



Attachment 'A'

The Ontario Ministry of the Environment and Climate Change
Drinking Water System Inspection Report
July 2nd , 2015

Ministry of the Environment and
Climate Change

Safe Drinking Water
Branch

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Ministère de l'Environnement et de
L'Action en matière de changement
climatique

Direction du contrôle de la qualité de l'eau
potable

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August 14, 2015

The City of Markham
Waterworks Department
101 Town Centre Boulevard
Markham, Ontario L3R 9W3

Attention: Peter Loukes, Director, Environmental Services

RE: Markham Distribution System (220004162)
Drinking Water Inspection Report 1-C16VV
File: SI YO MA TO 540

Please find attached the Ministry of the Environment's inspection report for the above facility. The report details the findings of the inspection that began on July 2, 2015.

The Appendix section of the inspection includes the Stakeholder Appendix A with links to key reference and guidance materials available on the Ministry of the Environment's (MOE) website. Appendix B contains the inspection rating record and an updated risk methodology memo.

Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspectors' Annual Report.

In the inspection report, any "*Actions Required*" are linked to incidents of non-compliance with regulatory requirements contained within the Act, a regulation, or site-specific approvals, licenses, permits, orders or instructions. Such violations could result in the issuance of mandatory abatement instruments including Orders, tickets, penalties, or referrals to the ministry's Investigations and Enforcement Branch.

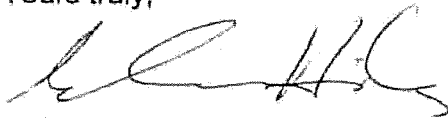
"*Recommended Actions*" convey information that the owner or operating authority should consider implementing in order to advance efforts already in place to address such issues as emergency preparedness, the availability of information to consumers, and conformance with existing and emerging industrial standards. Please note that items which appear as recommended actions do not, in themselves, constitute violations.

Please note, you will find in the report that bullets are shown in bold print and are the consistent and standard responses to the information gathered during the inspection. Statements shown in regular font provide additional site-specific details.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in *"Taking Care of Your Drinking Water: A guide for members of municipal council"* found under "Resources" on the Drinking Water Ontario website at www.ontario.ca/drinkingwater.

I would like to thank the Region of Durham staff for the assistance afforded to me during this compliance assessment. If you have any questions or concerns please contact myself or Demetra Koros, Water Supervisor, Central Region at 905-427-5630.

Yours truly,



Melissa Hills
Water Inspector
Ministry of the Environment and Climate Change
Phone: (905) 427-5622

C:

Eddy Wu, Manager, Operations & Maintenance
Peter Solymos, Supervisor, Water Quality
Helena Frantzke, Water Quality Coordinator
Bernard Mayer, Manager of Environmental Health, York Region Health Department
Joe La Marca, Director of Health Protection, York Region Health Department
Marion Young, Administrative Clerk, York Region Health Department
Don Ford, Director, Watershed Management, Toronto Region Conservation Authority
Demetra Koros, Water Supervisor, York Durham District Office



Ontario

Ministry of the Environment

MARKHAM DISTRIBUTION SYSTEM

Drinking Water System Inspection Report

DWS Number:	220004162
Inspection Number:	1-C16VV
Date of Inspection:	Jul 02, 2015
Inspected By:	Melissa Hills



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- A. Stakeholders Appendix
- B. Inspection Rating Record

OWNER INFORMATION:

Company Name: MARKHAM, THE CORPORATION OF THE CITY OF
Street Number: 101 **Unit Identifier:**
Street Name: TOWN CENTRE Blvd N
City: MARKHAM
Province: ON **Postal Code:** L3R 9W3

CONTACT INFORMATION

Type: Main Contact/Coordinator **Name:** Helena Frantzke
Phone: (905) 477-7000 x2449 **Fax:** (905) 479-7772
Email: hfrantzke@markham.ca
Title: Water Quality Coordinator, Waterworks Division

Type: Supervisor **Name:** Peter Solymos
Phone: (905) 477-7000 x2830 **Fax:** (905) 475-4732
Email: psolymos@markham.ca
Title: Supervisor, Water Quality, Waterworks Division

