

Ministry of the Environment,
Conservation and Parks

Ministère de l'Environnement, de
la Protection de la nature et des Parcs

Barrie District

District de Barrie

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November 20, 2020

Town of Bradford West Gwillimbury
3541 Line 11
P.O. Box 160, Bradford, Ontario
L3Z 2A8

Attention: Mr. Geoff McKnight - Chief Administrative Officer, CAO

Re: Drinking Water System Inspection Report-Bradford-Bond Head Drinking Water System (210000684)
Please find enclosed the Ministry of the Environment, Conservation and Parks Inspection Report for the Bradford-Bond Head Drinking Water System (DWS # 210000684) inspection. The compliance assessment took place on August 19, 2020.

The primary focus of this inspection was to confirm compliance with Ministry of the Environment, Conservation and Parks legislation and control documents, as well as conformance with Ministry drinking water related policies for the inspection period. The Ministry is implementing a rigorous and comprehensive approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as water system management practices.

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

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal and risk experts. The Inspection Summary Rating Record (IRR), included as Appendix A of the inspection report, provides the Ministry, the system owner and the associated Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report.

If you have any questions or concerns regarding the rating, please contact Craig Seabrook, Drinking Water Program Supervisor, at 705-791-9428.

If you have any questions or concerns regarding this inspection report, please contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to be 'DH' followed by a long horizontal stroke.

Darren Haines
Provincial Officer
Ministry of the Environment, Conservation and Parks
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CC Medical Officer of Health, Simcoe Muskoka District Health Unit
 Marianna Hayne, Simcoe Muskoka District Health Unit
 Samantha Mackenzie, Town of BWG, Manager of Compliance
 Barrie District Office File, Ministry of the Environment, Conservation and Parks



Ministry of the Environment, Conservation and Parks

**BRADFORD/BONDHEAD DRINKING WATER SYSTEM
Inspection Report**

Site Number:	210000684
Inspection Number:	1-O9TJZ
Date of Inspection:	Aug 19, 2020
Inspected By:	Darren Haines

OWNER INFORMATION:

Company Name: BRADFORD WEST GWILLIMBURY, THE CORPORATION OF THE TOWN OF
Street Number: 305 **Unit Identifier:**
Street Name: BARRIE St
City: BRADFORD
Province: ON **Postal Code:** L3Z 2A9

CONTACT INFORMATION

INSPECTION DETAILS:

Site Name: BRADFORD/BONDHEAD DRINKING WATER SYSTEM
Site Address: 3541 LINE 11 BRADFORD WEST GWILLIMBURY ON L3Z 2A8
County/District: BRADFORD-WEST GWILLIMBURY
MECP District/Area Office: Barrie District
Health Unit: SIMCOE MUSKOKA DISTRICT HEALTH UNIT
Conservation Authority:
MNR Office:
Category: Large Municipal Residential
Site Number: 210000684
Inspection Type: Announced
Inspection Number: 1-O9TJZ
Date of Inspection: Aug 19, 2020
Date of Previous Inspection:

COMPONENTS DESCRIPTION

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

Site (Name): Church Well No. 1
Type: Source **Sub Type:** Ground

Comments:
 Church Well No. 1 is a 200 millimetre (mm) diameter, 85.25 metre (m) deep drilled groundwater well. The well was constructed on October 24, 1968 by J.D. Crowley & Associates. The well is located within Church Well No. 1 pumphouse. The well is equipped with a submersible deep well pump rated at 18.9 litres per second (L/sec) at a total dynamic head (TDH) of 83.2 m.
 According to the Water Well Record #6909787, the hydrogeology encountered ranges from fine sand, clay to broken limestone. There are fourteen different layers of stratigraphy for the length of the casing.

Site (Name): Church Well No. 2
Type: Source **Sub Type:** Ground

Comments:
 Church Well No. 2 is a 385 millimetre (mm) diameter, 89 metre (m) deep drilled groundwater well. The well was constructed on October 9, 1975 by Snider Drilling Limited. The well is located within Church Well No. 2 pumphouse. The well is equipped with a vertical turbine pump rated at 56.8 litres per second (L/sec) at a total dynamic head (TDH)

of 149 m.

According to the Water Well Record # 6913158, the hydrogeology encountered ranges from sand, clay, sand to clay layers and sand to gravel. There are four different layers of stratigraphy for the length of the casing.

Site (Name): Church Well No. 1 Pumphouse

Type: Treated Water POE

Sub Type: Pumphouse

Comments:

Raw water from the well enters through the floor of the pumphouse into a treatment header. The treatment header has inline pressure monitoring and control, an automatic pressure relief blowoff for pump startup and shut down, a stainless steel raw water sampling port, a disinfection chemical injection point and a 100 millimetre (mm) Krohne flow meter. The pressure relief blowoff can also be manually operated if raw water needs to be wasted for sampling or maintenance purposes.

