

SECTION 02730 - MANHOLES AND CATCH BASINS

PART 1 - GENERAL

SUMMARY

Work Included. This Work shall consist of the furnishing and construction of manholes and catch basins including inlets as detailed on the Drawings and at the locations shown on the Drawings. Concrete, excavation and backfill shall be as specified hereinbefore. Manholes and catch basins shall be complete with frames, covers and steps. Adjustment of frames, inlets, etc., on new manholes and catch basins to meet new or existing pavement surfaces or sidewalks shall be included in the Work under this Section of the Contract.

Related Work Specified Elsewhere.

Section	02210	Excavation and Backfill (Sewers and Water Main)
Section	02660	Water Main Construction
Section	02720	Sewer Construction
Section	02740	Sewage Force Main
Section	03315	Concrete Work

REFERENCES

ASTM A48	Gray Iron Castings
ASTM A536	Ductile Iron Castings
ASTM C55	Concrete Building Brick
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C139	Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C478	Precast Reinforced Concrete Manhole Sections
ASTM C923	Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes

SUBMITTALS

Shop Drawings and Guarantees. Furnish shop drawings covering the items included under this Section of the Work.

Shop drawings shall include dimensions and reinforcement of precast concrete units, joint details, orientation and elevation of preformed openings in riser sections, pipe-to-manhole connection details, casting details and certification papers.

Certification of Materials. All precast concrete manhole sections, resilient connectors between manhole sections and pipes and castings delivered to the jobsite shall be preceded or accompanied by certification papers or stamped markings showing that the materials have been tested in accordance with applicable standard testing procedures and that the materials meet the Specifications for this Contract.

PART 2 - PRODUCTS

MANUFACTURERS

Cast Iron Manhole Steps shall be the product of one of the following, or equal:

James B. Clow and Sons
East Jordan Iron Works
Neenah Foundry Co.

Steel-Reinforced Manhole Plastic Steps shall be the product of one of the following, or equal:

M.A. Industries, Inc. (PSI-PF)

Frames and Covers shall be the product of one of the following, or equal:

James B. Clow and Sons
East Jordan Iron Works
Neenah Foundry Co.

MANHOLES

Materials. Manholes on new sanitary sewers of 48-inch diameter and smaller shall be precast reinforced concrete with flexible watertight connections between the manhole wall and the sewer pipe.

Manholes on new sanitary sewers larger than 48 inches in diameter shall be precast reinforced concrete set on integrally cast pipe tee sections. Pipe reinforcement shall meet ASTM C76 Specification with class as indicated on the Drawings for the adjoining pipe. Vertical risers shall be set on the tangent of the horizontal pipe. As an alternate, manholes may be constructed of Class A concrete according to details shown on the Drawings.

Manholes on existing sanitary sewers shall be precast reinforced concrete with preformed arched openings and the sewer pipe grouted into the opening and made watertight.

Manholes on new or existing storm sewers, water mains and pumping mains, shall be precast reinforced concrete.

Manhole slabs shall be constructed of Class A concrete; manhole channels and fillets shall be constructed of Class C concrete, as specified under Section 03315, Concrete Work, according to the details given on the Drawings. Unless otherwise directed, all surfaces of concrete channels and fillets shall be screened and floated to a smooth, uniform surface and troweled to a hard finish.

CATCH BASINS

Materials. Catch basins shall be constructed of precast reinforced concrete units. These precast units shall conform to the requirements of ASTM. Inside grouting with either cold-applied, ready-to-use plastic joint-sealing compound or rubber gasket shall be used to connect the units. As an alternate, the use of concrete

manhole block conforming to ASTM will be permitted. If block is used, a mortar coating shall be applied the same as with masonry construction of manholes.

If noted on the Drawings, catch basins shall be constructed with sumps.

Foundations. Foundations shall be constructed as a cast-in-place concrete slab according to details given on the Drawings or precast reinforced concrete base slabs as specified under Manholes.

MANHOLE STEPS

Manhole steps shall be asphalt-coated cast iron or be steel-reinforced, high-density polypropylene plastic meeting OSHA requirements. They shall be a minimum 10 inches wide and placed a maximum of 16 inches apart.

FRAMES AND COVERS

Cast iron frames and covers shall be furnished and placed on each manhole by CONTRACTOR. Casting materials shall conform to ASTM A48, Class 30 or better for gray iron, or ASTM A536 for ductile iron. Casting shall be free of defects and shall be smooth and well-cleaned by shot blasting. Castings shall be of the size and type as called for on the Drawings. Lids shall be self-sealing on all sanitary sewer manholes. Castings shall be set flush with sidewalk, pavement or ground surface and shall be securely cemented in place. In gravel streets, covers shall be set 4 inches below the surface.

Where noted on the Drawings, bolted gasketed frames and covers shall be provided. The frames shall be anchored to the concrete manhole sections according to details shown on the Drawings.

DROP CONNECTIONS

Where shown on the Drawings, directed by ENGINEER, or where a sanitary branch sewer is brought into a manhole more than 18 inches above the invert elevation in the manhole, a drop connection shall be provided according to the details shown on the Drawings.

PRECAST REINFORCED CONCRETE MANHOLES

Precast manhole base sections, riser sections, conical sections, flat slab tops, grade rings, manhole steps and ladders shall meet the requirements of ASTM C478.

Joints. Premium modified tongue and groove joints with rubber gaskets meeting the requirements of ASTM C443 shall be provided for all sanitary sewer manholes. Joints in storm sewer, water main and pumping main manholes shall be either premium joint as specified for sanitary manholes or shall be tongue and groove with a cold-applied plastic joint-sealing compound and primer.

