
Watermain Disinfection Procedure Questions and Answers – February 19, 2021

Overview	1
Preface	4
Section 1 Addition, Modification, Replacement, Extension and Planned Maintenance	6
Section 2 Watermain Disinfection Procedures for Emergency Repairs	16
Section 3 Documentation	20

Overview

Why was the Watermain Disinfection Procedure updated?

- Ontario’s Watermain Disinfection Procedure (WDP), first published in 2015, replaced the American Water Works Association (AWWA) Standard C651 as a requirement in municipal approvals for the disinfection of watermains.
- The first version of the Watermain Disinfection Procedure focused more on repairs of watermains in order to bring a consistent approach to watermain repairs in Ontario.
- After implementation of the procedure, Operating Authorities contacted the ministry to indicate the need to better define the requirements for disinfection, commissioning, and documentation for new watermains in Ontario.
- Revisions to the procedure were developed by the ministry in consultation with municipal drinking water system owners, operating authorities and the Ontario Water Works Association (OWWA).
- The updated procedure also includes changes to the watermain repair sections based on comments received about the first version.

What has been updated?

- The Preface and Section 1 of the procedure were almost entirely rewritten to reflect the additional requirements for new watermains.
- Minor changes were made to Section 2 of the procedure.
- Section 3.1 was added to define the requirements for documentation for new watermains.
- The Appendices were updated to reflect the changes to the procedure.

When will the procedure take effect?

- The revised procedure will take effect through conditions in the Drinking Water Works Permit. There are two scenarios that will apply depending on the timing of a system's Municipal Drinking Water Licence renewal.

Scenario 1: Permits specifying timelines for transition

- If the Municipal Drinking Water Licence for the system was renewed in 2019 or 2020, the updated Permit includes a condition (typically condition 2.3) requiring any new procedure to be used within six-months from the time the procedure is published by the ministry. The publication date of the revised procedure is August 1, 2020, requiring these systems to use the new procedure by February 1, 2021.

Scenario 2: Permits that do not specify timelines for transition

- If the system's Permit does not already include a condition (typically condition 2.3) that requires using the updated version of the ministry's Watermain Disinfection Procedure, this condition will be added when the Municipal Drinking Water Licence for the system is renewed. The November 2015 version of the procedure is to be used until the Permit is updated with the new condition at licence renewal, unless the system receives approval from the ministry to use the updated procedure earlier. The updated condition will require the drinking water system to use the updated version of the procedure six-months from the date the renewed licence is issued.

Can the new procedure be used prior to the date indicated in the Drinking Water Works Permit?

- The ministry is encouraging early implementation of the updated procedure as it eliminates the need to apply for relief in certain situations when disinfecting watermains. To implement the 2020 procedure prior to the date required by conditions in the Permit, systems are required to submit the attached one-page request to MDWLP@Ontario.ca.

Can a municipality partially implement the new procedure before the date indicated in the Drinking Water Works Permit?

- No. Municipalities must use either the 2015 Watermain Disinfection Procedure, or the 2020 Watermain Disinfection Procedure. The ministry is providing a six-month implementation window in the Permit to ensure municipalities have time to update their Operations and Maintenance Manuals, processes and procedures and train staff on the new procedure; however, the 2015 procedure must be used until the date specified in the Permit unless the municipality has received approval to implement the procedure early. Similarly, if the system has received approval to implement the procedure early, the 2015 Watermain Disinfection Procedure must be used until the date indicated in the approval.

A standalone system receives its water from a donor system under a Section 5 (4) agreement. The standalone system is required to use the 2020 procedure however, the donor system is not required yet. Should the donor system be required by the ministry to request for an early implementation of the 2020 procedure?

- No. The owner of the receiving system is required to ensure that they comply with the new procedure at the date indicated in their Drinking Water Works Permit. If the donor performs the maintenance within the receiving system, the receiving system has to ensure to communicate with the donor, so they use the 2020 procedure when installing/repairing watermains within the receiving system after this system is required to use the 2020 procedure.
- The donor is not required to comply with the 2020 procedure in its own system as their permit does not require it yet. The donor system has the option to apply for early implementation to make it simpler for them. It is the donor's decision whether they apply or not for their own system.

