Stevensville-Douglastown Lagoon Annual Performance Report – Treatment and Collection Reporting Year: 2023

Niagara Region

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SD-T-1 Wastewater Treatment Process Description

The Stevensville-Douglastown Lagoon is located at 3274 Netherby Road in the City of Niagara Falls but provides wastewater treatment to the portions of the Town of Fort Erie known as Stevensville, Black Creek and Douglastown. The Stevensville-Douglastown Lagoon is a Class I facultative lagoon treatment facility and has a rated capacity of 2,289 m3/d. Final effluent discharges to the Niagara River.

The Stevensville-Douglastown Lagoon operates under the following MECP approvals:

Environmental Compliance Approval (Sewage): 2588-7JTL5C, Issued October 2, 2008
Environmental Compliance Approval (Air): 6183-7ZNSYH, Issued January 15, 2010

The Stevensville-Douglastown Lagoon uses the following processes to treat wastewater:

- Facultative Lagoon Process
- Aeration
- Phosphorus Removal
- Treated Effluent Pumping

Facultative Lagoons:

These lagoons slow down the movement of the wastewater causing suspended solids to settle into a thick sludge layer at the bottom. Anaerobic bacteria in this layer consume and breakdown the solids. Algae in the upper layer of water in the lagoon consume the dissolved materials in the wastewater.

Aeration: Lagoon one (1) is divided in half with a floating baffle curtain. The first half is equipped with fine bubble diffusers which provide aeration to the incoming raw influent wastewater. Aeration of the wastewater encourages microorganisms (or “bugs”) to remove dissolved and suspended organics and nutrients from the incoming wastewater.

Phosphorus Removal: A coagulant, ferric chloride, is added to the treatment process to aid in phosphorus and suspended solids removal.

Treated Effluent Pumping: Effluent from is pumped from the lagoons and is discharged to the Niagara River.

SD-T-2 Review of Lagoon Flows and Lagoon Influent Sampling and Monitoring

Review of 2023 Lagoon Flows

Table SD-T-1 below outlines the volume of sewage treated at the Stevensville-Douglastown Lagoon during the reporting year.

Table SD-T-1: Table of Stevensville-Douglastown Lagoon 2023 Treated Sewage Flows

Flow Statistic	Value
Design Average Daily Flow (ML/d)	2.289
Total Volume Wastewater Treated (ML)	539.910
Average Daily Flow (ML/d)	1.479
% Increase/Decrease over prior year	-1%
% Annual Average Daily Flow Utilization	65%

Reviewing the treated flows in 2023, it was observed that, on average, the lagoons utilize 65% of its design Average Daily Flow. This indicates that the facility has the hydraulic capacity to meet the needs of the collection system with room for additional flows that may be added from development. Should the average daily flow become greater than 80% of the Design Flow, facility expansion should be considered.

Daily flows to the lagoon were reviewed. In 2023, there were 37 instances where the flow to the lagoon was greater than the design Average Daily Flow, amounting to approximately 10% of the year. These instances occurred during times of wet weather or heavy snow melt suggesting increased flows are occurring due to Inflow and Infiltration.

It was noted that average daily flows decreased 1% in 2023 from 2022. A review of the monthly average daily flow rate for the prior 10 year period was completed. This can be observed below in Figure SD-T-1 below. It was observed that the average daily flow rate has been consistent since 2021. Spikes are observed during typical wet weather seasons further support increased flows are occurring due to Inflow and Infiltration.

