SECTION 334100 – STORM DRAINAGE

ALL LIBRARIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
1. Storm sewer drainage piping, fittings, and accessories.
2. Storm drainage structures.

1.2 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, and accessories. Provide shop drawings for precast inlets and catch basins

B. Manufacturer's Certificate: Certify that products meet or exceed specified local requirements.

C. Project Record Documents:
1. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Reinforced Concrete Pipe (RCP): ASTM C76, Class III unless noted otherwise on Drawings, installed with flexible plastic, bitumen gaskets at joints.
1. Gaskets: AASHTO M198, Type B or ASTM C443, installed in accordance with manufacturer’s recommendations.
2. Flared End Sections: ASTM C76, or for sections with toe wall, AASHTO H170.

B. All High Density Polyethylene pipe (HDPE) shall conform to the following requirements:
1. AASHTO M252 Type S and M294 Type S, smooth interior and annular exterior. Pipe shall be installed in accordance with pipe manufacture’s installation guidelines.
2. Joint and Fittings. Pipe joints and fittings shall conform to ASTM D3212, AASHTO M252 or AASHTO M294, or be approved by the engineer. All joints and fittings to be water tight.

HDPE pipe shall not be used under paved areas.

2.2 DRAINAGE STRUCTURES

A. Catch Basins, Inlets, and Junction Boxes: Provide in accordance with details shown on Drawings and ASTM C-478.

B. Lids and Frame: Provide in accordance with details shown on Drawings.
   1. Acceptable Manufacturers:
      a. Neenah Foundry.
      b. East Jordan Iron Works.
      c. Bass & Hays Foundry.

C. Cement Mortar used for paving inverts, filling lift holes, joints, patching and anchoring castings shall consist of one part Portland cement, type I, ASTM C150, 1/4 part hydrated lime, ASTM C206 and 2-1/2 parts clean, well-graded sand and water free of suspended matter, alkali, and containing no industrial or domestic waste.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and excavation is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over-excavation with bedding material.

B. Remove large stones or other hard matter that could damage piping or impede consistent backfilling or compaction.

C. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

3.3 INSTALLATION - PIPE

A. The pipe shall be inspected for defects and cracks before being lowered into the trench, piece by piece. Any defective, damaged or unsound pipe or any pipe that has had its grade disturbed after laying shall be taken up and replaced. Open ends shall be protected with a stopper to prevent earth or other material from entering the pipe during construction. The interior of the pipe shall be free from dirt, excess water and other foreign materials as the pipe laying progresses and left clean at the completion of the installation.

B. Excavate pipe trench and place bedding material in accordance with specifications.

C. Install pipe in accordance with manufacturer’s written recommendations.

D. Reinforced Concrete Pipe: Pipe shall be installed in accordance with pipe manufacturer's installation Guidelines for Culvert Storm Drainage Applications.

E. Installation shall commence at the lowest point for each segment of the route.

F. Lay pipe to the required line and slope gradients with the necessary fittings, inlets, risers, structures, and other appurtenances placed at the required location as noted on Drawings.

G. Do not displace or damage pipe when compacting.

H. No pipe shall be laid in water or when trench conditions are unsuitable for such work.

I. Joints:
   1. Joints shall be constructed as described herein and in accordance with manufacturer's installation instructions for soiltight joints.
   2. For RCP, the joint surface shall be cleaned and washed with water, if necessary, before the joints are made. For tongue and groove joints in smaller sizes, make joints butting the inside of the bell with a cement mortar before joining. The inside joint shall be wiped clean of excess mortar by brush or a squeegee drawn through the pipe as the laying operations progress. In the lager diameters, which permit the entry of a man, annular space between pipe sections shall be completely filled with mortar and finished off smooth with the inside surface of the pipe.

J. All installation shall be in compliance with ASTM C1479.

3.4 INSTALLATION – CATCH BASINS, INLETS, AND JUNCTION BOXES

A. Drainage structures shall be constructed in accordance with details shown on drawings.

B. Precast Sections:
   1. Precast section with bases shall be installed in accordance with specifications or as shown on drawings.
   2. Pipe shall be properly aligned with connections to structures as shown on the drawings.

C. Invert channels shall be smooth and accurately shaped to a semicircular bottom conforming to the inside of the adjacent sewer section. Invert channels and structure bottoms shall be shaped with cement mortar. Changes in size and grade of invert shall be made gradually and evenly. Changes in direction of the sewer entering branch or branches shall have a true curve of as large a radius as the manhole will permit.

D. Frames and Covers:
   1. Frames and covers shall be set to the proper elevation. The frames shall be firmly embedded in mortar approximately 1 inch thick and aligned to fit the top section of the structure.
   2. Bricks set in mortar used to adjust the frame to finished grade shall be limited to no more than four courses.
   3. Adjustment rings used to make adjustments in grade shall be made with the initial ring embedded in mortar and the exterior of the rings parged with mortar not less than 1/2 inch thick. No adjustment made in this manner shall exceed 8 inches.

3.5 INSPECTION AND TESTING

A. General:
   1. Strom sewer systems and culverts, upon completion or at such time as directed, shall be cleaned, inspected and tested. The system or culvert shall have a true grade and line. Actual elevations shall be within 0.08 feet of the elevations given on the drawings.
   2. After completion of the Work, or any part thereof, the job shall be tested to determine that it has been installed in accordance with the drawings and specifications. In general,

the Work shall prove to be in good condition, installed in accordance with the drawings and specifications and ready for use.

B. Cleaning and Testing: Visibly inspect and remove all debris and obstructions from storm pipe. Test for infiltration and exfiltration by hydrostatic testing per ASTM C969. Manholes and pipe shall conform to ASTM C969 leakage criteria.

C. Alignment Test: After backfill has been placed and compacted to a depth not less than one foot above top of pipe, a visual inspection shall be made by flashing a light between manholes. Any displacement or misalignment of invert shall be corrected.

END OF SECTION 334100