

2024

TRACER WIRE
INFRASTRUCTURE
DESIGN STANDARD

W500B



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The City of Barrie reserves the right to amend, alter or to accept revisions to these documents at any time without further notice.

Overtime it will be necessary to update these documents as the regulations, design practices and technologies continue to evolve and change. It is the user's responsibility to check the City of Barrie's website for the current revision. Manual holders are cautioned about immediately discarding superseded and cancelled standards.

Last Revision Date: April 2024

REVISION No.	DATE	COMMENT
1	September 2020	Tracer Wire Standard
2	April 2023	Added new document names and numbers throughout
3	April 2024	Updated document name changes throughout

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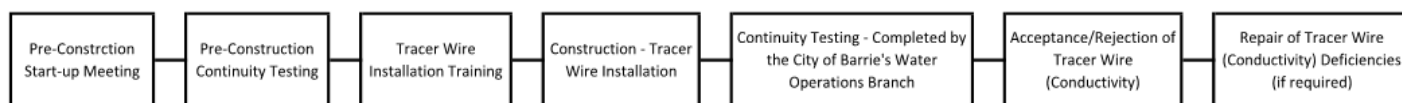
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1 Introduction

This document was prepared to provide guidance and to meet the requirements of the City of Barrie (City) in regard to the installation of Tracer wire on City owned buried infrastructure. With this infrastructure standard, the City's objective is to further protect and secure infrastructure from costly damages and repairs. Tracer Wire that is installed as per this standard should also provide the City with a traceability lifespan that is equal to the lifespan of the municipal infrastructure that it is installed on.

Over time, it will be necessary to update this Infrastructure Standard as design practices and new technologies continue to evolve and change. The guidance within this installation guide is based on the specific needs and requirements of the City of Barrie.

2 Tracer Wire Installation Process



3 Training Recommendations

In order to ensure the successful implementation of this standard and to minimize construction delays resulting from installations that are not compliant to the requirements of this standard the City's Water Operations Branch will provide **FREE** training to any person that will be installing or responsible for installing a system that is compliant with this standard. This training is required once per calendar year, in order to promote awareness and increase the likelihood of a successful installation. City Staff/Representative may request crews attend this training if it has not already been taken within the current calendar year or when new staff joins a contract.

Requests for this training can be made to the Water Operations Branch Customer Service line at (705)739-4220 x4805. The City will not be liable for the costs associated with repairing any installation deficiencies that are due to non-compliance with this standard.

4 General Requirements

- Where warranted by specific site challenges or limitations, the Water Operations Branch reserves the right to provide additional direction or requirements in order to provide a functional tracer wire system.
- All tracer wire shall be installed so that the City is able to properly trace all municipal infrastructure (where tracer wire is required) without the loss or deterioration of signal using industry standard locating equipment (RF Technology).
- Materials that are to be used to build the tracer wire system are as per the City's [Verified Technologies for Drinking Water Systems](#) List.
- Connections may be permitted to existing tracer wire based on acceptable results of a pre-continuity inspection that is completed by the City's Water Operations Branch. Existing tracer wire shall be extended using an approved wire connector to an approved test station (as per the City's Verified Technologies for Drinking Water Systems List).

- The City's Water Operations Branch reserves the right to request a test station at any location where it may be difficult to locate infrastructure, for reasons not limited to but including depth changes greater than 3 metres.
- Situations may arise that are not covered in this document. Should this occur the City or Contractor may require that changes are to be made in the field. All changes require the approval of the City's Water Operations Branch prior to implementing.

