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Ministry of the Environment and Climate Change

Safe Drinking Water Branch

Ottawa District Office
2430 Don Reid Drive
Ottawa ON K1H 1E1

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

Direction du contrôle de la qualité de l'eau potable

Bureau du district d'Ottawa
2430, chemin Don Reid
Ottawa (Ontario) K1H 1E1

Ontario

March 28, 2017

Sent by Email: cao@laurentianhills.ca

The Corporation of the Town of Laurentian Hills
34465 Highway 17, RR#1
Deep River, Ontario
K0J 1P0

Attention: Ms. Sherry Batten
Chief Administrative Officer

Dear Ms. Batten:

Re: 2016-2017 Inspection Report

The enclosed report documents findings of the inspection that was performed at the Chalk River drinking water system on January 19, 2017.

Two sections of the report, namely "Actions Required" and "Recommended Actions" cite due dates for the submission of information or plans to my attention.

Please note that "Actions Required" are linked to incidents of non-compliance with regulatory requirements contained within an 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 fulsome availability of information to consumers, and conformance with existing and emerging industry standards. Please note that items which appear as recommended actions do not, in themselves, constitute violations.

In order to measure individual inspection results, the ministry continues to adhere to an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Rating Record (IRR), appended to the inspection report,

provides the ministry, the system owner and the local Public Health Unit with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. Please note the IRR methodology document, also appended to the inspection report, describes how the risk model was improved to better reflect any health related and administrative non-compliance issues that may be cited in our inspection reports. IRR ratings are published in the ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Lyn Garrah, Water Compliance Supervisor (Acting), at 613-521-3450 ext. 239.

Section 19 of the *Safe Drinking Water Act, 2002* (Standard of Care) cites a number of obligations of individuals who exercise decision-making authority over municipal drinking water systems. The ministry encourages individuals, particularly municipal councilors, to take steps to be well 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.

Thank you for the assistance afforded to me during the conduct of the compliance assessment. Should you have any questions regarding the content of the enclosed report, please do not hesitate to contact me.

Yours truly,

Jen Bitten, B.Sc.
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Safe Drinking Water Branch
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JB

Enclosure

ec: Greg Prangley, Project Manager, American Water, 701 Main Street, Hamilton, ON L8S 1A2, gprangley@amwater.com
- Dave Ethier, Overall Responsible Operator - Chalk River DWS, American Water, 73 Railway Street, Chalk River, ON K0J 1P0, dethier@amwater.com
- Mike Grace, Manager, Environmental Health, Renfrew County and District Health Unit, 7 International Dr., Pembroke, ON K8A 6W5, mgrace@rcdhu.com
- John Swick, District Manager, Ministry of Natural Resources, Pembroke District Office, 31 Riverside Dr., Pembroke, ON K8A 8R6, john.swick@ontario.ca

c: File SI-RE-LH-RA 540 (2016)

Ontario

Ministry of the Environment and Climate Change

CHALK RIVER DRINKING WATER SYSTEM

Inspection Report

Site Number:	210000666
Inspection Number:	1-CLKZB
Date of Inspection:	Jan 19, 2017
Inspected By:	Jen Bitten

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OWNER INFORMATION:

Company Name:	LAURENTIAN HILLS,THE CORPORATION OF THE TOWN OF		
Street Number:	34465	**Unit Identifier:**	
Street Name:	HIGHWAY 17 Hwy		
City:	DEEP RIVER		
Province:	ON	**Postal Code:**	K0J 1P0

CONTACT INFORMATION

Type:	Owner	**Name:**	Sherry Batten
Phone:	(613) 584-3114	**Fax:**	(613) 584-3285
Email:	cao@laurentianhills.ca		
Title:	Chief Administrative Officer		
Type:	Operating Authority	**Name:**	Dave Ethier
Phone:	(613) 589-2161	**Fax:**	(613) 589-2158
Email:	dethier@amwater.com		
Title:	Lead Operator, Chalk River		
Type:	Operating Authority	**Name:**	Greg Prangley
Phone:	(905) 521-4605	**Fax:**	(613) 544-0266
Email:	gprangley@amwater.ca		
Title:	Project Manager, American Water		

INSPECTION DETAILS:

Site Name:	CHALK RIVER DRINKING WATER SYSTEM
Site Address:	73 RAILWAY ST CHALK RIVER K0J 1P0
County/District:	Laurentian Hills
MOECC District/Area Office:	Ottawa District
Health Unit:	RENFREW COUNTY AND DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	Pembroke District Office
Category:	Large Municipal Residential
Site Number:	210000666
Inspection Type:	Announced
Inspection Number:	1-CLKZB
Date of Inspection:	Jan 19, 2017
Date of Previous Inspection:	Jan 14, 2016

COMPONENTS DESCRIPTION

Site (Name):	MOE DWS Mapping		
Type:	DWS Mapping Point	**Sub Type:**	
Site (Name):	RAW WATER INTAKE		
Type:	Source	**Sub Type:**	Surface

Comments:
The source for the Chalk River drinking water system is Corry Lake, which is a shallow lake within the Chalk River drainage basin. The headwaters of Chalk River are located in the northeastern portion of Algonquin Park where land use is generally restricted to undeveloped forests and wetlands. According to the 2001 Engineers' Report prepared by Stantec Consulting Limited, Corry Lake is subject to potential contamination by storm water run-off, agricultural run-off and vector contact resulting in occasional elevated microbial levels.

The inlet screen consists of Tensar Biaxial Geogrid SSI screen with 25mm x 40mm openings and 100mm ribs. The screen is fastened to the end of a 400mm polyethylene intake pipe, located approximately 25m from shore and 1.65m below the water surface. Raw water flows by gravity through 60m of PET intake pipe to a three-chambered 2.5m by 2.5m pre-cast concrete valve chamber. Water flows from the first valve chamber to manhole 101 through 75m of 300mm poly vinyl chloride (PVC) pipe, and from manhole 101 to the low lift pumping station through 5m of 300mm corrugated steel pipe. Under normal conditions, the 300mm diameter knife gate isolation valve located within the valve chamber is fully open and the level in the raw water well matches the level in Corry Lake.

In addition, there is a 100mm diameter PVC pipe from the valve chamber to the low lift pumping station (for future use such as chlorination for zebra mussel control) which is currently capped at both ends.

Site (Name): LOW LIFT PUMPING STATION
Type: Source **Sub Type:** Pumphouse
Comments:
The low lift station is a brick and metal clad building located on the bank of Corry Lake. It is equipped with two 25HP horizontal end-suction centrifugal pumps (duty and standby), each with a capacity of 23L/s at 42.7m TDH, controlled by variable frequency drives, however since 2008, the pumps are operated at constant speed and adjusted to demand requirements.

Each pump has a dedicated suction line to the raw water well, which is 4.3m by 4.3m by 2m deep at average lake level. The pumps are brought into service manually or automatically through the use of an ultrasonic level measurement in the clearwell at the water treatment plant.

Water is pumped from the raw water well through a 150mm diameter common discharge header to the treatment plant through a 2000m long 200mm diameter transmission main along Corry Lake Road, Forestry Road, and Railway Street.

Site (Name): CHEMICAL FEED BUILDING
Type: Other **Sub Type:** Other
Comments:
The chemical feed building is located directly adjacent to the low lift pumping station. It is metal clad and is 7.8m long by by 3m wide. The building contains two soda ash chemical feed pumps (duty and standby) each rated at 60L/hr, and two 1000L soda ash solution tanks with containment.

Soda ash solution is dosed to the raw water well, flow-paced based on total raw water flow measured at the common raw water meter FE-101.

Site (Name): TREATED WATER
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The water treatment facilites are housed in a concrete block, brick and metal clad building 17m by 17m.

Raw water is pumped from the low lift station through a 2000m long 200mm diameter asbestos cement transmission main to the treatment plant. The flow rate is measured by the online flow meter (FE-101) located on the 200mm

diameter common intake header just prior to the splitter box which was designed to divide the water flow equally between the two treatment units. PAS8 is injected at the spitter box, and polyelectrolyte (Magnafloc LT 27AG) is injected at each the solids contact units.

Treatment Unit #1, installed in 1980, is composed of an ECODYNE solids contact unit and a dual media filter which provides coagulation, flocculation, settling and filtration. Until 2003, it was operated in batch mode at a flow rate equivalent to rated capacity. The solids contact unit contains two compartments: a circular sludge blanket tank with a rotating mixer, and a rectangular sedimentation basin with 60 degree tube settlers. There is no mechanical rake at the bottom of the tank to direct sludge to the drain.

Treatment Unit #2, installed in 2003, is composed of a solids contact unit and a two-compartment dual media (sand and anthracite) filter, which provide coagulation, flocculation, settling and filtration. It has improved operational characteristics including a more efficient solids contact tank which consists of a proprietary flocculator/clarifier providing a mixing zone, a reaction well cone with baffles, a clarification zone and a concentric sludge collector. No increase in rated capacity was made with the addition of the new treatment unit.

Other upgrades that were completed in 2003 included the following:
- Low lift pumps were replaced with variable frequency drive, in order to operate the plant at a lower flow rate.
- The original filters were modified to allow for filter-to-waste capability.
- Flow monitoring equipment and analyzers for pH, turbidity, chlorine residual and fluoride were replaced.
- Chemical feed systems were improved to allow for duty and standby pumps.
- Spill containment was provided for process chemicals.
- A sludge holding tank equipped with a mixer and two submersible pumps (one pump is now equipped with a variable frequency drive) were installed to discharge effluent to the sanitary sewer.
- Piping between the water treatment plant and the distribution system was modified to ensure all treated water was directed to the elevated storage tank prior to entering the distribution system. This was done to provide chlorine contact time needed to achieve 0.5-log inactivation of Giardia cysts and 2-log inactivation of viruses.

Filtered water from both units is directed through a common flow meter (FE-105), injected with hydrofluorosilicic acid, sodium hypochlorite, and soda ash, prior to entering the 100m³ clearwell.

Three horizontal centrifugal high lift pumps each rated at 15L/s at 40.8m TDH draw water from the clearwell and direct it through a common 300mm diameter discharge header to the elevated storage tank. In addition there is a 200mm diameter pipeline between the water treatment plant and the distribution system on Railway Street; the valve is kept closed and locked, but could be used in combination with a Boil Water Advisory in case of watermain failure to the elevated storage tank.

