

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF MARCH 10, 2021

Item 6, Report No. 8, of the Committee of the Whole, which was adopted without amendment by the Council of the City of Vaughan on March 10, 2021.

6. ANNUAL DRINKING WATER SYSTEM REPORT

The Committee of the Whole recommends approval of the recommendation contained in the following report of the Deputy City Manager, Public Works, dated March 2, 2021:

Recommendations

1. That this report be received for information.

Committee of the Whole (1) Report

DATE: Tuesday, March 2, 2021

WARD(S): ALL

TITLE: ANNUAL DRINKING WATER SYSTEM REPORT

FROM:

Zoran Postic, Deputy City Manager, Public Works

ACTION: FOR INFORMATION

Purpose

The purpose of this report is to provide Mayor and Members of Council information regarding the performance of the City's Water Distribution System and its Drinking Water Quality Management System (DWQMS), for the year 2020. This report and its attachments support Council, as the system owner, in meeting its statutory standard of care under the *Safe Drinking Water Act, 2002 (SDWA)* by providing information on the quality of water supplied and the operation and performance of the drinking water system. This report to Council satisfies the annual reporting requirements of Ontario Regulation 170/03 - Drinking Water System.

Report Highlights

- In 2020, 99.3% of the 4,028 drinking water samples tested met regulatory standards and confirm the City's continued delivery of safe drinking water
- The City's drinking water system achieved a 100% inspection rating in the Ministry of the Environment, Conservation and Parks' Chief Drinking Water Inspector's Report for the 2019-2020 fiscal year
- A Management Review, to evaluate the continuing suitability, adequacy and effectiveness of the Quality Management System as required under Element 20 of the DWQMS, was completed on June 26, 2020

Recommendations

1. That this report be received for information.

Background

Annual reports on drinking water systems are required to satisfy statutory requirements

Drinking water and drinking water systems are regulated by the Province through the Ministry of the Environment Conservation and Parks (MECP).

The Safe Drinking Water Act, 2002 (the Act), mandates owners and operating authorities of the municipal drinking water systems to annually produce a Summary Report, containing information on the system's operation, management, sampling, testing, certification of staff, and water quality and quantity. The Summary Report must be completed and made available to the public by March 31st of each year and is included as Attachment 1.

Regular updates and annual reporting assists Council in exercising its due diligence to meet its statutory standard of care

The Act imposes a standard of care upon individuals with decision-making authority over municipal drinking water systems. Council, through its decision-making power, protects the City's residents and businesses by demonstrating diligence over the supply and delivery of drinking water.

Council's commitment to the provision of safe drinking water ensures financial sustainability, asset management, and continual improvement of the City's drinking water system to proactively manage risks and increase efficiency.

Mitigating and monitoring potential public health risks related to drinking water ensures safety of drinking water users

York Region's Medical Officer of Health (MOH) has a key role in protecting public health by assessing potential health impacts from adverse water quality test results. The MOH may direct the owner of a drinking water system to take corrective actions over and beyond the regulatory mandated corrective actions or the City's Standard Operating Procedures (SOPs). For the 2020 reporting period, there were no additional corrective actions or water restrictions (e.g. boil water advisories or drinking water advisories) imposed on the City by the MOH.

Where an adverse water quality event or a water emergency occurs, procedures are in place to ensure close communication and co-operation between the MOH, York Region, and MECP, protecting public health.

Multi-barrier approach mitigates risks, protects the drinking water system and public health

The multi-barrier approach to protect drinking water in Ontario was a key recommendation in Justice O'Connor's report on the Walkerton tragedy in 2000.

Elements of this approach include source water protection, certification and training of operators, an operational plan and Quality Management System (DWQMS) based on Drinking Water Quality Management Standards along with a Provincial inspection and enforcement program.

Multiple levels of protection protect the public and ensure that preventative and corrective actions are taken to address potential risks.

Regulatory mandated training for certified drinking water operators provides required knowledge to operate complex drinking water systems

The City continues to participate in high quality operator training through MECP approved training providers and training courses. There are two components to drinking water operator training, in class training and on-the-job practical training. Both components are required to be completed by an operator to maintain certification. All of the City's operators and contractors are required to hold current MECP issued drinking water certificates before operating any component of the City's drinking water system.

Provincial inspections and enforcement assess compliance

The MECP's Provincial Officers conduct an on-site inspection to assess compliance with regulatory requirements including those laid out in the City's Municipal Drinking Water License and Drinking Water Works Permit. One detailed, unannounced, inspection is conducted by the MECP every three years.

The City's most recent announced MECP inspection took place on February 7, 2020. The City received a 100% inspection approval rating.

System Owners and Operators are informed of significant findings, that may affect public health, immediately during the inspection.

Internal and external audits of the DWQMS promote continuous improvement

In July 2020, staff completed an internal DWQMS audit with the assistance of an external consultant. The audit reviewed the elements of the DWQMS and their implementation.

The audit identified one minor non-conformance and four opportunities for improvement. The minor non-conformance and three opportunities for improvement were addressed immediately and closed; opportunities for improvement remain open and are being incorporated into the system, as appropriate.

