Ontario

Ministry of the Environment and Climate Change

CASSELMAN DRINKING WATER SYSTEM

Inspection Report

Site Number:	210001219
Inspection Number:	1-CLO31
Date of Inspection:	Nov 23, 2016
Inspected By:	Christina Des Rochers

Table of Contents:

OWNER INFORMATION:

Company Name:	CASSELMAN, THE CORPORATION OF THE VILLAGE OF		
Street Number:	751	**Unit Identifier:**	
Street Name:	ST. JEAN St		
City:	CASSELMAN		
Province:	ON	**Postal Code:**	K0A 1M0

CONTACT INFORMATION

Type:	Owner	**Name:**	Daniel Gatien
Phone:	(613) 764-3139	**Fax:**	(613) 764-5709
Email:	dgatien@casselman.ca		
Title:	Chief Administrative Officer / Clerk / Treasurer		
Type:	Operator	**Name:**	Alain Castonguay
Phone:	(613) 764-5678	**Fax:**	(613) 764-5424
Email:	acastonguay@casselman.ca		
Title:	Director of Environmental Services		
Type:	Operator	**Name:**	Sébastien Cadieux
Phone:	(613) 764-5678	**Fax:**	(613) 764-5424
Email:			
Title:	Operator, Casselman WTP		
Type:	Conservation Authority	**Name:**	Tessa Di Iorio
Phone:	(613) 984-2948	**Fax:**	(613) 984-2872
Email:	tdiiorio@nation.on.ca		
Title:	Hydrogeologist - South Nation Conservation		
Type:	Health Unit	**Name:**	Paul Roumeliotis
Phone:	(613) 933-1375	**Fax:**	(613) 933-7930
Email:	proumeliotis@eohu.ca		
Title:	Medical Officer of Health		

INSPECTION DETAILS:

Site Name:	CASSELMAN DRINKING WATER SYSTEM
Site Address:	832 LAVAL ST CASSELMAN K0A 1M0
County/District:	Casselman
MOECC District/Area Office:	Cornwall Area Office
Health Unit:	EASTERN ONTARIO HEALTH UNIT
Conservation Authority:	
MNR Office:	
Category:	Large Municipal Residential
Site Number:	210001219
Inspection Type:	Announced
Inspection Number:	1-CLO31
Date of Inspection:	Nov 23, 2016

Date of Previous Inspection:

COMPONENTS DESCRIPTION

Site (Name): MOE DWS Mapping
Type: DWS Mapping Point **Sub Type:**

Site (Name): RAW WATER
Type: Source **Sub Type:** Surface
Comments:
The Casselman Water Treatment Plant draws water from the South Nation River. The intake crib is located in the middle of the river at a depth of 7 m below mean river level. Raw water is drawn through a wire mesh screen at the intake and flows into a raw water well (equipped with three low lift pumps, an inlet gate and removable screens) situated below the water treatment plant.

Site (Name): TREATED WATER
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The Casselman Water Treatment Plant is located at 832 Laval Street, Casselman, Ontario.

At the treatment plant raw water from the South Nation River flows into a raw water well where it receives potassium permanganate. Water is fed through the raw water header where it may receive sodium hydroxide (no longer in use), an injection of aqueous chlorine solution (mix of chlorine gas and treated water), and receives coagulant upstream of the in-line static mixer.

Water is then pumped into one of two Actiflo® process units that provide coagulation, flocculation, clarification, and filtration. Effluent from the Actiflo® units is then directed to the filtered water holding tank from which it is pumped through a header pipe that receives an injection of aqueous chlorine solution (mix of chlorine gas and treated water).

The chlorinated water is then directed through one of two parallel UV reactors. Water then flows to a 415 m3 baffled clearwell located beneath the treatment plant, and a 440 m3 clearwell located adjacent to the main building where it is pumped alternately by three high lift vertical turbine high lift pumps into the distribution system. Chemical Feed Systems include:

i) Coagulant Feed System consisting of four 5000 L capacity polyethylene coagulant storage tanks; 2 variable speed metering pumps to feed alum into the raw water header upstream of the in-line static mixer;

ii) Polymer Feed System consisting of one 2270 L polyethylene solution storage tank and mixer with 3 variable speed metering pumps to feed polymer into the injection tank, coagulation tank and hydrocyclone on the treatment units;

iii) Chlorination System consisting of 2 wall mounted vacuum chlorinators with automatic switchover regulators to draw chlorine gas from cylinders and blend with treated water to create an aqueous chlorine solution for feeding into the raw water header and the filtered water header.

GPS coordinates: NAD 83, Zone 18, 0492370 E / 5017559 N.

Site (Name): DISTRIBUTION SYSTEM
Type: Other **Sub Type:** Other
Comments:
The distribution system consists of approximately 20 km of PVC watermains that were installed in 1976 and 1977.

The system supplies water to approximately 1000 service connections that serve a population of approximately 2,835. The operating authority reports that there were 128 hydrants installed on the system.

Site (Name): WATER TOWER
Type: Other **Sub Type:** Reservoir
Comments:
A 1,575 cubic meter capacity elevated storage tank is located at 758 Breboeuf Street. It is a steel tank that sits atop a concrete pedestal.

GPS coordinates: NAD 83, Zone 18, 0493526 E / 5017933 N.

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.

  This inspection covers the period from January 1, 2016 to November 20, 2016. Specifically this inspection examines compliance with Municipal Drinking Water Licence #173-101 and Drinking Water Works Permit #173-201, in addition to relevant Ministry of the Environment and Climate Change (MOECC) legislation as addressed in specific inspection questions.

  The inspection began November 23, 2016 when the announced physical inspection of Casselman Drinking Water System (DWS) was conducted consisting of a visual inspection of the treatment facility, including instrumentation and controls, and physical inspection of the elevated storage tank. Inspection interviews and review of operational information and log books also took place at that time.

  Operational responsibility for the Casselman DWS is held by the owner, The Corporation of the Village of Casselman (Village).

  The Casselman WTP was classified as a Class II Water Treatment Subsystem on November 26, 2015.

  Additional review of documentation and information relevant to the inspection were conducted at MOECC offices.

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.**

  MDWL #173-101 Schedule C, 2.0 Flow Measurement and Recording Requirements states:

  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:

Capacity Assessment

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.

Casselman DWS is equipped with two raw water flow meters, one located on each inlet line to the two treatment trains, one flow meter located post-filter measuring the flow volume of filtered water entering the filtered water holding tank, and one treated water flow meter located past the highlift pumps.

