Omemee Sewage Lagoon

Works # 110001630

Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1st – December 31st, 2022

Issued: March 23, 2023

Revision: 0

Operating Authorities:

Kawartha Lakes

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

2022 Performance Report for the Omemee Sewage Lagoon

Amended Environmental Compliance Approval 2737-B4DH46, Section 11(4) requires the Performance Report to contain the following:

a) a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;

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;

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;

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

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;

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

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

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:

   i. 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;

   ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

i) an estimate of the volume of sludge in the lagoon cells. Sludge volume is to be measured every five (5) years, but may be estimated in the interim years. A summary of disposal locations and volumes of sludge disposed of must also be provided if sludge was disposed of during the reporting period;

j) a summary of any complaints received and any steps taken to address the complaints;

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

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

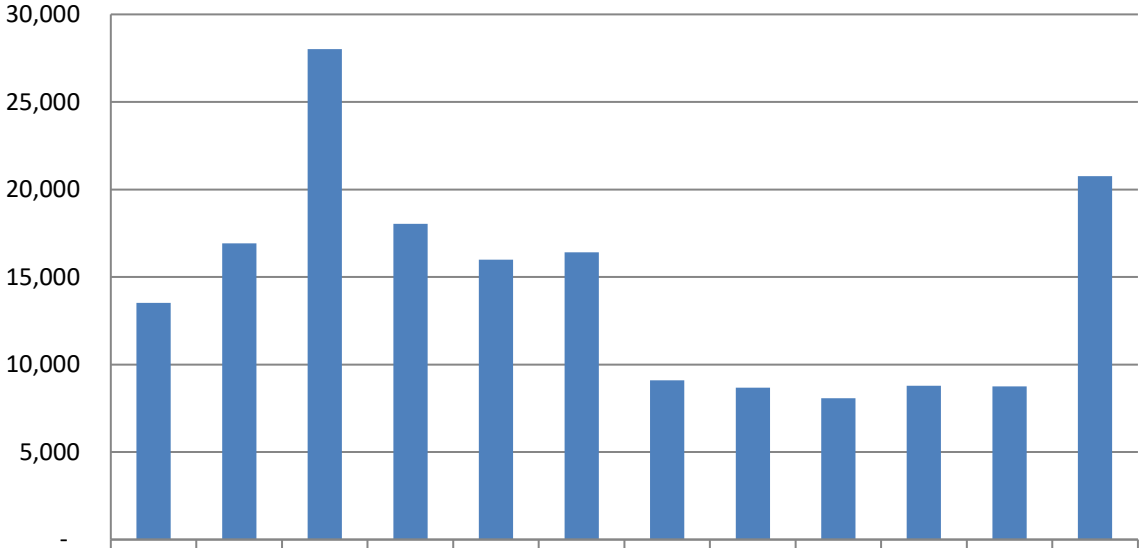
m) a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated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

The following is a report from the records maintained by the Ontario Clean Water Agency for the Omemee Sewage Lagoon for the year 2022.

a) Environmental Compliance Approval Number 2737-B4DH46 requires a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates.

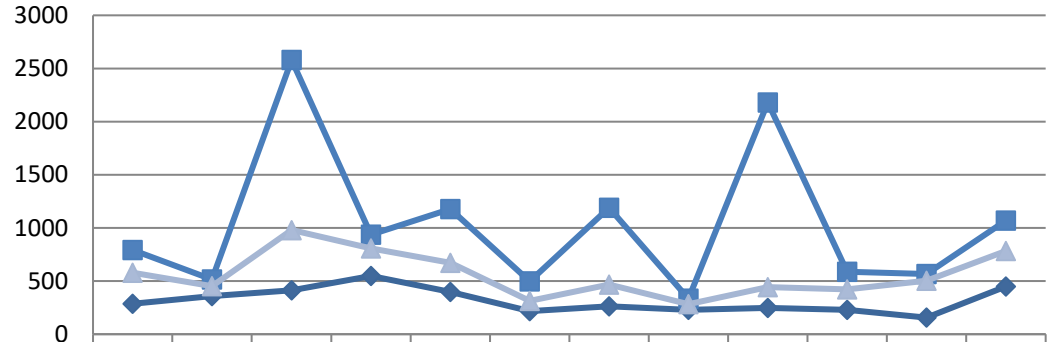
The Environmental Compliance Approval requires that everything practicable be undertaken to operate the Sewage Treatment Plant so that the annual average daily influent is within the Rated Capacity. The Rated Capacity of the Omemee Sewage Lagoon is 1,353 m^3/day and the 2022 annual average daily influent flow was 474.19 m^3/day or 35.05% of the Rated Capacity. The total Influent flow in 2022 was 173,078.39 m^3.

