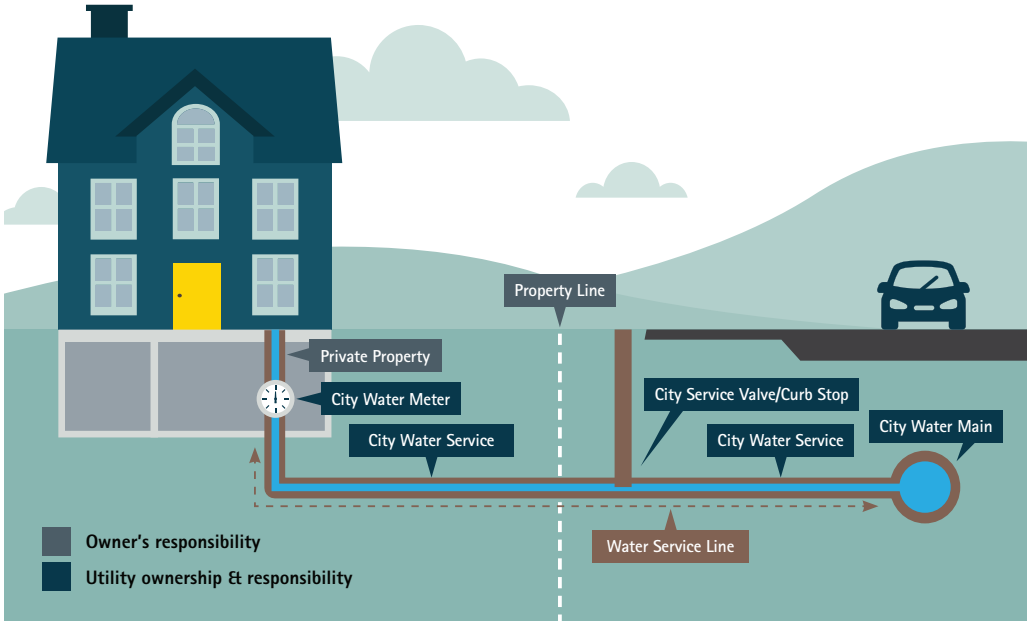
Copper Development Association Inc.
Copper Alliance

Best Practices for Replacing Lead Service Lines

Replacing lead service lines will provide Americans with clean water. Copper is the long-preferred material for lead replacement projects. While the installation methods differ from cheaper materials, copper's long service life and resiliency ensures customer satisfaction and safety when installed properly.



Cities and communities handle lead service line replacement responsibilities differently. Some are doing the entire line (from city water main through the private property), others are requiring owners to financially cover a certain portion within their private property.

General Notes

When replacing lead service lines, it is crucial to do a complete service line replacement for both the city and the homeowner lines. A partial replacement will exacerbate the issue and likely elevate lead levels due to disturbance of the line.

- Type K annealed (soft) coils are the most commonly used for water service lines.
- Proper sleeving and wrapping in soil and when penetrating through house foundation.
- Best practice for making connections is using flare fittings. Important note: when connecting the copper service line to the water main, it is critical to position the copper piping in the "3 o'clock" position (also known as a goose neck or pig tail). This way when backfilled and compaction occurs the service line flare connection is not loosened.

Tube End Preparation for Flare Fittings

Proper tube end preparation is critical in achieving an optimum seal of any flared tube end connection. When properly performed, the steps provided will assure the integrity of your tube and prevent leakage.


1

1. Ream the cut end of the copper tube so that the inside burr is remove. Then, debur or chamfer the outside diameter of the cut copper tube end. This can be accomplished by a file, chamfering tool or other appropriate tools.

WARNING: A burr left on the inner or outside diameter of the tube end can create an imperfect sealing service where metal-to-metal contact is made for flared compression joints.


2

2. Straighten and re-size/re-round the ends of the copper tube. As copper tube is uncoiled or rolled-out or with trenchless methods of installation as the tube is pulled through the ground – the tube end can easily become out-of-round, oval, bent or dented. To make satisfactory, strong, reliable, leak-free joints, the installer should re-size and re-round the tube end using an appropriate resizing tool.


3

3. When the outside and inside diameter burs are removed, along with the tube being re-rounded, the copper flare can be tightened to the connection. No material pipe joint compound should be applied to the matting surface of the flare fitting and flared tube before attaching the flare nut to the fitting body. Proper roundness, tube preparation and flare will provide a watertight seal.

Wrapping and Sleeving

Follow the descriptions and visuals below for proper wrapping in soil sleeving when penetrating through house foundation.

SOIL: In most cases, the best option for installing copper underground is to bury it in direct contact with the soil or bedding. Copper is naturally corrosion resistant to most soils and underground environments. Wrapping or sleeving the copper tube in an effort to provide an additional layer of protection, while well intended, can lead to failure due to improper sleeving or wrapping practices.

SLEEVING: When sleeving is required through foundation walls or floors, the sleeve should be sealed water-tight against the infiltration of ground water. Failure to properly seal the sleeve can result in the collection and concentration of ground water contaminated with thawing salts, fertilizers, or other chemicals, which can cause corrosion of the tube.

SEALING: Seal the space between the tube and sleeve with silicon caulk. Care should be taken to ensure that the chosen caulks or spray foams do not contain ammonia or methanol, which can outgas as they cure and in rare cases cause stress-cracking corrosion of the copper tube.

Seal the sleeve using Fernco™, equivalent electrometric clamps (See Figure 1 and 2) or electrician's duct seal (See Figure 3). These will allow the tube to expand, contract and move within the sleeve, while still maintaining its water-tight seal.

