SPECIAL PROVISION FOR

TRACER WIRE FOR NON-CONDUCTIVE UNDERGROUND PIPING

Description

This work shall consist of installing a continuous and traceable tracer wire(s) and related components for the purposes of locating non-conductive underground utilities.

Materials

All tracer wire and tracer wire products shall be domestically manufactured in the U.S.A.

1. Use tracer wire made of solid copper or multi-strand copper-clad steel.
2. Tracer wire shall have completed 5-year corrosion testing or provide a 5-year warranty.

Provide HDPE insulation jacket for all tracer wire.

1. Design for 600-volt applications and direct bury.
2. Color code jacket with APWA standard color coding convention.

Where called for on the Plans, provide tracer wire as follows:

1. Pipe Bursting/Sliplining
    a. Minimum tensile strength/break load of 4,700 pounds
    b. Specifically designed for Pipe Bursting/Sliplining applications.
    c. Minimum 50 ml thick HDPE insulation jacket
2. Horizontal Directional Drilling (HDD)/Boring
    a. Minimum tensile strength/break load of 2,500 pounds
    b. Specifically designed for HDD/Boring applications.
    c. Minimum 45 ml thick HDPE insulation jacket
3. Open Trench
    a. Minimum 10 AWG wire
    b. Minimum 30 ml thick HDPE insulation jacket
4. The minimum thickness at any point along the tracer wire shall not be less than 90% of the specified average thickness in compliance with UL 83.
    a. UL 83 specification shall be clearly marked on the wire insulation.
5. Manufacturers
    a. Copperhead Soloshot Extreme PBX-50B-LLS (Pipebursting/Sliplining)
    b. Copperhead Extra High Strength #845B EHS (HDD/Boring)
    c. Copperhead High Strength #1030B-HS (Open Trench)
    d. Approved Equal

Connectors

1. Three-way locakable connectors and mainline to lateral lug connectors specifically manufactured for use in underground tracer wire installation.
2. Sealed and filled with dielectric gel to seal out moisture and corrosion and installed to prevent uninsulated wire exposure.
3. Non-locking, friction fit, twist on or taped connectors are prohibited.
4. Manufacturers (Pipebursting/Sliplining or HDD/Boring Applications)
    a. Copperhead Pipeburst Connector - In-Line Splice #SC-PB-01
    b. Copperhead Pipeburst Connector – Three-way #SC-3WPB
    c. Copperhead Pipe Burst Mainline-to-Service Connector ##SC-3WPB-C
    d. Approved Equal

5. Manufacturers (Open-Cut Applications)
    a. Copperhead 3-way locking connector #LSC1030C
    b. Copperhead Mainline-to-Service Connector #3WB-01
    c. Approved Equal

Termination/Access

1. Provide test stations that are compatible with Owner's locating equipment.
2. For access points not located within a gate well, provide a heavy-duty access box with cast iron cover appropriately identified with "water" cast into the cap and color coded blue.
3. Access boxes in pavement shall be flush-mounted and rated for traffic.
4. Access points for hydrants shall be attached to the hydrant flange and installed with a mounting stake and 1-inch diameter galvanized conduit with a minimum two (2) foot depth of bury to protect the tracer wire
5. Manufacturers
    a. Copperhead #CD14B2T-SW (At-Grade Access Points Non-Roadway)
    b. Copperhead #RB14B2T-SW (At-Grade Access Points Roadway)
    c. Copperhead Cobra Access Point T2-B-FLPKG w/ T3-STAKE (Hydrant)
    d. Approved Equal

Grounding

1. Provide magnesium anodes for grounding all dead ends of tracer wire and all connections to existing tracer wire systems.
2. Brass or copper ground rods are prohibited.
3. Grounding to existing conductive piping systems is prohibited
4. Manufacturers
    a. Copperhead #ANO-1005
    b. Copperhead #12 AWG CCS-Red, Factory Ground Wire
    c. Approved Equal

Construction Methods

Attach two (2) separate tracer wires to the water main at 5-foot intervals along the full length and within one (1) foot of all connectors or re-routes around structures between test stations.

1. Utilize plastic cable ties or Owner approved alternative to attach the tracer wires to the pipe.
2. Install tracer wires at the bottom half of the pipe on the north or east side where possible
3. The use of tape is prohibited.

