Newington Water Treatment Plant

Drinking Water Works Permit No. 186-203
Municipal Drinking Water Licence No. 186-103

Works No. 220008051

- 2019 Summary Report -

Prepared by:
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NEWINGTON WATER TREATMENT PLANT

2019 SUMMARY REPORT

Facility description:	**Communal ground water supply system**
Capacity:	**328 m^3/day**
Service area:	**Village of Newington**
Service population:	**150**
In-service date:	**1937**
Water source:	**Ground water**
Disinfection method:	**Sodium Hypochlorite (liquid chlorine)**
Operations manager:	**Chris Eamon (613)-551-2720**

This report is a summary of water quality information for the Newington Water Treatment Plant, published in accordance with Schedule 22 of Ontario's Drinking Water Systems Regulation for the reporting period of January 1 to December 31. The Newington Water Treatment Plant is categorized as a Large Municipal Residential Drinking Water System.

This report is prepared by Caneau Water and Sewage Operations Inc. on behalf of the Corporation of the Township of South Stormont. A copy of the Summary report is to be provided to the members of the municipal council not later than March 31, 2020.

"The report must list the requirements of the Act, the regulations, the system's approval and any order that the system failed to meet at any time during the period covered by the report and specify the duration of the failure; and for each failure referred to, describe the measures that were taken to correct the failure." – O. Reg. 170/03 s. 22(2)

"The report must also include the following information for the purpose of enabling the owner of the system to assess the rated capability of their system to meet existing and planned uses of the system:

1. A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows and daily instantaneous peak flow rates.
2. A comparison of the summary referred to in paragraph 1 to the rated capacity and flow rates approved in the system's approval."

O. Reg. 170/03 s. 22 (3)

<u>System Description</u>

The Newington water works draws groundwater from two wells located within the Newington Fairgrounds. The wells are operated in series. The first well, known as the "Kraft" well is the primary source of water. It is a dug well which was originally installed in 1937. The well equipment was upgraded in 1988, including pump upgrade, pressure tanks, chlorination

equipment, etc. The Newington WTP was upgraded in 2004 to include cartridge filtration, extended chlorine contact piping, diesel standby generator, and new instrumentation, as outlined in Drinking Water Works Permit 186-203. The pressure tanks were replaced in 2019.

In dry periods, when the water level hits a minimum depth in the Kraft Well the pump in the second well, the "Fairgrounds" well, is activated to pump water to the Kraft Well. The Fairgrounds Well is a drilled well originally installed in 1979.

Additional descriptions of the wells and disinfection system are provided in the following sub-sections.

Well #1 – The Kraft Well

Well #1 is a dug well installed at a reported depth of 5.2 m. It is located on Lot 7 of Concession Road 8, Township of South Stormont. The co-ordinates for this location are 4,995,915 (+/ 100m) Northing and 498,463 (+/- 100) m Easting, determined from a GPS unit.

The Permit to Take Water limit for Well #1 is 326.9 m^3/d. Groundwater is pumped from one of two submersible pumps (capacity 6.0 L/s @ TDH 52.7 m) each installed in 200 mm diameter well casing. A check valve is located on the discharge of the pumps to prevent backflow. The well discharge is connected to the lift station via 6 meters of 75 mm diameter schedule 80 PVC pipe. Flow is measured by an inline ABB flow meter.

Well #2 – The Fairgrounds Well

The Fairgrounds Well is located on lot 7 Concession Road 8, Township of South Stormont, approximately 330m North of the Kraft Well. The co-ordinates for this location are 4,996,065 (+/- 100 m) Northing and 498,848 (+/- 100) m Easting. The well casing is 200 mm diameter and the well is drilled to a reported depth of 14 m. The piping from the Fairgrounds Well to the Pump Station is 38 mm Schedule 40 PVC. There is approximately 470 m of piping between the Fairgrounds Well and the Lift station. The piping leaves the well, enters the front end of the lift station. When the system is in auto, a three way solenoid valve opens to ditch discharge for the first 10 minutes of the Fairgrounds Well pump operation, and then directs the flow into the Kraft Well. When the system is in manual, it is flushed for 1 hour and tested before putting it into operation,

Groundwater is pumped by a single submersible pump. The capacity of the pump is 1.4 l/s @ TDH 30.5 m of head. The Permit to Take Water limit for the well is 65.5 m^3/day.

Water Treatment Plant

Treatment consists of cartridge filtration and disinfection by sodium hypochlorite.