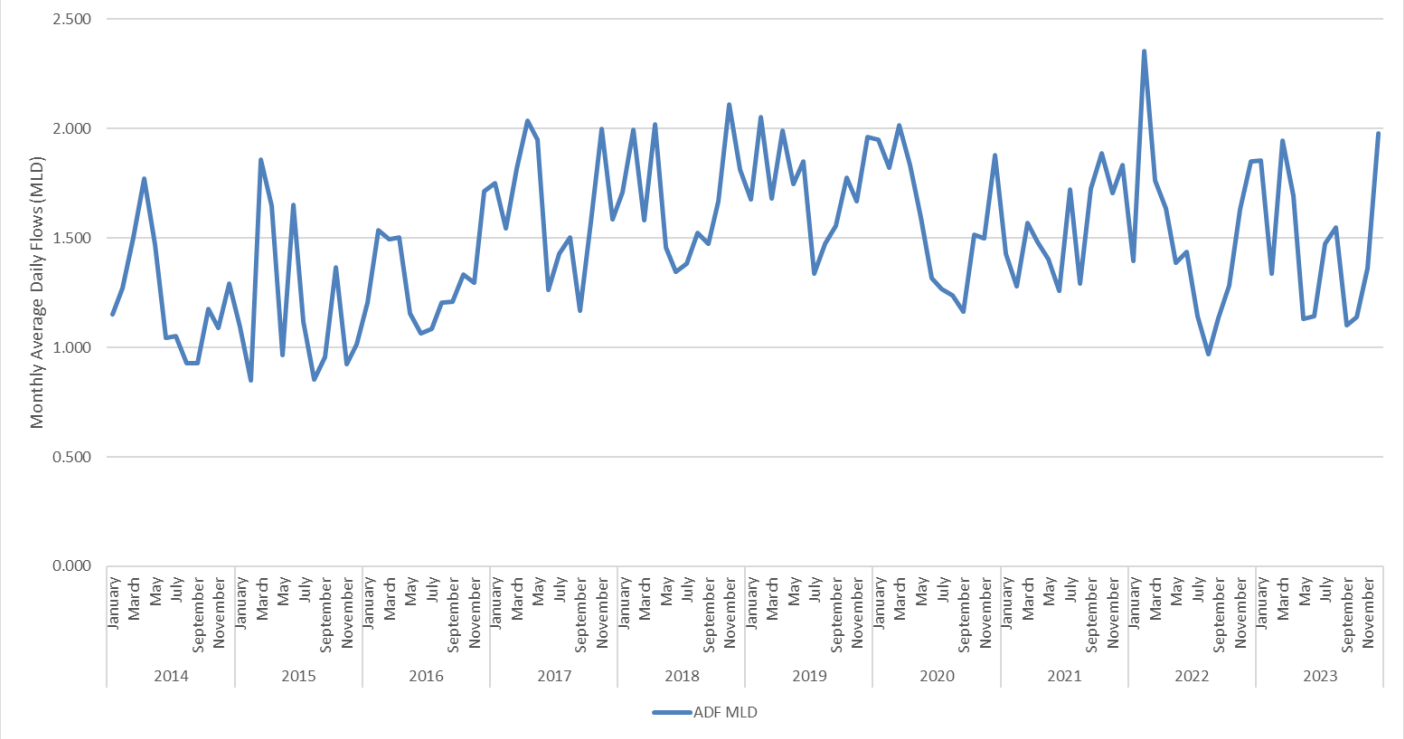

Figure SD-T-1: Graph displaying the Monthly Average Daily Flow Rate in MLD

Review of Influent Sampling and Monitoring Activities

In 2023, 104 samples of influent were collected and tested. An annual summary of influent sampling can be observed in Table SD-T-3.

Although the volume of sewage is an important consideration for the effective operation of a wastewater treatment facility, another important factor to monitor is plant loading. Lagoon loading displays if the strength of the sewage received at the lagoon is getting stronger or weaker. Stronger sewage may impact the amount of sewage the lagoon can treat effectively.

Lagoon loading is calculated by measuring the average strength of a pollutant per liter of influent sewage and multiplying it by the average volume of sewage received. This is generally displayed as kilograms of pollutant per day or kg/d. Below in Figure SD-T-2, is a graph depicting four (4) commonly monitored pollutant loadings to the lagoon for the period of 2021-2023.

