Village of Oil Springs Wastewater Lagoons

2024 Annual Report of Operations

Managed, Operated, and Maintained by

Jacobs

February 2025

Ontario Ministry of the Environment, Conservation and Parks
1094 London Road,
Sarnia, Ontario.

MECP District Manager,

On behalf of the Village of Oil Springs, in Lambton County, OMI (Jacobs) is pleased to submit to you the annual operating report for the Village of Oil Springs Wastewater Lagoon System. Please feel free to contact the undersigned if you have any questions regarding this report.

Respectfully submitted,

Joe Bloomfield
Jacobs - **Project Manager**

cc: Martha Gawley, Clerk-Treasurer, Village of Oil Springs
Derek Daly, Lead Operator, Jacobs
Cathy Culnan, Operator II, Jacobs

Overview

The Village of Oil Springs Wastewater lagoon system is a Class one (1) collection system and operated under the **Environmental Compliance Approval Number: 5278-BEVL2F, Issued Aug 14th, 2019.**
Wastewater System Number: 110001998

The Lagoon collection system consists of two (2) pumping stations and two (2) facultative lagoons. The Facultative lagoons are a secondary treatment consisting of a 15.5-acre waste stabilization pond constructed into two (2) cells with each cell volume being approximately 50,000 m3. Sewage enters a distribution-box equipped with sluice gates to direct flow into designated lagoon. Each lagoon has an outlet structure which flows to a 600 mm outfall sewer that discharges to Black Creek.

Sub-Station: is located at 2658 Oil Heritage Road and is equipped with 2 submersible pumps which alternate duty when called for. The Sub Station pumps the raw sewage via a 200 mm forcemain on easements, approximately 580 m southwesterly to a gravity sewer. The pump station also has a 200 mm (8-inch) emergency overflow pipe that discharges to Black Creek. The pump station has 24/7 monitoring capabilities.

Main Pump Station: is located at 2601 Frederick Street and is equipped with 2 submersible pumps which alternate duty when called for. The Main Station pumps the raw sewage via a 200 mm forcemain on easements, approximately 817 m northeasterly to the lagoons. The pump station also has a 200 mm (8-inch) emergency overflow pipe that discharges to Black Creek. The Main Station has a backup diesel generator for power outage emergencies. The pump station has 24/7 monitoring capabilities.

Reports which are submitted to the regional Environmental Officer are the S1and S2 Municipal Utility Monitoring Program reports and the Bypass/Overflow reports. These reports are submitted quarterly to the Ontario Ministry of the Environment, Conservation & Parks (MECP)

A required, a Federal quarterly ERRIS (Effluent Regulatory Reporting Information System) report is also submitted by Jacobs on behalf of The Village of Oil Springs. The Federal ERRIS inspectors were on site Nov 6, 2020; A contents sample of the "South Lagoon" was collected and analyzed for CBOD5, Unionized Ammonia and Acute lethality. An email received had determined that all the sample results were compliant with the Wastewater Systems Effluent Regulation. No additional sampling is required.

ECA, Schedule 11: Reporting

The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but not limited to, the following information pertaining to the reporting period:

a) a summary and interpretation of all Influent & Imported Sewage monitoring data, and a review of the historical trend of the sewage characteristics and flow rates.

The Total Influent flow to the Lagoons for 2024 was approximately **44,310 m3** (2023: 55,374) (2022: 48,741) with the daily average of approximately **121.2 m3/day** or **44.6 %** (2023 - 49%) of capacity. ECA rated capacity is 272 m3/day.

Historically the Influent flow rates increase due to infiltration during heavy rain events/storms and during the spring runoffs when the snow & ice melt. Also, a slight increase is due to new residential builds in the area.

The area has seen a rise in quick, intense rainstorms with a lot of rainfall in a short period of time.

The Operating Authority monitors the rainfall (rain gauge) and includes results in the monthly report.