INSPECTION DETAILS:

DWS Name: MARKHAM DISTRIBUTION SYSTEM
DWS Address: 101 TOWN CENTRE BLVD N MARKHAM L3R 9W3
County/District: Markham
MOE District/Area Office: York-Durham District
Health Unit: YORK REGION HEALTH SERVICES DEPARTMENT
Conservation Authority: N/A
MNR Office: N/A
DWS Category: Large Municipal Residential
DWS Number: 220004162
Inspection Type: Announced
Inspection Number: 1-C16VV
Date of Inspection: Jul 02, 2015
Date of Previous Inspection: May 07, 2014

DRINKING WATER SYSTEM COMPONENTS DESCRIPTION

Site (Name): MOE DWS Mapping
Type: DWS Mapping Point **Sub Type:**
Comments:
Not Applicable

Site (Name): Markham Operation Office**Type:** Other**Sub Type:** Other**Comments:**

The Markham Distribution System is owned and operated by the City of Markham, and receives treated water from the City of Toronto and the Region of Peel. The trunk transmission lines, pumping stations, and water storage facilities located within the City of Markham are owned and operated by the Region of York. The Region of York measures and monitors the distribution water flows and volumes directed to the City of Markham through the use of nineteen (19) flow meters located along the Richmond Hill, Vaughan, Stouffville, Toronto and Markham boundaries.

The Markham Distribution System provides potable water to approximately 332,200 residents of Markham and consists of approximately 1006 km of watermains, 7,999 hydrants, 7,820 valves, and 80,015 service connections.

INSPECTION SUMMARY

INTRODUCTION

- * The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This report is based on an inspection of a "stand alone connected distribution system". This type of system receives treated water from a separately owned "donor" system. This report contains elements required to assess key compliance and conformance issues associated with a "receiver" system. This report does not contain items associated with the inspection of the donor system, such as source waters, intakes/wells and treatment facilities.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

Drinking Water Inspector Melissa Hills began an announced inspection of the Markham Distribution System on July 2, 2015. The City of Markham (The City) owns and operates this drinking water system. Files were reviewed at the Markham Operations Centre located at 8100 Warden Avenue.

The City receives treated Lake Ontario water from the City of Toronto and the Region of Peel. The Region of York provides water storage and pressure boosting to the City and acts as a wholesaler of the water to the system. The City of Toronto, Region of Peel and the Region of York treatment and distribution systems were inspected separately from the Markham Distribution System.

TREATMENT PROCESSES

- * The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.
- * The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.

The City had eleven (11) Form 1s completed for 2014 and ten (10) for the inspection period of 2015.

- * The facility and equipment appeared to be maintained and in a fit state of repair.

TREATMENT PROCESS MONITORING

- * The secondary disinfectant residual was measured as required for the distribution system.

Continuous on-line analyzers for total chlorine residual monitoring and free chlorine residual monitoring were installed at the City's Operations Centre located at 8100 Warden Avenue on January 1, 2014. The analyzers were in a testing stage alongside grab samples until February 2, 2015 when the analyzers were put on-line.

TREATMENT PROCESS MONITORING

- * Records confirmed that the maximum free chlorine residual in the distribution system was less than 4.0 mg/L or that the combined chlorine residual was less than 3.0 mg/L.
- * Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.
- * Samples for chlorine residual analysis were tested using an acceptable portable device.
- * All continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or approval or order, were equipped with alarms or shut-off mechanisms that satisfied the standards described in Schedule 6.
- * Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.

Readings are taken every minute and averaged hourly and a report is sent to the Supervisor every 72 hours to be reviewed. Grab samples are still collected in the system to ensure the correct number of samples are collected weekly.

- * All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.

DISTRIBUTION SYSTEM

- * There is a backflow prevention program, policy and/or bylaw in place.

The City's By-law 2012-27 is in place to regulate cross connections and backflow prevention in private plumbing systems to protect the drinking water supply.

