Nanticoke Drinking Water System
2020 Annual Water Quality Report

January 1, 2020 – December 31, 2020

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Quality Management System Policy

The purpose of The Corporation of Haldimand County's Quality Management System policies are to:

- Ensure our drinking water systems comply with all current legislation and regulatory requirements for the safe supply of drinking water;
- Ensure financial support is provided to maintain infrastructure integrity to allow safe and consistent delivery of drinking water to our water customers;
- Commit to review and update our Operational Plans as regulated by the Drinking Water Quality Management Standard in order to continually improve our Quality Management System and to communicate the results with our water customers.

Haldimand County

Haldimand County Quality Management System Summary

Haldimand County's Quality Management System (QMS) is legislated under the Drinking Water Quality Management Standard (DWQMS) through the Safe Drinking Water Act. To maintain operating authority accreditation, the Ministry of the Environment, Conservation and Parks (MECP) mandate tasks that must be completed annually. These activities include:

- Conducting an internal audit of the Quality Management System.
- Conducting a Management Review meeting.
- Participating in an external audit conducting by a third party Accreditation Body
- Updating the Quality Management System Operational Plan.
- Updating Council of the status of the County's Quality Management System.

The QMS Operational Plan was reviewed and updated in 2020, with a focus on Document and Records Control (Element 5) and incorporating organizational changes within the County.

Internal audits were completed with support from Water and Wastewater Operations staff. An audit report was generated that identified two minor non-conformances and opportunities for improvement.

Haldimand County must receive accreditation annually to operate the water distribution systems. Through a qualified third party auditor, the County must demonstrate that its QMS meets the requirements of the DWQMS. SAI Global conducted an external audit on October 23, 2020. The County did not receive any non-conformances and will discuss identified opportunities for improvement and develop an implementation strategy.

Staff are required to conduct an annual Management Review meeting to evaluate the effectiveness of the QMS. Deficiencies and opportunities for improvement are identified and action items are developed to ensure follow-up. The County held their management review meeting on November 10, 2020.

All requirements were achieved in 2020 and SAI Global have issued an accreditation certificate to Haldimand County, which allows us to continue to operate the water distribution systems.

As part of the agreement with the County and through the regulations, Ontario Clean Water Agency (OCWA) must obtain accreditation to operate the water treatment facilities on behalf of the County. On September 25, 2020, OCWA obtained limited scope transitional accreditation.

NANTICOKE DRINKING WATER SYSTEM

Nanticoke Drinking Water System Overview

Lake Erie raw water flows from the Ontario Power Generation forebay into the Nanticoke Industrial Pumping Station forebay. Raw water can be pre-chlorinated for zebra mussel control and then drawn into two raw water wet wells. Seven vertical turbine pumps are capable of supplying Imperial Oil and US Steel plants with raw water. Two submersible pumps supply the municipal treatment works with raw water.

A coagulant (poly-aluminum chloride was used in 2020) is injected into the raw water supply. Powdered activated carbon can be injected into the raw water if there are taste and odour issues, however it was not added in 2020. Water flows into a high-rate clarification process (Actiflo), which uses microsand and polymer to improve floc formation and significantly reduce settling times. Settled water then flows to three filter units containing sand and anthracite. Filtered water is chlorinated with sodium hypochlorite for primary disinfection prior to flowing to two reservoirs. These reservoirs feed into a high lift pumping station, where chlorine is injected for secondary disinfection, before being pumped into the distribution system.

A settling lagoon collects waste water from various water treatment plant processes and continuously discharges to Lake Erie.

Figure 1 is a simplified schematic of the Nanticoke Water Treatment Plant. A larger version of the diagram is included in the appendices.

The distribution system is comprised of three residential communities (Townsend, Jarvis and Hagersville) and the Lake Erie Industrial Park. Townsend utilizes a water tower for storage and to maintain pressure in the distribution system. A booster station is utilized to maintain pressure and flow to Hagersville. As required, this facility has the capability to add sodium hypochlorite to the potable water to boost chlorine residuals. Hagersville utilizes a standpipe for storage and to maintain pressure in the distribution system. Bulk water stations are located in Hagersville and Jarvis. In addition, the Nanticoke Drinking Water System provides potable water to the Mississaugas of the Credit First Nation.