All non-conductive service lines shall include one (1) tracer wire.

1. Connect service lateral tracer wires to mainline tracer wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire to ensure full tracing/locating capabilities from a single connection point.
2. Terminate tracer wire at an approved access box located directly above the service lateral within 2 feet of the curb stop valve box within the public right-of-way.

Install an intermediate access point using a mainline to lateral lug connector, magnesium grounding anode rod and an approved grade level/in-ground tracer wire access box in areas where the distance between standard access point locations (i.e. hydrants and service lines when applicable) is greater than 1,500 feet.

Install tracer wire in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

Install trace wire systems as a single continuous wire, except where using approved connectors.

1. No looping or coiling of wire is allowed.

Immediately repair any damage occurring during installation of the tracer wire by removing the damaged wire and installing a new section of wire with approved connectors.

1. Taping and/or spray coating is prohibited.

Trace wire must be properly grounded as specified.

Do not connect mainline tracer wire to existing conductive pipes.

1. Treat mainline tracer wire as a dead-end and ground as specified.

Extend existing tracer wire with new tracer wire using approved splice connectors and ground at the splice location.

One (1) foot of excess slack wire is required in all tracer wire access points for both the tracer wire and ground rod wire after meeting final elevation.

Connectors

1. Interconnect all mainline tracer wires at intersections, mainline tees and mainline crosses
    a. Join the three wires at tees using a single 3-way lockable connector.
    b. Join the four wires at crosses using a 4-way connector.
        1) Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
2. For direct bury wire connectors, include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation.

Termination/Access

1. All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
2. Provide a minimum of 2 ft. of excess/slack wire in all trace wire access boxes after meeting final elevation.
3. Include a manually interruptible conductive/connective link in all trace wire access boxes between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
4. Connect grounding anode wire to the identified (or bottom) terminal on all access boxes.

Grounding

1. Properly ground tracer wire at all dead ends/stubs.
2. Achieve grounding by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to anode buried at the same elevation as the utility.
3. Install grounding anode in a direction of 180 degrees opposite of the tracer wire, at a maximum possible distance, when grounding the tracer wire at dead ends/stubs.
4. Provide a minimum of 2 ft. of excess/slack wire in all trace wire access boxes after meeting final elevation.