- * Existing parts of the distribution system that were taken out of service for inspection, repair or other activities that may lead to contamination, and all new parts of the distribution system that came in contact with drinking water, were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit.

At the time of the inspection, Drinking Water Quality Management Standard procedure documents were in place that met the provisions of AWWQ C651, which is a requirement of Condition 2.3 of the Permit. Watermain break and commissioning records showed that disinfection procedures were followed for the inspection period.

- * The owner had implemented a program for the flushing of watermains as per industry standards.

The City conducts regular flushing of mains with priority sites flushed more often than others. Flushing is performed in the spring.

- * Records confirmed that disinfectant residuals were routinely checked at the extremities and "dead ends" of the distribution system.

Chlorine residuals are routinely measured at dead ends when flushing is performed.

DISTRIBUTION SYSTEM

- * **A program was in place for inspecting and exercising valves.**

The City exercises larger valves every 2 to 3 years and smaller valves every 5 to 6 years.

- * **There was a program in place for inspecting and operating hydrants.**

Hydrants are inspected and operated annually.

- * **There was a by-law or policy in place limiting access to hydrants.**

The City's By-law #1602 outlines the access to the hydrants.

The City also has a bulk water station that uses a card system for accessing.

- * **The owner has undertaken efforts to identify, quantify and reduce sources of apparent water loss.**

The Region monitors flow to Markham through the use of 19 flowmeters. The City of Markham has three (3) pilot District Metered Areas (DMAs) to determine the flow in those areas.

The City also owns leak detection equipment to further determine problem areas. They have a leak detection strategy in place to identify, quantify, and repair unreported leaks. Three (3) DMAs within Markham are providing monitoring for water usage anomalies and trends. This allows the City to monitor usage and losses.

- * **The distribution system pressure was monitored to alert the operator of conditions which may have lead to loss of pressure below the value under which the system is designed to operate.**

Static water levels are measured at fire hydrants across the City during hydrant inspections. Pressure is also monitored if a water pressure complaint is received.

- * **Based on the records available the owner was able to maintain proper pressures in the distribution system.**

- * **The donor had provided an Annual Report to the receiver drinking water system.**

OPERATIONS MANUALS

- * **Operators and maintenance personnel had ready access to operations and maintenance manuals.**

Up to date plans, maps and manuals are available to staff at the City's Operations Centre located at 8100 Warden Avenue, Markham.

- * **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.**

- * **The operations and maintenance manuals did meet the requirements of the Permit and Licence or Approval issued under Part V of the SDWA.**

LOGBOOKS

- * **Logbook entries were made in chronological order.**

LOGBOOKS

- * The record system allowed the reader to unambiguously identify the person who made the logbook entry.
- * Entries in the logbook were made only by appropriate and authorized personnel.
- * Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.
- * For every required operational test and every required sample, a record was made of the date, time, location, name of the person conducting the test and result of the test.
- * Logs or other record keeping mechanisms were available for at least five (5) years.

SECURITY

- * All storage facilities were completely covered and secure.
- * The owner had provided security measures to protect components of the drinking-water system.

Sampling stations are locked and hydrants in areas of new development are equipped with anti-tampering devices to prevent unauthorized use.

CONSUMER RELATIONS

- * Water conservation was being practiced by the owner or operating authority.

Markham's By-law #105-95, outlines restrictions for water usage. The City is also in partnership with The Region of York for the "Water for Tomorrow Program."

- * Required documents were available free-of-charge during normal business hours at a location accessible to the public.

Documents are available at the Civic Centre at 101 Town Centre Blvd, Markham and are also available at the Operations Centre located at 8100 Warden Avenue, Markham during regular business hours, 8:30 AM to 4:30 PM.

- * The owner did take effective steps to advise users of the water system of the availability of Annual Reports, including posting a copy on a web site, if applicable.

The public is notified of the availability of the annual report through the City of Markham's internet site, Markham's newspaper, and upon public request.

CERTIFICATION AND TRAINING

- * The overall responsible operator had been designated for each subsystem.

