

SANITARY SEWERS

PART ONE - GENERAL

1.01 SUMMARY

- A. Section Includes: Sanitary sewers of the size and character shown on the drawings and specified herein, including the furnishing and installing of the pipe and appurtenances and necessary testing.

1.02 REFERENCES

- A. Reference Specifications: As herein noted, the work shall comply with requirements of:
 - 1. The current American Society of Testing Materials series of Standard Specifications, referred to as ASTM.
 - 2. The current American Association of State Highway and Transportation Officials, referred to as AASHTO.
 - 3. The Michigan Department of Transportation "Standard Specifications for Construction," 2003 edition, referred to as MDOT.
- B. All work is to be installed per City of Marshall (herein referred to as the sewer authority) standards and specifications. In case of a discrepancy(ies) between sewer authority standards and the technical specifications outlined in this section, the sewer authority's standards shall prevail.

1.03 SUBMITTALS

- A. Joint Details: Furnish proposed details of the pipe joints for consideration and approval before ordering any pipe.
- B. Guarantees: Furnish guarantees covering the items included under this section of the contract.

1.04 QUALITY CONTROL

- A. Testing: Sewers will be required to be tested for infiltration/exfiltration, and a final visual inspection will be performed with the sewer authority inspector and/or the Owner's representative to note any defects, dips, or other problems that must be repaired by the Contractor prior to final acceptance and payment. All new sanitary sewers will be required to be television inspected at the completion of the construction prior to final acceptance. This testing and inspection work is considered incidental to the cost of construction.

- B. Certification of Pipe: All pipe delivered to the job site shall be accompanied by certification papers showing that the pipe has been tested in accordance with applicable specifications and that the pipe meets the specifications for this project.

PART TWO - MATERIALS

2.01 SEWER PIPE

A. General

1. The locations of the various types of pipe are shown on the drawings. Sanitary sewer pipe shall be designed for air testing.
2. All sewer pipe used in this work shall meet the requirements of the referenced standard specifications. Sewer pipe shall be of the following types as noted on the drawings.

B. PVC Pipe

1. Polyvinyl Chloride Pipe (PVC) Sewer Pipe shall be ASTM D3034, SDR 35.
2. Joints in polyvinyl chloride pipe shall be bell and spigot type meeting ASTM standards. Each joint shall consist of a spigot and a formed bell complete with a factory-installed flexible elastomeric gasket meeting ASTM standards. Joints in all polyvinyl chloride tee branches, wyes, fittings, riser pipes, and service laterals shall conform to joints furnished for the polyvinyl chloride sewer pipe. All joints shall be made using lubricant as supplied and as directed by the pipe manufacturer. When necessary to field cut a standard length of pipe, the new spigot end shall be prepared as recommended by the pipe manufacturer.

2.02 STRUCTURES

- A. General: Manholes and other sanitary structures shall be of precast reinforced concrete to the dimensions and profiles shown on the drawings. Provide metal frames, covers or gratings, and fixed steps as shown.

B. Precast Concrete Structures

1. Precast concrete structures shall comply with ASTM specification for "Precast Reinforced Concrete Manhole Risers and Tops," C478.
2. All precast manhole tops shall be the eccentric cone type.
3. Precast manhole joints may be plain tongue and groove with cold mastic sealer. All joints in sanitary sewer structures to be "premium" grade joints. All precast manhole

joints shall also be pointed inside and outside. Lifting holes shall be plugged and mortared to a smooth surface finish.

4. Precast manhole bases shall be integral with first manhole section.

C. Leveling Brick or Block

1. Brick shall be grade MA conforming to the requirements of the "Standard Specifications for Sewer brick," ASTM C32.
2. Concrete brick for use in manhole construction shall conform to the requirements of ASTM specification for "Concrete Building Brick," C55, Grade A.
3. Concrete block for use in manhole construction shall conform to the requirements of ASTM specification for "Concrete Masonry Units for Construction of Catch Basins and Manholes," C139. These blocks shall be at least 8 inches thick and shaped so as to conform with the inside radius of the structure.

D. Mortar For Leveling Brick

1. Mortar for laying brick shall comply with ASTM specification, "Mortar for Unit Masonry," C270, Type M.
2. Mortar shall be composed of one part Portland cement and two-and-one-half parts natural or manufactured sand. Sand shall comply with ASTM specification, "Aggregate for Masonry Mortar," C144.
3. All brick and concrete work shall be properly cured and protected from freezing for a minimum of 72 hours. When the temperature is 40 degrees F., and falling, brick mortar and concrete shall be heated to a minimum temperature of 70 degrees F.

E. Concrete: Any concrete used in the construction of sanitary structures, bedding, backfill, cradles, encasements and flow channels shall be MDOT Grade 30M.

F. Castings

1. Cast iron manhole steps shall be castings meeting the requirements of ASTM specification for "Gray Iron Castings," A48, Class No. 35B. The steps shall be approximately 10 x 10 x 3 inches and shall be East Jordan Iron Works No. 8500 (No. 8503 for block construction) or as approved. Steps in precast manhole sections shall be cast in place at the plant.
2. Cast iron manhole frames and covers shall conform to the requirements of ASTM A48, Class No. 30B. They shall be heavy duty solid covers with "Sanitary" cast on the cover.

