with three weirs. Sewage flows over the weirs to enter the lagoon cells. Flow over the weirs can be blocked by placing stop-gates to prevent flow into any individual cell. Generally, Cells 1 and 3 operate in parallel with raw sewage divided equally between both cells. Sewage then overflows to Cell 2. There is a minimum total hydraulic retention time of 60 days and 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 Black Creek.

System Facts:

Environmental Compliance Approval #3636-9B3NMA (issued September 25, 2013)

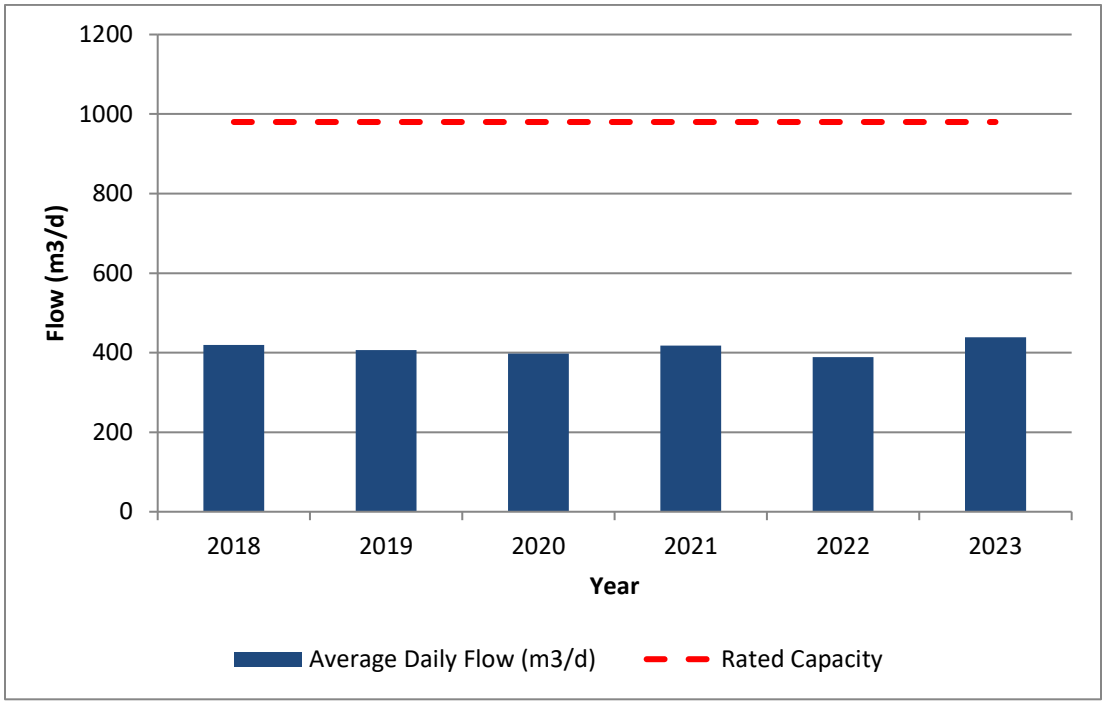
CLI Environmental Compliance Approval	#045-W601 (issued June 20, 2023)
Rated Capacity	980 m^3/d
Receiving Water	Black Creek

In 2023, the Hensall Sewage Lagoon and WWC system was operated in accordance with the provincial regulations as required in ECA #3636-9B3NMA and CLI-ECA #045-W601.

Influent and Effluent Flow Monitoring

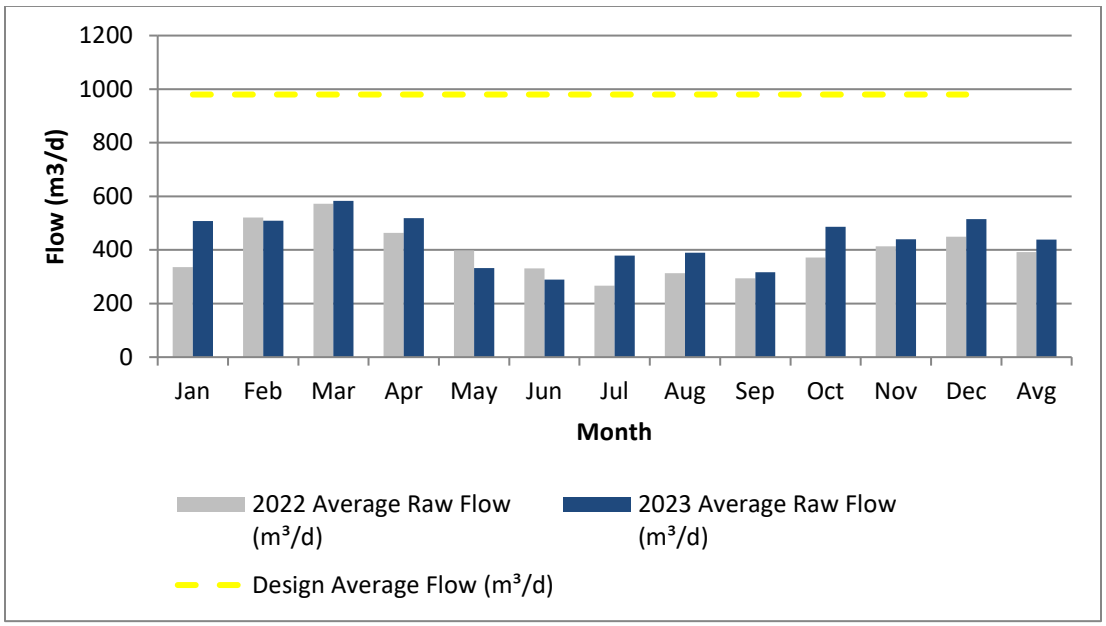
The Hensall Sewage Lagoon is rated to treat an average daily flow of 980 m^3. Refer to Figure 1 for a comparison of the average daily flow for the last six years against the rated capacity. The Hensall Sewage Lagoon is at 45% of the rated capacity of 980 m^3/d.

Figure 1: *Influent Flows 2018-2023*



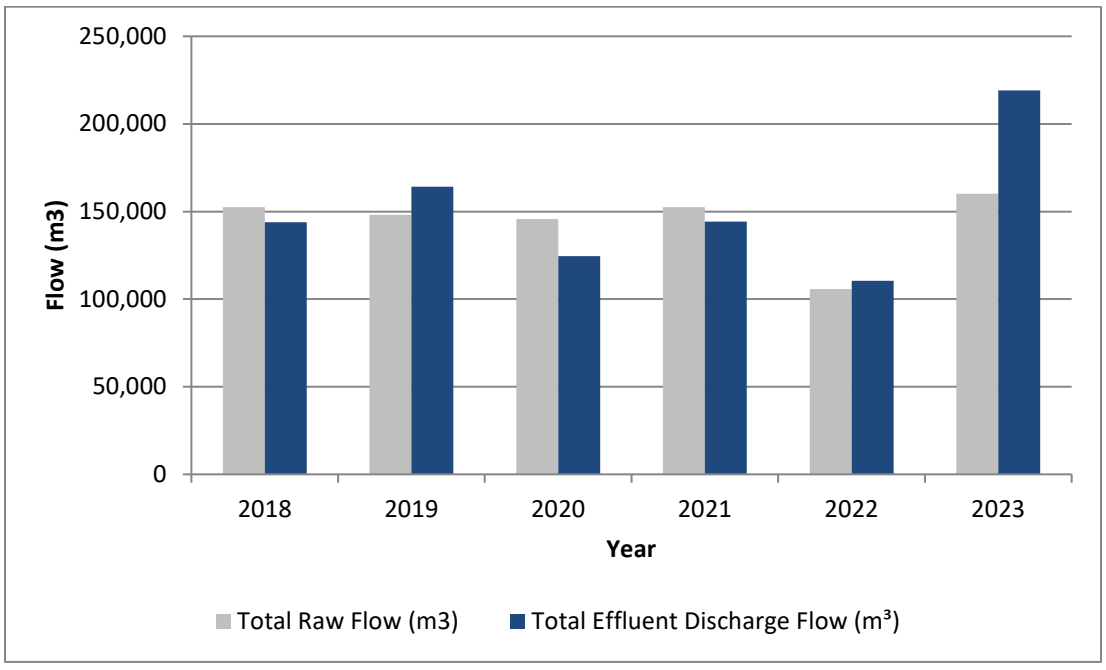
The raw sewage average daily flow was 439 m^3/d in 2023 and 392 m^3/d in 2022. This 12% annual increase was likely the result of wet weather throughout the year. Refer to Figure 2 for 2023 average daily flows by month and the corresponding annual average.

