

The Regional Municipality of York

Committee of the Whole
Environmental Services
March 7, 2019

Report of the Commissioner of Environmental Services

2018 Drinking Water Systems Report

1. Recommendation

1. The Regional Clerk circulate this report to the Clerks of the local municipalities, City of Toronto, Regional Municipality of Peel, and the Ontario Chief Drinking Water Inspector (Ministry of the Environment, Conservation, and Parks).

2. Summary

This report and attachments satisfy reporting requirements in Ontario Regulation 170/03 – Drinking Water Systems, and supports Council in meeting statutory standard of care requirements under the *Safe Drinking Water Act, 2002*.

Key Points:

- In 2018, 99.99 per cent of 16,923 laboratory analyzed samples and 37.6 million continuous monitoring analyzer readings were within regulated standards and confirm York Region's high quality drinking water. All adverse results were addressed and reported.
- In 2018, 12 of 16 inspections scored 100 per cent. The remaining four inspections scored between 86 and 96 per cent. Additional information on all 2018 calendar year inspections is found in Attachment 2.
- York Region is the top scoring GTA municipality in the Chief Drinking Water Inspector's Annual Report Card with an overall inspection and sample score for the Ministry of Environment, Conservation and Parks' 2017-2018 fiscal year of 99.17 per cent.
- With one exception, drinking water systems operated within volume and capacity limits. On June 17, 2018 the Nobleton system exceeded permitted production limits by seven cubic meters. Additional information is found in the Water Volume and Capacity section of this report.
- Advanced systems monitoring, controls, and a multi-barrier approach protect drinking water and public health.

3. Background

Drinking water system owners report annually to comply with the *Safe Drinking Water Act, 2002*

The Ministry of the Environment, Conservation, and Parks (MECP) regulates municipal drinking water systems in Ontario. The *Safe Drinking Water Act, 2002*, (the Act) requires municipal drinking water system owners to report annually on the quality and quantity of drinking water produced and distributed to the public. This regulatory requirement is satisfied through:

- This report, presentation and attachments to Council
- Water quality reports available at york.ca/drinkingwater

Within York Region, water is delivered through a two-tiered water system. The Region operates and maintains 15 drinking water supply systems, which provide water to the nine local municipalities. Our local municipal partners collectively maintain 15 drinking water distribution systems to distribute high quality water to residents and businesses.

Annual Reporting helps Council exercise due diligence and meet standard of care under the *Safe Drinking Water Act*

In 2000, seven people died and thousands became ill from municipal drinking water severely contaminated with E. coli bacteria in Walkerton, Ontario. A range of contributing factors was identified. As a result of this tragedy, the Province developed the Act to address some of these factors and reduce the risk of drinking water related illness.

The Act imposes a standard of care upon individuals with decision-making authority over municipal drinking water systems, which in York Region's case is Regional Council. Council has a responsibility to protect the people in their communities by demonstrating diligence over the sourcing, delivery, and services of safe, high quality drinking water.

Council members fulfil this duty through their decisions and commitments made at Regional Council. Council direction ensures financial sustainability, asset management, and continual improvement of the Region's water systems to proactively manage risks and increase efficiency. This report summarizes 2018 calendar year information that supports Council in their standard of care including:

- Process improvements to enhance operational diligence and continually improve drinking water operations
- Water quality and water quantity performance
- Reported adverse water quality events and corrective actions (Attachment 1)

- Summary of 2018 MECP inspection findings and corrective actions (Attachment 2)
- Summary of 2018 performance data for each drinking water system (Attachment 3)
- Summary of 2018 system monetary expenses (Attachment 4)

York Region's Medical Officer of Health is a key partner in mitigating and monitoring potential public health risks related to drinking water

The Region's Medical Officer of Health plays a key role in protecting public health through safe drinking water by assessing any potential health impact from an adverse water quality test result. The Medical Officer of Health may direct the owner of a drinking water system to take corrective actions beyond what is prescribed by regulations. There were no additional corrective actions required in 2018, and no water use restrictions due to water quality concerns have been ordered by the MECP or by the Medical Officer of Health in over a decade for any reported event.

Environmental Services and Public Health maintain a 24/7 response system to address potential water quality issues. In the event of a water emergency or adverse water quality incident, procedures are in place to ensure close cooperation between the Medical Officer of Health, the Region, the local municipalities, and the MECP, to ensure effective communication and protect public health.

