

Omemeew Sewage Lagoon

Works # 110001630

Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1st – December 31st, 2021

Issued: March 29, 2022

Revision: 0

Operating Authorities:



2021 Performance Report for the Omeme 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;

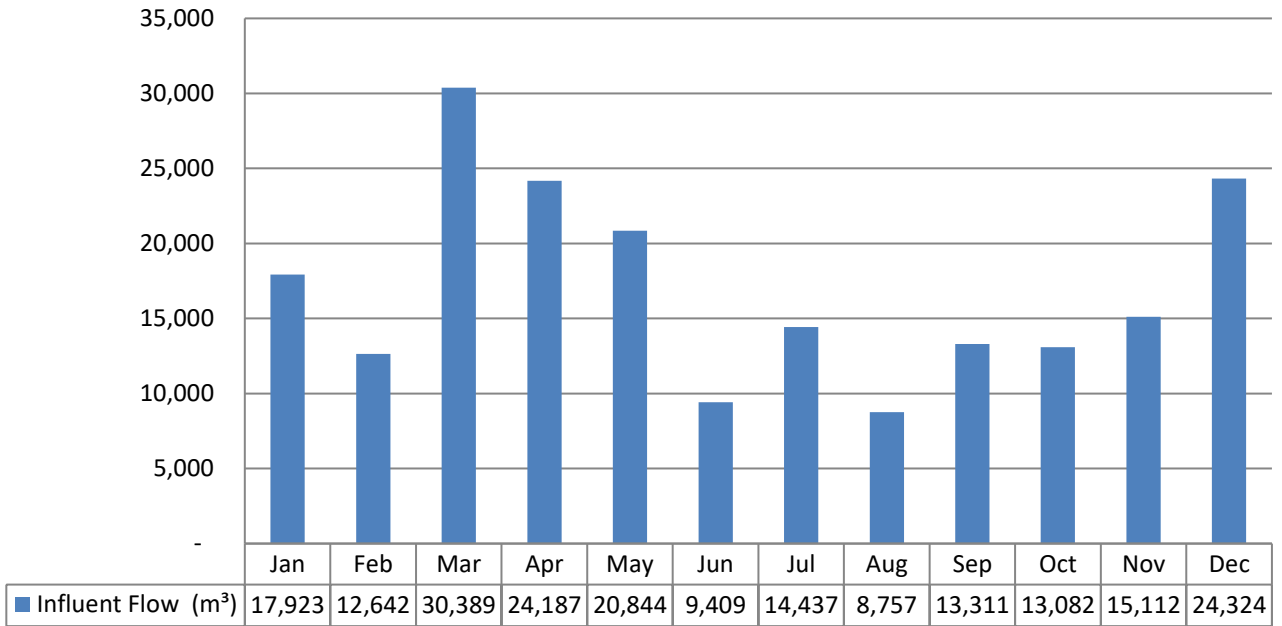
- j.** a summary of any complaints received and any steps taken to address the complaints;
- k.** a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;
- l.** a summary of all Notice of 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 2021.

- 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 m³/day and the 2021 annual average daily influent flow was 558.71 m³/day or 41.29% of the Rated Capacity. The total Influent flow in 2021 was 204,417.62 m³.