Additionally, each of the three filters are equipped with a filtered water flow meter

- **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.**

  MDWL #173-101 Schedule C, 1.0 Performance Limits, 1.1 Rated Capacity states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 3,182 m3/day.

  At no time during the inspection review period did the flow into the treatment system exceed the rated capacity. The maximum daily treated flow into the distribution system during the inspection review period was 3,059 m3/day.

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.**

- **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.**

  Filter effluent turbidity is monitored continuously at all filters and coagulant dosing is trended continuously via SCADA.

  The filter effluent turbidity met the performance criterion of less than or equal to 0.3 NTU in 95% of the measurements each month.

  The Ultraviolet (UV) light reactor system used for primary disinfection provided a minimum dose of 40 mJ/cm2 at all times water was distributed to users.

- **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.**

- **The primary disinfection equipment was equipped with alarms or shut-off mechanisms that satisfied the standards described in Section 1-6 (1) of Schedule 1 of Ontario Regulation 170/03.**

  The UV reactors in the Casselman DWS are equipped with alarms and lockouts which initiate a plant shutdown in the event that the UV dose drops below the required 40 mJ/cm2.

Treatment Process Monitoring

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

Treatment Process Monitoring

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

  Secondary disinfectant residual in the distribution system is monitored continuously via online analyzer located at the Casselman Sewage Pumping Station.

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

  Review of system logbooks confirms that continuous monitoring data are reviewed daily (every 24 hours), including weekends and statutory holidays.

- **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.**

  Turbidity, on each of three filter effluent lines, and UV dose are continuously monitored. If turbidity exceeds 0.80 NTU or UV dose drops below 40 mJ/cm2 an alarm is triggered and the interlock systems shut down the plant immediately.

- **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.**

  Online chlorine and turbidity analyzers, and raw, filtered, transfer, and backwash flowmeters were most recently calibrated by Franklin Empire on June 21, 2016.

  Bench-top and handheld turbidimeters, colourimeters, spectrophotometers, and pH meters were most recently calibrated by HACH Service Plus on May 3, 2016.

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.**

  MDWL #173-101, Schedule B 16.0 Operation and Maintenance Manual requires,

  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 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;

  16.2.4 Procedures for the operation and maintenance of monitoring equipment;

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

Operations Manuals

16.2.6 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;

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 Casselman WTP, water tower, and online distribution residual analyzer (sewage pumping station) are equipped with contact alarms and mechanical locks. In addition, the treatment facility is fenced and monitored by Ranguard Security from Cornwall, Ontario.

Certification and Training

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

  The current overall responsible operator (ORO) holds Water Treatment IV and Water Distribution II licences.

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

  Operator in charge (OIC) duties are assigned rotationally, based on scheduling needs, to all operators meeting the required levels of certification.

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

Water Quality Monitoring

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

  O. Reg. 170/03 10-2 states:

  10-2. (1) The owner of a drinking water system and the operating authority for the system shall ensure that,

  (a) if the system serves 100,000 people or less, at least eight distribution samples, plus one additional distribution sample for every 1,000 people served by the system, are taken every month, with at least one of the samples being taken in each week; and

  (2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection (1) is tested for,
  (a) Escherichia coli; and
  (b) total coliforms.

  (3) The owner of the drinking water system and the operating authority for the system shall ensure that at least 25 per cent of the samples required to be taken under subsection (1) are tested for general bacteria population expressed as colony counts on a heterotrophic plate count.

  Based on current population, Casselman DWS is required to collect a minimum of eleven samples per month, with at least one sample collected each week.

Water Quality Monitoring

A minimum of twelve samples per month, habitually three samples per week, are collected from Casselman DWS distribution system and analyzed as required. One of every three weekly samples is also analyzed for heterotrophic plate count.

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

  O. Reg. 170/03010-3 states:

  10-3. The owner of a drinking water system and the operating authority for the system shall ensure that a water sample is taken at least once every week and tested for,
  (a) Escherichia coli;
  (b) total coliforms; and
  (c) general bacteria population expressed as colony counts on a heterotrophic plate count.

  Samples were collected and analyzed as required during the inspection review period.

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

  Per O. Reg. 170/03, sampling frequency for any parameter of Schedule 23, provided previous sample results have not exceeded one-half MAC, is one sample every 12 months for a surface water system.

  The most recent samples for analysis of Schedule 23 parameters were collected April 21, 2016 and the previous sample was collected on April 14, 2015.

  These dates satisfy the requirements of the regulation.

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

  Per O. Reg. 170/03, sampling frequency for any parameter of Schedule 24, provided previous sample results have not exceeded one-half MAC, is one sample every 12 months for a surface water system.

  The most recent samples for analysis of Schedule 24 parameters were collected April 21, 2016 and the previous sample was collected on April 14, 2015 .

  These dates satisfy the requirements of the regulation.

- **All trihalomethanes water quality monitoring requirements prescribed by legislation were not conducted within the required frequency.**

  O. Reg. 170/03 13-6 states:

  (1) The owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water system's distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of trihalomethanes.

  (2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection (1) is tested for trihalomethanes.

  Further, O. Reg. 170/03 6-1.1 states:

  (4) If this Regulation or an approval, municipal drinking water licence or order, including an OWRA approval or

Water Quality Monitoring

OWRA order, requires at least one water sample to be taken every three months or in each calendar quarter and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a three month period or calendar quarter for the purpose of being tested for that parameter is taken at least 60 days, and not more than 120 days, after a sample was taken for that purpose in the previous three-month period or calendar quarter.

Samples were collected for analysis of trihalomethanes (THM) on January 5, April 4, July 4, and November 14, 2016. While these dates were intended to meet the requirement of sampling "quarterly", the July-November period does not satisfy the requirement to collect samples a least 60 days and not more than 120 days after the previous sample.

A similar non-compliance issue was identified in the 2015-2016 Inspection Report.

Village of Casselman staff shall insure, going forward from the most recent sampling date, that sampling for THM is conducted within required timeframes.

By January 30, 2017, Village of Casselman staff shall provide to the undersigned inspector, a schedule for the 2017 calendar year identifying dates meeting the above noted requirements for the collection of samples for THM analysis.

- **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were not conducted within the required frequency for the DWS.**

  O. Reg. 170/03 13-7 states:

  The owner of a drinking water system and the operating authority for the system shall ensure that at least one water sample is taken every three months and tested for nitrate and nitrite.

  Further, O. Reg. 170/03 6-1.1 states:

  (4) If this Regulation or an approval, municipal drinking water licence or order, including an OWRA approval or OWRA order, requires at least one water sample to be taken every three months or in each calendar quarter and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a three month period or calendar quarter for the purpose of being tested for that parameter is taken at least 60 days, and not more than 120 days, after a sample was taken for that purpose in the previous three month period or calendar quarter.