In **2024** the Influent TKN was the lowest in March (26.1 mg/L) and seen an increase to its highest in September (76.5 mg/L)
In **2023** the Influent TKN was the lowest in January (31.4 mg/L) and increased to its highest in November (78.0 mg/L)

The **2024** Influent BOD5 results were considerably lower in July (131 mg/L) with the highest in January (302 mg/L)
The **2023** Influent BOD5 findings were the lowest in April (238 mg/L) and the highest in March (239 mg/L)

The **2024** Total Phosphorous characteristics in the raw sewage range from the lowest being 2.49 mg/L (March) and the highest being 7.55 mg/L (September)
The **2023** Total Phosphorous characteristics in the raw sewage range from the lowest being 2.84 mg/L (January) and the highest being 7.50 mg/L (November)

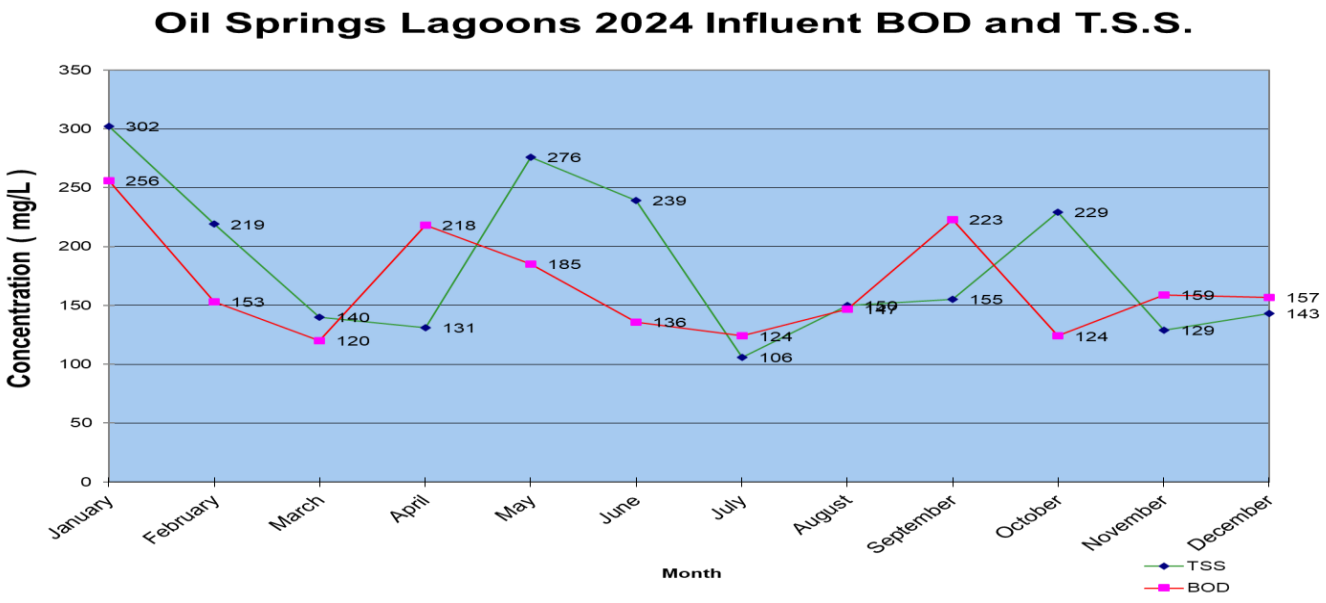
September **2024** – was an extremely dry month with not a lot of infiltration into the collection system. Both the TKN & Total Phosphorus results were high compared to other months throughout the year.