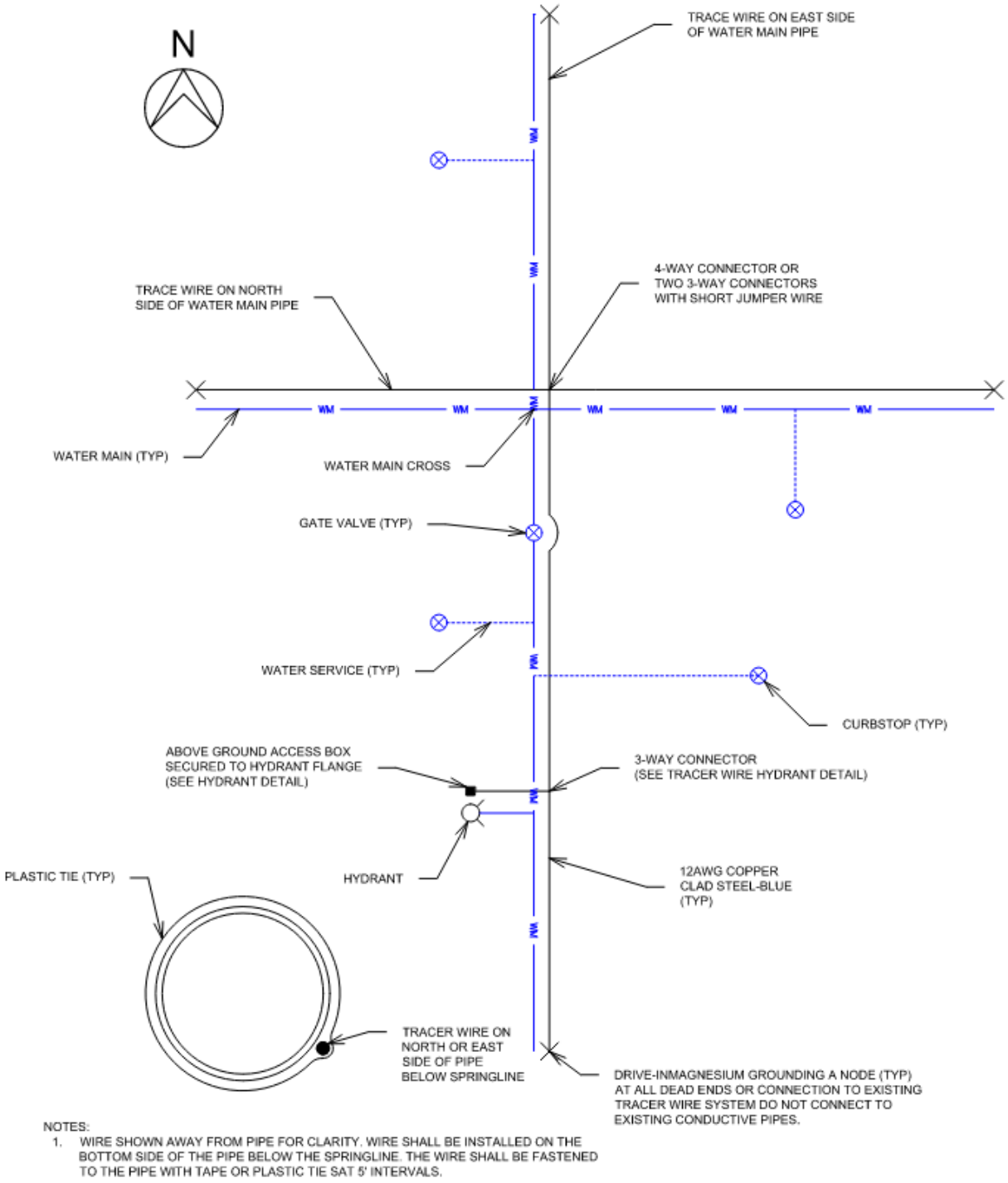
5. When grounding the tracer wire in areas where the tracer wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the tracer wire.
    a. Do not coil excess wire from grounding anode.
    b. Trim the grounding anode wire to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.

Locate all new tracer wire installations using typical low frequency (512 Hz) line tracing equipment.