Multi-barrier approach to risk management protects drinking water systems and public health

A key recommendation resulting from the Walkerton tragedy is a multi-barrier approach to drinking water quality and safety. Elements of this approach include source water protection, training of operators, a Drinking Water Quality Management Standard, and a strict Provincial inspection and enforcement program. The multi-barrier approach ensures both preventive and corrective actions are taken to protect drinking water quality.

Source Water Protection prevents contamination of Ontario's drinking water

Staff continue to identify and mitigate current and future threats to drinking water sources as required by the *Clean Water Act, 2006*. York Region's Source Water Protection program identifies and manages potential threats to drinking water. Some focus areas include:

- Requiring that proposed developments in vulnerable areas plan carefully to ensure the safety of our immediate and long term drinking water supply
- The Source Water Protection Incentive Program encourages and supports businesses to make changes to protect drinking water sources

- Collaborating with the Province, local and neighbouring municipalities, and Conservation Authorities, to align our programs and plans to ensure consistent, effective, and successful protection of all sources of drinking water

In 2019, York Region's Source Water Protection Program will continue to review development proposals in vulnerable areas, establish new risk management plans, complete inspections, and provide education to owners of sites within vulnerable areas. Implementation efforts are documented and reported to the Province as required by the *Clean Water Act, 2006*.

Provincially mandated training provides staff with required knowledge to sustain high performing water and wastewater systems

York Region continues to develop and participate in top quality Operator training. The training program is tailored to ensure Operators receive required provincially standardized education, and on-the-job training that translates regulatory requirements to operational needs. The program mandate ensures staff are equipped to competently and efficiently manage drinking water systems in compliance with applicable rules and best practices.

Drinking Water Quality Management Standard is a tool for driving continual improvement

The Region implements a statutory management standard that protects public health through consistent practices for managing and operating water systems, and by identifying and mitigating risks. It is also a tool for identifying and resolving inefficiencies through process and procedure updates that help to address potential compliance risks. The 2018 Integrated Management System Update Report, also on today's agenda, provides more information on the Region's continual improvement efforts to proactively manage risks to drinking water systems and ensures the Region maintains compliance.

Provincial inspections and enforcement assess compliance

York Region facilities are regularly inspected by the MECP, and staff maintain a positive working relationship with regulators to identify and mitigate risks identified in our watersheds. Results of all 2018 MECP inspections and corrective actions are detailed in Attachment 2.

York Region's drinking water sampling program and automated monitoring tools protect public health and safety

York Region uses a variety of monitoring methods to address the unique needs of each water system. Online analyzers and a comprehensive sampling program allow staff to understand the performance of Regional facilities. These tools provide valuable information that supports our industry-leading drinking water operations. Some examples include:

- Online analyzers continuously monitor many water quality parameters, and automatically stop the flow of drinking water when these parameters approach regulatory or operational limits
- A comprehensive sampling program includes both regulatory and research samples, and is frequently updated in response to operational needs and regulatory changes
- Analyzers and dosing equipment are calibrated on a regular schedule by trained operators and technologists to ensure accurate readings
- Using data and technology to analyze the information helps staff to better understand system performance and quality issues

Environmental Services is focused on improving reporting transparency and efficiency

To simplify reporting of York Region's drinking water quality in 2018, staff implemented interactive Water Quality Report Highlights on York Region's Drinking Water Quality webpage. These reports show key details from the Region's Open Data portal in a user-friendly, self-serve interface. The software used to create these highlights was also used to generate Attachments 1, 3, and 4 of this year's report. These reporting efficiencies have saved staff time and effort on managing documents and allow staff to spend more time on operating and performing deeper analysis to optimize delivery of our services. This initiative also supports the Region's commitment to accessibility, customer service, and being a leader in public services. Access the interactive Water Quality Reports highlights at york.ca/drinkingwater

4. Analysis

WATER QUALITY

99.99 per cent of laboratory samples were within Regulatory limits in 2018 and results confirm York Region's high quality drinking water continues to be safe

In 2018, the York-Durham Environmental Laboratory performed 16,923 water quality tests for York Region's drinking water systems, resulting in only two reported adverse test results.

This means 99.99 per cent of all samples collected and analyzed by the laboratory in 2018 were within regulated standards. The laboratory initiates a notification process when analysis indicates a parameter is outside regulatory limits. Staff responded to each adverse test result and performed corrective actions accordingly.