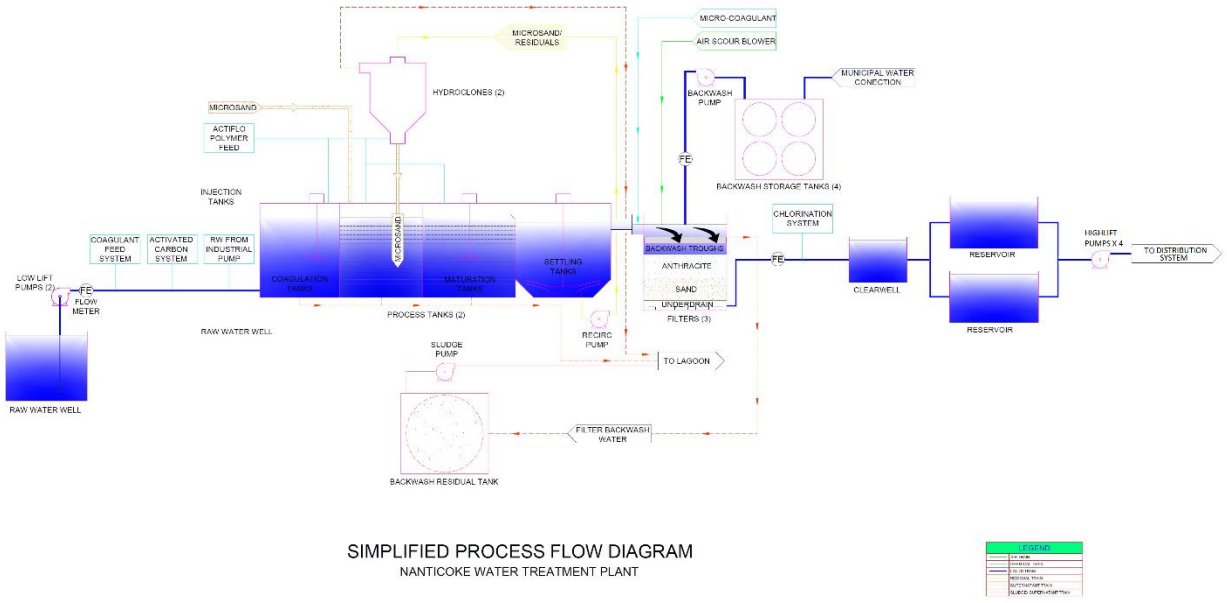


***Figure 1*: Nanticoke Water Treatment Plant Schematic**

The distribution system infrastructure services approximately 4,900 people (2016 Census).

Veolia Water was contracted to operate and maintain the raw water transmission mains, low lift pumping station, water treatment plant, and the standpipe until September 30, 2020. As of October 1, 2020, the County entered into a contract with Ontario Clean Water Agency to operate and maintain the water treatment facilities. Haldimand County operates and maintains the distribution system, including the bulk water depots.

Expenditure Information

Haldimand County and its contract operators are diligent in prioritizing projects on an annual basis to eliminate unnecessary expenditure. Using the best available information at the time of this report, expenses incurred in the Nanticoke Drinking Water System for 2020 are identified in Table 1. Not all drinking water expenditure information is included in this report.

Table 1: Nanticoke Drinking Water System 2020 Expenditures

Nanticoke Drinking Water System:	
Townsend Elevated Tank Security Fencing	
Nanticoke Reservoir Baffling and Transfer System	
Nanticoke High Lift Pumps (2 & 3) Motors and VFDs	
IPS Wet Well Piping and Valve Replacements	
Nanticoke Lagoon Clean Out	
Nanticoke Residual Removal from Townsend Lagoon	
Nanticoke Forebay Headwall Structural Repairs	
Nanticoke East Reservoir Rehabilitation	
Nanticoke High Lift Pump 3 Rebuild	
High Rate Sedimentation Capacity Expansion	
Decommissioning of Interim WTP and Filter Building	
Total Cost:	**$2,999,971**

Multi-Barrier Approach

Through the Walkerton Inquiry, Justice O'Connor recommended that drinking water is best protected by taking an approach that uses multiple barriers to prevent contamination from affecting our drinking water. The multi-barrier approach addresses potential threats by ensuring barriers are in place to either eliminate or minimize their impact. This holistic approach recognizes that each barrier may not be able to completely remove a contaminant, but by working together the barriers provide a high-level of protection. Typical barriers include:

- **Source Protection**
  - ***Source Protection Plans***
- **Treatment**
  - ***Treatment and Disinfection Goals***
- **Distribution System**
  - ***Residual Maintenance***
- **Monitoring**
  - ***Sampling Programs***
- **Emergency Preparedness**
  - ***Emergency Plans***

Haldimand County has adopted the multi-barrier approach in ensuring safe, reliable drinking water. Figure 2 shows how administration, design, maintenance, and operations work together to establish and maintain multi-barrier protection (US EPA, 1998).

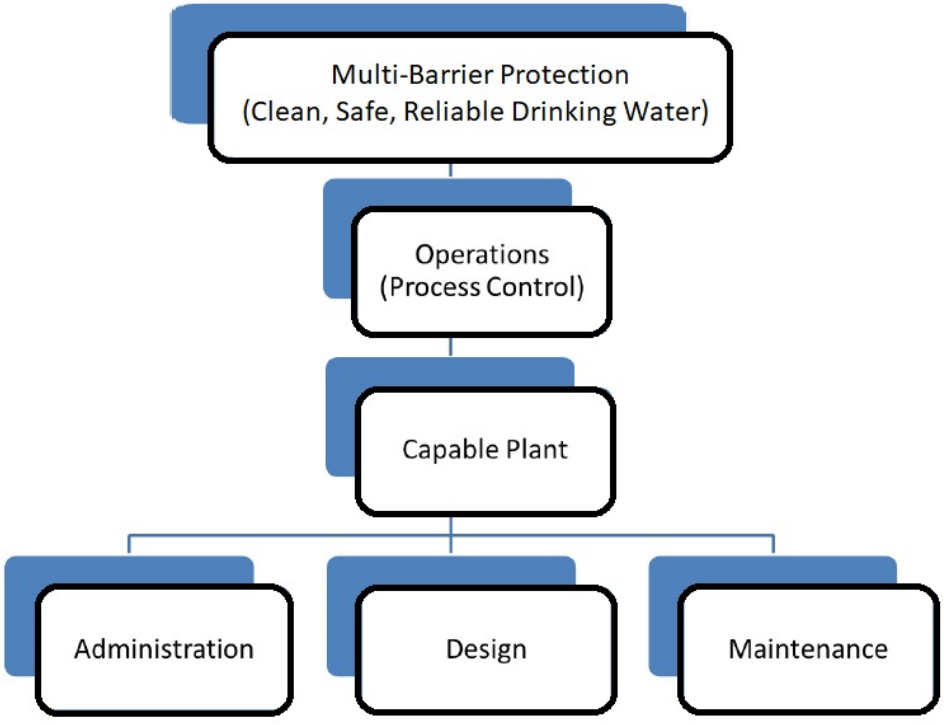


***Figure 2*: Responsibilities for Clean, Safe and Reliable Drinking Water**

A description of the responsibilities in each area is summarized as follows:

- **Administration**: The administrators or managers of a water treatment system are responsible for providing the resources (budget and staff) and policies (hours of staffing, reporting requirements, training and certification requirements, etc.). Funding may also need to be justified and obtained if the design of a system is inadequate or major upgrades are required. Managers establish and maintain emergency response plans and communication procedures to ensure prompt response to unsafe drinking water.

- **Design**: The designer's responsibility is to provide the physical infrastructure (pipes, valves, tanks, meters, etc.) capable of reliably producing and distributing the quality and quantity of water required. The design must provide adequate flexibility and controllability to enable the operator to make appropriate adjustments.

- **Maintenance**: The system must be maintained in good working order with the key equipment functional at all times. Should a key piece of equipment break down then it should be repaired in a timely manner.

- **Operations**: Once a capable system is in place, then it is the operator's responsibility to deliver safe drinking water through monitoring, testing and process control (for example by changing the setting on the dosing pumps). Operators are also responsible for maintaining records (log books, data forms, etc.), which aid in troubleshooting and design of upgrades. A further, and commonly unrecognized responsibility of the operator is to communicate the needs of the facility to administrators for possible action.

WATER SAMPLING

To comply with drinking water legislation, drinking water systems are required to monitor their water quality. Haldimand County has committed to providing safe, reliable drinking water and is diligent in ensuring that sampling and monitoring programs effectively characterize water quality. All samples are taken by certified operators and tests performed by accredited, licensed laboratories.

Microbiological Sampling

Microbial quality is one of the primary indicators for the safety of a drinking water supply. Of all contaminants in drinking water, human and/or animal feces present the greatest danger to public health. Pathogenic or disease causing microorganisms (including certain protozoa, bacteria or viruses) may be found in untreated water supplies. Bacteriological monitoring and testing is a way to detect and control pathogenic bacteria in treated drinking water supplies. Heterotrophic Plate Count (HPC) and background bacteria samples are monitored to identify potential changes in water quality and are not used as an indicator of adverse human health effects. Table 2 provides a summary of microbiological sampling completed in the Nanticoke Drinking Water System during 2020.

Table 2: 2020 Nanticoke Drinking Water System Microbiological Sampling

	Number of Samples	Range of E.coli Results (cfu/100ml)	Range of Total Coliform Results (cfu/100ml)	Number of HPC Samples	Range of HPC Results (cfu/ml)	Number of Background Samples	Range of Background Results (cfu/ml)
Raw	156	0 – 110	6– 2,700	N/A	N/A	N/A	N/A
Treated	156	0	0 - 1	156	0 – 11	N/A	N/A
Industrial Park Distribution System	52	0	0	52	0 - 1	52	0
Townsend Distribution System	104	0	0	104	0 - 29	52	0
Jarvis Distribution System	52	0	0	52	0 – 7	52	0
Hagersville Booster Station	52	0	0	52	0 - 20	N/A	N/A
Hagersville Distribution System	104	0	0 - 41	104	0 – 143	52	0

*****Note: At a minimum, 25% of all drinking water samples must be analyzed for HPC.

Operational Sampling

Operational sampling and monitoring is important in maintaining the integrity of each barrier in the multi-barrier approach. Schedules 7 and 8 of Ontario Regulation 170/03, specify requirements for operational checks that municipalities must follow. Table 3 provides a summary of operational samples taken for the drinking water system. Regulatory requirements were achieved for filtered water turbidity and efforts continue to consistently achieve settled and filter targets. Disinfection regulatory requirements and operational targets were consistently achieved in 2020.

Table 3: 2020 Nanticoke Drinking Water System Operational Sampling

	Number of Grab Samples	Range of Results	Regulatory Requirement	Recommended Target
Raw Turbidity	8760	0.53 – 35.05	N/A	N/A
Settled Turbidity	8760	0 – 4.3	N/A	1.00 NTU
Filtered Turbidity	8760	0.006 - 0.112	≤ 0.30 in 95% of all monthly readings	0.10 NTU
Treated Turbidity	8760	0.02 – 7.8	N/A	≤ 5.00
Free Chlorine High Lift	8760	1.03 – 2.51	≥ 0.05 mg/L	≥ 0.20 mg/L
Free Chlorine Industrial Park	104	0.75 – 1.56 mg/L	≥ 0.05 mg/L	≥ 0.20 mg/L
Free Chlorine Townsend	156	0.66 - 1.33 mg/L	≥ 0.05 mg/L	≥ 0.20 mg/L
Free Chlorine Jarvis	104	0.56 – 1.25 mg/L	≥ 0.05 mg/L	≥ 0.20 mg/L
Free Chlorine Hagersville Booster Station	52	0.77 – 1.42 mg/L	≥ 0.05 mg/L	≥ 0.20 mg/L
Free Chlorine Hagersville	156	0.29 – 1.29 mg/L	≥ 0.05 mg/L	≥ 0.20 mg/L

*****Note: 8760 is used for continuous monitoring.

Water treatment plant filters are backwashed to maintain or improve performance of the filters. The backwash water is discharged to a lagoon, which continuously discharges to Lake Erie. Municipal Drinking Water License number 066-102 specifies sampling requirements, summarized in Table 4, to monitor the discharge and ensure minimal impact to the natural environment.