The sodium hypochlorite disinfection system consists of one 1,434 litre (L) chemical storage tank that feeds a duty chemical metering pump and one approximately 20 L standby chemical storage tank that feeds a standby chemical metering pump. Each chemical metering pump is rated for at least 6 litres per hour (L/hr) and feeds into a common injection point. The automatic switchover from the duty to the standby pump occurs on duty pump failure (pressure activated) and is remotely alarmed. In addition, low free chlorine residual in the treated water will automatically shut down the well pumps, and cause an alarm.

In order to achieve the required contact time for the treated water prior to entering the distribution system, 950 metres (m) of 300 mm contact main was installed prior to the first consumer. As a result, a monitoring feed line from the actual point at which the required 15 minutes contact time has been achieved is not feasible. As a result, a residual chlorine simulator consisting of 2.1 m of 150 mm diameter pipe designed to simulate 15 minutes contact time has been installed within the pumphouse to feed "treated water" to the continuous free chlorine residual and turbidity analyzers, as well as a smooth bore treated water sampling tap.

All pumphouses and rechlorination facilities in the Bradford/Bondhead drinking water system are connected to a Supervisory Control and Data Acquisition (SCADA) system that allows real time remote monitoring and control of most treatment components within the system. This provides operations personnel with the ability to monitor, control, historically trend, log totals and archive all available field parameters within the system. This includes continuous data logging of processes such as residual and turbidity testing, well levels and flow monitoring. The Bradford office at 305 Barrie Street, the Melbourne Street yard, Standpipe 2 and the John Fennell Reservoir are all used for central monitoring of all remote sites and a laptop is utilized by the operator on call to access the information after hours.

Site (Name): Church Well No. 2 Pumphouse

Type: Treated Water POE

Sub Type: Pumphouse

Comments:

Raw water from the well enters through the floor of the pumphouse into a treatment header. The treatment header has inline pressure monitoring and control, an automatic pressure relief blowoff for pump startup and shut down, a stainless steel raw water sampling port, a disinfection chemical injection point and a 200 millimetre (mm) Krohne flow meter. The pressure relief blowoff can also be manually operated if raw water needs to be wasted for sampling or maintenance purposes.

The sodium hypochlorite disinfection system consists of one 3,954 litre (L) chemical storage tank that feeds a duty chemical metering pump and one approximately 20 L standby chemical storage tank that feeds a standby chemical metering pump. The chemical metering pumps are each rated at 14 litres per hour (L/hr) and feed into a common injection point. The automatic switchover from the duty to the standby pump occurs on duty pump failure (pressure activated) and is remotely alarmed. In addition, low free chlorine residual in the treated water will automatically shut down the well pumps, and cause an alarm.

In order to achieve the required contact time for the treated water prior to entering the distribution system, 950 metres (m) of 300 mm contact main was installed prior to the first consumer. As a result, a monitoring feed line from the actual point at which the required 15 minutes contact time has been achieved is not feasible. As a result, a residual chlorine simulator consisting of 2.1 m of 150 mm diameter pipe designed to simulate 15 minutes contact time has been installed within the pumphouse to feed "treated water" to the continuous free chlorine residual and turbidity

analysers, as well as a smooth bore treated water sampling tap.

All pumphouses and rechlorination facilities in the Bradford/Bondhead drinking water system are connected to a Supervisory Control and Data Acquisition (SCADA) system that allows real time remote monitoring and control of most treatment components within the system. This provides operations personnel with the ability to monitor, control, historically trend, log totals and archive all available field parameters within the system. This includes continuous data logging of processes such as residual and turbidity testing, well levels and flow monitoring. The Bradford office at 305 Barrie Street, the Melbourne Street yard, Standpipe 2 and the John Fennell Reservoir are all used for central monitoring of all remote sites and a laptop is utilized by the operator on call to access the information after hours.

Site (Name): Standpipe #1 and Roy Story Booster Station
Type: Other **Sub Type:** Reservoir

Comments:

Standpipe #1 is approximately 19 metres (m) diameter by 27.5 m high with a maximum storage volume of 7,720 cubic metres. The water level in the reservoir controls pumping at all of the supply wells.

At the Roy Story Booster Station, the sodium hypochlorite disinfection system consists of one 647 litre (L) chemical storage tank that feeds a duty chemical metering pump and one approximately 20 L standby chemical storage tank that feeds a standby chemical metering pump. The chemical metering pumps are each rated at 2 litres per hour (L/hr) and feed into a common injection point and are designed to maintain pre-set chlorine concentrations in the supply water to Zone 1 of the distribution system. Standpipe #1 can pump water to Standpipe #2. Within Zone 2, if there is a sudden loss of pressure or in emergency situations the booster pumps will automatically start up and maintain pressure.

