SECTION 720 -- CONCRETE PIPE CULVERTS

720.01 -- Description

This work shall consist of furnishing and installing new reinforced concrete culvert pipe (round, pipe-arch, and elliptical) and reinforced concrete slotted pipe and the relaying of existing reinforced concrete pipe at locations shown in the plans and in accordance with the requirements of these *Specifications*.

720.02 -- Material Requirements

1. The Contractor shall not order the pipe until a list of sizes and lengths is furnished by the Engineer.

2. Reinforced concrete culvert pipe shall conform to the requirements of Section 1037.

3. Reinforced concrete slotted pipe shall conform to the requirements shown in the plans.

4. Approved preformed plastic gaskets are shown in the NDR Approved Products List.

720.03 -- Construction Methods

1. Excavation and backfilling shall be performed by the Contractor in accordance with the requirements of Section 702.

2. a. The Contractor shall lay the pipe true to established lines and grades with hub, bell, or groove ends upstream and spigot or tongue ends fully entered into the adjacent sections of pipe.

b. All concrete pipe laid for drainage structures, except that which has been manufactured with tongue and groove ends, shall be made watertight with cement mortar (1-part cement and 2-parts sand).

c. When a bell and spigot section of pipe is laid, the lower portion of the hub, bell, or groove of the preceding pipe shall be filled on the inside with sufficient mortar to bring the inner surface of the abutting pipes flush and even.

d. After the pipe is laid, the remainder of the joint shall be filled and packed with cement mortar; and sufficient additional material shall be used to form a bead around the joint.

e. The inside of the joint shall be wiped and finished smooth.

f. After the initial set, the cement mortar on the outside shall be protected from the sun with a moist earth covering.

3. As an alternate to mortared joints, rubber gaskets or flexible plastic gaskets meeting the specification requirements of AASHTO M 198 may be used if the design of the joints is in conformance with this AASHTO designation.

4. a. When concrete pipe is laid for an irrigation structure, full compression gaskets conforming to the requirements of ASTM C 361 shall be used and installed on each section of the pipe as per the manufacturer's recommendations and standards.

b. In the event that full compression gaskets are not available for the type of pipe specified, a preformed plastic gasket for concrete pipe joints shall be supplied meeting Federal Specification SS-S-00210, "Sealing Compound, Preformed Plastic for Pipe Joints" Type 1, Rope Form.

c. The Contractor shall hydrostatically test all precast concrete pipe laid for irrigation structures. Where the bottom grade of the pipeline at the outlet is less than 1.2 m above the inside top of the pipe at its lowest point, no test will be required. Water for making the tests shall be furnished by the Contractor and shall be introduced into the siphons and pipelines in such a manner as to prevent rapid temperature drops in the pipe.

d. Tests shall be made as soon after completion of construction of the structure as practicable, but in no event sooner than 20 days after the placing of any concrete that will be subject to hydrostatic pressure during the test. Testing under full operating head or to heads designated by pipe classification will not be required, but the lines shall be tested to the maximum practical head by filling with water to the elevation of the bottom grade of the outlet end or by other methods as directed by the Engineer. After the pipe has been filled to the specified elevation, it may be allowed to stand for a period not to exceed 15 days to saturate the pipe before testing. The test period shall be for 24 consecutive hours during which time the water surface in the structure shall be maintained at the specified test elevation.

e. The total amount of leakage during this 24 hour test period shall not exceed 20 L/mm of internal diameter per kilometer. If the leakage exceeds 60 percent of the maximum allowed, the Engineer may require the water to be maintained at the limiting elevation stated above for an additional period of 10 days to allow evidence of excessive leakage at any point to become apparent. Individual leaks, evidenced by appearance of moisture, shall be repaired.

f. The Contractor shall make all repairs or replacements, or both, that are necessary to secure the required watertightness.

g. The Contractor shall be responsible for any damage to the structures or adjacent works due to testing.

h. The Contractor shall furnish all labor, equipment, materials, tools, water, and water-measuring apparatus required for making the tests; and the cost thereof shall be included in the unit bid price for the size of pipe being tested.

5. Any pipe which is not true in alignment or to the established grade or which shows any settlement shall be removed and reinstalled by the Contractor at no additional cost to the Department.

6. When the plans designate the extension of a concrete pipe culvert, the connection shall be made by enclosing the connecting joint with a concrete collar. The collar shall be constructed in accordance with the requirements of Section 704; and the steel reinforcement shall be furnished, handled, and placed in accordance with the requirements of Section 707. In all cases where a concrete headwall is in place, it shall be completely removed.

7. Concrete culvert pipe which is designated to be relaid shall be cleaned of accumulations of soil and debris, hauled, and relaid in accordance with the methods herein described for installing new pipe.

720.04 -- Method of Measurement

1. Excavation, concrete, and reinforcement for headwalls and collars will be measured for payment in accordance with the provisions in Table 720.01.

Table 720.01

Method of Measurement	
Requirements	**Subsection**
Excavation for Structures	702.04
Concrete	704.04
Steel Reinforcement	707.04

2. See Subsection 718.04 for the methods to measure concrete pipe.

3. Concrete pipe collar connections are measured by the cubic meter of concrete and kilograms of reinforcing steel used.

4. At the junction of new concrete pipes, the measurement shall be extended to the center of the pipe being tapped. This extension shall be the total allowance for building the junction.

720.05 -- Basis of Payment

1. Payment for excavation, concrete, and reinforcement for headwalls and collars shall be made in accordance with the provisions in Table 720.02.

Table 720.02

Basis of Payment	
Requirement	**Subsection**
Excavation for Structures	702.05
Concrete	704.05
Steel Reinforcement	707.05

2. Pay Item — Pay Unit

____ mm Reinforced Concrete Pipe	Meter (m)
____ mm Round Equivalent Reinforced Concrete Pipe	Meter (m)
____ mm Reinforced Concrete Slotted Pipe	Meter (m)
Relaying Reinforced Concrete Pipe	Meter (m)
Class _____ Concrete for Concrete Collar	Cubic Meter (m^3)
Reinforcing Steel for Collar	Kilogram (kg)

3. The cleaning and the hauling of the pipe from the site of removal or from the place where it is stored to the point or points at which it is to be relaid will not be paid for directly, but shall be considered subsidiary to the work of relaying the pipe.

4. Payment is full compensation for all work prescribed in this Section.