

SECTION 02402 – SANITARY SEWER MANHOLES AND CLEANOUTS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing sanitary sewer manholes and cleanouts complete, in place. It shall also include raising or lowering existing sanitary sewer manholes and cleanouts to conform to the final grade as shown on the Drawings and Standard Details.

1.2 SUBMITTALS

- A. Manholes: Shop Drawings showing method of construction and reinforcement, invert elevations, and overall dimensions.
- B. Frames and Grates: Catalogue cuts and materials certification.

PART 2 – PRODUCTS

2.1 MANHOLES

- A. All manholes shall consist of precast concrete sections, including integral base section, riser sections, cones, and flat slab tops and shall conform to ASTM C 478 and the dimensions shown on the Drawings. All precast sections shall have joints sealed with “RAM-NEK” or “RUB-R-NEK” gasketing material, or approved equal, installed as specified by the manufacturer. Cones shall be eccentric. Manhole steps shall be cast in all precast manhole sections. Pipe penetration gaskets shall be cast into all precast manholes. Grade rings shall be standard product, manufactured particularly for use in manhole construction, sized to fit the cones on which they are placed, and the wall thickness shall be not less than that of the cones. Grade rings shall be not less than two inches high, nor more than four inches high. Grade rings shall be *Infra-Riser*® or approved equal.
- B. Portland cement concrete cast in place shall conform to Section 03302 – Concrete Structures.

2.2 FRAMES, COVERS AND STEPS

- A. Manhole frames and covers shall be watertight, of ductile iron, and conform to the design and dimensions shown on the Drawings and Standard Details. Ductile iron castings shall conform to the requirements of AASHTO M 103. Grade shall be optional unless otherwise designated. Contact surfaces between frames and covers shall be machined to provide a uniform contact surface. When watertight locking devices are specified, the CONTRACTOR shall submit Shop Drawings for approval by the ENGINEER.
- B. All manhole covers shall have the word “SEWER” cast into the top in letters approximately three inches high.
- C. Manhole steps shall be constructed of polypropylene conforming to ASTM D4101, and shall meet current state and federal safety standards.

SECTION 02402 – SANITARY SEWER MANHOLES AND CLEANOUTS

- D. Frames and covers shall be ductile iron, conforming to ASTM A 48, Class 30. The cover shall be designed for the appropriate classification of traffic and shall have the word “SEWER” cast into the top with prominent letters. Bearing surfaces between the frame and cover shall be machined to smooth, plane surfaces. Frames and covers shall be Inland Foundry No. 743, or approved equal.

2.3 MISCELLANEOUS

- A. All pipes, bends and fittings used in cleanouts, drop connections, and pipe stubs for future connections to manholes shall conform to Section 02401 – Sanitary Sewer Pipe.
- B. Bentonite-Cement sealing plaster shall consist of two parts bentonite, one part Type 3 cement, and one part sand, with sufficient water to obtain workable consistency.
- C. Mortar shall consist of one part portland cement to two parts clean, well-graded sand which will pass a No. 4 screen. Admixtures may be used not exceeding the following percentages of weight of cement; hydrated lime, 10%; diatomaceous earth or other inert material, 5%. Consistency of mortar shall be such that it will readily adhere to the surface. Mortar mixed for longer than thirty minutes shall not be used. A non-shrink mortar may be submitted for approval as a substitute.
- D. Grout shall be a non-shrink type approved by the ENGINEER.
- E. Pipe penetration gasket through the manhole wall shall be cast-in-place Dura-Seal III, or approved equal, as manufactured by Dura-Tech, Inc., Kor-N-Seal Cavity O-Ring, or approved equal, as manufactured by NPC Inc. shall be used for filling the preformed void in the connection gasket.
- F. Manhole exterior joint waterproofing shall be a Miradri system as manufactured by Mirafi, Inc. including Miradri P-804 primer, Miradri 861 Membrane, and Miradri M-800 mastic, or approved equal that includes a membrane and adhesive system for positive water exclusion. The membrane shall extend at least 18” each side of manhole joints, except this width may be reduced to 9” each side of manhole joints if the joint is less than four feet below finished grade and the joint is above the maximum water table.

