SECTION 33 05 23

UTILITY PIPE JACKING

PART 1 - GENERAL

1. SECTION INCLUDES

A. JACKING OPERATION AND PIPE INSERTION

The equipment and method of operation shall be approved by the Engineer before proceeding with the work. Approval of the proposed method by the Engineer will not relieve the Contractor of the responsibility for making a satisfactory installation meeting the criteria set forth herein. Only workmen experienced in the boring and jacking of conduit shall be employed in performing the work. Sanitary sewer pipe to be jacked shall be installed in a steel casing pipe of the size and in the manner shown on the drawings.

If the Contractor elects to perform additional boring and jacking beyond the limits specified herein, the cost of any additional boring and jacking shall be provided at the Contractor's expense.

B. BORES

Where a casing pipe or conductor is installed in a bored hole, the hole shall be bored by use of a machine which will cut a true circular bore to the required line and grade. Bored tunnels shall be no more than one inch larger than the outside limits of the casing pipe to be placed therein. If so, required bracing and shoring shall be provided to adequately protect the workmen and the roadway. The conductor pipe shall be placed closely behind and in conjunction with the boring operation.

C. PLACING PIPES IN CONDUCTOR

Sanitary sewer pipe shall be strapped to two nylon skids with steel straps. The nylon skids shall be near the center of each pipe section and shall be large enough to prevent any part of the joint from bearing on the conductor. Skids may have to be adjusted in height to hold the pipe on correct line and grade. In lieu of nylon skids, Contractor may use conductor pipe spacers as herein specified.

After installation of the sanitary sewer pipe, clean dry sand shall then be blown into the conductor pipe on both sides to the full depth of the conductor pipe. Casing seals shall be provided at each end of conductor pipe to contain sand. Casing seals shall be Plico Type 660 or P.S.I. Model W, or equal.

D. CONDUCTOR PIPE SPACERS

Insulating casing spacers, where used, will be installed at not over 8-foot spacing, prior to inserting pipe in the conductor. Spacers will be similar and equal to Plico Type 512M or P.S.I. Model A12 with insulating skid, 12" bolted spacer with 6 skids. Segment with 4 skids will be placed on the bottom, with skid to give equal bearing pressure on the conductor without deformation of the pipe.

E. JACKING HEADS

Whenever the nature of the soil indicates, in the opinion of the Engineer, the likelihood of ground loss during the driving of the conduit, the use of a steel jacking head will be required. The jacking head shall be fitted to the leading section of the conduit in such a manner that it extends around the outer surface of the upper two-thirds of the circumference of the conduit and projects at least 18 inches beyond the driving end at the top of the conduit, but does not protrude over 1/2-inch outside of the outer conduit surface. This head shall be securely anchored to prevent any wobble or alignment variation during the jacking operation. Excavation shall be carried out entirely within the jacking head and no excavation in advance thereof will be permitted. Every effort shall be made to avoid any loss of ground outside the perimeter of the jacking head.

F. BACKPACKING VOIDS

In general, excavated material shall be removed from the conduit as jacking progresses and no accumulation of excavated material within the conduit will be permitted. Should appreciable loss of ground occur, the voids shall be backpacked promptly to the extent practicable with soil cement consisting of a slightly moistened mixture of one part cement to five parts of granular material. When material selected from the spoil is not suitable for this purpose, the Contractor shall import suitable material at his sole expense. The soil cement shall be thoroughly mixed and rammed into place as soon after the loss of ground as possible.

After jacking is completed, the Contractor shall drill holes in the conduit at the locations of ground loss and elsewhere where voids behind the conduit are suspected. If such holes disclose void spaces existing, the Contractor shall force grout into such voids to refusal at pressure as directed by the Engineer, but not to exceed 50 pounds per square inch. The Contractor shall then repair the drilled holes, including plastic lining. Grout shall be a lean mixture of sand and cement. Backpacking of the one-inch annular space in the case of bores will not be required, unless specifically called for on the drawings.

G. TOLERANCES

Extreme care shall be exercised by the Contractor to maintain line and grade during jacking operations, and the Contractor may be required to modify the

manner in which he is conducting his jacking operation to correct any deviation which is deemed necessary by the Engineer.
Maximum deviation from stated line and grade of conductor pipe shall be such that line and grade of the sanitary sewer pipe can be adjusted to a sufficient amount within the conductor pipe to achieve the line and grade shown on the drawings to within 0.3 inch per 100 feet, unless otherwise directed by the Engineer.

H. BORING AND RECEIVING PITS

Boring and receiving pits and trenches shall be prepared and back filled in accordance with sound bedding practices and with ASTM D2774 and D2321. Surfaces shall be restored to new condition with original kinds of materials.

In considering locations for access pits, the Contractor shall consider the size of the 27" steel casing, locations of obstructions and services, pulling distances, traffic conditions, and locations of utilities. The locations of the excavation points should be such as to minimize disruption.

Where an unstable or running soil condition occurs, such as in excavations below ground water, Class 1 or 2 permeable materials shall be used according to State of California Standard Specifications.

2. RELATED SECTIONS

Section 31 23 33 Utility Trenching and Backfill.

Section 33 30 00 Sanitary Sewerage Facilities

3. RELATED DOCUMENTS

Caltrans Standard Specifications.
Section 51 Concrete Structures.
Section 75 Miscellaneous Metal.

4. DEFINITIONS

AASHTO: American Association of State Highway and Transportation Officials.

ASTM: American Society for Testing Materials.

AWWA: American Water Works Association.

HDPE: High-density polyethylene.

NPS: Nominal pipe size.

5. SUBMITTALS

Follow submittal procedure outlined in Section 01 33 00.

(1) Proposed Plan for removing old pipe and installing new pipe. Plan shall include jacking direction, calculations of jacking forces, required bracing, and jacking head, and other pertinent data.

(2) Product data for the following:
Plastic casing spacers and manufacturer's recommendation on installation.

6. DELIVERY, STORAGE AND HANDLING

Do not store plastic pipe and fittings in direct sunlight.

Protect pipe, fittings, and seals from dirt and damage.

Protect imported bedding and backfill material from contamination by other materials.

PART 2- PRODUCTS

1. PIPE MATERIALS

High-density polyethylene (HDPE) pipe and fittings and shall be Driscopipe 1000, SDR 17, or equal.

SPECIAL PIPE COUPLINGS

Piping: ASTM C 1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined.

PART 3- EXECUTION

1. PIPE INSTALLATION

Carrier pipe casing spacers shall be installed at a maximum distance of 8' between each. Casing spacers shall also be installed on each side of every pipe joint at a maximum distance of 2' from each side of the joint. Casing spacers shall be installed within 12" of each end of the casing.

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