Village of Oil Springs Wastewater Lagoons

2023 Annual Report of Operations

Managed, Operated, and Maintained by

Jacobs

February 2024

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
Cathy Culnan, Operator II, Jacobs
Rick Marsh, Area Manager, 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

MECP performed an Inspection of the Wastewater System on March 26th, 2016.

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 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 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 2023 was approximately **55,374 m3** (2022: 48,741) with the daily average of approximately **138 m3/day** or **49 %** of capacity. The ECA rated capacity for the Works is 272 m3/day.

Historically the Influent flow rates increase 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 & an increase in quick, heavy rainstorms.

The Influent TKN increased in July (68.3 mg/L) and November (78.0 mg/L). In 2022 the Influent TKN increased during August (81.9 mg/L) then decreased dramatically for September (29.0 mg/L) and increased for September (72.3 mg/L) & October (77.0 mg/L)

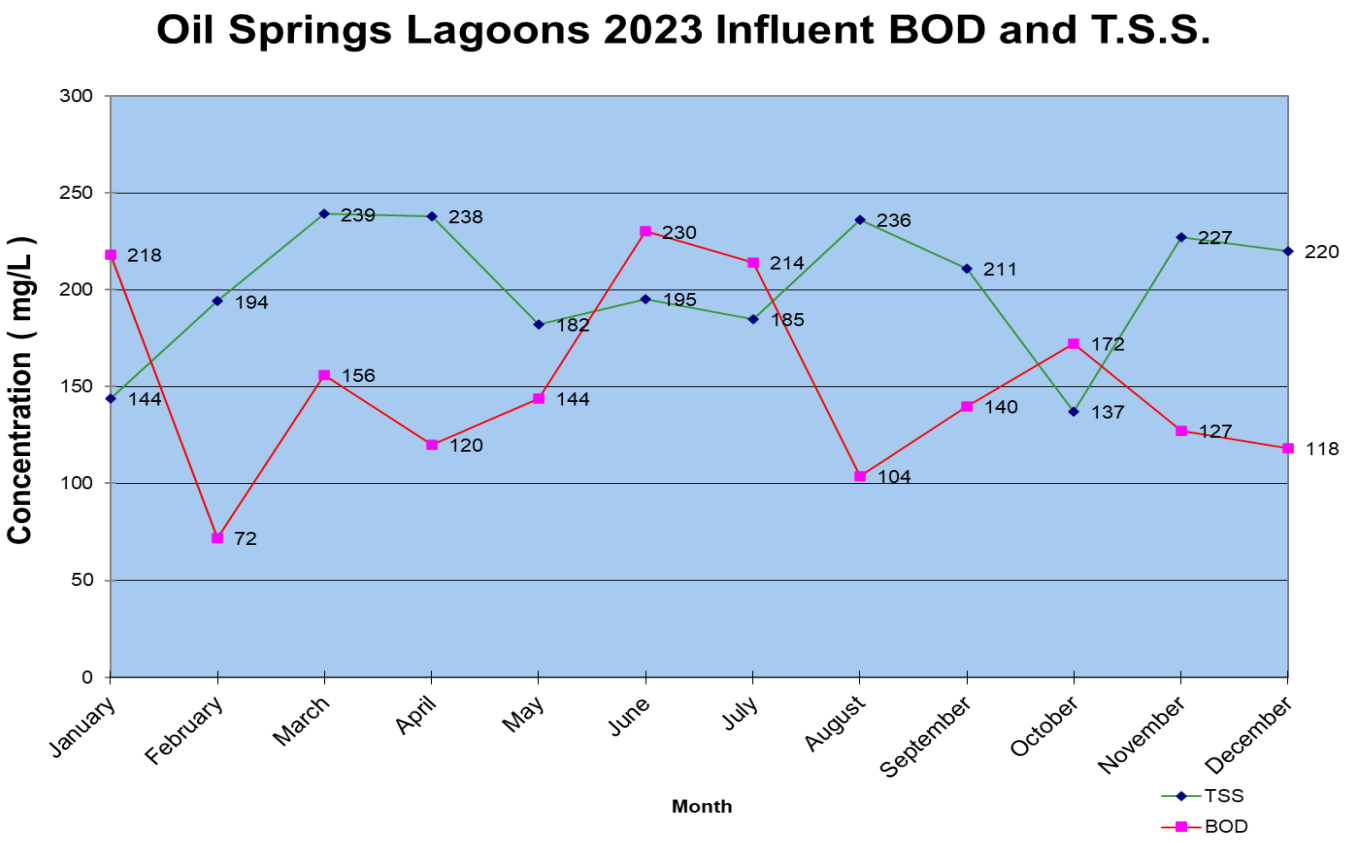
The Influent BOD5 results were considerably lower all throughout the year compared to results in 2022. The 2022 the Influent BOD5 findings were high for February (865 mg/L) and July (831 mg/L)
The Total Phosphorous characteristics in the raw sewage range from the lowest being 2.84 mg/L (January) and the highest being 7.50 mg/L (November)