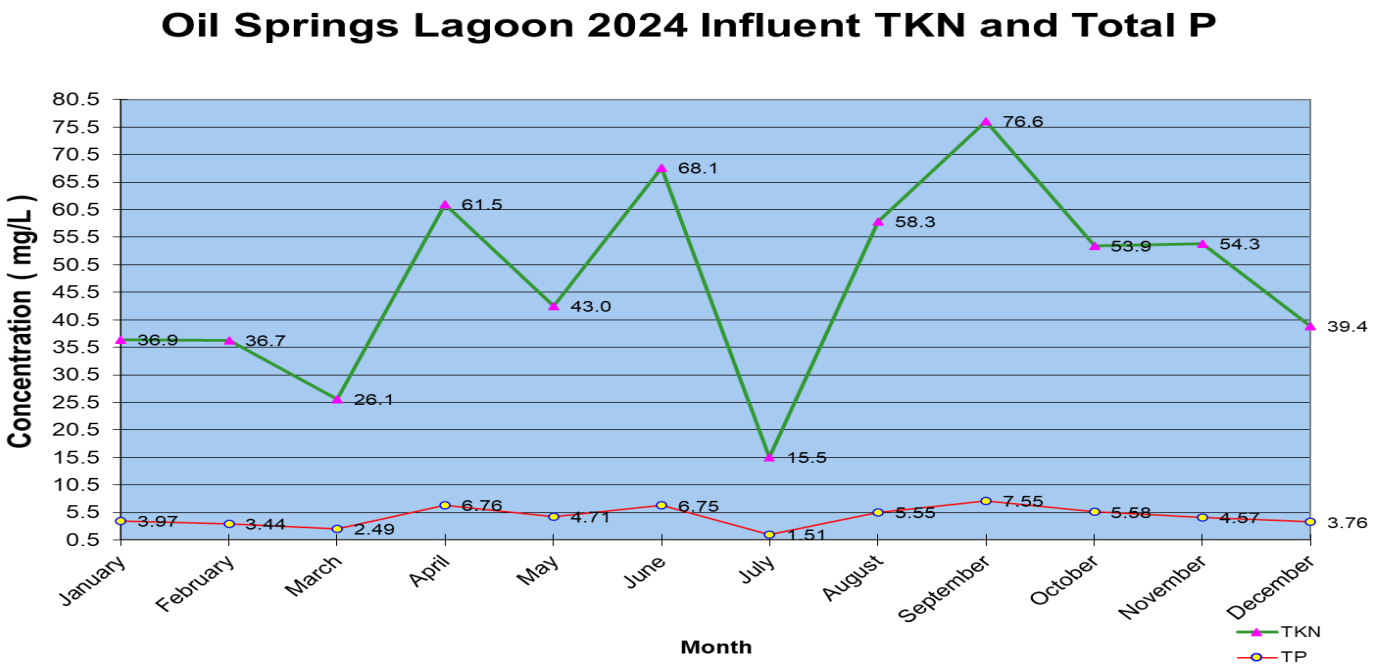
2024 Analytical Results and Lagoon Discharge

Oil Springs Lagoons
Operations Number: 110001998
Operating Authority: JACOBS (OMI)
Municipality: Village of Oil Springs

	Influent Flow		RAW - Influent Lab Data					Lagoon Discharge - Final Effluent Seasonal Average									Geomean Avg
Month	Total Flow m3	Avg. Flows m3/Day	BOD5 mg/L	S. S. mg/L	TKN mg/L	Total P mg/L	pH	CBOD5 mg/L	S. S. mg/L	TKN mg/L	Total P mg/L	Nitrite NO2 mg/L	Nitrate NO3 mg/L	pH	Ammonia NH3 mg/L	Total Sulphide	E-Coli Per 100ml
January	5308	171	302	256	36.9	3.97	7.69										
February	3136	112	219	153	36.7	3.44	7.46										
March	3875	125	140	120	26.1	2.49	7.55										
April	4216	136	131	218	61.5	6.76	7.40	5.6	18.4	3.6	0.22	0.0	0.1	7.59	1.8	0.0	5.2
May	3782	122	276	185	43.0	4.71	7.76										
June	3390	113	239	136	68.1	6.75	8.04										
July	4185	135	106	124	15.5	1.51	7.49										
August	3503	113	150	147	58.3	5.55											
September	2760	92	155	223	76.6	7.55	7.38										
October	3197	103	229	124	53.9	5.58	8.00										
November	3455	115	129	159	54.3	4.57	7.55	4.0	6.0	1.3	0.10	0.05	0.47	8.07	0.37	n/a	48
December	3503	113	143	157	39.4	3.76	7.58										
Total Flow	44,310																