Process chemicals used in the treatment system include:
- sodium hypochlorite for disinfection
- soda ash for pH and alkalinity control
- pre-hydroxylated aluminum sulphate (PAS-8) as a primary coagulant
- polyelectrolyte used as a coagulant aid
- hydrofluorosilicic acid for fluoridation

Water leaving the water treatment plant is directed to the elevated storage tank in order to complete its primary disinfection process.

Site (Name): ELEVATED STORAGE TANK
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:

Treated water from the water treatment plant is pumped to the elevated water storage tower through a 470m long, 250mm diameter pipe. The elevated storage tank has a volume of 1380m³, which is used to provide sufficient contact time to complete primary disinfection before water enters the distribution system. This storage capacity represents a one-day reserve in the summer and up to 3 days in the winter. Continuous analyzers are installed at the water tower to monitor chlorine residual, pH, temperature and fluoride.

It should be noted that the water tower inlet pipe is equipped with a swing check valve to keep the tower full in case of watermain failure prior to the tower. There are also swing check vaves at each high lift pump, to prevent backflow into the clearwell.

Site (Name): DISTRIBUTION SYSTEM
Type: Other **Sub Type:** Other
Comments:
Water from the elevated storage tank is conducted to Main Street via a 320m long, 200mm diameter pipe. The distribution system consists of approximately 12km of watermains (less than 10inch diameter) with more than ten dead-ends. Water consumers are not metered and customers are billed a flat rate dependent upon residential or commercial usage.

Site (Name): CHALK RIVER SEWAGE TREATMENT PLANT
Type: Other **Sub Type:** Other
Comments:
Historical records for water treatment operations are kept at the sewage treatment plant. In addition, daily chlorine residual monitoring of distribution system water is conducted there.

The sewage plant and water plant are also closely linked due to issues with the volume of wastewater generated at the water plant impacting the hydraulic capacity of the sewage treatment plant.

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 related policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment and distribution components as well as management practices.**

  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 a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

  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.

  The Chalk River Drinking Water System is owned by the Town of Laurentian Hills and operated by American Water.

  An inspection of the Chalk River Drinking Water System occurred on January 19, 2017. It was attended by Ministry of the Environment and Climate Change Water (MOECC) Inspector Jen Bitten and American Water staff Dave Ethier and Dan Danis.

  The inspection period referenced throughout this report includes January 14, 2016 - January 19, 2017.

  Chalk River DWS Licences & Permits:
  Municipal Drinking Water Licence (MDWL) #261-101 [Issue #4], expires on March 23, 2021
  Drinking Water Works Permit (DWWP) #261-201 [Issue #2]
  Permit to Take Water (PTTW) #8446-9BPRT6, expires on September 30, 2023

Capacity Assessment

- **There was sufficient monitoring of flow as required by the Municipal Drinking Water Licence or Drinking Water Works Permit issued under Part V of the SDWA.**

  A raw flow meter measures the volume and rate of raw water entering the plant from the Corry Lake station. Treated flows are measured leaving the clearwell, prior to the tower, and again leaving the tower. Records were provided for the annual verification of all flow meters in the plant.

- **The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Municipal Drinking Water Licence issued under Part V of the SDWA.**

  Municipal Drinking Water Licence #261-101, Schedule C, Section 1 states a maximum rated capacity of 1987m³/day of water from the treatment subsystem into the distribution system. Maximum treated flows for the inspection period was 707m³/day (or 36% of rated capacity) with average treated flows around 397m³/day.

Capacity Assessment

Permit to Take Water #8446-9BPRT6, states a maximum raw water taking of 1980m³/day. Maximum raw water taking for the inspection period was 692m³/day with average flows of 395m³/day.

All flows were well within their required capacity during the inspection period.

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 equipment is installed and operational as required.

  The new plant has been used primarily since the last inspection. The old plant had been taken down for repairs and sludge removal and was not in operation at the time of inspection. Operators reported that the new plant has been operating well since the last inspection with some filter optimization measures taken that has improved the performance of those filters.

  The Town is also investigating a complete inspection and cleaning of the interior of the tower. The tower provides the final stage for the primary disinfection process and taking the tower out of service for the duration of this work will require consultation with the health unit.

- **The owner/operating authority was in compliance with the requirement to prepare Form 3 and associated documents as required by their Drinking Water Works Permit during the inspection period.**

  A Form 3 has been completed for the addition of the standby generators that have been installed. The generators have been put into service and a Director Notification Form is required to be submitted to the Director to ensure that the equipment is included in Schedule A of the DWWP.

- **Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.**

  Chalk River provides conventional filtration complete with chlorination for disinfection. Two (2) separate treatment units are installed - each providing slightly different treatment methods. A review of records indicates that the treatment equipment was operated as required at all times during the inspection period.

  There are Daily Reports and Monthly Reports that are generated for the operators. Operators rely on the Daily Reports for the daily readings and for the daily CT calculations. Information gathered during plant checks is entered into a data management system and operators enter readings for numerous parameters.

  The operators visit both the water plant and the sewage plant each day and some details on the water system were entered into the sewage logbook instead of the water logbook (and vice versa). The information was still recorded, but in a different location. There is no consistency with regards to closing off the logbook for each day (ie. a line through the unused portion of the day), it is recommended that operators remain consistent with ensuring each day is closed off.

- **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

  Secondary chlorine residuals are taken at the sewage treatment plant on a daily basis and at other locations during sampling.

Treatment Processes

Residuals in the distribution system ranged from 0.30mg/L - 1.54mg/L over the inspection period.

Treatment Process Monitoring

- **Primary disinfection chlorine monitoring was conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved.**

  Primary disinfection is completed in the elevated tower where sufficient CT is achieved. Water is directed from the filters to the small clearwell at the plant where it is then directed to the elevated tower, approximately 470m northwest of the plant. CT is achieved leaving the tower and prior to the first consumer. CT calculations are completed on a daily basis, giving the "worst case scenario" for the previous day.

- **Continuous monitoring of each filter effluent line was being performed for turbidity.**

  Each treatment unit has a dedicated filter (dual media) equipped with a continuous turbidity meter on the effluent. Filter performance is assessed separately for each plant on a monthly basis. The Monthly Report shows the monthly minimum, maximum and average turbidity readings and the monthly percentage of readings <0.3NTU for each filter. Filter efficiency ranged from 99.36% - 100% over the inspection period.

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

  Secondary chlorine residuals are taken at the sewage treatment plant on a daily basis and at other locations during sampling. Chlorine residuals in the distribution system are measured with an appropriate device and records are maintained of the results.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

  Operators visit the plant every day conducting routine checks throughout the plant and reviewing data and trending.

- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6.**

  The plant is equipped with numerous online analyzers for chlorine, turbidity, pH, temperature and fluoride. Alarms are tested on a regular basis to ensure they are functional and received by the operator.

  Both chlorine analyzers - leaving the clearwell and leaving the tower - alarm at 0.65mg/L for low and 1.50mg/L for high.

  The filter effluent turbidity analyzers alarm at 0.25NTU and will lock out the operation of the plant.

- **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.**

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

  There are numerous continuous analyzers throughout the plant, measuring pH, chlorine residual, turbidity, fluoride and temperature. The analyzers are checked on a regular basis, adjusting as required. An outside company also cleans and checks the both the online and hand held/desktop analyzers on an annual basis to ensure proper operation.

Operations Manuals

- **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 met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

  The renewed MDWL requires a copy of the CT calculations that were used as the basis for primary disinfection under worst case operating conditions be included in the operations manual by November 23, 2016. These calculations were already included in the manual complete with a procedure for calculating CT, which is completed each day using the worst case parameters.

Logbooks

- **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.**

Security

- **The owner had provided security measures to protect components of the drinking water system.**

  The water plant and Corry Lake station are locked and alarmed for intrusion. The elevated water tower is also kept locked and alarmed as well as fencing around the tower with an access gate which is also kept locked.

Certification and Training

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

  Chalk River DWS is classified as a Class II Water Treatment system and Class II Water Distribution system. An appropriately certified operator has been designated as the Overall Responsible Operator (ORO) and is noted in the logbook each day.

- **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**

  The Operator in Charge (OIC) is noted each day in the logbook. Both operators are eligible to act as OIC at any given time.

- **Only certified operators made adjustments to the treatment equipment.**

Water Quality Monitoring

- **All microbiological water quality monitoring requirements for distribution samples were being met.**

  Chalk River DWS serves a population of approximately 1000 people (according to the 2016 Census Profile data), requiring nine (9) distribution samples each month, testing for E.coli, total coliform and 25% of samples tested for Heterotrophic Plate Count (HPC).

  A review of samples taken at the Chalk River DWS show that all required samples were taken and analyzed for the appropriate parameters. Operators take three (3) samples each week, analyzing at least one (1) sample for HPC.

- **All microbiological water quality monitoring requirements for treated samples were being met.**

  Treated water samples are required weekly under Schedule 10-3, testing for E.coli, total coliform and heterotrophic plate count (HPC).

Water Quality Monitoring

A review of sample results indicates that these are taken and analyzed as required.

- **All inorganic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

  Inorganic (Schedule 23) parameters are required every twelve (12) months for a surface water source under Schedule 13-2. These were completed on January 25, 2017, previous samples were completed in January 2016.

  All results were well within the Ontario Drinking Water Quality Standards (ODWQS).

- **All organic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

  Organic (Schedule 24) parameters are required every twelve (12) months for a surface water source under Schedule 13-3. These were completed on January 25, 2017, previous samples were completed in January 2016.

  All results were well within the Ontario Drinking Water Quality Standards (ODWQS).

- **All trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

  THM sampling is required every three (3) months from a point in the distribution system that is likely to have elevated THM levels (ie. the farthest point) under Schedule 13-6. The ODWQS for THMs is 100µg/L, based on the running annual average (RAA) of the last four (4) sample results. The current RAA, as of January 2017, is 70µg/L.

- **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were conducted within the required frequency for the DWS.**

  Nitrate/nitrite sampling is required every three (3) months under Schedule 13-7 from the treated water location.

  Nitrate results ranged from 0.1mg/L - 0.2mg/L, well within the ODWQS of 10.0mg/L.

  Nitrite results were consistently <0.1mg/L, also well within the ODWQS of 1.0mg/L.

