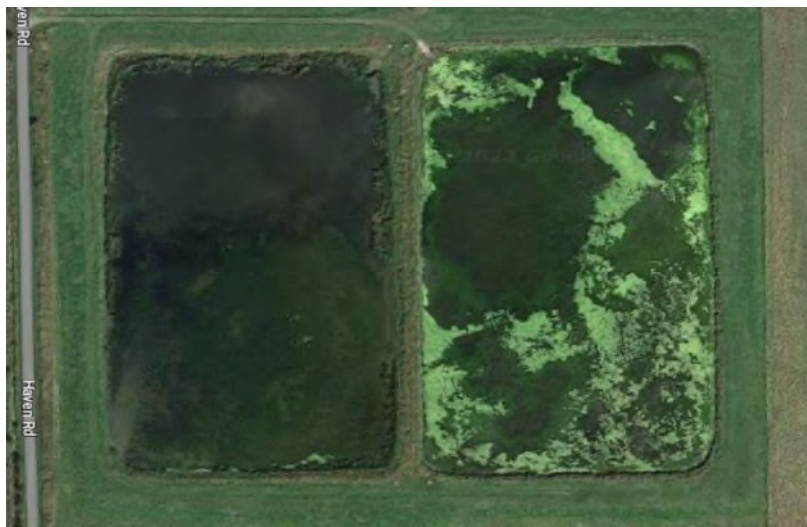




Wastewater Annual Report Warren Lagoon 2022



April 14, 2023, Version 2.0

2022 Warren Lagoon

Version 2.0

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Revision History

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Introduction to the Annual Wastewater Report

The City of Greater Sudbury entered into a service contract with the Municipality of Markstay-Warren, assuming Operating Authority for their Water and Wastewater Treatment facilities as of April 1, 2022. For the purposes of this report, this includes the Warren Lagoon, associated Lift Station and all other infrastructure included in the amended Certificate of Approval #4480-62PMJR.

The data included in this report covers the period for which the City of Greater Sudbury was Operating Authority. Data for the period from 1-Jan-2022 to 31-Mar-2022 can be obtained from the previous Operating Authority.

Under Environmental Compliance Approval (ECA) agreements issued by the Ministry of Environment, Conservation & Parks (MECP), the City is required to report annually on the values/parameters indicated in the ECA and must make this report publicly available within 90 days of January 1st for the year preceding the current year. Specifically, the annual report is to include:

- a) a summary of all monitoring data, including an overview of the success and adequacy of the Works.
- b) a description of any operating problems encountered, and corrective actions taken.
- c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Works.
- d) a description of efforts made, and results achieved in meeting the Effluent Objectives of the Approval.
- e) a summary of any complaints received during the reporting period and any steps taken to address the complaints.
- f) a summary of all by-passes, plant overflow, overflow, spill or abnormal discharge events.

To address these requirements, this report contains the following sections.

- 1. **Operating Issues & Corrective Actions;** Measured values resulting in a non-compliance with respect to a parameter listed within an ECA and the corrective actions taken to resolve the issue.
- 2. **Maintenance & Capital Improvements;** All major maintenance, modifications and capital works completed at the lagoon within the reporting period. Details on the calibration and maintenance carried out on all effluent monitoring equipment.
- 3. **Effluent Quality & Control Measures;** A summary and interpretation of all monitoring data collected and a comparison to the parameters and limits given in the ECA for each facility.
- 4. **Customer Complaints (CRM);** Any complaints received regarding the Warren Lagoon through the City of greater Sudbury 311 (CRM) system during the reporting period and any steps taken to address the complaints.
- 5. **Plant Bypasses and Overflows;** A listing of all bypasses, spills, and overflows at the lagoon during the reporting period.
- 6. **Lagoon Performance Report;** Annual results and performance summary, including pre discharge and effluent sampling records.

Definitions

Alkalinity: a measurement of the ability of water to neutralize acid by absorbing hydrogen ions.

