Mattice

Sewage Treatment Lagoon
Sewage Collection System

Annual Operating Report

January 1, 2025 to December 31, 2025

Table of Contents

Name of Facility:	**Mattice Sewage Treatment Lagoon**
Address:	**Lot 25 Concession 4,** **Eiber Township, Ontario**
Ministry Works #:	**120001791**
Environmental Compliance Approval (ECA):	**3-1305-81-826, issued March 10, 1982**
Sewage Collection System (CLI-ECA):	**291-W601, issued September 5, 2023**
Report Period:	**January 1, 2025 to December 31, 2025**

FACILITY DESCRIPTION:

Capacity of Works	unknown
Service Area	Community of Mattice
Service Population	542
Effluent Receiver	Missinaibi River via an unnamed creek
Major Process	Single Cell Waste Stabilization Lagoon

The Mattice Sewage Treatment Lagoon is classified as a Class I facility.

As described in the ECA, it consists of:

- Waste stabilization pond with a water surface area of 6.07 ha, providing a volume of 92,000 m^3 at 1.54 m operating depth
- Inlet and outlet chambers
- Approximately 230 metres of 200 mm diameter forcemain

The lagoon is discharged twice a year to the Missinaibi River over 10 days between May 1st to May 31st and October 15th to November 15th. When required, phosphorous removal is accomplished by batch dosing the lagoon contents with alum prior to discharge

DEFINITIONS

BOD_5 - Five-day biochemical oxygen demand measured in an unfiltered sample

$cBOD_5$ - Five-day carbonaceous biochemical oxygen demand measured in an unfiltered sample

TSS - Total Suspended Solids

TKN – Total Kjeldahl Nitrogen

TP - Total Phosphorus

E.coli - Escherichia coli

EFFLUENT QUALITY ASSURANCE AND CONTROL MEASURES UNDERTAKEN

The mechanical elements in the facility are in good repair, and each member of the operational staff possesses a high level of process knowledge and regulatory competence.

Samples are collected as required and analyzed by Testmark Laboratories located in Timmins, Ontario. Licensed Operators conduct in-house tests for monitoring purposes using procedures as per Standard Methods of Water and Wastewater.

Any bypass or upset events that occur at the pumping stations or plant site are tested, monitored and reported to the Spills Action Center (SAC).

MAINTENANCE PROCEDURES PERFORMED ON THE WORKS

Lagoon maintenance, including non-scheduled maintenance, is monitored using OCWA's preventative maintenance software programs. All routine and preventative maintenance measures were conducted as scheduled.

Capital expenses:

- Sewage pumping station
  - Generator annual maintenance
  - Generator transfer switch repair
  - Lifting device inspections
- Confined space equipment certification
- CLI-ECA – Documents annual review

OPERATING PROBLEMS AND CORRECTIVE ACTIONS

There were no major operating issues during the reporting period.

ALTERATIONS, EXTENSIONS OR REPLACEMENTS TO THE WORKS

There were no alterations, extensions or replacements proposed in the process or operations for the reporting period. There was no need for major modifications to improve performance or reliability of the facility; however, there are few improvements that have been identified;

- There is a junction box that is located inside the wet well for the sewage pumping station. Although this junction box has not caused any issues, it should be relocated to allow for easier access and to eliminate exposure to any gases that could promote corrosion.

- Although there are no immediate issues with the emergency generator, it has been showing signs of its age, and getting replacement parts is becoming increasingly difficult. Load testing is being planned to ensure that the generator can still perform to the required specifications.

CALIBRATION AND MAINTENANCE OF ALL MONITORING EQUIPMENT

The flow-monitoring program, maintained in the Work Management System (WMS), incorporates a calibration of all monitoring devices once a year. This helps ensure their accuracy within plus or minus 15 % of actual rate of flow.

The monitoring equipment is calibrated based on the manufacturers' recommendations and conducted by a trained person. The volume of raw sewage discharged into the lagoon is measured with a magnetic flow meter.

Instrument	Calibration Date	Accuracy
Lagoon influent flow meter (E&H Promag 50)	June 18, 2025	97.6 %

ABNORMAL DISCHARGE EVENTS, BYPASSES AND SPILLS

All events are verbally reported to the Ministry of the Environment's Spills Action Center, a courtesy call to the Ministry of Health and a written report is submitted to Environment Canada and OCWA's Compliance Department.

The following abnormal discharge events were reported:

Sample Date	**Details (Parameter, Limit, Result, Corrective Action, Date, etc.)**
April 24	Lagoon Overflow Type of incident: Overflow SAC Ref No.: 1-O4513P Start Date & Time: April 24, 2025 @ 14:30 Termination: May 15, 2025 @ 13:15 Duration: ~ 22 days Approximate volume: 14,181 m^3 Details: Spring snow melt caused the lagoon to reach capacity and overflow Receiver: Missinaibi River Actions: Sampled, reported and monitored. Once the legal discharge period began the overflow was terminated. Overflow effluent parameters were well below the ECA limits. Reporting: Verbal report to SAC, written report to EC, MOH, Owner and SAC.

Sample Date	Details (Parameter, Limit, Result, Corrective Action, Date, etc.)
June 22	Main SPS Overflow Type of incident: Overflow SAC Ref No.: 1-OMGHTV Start Date & Time: June 22, 2025 @ 22:17 Termination: June 23, 2025 @ 12:30 Duration: ~10 hours (intermittent) Approximate volume: 131 m^3 Details: Heavy rainfall Receiver: Missinaibi River Actions: Chlorinated, sampled, reported, and monitored Reporting: Verbal report to SAC, MOH, written report to EC, MOH, Owner and SAC.

SLUDGE REMOVAL

There was no sludge removed during the reporting period

COMPLAINTS

There were no complaints received during the reporting period

PROPOSED ALTERATIONS

There are no major proposed alterations

MONITORING PROGRAM – RAW SEWAGE (INFLUENT)

A monthly grab sample is taken on the raw sewage and analyzed for:

- BOD_5
- Total Suspended Solids
- Total Phosphorous

Below is a summary of the raw influent sampling for the calendar year

Parameter (mg/L)	Number of Samples	Average	Maximum
BOD_5	12	148.9	410
Total Phosphorous	12	2.32	3.91
Total Suspended Solids	12	313.5	1,590

Refer to *APPENDIX A: Monthly Summary of Raw Influent Sampling and Monitoring Data*, which summarizes the monitoring and sampling analysis conducted at the facility

MONITORING PROGRAM – COLLECTION SYSTEM OVERFLOWS (CLI-ECA)

A weekly grab sample is taken on any collection system overflow and analyzed for:

- BOD_5
- Total Suspended Solids
- Total Phosphorous
- Total Kjeldahl Nitrogen
- E.coli

The Mattice sewage collection system consists of one pumping station. There was one overflow event at the Melrose Pumping Station during this reporting period, with a total volume of 131 m^3.

Event Date	Volume (m^3)	Duration (hrs.)	Parameter	Result (mg/L)	Loading (kg)
June 22, 2025	131	~10	BOD	11.5	1.5
			TSS	59	7.7
			TP	0.347	0.05
			TKN	2.7	0.35
			E.coli	5,980	N/A

Note: E.coli parameter result values are *cfu/100 mL*

MONITORING PROGRAM – FINAL EFFLUENT

A grab sample is taken at the start, middle, and end of the discharge periods. Samples are analyzed for:

- BOD_5
- $cBOD_5$
- Total Suspended Solids
- Total Phosphorous
- *E. coli* (*Escherichia coli*)

EFFLUENT (SPRING DISCHARGE)

The discharging began as uncontrolled as it was overflowing via the overflow port on the final effluent discharge structure from April 24th to May 15th.

The following data is the average concentration values from the uncontrolled discharge. Non-compliance occurs when the compliance limit is exceeded.

Parameter (mg/L)	April 24 to May 15	Compliance
E. coli (cfu/100mL)	169	*None*
BOD_5	4.8	*Maximum 30 mg/L*
$cBOD_5$	4.3	*Maximum 25 mg/L*
Total Suspended Solids	9.3	*Maximum 40 mg/L*
Total Phosphorous (TP)	0.115	*None*

The approved spring discharge period is May 1st to May 31st. The spring discharge for 2025 began on May 15th and ended on May 25th.

The following data is the average concentration values from the controlled discharge. Non-compliance occurs when the compliance limit is exceeded.

Parameter (mg/L)	May 15 to May 25	Compliance
E. coli (cfu/100mL)	86	*None*
BOD_5	4.2	*Maximum 30 mg/L*
$cBOD_5$	3.6	*Maximum 25 mg/L*
Total Suspended Solids	9.3	*Maximum 40 mg/L*
Total Phosphorous (TP)	0.104	*None*

EFFLUENT (FALL DISCHARGE)

The approved fall discharge period is October 15th to November 15th. The fall discharge was from October 21st to October 31st.

The following data is the average concentration values from the controlled discharge. Non-compliance occurs when the compliance limit is exceeded.

Parameter (mg/L)	October 21st to October 31st	Compliance
E. coli (cfu/100mL)	6.2	*None*
BOD_5	1.3	*Maximum 30 mg/L*
$cBOD_5$	1.1	*Maximum 25 mg/L*
Total Suspended Solids	1.4	*Maximum 40 mg/L*
Total Phosphorous (TP)	0.025	*Maximum 1.8 mg/L*
TP Loadings (kg/d)	0.1	*17 kg/d*

Refer to *APPENDIX B: Summary of Final Effluent Sampling and Monitoring Data*, which summarizes the monitoring and sampling analysis conducted.

FLOWS SUMMARY AND COMPARISON

RAW INFLUENT FLOW

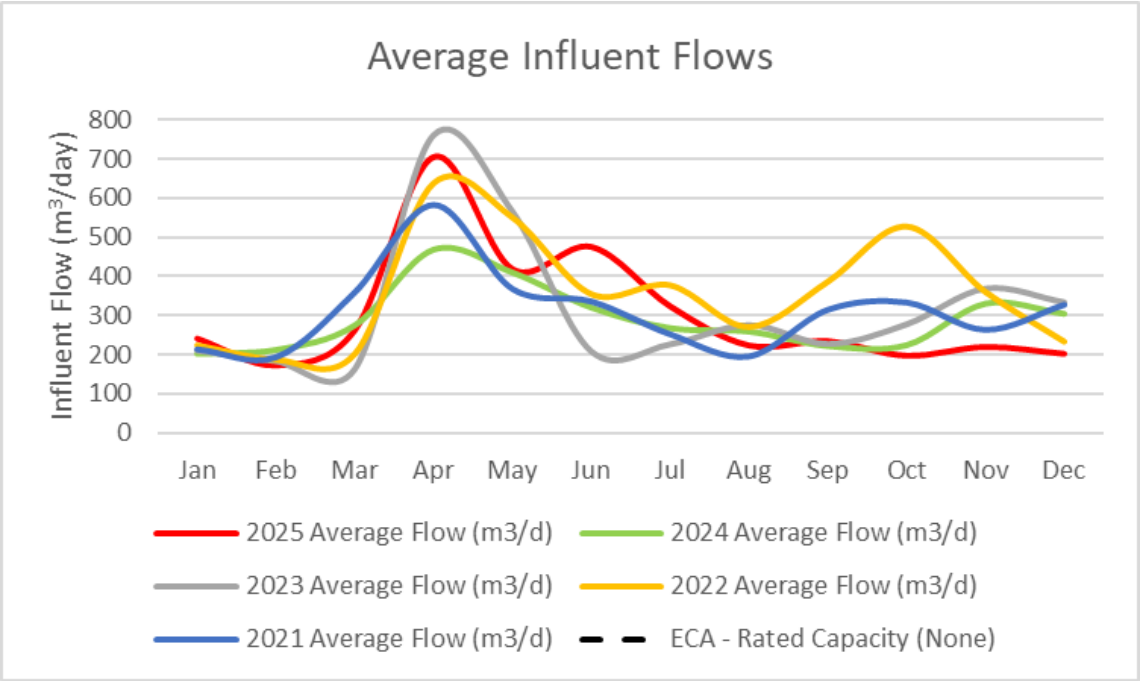
Month	Total Flow (m^3)	Average Flow (m^3/day)	Maximum Flow (m^3/day)
January	7,515	242	328
February	4,875	174	183
March	8,173	264	629
April	21,131	704	1,453
May	12,977	419	888
June	14,270	476	943
July	10,054	324	380
August	6,966	225	252
September	7,064	235	294
October	6,155	199	214
November	6,629	221	278
December	6,311	204	263

SUMMARY OF INFLUENT FLOW

Total Volume of Influent (m^3)	112,120
Maximum Annual Flow (m^3/day)	1,453
Average Annual Flow (m^3/day)	307
Rated Capacity (m^3/day)	N/A
Percent of Capacity (%)	N/A
Exceedance? (Yes/No)	No