This facility possesses a standby diesel generator rated at 100 kW complete with an automatic transfer switch in the event of power failure.

All pumphouses and rechlorination facilities in the Bradford/Bondhead drinking water system are connected to a Supervisory Control and Data Acquisition (SCADA) system that allows real time remote monitoring and control of most treatment components within the system. This provides operations personnel with the ability to monitor, control, historically trend, log totals and archive all available field parameters within the system. This includes continuous data logging of processes such as residual and turbidity testing, well levels and flow monitoring. The Bradford office at 305 Barrie Street and the Melbourne Street yard are used for central monitoring of all remote sites and a laptop is utilized by the operator on call to access the information after hours.

Site (Name): Standpipe #2 and Appi Sikkema Booster Station
Type: Other **Sub Type:** Reservoir

Comments:

Standpipe #2 is approximately 20.4 metres (m) diameter by 27.4 m high with a maximum storage volume of 8,460 cubic metres.

At the Appi Sikkema Booster Station, the sodium hypochlorite rechlorination facility consists of two identical chlorination systems that are designed to maintain pre-set chlorine concentrations in the supply water to both the Standpipe and Zone 2 of the distribution system. Both systems are comprised of an approximately 482 litre (L) chemical storage tank that feeds a duty chemical metering pump and one approximately 20 L standby chemical storage tank that feeds a standby chemical metering pump. The chemical metering pumps for each system are each rated at 2 litres per hour (L/hr) and feed into a common injection point for each respective system. The automatic switchover from the duty to the standby pump occurs on duty pump failure (pressure activated) and is remotely alarmed.

This facility possesses a standby diesel generator rated at 100 kW complete with an automatic transfer switch in the event of power failure.

All pumphouses and rechlorination facilities in the Bradford/Bond Head Well System are connected to a Supervisory Control and Data Acquisition (SCADA) system that allows real time remote monitoring and control of most treatment components within the system. This provides operations personnel with the ability to monitor, control, historically trend, log totals and archive all available field parameters within the system. This includes continuous data logging of processes such as residual and turbidity testing, well levels and flow monitoring. The Bradford office at 305 Barrie

Street and the Melbourne Street yard are used for central monitoring of all remote sites and a laptop is utilized by the operator on call to access the information after hours.

Site (Name): John Fennell Reservoir
Type: Other **Sub Type:** Reservoir

Comments:
 Beginning in 2006, the Town of Bradford West Gwillimbury (BWG) began receiving treated water from the Town of Innisfil Lakeshore (Alcona) Water Treatment Plant via a 500 – 600 millimeter (mm) transmission pipeline. This dedicated transmission main runs south along the 20th Sideroad from Innisfil Beach Road to Highway 89, westerly along Highway 89 to County Road 4 (Yonge Street/former Hwy 11), southerly along County Road 4 crossing into BWG to Line 12, then westerly along BWG Line 12 to the John Fennel Reservoir on Sideroad 10. Innisfil's Third Line Booster Pumping Station at Line 3 and 20th Sideroad provides the necessary pressure increase to deliver water to the John Fennel Reservoir, and flows are monitored and metered at the municipal boundary. Water is re-chlorinated at the John Fennel Reservoir and distributed through the BWG water distribution system.

The water obtained from the Town of Innisfil passes through the John Fennell Reservoir prior to entering the Bradford/Bondhead water distribution system. Treated water is first analysed by a continuous chlorine residual analyser before entering the facility. If chlorine residuals are below a set point, a gas chlorine rechlorination system comprised of two cylinders and a dosing system injects chlorine into the water prior to discharging into the reservoir. The system contains a valve on the Innisfil pipe that can be closed by the Town of Bradford West Gwillimbury should the need arise to in order to prevent the reservoir from draining.

The reservoir is comprised of two cells, each with a nominal capacity of 5,000 cubic metres. Each cell is continuously monitored for free chlorine residual at approximately the halfway point of travel through the baffled cell. Water is then analysed again by a continuous chlorine residual analyser before entering the distribution system. If chlorine residuals are below a set point, a gas chlorine rechlorination system comprised of two cylinders and a dosing system injects chlorine into the water prior to entering the distribution system.