Lagoon Effluent shows a monthly average - ECA limits are based on "Seasonal Average"





b) a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works.

Effluent Parameter	Design Objectives	Compliance Limits
CBOD5	10 mg/L	20 mg/L
TSS	15 mg/L	25 mg/L
Total Phosphorous	0.5 mg/L	1.0 mg/L
Total Ammonia Nitrogen	5.0 mg/L	
E-coli	150 CFU/100 mL	200 CFU/100 mL
Unionized Sulphide	0.02 mg/L (spring only)	

South Lagoon was discharged from April 3rd to April 26th with approximately 44,785 m3 deposited into Black Creek.

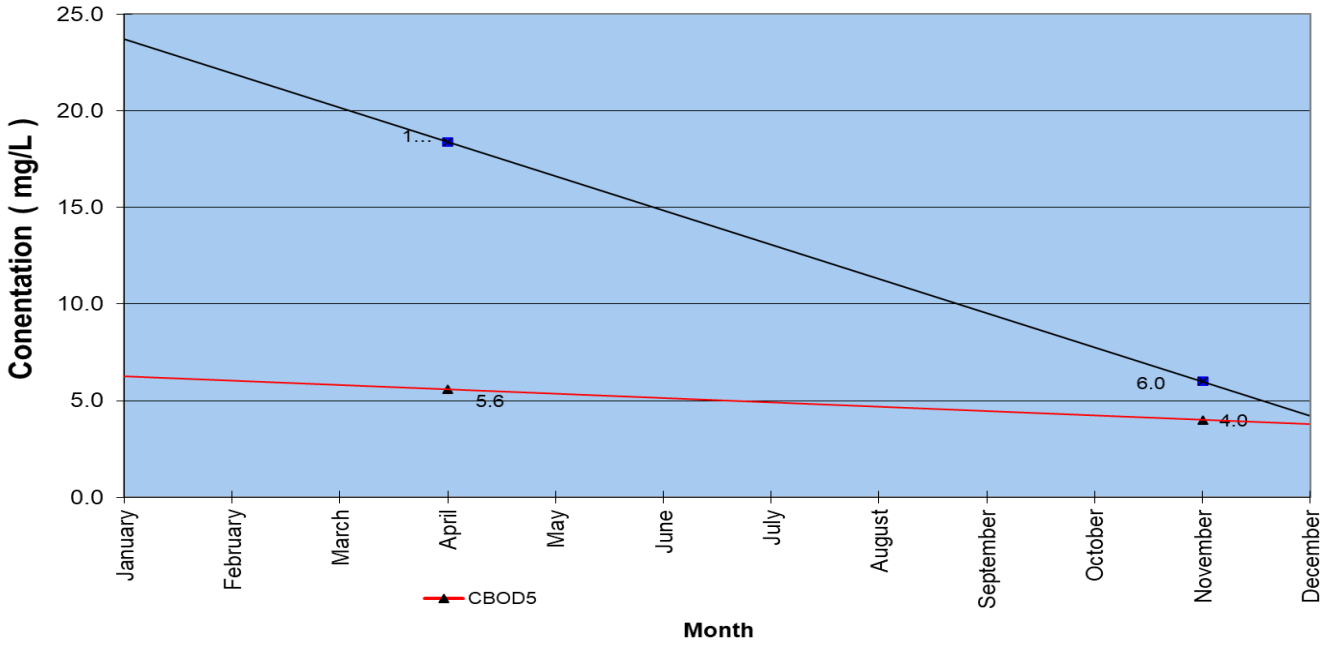
North Lagoon was discharged from Nov 8th to Nov 29th with approximately 46,163 m3 deposited into Black Creek

Lagoon Final Effluent can be seasonally discharged into Black Creek during the months of April and November as per the ECA. Lagoon Effluent compliance limits are based on a “Seasonal Average.”

