

Section 2503. Storm Sewers

2503.01 DESCRIPTION.

This section was developed in conjunction with [Section 4020 of the SUDAS Standard Specifications](#), with modifications to suit the needs of the Department.

- A. Construct storm sewers.
- B. Abandon storm sewer.
- C. Cleaning, inspecting, and testing storm sewers.
- D. Cleaning and inspecting pipe culverts.
- E. Cleaning, inspecting, and testing rehabilitated pipe.

2503.02 MATERIALS.

Apply [Article 4149.03](#).

2503.03 CONSTRUCTION.

A. Examination.

- 1. Verify measurements at site. Make necessary field measurements to accurately determine pipe makeup lengths or closures.
- 2. Examine site conditions to ensure construction operations do not pose hazards to adjacent structures or facilities.

B. Pipe Installation.

1. General.

- ~~a. Provide proper facilities for lowering the sections into place without damaging the pipe.~~
- ~~b. Inspect pipe for defects before carefully lowering into trench. Do not install damaged or defective pipe.~~
- c. Clean pipe interior and joints prior to lowering into trench. Keep pipe clean during construction.
- d. Begin at the lowest point in line. Lay groove or bell end pointing upstream unless specifically noted otherwise.
- e. Place pipe with lifting holes at the top of the pipe and fill lift hole with non-shrink grout or manufactured plugs.
- f. Assemble joints as specified by the pipe manufacturer. When specified, wrap exterior of storm sewer pipe joints with engineering fabric.
- g. Use a saw to cut ends of pipe at flush with inside wall manholes, intakes, and structures. Do not use hammer cut or other means to break pipe.
- h. Provide manholes and intakes as specified in the contract documents.
- i. Use watertight stopper, plug, or other approved means to protect the exposed upstream ends of the pipe and prevent soil sediment from entering the storm sewer system.

2. Trenched.

- a. Excavate trench and provide bedding and backfill material as specified in [Section 2552](#). If reinforced concrete elliptical pipe is used, provide pipe bedding as specified in the contract documents.
- b. Prepare trench bottom to design line and grade so that only minor movement of pipe is necessary after installation.
- c. Lay pipe to design line and grade:
 - ~~1) Install pipe to line and grade specified in the contract documents.~~ Set field grades to invert of pipe.
 - ~~2) Correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe, at no additional cost to the Contracting Authority~~
- d. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.

- e. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.
- f. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

3. Trenchless.

Apply [Section 2553](#).

C. Storm Sewer Pipe Installed within a Casing Pipe.

Apply [Article 2553.03, D](#), for installation of storm sewer pipe within a casing pipe.

D. Pipe Jointing.

1. General.

- a. Clean joint surfaces to remove soil or foreign material prior to jointing pipe.
- b. Assemble joints according to the pipe manufacturer's recommendations. Use equipment that does not apply damaging forces to pipe joints.

2. Reinforced Concrete Pipe, Reinforced Concrete Arch Pipe, and Reinforced Concrete Elliptical Pipe.

- a. Use cold applied bituminous or rubber rope gasket jointing materials unless specified otherwise.
 - 1) Apply joint material to entire tongue, or to top half of tongue and bottom half of groove, in sufficient quantity to fill the joint. Close the joint between pipes.
 - 2) Fill remaining voids in the joint, both inside and outside of pipe, with joint material. Smooth the joint material on the inside of pipes 24 inches (600 mm) and larger.
- b. If a rubber O-ring or profile gasket is specified for RCP, coat the rubber gasket and joint with soap based lubricant immediately prior to closing the joint.
- c. If wrapped pipe joint is specified, comply with the contract documents. Secure engineering fabric in place to prevent displacement while placing backfill material.
- d. Place pipe such that joint openings on the outside or inside of the pipe do not exceed 1/8 inch (3 mm) at the bottom and 5/8 inch (15 mm) at the top.

3. Reinforced Concrete Low Head Pressure Pipe, Polyvinyl Chloride Pipe and Corrugated PVC Pipe, and High Density Polyethylene Pipe.

Coat gasket and joint with soap based lubricant immediately prior to closing the joint.

4. Corrugated Metal Pipe and Corrugated Metal Arch Pipe.

Lap coupling bands to form a tightly closed joint upon installation.

5. Connections between Dissimilar Pipes.

- a. Use manufactured adapters or couplings approved by the Engineer.
- b. Where adapters or couplings are not available, the Engineer may authorize use of concrete collar as shown in the contract documents.

E. Tolerances.

The following tolerances apply to utilities installed by open trench construction. For trenchless construction, apply [Section 2553](#).