CERTIFICATION AND TRAINING

- * Operators in charge had been designated for all subsystems which comprised the drinking-water system.
- * All operators possessed the required certification.
- * Operator certificates or water quality analyst certificates were displayed in a conspicuous location at the workplace or at the premises from which the subsystem was managed.
Operator certificates are displayed at the Operations Centre at 8100 Warden Avenue, Markham.
- * The classification certificates of the subsystems were conspicuously displayed at the workplace or at premises from which the subsystem was managed.
Classification certificates are displayed at the Operations Centre at 8100 Warden Avenue, Markham.
- * An adequately licenced operator was designated to act in place of the overall responsible operator when the overall responsible operator was unable to act.
The Markham Distribution System has a procedure in place for staff coverage. As part of the procedure the Waterworks Supervisors are assigned to stand-by duties on a rotational basis. The supervisor on stand-by is designated as the ORO.
- * The owner/operating authority was aware of the operator training and record keeping requirements, and they were taking reasonable steps to ensure that all operators receive the required training.

WATER QUALITY MONITORING

- * All microbiological water quality monitoring requirements for distribution samples were being met.
Microbiological water quality sampling for the system exceeded the requirements under O. Reg. 170/03.
- * All trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.
Trihalomethane water quality sampling for the system exceeded the requirements under O. Reg. 170/03.
- * Trihalomethane samples were being collected from a point in the distribution system or connected plumbing system that was likely to have an elevated potential for the formation of trihalomethanes.
- * The owner ensured that water samples were taken at the prescribed location.
- * All sampling requirements for lead prescribed by schedule 15.1 of O. Reg. 170/03 were being met.
On November 1st, 2011, the system received relief from regulatory requirements for lead sampling as required by Schedule 15.1 of Ontario Regulation 170/03. Table two (2) and four (4) of Schedule D of the Licence, outlines the lead sampling requirements for the System.
The owner/operator is required to collect lead samples from ten (10) locations in the distribution system between the dates of:

WATER QUALITY MONITORING

December 15th, 2011 to April 15th, 2012;
June 15th, 2012 to October 15th, 2012;
December 15th, 2012 to April 15th, 2013;
June 15th, 2013 to October 15th, 2013;
December 15th, 2013 to April 15th, 2014;
June 15th, 2014 to October 15th, 2014;
December 15th, 2014 to April 15th, 2015;
June 15th, 2015 to October 15th, 2015;
December 15th, 2015 to April 15th, 2016; and,
June 15th, 2016 to October 15th, 2016.

At the time of the inspection, lead sample results were provided for review. The required amount of lead samples were collected according to sampling procedures for the periods of

June 15th, 2014 to October 15th, 2014; and

December 15th, 2014 to April 15th, 2015.

- * **The owner was conducting sampling beyond the minimum legislative requirements.**

The City conducts sampling for sodium, fluoride, nitrates and nitrites, Schedule 23 and 24 parameters which are not required by the distribution system.

- * **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**
- * **The drinking water system owner had submitted written notices to the Director that identified the laboratories that were conducting tests for parameters required by legislation, Order Certificate of Approval (OWRA) or a Permit, Licence or Approval issued under Part V of the SDWA.**
- * **Based on information provided by the owner/operator, samples were being taken and handled in accordance with instructions provided by the drinking-water system's laboratories.**
- * **The owner indicated that the required records are kept and will be kept for the required time period.**

WATER QUALITY ASSESSMENT

- * **Records show that water sample results taken during the review period met the Ontario Drinking Water Quality Standards (O. Reg. 169/03), with the following exceptions:**

During the inspection review period, there were seven (7) adverse water quality test results. Six (6) test results indicated a presence of Total coliforms or a result of more than 0 Total coliform colonies. One (1) test indicated a non-detect overgrown result for possible Total coliforms or E. coli. The Ontario Drinking Water Quality Standard for Total coliforms and E. coli is non-detectable.

Resamples were collected and corrective actions were taken for all adverse test results until results met the Ontario Drinking Water Quality Standards for microbiological parameters.