Subsequent to the internal audit, the Annual Management Review took place to update senior management on the status of the drinking water system, actions taken and planned for the next calendar year. A summary of the Management Review is provided in Attachment 2.

In August 2019, an audit of the DWQMS was completed by an external MECP approved auditor. The audit identified one minor non-conformance and five opportunities for improvement. The minor non-conformance has been closed and opportunities for improvement have been reviewed and are being incorporated in the system.

Previous Reports/Authority

[2019 Update on Drinking Water System Performance](#)

Analysis and Options

99.3% of laboratory samples were within Regulatory limits in 2020, re-confirming that the City's drinking water is and continues to be safe

In 2020, the York-Durham Environmental Laboratory, a MECP accredited drinking water testing laboratory, and the City's Certified Drinking Water Operators performed 4,028 water quality tests. Of these tests, only 27 fell outside of the regulatory limits, these incidents are called Adverse Water Quality Incidents (AWQI).

Staff responded to each AWQI in accordance with the City's Standard Operating Procedures, performing corrective actions required under relevant regulations of the SDWA and direction of the Region's MOH. Promptly and appropriately addressing AWQIs and their causes maintained continuous delivery of drinking water and ensured the safety of the public.

MECP inspections provide opportunities for improvement of the Drinking Water System

The February 2020 MECP inspection report made three recommendations for improvement, including, updating the forms that identify the Overall Responsible Operator (ORO)/Operator-in-Charge from Operator-in-Training (OIT) which was to ensure an OIT is not designated as an ORO/OIC since these designations require a higher level operator certification under O.reg 128/04 made under SDWA. The second observation was that Woodland Acres pressure elevating system did not appear to be visited on a consistent schedule and the third recommendation was to provide clarity on the adverse resolution forms, providing a concise document and avoiding references to multiple documents.

All three MECP recommendations were implemented in 2020 through updates to the City's SOPs, creating recurring work orders, and management oversight processes.

Vaughan received a 100% inspection score on the Chief Drinking Water Inspector's 2019-2020 Annual Report

Ontario's Chief Drinking Water Inspector releases an annual report, scoring drinking water systems. Reporting timelines are based on the MECP's previous fiscal year April 1, 2019 to March 31, 2020.

The 2019-2020 Chief Drinking Water Inspector Report gave the City the highest possible score of 100%.

For comparison purposes, only seven of the nine local area municipalities in York Region received a score of 100%, with the remaining two receiving scores ranging from 90.59% to 91.39%. Of all the 657 municipal residential drinking water systems in Ontario, only 71% receive the score of 100%, illustrating that the City's drinking water system operations and management as amongst the best in the Province.

Financial Impact

In May 2019, Council approved the proposed [Long Term Water Financial Plan for 2020 to 2031](#), committing to long-term financial sustainability of the City's water distribution system, ensuring the continuous delivery of safe drinking water. The plan identifies financial support required to operate, maintain and perform asset management on the drinking water system and was a component in the City's Municipal Drinking Water License renewal submission to the MECP.

Section 11 of Ontario Regulation 170/03: Drinking Water Systems requires the owners describe “any major expenses incurred during the period covered by the report to install, repair or replace required equipment.”

In 2020, the City invested \$8.85 million to install, repair or replace equipment required to deliver safe drinking water. Costs were funded through the City’s water rates, associated reserves and the approved capital budget.

Broader Regional Impacts/Considerations

There is no impact to the Region.

Conclusion

This report, and its attachments are provided to support Council’s statutory duty of care under Provincial drinking water regulations, allowing Council to demonstrate its due diligence in performing informed decision making under its statutory standard of care.

The City’s drinking water system is subject to strict regulations implemented by the Province to keep drinking water safe. The results from both internal and external parties for the reporting year 2020 confirm that the City’s drinking water system is performing well.

These results are attributed to Council’s commitment to the City’s residents and business by providing safe, clean drinking water.

As part of the regulatory reporting requirements, links to this report and its attachments will be posted on the City of Vaughan external website.

For more information, please contact: James Steele, Director, Environmental Services, ext. 6116

Attachments

1. Annual Report
2. Drinking Water Quality Management System – Summary of Management Review

Prepared by

James Steele, Director of Environmental Services, Extension: 6116

Approved by

A handwritten signature in blue ink, appearing to be 'Zoran Postic', with a stylized, looped design.

Zoran Postic, Deputy City Manager,
Public Works

Reviewed by

A handwritten signature in blue ink, appearing to be 'Jim Harnum', with a cursive style.

Jim Harnum, City Manager

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CITY OF VAUGHAN 2020 ANNUAL SUMMARY REPORT

March 8, 2021

Description of the Vaughan Water Distribution System to fulfill the requirements under Schedule 22 of Ontario Regulation 170/03

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1.0 REPORT OVERVIEW

1.1 BACKGROUND

This report is intended to provide the Mayor and Members of Council, as “Owners” of the drinking water systems, an understanding of the status of the City of Vaughan’s drinking water system for the reporting period of January 1, 2020 to December 31, 2020.