Figure 2: *Average Daily Flows by Month*



Refer to Figure 3 for the total raw and effluent flow in 2022 and 2023. Variances in effluent flow are due to raw incoming flow volumes and the corresponding amount of contents in the lagoons.

Figure 3*: Total Raw and Effluent Flow 2018-2023*

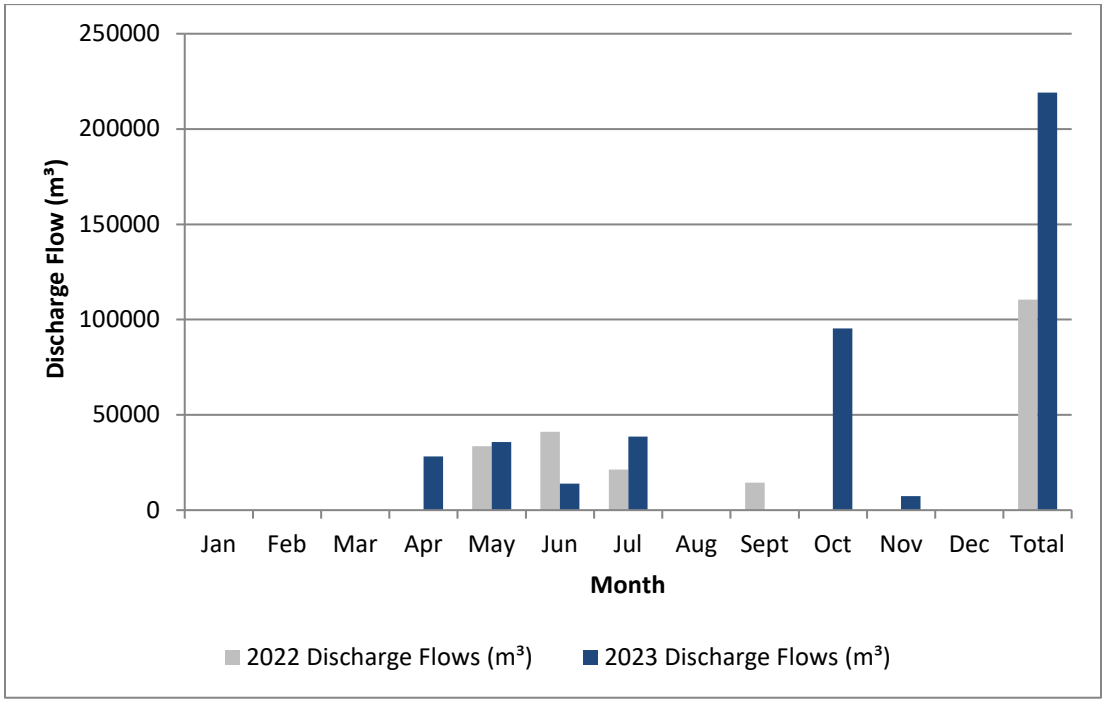


In 2023, the Hensall Sewage Lagoon discharged 219 122 m^3 of effluent. This is 98% higher than the 2022 total discharge flow of 110 472 m^3 and consistent with higher raw inflow in 2023. The average daily discharge flow was 1214 m^3/d in 2022 and 1796 m^3/d in 2023.

The maximum daily discharge flow in 2022 and 2023 was 5449 m^3/d recorded on October 3, 2023. This value exceeds the maximum daily hydraulic loading rate on the ISF of 3615 m^3/d as required in the ECA. Effluent samples did not exceed limits during this time thus indicating no adverse effects on the receiving stream as a result of increased loading. This non-compliance was noted during an annual data review and reported to the MECP on February 6, 2024.

Discharge periods in 2023 included: April 11 to May 31, June 19 to July 28, and October 3 to November 3. Refer to Figure 4 for final effluent total monthly flows for 2022 and 2023.

Figure 4*: Final Effluent Total Monthly Flows*

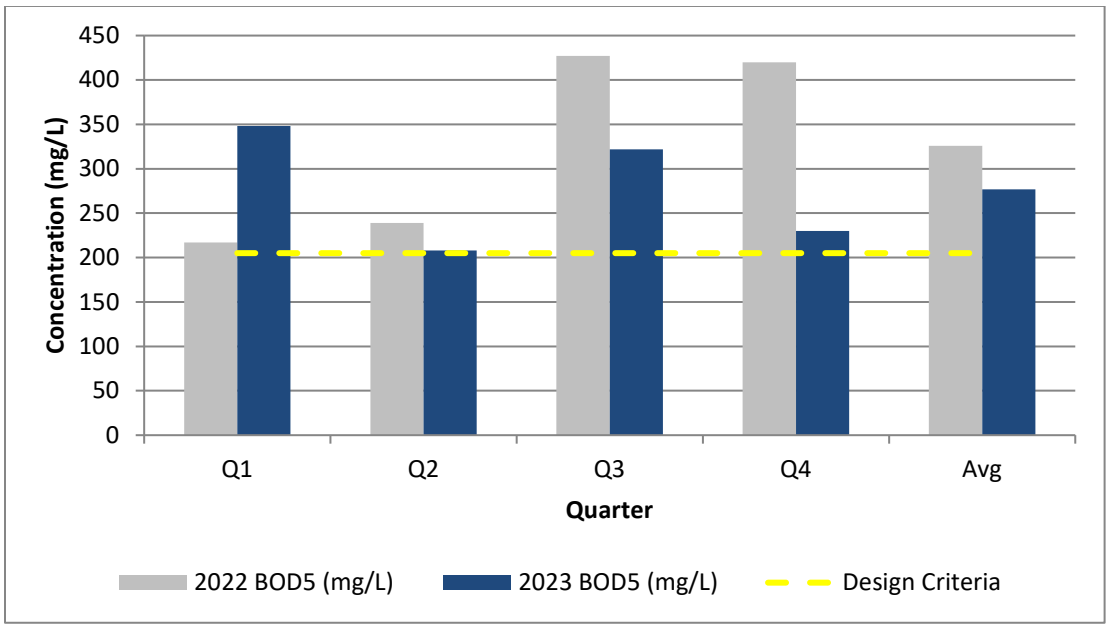


Influent Data

Influent is monitored for Biological Oxygen Demand (BOD_5), Total Suspended Solids (TSS), Total Phosphorous (TP), and Total Kjeldahl Nitrogen (TKN) on a quarterly basis through a grab sample. These parameters are measured against the design criteria of the Hensall Sewage Lagoon. Values above design concentration can result in ineffective treatment of raw sewage and can lead to effluent limit exceedances. In 2023, there were exceedances of all influent parameters; however, this did not affect effluent water quality, which continues to meet ECA limits.

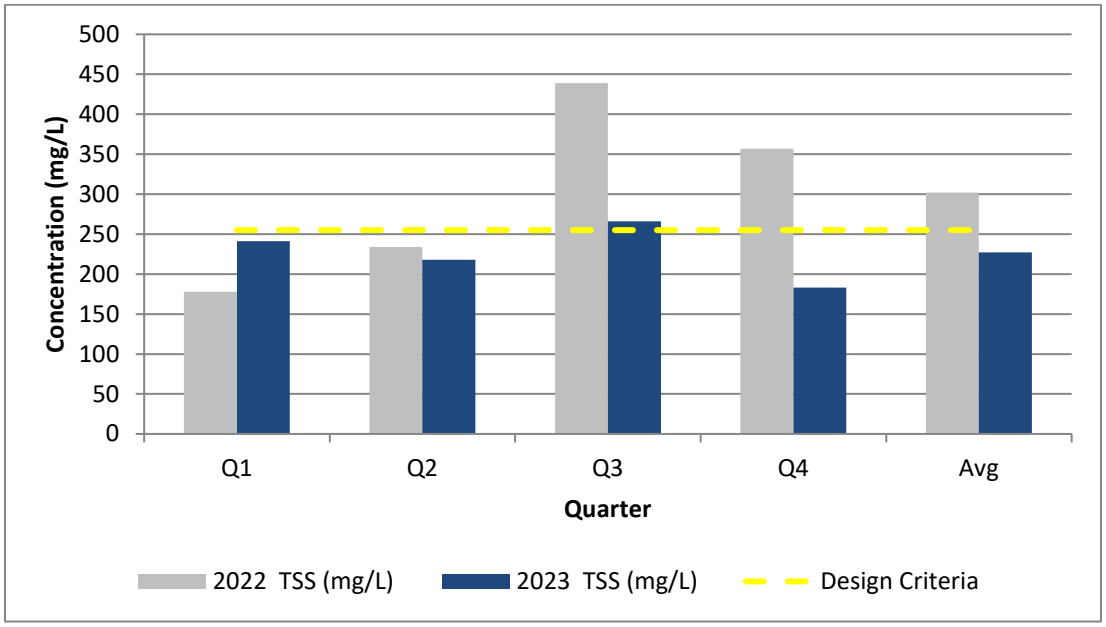
In 2023, the average raw BOD_5 concentration was 277 mg/L, a 14% decrease from 2022. Refer to Figure 5 for a comparison of 2023 quarterly raw BOD_5 concentrations to 2022 concentrations.

Figure 5: *Raw BOD_5 Concentrations*



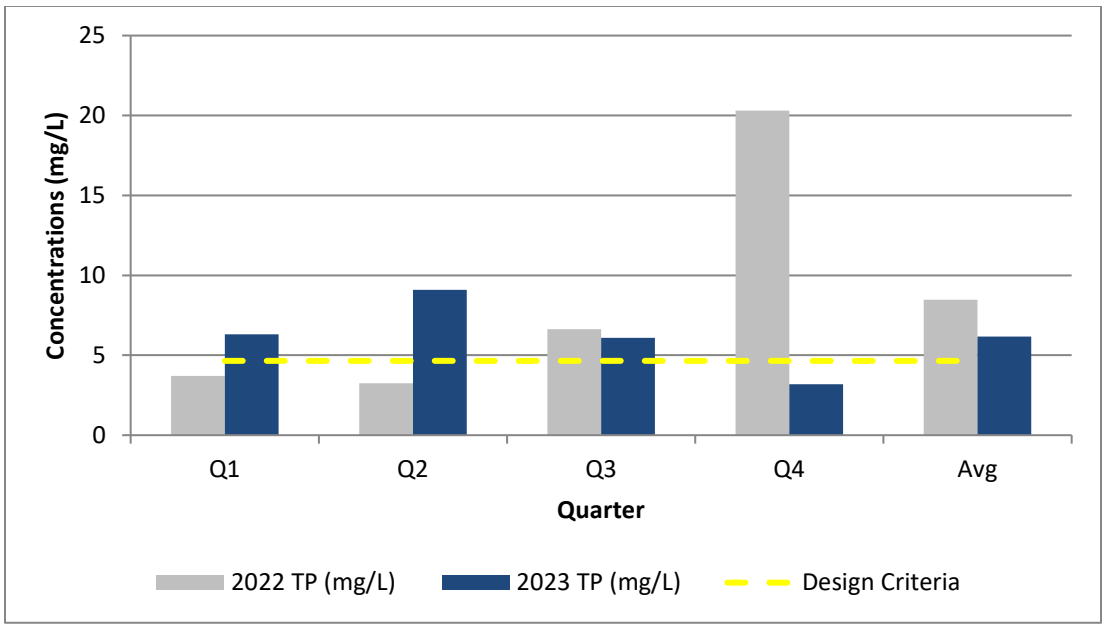
In 2023, the average raw TSS concentration was 227 mg/L, a 25% decrease from 2022. Refer to Figure 6 for a comparison of 2023 quarterly raw TSS concentrations to 2022 concentrations.

Figure 6: *Raw TSS Concentrations*



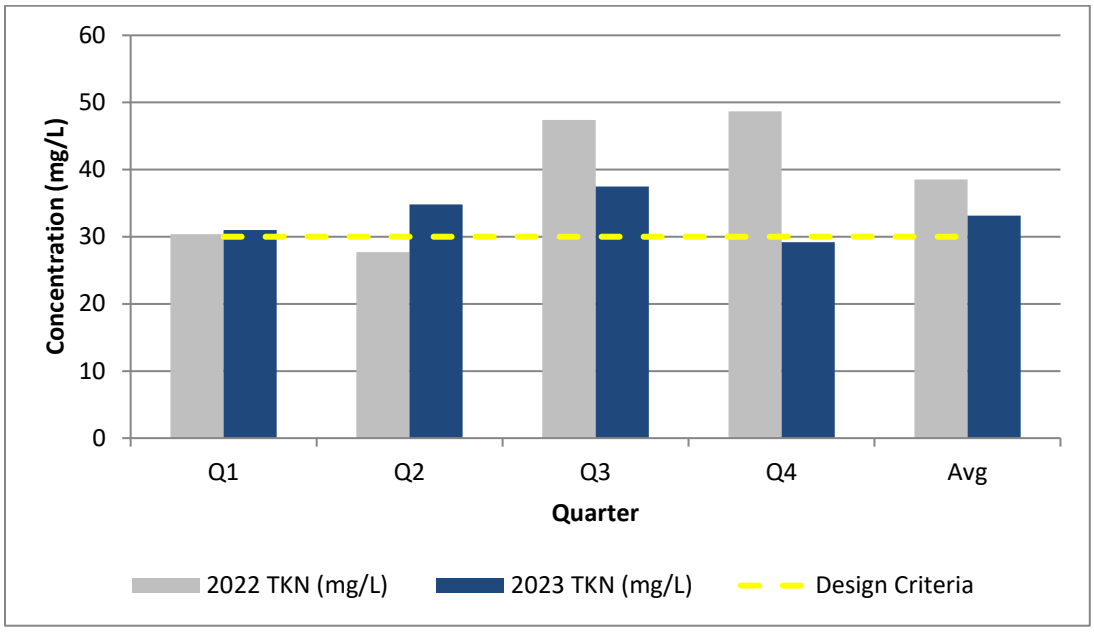
In 2023, the average raw TP concentration was 6 mg/L, a 27% decrease from 2022. Refer to Figure 7 for a comparison of 2023 quarterly raw TP concentrations to 2022 concentrations.

Figure 7: *Raw TP Concentrations*



In 2023, the average raw TKN concentration was 33 mg/L, a 14% decrease from 2022. Refer to Figure 8 for a comparison of 2023 quarterly raw TKN concentrations to 2022 concentrations.

Figure 8: *Raw TKN Concentrations*



Imported Sewage

The Hensall Sewage Lagoon received 11.36 m^3 of septage through Grand Bend Sanitation haulers on March 17, 2023.

Effluent Monitoring

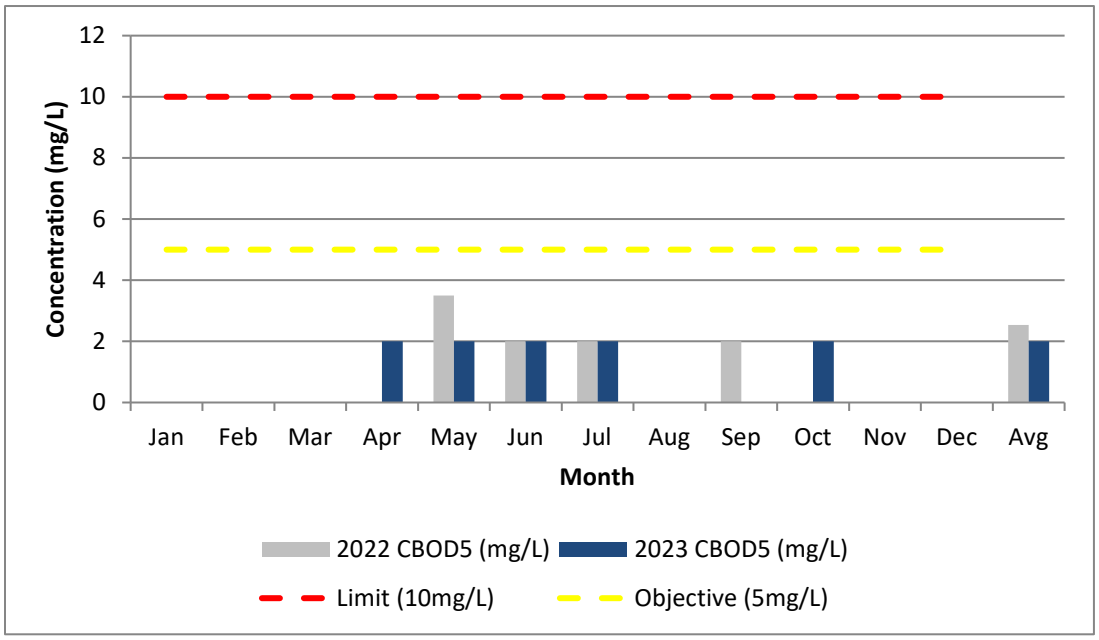
The lagoon effluent is permitted to be discharged between April 16 and November 30 in accordance with the ECA. Early discharge may be required to prevent a spill of wastewater over the banks due to capacity issues or heavy rains. Extra precipitation in April, 2023, led to a request to the MECP for early discharge. Permission was granted on April 11, 2023, and discharge began on that date. For a list of all discharge periods in 2023, see 'Influent and Effluent Flow Monitoring'.