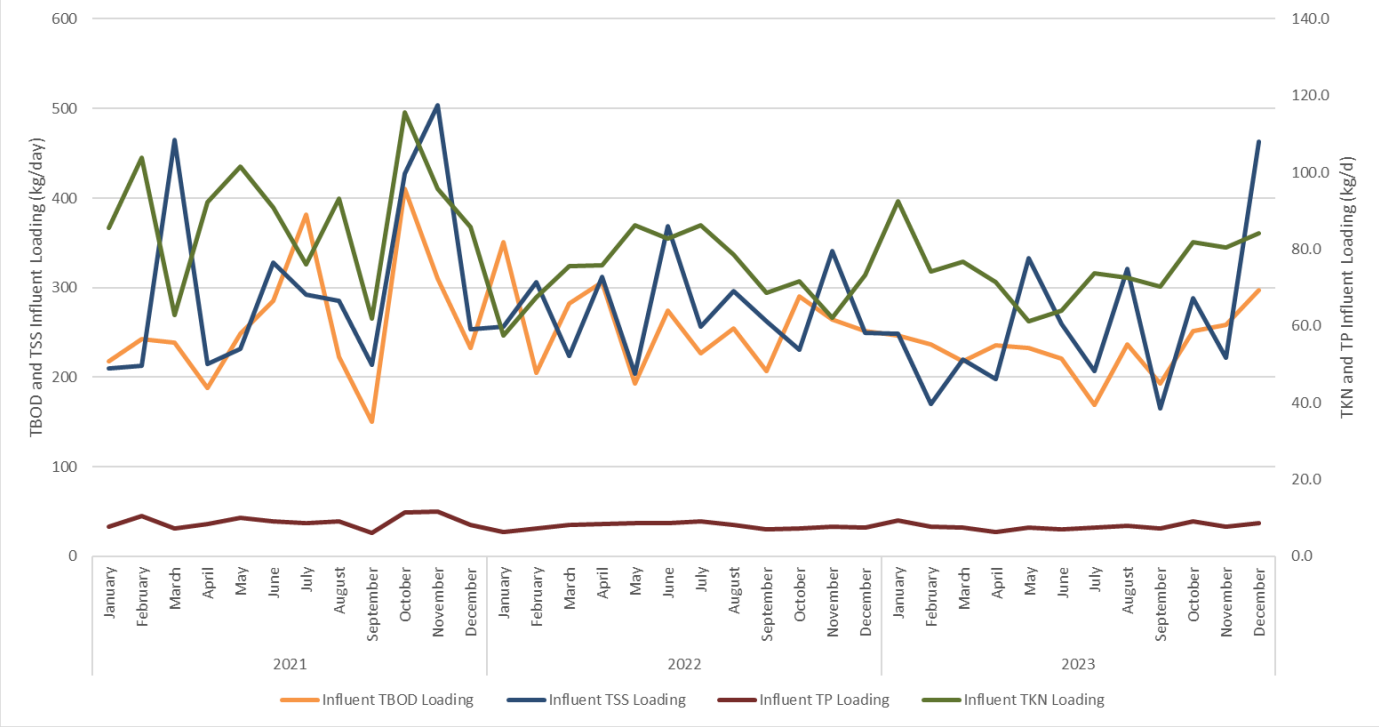

Figure SD-T-2: Figure of monthly lagoon loadings to the Stevensville-Douglastown Lagoon for Biochemical Oxygen Demand (TBOD), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (TP), in kg/d, for the period 2021 to 2023.

Reviewing the calculated loadings for TBOD, TSS, TKN and TP for the past 3 years the trending is consistent. An increase was observed in December 2023 and trends will be continued to be monitored to identify any persistent trends.

Review of Final Effluent Sampling and Monitoring Activities

In 2023, 82 samples of final effluent were collected and tested. Individual as well as monthly average results are reviewed and compared to the objective and compliance limits stated in the facility ECA. Table SD-T-2 below summarizes the number of monthly objective and compliance limit exceedances at the Stevensville-Douglastown Lagoon in the reporting year.

Table SD-T-2: Evaluation of Final Effluent sample results to ECA objectives and compliance limits

Parameter	ECA Concentration Objective	ECA Daily Concentration Limit	ECA Concentration Annual Average Limit	Number of Objective Concentration Exceedances	Number of Daily Limit Concentration Exceedances	Observed Annual Average (mg/L)	Annual Loading Limit (kg/d)	Observed Annual Loading (kg/d)
pH [1]	6.5-9.0	6.0-9.5	-	0	0	-	-	-
Carbonaceous Biochemical Oxygen Demand (CBOD)	15 mg/L	40.0 mg/L	25 mg/L	0	0	5.6	57.0	8.3
Total Suspended Solids (TSS)	15 mg/L	-	25 mg/L	4	-	12.8	57.0	19.0
Total Phosphorus (TP)	0.75 mg/L	-	1.0 mg/L	4	-	0.50	2.3	0.74
Total Ammonia (NH3) May 01 - October 31	-	10.0 mg/L	7.0 mg/L	-	33	16.04	16.0	20.2
Total Ammonia (NH3) Jan 01-Apr 30, Nov 01-Dec 31	-	15.0 mg/L	10.0 mg/L	-	12	14.41	23.0	24.5

[1]pH must meet objectives/limits at all times (inclusive)

The annual concentration and loading limit for Total Ammonia was exceeded in 2023 for the periods of January 01 to April 30, May 01 to October 31, and November 01 to December 31. Over the course of 2023, 45 daily limit exceedances for Total Ammonia occurred. The non-compliances for Total Ammonia can be attributed to capital project work carried out on the lagoon cell 2 in 2023. More information can be found below in section SD-T-3 Operational Issues Encountered below.

Stevensville-Douglastown Lagoon had four monthly objective exceedances for Total Suspended Solids (TSS) and Total Phosphorus. During these periods, operations staff were reducing the liquid level in lagoon cell 1 to support completion of the sludge cleanout that was anticipated to occur from this cell in 2023 and solids carryover into the lagoon effluent was occurring. This work has been postponed until 2024 due to inability to complete sludge removal prior to the end of land application season.