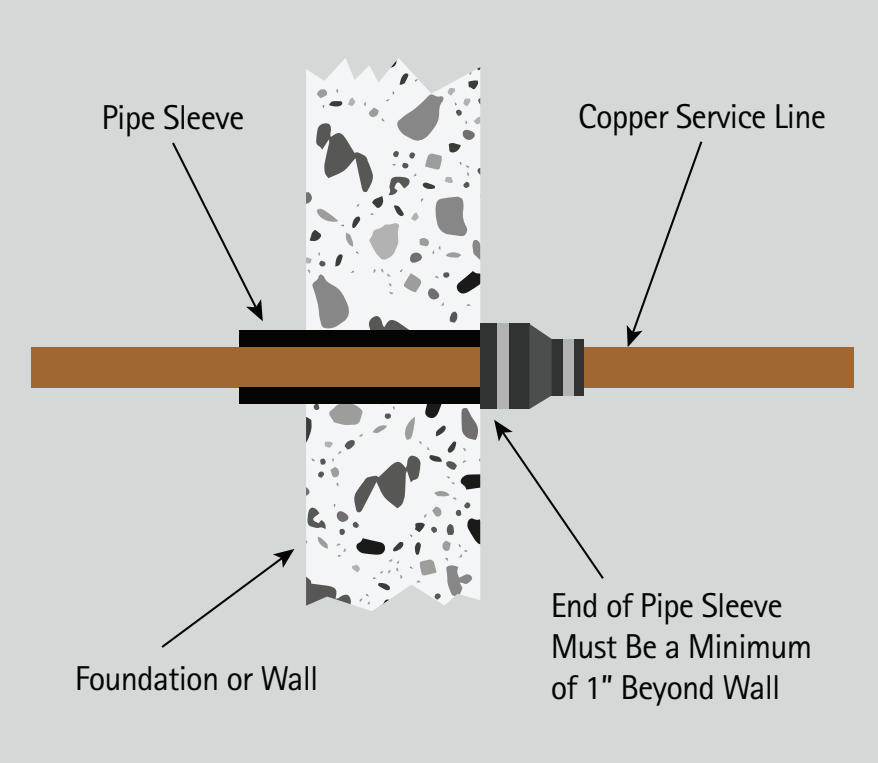


Figure 1

Figure 2

Figure 3

WRAPPING: Many municipalities require all underground piping to be encased in a polyethylene encasing wrap or a sleeving material. This material resembles a long plastic bag and is placed over the tube prior to installation in an open trench, moled, or directionally bored hole. Extreme care must be exercised when poly type encasing sleeves are used to ensure the poly wrap is not torn or otherwise damaged. Tears in the wrap material can permit unwanted chemicals to collect in the wrap, between the wrap and in the copper tube, which can contribute to premature failure of the tube.

Trenchless or Open Trenching

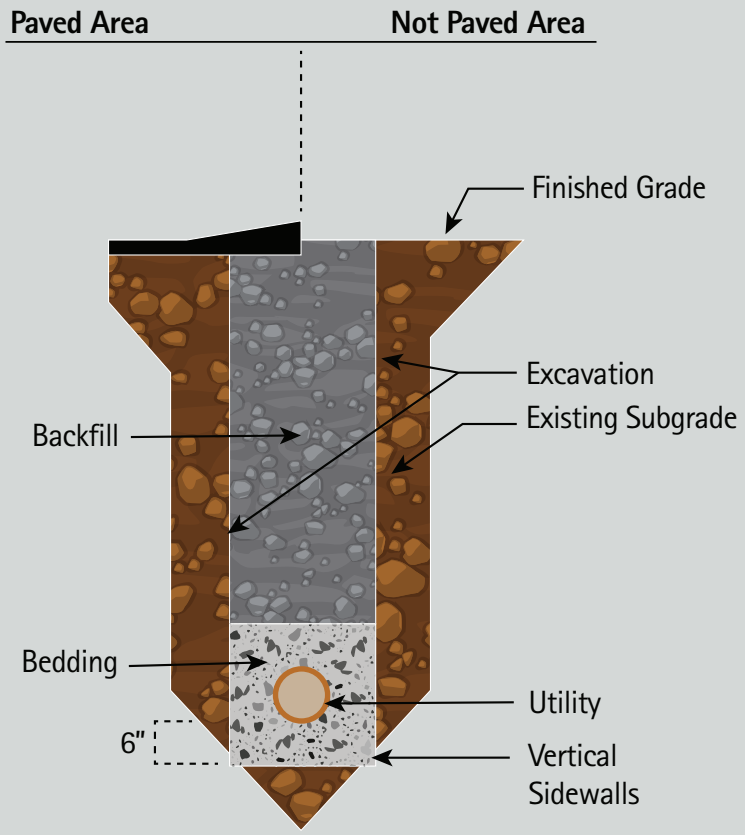
Trenchless vs. Open Trench: What's the difference? While open trenching may be more common for rural settings and trenchless more advantageous in urban areas, each method can be achieved for pipe replacement with the same goal in mind. However, they reach that goal differently and have unique considerations.

Trenchless: Installation of underground piping (common methods: impact moling, directional boring/drilling and direct pulling/slitting):

- Aware of different soil conditions
- Ensure sharp rocks and underground obstacles are not present in the path
- Mole diameters should be as close as possible to outside diameter of copper tube

Open Trenching: Excavation type of installation for underground piping

- Meet minimum requirements for trenching per OSHA 2226 Trenching and excavation safety
- Preferred backfill on all sides of tube, but not limited: washed sand, limestone sand, small smooth river stone, washed pea gravel



Trench detail note: Minimum depth of copper service line and back fill per local AHJ

WARNING: Laying the tube on the bottom of the trench, where it is in contact with the undisturbed or unexcavated soil could create an oxygen differential cell along the bottom of the tube and in rare cases, can lead to preferential corrosion in this area.

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