

The Complete Utility Locating System Specification

for the Water/Sewer Market

This specification provides the technical requirements necessary to ensure proper installation of tracer wire and related components for the purposes of locating both conductive and non-conductive underground water/sewer utilities. It recognizes that the first step in protecting underground utility assets is installing a quality, reliable locating system. This specification is based on best practices for underground utility locating.

*If using Copperhead® products, part numbers are in **bold print**.*

** denotes color (B=blue, G=green, P=purple)*

*** spool size (500', 1000', 2500')*

Materials

General

- All system components, including tracer wire, connectors, ground rods, and access boxes, must be compatible.
- All tracer wire shall have HDPE insulation for direct bury, and color coded per APWA standard for the specific utility being marked.

Tracer Wire

- Open Trench - Tracer wire shall be copper-clad steel 12-AWG High Strength with minimum 450 lb. break load, minimum 30 mil HDPE insulation thickness (**1230*-HS-****).
- Directional Drilling/Boring - Tracer wire shall be copper-clad steel 12-AWG Extra High Strength with minimum 1,150 lb. break load, minimum 45 mil HDPE insulation thickness (**1245*-EHS-****).
- Pipe Bursting - Tracer wire shall be 7x7 stranded copper-clad steel with 4,700 lb. break load, minimum 50 mil HDPE insulation thickness (**PBX-50*-****).

Connectors

- All mainline tracer wires shall be interconnected at intersections, at mainline tees, and mainline crosses. At tees, the three wires shall be joined using a single, three-way locking connector (**LSC1230***). At crosses, the four wires shall be joined using two, three-way locking connectors (**LSC1230***) with a short jumper wire between them.
- Direct bury wire connectors shall include three-way lockable locking connectors (**LSC1230***) and Mainline-to-Service connectors (**3WB- 01**) specifically manufactured for use in underground tracer wire installation. Connectors shall be dielectric silicone filled to seal out moisture and corrosion and shall be installed in a manner as to prevent any uninsulated wire exposure.
- Non-locking, friction fit, twist on, or taped connectors are prohibited.

Grounding

- Tracer wire must be properly grounded at all dead-end mains, service laterals, and curb stops.
- Grounding of tracer wire shall be achieved by using a 1.5-lb, drive-in, magnesium ground rod (**ANO-12**) with a minimum 20-foot, #12 red HDPE insulated copper-clad steel wire connected to the rod, specifically manufactured for this purpose.
- 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. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to tracer wire with a mainline to service connector.
- Where the anode wire will be connected to a tracer wire access box, a *minimum of 2 ft.* of excess/slack wire is required *after* meeting final elevation.
- When installing tracer wire from curb stop to residence, if sewer and water are in the same trench, tracer wire only needs to be installed with water. Tracer wire needs to be connected to existing blue wire at base of curb stop using an approved three-way connector (**3WB- 01**). Existing grounding anode may be used at base of curb stop. At base of exterior foundation, tracer wire needs to be properly grounded using approved grounding anode.

Termination/Access

- All tracer wire termination points must utilize an approved tracer wire access box (above ground access box or grade level/in-ground access box as applicable), (**LD14*2T** or **SP-SWLID-*2**) specifically manufactured for this purpose.
- All at-grade access boxes shall be appropriately identified with “sewer” or “water” cast into the cap and be color-coded.
- All two-terminal tracer wire access boxes must include a manually interruptible conductive/connective link between the terminal for the tracer wire connection and the terminal for the ground rod wire connection.
- Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.
- Service Laterals on public property - Tracer wire shall terminate at an approved at-grade, two-terminal access box (**LD14*2T** or **SP-SWLID-*2**) near the curb stop for water, or near the clean-out for sewer and storm applications. Water access box shall be installed under a top hat (**A1**) *with* curb stop when located in driveway. Sewer access box shall be located under a top hat (**A32**). Clean-out shall also be located under a top hat (**A32**) when in driveway. *See Grounding.*
- Service Laterals on private property - Tracer wire must terminate at an approved at-grade two terminal access box, (**LD14*2T** or **SP-SWLID-*2**) near the curb stop for water, or near the clean-out for sewer and storm applications. When installing sewer and water from curb stop to residence, if sewer and water are in the same trench, tracer wire only needs to be installed with water. Tracer wire needs to be connected to existing blue wire at base of curb stop using an approved three-way connector (**3WB- 01**). At base of exterior foundation, tracer wire needs to be properly grounded. *See Grounding.*
- Hydrants – Tracer wire must terminate at an approved above-ground tracer wire access box, properly affixed to the hydrant grade flange (**T2-B01**). 5/8 for hydrants with 5/8” bolts, and 3/4 for hydrants with 3/4” bolts. Affixing with tape or plastic ties shall not be acceptable.

