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 rights-of-way shall conform to Construction Standard Details TB-1, TB-2, TB-3, 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 one (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 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 streets shall conform to Construction Standard Detail TB-1, TB-2, TB-3, TB-4 and TB-5 the City's Trench Cut Ordinance. Longitudinal trenches for dry utilities (CATV, telephone, gas, electric, traffic signal and signal interconnect cable) shall be excavated six 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 six 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 four 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.

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 and 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 four inches in diameter with the following qualifications:

1. Cobbles in the initial backfill (the first one foot above the pipe bedding covering the pipe) shall be three inch maximum diameter.

2. An exception to the four inch maximum diameter cobble is where cobbles exceed four inches in diameter and are predominant (as determined by the City's Construction Inspector and Geotechnical Engineer). In this condition, eight 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.

Controlled Density Fill (CDF) may be used on a case by case basis. The Contractor shall submit proposed CDF design mix to the PWD for review and approval prior to placement.

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 ½ inch (minus) crushed rock or two 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 (hydrahammers) 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.

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

Maximum lift depth of four (4) inches, equipment type:

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

Maximum lift depth of twelve (12) inches, equipment type:

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

Maximum lift depth of eighteen (18) inches, equipment type:

Impact, free-fall or stomping equipment (hydrahammer)

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.