

# **CITY OF MARKHAM - WATER SAMPLING PROGRAM**

*January 1 to December 31, 2019*

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 2019, no additional locations were warranted. Sampling is rotated through the 106 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes (THM), Haloacetic Acids (HAA), Nitrites & Nitrates, Lead, 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 2019 follows:**

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### **Sampling Program:**

Total Number of Samples collected and tested in 2019= 7,323

### **Adverse Test Results:**

Total Number of Adverse Water Quality Incidents (AWQI) = 13

### **Breakdown of Adverse Results:**

Total adverse due to Microbiology Exceedances = 4

Total adverse due to low Chlorine Residual = 4

Total adverse due to Observation during Watermain Break = 5

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The drinking water distributed to the City of Markham residents in 2019 was safe to drink and met all drinking water requirements. During 2019 the operation of the water distribution system, there were very few adverse sample incidents (less than 0.10% 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**

<b>Drinking-Water System Number:</b>	<b>220004162</b>
<b>Drinking-Water System Name:</b>	Markham Distribution System
<b>Drinking-Water System Owner:</b>	The Corporation of the City of Markham
<b>Drinking-Water System Category:</b>	Large Municipal Residential System
<b>Period being reported:</b>	January 1, 2019 to December 31, 2019

<p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p><b>Does your Drinking-Water System serve more than 10,000 people? Yes [ x ] No [ ]</b></p> <p><b>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ x ] No [ ]</b></p> <p><b>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</b></p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>• <a href="http://www.markham.ca">www.markham.ca</a></li> <li>• 8100 Warden Ave. – Waterworks Department</li> </ul> </div>	<p><b><u>Complete for all other Categories.</u></b></p> <p><b>Number of Designated Facilities served:</b></p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Not applicable</div> <p><b>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ ] No [ ]</b></p> <p><b>Number of Interested Authorities you report to:</b></p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Not applicable</div> <p><b>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ ] No [ ]</b></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:**

<b>Drinking Water System Name</b>	<b>Drinking Water System Number</b>
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 349,007 residents and is comprised of approximately 1,092 kilometers of various size watermains, 11,239 watermain valves and 8,803 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**

<b>Cathodic Protection of Iron Watermains</b>	<b>= \$259,768</b>
<b>Watermain CIPP Lining (Watermain Rehabilitation)</b>	<b>= \$510,335</b>
<b>Water Meter Replacement/Upgrades</b>	<b>= \$1,086,858</b>
<b>Watermain Replacement</b>	<b>= \$8,454,682</b>
<b>Watermain Replacement Design for 2019</b>	<b>= \$244,402</b>
<b>Curb Box Inspection and Replacement</b>	<b>= \$201,845</b>



**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**

<b>Incident Date</b>	<b>Parameter</b>	<b>Result</b>	<b>Unit of Measure</b>	<b>Corrective Action</b>	<b>Corrective Action Date</b>
<b>January 02, 2019 (AWQI # 144429)</b>	<b>Combined Chlorine Residual</b>	<b>0.11</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>January 02, 2019</b>
<b>January 03, 2019 (AWQI # 144435)</b>	<b>Combined Chlorine Residual</b>	<b>0.17</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>January 03, 2019</b>
<b>January 03, 2019 (AWQI # 144436)</b>	<b>Combined Chlorine Residual</b>	<b>0.00</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>January 03, 2019</b>
<b>January 14, 2019 (AWQI # 144516)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>January 14, 2019</b>
<b>January 21, 2019 (AWQI # 144586)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>January 21, 2019</b>
<b>January 23, 2019 (AWQI # 144613)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>January 23, 2019</b>
<b>March 11, 2019 (AWQI # 144960)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>March 11, 2019</b>
<b>March 20, 2019 (AWQI # 145032)</b>	<b>Combined Chlorine Residual</b>	<b>0.18</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>March 20, 2019</b>
<b>July 23, 2019 (AWQI # 146688)</b>	<b>Total Coliform</b>	<b>1</b>	<b>cfu/100mL</b>	<b>Flush Mains and Resample</b>	<b>July 23, 2019</b>
<b>July 30, 2019 (AWQI # 146927)</b>	<b>Total Coliform</b>	<b>No Data, Overgrown</b>	<b>cfu/100mL</b>	<b>Flush Mains and Resample</b>	<b>July 30, 2019</b>
<b>July 31, 2019 (AWQI # 147000)</b>	<b>Total Coliform</b>	<b>146</b>	<b>cfu/100mL</b>	<b>Flush Mains and Resample</b>	<b>July 31, 2019</b>
<b>September 10, 2019 (AWQI # 147979)</b>	<b>Total Coliform</b>	<b>No Data Overgrown</b>	<b>cfu/100mL</b>	<b>Flush Mains and Resample</b>	<b>Sept. 10, 2019</b>