- Long-runs - In excess of 500 linear feet without service laterals or hydrants. Tracer wire access must be provided utilizing an approved grade level/in-ground tracer wire access box, located at the edge of the road right-of-way, and out of the roadway.

Installation

General

- Tracer wire installation shall be performed 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 (512 Hz) signal, and without distortion of signal caused by more than one wire being installed in close proximity to one another.
- Tracer wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
- Any damage occurring during installation of the tracer wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- Tracer wire shall be installed at the bottom half of the pipe and secured (taped/tied) at 5' intervals.
- Mainline tracer wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end ground using an approved waterproof connector to a ground rod driven into virgin soil beneath, in line with the utility, and buried at the same depth as the tracer wire.
- Tracer wire must be properly grounded as specified.
- All service lateral tracer wire shall be a single wire, connected to the mainline tracer wire using a three-way mainline-to-service connector, installed without cutting/splicing the mainline tracer wire.
- In occurrences where an existing tracer wire is encountered on an existing utility that is being extended or tied into, the new tracer wire and existing tracer wire shall be connected using approved connectors.
- Two feet of excess/slack wire is required in all tracer wire access points after meeting final elevation.
- At all dead-end mains, service laterals, and curb stops, tracer wire shall go to ground using an approved connection to a drive-in magnesium ground rod.

Sanitary Sewer System

- A mainline tracer wire must be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to ensure *full* tracing/locating capabilities from a *single* connection point.
- Lay mainline tracer wire continuously, by-passing around the outside of manholes/structures on the north or east side.
- Tracer wire on all sanitary service laterals must terminate at an approved at-grade, two-terminal access box color coded green (**LD14G2T** or **SP-SWLID-G2**) and located directly above the service lateral near the clean-out, or curb stop. Access box shall be installed under a top hat (**A32**) when located in driveway.

Water System

- A mainline tracer wire must be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to ensure *full* tracing/locating capabilities from a *single* connection point.
- Lay mainline tracer wire continuously, by-passing around the outside of valves and fittings on the north or east side.
- Tracer wire on all water service laterals must terminate at an approved at-grade, two-terminal tracer wire access box, color coded blue, **(LD14B2T or SP-SWLID-B2)** and located directly above the service lateral near the curb stop. Access box shall be installed under a top hat **(A1)** *with* curb stop when located in driveway.
- Above-ground tracer wire access boxes will be installed on all fire hydrants **(T2-B01)**.
- All conductive and non-conductive service lines shall include tracer wire.

Storm Water System

- If the storm sewer system includes service laterals for connection of private drains and tile lines, tracer wire shall terminate at an approved at-grade, two-terminal access box **(LD14G2T or SP-SWLID-G2)** near the clean-out.
- Lay mainline tracer wire continuously, by-passing around the outside of manholes/structures on the north or east side.

Prohibited Products and Methods

The following products and methods shall NOT be allowed or acceptable:

