

January 2023

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## SECTION 31: TRENCH BACKFILL

### 31-1 GENERAL

All trench backfill shall be mechanically compacted native soil, mechanically compacted imported fill, mechanically compacted aggregate base or slurry material, as required on the Construction Standard Details. All trenching within City Streets shall conform to the City's Trench Cut Ordinance Numbers 3524 and 3602. These ordinances represent a comprehensive pavement protection program incorporating a trench cut cost recovery fee. The trench cut fee provides funds to repair the actual accelerated street damage caused by trenching and is an incentive to promote better trench cut coordination among utility companies.

### 31-2 TRENCH BACKFILL

Trench backfill within the City of Roseville street right-of-ways shall conform to Construction Standard Details TB-1, TB-2, TB-3, TB-3a, TB-4 and TB-5. Moisture content shall be controlled to obtain the optimum density for the native soil type encountered. All compaction testing shall conform to ASTM D1557-78 test methods. Trench backfill compaction shall be tested and certified by a licensed geotechnical engineer at the Developer's expense. Certification shall be provided to the City Engineer prior to the construction of surface improvements.

Backfill for joint utility trench shall be sand compacted 85% relative compaction (TYP), above the 4 utilities occupying the joint trench. Then backfill with native material free of all deleterious materials, rocks or boulders compacted to 90% within 1 foot of final grade and 95% the last foot. Sand Shading material to be, screened free, No. 4 sieve, 4mm maximum particle size, free of sharp edges, and approved by each utility trench Inspector. (DG will not be approved).

Following paving operations and where water utility valve clusters are present, standard mechanical compaction efforts and equipment may have limited access to achieve adequate compaction per these Standards. In these cases, it is authorized that 2-sack flowable concrete slurry backfill material (Per Section 71-5.K) may be used within the water valve excavation area to just below the required concrete collar height. Once cured, placement of concrete collar and/or HMA paving operations may progress.

**A. Existing Streets:** Trench backfill in existing asphalt concrete streets shall conform to Construction Standard Detail TB-1, TB-2, TB-3, TB-4 and TB-5 and the City's Trench Cut Ordinance. Longitudinal trenches for dry utilities (CATV, telephone, gas, electric, traffic signal and signal interconnect cable) shall be excavated 6 inches clear from the gutter lip, conforming to Details TB-1 or TB-3. (For Detail TB-3, the 18 inch key nearest the gutter for the asphalt concrete patch shall be modified to 6 inches.) Following the patching of the trench with asphalt concrete, the street surface shall be slurry sealed from the gutter lip to the edge of the bike lane stripe (usually 4 feet wide). If the bike lane stripe is obliterated in any manner by the construction process, it shall be replaced with thermoplastic per these Construction Standards.

Trench backfill in existing Portland cement concrete streets shall conform to Construction Standard Detail TB-1, TB-2, TB-3a, TB-4, TB-5, and ST-54 and the City's Trench Cut Ordinance. Longitudinal trenches for dry utilities (CATV, telephone, gas, electric, traffic signal

January 2023

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and signal interconnect cable) shall be excavated 6 inches clear from the gutter lip, conforming to Details TB-1 or TB-3. (For Detail TB-3a, the 18 inch key nearest the gutter for the concrete patch shall be extended to the nearest concrete joint.) Following the patching of the trench with Portland cement concrete, the street surface shall be finished in a manner similar to the surrounding pavement, i.e. diamond ground, troweled, or natural. If the bike lane stripe is obliterated in any manner by the construction process, it shall be replaced per these Construction Standards.

**B. Jetting:** Compaction of trench backfill by jetting methods is NOT allowed in City of Roseville right-of-way areas or over dedicated reclaimed water, storm, sewer or water easements or mains. Jetting of joint utility trenches behind the right-of-way and within public Utility easements may be allowed under specific conditions and upon the written approval of the City's Construction Inspector and the Geotechnical Engineer.

**C. Material:** Material for backfilled trenches shall contain no organic material and no rocks or soil lumps exceeding 4 inches in diameter with the following qualifications:

1. Cobbles in the initial backfill (the first 1 foot above the pipe bedding covering the pipe) shall be 3 inch maximum diameter.
2. An exception to the 4 inch maximum diameter cobble is where cobbles exceed 4 inches in diameter and are predominant (as determined by the City's Construction Inspector and Geotechnical Engineer). In this condition, 8 inches in diameter is the maximum size cobble allowed.
3. The maximum cobble size shall not be greater than that of the depth of the maximum compaction lift, for the type of equipment used.

Slurry cement backfill, controlled low-strength material or dry mix "Popcorn" may be used on a case by case basis. The Contractor shall submit a proposed design mix to the City Construction Inspector for review and approval prior to placement. ) See Section 71-5.K.

Native soil shall not be used for bedding for utility conduits or chases within the City right-of-way, but only select bedding materials such as sand, pea gravel, and 1/2 inch (minus) crushed rock or 2-sack cement slurry.

**D. Placement of Material:** Equipment shall be a size and type satisfactory to the on-site geotechnical engineer or City's Construction Inspector. Impact-type pavement breakers or compactors (hydro-hammers) shall not be used within 5 feet of the top of any type pipe. Material for mechanically compacted backfill shall be placed in horizontal lifts which, prior to compaction, shall not exceed the depths specified below for the type of equipment employed. Actual maximum lift depth will vary with soil conditions and compaction equipment. The Contractor shall consult with a geotechnical engineer to determine the appropriate maximum depths.

The Contractor shall be responsible for verifying compaction requirements for each lift.

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January 2023

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**E. Typical Compaction Equipment and Maximum Lift Depths Achieved by Proper Compaction**

**Maximum lift depth of 4 inches, equipment type:**

- Portable, engine driven pneumatic type (wacker)
- Portable vibratory plate

**Maximum lift depth of 12 inches, equipment type:**

- Backhoe mounted sheep-foot
- Vibratory smooth wheeled roller
- Vibratory smooth wheel roller with pneumatic tires

**Maximum lift depth of 18 inches, equipment type:**

- Impact, free-fall or stomping equipment (hydro-hammer)

**F. Pipe Bedding References:**

- See W-1 and SS-1 for water and sewer pipe bedding requirements.
- See TB-2 for non-rigid storm drain pipe bedding.