

# Merrickville Wastewater System

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Waterworks # 110001729

## Annual Report

Prepared For: Village of Merrickville-Wolford

Reporting Period of January 1<sup>st</sup> – December 31<sup>st</sup> 2023

Issued: March 8, 2024

Revision: 0

Operating Authority:



This report has been prepared to meet the requirements set out in:

Document	Document #	Issue Date	Issue Number
Facility ECA	1121-7YRQLF	January 18, 2010	N/A
CLI ECA	264-W601	May 16, 2023	1.0

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## 1 Revision History

Date	Rev#	Revisions	Revised By
2024-03-08	0	Annual Report Issued	PCT

## 2 Operations and Compliance Reliability Indices

Compliance Event	Details
Ministry of Environment Inspections	Inspection Date: July 6 <sup>th</sup> , 2023 <ul style="list-style-type: none"> <li>• Non-conformance, overflow samples not sampled in accordance with the ECA</li> <li>• Recommendations               <ul style="list-style-type: none"> <li>○ ECA objective exceedances, best efforts to run plant below objectives</li> </ul> </li> </ul>
Ministry of Labour Inspections	No MOL inspections in 2023.
Non-Compliance	1 Non-compliance in 2023 <ul style="list-style-type: none"> <li>• Details reference in report</li> </ul>
Community Complaints	No community complaints in 2023.
Spills	No spills (other than sewage) in 2023.
Overflows	1 overflow event on April 5 <sup>th</sup> , 2023 <ul style="list-style-type: none"> <li>• Details reference in report</li> </ul>
Bypass	No bypass events in 2023.

## 3 Process Description

The Merrickville Wastewater system utilizes an ISAM treatment system. This system incorporates a surge/anoxic mix tank to optimally control the process and it provides rapid and complete treatment. The surge tank provides flow and nutrient equalization to optimally provide treatment at the full range of flows and loadings.

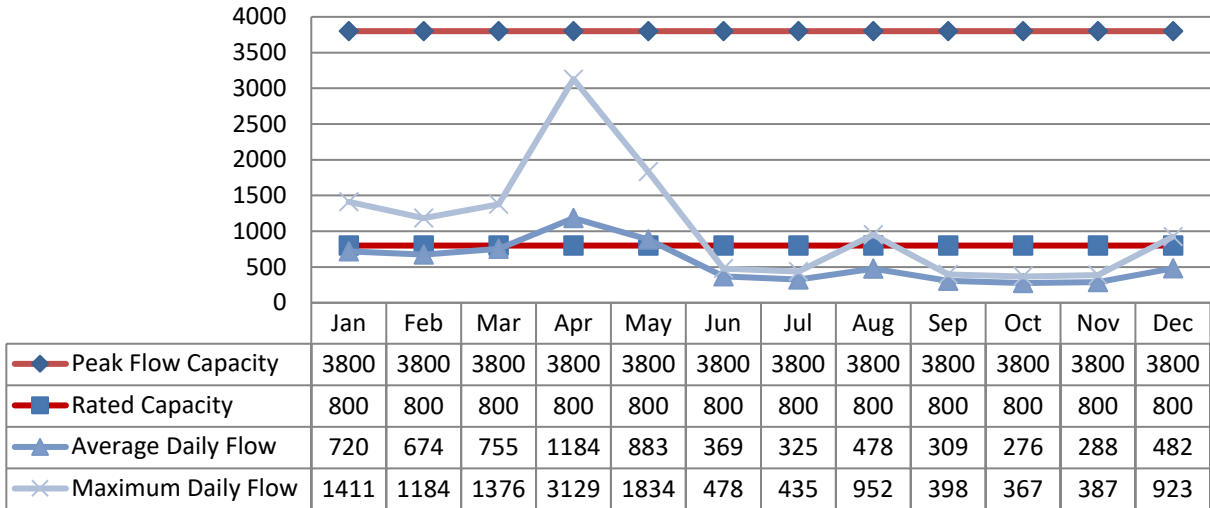
The secondary treatment process employs sequencing batch reactor (SBR) technology consisting of anaerobic tanks, anoxic tanks and a sequencing batch reactor. The SBR incorporates an anaerobic selector chamber which provides consistent phosphorous removal by subjecting the recirculated biomass to anaerobic conditions, forcing the release of phosphorous, but also creates soluble carbon as a food source for phosphorous removal through anaerobic conversion of settleable BOD to soluble carbon. Additionally, anaerobic sludge digestion occurs in the anaerobic selector chamber, reducing waste solids production by up to 65% for the entire secondary process.

Effluent is disinfected using Ultraviolet disinfection. Permanent Diesel generator is on-site to provide back-up power.

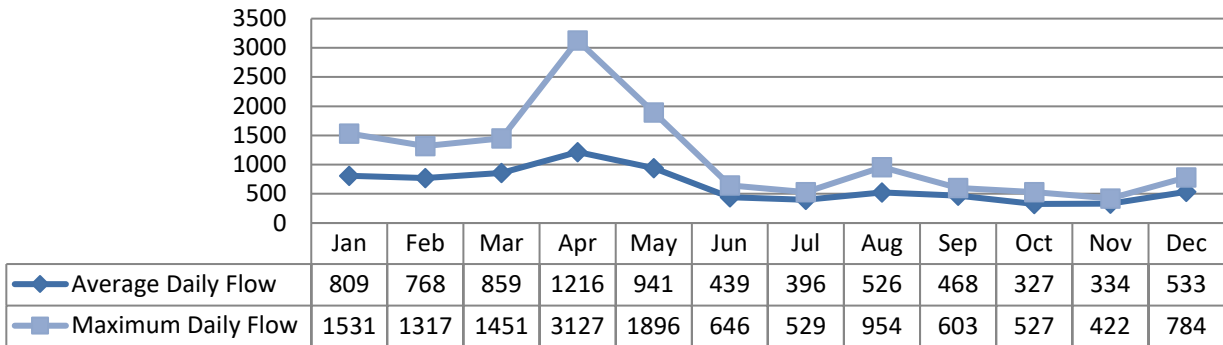
## 4 Treatment Flows

Annual average flow for 2023 was 562 m<sup>3</sup>/d, which is 70% of the daily flow rated capacity of 800 m<sup>3</sup>/d. A flow reduction plan was established for 2018.