- **All sodium water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

  Sodium sampling is required every sixty (60) months under Schedule 13-8. It was last sampled for on January 30, 2013 with a sodium content of 34.3mg/L and a resample was taken on February 12, 2013 confirming high sodium content with a result of 32.2mg/L. The local Medical Officer of Health is notified of concentrations that exceed 20mg/L so that doctors in the area can be notified for those on sodium restricted diets. The aesthetic objective for sodium is 200mg/L.

  Sodium sampling is required again in 2018.

- **The required daily samples were being taken at the end of the fluoridation process.**

  Fluoride is continuously monitored in water leaving the tower.

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit were being met.**

  Chalk River has Lead Regulatory Relief under Schedule D of the MDWL. The relief allows for nine (9) sampling points in private plumbing, one (1) sampling point in plumbing that does not serve private residences and two (2) samples in the distribution system in each of the lead sampling periods until April 15, 2019.

Water Quality Monitoring

The lead samples have been taken as required in the first sampling period (June 15, 2016 - October 15, 2016) with one (1) exceedance of the ODWQS found in private plumbing. Letters were sent to residents advising them of the lead test results in their home.

- **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

Water Quality Assessment

- **Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O.Reg. 169/03).**

  As previously discussed in this report, a lead sample exceeded the ODWQS in private plumbing. There were no other Adverse Water Quality Incidents (AWQIs) during the inspection period.

Reporting & Corrective Actions

- **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.**

  Responses to alarms are recorded in the logbook. Further attention to details when responding to alarms is required, including time of alarm, time of arrival at the plant and any actions taken to resolve the alarm condition.

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

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

Not Applicable

SIGNATURES

Inspected By: Jen Bitten

Signature: (Provincial Officer)

Reviewed & Approved By: Lyn Garrah

Signature: (Supervisor)

Review & Approval Date: 28/03/2017

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.

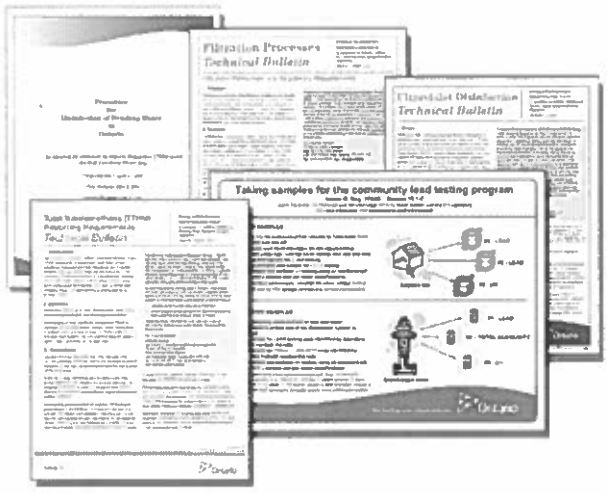
APPENDIX A

STAKEHOLDER SUPPORT

March 2015

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.



To access these materials online click on their titles in the table below or use your web browser to search for their titles. 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.

For more information on Ontario's drinking water visit www.ontario.ca/drinkingwater and email drinking.water@ontario.ca to subscribe to drinking water news.

PUBLICATION TITLE	PUBLICATION NUMBER
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	7889e01
FORMS: Drinking Water System Profile Information, Laboratory Services Notification, Adverse Test Result Notification Form	7419e, 5387e, 4444e
Procedure for Disinfection of Drinking Water in Ontario	4448e01
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	7152e
Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)	8215e
Filtration Processes Technical Bulletin	7467
Ultraviolet Disinfection Technical Bulletin	7685
Guide for Applying for Drinking Water Works Permit Amendments, Licence Amendments, Licence Renewals and New System Applications	7014e01
Certification Guide for Operators and Water Quality Analysts	
Guide to Drinking Water Operator Training Requirements	9802e
Taking Samples for the Community Lead Testing Program	6560e01
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	7423e
Guide: Requesting Regulatory Relief from Lead Sampling Requirements	6610
Drinking Water System Contact List	7128e
Technical Support Document for Ontario Drinking Water Quality Standards	4449e01

PIBS 8990b01

Ontario

APPENDIX B

MUNICIPAL DRINKING WATER LICENCE & DRINKING WATER WORKS PERMIT

Ontario

MUNICIPAL DRINKING WATER LICENCE

Licence Number: 261-101
Issue Number: 4

Pursuant to the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, this municipal drinking water licence is issued under Part V of the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32 to:

The Corporation of the Town of Laurentian Hills

34465 Highway 17, R.R. #1
Laurentian Hills
ON K0J 1P0

For the following municipal residential drinking water system:

Chalk River Drinking Water System

This municipal drinking water licence includes the following:

Schedule	Description
Schedule A	Drinking Water System Information
Schedule B	General Conditions
Schedule C	System-Specific Conditions
Schedule D	Conditions for Relief from Regulatory Requirements
Schedule E	Pathogen Log Removal/Inactivation Credits

DATED at TORONTO this 2nd day of November, 2016

Signature

A. Ahmed

Aziz Ahmed, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Information

System Owner	**The Corporation of the Town of Laurentian Hills**
Licence Number	**261-101**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule A Issue Date	**November 2nd, 2016**

The following information is applicable to the above drinking water system and forms part of this licence:

Licence

Licence Issue Date	March 24, 2016
Licence Expiry Date	March 23, 2021
Application for Licence Renewal Date	September 23, 2020

Drinking Water Works Permit

Drinking Water System Name	Permit Number	Issue Date
Chalk River Drinking Water System	261-201	March 24, 2016

Permits to Take Water

Water Taking Location	Permit Number	Issue Date
Corry Lake	8446-9BPRT6	October 1, 2013

Financial Plans

The Financial Plan Number for the Financial Plan required to be developed for this drinking water system in accordance with O. Reg. 453/07 shall be:	261-301
Alternately, if one Financial Plan is developed for all drinking water systems owned by the owner, the Financial Plan Number shall be:	261-301A

Accredited Operating Authority

Drinking Water System or Operational Subsystems	Accredited Operating Authority	Operational Plan No.	Operating Authority No.
Operational Plan – Chalk River Water System	American Water Canada Corp.	261-401	261-OA1

Schedule B: General Conditions

System Owner	**The Corporation of the Town of Laurentian Hills**
Licence Number	**261-101**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule B Issue Date	**November 2nd, 2016**

1.0 Definitions

1.1 Words and phrases not defined in this licence and the associated drinking water works permit shall be given the same meaning as those set out in the SDWA and any regulations made in accordance with that act, unless the context requires otherwise.

1.2 In this licence and the associated drinking water works permit:

"**adverse effect**", "**contaminant**" and "**natural environment**" shall have the same meanings as in the EPA;

"**alteration**" may include the following in respect of this drinking water system:

(a) An addition to the system,
(b) A modification of the system,
(c) A replacement of part of the system, and
(d) An extension of the system;

"**compound of concern**" means a contaminant that, based on generally available information, may be emitted from a component of the drinking water system to the atmosphere in a quantity that is significant either in comparison to the relevant point of impingement limit or if a point of impingement limit is not available for the compound, then based on generally available toxicological information, the compound has the potential to cause an adverse effect as defined by the EPA at a point of impingement;

"**Director**" means a Director appointed pursuant to section 6 of the SDWA for the purposes of Part V of the SDWA;

"**drinking water works permit**" means the drinking water works permit for the drinking water system, as identified in Schedule A of this licence and as amended from time to time;

"**emission summary table**" means the table that was prepared by a Professional Engineer in accordance with O. Reg. 419/05 and the procedure document listing the appropriate point of impingement concentrations of each compound of concern emitted from a component of the drinking water system and providing comparison to the corresponding point of impingement limit;

"**EPA**" means the *Environmental Protection Act*, R.S.O. 1990, c. E.19;

"**financial plan**" means the financial plan required by O. Reg. 453/07;

"**licence**" means this municipal drinking water licence for the municipal drinking water system identified in Schedule A of this licence;

"**operational plan**" means an operational plan developed in accordance with the Director's Directions – Minimum Requirements for Operational Plans made under the authority of subsection 15(1) of the SDWA;

"**owner**" means the owner of the drinking water system as identified in Schedule A of this licence;

"**permit to take water**" means the permit to take water that is associated with the taking of water for purposes of the operation of the drinking water system, as identified in Schedule A of this licence and as amended from time to time;

"**point of impingement**" means any point in the natural environment that is not on the same property as the source of the contaminant and as defined by section 2 of O. Reg. 419/05;

"**point of impingement limit**" means the appropriate standard from Schedule 1, 2 or 3 of O. Reg. 419/05 and if a standard is not provided for a compound of concern, the appropriate criteria listed in the Ministry of the Environment and Climate Change publication titled "Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution – Local Air Quality (including Schedule 6 of O. Reg. 419 on Upper Risk Thresholds)", dated February 2008, as amended;

"**procedure document**" means the Ministry of the Environment and Climate Change procedure titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated July 2005, as amended;

"**Professional Engineer**" means a Professional Engineer who has been licenced to practice in the Province of Ontario;

"**provincial officer**" means a provincial officer appointed pursuant to section 8 of the SDWA;

"**publication NPC-300**" means the Ministry of the Environment and Climate Change publication titled "Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning" dated August 2013, as amended;

"**SDWA**" means the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32;

"**sensitive populations**" means any one or a combination of the following locations where the health effects of nitrogen oxides emissions from emergency generators shall be considered using the point of impingement limit instead of the Ministry of the Environment and Climate Change screening level for emergency generators:

(a) health care units (e.g., hospitals and nursing homes),
(b) primary/junior public schools,
(c) day-care facilities, and
(d) playgrounds;

"**subsystem**" has the same meaning as in Ontario Regulation 128/04 (Certification of Drinking Water System Operators and Water Quality Analysts);

"**surface water**" means water bodies (lakes, wetlands, ponds - including dug-outs), water courses (rivers, streams, water-filled drainage ditches), infiltration trenches, and areas of seasonal wetlands;

2.0 Applicability

2.1 In addition to any other requirements, the drinking water system identified above shall be established, altered and operated in accordance with the conditions of the drinking water works permit and this licence.