Second, the Safe Drinking Water Act (2002) mandates that it is the responsibility of the municipality to:

- Recognize that the people of Ontario are entitled to expect their drinking water to be safe; and,
- Provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Finally, this report has also been prepared to satisfy the requirements of Schedule 22, O. Reg. 170/03 (Summary Reports for Municipalities).

For the 2020 reporting period, a separate Annual Report, which contains data related to annual testing and sampling parameters, was prepared to fulfill Section 11 of O. Reg. 170/03. This report will be posted on the City’s website by March 31, 2021.

1.2 QUALITY MANAGEMENT SYSTEM POLICY

As the owners and operators of the City of Vaughan’s water distribution system we are committed to:

- providing safe and clean drinking water to our citizens and businesses
- complying with all applicable legislation and regulations as related to the provision of safe drinking water
- implementing and continually improving the effectiveness of our Quality Management System

This quality management policy has been developed in accordance with the objectives of the 2018-2022 Term of Council Service Excellence Strategic Plan specifically to enhance and ensure community safety, health and wellness and to maintain assets and infrastructure integrity.

2.0 DRINKING WATER SYSTEM DESCRIPTION

2.1 DRINKING WATER SYSTEM PROFILE

The City of Vaughan, Environmental Services Department is responsible for the distribution of safe drinking water throughout the City. In 2020, 42,331,721m³ of water was supplied to residences, industrial, commercial and institutional locations throughout the City.

The City purchases its drinking water from York Region prior to distribution. York Region obtains this water from the City of Toronto and the Region of Peel. The water originates from Lake Ontario and is treated using a process called chloramination, a disinfection method which uses chlorine combined with ammonia, which ensures that the water continues to be safe to drink from the time of treatment until it reaches the consumer.

The Vaughan water distribution system includes 1,135 kilometers of active watermains, 1 booster station and 1 pressure elevating station. Table 1 below displays the Vaughan Distribution System profile information, which includes the system number, class of subsystem, Municipal Drinking Water Licence (MDWL) number, Drinking Water Works Permit (DWWP) number, and the system classification.

Table 1 Vaughan Distribution System Profile Information.

System Number: 260003097	Class 2 Water Distribution Subsystem
Municipal Drinking Water Licence: 011-101	Drinking Water Works Permit: 011-201
Classification: Large Municipal Residential System	

3.0 LEGISLATIVE REQUIREMENTS

3.1 SUMMARY OF LEGISLATIVE REQUIREMENTS

The Act and associated Regulations under which the City of Vaughan operates the water distribution system are:

The Safe Drinking Water Act, 2002 (SDWA),

(a) Ontario Regulation 170/03 of the SDWA

- The overall legislative framework for operating a drinking water system

(b) Ontario Regulation 128/04 of the SDWA

- The certification of the City's drinking water system operators

(c) Ontario Regulation 169/03 of the SDWA

- The water sampling parameters according to Ontario Drinking Water Quality Standards

(d) Ontario Regulation 188/07 of the SDWA

- The licensing requirements of our drinking water system

3.1.1 ONTARIO REGULATION 170/03

The Drinking Water Systems Regulation (O. Reg. 170/03) establishes eight categories of drinking water systems, four of which are municipal, and the other four being non-municipal. The City of Vaughan's water system is a **Large Municipal Residential System**. It meets this requirement because it matches the legislative definition of a *"municipal drinking water system that serves a major residential development and serves more than 100 private residences"*.

The Regulation contains schedules that address several requirements for a drinking water system. The following schedules are applicable to the City of Vaughan's distribution system:

- | | |
|-----------------|--|
| • Schedule 6 | Operational Checks, Sampling and Testing - General |
| • Schedule 7 | Operational Checks |
| • Schedule 10 | Microbiological Sampling and Testing |
| • Schedule 13 | Chemical Sampling and Testing |
| • Schedule 15.1 | Lead |
| • Schedule 16 | Reporting Adverse Test Results and Other Problems |
| • Schedule 17 | Corrective Action |
| • Schedule 22 | Summary Reports for Municipalities |

3.0 LEGISLATIVE REQUIREMENTS

SCHEDULE 6 – OPERATIONAL CHECKS, SAMPLING AND TESTING – GENERAL

This section of the Regulation provides direction on sample frequency, form, handling, monitoring equipment and record keeping. Wording in this schedule provides the framework for performing drinking water samples as discussed in detail in Schedule 7.

SCHEDULE 7 – OPERATIONAL CHECKS

This schedule identifies responsibility for chlorine, turbidity, and fluoride testing, as well as defines tests that can be done by a certified water operator.

As required under this schedule, the City ensures that drinking water samples from the Vaughan Water Distribution System are taken and tested for a combined chlorine residual. In 2020, 2,197 samples were taken to measure chlorine residuals.

The Vaughan Water Distribution System is a stand-alone system which means that the water which is received stays only within the City borders. Primary disinfection, testing for turbidity and fluoride addition is provided by the City of Toronto and the Region of Peel at their water treatment plants.

SCHEDULE 10 – MICROBIOLOGICAL SAMPLING AND TESTING

The frequency of microbiological sampling for the presence of bacteria and testing for the City is covered within this schedule. The number of required samples is based upon population size, and therefore in 2020 Vaughan was mandated to take a minimum of 134 microbiological samples per month for an annual total of 1,608 samples.