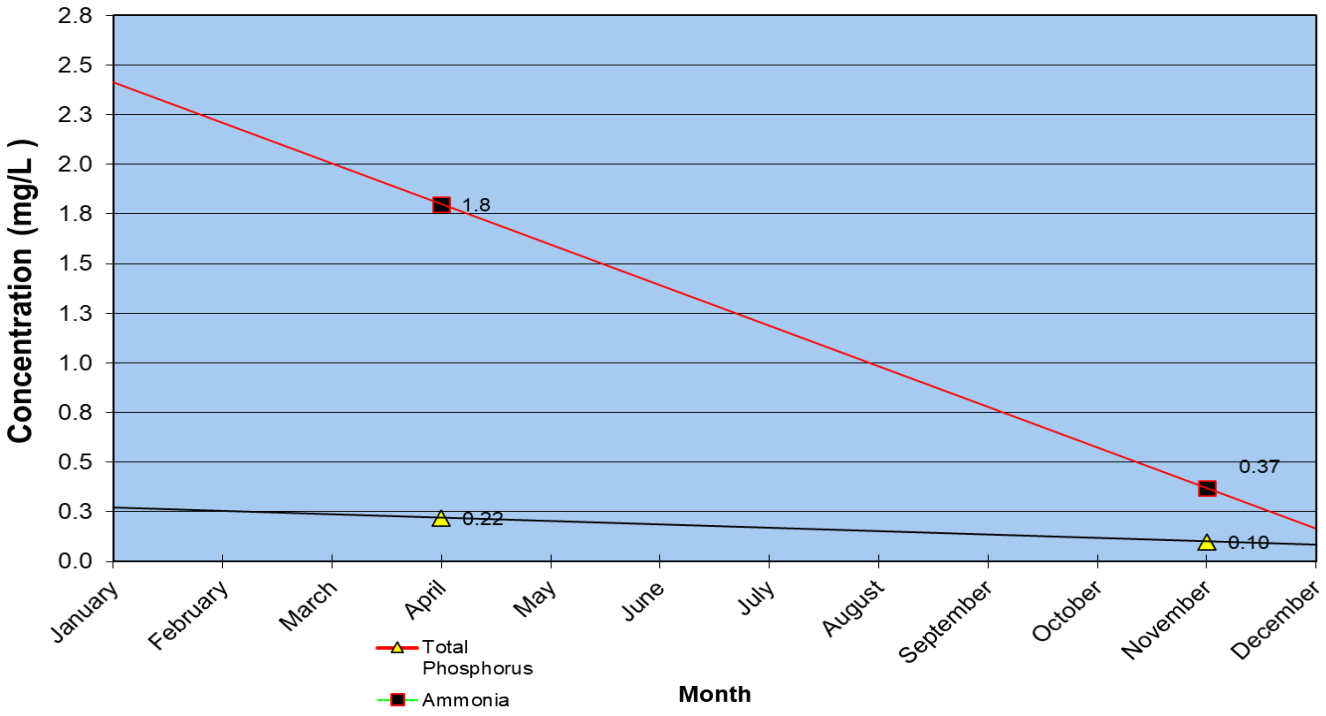
The Lagoon Effluent samples are analyzed for CBOD5, TSS, Total Phosphorous, Total Ammonia Nitrogen, Total Kjeldahl Nitrogen, Nitrate, Nitrite and E-coli. The Total Sulphide is analyzed only for the “spring” season discharge. The pH, Temperature and Reactive Phosphorus are analyzed on site by the Operator.