Table 1 summarizes the laboratory analyzed water quality test results reported as adverse water quality events in 2018. Laboratory analyzed sample results are factored into the Chief Drinking Water Inspector’s annual report.

Table 1
Adverse Water Quality Events Reported from
Laboratory Analyzed Test Results in 2018

Parameter and Number of Occurrences	Summary of Reported Results
Sodium (2 occurrences)	<ul style="list-style-type: none"> • Two storage facilities in Newmarket, the Southeast Elevated Tank and the West Reservoir, reported adverse sodium levels between 29.7 mg/L and 33.4 mg/L • Although the reporting standard is 20 mg/L, Health Canada’s aesthetic taste objective maximum for sodium in drinking water is 200 mg/L

Continuous analyzers safeguard drinking water delivered to residents

In addition to sampling conducted by operators, 358 online analyzers continuously monitor system performance, creating approximately 37.6 million records in 2018. Analyzers monitor several system performance parameters, including chlorine residual, which is also known as the “disinfection level”. Analyzers record point-in-time measurements, and the online equipment is highly sensitive to flow changes. Occasional high or low readings on an analyzer are not representative of overall disinfection level in the distribution system, even when reported as adverse at a facility.

When analyzers detect an issue, a facility alarm is triggered and flow shuts down to prevent potential adverse water from entering the distribution system. Control panel operators monitor the system and dispatch operators to respond to alarms or unusual trends. Facilities can only return to operation after an operator attends the site to inspect the equipment, manually test the water, and complete any other required corrective actions to confirm water quality.

Staff reported 52 adverse water quality events observed through continuous monitoring analyzer readings in 2018. In every occurrence, the flow of water was stopped by the system’s automatic safeguards.

- The majority of these events occurred at storage and re-treatment facilities. Several facilities have been recently upgraded, and/or are adjusting to the change in demand in growing areas, therefore ongoing process optimization is anticipated for fine tuning performance
- More than half of the events self-corrected or required minor equipment adjustment, and required no operator intervention aside from confirming compliant readings and restarting the facility operation
- Sixteen events were reported as due diligence. Most of these are considered due diligence reports because there was no water flow leaving the facility at the time of the adverse reading

Table 2 summarizes the continuously monitored analyzer readings reported as adverse water quality events in 2018. Continuous monitoring analyzer results are not factored into the Chief Drinking Water Inspector’s annual report.

Table 2
Adverse Water Quality Events Reported from
Continuous Monitoring Analyzer Readings in 2018

Parameter and Number of Occurrences	Summary of Reported Results
High Disinfection Level (combined chlorine) (26 occurrences)	<ul style="list-style-type: none"> • Many high residual events occurred at facilities operating near the upper regulatory limit. This practice helps to optimize water quality in areas of the distribution system that are furthest from the treatment source. The local Medical Officer of Health, the MECP, and local municipalities were consulted when planning to operate near the upper disinfection dosing limit.

Table 2 (continued)

Parameter and Number of Occurrences	Summary of Reported Results
Low Disinfection Level (combined/ free chlorine, contact time) (21 occurrences)	<ul style="list-style-type: none">• Most low disinfection events are caused by equipment error or maintenance at the time of the alarm.• Corrective actions for low disinfection level include collecting grab samples and recalibrating analyzers. When analyzers are found to be reading a low disinfection level correctly, staff perform system flushing in cooperation with local municipalities and monitor chlorine residuals until it reaches optimal levels.
High Fluoride Level (4 occurrences)	<ul style="list-style-type: none">• Fluoride is continuously monitored at the Georgina and Keswick Water Treatment Plants, where it is applied within the optimal range recommended by the MECP and the Medical Officer of Health.• If a fluoride analyzer exceeds operational limits, the facility immediately stops directing water to the distribution system. If there is no flow at the time of the alarm, staff recalibrate equipment to ensure accurate readings.• If required, an operator may backflush the system to prevent water from leaving the facility and restore correct fluoride dose.
Low System Pressure (1 occurrence)	<ul style="list-style-type: none">• During routine infrastructure maintenance, a flooded chamber required isolation and pump out. Precautionary disinfection of all exposed infrastructure and testing of water upstream, downstream and at the location was undertaken in coordination with Public Health and the Town of Aurora.• All sample results demonstrated disinfection residuals remained constant and protective.

Attachment 1 summarizes all reported adverse events detected through continuous monitoring and laboratory results, as well as the actions taken to correct them.

