

Subsection 5.04
Box Culverts

I. Scope: Furnish, construct and install, concrete box culverts for drainage structures.

II. Material

A. Furnishing materials in accordance with:

1. Subsection 4.07, "Concrete;"
2. Subsection 4.12, "Reinforcing Steel;"
3. Subsection 5.01, Storm Sewer Pipe," and

Provide material for machine-made precast boxes in accordance with DMS-7310, "Reinforced Concrete Pipe and Machine Made Precast Concrete Box Culvert Fabrication and Plant Qualification.

B. Fabrication

1. **Cast in Place:** Fabricate cast in place concrete in accordance with Subsection 4.07, "Concrete."

2. **Precast:** Supplier of box culverts must be on TxDOT's MPL.

a) **Marking:** Clearly mark each precast unit before shipment from the casting yard with the following:

- (1) Date of manufacture
- (2) Name or Trademark of manufacturer
- (3) Size of box
- (4) Minimum and maximum fill heights
- (5) Approval stamp

b) **Defects and Repair:** Repair cracks that extend to the reinforcing steel. Honeycomb areas or excessive damage will be subject to a structural review. This review will be provided by the contractor. Without a structural review being completed, the boxes will be rejected.

III. Construction: The Contractor shall design, produce, transport, and place the type of

concrete in accordance with requirements of this Subsection. The Contractor will perform quality assurance (QA) testing at the scope and frequency outlined in Table 1. QA testing conducted by the Contractor will be submitted to the ODR for review to determine payment and make acceptance decisions. The Contractor may perform quality control (Q/C) testing. The Contractor is allowed to submit Q/C testing to the ODR. The ODR reserves the right to take additional Q/A tests.

**Table 1
Concrete Testing Frequency**

Test For	Test Number	Sampling Location	Frequency of Testing	Remarks
Compressive Strength	Tex-418-A	At point of placement	4 cylinders for each 60 CY or fraction thereof for 4000 psi concrete for direct traffic culvert decks. 4 cylinders for each 100 CY or fraction thereof for 3000 psi concrete for rest of box culvert.	Sampling shall be in accordance with Tex-407-A. 2 cylinders shall be tested at 7 days and if the average is below the design strength as defined in Table 1 of Subsection 4.07 "Concrete", the remaining 2 cylinders shall be tested at 28 days. If the average value of the 2 cylinders broken at 7 days the 2 remaining cylinders are not required to be tested.
Slump	Tex-415-A	At point of placement	When cylinders are taken.	Slump will not exceed 4 inches
Entrained Air	Tex-416A or Tex-414A	At point of placement	When cylinders are taken.	A minimum of 3% and a maximum of 7% entrained air is required.
Temperature	Tex-422-A	At point of placement	When cylinders are taken.	A maximum of 90°F is allowed at time of placement.

A. Excavation, Shaping, Bedding, and Backfill: Excavate, shape, bed and backfill in accordance with Subsection 5.06," Structural Excavation and Backfill." Boxes must be placed on a firm foundation. Take precaution to keep from disturbing the boxes while backfilling. Any boxes damaged during placement and backfilling will be replaced at no additional cost to the City.

B. Placement of Boxes: Place the box sections in conformance with the plans or as directed. Start laying boxes on the bedding at the outlet end and proceed toward the inlet end. Lay boxes to form a smooth and uniform conduit that is true to the lines and grades shown in the plans. Boxes shall be laid so they are not damaged and the bedding and walls are not disturbed. Boxes out of alignment will be removed and relayed at the Contractor's expense.

C. Jointing: Use any of the jointing materials in accordance with 5.01, "Storm Sewer Pipe." Maximum joint allowed is 1/2" inch.

D. Connections and Stub Ends: Make connections to existing boxes, pipes, or inlets. Mortar or concrete the bottom of existing structure to eliminate any drainage pockets. Connect boxes to ant required headwalls, wingwalls or safety end

treatments. Plugging structures will be considered subsidiary to this item.

IV. Measurement: This Subsection will be paid for by the linear foot of each barrel. Measurement of each line will be measured along the flow line to the surface into which it connects. All work to tie boxes into existing appurtances will be included in the measurement.

V. Payment: The work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" shall be paid for at the unit price bid for "Box Culvert," which price shall be full compensation for supplying, hauling, testing, installing of end treatments; excavating, and backfilling, and all incidentals necessary to complete the work. Excavation, shaping, bedding, and backfill in accordance with Subsection 5.06, "Structural Excavation and Backfill," will be subsidiary to this Section.

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