Table 4: 2020 Nanticoke Water Treatment Plant Lagoon Sampling

Date of Legal Instrument Issued	Parameter	# of Samples	Annual Average (mg/L)	Regulatory Requirement
License 066-102 July 15, 2016	Backwash Lagoon Total Suspended Solids	48	3.0	Annual Average Concentration 25 mg/L

As result of public inquiries, a quarterly treated water hardness sampling program was initiated.

The term hardness was originally applied to waters that were hard to wash in, referring to the soap wasting properties of hard water. Hardness prevents soap from lathering by causing the development of an insoluble curdy precipitate in the water; hardness typically causes the buildup of hardness scale (such as seen in cooking pans). Dissolved calcium and magnesium salts are primarily responsible for most scaling in pipes and water heaters and can cause numerous problems in laundry, kitchen, and bath. Hardness is usually expressed in grains per gallon (or ppm) as calcium carbonate equivalent.

The degree of hardness standard as established by the American Society of Agricultural Engineers (S-339) and the Water Quality Association (WQA) is shown in the following table:

Table 5: Standard Degree of Hardness

Degree of Hardness	Grains per Gallon (gpg)	Ppm (mg/L)
Soft	< 1.0	< 17.0
Slightly Hard	1.0 – 3.5	17 - 60
Moderately Hard	3.5 – 7.0	60 - 120
Hard	7.0 – 10.5	120 - 180
Very Hard	> 10.5	> 180

The sample results in Table 6 indicate that the average values for Nanticoke are considered moderately hard to hard water as taken from the Degree of Hardness Table above.

Table 6: 2020 Nanticoke Drinking Water System Hardness Sampling

Parameter	Sample Date	Industrial Park	Townsend	Jarvis	Hagersville
Total Hardness (mg/L as $CaCO_3$)	February 25, 2020	116	120	118	114
	June 9, 2020	118	126	118	122
	August 25, 2020	128	136	134	122
	November 17, 2020	122	152	122	136
	2018 Average ------>	**121**	**134**	**123**	**124**

Lead Sampling

The community lead testing program is a requirement of O. Reg. 170/03 under the Safe Drinking Water Act, 2002. Haldimand County is exempt from sampling private residences due to having less than 10% of plumbing sample locations exceed the standard for two consecutive periods of reduced sampling. Annual pH and alkalinity samples are taken, as well as distribution system lead samples every three years. There are no regulatory limits for alkalinity and pH, however Haldimand County sample results are within the operational guidelines provided by the MECP. A summary of 2020 sampling has been provided in Table 7.

Table 7: 2020 Nanticoke Drinking Water System Lead Sampling

	Sample Type	Number of Samples	Range of Results	Number of Exceedances
Industrial Park	Plumbing - Lead	N/A	N/A	N/A
	Distribution - Lead	N/A	.N/A	N/A
	Distribution - Alkalinity	1	95 mg/L	N/A
	Distribution - pH	1	8.04	N/A
Townsend	Plumbing - Lead	N/A	N/A	N/A
	Distribution - Lead	N/A	N/A	N/A
	Distribution - Alkalinity	1	96 mg/L	N/A
	Distribution - pH	1	8.13	N/A
Jarvis	Plumbing - Lead	N/A	N/A	N/A
	Distribution - Lead	N/A	N/A	N/A
	Distribution - Alkalinity	1	97 mg/L	N/A
	Distribution - pH	1	8.14	N/A
Hagersville	Plumbing - Lead	N/A	N/A	N/A
	Distribution - Lead	N/A	N/A	N/A
	Distribution - Alkalinity	1	96 mg/L	N/A
	Distribution - pH	1	8.14	N/A

Organic Sampling

To protect drinking water from pathogens, a disinfectant (usually chlorine) is added to the drinking water. Disinfectants can react with naturally-occurring materials in the water to form disinfection byproducts (DBP), which may pose health risks.

A challenge for water systems is balancing pathogen control and disinfection byproduct formation. It is important to provide protection from pathogens while minimizing health risks from disinfection byproducts. More information on each byproduct is summarized in Table 6.

Haldimand County sample for haloacetic acids (HAA) and trihalomethanes (THM) at the water treatment plant and in the distribution system where there is an elevated potential for the formation of these byproducts. Although a treatment sample and individual distribution system samples are not required by regulation, these samples are used to monitor byproduct formation within the drinking water system.

Table 8: Disinfection Byproduct Information

Disinfection Byproduct	How it is formed?	Health Effects
Trihalomethanes	Trihalomethanes occur when naturally-occurring organic and inorganic materials in the water react with the disinfectants, chlorine and chloramine.	Some people who drink water containing total trihalomethanes in excess of the MCL over many years could experience liver, kidney, or central nervous system problems and an increased risk of cancer.
Haloacetic Acids	Haloacetic acids occur when naturally-occurring organic and inorganic materials in the water react with the disinfectants, chlorine and chloramine.	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

Regulatory reporting is based on a running annual average of quarterly sample results using the worst case scenario. The calculated THM and HAA averages were below the maximum allowable concentrations (MAC) permitted by the MECP. Table 9 provides a summary of 2020 disinfection byproduct sampling.

Table 9: 2020 Nanticoke Drinking Water System DBP Sampling

Parameter	Sample Location	Sample Date	Sample Results (ug/L)	Annual Average (ug/L)	Regulatory MAC (ug/L)	Exceedance
Haloacetic Acids	Nanticoke WTP	February 10, 2020 May 4, 2020 August 4, 2020 November 3, 2020	11.2 5.9 18.7 6.2	10.5	80	**No**
	Industrial Park Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	6.2 7.2 28.3 8.4	12.5	80	**No**
	Townsend Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	15.2 16.2 29.7 10.4	17.9	80	**No**
	Jarvis Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	13.3 13.9 30.3 17.9	18.9	80	**No**
	Hagersville Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	13.8 16.7 31.5 18.5	20.1	80	**No**

Table 9: 2020 Nanticoke Drinking Water System DBP Sampling (continued)

Parameter	Sample Location	Sample Date	Sample Results (ug/L)	Annual Average (ug/L)	Regulatory MAC (ug/L)	Exceedance
Trihalomethanes	Nanticoke WTP	February 10, 2020 May 4, 2020 August 4, 2020 November 3, 2020	24.9 18.1 48.0 24.0	28.8	100	**No**
	Industrial Park Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	25 30 63 33	37.8	100	**No**
	Townsend Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	32 36 62 40	43.5	100	**No**
	Jarvis Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	32 36 61 45	43.5	100	**No**
	Hagersville Distribution	February 20, 2020 May 12, 2020 August 4, 2020 November 3, 2020	37 43 74 53	**51.8**[1]	100	**No**

[1] Result exceeded half the standard prescribed in Schedule 2 on the Ontario Drinking Water Quality Standards.

Additional sample results for organic and inorganic parameters are located in the appendices.

WATER USE

Raw Water

The Nanticoke Drinking Water System's raw water source is Lake Erie. A Permit to Take Water (PTTW) specifies the maximum volume of raw water that can be taken from the water source and conveys MECP site-specific regulatory requirements. Haldimand County has a large volume of available raw water capacity, however an interim limit of 437 MLD is in place until a number of conditions have been satisfied. When comparing the 2020 maximum raw water flow and the interim permit limits (Figure 3), 81% of Haldimand County's raw water allotment was available for use.

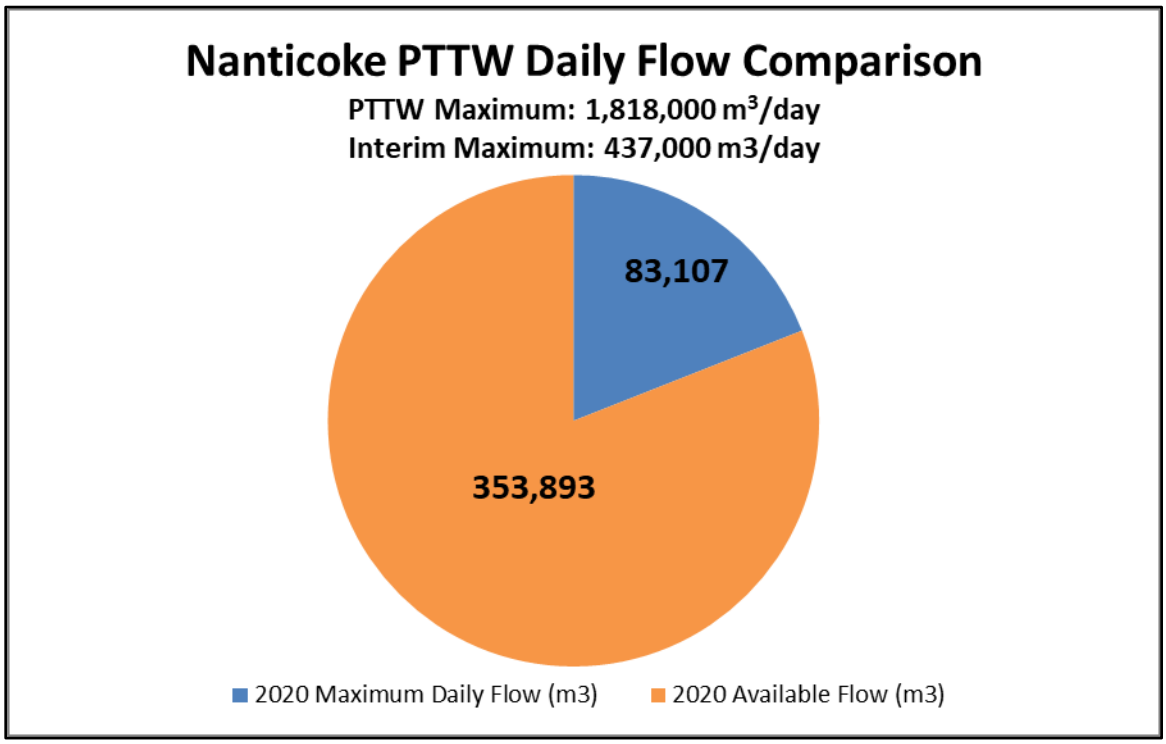


***Figure 3*: Nanticoke Permit To Take Water Flow Comparison**

Potable Water

As required by Schedule 22 of Ontario Regulation 170/03, Table 10, Table 11 and Figure 4 are intended to provide a summary of potable water supplied by the Nanticoke Drinking Water System in 2020.