  Samples were collected for analysis of nitrate and nitrite on January 5, April 4, July 4, and November 14, 2016. While these dates were intended to meet the requirement of sampling "quarterly", the July-November period does not satisfy the requirement to collect samples a least 60 days and not more than 120 days after the previous sample.

  A similar non-compliance issue was identified in the 2015-2016 Inspection Report.

  Village of Casselman staff shall insure, going forward from the most recent sampling date, that sampling for nitrate and nitrite is conducted within required timeframes.

  By January 30, 2017, Village of Casselman staff shall provide to the undersigned inspector, a schedule for the 2017 calendar year identifying dates meeting the above noted requirements for the collection of samples for nitrate and nitrite analysis.

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

Water Quality Monitoring

required frequency.

O. Reg. 170/03 Schedule 13-8 requires sampling and analysis of sodium every 60 months.

A sample was collected for sodium analysis on January 5, 2015 and a resample due to exceedence of the standard was collected on January 13, 2015.

A sample for the analysis of sodium is next required to be collected within 90 days of January 5, 2020.

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

  O. Reg. 170/03 Schedule 13-9 requires sampling and analysis of fluoride every 60 months.

  A sample for analysis of fluoride was collected on April 14, 2015.

  A sample for the analysis of fluoride is next required to be collected within 90 days of April 14, 2020.

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

  MDWL #173-101 Schedule C: System Specific Conditions, 1.0 Performance Limits, 1.5 Residue Management, identifies that the annual average of suspended solids in the effluent discharged from the waste residual management works shall not exceed 25 mg/L.

  Further, 4.0 Additional Sampling, Testing and Monitoring, Environmental Discharge Parameters requires that manual composite samples (meaning at least three grab samples taken during a discharge event) be collected monthly for analysis of suspended solids from the point of discharge of the works.

  Samples are collected as required for both filter backwash and Actiflo clarifier supernatant.

  The annual averages of suspended solids discharged from filter backwash and clarifier residuals management systems in 2016 were 3 mg/L and 4 mg/L respectively.

- **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).**

Reporting & Corrective Actions

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

  In response to AWQI# 104702, THM RAA of 103 ug/L, reported on January 13, 2016, Village staff reduced chlorine dosing.

  Pending financial ability, the Village intends to implement a chloramination system for the purposes of secondary disinfection in order to reduce the formation of THMs in the distribution system.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg.**

Reporting & Corrective Actions

170/03 16-6.

- **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.**

- **When the primary disinfection equipment, other than that used for chlorination or chloramination, has failed causing an alarm to sound or an automatic shut-off to occur, a certified operator responded in a timely manner and took appropriate actions.**

  Logbooks clearly demonstrate that Village of Casselman certified operators responded as required to all instances when the UV disinfection system was in alarm.

Other Inspection Findings

- **The following items are noted as being relevant to the Drinking Water System:**

  1. The source water for the Casselman DWS, South Nation River, contains chronically elevated levels of organic nutrients. Elevated levels of organic compounds combined with free chlorine in the distribution system result in the production of THMs at levels above the ODWQS. Pending financial ability, the Village intends to implement a chloramination system for the purposes of secondary disinfection in order to reduce the formation of THMs in the distribution system.

  2. On November 4, 2016 a Notice of Commencement for the Village of Casselman Wastewater Treatment System Class Environmental Assessment was issued by J. L. Richards & Associates Limited.

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.

1 **All trihalomethanes water quality monitoring requirements prescribed by legislation were not conducted within the required frequency.**

Samples were collected for analysis of trihalomethanes (THM) on January 5, April 4, July 4, and November 14, 2016. While these dates were intended to meet the requirement of sampling "quarterly", the July-November period does not satisfy the requirement to collect samples a least 60 days and not more than 120 days after the previous sample.

A similar non-compliance issue was identified in the 2015-2016 Inspection Report.

Action(s) Required:

Village of Casselman staff shall insure, going forward from the most recent sampling date, that sampling for THM is conducted within required timeframes.

By January 30, 2017, Village of Casselman staff shall provide to the undersigned inspector, a schedule for the 2017 calendar year identifying dates meeting the above noted requirements for the collection of samples for THM analysis.

2 **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were not conducted within the required frequency for the DWS.**

Samples were collected for analysis of nitrate and nitrite on January 5, April 4, July 4, and November 14, 2016. While these dates were intended to meet the requirement of sampling "quarterly", the July-November period does not satisfy the requirement to collect samples a least 60 days and not more than 120 days after the previous sample.

A similar non-compliance issue was identified in the 2015-2016 Inspection Report

Action(s) Required:

Village of Casselman staff shall insure, going forward from the most recent sampling date, that sampling for nitrate and nitrite is conducted within required timeframes.

By January 30, 2017, Village of Casselman staff shall provide to the undersigned inspector, a schedule for the 2017 calendar year identifying dates meeting the above noted requirements for the collection of samples for nitrate and nitrite analysis.

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: Christina Des Rochers

Signature: (Provincial Officer)

Reviewed & Approved By: Dan White

Signature: (Supervisor)

Review & Approval Date: 18/01/2017

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

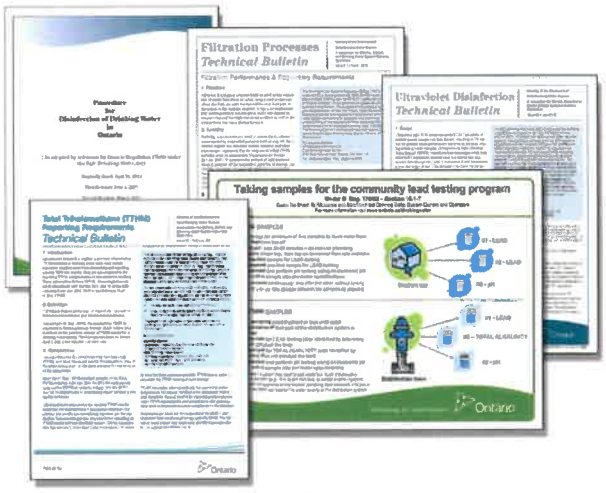
March 2015

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

Mars 2015

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

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment.

Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le Centre d'information au public au 1 800 565-4923 ou au 416 325-4000, ou encore à **picemail.moe@ontario.ca** si vous avez des questions ou besoin d'aide.

Pour plus de renseignements sur l'eau potable en Ontario, consultez le site **www.ontario.ca/eaupotable** ou envoyez un courriel à **drinking.water@ontario.ca** pour suivre l'information sur l'eau potable.