Graph 1: 2022 Influent Monthly Flow Totals



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Influent Flow (m^3)	13,524	16,922	28,023	18,041	15,998	16,412	9,100	8,671	8,082	8,787	8,753	20,766

Graph 2: 2022 Influent Daily Minimum, Maximum and Average Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (m^3/day)	285	359	412	548	399	216	262	229	247	230	156	448
Max (m^3/day)	793	517	2580	936	1179	496	1188	334	2181	588	565	1068
Avg(m^3/day)	578	452	980	806	672	314	466	282	444	422	504	785

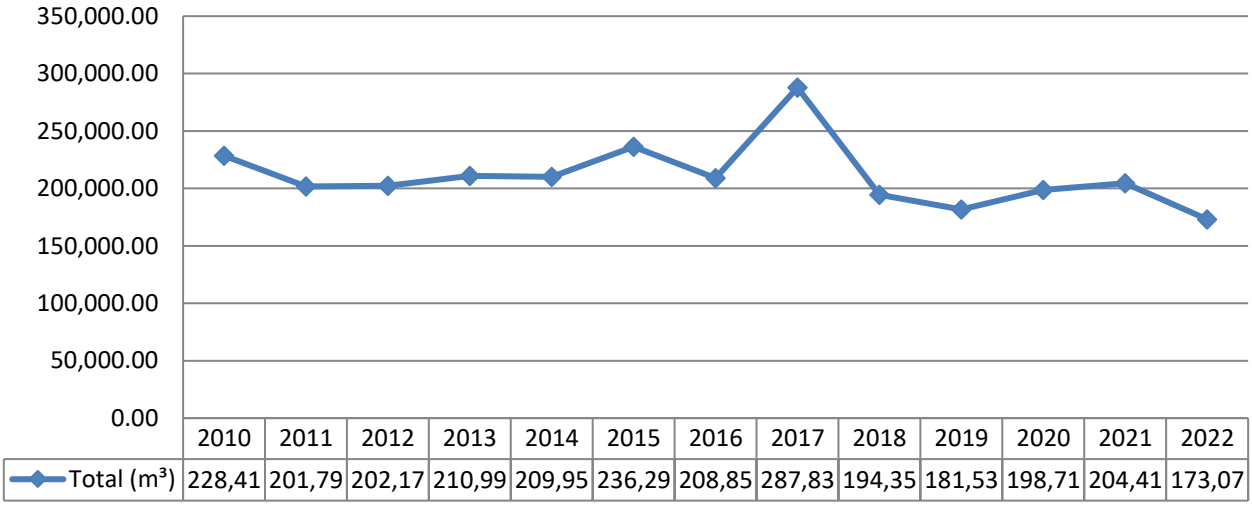
Table 1 reviews the historical trend of the influent sewage characteristics for the Omemee Sewage Lagoon, as required by Environmental Compliance Approval 2737-B4DH46, Condition 10 (4) (a).