3. Manhole shall be EJIW 1000 Type A or similar approved in writing.

PART THREE - EXECUTION

3.01 INSPECTION

- A. Before any sewer work is started, the Contractor shall uncover the existing sewer at each point of connection and shall determine the actual location and elevation of the sewer.
- B. If the actual location and elevation of the sewer is not as shown on the drawings, the Owner's representative shall be notified by letter prior to beginning any sewer work.
- C. Sewer work shall be corrected at the expense of the Contractor in compliance with instructions by the Owner's representative when the installed work is in error due to deviations between the drawings and actual sewer location and elevation, and the Contractor has not acted in compliance with the above procedure.
- D. Pipe shall be inspected prior to use, and any pipe which is damaged shall be rejected from use in the work and shall be immediately removed from the site by the Contractor. Any pipe or manhole found to have dirt, concrete, asphalt or foreign matter shall be cleaned prior to acceptance.

3.02 EXCAVATION AND BEDDING

- A. Pipe Trench: Excavation shall be in accordance with "Earthwork." Trench excavation shall be of sufficient depth and width to provide adequate room for construction and installation of the work, except that the width of a trench from the pipe invert to a point 12 inches above the top of the sewer pipe shall not be greater than the pipe width plus 12 inches.
- B. Structures: Excavation for structures such as manholes, catch basins and inlets shall be made to the depth required for placing the base slab. Whenever possible, the base shall rest on undisturbed soil with a minimum amount of compacted sand-cement mixture to be used for leveling. In no case will more than 3 inches of sand-cement mixture be permitted under a base slab. If ground conditions or excess excavation causes need for more than 3 inches of fill or leveling course, an approved aggregate fill, compacted in place, will be required.
- C. Pipe bedding shall be in accordance with "Earthwork".
- D. Pavement Cuts: When the trench must be cut through pavement, driveway, or sidewalk, particular care shall be taken not to unnecessarily damage the adjoining areas of the pavement, driveway, or sidewalks. All cuts through existing surfaces shall be made with a concrete saw, sawing deep enough to allow a straight cut parallel with longitudinal and transverse construction or contraction joints.

3.03 PIPE INSTALLATION

- A. Construction shall begin at the outlet end and proceed upgrade with the spigot ends pointing in the direction of flow.
- B. The Contractor shall use laser-aligning equipment for the laying of sewers to the specified lines and grades. Competent, trained operators shall operate the equipment. The laser beam projector is to be rigidly mounted to its support platforms to ensure that all ground equipment vibrations will be kept to a minimum and will permit the laser beam to be projected coaxially through the center of the pipe. All units shall be furnished with equipment to control atmospheric conditions in the pipe that could affect the acceptable standard of construction.
- C. The inside of pipe and outside of the tongue shall be cleaned of any dirt or foreign matter. Joint materials shall be placed as recommended by the manufacturer. The pipe shall be centered in the grooves and pushed tight together to form a smooth and continuous invert. Mechanical means shall be used for pulling the pipe home. The finished work shall be straight and shall be sighted through between manholes.

3.04 STRUCTURE INSTALLATION

- A. Structures shall be constructed of the type and in compliance with the details and at the locations shown. All necessary metal frames and covers shall be furnished and installed. Covers shall be set at the required final elevation, 1/4 inch to 3/8 inch below flush with pavement or flush with lawn elevations so subsequent adjustment shall not be necessary.
- B. Leveling Brick Work: Leveling brick for manhole frame and cover shall be laid radially in courses in a full bed of mortar with interior joints not more than 1/4 inch in width. Whole bricks only shall be used except to effect closures and to fill in the outside portion of radial joints. All bricks shall be moist prior to laying. Brick and block leveling courses shall be completely mortared to a thickness of at least 1/2 inch on the exterior surface.

3.05 ALLOWABLE TOLERANCES IN SEWER GRADE

- A. Sewers shall be constructed and laid to the alignment and grade indicated on the drawings. A variation of 1/4 inch from this will be deemed sufficient reason to cause the work to be rejected and relaid.

3.06 STUBS, BULKHEADS, AND MISCELLANEOUS WORK

- A. The Contractor shall furnish all material and labor required to construct stubs, bulkheads, and miscellaneous work shown on the drawings or detailed in the specifications. The cost of this work shall be incidental prices for manholes, structures, and/or sewers.

3.07 BACKFILL

- A. All pipe backfilling to be completed as authorized.
- B. Backfilling Around Structures: After structures have been set sufficiently to avoid damage, backfilling shall be done in a manner that will not cause unequal pressure on the structure. Backfill material other than sand shall not be placed within 3 feet of the structure.

3.08 TESTING

- A. Gravity Sewers: A final visual inspection will be performed with the city and/or the Owner's representative to note any defects, dips, or other problems. All gravity sanitary sewers will be air pressure tested in accordance with the sewer authority standards at the completion of the construction prior to final acceptance.
- B. All corrective work shall be completed and additional testing performed until all work passes pressure tests. This testing and inspection work is considered incidental to the cost of construction.