
SUBJECT: Annual Water Quality Report (January-December 2024)
PREPARED BY: Catalina Ching Ext. 2035
Water Quality Coordinator, Environmental Services

RECOMMENDATION:

1. That the report titled “Annual Water Quality Report (January-December 2024)” as required by Schedule 22 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*, enclosed herein be received; and,
2. That the Annual 2024 Regulatory Water Quality Report (Attachment “A”), containing information for the Ministry of the Environment, Conservation and Parks (MECP) on water supply and quality as required by Section 11 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*, be received; and,
3. That Council acknowledge that staff posted the Annual 2024 Detailed Regulatory Water Quality Report on the City’s website and that it has been made available electronically and in hard copy version by February 28, 2025 as per regulations; and further,
4. And That Staff be authorized and directed to do all things necessary to give effect to this resolution.

EXECUTIVE SUMMARY:

As per Provincial Regulation 170/03, under the *Safe Drinking Water Act, 2002*, the City of Markham is mandated to produce the following two reports:

An annual report summarizing water quality information. This report outlines how the City of Markham receives its water, a description of the drinking water system and the water quality results for the period from January 1, 2024 to December 31, 2024. In addition, this report is required to be made available to the public upon request. The annual report has been posted on the Markham website and is available at the Environmental Services Department, Waterworks Division, located at 8100 Warden Avenue. The regulatory requirements for such a report are met in this way and a copy of the report has been enclosed as Attachment “A”, for Council reference.

A report prepared for Council is to be submitted by March 31, 2025. This report is to inform Council on any regulatory requirements that have not been met during the period of January 1, 2024 to December 31, 2024. For each requirement not met, Council is to be informed of what corrective actions were taken. In addition, a summary is to be provided of the quantities and flow rates of the water supplied during the same period. This report enclosed herein ensures that Markham has met all regulatory requirements.

Markham’s customers consumed 30,211,127 m³ of water over 366 days in 2024. Representative water quality sampling was undertaken throughout the distribution system

and analyzed according to O. Reg. 170/03. A total of nineteen (19) Adverse Water Quality Incidents (AWQIs) were reported to the MECP. There are two ways that an AWQI can arise, either as a result of sampling or from an on-site observation. Of the 7,131 regulatory samples taken in 2024, sixteen samples (0.22%) did not meet regulatory limits outlined in the Ontario's Drinking Water Systems Regulation (O. Reg. 170/03). There were three (3) AWQI's reported as an on-site observation during a watermain break repair. For all of the adverse incidents, the City of Markham performed the regulatory notifications and corrective actions to rectify the situation.

PURPOSE:

To inform Council, as owners of the drinking water system, on the quality of drinking water provided to the residents of Markham in 2024 through the water distribution system. By doing so, we are meeting the requirements of Schedule 22 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*.

To provide Council with a summary on the more detailed & technical annual water quality report (included as Attachment "A"). This annual report has been prepared and made available to the public prior to February 28, 2025 via City's website and at the Environmental Services Department, Waterworks Division located at 8100 Warden Avenue. This annual report details the drinking water system, sampling activity, corrective actions and any major monetary expenses incurred in 2024.

BACKGROUND:

In order to meet regulatory requirements and to strengthen customer confidence in the quality of the City of Markham's drinking water supply, Waterworks prepares annual update reports on the status of drinking water quality.

Enclosed, as Attachment "A", is the 2024 Annual Water Quality Report, which is intended to be a standalone document. This detailed, technical and statistical report summarizes the 2024 water distribution system, for: results of lab tests and corrective actions taken, and any major expenses incurred. The Regulation also requires that this report be made available to the public, free of charge, and be posted on the City's website on or before February 28, 2025.

The 2024 Annual Water Quality Report to Council, contained herein, is intended to inform Council on the performance of the water distribution system over the past year and to provide specific information that meets the Ontario Regulation 170/03 requirements concerning Markham's Drinking Water Distribution System.