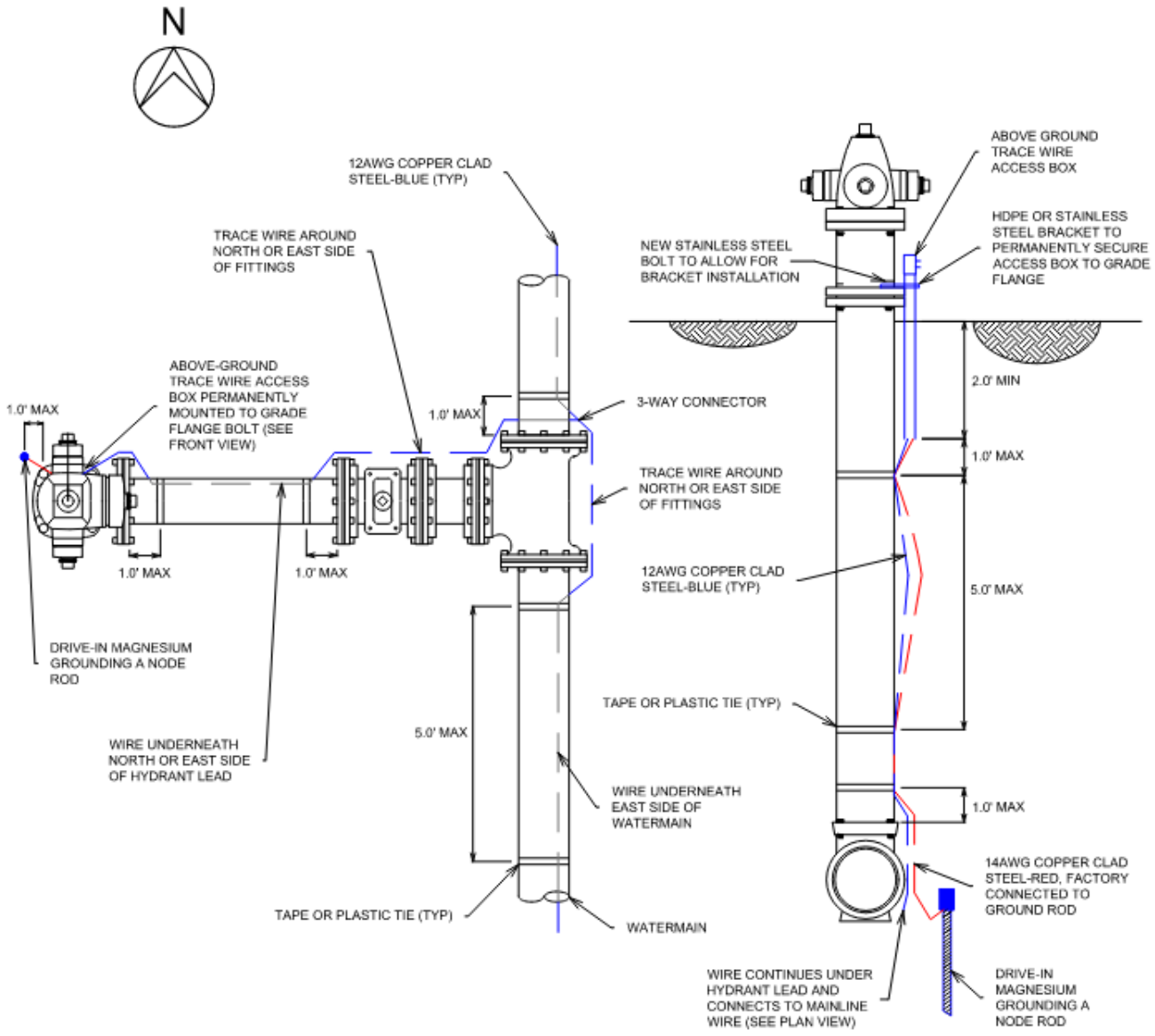
1. Perform line tracing (continuity testing) upon completion of rough grading, during any "subsequent" work that will expose the tracer wire to potential damage (such as, but not limited to, service line taps/connections) and again prior to final acceptance of the project.
    a. For water main projects, perform line tracing upon acceptance of the water main but prior to performing service line taps/connections
    b. Perform line tracing at the end of each day that "subsequent" work is performed on the water main to ensure the continuity of the tracer wire was not compromised during the work.
    c. Perform line tracing again upon completion of the work.
2. Complete locating in the presence of the Owner or Owner's field representative.
3. Conductivity testing in lieu of actual line tracing is not acceptable.

Measurement and Payment

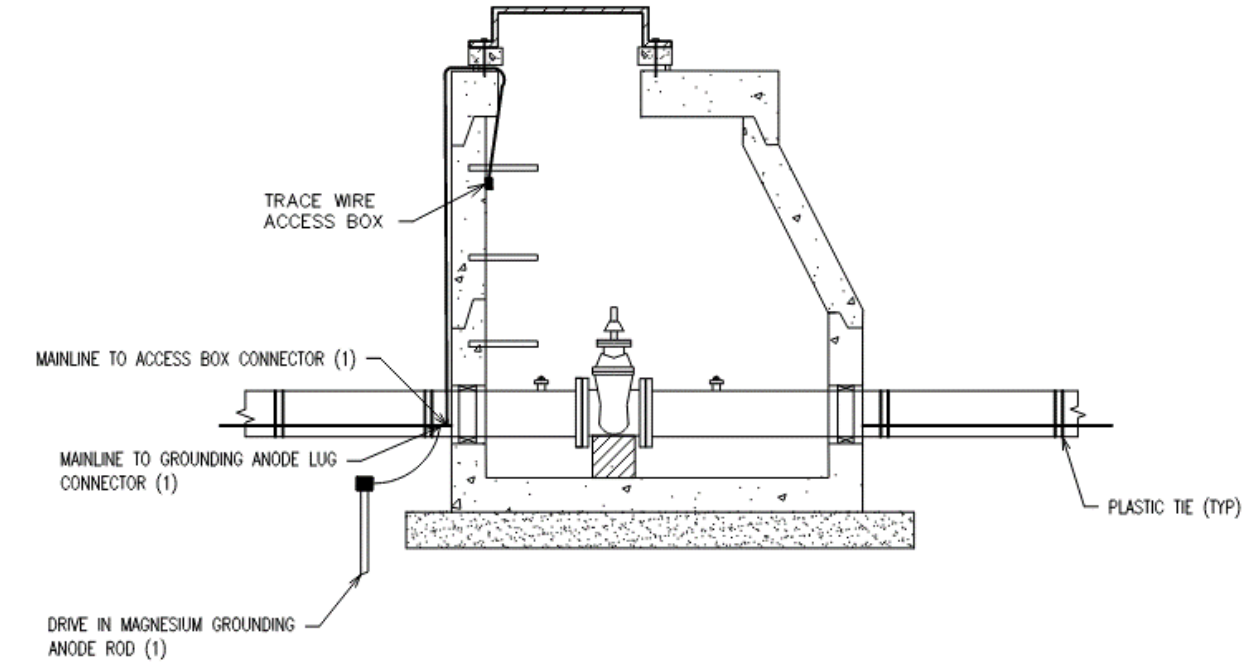
Installation of tracer wires, including all the work as covered by this special provision and all work to verify the continuity of the installed tracer wires, shall be included in the unit price bid for **"Water Main, HDPE SDR 11, __ inch, (install method) – Lft"** of which ever installation method is specified in the Proposal including extending tracer wire through transition areas of conductive piping.

