Section 02426

SEWER LINE IN TUNNELS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

A. Handling, transporting, and installing sanitary and storm sewer lines in primary lined tunnels.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Length of sewer installed in primary lined tunnels will be measured by linear foot along center line of completed sewer, center line to center line of manholes, as designated on Drawings, and to end of stubs or termination of pipe; and to inside face of lift stations and treatment plant works. Installation of sewer within limits of structure other than manholes will not be considered for measurement and payment at unit price bid.

2. Payment for installation of sewer in primary lined tunnels is on a linear foot basis.

B. Stipulated Price (Lump Sum): If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.03 SUBMITTALS

A. Conform to requirements of Section 01330 - Submittal Procedures.

B. Provide brief description of method of transporting carrier pipe into tunnel; method of hoisting and positioning pipe; method of jointing and aligning pipe; and blocking plan.

C. Submit buoyant force calculations, bulkhead design, and blocking details. Include in calculations analysis of stresses and deformation induced on carrier pipe. Submittal must be signed and sealed by Professional Engineer registered in State of Texas.

D. Submit as-built survey as described in Document 02533 - Acceptance Testing for Sanitary Sewers to City Engineer prior to substantial completion.

PART 2 P R O D U C T S

2.01 PIPE MATERIAL AND FITTINGS

A. Sewer pipe may consist of fiberglass pipe (FRP), vitrified clay pipe (VCP), polyvinyl chloride (PVC) pipe, high density polyethylene (HDPE) pipe, plastic-lined reinforced concrete pipe (RCP), plastic-lined or epoxy lined ductile iron pipe (DIP) or combinations of these. Storm sewers do not require lining.

B. Assume responsibility for selecting appropriate pipes and pipe joints to safely carry loads imposed during construction.

2.02 FIBERGLASS PIPE

A. Provide fiberglass pipe, joints, and fittings in accordance with Section 02504 - Fiberglass Pipe.

2.03 VITRIFIED CLAY PIPE

A. Provide vitrified clay pipe, joints and fittings in accordance with Section 02508 - Extra Strength Clay Pipe.

2.04 POLYVINYL CHLORIDE PIPE

A. Provide polyvinyl chloride pipe, joints and fittings in accordance with Section 02506 - Polyvinyl Chloride Pipe.

2.05 HIGH DENSITY POLYETHYLENE PIPE

A. Provide High Density Polyethylene (HDPE) Solid and Profile Wall pipe, joints and fittings in accordance with Section 02505 - High Density Polyethylene (HDPE) Solid and Profile Wall Pipe.

2.06 DUCTILE IRON PIPE

A. As approved for pipe jacking applications, ductile iron pipe lined with polyethylene, polyurethane, or ceramic epoxy, and fittings to be in accordance with Section 02501 - Ductile Iron Pipe.

2.07 REINFORCED CONCRETE PIPE

A. Provide reinforced concrete pipe, joints, and fittings in accordance with Section 02611 - Reinforced Concrete Pipe.

B. Provide plastic-liner for sanitary sewers in accordance with Section 02427 - Plastic Liner for Large Diameter Concrete Sewers and Structures.

2.08 ANNULAR GROUT

A. Provide for grouting of annular space between pipe and tunnel liner as specified in Section 02431 - Tunnel Grout.

PART 3 E X E C U T I O N

3.01 INSTALLATION TOLERANCES

A. Prior to installing sewer pipe, verify that primary liner has been constructed so that sewer pipe may be placed in conformance with specified tolerances.

B. Tolerances from lines and grades shown on Drawings for sewer pipe installed in primary liner are plus or minus 6 inches in horizontal alignment and plus or minus 1-1/2 inches in elevation. Should misalignment of primary liner preclude installation of sewer pipe to tolerances specified, notify City Engineer.

3.02 PIPE HANDLING

A. Handle and transport pipe into tunnel in manner that prevents damage to pipe, joints, gaskets, and plastic liner. Do not install pipe damaged during placement operations. Propose repair procedures for review and approval of City Engineer.

3.03 TUNNEL CLEANUP

A. Prior to pipe placement in tunnel, remove temporary tunnel utilities, such as electrical and ventilation. Remove loose material, dirt, standing water, and debris prior to pipe placement.

B. Temporary steel construction tracks or steel pipe skids may be left in place when they do not interfere with alignment of sewer pipe or interfere with final placement of annular grout.

3.04 INVERT PIPE SUPPORT

A. Provide support adequate to establish final pipe grade. Support may include screeded concrete, steel beam, or other method as designated by Contractor’s Engineer. Secure pipe support to pipe or primary liner. When concrete is used for pipe support, cure it minimum of 12 hours prior to setting pipe.

3.05 JOINING PIPE IN TUNNELS

A. Join pipe segments to properly compress gaskets and allow for correct final positioning of pipe for line and grade. Closely align pipes by bringing them loosely together by means of hydraulic jacks, locomotives, pipemobiles, or winches. Once pipes have been loosely joined, pull them home by means of hydraulic tugger or other similar method suitably protecting pipe and joints against damage. Impact jointing such as ramming with locomotives or other mechanical equipment is not permitted.

3.06 BLOCKING PIPE IN TUNNEL AND BULKHEADS

A. Install pipe blocking system. Use pipe blocking to position sewer pipe in tunnel to allow minimum of 4 inches of grout to be placed between sewer pipe and tunnel primary liner or casing.

B. Secure blocking rigidly in place without dependence on wedges to prevent dislodging during pipe placement and grouting operations.

C. Construct bulkheads to withstand imposed grout pressure without leakage. Provide adequate venting for bulkheads.

3.07 ACCEPTANCE TESTING

A. Perform as-built survey on installed sewer pipe. Take invert elevations at each pipe joint. Take two diameter readings, at right angles, randomly at average of 20 feet spacing or less in non-rigid pipe.

B. Test for leakage by low pressure air methods in accordance with Section 02533 - Acceptance Testing for Sanitary Sewers.

END OF SECTION