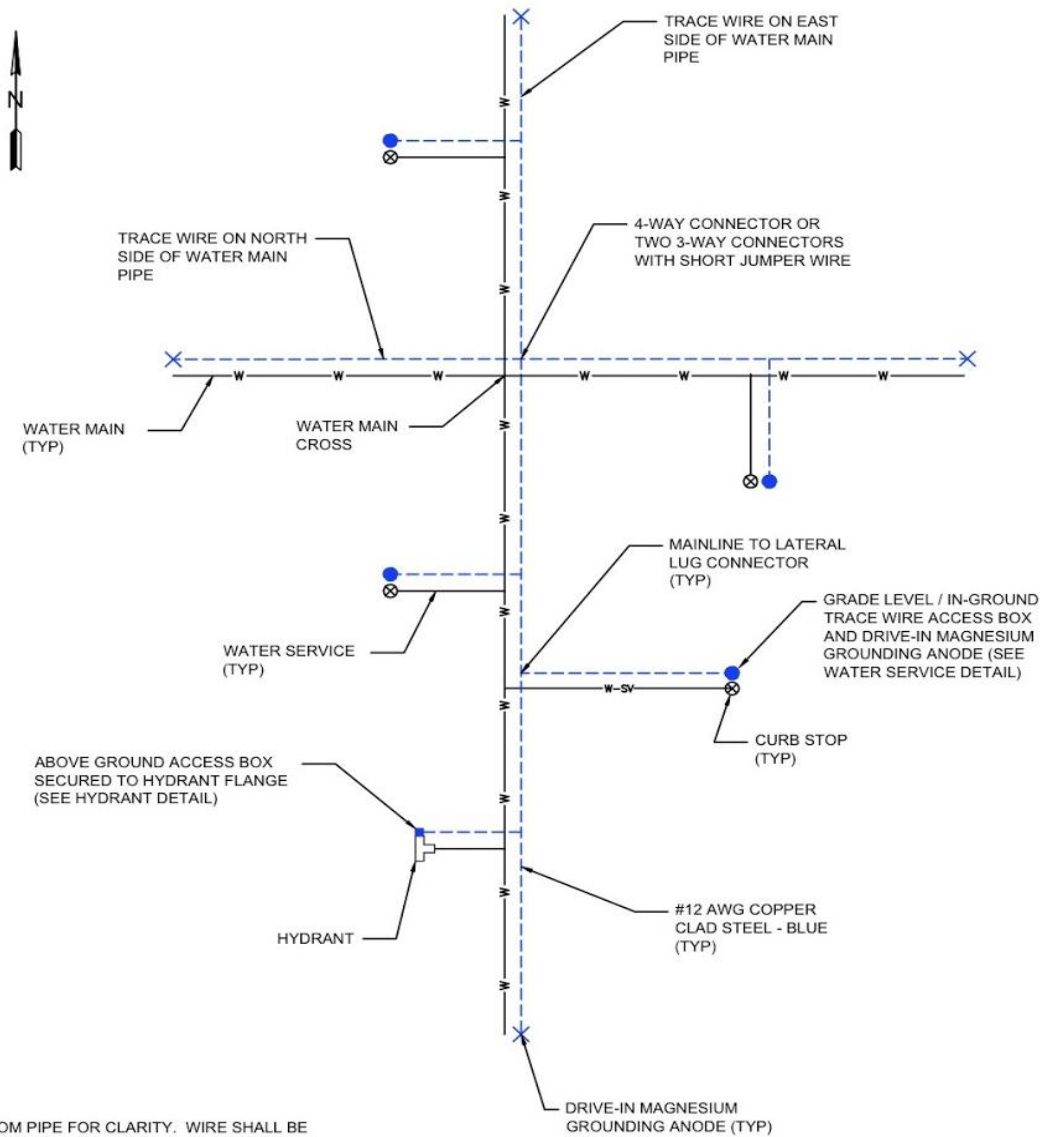
- Uninsulated tracer wire
- Stainless steel tracer wire
- Tracer wire insulations other than HDPE
- Non-locking, friction fit, twist on, or taped connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations that have more than one wire laid side-by-side or in close proximity to one another
- Tracer wire wrapped around the corresponding utility
- Brass fittings with tracer wire connection lugs
- Wire terminations within the roadway in valve boxes, cleanouts, manholes, etc.
- Connecting tracer wire to existing conductive utilities

Testing

All new tracer wire installations shall be located using typical low frequency (512 Hz) line tracing equipment, witnessed by the contractor, engineer, and facility owner as applicable, *prior* to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall *not* be accepted.