Can this procedure be used for Non-Municipal Drinking Water Systems?

- Although the procedure was written for Municipal Drinking Water Systems, it is expected that Non-Municipal Drinking Water Systems will be using similar approaches.

Preface

Why does the procedure apply to Service Pipes of 100 mm diameter and greater?

- The regulated community advised that larger Service Pipes should be constructed and disinfected in the same way as watermains.
- Service Pipes under 100 mm are typically continuous pipes without bell & spigot joints and are therefore less prone to contamination during installation. Higher flushing velocities are also more easily obtained.
- Service Pipes under 100 mm, including their appurtenances and fittings, are to be installed using sanitary procedures and flushed, though Operating Authorities may require additional steps as they see fit.
- This procedure does not apply to service pipes on private property, which are regulated under the Building Code, however Operating Authorities may choose to require the procedure to be carried out to disinfect service pipes on private property.

Does the procedure for disinfection of watermains apply to piping inside water treatment plants if the piping is downstream of filters?

- Piping inside a water treatment plant or an outstation is to be disinfected in accordance with AWWA C653. Section 4.4.1 of AWWA C653 mentions that plant process piping downstream of the filter or the first point of disinfection and pump stations shall be disinfected using one of three alternative methods described in ANSI/AWWA C651. Although the 2020 Watermain Disinfection Procedure does not apply, it is expected that the Operating Authority will use the principles of Section 1 of the 2020 Watermain Disinfection Procedures for these pipes.

- The ministry does not consider the disinfectant usage in the raw water for mussel control to be the first point of disinfection for the purpose of the disinfection mentioned in AWWA C653.
- Treated water pipes outside the water treatment plant building are considered as watermains and are therefore covered under the 2020 Watermain Disinfection Procedure.

Who do we contact to get relief from a section of the Watermain Disinfection Procedure?

- Deviations from this procedure may be requested from the ministry's Municipal Water and Wastewater section on a case-by-case basis by making a written request to MDWLP@ontario.ca

Does an Operating Authority need an approval for a deviation to implement their best management practices?

- Operating Authorities can implement best management practices without extra approvals if the practices are over and above the minimum requirements of the procedures.
- Approval requests for deviations are intended for when the Operating Authority wants to perform a portion of the procedure in a different way than prescribed by the procedure.

Section 1 - Addition, Modification, Replacement, Extension and Planned Maintenance

Section 1.1 - Where temporary watermains are installed for non-emergency work, and all other standard installation requirements have been met, is it permissible to maintain a continuous trickle flow to maintain temperature and an Acceptable Disinfectant Concentration during the summer and to prevent pipe freezing in the winter.

- It is the responsibility of the Operating Authority to take steps, such as the ones described above, to ensure that temporary watermains provide safe water.

Section 1.1 - What do we refer to if there is a watermain break in a temporary main?

- Temporary watermains are considered watermains for the purpose of the procedure. The requirements of Section 2 apply.

Section 1.1.1 - Why are we not allowed to use a Double Check Valve Assembly (DCVA) backflow preventer for new watermains?

- The working group wanted to ensure that backflow preventer failures could be easily detected by the discharge of water from a reduced pressure principle (RP) backflow preventer.

Section 1.1.1 – Why does the procedure require backflow preventer testing for the first installation of the day only when a backflow preventer is relocated within the same day?

- Some Operating Authorities mentioned that it was very difficult and time consuming to have backflow preventers tested every time they are relocated during the same day. As a result, the decision was made to allow a backflow preventer to be tested for the first installation of the day, and be moved to subsequent locations on the same day without re-testing.
- However, a Certified Operator must be responsible for the relocation to prevent damage. It is expected that the Certified Operator will arrange for testing if it is believed that the backflow preventer could have suffered damage during transit or installation.

Section 1.1.1 – Is there a ministry-approved equivalent to the Ontario Water Works Association (OWWA) Certified Cross Connection Control Specialist Certificate?

- At this time, there is none, however the “ministry-approved equivalent” wording was included in case another entity creates an alternate approved licence.

Section 1.1.1 – The procedure refers to a list of professionals in Table 1 of Figure E.1. of CSA Standard B64.10. Who are these people?