2024 Drinking Water System Information

The City of Markham's drinking water system is strictly a distribution system. We do not operate any treatment plant and therefore the rated capacity of our system, as requested by the MECP, is not applicable. The Region of York receives treated water from both the City of Toronto and the Region of Peel, stores and distributes it to various Municipalities including Markham, through trunk watermain from York and Toronto. The City of Markham purchases its water entirely through the Region of York as the wholesaler, and distributes this water to its residents through metered connections.

OPTIONS/ DISCUSSION:**Water Supplied During 2024**

The City of Markham customers (including residential, industrial, commercial and institutional) purchased a total of 30,211,127 m³ of water over 366 days in 2024. This amounts to an average of 2,517,594 m³/ month or 82,544 m³/day.

In 2024 a total of nineteen (19) Adverse Water Quality Incidents (AWQIs) were reported to the MECP. There were three (3) reported AWQI's due to an on-site observation during a watermain break repair and sixteen (16) reported AWQIs, from 7,131 samples taken, which did not meet the Ontario's Drinking Water Systems Regulation (O. Reg. 170/03).

2024 On-Site Observation

In 2024 there were three (3) on-site observation incidents reported as adverse water quality incidences during a watermain break repair. The watermain break was repaired, the system was then flushed until acceptable chlorine residuals were established and a water sample was taken and tested for microbial contamination following the repair of the break.

Watermain breaks are only to be reported to MECP when it has been observed that contaminated water may have been directed to users. These observations often occur when there is a severe watermain break resulting in the collapse of the pipe wall and entry of dirt in the watermain. Further, following every watermain repair, regardless of its severity, Waterworks initiates a procedure to test a water sample for microbial contamination.

2024 Drinking Water Quality Sampling Results

Ontario's Drinking Water Systems Regulation (O.Reg.170/03) requires all drinking water system owners to collect and test a minimum prescribed number of representative water quality samples for its distribution system. It further requires that drinking water system owners prepare an annual report (in MECP format) on the operation and the quality of drinking water within their jurisdictional boundaries. Markham Waterworks Division has complied with this requirement. For the calendar year January 1, 2024 to December 31, 2024; an annual regulatory report was prepared (MECP format) in February 2025 on the Markham Water Distribution System and is enclosed as Attachment "A". This report was posted prior to Feb. 28, 2025 as required by the Regulation.

During the period from January 1, 2024 to December 31, 2024, the total number of water samples collected and tested by Waterworks Operators was 7,131. These samples were tested for the presence of bacteria (*Escheria coli*, Total Coliforms, and Heterotrophic Plate Count), for chemical analysis [Organic parameters, including Trihalomethanes (THM), Haloacetic acids (HAA) and Nitrosodimethylamine (NDMA) and Inorganic parameters including Lead (Pb), Nitrate (NO₃) & Nitrite (NO₂)] and all chlorine residuals as required.

Of the 7,131 regulatory samples collected and tested in 2024, sixteen samples (0.22%) did not meet regulatory limits outlined in the Ontario's Drinking Water Systems

Regulation (O. Reg. 170/03). The table below depicts the total number of AWQIs from all regulatory sampling in 2024.

2024 TOTAL NUMBER OF AWQIs FROM SAMPLING

PARAMETER	# SAMPLES TAKEN (TOTAL 7,131)	REPORTABLE TO MECP	ADVERSE RESULT (AWQI)
MICROBIOLOGY - Scheduled (Total Coliforms / E. coli)	1,881	Yes	14
MICROBIOLOGY - Scheduled (HPC)	626	Not applicable	Not applicable
MICROBIOLOGY -Unscheduled (Total Coliforms /E. coli /HPC) Watermain Breaks, Adverse Water Quality Incident Resamples, Distribution system samples	99	Yes	0
CHLORINE	4,373	Yes	2
OTHERS (Organic, Inorganic, Lead, THM, HAA, NO ₂ /N0 ₃ , NDMA)	152	Yes	0

Adverse Water Quality – Presence of Bacteria

In 2024 as part of our weekly regular scheduled microbiology sampling program, fourteen (14) samples tested positive for the presence of microbiological parameters:

- Eleven (11) of the samples had a count of total coliforms,
- Two (2) of the samples had a count of total coliform and E.coli
- One (1) sample had NDOGN (No data was able to be achieved due to an overgrowth of target bacteria (Total coliforms and/or E. coli)).

