

SECTION 02501 – STORM SEWER PIPE

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing pipe culverts, storm drains and underdrains, in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the ENGINEER.
- B. This WORK includes furnishing and installing connecting bands, branch connections, elbows and end sections required to complete the culvert or drain structure.
- C. Special sections, such as elbows and branch connections shall be of the same material and coating as the culvert pipe to which they are attached, or be designed to be connected to the culvert pipe.

1.2 SUBMITTALS

- A. Storm Sewer Pipe: Material certifications.

PART 2 – PRODUCTS

2.1 METALLIC-COATED STEEL CORRUGATED PIPE AND PIPE ARCHES

- A. Metallic-coated steel corrugated pipe and pipe arches and specials sections (such as elbows, branch connections, and prefabricated flared end sections) shall conform to the applicable requirements of AASHTO M 36 and either AASHTO M 218 or AASHTO M 274 for the specified sectional dimensions and thickness.
- B. Coupling bands shall conform to AASHTO M 36 except that the use of bands with projections (dimples) will be limited to attaching prefabricated flared end sections. Flat bands and smooth sleeve-type couplers will not be permitted.
- C. Steel sheets of the required composition may be furnished with commercially produced corrugation dimensions other than those specified in ASSHTO M 36 if shown on the Drawings or approved by the ENGINEER.

2.2 ALUMINUM ALLOY CORRUGATED PIPE AND PIPE ARCHES

- A. Aluminum alloy corrugated pipe and pipe arches and special sections (such as elbows, branch connections, and prefabricated flared end sections) shall conform to the applicable requirements of AASHTO M 196 for the specified sectional dimensions and thickness.
- B. Coupling bands shall conform to AASHTO M 196 except that the use of bands with projections (dimples) will be limited to attaching prefabricated flared end sections.
- C. Aluminum alloy sheets of the required composition may be furnished with commercially produced corrugation dimensions other than those specified in AASHTO M 196 if shown on the Drawings or approved by the ENGINEER.

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2.3 POLYMER-COATED STEEL CULVERTS

- A. Polymer-coated steel culverts and special sections (such as elbows and branch connections) shall conform to the applicable requirements of AASHTO M 245 and AASHTO M 246. Unless otherwise specified, the polymer coating shall be type B. The 0.010 inch thickness shall be on the inside surface of the pipe.
- B. Coupling bands shall conform to AASHTO M 245 except the use of bands with projections (dimples) is not acceptable.
- C. Steel sheets of the required composition may be furnished with commercially produced corrugation dimensions other than those specified in AASHTO M 245 if shown on the Drawings or approved by the ENGINEER.

2.4 REINFORCED CONCRETE PIPE

- A. Concrete pipe shall be ASTM C 76, Class IV, with rubber gasket joint.
- B. Rubber gasket joint shall meet the requirements of ASTM C 443

2.5 PVC PIPE CONDUIT

- A. PVC Pipe Conduit shall have a standard dimension ration (SDR) of 35 and conform to ASTM D 3034. Before any PVC pipe is used on this Project, the CONTRACTOR shall supply certifications, signed by an authorized agent of the seller or manufacturer, stating that the material has been sampled, tested, and inspected in accordance with ASTM D 3034.
- B. The pipe shall have integral wall bell and spigot joints conforming to ASTM D 3212. The bell shall consist of an integral wall section with a solid cross section elastomeric ring, factory assembled, securely locked in place to prevent displacement.
- C. Flexible watertight connections, approved by the ENGINEER, shall be used at PVC pipe connections to manholes and other rigid structures.

2.6 CORRUGATED POLYETHYLENE PIPE

- A. Corrugated polyethylene pipe (CPP) shall be high density corrugated polyethylene, smooth interior pipe, and shall be manufactured in conformity with the latest AASHTO M 294, Type S specification, and shall meet the requirements of ASTM D 3350 Cell Classification 324420C, or ASTM D 1248, Class C, Category 4, Grade P33.
- B. Pipe shall be joined with “Hancor, Inc. Hi-Q Sure-Lok” (bell-and-spigot) joint, or approved equal, meeting the requirements of AASHTO M 294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 pounds.
- C. The bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell, or on the pipe, by the pipe manufacturer.

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- D. Fittings shall conform to AASHTO M 294. Fabricated fittings shall be welded on the interior and exterior at all junctions. All fittings shall connect to the pipe with a bell and spigot joint.
- E. All cut corrugations on CPP pipe shall be cleared of all water and completely grouted to prevent the accumulation of water.