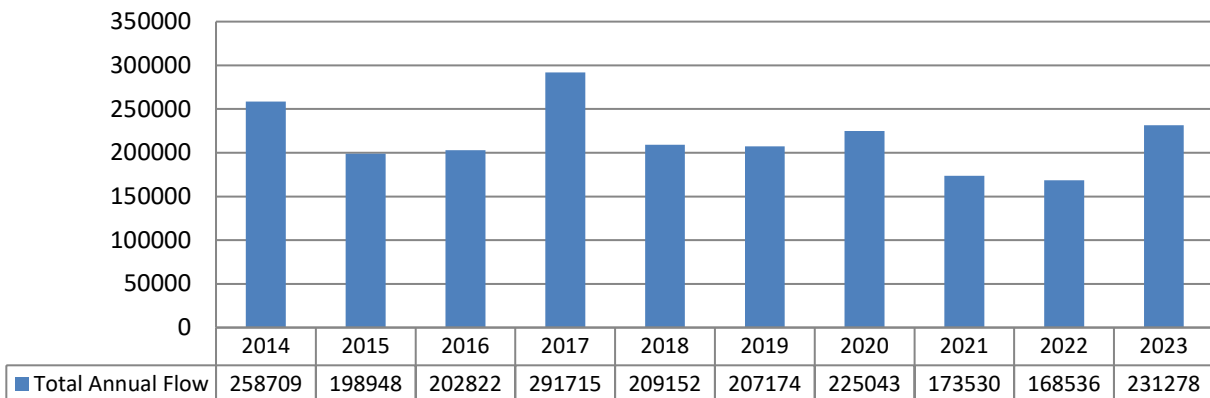
### 4.1 Raw Flow (m3/d)



### 4.2 Effluent Flow (m3/d)

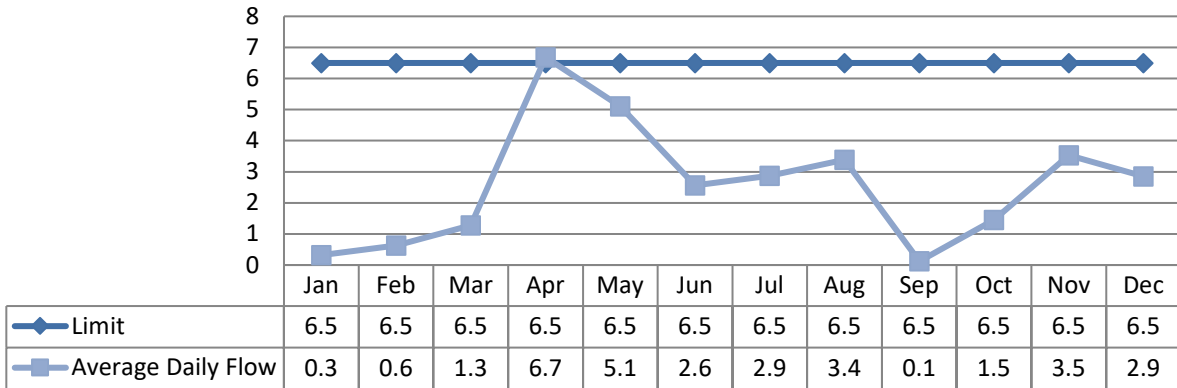


#### 4.2.1 Annual Comparison (m3)



### 4.3 Imported Sewage

#### 4.3.1 Septage Flow (m3/d)



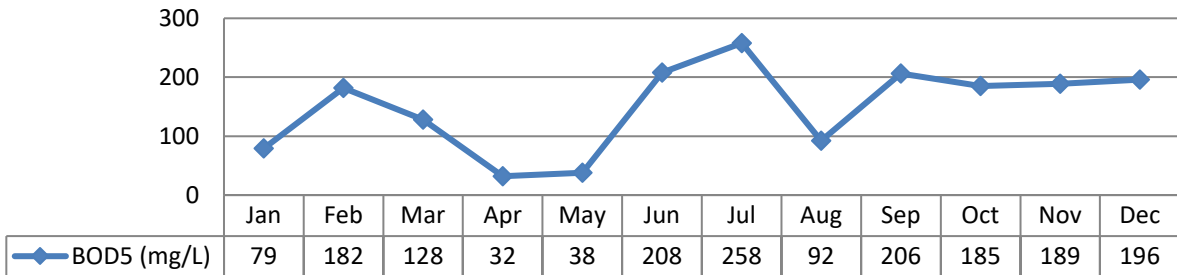
Septage flow was calculated using total m3 for the month divided by days in that month. The operator ensures no more than 6 m3 of septage is processed per day.

## 5 Raw Sewage Quality

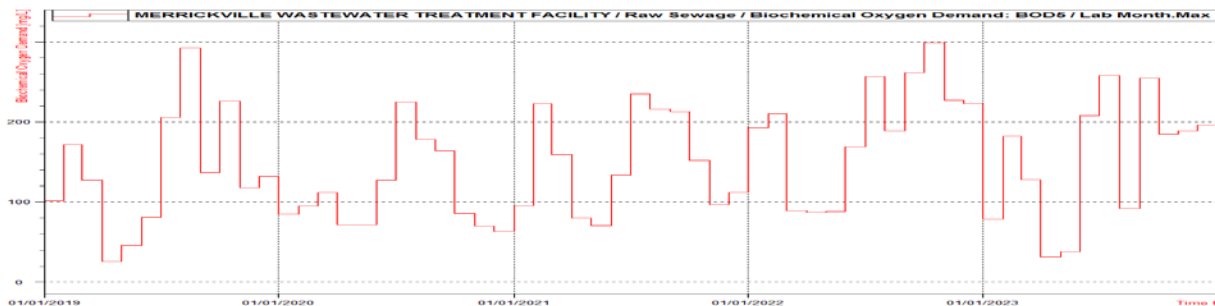
Current year minimum, maximum and averages are available in Appendix A – Performance Assessment Report.

