

**SECTION 03400
PRECAST CONCRETE UTILITY STRUCTURES**

1.0 GENERAL

A. Description

Precast concrete utility structures shall include, but not necessarily be limited to, furnishing and installing precast concrete structures, manholes, valve and meter vaults, grade rings, and other miscellaneous structures of the configuration and to the extent indicated and in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Trench Excavation, Backfill, and Compaction: Section 02250
2. Water Valves and Appurtenances: Section 02552
3. Water Services, Water Meter Settings, and Vaults: Section 02553
4. Sanitary Sewer Manholes: Section 02562

C. Quality Assurance

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

2.0 MATERIALS

A. Materials Furnished by the Commission

The Commission will not furnish any materials for precast concrete utility structures.

B. Contractor's Options

None.

C. Detailed Material Requirements

1. Portland cement concrete shall meet the requirements specified in Section 03300 except as modified herein. Portland cement for units to be used in sanitary sewer systems shall be type II.
2. Concrete Reinforcement

Concrete reinforcement shall meet the requirements specified in Section 03200.
3. Water shall be potable.
4. Joint Seals Between Sections

Joint sealing material for use in vaults shall be cold-applied preformed sealing compound that meets the manufacturer's recommendations and Commission approval.

5. Precast sanitary sewer manholes and appurtenances shall be as noted within this section and as specified in Section 02562.
6. Dampproofing and Waterproofing

Dampproofing and waterproofing the exterior of precast structures shall be as per the Contract Documents or the approved list of suppliers and materials for Water and Sewer construction.
7. Steps

Steps shall be as specified in the Standard Details.
8. Granular Bedding

Granular bedding beneath precast units shall meet the requirements of AASHTO M 43, No. 57, as specified in Section 02240.
9. Non-Shrink Mortar

Non-shrink cement mortar shall be as specified in Section 04100.
10. Underground Precast Concrete Vaults

Underground precast concrete vaults and appurtenances shall be as required in this Section and the Standard Details. See Approved Material List for vault to pipeline connections.

3.0 EXECUTION

A. Design Criteria

1. General
 - a. Structural design for precast units shall be prepared by a Maryland Professional Engineer for the precast concrete manufacturer. Units shall be designed for HS 20 load designation or 300 pounds per square foot live load, whichever is most critical for determining the concrete and steel stresses.
 - b. Where more than one standard is referenced for any given unit, should there be a conflict, the more stringent requirement as determined by the Commission, shall apply.
 - c. Unit configuration shall be as shown on the Plans and/or Standard Details.
 - d. Distribution of earth loading and live load shall be in accordance with ASTM C 857 or ASTM C 890.
 - e. Walls shall be designed using an equivalent fluid pressure of 83 pounds per cubic foot and a 2 foot surcharge. The units shall also be designed to resist all stress encountered during casting, handling, and erection.
2. Manholes

- a. Precast concrete manholes and grade rings shall meet the requirements of ASTM C478 except that the minimum compressive strength of the concrete shall be 4000 psi.

The maximum individual grade ring height shall be 3 inches.

- b. Joints shall meet the requirements of ASTM C 443, shall be self-centering, and shall form a uniform water tight joint.

3. Miscellaneous Water and Wastewater Structures

Miscellaneous water and wastewater structures not otherwise covered shall meet the requirements of ASTM C 913.

4. Underground Precast Concrete Vaults

Underground precast concrete utility structures shall meet the requirements of ASTM C 857 and C 858 except that the minimum compressive strength of the concrete shall be 4,000 psi at 28 days of age.

B. Fabrication

- 1. The precast units shall be factory cast. Job site casting will not be permitted. Concrete in the precast elements shall be continuously placed to prevent formation of seams. The finished units shall be free of voids and cracks. Exposed corners and edges shall be beveled. All inserts shall be securely attached or embedded in their proper location.
- 2. Concrete strength of all precast units at 28 days shall be 4000 psi minimum, unless otherwise specified. It shall be the precast unit manufacturer's responsibility to ensure that the specified concrete strength is maintained throughout production of the units. Mix design shall be one previously used by the manufacturer which has proven satisfactory for casting units similar to those specified and producing the required strength. All precast concrete shall be air entrained in accordance with AASHTO M154. Admixtures containing calcium chloride shall not be used.
- 3. Wall sleeves or gaskets for piping, sumps, steps, access hatches, and other inserts as shown on the Plans and/or Standard Details shall be cast into the structure or inserted at the place of manufacture.

C. Product Handling

- 1. No precast unit shall be shipped less than 7 days from date of manufacture, unless the unit has been tested and is shown to be in full compliance with the Specifications. Date of manufacture shall be stamped on each unit.
- 2. Precast sections shall be transported and handled with proper equipment to protect the elements from damage. Sections shall be handled by means of lifting inserts embedded in the concrete. Damaged sections that cannot be satisfactorily repaired by the manufacturer shall be replaced by new sections at no additional cost to the Commission.
- 3. Manufacturer shall identify each manhole section with an identification number that corresponds to the manhole number noted on the contract drawings.

D. Installation

1. Excavation, foundation preparation, backfill, and compaction shall be as specified in Section 02250.
2. Precast units shall be installed where and as shown on the Contract Documents and Standard Details or as directed by the Commission.
3. Pipe connections, penetrations, and other appurtenances shall be installed as specified in the following sections:
 - a. Water Valves and Appurtenances; Section 02552,
 - b. Water Services, Water Meter Settings, and Vaults; Section 02553,
 - c. Sanitary Sewer Manholes; Section 02562.
4. Field modifications of precast units, such as cutting or enlarging holes or slots, will not be permitted without the specific approval of the precast unit's manufacturer and the Commission.

 Permitted modifications shall be made by the manufacturer in strict accordance with Commission approval and the manufacturer's directions and recommendations.
5. Mating surfaces shall be cleaned of all foreign materials such as dirt, mud, stones, etc., and where appropriate, joint sealing materials applied prior to assembly of the units.
6. Grade rings shall be set on a full bed of mortar.

4.0 METHOD OF MEASUREMENT

Measurement for precast concrete utility structures will be made as specified in the specification section pertaining to the type of structure provided.

5.0 BASIS OF PAYMENT

A. General

1. Payment for precast concrete utility structures, complete and in place will be lump sum or as dictated by the appropriate section for the type of structure provided. The prices shall include all materials, sealing caulking, waterproofing, and all necessary equipment, tools, labor, and work incidental thereto in accordance with the Contract Documents.

****END OF SECTION 03400****