All pumphouses and rechlorination facilities in the Bradford/Bondhead drinking water system are connected to a Supervisory Control and Data Acquisition (SCADA) system that allows real time remote monitoring and control of most treatment components within the system. This provides operations personnel with the ability to monitor, control, historically trend, log totals and archive all available field parameters within the system. This includes continuous data logging of processes such as residual and turbidity testing, well levels and flow monitoring. The Bradford office at 305 Barrie Street, the Melbourne Street yard, Standpipe 2 and the John Fennell Reservoir are all used for central monitoring of all remote sites and a laptop is utilized by the operator on call to access the information after hours.

Site (Name): Bond Head Monitoring Station
Type: Other **Sub Type:** Other

Comments:
 The Bond Head Monitoring Station facility, located approximately one kilometer west of the Village of Bond Head on Line 7, and is connected to a distribution system extremity. The facility houses process monitoring equipment, specifically a HACH CL17 chlorine residual analyser with an associated chart recorder and is connected to the Municipal SCADA system.

The 150-mm transmission main terminates with a 50-mm branch line servicing the ClubLink Corporation Bond Head property. A 2" 9M2 Backflow Preventer Reduced Pressure Zone Assembly and Sensus flow meter is installed on this service line. Another flow meter is installed within the monitoring station to register flushed water.

Site (Name): Distribution System
Type: Other **Sub Type:** Other

Comments:
 The Bradford / Bondhead drinking water supply supplies the Town of Bradford and the Village of Bond Head with an estimated service population of approximately 27,447 persons via approximately 9,149 service connections.

The system is comprised of approximately 139.3 kilometres (km) of watermain (including the 18.6 km Bradford-Alcona supply pipeline and Bond Head line), ranging in size from 50 millimetres (mm) to 600 mm. Approximately

80% of the water transmission main is PVC piping and the remaining 20% ductile iron. Other appurtenances include approximately 1010 fire hydrants, and 50 zone boundary valves, air relief valves, and pressure valves. There are approximately 8,850 residential connections and 300 general connections which include industrial, commercial and institutional connections.

INSPECTION SUMMARY:

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) 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.

On August 19, 2020, the Ministry conducted an announced inspection of the Bradford/Bondhead drinking water system (DWS# 220000684). The Bradford/Bondhead DWS services the Town of Bradford and Bondhead and is classified as a Large Municipal Residential drinking water system.

The municipal drinking water source is approximately 55 percent surface water received at the John Fennel Reservoir via a watermain connection from the adjacent Town of Innisfil Lakeshore (Alcona) Water Treatment Plant. The Alcona Water Treatment Plant is a surface water intake facility located on the eastern shore of the subwatershed at the inlet to Cook's Bay (Lake Simcoe). The two Church ground water wells, which are located within York Region, provide the remaining 45 percent. There are also monitoring stations, as well as two finished water storage standpipes, each with its own dedicated re-chlorination and booster pumping station. A site visit of the Reservoir site, Standpipe 1&2 and both of the Church wells was conducted by the Ministry as part of this inspection.

The inspection review period for this report is from January 22, 2020 to August 19, 2020. During this review period, the Owner operated under Municipal Drinking Water License 116-101 and Drinking Water Works Permit 116-201, which were issued on August 11th and 23rd, 2011 and is also subject to the regulatory requirements of the Safe Drinking Water Act and the Drinking Water Systems Regulation 170/03.

Source

- **The owner was maintaining the production well(s) in a manner sufficient to prevent entry into the well of surface water and other foreign materials.**

As part of this inspection, both Church Well #1 and Church Well #2 pump houses were visited. Each of the Church wells, which are the two production wells for the Bradford/Bondhead DWS, associated piping, well pumps and sodium hypochlorite are housed within a pump house. It appeared as though the Owner was maintaining both pump houses and the equipment in a sufficient manner to prevent the entry of surface water and other foreign materials.

- **Measures were in place to protect the groundwater and/or GUDI source in accordance with any the**

Source

Municipal Drinking Water Licence and Drinking Water Works Permit issued under Part V of the SDWA.

Church Street Wells No.1 and No.2, the two groundwater production wells serving the Bradford/Bondhead DWS, are physically located within the Township of King, Regional Municipality of York. The Owner stated previously that a Source Water Protection Plan was submitted to the Ministry which has addressed the Source Protection areas for both Church Street Wells.

The Owner also previously stated that they entered into an Enforcement Agreement in June 2015 with the Regional Municipality of York which states that the Region of York will provide the oversight of activities within the Source Protection Zone and Well Head Protection Area's for both the Church wells because they are within their municipal boundary. Signs were posted on the exterior of each of the well pump houses as well as along the edge of the adjacent agricultural property, which state that no pesticides are to be spread in the area of the pump houses that it is a wellhead protection area.

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.**

Section 2 of Schedule C of Municipal Drinking Water License 116-101 states that continuous flow measurement and recording shall be undertaken for: flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system; and the flow rate and daily volume of water that flows into the treatment subsystem.

To capture flow data, the Owner has installed mechanical flow measuring devices at the following locations: on both Church 1&2 well headers, standpipe 1&2 for flows into zone 1&2 and the Fennell Reservoir site for treated water coming from the Town of Innisfil. Each of the flow meters interface with the Owner's SCADA system which makes record of flow rates as well as totalized volumes to satisfy record keeping requirements for both the License and PTTW.

The Owner provided flow meter calibration records to the Ministry which showed that they were calibrated during the inspection review period (December 2019).

- **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.**

Condition 1.1, Schedule C of Drinking Water Works License# 116-101, issued 8/23/2011 provides rated capacity limits for each treatment subsystem. Specifically;

- Church Well No. 1 Pumphouse rated capacity is listed at 1,637 m³/day
- Church Well NO.2 Pumphouse rated capacity is listed at 4,912 m³/day

Based on flow records provided to the Ministry by the Owner, for the Bradford/Bondhead DWS, none of the above stated maximum flow rate parameters for the above noted authorizing document, were exceeded during the inspection review period.

Treatment Processes

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

The Owner prepared six Form 1 documents for the Bradford/Bondhead DWS during the inspection review period. The six Form 1 submissions that the Owner submitted were primarily for various watermain installations in new development areas within the distribution system. The Owner provided to the Ministry copies of all Form 1 documents as part of this inspection.

Treatment Processes

- **The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.**

The Owner submitted five Form 2 documents for the Bradford/Bondhead DWS during the inspection review period. The five Form 2 documents that the Owner submitted were for the installation of the following equipment: reservoir vacuum regulator; datalogger in Bond Head; new larger sodium hypochlorite tank in the Church 1 pump house; new chemical metering pumps at Church 1 and removal of dataloggers at Church 1 pump house. The Owner provided to the Ministry copies of all the Form 2 documents as part of this inspection.

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

The Owner prepared one Form 3 document for the Bradford/Bondhead DWS during the inspection review period. The Form 3 document that the Owner submitted was for the installation of a new 600 volt standby diesel generator for the Bond Head Water Tower. The Owner provided to the Ministry a copy of the Form 3 document as part of this inspection.

- **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.**

Section 1-3 of Schedule 1 Ontario Regulation (O.Reg.) 170/03 requires the Owner of a drinking water system that obtains water from a raw water supply that is ground water to ensure provision of water treatment equipment that is designed to be capable of achieving, at all times, primary disinfection in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario, including at least 99 per cent (2.0M log) removal or inactivation of viruses by the time water enters the distribution system. This is the case for the treatment train comprising the Bradford/Bondhead drinking water system.

To satisfy these requirements, the Owner has installed free available chlorine residual chemical disinfection systems, and employs the CT disinfection concept to quantify the capability of the chemical disinfection system and ensure the provision of effective pathogen inactivation for primary disinfection purposes. Primary disinfection for the Church production wells is achieved by the addition of sodium hypochlorite. Contact time is provided by a 950 meter length of 300 millimeter diameter dedicated contact main installed prior to the first consumer.

The water provided from the Town of Innisfil's Lakeshore Alcona drinking water treatment facility is from a surface water source, and has achieved primary disinfection upon transmission to the John Fennell reservoir.

- **Records did not confirm that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

Secondary disinfectant residuals are monitored by the Owner through the use of continuous chlorine analyzers, which are linked to the Owners SCADA system and through the collection of weekly distribution chlorine residuals obtained by system operators.

The Owner reported one incident of a low chlorine residual in the distribution system during the review period. On August 25, 2020, one of the Owner's operators received a low chlorine alarm from an online analyzer located at 4557 Line 7, in Bradford. The low chlorine result indicated a free chlorine reading of 0.04mg/L at 12:38. The operator took immediate steps to begin flushing the distribution system. It is suspected that the low chlorine was due to a slug of water caused by construction in the immediate area. After flushing, the operator verified the residual had been restored to 0.05mg/L at 14:49. by 15:10 the residual had reached 0.53mg/L. The SMDHU was notified but no further actions were recommended.

- **Where an activity has occurred that could introduce contamination, all parts of the drinking water system were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit.**

The Owner, who operates the distribution system for the Bradford/Bond Head DWS, provided documents

Treatment Processes

(microbiological sample results and chlorine residuals) to the Ministry which showed that they followed all AWWA standards for new and repaired water-mains during the review period.