Effluent flow rates are monitored & achieved by manually regulating the discharge valve at the outlet structure.

Oil Springs Lagoons 2024 Effluent BOD and TSS



Oil Springs Lagoons 2024 Effluent Total P & Ammonia



c) a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year:

There were no deviations from the monitoring schedule for 2024

Raw: samples consist of a 4-hour composite sample collected once per month at the Main Pumping station and analyzed for: BOD5, TSS, Total Phosphorus, TKN. The Operator analyzes the pH & Temperature on-site.

Spring: Lagoon Effluent discharge can commence no earlier than April 1st and continuing for not less than twenty (20) days and terminating no later than April 30th.

Fall: Lagoon Effluent discharge can commence no earlier than November 1st and continuing for not less than twenty (20) days and terminating no later than November 30th.

d) a summary of all operating issues encountered, and corrective actions taken

There are ongoing issues with high flows due to infiltration during storm events/heavy rains, spring runoff and ice & snow melt. The Operating Authority has placed Manhole Inflow dishes throughout the system where infiltration through the Manhole covers can be the most problematic (in low lying areas, in ditches, in water ponding areas)

A new spare sewage wet well pump is kept on site to replace a pump in the wetwell should one fail. This will lessen the likelihood of a sewage backup into a residential home and/or an overflow occurring at the pump station wetwell due to only having one pump in operation and the likelihood it would not keep up with heavy flows.

e) a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus, or mechanism forming part of the works

- Albert's Generator Services performs all the quarterly servicing of the diesel generator at the Main pump station: Jan 5h, April 10th, July 11th, Oct 4th
- Albert's Generator Services also performs the annual maintenance/inspection of the diesel generator which includes oil change, filter change, battery inspection, tank inspection, pressure gauge testing and running "on-load" to ensure operations during an emergency.
- Alum deliveries on March 5th, July 10th, Oct 16th, Dec 18th
- January – Alberts Generator repaired a small oil leak on the Main pump station generator
- February 23rd – Local area Power Outage – generator ran at Main pump station
- February – Oil Springs Public Works removed tree at Sub Station (rubbing on overflow pipe)
- April – repairs to the alum pump/compression fittings
- June –Phragmites, weeds and tree growth around both the North & South Lagoons have been cut down,
- July – Sev-Con performed repairs to the sewer main on Hannah St. (belly in the piping)
- August – Public Works distributed crushed cement on parts of the laneway leading to the lagoons
- September– Collection system's annual Manhole Inspections were performed.
- October – Gillier X-Vac flushed parts of the collection system, recommended from the Inspection report
- Public Works repairs / replaces Manhole & covers (5 per year) as recommended in Inspection Report

f) a summary of any effluent quality assurance or control measures undertaken.

During discharge, the samples are comprised of a representative grab sample at a frequency of twice per week with a minimum of five (5) samples during discharge that captures the beginning of the seasonal discharge at a 25%, 50% and 75% drawdown and at the end of the seasonal discharge.

SOP - “Lagoon Discharge Sampling & Monitoring” can be referenced for compliance parameters and release timelines, ensuring effluent quality meets the regulated parameter limits.

g) a summary of the calibration and maintenance carried out on all Influent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer.

A flow meter calculates the Influent flow received at the main pump station. The meter is calibrated annually by Pierce Services. Calibrations performed on August 27, 2024: report is attached. The in- house meters for pH are calibrated by the Operators as per the manufacturer’s recommendations.

h) a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

- **When any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality**
- **When the Annual Average Daily influent Flow reaches 80% of the Rated Capacity**

To meet the design objectives of the ECA, phosphorous and solids removal is achieved by the addition of aluminum sulphate (alum) from two (2) metering pumps that inject directly into the forcemain at the main pumping station which then pumps to the lagoon system. The alum is stored in a 5867-litre insulated outdoor tank. The tank is equipped with an immersion heater and a heat trace system to prevent freezing of the alum lines. Total volume for 2024 was 28,730 Litres.