3.0 Licence Expiry

3.1 This licence expires on the date identified as the licence expiry date in Schedule A of this licence.

4.0 Licence Renewal

4.1 Any application to renew this licence shall be made on or before the date identified as the application for licence renewal date set out in Schedule A of this licence.

5.0 Compliance

5.1 The owner and operating authority shall ensure that any person authorized to carry out work on or to operate any aspect of the drinking water system has been informed of the SDWA, all applicable regulations made in accordance with that act, the drinking water works permit and this licence and shall take all reasonable measures to ensure any such person complies with the same.

6.0 Licence and Drinking Water Works Permit Availability

6.1 At least one copy of this licence and the drinking water works permit shall be stored in such a manner that they are readily viewable by all persons involved in the operation of the drinking water system.

7.0 Permit to Take Water and Drinking Water Works Permit

7.1 A permit to take water identified in Schedule A of this licence is the applicable permit on the date identified as the Schedule A Issue Date.

7.2 A drinking water works permit identified in Schedule A of this licence is the applicable permit on the date identified as the Schedule A Issue Date.

8.0 Financial Plan

8.1 For every financial plan prepared in accordance with subsections 2(1) and 3(1) of O. Reg. 453/07, the owner of the drinking water system shall:

8.1.1 Ensure that the financial plan contains on the front page of the financial plan, the appropriate financial plan number as set out in Schedule A of this licence; and

8.1.2 Submit a copy of the financial plan to the Ministry of Municipal Affairs and Housing within three (3) months of receiving approval by a resolution of municipal council or the governing body of the owner.

9.0 Interpretation

9.1 Where there is a conflict between the provisions of this licence and any other document, the following hierarchy shall be used to determine the provision that takes precedence:

9.1.1 The SDWA;

9.1.2 A condition imposed in this licence that explicitly overrides a prescribed regulatory requirement;

9.1.3 A condition imposed in the drinking water works permit that explicitly overrides a prescribed regulatory requirement;

9.1.4 Any regulation made under the SDWA;

9.1.5 Any provision of this licence that does not explicitly override a prescribed regulatory requirement;

9.1.6 Any provision of the drinking water works permit that does not explicitly override a prescribed regulatory requirement;

9.1.7 Any application documents listed in this licence, or the drinking water works permit from the most recent to the earliest; and

9.1.8 All other documents listed in this licence, or the drinking water works permit from the most recent to the earliest.

9.2 If any requirement of this licence or the drinking water works permit is found to be invalid by a court of competent jurisdiction, the remaining requirements of this licence and the drinking water works permit shall continue to apply.

9.3 The issuance of and compliance with the conditions of this licence and the drinking water works permit does not:

9.3.1 Relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including the *Environmental Assessment Act*, R.S.O. 1990, c. E.18; and

9.3.2 Limit in any way the authority of the appointed Directors and provincial officers of the Ministry of the Environment and Climate Change to require certain steps be taken or to require the owner to furnish any further information related to compliance with the conditions of this licence or the drinking water works permit.

9.4 For greater certainty, nothing in this licence or the drinking water works permit shall be read to provide relief from regulatory requirements in accordance with section 46 of the SDWA, except as expressly provided in the licence or the drinking water works permit.

10.0 Adverse Effects

10.1 Nothing in this licence or the drinking water works permit shall be read as to permit:

10.1.1 The discharge of a contaminant into the natural environment that causes or is likely to cause an adverse effect; or

10.1.2 The discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters.

10.2 All reasonable steps shall be taken to minimize and ameliorate any adverse effect on the natural environment or impairment of the quality of water of any waters resulting from the operation of the drinking water system including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

10.3 Fulfillment of one or more conditions imposed by this licence or the drinking water works permit does not eliminate the requirement to fulfill any other condition of this licence or the drinking water works permit.

11.0 Change of Owner or Operating Authority

11.1 This licence is not transferable without the prior written consent of the Director.

11.2 The owner shall notify the Director in writing at least 30 days prior to a change of any operating authority identified in Schedule A of this licence.

11.2.1 Where the change of operating authority is the result of an emergency situation, the owner shall notify the Director in writing of the change as soon as practicable.

12.0 Information to be Provided

12.1 Any information requested by a Director or a provincial officer concerning the drinking water system and its operation, including but not limited to any records required to be kept by this licence or the drinking water works permit, shall be provided upon request.

13.0 Records Retention

13.1 Except as otherwise required in this licence or the drinking water works permit, any records required by or created in accordance with this licence or the drinking water works permit, other than the records specifically referenced in section 12 of O. Reg. 170/03, shall be retained for at least 5 years and made available for inspection by a provincial officer, upon request.

14.0 Chemicals and Materials

14.1 All chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association ("AWWA") and the American National Standards Institute ("ANSI") safety criteria standards NSF/60, NSF/61 and NSF/372.

14.1.1 In the event that the standards are updated, the owner may request authorization from the Director to use any on hand chemicals and materials that previously met the applicable standards.

14.1.2 The requirement for the owner to comply with NSF/372 shall come into force no later than **May 23, 2018**.

14.2 The most current chemical and material product registration documentation from a testing institution accredited by either the Standards Council of Canada or by the American National Standards Institution ("ANSI") shall be available at all times for each chemical and material used in the operation of the drinking water system that comes into contact with water within the system.

14.3 Conditions 14.1 and 14.2 do not apply in the case of the following:

14.3.1 Water pipe and pipe fittings meeting AWWA specifications made from ductile iron, cast iron, PVC, fibre and/or steel wire reinforced cement pipe or high density polyethylene (HDPE);

14.3.2 Articles made from stainless steel, glass, HDPE or Teflon®;

14.3.3 Cement mortar for watermain lining and for water contacting surfaces of concrete structures made from washed aggregates and Portland cement;

14.3.4 Gaskets that are made from NSF approved materials;

14.3.5 Food grade oils and lubricants, food grade anti-freeze, and other food grade chemicals and materials that are compatible for drinking water use; or

14.3.6 Any particular chemical or material where the owner has written documentation signed by the Director that indicates that the Ministry of the Environment and Climate Change is satisfied that the chemical or material is acceptable for use within the drinking water system and the chemical or material is only used as permitted by the documentation.

15.0 Drawings

15.1 All drawings and diagrams in the possession of the owner that show any treatment subsystem as constructed shall be retained by the owner unless the drawings and diagrams are replaced by a revised or updated version showing the subsystem as constructed subsequent to the alteration.

15.2 Any alteration to any treatment subsystem shall be incorporated into process flow diagrams, process and instrumentation diagrams, and record drawings and diagrams within one year of the substantial completion of the alteration.

15.3 Process flow diagrams and process and instrumentation diagrams for any treatment subsystem shall be kept in a place, or made available in such a manner, that they may be readily viewed by all persons responsible for all or part of the operation of the drinking water system.

16.0 Operations and Maintenance Manual

16.1 An up-to-date operations and maintenance manual or manuals shall be maintained and applicable parts of the manual or manuals shall be made available for reference by all persons responsible for all or part of the operation or maintenance of the drinking water system.

16.2 The operations and maintenance manual or manuals, shall include at a minimum:

16.2.1 The requirements of this licence and associated procedures;

16.2.2 The requirements of the drinking water works permit for the drinking water system;

16.2.3 A description of the processes used to achieve primary and secondary disinfection within the drinking water system, including where applicable:

a) A copy of the CT calculations that were used as the basis for primary disinfection under worst case operating conditions; and

b) The validated operating conditions for UV disinfection equipment, including a copy of the validation certificate;

16.2.4 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;

16.2.5 Procedures for the operation and maintenance of monitoring equipment;

16.2.6 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;

16.2.7 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint;

16.3 Procedures necessary for the operation and maintenance of any alterations to the drinking water system shall be incorporated into the operations and maintenance manual or manuals prior to those alterations coming into operation.

16.4 The requirement for the owner to comply with condition 16.2.3 shall come into force on **November 23, 2016**.

Schedule C: System-Specific Conditions

System Owner	**The Corporation of the Town of Laurentian Hills**
Licence Number	**261-101**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule C Issue Date	**November 2nd, 2016**

1.0 System Performance

Rated Capacity

1.1 For each treatment subsystem listed in column 1 of Table 1, the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed the value identified as the rated capacity in column 2 of the same row.

Table 1: Rated Capacity

Column 1 Treatment Subsystem Name	Column 2 Rated Capacity (m^3/day)
Chalk River Drinking Water System	1,987

Maximum Flow Rates

1.2 For each treatment subsystem listed in column 1 of Table 2, the maximum flow rate of water that flows into a treatment subsystem component listed in column 2 shall not exceed the value listed in column 3 of the same row.

Table 2: Maximum Flow Rates

Column 1 Treatment Subsystem Name	Column 2 Treatment Subsystem Component	Column 3 Maximum Flow Rate (L/s)
Not Applicable	Not Applicable	Not Applicable

1.3 Despite conditions 1.1 and 1.2, a treatment subsystem may be operated temporarily at a maximum daily volume and/or a maximum flow rate above the values set out in column 2 of Table 1 and column 3 of Table 2 respectively for the purposes of fighting a large fire or for the maintenance of the drinking water system.

1.4 Condition 1.3 does not authorize the discharge into the distribution system of any water that does not meet all of the requirements of this licence and all other regulatory requirements, including compliance with the Ontario Drinking Water Quality Standards.

Residue Management

1.5 In respect of an effluent discharged into the natural environment from a treatment subsystem or treatment subsystem component listed in column 1 of Table 3:

1.5.1 The annual average concentration of a test parameter identified in column 2 shall not exceed the value in column 3 of the same row; and

1.5.2 The maximum concentration of a test parameter identified in column 2 shall not exceed the value in column 4 of the same row.

