

CITY OF MARKHAM – WATER SAMPLING PROGRAM

January 1 to December 31, 2023

To comply with the Ontario Drinking Water System Regulation, Markham collects and tests water samples throughout its distribution system at a total of 107 locations. The 107 sample locations are strategically selected and evenly distributed to ensure Markham gets the best representation of the water distribution system. Sampling is rotated through the 107 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes (THM), Haloacetic Acids (HAA), Nitrites & Nitrates, Lead, and Organics & Inorganics in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by an accredited and provincially licensed Laboratory.

Waterworks follows rigorous testing and compliance procedures. The City reports any adverse sampling results that occur to the York Region Medical Officer of Health and to the Ministry of Environment, Conservation and Parks (MECP) and immediately undertakes the necessary corrective action. Re-samples are taken following the corrective action(s) and tested until two consecutive samples are within acceptable parameters.

Summary of the sampling for 2023 follows:

Sampling Program:

Total Number of Samples collected and tested in 2023= 7,721

Adverse Test Results:

Total Number of Adverse Water Quality Incidents (AWQI) = 19

Breakdown of Adverse Results:

Total adverse due to Microbiology Exceedances = 14

Total adverse due to low Chlorine Residual = 4

Total adverse due to Observation during Watermain Break = 1

The drinking water distributed to the City of Markham residents in 2023 was safe to drink and met all drinking water requirements. During 2023 the operation of the water distribution system, there were very few adverse sample incidents (0.23% of all system samples undertaken) and when these occurred, they were immediately resolved. The drinking water system is maintained by Waterworks with continual improvements and programs in place to ensure water of the highest quality.



ANNUAL REPORT

Drinking-Water System Number:	220004162
Drinking-Water System Name:	Markham Distribution System
Drinking-Water System Owner:	The Corporation of the City of Markham
Drinking-Water System Category:	Large Municipal Residential System
Period being reported:	January 1, 2023 to December 31, 2023

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [x] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [x] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> • www.markham.ca • 8100 Warden Ave. – Environmental Services Department, Waterworks Division </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Not applicable</div> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to:</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Not applicable</div> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Not applicable	

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water? Yes [] No [] Not applicable



Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method _____

Describe your Drinking-Water System

The City of Markham’s distribution system is an extension of the Toronto and York Region distribution systems. Raw surface water from Lake Ontario is disinfected, treated and tested rigorously by the City of Toronto and Peel Region for microbiological, organic and inorganic parameters prior to reaching the York Region distribution system. Markham is supplied with treated water via feeder mains from Toronto and Peel Region. York Region distribution system acts as a wholesale supplier of water and provides further testing, storage and pressure boosting for the Markham system.

Markham’s Distribution System provides treated water to approximately 362,445 residents and is comprised of approximately 1,098 kilometers of various size watermains, 11,320 watermain valves and 8,894 municipal fire hydrants. Markham is a distribution only system, without pumping and storage facilities. Markham’s drinking water within the distribution system is tested for standard parameters, in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by an accredited and provincially licensed Laboratory.

List all water treatment chemicals used over this reporting period

Not applicable; treatment chemicals are introduced at various sources by the City of Toronto, Peel Region and York Region only.

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Cathodic Protection of Iron Watermains	= \$905,463
Water Meter Replacement/Upgrades	= \$788,910
Watermain Replacement	= \$ 8,070,119
Watermain Replacement Design for 2022	= \$224,529
Curb Box Inspection and Replacement	= \$119,704



Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date and AWQI #	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
May 09, 2023 (AWQI # 161919)	On-Site Observation (CAT 2)	n/a	n/a	Repair Watermain, Flush Main and Resample	May 09, 2023
June 12, 2023 (AWQI # 162183)	Low Chlorine	0.09	milligrams per litre	Flush Mains and Resample	June 12, 2023
July 05, 2023 (AWQI # 162415)	Low Chlorine	0.15	milligrams per litre	Flush Mains and Resample	July 05, 2023
July 18, 2023 (AWQI # 162640)	Total Coliform E. coli	No Data, Overgrown	colony forming units per 100 millilitres	Flush Mains and Resample	July 18, 2023
July 18, 2023 (AWQI # 162644)	Total Coliform	17	colony forming units per 100 millilitres	Flush Mains and Resample	July 18, 2023
July 18, 2023 (AWQI # 162673)	Total Coliform	3	colony forming units per 100 millilitres	Flush Mains and Resample	July 18, 2023
July 19, 2023 (AWQI # 162709)	Total Coliform	12	colony forming units per 100 millilitres	Flush Mains and Resample	July 19, 2023
July 20, 2023 (AWQI # 162731)	Total Coliform	15	colony forming units per 100 millilitres	Flush Mains and Resample	July 20, 2023
August 01, 2023 (AWQI # 162867)	Total Coliform	1	colony forming units per 100 millilitres	Flush Mains and Resample	August 01, 2023
August 01, 2023 (AWQI # 162868)	Total Coliform	1	colony forming units per 100 millilitres	Flush Mains and Resample	August 01, 2023
August 07, 2023 (AWQI # 162952)	Low Chlorine	0.08	milligrams per litre	Flush Mains and Resample	August 07, 2023



August 21, 2023 (AWQI # 163134)	Total Coliform E. coli	No Data, Overgrown	colony forming units per 100 millilitres	Flush Mains and Resample	August 21, 2023
September 11, 2023 (AWQI # 163388)	Total Coliform E. coli	No Data, Overgrown	colony forming units per 100 millilitres	Flush Mains and Resample	September 11, 2023
September 11, 2023 (AWQI # 163390)	Total Coliform	56	colony forming units per 100 millilitres	Flush Mains and Resample	September 11, 2023
September 12, 2023 (AWQI # 163428)	Total Coliform	1	colony forming units per 100 millilitres	Flush Mains and Resample	September 12, 2023
October 10, 2023 (AWQI # 163769)	Total Coliform	1	colony forming units per 100 millilitres	Flush Mains and Resample	October 10, 2023
October 10, 2023 (AWQI # 163771)	Total Coliform	54	colony forming units per 100 millilitres	Flush Mains and Resample	October 10, 2023
October 13, 2023 (AWQI # 163797)	Low Chlorine	0.19	milligrams per litre	Flush Mains and Resample	October 13, 2023
December 19, 2023 (AWQI # 164232)	Total Coliform	13	colony forming units per 100 millilitres	Flush Mains and Resample	December 19, 2023

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.coli Or Fecal Results (minimum #) - (maximum #)	Range of Total Coliform Results (minimum #) - (maximum #)	Number of HPC Samples	Range of HPC Results (minimum #) - (maximum #)
Raw	N/A				
Treated	N/A				
Distribution	1,854	0	0 – 56	618	0 - 790



Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (minimum #)-(maximum #) (in milligrams per litre)
Turbidity	Not applicable	
Chlorine	8,760 (Chlorine Analyzer) 4,774(Grab)	Combined: 0.08.mg/L – 2.00
Fluoride (If the DWS provides fluoridation)	Not applicable	

NOTE: For continuous monitors use 8760

NOTE: Record the unit of measure if it is not milligrams per litre.

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
N/A				

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value (measured in micrograms per litre)	Exceedance
Antimony	April 19, 2023	less than 0.50	No
Arsenic	April 19, 2023	less than 1.0	No
Barium	April 19, 2023	22	No
Boron	April 19, 2023	20	No
Cadmium	April 19, 2023	less than 0.090	No
Chromium	April 19, 2023	less than 5.0	No
*Lead	See Summary Below		
Mercury	April 19, 2023	less than 0.1	No
Selenium	April 19, 2023	less than 2.0	No
Sodium	Not applicable		
Uranium	April 19, 2023	0.33	No
Fluoride	Not applicable		
Nitrite	November 30, 2023	less than 10.0	No
Nitrate	November 30, 2023	360	No



***Summary of Lead testing under Schedule 15.1 during this reporting period**

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (minimum to maximum)	Number of Exceedances
Plumbing	0	Not applicable	Not applicable
Distribution	20	Minimum was less than 0.0005 milligrams per litre Maximum was less than 0.0005 milligrams per litre	0

The City of Markham was granted relief from regulatory requirements contained in Schedule 15.1 of O. Reg. 170/03. This includes no lead testing from plumbing servicing of private residences, no lead testing from plumbing servicing non-residential buildings and reduced lead testing from distribution locations (10 per period). This reduced sampling was granted for the two periods of sampling in 2023, December 15, 2022 to April 15, 2023 and June 15, 2023 to October 15, 2023.