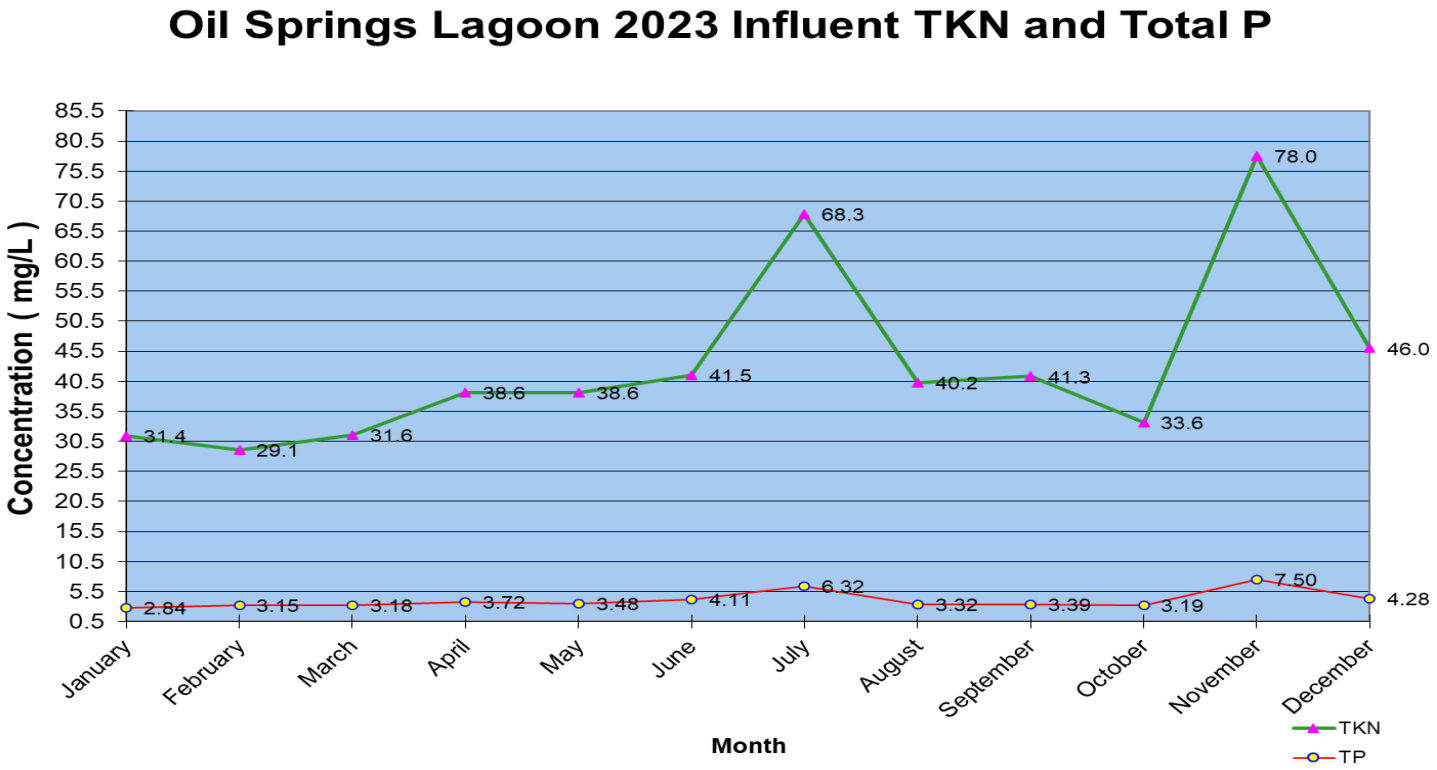
Raw samples consist of a 4-hour composite sample collected once per month at the Main Pumping station and analyzed for: BOD5, TSS, Total Phosphorus, TKN. The Operator analyzes the pH & Temperature on-site.