Treatment Process Monitoring

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

Primary disinfection chlorine residual monitoring is being effected at the Church Wells 1&2 pump houses via a continuous analyser connected to a sample line from a chlorine contact simulator. The chlorine sample point within the simulator represents the point at which the water enters the distribution system after the required contact time. The approved contact simulator consists of 2.1 meter length of 150 millimeter diameter piping which has been installed within each pump house to simulate the conditions of the in-ground chlorine contact chamber. Primary disinfection has already been achieved with the treated water that is received from the Alcona DWS at the Fennell reservoir. The Owner analyses the chlorine levels on the water coming into the Fennell reservoir as well as the water leaving the reservoir.

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

The Owner has installed and maintains continuous chlorine residual analyzers at both standpipe locations, the Fennell Reservoir as well as the Bondhead monitoring station. Chlorine residual readings are also obtained by staff with portable hand-held devices on a regular basis and recorded on a daily check sheet to ensure adequate secondary disinfectant residual within the distribution system.

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

Operators review SCADA data logs each day or within 72 hours and make a note of this in a designated log book. Results are again examined to ensure continuous monitoring equipment has accurately recorded all information and that all results are within acceptable ranges.

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

The Owner utilizes continuous analyzers to monitor various activities within the Bradford/Bondhead distribution system. These analyzers are linked to the Owner's SCADA system for monitoring and alarming purposes. Should continuous monitoring equipment generate a measurement of results above or below the prescribed set points (typically 0.3mg/L and 4.0mg/L free chlorine residual), the continuous monitoring equipment malfunctions, or if there is a loss of power to the continuous monitoring equipment, an alarm is sounded, the well pumps are locked out and the on-duty Operator notified.

Documents reviewed indicate that continuous monitoring equipment alarms are regularly tested.

- **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.**

A record of the date, time, location and result of every test made using continuous monitoring equipment for those parameters (chlorine) are being made by the Owner's operators with at least the minimum frequency specified in the Table in Schedule 6 when water is being directed to users.

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

Documents provided by the Owner for the Bradford/Bondhead DWS indicated that the Owner

Treatment Process Monitoring

effects weekly maintenance checks and calibrations on all continuous analysers. All calibrations on handheld chlorine colourimeters are done on an annual basis. All maintenance and calibrations on continuous analysers are performed by an outside contractor on an annual basis. All calibration and maintenance performed by the Owner is documented in the logbook for the individual site. Calibration records for all handheld devices and continuous analysers were provided to the Ministry by the Owner as part of this inspection.

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 Manual for the Bradford/Bondhead DWS was reviewed as part of this inspection. The O&M manual contained plans, drawings and process descriptions and appears to provide sufficient information/guidance for the safe and efficient operation of the Bradford/Bondhead drinking water system.

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

The Owner's Operations and Maintenance Manual appears to meet the requirements as outlined in condition 16.2, Schedule' B of Municipal Drinking water License 116-101, issued to the Owner for the Bradford/Bondhead DWS.

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.**

Only adequately certified operators are employed by the Town of Bradford West Gwillimbury to operate their water system. These operators conduct all of the operational tests, record all of the results obtained, make all of the log entries, and collect all of the required samples to be sent to the appropriate accredited laboratory.

Security

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

The Fennell reservoir site and both standpipe sites are within a locked fenced compound and equipped with intrusion alarms and are generally visited on a daily basis by operational staff. Both Church well pump houses as well as monitoring stations within the Bradford/Bondhead distribution system, are locked to prevent unauthorized access.

Access to all locked premises is restricted solely to the Owner's water system operators.

Certification and Training

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

The Owner of the Bradford/Bondhead DWS has designated an Overall Responsible Operator (ORO) in accordance with 23(1) or O. Reg. 128/04. In the event the ORO is unable to act another certified operator has been designated to act for the ORO. The ORO for the BWG DWS holds an Operator certificate (class 4) appropriate to the class of the drinking water system.

- **Operators-in-charge had been designated for all subsystems which comprised the drinking water system.**
- **All operators possessed the required certification.**

All of the Owner's operators have valid operator certificates which were provided to the Ministry by the Owner as

Certification and Training

part of this inspection.

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

All of the work that was undertaken on the treatment system for the Bradford/Bondhead drinking water system was either performed or supervised by certified operators who are employed by the Owner.

Water Quality Monitoring

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

Subsection 10-2 of Schedule 10 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system to collect at a minimum 8 microbiological samples within the distribution system on a monthly basis; with at least one distribution sample taken each week.

Subsection 10- 2 further stipulates that each of the distribution samples collected are tested for Escherichia coli total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count, if subsection 2-5 (1) of Schedule 2 applies to the system, as is the case for the Bradford/Bondhead drinking water system.