Cartridge Filtration

Cartridge Filters	
Manufacturer	Harmsco
Housing Model	HUR 90 HP
10 Micron Filter	Model HC-170-10
5 Micron Filter	Model HC-170-5
1 Micron Filter	Model PP-HC-170-1

Three (3) cartridge filters operating in series. The first filter is a 10 micron pre filter, the second filter is a 5 micron filter, and the third is a 1 micron absolute filter. The 1 micron absolute filter is a Harmsco Poly-Pleat filter cartridge which meets the 3-log (99.9%) removal requirements in the National Sanitation Foundation Standard (NSF) 53 for cyst size particles. The turbidity in the filtered water is measured with a Hach turbidity analyzer.

Turbidity Analyzer

The Newington WTP contains one Hach turbidity analyzer. The purpose of this unit is to measure the turbidity of the water following the cartridge filters.

The analyzer provides the operator interface and communications with other devices.

The signal from the filtered water analyzer is datalogged on the ABB SM1000 unit.

Sodium Hypochlorite Disinfection

Post-Chemical Metering Pumps	
Manufacturer	Metcon/Prominent
Model	GALA1602NPB900UD112000
Chemical Used	Sodium Hyprochlorite
Max Capacity	1.4 L/hr
@ Max Back Press. Of	253 psi
Pressure Relief Valve Setting	100 psi
Back Pressure Valve Setting	80 psi
Size of Calibration Column Used	100 mL

The panel was equipped with two (2) Prominent chemical feed pumps. Model GALA1602NPB900UD112000. It is equipped with one (1) back pressure valve set at 100 psi and two (2) pressure relief valves set at 115 psi. The suction of the pump is suction lift. The line pressure at the injection point is estimated @ 90 psi injected into a pipe.

A 70 m length of 600 mm diameter pipe installed outside of the plant, directly to the north-east of the plant, provides chlorine contact time. As water exists the contact pipe, the treated water is monitored for free chlorine residual.

A 6% v/v sodium hypochlorite solution is kept in a 200 litre polyethylene tank. The metering pump rate is set on a daily basis to correspond with the groundwater pumping rate and the chlorine residual in the distribution system.

Chlorine Analyzer - Dulcometer D1C

The Prominent Dulcometer D1C is a device designed for measuring, displaying and controlling free chlorine concentrations in the filtered and potable water. The unit is comprised of the controller, the In-Line Sensor Housing (DGMA), a CLE chlorine sensor, and a Dulcotest Transducer 4-20 mA pH probe.

System Pressurization

Pumping is activated by a pressure drop in the distribution system. Pressure is maintained by six (6) pressure tanks in the lift station. The pressure tanks are ProliteSS, Model CSS 120. The pressure tanks maintain a pressure of 470 kPa in the feeder main to the distribution system. Flow is measured by an inline ABB flow meter.

The piping from the pump station to the distribution system is mostly 75 mm diameter PE Series 100 pipe. A 21m length of 600 mm diameter cast iron pipe has been incorporated into this pipe. The purpose of this addition is to provide additional chlorine contact time prior to the first user. There is no sampling point after this length of pipe to re-establish the chlorine residual.

Distribution System

The distribution system consists of approximately 2.9 km of 75 mm diameter PE Series 100 distribution piping.

There are no other disinfection systems in the distribution system.

There are no storage reservoirs on the distribution network.

Compliance with Terms and Conditions of the Municipal Drinking Water Licence

The Newington Water Treatment Plant and distribution system is operated and maintained in accordance with O. Reg. 170/03 dated June 1, 2003 (last amendment – O. Reg. 185/18) and the Municipal Drinking Water Licence.

A valid Permit to Take Water was issued on June 30, 2015 (No. 5764-9XYMDS) and permits the taking of water from two wells – the Kraft Well (326.9 m^3/day) and the Fairground Well (65.5 m^3/day). The permit expires June 30, 2025.

The water treatment plant is operated to treat water at a rate not exceeding the maximum flow rate of 328m^3/day. The average water taking for the year was 50 m^3/day, 15% of the authorized water taking. (See Appendix I for total flow, average monthly flow and maximum monthly flow.) The flows into the water treatment plant did not exceed the maximum flow rate of 328m^3/day at any time. The maximum flow occurred on August 4, 2019 – 132m^3.