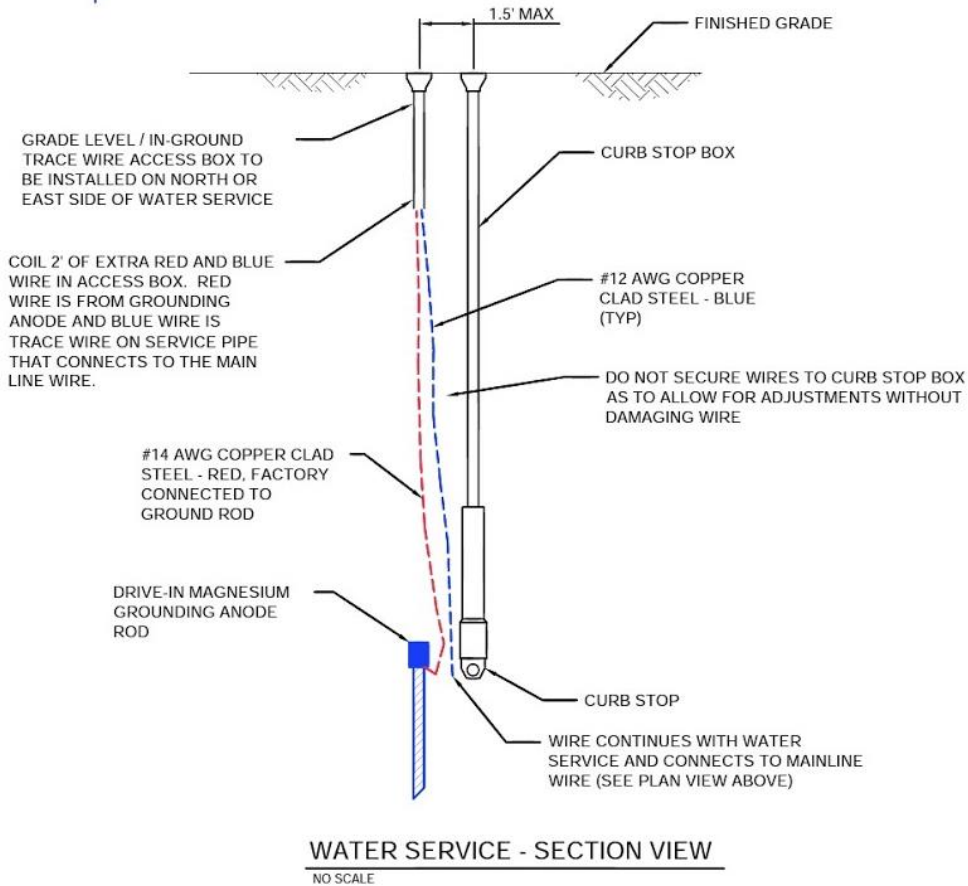
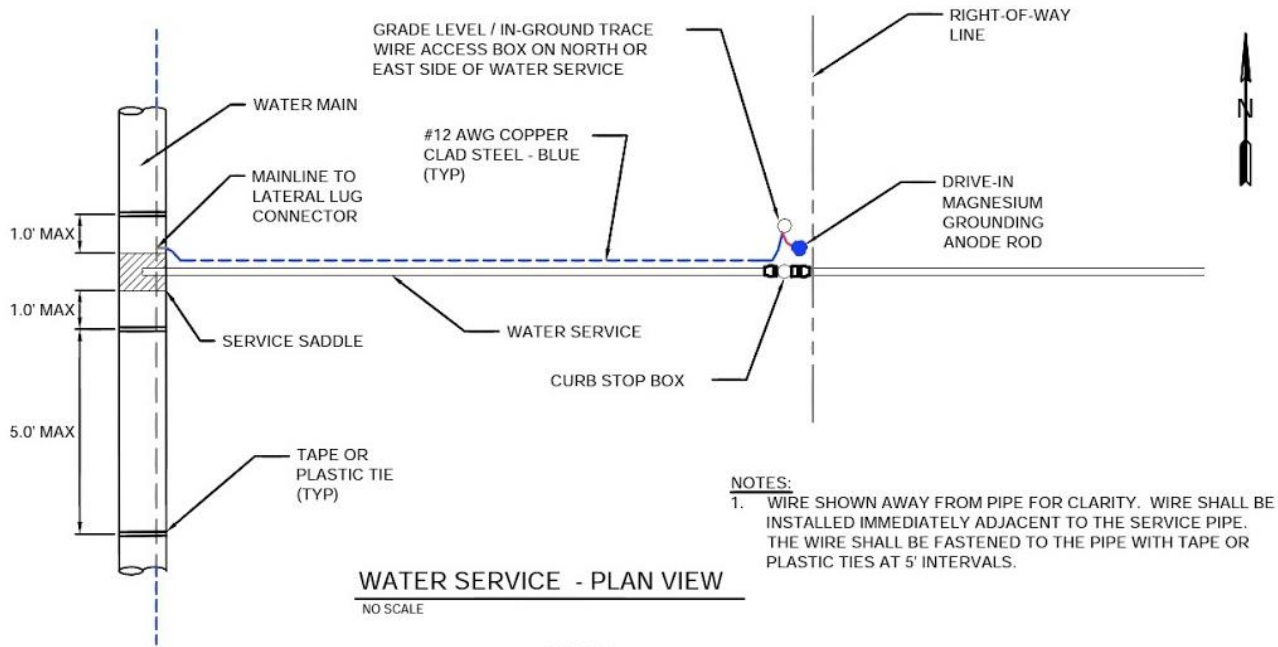