Graph 1: 2021 Influent Monthly Flow Totals



Graph 2: 2021 Influent Daily Minimum, Maximum and Average Flows

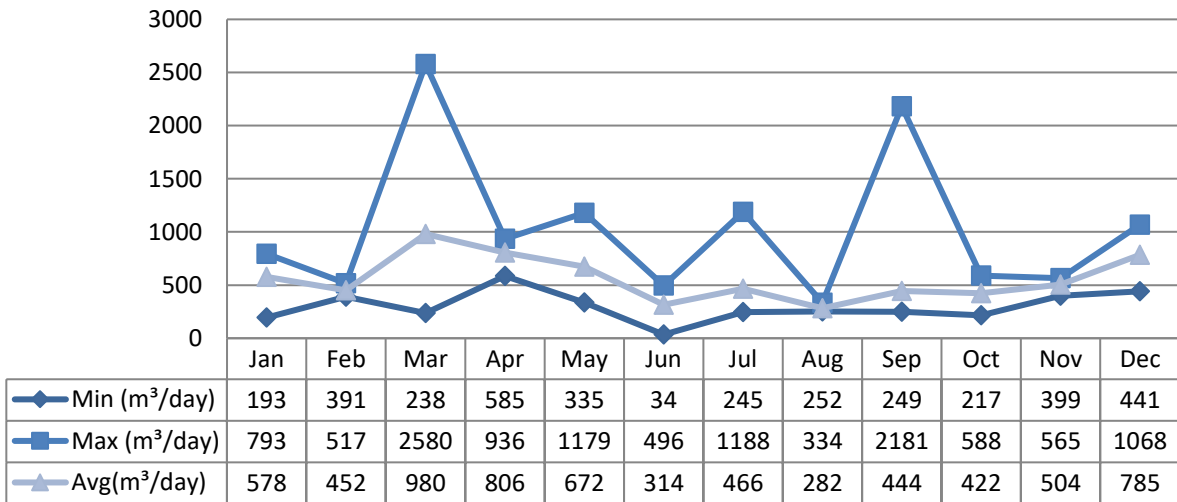


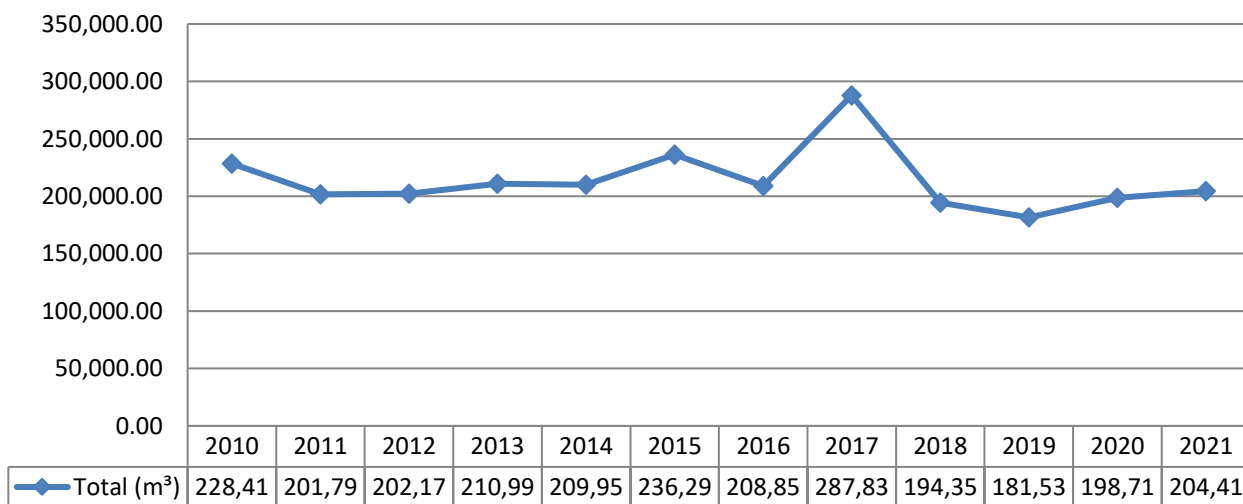
Table 1 reviews the historical trend of the influent sewage characteristics for the Omeme Sewage Lagoon, as required by Environmental Compliance Approval 2737-B4DH46, Condition 10 (4) (a).

Table 1: 2010 – 2021 Historical Average Influent Sewage Characteristics for the Omemee Sewage Lagoon

| Year | BOD (mg/L) | TSS (mg/L) | Phosphorus (mg/L) | TKN (mg/L) | TAN (mg/L) |
|------|------------|------------|-------------------|------------|------------|
| 2010 | 129.40 | 295.35 | 3.47 | N/A | 20.17 |
| 2011 | 133.45 | 149.48 | 3.27 | 27.62 | 23.34 |
| 2012 | 125.00 | 164.16 | 3.89 | 32.59 | 22.95 |
| 2013 | 105.25 | 530.68 | 3.15 | 28.07 | 22.37 |
| 2014 | 122.91 | 107.08 | 2.48 | 22.13 | 18.53 |
| 2015 | 134.63 | 133.81 | 2.42 | 21.71 | N/A |
| 2016 | 187.66 | 218.58 | 3.36 | 28.15 | N/A |
| 2017 | 117.08 | 168.75 | 2.09 | 18.15 | N/A |
| 2018 | 157.18 | 267.45 | 3.49 | 28.10 | N/A |
| 2019 | 117.42 | 138.92 | 2.23 | 21.18 | N/A |
| 2020 | 122.42 | 134.75 | 2.15 | 21.53 | N/A |
| 2021 | 130.29 | 195.46 | 2.94 | 25.22 | N/A |

Table 1 shows The Biochemical Oxygen Demand annual average has increased slightly from 2019 to 2021. The 2021 annual average for Total Suspended Solids and Phosphorus has increased slightly from the 2020 annual average. TKN has remained fairly consistent since 2011.

Graph 3: 2010 – 2021 Historical Influent Flows for the Omemee Sewage Lagoon



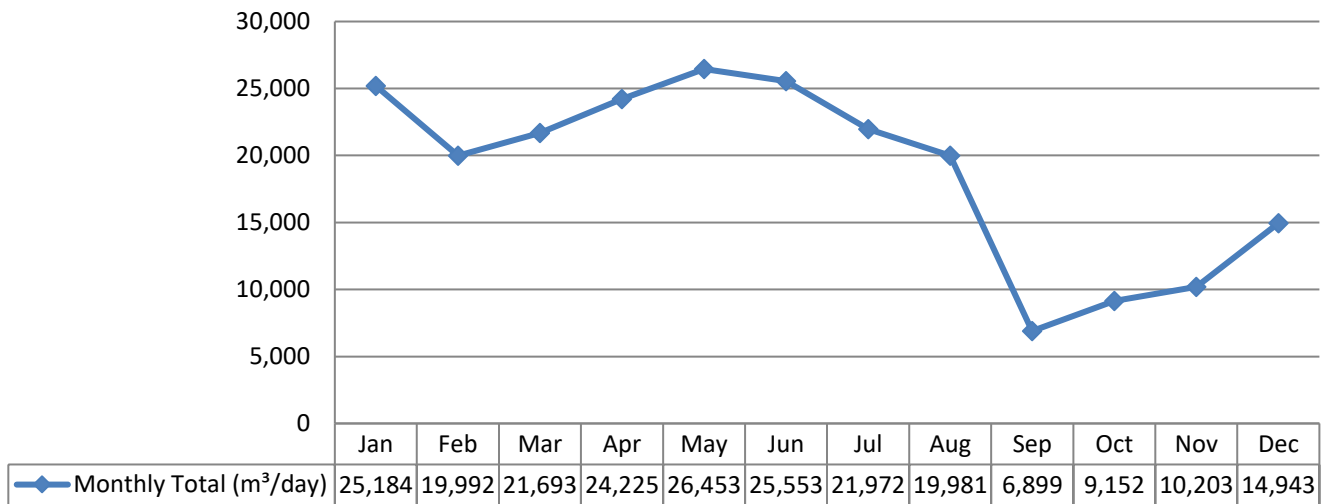
Graph 3 shows the historical influent flows for the Omemee Sewage Lagoon from 2010 to 2021. Since 2017, the influent flows have remained consistent. The increased influent flow in 2017 can be attributed to the extremely wet spring season.

- a. 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 2021 at the Omeme 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: 2021 Effluent Monthly Flow Totals



Graph 5: 2021 Effluent Daily Minimum, Maximum and Average Flows

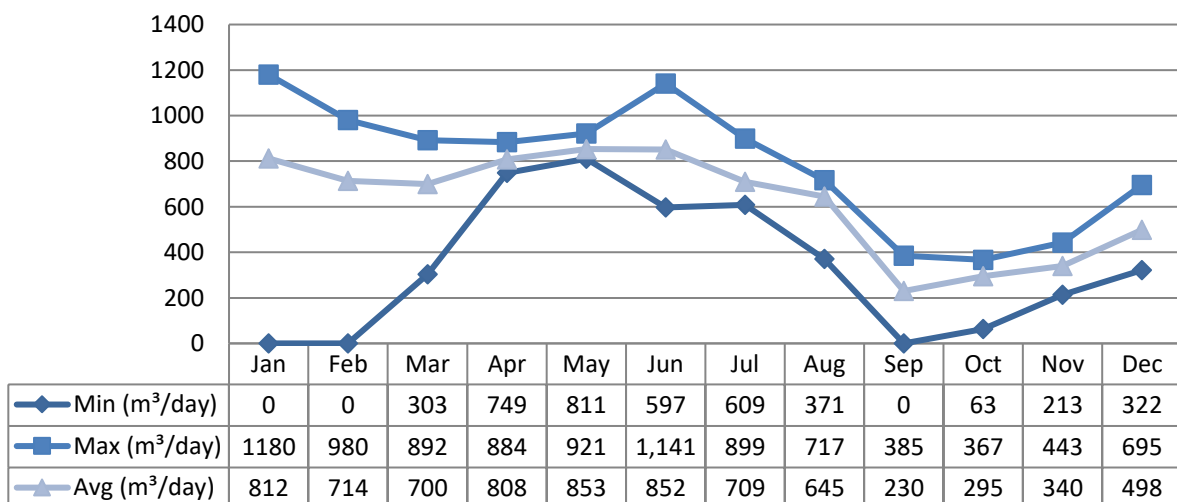


Table 2 outlines the effluent criteria limits as set out in Section 7(1), Schedule C of Environmental Compliance Approval Number 2737-B4DH46 as follows:

Table 2: Omemeew Sewage Lagoon - Final Effluent Compliance Limits - 2021

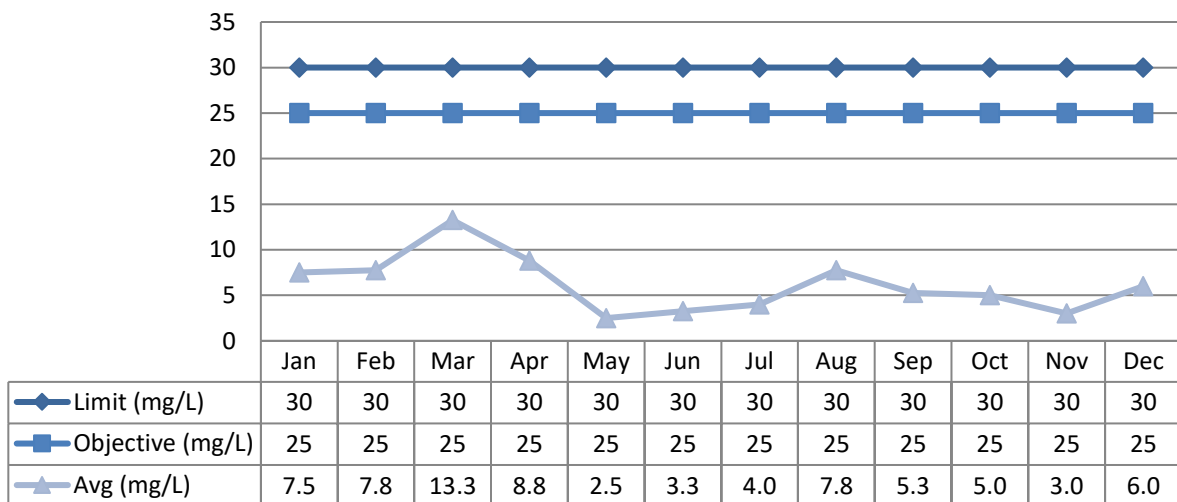
| Effluent Parameters | Average Effluent Concentration Limit (mg/L) | Actual Monthly Average Effluent Concentration (mg/L) | Compliant (Y/N) |
|------------------------|---|--|-----------------|
| CBOD ₅ | 30.0 | 6.171 | Y |
| Total Suspended Solids | 40.0 | 9.246 | Y |
| Total Phosphorus | 1.0 | Annual Avg. = 0.386 | Y |

During the reporting period of 2021, the Omemeew Sewage Lagoon final effluent met the compliance limits as prescribed in the Environmental Compliance Approval Number 2737-B4DH46.

Carbonaceous Biochemical Oxygen Demand (CBOD₅)

ECA Number 2737-B4DH46 (issued September 28, 2018) set the CBOD₅ monthly average concentration limit at 30.0 mg/L and the monthly average concentration objective at 25.0 mg/L. For 2021, the CBOD₅ monthly average concentration was 6.171 mg/L.