2.7 PIPE CULVERT w/UNDERDRAIN

- A. Pipe Culvert shall be corrugated polyethylene pipe (CPP), high density corrugated polyethylene, smooth interior pipe, and shall be manufactured in conformity with the latest AASHTO M 294, Type S specification, and shall meet the requirements of ASTM D 3350 Cell Classification 324420C, or ASTM D 1248 Type III, Class C, Category 4, Grade P33.
- B. Pipe for underdrain shall be CPP, high density smooth interior pipe with the size shown on the Drawings, and shall be manufactured in conformity with the latest AASHTO M 294, Type S Specifications, and shall meet the requirements of ASTM D 3350 Cell Classification 324420C, or ASTM D 1248 Type III, Class C, Category 4, Grade P33, or perforated PVC pipe conforming to Article 2.5 of this Section, with two rows of slots or perforations set at 60° from the invert position.
- C. Pipe shall be joined with “Hancor, Inc. Hi-Q Sure-Lok” (bell-and-spigot) joint, or approved equal, meeting the requirements of AASHTO M 294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 lbs.
- D. The bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell, or on the pipe by the pipe manufacturer.
- E. Fittings shall conform to AASHTO M 294. Fabricated fittings shall be welded on the interior and exterior at all junctions. All fittings shall connect to the pipe with a bell and spigot joint.
- F. Washed coarse concrete aggregate shall meet the requirements of Section 03301 – Structural Concrete, Article 2.3.
- G. Filter cloth shall meet the requirements of Section 02714 – Filter Cloth, and shall be Type A.

2.8 CPP SADDLE TEE

- A. CPP saddle tees shall be manufactured saddle tees designed to connect to the corrugated polyethylene pipe.
- B. Fittings shall conform to AASHTO M 294. Fabricated fittings shall be welded on the interior and exterior of all junctions.
- C. A soil-tight seal shall be obtained with the coupling at the saddle tee stub to the storm service pipe.

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PART 3 – EXECUTION

3.1 CONSTRUCTION

- A. Excavation, Bedding, and Backfill shall conform to the requirements of Section 02203 – Trenching. All pipe shall have a minimum cover of 12 inches, unless otherwise shown on the Drawings or directed by the ENGINEER.
- B. The pipe laying shall begin at the downstream end of the pipe. The lower segment of the pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of rigid pipe and outside circumferential laps of flexible pipe shall be placed facing upstream.
- C. Paved or partially lined pipe shall be laid so that the longitudinal centerline of the paved segment coincides with the flow line. Elliptical and elliptically reinforced pipes shall be placed with the minor axis within five degrees of a vertical plane through the longitudinal axis of the pipe.
- D. If the spelter coat or galvanized metal pipe is damaged during installation, the CONTRACTOR shall make necessary repairs to the spelter in accordance with AASHTO M 36, or replace the damaged section of pipe, at no additional cost to the OWNER.
- E. Rigid conduits may be of bell and spigot or tongue and groove design unless one type is specified. Conduit sections shall be joined such that the inner surfaces are reasonably flush and even.
- F. Joints shall be made with portland cement mortar, portland cement grout, rubber gaskets, plastic sealing compound, or by any combination of these types, or any other approved type, as may be specified.
- G. Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the conduit and finished smooth on the inside. For grouted joints, molds or runners shall be used to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible, watertight seal. Joints in concrete pipe shall be thoroughly wetted before mortar or grout is applied.
- H. Where portland cement mixtures are used, the completed joints shall be protected against rapid drying by a suitable curing method
- I. Flexible conduits shall be firmly joined by approved coupling bands.
- J. Conduit shall be inspected before any backfill is placed. Any pipe found to be substantially out of alignment, unduly settled, or damaged shall be taken up and relaid or replaced.
- K. Installation of all pipes shall conform to the manufacturer's recommended procedures. These Specifications and the Drawings shall take precedence over the manufacturer's recommendations in the event of conflict, if more restrictive.

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- L. Four and six inch pipe culvert shall be installed as shown on the Drawings, unless otherwise directed by the ENGINEER. Other service pipe connections may be necessary, depending on whether unknown existing drainage pipes or drainages are encountered. Additional saddle tees shall be provided, as necessary, for storm service piping required in addition to those services shown on the Drawings. All bends, couplings and other fittings as necessary to connect to existing pipes or flows and to maintain a minimum cover of 12 inches shall be provided.
- M. All storm service pipes to be stubbed out shall be capped and marked with a pressure treated two inch or four inch post extending from the cap to one inch above ground surface with the top six inches painted green.
- N. All cut corrugations on CPP pipe shall be cleared of all water and completely grouted to prevent the accumulation of water.
- O. Pipe Culvert w/Underdrain shall be constructed with two pipes as shown on the Drawings. The flowlines of the two pipes shall be along the same gradeline, unless otherwise shown on the Drawings or if pipe laterals connected to the storm drain pipe would conflict with the underdrain pipe. Where the lateral pipe would conflict with the underdrain pipe, the underdrain pipe shall be graded to pass beneath the lateral pipe along a length that will provide a minimum flow rate of 0.4%.

END OF SECTION