



CITY OF MARKHAM

WATER SAMPLING PROGRAM

January 1 to December 31, 2015

To comply with the Ontario Drinking Water System Regulation, Markham collects and tests water samples throughout its distribution system at a total of 106 locations. The 106 sample locations are strategically selected and evenly distributed to ensure Markham gets the best representation of the water distribution system. The need for additional locations is reviewed annually & in 2015, no additional locations were warranted. Sampling is rotated through the 106 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes, Nitrites & Nitrates, Lead, Organics & Inorganics in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by the provincially approved York-Durham Regional Environmental 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 and Climate Change (MOECC) 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 2015 follows:

Sampling Program:

Total Number of Samples collected and tested in 2015 = 5,975

Adverse Test Results:

Total Number of Adverse Water Quality Incidents (AWQI) = 6

Breakdown of Adverse Results:

Total adverse due to Microbiology Exceedances = 6

The drinking water distributed to the City of Markham residents in 2015 was safe to drink and met all drinking water requirements. During the operation of the water distribution system during 2015, there were very few adverse sample incidents (0.10% of all system tests 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 Water Distribution
Drinking-Water System Owner:	The Corporation of the City of Markham
Drinking-Water System Category:	Large Municipal Residential System
Period being reported:	January 1, 2015 to December 31, 2015

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [x] No []

Is your annual report available to the public at no charge on a web site on the Internet?
Yes [x] No []

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

- www.markham.ca
- 8100 Warden Ave. – Waterworks Department
- Markham Civic Centre – 101 Town Centre Blvd. – Contact Centre

Complete for all other Categories.

Number of Designated Facilities served:

Not applicable

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [] No []

Number of Interested Authorities you report to: Not applicable

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [] No []

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 []



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 350,000 residents and is comprised of approximately 1,500 kilometers of various size watermain, 10,800 watermain valves and 8,551 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 the provincially approved York-Durham Regional Environmental 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	= \$413,100
Water Meter Replacement/Upgrades	= \$545,700
Watermain Replacement	= \$1,591,700
Watermain Replacement Design for 2015	= \$139,600

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	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
June 23, 2015 (AWQI #124352)	Total Coliform	P	P/A	Flush Mains and Resample	June 23, 2015
June 30, 2015 (AWQI # 124582)	Total Coliform	P	P/A	Flush Mains and Resample	June 30, 2015
July 7, 2015 (AWQI #124740)	Total Coliform	P	P/A	Flush Mains and Resample	July 7, 2015
July 14, 2015 (AWQI #124948)	Total Coliform	P	P/A	Flush Mains and Resample	July 14, 2015
July 28, 2015 (AWQI #125285)	Total Coliform	P	P/A	Flush Mains and Resample	July 28, 2015
July 29, 2015 (AWQI #125310)	Total Coliform	1	CFU/mL	Flush Mains and Resample	July 29, 2015

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 (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	N/A				
Treated	N/A				
Distribution	1,838	0-0	0-1	613	0-210

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 (min #)-(max #)
Turbidity		
Chlorine	3,396	0.30-1.92
Fluoride (If the DWS provides fluoridation)	0.574	

NOTE: For continuous monitors use 8760 as the number of samples.

*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

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	May 13, 2015	0.0008	mg/L	No
Arsenic	May 13, 2015	0.0008	mg/L	No
Barium	May 13, 2015	0.0209	mg/L	No
Boron	May 13, 2015	0.024	mg/L	No
Cadmium	May 13, 2015	<0.0001	mg/L	No
Chromium	May 13, 2015	0.0002	mg/L	No
*Lead	See Summary Below			
Mercury	May 13, 2015	<0.01	ug/L	No
Selenium	May 13, 2015	<0.0001	mg/L	No
Sodium	January 7, 2015	14.9	mg/L	No
Uranium	May 13, 2015	0.0003	mg/L	No
Fluoride	January 7, 2015	0.574	mg/L	No
Nitrite	November 25, 2015	0.006	mg/L	No
Nitrate	November 25, 2015	0.302	mg/L	No

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems

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 (min#) – (max #)	Number of Exceedances
Plumbing	N/A *		
Distribution	20	<0.0001 - 0.0002	0

*The City of Markham has been exempt for Lead Testing from plumbing servicing private residences and plumbing servicing non-residential buildings. Relief was granted as sample results for seven rounds of sampling were confirmed to be well below the MOE's limit of 0.01mg/L.

