

**SECTION 02563
SANITARY SEWER FORCE MAINS**

1.0 GENERAL

A. Description

Sanitary sewer force main installation shall include, but not necessarily be limited to, furnishing and installing pressure rated pipe, fittings, and appurtenances of size and type shown on the Plans, installed on firm foundation true to line and grade and in accordance with the Contract Documents.

B. Related Work Specified Elsewhere

1. Trench Excavation, Backfill, and Compaction; Section 02250.
2. Precast Concrete Utility Structures; Section 03400.

C. Quality Assurance

1. Materials

The Commission will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.

2.0 MATERIALS

A. General

1. Materials shall be furnished in accordance with the Contract Documents.
2. To minimize the number of joints, only standard manufacturers length of pipe shall be furnished and installed for all sanitary sewer force mains and house connections unless otherwise indicated on the plans, or as approved by the Commission.

B. Pipe Symbols

For convenience and standardization, the various types of pipe are designated on the plans by the symbols noted in Section 02551, entitled "Water Main Installation and Chlorination".

C. Materials Furnished by the Commission

1. The Commission will not furnish any materials for sanitary sewer force main construction.
2. Unless otherwise noted in the "Special Provisions," the Contractor shall pay for potable water for all testing. The Contractor shall contact the Commission to coordinate its use.

D. Contractor's Options

The Contractor may furnish ductile iron pipe and fittings, polyvinyl chloride pipe and fittings, or high density polyethylene pressure pipe and fittings for sanitary sewer force

mains unless otherwise noted. Ductile or cast iron fittings shall be furnished for use with ductile iron pipe or polyvinyl chloride pipe.

E. Detailed Material Requirements

1. Portland cement concrete for pipe buttresses and anchorages shall be Mix No. 1, as specified in Section 03300.
2. Ductile iron pipe and fittings, polyvinyl chloride pipe and fittings, concrete pressure pipe and fittings shall be as specified in Section 02551. Pressure rating or class shall be as noted in the Contract Documents. Epoxy lining and coatings shall be as required on ductile iron pipe (DIP) and fittings.
3. Joint Restraint
 - a. Restrained joint pipe and fittings shall be of the pipe manufacturer's standard design.
 - b. Ductile iron retainer glands for use with mechanical type joints shall be as approved.
 - c. Rod for tie rod assemblies shall meet the material requirements of ASTM A193, Grade B7, and shall be threaded for at least 8 inches on both ends. Rod shall be 3/4 inch diameter unless otherwise noted.
 - d. Nuts shall meet the requirements of ASTM A194. Manufactured tie rod and accessories shall result in the completed restrained joint assembly having a minimum working pressure rating of 200 psi.
4. Resilient Seat Gate Valves

Resilient seat gate valves shall be as specified in Section 02552 for water valves.
5. Valve Boxes

Valve boxes shall be as specified in Section 02552, except the covers shall be labeled "SEWER."
6. Sewage Air Release and Combination Air/Vacuum Valves
 - a. Sewage air and vacuum valves shall be of the type that automatically releases air, gas or vapor under pressure, automatically exhaust large quantities of air during the filling of a system, and allow air to reenter during draining or when a vacuum occurs.
 - 8/9/10 b. Sewage air and vacuum valves shall have an elongated stainless steel body and stainless steel cover. The internal compound lever mechanism shall be stainless steel and all other internals, including float, shall be stainless steel to positively prevent a galvanic action. The stainless steel float shall withstand a minimum pressure of 1,000 psi.
 - c. All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

	<u>PART</u>	<u>MATERIAL</u>	<u>SPECIFICATION</u>
8/9/10	Body and Cover	Stainless Steel	ASTM A48, Class 30
	Internals	Stainless Steel	Series 300
	Float	Stainless Steel	Series 300
	Seat	Buna-N	
	Exterior Paint	Phenolic Primer Red Oxide	FDA approved for potable water

- d. The valve manufacturer shall furnish installation and maintenance instruction manuals with each valve.
- e. Isolating valve shall be installed between force main and air and vacuum valve.
- f. Sewage air and vacuum valves shall be installed in an easily accessible vault. Vault shall be adequately vented to meet air and vacuum valve requirements.
- g. All internals shall be easily removed through the top cover without removing the main valve from the lines.