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Prendre soin de votre eau potable – Un guide destiné aux membres des conseils municipaux	7889f01
Renseignements sur le profil du réseau d'eau potable, Avis de demande de services de laboratoire, Formulaire de communication de résultats d'analyse insatisfaisants et du règlement des problèmes	7419f, 5387f, 4444f
Marche à suivre pour désinfecter l'eau potable en Ontario	4448f01
Strategies for Minimizing the Disinfection Products Thrihalomethanes and Haloacetic Acids (en anglais seulement)	7152e
Total Trihalomethane (TTHM) Reporting Requirements: Technical Bulletin (février 2011) (en anglais seulement)	8215e
Filtration Processes Technical Bulletin (en anglais seulement)	7467
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	7685
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable, de modification du permis de réseau municipal d'eau potable, de renouvellement du permis de réseau municipal d'eau potable et de permis pour un nouveau réseau	7014f01
Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable	
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802f
Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités	6560f01
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	7423f
Guide: Requesting Regulatory Relief from Lead Sampling Requirements (en anglais seulement)	6610
Liste des personnes-ressources du réseau d'eau potable	7128f
Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario	4449f01

PIBS 8990b01

Ontario

APPENDIX B

AUDIT SAMPLE RESULTS

Ontario Ministry of the Environment and Climate Change
Laboratory Services Branch - 125 Resources Road
Etobicoke, Ontario M9P 3V6
FINAL REPORT(manager4)

Login: **C234911**

Print Date: Jan. 09, 2017 10:26 AM By REPORTADMIN

**** FINAL ****

Program Code 130072201

Program: MOE OPERATIONS DIVISION
Study: WATER, COMMUNAL
Project: EASTERN REGION - KINGSTON DIST
Activity: WTP MUNIC INSPECT/ADVERS NOTIF
Organization: ER-KINGSTON DISTRICT OFFICE

Org. Id: 407811

Mail this copy to :

DES ROCHERS, CHRISTINA
MOE - KINGSTON REGIONAL OFFICE
1259 GARDINERS ROAD
KINGSTON,ONT
K7P 3J6

Final reports to : DES ROCHERS, CHRISTINA
MAHONEY, JIM
DEBARROS, CAROL

Approved for release by :

Inquiries to : TERESA SWITZER
PETER DROUIN

Telephone : 416-235-5863
Telephone : 416-235-5850

LOGIN DESCRIPTION: 210001219 CASSELMAN WS, CHRISTINA DES ROCHERS 613-521-3450

The results relate only to items tested.
To provide customer service feedback on this report and/or other services provided by LaSB, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831

Ontario Ministry of the Environment and Climate Change
Laboratory Services Branch - 125 Resources Road
Etobicoke, Ontario M9P 3V6
FINAL REPORT(manager4)

Login: **C234911** Print Date: Jan. 09, 2017 10:26 AM By REPORTADMIN **** FINAL ****

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
CDR-CDW-01	2100012198001	TREATED WATER TAP	23 NOV 2016	11:25	5	
	Sample ID C234911-0001	Sample Comment Description				

MOE*LIMS Products Requested:

WD	E3144B	VOL3144	WD	E3172A	F3172	WD	E3196A	IBC3196
WD	E3226A	PA3226	WD	E3274A	LIC3274	WD	E3364A	DISNUT3364
WD	E3473	MET3473	WD	E3526	HG3526			

Login: **C234911**

Print Date: Jan. 09, 2017 10:26 AM By REPORTADMIN

**** FINAL ****

Field ID:	CDR-CDW-01
Sample ID:	C234911-0001
MOE*LIMS ID:	2016WD47-00121
Station ID:	2100012198001
Collect Date:	23 NOV 2016
Sample Location Description:	TREATED WATER TAP

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2
3144L1	Chloroethene	.05	ug/L	<=W		
	1,1-dichloroethene	.05	ug/L	<=W		
	Dichloromethane	.2	ug/L	<=W		
	Tert-butyl methyl ether	.05	ug/L	<=W		
	trans-1,2-dichloroethene	.05	ug/L	<=W		
	Diisopropylether	.05	ug/L	<=W		
	1,1-dichloroethane	.05	ug/L	<=W		
	cis-1,2-dichloroethene	.05	ug/L	<=W		
	Chloroform	41.1	ug/L			
	1,1,1-trichloroethane	.05	ug/L	<=W		
	Carbon tetrachloride	.2	ug/L	<=W		
	1,2-dichloroethane	.05	ug/L	<=W		
	Benzene	.05	ug/L	<=W		
	Trichloroethene	.05	ug/L	<=W		
	1,2-dichloropropane	.05	ug/L	<=W		
	Bromodichloromethane	11.0	ug/L			
	Dichloroacetonitrile	4.0	ug/L	<T		
	cis-1,3-dichloropropene	.05	ug/L	<=W		
	Toluene	0.10	ug/L	<T		
	trans-1,3-dichloropropene	.05	ug/L	<=W		
	1,1,2-trichloroethane	.1	ug/L	<=W		
	Tetrachloroethene	.05	ug/L	<=W		
	Dibromochloromethane	2.4	ug/L			
	1,2-dibromoethane	.1	ug/L	<=W		
	Chlorobenzene	.05	ug/L	<=W		
	Ethylbenzene	.05	ug/L	<=W		
	m- and p-xylene	0.05	ug/L	<T		
	o-xylene	.05	ug/L	<=W		
	Styrene	.05	ug/L	<=W		
	Bromoform	.5	ug/L	<=W		
	1,1,2,2-tetrachloroethane	.2	ug/L	<=W		
	1,3-dichlorobenzene	.05	ug/L	<=W		
	1,4-dichlorobenzene	.05	ug/L	<=W		
	1,2-dichlorobenzene	.05	ug/L	<=W		
	Trihalomethanes; total	54.6	ug/L			
3172L3	Fluoride	.01	mg/L	<=W		
3196L1	Ion balance calculation		%	NDID		
	Anions		meq/L	NDID		

Login: **C234911**

Print Date: Jan. 09, 2017 10:26 AM By REPORTADMIN

**** FINAL ****

Field ID:	CDR-CDW-01
Sample ID:	C234911-0001
MOE*LIMS ID:	2016WD47-00121
Station ID:	2100012198001
Collect Date:	23 NOV 2016
Sample Location Description:	TREATED WATER TAP
Sample Comments Description:	

	Parmname	Value	Units	Qual	Rmk1	Rmk2
3196L1	Cations		meq/L			
	Conductivity Estimated		uS/cm	NDID		
	Solids; Dissolved Estimated		mg/L	NDID		
3226L1	NT: Total Coliforms	See Non-Target Textual result				
3274L1	Langeliers index calculation		none			
	Saturation pH Estimated		none			
3364L1	Nitrogen; ammonia+ammonium	.005	mg/L	<=W		
	Nitrogen; nitrite	.001	mg/L	<=W		
	Nitrogen; nitrate+nitrite	4.38	mg/L			
	Phosphorus; phosphate	0.0052	mg/L			
3473L1	Aluminum	35.6	ug/L	+/-5.90		
	Antimony	.8	ug/L	+/-0.18		
	Arsenic	.2	ug/L	+/-0.27		
	Barium	50	ug/L	+/-8.10		
	Beryllium	0	ug/L	+/-0.25		
	Boron	39.3	ug/L	+/-7.20		
	Cadmium	0	ug/L	+/-0.13		
	Chromium	.2	ug/L	+/-0.34		
	Cobalt	.2	ug/L	+/-0.18		
	Copper	21.9	ug/L	+/-2.40		
	Iron	0	ug/L	+/-18.42		
	Lead	.2	ug/L	+/-0.16		
	Manganese	7.1	ug/L	+/-0.70		
	Molybdenum	3	ug/L	+/-0.30		
	Nickel	.9	ug/L	+/-0.32		
	Selenium	.5	ug/L	+/-0.50		
	Silver	0	ug/L	+/-0.17		
	Strontium	686	ug/L	+/-68.00		
	Thallium	.1	ug/L	+/-0.11		
	Titanium	1	ug/L	+/-0.30		
	Uranium	.6	ug/L	+/-0.18		
	Vanadium	.7	ug/L	+/-0.23		
	Zinc	4.7	ug/L	+/-0.60		
3526L1	Mercury	8.0	ng/L			

CODE	DESCRIPTION
<=W	NO MEASURABLE RESPONSE (ZERO): <REPORTED VALUE
<T	A MEASURABLE TRACE AMOUNT:INTERPRET WITH CAUTION
NDID	NO DATA: INSUFFICIENT DATA TO PERFORM CALC.
NDAT	NO DATA: ABSENT NT: TOTAL COLIFORMS
NDAE	NO DATA: ABSENT NT: ESCHERICHIA COLI

NON-TARGET TEXTUAL RESULT

Sample ID: C234911-0001	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:

Absent

Sample ID: C234911-0001	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:

Absent

TEXT COMMENT

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C234911-0001	WD	E3144B	VOL3144	4410	01-DEC-16
C234911-0001	WD	E3172A	F3172	5216	12-DEC-16
C234911-0001	WD	E3226A	PA3226	6510	28-NOV-16
C234911-0001	WD	E3364A	DISNUT3364	5313	02-DEC-16
C234911-0001	WD	E3473	MET3473	6410	15-DEC-16
C234911-0001	WD	E3526	HG3526	6314	28-DEC-16

LaSB Method Summary

Method	Method Description	Status	Status Description
E3144B	THE DETERMINATION OF VOLATILE ORGANIC COMPOUNDS IN RAW AND TREATED DRINKING WATER BY PURGE AND TRAP CAPILLARY GAS CHROMATOGRAPHY-FLAME IONIZATION/MASS SELECTIVE (PT/GC-FID/MSD) DETECTION	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3172A	THE DETERMINATION OF FLUORIDE AND SULPHATE IN WATER, LEACHATES AND EFFLUENTS BY AUTOMATED ION CHROMATOGRAPHY (IC)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3196A	LIMS CALCULATIONS-ION BALANCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3226A	THE DETECTION OF COLIFORM BACTERIA INCLUDING ESCHERICHIA COLI IN DRINKING WATER BY THE PRESENCE-ABSENCE PROCEDURE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

E3274A	LIMS CALCULATIONS-LANGELIERS INDEX	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3364A	THE DETERMINATION OF AMMONIA NITROGEN, NITRITE NITROGEN, NITRITE PLUS NITRATE NITROGEN AND REACTIVE ORTHO-PHOSPHATE IN SURFACE WATER, DRINKING WATER AND PRECIPITATION BY COLOURIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3473	THE DETERMINATION OF TRACE METALS IN POTABLE WATERS BY DYNAMIC REACTION CELL (DRC) INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (ICP-MS)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3526	THE DETERMINATION OF MERCURY IN AQUEOUS SAMPLES BY COLD VAPOUR ATOMIC FLUORESCENCE SPECTROMETRY (CV-AFS)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

APPENDIX C

MUNICIPAL DRINKING WATER LICENCE

DRINKING WATER WORKS PERMIT

Ontario

MUNICIPAL DRINKING WATER LICENCE

Licence Number: 173-101
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 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 Village of Casselman

751 St.-Jean St. Box 710
Casselman
ON K0A 1M0

For the following municipal residential drinking water system:

Casselman 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 10th day of March, 2016

Signature

Indra R. Prashad, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Information

System Owner	**The Corporation of the Village of Casselman**
Licence Number	**173-101**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule A Issue Date	**March 10th, 2016**

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

Licence

Licence Issue Date	2016-03-10
Licence Expiry Date	2021-03-09
Application for Licence Renewal Date	2020-09-07

Drinking Water Works Permit

Drinking Water System Name	Permit Number	Issue Date
Casselman Drinking Water System	173-201	March 8, 2016

Permits to Take Water

Water Taking Location	Permit Number	Issue Date
South Nation River	6067-9EGMS2	December 17, 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:	173-301
Alternately, if one Financial Plan is developed for all drinking water systems owned by the owner, the Financial Plan Number shall be:	173-301A

Accredited Operating Authority

Drinking Water System or Operational Subsystems	Accredited Operating Authority	Operational Plan No.	Operating Authority No.
Casselman Drinking Water System	The Corporation of the Village of Casselman	173-401	173-OA1

Schedule B: General Conditions

System Owner	**The Corporation of the Village of Casselman**
Licence Number	**173-101**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule B Issue Date	**March 10th, 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 April 13, 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 October 13, 2016.

Schedule C: System-Specific Conditions

System Owner	**The Corporation of the Village of Casselman**
Licence Number	**173-101**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule C Issue Date	**March 10th, 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)
Casselman Village Water treatment Plant	3,182

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)
Waste Residual Management	Suspended Solids (composite)	25 mg/L	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**
Casselman Drinking Water System	40	Calculated Dose	Calculated UV Dose
			Flow Rate
			UV Transmittance
			UV Lamp Status

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
Plant Residuals Management	Total Suspended Solids	Manual	Monthly	Point of Discharge

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 Village of Casselman**
Licence Number	**173-101**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule D Issue Date	**March 10th, 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.

2.0 Other Regulatory Relief

2.1 Not applicable

Schedule E: Pathogen Log Removal/Inactivation Credits

System Owner	**The Corporation of the Village of Casselman**
Licence Number	**173-101**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule E Issue Date	**March 10th, 2016**

1.0 Primary Disinfection Pathogen Log Removal/Inactivation Credits

Casselman Village Water Treatment Plant

South Nation River [SURFACE WATER]

Minimum Log Removal/ Inactivation Required	Cryptosporidium Oocysts	Giardia Cysts [a]	Viruses [b]
Casselman Village 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
UV Disinfection [40 mJ/cm2]	2	3	2
Chlorination [CT:Clearwells]	-	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.
UV Disinfection	Duty UV Sensor Checks and Calibration 1. Duty UV sensors shall be checked on at least a monthly basis against a reference UV sensor; 2. When comparing a duty UV sensor to a reference UV sensor, the calibration ratio (intensity measured with the duty UV sensor/intensity measured with the reference UV sensor) shall be less than or equal to 1.2; 3. If the calibration ratio is greater than 1.2, the duty UV sensor shall be replaced with a calibrated UV sensor or a UV sensor correction factor shall be applied while the problem with the UV sensor is being resolved; 4. Reference UV sensors shall be checked against a Master Reference Assembly at a minimum frequency of once every three years or on a more frequent basis depending upon the recommendations of the equipment manufacturer; Operational Requirements 5. Ultraviolet light disinfection equipment shall have a feature that ensures that no water is directed to users of water treated by the equipment or that causes an alarm to sound in the event that the equipment malfunctions, loses power or ceases to provide the appropriate level of disinfection; 6. Water shall not flow through a UV reactor when the reactor's UV lights are off or not fully energized; 7. UV lamp status shall indicate whether each UV lamp is on or off; 8. All UV sensors shall operate within their calibration range or corrective measures shall be taken; and 9. Installed or replaced UV equipment components shall be equal or better than the components used during validation testing unless the UV equipment was revalidated.
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: 173-201
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 Village of Casselman

751 St.-Jean St. Box 710
Casselman
ON K0A 1M0

For the following municipal residential drinking water system:

Casselman 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 8th 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 Village of Casselman**
Permit Number	**173-201**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule A Issue Date	**March 8th, 2016**

1.0 System Description

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

Overview

The **Casselman Drinking Water System** consists of one drinking water treatment plant, one elevated storage tank and approximately 10 km of watermain, ranging in size from 150mm to 250mm diameter pipe.

Casselman Village Water Treatment Plant

Treatment Plant

Name	Casselman Village Water Treatment Plant
Street Address	832 Drouin Street
UTM Coordinates	NAD83: UTM Zone 18: 492320 m E, 5017340 m N
System Type	Surface Water Treatment Plant
Notes	A main building housing the treatment units and control, testing and monitoring equipment

Surface Water Supply

Intake Facilities

Description	One (1) timber intake structure in the South Nation River
Notes	With upturned elbow and coarse screen; approximately 57 m of 450 mm diameter PVC intake pipe

Low Lift Works

Wet Well

Description	One (1) low lift concrete wet well with removable perforated plates with 6.35 mm openings
Dimensions	5.0 m long by 2.2 m wide by 7.0 m deep
Notes	

Low Lift Pumps

Description	Three (3) variable speed vertical turbine low lift pumps
Capacity	Each pump rated at 19.5 L/s at a TDH of 12.2 m
Notes	A in-line static mixer on the low lift pump discharge common header for mixing of coagulant in the raw water
	Approximately 12.5 m of 250 mm diameter pipe to convey raw water to the water treatment units or to the filter backwash process residuals settling tank during cleaning of the raw water well

Coagulation/Flocculation/Clarification

Coagulation/Flocculation/Clarification Facilities

Description	Two (2) ballasted flocculation water treatment units (Actiflo® process units) complete with coagulation, injection, maturation and settling tanks, each rated at a nominal capacity of 1,920 m^3/day
Equipment (on each train)	One (1) coagulation tank having approximate dimensions of 1.2 m by 0.8 m by 2.1 m water depth, with a working volume of approximately 2.0 m^3, equipped with a mechanical mixer
	One (1) injection tank having approximate dimensions of 1.2 m by 1.2 m by 2.1 m water depth, with a working volume of approximately 3.0 m^3, equipped with a mechanical mixer
	One (1) maturation tank having approximate dimensions of 1.9 m by 2.0 m by 2.1 m water depth with a working volume of approximately 8.0 m^3, equipped with a mechanical mixer
	One (1) settling tank having approximate dimensions of 1.5 m by 2.0 m complete with an inclined collection hopper, inclined tube settling module
	One (1) recirculation pump for recycling settled microsand and residuals to the hydrocyclone
	One (1) hydrocyclone chamber for separating microsand and residuals and returning microsand to the injection tank, and residuals to a residuals treatment tank
Notes	Coated steel tankage

Filtration

Filters

Description	Dual media filters consisting of 150 mm sand overlain by 600 mm activated carbon
Dimensions	Two (2) filters, each with a filtration area of 8.0 m^2, and a nominal filtration rate of 10 m/hr
Notes	Coated steel tankage

Backwash Pumps

Description	One vertical turbine filter backwash pump (used for both filters)
Capacity	Having a rated capacity of 88.9 L/s at a TDH of 13 m
Notes	A standby backwash system consisting of the high lift pumps described below, complete with a pressure reducing valve

Filter Backwash Blower

Description	One filter backwash blower (used for both filters)
Capacity	Having a rated capacity of 480 m^3/hr at a discharge pressure of 4.8 m
Notes	For air scouring of the filter media as part of the backwash sequence

Filter Water Holding Tank

Description	One filtered water holding tank
Dimensions	Approximate dimensions of 2.25 m by 4.45 m by 1.83 m
Notes	Used to transfer filtered water from filters to the clearwell

Filter Water Holding Tank Transfer Pumps

Description	Three (3) variable speed vertical turbine transfer pumps
Capacity	Each pump rated at 18.5 L/s at a TDH of 4.5m
Notes	Pump operation and speed controlled by the water level in the holding tank

Primary Disinfection

Ultraviolet (UV) Disinfection System

Description	UV disinfection system
UV Dose	Two (2) ultraviolet disinfection units (one duty, one standby), providing a minimum ultraviolet dosage of 40mJ/cm^2 at the end of lamp life
Capacity	Each unit rated at a flow rate of 44.4 L/s
Notes	