A review of individual results against ECA objectives were also complete. Below summarizes the percentage of individual samples that were over the ECA objective:

- CBOD – 1%
- TSS – 28%
- TP – 29%

Final Effluent sample results did not exceed the ECA objective greater than 50% of the time.

The capital project taking place will ensure the lagoon continues to produce a high-quality effluent in the future. An annual summary of monthly average final effluent sample results can be observed in Table SD-T-3 below.

Effluent Quality Assurance Measurements and Control Measures

To ensure Stevensville-Douglastown Lagoon continues to produce a high quality effluent the following measures have been implemented:

- Development and implementation of a Wastewater Quality Management System (WWQMS) program
    - This program promotes an environment of continuous improvement for all staff impacting the quality of wastewater
- Compliance samples are analyzed by an ISO 17025:2017 accredited laboratory unless sample results are required to be collected in the field at the time of sampling
- Standard Operating Procedures (SOPs) are in place to support proper sampling and field measurements
- A compliance sampling schedule is created each year to ensure regulatory requirements are being met, as a minimum

- Equipment used in the monitoring and measurement of Final Effluent quality are calibrated annually

Deviations from Scheduled Monitoring Program

Compliance sampling activities at the Stevensville-Douglastown Lagoon follow a scheduled monitoring program to ensure all provincial and federal requirements are met. A schedule is prepared for the upcoming year and is submitted to the MECP as part of the annual reporting requirement.

In 2023, there were 17 deviations from the scheduled sampling days. These deviations occurred when there was no effluent flow from the lagoon.

The 2024 sampling schedule is available upon request.

Table SD-T-3: Annual Summary of Lagoon Flows, Influent and Effluent Sampling and Monitoring Results

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Total Samples Collected
Influent - Monthly Average TSS (mg/L)	134	127	113	117	295	227	140	207	150	253	163	234	180	
Number of Influent TSS Samples	9	8	9	8	9	9	9	9	8	9	9	8		104
Influent - Monthly Average TBOD5 (mg/L)	133	177	112	139	206	193	115	153	175	221	190	150	164	
Number of Influent TBOD5 Samples	9	8	9	8	9	9	9	9	8	9	9	8		104
Influent - Monthly Average TP (mg/L)	5.0	5.8	3.8	3.8	6.6	6.1	5.1	5.1	6.6	8.0	5.7	4.4	5.5	
Number of Influent TP Samples	9	8	9	8	9	9	9	9	8	9	9	8		104
Influent - Monthly Average TKN (mg/L)	49.9	55.4	39.4	42.1	54.1	55.9	50.0	46.9	63.7	71.8	59.1	42.6	52.6	
Number of Influent TKN Samples	9	8	9	8	9	9	9	9	8	9	9	8		104
Total Lagoon Influent Flows (ML)	57.486	37.468	60.362	50.838	35.039	34.336	45.716	48.008	33.064	35.333	40.883	61.377	539.910	
Daily Average (MLD)	1.854	1.338	1.947	1.695	1.130	1.145	1.475	1.549	1.102	1.140	1.363	1.980	1.479	
Final Effluent - Monthly Average TSS (mg/L)	5.4	8.4	18.1	12.5	3.6	8.0	18.7	23.3	39.4	7.5	4.6	4.6	12.8	
Final Effluent - Average Daily TSS Loading (kg/d)	10.0	11.2	35.2	21.2	4.1	9.2	27.6	36.1	43.4	8.5	6.3	9.1	19.0	
Number of Final Effluent TSS Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average CBOD5 (mg/L)	4.3	6.5	7.1	7.3	4.0	4.0	6.3	6.8	9.2	4.0	4.2	4.0	5.6	
Final Effluent - Average Daily CBOD5 Loading (kg/d)	8.0	8.7	13.8	12.4	4.5	4.6	9.3	10.5	10.1	4.6	5.7	7.9	8.3	
Number of Final Effluent CBOD5 Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average TP (mg/L)	0.14	0.21	0.25	0.20	0.11	1.19	1.18	1.10	1.20	0.21	0.11	0.10	0.50	
Final Effluent - Average Daily TP Loading (kg/d)	0.26	0.28	0.49	0.34	0.12	1.36	1.74	1.70	1.32	0.24	0.15	0.20	0.74	
Number of Final Effluent TP Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average NH3 (mg/L): Jan 01 - Apr 30, Nov 01-Dec 31	12.52	13.26	11.34	9.39							21.14	18.79	14.41	
Final Effluent - Average Daily NH3 Loading (kg/d): Jan 01 - Apr 30, Nov 01-Dec 31	23.2	17.7	22.1	15.9							28.8	37.2	24.5	
Final Effluent - Monthly Average NH3 (mg/L): May 01 - Oct 31					13.73	23.30	16.47	11.40	12.38	18.95			16.04	
Final Effluent - Average Daily NH3 Loading (kg/d): May 01 - Oct 31					15.5	26.7	24.3	17.7	13.6	21.6			20.2	
Number of Final Effluent NH3 Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average TKN (mg/L)	14.02	15.73	12.93	12.21	14.53	24.75	18.86	13.12	13.90	18.95	17.56	18.03	16.22	
Number of Final Effluent TKN Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average NO3 (mg/L)	0.47	0.29	0.42	0.40	0.34	0.20	0.47	0.36	0.60	0.20	0.20	0.21	0.35	
Number of Final Effluent NO3 Samples	9	8	9	8	8	2	9	9	5	2	5	8		82
Final Effluent - Monthly Average Temperature (°C)	7.2	6.6	7.2	12.7	16.2	19.5	24.3	22.0	20.9	14.1	7.8	6.4	13.7	
Number of Final Effluent Temperature Samples	9	8	9	8	8	2	9	9	5	2	5	8		82