5 Municipal Infrastructure

- Tracer wire shall be installed on all Watermain (includes hydrant laterals and non-copper water services) and Sanitary (Forced and Radius Pipe) mains, where the pipe material is not copper.
- Tracer wire shall be laid flat and securely affixed to the top of the main with mastic tape at a maximum of 3-meter intervals. The tracer wire shall always be protected from damage during the execution of the installation works.
- Tracer wire shall not be wrapped around bolts or other components and shall not be placed under any pipe components.
- Tracer wire shall not be placed between the saddle and the watermain at water service saddle locations.
- No splices are allowed on tracer wire between test points other than laterals, crosses or tees or authorized repairs.
- Where a main terminates at a dead end, either a grounding anode or a test station shall be installed as per the City staff instructions.
- Locations of all splices are to be recorded and shall be submitted to the City's Water Operations Branch in the form of As-Built Drawings.
- In the case of Parallel mains, each main should have its own tracer wire installed and the wires are to remain isolated from each other.
 - Parallel wires that are found to be connected, will result in a request to correct the installation. This correction may involve re-excavation of the main in question at the contractor's cost.
- Tracer Wire installation details can be found as follows:
 - [W515](#) Water Infrastructure Tracer Wire
 - [W504](#) Water Service Cross-Linked Polyethylene 25mm to 50mm
 - [W507](#) Hydrant & Valve
- All tracer wire shall be colour coded according to the following:
 - Water = Blue
 - Sewer (Storm/Sanitary) = Green
 - Low Impact Developments (LIDs) = Purple
- Contractor should use a barrier where they feel that there may be risk of damage to the Tracer Wire.
- All tracer wire ends must be connected; no unconnected wires are permitted.
 - Underground – either to existing tracer wire or grounding anode

- Above ground – inside a Hydrant Three Terminal Test Station on post, on terminal board of Test Station or on set screw of Flushmount Test Station

6 Test Stations

- The contractor/developer shall install a test station or grounding anode and connect to existing tracer wire at all limits of construction as per the City Staff/Representative instructions. If possible, these should be shown on contract drawings once they reach 60-90% completion.
- Should a watermain terminate in a boulevard area or within 1m of a boulevard area an appropriate test station (as per the City's Verified Technologies for Drinking Water Systems List) shall be installed by the contractor/developer. The contractor/developer shall situate the test stations at least 1.0 metres behind sidewalk (wherever possible). If this is not possible, they should be installed in locations where they will be reasonably protected from above grade damage by winter control or other maintenance activities (such as grass cutting).
- Test stations shall be installed at all chamber locations.
- The maximum allowable length of wire permitted between tracer access points (test station or hydrants or a combination of both) is 275m.
- All test stations shall be installed 1.0-1.2m above grade and the bury line shown on the test station is not to be followed.
- All test stations shall be colour coded by Utility.
 - Water = Blue
 - Sewer (Sanitary/Storm) = Green
 - Low Impact Developments (LIDs) = Purple
- Tracer wire running from the main to the test station is to be in minimum 25mm diameter plastic conduit and buried at the depth of the main or at a minimum of 1.7m below grade until it is directly under the test station location. The tracer wire is to then travel straight up to the test station to the termination point.
- All bends that need to be used in the conduit are to be of a long radius type.
- When installing the tracer wire at the test station, 2m of slack from the tracer wire shall be left inside the bottom 400mm of the test station. This is to be accomplished by using a 19mm dowel to create a pig tail with the tracer wire.
- All tracer wire that terminates at a test station shall be labelled to identify the infrastructure the wire is installed on and the direction the wire is travelling from the test station.

7 Directional Drilling and Jack & Bore Installations

- For all Directional Drilling and Jack and Bore installations, the appropriate (heavier gauge) Tracer Wire shall be used as per the City's Verified Technologies for Drinking Water Systems List.
- Contractors are required to pull a minimum of four (4) tracer wires when completing a directional drilling or jack and bore installation. Once the installation has been completed one (1) working tracer wire must be in place.
- When a hydrant is required to be installed on a Directional Drilling project, at the hydrant install location the contractor shall cut the tracer wire then install an approved connector, then run the

tracer wire up the hydrant and back to the main (as per W515) and connect to the directional drilling tracer wire with an approved connector.

8 ICI Properties

- A test point station shall be installed at the property line directly on top of the pipe and the tracer wire coming from the watermain shall be kept separate from the tracer wire leading into the private property (where present).
- If there is both a domestic and a fire service to the ICI property, then 2 test stations will be required.
- Continuity testing on private property is not performed by Water Operations Staff.