2023 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	5296	160	144	218	31.4	2.84	7.71										
February	5076	158	194	72	29.1	3.15	7.72										
March	5792	187	239	156	31.6	3.18	8.07										
April	5942	198	238	120	38.6	3.72	7.59										
May	4151	134	182	144	38.6	3.48	7.29	13.7	16.5	5.9	0.20	0.10	0.50	8.00	3.0	0.02	16.5
June	4050	135	195	230	41.5	4.11	7.47										
July	5177	167	185	214	68.3	6.32	7.11										
August	5697	184	236	104	40.2	3.32											
September	3116	104	211	140	41.3	3.39	7.25										
October	3379	109	137	172	33.6	3.19	7.36										
November	3420	114	227	127	78.0	7.50	8.39	4.0	7.0	1.4	0.10	0.03	0.06	8.66	0.12		9
December	4278	138	220	118	46.0	4.28	8.38										
Total Flow	55,374																





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 partially discharged from April 4th to May 7th with approximately 40,460 m3 being released to Black Creek. Due to the "pre-discharge" sample results being over for TSS, a lagoon release approval letter was received from the MECP (April 3rd)

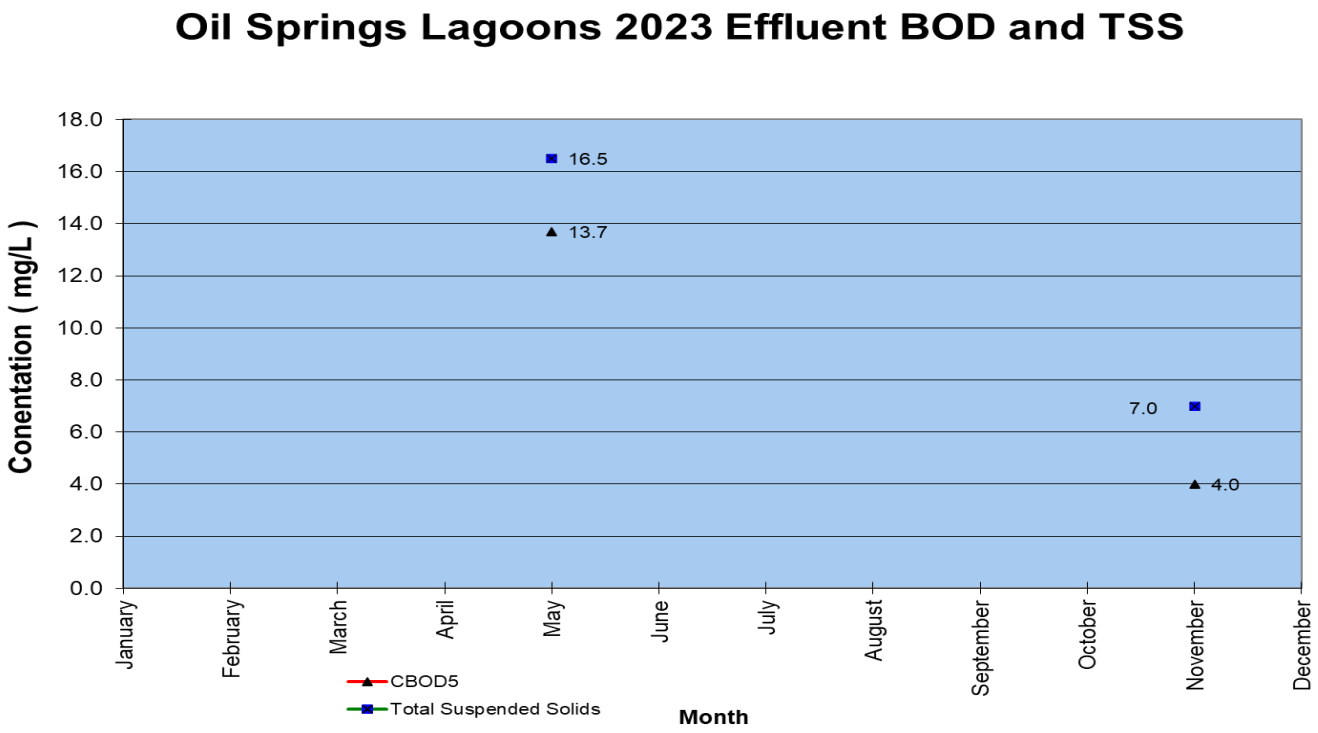
North Lagoon was partially discharged from Nov 2nd to Nov 24th with approximately 44,785 m3 being released to Black Creek