A pre-discharge sample must be collected at least 7 days prior to discharge and the results must be within the compliance limits listed in Schedule C of the ECA. At a minimum, the sample must be made up of three (3) grab samples collected from the surface, middle and bottom of the lagoon at a location representative of the cell content and composited as one sample.

i) an estimate of the sludge volumes in the lagoon cells. Sludge volume is to be measured every five (5) years. But may be estimated in the interim years.

The lagoon cells are manually measured for sludge levels throughout the lagoon cell (boat & sludge judge).

The North Lagoon’s sludge depth is approximately 18-24 inches

The South lagoon estimated sludge depth is approximately 20-24 inches.

Sludge was removed from lagoons and the berms were packed in 1998 & 1999; no sludge has been removed since

j) a summary of any complaints received, and any steps taken to address the complaint.

No Complaints for 2024

k) a summary of all Bypasses, Overflows, other situation outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events.

January 26th: at 04:45am, an Overflow occurred at Main pumping station due to heavy rains throughout the area.

- SAC, MOH & MECP were notified – Incident # 1-4M7F97
- Event duration was 35 minutes with approximately 163 m3 being released to Black Creek
- Grab samples were collected and analyzed for: BOD5, TSS, TKN, Total Phosphorous as per ECA - Schedule 5 (5) (b) page 10.

l) a summary of all Notice of Modifications to Sewage Works completed under the Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.

There were no Notice of Modifications submitted.

m) a summary of efforts made to achieve conformance with procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.

The Operating Authority annually inspects the collection system at each manhole – checking for blockages, build-up on benching and confirming flow through the channels. Also, parts of the collection system are flushed annually to ensure optimum flow throughout the system.

The stand-by generator which keeps the pumps operational during a power outage, it is exercised monthly by the Operating Authority to ensure proper performance during an emergency.

Each sewage pump station is equipped with an 8-inch Overflow pipe which consists of a cast iron flap valve at the end to prevent backflow from Black Creek entering the pump station wet-well (inspected annually to confirm operations)

When required pump station wet wells are cleaned using a contracted Hydrovac / Spray system which rids the wet well of FOG (Fat, Oil, Grease) that can buildup on monitoring equipment (floats, transducers) impeding proper operations.

The cleaning of the wet wells also eliminates the buildup of sediment on the bottom that can reduce capacity.

Oil Springs North Lagoon Seasonal Discharge - 2024

Date	CBOD5 mg/L	S. S. mg/L	TKN mg/L	Total P mg/L	pH	Nitrite NO2 mg/L	Nitrate NO3 mg/L	Ammonia NH3 mg/L	E-Coli	Total Sulphide mg/L Spring Only
Nov 8th Start-Discharge	**4**	**2**	**1.3**	**0.11**	**7.83**	**0.05**	**0.39**	**0.30**	**44**	
Nov 13th Discharge	**2**	**6**	**1.2**	**0.09**	**8.01**	**0.06**	**0.42**	**0.30**	**56**	
Nov 15th Discharge	**4**	**5**	**1.2**	**0.10**	**7.93**	**0..07**	**0.45**	**0.30**	**42**	
Nov 19th Discharge	**4**	**6**	**1.2**	**0.10**	**7.94**	**0.06**	**0.47**	**0.40**	**64**	
Nov 22nd Discharge	**4**	**4**	**1.0**	**0.10**	**8.05**	**0.05**	**0.43**	**0.40**	**26**	
Nov 26th Discharge	**4**	**4**	**1.3**	**0.08**	**8.10**	**0.05**	**0.51**	**0.40**	**56**	
Nov 29th Stop Discharge	**4**	**11**	**1.6**	**0.14**	**8.41**	**0.03**	**0.52**	**0.40**	**56**	
ECA Limits	**20**	**25**		**1.0**					**200 CFU/100 mL**	
Design Objectives	**10**	**15**		**0.50**				**5.0**	**150 CFU/100 mL**	
Seasonal Average	4	6	1.3	0.10	8.07	0.05	0.47	0.37	48	#DIV/0!