### 5.1 Influent Quality

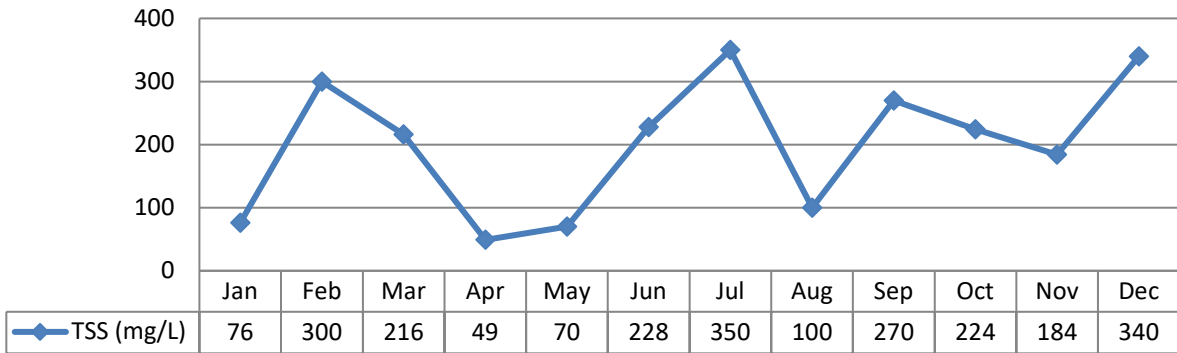
#### 5.1.1 BOD5 (mg/L)



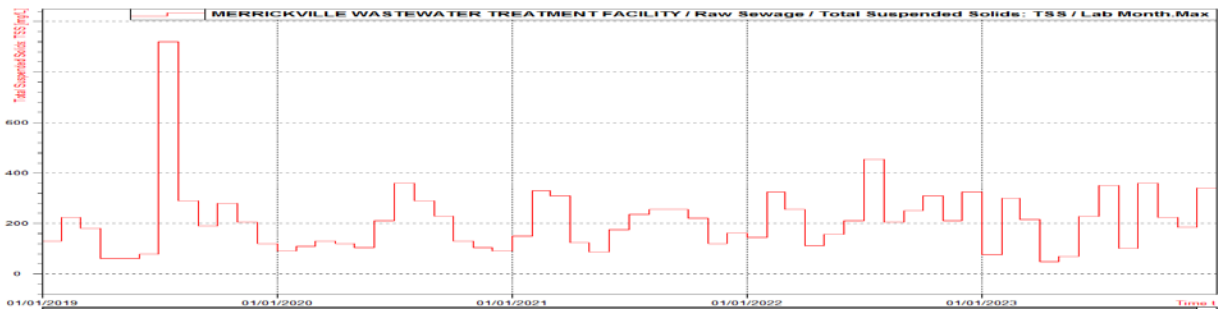
#### 5.1.2 5-year BOD5 (mg/L)



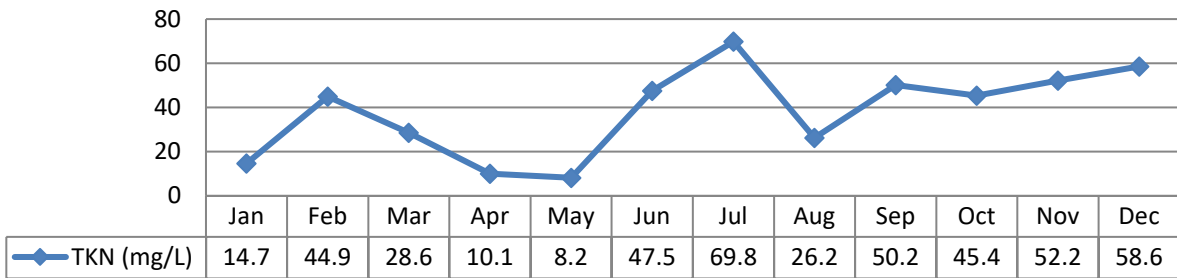
5.1.3 Total Suspended Solids (mg/L)



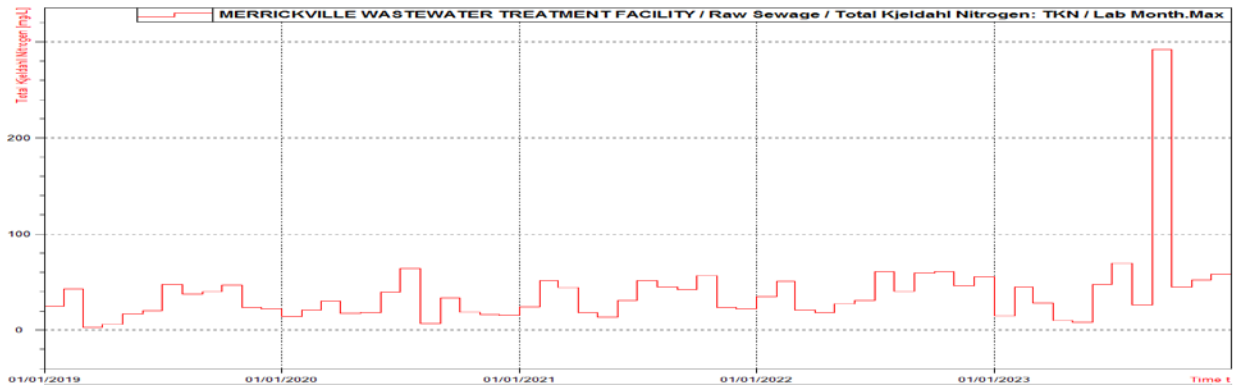
5.1.4 5-year Total Suspended Solids (mg/L)



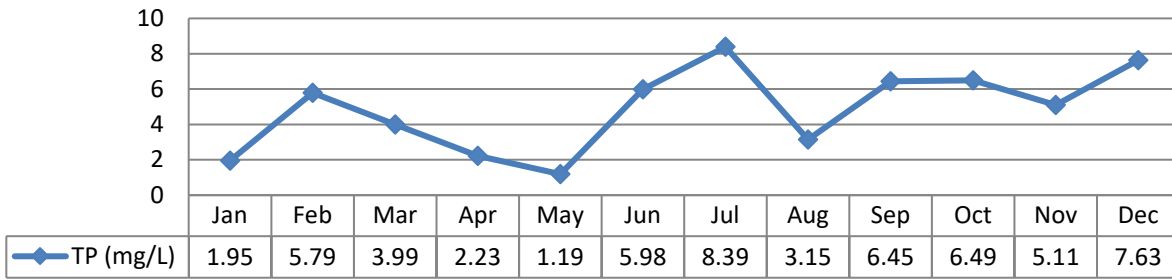
5.1.5 Total Kjeldahl Nitrogen (mg/L)