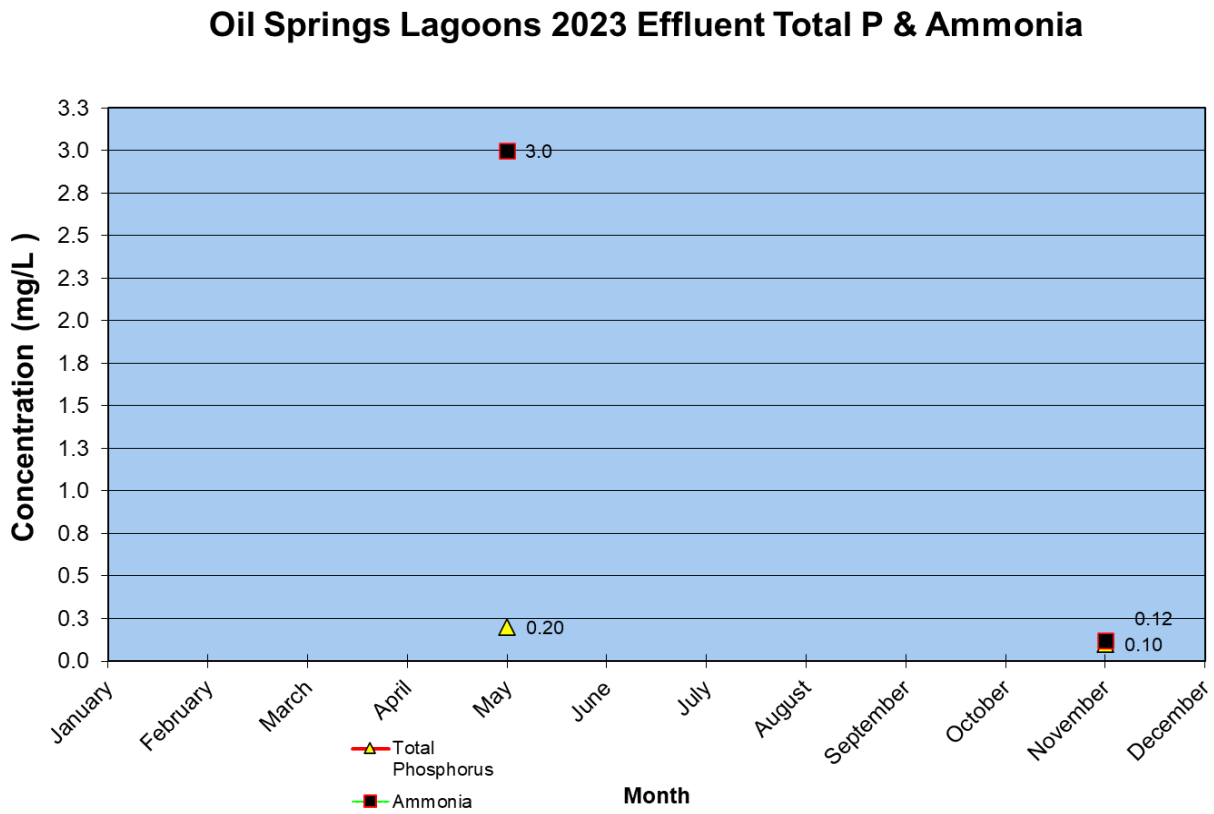
Lagoon Final Effluent can be seasonally discharged into Black Creek during the months of April and November as per the ECA. Effluent compliance limits are based on a "Seasonal Average."