HISTORICAL AVERAGE INFLUENT FLOW

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
2025	242	174	264	704	419	476	324	225	235	199	221	204
2024	201	211	274	469	410	320	267	258	221	223	330	304
2023	211	184	164	760	565	209	227	276	228	278	369	334
2022	223	186	200	638	550	354	376	270	385	527	359	232
2021	216	195	360	582	369	337	254	197	316	334	265	328



SUMMARY OF EFFLUENT FLOW

Discharge Period	Average Flow (m^3/d)	Maximum Flow (m^3/d)	Total Flow (m^3)
Spring	7,895	8,758	86,848
Fall	3,793	4,270	41,718

Refer to APPENDIX C: Summary of Raw Influent and Final Effluent Flow Monitoring Data which summarizes the raw influent and treated effluent flows during the reporting period.

SEWAGE TREATMENT PROGRAM SUCCESS AND ADEQUACY

The table below details results and efficiency of the lagoon's performance demonstrating pollutant removal rates from raw sewage concentrations through to final effluent for BOD_5, suspended solids and total phosphorus.

Parameter (Avg)	Influent	Effluent	% Removal
TP (mg/L)	2.32	0.085	96.3
BOD_5 (mg/L)	148.9	3.2	97.8
TSS (mg/L)	313.5	6.9	97.8

Notes: *Percent removal calculations are based on the annual average values*

Interpretation of Monitoring and Analytical Data

The Mattice sewage treatment Lagoon's effluent monitoring parameters fell below the compliance limits specified in the facility's ECA.

The effluent quality is based on the biochemical oxygen demand, total suspended solids and total phosphorous levels.

The Biological Oxygen Demand (BOD_5) is the amount of oxygen used by micro-organisms as they decompose organic matter in the effluent sample for five days. High BOD_5 in effluent means a large quantity of oxygen was needed to break down the organic matter and identifies a large amount of organic matter in the effluent indicating inadequate treatment. The BOD_5 limit of 30 mg/L was not exceeded.

Suspended Solids (TSS) in effluent are composed of settleable solids and nonsettleable solids depending on the size, shape and weight of the solid particles. Settable solids are large sized particles that tend to settle more rapidly in a given period of time. The compliance limit of 40.0 mg/L was not exceeded.

Total Phosphorus (TP) refers to the amount of phosphorus in a sample. Excess TP stimulates algae and weed growth that may cause fluctuations in dissolved oxygen in the receiving waters. The compliance limit of 1.8 mg/L was not exceeded.

Summary

The Melrose pumping station had new pumps installed in 2019. Since the installation of the new pumps, there have been only two collections system overflows. This occurred in 2020, during a rapid snowmelt event, and again in 2025 due to heavy rain. The pumping station and collection system do not have any immediate concerns.

In 2025, the effluent during discharge periods was of good quality and well below the compliance limits established in the ECA.

APPENDIX A: Monthly Summary of Raw Influent Sampling and Monitoring Data

Influent	9-Jan-25	24-Feb-25	13-Mar-25	10-Apr-25	6-May-25	10-Jun-25	9-Jul-25	12-Aug-25	10-Sep-25	6-Oct-25	18-Nov-25	16-Dec-25
BOD5	61.8	170	280	150	23	56	62.2	28	403	23	120	410
TSS	63	89	119	140	35.7	51	132	106	723	477	236	1590
TP	2.13	3.19	3.91	3.1	0.738	1.18	1.28	1.06	3.01	2.34	3.54	2.35

APPENDIX B: Summary of Final Effluent Sampling and Monitoring Data

Spring Overflow Effluent	24-Apr	29-Apr	06-May	13-May
BOD (5-day)	3	5.5	5.6	5.2
Carbonaceous BOD	1.8	7	3.8	4.6
Escherichia coli	55	680	60	360
Field pH	7.58	6.76	7	7.42
Field Temperature	2	2	17.9	14
Total Phosphorus (as P)	0.083	0.161	0.111	0.103
Total Suspended Solids	1	2	< 2	32

Spring Discharge Effluent	15-May	20-May	25-May
BOD (5-day)	4.4	3.9	4.4
Carbonaceous BOD	5.1	2.4	3.4
Escherichia coli	125	85	60
Field pH	8.25	7.12	8.08
Field Temperature	17	13.4	18.5
Total Phosphorus (as P)	0.083	0.071	0.158
Total Suspended Solids	4	6	18