Effluent from the Hensall Sewage Lagoon is sampled twice 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

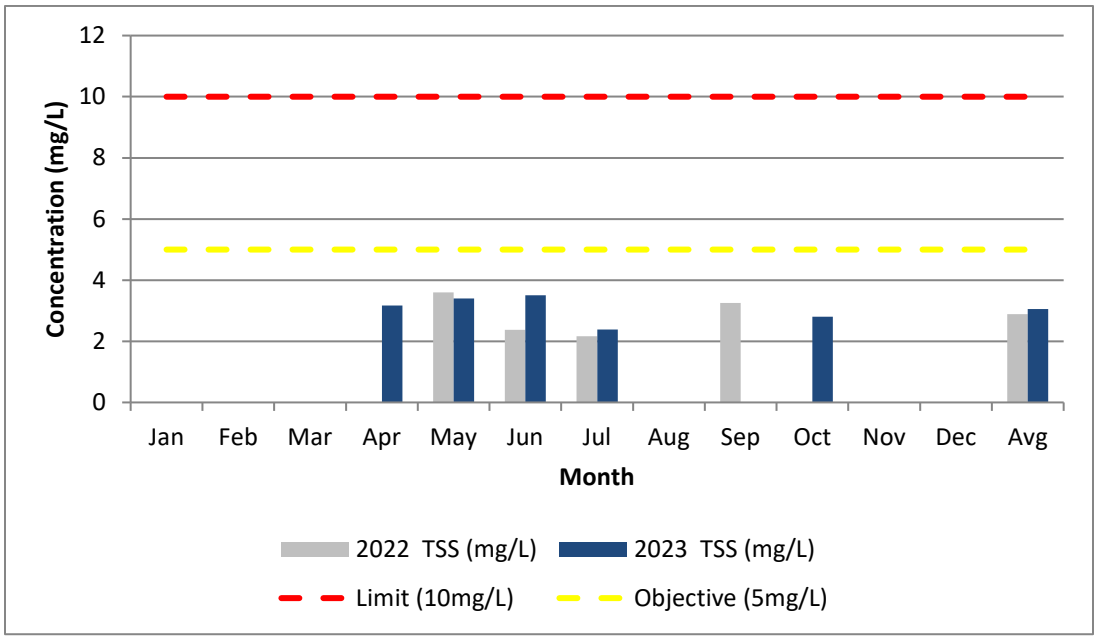
The average monthly effluent $CBOD_5$ concentration in 2023 was 2.0 mg/L, a 21% decrease from 2022. There were no limit or objective exceedances in 2023. Refer to Figure 9 for a comparison of 2023 monthly effluent $CBOD_5$ concentrations to 2022 concentrations.

Figure 9: *Effluent $CBOD_5$ Concentrations*



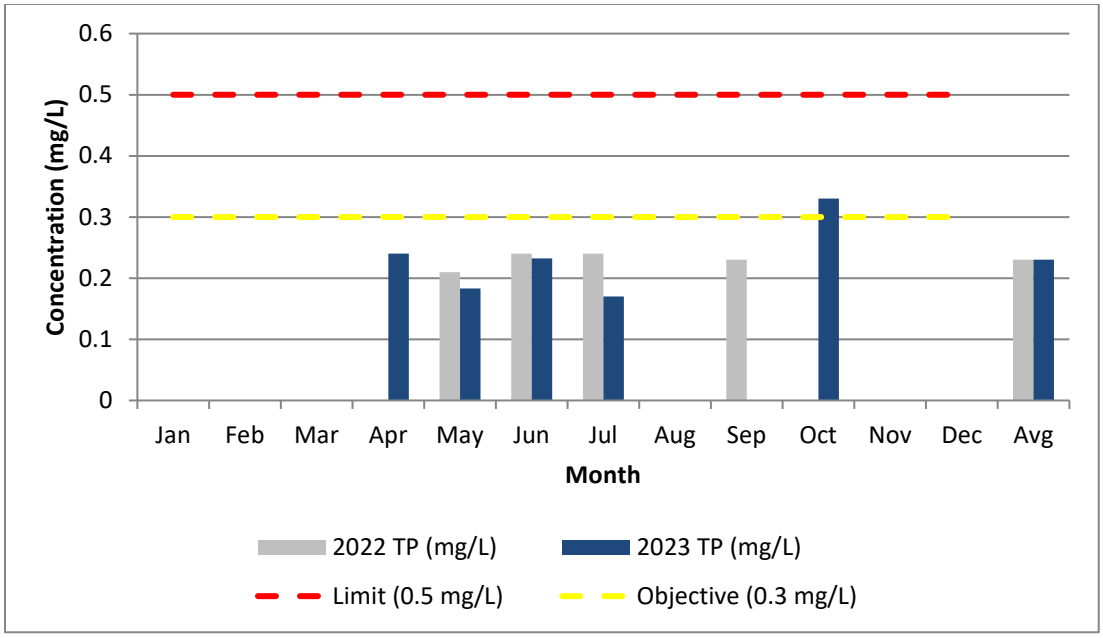
The average monthly effluent TSS concentration in 2023 was 3.1 mg/L, a 6% increase from 2022. There were no limit or objective exceedances in 2023. Refer to Figure 10 for a comparison of 2023 monthly effluent TSS concentrations to 2022 concentrations.

Figure 10: *Effluent TSS Concentrations*



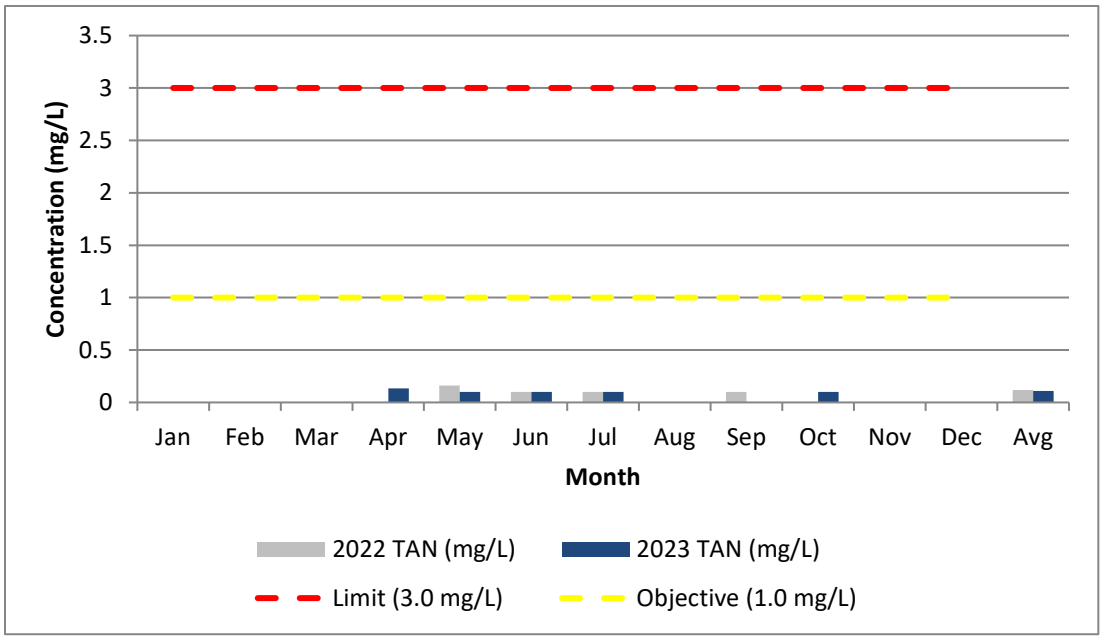
The average monthly effluent TP concentration in 2023 was 0.2 mg/L, equal to the 2022 value. There were no limit or objective exceedances in 2023. Note that October result is not over the objective, as the significant digits in its monthly average does not exceed the objective. Refer to Figure 11 for a comparison of 2023 monthly effluent TP concentrations to 2022 concentrations.