- Table 1 of Figure E.1. of CSA Standard B64.10 mentions: Only those persons listed in the Authorized functions list (see Table 1) shall carry out the corresponding functions set out in such list. A copy of the applicable portion of Table 1 is shown below.

Figure E.1 (Concluded)

Table 1 Authorized functions list Municipality of _____ Bylaw number _____									
Item	Authorized function	Professional engineer with tester's licence	Certified engineering technologist with tester's licence*	Licensed master plumber with contractor's and tester's licence	Journey-man plumber with tester's licence†	Apprentice plumber with tester's licence‡	Fire system sprinklerfitter with a tester's licence	Lawn irrigation system installer with tester's licence	Steamfitter with tester's licence
1	Carry out cross-connection survey	✓	✓	✓	✓	—	—	—	—
2	Install, relocate, or replace backflow preventer	—	—	✓	✓	✓	—	—	—
3	Repair backflow preventer	✓	✓	✓	✓	✓	—	—	—
4	Test backflow preventer	✓	✓	✓	✓	✓	—	—	—
5	Complete Items 1, 2, 3, and 4 in relation to fire protection systems	✓	✓	✓	✓	✓	✓	—	—
6	Complete Items 3 and 4 in relation to lawn sprinkler systems	✓	✓	✓	✓	✓	—	✓	—
7	Complete Items 1, 2, 3, and 4 in relation to heating and cooling systems	—	—	—	—	—	—	—	✓

* Required to be under the direction of a professional engineer.

† Required to be employed by a licensed plumbing contractor or licensed fire sprinkler contractor.

‡ Required to be employed by a licensed plumbing contractor and under the direct supervision of a journeyman plumber or master plumber.

- The Watermain Disinfection Procedure also prescribes that a Certified Operator or a Water Quality Analyst with a backflow prevention tester's licence shall also be authorized to test, install, relocate, repair or replace backflow preventers used in the installation and commissioning of new watermains.

Section 1.1.2 – Could you explain what you mean by “When using the Tablet or Continuous Feed Disinfection Method, if the maximum allowable decrease in chlorine concentration is exceeded at any of the sampling points, the disinfection procedure must be repeated.”?

- Ontario’s procedure allows for higher initial chlorine concentrations than the 25 mg/L specified in AWWA C651, but limits the allowable decrease in chlorine concentration at the end of 24-hour contact period.
- Table 1 lists the “Maximum Allowable Decrease in Chlorine Concentration” for the Tablet or Continuous Feed Disinfection Method. The maximum allowable decrease is 40% of the initial chlorine concentration, up to a maximum of 50 mg/L. Example calculations are included in Section 1.1.2 of the procedure.
- Once the initial chlorine concentration has been measured, the Maximum Allowable Decrease in Chlorine Concentration must be calculated. After the 24-hour contact period, if the measured chlorine concentration at any sampling point indicates that the Maximum Allowable Decrease in Chlorine Concentration has been exceeded, the disinfection process must be repeated.

Section 1.1.2 – Can we use different chlorine concentrations/contact times than the ones prescribed in Table 1?

- Different chlorine concentrations or contact times cannot be used without written approval from the ministry’s Municipal Water and Wastewater Permissions section. Requests for deviation from Table 1 will be reviewed on a case-by-case basis.

Section 1.1.2 – Can we use test strips to determine the chlorine concentrations prescribed in Table 1?

- The ministry does not allow the use of test strips to determine the chlorine concentrations recorded to show compliance with Table 1, however test strips can be used when preparing disinfectant solutions or to determine when a chlorine solution is being discharged from outlets as a presence/absence test. Where test strips are used, their accuracy should be confirmed using an electronic direct readout colourimetric or amperometric chlorine meter.
- The Operating Authority shall ensure that the chlorine concentrations recorded to show compliance with Table 1 are determined by:
 - an electronic direct readout colourimetric or amperometric chlorine meter; or
 - another device, if, based on an inspection of the device and on a review of relevant records and documentation, a licensed engineering practitioner states in writing that it is equivalent to or better than an electronic direct readout colourimetric or amperometric chlorine meter, having regard to accuracy, reliability and ease of use.