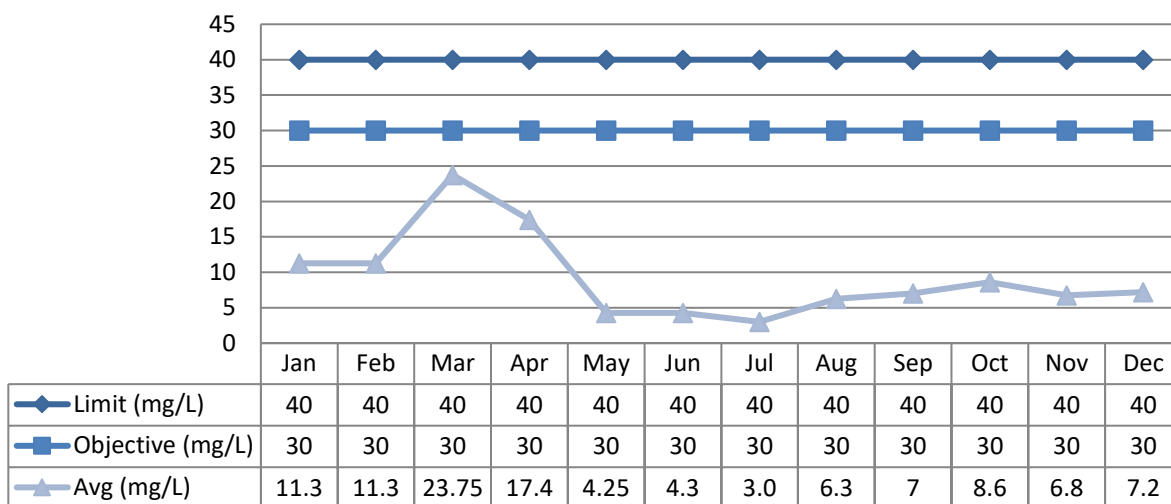
Graph 6: 2021 Monthly CBOD₅ Final Effluent Concentration Comparisons



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 2021, the TSS monthly average concentration was 9.246 mg/L.

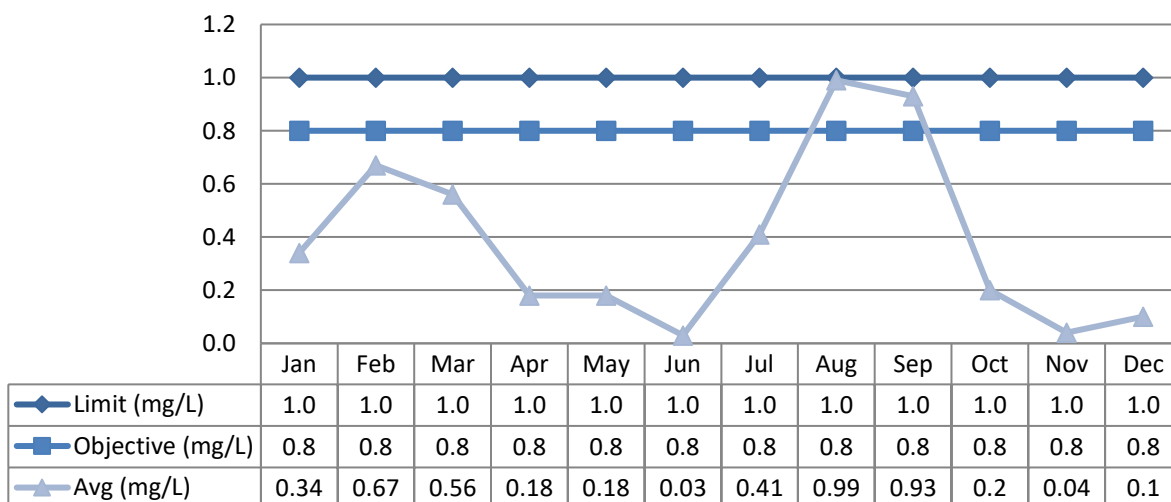
Graph 7: 2021 Monthly TSS Final Effluent Concentration Comparisons



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 2021, the Total Phosphorus annual average concentration was 0.386 mg/L.