Lagoon discharge is deposited into Black Creek. There was 67 inches released - 46,163 m3 and discharged for 21 days (504 hours)

Lagoon Effluent Flow is calculated by measuring the level (in inches) fom the lagoon freeboard at the Start of discharge and then again at the Stop of discharge - for the calculation, the formula is 689 m3/inch - each lagoon holds approximately 50,000 m3

Nov 10th - there was an " E-coli - UAL" result on the lab report - means the sample age exceeds the normal limit of 48 hours holding time - for the Nov 10th sample - the Purolator was late with delivery

Oil Springs South Lagoon Seasonal Discharge - 2024

Date	CBOD5 mg/L	S. S. mg/L	TKN mg/L	Total P mg/L	pH	Nitrite NO2 mg/L	Nitrate NO3 mg/L	Ammonia NH3 mg/L	E-Coli Per cfu/100 mL	Total Sulphide mg/L Spring Only
April 3rd Start-Discharge	7	15	1.7	0.08	7.33	0.03	0.06	0.10	6	0.02
April 5th Discharge	7	21	1.8	0.07	8.20	0.03	0.06	0.10	10	0.02
Apr 9th Discharge	7	41	2.2	0.07	7.98	0.03	0.06	0.10	5	0.02
Apr11th Discharge	7	13	1.8	0.09	7.75	0.03	0.06	0.20	30	0.02
Apr 16th Discharge	4	15	3.2	0.22	7.07	0.03	0.07	1.30	2	0.02
April 19th Discharge	4	11	3.9	0.37	7.38	0.03	0.06	2.30	8	0.02
Apr 23rd Discharge	4	16	6.0	0.44	7.53	0.03	0.06	3.90	2	0.02
April 26th Stop Discharge	5	15	7.8	0.41	7.49	0.03	0.06	6.00	2	0.02
ECA Limits	20	25		1.0					200 CFU/100 mL	
Design Objectives	10	15		0.50				5.0	150 CFU/100 mL	
Seasonal Average	5.6	18.4	3.6	0.22	7.59	0.03	0.1	1.8	5.2	0.02

Lagoon discharge is deposited into Black Creek. There was approximately 44,785 m3 released and discharged for 23 days (552 hours)

Lagoon Effluent Flow is calculated by measuring the level (in inches) fom the lagoon freeboard at the Start of discharge and then again at the Stop of discharge - for the calculation, the formula is 689 m3/inch - each lagoon holds approximately 50,000 m3

An " E-coli - UAL" result - means the sample age exceeds the normal limit of 48 hours holding time

Pierce Services & Solutions Inc.

519.820.4853 Fax 519.824.9402

Instrument Verification Sheet

Client Name: Jacobs

Date: August 27, 2024

Equipment Description: Flow Transmitter

Assigned Number: FIT-507

Area Located: Oil Springs Pumping Station

AMMS Number:

Instrument Data

Manufacturer: Siemens

Model Number: Mag Flow

Type:Magmeter 150mm

Serial Number: 7ME6910-1AA10-1AA0

Range: 0-2000 l/min

Accuracy: +/- 5%

Method Of Calibration: Standard Verification

Application: Wastewater

Calibration Data

Input %	Input	As Found	As Left	Pass/Fail
	Program Test OK			Pass
	Functional Test OK			
	Output Test Ok			
82%	27.4 l/s	2745 l/s	27.4 l/s	Pass
25.50%	433.2 l/m	433 l/m	433 l/m	

Confirmed Run Mode: ✓

Placed back in service: ✓

Comments:

Verification of original calibration only.

Checked By: Greg Pierce CCST

Signature: