SECTION 33 34 00 - SANITARY FORCE MAIN

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section specifies the requirements for furnishing and installing sanitary force main and appurtenances. The pipe shall be of the type and size as shown on the plans and constructed in accordance with these specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 23 33 Trenching, Backfilling and Compaction

B. Section 31 41 33 Trench Safety

C. Section 33 30 00 Sanitary Sewer

1.3 APPLICABLE PUBLICATIONS

The following publications of the latest issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by reference thereto:

A. American National Standards Institute (ANSI).

1. B16.1 Cast Iron Pipe Flanges and Flanged Fittings, Class 125.

B. American Water Works Association (AWWA).

1. C-111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

2. C-151 Ductile Iron Pipe, Centrifigually Cast, For Water

3. C105 Polyethylene Encasement for Ductile Iron Pipe Systems

C. American Society for Testing and Materials Standards (ASTM).

1. D-2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe

2. D-3139 Push-On Joints for PVC Pipe.

D. American Society of Mechanical Engineers (ASME)

1. A112.1 4 Backwater Valves

1.4 SUBMITTALS

A. Product Data: For the following:

1. Corrosion proof liner selected for protecting concrete pipe from sewer gases. Contractor shall submit data on the selected liner for approval prior to construction.

2. Any special pipe fittings as shown in the drawings.

3. Backwater valves.

B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

C. Field quality-control test reports.

1.5 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FRP: Fiberglass-reinforced plastic.

C. LLDPE: Linear low-density, polyethylene plastic.

D. PE: Polyethylene plastic.

E. PP: Polypropylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. TPE: Thermoplastic elastomer.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Follow the University of Houston's Plant Operations Planned and Emergency Utility Outage Policy.

2. If work requires interference with any public sewer systems within or outside of Public Rights of Way or Easements, contractor must obtain prior approval and coordinate with local municipality before commencing work.

1.7 DELIVERY STORAGE AND HANDLING

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

1.8 PERFORMANCE REQUIREMENTS

A. Force-Main, Pressure-Piping Pressure Rating: At least equal to system operating pressure but not less than 50 psig or as directed by the engineer's drawings

PART 2 – PRODUCTS

2.1 PIPE

A. All materials and equipment shall be new, of best grade and standard manufacture.

B. Ductile iron pipe shall conform to AWWA C151, latest edition. Wrap pipe in polyethylene per AWWA C 105.

C. PVC pipe shall conform to ASTM D-2241 - SDR 21.

2.2 FITTINGS

A. All materials and equipment shall be new, of best grade and standard manufacture.

B. Cast iron fittings shall conform to ANSI B16.1, latest edition, Class 125, when using Ductile Iron Force Main.

C. Cast iron fittings shall conform to AWWA C 111 when using PVC force main.

D. Wrap cast iron fittings with polyethylene per AWWA C 105.

2.3 VALVES

A. Gray-Iron Backwater Valves: ASME A112.1 4.1, gray-iron body and bolted cover, with bronze seat.

1. Manufacturers:

a. Josam Company.

b. Smith, Jay R. Mfg. Co.

c. Wade Div.; Tyler Pipe.

d. Watts Industries, Inc.

e. Watts Industries, Inc.; Enpoco, Inc. Div.

f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Horizontal Type: With swing check valve and hub-and-spigot ends.

3. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.

4. Terminal Type: With bronze seat, swing check valve, and hub inlet.

B. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

1. Manufacturers:

a. Canplas Inc.

b. IPS Corporation.

c. NDS Inc.

d. Plastic Oddities, Inc.

e. Sioux Chief Manufacturing Company, Inc.

f. Zurn Light Commercial Specialty Plumbing Products; Zurn Plumbing Products Group.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The interior of the pipe shall be kept relatively cleaned of all foreign matter before lowered into the trench, and shall be kept clean during these operations.

B. Pipe shall not be laid in water, or when trench or weather conditions are unsuitable for work.

C. Install piping with a minimum of 4 feet of cover.

D. When work is not in progress, open ends of pipes and fittings shall be securely closed so that water, earth, or other substances will not enter the pipes or fittings.

E. All bends, tees and plugs shall have thrust blocks installed where applicable.

F. Air release valves and cleanouts shall be installed at intervals as indicated on the plans. These fixtures shall be sufficient to withstand 200 psi surge in pressure.

3.2 FIELD QUALITY CONTROL AND TESTING

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.

2. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.

b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.

c. Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

B. The sanitary force main to be installed shall be hydrostatic tested as per this specification.

1. General

a. After the pipe has been laid and initial backfill completed, the force main shall be subjected to a hydrostatic pressure of 150 psi.

b. The Contractor shall furnish, install, and operate, at his expense, the necessary connections, pumps, meters, and gauges necessary to conduct the test.

2. Procedures

a. Before applying the specified pressure test, all air shall be expelled from the pipe.

b. All pipe, fittings, and joints will be examined during testing.

c. Any defective material shall be replaced with sound material and the test repeated until satisfactorily completed and approved.

d. Allowable leakage shall not exceed 25 gallons per inch of diameter per mile of pipe per 24 hours.

e. All visible leaks at exposed joints and all leaks evident on the surface where joints are covered, shall be replaced, regardless of total leakage shown.

END OF SECTION