Table 3: Residue Management

Column 1 Treatment Subsystem or Treatment Subsystem Component Name	Column 2 Test Parameter	Column 3 Annual Average Concentration (mg/L)	Column 4 Maximum Concentration (mg/L)
Not Applicable	Not Applicable	Not Applicable	Not Applicable

UV Disinfection Equipment Performance

1.6 For each treatment subsystem or treatment subsystem component listed in column 1 of Table 4, and while directing water to the distribution system:

1.6.1 The UV disinfection equipment shall be operated such that a continuous pass-through UV dose is maintained throughout the life time of the UV lamp(s) that is at least the minimum continuous pass-through UV dose set out in column 2 of the same row at the maximum design flow rate for the equipment;

1.6.2 In addition to any other sampling, analysis and recording that may be required, the ultraviolet light disinfection equipment shall test for the test parameters set out in column 4 of the same row at a testing frequency of once every five (5) minutes or less and record the test data at a recording frequency of once every four (4) hours or less;

1.6.3 If there is a UV disinfection equipment alarm, the test parameters set out in column 4 of the same row shall be recorded at a recording frequency of once every five minutes or less until the alarm condition has been corrected;

1.6.4 A monthly summary report shall be prepared at the end of each calendar month which sets out the time, date and duration of each UV equipment alarm, the volume of water treated during each alarm period and the actions taken by the operating authority to correct the alarm situation;

Table 4: UV Disinfection Equipment			
Column 1 Treatment Subsystem or Treatment Subsystem Component Name	**Column 2 Minimum Continuous Pass-Through UV Dose (mJ/cm^2)**	**Column 3 Control Strategy**	**Column 4 Test Parameter**
Not Applicable	Not Applicable	Not Applicable	Not Applicable

2.0 Flow Measurement and Recording Requirements

2.1 For each treatment subsystem identified in column 1 of Table 1 and in addition to any other flow measurement and recording that may be required, continuous flow measurement and recording shall be undertaken for:

2.1.1 The flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system.

2.1.2 The flow rate and daily volume of water that flows into the treatment subsystem.

2.2 For each treatment subsystem component identified in column 2 of Table 2 and in addition to any other flow measurement and recording that may be required, continuous flow measurement and recording shall be undertaken for the flow rate and daily volume of water that flows into the treatment subsystem component.

2.3 Where a rated capacity from Table 1 or a maximum flow rate from Table 2 is exceeded, the following shall be recorded:

2.3.1 The difference between the measured amount and the applicable rated capacity or maximum flow rate specified in Table 1 or Table 2;

2.3.2 The time and date of the measurement;

2.3.3 The reason for the exceedance; and

2.3.4 The duration of time that lapses between the applicable rated capacity or maximum flow rate first being exceeded and the next measurement where the applicable rated capacity or maximum flow rate is no longer exceeded.

3.0 Calibration of Flow Measuring Devices

3.1 All flow measuring devices that are required by regulation, by a condition in the Drinking Water Works Permit, or by a condition otherwise imposed by the Ministry of the Environment and Climate Change, shall be checked and calibrated in accordance with the manufacturer's instructions.

3.2 If the manufacturer's instructions do not indicate how often to check and calibrate a flow measuring device, the equipment shall be checked and calibrated at least once every 12 months during which the drinking water system is in operation.

3.2.1 For greater certainty, if condition 3.2 applies, the equipment shall be checked and calibrated not more than 30 days after the first anniversary of the day the equipment was checked and calibrated in the previous 12-month period.

4.0 Additional Sampling, Testing and Monitoring

Drinking Water Health and Non-Health Related Parameters

4.1 For each treatment subsystem or treatment subsystem component identified in column 1 of Tables 5 and 6 and in addition to any other sampling, testing and monitoring that may be required, sampling, testing and monitoring shall be undertaken for a test parameter listed in column 2 at the sampling frequency listed in column 3 and at the monitoring location listed in column 4 of the same row.

Table 5: Drinking Water Health Related Parameters

Column 1 Treatment Subsystem or Treatment Subsystem Component Name	Column 2 Test Parameter	Column 3 Sampling Frequency	Column 4 Monitoring Location
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 6: Drinking Water Non-Health Related Parameters

Column 1 Treatment Subsystem or Treatment Subsystem Component Name	Column 2 Test Parameter	Column 3 Sampling Frequency	Column 4 Monitoring Location
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Environmental Discharge Parameters

4.2 For each treatment subsystem or treatment subsystem component identified in column 1 of Table 7 and in addition to any other sampling, testing and monitoring that may be required, sampling, testing and monitoring shall be undertaken for a test parameter listed in column 2 using the sample type identified in column 3 at the sampling frequency listed in column 4 and at the monitoring location listed in column 5 of the same row.

4.3 For the purposes of Table 7:

4.3.1 Manual Composite means the mean of at least three grab samples taken during a discharge event, with one sample being taken immediately following the commencement of the discharge event, one sample being taken approximately at the mid-point of the discharge event and one sample being taken immediately before the end of the discharge event; and

4.3.2 Automated Composite means samples must be taken during a discharge event by an automated sampler at a minimum sampling frequency of once per hour.

4.4 Any sampling, testing and monitoring for the test parameter Total Suspended Solids shall be performed in accordance with the requirements set out in the publication "Standard Methods for the Examination of Water and Wastewater", 21st Edition, 2005, or as amended from time to time by more recently published editions.

Table 7: Environmental Discharge Parameters

Column 1 Treatment Subsystem or Treatment Subsystem Component Name	Column 2 Test Parameter	Column 3 Sample Type	Column 4 Sampling Frequency	Column 5 Monitoring Location
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

4.5 Pursuant to Condition 10 of Schedule B of this licence, the owner may undertake the following environmental discharges associated with the maintenance and/or repair of the drinking water system:

4.5.1 The discharge of potable water from a watermain to a road or storm sewer;

4.5.2 The discharge of potable water from a water storage facility or pumping station:

4.5.2.1 To a road or storm sewer; or

4.5.2.2 To a watercourse where the discharge has been dechlorinated and if necessary, sediment and erosion control measures have been implemented.

4.5.3 The discharge of dechlorinated non-potable water from a watermain, water storage facility or pumping station to a road or storm sewer;

4.5.4 The discharge of raw water from a groundwater well to the environment where if necessary, sediment and erosion control measures have been implemented; and

4.5.5 The discharge of raw water, potable water or non-potable water from a treatment subsystem to the environment where if necessary, the discharge has been dechlorinated and sediment and erosion control measures have been implemented.

5.0 Studies Required

5.1 Not applicable.

6.0 Source Protection

6.1 Not applicable.

Schedule D: Conditions for Relief from Regulatory Requirements

System Owner	**The Corporation of the Town of Laurentian Hills**
Licence Number	**261-101**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule D Issue Date	**November 2nd, 2016**

1.0 Lead Regulatory Relief

1.1 Any relief from regulatory requirements previously authorized by the Director in respect of the drinking water system under section 38 of the SDWA in relation to the sampling, testing or monitoring requirements contained in Schedule 15.1 of O. Reg. 170/03 shall remain in force until such time as Schedule 15.1 of O. Reg. 170/03 is amended after June 1, 2009.

1.2 In addition to condition 1.1, for a drinking water system or drinking water subsystem identified by columns 1 and 2 of Table 1 and notwithstanding the provisions of Schedule 15.1 of O. Reg. 170/03, the owner is not required to comply with the sampling requirements of columns 3, 4 and 5 of the same row.

Table 1: Number of Sampling Points Required for Compliance with Schedule 15.1 of O. Reg. 170/03

Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 DWS Numbers	Column 3 Number of Sampling Points in Plumbing that Serves Private Residences	Column 4 Number of Sampling Points in Plumbing that Does Not Serve Private Residences	Column 5 Number of Sampling Points in Distribution System
Chalk River Drinking Water System	210000666	20	2	4

1.3 For a drinking water system or drinking water subsystem identified by columns 1 and 2 of Table 2 and in exchange for any relief from regulatory requirements granted in condition 1.2 and subject to any other applicable conditions of this licence and drinking water works permit, the owner is required to comply with the sampling requirements of columns 3, 4 and 5 of the same row.

Table 2: Number of Sampling Points Required for Relief from Regulatory Requirements

Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 DWS Numbers	Column 3 Number of Sampling Points in Plumbing that Serves Private Residences	Column 4 Number of Sampling Points in Plumbing that Does Not Serve Private Residences	Column 5 Number of Sampling Points in Distribution System
Chalk River Drinking Water System	210000666	9	1	2

1.4 For a drinking water system or drinking water subsystem identified by columns 1 and 2 of Table 3, the relief from regulatory requirements granted in condition 1.2 is in effect for the sampling period identified in column 3 of the same row.

Table 3: Sampling Periods

Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 DWS Numbers	Column 3 Sampling Period
Chalk River Drinking Water System	210000666	June 15, 2016 to October 15, 2016 December 15, 2016 to April 15, 2017 June 15, 2017 to October 15, 2017 December 15, 2017 to April 15, 2018 June 15, 2018 to October 15, 2018 December 15, 2018 to April 15, 2019

1.5 The owner of the drinking water system and the operating authority for the system shall ensure that samples are taken as described in condition 1.3 to test for total alkalinity and pH during each of the sampling periods identified in column 3 of Table 3.

2.0 Other Regulatory Relief

2.1 Not applicable.

Schedule E: Pathogen Log Removal/Inactivation Credits

System Owner	**The Corporation of the Town of Laurentian Hills**
Licence Number	**261-101**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule E Issue Date	**November 2nd, 2016**

1.0 Primary Disinfection Pathogen Log Removal/Inactivation Credits

Chalk River Water Supply Plant

Corry Lake (SURFACE WATER)

Minimum Log Removal/ Inactivation Required	Cryptosporidium Oocysts	Giardia Cysts [a]	Viruses [b]
Chalk River Water Treatment Plant	2	3	4

[a] At least 0.5 log inactivation of Giardia shall be achieved by the disinfection portion of the overall water treatment process.
[b] At least 2 log inactivation of viruses shall be achieved by disinfection.

Log Removal/Inactivation Credits Assigned [c]	Cryptosporidium Oocysts	Giardia Cysts	Viruses
Conventional Filtration	2	2.5	2
Chlorination [CT Clearwell]	-	0.5	2+

[c] Log removal/inactivation credit assignment is based on each treatment process being fully operational and the applicable log removal/inactivation credit assignment criteria being met.

