

Section 61 Drainage Facilities—General

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Section 61 Drainage Facilities—General

4-6101 General

The requirements in Section 61, “General,” of the *Standard Specifications* include general specifications for constructing drainage facilities. These requirements and the guidance in this section apply to other drainage sections of this manual. This section provides inspection guidelines for:

- Culvert and drainage pipe joints
- Alternative culverts
- Alternative slotted pipe
- Concrete backfill for pipe trenches
- Temporary culverts

When the bid item list includes items for alternative pipe culvert, the contractor chooses from the list in Section 61-3, “Alternative Culverts,” of the *Standard Specifications*.

Refer to the following sections of this manual for inspection guidelines of the culvert type selected by the contractor:

- Section 4-51, “Concrete Structures,” for reinforced box culverts.
- Section 4-64, “Plastic Pipe,” for high-density polyethylene or plastic pipe.
- Section 4-65, “Concrete Pipe,” for reinforced concrete pipe.
- Section 4-66, “Corrugated Metal Pipe,” for corrugated steel pipe and pipe arches; or corrugated aluminum pipe and pipe arches.
- Section 4-67, “Structural Plate Culverts,” for structural steel pipe, arches, and pipe arches; or aluminum plate pipe, arches, and pipe arches.

When the bid item list includes items for alternative slotted pipe, the contractor chooses from the following types:

- As shown in Section 64-3, “Slotted Plastic Pipe,” of the *Standard Specifications*, or equal.
- Slotted corrugated pipe.

For inspection guidelines for slotted plastic pipe, refer to Section 4-64, “Plastic Pipe,” of this manual. For inspection guidelines for corrugated pipe, refer to Section 4-66, “Corrugated Metal Pipe,” of this manual.

4-6102 Before Work Begins

Before work begins, do the following:

- Review the special provisions and contract plans to determine the different types of culvert that may be used and the locations where alternative culverts may be installed.
- Review the special provisions and contract plans to determine the different types of slotted pipe that may be used and the locations where alternative slotted pipe may be installed. Do not mix different types of slotted pipe.
- Verify that Form CEM-3101, “Notice of Materials to Be Used,” includes all materials. Refer to Section 6-202, “Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products,” of this manual for additional information.

4-6102A Culvert and Drainage Pipe Joints

Ensure the contractor submits test results or a mathematical analysis of the joint materials for joint systems specified as watertight.

4-6102B Concrete Backfill for Pipe Trenches

Concrete backfill for pipe trenches must comply with specifications for minor concrete, except the concrete must contain at least 380 pounds of cementitious material per cubic yard.

When rapid strength concrete is to be used as concrete backfill, ensure that the contractor submits the mix design and test data at least 10 days before excavation of the pipe trench. Review the mix design, test data, and cure time required for the concrete mix to attain 500 psi (pounds per square inch) compressive strength.

4-6102C Temporary Culverts

In consultation with district hydraulics, verify that the type of temporary culvert proposed by the contractor has acceptable strength to sustain the intended load and has the intended discharge capacity.

4-6103 During the Course of Work

Refer to the various sections of this manual for guidance on inspecting the types of culvert, drainage pipe, and slotted pipe to be placed. Ensure that the correct types of joints or couplers are used.

4-6103A Culvert and Drainage Pipe Joints

Review contract requirements for designated culverts and drainage structures that will require field leakage testing. Where field leakage testing is shown, ensure the contractor submits test procedure, leakage calculations for exfiltration and infiltration tests, and repair procedures for sections that fail testing.

4-6103B Concrete Backfill for Pipe Trenches

- Ensure unsuitable materials are removed as specified when placing plastic pipe.
- Verify concrete is consolidated with high-frequency vibrators.

- Ensure contractor removes foreign material that falls into trench before and during concrete placement.
- When hot mix asphalt is to be placed on top of concrete backfill, ensure contractor provides a uniformly rough broom finish to the surface.
- Ensure concrete is cured as specified before placement of next material layer.

4-6104 Quality Control

Guidance for managing the contractor's quality control activities for this section is summarized as follows:

- When joint systems and couplers conforming to the provisions in Section 61-2, "Culvert and Drainage Pipe Joints," of the *Standard Specifications* are selected, the contractor must provide test results or a mathematical analysis of the joint materials.
- Verify manufacturer's watertightness tests of joints.
- Ensure contractor performs field leakage testing.

4-6105 Level of Inspection

Suggested levels of inspection for typical stabilization work activities are:

- Benchmark inspection of field leakage testing for culvert and drainage pipe joints
- Intermittent inspection of concrete backfill for pipe trenches

4-6106 Payment

The payment for pipe joints and couplers is normally included in the contract prices paid for the various types and sizes of culvert and drainage pipe.

Quantities for field leakage testing includes the length of pipe that has passed field leakage tests and includes elbows, tees, and other fittings.

Concrete collars, concrete tees, and reinforcement for connecting new pipe to existing pipe or facilities is included in the contract prices paid for the various types and sizes of alternative culverts.