The works and related equipment and appurtenances used to achieve compliance with the Municipal Drinking Water Licence are properly operated and maintained, including effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this certificate and the Act and regulations, adequate laboratory facilities, process controls and alarms, and the use of the process chemical that comes in contact with the water being treated is suitable for the process and appropriate for drinking water.

A mechanical meter measures the flow rate and daily quantity of water taken from each well and conveyed to, and through, the water treatment plant. The flow rate of treated water supplied to the distribution system is recorded as total flow (See Appendix I). The flow meter was calibrated November 21, 2019 by Endress and Hauser.

Free chlorine residual and turbidity in treated water is continuously monitored at the point of entrance into the distribution system. The Prominent chlorine analyzer is accurate to $\pm$2% of the measured value. A low chlorine alarm calls out at a value that is above the required CT, and the high lift pumps will shut down if the chlorine reaches a level lower than the required CT, or the lowest chlorine level of 0.40 mg/L, to prevent non-chlorinated water from being produced. Operators at the Newington Water Treatment Plant try to keep the chlorine residual at around 1.00 mg/L. The on-line chlorine analyzer is checked with the hand-held chlorine analyzer and adjusted as required. The chlorine analyzer was calibrated November 21, 2019 by Endress and Hauser. The Hach turbidity analyzer is accurate to $\pm$0.1 NTU (Nephelometric Turbidity Unit). The turbidity analyzer is checked monthly using a hand-held turbidity analyzer and adjusted accordingly. Raw water turbidity is analyzed monthly. The turbidimeter alarms out when the turbidity reaches 1.00 NTU (Nephelometric Turbidity Units) for a period greater than 14 minutes, 50 seconds and will shut the system down to prevent turbid water from entering the contact pipe. (See Appendix I for monthly average turbidity, and minimum, maximum and average chlorine residual.) The turbidity analyzer was calibrated June 5, 2019 by Hach Canada.

Operators in charge of the Newington Water Treatment Plant keep a daily log book, recording flow meter readings, free and total chlorine residual (both continuous and grab samples), turbidity, and other physical and chemical parameters of the treated water. The WTP is checked (at minimum) every 72 hours.

Samples are collected throughout the year from the raw water and treated water to determine whether or not the water is safe for human consumption (in accordance with O. Reg.170/03, Schedule 10 and 13, Microbiological and Chemical Sampling and Testing). Bacteriological analysis is performed weekly (1 sample each per week of raw and treated water, and 8 samples monthly from the distribution system). Nitrates, THMs and HAAs are analyzed 4 times a year in the distribution system. Schedule 23 and 24 (treated water) are analyzed annually. Sodium and fluoride (treated water) are tested once every 60 months. (See Appendix II – 2018 Annual Report for the Ministry of the Environment.) All samples are analyzed at Caduceon Environmental Labs in Nepean, Ontario. Caduceon and its subcontracted labs are accredited by the Standards Council of Canada. Written procedures have been established for the notification of the Medical Officer of Health and the Ministry of the Environment Spills Action Centre should a sample result indicate an exceedance has occurred. In the reporting year, there were no adverse water quality incidents.

Under Ontario Regulation 170/03, Schedule 15, Section 15.1-5 (lead sampling), Newington WTP and distribution system is eligible for reduced sampling and reduced frequency (every 3 years). Samples were collected in 2018/2019 and will be collected again in 2021/2022. pH and alkalinity are required to be sampled twice per year.

Free chlorine residual in the distribution system is monitored by an alarmed online analyzer with datalogging. The analyzer is checked, at minimum, every 72 hours. The analyzer will alarm out when the chlorine goes below 0.15 mg/L for a period greater than 15 minutes. The online distribution chlorine analyzer was calibrated November 21, 2019 by Endress and Hauser.

All records and information relating to or resulting from the monitoring, sampling and analyzing activities required by the Certificate of Approval are retained for a minimum of 5 years.

The Newington Water Treatment Plant is classified as a Water Treatment 1 (Certificate No. 3668) and Water Distribution 1 (Certificate Number 903). Operators responsible for the operation of the Newington Water Treatment Plant hold valid licences applicable to this type of water treatment plant.

Following all maintenance or repairs to the water treatment facility, all affected areas are disinfected in accordance with the MOE's "Procedure for Disinfection of Drinking Water in Ontario" dated June 2006. All chemicals used in the treatment process and all materials contacting the water meet both the American Water Works Association (AWWA) quality criteria and the American National Standards Institute (ANSI) safety criteria. All chemicals have been registered by a testing institution accredited under the Standards Council of Canada Act or by ANSI.