Table 1: 2010 – 2022 Historical Average Influent Sewage Characteristics for the Omemee Sewage Lagoon

Year	BOD (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	TKN (mg/L)
2010	129.40	295.35	3.47	N/A
2011	133.45	149.48	3.27	27.62
2012	125.00	164.16	3.89	32.59
2013	105.25	530.68	3.15	28.07
2014	122.91	107.08	2.48	22.13
2015	134.63	133.81	2.42	21.71
2016	187.66	218.58	3.36	28.15
2017	117.08	168.75	2.09	18.15
2018	157.18	267.45	3.49	28.10
2019	117.42	138.92	2.23	21.18
2020	122.42	134.75	2.15	21.53
2021	130.29	195.46	2.94	25.22
2022	167.08	169.33	2.47	24.37

Table 1 shows The Biochemical Oxygen Demand annual average has been increasing from 2019 to 2022. The 2022 annual average for Total Suspended Solids and Phosphorus has decreased slightly from the 2021 annual average.

Graph 3: 2010 – 2022 Historical Influent Flows for the Omemee Sewage Lagoon



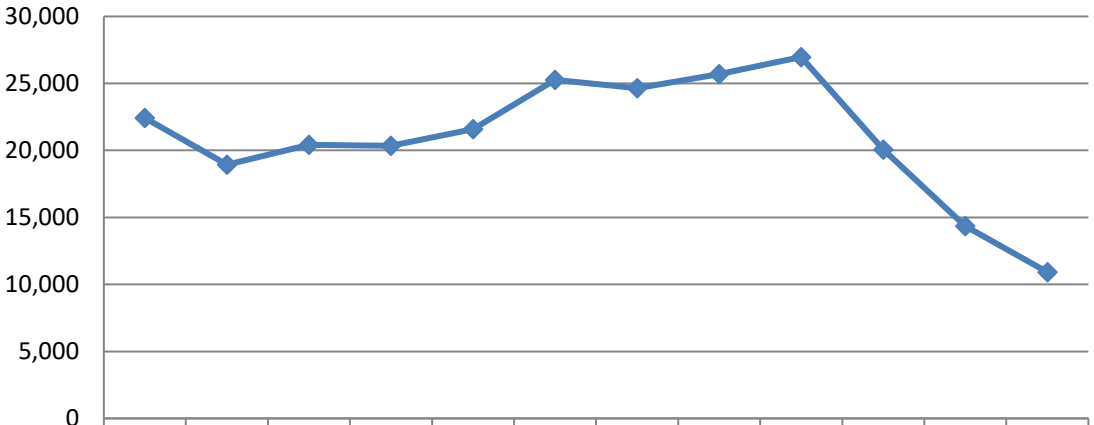
Graph 3 shows the historical influent flows for the Omemee Sewage Lagoon from 2010 to 2022. Since 2017, the influent flows have remained consistent. The increased influent flow in 2017 can be attributed to the extremely wet spring season.

b) Environmental Compliance Approval 2737-B4DH46 requires a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rate, 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.

The Performance Assessment Report (PAR) Wastewater/Lagoon is attached in **Appendix I**.

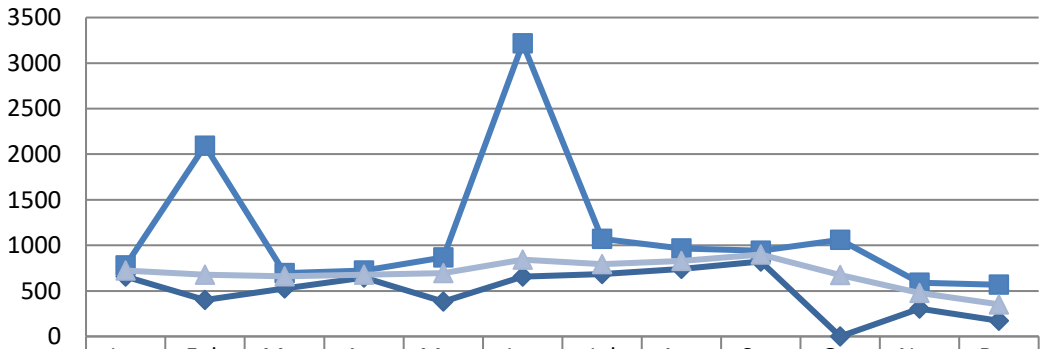
The following graphs provide final effluent flows for 2022 at the Omemee Sewage Lagoon. Final effluent is directed to the subsurface sewage disposal system during the winter months and to the spray irrigation system, typically during the warmer months, when all conditions were met. During the reporting period, all final effluent was directed to the subsurface sewage disposal system.