The City collected a total of 1,755 microbiological samples for testing. Of these, more than 25% of them were additionally sampled for Heterotrophic Plate Count (HPC) to satisfy regulatory requirements. HPC measures the overall bacteriological quality of drinking water.

SCHEDULE 13 – CHEMICAL SAMPLING AND TESTING

This schedule outlines requirements for sampling of inorganics, organics, trihalomethanes (THMs), haloacetic acids (HAAs), nitrate and nitrite, sodium, and fluoride.

Though the City itself was not required to test for inorganics, to maintain diligence, testing was performed for these in 2020.

The City also tested for THMs and HAAs – chlorine disinfection byproducts - on a quarterly basis. All levels were below legislative limits.

3.0 LEGISLATIVE REQUIREMENTS

SCHEDULE 15.1 – LEAD SAMPLING

This Schedule applies to sampling for lead and stipulates that there are two sample periods to consider – one during the winter and the other during the summer. Prior to 2011, the City was mandated to collect 100 samples from points in plumbing that serve private residences, 10 samples from points in plumbing that do serve private residences and 20 samples from sampling points in the distribution system. These samples showed that lead is not a matter of significant health concern in the City, and therefore regulatory relief from testing in private residences was granted by the MECP.

A reduced lead sampling schedule is followed in Vaughan with 10 distribution samples, obtained from fire hydrants throughout the City, taken twice per year and measured for pH, alkalinity, and lead. In 2020, there were no sample exceedances for lead.

SCHEDULE 16 – REPORTING ADVERSE TEST RESULTS AND OTHER PROBLEMS

The schedule defines the City's duty to report any drinking water test result which exceed any of the standards prescribed by the Ontario Drinking Water Quality Standards (O.Reg. 169/03).

The reporting requirement involves immediate oral and written notification to the Ministry of the Environment, Conservation, and Parks (MECP) Spills Action Centre (SAC), and the Medical Officer of Health at the York Region Public Health Unit.

Table 2 below provides a summary of all adverse water quality incidents that occurred in 2020. The corrective action for each incident is also included. There were 27 adverse water quality incidents, none of which resulted in a risk to public health.

Table 2 2020 Adverse Water Quality Incidents and Corrective Actions.

Incident Description	Incident Date	Adverse Test Result	Regulatory Limits	Corrective Action
Combined Chlorine Residual	06/02/20	0.00mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	08/05/20	0.10mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	08/20/20	0.06mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	08/30/20	0.12mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.

3.0 LEGISLATIVE REQUIREMENTS

Incident Description	Incident Date	Adverse Test Result	Regulatory Limits	Corrective Action
Combined Chlorine Residual	10/01/20	0.12mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	10/06/20	0.04mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	10/22/20	3.09mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	10/23/20	0.00mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	11/04/20	0.05mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	11/19/20	0.08mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	12/08/20	0.04mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
	12/14/20	0.10mg/L	0.25 mg/L (Minimum) 3.0 mg/L (Maximum)	Water Operations flushed watermain at site and resampled.
Total Coliform (TC) Present	01/17/20	TC -Present	0	Water Operations flushed watermain at site and resampled.
	03/18/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	07/19/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	08/26/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	09/02/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	10/21/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	10/28/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	11/04/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	11/04/20	TC- Present	0	Water Operations flushed watermain at site and resampled.

3.0 LEGISLATIVE REQUIREMENTS

Incident Description	Incident Date	Adverse Test Result	Regulatory Limits	Corrective Action
Total Coliform (TC) Present	11/04/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	11/06/20	TC -Present	0	Water Operations flushed watermain at site and resampled.
	11/11/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	11/18/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	11/20/20	TC- Present	0	Water Operations flushed watermain at site and resampled.
	12/18/20	TC- Present	0	Water Operations flushed watermain at site and resampled.

SCHEDULE 17 – CORRECTIVE ACTION

In conjunction with the requirements of Schedule 16 listed above, corrective actions are immediately undertaken to address adverse water quality incidents. Responses include watermain flushing and resampling of the identified area. The samples are tested for chlorine residuals and sent to the laboratory for further microbiological tests. Once complete results have been received from the laboratory, and are within the set regulatory limits, a notice of issue resolution is reported back to both the MECP Spills Action Centre and the Medical Officer of Health at the York Region Public Health Unit.

SCHEDULE 22 - SUMMARY REPORTS FOR MUNICIPALITIES, AND SECTION 11 OF O. REG. 170/03

Summary Reports for Municipalities for Large Municipal Residential systems are identified within Schedule 22. The requirements of the report are listed within it, and annual submissions for the previous calendar year, must be submitted to the City's Mayor and Members of Council, as "Owners" of the system, by March 31 of the following year. The City also posts the report on the City's website and hard copies of the report are available free of charge to the public at the City's Joint Operations Centre located at 2800 Rutherford Road.

Similarly, Annual Reports defined under Section 11 of the Regulation are prepared for submission no later than February 28th of the following year. The requirements of the content set within this report are also defined in the legislation. The City ensures that effective steps are taken to advise users that copies of the report are available, without charge, and locations where copies of the report may be obtained. This report is also made available on the City of Vaughan's website.

