

SECTION 02500

STORM DRAIN CONSTRUCTION

PART 1 - GENERAL

1.1 Description

A. Description of Work

The work to be performed in accordance with this section includes furnishing and installing pipe, manholes and catch basins for the conveyance of storm drainage.

The work shall include the furnishing of all labor, tools, equipment, materials and performing all operations required to provide a complete item in accordance with the project plans and these specifications.

B. Related Work Specified Elsewhere

Trench Excavation and Backfill.....	Section 02300
Rock Rip-Rap Construction	Section 02510
Manhole Construction.....	Section 02570
Concrete Structures.....	Section 03300

1.2 Quality Assurance

A. Reference Test Standards and Specifications

ASTM A48, Specification for Gray Iron Castings.

ASTM C14, Specification for Concrete Sewer, Storm Drain, and Culvert Pipe

ASTM C76, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe

ASTM C150, Specification for Portland Cement

ASTM C361, Specification for Reinforced Concrete Low-Head Pressure Pipe

B. Bedding, Backfill and Compaction

Test methods, frequencies and tolerances per Specification Section 2300, Trench Excavation and Backfill.

1.3 Submittals

A. Certificate of Compliance

1. Non Reinforced Concrete Pipe

- a. Compliance with ASTM C14
- b. Cement Mill Certificate

2. Reinforced Concrete Pipe

- a. Compliance with ASTM C76
- b. Cement Mill Certificate
- c. Cement Content
- d. Concrete Asmixture
- e. Reinforcing Steel
- f. Manufacturer Qualifications

3. Corrugated Aluminum Pipe

Compliance with ASTM B209

4. Corrugated Steel Pipe

Compliance with AASHTO M36

5. PVC Ribbed Pipe

Compliance with ASTM F794

6. Concrete Pipe Gaskets

Compliance with ASTM C361

7. Precast Concrete Joint Material

Compliance with ASTM C361 and AASHTO M198

8. Castings

Compliance with ASTM A48

B. Shop Drawings

1. Storm Drain Pipe

a. Layout drawing including size, class, D-load of pipe and number, length and type of pipe sections.

b. Pipe sections including joint with gasket.

2. Catch Basin Frame and Grate

Compliance with ASTM A48

1.4 Product Delivery, Storage and Handling

A. Precast Concrete Components

Take all precautions in unloading, storing and placing precast concrete components to prevent damaging the component. All components with visible damage are subject to rejection by the OWNER.

PART 2 - MATERIALS

2.1 Non Reinforced Concrete Pipe

ASTM C14, ASTM C150, Type V Cement. Size and class indicated. Unless otherwise shown use Class 3.

2.2 Reinforced Concrete Pipe

ASTM C76, except as modified herein.

- A.** Size, class and D-load as indicated.
- B.** ASTM C150, Type V cement.
- C.** Pipe that has a diameter of 36 inches or less shall be supplied with an area of reinforcing steel in the bell not less than the area required for the circumferential reinforcement in the wall of the pipe.
- D.** Minimum cement content of 564 lbs. per cubic yard of concrete.
- E.** No calcium chloride or calcium chloride admixture will be allowed.
- F.** Cure pipe using steam or water techniques to produce a pipe with the specified physical properties.
 - 1.** The manufacturer shall be competent to manufacture the type, size and quality of pipe repaired.

2.3 Corrugated Aluminum Pipe and Pipe Arches

Corrugated aluminum pipe, pipe arches, and connectors and coupling bands shall be manufactured and inspected in conformance with the requirements of AASHTO M196, M197, and as specified herein. The size, type, and gauge of the pipe to be furnished shall be shown on the Plans. Corrugated aluminum sheets covered by this Section shall be fabricated from alloy Alclad 3004 with Temper H-34 and shall conform to ASTM B209.

2.4 Corrugated Steel Pipe and Pipe Arches

Corrugated steel pipe, pipe arches, slotted pipe, and coupling bands shall be manufactured and inspected in conformance with AASHTO M36 and as specified herein. The size, type, and metal thickness of the pipe to be furnished shall be as shown on the Plans.

Corrugated steel pipe arches shall consist of corrugated steel pipe other than spiral rib, which has been re-formed to multi-centered pipe, having an arch-shape top with a slightly curved integral bottom. Nominal diameter shall be the minimum inside dimensions of the round pipe.

The material for corrugated steel pipe, pipe arched and coupling bands shall be zinc coated (galvanized) or aluminum coated (AL-T-2) iron or steel conforming to AASHTO M36 and M218 or M274.