Graph 4: 2022 Effluent Monthly Flow Totals



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Total (m³/day)	22,429	18,943	20,412	20,356	21,589	25,275	24,643	25,689	26,969	20,065	14,354	10,916

Graph 5: 2022 Effluent Daily Minimum, Maximum and Average Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (m³/day)	656	400	528	645	384	656	686	741	823	0	304	171
Max (m³/day)	778	2,093	696	724	866	3,217	1,071	964	941	1,061	588	567
Avg (m³/day)	724	677	658	679	696	843	795	829	899	674	478	352

Table 2 outlines the effluent criteria limits as set out in Section 7(1), Schedule C of Environmental Compliance Approval Number 2737-B4DH46 as follows:

Table 2: Omemee Sewage Lagoon - Final Effluent Compliance Limits - 2022

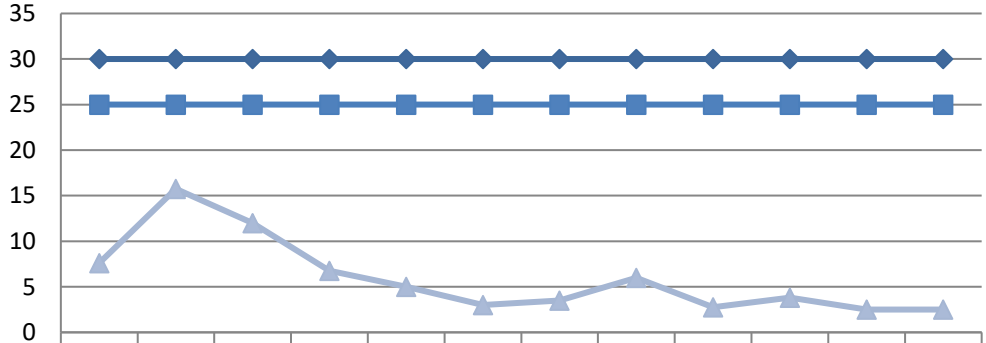
Effluent Parameters	Average Effluent Concentration Limit (mg/L)	Actual Monthly Average Effluent Concentration (mg/L)	Compliant (Y/N)
$CBOD_5$	30.0	5.90	Y
Total Suspended Solids	40.0	8.02	Y
Total Phosphorus	1.0	Annual Avg. = 0.38	Y

During the reporting period of 2022, the Omemee Sewage Lagoon final effluent met the compliance limits as prescribed in the Environmental Compliance Approval Number 2737-B4DH46.

Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)

ECA Number 2737-B4DH46 (issued September 28, 2018) set the $CBOD_5$ monthly average concentration limit at 30.0 mg/L and the monthly average concentration objective at 25.0 mg/L. For 2022, the CBOD5 monthly average concentration was 5.90 mg/L.