Records provided and reviewed in the course of this inspection indicate that the Owner has complied with these sampling requirements as stated above. Documents indicate that typically 12 distribution water samples from different points within the distribution system were obtained and tested once per week, of which at least four of these samples were tested for Heterotrophic Plate Count (HPC) in addition to Escherichia Coli and Total Coliform bacteria.

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

Subsection 10-3 of schedule 10 of O.Reg. 170 requires that the Owner and the operating authority of a large municipal residential drinking water system, such as the Bradford/Bondhead drinking water system, ensure that a water sample is taken at least once every week from the point at which treated water enters the distribution system. The Owner and operating authority are required to ensure that each of these samples are tested for E.coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count. Treated water samples were obtained by the Owner from Church well 1 and 2, each week during the inspection review period, after CT was met and just before treated water entered the distribution system. Records provided by the Owner and reviewed during the course of this inspection indicate that the Owner has complied with these requirements of obtaining a weekly treated water sample.

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

Section 13-2 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system to ensure that at least one water sample is taken every 36 months if the system obtains water from a raw water supply that is ground water, such is the case for the Bradford/Bondhead drinking water system, and have those samples tested for every parameter set out in Schedule 23.

The Owner provided sample results to the Ministry as part of this inspection which showed the Owner last performed Inorganic sample analysis from the treated water on Church wells 1&2 on August 22,2018. The Owner did not report any adverse sample results as a result of those samples and they are not required to obtain Inorganic samples again until 2021.

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

Section 13-4 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system to ensure that at least one water sample is taken every 36 months if the system obtains water from a raw water supply that is ground water, such is the case for the Bradford/Bondhead

Water Quality Monitoring

drinking water system, and have those samples tested for every parameter set out in Schedule 24 of Ontario Regulation 170/03.

The Owner provided sample results to the Ministry as part of this inspection which showed the Owner last performed Organic sample analysis from the treated water on Church wells 1&2 on August 22, 2018. The Owner did not report any adverse sample results as a result of those samples and they are not required to obtain Organic samples again until 2021.

- **All haloacetic acid water quality monitoring requirements prescribed by legislation are being conducted within the required frequency and at the required location.**

Section 13-6.1 requires the owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system to ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water systems distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of haloacetic acids. The owner of the drinking water system and the operating authority for the system shall also ensure that each of the samples taken under subsection (1) is tested for haloacetic acids.

The Owner conducted this required Haloacetic acid monitoring during the review period on February 18, 2020, May 20, 2020 and August 19, 2020. The Owner is reporting that their rolling annual average for HAA's is currently 43.4 uq/L.

- **All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location.**

Section 13-6 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system, such as the Bradford/Bondhead drinking water system, to ensure that at least one distribution sample is taken every 3 months from a point in the drinking-water system's distribution system, or in plumbing that is connected to the drinking water system that is likely to have an elevated potential for the formation of trihalomethanes, and tested for trihalomethanes.

The Owner conducted this required THM monitoring during the review period on February 18, 2020, May 20, 2020 and August 19, 2020. The Owner is reporting that their rolling annual average for THM's is currently 70.8 uq/L.

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

Section 13-7 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system, such as the Bradford/Bondhead drinking water system, to ensure that at least one distribution sample is taken every 3 months and no more than 120 days from the date of the last sample for Nitrates/Nitrites.

The Owner conducted this required monitoring during the review period on February 18, 2020, May 20, 2020 and August 19, 2020. Results of the Nitrite/Nitrate sampling would indicate that the water met the prescribed standards set out for those parameters in the ODWQS.

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

Sections 13--8 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system, such as the Bradford/Bondhead drinking water system, to ensure that at least one water sample is taken every 60 months and tested for Sodium.

The Owner conducted Sodium sampling for the Bradford/Bondhead DWS on May 20, 2020. The results of those samples were adverse for Sodium. The Owner reported this adverse result to the Ministry and the MOH. The details of this adverse sodium sample will be discussed in another section of this report.

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

Water Quality Monitoring

Section 13-9 of Schedule 13 Ontario Regulation 170/03 requires the Owner and the operating authority of a large municipal residential drinking water system, such as the Bradford/Bondhead drinking water system to ensure that at least one water sample is taken every 60 months and tested for Fluoride. The Owner last conducted Fluoride sampling for the Bradford/Bond Head DWS on May 23, 2018. Results of the Fluoride sampling would indicate that the water met the prescribed standards set out for those parameters in the ODWQS. The Owner isn't required to obtain a Fluoride sample again until May 2023.