Graph 8: 2021 Annual Total Phosphorus Final Effluent Concentration Comparisons



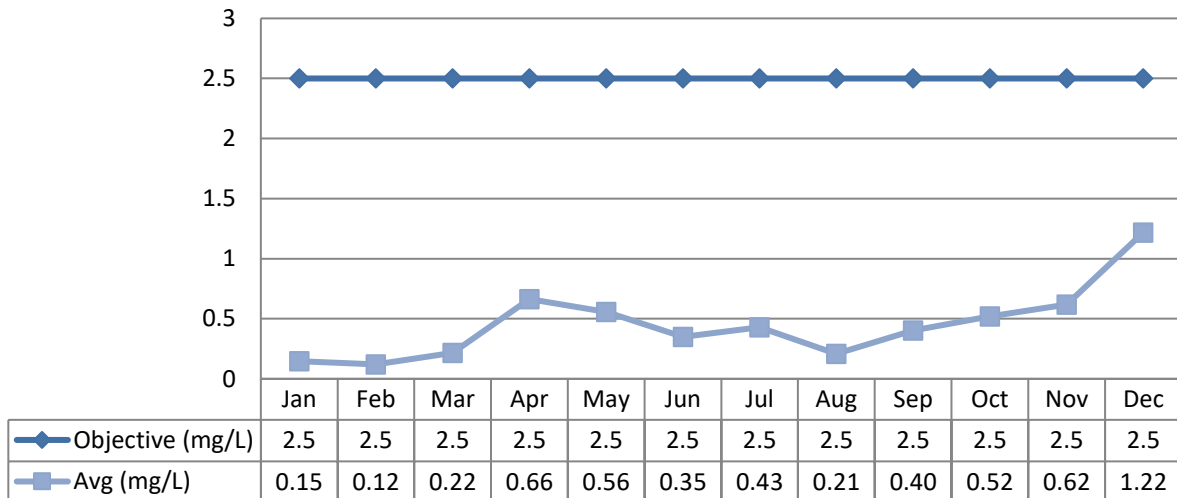
Additional Parameter

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 2021, the Nitrite and Nitrate as Nitrogen monthly average concentration was 0.473 mg/L.

Graph 9: 2021 Monthly Nitrite and Nitrate as Nitrogen Final Effluent Concentration Comparison



- 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 2021 Omeme Sewage Lagoon Sampling Calendar was established and the sample day was Friday. There were no deviations from the sample plan during the reporting period.

The Sample Plan for 2022 has been established and the sample day is on Monday. A copy of the 2022 Omeme Sewage Lagoon Sampling Calendar is included in **Appendix II**. 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: 2021 Sewage Lagoon Operational Challenges

| Month | Challenges | Corrective Actions |
|---------|--------------------------------------|---|
| January | Aeration Pond Air Diffusers - no air | Check valves, steam lines and add menthol hydrate to lines. |
| March | Air System Blower – air line leaks | Repair and/or replace air lines. |
| July | Subsurface Pump #1 failure | Replaced pump. |

- d. 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**

- e. 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.

- f. 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 September 2021 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 5 provides continuous efforts made to meet the Effluent Objectives at the Omemeew Sewage Lagoon.

Table 4: Efforts Made to Meet the Effluent Objectives of Condition 6

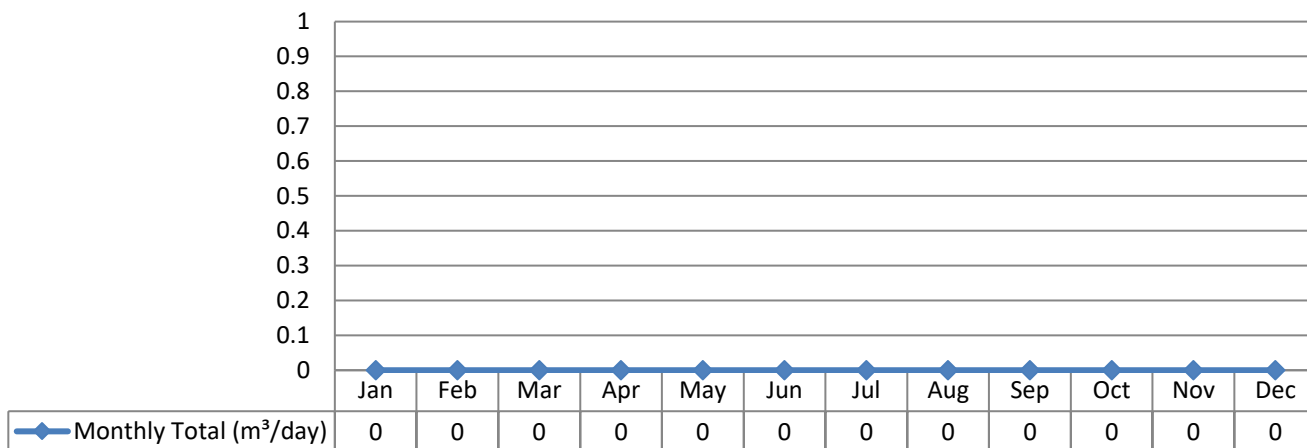
| |
|--|
| 1. Sampling effluent as per the ECA. |
| 2. Visual Inspection of the effluent while performing rounds and sampling. |
| 3. Inspection of lagoon berms. |
| 4. Inspection of subsurface disposal area. |
| 5. Ensuring that Alum is being dosed. |
| 6. Annual calibration of the flow meters. |
| 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 2021. 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 Omeme Sewage Lagoon annual performance report.