The 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 lagoon discharge.

The pH & Temperature are analyzed on site by the Operator.

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





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;

South Lagoon: Due to the "pre-discharge" sample results being over for TSS, a lagoon release approval letter was received from the MECP (April 3rd). The South Lagoon was partially discharged from April 4th to May 7th with approximately 40,460 m3 being released to Black Creek. The lagoon had high algae content with a large amount of Tundra Swans landing on lagoons. With the mixing, droppings, and warm weather sporadically through the winter, this has allowed for the overgrowth of algae. The lagoon did not have the usual stretch of thick ice cover which helps settle the solids and with ice cover the migratory birds do not settle on the lagoons.

Spring: 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: 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 during storm events/heavy rains, spring runoff and ice & snow melt.

A new spare sewage wet well pump is kept on site to replace a pump in the sewage 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.

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 20th, April 4th, July 7th, Oct 6th
- 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 10th, May 31st, Aug 16th, Dec 15th
- March – repairs to the alum tank piping at the top (old, cracked, exposed to the elements)
- April – repairs to the alum pump/compression fittings
- May – lagoon cross connection valves were painted – help identify location
- June – Nevtro Engineering installed new isolation gates in the lagoon distribution box.
- June – replaced the hour meter on the main pump station generator.
- July – Gilliard Drainage excavated & performed repairs on a sewage cleanout at 4732 Orchardview Drive
- August – Steve Vokes treated the Phragmites around the berm of the "South" lagoon.
- October – Collection system manhole inspections were performed.
- October – installed a Miltronic's unit in the Alum tank
- November – Gillier Drainage flushed parts of the collection system.

The stand-by generator which keeps the pumps operational during a power outage, is exercised monthly by the Operating Authority.

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

During discharge, the samples are comprised of a 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 31, 2023: 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. For 2023 a total volume of 27,144 kg (18,095 Litres) was injected into the lagoon system.

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 16-18 inches.

The South lagoon estimated sludge depth is approximately 18-20 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.

On Hannah Street there were multiple odour & toilet gurgling complaints during the flushing of the collection system. Due to the pressure of the flushing, residents will hear gurgling and experience a slight odour.

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.

July 3rd: at 05:15 am, an Overflow occurred at Main pumping station due to heavy rains throughout the night.

- SAC, MOH & MECP were notified – Incident # 1-3LF37D
- Event duration was 1.5 hours with approximately 428 m3 being released to Black Creek
- Grab samples were collected and analyzed for: BOD5, TSS, TKN, Total Phosphorous (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.

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.

Oil Springs North Lagoon Seasonal Discharge - 2023

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 2nd Start-Discharge	4	7	0.9	0.10	7.95	0.03	0.06	0.10	80	
Nov 6th Discharge	4	4	1.3	0..08	8.82	0.03	0.06	0.10	12	
Nov 9th Discharge	4	8	1.0	0.08	8.35	0.03	0.06	0.10	154	
Nov 15th Discharge	2	2	1.3	0.08	8.90	0.03	0.06	0.10	2	
Nov 17th Discharge	4	2	1.1	0.10	8.90	0.03	0.06	0.10	1	
Nov 21st Discharge	4	22	1.8	0.11	8.75	0.03	0.06	0.20	2	
Nov 24th Stop Discharge	4	4	1.4	0.13	8.22	0.03	0.06	0.10	92	
ECA Limits	**20**	**25**		**1.0**					**200 CFU/100 mL**	
Design Objectives	**10**	**15**		**0.5**				**5.0**	**150 CFU/100 mL**	
Seasonal Average	4	7	1.3	0.10	8.66	0.03	0.06	0.12	9	#DIV/0!