2.5 PVC Ribbed Pipe

Pipe and fittings shall be made from PVC compounds as defined and described in ASTM D1784. The sewer pipe shall meet the performance requirements ASTM F794 for sanitary sewers with minimum pipe stiffness of 46.

PVC sewer pipe and fittings shall be made of PVC material having a cell clarification of 12454C or 13364B as defined by ASTM D1784.

2.6 Manholes

Specification Section 2570.

2.7 Joint Materials

A. Concrete Pipe

O-ring gasket joints conforming to ASTM C361.

2.8 Castings

ASTM A48, Class 30. The bearing of the frames and covers shall be machined and the cover shall seat firmly onto the frames without rocking. All castings shall be painted or dipped in commercial quality asphalt paint.

2.9 Concrete Structures

Specification Section 3300.

2.10 Non-Shrink Grout

ASTM C1107, pre-packaged.

2.11 Steel Shapes

Specification Section 3300.

2.12 Cast Iron Catch Basin Frame and Grate – Bicycle Safe

ASTM A48. Bicycle safe, high capacity vane grate, type L, manufactured by Neenah Foundry or approved equal.

PART 3 - EXECUTION

3.1 Preliminary Investigation of the Work

Verify that all preliminary work has been performed in accordance with the plans and specifications prior to performing storm drain construction.

3.2 Trench Excavation and Backfill

Accomplish excavation, bedding, backfilling, compaction and surface replacement as specified in Section 2300 and as indicated on the plans.

3.3 Storm Drain Collection Systems

A. Pipe Placement

Carefully inspect each pipe section before and after installation with reference to the ASTM specification. Remove those pipe sections found defective and replace with sections which comply with the specification. Place concrete pipe with bell end in the upgrade position. Adjust spigots in bells to produce satisfactory joint. Blocking or wedging between the bell and spigot will not be permitted. Continually monitor pipe end elevations and locations to ensure proper grade and alignment.

B. Jointing of Concrete Pipes

Thoroughly clean all surfaces to receive gaskets. Install gasket and stab pipe per manufacturer recommendations. Check each joint to ensure the spigot end is home.

C. Jointing of Corrugated Metal Pipe

The pipe shall be laid so that the seams are not on the bottom. The inside circumferential seams shall be placed pointing downstream. Care shall be taken to ensure dirt or other particles do not get between the outside of pipe and the pipe coupling. Paved inverts shall be placed and centered on the bottom of the trench. Any

damage done to the protecting lining and coating shall be repaired prior to the backfilling around the pipe.

D. Jointing of Solvent Cemented PVC Pipe

Solvent welded jointing of PVC pipe shall be in accordance with the approved manufacturer's printed instructions, which shall be furnished to the **ENGINEER**.

E. Connections to Manholes, Catch Basins and Existing Systems

All connections shall be watertight. Furnish and install waterstop gaskets and nonshrink grout. Where pipe enters pre-cast concrete structure place gasket in the center of the wall and pack watertight with grout. Where concrete is to be placed around a pipe, provide and install at waterstop gasket. Place gasket in the center of the intersecting wall.

F. Allowable Variation from Plan Line and Grade

The final position of the pipe shall be to the plan line and grade. Variation shall not exceed "0.03 feet vertically. The horizontal alignment shall not vary from plan alignment by more than 0.1 feet.

G. Manholes

Furnish and install manholes in the locations shown per Specification Section 2570, Manhole Construction, and as detailed.

H. Catch Basins and Drop Inlets

Furnish and install catch basins and drop inlets at the location and to elevation indicated on the plans. Alignment and grade shall not vary from plan elevation by more than 0.10 feet. Cast-in-place units are to be constructed per Specification Section 3300, Concrete Structures. Pre-cast units will be furnished and installed in accordance with applicable portions of Specification Section 2570, Manhole Construction and 3300, Concrete Structures.

I. Cast Iron Frame and Grate – Bicycle Safe

Bicycle safe, high capacity vane grate castings shall conform to ASTM designation A48. The grate shall be installed with the vanes perpendicular to the curb line for bicycle safety. Vane grates shall not

be installed in a driveway entry area of the roadway unless longitudinal bars have been added for bicycle safety. Frames shall be set accurately to the final elevations as indicated on the plans.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement

Storm drainpipe will be measured by the number of linear feet of pipe laid horizontally between centerline of structures or the end of the pipe at an outfall.

4.2 Payment

Storm drain pipe will be paid at the contract unit price bid per linear foot, to the nearest foot, for each size and type of pipe and shall be compensation in full for furnishing and installing the type of pipe as specified and as shown on the plans including removal of obstructions, excavation, bidding, backfilling, compacting, testing, joint materials, collars, and field closures.

****END OF SECTION****