<b>October 23, 2019 (AWQI # 148712)</b>	<b>On-Site Observational Adverse</b>	n/a	n/a	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>October 23, 2019</b>
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**Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.**

	<b>Number of Samples</b>	<b>Range of E.Coli Or Fecal Results (min #)-(max #)</b>	<b>Range of Total Coliform Results (min #)-(max #)</b>	<b>Number of HPC Samples</b>	<b>Range of HPC Results (min #)-(max #)</b>
<b>Raw</b>	<b>N/A</b>				
<b>Treated</b>	<b>N/A</b>				
<b>Distribution</b>	<b>1,835</b>	<b>0-0</b>	<b>0-Presence Of Total Coliforms</b>	<b>625</b>	<b>0-1,420</b>

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

	<b>Number of Grab Samples</b>	<b>Range of Results (min #)-(max #)</b>
<b>Turbidity</b>		
<b>Chlorine</b>	8,760 (Chlorine Analyzer) 4,669 (Grab)	Combined: 0.00mg/L – 1.93 mg/L
<b>Fluoride</b> (If the DWS provides fluoridation)	*Next sampling is in January, 2020	

***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.**

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

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

<b>Parameter</b>	<b>Sample Date</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Exceedance</b>
Antimony	April 30, 2019	0.0001	mg/L	No
Arsenic	April 30, 2019	0.0007	mg/L	No



<b>Barium</b>	<b>April 30, 2019</b>	<b>0.021</b>	<b>mg/L</b>	<b>No</b>
<b>Boron</b>	<b>April 30, 2019</b>	<b>0.023</b>	<b>mg/L</b>	<b>No</b>
<b>Cadmium</b>	<b>April 30, 2019</b>	<b>&lt;0.000015</b>	<b>mg/L</b>	<b>No</b>
<b>Chromium</b>	<b>April 30, 2019</b>	<b>&lt;0.002</b>	<b>mg/L</b>	<b>No</b>
<b>*Lead</b>	<b>See Summary Below</b>			
<b>Mercury</b>	<b>April 30, 2019</b>	<b>&lt;0.00002</b>	<b>ug/L</b>	<b>No</b>
<b>Selenium</b>	<b>April 30, 2019</b>	<b>&lt;0.001</b>	<b>mg/L</b>	<b>No</b>
<b>Sodium</b>	<b>N/A</b>			
<b>Uranium</b>	<b>April 30, 2019</b>	<b>&lt;0.00033</b>	<b>mg/L</b>	<b>No</b>
<b>Fluoride</b>	<b>N/A</b>			
<b>Nitrite</b>	<b>November 26, 2019</b>	<b>&lt;0.01</b>	<b>mg/L</b>	<b>No</b>
<b>Nitrate</b>	<b>November 26, 2019</b>	<b>0.30</b>	<b>mg/L</b>	<b>No</b>

\*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)

<b>Location Type</b>	<b>Number of Samples</b>	<b>Range of Lead Results (min#) – (max #)</b>	<b>Number of Exceedances</b>
<b>Plumbing</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>
<b>Distribution</b>	<b>20</b>	<b>&lt;0.00002 mg/L – 0.00230 mg/L</b>	<b>0</b>

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 2019, December 15, 2018 to April 15, 2019 and June 15, 2019 to October 15, 2019.