- 1. Ensure horizontal and vertical alignment of gravity sewer lines does not vary from design line and grade at any point along the pipe by more than 1% of the inside diameter of the pipe or 1/4 inch (6 mm), whichever is larger.
- 2. Tolerance is allowed only if design line and grade is sufficient to prevent backslope when tolerance limits are reached.
- 3. Reverse slope on pipe is prohibited. Remove and reinstall to proper grade.

~~F. Conflicts.~~

- ~~1. Provide temporary support for existing water, gas, telephone, power, and other utilities or services that cross trench.~~

- ~~2. Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents or as directed by the Engineer.~~

G. Storm Sewer Abandonment.

1. Plug.

- ~~1a.~~ Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.
- ~~2b.~~ Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches (400 mm), or one-half the pipe diameter, whichever is greater.

2. Fill.

- a. Prior to filling sewer, Engineer will verify sewer line is not in use.
- ~~3b.~~ If ~~noted in the plans~~ specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM, ~~(comply with~~ according to [Article Section 2552.02, E.](#)) by gravity flow or pumping.

H. Connection to Existing Manhole or Intake.

Apply [Article 2435.03, E.](#)

I. Cleaning, Inspection, and Testing.

Apply [Articles 2504.03, L, 1, 2,](#) and [5.](#)

2503.04 METHOD OF MEASUREMENT.

A. Storm Sewer.

1. Trenched.

Measurement for each type and size of pipe installed in a trench will be in linear feet (meters) along the centerline of the pipe from center of intake or manhole to center of intake or manhole. Where the end of the pipe discharges to a ditch or waterway, measurement will be to the end of the pipe, exclusive of aprons. Lengths of elbows and tees will be included in the length of pipe measured.

2. Trenchless.

Measurement for each type and size of pipe installed by trenchless methods will be in linear feet (meters) along the centerline of the pipe.

B. Storm Sewer with Casing Pipe.

1. Trenched.

Measurement for each type and size of pipe installed with a casing pipe in a trench will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

2. Trenchless.

Measurement for each type and size of pipe installed by trenchless methods with a casing pipe will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

C. Removal of Storm Sewer.

Measurement for each type and size of pipe removed will be in linear feet (meters) from end to end.

D. Connection to Existing Manhole or Intake.

Connections to existing manhole will be measured according to [Article 2435.04, G.](#)

E. Storm Sewer Abandonment.

1. Plug.

None.

2. Fill and Plug.

Measurement for each size of pipe filled and plugged will be in linear feet (meters) from end of pipe to end of pipe.

D F. Cleaning, Inspecting, and Testing.

None.

2503.05 BASIS OF PAYMENT.

A. Storm Sewer.

1. Trenched.

- a. Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
- b. Payment is full compensation for:
 - Trench excavation,
 - Dewatering,
 - Furnishing bedding material,
 - Placing bedding and backfill material,
 - Joint wrapping,
 - ~~Connectors~~ Wyes and other fittings,
 - Pipe joints and pipe connections, and
 - Testing, and inspection.

2. Trenchless.

- a. Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
- b. Payment is full compensation for:
 - Furnishing and installing pipe,
 - Trenchless installation materials and equipment,
 - Pit excavation, dewatering, and placing backfill material,
 - Pipe connections, and
 - Testing, and inspection.

B. Storm Sewer with Casing Pipe.

1. Trenched.

- a. Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
- b. Payment is full compensation for:
 - Furnishing and installing both carrier pipe and casing pipe,
 - Trench excavation,
 - Dewatering,
 - Furnishing bedding material,
 - Placing bedding and backfill material,
 - Furnishing and installing annular space fill material,
 - Casing spacers,
 - Pipe connections, and
 - Testing and inspection.

2. Trenchless.

- a. Payment will be made at the contract unit price per linear foot (meter) for each type and size of carrier pipe.
- b. Payment is full compensation for:
 - Furnishing and installing both storm sewer pipe and casing pipe,
 - Trenchless installation materials and equipment,
 - Pit excavation, dewatering, and placing backfill material,
 - Casing spacers,
 - Furnishing and installing annular space fill material,

- Pipe connections,
- Testing, and inspection.

C. Removal of Storm Sewer.

1. Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe removed.
2. Payment is full compensation for removal, disposal, and capping (if specified) of pipe.

D. Connection to Existing Manhole or Intake.

Connections to existing manhole will be paid according to [Article 2435.05, G.](#)

E. Storm Sewer Abandonment.

1. Plug.

Plugging storm sewers is incidental to other work and will not be paid for separately.

2. Fill and Plug.

Payment will be the contract unit price per linear foot (meter) for each size of pipe filled and plugged.

D F. Cleaning, Inspecting, and Testing.

Cleaning, inspecting, and testing storm sewers and pipe culverts is incidental to other project costs and will not be paid for separately.