Section 1.1.2 – Is hydrogen peroxide an acceptable disinfectant?

- It is expected that an Operating Authority wanting to use hydrogen peroxide as disinfection will apply to the ministry for a deviation as described in the Preface of the procedure.

Section 1.1.2 – A new watermain servicing a future industrial park will have multiple Service Pipes over 100 mm diameter. Do microbiological samples have to be taken for each of these Service Pipes during the disinfection process?

- As the Service Pipes are over 100 mm diameter, the procedure applies to them.
- Section 5.1.1.2 of AWWA C651 mentions that at least one set of microbiological samples is to be obtained “from each branch greater than one pipe length” therefore samples are to be obtained from any of these Service Pipes that are longer than one pipe length.

Section 1.1.3 – Why does the procedure require testing only for Escherichia coli and Total Coliforms?

- The Watermain Disinfection Procedure stipulates only the minimum requirements which are required to be met.
- The Operating Authority may choose to test for additional parameters (such as HPC or background bacteria), as it has the responsibility to ensure that the new watermain provides safe water.

Section 1.1.3 – Section 5.1.1.2 of AWWA C651-14 states “For new mains, sets of samples shall be collected every 1,200 ft (370 m) of the new water main, plus one set from the end of the line and at least one from each branch greater than one pipe length.” Does that mean that a sample is not required at the start of the main?

- Although it is not stated clearly in Section 5.1.1.2 of AWWQ C651-14, the ministry expects that microbiological samples be taken at the beginning of the line.
- For example: If a new watermain is 2,000 ft (610 m) long, with no branches, three samples are required: One sample at the start of the main, one sample 1,200 ft (370 m) from the start of the main, and one sample at the end of the main.
- If the main is less than 1,200 ft (370 m), then two samples are required: One at the start of the main and one at the end.

Sections 1.1.3 and 1.1.4 – Why does the procedure require chlorine residual measurements for the microbiological samples?

- The procedure requires chlorine residual measurements to assist in troubleshooting microbiological parameter exceedances.

Section 1.1.4 - Why does the procedure refer to connections instead of final connections as in AWWA Standard C651?

- The working group decided to use “connections” instead of “final connections” to avoid confusion as new watermains can be connected to the drinking water system at multiple locations.

Section 1.1.4.1 describes that a Certified Operator is required to witness the installation of the Connection to ensure that sanitary construction practices are followed, and proper disinfection is performed. When does the installation begin and end?

- The Certified Operator is expected to be present when the new watermain is exposed, the new connection pieces are disinfected and pipefitting for the connection is completed.

Section 1.1.4.2 - Why was the 40-metre exception created and where can we use it?

- Operating Authorities communicated to the ministry that installations performed under Section 4.10.2 of ANSI/AWWA Standard C651 could require extended road closures of busy streets or highways. The ministry worked with a few Operating Authorities to create relief conditions in their Permits which were satisfactorily performed. These conditions were added to the procedure.
- This exception is not meant to be used for every watermain installation but may be used if the criteria in Section 1.1.4.2 are met. Systems using this exception are required to document the reason why the exception was used.

Section 1.1.4.2 – Can an Operator-In-Training (OIT) be the Certified Operator who witness the installation of the Connection under Section 1.1.4.2 to ensure that sanitary construction practices are followed, and proper disinfection is performed?

- As an Operator-In-Training (OIT) is a “Certified Operator” under O. Reg. 128.04, they are allowed to act as the Certified Operator who witnesses the installation of the Connection under Section 1.1.4.2 to ensure that sanitary construction practices are followed, and proper disinfection is performed.
- It is expected that the Operating Authority will provide adequate training and direction where needed to any Operator-In-Training who is not yet competent to perform these operational tasks.

Section 1.1.4.3 – Who makes the decision to open the valves to place the new watermain in service?

- The ministry expects that the Operative Authority, after ensuring that the new watermain was disinfected and connected in accordance with the procedure, allows the valves to be opened to place the new watermain in service and ensures that a Certified Operator operates the valves.

Section 1.1.4.3 - When does a microbiological sample or a disinfectant residual test result have to be reported after the watermain has been placed in service?