Average Concentration: the mean of all Single Sample Results of the concentration of a contaminant in a given stream (influent/effluent) measured during a specified time period.

Average Flow: the cumulative total influent or effluent flow measured during a defined time period (annual, monthly, etc.) divided by the number of days during that specified period.

Average Loading: the value obtained by multiplying the Average Concentration of a contaminant in a given stream (influent/effluent) by the Average Flow for that stream.

BOD₅: the five-day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands.

Bypass: the diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities.

cBOD₅: the five-day carbonaceous biochemical oxygen demand of biological organisms in the material, without the impact of oxygen depletion by nitrogenous bacteria.

E. coli: coliform bacteria that possess the enzyme beta-glucuronidase and can cleave a fluorogenic or chromogenic substrate with the corresponding release of a fluorogen or chromogen, that produces fluorescence under long wavelength (366 nm) UV light, or color development, respectively. Data are reported as colony forming units (CFU) per 100 mL.

Event: an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the start of the event.

Final Effluent: effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s).

Influent: flows to the Sewage Treatment Plant from the collection system. Flows can fluctuate according to weather conditions and high flows are commonly due to Inflow and Infiltration, a condition that allows rain and/or snow melt to enter the sanitary sewer.

Monthly Geometric Mean Density: the mean of all Single Sample Results of *E. coli* measurement in the samples taken during a calendar month, calculated, and reported as per the methodology specified by the MECP.

Nitrite: the amount of nitrogen present in the effluent as the NO₂- anion.

Nitrate: the amount of nitrogen present in the effluent as the NO₃- anion.

Overflow: a discharge to the environment at location(s) other than the approved effluent discharge.

pH: the potential of hydrogen measured on a 14-point scale where 0 represents highly acidic material, 14 represents highly basic material and 7 represents neutral material (such as water).

Rated Capacity: The Annual Average Daily Influent Flow for which the facility is designed to process.

T Amm: the total ammonia measured in the final effluent.

TKN: Total Kjeldahl Nitrogen; the total concentration of organic nitrogen & ammonia in the effluent.

TP: Total Phosphorous; the total amount of phosphorous measured in the final effluent.

TSS: Total Suspended Solids; the total amount of residual solid matter in the final effluent.

Un-ionized Amm: the calculated amount of un-ionized ammonia in the final effluent.

Sludge: the residual material produced through the wastewater treatment process.

WSER: Wastewater Systems Effluent Regulations, as defined in the Fisheries Act

1. Operating Issues & Corrective Actions

Date	Facility	Parameter	Probable Cause	Corrective Actions Taken
July 2022	Warren LS	Flow Meter issues	Calibration of meter	Contractor Recalibrated
Nov 2022	Warren Lagoon	Total Phosphorus	Not chemically treated prior to discharge	SOP created for future discharge
Nov 2022	Warren Lagoon	TSS	Poor sampling location	Due care and caution when taking samples

2. Maintenance & Capital Improvements

Maintenance Completed	Capital Improvements Completed
- Installed Davit pin	- None
- Replaced backflow preventer at LS	
- Repaired East cell discharge valve	
- Installed new PLC panel at LS	
- Replace high fuel level sensor on Lift station Generator	

All analyzers at all plants are calibrated as per manufacturer's recommendations, a minimum of once per year. Calibration Certificates are submitted and retained electronically for each unit.

All major plant equipment is maintained as per manufacturer's recommendations, with regular preventive maintenance checks completed as per established schedules.

3. Effluent Quality & Control Measures

Values for average loading and material removed were calculated using laboratory results and plant influent flow data.

4. Customer Complaints (CRM)

No customer complaints were logged during April 1, 2022, to December 31, 2022.

5. Bypasses and Overflows

No bypasses or overflows were logged during April 1, 2022, to December 31, 2022.