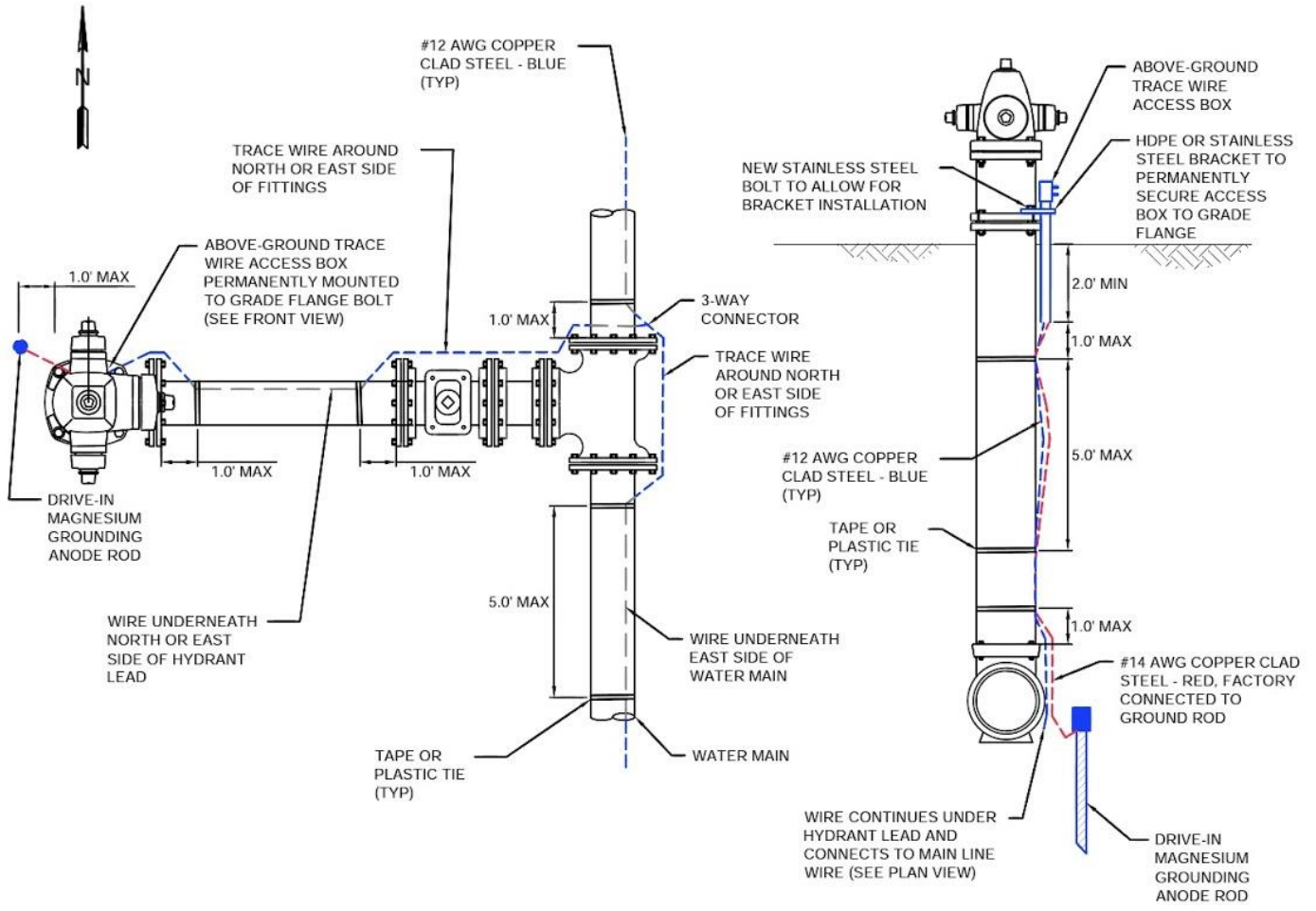
NOTES:

1. WIRE SHOWN AWAY FROM PIPE FOR CLARITY. WIRE SHALL BE INSTALLED ON THE BOTTOM SIDE OF THE PIPE BELOW THE SPRING LINE. THE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 5' INTERVALS.

