
HALDIMAND COUNTY

Report ENV-02-2019 Annual Wastewater Quality Report

For Consideration by Council in Committee on October 8, 2019



OBJECTIVE:

To provide a summary of wastewater treatment facilities' performance and key achievements in 2018 and planned activities for 2019.

RECOMMENDATIONS:

1. THAT Report ENV-02-2019 Annual Wastewater Quality Report be received as information.

Prepared by: Stéphanie Nolet, Water and Wastewater Technologist

Reviewed by: Jeff Oakes, 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:

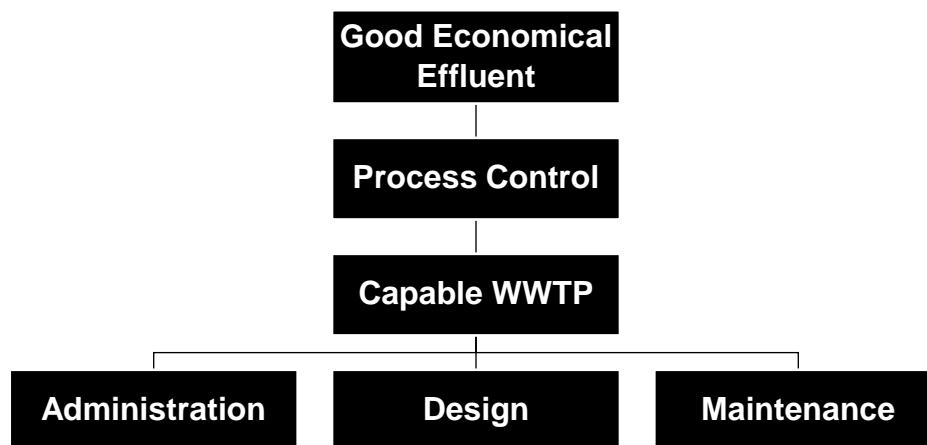
Haldimand County owns eight wastewater treatment facilities including four mechanical plants and four lagoon systems. The 2018 facility performance parameters, along with the results, have been summarized and provided within Report ENV-02-2019, along with some noteworthy action items that were identified as part of the Ministry of the Environment, Conservation and Parks inspection. 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 facilities.

This report contains key information regarding Haldimand County's approach to wastewater optimization and facility performance, as well as some key activities and achievements that occurred during the year, with plans and goals developed for 2019.

BACKGROUND:

For the past ten years, Haldimand County's wastewater treatment operations staff have been participating in an optimization program. The foundation of the program is based on the Composite Correction Program, established by the US EPA in the 1970's. The focus of the program is to obtain a 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 available plant infrastructure.

In the following flow chart, administration, design, and maintenance practices are the foundation necessary to establish a plant that is capable of achieving the desired performance. By applying process control activities on a day-to-day basis, the plant operators take a capable plant to the desired level of performance and in the process maximize the significant capital investments associated with wastewater treatment facilities. The requirements of the treatment process are determined by process control and testing and 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 Wastewater Treatment Plants (WWTP)

Mechanical Plant	Type of Plant	Design Flow	Average Flow 2018
Caledonia	Stacked conventional activated sludge plant with tertiary filtration, aerobic digestion, chlorine disinfection and de-chlorination.	7,200 m ³ /d	3,208 m ³ /d
Cayuga	Oxidation ditch, aerobic sludge digestion and storage and UV disinfection.	1,200 m ³ /d	797 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	4,439 m ³ /d
Hagersville	Extended aeration plant with on-site aerobic sludge treatment and storage. The plant is also equipped with tertiary filtration (2 units) and ultraviolet disinfection (2 units). Facility also includes a leachate receiving station.	4,200 m ³ /d	2,657 m ³ /d

Haldimand County Lagoon Systems

Lagoon System	Description	Design Flow (m ³ /d)	Average Flow 2018 (m ³ /d)	Discharge Period	Effluent Discharge
Jarvis	4-cell lagoon system	853	1,010	Spring: 21 – 30 days starting no earlier than March 15. Fall: 21 – 30 days starting no earlier than November 1.	Sandusk Creek
Townsend	4-cell lagoon system (3 cells for wastewater treatment, 1 cell for biosolids storage).	2,095	276	Spring: 50% free of ice, continuing for at least 14 days and ending no later than May 15. Fall: starting on October 15, continuing for at least 14 days and ending no later than November 30.	Nanticoke Creek
Oswego	2-cell lagoon system	85	70	Specific daily flow rate for March, April, May, November and December.	Oswego Creek
LEIP (Lake Erie Industrial Park)	3-cell lagoon system	657	703	Spring and Fall: discharge when conditions allow.	Centre Creek

Note: The Jarvis Lagoons average daily flow exceeded the design flow. The introduction of enhanced flow control equipment in 2017 has provided more accurate flow information. Using the new flow data, the average daily flow in Jarvis has increased. The flow exceedance did not result in storage or performance issues at the lagoons. The preferred option for obtaining additional wastewater in Jarvis capacity is to construct a sanitary sewer forcemain from the Jarvis lagoons to the Townsend lagoons. Construction is proposed to start in the summer of 2020.