The detection of total coliforms in drinking water has had a longstanding history of use as an indicator of drinking water safety. Total coliform bacteria are common in the environment (soil or vegetation) and are generally harmless. E.coli is a fecal coliform and should not be detected/present in any drinking water samples .Since E.coli is present in fecal matter and prevalent in sewage, it is rapidly destroyed by chlorine. Positive E.coli results would suggest presence of harmful bacteria and viruses. Upon being notified by the laboratory of the E.coli result, Waterworks staff immediately notified York Region Medical Officer of Health (MOH) and the MECP Spills Action Centre. Immediate and proactive corrective actions were followed as per Standard Operating Procedures for responding to an adverse water quality test result. In such incidents the location which failed is resampled along with one location upstream and one location downstream of the initial location some distance away. No additional directions were provided by the MOH or MECP with respect to corrective actions. All resamples had zero E.coli results and the situation was immediately resolved.

There was an increase in microbiological incidents during the warmer months, which may have been caused by contaminants of the sampling stations. Factors such as temperature, humidity, rainfall and insect activity may have contributed to these incidents though they were not necessarily related to the drinking water itself. After flushing, all re-sample results were normal and met regulatory requirements. Through collaborative efforts among System Engineering and Waterworks Operations and Maintenance (OM) staff, a plan was developed to prevent future contamination of the sampling stations.

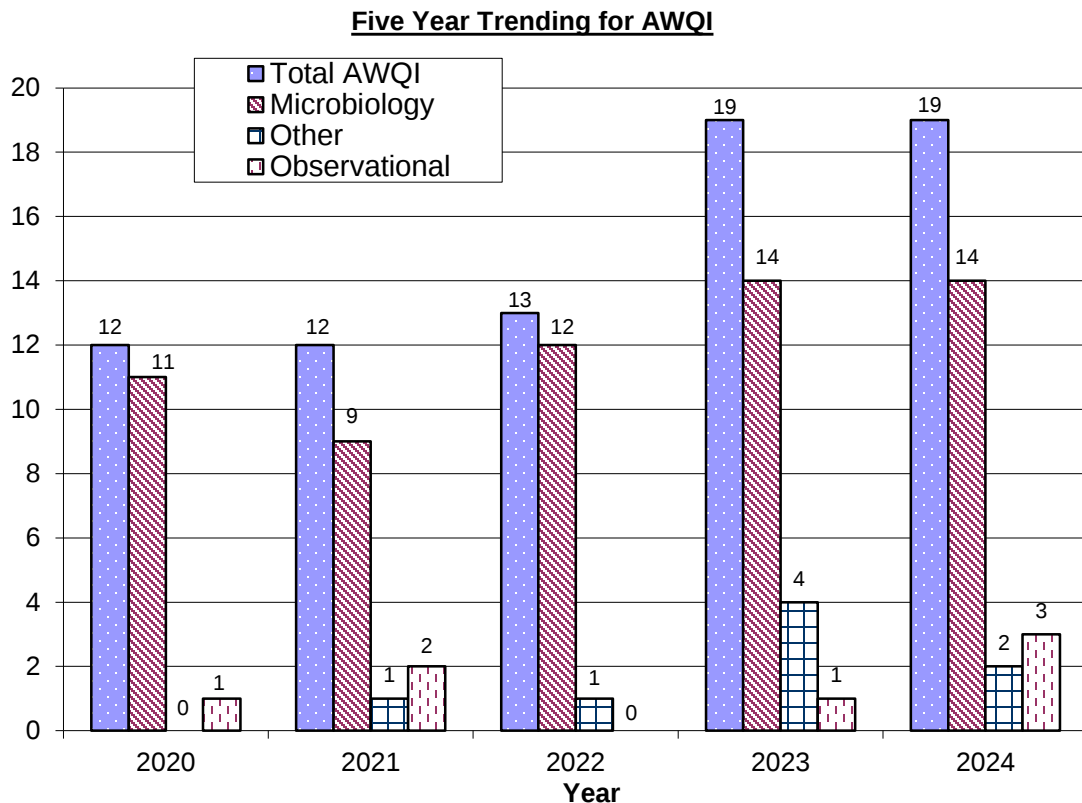
Upon notification of these adverse water quality incidents Waterworks staff followed all regulatory reporting procedures, notifying the York Region Medical Officer of Health (MOH) and the MECP Spills Action Centre. In addition, Waterworks staff responded immediately and followed all corrective actions as per the Standard Operating Procedures and all regulatory requirements were met.