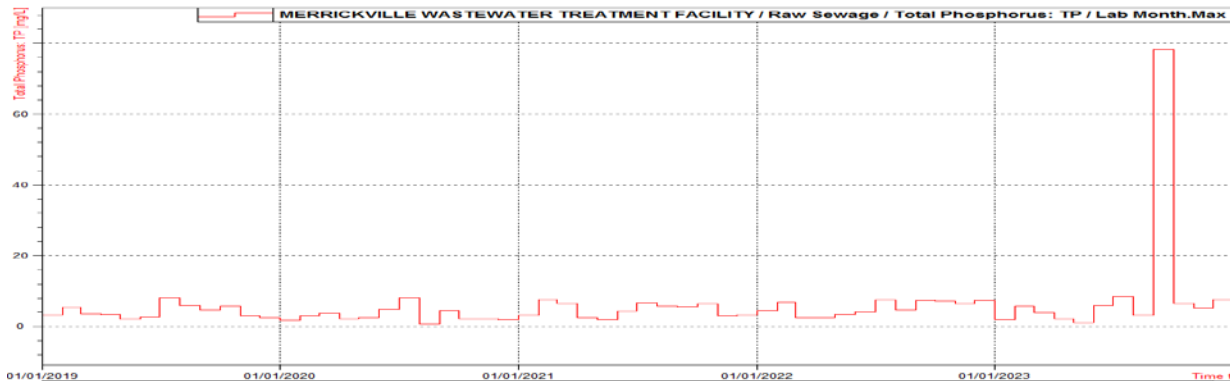
5.1.6 5-year Total Kjeldahl Nitrogen (mg/L)



5.1.7 Total Phosphorus (mg/L)



5.1.8 5-year Total Phosphorus (mg/L)



5.2 Imported Waste Quality

No septage sampling requirements, as per the ECA.

6 **Effluent Quality**

The monthly average concentrations of carbonaceous biochemical oxygen demand (CBOD5), total suspended solids (TSS), and total ammonia nitrogen (TAN) remained below the effluent objectives and limits outlined in the facility’s Certificate of Approval during 2023. The monthly average concentration for total phosphorus remained below the effluent limits outlined in the facility’s Certificate of Approval during 2023. The geometric mean density of E. coli in the effluent also remained below the ECA limit and objective in 2023. In addition the effluent pH remained within the limits and objectives throughout the year.

Effluent results from the WWTP for 2023 are tabulated below. Additional data can be found in the Performance Assessment Reports attached in Appendix A.

6.1 Effluent Quality Assurance and Control Measures Taken

This system is part of OCWA’s Seaway Valley Cluster. The cluster is supported by the Eastern Regional Hub, and corporate resources. Operational Services are delivered by OCWA staff that live and work in the community. The systems are operated to meet compliance with applicable regulations. The system has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents and are updated as required. These documents are also part of OCWA’s Quality & Environmental Management System.

The process is reviewed and maintained by certified operators. These operators complete in-house rounds and testing to monitor the process. All sampling and analysis follow approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet legislated sampling requirements are submitted to Caduceon Kingston for analysis, with the exception of pH and temperature. Caduceon Kingston 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. The pH and temperature parameters are analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained.

OCWA uses several computer systems which include:

- Process Data Management (PDM)
  - This database program consolidates all operational data from a variety of sources including field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.
- Maximo – OCWA's Work Management System (WMS)
  - This program is used to track and schedule maintenance activities for all equipment in the system. It is also used to assign tasks for specific operational tasks.
- Wonderware (OUTPOST5)/SCADA
  - Wide-area SCADA system allows for process optimization and data logging, process trending, remote alarming.

The operations team also has access to a network of operational compliance and process specialists to assist for emerging process issues. This aids in establishing additional control measures to ensure a quality effluent product.

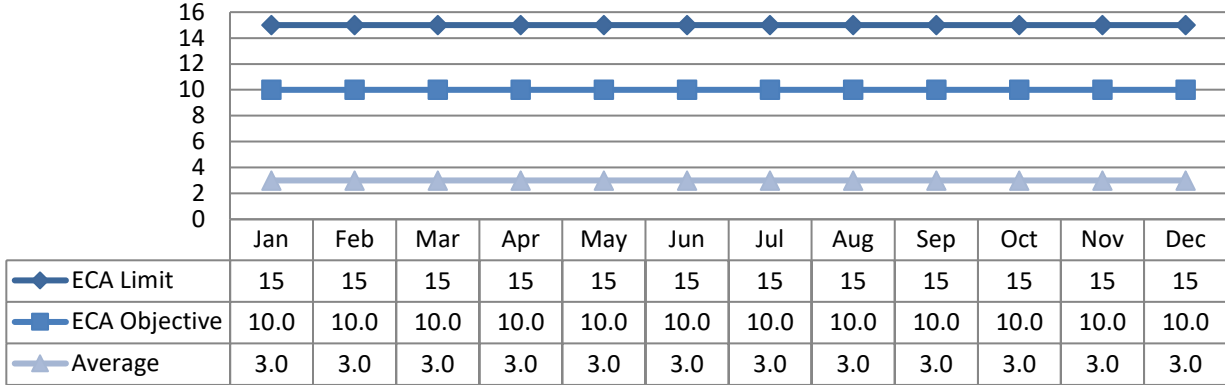
Detailed individual sample results for both raw sewage and final effluent can be requested from the operating authority.



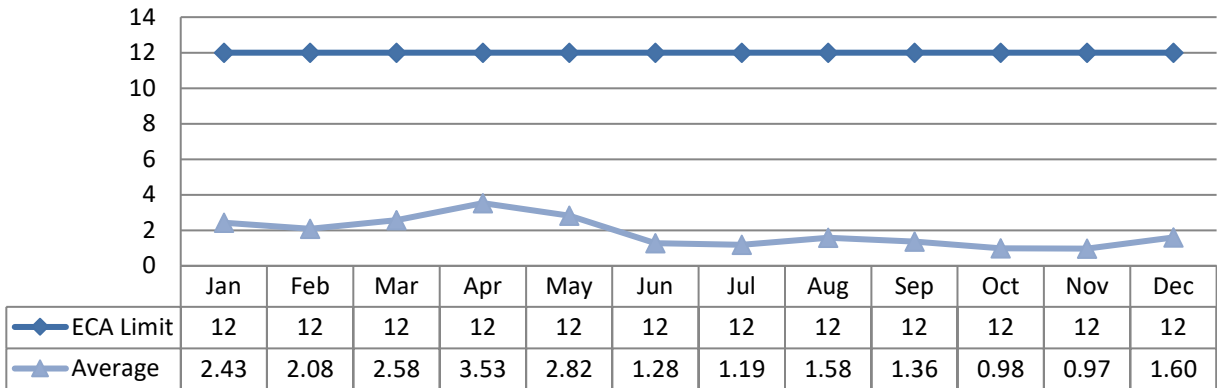
## 6.2 CBOD5 (mg/L)

Compliance Limit and Objective for this parameter was met in 2023.