Graph 6: 2022 Monthly $CBOD_5$ Final Effluent Concentration Comparisons

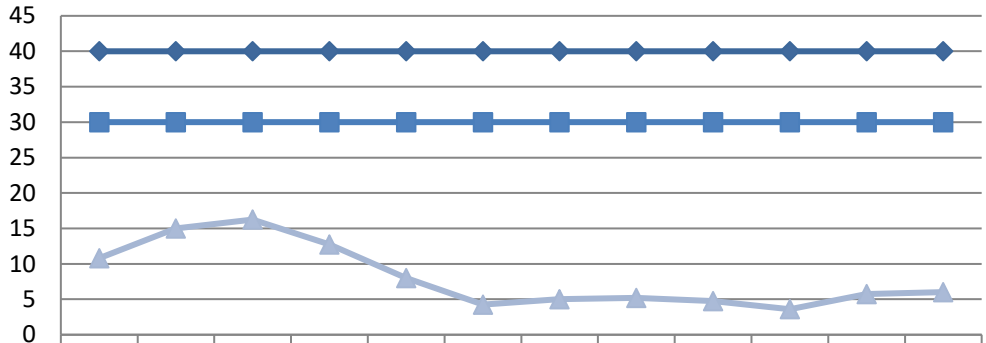


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	30	30	30	30	30	30	30	30	30	30	30	30
Objective (mg/L)	25	25	25	25	25	25	25	25	25	25	25	25
Avg (mg/L)	7.6	15.8	12.0	6.8	5.0	3.0	3.5	6.0	2.8	3.8	2.5	2.5

Total Suspended Solids (TSS)

ECA Number 2737-B4DH46 set the Total Suspended Solids (TSS) monthly average concentration limit at 40.0 mg/L and the monthly average concentration objective at 30.0 mg/L. For 2022, the TSS monthly average concentration was 8.02 mg/L.

Graph 7: 2022 Monthly TSS Final Effluent Concentration Comparisons

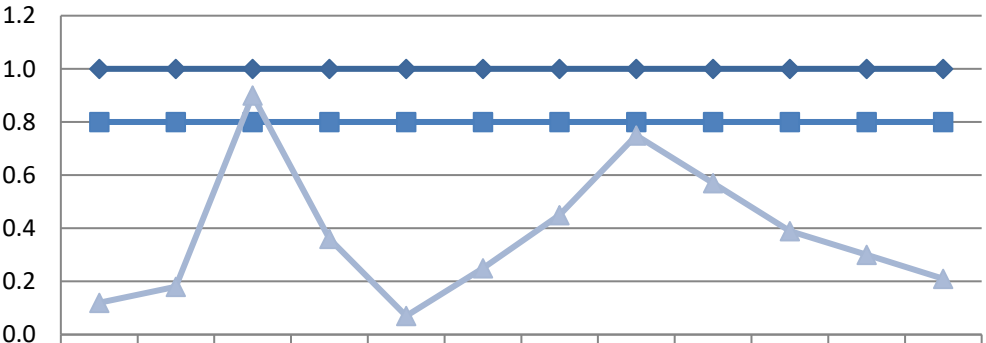


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	40	40	40	40	40	40	40	40	40	40	40	40
Objective (mg/L)	30	30	30	30	30	30	30	30	30	30	30	30
Avg (mg/L)	10.8	15.0	16.25	12.8	8	4.3	5.0	5.2	4.75	3.6	5.8	6.0

Total Phosphorus (TP)

ECA Number 2737-B4DH46 set the Total Phosphorus annual average concentration limit at 1.0 mg/L and the annual average concentration objective at 0.8 mg/L. For 2022, the Total Phosphorus annual average concentration was 0.38 mg/L.

Graph 8: 2022 Annual Total Phosphorus Final Effluent Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Objective (mg/L)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Avg (mg/L)	0.12	0.18	0.9	0.36	0.07	0.25	0.45	0.75	0.57	0.39	0.30	0.21