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Total Samples Collected
Final Effluent - Monthly Average pH	7.6	7.6	7.8	7.8	7.6	7.8	7.9	8.0	7.7	7.4	7.6	7.5	7.7	
Number of Final Effluent pH Samples	9	8	9	8	8	2	9	9	5	2	5	8		82

SD-T-3 Description of Operating Problems Encountered and Corrective Actions Taken

Lagoon cell 2 was removed from service in the summer of 2022 for cleaning and maintenance activities as part of a capital upgrade project. Lagoon cell 2 remained out of service in 2023 as temporary aeration equipment and baffle curtain installation was occurring to support the second phase of the lagoon maintenance project which includes sludge removal and berm rehabilitation of cell 1.

With lagoon cell 2 remaining out of service, the treatment capacity of the Stevensville-Douglastown lagoon system was reduced. This reduction in treatment efficiency resulted in Total Ammonia levels greater than the compliance limits for this facility. In an effort to reduce total ammonia concentrations in the lagoon effluent discharge, operational staff took the following corrective actions.

- Running all aeration blowers to provide as much dissolved oxygen as possible
- Increase the liquid level (retention time) of the lagoon system by reducing or stopping effluent discharge from the lagoon while still maintaining safe working levels in the lagoon cell. There was no effluent discharged from the lagoon during the following periods:
    - May 29 to June 22
    - September 20 to October 25
    - November 7 to November 20
- Installation of a recirculation pump in December 2022 to increase the treatment/retention time of the lagoon system.

Operational issues related to the maintenance project also impacted total suspended solids and total phosphorus removal in March, June, July, August and September. The increased effluent solids has been attributed to operations staff reducing the liquid level in lagoon cell 1 to support sludge removal from this cell during 2023. This work has been postponed until 2024 due to inability to complete sludge removal prior to the end of land application season.

The higher concentration of total phosphorus in the final effluent was likely related to solids carryover and the increased TSS discussed above. Coagulant dosing was increased in the spring to increase the phosphorus removal in the lagoon.

Temporary aeration equipment and baffle curtain have been installed in lagoon cell 2 in 2023 and was returned to service in January 2024. Both cells will be in service for a short period until contents from lagoon cell 1 are transferred to cell 2 in preparation for sludge removal from cell 1 during land application season in 2024.

SD-T-4 Summary of Major Maintenance Activities and Capital Works

Summary of Maintenance Carried out on Major Equipment

Niagara Region works to keep wastewater infrastructure in a state of good repair. Maintenance activities completed include regular preventative maintenance (PM) activities and normal and emergency equipment repair or replacement. Where a substantial amount of upgrade is required, this work is carried out under the capital works program.

No normal or emergency repairs were required on major equipment in 2023 above and beyond preventative maintenance (PM) activities. PMs are completed and tracked in a computerized maintenance management system. PMs completed during the reporting year are available upon request.

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Stevensville-Douglastown Lagoon:

- A maintenance project to cleanout and rehabilitate the lagoon cells was initiated in November 2021. The project includes removing the accumulated sediment, rehabilitation of the lagoon banks, aeration and ferric system upgrades. In 2022, Cell 2 was isolated, dried and trucking of biosolids was complete. In 2023, phase 2 of the project to cleanout the biosolids from Cell 1 was initiated in June. Due to challenges with installing a temporary aeration system in Cell 2 and the narrow timeline to drain cell 1 and land apply biosolids before the winter months, the project tasks were deferred to July 2024.

Summary and Update of Notice of Modifications Completed

Through the facility ECA, the MECP has given System Owners the ability to complete low risk changes to a treatment facility without requiring approval from the MECP. These modifications are documented on a Notice of Modification form and are signed off by the Owner or delegate of the system. Any pre-authorized modifications must be reported on annually to the MECP.