A contingency plan ensures adequate equipment and material are available for dealing with emergencies, upset conditions and equipment breakdowns in the works.

An operating manual incorporates the requirements of the Municipal Drinking Water Licence. The manual includes monitoring and reporting of the necessary and in-process parameters essential for control of the treatment process and for the assessment of the performance of the works. It also contains procedures that are required for adequate operation and maintenance of the monitoring equipment.

Drawings are prepared and kept up-to-date showing the new works as constructed (record drawings), including timely incorporation of all modifications made to the works throughout its operational life.

A Process and Instrumentation Diagram (PID) for the entire water treatment plant has been prepared and is kept up-to-date, including timely incorporation of all modifications made to the works throughout its operational life.

All record drawings and diagrams and all existing record drawings which are currently in retention throughout the operational life of the water works are readily available for inspection by Ministry staff.

Procedures have been established and are followed for receiving, responding to, and recording complaints about any aspect of the works, including recording the steps that were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its reoccurrence.

Compliance with Regulatory Requirements and Actions Required

The 2019-2020 Compliance Inspection took place on January 7, 2020 by the Ministry of the Environment, Conservation and Parks. The Compliance Inspection Report has not been received as of March 31, 2020. There are no known issues of regulatory non-compliance.

A copy of the report is available at the Township office.

MAINTENANCE

- February 4 – Quarterly samples collected at WTP and distribution points.
- February 6 – Bell Canada on site at rink to troubleshoot phone line – trouble light on alarm panel – panel is failing to communicate – repaired phone line and tested alarms.
- February 27 – Marleau HVAC on site at rink to install new pressure regulator on chlorine analyzer block.
- February 27 – EVB on site to spec tender document for new pressure tanks.
- March 5 – EH on site to complete flow meter calibration.
- March 20 – Surgeson Electric on site to install new EH flow meter. Capital Controls on site to verify programming off old flow meter to new flow meter.
- March 20 – Marleau HVAC on site to replace damper motors on exhaust fans and louvres.
- March 26 – Marleau HVAC on site for annual backflow testing and to repair/replace leaking unions and nipples.
- April 2 – EVB Engineering on site for final design measurements of temporary piping around the treated flow meter during the construction of the replacement of the existing pressure tanks.
- April 3 – Township on site to install Hymax clamp on well pump internal piping leak.
- April 3 – Genrep on site to perform semi-annual generator inspection.
- May 6 – Annual samples collected, quarterly samples collected at WTP and distribution points.
- May 15 – Bergeron Electric and Capital Controls on site for preliminary talks on the new telemetry system to be installed between the Fairgrounds well and the water plant.
- July 9 – EVB on site for pressure tank tender meetings.
- July 24 – Ranguard on site to troubleshoot alarm panel.
- July 25 – Capital Controls on site to troubleshoot relays in PLC cabinet.
- August 7 - Quarterly samples collected at WTP and distribution points.
- September 10 – Marleau HVAC on site to repair backflow preventer. Because the backflow preventer was too rusted, it could not be repaired will require replacement.
- September 13 – Marleau HVAC on site to complete backflow preventer installation and testing.
- October 10 – Capital Controls on site to look over upcoming telemetry job.
- October 17 – Gen Rep on site for annual load test/transfer test.
- October 17 – Eastern Welding on site to prepare for capital project (pressure tank job).
- October 29 – Gen Rep on site to replace faulty battery.
- October 30 – Capital Controls and Bergeron Electric on site for capital project of telecommunications from Fairground well to water plant.

- October 31 – Capital Controls and Bergeron Electric on site to continue work on telemetry capital project.
- November 2 – Capital Controls on site to commission and complete telemetry capital project.
- November 18 - Quarterly samples collected at WTP and distribution points.
- November 19 – Eastern Welding on site with electrical contractor to sort out flow meter install during capital project.
- November 21 – Endress & Hauser on site for annual flow meter and Cl_2 analyzer calibrations.
- November 21 – Final walk-through meeting for capital project.
- November 25 – Eastern Welding on site to begin preparations for plant shutdown @ 11pm. At 11:15pm, plant dropped below 20psi and SAC was notified.
- November 26 – Eastern Welding and Capital Controls on site completing installation of new treated flow meter.
- December 3 – Eastern Welding on site to install braces for new pipes.

APPENDIX I
Flow Data

APPENDIX II

2018 Annual Report

Ministry of the Environment, Conservation and Parks