3.0 LEGISLATIVE REQUIREMENTS

3.1.2 ONTARIO REGULATION 128/04

This Regulation establishes the training and certification requirements that must be satisfied by certified water operators.

The City of Vaughan's water operations staff operated the Vaughan Water Distribution System in 2020. Every operator is required to complete a total of 105 training hours within the three-year operator certificate renewal period. Operator training consists of 36 hours of MECP's classroom training, plus 69 hours of On-the-Job practical training.

During the reporting period January 1, 2020, to December 31, 2020, all City of Vaughan's drinking water operators held a valid operator certificate in compliance with O. Reg. 128/04 and met provincial training requirements.

3.1.3 ONTARIO REGULATION 169/03

The Ontario Drinking Water Quality Standard (ODWQS) under Ontario Regulation 169/03 identifies the minimum level of drinking water quality acceptable for human consumption.

The City of Vaughan water sampling and testing program complied with the following standards:

- Schedule 1. Microbiological Standards
- Schedule 2. Chemical Standards
- Schedule 3. Radiological Standards

As this Regulation indicates the minimum standard, exceedance of these values represents the point of which adverse reporting and corrective action is triggered.

3.1.4 ONTARIO REGULATION 188/07

The Safe Drinking Water Act, 2002 (SDWA) requires Owners and Operating Authorities of municipal residential drinking water systems to have an accredited Operating Authority. In order to become accredited, an Operating Authority must establish and maintain a Quality Management System (QMS). Minimum requirements for the QMS are specified within the Drinking Water Quality Management Standard (DWQMS). Ontario Regulation 188/07 of the SDWA has been established to aid in the licensing of the municipal drinking water systems.

3.0 LEGISLATIVE REQUIREMENTS

3.2 DRINKING WATER QUALITY MANAGEMENT STANDARD (DWQMS)

The Drinking Water Quality Management Standard has 21 elements which relate to quality management and the risk assessment/risk management of critical control points. The Operational Plan documents the processes and procedures that the Owner and Operating Authority have in place to meet the requirements of the DWQMS.

The original full scope DWQMS accreditation certificate was formally issued by Canadian General Standards Board to the Corporation of the City of Vaughan on July 7, 2009. The City of Vaughan DWQMS was re-accredited on August 11, 2018 and had a full-scope surveillance audit completed August 4 & 5, 2020. Based on obtaining DWQMS accreditation and submitting a Council approved Financial Plan, as required under the Sustainable Sewage and Water System Act, to the Ministry of Municipal Affairs and Housing, the City of Vaughan received its Drinking Water Works Permits and Municipal Drinking Water Licenses on July 27, 2009.

As participants of the full scope accreditation process for the DWQMS, the City of Vaughan is required to submit system information for an on-site verification audit to maintain accreditation status. The Vaughan Distribution System remains fully accredited.

4.0 DRINKING WATER SYSTEM MAINTENANCE PROGRAMS

4.1 WATERMAIN FLUSHING PROGRAM

The main objective of the watermain flushing program is to maintain chlorine residual in the water distribution system in order to meet the regulatory requirements and ensure the chlorine residual reflects the water quality in a given area. Flushing also helps clean the pipe by removal of mineral deposits from the pipe walls while improving the aesthetics of the water. It is performed at locations that have the potential for stagnant water, such as dead ends, areas of low water consumption (i.e. new subdivisions), and during watermain repairs to remove any debris in the watermain and restore chlorine residuals. Flushing is performed by the City's certified and trained drinking water operators. Chlorine residuals are recorded at each location on completion of watermain flushing.

4.2 WATERMAIN SWABBING

The primary reason for watermain swabbing is to clean any mineral build-up from pipe walls and remove rust due to corrosion of metallic pipes. Swabbing typically utilize a polyurethane swab slightly bigger than the diameter of the watermain. The swab is inserted from a hydrant which exits from another hydrant; any mineral deposits removed from the pipe walls will also exit from this hydrant. Mineral and rust build-up in pipes provides a potential safe place for harmful pathogens to hide by avoiding contact with chlorine. Swabbing assists in removal of these pathogens and helps in delivery of safe drinking water. Flushing and swabbing improve the hydraulics in the water distribution systems which reduce energy costs and improve water flow.

4.3 HYDRANT INSPECTION PROGRAM

An annual inspection of all hydrants in the City is a requirement under the Provincial Fire Code (Ontario Regulation 213/07). The inspection determines the operational functionality of hydrants and valves to ensure their smooth operation for firefighting. The hydrant inspection program is outsourced by the City. Repairs for deficiencies identified through the hydrant inspection program are completed by City drinking water operators along with the contractor, if required.

4.4 VALVE EXERCISING PROGRAM

Valves, along with hydrants, and water booster stations are key components of the City's water distribution infrastructure. Valves control and change the direction of flow of water within the water distribution system, they are required to be operated during other maintenance activities including watermain swabbing and watermain flushing. During a watermain break, valves isolate a section of watermain for the repairs, confining the water disruption to a smaller area. Valves are exercised as part of the City's preventative maintenance program. Valve exercising involves turning the valve on and off to prevent the valve from becoming stiff and not functioning properly- this is completed by a contractor.