Treatment Component	Log Removal/Inactivation Credit Assignment Criteria
Conventional Filtration	1. A chemical coagulant shall be used at all times when the treatment plant is in operation; 2. Chemical dosages shall be monitored and adjusted in response to variations in raw water quality; 3. Effective backwash procedures shall be maintained including filter-to-waste or an equivalent procedure during filter ripening to ensure that effluent turbidity requirements are met at all times; 4. Filtrate turbidity shall be continuously monitored from each filter; and 5. Performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month shall be met for each filter.
Chlorination	1. Sampling and testing for free chlorine residual shall be carried out by continuous monitoring equipment in the treatment process at or near a location where the intended contact time has just been completed in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario; and 2. At all times, CT provided shall be greater than or equal to the CT required to achieve the log removal credits assigned.
Primary Disinfection Notes	

Ontario

DRINKING WATER WORKS PERMIT

Permit Number: 261-201
Issue Number: 2

Pursuant to the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, this drinking water works permit is issued under Part V of the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32 to:

The Corporation of the Town of Laurentian Hills

34465 Highway 17, R.R. #1
Laurentian Hills
ON K0J 1P0

For the following municipal residential drinking water system:

Chalk River Drinking Water System

This drinking water works permit includes the following:

Schedule	Description
Schedule A	Drinking Water System Description
Schedule B	General
Schedule C	All documents issued as Schedule C to this drinking water works permit which authorize alterations to the drinking water system
Schedule D	Process Flow Diagrams

DATED at TORONTO this 24th day of March, 2016

Signature

Aziz Ahmed, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Description

System Owner	**The Corporation of the Town of Laurentian Hills**
Permit Number	**261-201**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule A Issue Date	**March 24th, 2016**

1.0 System Description

1.1 The following is a summary description of the works comprising the above drinking water system:

Overview

The **Chalk River Drinking Water System** consists of one (1) drinking water treatment plant, one (1) elevated storage tank and approximately 12 kilometers of distribution watermains.

Chalk River Water Supply Plant

Drinking Water Supply Plant

- Chalk River Water Treatment Plant

Elevated Storage

- Chalk River Elevated Storage Tank

Chalk River Distribution

Chalk River Water Supply Plant

Location and System Type

Street Address	73 Railway Street, Chalk River, Laurentian Hills
UTM Coordinates	NAD 83, UTM Zone 18: 310585 m E., 5098135 m N
System Type	Surface water supply and treatment
Notes	

Surface Water Supply

Intake Facility

Description	Raw water intake system extending into Corry Lake
Equipment	An intake crib with screen located approximately 25 m offshore
	60 m of 400 mm diameter and 80 m of 300 mm diameter intake pipes complete with valve chamber and manhole
Notes	

Low Lift Works

Low Lift Pumping Station

Description	Low lift pumping station located at Corry Lake Road at bank of Corry Lake
Discharge to	Water treatment plant
Equipment	Raw water well approximately 4.3 m by 4.3 m and 2 m deep
	Two (2) vertical turbine pumps (duty and standby) each at 1,380 L/min. at 42.7 m TDH equipped with variable frequency drives
	Approx. 2,000 m of 200 mm diameter raw water line from low lift pumping station to water treatment plant
Notes	

Chemical Feed Building

Description	Chemical feed building located adjacent to the low lift pumping station for alkalinity control
Discharge to	Raw water well in low lift pumping station
Equipment	Two (2) metering pumps (duty and standby) each capable of 60 L/hr. complete with automatic switchover controls
	Two (2) chemical solution tanks complete with mixers and spill containment
Notes	

Flocculation/Clarification/Filtration

Package Treatment Units

Description	Two (2) proprietary package flocculator/clarifier units (in parallel)
Dimensions	Unit no. 1 approx. 3.65 m diameter by 8.5 m long
	Unit no. 2 approx. 7.3 m diameter by 5.2 m high
Equipment	Unit no. 1: a flocculation/clarity unit consisting of a mixing zone, a flocculation zone, a settling compartment and floc barriers
	Unit no. 2: a flocculation/clarity unit consisting of a mixing zone, a reaction well cone with baffles, a clarification zone and a concentric sludge collector
Notes	

Filtration

Description	Two (2) dual media filter units (in parallel)
Dimensions	Filter no. 1 approx. 3.5 m diameter by 3.2 m high
	Filter no. 2 approx. 3.7 m diameter by 3.2 m high
Equipment	Filter no. 1: a dual compartment dual media (anthracite/sand) gravity filter with a common integral backwash tank and air scour system, complete with filter-to-waste capability
	Filter no. 2: a dual compartment dual media (anthracite/sand) gravity filter with a common integral backwash tank and air scour system, complete with filter-to-waste capability
Notes	

Chemical Addition

Alkalinity Control

Description	Chemical addition for alkalinity and pH adjustment
Feed Points	Upstream of the static mixer at entry to clearwell
Equipment	Two (2) metering pumps (duty and standby) each capable of 17.1 L/hr.
	One (1) storage tank complete with a mixer and spill containment
Notes	

Coagulant

Description	Coagulation feed system
Feed Points	Upstream of each flocculator/clarifier units
Equipment	One (1) metering pump capable of 12.3 L/hr.
	One (1) bulk storage tank and one (1) day tank with spill containment
Notes	

Coagulant Aid

Description	Polyelectrolyte feed system for coagulation aid
Feed Points	Mixing compartment of each flocculator/clarifier units
Equipment	One (1) metering pump capable of 60 L/hr.
	One (1) storage tank complete with a mixer and spill containment
Notes	

Chlorine

Description	Sodium hypochlorite solution for disinfection
Feed Points	Upstream of the static mixer at entry to clearwell
Equipment	Two (2) metering pumps (duty and standby) each capable of 3.6 L/hr. complete with automatic switchover controls and spill containment
	One (1) bulk storage tank and one (1) day tank with spill containment
Notes	

Fluoride

Description	Hydrofluosilic acid solution for fluoridation
Feed Points	Upstream of the static mixer at entry to clearwell
Equipment	One (1) metering pump capable of 0.74 L/hr.
	One (1) chemical container with spill containment
Notes	

Waste Residual Management System

Holding Tank

Description	One (1) backwash wastewater and sludge holding tank
Dimensions	9.6 m long by 4.5 m wide by 3.15 m deep
Equipment	Two (2) submersible pumps (lead/lag) for discharging effluent at a controlled rate into sanitary system
Notes	

On-Site Storage

Clearwell and High Lift Pumps

Description	One (1) clearwell installed with high lift pumps
Dimensions	100 m^3
Discharge to	Elevated storage tank
Equipment	Three (3) vertical turbine pumps each at 1,296 m^3/day at 40.8 m TDH
	A dedicated (valves normally kept close) 200 mm diameter pipeline between the water treatment plant and the distribution system for emergency supply
Notes	

Instrumentation and Control

SCADA System

Description	Process control and monitoring equipment
Notes	System control with data acquisition including various on-line analyzers and monitors

Elevated Storage Tanks

Chalk River Storage Tank

Location	Forced Road, Laurentian Hills
UTM Coordinates	
Description	Elevated storage tank
Dimensions	Total volume 1,380 m^3
Notes	

Watermains

1.2 Watermains within the distribution system comprise:

1.2.1 Watermains that have been set out in each document or file identified in column 1 of Table 1.

Table 1: Watermains

Column 1 Document or File Name	Column 2 Date
MapDistributionSystem	Jan. 14, 2004

1.2.2 Watermains that have been added, modified, replaced or extended further to the provisions of Schedule C of this drinking water works permit on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

1.2.3 Watermains that have been added, modified, replaced or extended further to an authorization by the Director on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

Schedule B: General

System Owner	**The Corporation of the Town of Laurentian Hills**
Permit Number	**261-201**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule B Issue Date	**March 24th, 2016**

1.0 Applicability

1.1 In addition to any other requirements, the drinking water system identified above shall be altered and operated in accordance with the conditions of this drinking water works permit and the licence.

1.2 The definitions and conditions of the licence shall also apply to this drinking water works permit.

2.0 Alterations to the Drinking Water System

2.1 Any document issued by the Director as a Schedule C to this drinking water works permit shall provide authority to alter the drinking water system in accordance, where applicable, with the conditions of this drinking water works permit and the licence.

2.2 All Schedule C documents issued by the Director for the drinking water system shall form part of this drinking water works permit.

2.3 All parts of the drinking water system in contact with drinking water which are:

2.3.1 Added, modified, replaced, extended; or

2.3.2 Taken out of service for inspection, repair or other activities that may lead to contamination,

shall be disinfected before being put into service in accordance with a procedure approved by the Director or in accordance with the applicable provisions of the following documents:

a) The ministry's Watermain Disinfection Procedure, effective August 1, 2016;
b) AWWA C652 – Standard for Disinfection of Water-Storage Facilities;
c) AWWA C653 – Standard for Disinfection of Water Treatment Plants; and
d) AWWA C654 – Standard for Disinfection of Wells.

2.4 The owner shall notify the Director within thirty (30) days of the placing into service or the completion of any addition, modification, replacement or extension of the drinking water system which had been authorized through:

2.4.1 Schedule B to this drinking water works permit which would require an alteration of the description of a drinking water system component described in Schedule A of this drinking water works permit;

2.4.2 Any Schedule C to this drinking water works permit respecting works other than watermains; or

2.4.3 Any approval issued prior to the issue date of the first drinking water works permit respecting works other than watermains which were not in service at the time of the issuance of the first drinking water works permit.

2.5 For greater certainty, the notification requirements set out in condition 2.4 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:

2.5.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03;

2.5.2 Constitutes maintenance or repair of the drinking water system; or

2.5.3 Is a watermain authorized by condition 3.1 of Schedule B of this drinking water works permit.

2.6 The owner shall notify the legal owner of any part of the drinking water system that is prescribed as a municipal drinking water system by section 2 of O. Reg. 172/03 of the requirements of the licence and this drinking water works permit as applicable to the prescribed system.

2.7 For greater certainty, any alteration to the drinking water system made in accordance with this drinking water works permit may only be carried out after other legal obligations have been complied with including those arising from the *Environmental Assessment Act*, *Niagara Escarpment Planning and Development Act*, *Oak Ridges Moraine Conservation Act, 2001* and *Greenbelt Act, 2005.*

3.0 Watermain Additions, Modifications, Replacements and Extensions

3.1 The drinking water system may be altered by adding, modifying, replacing or extending a watermain within the distribution system subject to the following conditions:

3.1.1 The design of the watermain addition, modification, replacement or extension:

a) Has been prepared by a Professional Engineer;

b) Has been designed only to transmit water and has not been designed to treat water;

c) Satisfies the design criteria set out in the Ministry of the Environment and Climate Change publication "Watermain Design Criteria for Future Alterations Authorized under a Drinking Water Works Permit – June 2012", as amended from time to time; and

d) Is consistent with or otherwise addresses the design objectives contained within the Ministry of the Environment and Climate Change publication "Design Guidelines for Drinking Water Systems, 2008", as amended from time to time.