REPORTING & CORRECTIVE ACTIONS

- * Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.
- * Corrective actions as directed by the Medical Officer of Health had been taken by the owner and operating authority to address exceedances of the lead standard.
- * All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.
- * All required written notices of adverse water quality incidents were provided as per O. Reg. 170/03 16-7.
- * In instances where written notice of issue resolution was required by regulation, the notice was provided as per O. Reg. 170/03 16-9.
- * Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.
- * The Annual Report containing the required information was prepared by February 28th of the following year.
- * Summary Reports for municipal council were completed on time, included the required content, and were distributed in accordance with the regulatory requirements.
- * The owner had evidence that all required notifications to all legal owners associated with the Drinking Water System had been made during the inspection period.

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

Not Applicable



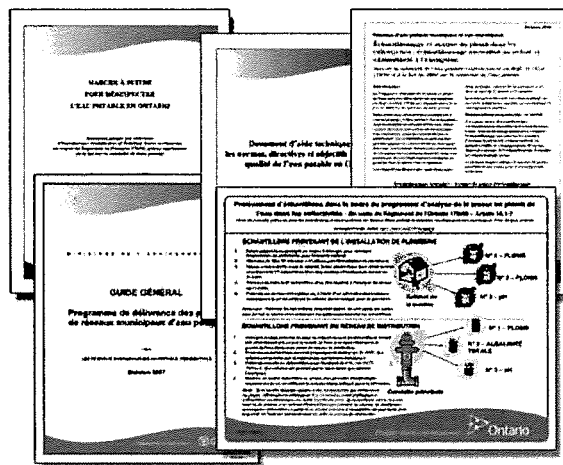
APPENDIX B
INSPECTION RATING RECORD

Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

Beaucoup de documentation sur le fonctionnement d'un réseau d'eau potable se trouve sur le site Web du **ministère de l'Environnement**.

Vous trouverez ci-dessous la liste des principaux documents que les propriétaires et les exploitants de réseaux municipaux d'eau potable utilisent fréquemment. Pour lire ou télécharger ces documents, allez sur le site Web du Ministère, et effectuez une recherche par numéro de publication dans la section **RESSOURCES**.

Consultez le site **Eau potable Ontario** pour obtenir d'autre documentation. Communiquez avec le Centre d'information du public au 1 800 565-4923



ou au 416 325-4000, ou encore à **picemail.moe@ontario.ca** si vous avez des questions ou besoin d'aide.

NUMÉRO DE PUBLICATION	TITRE DE LA PUBLICATION
4448f01	Marche à suivre pour désinfecter l'eau potable en Ontario
7152e	Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids (en anglais seulement)
7467	Filtration Processes Technical Bulletin (en anglais seulement)
7685	Ultraviolet Disinfection Technical Bulletin (en anglais seulement)
8215	Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (février 2011) (en anglais seulement)
2601f	Guide général - Programme de délivrance des permis de réseaux municipaux d'eau potable
0000	Bulletin du Programme des permis de réseaux municipaux d'eau potable, numéro 1, janvier 2011
0000	Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable
6560f	Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités
7423f	Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption
7128f	Liste des personnes-ressources du réseau d'eau potable
4449f01	Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario

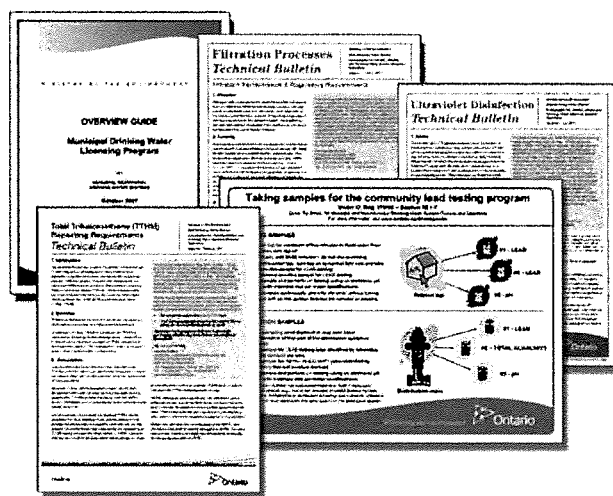
ontario.ca/drinkingwater

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are posted on the Ministry of the Environment's **Drinking Water Ontario** website at www.ontario.ca/drinkingwater to help in the operation of your drinking water system.