5.0 WATER QUALITY

5.1 WATER QUALITY INQUIRIES

Under the current issue of the City's MDWL, the City is required to address water quality inquiries related to the drinking water system. The nature of the inquiry and the appropriate corrective action taken in respect of the inquiry must be documented. Table 3 below provides a summary of the water quality inquiries addressed in 2020. Types of inquiries include taste, odour, discolouration, lead inquiries, and general inquiries which include questions pertaining to pH, hardness, alkalinity, etc. There was a total of 124 water quality inquiries in 2020. Most inquiries were classified as water inquiries (i.e. questions pertaining to fluoride, internal plumbing, etc.). By documenting the water quality inquiries, the City can address citizens' concerns and continually improve the drinking water system by tracking inquiries of a similar nature within a given area(s) of the City.

5.0 WATER QUALITY

Table 3 2020 Water Quality Inquiries for the Vaughan Distribution System.

Type of Inquiry	Number of Inquiries	Action Taken
Odour	23	<ul style="list-style-type: none"> • Information provided by phone or email to identify the source of the smell (plumbing vs. drinking water), and flush taps. • Appointment scheduled for chlorine residual sample to be collected or flush and sample at the nearest fire hydrant.
Discolouration	21	<ul style="list-style-type: none"> • Information provided by phone or email to flush taps. • Appointment scheduled for chlorine residual sample to be collected in home and/or flush and sample at the nearest fire hydrant.
Taste	7	<ul style="list-style-type: none"> • Information provided by phone or email. • Appointment scheduled for chlorine residual sample to be collected in home and/or flush and sample at the nearest fire hydrant.
Lead Inquiries	4	<ul style="list-style-type: none"> • Samples collected for analysis at the request of the citizens • Copies of laboratory report provided to citizens
General Inquiries (i.e. pH, hardness, alkalinity, fluoride internal plumbing)	69	<ul style="list-style-type: none"> • Information provided by phone conversation and/or email correspondence • Provide most recent sample results upon request • Operator inspect nearest hydrant for water quality if appropriate
TOTAL	124	

6.0 WATER USAGE

6.1 ANNUAL WATER TAKING FROM YORK REGION

York Region receives treated water from the City of Toronto and the Region of Peel and supplies it to the City of Vaughan for distribution. The total volume of water supplied from York Region to the Vaughan Distribution System for the reporting period of January 1, 2020 to December 31, 2020 was 42,331,721m³.

A comparison of 2019 and 2020 monthly flows for the Vaughan Water Distribution System are indicated in Table 4 below. The monthly average flow and maximum daily flow are also included. Figure 1 below shows a bar graph of the data from Table 4. In 2020, July had the greatest flow and February had the lowest flow.

Table 4 2019 vs 2020 Monthly Flows for the Vaughan Distribution System.

Month	2019 Volume (m3)	2020 Volume (m ³)
January	2,980,004	3,077,774
February	2,829,251	2,878,450
March	3,047,182	3,095,795
April	3,054,086	2,962,290
May	3,452,107	3,457,889
June	3,525,204	4,142,098
July	4,451,385	4,908,594
August	4,335,309	4,482,517
September	3,640,636	3,852,898
October	3,309,436	3,199,023
November	3,065,445	3,186,863
December	3,075,547	3,087,530
TOTAL	40,765,591	42,331,721
MONTHLY AVERAGE FLOW	3,397,133	3,527,643

6.0 WATER USAGE

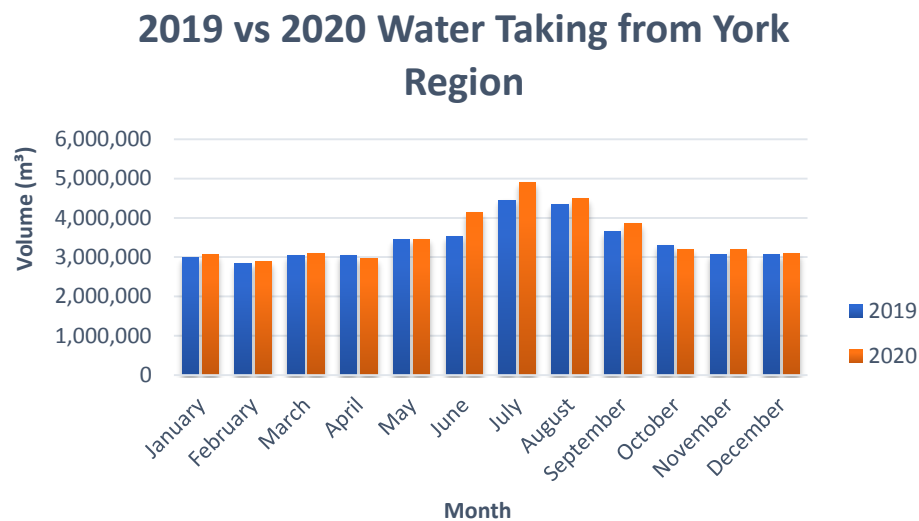


Figure 1 2019 vs 2020 Monthly Flows for the Vaughan Distribution System.