During the reporting year 2023, no Notices of Modification were completed.

No Notice of Modification forms were completed in previous reporting years. No status update is required.

Proposed Works – Status Update

There were no Proposed Works to be reported on for the 2023 reporting period.

SD-T-5 Summary Calibration Activities

Flow Meter Calibration – Influent, and Effluent

Flow meters measuring flows discharging to the environment are calibrated at minimum, once per calendar year. Below in Table SD-T-4 provides a summary of flow meter calibration.

Table SD-T-4: Summary of Flow Meter Calibration

Meter Name	Date Calibrated	Comments
Influent Meter – Stevensville SPS	2023-04-14	Passed
Influent Meter – Douglastown SPS	2023-04-14	Passed
Influent Meter – Black Creek	2023-04-14	Passed
Influent Meter – Stevensville SPS	2023-11-16	Passed
Influent Meter – Douglastown SPS	2023-11-08	Passed
Influent Meter – Black Creek	2023-11-08	Passed

Calibration certificates are available upon request.

Effluent Monitoring Equipment Calibration/Verification

It is a requirement to calibrate, or, where unable to calibrate, verify equipment that is used to measure effluent quality.

Some effluent monitoring equipment calibration or verification is completed daily or as used by operations staff such as pH meter calibration or verification of the Total Residual Chlorine colorimeter.

Once annually, a third-party contractor performs calibration or verification on all effluent monitoring equipment. A summary of third-party calibration/verification activities are available in Table SD-T-5 below.

Table SD-T-5: Summary of Calibration/Verification of Effluent Monitoring Equipment

Equipment Description	Date Calibrated	Comments
pH Meter - Thermostar	2023-08-09	Passed

Calibration certificates are available upon request.

SD-T-6 Solids Handling

Processed Organics Received

No processed organics were received at the Stevensville-Douglastown Lagoon during the reporting period. Stevensville-Douglastown does not typically receive processed organics.

Volumes of Sludge Generated and Removed From Site

In the facultative lagoon process, solids removed during the treatment process accumulate at the bottom of the lagoons as a sludge layer and removed when required.

No sludge was removed from site in 2023. Cell 1 sludge will be removed as part of the capital project in 2024.

Sludge Quality Monitoring

No sludge quality monitoring was completed in 2023.

SD-T-7 Complaints

No complaints were received regarding the operations of the Stevensville-Douglastown Lagoon in 2023.

SD-T-8 Bypasses, Overflows, Other Situations Outside Normal Operating, Spills and Abnormal Discharge Events

Bypasses and Overflows

The Stevensville-Douglastown Lagoon is not equipped with bypass or overflow structures. The lagoon system does not bypass or overflow to the environment.

Situations Outside of Normal Operating Conditions

The MECP defines “Normal Operating Conditions” as when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity.

The lagoon was operating with a single lagoon cell in service in 2023 as installation of temporary aeration equipment and baffle curtain was installed in cell 2 in preparation of cell 1 maintenance to occur in 2024. Additional samples were collected to monitor system performance.

Spills

Niagara Region strives to maintain and operate wastewater infrastructure so spills to the environment do not occur. However, circumstances may arise and a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a planned spill may required in order to safely complete required maintenance to critical equipment. In the event that this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery. Spills are investigated and written reports are submitted to the MECP and Environment and Climate Change Canada as required by legislation. Below in Table SD-T-6 summarizes spills that occurred at the Stevensville-Douglastown Lagoons in 2023.

Table SD-T-6: Summary of spills occurring at the Stevensville-Douglastown Lagoons during the reporting year

Spill Date	MECP Incident Number	Description of Spill
No spills occurred during 2023.		

Abnormal Discharges

An abnormal discharge is a discharge to the environment that is abnormal in quality or quantity. There were no abnormal discharges from the Stevensville-Douglastown Lagoons during this reporting year.

SD-T-9 Summary of Efforts to Achieve Conformance with F-5-1 and/or F-5-5

Summary of Efforts – Procedure F-5-1 – Secondary Treatment Equivalent

Procedure F-5-1 states wastewater treatment facilities are to provide treatment of wastewater to a minimum of secondary treatment equivalence. This means the lagoon should be designed to meet objectives of 15 mg/L for CBOD and TSS and 1 mg/L for TP.

As demonstrated above in section SD-T-1 and Table SD-T-3, Stevensville-Douglastown generally achieved effluent quality that met or exceeded design objectives for CBOD, TSS and TP. The annual averages for these parameters for 2023 were at or below F-5-1 objectives.