Below is a list of key materials frequently used by owners and operators of municipal drinking water systems. To read or download these materials, go to **Drinking Water Ontario** and search in the **Resources** section by **Publication Number**.

Visit **Drinking Water Ontario** for more useful materials. Contact the Public Information Centre if you need assistance or have questions at 1-800-565-4923/416-325-4000 or picemail.moe@ontario.ca.



PUBLICATION NUMBER	PUBLICATION TITLE
4448e01	Procedure for Disinfection of Drinking Water in Ontario
7152e	Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids
7467	Filtration Processes Technical Bulletin
7685	Ultraviolet Disinfection Technical Bulletin
8215	Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)
2601e	Overview Guide: Municipal Drinking Water Licensing Program
0000	Municipal Drinking Water Licensing Program Bulletin, Issue 1, January 2011
0000	Certification Guide for Operators and Water Quality Analysts
6560e	Taking Samples for the Community Lead Testing Program
7423e	Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption
7128e	Drinking Water System Contact List
4449e01	Technical Support Document for Ontario Drinking Water Quality Standards

ontario.ca/drinkingwater



APPENDIX A

STAKEHOLDER APPENDIX

SIGNATURES

Inspected By:

Melissa Hills

Signature: (Provincial Officer):



Reviewed & Approved By:

Demetra Koros

Signature: (Supervisor):



Review & Approval Date:

August 14, 2015

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.

SUMMARY OF BEST PRACTICE ISSUES AND RECOMMENDATIONS

This section provides a summary of all best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. Best Management Practices are recommendations and not mandatory requirements, but may lead to safe drinking water for the consumer.

In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following practices and consider measures to implement them so that all drinking water systems continuously improve their processes.

Not Applicable

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2015-2016)

DWS Name: MARKHAM DISTRIBUTION SYSTEM
DWS Number: 220004162
DWS Owner: Markham, The Corporation Of The City Of
Municipal Location: Markham

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Standalone
Inspection Date: July 2, 2015
Ministry Office: York-Durham District

Maximum Question Rating: 464

Inspection Module	Non-Compliance Rating
Treatment Processes	0 / 32
Distribution System	0 / 21
Operations Manuals	0 / 42
Logbooks	0 / 34
Consumer Relations	0 / 8
Certification and Training	0 / 43
Water Quality Monitoring	0 / 83
Reporting & Corrective Actions	0 / 102
Treatment Process Monitoring	0 / 99
TOTAL	0 / 464

Inspection Risk Rating 0.00%

FINAL INSPECTION RATING: 100.00%

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2015-2016)

DWS Name: MARKHAM DISTRIBUTION SYSTEM DWS Number: 220004162 DWS Owner: Markham, The Corporation Of The City Of Municipal Location: Markham