Schedule 22 requires that if a system is receiving all of its water from another system under an agreement, a comparison of actual flow rates to the flow rates specified in the written agreement, needs to be provided. The City does not currently have a written agreement under subsection 5 (4) with the Regional Municipality of York. The City, along with the other area municipalities, rely on Sections 11 and 89 (b), of the Ontario Municipal Act with respect to the supply of water.

7.0 ASSOCIATED WATER SUMMARY REPORTS

7.1 LINKS TO ASSOCIATED WATER SUMMARY REPORTS

City of Toronto, [Annual Report and Annual Summary Report](#)

Region of Peel, [Annual Report and Annual Summary Report](#)

York Region, [Annual Report and Annual Summary Report](#)

8.0 CONTACT INFORMATION

8.1 REPORT CONTACT INFORMATION

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Attachment 2: Drinking Water Quality Management System – Summary of Management Review

Review – 2020 Operational Performance

The purpose of this summary is to provide Council with mandatory updates regarding the City of Vaughan's drinking water systems performance as mandated through Element 20 of the [Drinking Water Quality Management Standard \(DWQMS\)](#).

	Requirement of Element 20 - Management Review	Achieved?	Conforms to
1	Ensure that a Management Review is conducted at least once every calendar year Completed on June 26, 2020 with the top management and the Owner representative for the 2020 operational year	Yes ✓	Yes ✓
2	Consider the results of the Management Review and identify deficiencies and action items to address the deficiencies Completed. See the Management Review Summary below	Yes ✓	Yes ✓
3	Provide a record of any decisions and action items related to the management review including the personnel responsible for delivering the action items related and the proposed timelines for their implementation All decisions and action items discussed during the review have been captured through record of minutes. Follow up on actions is tracked.	Yes ✓	Yes ✓
4	Report the results of the management review, the identified deficiencies, decisions, and action items to the Owner (the Council) Completed through this report, submitted for information March 8, 2020.	Yes ✓	Yes ✓

Management Review Summary

a) Annual Review of QMS 02- Quality Management System (QMS) Policy

The QMS Policy was reviewed with all attendees. It was discussed that the Policy should update the wording to replace residents with citizens. This will be reviewed and considered in the next update of the DWQMS

Action Items: One (1) action item pending from 2020 report.

b) Incidents of regulatory non-compliance

There was no non-compliance identified in Ministry of Environment, Conservation and Parks inspection on February 7, 2020.

Action Item: No action item pending from 2020 report.

c) Incidents of adverse drinking water tests

Indicators of adverse water quality are immediately reported to York Region Public Health and the Ministry of the Environment, Conservation and Parks (MECP) Spills Action Centre and appropriate corrective action is taken. In 2020, there were a total of 27 water quality reportable events, all of which were immediately addressed as required by the regulation. None of these events resulted in the integrity and safety of the drinking water supply being compromised. It was discussed that the number of adverse incidents from past 3 years will be included in the 2021 Management Review and moving forward.

Action Item: One (1) action item pending from the 2020 report.

d) Deviations from Critical Control Points (CCP)

Critical control limits have been established based on known critical control points identified through Risk Assessment outcomes. There was no deviation from the two identified CCP's, both the CCP's are related to potential contamination during a watermain break.

Action Item: No action items pending from 2020 report.

e) The effectiveness of the risk assessment process

Verification of risks to public health and the drinking water system is conducted at least once every calendar year and assessed at least once every thirty-six (36) months. The 36-month Comprehensive Review of the Risk Assessment was held on March 25, 2020. Water Operations staff participated in the review process by ranking the identified potential hazards. The ranking was updated for the following hazards: Bulk Water Services, Unauthorized Hydrant Connections, Extreme Weather Events, and Backflow. No new Critical Control Points (CCP) were identified. Other potential hazards discussed: Considered adding Pandemic as a potential hazard and added Watermain Break/Closure piece as a hazardous event under Unauthorized Hydrant Connections.

Action Item: No action items pending from 2020 report.

f) Internal and third-party Audit results

Internal and third-party audits assess how the City meets the requirements of the Drinking Water Quality Management Standard (DWQMS). The 13 OFIs issues during the 2019 internal audit held July 29 and 30 have been addressed. The 2020 Internal Audit was held July 6 and 7- one (1) minor non-conformance and three (3) opportunities for improvement were addressed and the minor non-conformance was closed. The opportunities for improvement remain open and are being incorporated into the system. The 2020 external audit was held August 4 and 5- one (1) minor non-conformance has been and five (5) opportunities for improvement have been reviewed and are being incorporated into the system. It was discussed whether the internal audit should be conducted more than once per year- this will be discussed further at the next Management Review.

Action Item: There are eight (8) OFIs still in progress, one (1) action item pending from the 2020 report.

g) Results of emergency response testing

Testing of emergency response ensures that staff are prepared for emergency situations and allows the City to identify what could happen in the drinking water system to cause an emergency. The DWQMS requires the City to complete emergency response testing at least once every two (2) years. Testing will be conducted in 2021.

