
HALDIMAND COUNTY

Report ENV-04-2021 Annual Wastewater Quality Report

For Consideration by Council in Committee on October 5, 2021



OBJECTIVE:

To provide an annual summary of wastewater treatment performance, key achievements and planned activities.

RECOMMENDATIONS:

1. THAT Report ENV-04-2021 Annual Wastewater Quality Report be received as information.

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Reviewed by: Brandon Hedges, Manager, Environmental Operations

Respectfully submitted: Philip Mete, P. Eng., General Manager of Public Works Operations

Approved: Craig Manley, MCIP, RPP, Chief Administrative Officer

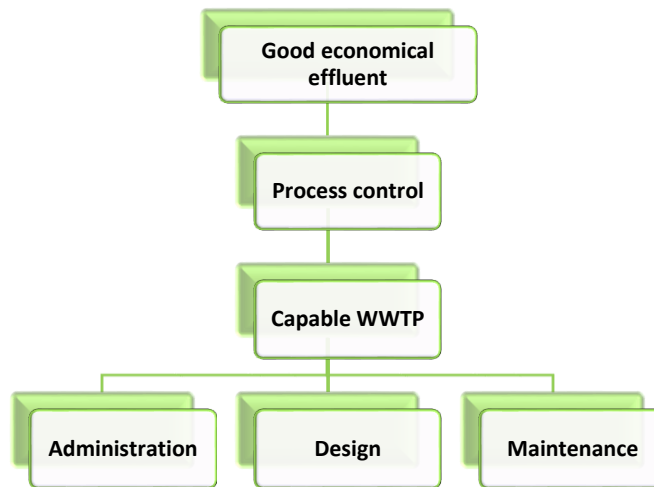
EXECUTIVE SUMMARY:

Haldimand County owns eight wastewater treatment facilities, which includes four mechanical plants and four lagoon systems. Facility performance and key activities, including proposed activities for 2021, are summarized within this report. Since 2008, the County has successfully incorporated the Composite Correction Program approach with respect to the operation, maintenance and capital program upgrades related to its wastewater treatment facilities which facilitates meeting performance targets and efficient operations.

BACKGROUND:

For the past ten years, Haldimand County's wastewater treatment operations staff has participated in an optimization program. The foundation of the program is based on the Composite Correction Program, established by the United States Environmental Protection Agency (US EPA) in the 1970's. The focus of the program is to achieve good, economical effluent that meets or exceeds compliance limits. An economical effluent is achieved through the efficient and effective use of power, chemicals, staff time and existing plant infrastructure. Since the goal is environmental protection, good is placed ahead of economical as the focus.

In the following flow chart, administration, design, and maintenance practices are the foundation necessary to establish a plant that is capable of achieving performance goals. By applying process control activities at a capable wastewater treatment facility, plant operators can consistently meet performance targets. The requirements of the treatment process, determined by process control and testing, help establish priorities for the facility.



Haldimand County's wastewater treatment infrastructure consists of four facultative lagoon systems, four mechanical plants and twenty pump stations. These facilities are currently operated by Veolia Water Canada, under contract to Haldimand County. Haldimand County staff are responsible for the operation and maintenance of the sanitary collection systems.

Haldimand County Wastewater Treatment Plants (WWTP)

Mechanical Plant	Type of Plant	Design Flow	Average Flow 2020
Caledonia	Stacked conventional activated sludge plant with tertiary filtration, aerobic digestion, chlorine disinfection and de-chlorination.	7,200 m ³ /d	3,114 m ³ /d
Cayuga	Oxidation ditch, aerobic sludge digestion and storage and ultraviolet disinfection.	1,200 m ³ /d	826 m ³ /d
Dunnville	Extended aeration plant with on-site aerobic sludge treatment and storage. Effluent is chlorinated and de-chlorinated. The plant is also equipped with hauled sewage pre-treatment and storage facilities for holding and septic tanks, portable toilet wastes, and landfill leachate.	7,728 m ³ /d	4,561 m ³ /d
Hagersville	Extended aeration plant with on-site aerobic sludge treatment and storage. The plant is also equipped with tertiary filtration (two units) and ultraviolet disinfection (two units). Facility also includes a leachate receiving station.	4,200 m ³ /d	1,789 m ³ /d