3.1.2 The maximum demand for water exerted by consumers who are serviced by the addition, modification, replacement or extension of the watermain will not result in an exceedance of the rated capacity of a treatment subsystem or the maximum flow rate for a treatment subsystem component as specified in the licence, or the creation of adverse conditions within the drinking water system.

3.1.3 The watermain addition, modification, replacement or extension will not adversely affect the distribution system's ability to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions.

3.1.4 Secondary disinfection will be provided to water within the added, modified, replaced or extended watermain to meet the requirements of O. Reg. 170/03.

3.1.5 The watermain addition, modification, replacement or extension is wholly located within the municipal boundary over which the owner has jurisdiction.

3.1.6 The owner of the drinking water system consents in writing to the watermain addition, modification, replacement or extension.

3.1.7 A Professional Engineer has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of condition 3.1.1.

3.1.8 The owner of the drinking water system has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of conditions 3.1.2 to 3.1.6.

3.2 The authorization for the addition, modification, replacement or extension of a watermain provided for in condition 3.1 does not include the addition, modification, replacement or extension of a watermain that:

3.2.1 Passes under or through a body of surface water, unless trenchless construction methods are used;

3.2.2 Has a nominal diameter greater than 900 mm;

3.2.3 Results in the fragmentation of the drinking water system; or

3.2.4 Connects to another drinking water system, unless:

a) Prior to construction, the owner of the drinking water system seeking the connection obtains written consent from the owner or owner's delegate of the drinking water system being connected to; and

b) The owner of the drinking water system seeking the connection retains a copy of the written consent from the owner or owner's delegate of the drinking water system being connected to as part of the record that is recorded and retained under condition 3.3.

3.3 The verifications required in conditions 3.1.7 and 3.1.8 shall be:

3.3.1 Recorded on "Form 1 – Record of Watermains Authorized as a Future Alteration", as published by the Ministry of the Environment and Climate Change, prior to the watermain addition, modification, replacement or extension being placed into service; and

3.3.2 Retained for a period of ten (10) years by the owner.

3.4 For greater certainty, the verification requirements set out in condition 3.3 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:

3.4.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or

3.4.2 Constitutes maintenance or repair of the drinking water system.

3.5 The document or file referenced in Column 1 of Table 1 of Schedule A of this drinking water works permit that sets out watermains shall be retained by the owner and shall be updated to include watermain additions, modifications, replacements and extensions within 12 months of the addition, modification, replacement or extension.

3.6 The updates required by condition 3.5 shall include watermain location relative to named streets or easements and watermain diameter.

4.0 Minor Modifications to the Drinking Water System

4.1 The drinking water system may be altered by adding, modifying or replacing the following components in the drinking water system:

4.1.1 Raw water pumps and treatment process pumps in the treatment system;

4.1.2 Coagulant feed systems in the treatment system, including the location and number of dosing points;

4.1.3 Valves;

4.1.4 Instrumentation and controls, including SCADA systems, and software associated with these devices;

4.1.5 Filter media, backwashing equipment and under-drains in the treatment system; or,

4.1.6 Spill containment works.

4.2 The drinking water system may be altered by adding, modifying, replacing or removing the following components in the drinking water system:

4.2.1 Treated water pumps and associated equipment;

4.2.2 Re-circulation devices within distribution system storage facilities;

4.2.3 In-line mixing equipment;

4.2.4 Chemical metering pumps and chemical handling pumps;

4.2.5 Chemical storage tanks (excluding fuel storage tanks) and associated equipment; or,

4.2.6 Measuring and monitoring devices that are not required by regulation, by a condition in the Drinking Water Works Permit, or by a condition otherwise imposed by the Ministry of the Environment and Climate Change.

4.3 The drinking water system may be altered by replacing the following:

4.3.1 Raw water piping, treatment process piping or treated water piping within the treatment subsystem;

4.3.2 Fuel storage tanks and spill containment works, and associated equipment; or

4.3.3 Coagulants and pH adjustment chemicals, where the replacement chemicals perform the same function;

a) Prior to making any alteration to the drinking water system under condition 4.3.3, the owner shall undertake a review of the impacts that the alteration might have on corrosion control or other treatment processes; and

b) The owner shall notify the Director in writing within thirty (30) days of any alteration made under condition 4.3.3 and shall provide the Director with a copy of the review.

4.4 Any alteration of the drinking water system made under conditions 4.1, 4.2 or 4.3 shall not result in:

4.4.1 An exceedance of a treatment subsystem rated capacity or a treatment subsystem component maximum flow rate as specified in the licence;

4.4.2 The bypassing of any unit process within a treatment subsystem;

4.4.3 A deterioration in the quality of drinking water provided to consumers;

4.4.4 A reduction in the reliability or redundancy of any component of the drinking water system;

4.4.5 A negative impact on the ability to undertake compliance and other monitoring necessary for the operation of the drinking water system; or

4.4.6 An adverse effect on the environment.

4.5 The owner shall verify in writing that any addition, modification, replacement or removal of drinking water system components in accordance with conditions 4.1, 4.2 or 4.3 has met the requirements of the conditions listed in condition 4.4.

4.6 The verifications and documentation required in condition 4.5 shall be:

4.6.1 Recorded on "Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System", as published by the Ministry of the Environment and Climate Change, prior to the modified or replaced components being placed into service; and

4.6.2 Retained for a period of ten (10) years by the owner.

4.7 For greater certainty, the verification requirements set out in conditions 4.5 and 4.6 do not apply to any addition, modification, replacement or removal in respect of the drinking water system which:

4.7.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or

4.7.2 Constitutes maintenance or repair of the drinking water system.

4.8 The owner shall update any drawings maintained for the drinking water system to reflect the modification or replacement of the works, where applicable.

5.0 Equipment with Emissions to the Air

5.1 The drinking water system may be altered by adding, modifying or replacing any of the following drinking water system components that may discharge or alter the rate or manner of a discharge of a compound of concern to the atmosphere:

5.1.1 Any equipment, apparatus, mechanism or thing that is used for the transfer of outdoor air into a building or structure that is not a cooling tower;

5.1.2 Any equipment, apparatus, mechanism or thing that is used for the transfer of indoor air out of a space used for the production, processing, repair, maintenance or storage of goods or materials, including chemical storage;

5.1.3 Laboratory fume hoods used for drinking water testing, quality control and quality assurance purposes;

5.1.4 Low temperature handling of compounds with a vapor pressure of less than 1 kilopascal;

5.1.5 Maintenance welding stations;

5.1.6 Minor painting operations used for maintenance purposes;

5.1.7 Parts washers for maintenance shops;

5.1.8 Emergency chlorine and ammonia gas scrubbers and absorbers;

5.1.9 Venting for activated carbon units for drinking water taste and odour control;

5.1.10 Venting for a stripping unit for methane removal from a groundwater supply;

5.1.11 Venting for an ozone treatment unit;

5.1.12 Natural gas or propane fired boilers, water heaters, space heaters and make-up air units with a total facility-wide heat input rating of less than 20 million kilojoules per hour, and with an individual fuel energy input of less than or equal to 10.5 gigajoules per hour; or

5.1.13 Emergency generators that fire No. 2 fuel oil (diesel fuel) with a sulphur content of 0.5 per cent or less measured by weight, natural gas, propane, gasoline or biofuel, and.that are used for emergency duty only with periodic testing.

5.2 The owner shall not add, modify or replace a drinking water system component set out in condition 5.1 for an activity that is not directly related to the treatment and/or distribution of drinking water.

5.3 The emergency generators identified in condition 5.1.13 shall not be used for non-emergency purposes including the generation of electricity for sale or for peak shaving purposes.

5.4 The owner shall prepare an emission summary table for nitrogen oxide emissions only, for each addition, modification or replacement of emergency generators identified in condition 5.1.13.

Performance Limits

5.5 The owner shall ensure that a drinking water system component identified in conditions 5.1.1 to 5.1.13 is operated at all times to comply with the following limits:

5.5.1 For equipment other than emergency generators, the maximum concentration of any compound of concern at a point of impingement shall not exceed the corresponding point of impingement limit;

5.5.2 For emergency generators, the maximum concentration of nitrogen oxides at sensitive populations shall not exceed the applicable point of impingement limit, and at non-sensitive populations shall not exceed the Ministry of the Environment and Climate Change half-hourly screening level of 1880 ug/m^3 as amended; and

5.5.3 The noise emissions comply at all times with the limits set out in publication NPC-300, as applicable.

5.6 The owner shall verify in writing that any addition, modification or replacement of works in accordance with condition 5.1 has met the requirements of the conditions listed in condition 5.5.

5.7 The owner shall document how compliance with the performance limits outlined in condition 5.5.3 is being achieved, through noise abatement equipment and/or operational procedures.

5.8 The verifications and documentation required in conditions 5.6 and 5.7 shall be:

5.8.1 Recorded on "Form 3 – Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere", as published by the Ministry of the Environment and Climate Change, prior to the additional, modified or replacement equipment being placed into service; and

5.8.2 Retained for a period of ten (10) years by the owner.

5.9 For greater certainty, the verification and documentation requirements set out in conditions 5.6 and 5.8 do not apply to any addition, modification or replacement in respect of the drinking water system which:

5.9.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or

5.9.2 Constitutes maintenance or repair of the drinking water system.

5.10 The owner shall update any drawings maintained for the works to reflect the addition, modification or replacement of the works, where applicable.

6.0 Previously Approved Works

6.1 The owner may add, modify, replace or extend, and operate part of a municipal drinking water system if:

6.1.1 An approval was issued after January 1, 2004 under section 36 of the SDWA in respect of the addition, modification, replacement or extension and operation of that part of the municipal drinking water system;

6.1.2 The approval expired by virtue of subsection 36(4) of the SDWA; and

6.1.3 The addition, modification, replacement or extension commenced within five years of the date that activity was approved by the expired approval.