PART 3 – EXECUTION

3.1 CONSTRUCTION

- A. Portland cement concrete cast in place shall conform to the requirements of Division 3 – Concrete. Concrete shall not be placed under water. Running water shall not be permitted over newly poured concrete.
- B. Manholes shall be constructed in a dry excavation on a six inch compacted (95%) base of D-1. The excavation shall be kept dry until the concrete or mortar has developed sufficient strength to prevent rupture by groundwater pressure.
- C. Manhole inverts shall be formed as shown on the Drawings, either by laying pipe through and cutting out the top portion before completion of the base of the manholes, or by forming U-shaped channels in the concrete base section. Cut edges of pipe laid through

SECTION 02402 – SANITARY SEWER MANHOLES AND CLEANOUTS

the manhole shall be fully covered by concrete when the manhole invert is complete. The finished invert shall be smooth and true to grade. No mortar or broken pieces of pipe shall be allowed to enter the sewers.

- D. Precast bases sections shall be set on a level base of six inches of compacted D-1, as shown in the Standard Details. Provisions shall be made to prevent flotation of the manhole.
- E. All lifting holes shall be plugged with Bentonite-Cement sealing plaster and sealed with a Miradri System patch, or approved equal, to a minimum of six inches from the edges of the opening, as required to prevent leakage.
- F. After completion of the manhole, all plugs shall be completely removed from the sewers and all loose material shall be removed from the manhole.
- G. Service connections shall not be installed into manholes unless otherwise shown on the Drawings or directed by the ENGINEER. Where service connections into manholes are allowed, the top of the service sewer pipe shall be 0.2 feet higher than the top of the downstream main sewer pipe. The manhole invert shall be channeled for the service connection sewers in the same manner as for main sewers.
- H. Stubs for future construction shall consist of a section of pipe extending two feet outside the manhole wall, connected as shown on the Drawings and Standard Details. The manhole fillet shall be formed for future connection. The stubs shall be located as shown on the Drawings.
- I. Connection to existing manholes shall be made in such a manner that the modified manhole is equal to a new manhole in appearance and performance. A channel, approximately two inches larger all around than the connecting pipe, shall be cut into the existing manhole base. The new pipe shall be connected as shown on the Drawings and Standard Details. The rough-cut channel shall be finished to its final smooth and uniform shape with mortar. The existing sewer(s) shall be maintained in service and the fresh concrete and mortar surface shall be protected from the flowing sewage for a minimum of 24 hours.
- J. Drop construction at manholes shall be as shown on the Drawings and Standard Details.
- K. The joint exterior waterproofing system shall be installed as recommended by the system manufacturer and as shown on the Drawings and Standard Details.
- L. All manholes will be visually inspected by the ENGINEER; there shall be no evidence of leakage of water into any manhole from outside sources or any imperfections which may allow such leakage.
- M. At least 25% of the completed manholes, as selected by the ENGINEER, shall be tested for water-tightness by the CONTRACTOR. The test shall be made, with all connecting pipes plugged, by filling the manhole with clean water to within two inches of the bottom of the cast iron frame. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test period of not less than two

SECTION 02402 – SANITARY SEWER MANHOLES AND CLEANOUTS

hours when the water table is not an adverse factor. For every manhole that fails to meet the test, four additional manholes shall be tested.

- N. If the water table is an adverse factor, the manhole shall be pumped completely dry, all pipes plugged, and then be checked for infiltration. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test period of not less than two hours.
- O. Cleanouts shall be constructed as shown on the Drawings and Standard Details. The frame shall be jointed to the riser pipe so that groundwater will be prevented from entering the sewer. Cleanouts shall be tested for watertightness along with the sewers to which they are connected.
- P. The CONTRACTOR shall repair all imperfections and leaks disclosed by either visual inspection or testing. The method of repair shall be subject to the ENGINEER's approval.
- Q. ADJUST EXISTING FRAME AND COVER TO GRADE shall include adjusting the existing frame and cover to grade, and construction of a concrete collar in accordance with CBJ Standard Detail 126 – Concrete Collar, when the frame and cover is located within the paved street surface.
- R. Construct a concrete collar around each manhole frame and cover within the roadway pavement limits. Sawcut through the total pavement depth following final paving and construct the concrete collar in accordance with CBJ Standard Detail 126 – Concrete Collar. No backfilling, except with concrete, will be permitted. Seal all sawcut grooves beyond the edge of concrete.

3.2 CONNECT TO EXISTING MANHOLE

- A. CONTRACTOR shall remove or plug existing pipe as applicable, drill hole at new location required for installation of sewer under this contract, install pipe, seal the pipe penetration, form channeled inverts, install drop connections as required, and backfill as require.

END OF SECTION