Action Item: No action items pending from 2020 report.

h) Operational performance

Annual MECP inspections ensure that the City meets the requirements identified in applicable legislation and regulations. The MECP Inspection was held on February 7, 2020. Three (3) recommendations were made: Separate the attendance/activity/task and ORO/OIC identification into two different forms, City of Vaughan should synchronize the Woodland Acres Pressure Elevation System visits with the Maplewood Booster Station, and Staff responsible for Notice of Issue Resolution to include a more detailed summary of actions taken and results achieved. All recommendations were addressed immediately after the report was issued.

Action Item: Completed.

i) Raw water supply and drinking water quality trends

The Annual Report and Annual Summary Report provide data on drinking water quality trends within the City's drinking water. The 2019 Annual Report and Annual Summary Report were posted on the City's website prior to February 28 and March 31, 2020. The City has an exemption under the Municipal Drinking Water Licence (MDWL) for lead sampling from plumbing systems. It was also discussed to extend an invitation to Council for a tour of the drinking water system and facilities. This will be postponed due to COVID-19 situation.

Action Item: Invitation to Council for tour of drinking water system is pending.

j) Follow-up on action items from previous management reviews

The previous Management Review (prior to 2020) was held July 18, 2019. There was a total of 19 action items.

Action Item: There are actions pending. Inquiring about York Region's communication protocol, and mapping of water quality inquiries with GIS.

k) The status of management action items identified between reviews

The City's Internal Audit Department investigation and findings identified key areas of improvement for Environmental Services.

Action Items: The most urgent items identified by the Internal Auditing Team have been addressed. A plan is in place with the timelines to address the remaining recommendations. Progress is monitored on a regular basis.

l) Changes that could affect the Quality Management System

The impact from COVID-19 pandemic could affect the way work is conducted within the City. The QMS may see changes as a result of alternate work arrangements for staff. Some areas that may be affected: number of samples taken, SOPs may require adjustments. At that time of the 2020 Management Review, it was confirmed that the City is able to continue business as usual.

Action Items: No action items pending from 2020 report.

m) Consumer feedback

Consumer feedback allows the City to identify if the water system is operating effectively. In the 2020 Management Review report, there was a total of 159 calls that were classified as odour, taste, lead inquiry/testing, discoloured, and general inquiries (water testing, sample results, etc.). It was noted that there were a high number of lead inquiry calls for this report as a result of the media. All the concerns/inquiries were addressed appropriately and in a timely manner. Some resolutions include sharing information and laboratory results.

Action Items: No action items pending from the 2020 report.

n) Resources needed to maintain the QMS

At the time of the 2020 Management Review the Supervisor of Compliance and Training position has been filled. Water Operations Staff have been trained for DWQMS Awareness and

an Environmental Services Information sharing session occurred with Engineering and Development on May 7, 2020.

The Water Operations Coordinator position will be posted and will be converted into another Team Lead. This action has been completed.

Action Items: No action items pending from 2020 report.

o) The results of the infrastructure review

Physical condition of water infrastructure is regularly evaluated to maintain a state of good repair. Capital projects were identified by Environmental Services and Infrastructure Delivery via the City's capital budget process. In the 2020 Management Review reporting period, there were 44 watermain breaks. A total of 24km of watermain was added/replaced during the 2020 reporting period. Preventative maintenance on the drinking water system during 2020 included: 3,000 valves exercised by external contractor and 500 exercised by the City.

Action Items: Completed.

p) Operational Plan currency, contact and updates

The Operational Plan has been revised to incorporate corrective actions, preventive actions, and opportunities for improvement from the 2019 Internal and External Audits

Action Items: No action items pending from 2020 report.

q) Staff suggestions

Water Operations staff participated in the 36-month Comprehensive Review of the Risk Assessment in 2020. During this time, staff provided feedback on the ranking of potential hazards to the drinking water system. This resulted in the consideration of re-ranking some identified hazards. Water Operations also continue to provide input and assist in the development of the Standard Operating Procedure Manual. Water Operations keeps a One Drive folder with meeting minutes which captures staff discussions which will be shared with the Compliance team to review any staff suggestions.

There were 14 Best Management Practices identified during this reporting period from the 2019 Internal Audit. They have tracked and the status of each have been reviewed.

Action Items: One (1) action item pending from the 2020 report.

r) New Business

Staff discussed the increased use of technology amongst Water Operations during this reporting period (i.e. e-log books, new SCADA at Maplewood, DR-300 units, Eris, dashboards for tracking

chlorine residual trending). It was also noted that the City's nitrification study concluded this Quarter 2 2020.

Action Items: No action items pending from 2020 report.

s) Date of Next Meeting

The DWQMS dictates that the Management Review meeting be held at least once every calendar year.

Action Items: No action items pending from 2020 report.

Conclusion

The Management Review is recognized as a best practice for continual improvement for the City of Vaughan's Drinking Water Quality Management System, drinking water system, and associated monitoring and maintenance programs.

The on-going maintenance of the Quality Management System and focus on continual improvement provides assurance to Council, as the Owner of the municipal drinking water systems, that their duties and responsibilities of Standard of Care under the Act are being met.