Chlorine Disinfection

Description	Chlorination
Injection Point	Feed into the raw water header and the filtered water header
Equipment	Two (2) wall mounted vacuum chlorinators, each capable of delivering 227 kg/d
Notes	Draw chlorine gas from 68 kg cylinders

Clear Well and High Lift Works

Clear Wells

Description	Two-celled reinforced concrete clearwell
Dimensions	Volume of clearwell 1 is 415 m^3
	Volume of clearwell 2 is 440 m^3
Notes	Complete with masonry baffling

High Lift Pump Station

Description	High lift pump system
Dimensions	High lift pump well 1.9 m by 7.6 m by 3.0 m
Pumps	Three (3) vertical turbine pumps (two duty and one standby), each rated at 19 L/s at a TDH of 61 m
Notes	High lift pump well partitioned from the existing clearwell

Plant Residuals Management

Filter Backwash Residuals Treatment

Description	One (1) reinforced concrete settling tank for residuals generated from the filter backwash process
Dimensions	Approximate dimensions 6.4 m by 6.4 m by 3.5 m
Equipment	One (1) progressive cavity pump with a rated capacity of 5.0 L/s at a TDH of 6 m, for pumping settled sludge from the bottom of the tank through a forcemain to a gravity sanitary sewer
Notes	Supernatant discharge to the South Nation River via 300 mm diameter supernatant decant piping
	Located under the filter room floor

Clarification Process Residuals Treatment

Description	One (1) reinforced concrete settling tank for residuals generated from the clarification process
Dimensions	Approximate dimensions 4.1 m by 2.3 m by 5.7 m
Equipment	One (1) progressive cavity pump with a rated capacity of 5.0 L/s at a TDH of 6 m, for pumping settled sludge from the bottom of the settling tank through a forcemain to a gravity sanitary sewer
Notes	Supernatant discharge to the South Nation River

Chemical Addition

Coagulant

Description	Coagulant feed system
Feed Point	Feed into the raw water header upstream of the in-line static mixer
Equipment	Two (2) metering pumps each is capable of delivering 22.7 L/hr
	Four (4) 5000 L capacity polyethylene coagulant storage tanks, complete with secondary containment
Notes	

Polymer

Description	Polymer feed system
Feed Point	Feed into the injection tank and maturation tank in the ballasted flocculation treatment units
Equipment	Three (3) metering pumps, each is capable of delivering 45.4 L/hr
	One (1) 2270 L polyethylene solution storage tank, complete with a 1.1 kW motor mixer, and secondary containment
	One (1) 270 L polymer tank for use during batch preparation in the solution storage tank, complete with secondary containment
Notes	

Potassium Permanganate

Description	Potassium permanganate feed system
Feed Point	Feed into the raw water header or into the raw water well
Equipment	Two (2) metering pumps (one duty, one standby), each is capable of delivering 6.3L/hr
	One (1) 340 L polyethylene solution tank, complete with a mixer and secondary containment
	One (1) 90 L day tank for use during batch preparation in the solution tank, complete with secondary containment
Notes	

Sodium Hydroxide

Description	Sodium hydroxide feed system
Feed Point	Prior to the clearwell
Equipment	Two (2) metering pumps, each is capable of delivering 6.7 L/hr
	One (1) 5,000 L heat traced, insulated reinforced fibreglass bulk storage tank, complete with secondary containment
Notes	

Emergency Power

Backup Power Supply

Description	One (1) air-cooled 225 kVA diesel generator, complete with weatherproof enclosure, fuel storage tank, and secondary containment
Notes	

Storage Tanks

Village of Casselman Elevated Storage Tank

Location	756 Brebeuf Street
UTM Coordinates	NAD 83, Zone 18, 493256 E 5017917 N
Dimensions	16,000 m^3
Notes	Useable volume is 12,000 to 13,000 m^3

Instrumentation and Control

Regulatory Monitoring

Description	Process control and monitoring equipment for Casselman Drinking Water System
Notes	System control with data acquisition including various in-line analyzers and monitors

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
Village of Casselman Tangible Capital Assets Waterworks System	October, 2015

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 Village of Casselman**
Permit Number	**173-201**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule B Issue Date	**March 8th, 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 June 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 750 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.