MINISTRY INSPECTIONS

In 2018, 12 of 16 inspections scored 100 per cent

In 2018, 12 of 16 inspections scored 100 per cent. In this timeframe, the Georgina Drinking Water System was inspected twice. Four inspections scored between 86 and 96 per cent and resulted in 10 non-compliances, which are summarized in Table 3.

Table 3
Summary of 2018 Ministry Inspection Findings

Location	Summary of Non-Compliant Findings and Corrective Actions
Mount Albert, Ballantrae-Musselman's Lake and Stouffville Drinking Water Systems (6 non-compliances)	<ul style="list-style-type: none">• Samples were taken but not delivered to the laboratory within the required timeframe. Operational procedures were updated and training was provided to staff.
Keswick Drinking Water System (3 non-compliances)	<ul style="list-style-type: none">• Coagulant feed was interrupted and not immediately reported. Monitoring equipment was installed to prevent reoccurrence and additional training was provided to staff.• Temporary inadequate turbidity monitoring. Operational procedures were updated and monitoring equipment was upgraded.
King City Drinking Water System (1 non-compliance)	<ul style="list-style-type: none">• Inadequate documentation of site work. Operational procedures were reviewed and additional training was provided to staff.

CHIEF DRINKING WATER INSPECTOR 2017-2018 RATINGS

York Region receives top scores in the Greater Toronto Area for the Ontario Chief Water Inspector's 2017-2018 Annual Report

Ontario's Chief Drinking Water Inspector releases an annual report rating for drinking water systems. Reporting timelines are based on the MECP's previous fiscal year from April 1, 2017 to March 31, 2018. York Region achieved top compliance scores for MECP inspections and for samples meeting provincial water quality standards. York Region's combined average score for inspections and samples meeting provincial water quality standards was

99.17 for all 15 drinking water systems combined in the 2017-2018 Chief Drinking Water Inspector's Report. The City of Toronto and Peel Region, who supply the majority of York Region's drinking water, also received high scores. Table 4 outlines the scores for GTA municipalities.

Table 4
Ministry of the Environment, Conservation and Parks
2016-2018 Chief Drinking Water Inspector's Annual Report Scores

Municipality	Inspection Rating (%)		Water Quality Tests Meeting Standards (%)		Overall Score	
	2016-2017	2017-2018	2016-2017	2017-2018	2016-2017	2017-2018
York Region*	99.60	98.45	99.93	99.89	99.77	99.17
Durham Region*	99.36	98.14	99.95	99.81	99.65	98.98
Peel Region*	97.76	98.08	99.92	99.93	98.84	99.00
City of Toronto*	95.57	95.00	99.72	99.55	97.65	97.27
Provincial Average	98.47	98.64	99.89	99.78	99.18	99.21

*Average of scores for all drinking water systems within municipality

York Region achieved an overall inspection rating of 98.45 per cent in the Chief Drinking Water Inspector's Report. This is based on 15 inspections conducted from April 1, 2017 to March 31, 2018. 12 of 15 inspections in the Chief Drinking Water Inspector's Report scored 100 per cent. Non-compliances found in three inspections were promptly identified and addressed. Details on all 2017 inspections are found in [last year's report to Council](#). Details of 2018 non-compliance findings are summarized in Table 3 and all 2018 inspection results are listed in Attachment 2.

York Region achieved an overall sample compliance rating of 99.89 per cent in the Chief Drinking Water Inspector's Report for laboratory analyzed samples meeting the requirements of the *O.Reg. 169/03: Ontario Drinking Water Quality Standards*. This is based on laboratory sampling conducted from April 1, 2017 to March 31, 2018. 12 of 15 drinking water systems scored 100 per cent for samples meeting provincial water quality standards. All incidents occurred in 2017, were promptly reported and corrective actions completed. Details on all 2017 adverse water quality incidents are found in [last year's report to Council](#).

Inspectors evaluate facilities against regulations, licenses, permits and MECP procedures. There were no risks to public health relating to the inspection findings identified by the

MECP. As demonstrated in Table 4, York Region continues to receive top marks on MECP inspections and sampling results, consistently leading the Province along with our Greater Toronto Area municipal partners and neighbours.