Summary of Organic parameters sampled during this reporting period or the most recent sample results

<u>Parameter</u>	<u>Sample Date</u>	<u>Result Value</u> (measured in micrograms per litre)	<u>Exceedance</u>
Alachlor	April 19, 2023	less than 0.50	No
Atrazine + Metabolites	April 19, 2023	less than 1.0	No
Azinphos-methyl (Guthion)	April 19, 2023	less than 2.0	No
Benzene	April 19, 2023	less than 0.10	No
Benzo(a)pyrene	April 19, 2023	less than 0.0050	No
Bromoxynil	April 19, 2023	less than 0.50	No
Carbaryl	April 19, 2023	less than 5.0	No
Carbofuran	April 19, 2023	less than 5.0	No
Carbon Tetrachloride	April 19, 2023	less than 0.10	No
Chlorpyrifos	April 19, 2023	less than 1.0	No
Diazinon	April 19, 2023	less than 1.0	No
Dicamba	April 19, 2023	less than 1.0	No
1,2-Dichlorobenzene	April 19, 2023	less than 0.20	No
1,4-Dichlorobenzene	April 19, 2023	less than 0.20	No
1,2-Dichloroethane	April 19, 2023	less than 0.20	No
1,1-Dichloroethylene	April 19, 2023	less than 0.10	No
Dichloromethane	April 19, 2023	less than 0.50	No
2-4 Dichlorophenol	April 19, 2023	less than 0.25	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	April 19, 2023	less than 1.0	No
Diclofop-methyl	April 19, 2023	less than 0.90	No
Dimethoate	April 19, 2023	less than 2.5	No
Diquat	April 19, 2023	less than 7.0	No



Diuron	April 19, 2023	less than 10.0	No
Glyphosate	April 19, 2023	less than 10.0	No
<u>Parameter</u>	<u>Sample Date</u>	<u>Result Value</u> (measured in micrograms per litre)	<u>Exceedance</u>
Haloacetic Acids (HAA)	Running Annual Average of Quarterly Results	less than 5.0	No
Malathion	April 19, 2023	less than 5.0	No
Metolachlor	April 19, 2023	less than 0.5	No
Metribuzin	April 19, 2023	less than 5.0	No
Monochlorobenzene	April 19, 2023	less than 0.10	No
Nitrosodimethylamine (NDMA)	Running Annual Average of Quarterly Results	0.0012	No
Paraquat	April 19, 2023	less than 1.0	No
Pentachlorophenol	April 19, 2023	less than 0.50	No
Phorate	April 19, 2023	less than 0.50	No
Picloram	April 19, 2023	less than 5.0	No
Polychlorinated Biphenyls(PCB)	April 19, 2023	less than 0.05	No
Prometryne	April 19, 2023	less than 0.25	No
Simazine	April 19, 2023	less than 1.0	No
THM (NOTE: show latest annual average)	Running Annual Average of Quarterly Results	9.88	No
Terbufos	April 19, 2023	less than 0.50	No
Tetrachloroethylene	April 19, 2023	less than 0.10	No
2,3,4,6-Tetrachlorophenol	April 19, 2023	less than 0.50	No
Triallate	April 19, 2023	less than 1.0	No
Trichloroethylene	April 19, 2023	less than 0.10	No
2,4,6-Trichlorophenol	April 19, 2023	less than 0.05	No
Trifluralin	April 19, 2023	less than 1.0	No
Vinyl Chloride	April 19, 2023	less than 0.20	No
MCPA	April 19, 2023	less than 10.0	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
None			