Adverse Water Quality – Low Chlorine Residual

In 2024 there were two (2) adverse chlorine residual incidents where the chlorine residual dropped below the regulatory requirement of 0.25 mg/L. Both incidents occurred during dead end flushing exercises. In addition to notifying the MECP & MOH, immediate corrective actions were taken by flushing the watermain to restore chlorine residual levels, which occurred within 15 minutes.

5 Year Trending of Adverse Water Quality Incidents (AWQIs):

The graph below depicts the breakdown of the total number of adverse water quality incidents for the last 5 years (Total AWQIs and the source of the adverse incidents).



Lead Sampling

The City of Markham has no known lead public service lines and the City has not encountered any lead issues in City drinking water. As a result The MECP has reviewed our program and has granted an additional four years of reduced sampling beginning in 2024 to the end of 2027. This includes no lead testing from plumbing servicing of private residences or non-residential buildings and reduced lead testing from distribution locations (20 per year).

Conclusions:

In 2024, the drinking water distributed to the City of Markham residents continued to be of high quality. During the operation of the water distribution system during 2024, there were few adverse water quality incidents, (0.22% of all system samples undertaken) and corrective actions were taken immediately to resolve each incident. The drinking water system is maintained by Waterworks with continual improvements and programs in place to ensure excellent water quality.

FINANCIAL CONSIDERATIONS

Not Applicable

HUMAN RESOURCES CONSIDERATIONS

Not Applicable

ALIGNMENT WITH STRATEGIC PRIORITIES:

The Annual Water Quality Report (January – December 2024) on the drinking water system meets legislative requirements and is consistent with the City's corporate goals of Infrastructure Management and Quality Community.

BUSINESS UNITS CONSULTED AND AFFECTED:

Not Applicable

The undersigned represent the Top Management of City of Markham's Drinking Water Distribution System, and by signing below the Top Management of the Operating Authority has reviewed the deficiencies, decisions and action items identified in the Management Review, and hereby communicating these results to the Owner.

RECOMMENDED BY:

Eddy Wu, P. Eng.
Director, Environmental Services

Morgan Jones
Commissioner, Community Services

Andy Taylor
CAO, City of Markham

ATTACHMENTS:

Annual Water Quality Report (January – December 2024) – Attachment A

The contents of this report include:

1. A description of where the report will be located and made available to the public.
2. A brief description of the drinking water system.
3. A breakdown of major expenses incurred to install, repair or replace required equipment.
4. A summary of adverse water quality reports and corrective actions taken.
5. A summary of water quality testing results for microbiological, inorganic chemical, and organic chemical parameters.

The City of Markham has met the Regulation 170/03 submission dates and requirements of reporting for the annual water quality report.