Figure 11: *Effluent TP Concentrations*



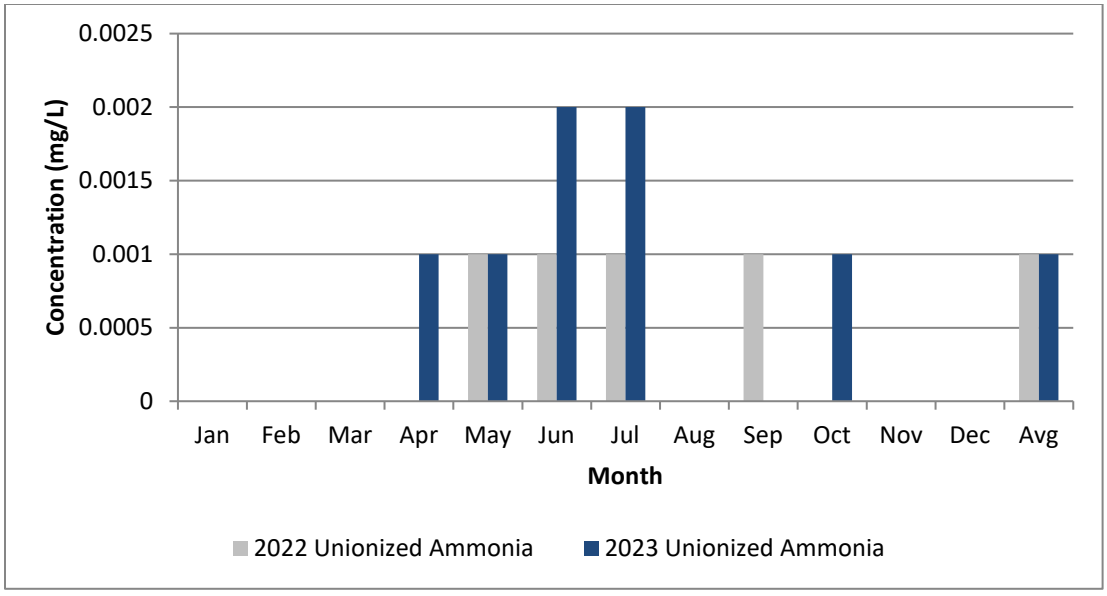
The average monthly effluent TAN concentration in 2023 was 0.1 mg/L, an 8% decrease from 2022. There were no limit or objective exceedances in 2023. Refer to Figure 12 for a comparison of 2023 monthly effluent TAN concentrations to 2022 concentrations.

Figure 12: *Effluent TAN Concentrations*



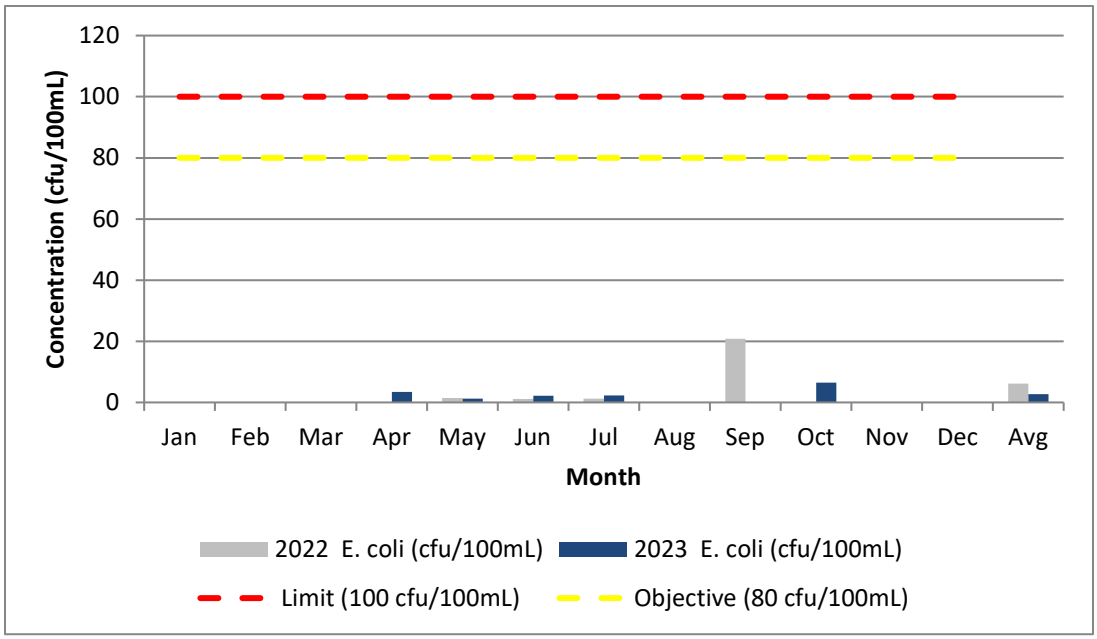
The average monthly effluent Unionized Ammonia concentration in 2023 was 0.001 mg/L, equal to the 2022 value. There are no objectives or limits for Unionized Ammonia, but the 2023 values meet the Provincial Water Quality Objective (PWQO) of 0.02 mg/L. Refer to Figure 13 for a comparison of 2023 monthly effluent Unionized Ammonia concentrations to 2022 concentrations.

Figure 13: *Effluent Unionized Ammonia Concentrations*



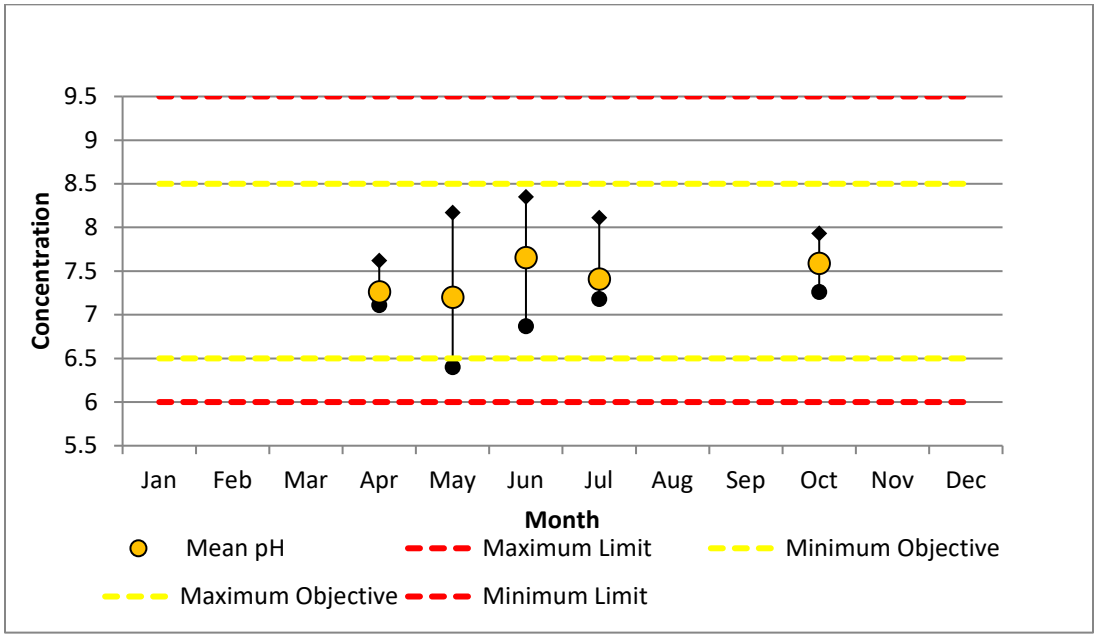
The average monthly effluent E. coli concentration in 2023 was 3 cfu/100mL, a 56% decrease from 2022. There were no limit or objective exceedances in 2023. Given this, it is not recommended that the contingency ultraviolet disinfection system be implemented at this time. Refer to Figure 14 for a comparison of 2023 annual effluent E. coli concentrations to 2022 concentrations.