TRACE WIRE PLAN (WATER)

NO SCALE



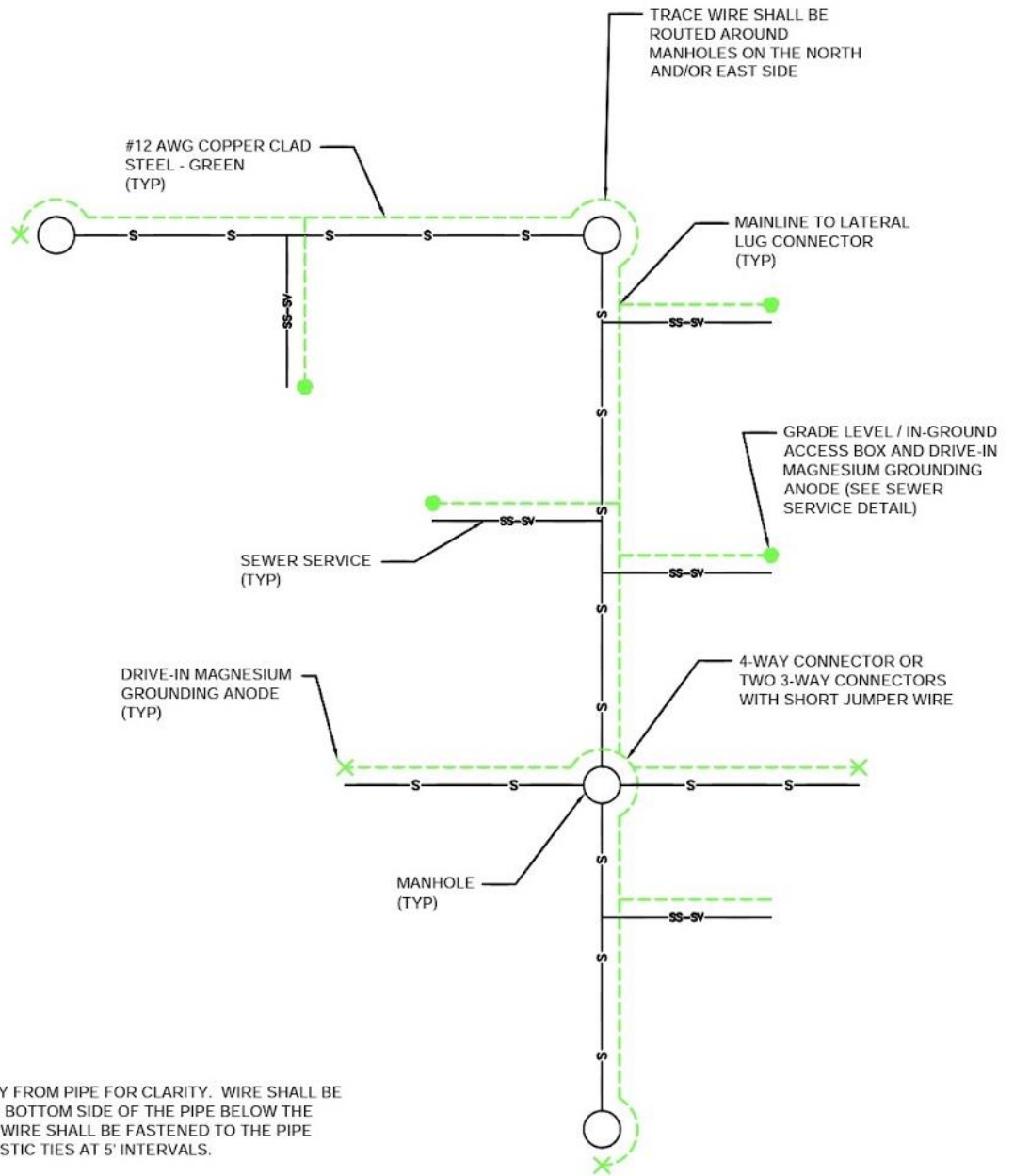


HYDRANT - PLAN VIEW

NO SCALE