The LEIP Lagoons average daily flow also exceeded the design flow. This may be due to industry production changes. Haldimand County and Stelco are investigating options to increase capacity. The flow exceedance did not result in storage or performance issues at the lagoons.

ANALYSIS:

Municipalities are required to meet effluent quality compliance and objective limits as defined in the Environmental Compliance Approval (ECA) which is issued by the Ministry of Environment, Conservation and Parks (MECP) as per the following table. Haldimand County has also committed to meeting the voluntary targets established through the Grand River Conservation Authority (GRCA)

Water Management Plan in 2014 (PW-WW-05-2014 Grand River Watershed Water Management Plan). See table below.

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

The MECP performance objectives set out for each facility are criteria that the plant is designed to meet. These are performance values that operations strive to achieve on a regular basis. There are no penalties for exceeding these objectives.

The GRCA targets are established to improve overall receiving water quality. The plants that discharge to the Grand River are operated to achieve the more stringent performance targets on a day to day basis. There are no penalties for exceeding these targets. Haldimand County has been recognized by GRCA for achieving the performance targets in 2016 and 2017.

The MECP compliance limits should never be exceeded. These 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. Evaluations against compliance limits and objectives are identified in the Annual Wastewater Quality Reports, which can be found at <https://www.haldimandcounty.ca/water-wastewater-information/wastewater/>. There are no defined penalties for exceeding these limits, however they are reportable. The MECP expectation is that a plan be put in place to address the reason for the non-compliance, as well a due date will be established to complete the actions.

Performance

Haldimand County Wastewater Treatment Plant Performance Parameters

All wastewater facilities met the Ministry of the Environment, Conservation and Parks (MECP)'s ECA effluent compliance limits for 2018. Some MECP Compliance Objectives were exceeded for Caledonia, Dunnville and Hagersville as referenced in the table below. There are no penalties for exceeding these objectives, however County and operational staff are jointly discussing means to reduce these events in the future.

Facility	MECP Compliance Limits	MECP Compliance Objectives	GRCA Voluntary Targets
Caledonia	No exceedances	Total phosphorous exceedance for 1 month	Total phosphorous exceedance for 1 month
Cayuga	No exceedances	No exceedances	Total phosphorous exceedance for 3 months
Dunnville	No exceedances	E.coli exceedance for 1 month	Total phosphorous exceedance for 1 month Total ammonia nitrogen exceedance for 5 months
Hagersville	No exceedances	Total suspended solids exceedance for 5 months Total phosphorous exceedance for 4 months	N/A

Caledonia, Cayuga and Dunnville wastewater treatment facilities are located within the Grand River watershed. In the County's partnership with the GRCA, effluent targets have been established. GRCA voluntary targets were exceeded on a few occasions. Similar to the MECP Compliance Objectives, County and operational staff jointly review and discuss these exceedances to understand why they occurred and how best to reduce the occurrence of these events in the future. These targets are voluntary and do not result in significant additional operating costs, but focus on educating and empowering operational staff to enhance process control while improving overall river health.

Haldimand County WWTPs Performance

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

Wastewater treatment plant inspections are performed by the MECP approximately every four years. These inspections occur to ensure that the County's wastewater plants are operating as per their assigned Environmental Compliance Approvals (ECAs). The performance data that has been collected in the previous four years (between inspections) is reviewed against the effluent compliance objectives and limits. The Oswego Park Lagoons was the only facility inspected by the MECP in 2018. The previous inspection was conducted in 2013. For the 2018 inspection, the performance period of 2016 to 2018 was reviewed by the Ministry. Any performance issues that are identified are communicated or reported to the MECP as they occur. The performance of the treatment facilities is jointly reviewed and discussed on a monthly basis with operations staff. If there are performance or operational issues, actions are jointly identified to address the problem(s) as they arise.

There were no non-compliance items identified.

There were two Best Practice Recommendations made for the Oswego Park Lagoons which included:

- The facility had an annual average daily influent flow of 76.3 m³/d in 2016, which is approximately 90% of the rated capacity. In 2017 the annual average was 105.0 m³/d, which is approximately 124% of the rated capacity.
 - Sump pumps from residential dwellings are suspected to be connected to the sanitary collection system;
 - High precipitation caused the exceedance of the designed rated capacity in 2017.