Haldimand County Lagoon Systems

Lagoon System	Description	Design Flow (m ³ /d)	Average Flow 2020 (m ³ /d)	Discharge Period	Effluent Discharge
Jarvis	4-cell lagoon system	853	992	Spring: 21 - 30 days starting March 15 Fall: 21 - 30 days starting November 1	Sandusk Creek
Townsend	4-cell lagoon system (3 cells for wastewater treatment, 1 cell for biosolids storage).	2,095	262	Spring: 50% free of ice cover for 14 – 45 days Fall: starting on October 15, continuing for at least 14 days and ending on November 30	Nanticoke Creek
Oswego	2-cell lagoon system	85	62	Specific daily flow rate for March, April, May, November and December	Oswego Creek
LEIP (Lake Erie Industrial Park)	3-cell lagoon system	657	588	Spring and Fall: discharge when conditions allow	Centre Creek

The Jarvis Lagoons average daily flow exceeded the design flow. The flow exceedance did not result in storage or performance issues at the lagoons. The County has initiated a project to acquire additional wastewater treatment capacity at the Jarvis Lagoons by pumping wastewater to the Townsend Lagoons.

The LEIP Lagoons average daily flow did not exceed the design flow in 2020, however approximately 90% of the design capacity was utilized. Council recently approved recommendations within report ECW-08-2021 which included a budget revision to provide consulting services to support the filing of an addendum to extend the validity of the LEIP Wastewater Treatment Plant Municipal Class Environmental Assessment. In addition to this, the development of a Regional Servicing Strategic Plan that will include the LEIP community is planned to be initiated later in 2021 which will look at alternatives for acquiring additional wastewater treatment capacity for this area and for the long term needs of the west side of the County.

ANALYSIS:

Municipal facilities are required to meet performance requirements specified in Environmental Compliance Approvals, which are issued by the Ministry of Environment, Conservation and Parks (MECP). Haldimand County has also committed to achieving voluntary performance targets established through the Grand River Conservation Authority (GRCA) Water Management Plan in 2014 (PW-WW-05-2014 Grand River Watershed Water Management Plan).

The MECP performance objectives are criteria that the plant is designed to meet. These are performance values that operations strive to achieve on a regular basis. While an exceedance of these values is not reportable to the MECP, the County includes this information in the annual report and the limits are outlined in the table below.

The MECP performance limits are set by the ministry based on maximum levels of nutrients or other parameters being sent to the receiving water. Each plant is evaluated based on its specific receiving water impact. There are no defined penalties for exceeding these limits, however an exceedance has to be reported to the MECP and a plan developed to address the non-compliance.

The GRCA voluntary targets are established to improve overall receiving water quality. The Caledonia, Cayuga and Dunnville wastewater treatment facilities discharge to the Grand River. In a partnership with the GRCA, voluntary effluent targets have been established. Failure to meet these targets will not result in penalties or cause significantly harmful impacts on the receiving waters. Haldimand County has been recognized by GRCA for achieving performance targets in 2019 and is expected to be recognized in 2020 for wastewater treatment plant performance, however at the time of this report, the 2020 GRCA Watershed Overview of Wastewater Treatment Plant Performance report was not released.

Facility targets and limits are summarized in the following table.

Facility	Performance Parameter	MECP Compliance Limits	MECP Compliance Objectives	GRCA Voluntary Targets
Caledonia	Phosphorous	0.3	0.15	0.15
	Ammonia May 1 – November 30 December 1 – April 30	1.0 2.0	0.75 1.5	November – April 2.0 May – October 1.0
Cayuga	Phosphorous	0.75	0.50	0.30
	Ammonia October 1 – May 31 June 1 – September 30	4 2	N/A N/A	November – April 2.0 May – October 1.0
Dunnville	Phosphorous	1.0	0.5	0.30
	Ammonia December 1 – April 30 May 1 – November 30	N/A N/A	10 5	November – April 2.0 May – October 1.0
Hagersville	Phosphorous June 1 – November 30 December 1 – April 30	0.15 0.20	0.10 0.14	N/A
	Ammonia May 1 – October 31 November 1 – April 30	2.20 3.60	0.73 2.20	N/A N/A

Haldimand County Wastewater Treatment Plant Performance

In 2020, the statutory compliance limits were achieved at all County' wastewater treatment plants and lagoon systems with the exception of one incident at the Caledonia Wastewater Treatment Plant. During this incident, the effluent chlorine residual was impacted by equipment failure, which resulted in the monthly average chlorine residual being at the compliance limit. The issue was addressed and there have been no issues since the repair. Additional wastewater treatment plant performance is summarized in the following table:

Facility	MECP Compliance Limits	MECP Compliance Objectives	GRCA Voluntary Targets
Caledonia	No exceedances	Effluent total phosphorous exceedance for two months	Effluent total phosphorous exceedance for two months
Cayuga	No exceedances	No exceedances	No exceedances
Dunnville	No exceedances	No exceedances	No exceedances
Hagersville	No exceedances	Effluent cBOD ₅ exceedance for one month Effluent total suspended solids exceedance for two months	Not Applicable

Monthly compliance objectives were exceeded in Caledonia and Hagersville. In Caledonia the exceedances were due to high flows and a possible sampling error. In Hagersville, the exceedances were caused by a chemical overdose and the external lab changing their analysis method. Although the performance objectives were not achieved, no environmental or public health protection was compromised during the months with exceedances.

Ministry of the Environment, Conservation and Parks (MECP) Inspections

Wastewater treatment plant inspections are performed by the MECP. These inspections occur to ensure that the County's wastewater plants are operating as per their assigned Environmental Compliance Approvals (ECAs). The County did not have any MECP Wastewater Inspections in 2020.

Key Achievements in 2020

Below is a list of key activities and projects completed in 2020.

- The Caledonia WWTP received a Silver recognition for demonstrating data integrity and achieving 2019 effluent performance targets for total phosphorous and ammonia.
- Facilitated a performance based workshop on nitrogen removal with Veolia staff.

- Continued receiving water studies in partnership with Hutchinson Environmental at Jarvis and Sandusk Creeks for the Jarvis Lagoons, Nanticoke Creek for the Townsend Lagoons, Centre Creek for the LEIP Lagoons and the Grand River for the Caledonia WWTP.
- Replaced aeration diffusers and piping at the Caledonia WWTP to assist with achieving design capacity.
- Repaired the Dunnville WWTP Outfall Discharge Pipe after an unplanned failure.
- Initiated construction of a sanitary sewer forcemain from Jarvis to Townsend.

Planned Activities for 2021

Below is a list of planned activities, projects and process improvements identified for 2021. The current status of these projects has also been noted. Accomplishing these items will potentially improve performance and allow, in some cases, for increased capacity.

- Insulate Dunnville digester and investigate installing tank cover.
 - Insulation to be installed October 2021.
- Insulate Hagersville digesters and investigate installing tank covers.
 - This project has been deferred until Spring of 2022 to allow for an assessment of the Dunnville digester insulation projects effectiveness.
- Construction of a sewer forcemain from Jarvis to Townsend
 - This project has been completed.
- Award construction of new sewage pump station in Jarvis.
 - Construction has been awarded and contractor is expected to mobilize on site in October 2021.
- Continue wastewater pump station assessments and equipment replacements:
 - Paisley – pumps 1 and 2 rebuild.
 - Pump 1 has been rebuilt and Pump 2 is scheduled to be completed before the end of the year.
 - Nairne – wet well gas monitoring equipment.
 - Monitoring equipment has been ordered and installation will be scheduled once equipment is received.
- RFP for the design / build construction of the Nairne Street forcemain.
 - RFP has closed and award is pending.
- Initiate the assimilative capacity study as part of Municipal Class Environmental Assessment Phase 3 work, for the proposed North Side Caledonia wastewater treatment plant.
 - This Project has been initiated.
- Continue receiving water studies in partnership with Hutchinson Environmental for Sandusk Creek, Nanticoke Creek, Centre Creek and the Grand River to support future discussions with MECP for additional wastewater treatment capacity.
 - Receiving water studies have been ongoing during 2021.
- Facilitate performance based workshops and special studies with Veolia and County staff to promote data based decision making and skills development.

- Various studies have been conducted at County Wastewater Treatment Facilities and workshops are scheduled for November and December.

Haldimand County and its Contract Operator are diligent in ensuring that regulatory requirements are achieved and the wastewater treatment plants are operated to consistently achieve performance targets on a day to day basis.

FINANCIAL/LEGAL IMPLICATIONS:

Not applicable.

STAKEHOLDER IMPACTS:

Not applicable.

REPORT IMPACTS:

Agreement: No

By-law: No

Budget Amendment: No

Policy: No

ATTACHMENTS:

1. None