Figure 14: *Effluent E. coli Concentrations*



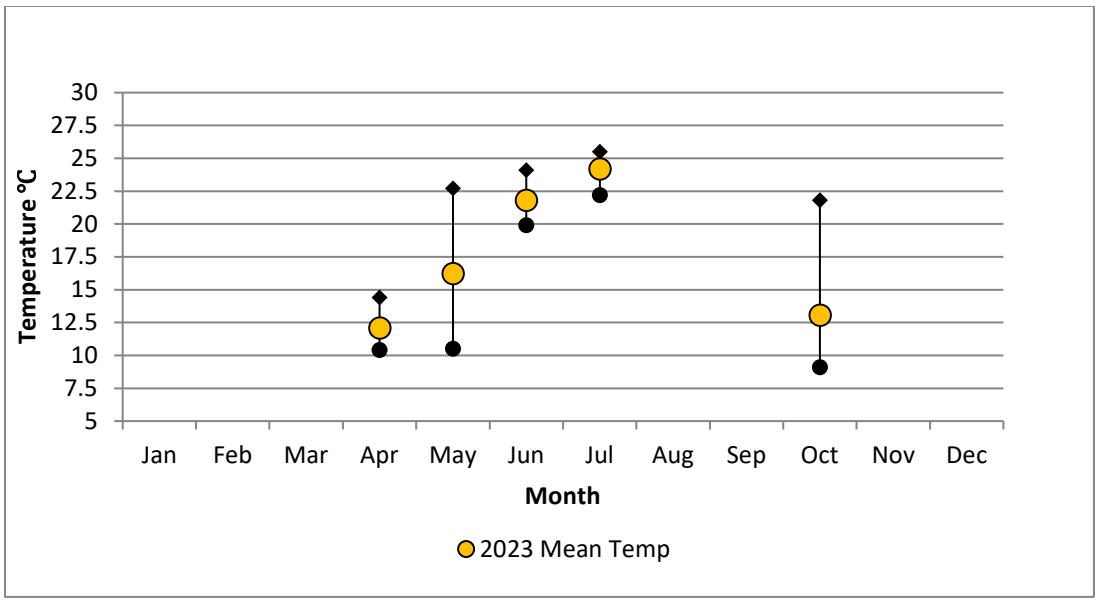
In 2023, effluent pH ranged from 6.4 to 8.4. All limits were met, however the minimum pH objective was not met in May (6.4). Refer to Figure 15 for a comparison of 2023 monthly effluent pH values to the objectives and limits.

Figure 15: *Effluent pH Values*



In 2023, effluent Temperatures ranged from 9.1 °C to 25.5 °C. There are no objectives or limits for Temperature. Refer to Figure 16 for monthly effluent Temperature values in 2023.

Figure 16: *Effluent Temperatures*



In 2023, average waste loadings were calculated for $CBOD_5$, TSS, TP, and TAN. No loading limits were exceeded. Refer to Table 1 below for details.

Table 1: *Average Waste Loadings in 2023*

Effluent Parameter	Average Waste Loading Limit (kg/d)	2023 Loading (kg/d)
$CBOD_5$	9.8	0.88
Total Suspended Solids	9.8	1.32
Total Phosphorus	0.49	0.1
Total Ammonia Nitrogen	2.94	0.05

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

Design objectives were not exceeded more then 50% of the time in 2023 and there were no trends in deterioration of final effluent quality. The average influent flow has not exceeded 80% of the rated capacity. Refer to Table 2 for details on the one objective exceedance that occurred in 2023.

Table 2: *Summary of Objective Exceedance*

Month	Parameter	Concentration (mg/L)	Objective (mg/L)	Issue
May	pH	6.4	6.5	Measurement took early in the morning when pH in lagoons is lower

Operating Problems and Corrective Actions

In 2023, the biggest challenge for the Hensall Sewage Lagoons and WWC system was maintaining pump operation during heavy rain flows. See 'Summary of Efforts made to achieve conformance with F-5-1' for details.

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 included on the list for 2024 are:

- Chemical costs – aluminum sulfate
- Generator maintenance
- Flushing and camera inspection of the WWC system

Maintenance Activities

Preventative and corrective maintenance is assigned and monitored within the Workplace Management System (WMS) program. Refer to Appendix A for the 2023 maintenance summary. Refer to Table 3 for a list of repairs and replacements that occurred in 2023.

Table 3: *Major Maintenance in 2023*

Major Maintenance Wastewater
Fire alarm system repair – Hensall Sewage Lagoon and Richmond SPS
Mechanical louvre repair – Richmond SPS
Generator repair – Richmond SPS
Pump repair – Richmond SPS
Alum feed line repair – Hensall Sewage Lagoon
Upgraded outdoor lighting – Richmond Street SPS

Calibration Records

Pierce Services and Solutions Inc. calibrated influent and effluent flow meters and the wet well level sensor on March 23, 2023. Flow meters met the accuracy tolerance of within 15% of the actual flow rate. Operational staff complete routine pH meter calibrations and verifications. Refer to Appendix B for 2023 Calibration Records.

Sludge Generation

In 2023, the Hensall Sewage Lagoon generated 160 m^3 of sludge. No sludge was hauled in 2023. It is estimated that approximately 160 m^3 of sludge will be generated in 2024.

Complaints

In 2023, there were no complaints were received for the Hensall Sewage Lagoon or WWC system.

Bypass, Overflows, Spills and Abnormal Discharge Events

The ECA requires additional daily sampling for bypass, overflow or spill events. Two overflows occurred in February and April 2023 at the Richmond Street Pumping Station. These resulted in 35 m^3 and 75 m^3 of raw sewage entering the Boise Cascade Drain, respectively. Both incidents were reported to the Medical Officer of Health and the Spills Action Centre (February Reference #1-2HSSMD, April Reference #1-3466DQ). Samples were obtained on both occasions. Refer to Table 4 below for details on each event and sampling results.

Table 4: Overflow Event Summary

Type of Event	Date of Event	Reason for Event	Sample Results				
			E. coli (cfu/100ml)	$CBOD_5$ (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)
Overflow	February 9/23	Heavy Rain and Pump Failure	8 700 000	226	325	6.44	4.8
Overflow	April 1/23	Heavy Rain	101 000	<4	23	0.25	0.7

There were no bypasses or spills in 2023.

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.

There is one designed overflow within the collection system for the protection against basement flooding, damage to equipment/property and prevention of treatment process wash out. Two overflows occurred in 2023 at the Richmond Street SPS due to heavy rain. One was the result of a combination of heavy rain and pump failure. Both pumps were pulled in 2023 for repairs to ensure optimal functioning. In addition, it has been proposed to complete flushing and a camera inspection of the collection system. These projects are recommended to be undertaken to provide an overflow/bypass/spill overall reduction or elimination.

Notice of Modification to the Works

There were no 'Notice of Modification to Sewage Works' forms submitted in 2023.

Alterations to the Wastewater Collection System

No alterations to the collection system posed any significant threat to the drinking water systems in 2023.

Additional Information the Water Supervisor Requires

No additional information requests have been made.