Regulation: O.REG 170/03

Category: Large Municipal Residential System

Type Of Inspection: Standalone

Inspection Date: July 2, 2015

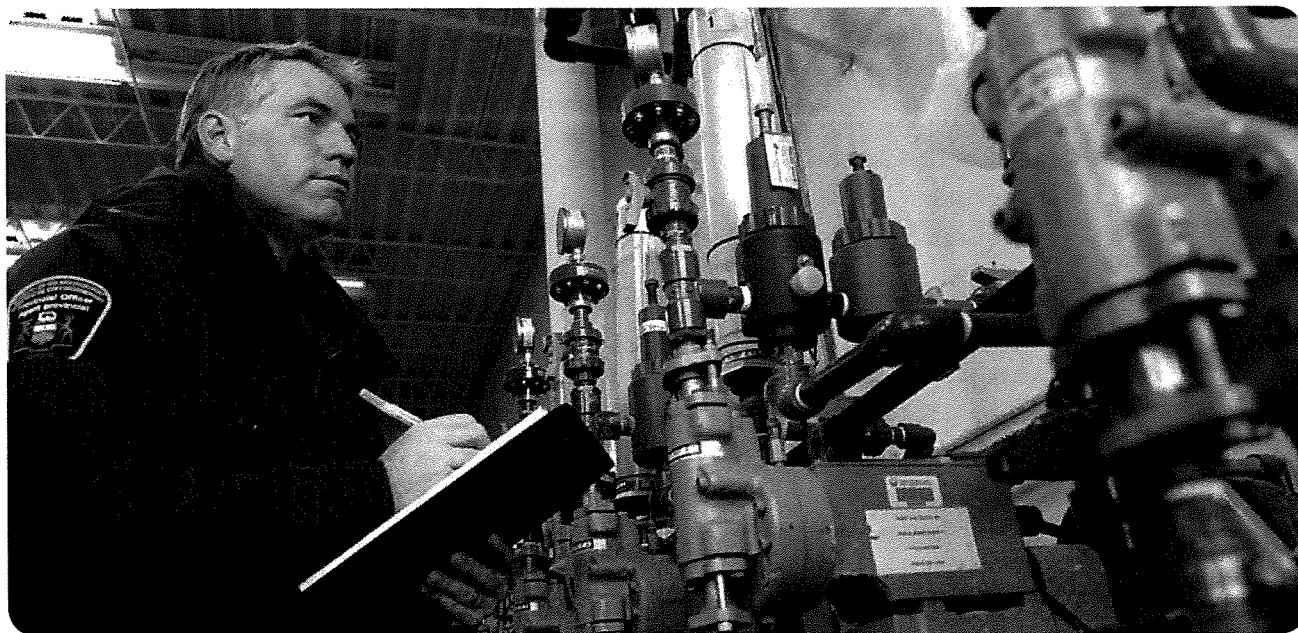
Ministry Office: York-Durham District

Maximum Question Rating: 464

Inspection Risk Rating	0.00%
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FINAL INSPECTION RATING:	100.00%
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APPLICATION OF THE **RISK METHODOLOGY** USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS



The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection results since fiscal year 2008-09. The primary goals of this assessment

are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains up to 14 inspection modules and consists of approximately 120 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections. The questions address a wide range of regulatory issues, from administrative procedures

ontario.ca/drinkingwater

to drinking water quality monitoring. Additionally, the inspection protocol contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry have assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating that is less than 100 per cent does not mean that the drinking water from the system is unsafe. It shows areas where a system's operation can improve. To that end, the ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry's annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario's Risk Management Framework. Risk management is a systematic approach to identifying potential hazards; understanding the likelihood and consequences of the hazards; and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

$$\text{RISK} = \text{LIKELIHOOD} \times \text{CONSEQUENCE}$$

(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

TABLE 1:

Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 - 10% (Unlikely)	L = 1
11 - 49% (Possible)	L = 2
50 - 89% (Likely)	L = 3
90 - 100% (Almost Certain)	L = 4

TABLE 2:

Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8

The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

Table 3 presents a sample question showing the risk rating determination process.

TABLE 3:							
Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?							
Risk = Likelihood × Consequence							
C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	Major Administrative Consequence	Minor Environmental Consequence	Minor Health Consequence	Medium Environmental Consequence	Major Environmental Consequence	Medium Health Consequence	Major Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely)	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely)	L=3 (Likely)	L=2 (Possible)
R=4	R=2	R=6	R=12	R=15	R=6	R=21	R=16

Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions that relate to regulatory compliance and input their responses as “yes”, “no” or “not applicable” into the Ministry’s Laboratory and Waterworks Inspection System (LWIS) database. A “no” response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone), type of inspection (i.e., focused, detailed), and source type (i.e., groundwater, surface water).