9 Grounding Anodes

- A grounding anode shall be installed where any tracer wire terminates in the roadway (asphalt) or concrete area.
- Grounding anode installed shall be as per the City's Verified Technologies for Drinking Water Systems List.
- A grounding anode shall be installed at all dead ends unless there is a test station being installed.
- A grounding anode shall be installed whenever there is a transition between a metallic pipe without tracer wire and pipe requiring tracer wire.
- Grounding anode shall be driven into the ground vertically perpendicular to the watermain.
- Grounding anode shall be connected to tracer wire using an approved connector as per the City's Verified Technologies for Drinking Water Systems List.
- If the contractor is permitted to connect the new tracer wire to existing tracer wire that has an existing grounding anode installed, the contractor shall remove the existing grounding anode before connecting the tracer wires.
- If the contractor is not permitted to connect to existing tracer wire, then the existing tracer wire is to be grounded or brought to a test station as instructed by the City's Water Operations Branch.

10 Tracer Wire at Hydrants

- Shall be looped at each hydrant; this means that the tracer wire that follows the main trench follows the hydrant lead pipe all the way up to and above the ground then it loops back alongside the hydrant supply pipe and back to the main to continue along the trench. These looped tracer wires must be taped tightly together to create a single conductor.
- Tracer wire is not permitted to go up inside any valve.
- Tracer wire shall be brought above grade inside a plastic conduit and looped at each hydrant.
- A test station (as per the City's Verified Technologies for Drinking Water Systems List) shall be installed at the back of each hydrant and bolted at the flange.
- Conduit shall be installed from 60cm below grade and attached to the test station at each hydrant.
- The looped tracer wire at each hydrant is to be left, untouched inside the test station. One (1) metre is to be left in the conduit and this is to be accomplished by wrapping the tracer wire around 19mm dowel to create a pig tail of slack.

- When a tracer wire reel ends and a new reel begins at a fire hydrant, the two (2) wires must be connected to the terminals inside the test station (as per the City's Verified Technologies for Drinking Water Systems List).

11 Plastic Water Services

- Tracer wire shall run between the electrical shoulders set screw on the main stop to the electrical shoulder set screw on the curb stop.
- No splices are allowed on the tracer wire between main stop and curb stop.
- A grounding anode (as per the City's Verified Technologies for Drinking Water Systems List) shall be installed at each main stop location by clamping the wire running from the anode to the main stop electrical shoulder set screw.
- When both the grounding anode and tracer wire have been secured at the main stop, profiling mastic (as per the City's Verified Technologies for Drinking Water Systems List), shall be used to pack any voids in the electrical shoulder set screw the connection shall then be wrapped in petrolatum tape (as per the City's Verified Technologies for Drinking Water Systems List) such as to protect from corrosion.
- When the tracer wire has been secured at the curb stop, profiling mastic (as per the City's Verified Technologies for Drinking Water Systems List) shall be used to pack any voids in the electrical shoulder set screw the connection shall then be wrapped in petrolatum tape (as per the City's Verified Technologies for Drinking Water Systems List) such as to protect from corrosion.
- Tracer wire on the private side shall not to be connected to the tracer wire or any infrastructure on the municipal side.
- Where deemed necessary (on reconstruction projects) there should be a jumper piece installed from the curb stop to the coupler on the residential side if the existing service is copper or galvanized.

12 Continuity Testing

- This City's Water Operations Branch will perform all continuity testing. The continuity test must pass using the City's locating equipment at no more than 50% power output on 512Hz frequency.
- Continuity testing will be completed by preliminary/interim checks throughout construction, prior to the placement of asphalt and once again at the end of the maintenance period.
- The City's Water Operations Branch will conduct one (1) retest at no additional charge. Any subsequent site visits relevant to the continuity test or test results will be billable by the hour as per the City's Fees By-Law.
- It is the responsibility of the developer/contractor to identify and rectify all tracer wire related deficiencies.
- When a continuity test fails, the developer/contractor will be responsible to identify any tracer wire faults/issues and produce a report on their findings. A copy of this report must be provided to the City's Water Operations Branch for review.

- Should the City's representative(s) find any problems with continuity or installation of the tracer wire, the Contractor/Developer shall be responsible for all repairs and site remediation as required, at no cost to the City.