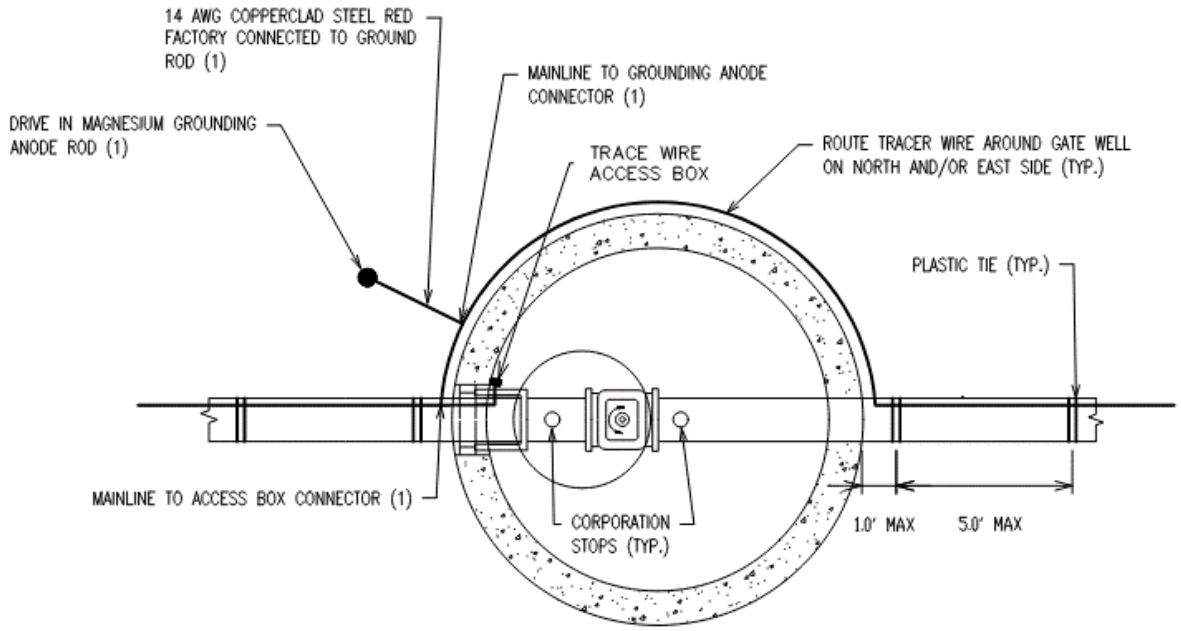


TRACER WIRE SAMPLE WATER PLAN



TRACER WIRE SAMPLE HYDRANT DETAIL





TRACER WIRE GATE WELL DETAIL

NOTES:

1. GROUNDING ANODE ROD AND ASSOCIATED COMPONENTS ONLY NECESSARY ON DEAD END GATE WELLS.