City of Ft. Lauderdale Utility Detection Requirements & Specifications

-Water Services and Sewer Lateral Construction

1. Specifications

1. All underground water services shall have electronically detectable Path Marking Warning Tape installed above it from the connected watermain to the meter box. This includes domestic water connections as well as fire connections.

2. Sewer laterals shall have electronically detectable Path Marking Warning Tape installed above it from the connection with the public sewer main to the cleanout.

3. The Path Marking Warning Tape shall be made of polyethylene (or approved equivalent) material, 6-inches wide and a minimum of 11 millimeters thick.

4. The Path Marking Warning Tape shall have detectable RFID Markers embedded in the tape every eight feet to provide a continuous path to allow for easy detection at any point along the pipe. The signal should be such that it will provide guidance on the direction of the tape.

5. RFID Frequencies for path marking warning tape shall be as follows:
   i. Water: 73.5 kHZ
   ii. Wastewater: 41.4 kHz

6. The Path Marking Warning Tape shall be able to function and be detected without the need for a direct connection to an external power source (e.g. no access points needed), which will allow for quicker detection at any point along the path.

7. Each detectable RFID marker embedded in the Path Marking Warning Tape functions independently so that even if a section of tape is removed, the remaining marked sections will continue to function.

8. Path Marking Warning Tape must be able to provide a depth measurement using an underground cable/pipe locator.

9. The Path Marking Warning Tape will not require grounding.

10. Path Marking Warning Tape shall be Blue or Green in color and shall be printed on one side in black letters (Typical for all lettering) and shall be as follows: “CAUTION WATER (or Sewer or Reclaim) LINE BURIED BELOW” (or an approved equivalent wording). The wording shall be repetitive along the full length of the tape.

11. Path Marking Tape shall be detectable at a maximum of 48” below grade regardless of soil composition.

12. Approved Manufacturer: 3M Electronic Marking System (EMS) Path Marking Warning Tape or approved equal.

2. Installation

1. Path Marking Warning Tape shall be installed continuously and longitudinally above and along all water and wastewater services for new construction and for any repair or retrofit construction using open trench methods, for identification and detection purposes.

2. The Path Marking Warning Tape shall be installed directly above the center of the pipe and at least 16-inches deep from final grade to a maximum depth of 48-inches below final grade. If 16-inch depth cannot be achieved, place the tape directly on the pipe.

3. The contractor shall exercise care to prevent damage to the Path Marking Warning Tape when placing the remaining backfill.

<u>City of Ft. Lauderdale Utility Detection Requirements & Specifications</u>

-Pressure Systems Other Than Water Services.

1. Tracer Wire

All tracer wire shall have HDPE insulation intended for direct bury and color-coated per the APWA standard for the specific utility being marked.

i. Open Trench - Tracer wire shall be #10 AWG copper clad steel, high strength with minimum 650 lb break load, with minimum 30-mil HDPE insulation thickness.

ii. Directional Drilling/Boring - Tracer wire shall be #10 AWG copper clad steel, extra high strength with minimum 2,032 lb break load, with minimum 45-mil HDPE insulation thickness.

iii. Pipe Bursting/Slip Lining - Tracer wire shall be 7 x 7 stranded copper clad steel, extreme strength with 4,700 lb break load, with minimum 50-mil HDPE insulation thickness.

2. Tracer Wire Installation

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

2. Tracer wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.

3. Runs of tracer wire are not to exceed 1,000 feet between grounds and are to terminate in an approved tracer wire access box or approved above ground access point located at a fire hydrant. (See Termination/Access)

4. 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 or spray coating shall not be allowed.

5. Tracer wire shall be installed at the top of the pipe and secured (taped or tied) at 5-foot intervals.

6. Tracer wire must be correctly grounded as specified.

7. Mainline tracer wire shall not be connected to existing conductive pipes.

8. 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 splice connectors.

9. Lay mainline tracer wire continuously, by-passing around the outside of valves and any other appurtenances on the north or east side.

3. Connectors

1. Mainline Tracer Wire - All mainline tracer wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector (SnakeBiteTM or approved equal). At crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

2. Pipe Burst Wire– All connections from a Pipe Burst Wire are to use Pipe Burst Connectors either In-Line Splice, or Three-Way connectors from Copperhead or approved equal.

4. Termination/Access

1. All tracer wire termination points must use an approved tracer wire access point (above ground access point or grade level/in-ground access box as applicable), specifically manufactured for this purpose.

2. All tracer wires are to terminate at the nearest fire hydrant utilizing an above ground, 2-terminal, access point (Cobra Access PointTM or approved equal). The Access Point is to be connected to the flange of the fire hydrant. Use of grade level/in-ground access box is to only be used when there are no fire hydrants on the main (transmission mains).

3. All grade level/in-ground access boxes shall include a dual terminal switchable lid (SnakePit™ RB14*2T-SW or approved equal), be rated for heavy traffic, and color coded per APWA standard for the specific utility being marked.

4. A minimum of 2 feet of excess/slack wire is required in all tracer wire access boxes after meeting final elevation.

5. All tracer wire access boxes and above ground terminals must include a manually-interruptible conductive/connective link between the terminal(s) for the tracer wire connection and the terminal for the ground rod wire connection.

6. Ground wire shall be connected to the identified (or bottom) terminal on all access boxes.

5. Grounding

1. Tracer wire must be correctly grounded at all above ground and at grade access points.

2. Ground tracer wire by using a drive-in magnesium ground rod with a minimum of 20 feet of #12 red HDPE insulated copper-clad steel wire connected to the anode (minimum 1.5 lb) specifically manufactured for this purpose and buried at the same elevation as the utility.

3. Install the ground rod per the manufacturer's recommendations and instructions.

4. Where the ground rod wire will be connected to a tracer wire access box, a minimum of 2 feet of excess or slack wire is required after meeting final elevation.

6. Prohibited Products and methods shall not be allowed or acceptable:

1. Uninsulated tracer wire

2. Tracer wire insulations other than HDPE intended for direct bury.

3. Tracer wires not domestically manufactured

4. Non-locking, friction-fit, twist-on or taped connectors

5. Brass or copper ground rods

6. Wire connections utilizing taping or spray-on waterproofing

7. Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another

8. Tracer wire wrapped around the corresponding utility

9. Brass fittings with tracer wire connection lugs

10. Wire terminations within the roadway, (in valve boxes, cleanouts, manholes)

11. Connecting tracer wire to any conductive utilities

7. Testing Tracer Wire Signal

1. All new tracer wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the Contractor, the Engineer and the City 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.

8. RFID Ball Markers

1. The RFID ball markers are to be placed at all valves, tees, crosses, and at any vertical changes. The ball markers will be placed during the backfill operation of the facility with a minimum 3-foot cover for roadway applications and a maximum 5-foot depth.

2. RFID ball markers are to be 3M™ Electronic Marker System (EMS) Ball Markers or approved equal.

3. The frequency of the RFID Marker is based upon the specific utility that is being installed as identified below:
    - i. Water: 145.7 kHz
    - ii. Wastewater: 121.6 kHz