Summary of Efforts – Procedure F-5-1 – Sewage Bypass/Overflow from Nominally Separated System

Procedure F-5-1 states that bypasses and overflows from nominally separated systems are not allowed except in emergency situations. Emergency situations include protection from basement flooding, preventing damage to lagoon equipment or pumping stations or to prevent treatment process washout.

There were no bypasses or overflows from the Stevensville-Douglastown Lagoon in 2023. The lagoon system provides a buffer against wet weather and mitigates the need for a lagoon bypass or overflow.

Industrial Waste

Industrial waste can contain material that can have negative impacts on collection system infrastructure as well as the wastewater treatment process itself. Upsets to the treatment process can cause a plant to become non-compliant with ECA objectives and limits. To protect our infrastructure, the Niagara Region has a Sewer Use By-law in place. Environmental Enforcement Officers conduct industry inspections, sampling and monitoring of industrial discharges on a routine basis to ensure that they meet the Sewer Use By-law limits.

Summary of Efforts – Procedure F-5-5

The MECP Procedure F-5-5 applies to combined sewage systems. The Stevensville-Douglastown wastewater collection system is considered nominally separated. This procedure does not apply.

SD-C-1 Overview of the Stevensville-Douglastown Lagoon Collection System

The Stevensville-Douglastown Lagoon collection system is a class III system that collects wastewater from domestic, commercial and some industrial sources from the municipality of Fort Erie. The collection system consists of the following:

- Local sanitary sewers
- 1.2 kilometres of regional gravity mains
- 8.0 kilometres of regional force mains
- Two (2) pumping stations
    - Douglastown Sewage Pumping Station
    - Stevensville Sewage Pumping Station
- There is one (1) Sanitary Sewage Outfalls (SSO) located at one sewage pumping station within the collection system.

Figure SD-C- 1: Map of Stevensville-Douglastown Lagoon Collection System

The collection system is operated under a two-tier system, where the Town of Fort Erie owns and operates local gravity sanitary sewers and Niagara Region owns and operates sewage pumping stations, forcemains and larger gravity sanitary sewers or trunk sewers. It is classified as a nominally separated system meaning that storm water is collected separately from sanitary sewage but the system may still be impacted by inflow and infiltration from sources such as roof leaders, foundation drains, leaky pipes and joints and maintenance holes.

The collection system operates under the following Consolidated Linear Infrastructure ECA:

- Stevensville-Douglastown Wastewater Collection System, 007-W602, issue number 1

Annual reporting has been prepared to meet the requirements of this approval.

SD-C-2 Summary and Interpretation of Collection System Monitoring Data

Monitoring of Pump Station Operations

Pump stations operate through automatic control and are monitored continuously using Supervisory Control and Data Acquisition (SCADA). Stations alarms are programmed to alert the operations staff at the Anger Avenue (Fort Erie) WWTP 24 hours a day of potential issues including but not limited to high wet well levels, pump faults, communication failures and standby generator status. Operators will respond to station alarms as required to ensure proper station operation.

Station operation is trended in SCADA. SCADA trends are reviewed daily by operations staff to evaluate station performance. Operators will look at pump cycle times, station discharge flow and pump duty rotation to identify potential issues. Where potential issues are identified, work orders are generated for follow up by maintenance staff.

In addition to SCADA monitoring, monthly station inspections are completed by operations staff. This includes inspection of the station and testing of standby generator equipment.

Sanitary Sewer Closed-Circuit Television Inspection Program

Niagara Region owns and maintains 145 kilometers of trunk sanitary gravity sewers, 161 kilometers of sanitary forcemains, and 2,093 sanitary access chambers across 11 municipalities. Approximately 85% of its conventional trunk sanitary gravity system is inspected using closed-circuit television (CCTV) once every three years. The remaining 15% is large diameter trunk sewers, which are inspected once every 10 to 15 years due to the necessity for specialized equipment to access and inspect sewers that have continuous high flow levels.

Table SD-C- 1 details the total length of sewers inspected over the past four years.

Table SD-C- 1- CCTV Program Summary

Measurement in Kilometers (km)	2020	2021[2]	2022	2023
Inspection Length (km)	37.9	18.5	59.3	33.0

Observations from the inspections are recorded for structural and operational deficiencies of the pipes. Operational deficiencies (blockage from grease, roots, debris) are addressed through the cleaning/flushing program. Structural deficiencies (broken, fractured, surface damage, holes) as well as Inflow and Infiltration are forwarded for consideration in the asset management plan and capital upgrade program.

Flow Monitoring

Niagara Region monitors sewer flows at 158 locations. Flow monitoring information is used for municipal Pollution Prevention and Control Plans (PPCPs), Master Servicing Plans (MSPs) including the 2021 Water and Wastewater MSP, Inflow and Infiltration studies, billing, development planning, and capital project design.