The joints around the inside circumference of the manhole shall be pointed with cement mortar. All holes provided for handling and lifting shall be filled with mortar and made watertight.

Foundations. Foundations for precast manholes shall be constructed as a cast-in-place concrete slab, precast reinforced concrete slab, or precast reinforced concrete base riser section with integral floor as specified under Section 03315, Concrete Work, and as shown on the Drawings. Steel reinforcing for precast base slabs shall meet the requirements of ASTM C472.

Pipe-to-manhole Connections. Pipe-to-manhole connections on new sanitary sewers shall be made with resilient connectors meeting the requirements of ASTM C923 and shall be adequate for hydrostatic pressures of 10 psi, without leakage, when tested in accordance with ASTM C923 Specifications.

PART 3 - EXECUTION

DEWATERING

Dewatering of the site shall be as specified under Section 02140, Dewatering.

Subbase preparation is an adequate foundation for all manhole structures and shall be obtained by removal and replacement of unsuitable materials with 4 inches minimum crushed stone, or by such other means as provided for foundation preparation of the connected sewers.

EXCAVATION AND BACKFILL

Excavation and backfill shall be in accordance with Section 02210, Excavation and Backfill (Sewers and Water Main).

The excavation shall be of sufficient dimensions to provide ample space for sheeting and bracing where sheeting and bracing are required, and ample space to perform the Work in a satisfactory manner.

When the earth at the normal depth of the structure is unsuitable for a foundation for the structure, such unsuitable materials shall be removed as required by ENGINEER and replaced with MDOT Class II material.

BEDDING

Precast base section shall be placed on a well-graded granular bedding course conforming to the requirements for sewer bedding, but not less than 4 inches in thickness and extending to the limits of the excavation. The bedding course shall be firmly tamped and made smooth and level to ensure uniform contact and support of the precast element.

PRECAST REINFORCED CONCRETE MANHOLES

Lift Holes and Joints. All lift holes and all joints between precast elements in manhole shall be thoroughly wetted and then completely filled with mortar, smoothed and painted both inside and out, to ensure water tightness.

Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the manhole steps. The complete manhole shall be rigid, true to dimensions and watertight.

PLACING OF CASTINGS, GRADE RINGS, AND TOP SECTIONS

Castings placed on concrete surface shall be set in full mortar beds. The mortar shall be mixed in proportion of one part Portland cement to two parts sand, by volume, based on dry materials. Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary, or unless otherwise specified by ENGINEER.

Street at Grade. Where Work is in paved streets or areas which have been brought to grade, not more than 15 inches shall be provided between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to street grade.

Where Work is in unpaved streets or alleys, provide not less than 12 inches of adjusting rings between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to finished grade. Set the top of the manhole casting 5 inches below finished grade, unless otherwise directed by ENGINEER.

Where Work is in cultivated agricultural areas, bury the top of the manhole casting 3 feet, and in noncultivated areas, set the casting flush with the finished grade, unless otherwise directed by ENGINEER.

Where the last manhole section is a reducing cone and it is set to final grade as required by ENGINEER, if as part of the continuous Work it becomes necessary to lower this casting and the adjustment entails going below the cone, compensation to CONTRACTOR will be allowed for said adjustment and changing of the manhole stacks.

Point up and make watertight adjusting rings used to set the casting to grade.

CHANNELS AND INVERTS

Channels and inverts shall be made to conform accurately to the sewer characteristics and grades and shall be brought together smoothly with well-rounded junctions.

PIPE CONNECTIONS

Make pipe-to-manhole connections on sanitary sewers with properly sized watertight resilient connector. Fill other pipe joints firmly full of jointing materials to ensure water tightness. The pipes shall not protrude into the inside face of the manhole, measured along the horizontal center of the pipe unless the pipe is placed through the entire diameter of the manhole.

Use rubber water stops, O-ring gaskets, or poured-in-place pipe sleeves for water tightness between the pipe and manhole. Core drill or star drill new holes in a circle of the required diameter. In no instance shall new holes be sledge hammered out.

REMOVALS, REPLACEMENTS AND MODIFICATIONS

Removing Existing Manholes. Remove existing manholes where indicated on the Drawings or as directed by ENGINEER. Remove frame and cover and deliver to Municipality. Bulkhead all abandoned pipes and either remove the manhole and backfill the area as specified under "Excavation and Backfill," or, if in good condition, remove to a depth of 24 inches below grade and fill with granular fill materials.

Removing Existing Catch Basins. Remove existing catch basins where indicated on the Drawings or as directed by ENGINEER. Remove frame and cover and deliver to Municipality. Completely break up masonry, or pipe, and remove and dispose. Bulkhead all abandoned pipe connections at both ends where accessible. Backfill the area occupied by existing catch basins after their removal as specified under Section 02210, Excavation and Backfill.

Catch Basin Modifications. Where indicated on the Drawings and/or as directed by ENGINEER, fit existing catch basins to be retained with a new frame and cover of the type noted on the Drawings including all necessary work required to adjust to grade. Where indicated on the Drawings or as directed by ENGINEER, fillet existing sumps with Class C concrete and bulkhead abandoned leads. This Work shall be considered incidental to construction of the new catch basin lead.

Replacing Existing Casting. Where noted on the Drawings and/or as directed by ENGINEER, remove existing manhole and/or catch basin castings and replace with a new casting as hereinbefore specified.

END OF SECTION 02730