MECP recommended that no further connections are made to the Oswego Park Lagoons and that the County undertakes a study to evaluate the causes of the design rated capacity exceedances and determine actions to address these exceedances.

No further connections will be made to the Oswego Park Lagoons. The development opportunities within this area are limited due to the existing policies of the Official Plan which do not support additional lot creation. There is no supply of lots awaiting development as the area is built out. The exceedance of rated capacity has not caused any issues in the performance of the lagoon system.

- Minor erosion was observed along the inside of berm of cell #2. MECP recommended that the eroded area be repaired. Veolia coordinated the repairs of the eroded area of the berm of cell #2.

Key Achievements in 2018

- Completed phosphorous special study at the Cayuga WWTP to demonstrate that a secondary treatment plant is capable of achieving the GRCA target of 0.30 mg/L or lower total effluent phosphorous in order to improve the quality of the receiving waters. In 2019, the same study will be implemented at the Dunnville WWTP.
- Completed sodium bisulfite special study at the Caledonia WWTP to optimize the de-chlorination chemical dosage to reduce chemical cost and impacts on the Grand River quality.
- Continued the receiving water studies in partnership with Hutchinson Environmental for the Jarvis and Sandusk Creeks and for the Centre Creek receiving water for the Lake Erie Industrial Park lagoons. Also expanded receiving water studies in the Grand River to support planned treatment capacity increases for the community of Caledonia.
- Completed performance and capacity assessments at the Hagersville wastewater treatment facility to assess current treatment capabilities and plan for future upgrades. Hagersville is currently at 60% of its capacity.
- At the Ouse Street pumping station in Cayuga a new backflow prevention device was installed in the raw sewage bypass outfall pipe at the river.
- Started up new chemical storage and dosing facilities (sodium aluminate) for phosphorous removal at the Hagersville WWTP.
- Completed onsite fill/draw assessment of the Parkview Pump Station in Hagersville in order to assist with determining true capacity and capability to handle development within that area of Hagersville.
- On-going construction for the Dunnville wastewater upgrades:
 - New pre-treatment system;
 - Upgraded Return Activated Sludge (RAS) system;

- New waste sludge thickening tanks and equipment;
- New control building;
- Demolition of buildings and equipment that have surpassed service life.
- Completed majority of the Townsend biosolids upgrade:
 - Residual solids removed;
 - Construction of new internal berms to sub-divide storage cell into 3 smaller cells;
 - Road access surfaces re-constructed;
 - Decant piping and valving for new biosolids cell;
 - Installation of new automatic card swipe gate and fence.
- Facilitated performance based workshops and special studies including mass control, phosphorous removal and step feed with Veolia staff, to empower operators to practice data based decision-making and improve critical thinking.

Planned Activities for 2019

Below is a list of planned activities, projects and process improvements for 2019. Accomplishing these items will potentially improve performance and allow, in some cases, for increased capacity.

- Continue receiving water studies in partnership with Hutchinson Environmental for Jarvis (Sandusk Creek), Townsend (Nanticoke Creek), Lake Erie Industrial Park (Centre Creek) and Caledonia (Grand River). The work is being carried out to support future discussions with MECP for additional wastewater treatment capacity.
- Complete construction of the Dunnville Wastewater Treatment Plant (WWTP) upgrades.
- Caledonia WWTP aeration diffuser upgrades to achieve design capacity.
- Complete upgrades to Townsend biosolids management facility:
Engineering work for obtaining additional treatment capacity for the community of Jarvis including:
 - Municipal Class EA;
 - ECA Approvals;
 - Design and tendering of proposed upgrades.
- Facilitate performance based workshops and special studies including mass control, and digester performance with Veolia staff, to empower operators to practice data based decision-making and improve critical thinking.
- Comprehensive review of pump stations within the County to determine deficiencies and development of a prioritized capital implementation plan to address them.
- At the Hagersville WWTP installation of new motors and replace bearings on the three (3) multi-stage centrifugal blowers to extend their useful life.
- At the Caledonia WWTP installation of new sodium hypochlorite storage and dosing system.
- Address flow restriction identified within Nairne Street forcemain, located under the Grand River in Caledonia.
- LEIP lagoons replacement of pump station forcemain to lagoon inlet distribution chamber. Replacement of pumps, isolation and check valves at the pumping station.

FINANCIAL/LEGAL IMPLICATIONS:

Not applicable.

STAKEHOLDER IMPACTS:

A collaborative effort between Environmental Operations, Water & Wastewater Engineering & Compliance, Planning & Development and Financial & Data Services is required to successfully deliver program activities.

REPORT IMPACTS:

Agreement: No

By-law: No

Budget Amendment: No

Policy: No

ATTACHMENTS:

None