### 6.2.1 Concentration (mg/L)



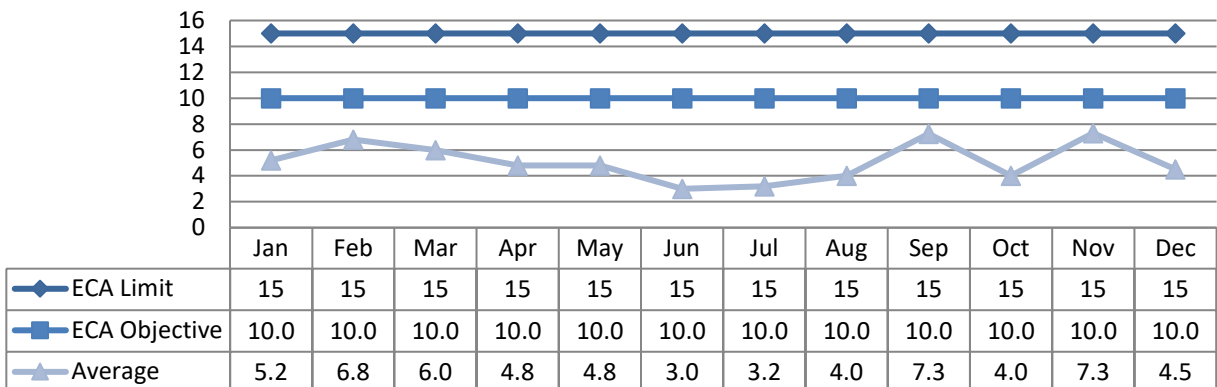
### 6.2.2 Loading (kg/d)



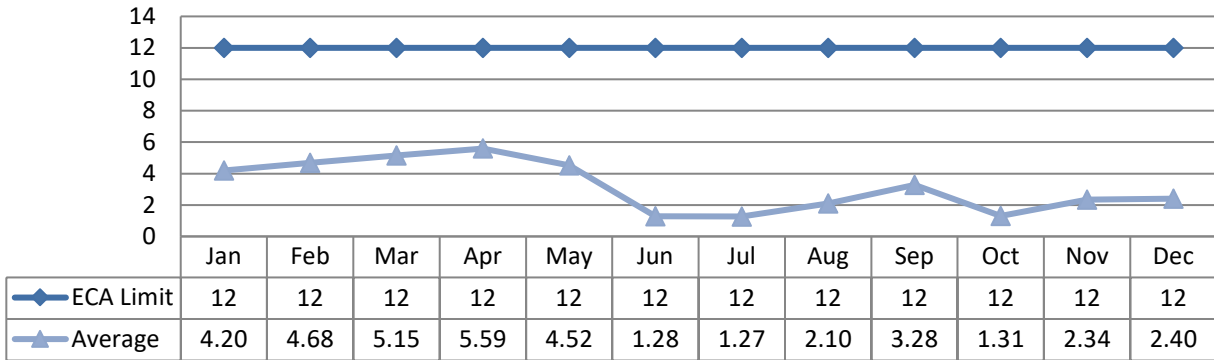
## 6.3 Total Suspended Solids (mg/L)

Compliance Limit and Objective for this parameter was met in 2023.

### 6.3.1 Concentration (mg/L)



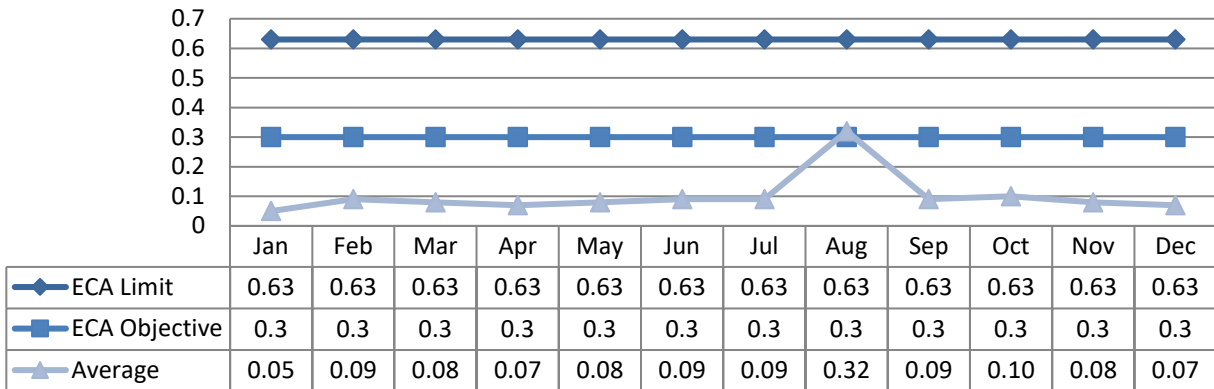
6.3.2 Loading (kg/d)



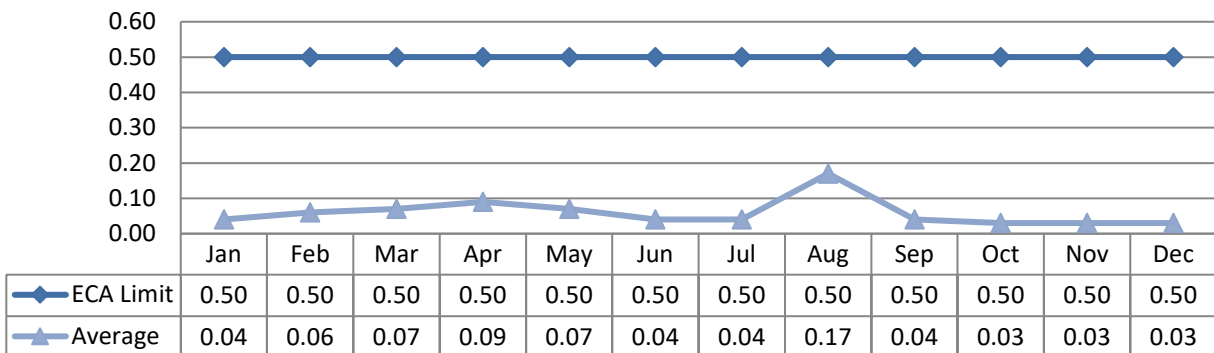
6.4 Total Phosphorus (mg/L)

Compliance Limit for this parameter was met in 2023. Objective exceedance in August detailed in Operational Issues section.