Lagoon discharge is deposited into Black Creek. There was 65 inches released - 44,785 m3 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

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 - 2023

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 4th Start-Discharge	13	15	2.8	0.10	7.19	0.06	1.56	0.60	40	0.02
April 6th Discharge	14	15	3.1	0.10	7.59	0.08	1.55	0.80	20	0.02
April 11th Discharge	9	11	5.9	0.17	7.34	0.07	0.68	1.90	18	0.02
April 14th Discharge	14	23	7.7	0.38	7.02	0.04	0.11	3.40	18	0.02
April 17th Discharge	11	12	7.6	0.47	7.51	0.05	0.06	5.80	630	0.02
April 20th Discharge	10	10	8.7	0.39	7.78	0.05	0.06	6.50	54	0.02
April 25th Discharge	6	8	8.2	0.26	7.80	0.04	0.10	6.60	2	0.02
April 28th Discharge	19	12	6.2	0.13	8.53	0.09	0.30	4.20	20	0.02
May 2nd Discharge	21	26	5.3	0.12	8.83	0.18	0.43	1.50	6	0.02
May 5th Discharge	21	26	5.3	0.12	8.83	0.18	0.43	1.50	6	0.02
May 7th Stop Discharge	13	23	3.9	0.18	9.49	0.03	0.14	0.60	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	13.7	16.5	5.9	0.22	7.99	0.08	0.5	3.0	16.5	0.02

Lagoon discharge is deposited into Black Creek. There was approximately 40,460 m3 released and discharged for 33 days (816 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

Oil Springs South Lagoon Discharge - April										
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 4th Start-Discharge	13	15	2.8	0.10	7.19	0.06	1.56	0.60	40	0.02
April 6th Discharge	14	15	3.1	0.10	7.59	0.08	1.55	0.80	20	0.02
April 11th Discharge	9	11	5.9	0.17	7.34	0.07	0.68	1.90	18	0.02
April 14th Discharge	14	23	7.7	0.38	7.02	0.04	0.11	3.40	18	0.02
April 17th Discharge	11	12	7.6	0.47	7.51	0.05	0.06	5.80	630	0.02
April 20th Discharge	10	10	8.7	0.39	7.78	0.05	0.06	6.50	54	0.02
April 25th Discharge	6	8	8.2	0.26	7.80	0.04	0.10	6.60	2	0.02
April 28th Discharge	19	12	6.2	0.13	8.53	0.09	0.30	4.20	20	0.02
ECA Limits	**20**	**25**		**1.0**					**200 CFU/100 mL**	
Design Objectives	**10**	**15**		**0.50**				**5.0**	**150 CFU/100 mL**	
Monthly Average	12.0	13.3	6.3	0.25	7.60	0.06	0.6	3.7	27.8	0.02

Lagoon discharge is deposited into Black Creek. There was 32,130 m3 released and discharged for 27 days (648 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

Oil Springs South Lagoon Discharge - MAY										
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**
May 2nd Discharge	21	26	5.3	0.12	8.83	0.18	0.43	1.50	6	0.02
May 5th Discharge	21	26	5.3	0.12	8.83	0.18	0.43	1.50	6	0.02
May 7th Stop Discharge	13	23	3.9	0.18	9.49	0.03	0.14	0.60	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**	
Monthly Average	18.3	25.0	4.8	0.14	9.05	0.13	0.3	1.2	4.2	0.02

Lagoon discharge is deposited into Black Creek. There was 8,330 m3 released and discharged for 7 days (168 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 31, 2023

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:

Cal_Aug2123_Oil Springs_a