Graph 10: 2021 Monthly Effluent Flow to Spray Irrigation System



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 m³/day. The maximum influent daily flow in 2021 was 5,282 m³, which does not exceed the SPS rated capacity.

Table 5: 2021 Influent Flows at Church St. SPS

| Month | Max Daily Flow (m ³ /day) | Average Daily Flow (m ³ /day) |
|----------|--------------------------------------|--|
| January | 228.2 | 157.99 |
| February | 135 | 109.29 |
| March | 5,282 | 439.29 |

| Month | Max Daily Flow (m ³ /day) | Average Daily Flow (m ³ /day) |
|-----------|--------------------------------------|--|
| April | 269 | 220.37 |
| May | 322.5 | 175.85 |
| June | 180 | 95.95 |
| July | 433 | 146.77 |
| August | 93.6 | 83.04 |
| September | 456 | 129.29 |
| October | 213 | 130.13 |
| November | 198 | 169.67 |
| December | 370.6 | 259.08 |

The Sturgeon St. SPS was upgraded under Environment Compliance Approval 6602-8X8FXB and the rated capacity of 122 L/s which equals 10,500 m³/day. The maximum influent daily flow in 2021 was 2,580 m³ which does not exceed the raw rated capacity.

Table 6: 2020 Influent Flows at Sturgeon St. SPS

| Month | Max Daily Flow (m ³ /day) | Average Daily Flow (m ³ /day) |
|-----------|--------------------------------------|--|
| January | 793.2 | 578.15 |
| February | 516.6 | 451.51 |
| March | 2,580 | 980.28 |
| April | 950 | 812.47 |
| May | 1,178.5 | 672.39 |
| June | 495.7 | 313.63 |
| July | 1,188.2 | 465.72 |
| August | 333.8 | 282.49 |
| September | 2181 | 443.7 |
| October | 588 | 422.01 |
| November | 565.4 | 503.74 |
| December | 1,067.92 | 784.65 |

- 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 2021 was 5,023 m³. 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 2021

| Date | Issue | Actions Taken |
|--------|---|--|
| May 13 | Possible sewage spill north of 95 Sturgeon Road | Investigate possible spill at air release chamber, pump out chamber, and disinfect area. Owner repaired air release valve. |

- 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 Omemeew Sewage Lagoon in 2021.

Overflows

There were no overflows at the Omemeew Sewage Lagoon in 2021.

Situations outside Normal Operation Conditions

Normal Operating Conditions was a new condition, which became applicable to the Omemeew 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, 2021.

Spills

There was one spill within the sewage collection system at the Omemeew Sewage Lagoon in 2021. The spill occurred on May 13, 2021 at the air release chamber north of 95 Surgeon Road, Omemeew. This portion of the sewage collection system is the forcemain from Sturgeon Street Sewage Pump Station to the Omemeew Lagoons. Approximately 10 gallons of sewage was released. Corrective actions included pumping out the chamber and disinfecting the area with a mild chlorine solution. The air relief valve was repaired by the Owner and placed back into service on June 2, 2021.

Abnormal Discharge Events

There were no abnormal discharge events at the Omemeew Sewage Lagoon in 2021.

- 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 2021 for the Omemeew 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 2021 reporting period there were no incidents of a bypass or overflow within the sanitary sewer system. Additionally, during 2021, efforts included a full sanitary sewer collection system flushing maintenance program and continued monitoring of installed rain stoppers in manholes. Manhole rehabilitation program included the frame and cover replacement of selected manholes and manhole benching. Forecasted for the 2022 reporting period for the Omeme Sewage Lagoon, collection system maintenance: collection system flushing - \$3,500 (partial), and manhole repairs - \$21,500.