Table 10: 2020 Nanticoke Monthly Potable Water Flow Data

System	Month	Monthly Total m^3	Daily Average m^3/d	Maximum Daily Flow m^3/d	Maximum Daily Peak Flow L/s
Nanticoke Drinking Water System	January	181,344	5,849	7,159	260.9
	February	176,392	6,082	7,034	150.9
	March	186,858	6,028	7,377	147.8
	April	178,523	5,951	6,735	253.0
	May	208,856	6,737	8,523	262.4
	June	230,063	7,669	9,121	285.5
	July	232,567	7,502	10,139	300.0
	August	201,834	6,511	8,340	297.0
	September	189,920	6,331	9,466	303.9
	October	169,356	5,463	7,048	289.9
	November	177,474	5,916	7,326	216.1
	December	196,575	6,341	10,006	287.3

Figure 4 compares the monthly flows over the last five years at the Nanticoke Water Treatment Plant. When comparing the average monthly flows for 2019 and 2020, there was a 9.6% decrease in potable water produced at the Nanticoke Water Treatment Plant.

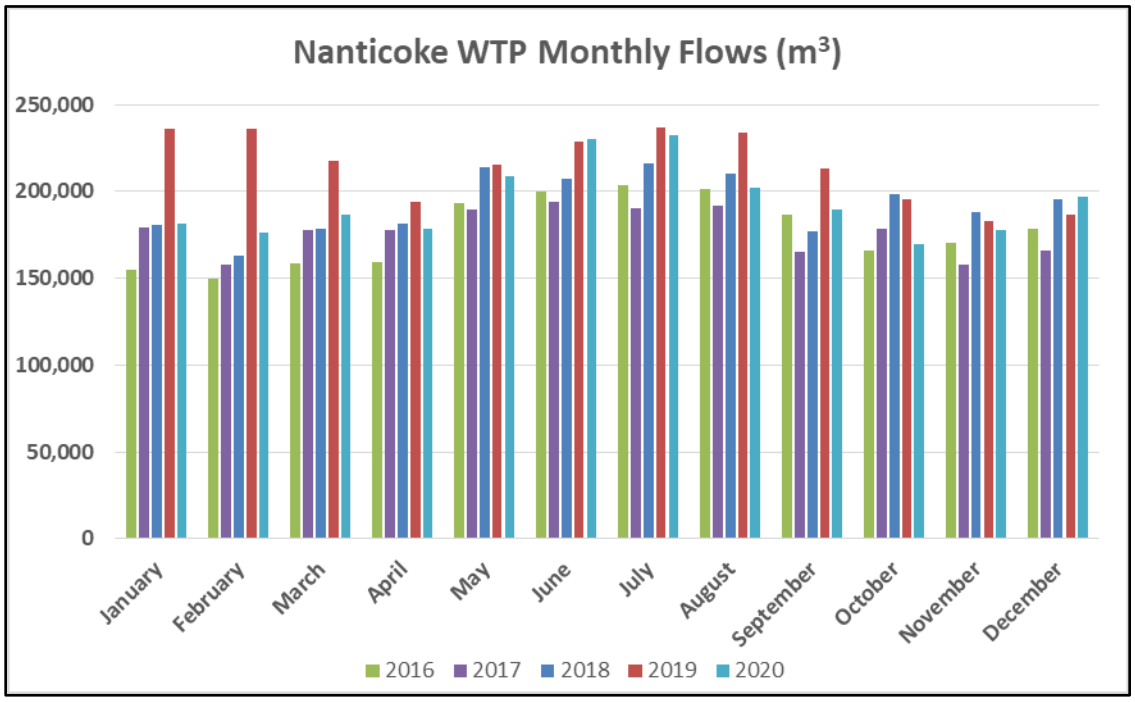


***Figure 4*: Nanticoke WTP Five Year Monthly Potable Flow Comparison**

The facility has a rated capacity of 13,636 cubic metres per day. When compared against the maximum daily flow for 2020, the Nanticoke Water Treatment Plant operated at approximately 74% of design capacity, however this calculation does not take into account any operational and infrastructure limitations.

Table 11: Comparison of Rated Capacity and 2017 Maximum Flow Rate

System and Municipal Drinking Water Licence	Rated Capacity (m^3/day)	Maximum Daily Flow (m^3)	Percentage of Capacity
Nanticoke 066-102	13,636	10,139	74.3 %

To ensure the water treatment facility is capable of meeting current and projected demands, Haldimand County staff annually review plant capability and performance and update development allocation accordingly.

REGULATORY COMPLIANCE

Adverse Water Quality Incidents

Regulatory compliance requires reporting adverse water quality incidents to the Ministry of Health (MOH) and the MECP. In all instances, corrective action is initiated to resolve the issue. A summary of the incidents and corrective actions is provided in Table 12.

Table 12: 2020 Nanticoke Drinking Water System Reported Adverse Events

Incident Date	Parameter	Result	Corrective Action	Date Resolved
June 30, 2020	Total Coliforms	Nanticoke WTP Highlight 1 cfu/100 mL	Resampled – upstream, downstream and at the original adverse location.	July 3, 2020
July 27, 2020	Total Coliforms	Hagersville Standpipe 41 cfu/100 mL	Resampled – upstream, downstream and at the original adverse location.	July 30, 2020

Corrective actions are based on each incident and is determined through discussion with the MOH. For each adverse identified in Table 12, resamples were taken at the source of the adverse and upstream and downstream locations on two consecutive days. All samples were negative for the presence of total coliform bacteria.