7.0 System-Specific Conditions

7.1 Not applicable.

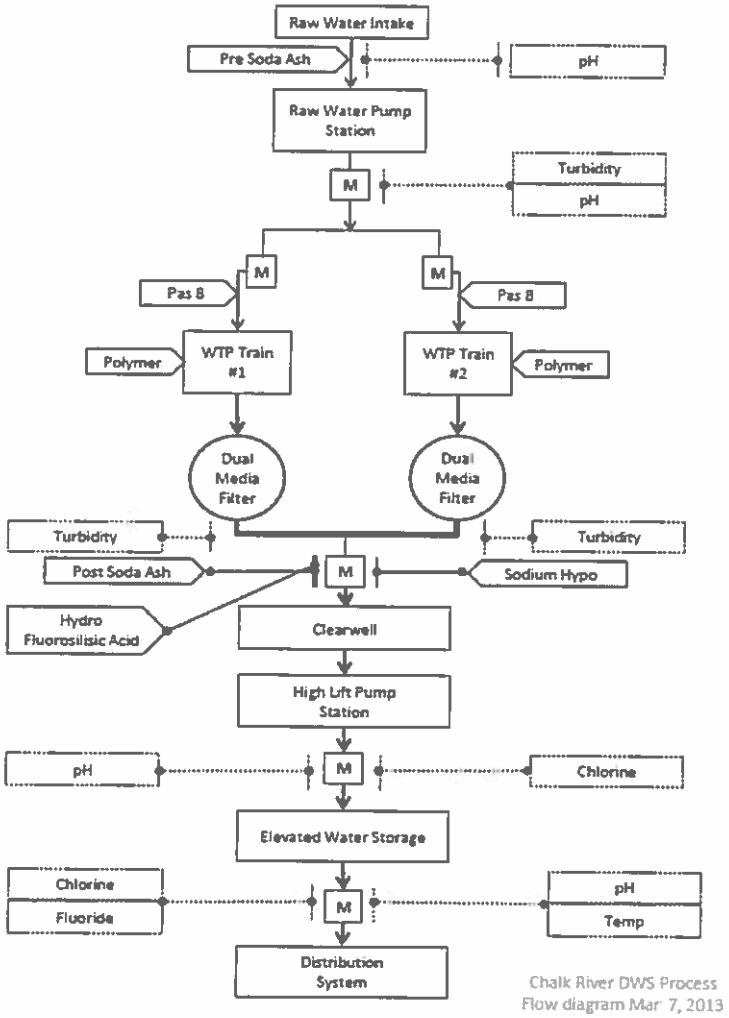
8.0 Source Protection

8.1 Not applicable.

Schedule D: Process Flow Diagrams

System Owner	**The Corporation of the Town of Laurentian Hills**
Permit Number	**261-201**
Drinking Water System Name	**Chalk River Drinking Water System**
Schedule D Issue Date	**March 24th, 2016**

Chalk River Water Treatment Plan



[Source: Town of Laurentian Hills Drinking Water Quality Management System/Operational Plan, Version 7, April 29, 2014]

APPENDIX C

PERMIT(S) TO TAKE WATER

Ontario

Ministry of the Environment
Ministère de l'Environnement

PERMIT TO TAKE WATER
Surface Water
NUMBER 8446-9BPRT6

Pursuant to Section 34 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

The Corporation of the Town of Laurentian Hills
34465 Highway 17
Laurentian Hills, Ontario
K0J 1P0
Canada

For the water taking from: Corry Lake

Located at: Lot 3, Concession VII, Geographic Township of Buchanan
Laurentian Hills, County of Renfrew

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment.

(d) "District Office" means the Ottawa District Office.

(e) "Permit" means this Permit to Take Water No. 8446-9BPRT6 including its Schedules, if any, issued in accordance with Section 34 of the OWRA.

(f) "Permit Holder" means The Corporation of the Town of Laurentian Hills.

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated August 1, 2013 and signed by Wayne T. Kirby , and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act* , R.S.O. 1990, the *Pesticides Act* , R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **September 30, 2023**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Corry Lake	Lake	Municipal	Water Supply	1,380	24	1,980,000	365	18 310975 5096835
						Total Taking:	1,980,000		

4. Monitoring

4.1 The Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit or as otherwise accepted by the Director. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Surface-Water Takings
The taking of water (including the taking of water into storage and the subsequent or simultaneous withdrawal from storage) shall be carried out in such a manner that streamflow is not stopped and is not reduced to a rate that will cause interference with downstream uses of water or with the natural functions of the stream.

6. Director May Amend Permit
The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, as amended, provides that the Notice requiring the hearing shall state:

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Permit to Take Water number;
6. The date of the Permit to Take Water;
7. The name of the Director;
8. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 314-4506
Email: ERTTribunalsecretary@ontario.ca

AND

The Director, Section 34
Ministry of the Environment
1259 Gardiners Rd, PO Box 22032
Kingston, ON
K7P 3J6

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by telephone at (416) 314-4600 ***by fax at (416) 314-4506*** ***by e-mail at www.ert.gov.on.ca***

This Permit cancels and replaces Permit Number 88-P-4040, issued on 1988/06/22.

Dated at Kingston this 1st day of October, 2013.

Gillian Dagg-Foster
Director, Section 34
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule "A" forms part of Permit To Take Water 8446-9BPRT6, dated October 1, 2013.

APPENDIX D

INSPECTION RATING RECORD

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2016-2017)

DWS Name:	CHALK RIVER DRINKING WATER SYSTEM
DWS Number:	210000666
DWS Owner:	Laurentian Hills,The Corporation Of The Town Of
Municipal Location:	Laurentian Hills
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	January 19, 2017
Ministry Office:	Ottawa District

Maximum Question Rating: 430

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 60
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 116
Reporting & Corrective Actions	0 / 21
Treatment Process Monitoring	0 / 133
TOTAL	**0 / 430**

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 22-MAR-17 (Inspection ID: 1-CLKZB).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2016-2017)

DWS Name:	CHALK RIVER DRINKING WATER SYSTEM
DWS Number:	210000666
DWS Owner:	Laurentian Hills,The Corporation Of The Town Of
Municipal Location:	Laurentian Hills
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	January 19, 2017
Ministry Office:	Ottawa District

Maximum Question Rating: 430

Inspection Risk Rating	**0.00%**
FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 22-MAR-17 (Inspection ID: 1-CLKZB).

APPENDIX E

INSPECTION RATING RECORD METHODOLOGY

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 15 inspection modules consisting of approximately 100 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

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The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry 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 less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system's operation can improve. 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:

RISK = LIKELIHOOD × 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 related to regulatory compliance and input their "yes", "no" or "not applicable" responses 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).

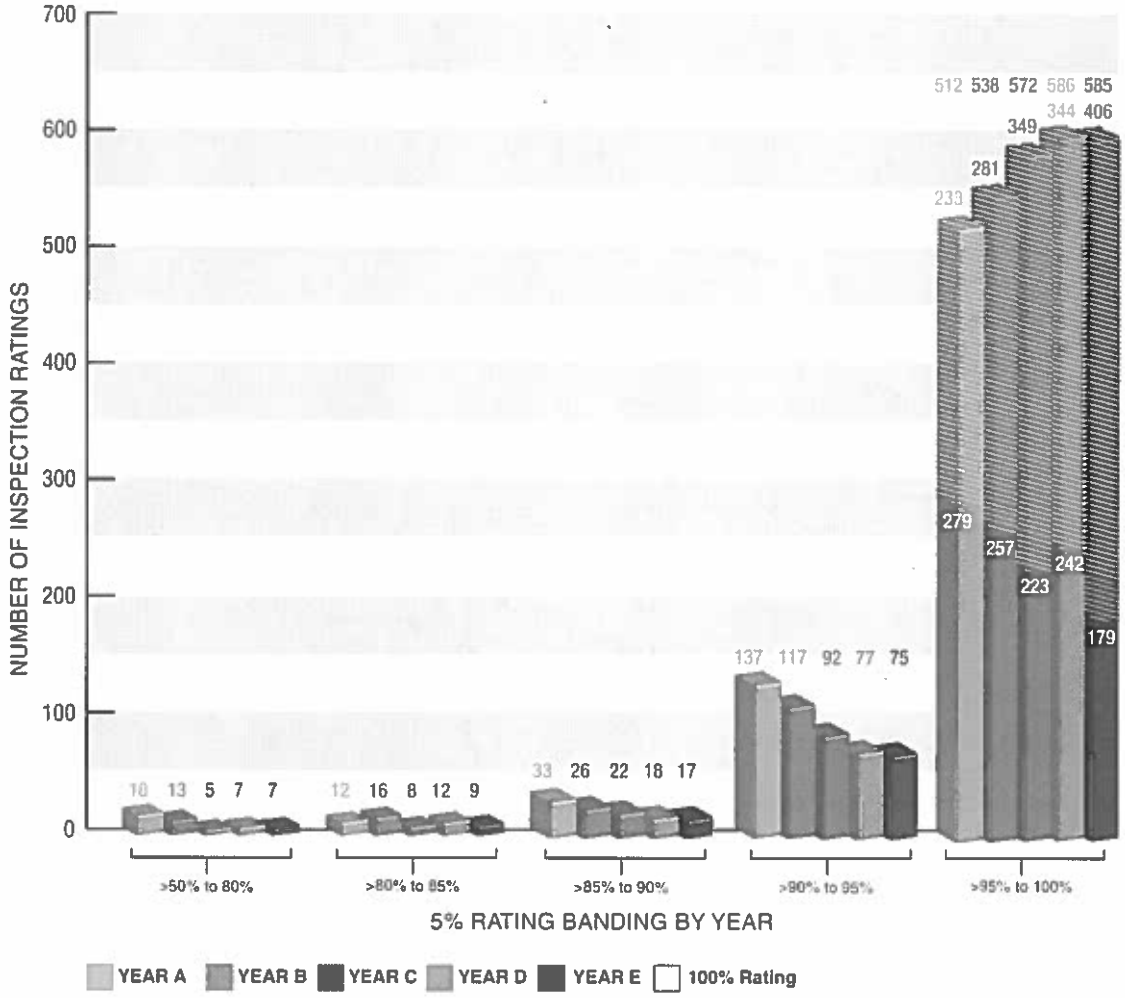
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

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 15 possible modules of the inspection protocol, which would provide the system owner/operator with information on the areas where they need to improve. The 15 modules are:

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

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