- Any *Microbiological Samples* taken and/or disinfectant residual tests performed after a watermain is placed into service are considered Drinking Water tests for the purpose of the SDWA, and adverse test results are reportable.

Section 1.4 - Would the planned removal of a short pipe section (less than one pipe length) for analysis purpose fall under Section 1.4 Planned Maintenance of Appurtenances and Fittings?

- Yes, however the removal of a short pipe under Section 1.4 is limited to less than one pipe length (Generally ≤ 6 m).

Section 1.5 - Why does the procedure require a Certified Operator for wet taps?

- The WDP mentions that the live tapping (i.e., “wet” tapping) of a watermain that is part of the Drinking Water System must be performed by a Certified Operator.
- A Certified Operator is not required to perform wet tapping on a new watermain prior to commissioning as long as the watermain that has yet to be commissioned is isolated from the rest of the distribution subsystem.
- This requirement comes from Section 5.1 of the “Certification Guide for Operators and Water Quality Analysts”. Performing a wet tap is a task which requires a person certified as an Operator.
- The guide also states that “A person or contractor, not certified as a drinking water operator, can perform functions normally required to be done by a Certified Operator provided they are being directly supervised by a Certified Operator, who is physically present and monitoring the work being performed. The Certified Operator is responsible for all operational work”.

Section 1.7 - Is there a limit to the amount of time that a section of existing watermain can be left isolated from a Drinking Water System?

- The working group realized that this is not a one-size-fits-all situation. A watermain that is isolated for a week will be treated very differently than one that was isolated for a year, and an 80-year old watermain will present different challenges than a brand new watermain. That’s why the Procedure requires that a plan be developed that reflects the duration of isolation and the associated risks.
- Section 1.7 applies every time a section of an existing watermain remains isolated long enough for the free chlorine residual to decrease below 0.05 mg/L, or for the combined chlorine residual to decrease below 0.25 mg/L.

Section 1.7 – Are adverse microbiological sample results obtained when returning an isolated watermain into service reportable?

- Exceedances from microbiological sample results from the isolated watermain prior to connection to the distribution system are not considered as drinking water tests and are not reportable.
- Exceedances from microbiological sample results from the isolated watermain after it has been reconnected to the “live” distribution system are considered as drinking water tests and are therefore reportable.

Section 1.7 – Will the ministry review the recommissioning plan to ensure that it is satisfactory?

- It is not expected that the ministry will review the recommissioning plan prior to its implementation unless the Operating Authority requests guidance with the plan.
- The ministry’s Water Inspectors will review the recommissioning plan and documentation during the inspection to ensure that the plan was implemented.

Section 2 - Watermain Disinfection Procedures for Emergency Repairs

Section 2.1 - Why is a watermain break now a Category 2 by default in the new procedure?

- Stakeholders communicated that the categorizing of watermain breaks as 1 or 2 was a source of arguments in the field. The working group decided that it would be better to state a default category as a starting point.

Section 2.1 – Why is it that an Operator-in-Charge is the only person allowed to classify a watermain break a Category 1?

- The working group wanted to ensure that the operator making the decision would have enough experience/expertise to make the determination.
- An Operator-in-Training (OIT) cannot classify a watermain break on their own as subsection 25 (5) of O. Reg. 128/04 states that “A person who holds an operator-in-training’s certificate shall not be designated as an operator-in-charge”.

Section 2.1 - During main breaks, the Operator-in-Charge is to assess the evidence of contamination or potential contamination of the watermain throughout the repair procedure and reclassify if required. Does he/she have to be present at all times?

- An Operator-in-Charge must be on site until the repair pieces are installed to be able to state that there was no evidence of contamination or potential contamination of the watermain.
- If Operator(s)-in-Charge cannot remain on site until the repair pieces are installed, the watermain break remains a Category 2.

Section 2.1 - Why do I have to speak in person or on the telephone with a person from the ministry for Water Advisories or Special Cases?

- The procedure requires speaking in person or on the telephone with a person from the ministry to ensure that the ministry has the information to respond to inquiries from the public and/or the media.

Section 2.1.3.2 - Why are some Special Case watermain breaks due to Sewage or Chemical Contamination not reportable under Section 16-4 of O. Reg. 170/03?