6. Lagoon Performance Report

The Warren Lagoon is subject to semi-annual discharge. Discharging in the spring and fall as follows:

Spring: discharge commencing after the liquid surface in the lagoon has become free of ice cover, terminating within 60 days thereafter, and continuing for not less than 15 days for each lagoon cell released, and

Fall: discharge commencing not earlier than October 15 and terminating not later than November 30 and continuing for not less than 15 days for each lagoon cell released.



2022 Warren Wastewater Treatment Lagoon Performance

Lagoon Type: Seasonal Retention
Design Capacity: 682 m3/day

Month	Raw Flows (Act meter)				Raw			
	Total	Avg Day			CBOD5	YSS	TP	BOD
	m ³	m ³ /d	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-21	5390.9	180	184	130	2.1			
Dec-21	8249.1	266	148	272	2.0			
January	4032.3	131	318	1900	3.5			
February	3581.4	128	186	195	2.0			
March	8554	285	224	137	1.7			
April	3690	103	51	26	2.5			
May	5700	184	94	148	2.6			
June	4608	154	110	126	3.3			
July	4756	137	130	92	4.0			
August	4725	152	120	108	3.2			
September	3764	125	160	214	4.1			
October	5348	173						
November	5343	178	200	114	5.0			
December	5407	174	150	120	4			
Total	58408		1743	3180	36	1220		
Average	4867.35	160	159	289	3.27	174		
Q1 RAW	16167.2		243	744	2.4	HOV(O)		
Q2 RAW	13948		85	100	2.8	135		
Q3 RAW	12745		137	138	3.8	187		
Q4 RAW	16098		175	117	4.3	180		
Spring Raw Flows	32897							
Fall Raw Flows	28401							

Pre Discharge Sampling		
SPRING	EAST CELL	
Date	22-Apr-22	
CBOD5 (mg/L)	14.0	4.2
YSS (mg/L)	16.00	
TP (mg/L)	0.237	
TAN (mg/L)	2.340	
pH	7.9	7.7
H ₂ S (mg/L)	NA	NA
TAN (mg/L)	5.7	15.1

Pre Discharge Sampling		
FALL	West Cell	
Date	11-Oct-22	
CBOD5 (mg/L)	4.2	
YSS (mg/L)	11.00	
TP (mg/L)	2.340	
TAN (mg/L)	1.13	
pH	7.7	7.7
H ₂ S (mg/L)	NA	NA
TAN (mg/L)	15.1	

Spring		
CBOD5 (mg/L)	12.6	14.6
YSS (mg/L)	35.1	108.2
TP (mg/L)	0.8	1
	NA	NA

Spring Effluent Discharge - East Cell #2				
Date	Apr.29/22	May.6/22	May.13/22	27-May-22
Depth	Beginning			End
CBOD5 (mg/L)	14.0	14.9	26.0	4.7
YSS (mg/L)	23	78	42.70	3.3
TAN (mg/L)	3.5	0.87	0.10	0.84
TP (mg/L)	0.750	0.672	0.526	0.715
pH	7.3	8.0	10.8	8.2
E.Coli	20.00	10.00	10.00	2.00
BOD5	17	22	34.8	2
TAN	na	na	2.2	2
Nitrite as N	0.27	0.05	0.05	0.05
Nitrate as N	0.12	0.05	0.05	0.1

Approx Spring Discharge Vol 32897 m3

Fall Effluent Discharge - West Cell #1				
Date	Oct.18/22	Oct.27/22	Nov.2/22	Seasonal Average
Depth	Beginning		End	
CBOD5 (mg/L)	2.3	20.0	32.0	18.1
YSS (mg/L)	8	316.00	366	230.0
TAN (mg/L)	0.14	2.14	4.85	2.4
TP (mg/L)	0.598	2.340	2.120	1.8
pH	7.9	7.4	8.0	7.8
E.Coli	366.00	310.00	20.00	232.0
BOD5	3	20	33	18.7
TAN	0.9	3	10	4.6
Nitrite as N	0.5	0.25	0.05	0.3
Nitrate as N	0.5	0.25	0.05	0.3

Approx Fall Discharge Vol 28401 m3