- **All water quality monitoring requirements imposed by the MDWL or DWWP issued under Part V of the SDWA were being met.**
- **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

A review of the Bradford/Bondhead DWS records provided by the Owner for the inspection period found that each time a microbiological sample was taken by one of the Owner's operators in the distribution system, a corresponding chlorine residual was also taken by the Owner. All of the in-house monitoring and sampling information (which includes chlorine residuals) that the Owner undertakes for the Bradford/Bondhead DWS is documented internally as well as on the sample submission sheet.

Water Quality Assessment

- **Records showed 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).**

The Owner did report three AWQI's for the BWG/Bondhead DWS during the review period. The three AWQI's (151559, 150046, 150047) reported by the Owner were for a low chlorine reading and two sodium exceedences from the Church wells 1 and 2. The Owner made the appropriate notifications to the Ministry and the MOH and performed all corrective actions as required by O.Reg. 170/03. Copies of the all three Notification of Adverse test Results and Issue Resolutions were provided to the Ministry as part of this inspection. None of the Sodium and low chlorine AWQI's are exceedences of the ODWQS's listed in Table 1, 2 or 3.

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.**

The Owner did report three AWQI's for the BWG/Bondhead DWS during the review period. The three AWQI's (151559, 150046, 150047) reported by the Owner were for a low chlorine reading and two sodium exceedences from the Church wells 1 and 2. The Owner made all of the appropriate notifications to the Ministry and the MOH and performed all corrective actions as required by O.Reg. 170/03. No other corrective actions were required by the SMDHU.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**

The Owner did report three AWQI's for the BWG/Bondhead DWS during the review period. The three AWQI's (151559, 150046, 150047) reported by the Owner were for a low chlorine reading and two sodium exceedences from the Church wells 1 and 2. The Owner made all of the appropriate notifications to the Ministry and the MOH as required.

- **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.**

Logbooks that were provided by the Owner for the Bradford/Bondhead DWS were reviewed where the Operator

Reporting & Corrective Actions

responded to alarm calls during the review period. In all cases, the Operator responded in a timely manner and took the appropriate actions. The Owner does have a written procedure for responding to alarms which is kept in their Emergency and Contingency plan. A separate spreadsheet is being maintained by the Owner in order to track all low chlorine incidents that occur in the BWG/Bondhead DWS.

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. **Records did not confirm 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 Owner reported one incident of a low chlorine residual in the distribution system during the review period. On August 25, 2020, one of the Owner's operators received a low chlorine alarm from an online analyzer located at 4557 Line 7, in Bradford. The low chlorine result indicated a free chlorine reading of 0.04mg/L at 12:38. The operator took immediate steps to begin flushing the distribution system. It is suspected that the low chlorine was due to a slug of water caused by construction in the immediate area. After flushing, the operator verified the residual had been restored to 0.05mg/L at 14:49. by 15:10 the residual had reached 0.53mg/L. The SMDHU was notified but no further actions were recommended.

Action(s) Required:

The Owner performed all regulatory corrective actions as required by Regulation 170/03 for an incident of low chlorine below 0.05mg/L free chlorine. It is recommended that the Owner continue to perform corrective actions as per Regulation 170/03 for all incidents of adverse water quality within the Bradford/Bond Head DWS.

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:

Darren Haines

Signature: (Provincial Officer)



Reviewed & Approved By:

Craig Seabrook

Signature: (Supervisor)



Review & Approval Date:

November 18, 2020

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.



Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2020-2021)

DWS Name:	BRADFORD/BONDHEAD DRINKING WATER SYSTEM
DWS Number:	210000684
DWS Owner:	Bradford West Gwillimbury, The Corporation Of The Town Of
Municipal Location:	Bradford-West Gwillimbury

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Focused
Inspection Date: August 19, 2020
Ministry Office: Barrie District

Maximum Question Rating: 507

Inspection Module	Non-Compliance Rating
Source	0 / 14
Capacity Assessment	0 / 30
Treatment Processes	21 / 89
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 42
Water Quality Monitoring	0 / 112
Reporting & Corrective Actions	0 / 66
Treatment Process Monitoring	0 / 112
TOTAL	21 / 507

Inspection Risk Rating	4.14%
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FINAL INSPECTION RATING:	95.86%
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2020-2021)

DWS Name:	BRADFORD/BONDHEAD DRINKING WATER SYSTEM
DWS Number:	210000684
DWS Owner:	Bradford West Gwillimbury, The Corporation Of The Town Of
Municipal Location:	Bradford-West Gwillimbury
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	August 19, 2020
Ministry Office:	Barrie District

Non-compliant Question(s)	Question Rating
Treatment Processes	
Do records confirm 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?	21
TOTAL QUESTION RATING	21

Maximum Question Rating: 507

Inspection Risk Rating	4.14%
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FINAL INSPECTION RATING:	95.86%
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