6.4.1 Concentration (mg/L)



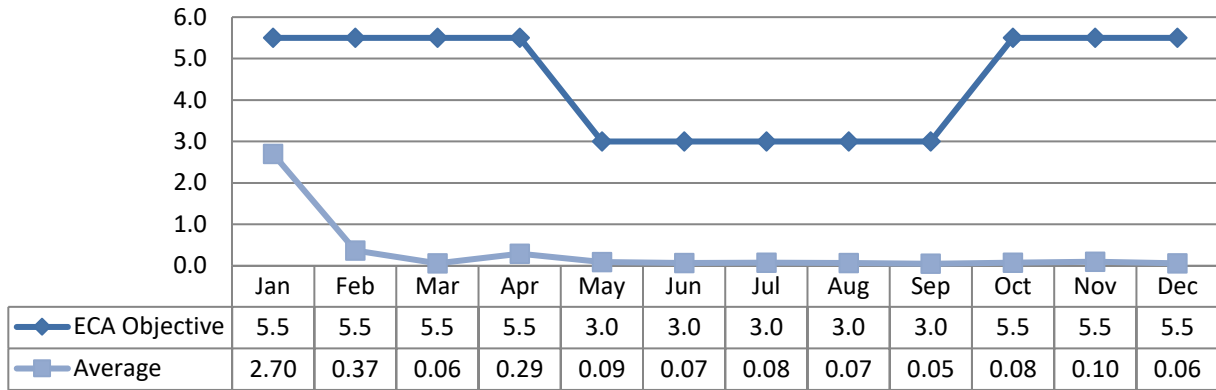
6.4.2 Loading (kg/d)



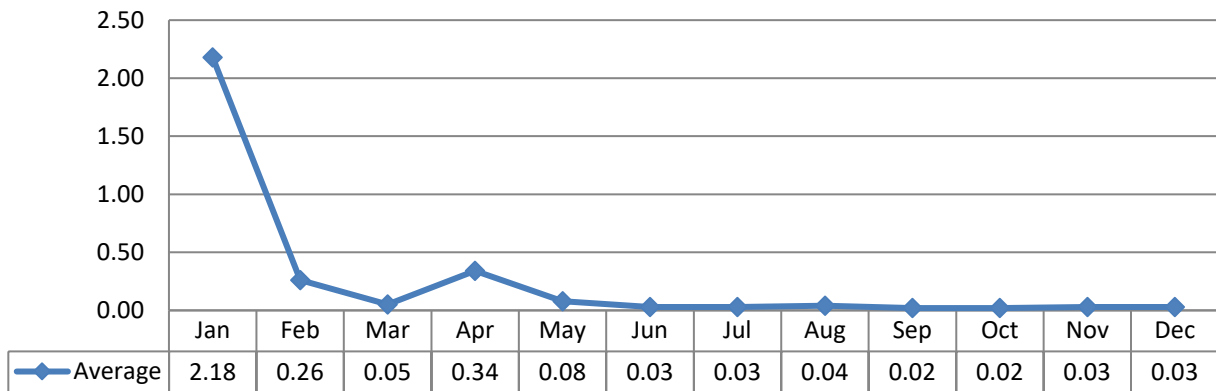
## 6.5 Total Ammonia Nitrogen (mg/L)

Compliance Objective for this parameter was met in 2023.

### 6.5.1 Concentration (mg/L)



### 6.5.2 Loading (kg/d)



## 6.6 Acute Lethality

There were two (2) samples collected in 2023 and tested for acute lethality (Rainbow Trout and Daphnia Magna). This sampling is required both provincially and federally. Results are displayed as % mortality. An adverse result is a > 50% mortality rate.

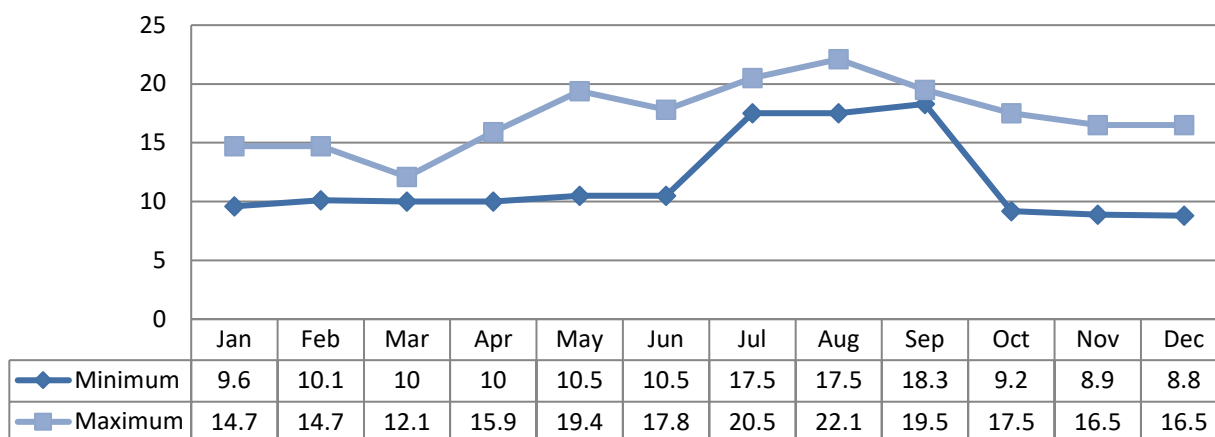
The compliance limit for this parameter was met in 2023.

Date	Rainbow Trout	Daphnia Magna
April 4 <sup>th</sup> , 2023	0%	0%
October 3 <sup>rd</sup> , 2023	0%	0%



## 6.9 Temperature

There are no compliance limits or objectives defined for Effluent.



## 7 Operating Issues/Problems

There are no other operating issues/problems outside the objective exceedance mentioned below.

### 7.1 Effluent Quality Non-Compliance Summary

Date	Exceedance of	Objective	Value	Corrective Action
August 2023	Total Phosphorus	0.30 mg/L	0.32 mg/L	Increased loading on SBR 1 due to SBR 2 being out of service. Wasting and chemical feed rates increased on both trains.
October 2023	Missed Acute Lethality Summer sample	N/A	N/A	Collected sample October 3 <sup>rd</sup> , 2023, also February 6 <sup>th</sup> , 2024, as per the MECP inspection. Back to winter/summer sampling

### 7.2 Summary of Abnormal Sewage Discharge Events

Abnormal Discharge Events include Bypass', Overflows, Diversions and Spills of Sewage. Summary Details are included in Appendix B.

