

06-02

**ROGERS WATER UTILITIES SEWER SYSTEM
ROGERS, ARKANSAS**

**SPECIFICATIONS FOR SANITARY
SEWER MANHOLE CONSTRUCTION
REVISED NOVEMBER 2006**

1. **SCOPE**

This specification governs the construction of 4 foot and 6 foot diameter concrete cast-in-place (monolithic) sanitary sewer manholes.

2. **MATERIALS**

- a. Manhole frames and covers shall conform to Section 03-04 Manhole Frames and Covers of the RWU specification.
- b. Manhole gasket waterstops material shall conform to Section 03-05 Gravity Sewer Miscellaneous of the RWU specification.
- c. Grout shall conform to Section 03-11 Manhole Coatings and Wet Well Liners of the RWU specification.
- d. Concrete shall conform to Section 04-07 Concrete of the RWU specification.
- e. Steel reinforcing dowels shall conform to Section 04-08 Reinforcing Steel Material of the RWU specification.

3. **GENERAL**

- a. Pre-cast reinforced concrete sanitary sewer manholes and brick sanitary sewer manholes are prohibited for use in the sanitary sewage collection system.
- b. Steps are not allowed within the sanitary sewer manhole except when required under extenuating circumstances and only as approved by RWU.
- c. Drop sanitary sewer manholes (interior drop and/or exterior drop) are not allowed except when required under extenuating circumstances and only as approved by RWU.
- d. Sewer services larger than 4-inches shall enter at a sanitary sewer manhole and the maximum number of sanitary sewer mains and/or sewer services (combined number) penetrating a sanitary sewer manhole is four pipes.

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- e. A sanitary sewer main stub-out (future main extension) from the sanitary sewer manhole is not allowed. A block out (green hole) that is formed in the sanitary sewer manhole is allowed if location and size are specified upon project construction plans.
- f. The cast-in-place (monolithic) sanitary sewer manholes shall be constructed in accordance with ACI 301-05, except as specified otherwise herein.
- g. The Engineer shall be responsible for the staking of the center of manhole and offset staking. The survey stakes shall be marked with invert (cut) elevation and manhole cover (rim) elevation as shown on the project construction plans.
- h. All sanitary sewer manholes shall have concentric top barrel (sections). The use of flat top sections for sanitary sewer manholes must be approved by RWU.
- i. The Contractor shall furnish manholes barrel forms that conform to the size and shape of the sanitary sewer manhole as shown on the RWU standard details.
- j. The concrete used in the construction of sanitary sewer manholes shall be Class C (4,000 psi). The concrete used in the setting of the manhole frames shall be Class B (3,000 psi) if said frame is not cast with the construction of the sanitary sewer manhole.

4. **CONSTRUCTION METHOD**

Sanitary sewer manholes shall be constructed of materials and workmanship as prescribed by these specifications and shall conform to the RWU standard details.

- a. Manhole bases shall be placed against undisturbed soil or compacted engineered select backfill.
- b. Manhole bases shall be a minimum of 8-inches in depth below the bottom of the sanitary sewer mains/sewer services for 4 foot diameter sanitary sewer manholes and 12-inches in depth below the bottom of the sanitary sewer mains/sewer services for 6 foot diameter sanitary sewer manholes.
- c. The footing of the manhole bases shall extend past the exterior manhole wall a minimum distance on 2 feet in all direction for 4 foot and 6 foot diameter sanitary sewer manholes. The addition and/or extension of a manhole footing after the sanitary sewer manhole is constructed is prohibited.

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- d. All manhole invert channels shall be constructed and shaped accurately so as to be smooth, uniform and cause minimum resistance to flow. The invert channel shall have a slope of 1 tenth across the manhole (down stream sanitary sewer main entrance to the up stream sanitary sewer main entrance).
- e. The manhole bench shall be constructed to the spring line of the sanitary sewer main for 4 foot diameter sanitary sewer manholes. The manhole bench shall be constructed to the top of pipe of the sanitary sewer main for 6 foot diameter sanitary sewer manholes. The bench shall have a smooth finish and shall be sloped to drain.
- f. Sanitary sewer manholes that are constructed over existing sanitary sewer mains shall be benched as described in previous sections for the diameter of manhole. The existing sanitary sewer main shall be sawed out and the rough edges smoothed. The breaking out of the top of pipe of the sanitary sewer main is prohibited.
- g. The joints of the sanitary sewer mains/sewer services shall not be cast or constructed within the walls of the sanitary sewer manhole.
- h. Wall thickness of manholes shall be 8-inches for 4 foot and 6 foot diameter sanitary sewer manholes.
- i. All sanitary sewer mains/sewer services entering the manhole walls shall have a gasket waterstop within the manhole base/wall.
- j. The manhole base with footing and walls shall be cast monolithically.
- k. The placement of concrete in the manhole barrel forms shall be limited to a maximum 18-inch depth layer (monolithic). Each 18-inch layer shall be vibrated to bond to the preceding layer.
- l. A manhole wall (barrel) construction joint is allowed within a straight wall segment of the barrel at 12-foot above the manhole base. The construction joint shall have a key way and no. 4 reinforcing dowels (16-inch in length) at 12-inch on centers around the perimeter of the manhole as shown on the RWU standard details.
- m. Manhole barrel forms shall not be removed after the placement of concrete for a minimum of 24 hours.

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- n. Manhole frames shall be encased with concrete as shown on the RWU standard details or the manhole frames shall be set/encased using Class B concrete (3,000 psi).
- o. The manhole bench, channel and frame encasement shall have a broom finish. All fins inside the sanitary sewer manhole that are caused by manhole forms, construction joint or other projections shall be removed.
- p. All visible manhole concrete defects shall be repaired with a non-skrink grout material for manholes that is specified in Section 03-11 Protective Coating of the RWU specification.
- q. No backfill operation and/or paving operation shall be preformed against the sanitary sewer manhole for a minimum of 48 hours after the placement of concrete.

5. COLD WEATHER REQUIREMENTS

Whenever the temperatures of the surrounding air is below 40 degrees F or when the possibility exists that the temperature will fall below 40 degrees F, within the 24 hour period after concrete operations, the concrete placed in the forms shall have a temperature of between 50 degrees F and 70 degrees F. All concrete shall be maintained at a temperature of not less than 50 degrees F for at least 48 hours or for as much time as is necessary to ensure proper curing of the concrete. No dependence shall be placed on surface treatment of the concrete with salt or other chemicals for the prevention of freezing. If a sanitary sewer manhole is damaged by freezing, in the opinion of the Engineer and RWU personnel, the Contractor shall replace the sanitary sewer manhole. The cost of the manhole replacement is incidental to the cost of the project.

6. TESTING

The Contractor shall perform a vacuum test in accordance with Section 08-02 Sanitary Sewer Manhole Testing of the RWU specification.