Fall Discharge Effluent	21-Oct	26-Oct	31-Oct
BOD (5-day)	< 1	0.8	2
Carbonaceous BOD	< 1	0.8	1.6
Escherichia coli	40	6	1
Field pH	8.07	8.44	8.37
Field Temp	10	6.5	5.5
Total Phosphorus (as P)	0.016	0.012	0.047
Total Suspended Solids	< 1	< 1.3	2

APPENDIX C: Summary of Raw Influent and Final Effluent Flow Monitoring Data

Raw Flows	January	February	March	April	May	June	July	August	September	October	November	December
Maximum Flow (m^3/d)	328	183	629	1,453	888	943	380	252	294	214	278	263
Average Flow (m^3/d)	242	174	264	704	419	476	324	225	235	199	221	204
Total Volume (m^3)	7,515	4,875	8,173	21,131	12,977	14,270	10,054	6,966	7,064	6,155	6,629	6,311

Effluent Flows	January	February	March	April	May	June	July	August	September	October	November	December
Maximum Flow (m^3/d)				***May 15 -25***	8,758				***Oct 21 - Nov 31***	4,270		
Average Flow (m^3/d)					7,895					3,793		
Total Volume (m^3)					86,848					41,718		

APPENDIX D: CLI-ECA Reporting Sections

Collection ECA # 291-W601 Schedule E	(Page #) Section in Report
4.6.3 If applicable, includes a summary of all required monitoring data along with an interpretation of the data and any conclusion drawn from the data evaluation about the need for future modifications to the Authorized System or system operations.	(7) HISTORICAL AVERAGE INFLUENT FLOW (5) MONITORING PROGRAM – COLLECTION SYSTEM OVERFLOWS (CLI-ECA) (3) ABNORMAL DISCHARGE EVENTS, BYPASSES AND SPILLS (4) PROPOSED ALTERATIONS (9) SUMMARY
4.6.4 Includes a summary of any operating problems encountered and corrective actions taken.	(3) ABNORMAL DISCHARGE EVENTS, BYPASSES AND SPILLS (2) OPERATING PROBLEMS AND CORRECTIVE ACTIONS
4.6.5 Includes a summary of all calibration, maintenance, and repairs carried out on any major structure, Equipment, apparatus, mechanism, or thing forming part of the Municipal Sewage Collection System.	(3) CALIBRATION AND MAINTENANCE OF ALL MONITORING EQUIPMENT (2) MAINTENANCE PROCEDURES PERFORMED ON THE WORKS
4.6.6 Includes a summary of any complaints related to the Sewage Works received during the reporting period and any steps taken to address the complaints.	(4) COMPLAINTS
4.6.7 Includes a summary of all Alterations to the Authorized System within the reporting period that are authorized by this Approval including a list of Alterations that pose a Significant Drinking Water Threat.	(2) ALTERATIONS, EXTENSIONS OR REPLACEMENTS TO THE WORKS
4.6.8 Includes a summary of all Collection System Overflow(s) and Spill(s) of Sewage, including: a) Dates; b) Volumes and durations; c) If applicable, loadings for total suspended solids, BOD, total phosphorus, and total Kjeldahl nitrogen, and sampling results for E.coli; d) Disinfection, if any; and e) Any adverse impact(s) and any corrective actions, if applicable.	(3) ABNORMAL DISCHARGE EVENTS, BYPASSES AND SPILLS

4.6.9 Includes a summary of efforts made to reduce Collection System Overflows, Spills, STP Overflows, and/or STP Bypasses, including the following items, as applicable: a) A description of projects undertaken and completed in the Authorized System that result in overall overflow reduction or elimination including expenditures and proposed projects to eliminate overflows with estimated budget forecast for the year following that for which the report is submitted. b) Details of the establishment and maintenance of a PPCP, including a summary of project progresses compared to the PPCP's timelines. c) An assessment of the effectiveness of each action taken. d) An assessment of the ability to meet Procedure F-5-1 or Procedure F-5-5 objectives (as applicable) and if able to meet the objectives, an overview of next steps and estimated timelines to meet the objectives. e) Public reporting approach including proactive efforts.	(9) SUMMARY