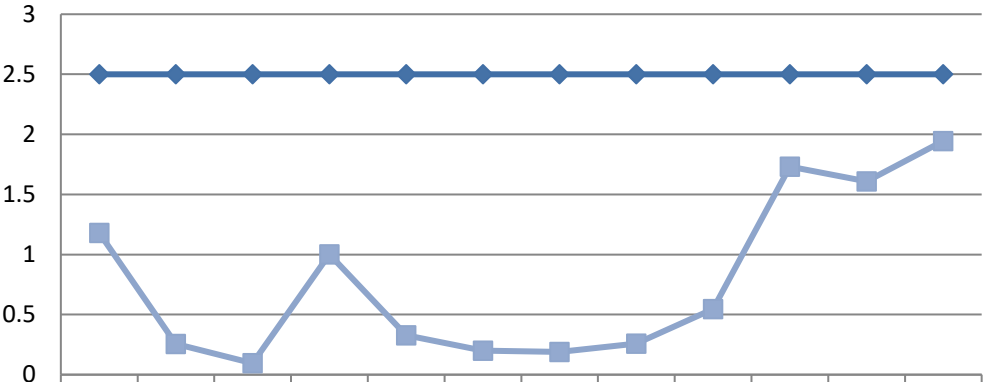
Additional Parameter

The following parameter was sampled as a requirement of ECA Number 2737-B4DH46. A monthly average concentration objective is indicated in the ECA but no monthly average concentration limit is indicated.

Nitrite and Nitrate as Nitrogen

ECA Number 2737-B4DH46 set the Nitrite and Nitrate as Nitrogen monthly average concentration objective at 2.5 mg/L. For 2022, the Nitrite and Nitrate as Nitrogen monthly average concentration was 0.787 mg/L.

Graph 9: 2022 Monthly Nitrite and Nitrate as Nitrogen Final Effluent Concentration Comparison



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Objective (mg/L)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Avg (mg/L)	1.18	0.26	0.10	1.00	0.33	0.20	0.19	0.26	0.55	1.73	1.61	1.95

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

The 2022 Omemee Sewage Lagoon Sampling Calendar was established and the sample day was Monday. There were eight (8) deviations from the sample plan during the reporting period.

Sample Date	Deviation	Alternate Sample Date
Jan. 3, 2022	Stat Holiday – Observe New Year's	Jan. 4, 2022
Feb. 21, 2022	Stat Holiday – Family Day	Feb. 22, 2022
Apr. 18, 2022	Stat Holiday – Easter Monday	Apr. 19, 2022
May 23, 2022	Stat Holiday – Victoria Day	May 24, 2022
Aug. 1, 2022	Stat Holiday – Civic Holiday	Aug. 2, 2022
Sep. 5, 2022	Stat Holiday – Labour Day	Sep. 6, 2022
Oct. 10, 2022	Stat Holiday – Thanksgiving	Oct. 11, 2022
Dec. 26, 2022	Stat Holiday – Boxing Day	Dec. 28, 2022

The Sample Plan for 2023 has been established and the sample day is on Tuesday. A copy of the 2023 Omemee Sewage Lagoon Sampling Calendar is included in **Appendix II**.

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

The following details describe all operating problems encountered during the reporting period and the corrective actions taken.

Table 3: 2022 Sewage Lagoon Operational Challenges

Month	Challenges	Corrective Actions
January	Aeration Pond Air Diffusers - Frozen	Thaw lines with steamer.
August	Miltronics failure	Power failure caused miltronics unit to lose all memory. Franklin Empire changed board and programed unit.
October	Pump 4 - failure	Replaced pump.
	Pump 3 - failure	Pump to be replaced in 2023.

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.

OCWA uses a Work Maintenance System (WMS). WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out and assets are maintained to manufacturer's and/or industry standards. Emergency and capital repair maintenance is completed and added to the system.

Refer to **Appendix III: WMS Workorder Summary**

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

Effluent quality assurance is maintained in several ways. All final effluent samples collected during the reporting period to meet ECA sampling requirements were submitted to SGS Lakefield Research Ltd. laboratory for analysis. SGS Lakefield Research has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis. Sampling calendars issued to the operators denoting frequency of sampling and these calendars are submitted to the Process Compliance Technician at the end of

each month. Raw and effluent samples are collected as per the Environmental Compliance Approval and the results are reviewed on a regular basis to ensure compliance with the site's objectives and limits.