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
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Alachlor	May 13, 2015	<0.4	ug/L	No
Aldicarb	May 13, 2015	<4.5	ug/L	No
Aldrin + Dieldrin	May 13, 2015	<0.006	ug/L	No
Atrazine + N-dealkylated metabolites	May 13, 2015	<0.2	ug/L	No
Azinphos-methyl	May 13, 2015	<0.3	ug/L	No
Bendiocarb	May 13, 2015	<3.0	ug/L	No
Benzene	May 13, 2015	<0.1	ug/L	No
Benzo(a)pyrene	May 13, 2015	<0.01	ug/L	No
Bromoxynil	May 13, 2015	<0.4	ug/L	No
Carbaryl	May 13, 2015	<3.0	ug/L	No
Carbofuran	May 13, 2015	<3.0	ug/L	No
Carbon Tetrachloride	May 13, 2015	<0.2	ug/L	No
Chlordane (Total)	May 13, 2015	<0.006	ug/L	No
Chlorpyrifos	May 13, 2015	<0.2	ug/L	No
Cyanazine	May 13, 2015	<0.3	ug/L	No
Diazinon	May 13, 2015	<0.2	ug/L	No
Dicamba	May 13, 2015	<0.4	ug/L	No
1,2-Dichlorobenzene	May 13, 2015	<0.1	ug/L	No
1,4-Dichlorobenzene	May 13, 2015	<0.1	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	May 13, 2015	<0.008	ug/L	No
1,2-Dichloroethane	May 13, 2015	<0.1	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	May 13, 2015	<0.3	ug/L	No
Dichloromethane	May 13, 2015	<1.0	ug/L	No
2,4 Dichlorophenol	May 13, 2015	<0.7	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	May 13, 2015	<0.8	ug/L	No
Diclofop-methyl	May 13, 2015	<0.4	ug/L	No
Dimethoate	May 13, 2015	<0.3	ug/L	No
Dinoseb	May 13, 2015	<0.5	ug/L	No
Diquat	May 13, 2015	<1.0	ug/L	No
Diuron	May 13, 2015	<3.0	ug/L	No
Glyphosate	May 13, 2015	<25	ug/L	No
Heptachlor + Heptachlor Epoxide	May 13, 2015	<0.008	ug/L	No
Lindane (Total)	May 13, 2015	<0.005	ug/L	No
Malathion	May 13, 2015	<0.2	ug/L	No
Methoxychlor	May 13, 2015	<0.009	ug/L	No
Metolachlor	May 13, 2015	<0.2	ug/L	No
Metribuzin	May 13, 2015	<0.3	ug/L	No
Monochlorobenzene	May 13, 2015	<0.1	ug/L	No
Paraquat	May 13, 2015	<1.0	ug/L	No
Parathion	May 13, 2015	<0.2	ug/L	No
Pentachlorophenol	May 13, 2015	<0.4	ug/L	No
Phorate	May 13, 2015	<0.2	ug/L	No
Picloram	May 13, 2015	<0.7	ug/L	No



Polychlorinated Biphenyls(PCB)	May 13, 2015	<0.02	ug/L	No
Prometryne	May 13, 2015	<0.2	ug/L	No
Simazine	May 13, 2015	<0.2	ug/L	No
THM (NOTE: show latest annual average)	Annual Average	19.0	ug/L	No
Temephos	May 13, 2015	<3	ug/L	No
Terbufos	May 13, 2015	<0.2	ug/L	No
Tetrachloroethylene	May 13, 2015	<0.3	ug/L	No
2,3,4,6-Tetrachlorophenol	May 13, 2015	<0.5	ug/L	No
Triallate	May 13, 2015	<4.0	ug/L	No
Trichloroethylene	May 13, 2015	<0.1	ug/L	No
2,4,6-Trichlorophenol	May 13, 2015	<0.5	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	May 13, 2015	<0.5	ug/L	No
Trifluralin	May 13, 2015	<0.006	ug/L	No
Vinyl Chloride	May 13, 2015	<0.2	ug/L	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