### 7.3 Spills (Other than Sewage)

Date	Location	Details	Volume (m3)	Start Date and Time	End Date and Time
No spills (other than sewage) in 2023.					

## 8 Maintenance

Routine planned maintenance activities are scheduled in WMS and include:

- Inspect, adjust and calibrate process control equipment to ensure proper operation of water

distribution systems, pumps, chemical feeders, and all other equipment installed at the facilities.

- Carry out a routine maintenance program including greasing and oiling as specified in the lubrication schedule.
- Perform day-to-day maintenance duties to equipment including checking machinery and electrical equipment when required.
- Maintain an equipment inventory
- Maintain accurate records of work conducted, activities, and achievements.

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a schedule as determined based on manufacturer's recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the designated WMS Primary. Work orders are completed and electronically entered into WMS by the person responsible for completing the task.

Unplanned maintenance is conducted as required.

### 8.1 Normal Maintenance and Repairs

Work Order	Details
3705358	UV circuit board replaced
3522274	Walkway concrete repairs
3479988	Blower #2 analysis, new blower and rebuild kit purchased
3246084	SCADA memory fail, repaired
3204984	Rebuild septage grinder pump #2, adapter plate purchased
3204982	Rebuild Jet Motive SAM pump #1
3204997	Replace floats in Wet Well
3204994	SAM Tank #2 inspection and cleaning
3204843	New DO probe tank #2
3204842	New DO probe tank #1
3202810	ISAM pump replaced
3201634	Plant security camera installation

### 8.2 Emergency Maintenance and Repairs

Work Order	Details
3245610	Tank #1 effluent valve and actuator replaced

### 8.3 Flow Meter Calibrations and Maintenance

Location	Date of Calibration	Additional Maintenance
FIT-701 Sludge	May 17 <sup>th</sup> , 2023	None.
FIT-402 Final Effluent	May 17 <sup>th</sup> , 2023	None.
FIT-501 Septage/Supernatant	May 17 <sup>th</sup> , 2023	None.
FIT-305 Raw Sewage	May 17 <sup>th</sup> , 2023	None.

## 8.4 Authorized Alterations in Collection System

Work Order	Details	Significant Drinking Water Threat (Y/N)
No alterations made in collection system in 2023.		

## 8.5 Notice of Modifications

Date	Process	Modification	Status
No modifications made in 2023.			

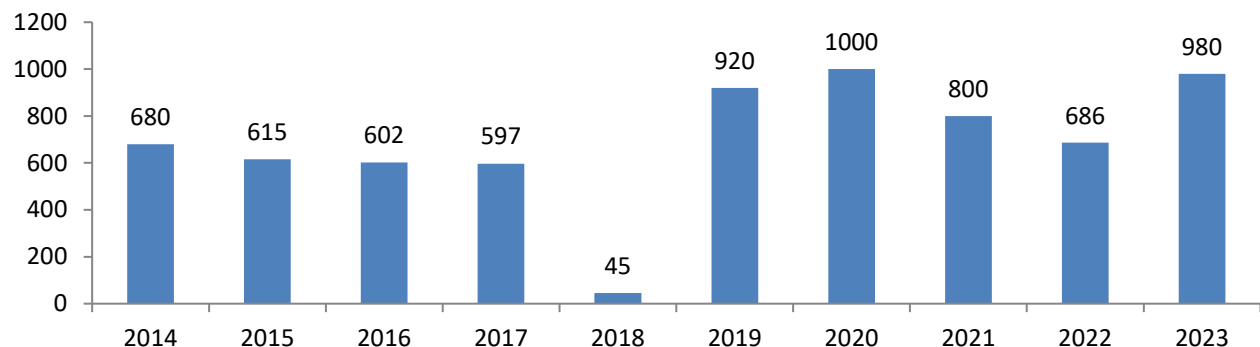
# 9 Sludge Generation

## 9.1 Sludge Disposal Summary

Date	Disposal Location	Approval Number	Total Volume (m3)
May 15-17, 2023	Sunol Farms – Turner Farm	CofA # 6069-5BXNTB	480
November 6-7, 2023	Sunol Farms – Turner Farm	CofA # 6069-5BXNTB	500

In 2023, a total of 980 m<sup>3</sup> of liquid bio-solids was hauled offsite by GFL and utilized as soil conditioner. It was spread in May (NASM Submission ID #24589) and November (NASM Submission ID #24589). It is anticipated that approximately the same volume of sludge will be generated in 2024.

## 9.2 Annual Comparison (m<sup>3</sup>/year)



It is anticipated that sludge volumes will remain similar to the 2023 volumes. Note in 2018, there was limited hauling due to wet weather.