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

Calibrations on influent and effluent monitoring equipment were performed by Franklin Empire in October 2022 for equipment located at the Sewage Lagoon and Sewage Pump Stations. Refer to **Appendix IV: Calibration Report**.

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:
   i. 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;
   ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

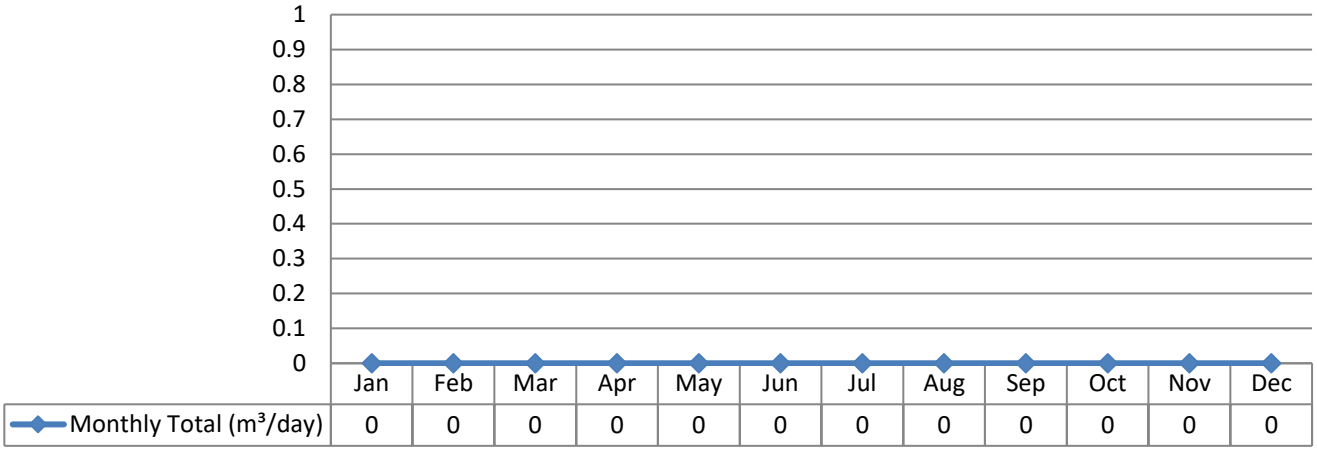
Table 4 provides continuous efforts made to meet the Effluent Objectives at the Omemee Sewage Lagoon.

Table 4: Efforts Made to Meet the Effluent Objectives of Condition 6
1. Sampling effluent as per the ECA.
2. Visual Inspection of the effluent while performing rounds and sampling.
3. Inspection of lagoon berms.
4. Inspection of subsurface disposal area.
5. Ensuring that Alum is being dosed.
6. Annual calibration of the flow meters.
7. Performing preventative maintenance activities in accordance with work order schedules.
8. Monitoring treatment processes through review of lab results.
9. Inspection of Sewage Pump Stations.
10. Visual Inspection of wet wells.
11. Inspection of spray irrigation system and fields.
12. Inspection of monitoring wells.

Additional Reporting Requirements:

The spray irrigation system did not operate in 2022. The spray irrigation system operates under the authority of Provincial Officer's Order Number 1-L4E0C issued on May 8, 2019. ECA Number 2737-B4DH46 does not require any information pertaining to the spray irrigation be included in the Omemee Sewage Lagoon annual performance report.

Graph 10: 2022 Monthly Effluent Flow to Spray Irrigation System



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Total (m^3/day)	0	0	0	0	0	0	0	0	0	0	0	0

Groundwater Monitoring Program

During the reporting period, ECA Number 2737-B4DH46, stipulates that the two (2) groundwater monitoring wells down-gradient of the subsurface disposal system and collect samples at the frequency specified, by means of the specified sample type and analyzed for each parameter outline in Schedule D. Each monitoring well was sampled or attempt made where the well was found to be dry, on a quarterly basis. The samples were analyzed for the parameters required. Please see attached **Appendix V: Monitoring Wells**, which provides the results of the two groundwater monitoring wells.