Appendix A

Maintenance Summary

Workorder Summary Report

WO #	Asset ID	Asset Description	Location Description	Class	Work Order Description	Status	Schedule	Actual
							Start	Finsh
3156735	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	1/1/23 12:00 AM	1/26/23 12:52 PM
3157260	0000249165	MCC	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Refurbish/Replace/Repair	MCC Hensall PS Insp/Service (1y/3y) 5695	CLOSE	1/1/23 12:00 AM	4/25/23 08:40 AM
3157263	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	1/1/23 12:00 AM	1/24/23 09:45 AM
3157620	0000249187	MCC Hensall Lagoons	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Refurbish/Replace/Repair	MCC Hensall Lagoons Insp/Service (1y/3y) 5695	CLOSE	1/1/23 12:00 AM	4/25/23 08:36 AM
3177145			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	1/1/23 12:00 AM	1/26/23 12:58 PM
3202338			5695, Hensall WWL & CS, Facility	Compliance	RP03 Annual Report ECA (1y) 5695	CLOSE	1/7/23 12:00 AM	3/23/23 11:38 AM
3203365			5695, Hensall WWL & CS, Facility	Compliance	WSER Quarterly Reporting (3m) 5695	CLOSE	1/12/23 12:00 AM	1/16/23 01:50 PM
3211523	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	2/1/23 12:00 AM	2/13/23 10:54 AM
3212004	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	2/1/23 12:00 AM	3/6/23 01:46 PM
3226086			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	2/1/23 12:00 AM	3/6/23 07:42 AM
3245274	0000121360	PUMP SUBMERSIBLE 02 WETWELL PS	5695, Hensall WWL & CS, Process, Headworks	Refurbish/Replace/Repair	Trouble shoot pump #2 soft starter fault. 5695	CLOSE		4/21/23 10:46 AM
3247878	0000249168	BACKFLOW PREVENTER - HENSALL LIFT STATION	5695, Hensall WWL & CS, Process	Refurbish/Replace/Repair	Purchase and installation of soft starter for Hensall SPS	CLOSE		5/17/23 08:58 AM
3252988	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	3/1/23 12:00 AM	3/28/23 03:00 PM
3253443	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	3/1/23 12:00 AM	3/24/23 03:51 PM
3269050			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	3/1/23 12:00 AM	3/28/23 03:45 PM
3297773	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	4/1/23 12:00 AM	4/24/23 03:54 PM
3298307	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	4/1/23 12:00 AM	4/12/23 10:03 PM
3315097			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	4/1/23 12:00 AM	4/25/23 07:40 AM
3324770			5695, Hensall WWL & CS	Inspection	Air Valve Insp/Pump Out (6m) 5695	CLOSE	4/1/23 12:00 AM	6/7/23 10:22 AM
3346937	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	5/1/23 12:00 AM	5/10/23 03:25 PM
3347449	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	5/1/23 12:00 AM	5/10/23 03:35 PM
3363248			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	5/1/23 12:00 AM	5/10/23 03:46 PM
3392951	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	6/1/23 12:00 AM	6/7/23 10:31 AM
3393466	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	6/1/23 12:00 AM	6/7/23 10:39 AM

3410035			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	6/1/23 12:00 AM	6/7/23 10:49 AM
3430226	0000121360	PUMP SUBMERSIBLE 02 WETWELL PS	5695, Hensall WWL & CS, Process, Headworks	Refurbish/Replace/Repair	Pulled pump 2, removed debris from pump, removed steel debris from base of well 5695	CLOSE		6/1/23 12:40 PM
3441737	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	7/1/23 12:00 AM	7/11/23 02:39 PM
3442254	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	7/1/23 12:00 AM	7/11/23 02:44 PM
3457383			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	7/1/23 12:00 AM	7/11/23 02:46 PM
3480178	0000121360	PUMP SUBMERSIBLE 02 WETWELL PS	5695, Hensall WWL & CS, Process, Headworks	Refurbish/Replace/Repair	Hensall pump#2 rebuild 5695	COMP		2/8/24 03:34 PM
3489018	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	8/1/23 12:00 AM	8/10/23 03:09 PM
3489608	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	8/1/23 12:00 AM	8/10/23 03:11 PM
3503183			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	8/1/23 12:00 AM	8/10/23 03:07 PM
3533065	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	9/1/23 12:00 AM	9/12/23 02:29 PM
3533650	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	9/1/23 12:00 AM	9/28/23 08:37 AM
3534218			5695, Hensall WWL & CS	Compliance	Operation SOP Manual Review and Update (2y) 5695	CLOSE	9/1/23 12:00 AM	12/5/23 02:56 PM
3548406			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Service (1y) 5695	CLOSE	9/1/23 12:00 AM	10/25/23 03:41 PM
3548445			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	9/1/23 12:00 AM	9/12/23 02:29 PM
3548688			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Filter Sand 01 Insp/Service (1y) 5695	CLOSE	9/1/23 12:00 AM	9/25/23 01:06 PM
3548691			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Filter Sand 02 Insp/Service (1y) 5695	CLOSE	9/1/23 12:00 AM	9/25/23 01:07 PM
3548700			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Lagoon 01 Insp/Service (1y) 5695	CLOSE	9/1/23 12:00 AM	9/25/23 01:09 PM
3548703			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Lagoon 02 Insp/Service (1y) 5695	CLOSE	9/1/23 12:00 AM	9/25/23 01:09 PM
3581666	0000249167	METER LEVEL	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Calibration	Meter Level Insp/Service (1y) 5695	CLOSE	10/1/23 12:00 AM	11/10/23 10:59 AM
3581671	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	10/1/23 12:00 AM	10/25/23 03:47 PM
3582444	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	10/1/23 12:00 AM	10/23/23 03:40 PM
3597612			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	10/1/23 12:00 AM	10/31/23 05:41 PM
3606909			5695, Hensall WWL & CS	Inspection	Air Valve Insp/Pump Out (6m) 5695	CLOSE	10/1/23 12:00 AM	11/17/23 02:17 PM
3624784	0000249187	MCC Hensall Lagoons	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Refurbish/Replace/Repair	Converted outdoor lighting fixtures to LED 5695	CLOSE		10/26/23 03:45 PM
3630034	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	11/1/23 12:00 AM	11/30/23 11:58 AM

			Control & Monitoring					
3630554	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	11/1/23 12:00 AM	11/10/23 11:45 AM
3643550			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	11/1/23 12:00 AM	11/30/23 12:48 PM
3671190	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process	Inspection	Alarm Dialer 01 Hensall PS Testing (1m) 5695	CLOSE	12/1/23 12:00 AM	12/7/23 03:47 PM
3671768	0000249176	PANEL ALARM/DIALER 01	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Inspection	Alarm Dialer 01 Hensall LagoonTesting (1m) 5695	CLOSE	12/1/23 12:00 AM	12/4/23 03:17 PM
3685531			5695, Hensall WWL & CS	Refurbish/Replace/Repair	Engine Diesel Hensall Lift PS Insp/Test (1m) 5695	CLOSE	12/1/23 12:00 AM	12/7/23 03:49 PM
3706413			Hensall Wastewater Lagoon & Collection System	Inspection	Esa inspection @ Bayfield main PS, Lagoon, Zurich well, knell st, Bluewater rest home, Hensall PS,	CLOSE		12/20/23 03:55 PM
3706491	0000156286	PANEL ALARM/DIALER 01 PS	5695, Hensall WWL & CS, Process, Process Control & Monitoring	Refurbish/Replace/Repair	Fixed ESA defect on level transducer wiring 5695	CLOSE		12/21/23 07:33 AM

Appendix B

2023 Calibration Report

Pierce Services & Solutions Inc.

519.820.4853 Fax 519.824.9402

Instrument Verification Sheet

Client Name: Ontario Clean Water Agency

Date: March 23, 2023

Equipment Description: Level Sensor

Assigned Number: Wet Well Level

Area Located: Hansall Well

Inventory Number: 156303

Instrument Data

Manufacturer: Milltronics

Model Number: MultiRanger Plus

Type: Ultrasonic

Serial Number: N/A

Range: 0 - 3.800 m

Accuracy: +/- 5%

Method Of Calibration: Standard Measurement

Application: Waste Water

Calibration Data

Input %	Input	As Found	As Left	Pass/Fail
	12.48 mA	2.014 m	2.014 m	Pass

Confirmed Run Mode: ✓

Placed back in service: ✓

Comments:

Checked By: Greg Pierce CCST

Signature:

Pierce Services & Solutions Inc.