WATER VOLUME AND CAPACITY

All drinking water systems operated within permitted water volume and capacity limits except for one system on one day

In 2018, York Region's drinking water systems operated within the monthly average flow, maximum daily withdrawal and allowable daily withdrawal limits, with a single exception. On June 17, 2018, the combined total flow from the three wells in Nobleton exceeded the permitted limit of 4,460 cubic metres per day by seven cubic metres. Automatic shutdowns were programmed on each well, but there was no alarm for the combined total volume of all three wells running at allowable flowrates. 48 hours after the exceedance, technicians updated the system programming to shut down the wells if the combined daily total flow reaches the permit limit to ensure flow stays within permitted limits. Based on this experience, programming for all systems with combined flow limits was reviewed and updated as necessary.

York Region continues to maintain compliance with:

- The *Safe Drinking Water Act, 2002* and its regulations
- Terms and conditions of the Region's Permits to Take Water and supply agreements with the City of Toronto and Peel Region
- The permitted Intra-Basin Transfer volumes for water taken from (and returned to Lake Ontario) for communities in the Lake Huron watershed

York Region continues to ensure sufficient drinking water capacity for the Region's growing population. Included in Attachment 3 are the number of days where water supply facilities operated at 80 per cent or higher of the permitted daily withdrawal, and the bar graph at the bottom shows the single highest daily volume taken in the entire year. This data informs decision making regarding long term water sourcing, and helps ensure there is adequate water available for fire protection. Maximum permitted volumes support forecasted population growth to 2031. Long term water demands will be refined in the Water and Wastewater Master Plan Update, currently planned for completion in 2021.

5. Financial

Effective and comprehensive asset management is critical to delivering reliable and sustainable water services

York Region delivers high quality drinking water in a safe and cost effective manner. The estimated replacement cost for York Region’s water facilities and underground infrastructure is approximately \$2.1 billion, accounting for approximately 16 per cent of all the Region’s assets. These assets are wholly owned by the Region and do not include shared assets with the City of Toronto and with Peel Region. For more information about Peel and Toronto cost-shared projects, refer to the [Water and Wastewater Capital Infrastructure Status Update](#) presented to Committee of the Whole on January 10, 2019. These investments support long-term drinking water safety and supply reliability. Effective asset and infrastructure management is critical to the Region’s ability to deliver services that are safe, reliable and efficient while sustaining our growing communities. Operational excellence is supported by collaboratively planned and prioritized upgrades, repairs and expansions.

In [October 2015](#), Council approved 2016 – 2021 water and wastewater rates supported by a detailed analysis described in the Financial Sustainability Plan. The plan was implemented commencing in April 2016, and focuses on achieving full cost recovery pricing in 2021 and eliminating shortfalls in asset management funding.

York Region spent approximately \$26.7 million in 2018 to maintain and improve drinking water systems

Section 11 of the Drinking Water Systems regulation requires water utility owners to “describe any major expenses incurred during the period covered by the report to install, repair or replace required equipment.”

In 2018, York Region spent approximately \$26.7 million installing, repairing or replacing equipment used to treat, store and deliver safe drinking water. Costs are funded through the rate-supported Environmental Services water budget, as approved annually by Council. These expenses do not include operational costs or salaries, and are summarized in Attachment 4.

6. Local Impact

York Region and its nine local municipalities work together to distribute high quality drinking water

Water quality standards are maintained through collaboration between York Region and the nine local municipalities. Although ownership and operation of the water systems is two-tiered, the Region and the local municipalities coordinate operation of highly efficient systems to provide safe and uninterrupted water supply to our collective customers.

7. Conclusion

This report and all attachments, along with drinking water data posted on york.ca/opendata and summaries posted on york.ca/drinkingwater, satisfies reporting requirements under the Act. It demonstrates the Region's commitment to operational excellence through continual improvement, while also fulfilling our obligation to communicate performance to Council, stakeholders and the public. Council is able to demonstrate due diligence required for decision making under their statutory standard of care by reviewing and considering the information contained in this report when exercising decision making authority.

York Region's drinking water systems are subject to strict regulations implemented by the Province to keep public drinking water safe. Results from the 2018 reporting year continue to demonstrate the excellent performance of York Region's drinking water systems.

For more information on this report, please contact David Szeptycki, Director of Strategy and Innovation, at 1-877-464-9675 ext. 75723, or Roy Huetl, Director of Operations, Maintenance and Monitoring, at 1-877-464-9675 ext. 75323. Accessible formats or communication supports are available upon request.

Recommended by:

Erin Mahoney, M. Eng.
Commissioner of Environmental Services

Approved for Submission:

Bruce Macgregor
Chief Administrative Officer

February 26, 2019
Attachments (4)
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