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

<b>Parameter</b>	<b>Sample Date</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Exceedance</b>
<b>Alachlor</b>	<b>April 30, 2019</b>	<b>&lt;0.3</b>	<b>ug/L</b>	<b>No</b>
<b>Atrazine + N-dealkylated metabolites</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>Azinphos-methyl</b>	<b>April 30, 2019</b>	<b>&lt;0.1</b>	<b>ug/L</b>	<b>No</b>
<b>Benzene</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>Benzo(a)pyrene</b>	<b>April 30, 2019</b>	<b>&lt;0.005</b>	<b>ug/L</b>	<b>No</b>
<b>Bromoxynil</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>Carbaryl</b>	<b>April 30, 2019</b>	<b>&lt;3.0</b>	<b>ug/L</b>	<b>No</b>
<b>Carbofuran</b>	<b>April 30, 2019</b>	<b>&lt;1.0</b>	<b>ug/L</b>	<b>No</b>
<b>Carbon Tetrachloride</b>	<b>April 30, 2019</b>	<b>&lt;0.2</b>	<b>ug/L</b>	<b>No</b>
<b>Chlorpyrifos</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>Diazinon</b>	<b>April 30, 2019</b>	<b>&lt;1.0</b>	<b>ug/L</b>	<b>No</b>
<b>Dicamba</b>	<b>April 30, 2019</b>	<b>&lt;10.0</b>	<b>ug/L</b>	<b>No</b>
<b>1,2-Dichlorobenzene</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>1,4-Dichlorobenzene</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>
<b>1,2-Dichloroethane</b>	<b>April 30, 2019</b>	<b>&lt;0.5</b>	<b>ug/L</b>	<b>No</b>



1,1-Dichloroethylene (vinylidene chloride or 1,1-dichloroethene)	April 30, 2019	<0.5	ug/L	No
Dichloromethane	April 30, 2019	<5.0	ug/L	No
2-4 Dichlorophenol	April 30, 2019	<0.1	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	April 30, 2019	<10.0	ug/L	No
Diclofop-methyl	April 30, 2019	<0.9	ug/L	No
Dimethoate	April 30, 2019	<1.0	ug/L	No
Diquat	April 30, 2019	<5.0	ug/L	No
Diuron	April 30, 2019	<5.0	ug/L	No
Glyphosate	April 30, 2019	<25	ug/L	No
Haloacetic Acids (HAA)	Running Annual Average of Quarterly Results	< 5.3	ug/L	No
Malathion	April 30, 2019	<5.0	ug/L	No
Metolachlor	April 30, 2019	<3.0	ug/L	No
Metribuzin	April 30, 2019	<3.0	ug/L	No
Monochlorobenzene	April 30, 2019	<0.5	ug/L	No
Nitrosodimethylamine (NDMA)	Running Annual Average of Quarterly Results	0.001	ug/L	No
Paraquat	April 30, 2019	<1.0	ug/L	No
Pentachlorophenol	April 30, 2019	<0.1	ug/L	No
Phorate	April 30, 2019	<0.3	ug/L	No
Picloram	April 30, 2019	<20.0	ug/L	No
Polychlorinated Biphenyls(PCB)	April 30, 2019	<0.05	ug/L	No
Prometryne	April 30, 2019	<0.1	ug/L	No
Simazine	April 30, 2019	<0.5	ug/L	No
THM (NOTE: show latest annual average)	Running Annual Average of Quarterly Results	14.08	ug/L	No
Terbufos	April 30, 2019	<0.4	ug/L	No
Tetrachloroethylene(perchloroethylene)	April 30, 2019	<0.5	ug/L	No
2,3,4,6-Tetrachlorophenol	April 30, 2019	<0.1	ug/L	No
Triallate	April 30, 2019	<10.0	ug/L	No
Trichloroethylene	April 30, 2019	<0.5	ug/L	No
2,4,6-Trichlorophenol	April 30, 2019	<0.1	ug/L	No
Trifluralin	April 30, 2019	<0.5	ug/L	No
Vinyl Chloride	April 30, 2019	<0.2	ug/L	No
MCPA	April 30, 2019	<10.0	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
NONE			