Alphabetical Parameter Listing Multiranger Plus

Tag # LIT 300 Reservoir Level Hensall
Date: March 23, 2023

#	Parameter	Value	#	Parameter	Value
P-0	Security	1954	P-50	OCM mA output	1
P-1	Units	1	P-51	OCM simulation	--
P-2	Mode of Measurement	1	P-52	Totalizer display factor	0
P-3	Empty Distance	4.000	P-53	Totalizer decimal point	2
P-4	Span	3.800	P-54	Low total	00.00
P-5	Blanking	0.300	P-55	High total	0000
P-6	Analog Output	2	P-56	Remote totalizer contact	0
P-7	Decimal Point	2	P-57	Flow sampler control	0
P-8	Relay 1, Function	0	P-58	Flow sampler control	1.000
P-9	Relay 1, Setpoint On	1.900	P-59	Time sampler control	--
P-10	Relay 1, Setpoint Off	1.950	P-60	Full Calibration	--
P-11	Relay 2, Function	1	P-61	Empty Calibration	--
P-12	Relay 2, Setpoint On	3.050	P-62	Measurement Offset	0.000
P-13	Relay 2, Setpoint Off	3.030	P-63	Sound Velocity at 20° C	344.1
P-14	Relay 3, Function	7	P-64	Velocity at P-65	336.9
P-15	Relay 3, Setpoint On	3.800	P-65	Air temperature	8 C
P-16	Relay 3, Setpoint Off	3.750	P-66	Maximum air temperature	33 C
P-17	Relay 4, Function	1	P-67	Minimum air temperature	-1 C
P-18	Relay 4, Setpoint On	1.500	P-68	Fill damping	10.00
P-19	Relay 4, Setpoint Off	1.700	P-69	Empty damping	10.00
P-20	Relay 5, Function	0	P-70	Process rate display	0.000
P-21	Relay 5, Setpoint On	--	P-71	Process rate filter	1
P-22	Relay 5, Setpoint Off	--	P-72	Fuzz filter	1
P-23	Transducer, Submersible	0	P-73	Agitator discrimination	1
P-24	Pump 1, hours	0.000	P-74	Fail-safe mode	3
P-25	Pump 2, hours	0.000	P-75	Fail-safe timer	1.000
P-26	Pump 3, hours	0.000	P-76	Reading	2.01
P-27	Pump 4, hours	0.000	P-77	Material level	2.014
P-28	Pump 5, hours	0.000	P-78	Space or distance	1.986
P-29	Pump, run on, interval	0.000	P-79	Scope displays	_____
P-30	Pump, run off, duration	0	P-80	Echo confidence	1:24
P-31	Transducer	104	P-81	Confidence threshold long	10
P-32	DLD milliamp output	1	P-82	Confidence threshold long	5
P-33	Inflow/discharge totaling	1	P-83	Echo strength	88
P-34	Tank Shape	0	P-84	Noise	4:9
P-35	Tank dimension A	0.000	P-85	Algorithms	1
P-36	Tank dimension L	0.000	P-86	TVT curve	1
P-37	Convert display	1.000	P-87	Range extension	20
P-38	Display offset	0.000	P-88	Number of transmit pulses	4
P-39	Display reading options	0	P-89	Software version	1.22
P-40	Primary measuring device	1	P-90	Memory test	PASS
P-41	Flow rate time units	4	P-91	LCD,LED and relay test	PASS
P-42	OCM exponent	1.550	P-92	mA output test	12.48
P-43	Flume Dimensions	1.000	P-93	Temperature sensor test	183.0
P-45	Maximum head	3.800	P-94	Transmitter test	PASS
P-46	Maximum flow rate	1000	P-95	Programmer test	PASS
P-47	Auto zero	--	P-96	Watchdog reset test	PASS
P-48	OCM low head cutoff	5.000	P-97	Trim for 4 mA	220
P-49	OCM decimal point	2	P-98	Trim for 20 mA	3495
			P-99	Master reset	

Site Location: Hansall Well

Pierce Services & Solutions Inc.

45 Wilton Road
Guelph, ON N1E 7L6

Phone: 519.820.4853
Fax: 519.824.9402

Flowmeter Report

Verification: X **Calibration:**

Client: OCWA Bluewater
Description: Mag Flow Meter
Manufacturer: Endress Hauser
Model: Promag
Inventory No.: 249166

Location: Hensall Lift Station
Date: 23-Mar-23
Checked By: Greg Pierce
Serial No.: JA02691600

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
1.99 m/s	36.41 l/s	36.41 l/s	36.41 l/s	Pass
5.65 m/s	100.00 l/s	100.00 l/s	100.00 l/s	Pass

Confirmed Run Mode: X

Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 150 mm
Pipe Material: Stainless Steel
Liner Material: PU
Range: 0-100 l/s
Tag Number: FIT 100

Comments:
Verification of original calibration

Signature:

Greg Pierce, CCST

CaApr1422_Hensall2

Pierce Services & Solutions Inc.

Alphabetical Parameter Listing Milltronics 100/200

Tag # Wet Well Level Hensall Lift SPS
Date: arch 23, 2023

Parameter #	Parameter Description	Parameter Value	Value Description	Relay #
P001	Operation	1	Level measurement	
P002	Material	1	Liquid surface	
P003	Process Speed	2	Medium (1m/min)	
P004	Transducer	104	XPS 10	
P005	Units	1	Meters	
P006	Empty	2.743	Transducer to base	
P007	Span	2.682	Maximum reading	
P065	Reading Override Value	5.00	Relay Value Inserted	
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	1
P112	Relay on Level	0.950	Meters	1
P113	Relay off Level	0.100	Meters	1
P309	Run Time	47736	Hours	1
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	2
P112	Relay on Level	1.550	Meters	2
P113	Relay off Level	1.100	Meters	2
P309	Run Time	2.3	Hours	2
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	3
P112	Relay on Level	1.650	Meters	3
P113	Relay off Level	1.200	Meters	3
P309	Run Time	2	Hours	3
P111	Loss of Echo	6		4
P112	Relay on Level		Meters	4
P113	Relay off Level		Meters	4
P309	Run Time		Hours	4
P111	Loss of Echo	1		5
P112	Relay on Level	1.820		5
P113	Relay off Level	1.750		5
P309	Run Time			5
P340	Date of Manufacture	9:10:22		
P341	Run Time	3832 day		
P342	Start Ups	171		
P650	Offset Calibration			
P651	Sound Calibration			
P652	Offset Correction			
P653	Velosity	338.1		
P654	Velosity at 20 C	344.1		
P660	Temperature Source Fixed	1		
P791	Bus Error Count	8		
P802	Transducer Submergence	0		
	%	45.237.61 %		
	Echo	100		
	Temp	10 C		
	mA	10.19 mA		
	Level	1.04 m		

Site Location: Hensall SPS

Pierce Services
& Solutions Inc.

45 Wilton Road
Guelph, ON N1E 7L6

Phone: 519.820.4853
Fax: 519.824.9402

Flowmeter Report

Verification: X **Calibration:**

Client: OCWA Bluewater
Description: Mag Flow Meter
Manufacturer: Endress Hauser
Model: Promag W
Inventory No.:

Location: Hensall Lagoons
Date: 23-Mar-23
Checked By: Greg Pierce
Serial No.: J6052B1600

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
42.38 m/s	42.27 l/s	42.27 l/s	42.27 l/s	Pass
2.83 m/s	200.00 l/s	200.00 l/s	200.00 l/s	Pass

Confirmed Run Mode: X

Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 300 mm
Pipe Material: Stainless Steel
Liner Material: PU
Range: 0-200 l/s
Tag Number: FIT 100

Comments:
Verification of original calibration

Signature:

Greg Pierce, CCST

Pierce Services & Solutions Inc.

Alphabetical Parameter Listing Milltronics 100/200

Tag # Wet Well Level Hensall Lift SPS
Date: March 23, 2023

Parameter #	Parameter Description	Parameter Value	Value Description	Relay #
P001	Operation	1	Level measurement	
P002	Material	1	Liquid surface	
P003	Process Speed	2	Medium (1m/min)	
P004	Transducer	104	XPS 10	
P005	Units	1	Meters	
P006	Empty	2.743	Transducer to base	
P007	Span	2.682	Maximum reading	
P065	Reading Override Value	5.00	Relay Value Inserted	
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	1
P112	Relay on Level	0.950	Meters	1
P113	Relay off Level	0.100	Meters	1
P309	Run Time	47736	Hours	1
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	2
P112	Relay on Level	1.550	Meters	2
P113	Relay off Level	1.100	Meters	2
P309	Run Time	2.3	Hours	2
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	3
P112	Relay on Level	1.650	Meters	3
P113	Relay off Level	1.200	Meters	3
P309	Run Time	2	Hours	3
P111	Loss of Echo	6		4
P112	Relay on Level		Meters	4
P113	Relay off Level		Meters	4
P309	Run Time		Hours	4
P111	Loss of Echo	1		5
P112	Relay on Level	1.820		5
P113	Relay off Level	1.750		5
P309	Run Time			5
P340	Date of Manufacture	9:10:22		
P341	Run Time	3832 day		
P342	Start Ups	171		
P650	Offset Calibration			
P651	Sound Calibration			
P652	Offset Correction			
P653	Velosity	338.1		
P654	Velosity at 20 C	344.1		
P660	Temperature Source Fixed	1		
P791	Bus Error Count	8		
P802	Transducer Submergence	0		
	%	37.61%		
	Echo	100		
	Temp	10 C		
	mA	10.19 mA		
	Level	1.01 m		

Site Location: Hensall SPS