7. **Detector Tape**

Visual detection tape shall be 3 inches wide (minimum) nonmetallic green plastic tape, lettered "SEWER" in black graphics.

8. **Tracer Wire for Non-Metallic Pipelines**

Tracer wire shall be THHN solid, soft continuous copper wire with a 45 mil polyethylene insulation. The wire shall be blue, have "UL" markings and suitable for direct bury applications. All underground splicing shall be with butt splice connectors and shrink tubing or split bolt connectors with a water proof binder and underground electrical tape.

F. **Material Storage Note:** Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

3.0 EXECUTION

A. **General**

- 1. Trench excavation, foundation preparation, backfill, and compaction shall be as specified in Section 02250.
- 2. Force main installation shall be as specified in Section 02551, "Water Main Installation and Chlorination," except chlorination is not required.

- i. A minimum 4.5' and maximum 6' depth of cover is required for all sewer force mains.
 3. Pipe bedding, thrust and anchor blocks, and force main appurtenances shall be installed in accordance with the Standard Details for Water.
 4. Resilient Seat gate valve installation shall be as specified in Section 02552 for water valves.
 5. Sewage air release and combination air release/vacuum valves shall be installed in accordance with the Standard Details.
- B. Field Test
 1. The force main and appurtenances shall be tested in accordance with Section 02551, except as modified herein.
 - a. The pressure in the main shall be increased to 150 psi at the highest point of the section of main under test, provided the design static pressure is under 100 psi. Where the design static pressure is over 100 psi, the test pressure shall be 50 psi above static pressure. This test pressure shall be maintained, without pumping for at least two (2) hours. Should this test show the main to be defective, the Contractor shall remedy such defects and retest the main as specified above. This procedure shall be repeated until the test requirements are met.
 - 2.
 3. Chlorination will not be required.

4.0 METHOD OF MEASUREMENT

A. Force Main

Measurement for furnishing and installing force main pipe and fittings will be per linear foot made horizontally along the centerline of the pipe through all fittings and appurtenances.

B. Isolation, Sewage Air Release and Combination Air/Vacuum Valves

Measurement for isolation, sewage air release and combination air/vacuum valves will be made of the number of each size and type of valves installed complete.

5.0 BASIS OF PAYMENT

A. General

1. Payment will be made at the unit and/or lump sum prices bid. The prices bid shall include furnishing all labor, tools, equipment and materials necessary to complete the work as shown, specified, and in strict accordance with the Contract Documents.
2. Payment for furnishing and installing force main pipelines and appurtenances will include the following:
 - a. Trench excavation, backfill, compaction and incidental items as specified in Section 02250.

- b. Furnishing and installing bedding material for air release and vacuum valve manhole fill as per the Contract Documents.
3. Payment will be made for contingent items when approved by the Commission.

B. Force Main

Payment for furnishing and installing force main pipelines, complete and in place, will be made per linear foot of the size and type installed. The price(s) bid shall include traffic control, furnishing and installing all pipe, fittings, and jointing materials, removing existing buttresses when necessary, joint restraint, tracer wire and test stations where required, furnishing materials for and constructing all concrete anchorages and buttresses; strapping of fittings, connecting to existing pipelines or structures, testing; all aggregate bedding, and backfill; providing an approved spoil site, and disposing of all spoil or excess materials; all environmental and erosion or sediment control work including off-site requirements at spoil storage or borrow sites; restoration of all disturbed areas, and for all appurtenances, and incidental items to complete the force main.

C. Isolation, Sewage Air Release and Combination Air/Vacuum Valves

Payment for furnishing and installing isolation, sewage air release and combination air/vacuum valves, complete and in place, will be made for each size and type of valve installed. The price(s) bid shall include traffic control, furnishing and installing all valves, saddles, vaults or manholes, lids or frames and covers, pipe supports, angle valves, corporation stops, extension bar, restoration; testing of the complete installation; and incidental items to complete the valve installation.

****END OF SECTION 02563****