1.0 System-Specific Conditions

1.1 Not applicable

2.0 Source Protection

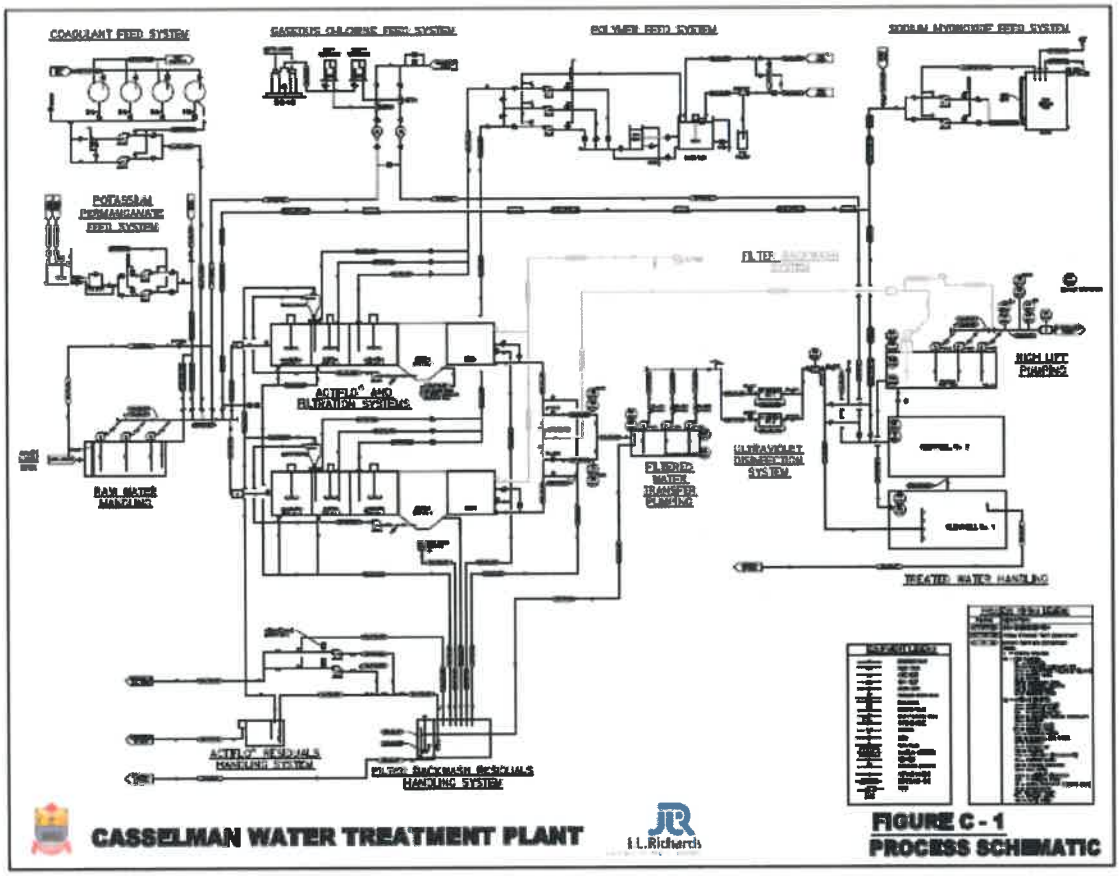
2.1 Not applicable

Schedule D: Process Flow Diagrams

System Owner	**The Corporation of the Village of Casselman**
Permit Number	**173-201**
Drinking Water System Name	**Casselman Drinking Water System**
Schedule D Issue Date	**March 8th, 2016**

1.0 Process Flow Diagrams

Casselman Village Water Treatment Plant



APPENDIX D

INSPECTION RATING RECORD

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

DWS Name:	CASSELMAN DRINKING WATER SYSTEM
DWS Number:	210001219
DWS Owner:	Casselman, The Corporation Of The Village Of
Municipal Location:	Casselman
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	November 23, 2016
Ministry Office:	Cornwall Area Office

Maximum Question Rating: 492

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 77
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	16 / 116
Reporting & Corrective Actions	0 / 87
Treatment Process Monitoring	0 / 112
TOTAL	**16 / 492**

Inspection Risk Rating	**3.25%**

FINAL INSPECTION RATING:	**96.75%**

Inspection Rating Record Generated On 22-DEC-16 (Inspection ID: 1-CLO31).

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

DWS Name:	CASSELMAN DRINKING WATER SYSTEM
DWS Number:	210001219
DWS Owner:	Casselman, The Corporation Of The Village Of
Municipal Location:	Casselman
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	November 23, 2016
Ministry Office:	Cornwall Area Office

Non-compliant Question(s)	Question Rating
Water Quality Monitoring	
Are all trihalomethanes water quality monitoring requirements prescribed by legislation conducted within the required frequency?	8
Are all nitrate/nitrite water quality monitoring requirements prescribed by legislation conducted within the required frequency for the DWS?	8
TOTAL QUESTION RATING	16

Maximum Question Rating: 492

Inspection Risk Rating	**3.25%**
FINAL INSPECTION RATING:	**96.75%**

Inspection Rating Record Generated On 22-DEC-16 (Inspection ID: 1-CLO31).

APPENDIX E

INSPECTION RATING RECORD METHODOLOGY

April 2012

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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Ontario

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).

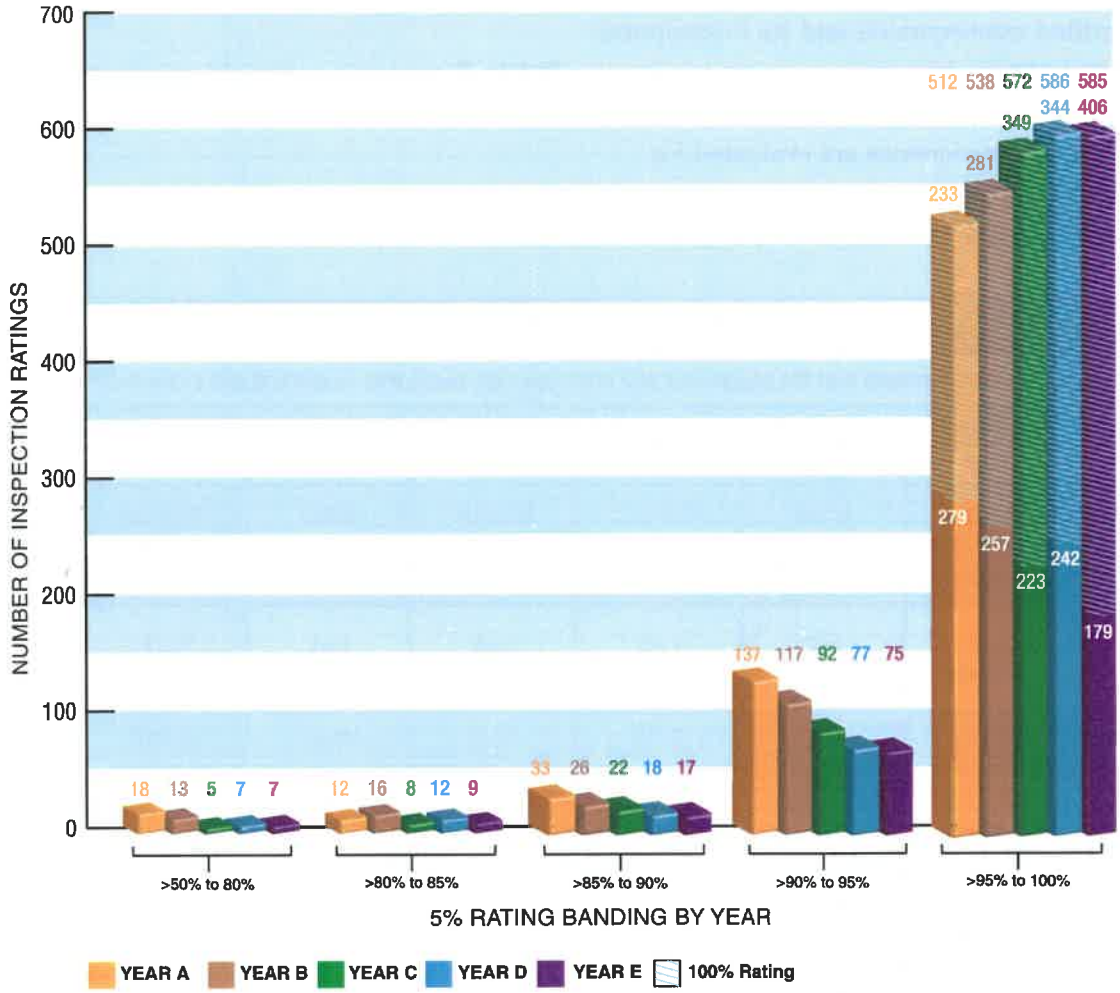
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

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**