SD-C-3 Summary of Operating Issues Encountered and Corrective Actions Taken

Pump Stations and Forcemains

During the 2023 reporting year, operating issues were encountered at the Stevensville SPS. The discharge piping from one of the two sewage pumps at the station has cracked. When that pump is in operation, some of the pumped sewage is leaking from the crack back into the wet well. To ensure the station continues pumping the rated capacity, the pump with the cracked discharge piping has been set to run as the standby pump. Repairs to the discharge piping are planned for 2024.

Gravity Trunk Sewers

No operational issues were experienced at the gravity trunk sewers in 2023.

[2] 2021 marked the end of one inspection contract and the start of a new contract. Delays in the procurement process due to competing priorities resulted in a gap in inspection contracts. As a result, the length of sewers inspected in 2021 was less than in prior years.

SD-C-4 Summary of Major Maintenance, Capital Projects and Pre-Authorized Alterations

Summary of Maintenance Carried out on Major Equipment

Niagara Region works to keep wastewater infrastructure in a state of good repair. Maintenance activities completed include regular preventative maintenance (PM) activities and normal and emergency equipment repair or replacement. Where a substantial amount of upgrade is required, this work is carried out under the capital works program.

Below is a summary of normal and emergency repairs carried out on major equipment in the Stevensville-Douglastown Collection System:

- No major maintenance was completed in the collection system in 2023.

This list does not include PM activities. PMs are completed and tracked in a computerized maintenance management system. PM completed during the reporting year are available upon request.

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Stevensville-Douglastown Collection System:

There are no planned capital upgrades forecasted for the Stevensville-Douglastown Collection System at this time.

Summary of Pre-Authorized Alterations Undertaken

Through collection system ECAs, MECP has given System Owners the ability to complete low risk changes to a sewage pumping station, forcemain or gravity main without requiring further approval from the MECP. These modifications are documented on an applicable MECP form and signed off by the Owner or delegate of the system. Any pre-authorized modifications must be reported on annually to the MECP.

During the reporting year 2023, no pre-authorized modifications were completed.

No pre-authorized works were completed and therefore, there were no alterations that would pose a significant threat to drinking water.

SD-C-5 Summary of Calibration Activities

No calibration activities were completed in the collection system in 2023.

SD-C-6 Summary of Complaints

No complaints were received in 2023 regarding the operation of the Stevensville-Douglastown collection system.

SD-C-7 Summary of Collection System Overflows and Spills

Collection System Overflows

Although the Stevensville-Douglastown lagoon collection system is nominally separated, collection system overflows may occur during wet weather events due to inflow and infiltration of storm water into the sewage collection system. Overflows are necessary to prevent basement flooding and to protect downstream infrastructure and wastewater treatment processes.

In 2023, there were no collection system overflows from the Stevensville-Douglastown Lagoon system.

More information on sewage overflows and inflow and infiltration, is available on the Region's website (www.niagararegion.ca/living/sewage/cso).

Collection System Spills

Niagara Region strives to maintain and operate wastewater infrastructure so spills to the environment do not occur. However, circumstances arise where a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a planned spill may be required to safely complete required maintenance to critical equipment. If this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery. Spills are investigated and written reports are submitted to the MECP and Environment and Climate Change Canada as required by legislation. No spills occurred in the Stevensville-Douglastown collection system in 2023.

SD-C-8 Summary of Efforts to Reduce Lagoon Bypasses/Overflows and Collection System Overflows

Projects Undertaken to Reduce Bypasses or Overflows

The Stevensville-Douglastown Lagoon experiences high flow conditions that require overflows to occur due to inflow and infiltration in the collection system to prevent emergency situations. Being a two-tier system, Niagara Region works closely with the Town of Fort Erie to reduce overflows at the wastewater treatment plant.

There were no bypasses or overflows from the lagoon or Niagara Region collection system infrastructure in 2023.

Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects. In 2023, Niagara Region had an approved budget totaling $4.0M for the overflow reduction cost sharing program. Three (3) projects were approved for cost sharing in the Town of Fort Erie with Niagara Region contributing $228,800 to support overflow reduction.

Public Reporting of Bypasses and Overflows

Niagara Region reports all bypass and overflow events publicly on the Niagara Region website (https://www.niagararegion.ca/living/sewage/CSO/Reporting/CSOLocations.aspx)

Niagara Region updates the data on recent overflows four times a year and displays any overflows that may have occurred in the past 12 months.

A listing of overflow data back to 2008 is available through the Niagara Open Data website (https://niagaraopendata.ca/dataset/combined-sewage-overflow)

An active project is underway to improve public reporting of bypasses and overflows including making the data available in near real time.