HYDRANT - SECTION VIEW

NO SCALE

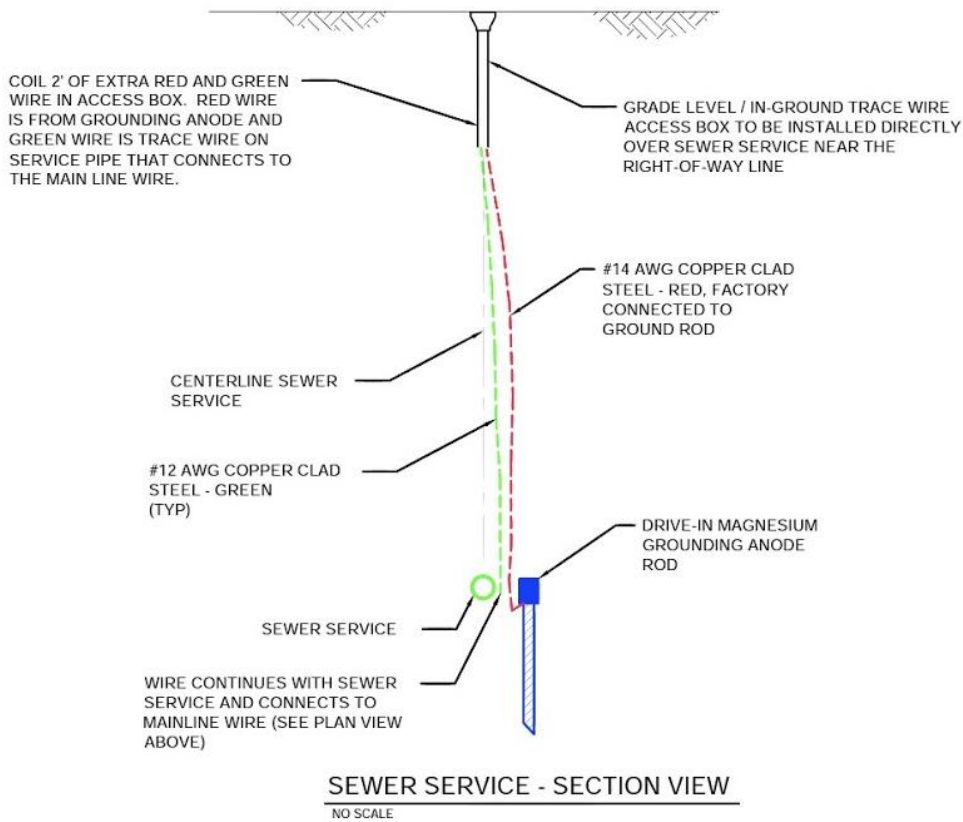
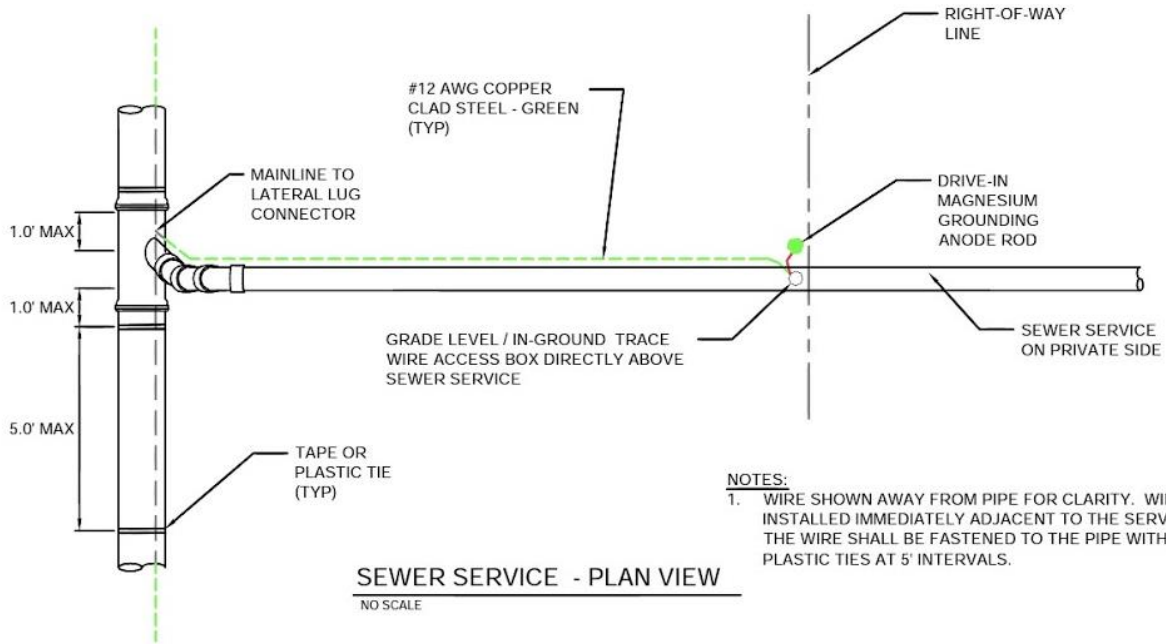