# 10 Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
There were no complaints received in 2023.			





**2023 -MERRICKVILLE STP EFFLUENT SAMPLING MONTHLY AVERAGES**

MONTH	DATE	COD (mg/L)	TSS (mg/L)	TP (mg/L)	NH <sub>3</sub> (mg/L)	E. Coll (CFU/100ml)
January	January 3 2023	< 3	8	0.06	0.16	0
	January 9 2023	< 3	5	0.08	2.43	31
	January 16 2023	< 3	6	0.05	5.64	1
	January 23 2023	< 3	4	0.03	3.5	0
	January 30 2023	< 3	< 3	0.04	1.78	640
	Monthly Average	3.0	5.2	0.05	2.70	0
	Compliant?	YES	YES	YES	YES	YES
February	February 6 2023	< 3	6	0.11	0.09	1
	February 13 2023	< 3	6	0.09	0.01	4
	February 21 2023	< 3	8	0.12	< 0.05	91
	February 27 2023	< 3	7	0.04	1.34	57
	Monthly Average	3.0	6.8	0.09	0.37	12
	Compliant?	YES	YES	YES	YES	YES
	March	March 6 2023	< 3	8	0.14	0.05
March 13 2023		< 3	4	< 0.1	0.07	0
March 20 2023		< 3	7	0.05	< 0.05	0
March 27 2023		< 3	5	0.03	0.05	0
Monthly Average		3.0	6.0	0.08	0.06	0
Compliant?		YES	YES	YES	YES	YES
April		April 3 2023	< 3	4	0.06	< 0.05
	04/11/2023	< 3	< 3	0.07	0.99	8
	04/11/2023	< 3	< 3	0.07	0.99	31
	04/17/2023	< 3	4	0.08	< 0.05	110
	04/17/2023	< 3	4	0.08	< 0.05	260
	04/24/2023	< 3	8	0.08	< 0.05	590
	Monthly Average	3.0	4.8	0.07	0.29	77
Compliant?	YES	YES	YES	YES	YES	
May	05/01/2023	< 3	< 3	0.09	0.06	7
	05/01/2023	< 3	< 3	0.09	0.06	7
	05/08/2023	< 3	9	0.07	< 0.05	1
	05/08/2023	< 3	9	0.07	< 0.05	0
	05/15/2023	< 3	4	0.09	0.11	2
	05/23/2023	< 3	5	0.09	0.05	1
	05/29/23	< 3	< 3	0.05	0.17	0
Monthly Average	3.0	4.8	0.08	0.09	0	
Compliant?	YES	YES	YES	YES	YES	
June	06/05/2023	< 3	< 3	0.04	0.13	0
	06/12/2023	< 3	< 3	0.12	0.05	0
	06/19/2023	< 3	< 3	0.11	< 0.05	0
	06/26/2023	< 3	3	0.08	0.06	1
	Monthly Average	3.0	3.0	0.09	0.07	0
	Compliant?	YES	YES	YES	YES	YES
	July	July 4 2023	< 3	3	0.03	0.05
July 10 2023		< 3	3	0.04	0.08	0
July 17 2023		< 3	3	0.04	< 0.05	0
July 24 2023		< 3	3	0.2	0.18	0
July 31 2023		< 3	4	0.15	< 0.05	9
Monthly Average		3.0	3.2	0.09	0.08	0
Compliant?		YES	YES	YES	YES	YES
August	August 8 2023	< 3	3	1.08	0.13	3
	August 8 2023	< 3	3	1.08	0.13	4
	August 14 2023	< 3	< 3	0.08	0.05	0
	August 21 2023	< 3	4	0.05	< 0.05	56
	August 21 2023	< 3	4	0.05	< 0.05	3
	August 28 2023	< 3	6	0.06	< 0.05	1
	Monthly Average	3.0	4.0	0.32	0.07	1
Compliant?	YES	YES	YES	YES	YES	
September	September 5 2023	< 3	6	0.06	0.06	0
	September 11 2023	< 3	< 3	0.13	< 0.05	136
	September 18 2023	< 3	13	0.05	< 0.05	0
	September 25 2023	< 3	7	0.1	< 0.05	4
	Monthly Average	3.0	7.25	0.09	0.05	0
	Compliant?	YES	YES	YES	YES	YES
	October	October 3 2023	< 3	< 3	0.08	< 0.05
October 10 2023		< 3	6	0.22	< 0.05	3
October 16 2023		< 3	4	0.02	0.09	0
October 23 2023		< 3	3	0.09	0.11	0
October 30 2023		< 3	3	0.09	0.11	0
Monthly Average		3	4.0	0.10	0.08	0
Compliant?		YES	YES	YES	YES	YES
November	November 6 2023	< 3	7	0.08	0.18	0
	November 15 2023	< 3	14	0.13	< 0.05	112
	November 20 2023	< 3	3	0.04	< 0.05	760
	November 27 2023	< 3	5	0.08	0.1	0
	Monthly Average	3.0	7.3	0.08	0.10	0
	Compliant?	YES	YES	YES	YES	YES
	December	December 4 2023	< 3	6	0.08	0.05
December 11 2023		< 3	5	0.08	0.05	1
December 18 2023		< 3	3	0.07	0.05	0
December 27 2023		< 3	4	0.03	0.08	1
December 27 2023		< 3	4	0.03	0.08	1
Monthly Average		3.0	4.5	0.07	0.06	0
Compliant?		YES	YES	YES	YES	YES

# Appendix B

## Appendix B - Details of Abnormal Sewage Discharge Events

### Facility Bypass/Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There were no facility bypass' or overflows to report in 2023.								

### Collection Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
April 5 <sup>th</sup> , 2023	320 Main St. SPS	Heavy rainfall causing hydraulic overload of the collection system, causing it to overflow.	360	16:30	02:30	10	Rideau River	Stabilized chlorinating pucks

### Spills of Sewage

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There were no spills of sewage in 2023.								

### Collection System Monitoring Data

Event Date	Event Location	Volume (m3)	Parameter	mg/L	Source Loading (kg/d)	Any Adverse Impacts & Corrective Actions
April 5 <sup>th</sup> , 2023	320 Main St. SPS	360	BOD5	15	3.78	None.
			BOD5	6		
			Total Phosphorus	0.61	0.14	
			Total Phosphorus	0.18		
			Total Suspended Solids	34	7.56	
			Total Suspended Solids	8		
			E. coli	166,000	N/A	
E. coli	24,000	N/A				



# Appendix D

## Appendix D - ECA Annual Report Requirements

<b>Facility ECA # 1121-7YRQLF Section 10(6)</b>	<b>Section in Report</b>
(a) A summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the Works ;	Treatment Flows, Raw Sewage and Effluent Quality
(b) A description of any operating problems encountered and corrective actions taken;	Operating Issues/Problems
(c) A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works ;	Maintenance
(d) A summary of any effluent quality assurance or control measures undertaken in the reporting period;	Effluent Quality
(e) A summary of the calibration and maintenance carried out on all effluent monitoring equipment; and	Maintenance
(f) A description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6.	Effluent Quality
(g) A tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;	Sludge Generation
(h) A summary of any complaints received during the reporting period and any steps taken to address the complaints;	Summary of Complaints
(i) A summary of all By-pass , spill or abnormal discharge events; and	Operating Issues/Problems and Appendix B
(j) Any other information the District Manager requires from time to time.	N/A

<b>Collection ECA #264-W601 1.0 Schedule E</b>	
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.	Operating Issues and Problems
4.6.4 Includes a summary of any operating problems encountered and corrective actions taken.	Operating Issues and Problems
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.	Maintenance
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.	Summary of Complaints

<p><b>Collection ECA #264-W601 1.0</b> <b>Schedule E</b></p>	
<p>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.</p>	<p>Maintenance</p>
<p>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.</p>	<p>Operating Issues and Problems Appendix B</p>
<p>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.</p>	<p>Maintenance Operating Issues and Problems</p>