

SECTION 043 SPECIFICATIONS - MANHOLES

1.0 General

Manholes shall be built on the sewers where they change in size, slope or direction and other necessary points as shown on the plans. The diameter shall be as shown on the plans.

The manhole top shall carry a cast iron frame and cover, equal to Neenah Foundry Number R-1530, Type "B", with modifications as shown on the Sanitary District's Detail Drawing for castings, included in Section 095 of the specifications. A waterproof frame and cover equal to Neenah Number R-1915-H2 or Neenah Number R-1916-C shall be used where shown on the plans. All castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage, distortion or other defects. They shall be smooth and well-cleaned by shot blasting or by some other approved method, and shall be coated with asphalt paint that shall result in a smooth coating, tough and tenacious when cold, yet neither tacky nor brittle. Casting shall be sealed to the top of the manhole with butyl rubber sealant.

Steps in the manhole shall be equal to M.A. Industries, Inc. molded step PS-1-PF and shall be placed as specified on the applicable Detail Drawing as provided on the drawings and/or in Section 095 of the specifications. Manhole steps shall be installed centered over the outlet pipe on eight (8) inch to twelve (12) inch diameter sewers. Steps shall be installed at ninety (90) to the outlet pipe on sewers larger than twelve (12) inches.

Manhole bottoms shall be pre-cast and equal to the "Moorbase Bottom" as manufactured by Darnall Concrete Products Company of Normal, Illinois. Such other pre-cast bottoms as may be approved in writing by the Engineer shall have preformed inverts.

Pre-cast manhole sections (Tops, Barrels and Bases) shall meet the requirements of ASTM designation C478, as amended, except where otherwise directed by this Section. Manhole section joints shall be constructed with a rubber gasket seal or a butyl rubber sealant. The exterior side of the manhole joints shall be sealed with an additional coating of a waterproof asphalt based sealer. All interior joints of the manhole shall be filled neatly with cement mortar if the Engineer determines in the field it is required. Joints to seal the connection between pipe and the manhole shall be either the "A-Lock" type, or a press seal boot.

The height of the barrel shall be suitable to fit the various depths of the manholes as shown on the plans and as directed in the field by the Engineer. The maximum height of adjusting ring to be allowed for use under the manhole cast iron frame shall be eight (8) inches.

Manhole barrel reducing sections shall not be allowed.

2.0 Standard Manhole

The barrel heights shall be chosen to bring the top of the casting to the existing grade or as directed by the Engineer. Manhole casting adjusting rings or concrete bricks may be used for minor height adjustments not exceeding eight (8) inches. Standard precast, concrete, and flat top manholes shall be permitted for pipe diameters up to forty-two (42) inches and for depths up to twenty (20) feet. A structural engineer, registered in Illinois, shall certify the proper design, for the intended use, of flat top manholes for pipe diameters greater than forty-two (42) inches, or depths greater than twenty (20) feet.

3.0 Drop Manhole

Where a sewer discharges into a manhole, the bottom of which is two (2) feet or more below the invert of the sewer, the connection shall be made through a manhole drop connection. Such connection shall comprise a vertical PVC, or Ductile Iron, stack encased in a minimum of six (6) inches of concrete, at the outside surface of the wall of the manhole, with ductile iron tee and ell fittings to connect the sewer through the stack to the lower part of the manhole. The concrete encasement is to extend to the limit of the excavation or to the undisturbed earth. The first pipe from the drop connection shall be Ductile Iron in accordance with Section 027 of these specifications. Regular Drop Manholes shall be precast units as manufactured by Darnall Concrete Products Company of Normal, Illinois, or approved equal. The Engineer shall approve Cast-In-Place Regular Drop Manholes.

As a minimum, the diameter of the drop pipe shall be at least $\frac{2}{3}$ as large as the diameter of the sewer tributary to the drop pipe, but shall not be smaller than eight (8) inches in diameter.

Detail Drawings for both regular drop manholes and those with an influent pipe at ten (10) percent grade or greater are provided in Section 095 of these specifications.

4.0 Splash-Drop Manhole

Where a sewer discharges into a manhole, the bottom of which is less than two (2) feet below the invert of the sewer, the connection shall be made through a splash drop connection. Splash-drop manholes shall be in accordance with the Detail Drawings supplied in these specifications.

5.0 Special-Type Manhole

Where specified, manholes shall be constructed based upon actual conditions revealed after field investigation. As much as possible, special-type manholes shall be constructed using precast concrete manhole parts such as wall sections, flat tops, moor bases, etc.; however, as directed by the Engineer, portions of the manholes shall be cast-in-place. Cast-in-place portions shall conform as much as possible to the specifications for standard or drop manholes detailed in these specifications.

Unless directed by the Engineer, castings and lids shall be as specified in these specifications. Portland cement concrete used shall be in accordance with Class SI concrete as detailed in Section 1020 of the Illinois Department of Transportation (IDOT) Standard Specifications. Formwork shall be as directed by the Engineer. As directed by the Engineer, cast-in-place benches shall have troughs formed within that are smooth and transfer the flow through the manhole without disruption. All cast-in-place concrete shall be smoothly finished, cured and protected as directed by the Engineer. There shall be no materials or concrete debris left in the manhole after construction nor shall any concrete debris or materials be introduced into the existing sewer system.

The crown of existing sewer pipes shall be removed to the spring line of the pipe or to the top of the newly cast bench.

The Contractor shall not make any claims for additional compensation for costs associated with work performed as directed by the Engineer. Alterations to the planned design of special-type manholes shall not serve as a basis of claims for additional compensation by the Contractor.

6.0 Manhole Testing

Manholes shall be tested when required by the Engineer. Testing shall conform to ASTM C1244 Standard

Test Method for Concrete Sewer Manholes by the negative air pressure (vacuum) test and ASTM C1227
Standard Test Method for Concrete Septic Tanks.

END OF SECTION