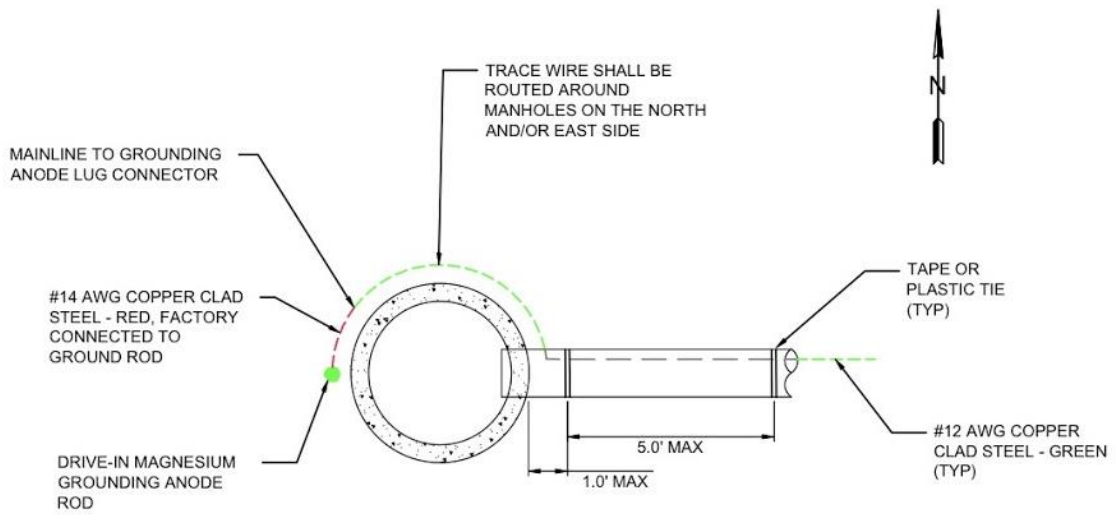
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TRACE WIRE PLAN (SEWER)

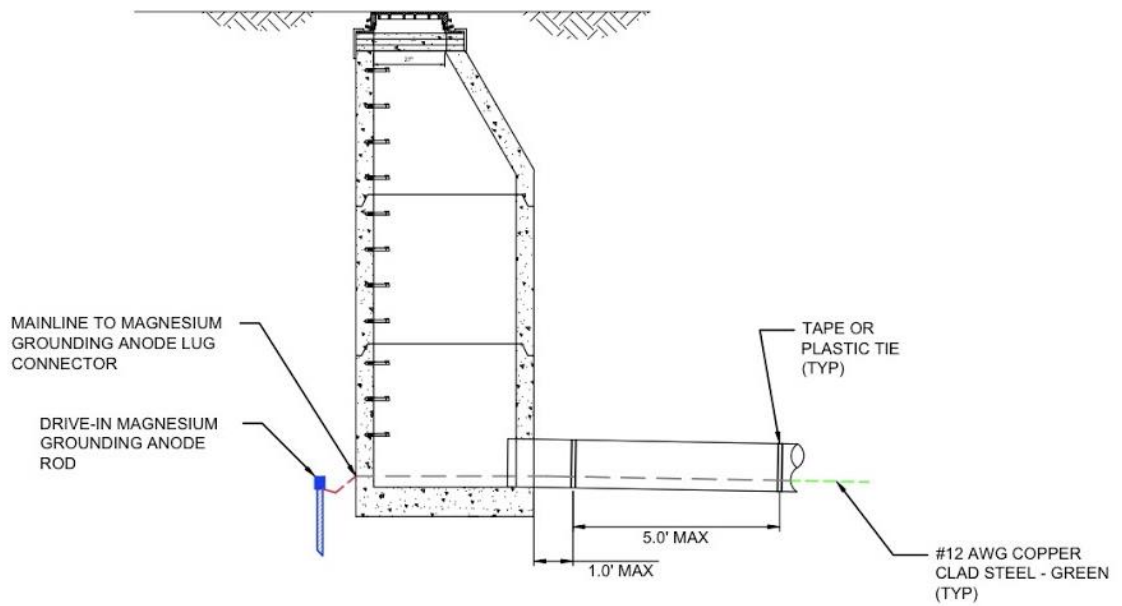
NO SCALE





SEWER MANHOLE - PLAN VIEW

NO SCALE



SEWER MANHOLE - SECTION VIEW

NO SCALE