Additionally, as per Provincial Officer's Order 1-L4E0C issued on May 8, 2019, an additional fifteen (15) groundwater monitoring wells were identified to be sampled on a quarterly basis, and analyzed for each parameter identified in the Order. Please see attached **Appendix V: Monitoring Wells**, which provides the results of these groundwater monitoring wells.

Sewage Pump Station (SPS) Capacity Assessments:

The Church St. SPS rated capacity of 64 L/s which equals 5,530 m^3/day. The maximum influent daily flow in 2022 was 2,533 m^3, which does not exceed the SPS rated capacity.

Table 5: 2022 Influent Flows at Church St. SPS

Month	Max Daily Flow (m^3/day)	Average Daily Flow (m^3/day)
January	191	136
February	512	200
March	659	343
April	303	224
May	312	182
June	2,533	257
July	135	95
August	165	94
September	110	87
October	130	89
November	246	102
December	1,746	255

The Sturgeon St. SPS was upgraded under Environment Compliance Approval 6602-8X8FXB and the rated capacity of 122 L/s which equals 10,500 m^3/day. The maximum influent daily flow in 2022 was 2,556 m^3 which does not exceed the raw rated capacity.

Table 6: 2022 Influent Flows at Sturgeon St. SPS

Month	Max Daily Flow (m^3/day)	Average Daily Flow (m^3/day)
January	586	436
February	1,355	604
March	1,544	904
April	1,106	668
May	887	516
June	1,063	547
July	366	294
August	454	280
September	325	269
October	376	283
November	616	292
December	2,556	670

i) an estimate of the volume of sludge in the lagoon cells. Sludge volume is to be measured every five (5) years, but may be estimated in the interim years. A summary of disposal locations and volumes of sludge disposed of must also be provided if sludge was disposed of during the reporting period.

The estimated volume of sludge in the lagoon cells in 2022 was 5442 m^3. During the reporting period, no sludge was disposed of from the Omemee Sewage Lagoon.

j) A summary of any complaints received and any steps taken to address the complaints.

Table 7: Complaints Received Summary for 2022

Date	Issue	Actions Taken
Fall 2022	Concern that the sewage lagoon is leaking into the neighbouring property to the North.	Investigate concern by taking samples from the excavation on private property as well as from locations along the property line, and the lagoon cells. Azimuth Environmental has been contracted to provide assessment. At the time of this report being issued, the final assessment report was not available. A copy of the report will be provided to the stakeholders involved.

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

Bypasses
There were no bypasses at the Omemee Sewage Lagoon in 2022.

Overflows
There were no overflows at the Omemee Sewage Lagoon in 2022.

Situations outside Normal Operation Conditions
Normal Operating Conditions was a new condition which became applicable to the Omemee Sewage Lagoon with the issuance of ECA 2737-B4DH46 (September 28, 2018). All unit processes operated within their design capacity between January 1 and December 31, 2022.

Spills
There were no spills at the Omemee Sewage Lagoon in 2022.

Abnormal Discharge Events
There were no abnormal discharge events at the Omemee Sewage Lagoon in 2022.

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

There were no Notice of Modification to Sewage Works initiated, worked on or completed in 2022 for the Omemee Sewage Lagoon.

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.

During the 2022 reporting period there were no incidents of a bypass or overflow within the sanity sewer system. Additionally, during 2022, efforts included dead end sanitary sewer collection system flushing maintenance program and continued monitoring of installed rain stoppers in manholes. Four (4) manholes were rehabilitated with new moduloc sections, frame and covers. Forecasted for the 2023 reporting period for the Omemee Sewage Lagoon, collection system maintenance: dead end collection system flushing - $4,600, and manhole maintenance and repairs - $21,500.