Annual Drinking Water Inspection

The MECP annually confirms compliance with drinking water legislation by conducting inspections on drinking water systems. All aspects of the drinking water system are reviewed, including treatment equipment, disinfection, training records, and operational data required under the Safe Drinking Water Act, Ontario Regulations 170/03, 169/03 and 128/04. These inspections provide Haldimand County and OCWA an opportunity to review best management practices and work towards continually improving the operation and management of the drinking water systems. Any issues of regulatory non-compliance are identified and corrective actions issued.

The findings for the 2020 annual drinking water system inspections is included in this report. Below is a summary of the key findings for the inspection:

Nanticoke Drinking Water System – Waterworks # 210001558

There was one non-compliance identified during the 2020 inspection period. The County received a **100%** inspection rating from the MECP.

The following issues were identified during the drinking water inspection:

1. Total alkalinity and pH were not tested in accordance with Schedule 15.1-5 of Ontario Regulation 170/03.

   Follow-Up: The County revised the sample scheduling strategy to ensure that all samples were scheduled in the beginning of the year. The County has also revised the compliance calendar inputs to ensure that reoccurring calendar item end dates are checked for each item after completion.

During each inspection, the Ministry may provide recommendations and best practices specific to each drinking water system. The MECP provided two recommendations, which the County will review with our contract operator and determine if implementation is required.

Haldimand County continues to work closely with regulatory bodies to ensure a continued supply of safe, reliable drinking water to its users. All recommendations have been addressed and communicated to the MECP.

REPORT AVAILABILITY

This report can be viewed online at:

https://www.haldimandcounty.ca/drinking-water/

Reports can also be obtained upon request at any Haldimand County Administration Building:

Cayuga Administration Building
53 Thorburn St.
Cayuga, ON
N0A 1E0

For more information on report content, please contact the Haldimand County Environmental Operations Division at:

Email: wwwops@haldimandcounty.on.ca

Telephone: 905-318-5932

Appendix A

Inorganic and Organic Sample Results

Inorganic Parameters:

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	February 10, 2020	**ND**	ug/L	No
Arsenic	February 10, 2020	**ND**	ug/L	No
Barium	February 10, 2020	24	ug/L	No
Boron	February 10, 2020	**ND**	ug/L	No
Cadmium	February 10, 2020	**ND**	ug/L	No
Chromium	February 10, 2020	**ND**	ug/L	No
Mercury	February 10, 2020	**ND**	mg/L	No
Nitrite	February 10 2020 May 4, 2020 August 4, 2020 November 3, 2020	**ND**	mg/L	No
Nitrate	February 10 2020 May 4, 2020 August 4, 2020 November 3, 2020	0.317 0.242 0.132 0.230	mg/L	No
Selenium	February 10, 2020	**ND**	ug/L	No
Uranium	February 10, 2020	**ND**	ug/L	No

ND = Not Detectable

Organic Parameters:

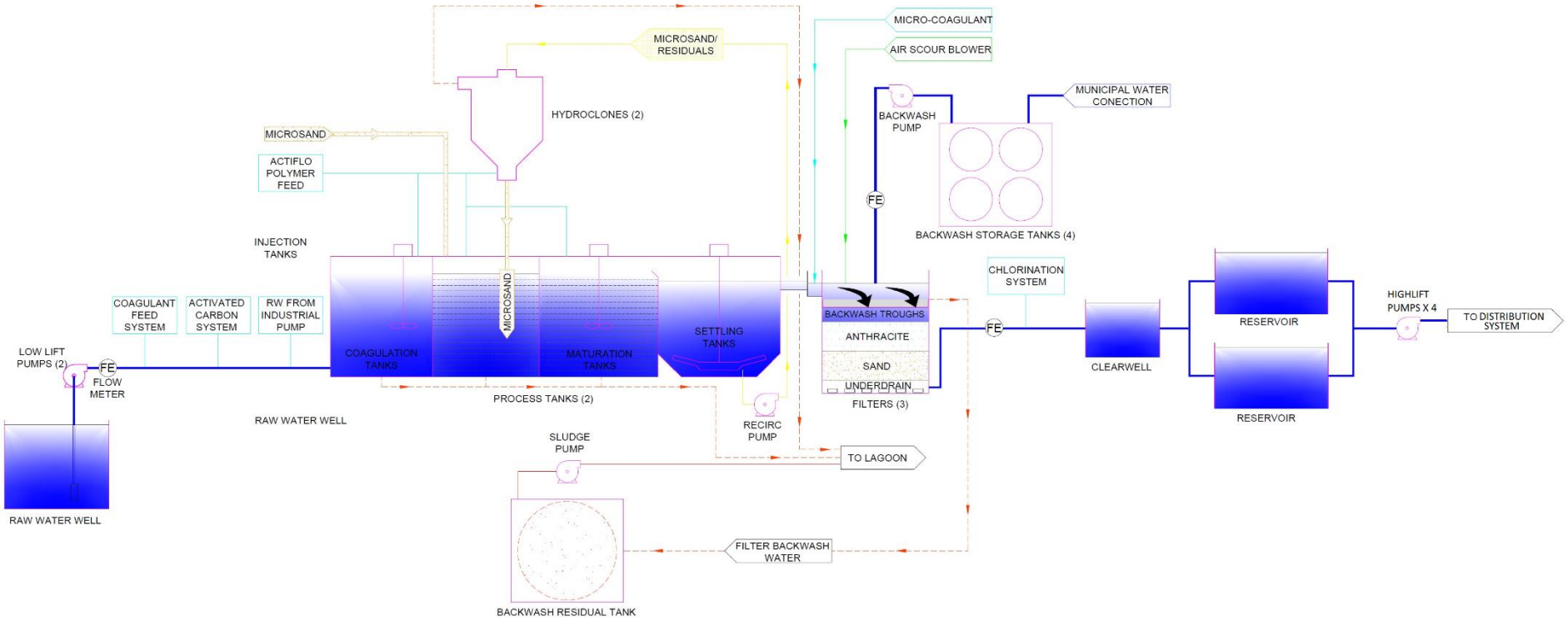
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	February 10, 2020	**ND**	ug/L	No
Atrazine + Metabolites	February 10, 2020	**ND**	ug/L	No
Azinphos-methyl	February 10, 2020	**ND**	ug/L	No
Benzene	February 10, 2020	**ND**	ug/L	No
Benzo(a)pyrene	February 10, 2020	**ND**	ug/L	No
Bromoxynil	February 10, 2020	**ND**	ug/L	No
Carbaryl	February 10, 2020	**ND**	ug/L	No
Carbofuran	February 10, 2020	**ND**	ug/L	No
Carbon Tetrachloride	February 10, 2020	**ND**	ug/L	No
Chlorpyrifos	February 10, 2020	**ND**	ug/L	No
Diazinon	February 10, 2020	**ND**	ug/L	No
Dicamba	February 10, 2020	**ND**	ug/L	No
1,2-Dichlorobenzene	February 10, 2020	**ND**	ug/L	No
1,4- Dichlorobenzene	February 10, 2020	**ND**	ug/L	No
1,2- Dichloroethane	February 10, 2020	**ND**	ug/L	No
1,1- Dichloroethylene	February 10, 2020	**ND**	ug/L	No
Dichloromethane (Methylene Chloride)	February 10, 2020	**ND**	ug/L	No
2,4- Dichlorophenol	February 10, 2020	**ND**	ug/L	No
2,4- Dichlorophenoxy acetic acid (2,4-D)	February 10, 2020	**ND**	ug/L	No
Diclofop-methyl	February 10, 2020	**ND**	ug/L	No
Dimethoate	February 10, 2020	**ND**	ug/L	No
Diquat	February 10, 2020	**ND**	ug/L	No
Diuron	February 10, 2020	ND	ug/L	No
Glyphosate	February 10, 2020	ND	ug/L	No
Malathion	February 10, 2020	**ND**	ug/L	No
MCPA	February 10, 2020	**ND**	ug/L	No
Metolachlor	February 10, 2020	**ND**	ug/L	No
Metribuzin	February 10, 2020	**ND**	ug/L	No
Monochlorobenzene (Chlorobenzene)	February 10, 2020	**ND**	ug/L	No
Paraquat	February 10, 2020	**ND**	ug/L	No
Pentachlorophenol	February 10, 2020	**ND**	ug/L	No
Phorate	February 10, 2020	**ND**	ug/L	No
Picloram	February 10, 2020	**ND**	ug/L	No
Prometryne	February 10, 2020	**ND**	ug/L	No
Simazine	February 10, 2020	**ND**	ug/L	No
Terbufos	February 10, 2020	**ND**	ug/L	No
Tetrachloroethylene	February 10, 2020	**ND**	ug/L	No
2,3,4,6- Tetrachlorophenol	February 10, 2020	**ND**	ug/L	No
Total PCBs	February 10, 2020	**ND**	ug/L	No
Triallate	February 10, 2020	**ND**	ug/L	No
Trichloroethylene	February 10, 2020	**ND**	ug/L	No
2,4,6- Trichlorophenol	February 10, 2020	**ND**	ug/L	No
Trifluralin	February 10, 2020	**ND**	ug/L	No
Vinyl Chloride	February 10, 2020	**ND**	Ug/L	No

ND = Not Detectable

Microcystin Sample Results

Parameter	Sample Date	Raw Water Results	Treated Water Results	Unit of Measure	Exceedance
Microcystin	June 2, 2020	ND	ND	ug/L	No
	June 9, 2020	ND	ND		
	June 16, 2020	ND	ND		
	June 23, 2020	ND	ND		
	June 30, 2020	ND	ND		
	July 7, 2020	ND	ND		
	July 14, 2020	ND	ND		
	July 21, 2020	ND	ND		
	July 28, 2020	ND	ND		
	August 4, 2020	ND	ND		
	August 11, 2020	ND	ND		
	August 18, 2020	ND	ND		
	August 25, 2020	ND	ND		
	Sept. 1, 2020	ND	ND		
	Sept. 8, 2020	0.10	ND		
	Sept. 15, 2020	ND	ND		
	Sept. 22, 2020	ND	ND		
	Sept. 29, 2020	ND	ND		
	October 5, 2020	ND	ND		
	October 13, 2020	ND	ND		
	October 19, 2020	0.10	ND		
	October 26, 2020	ND	ND		

ND = Not Detectable



SIMPLIFIED PROCESS FLOW DIAGRAM

NANTICOKE WATER TREATMENT PLANT