- Category 2 watermain breaks, including Special Cases, are not reportable to the Spills Action Centre in accordance with Section 16-4 of Schedule 16 of O. Reg. 170/03 unless an Operating Authority believes that contaminated water was directed to users.
- However, the Operating Authority shall verbally notify the ministry of Special Cases as soon as reasonably possible by speaking on the telephone with a person.
- The notification shall be made to the Spills Action Centre during and after of business hours.

Section 2.1.3 – Based on the procedure, it appears that most watermain breaks are not reportable to the Spills Action Centre. Are there other situations where watermain breaks need to be reported to the ministry?

- Watermain breaks are considered Class II spills under O. Reg. 675/98 and are exempt from Part X of the Environmental Protection Act; however, the ministry expects the Operating Authorities will report watermain breaks which cause adverse effects as Condition 10.1 of License specifies:
 - 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.
- Reporting these incidents to the ministry is therefore required under Section 15 of the Environmental Protection Act if the Operating Authority believes that there could be adverse effects.
- The ministry understands that the determination of adverse effects is a judgment call in these situations. The following is provided to help determine whether the discharge of drinking water from a watermain break would be reportable or not.
 - A discharge to a storm sewer would not be reportable.
 - A discharge which causes injury or damage to a property or plant or animal would be reportable.
 - A direct discharge to a watercourse which would have or may have adverse impacts to fish, vegetation or alter the actual bed of the watercourse (scouring) would be reportable.

Section 2.2.5 – Do I need to measure turbidity to ensure that the discharged water is visibly free from discoloration when Flushing?

- It is not required to measure turbidity under the procedure. Visual observation is sufficient.

Section 2.2.5 Why does the procedure allow for the Exception: “Where the repair was performed using a repair sleeve and flow was maintained from the break until an Air Gap was established, Flushing is not required”?

- This exception was created due to the minimal potential for contamination in this situation, and to avoid the need to flush extremely long watermains (km long) where no sampling point exists. It is thought that installing a flushing point could reduce the life of the watermain.

Section 2.4.3 – Why does the procedure state that one Microbiological Sample shall be taken and submitted as soon as reasonably possible, taking into consideration laboratory working hours and transportation timeframes?

- This wording was created because, in some remote areas, samples taken immediately after a watermain is repaired would be expired before they could be set up for analysis at the laboratory, taking into account the laboratory working hours and/or transportation timeframes.

Section 2.4.4 – Does the ministry need to approve the disinfection and sampling plan to address sewage contamination before I can proceed with it?

- The wording of this section of the procedure can lead to confusion. The ministry’s position is that if the Operating Authority develops a plan which meets all the requirements below, at a minimum, there is no need for pre-approval from the ministry before proceeding with the plan:
 - Applicable steps from Sections 2.2 and 2.4 of this procedure;
 - Disinfection as per Section 1.1.2 of this procedure; and
 - Two sets of microbiological samples at least 24 hours apart
- Deviations from the procedure mentioned above will require the ministry’s approval. Operating Authorities can request deviations from these steps in advance. The deviations will be approved on a case-by-case basis.

Sections 2.4.4 and 2.4.5 - Who can declare Water Advisories?

- The Medical Officer of Health is the only entity who can declare an advisory under this procedure.

Section 3 - Documentation

Section 3.1 – Is the Owner expected to supply the microbiological test reports to the Inspector?

- As many Operating Authorities have switched to databases to record required sample results, it is not expected that the Operating Authorities will be provided individual written test reports for every microbiological test result. However, it is expected that the Operating Authorities will be able to show the location of each sample, the date and time of the sampling as well as the sample results obtained.

Section 3.1 – How does the Operating Authority show that sanitary construction practices were followed, and that proper disinfection was performed when installing the connection piece(s)?

- The Operating Authority is not expected to record in detail how sanitary construction practices were followed and proper disinfection was performed during the installation of the connection piece.
- A simple statement or checkbox should be sufficient.

Section 3.1 – What is expected for documentation for “Reason for using the exception” under s. 1.1.4.2?

- It is expected to provide a written description of the reason and sufficient maps/pictures/diagrams to ensure that a ministry Inspector understands the reason why the exception was applied.