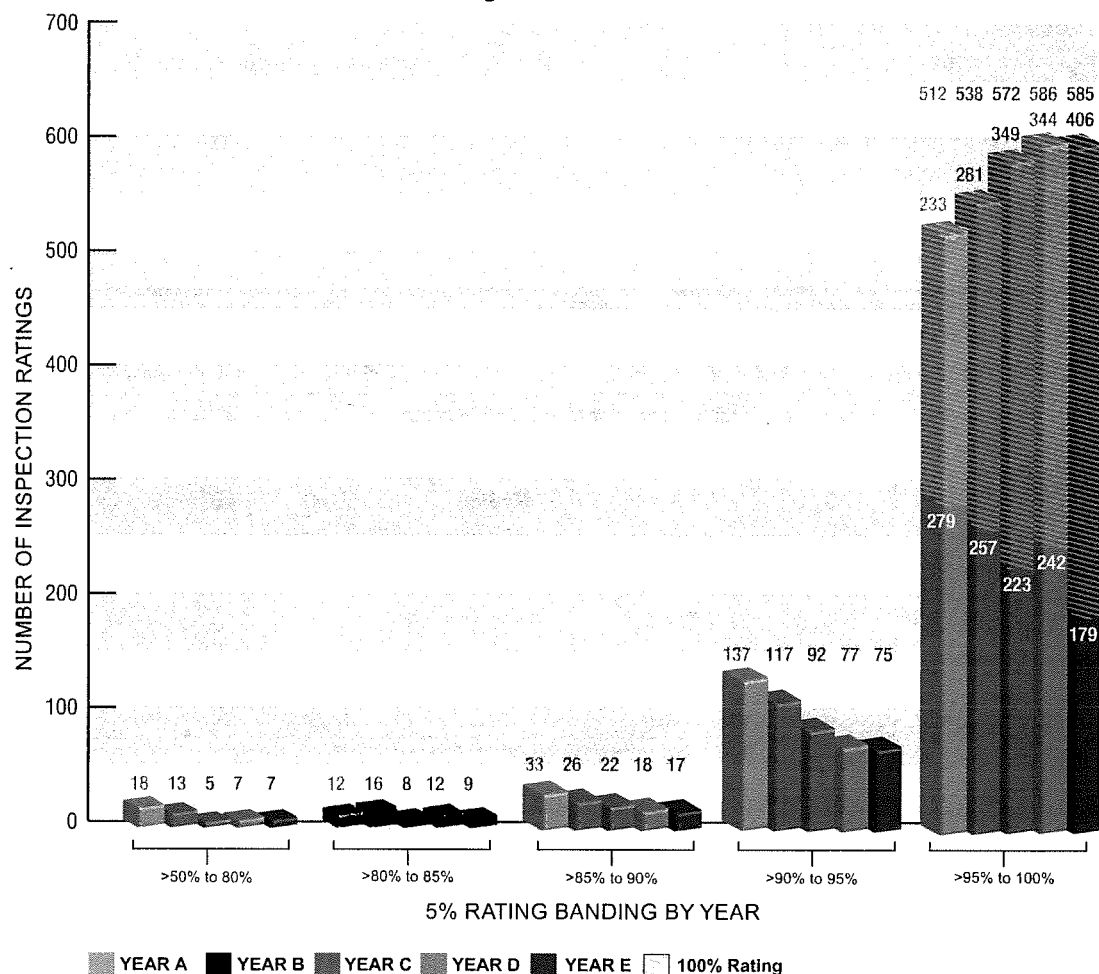
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry's Chief Drinking Water Inspector's Annual Report.

Figure 1 presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

Figure 1: Year Over Year Distribution of MRDWS Ratings



Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 14 possible modules of the inspection protocol,

which would provide the system owner/operator with information on the areas where they need to improve. The 14 modules are:

- | | | | |
|-------------------------|------------------------|---------------------------------------|--|
| 1. Source | 5. Process Wastewater | 9. Contingency and Emergency Planning | 12. Water Quality Monitoring |
| 2. Permit to Take Water | 6. Distribution System | 10. Consumer Relations | 13. Reporting, Notification and Corrective Actions |
| 3. Capacity Assessment | 7. Operations Manuals | 11. Certification and Training | 14. Other Inspection Findings |
| 4. Treatment Processes | 8. Logbooks | | |

For further information, please visit www.ontario.ca/drinkingwater