ITEM 926

MANHOLE REHABILITATION

926.1 General: This Specification covers rehabilitation of existing sanitary sewer manholes including reconstruction of benches and inverts, resurfacing interior of manholes to prevent infiltration/exfiltration, replacement of manhole covers, and repair or replacement of manhole rings. Specification also covers method of repair, material, equipment, and payment for work. Rehabilitation of sewer manholes is divided into three categories as indicated below and shown on Plans.

A. Sealing joints and cracks in walls and flow channels

B. Replacing ring

C. Replacing cover

926.2 Sealing of Joints and Cracks in Manhole Wall and Flow Channels:

A. Surface Preparation: Consists of removal of all foreign materials and matter from manhole interior. Accomplish cleaning by water blasting or acid washing. Water blasting of sufficient pressure (3,500 psi) to remove all surface contaminants thoroughly and loose material. Use muriatic acid (ratio of one part hydrochloric acid to ten parts of water) for acid wash of all interior surfaces. Perform mixing, application, and removal of acid wash solution in strict accordance with manufacturer's recommendation and safety procedures. Acid solution to remain on interior surfaces until all foreign material and matter has been removed and then wash off with potable water. After thoroughly cleaning, allow manhole surfaces to dry before application of rehabilitation materials.

B. Rehabilitation Materials: Use Strong-Seal MS-2C, Reliner MSP, Quadex QM-1S, or other approved equal.

C. Construction Method: Mix materials and apply as described and recommended by manufacturer. Application thickness shall be in accordance with manufacturer's recommendations or a minimum of one-inch (1") thick, whichever is greater. Remove obstructions and loose materials from benches prior to shaping the invert. Form a smooth U-shaped invert having a minimum depth of one-half (1/2) pipe diameter and channel it across the floor using a quickset mortar. Make finished benches smooth and without defects which would allow for accumulation of debris. Control flows including any service connections to allow sufficient setting time for material used. Apply sealant to manhole walls beginning at the bottom and continuing to joint between cast iron ring and manhole wall. Thoroughly seal around all sewer lines and manhole steps. During application and

sealant curing no water permitted in manhole (See Specification Item 925, By-Pass Pumping). Follow safety regulations and precautions as set out by material manufacturer and OSHA regulations.

1. Stopping Infiltration: After surface has been prepared, but prior to application of rehabilitation materials, plugs visible points of infiltration by use of a mixture of cement powder or hydraulic mix. If heavy infiltration is present, drill holes circumferentially around base of manhole for relief ports. After manhole rehabilitation, plug holes with mixture of materials as specified for plugging visible points of infiltration.

2. Patching: Patch manhole walls in areas of large voids, i.e., missing brick, around pipe openings, steps, frames, etc., by use of a quickset mortar. Remove all cracking or disintegrated materials to sound sub-base. Strictly follow the manufacturer's application procedure.

D. Testing: Test completed manholes for leakage in accordance with Specification Item 923. If manholes fail test, correct rehabilitation deficiencies as required, and retest until manhole leakage is within allowable quantity specified in Specification Item 923.

926.3 Reinstallation/Replacement of Manhole Rings and/or Covers: Conform to following and in accordance with details shown on Plans:

A. Materials:

1. Cast Iron: ASTM A48, Class No. 30, cast iron. Make cast iron manhole frames and covers to dimensions shown on detail drawing. Free of sand or blowholes and other defects. Holes in cover to be free from plugs and burrs. Machined bearing surfaces of manhole frames and covers to obtain even bearing. Cast wording "Sanitary Sewer" and name of OWNERS on covers. See wording as shown on Plans. Use same size diameter cover as existing for sanitary sewers.

2. Brick: ASTM C32, Grade NA, except that no more than 16% (by weight) maximum individual brick absorption permitted when submerged in water for 24 hours. Thoroughly dry prior to placing in water. Use only first quality, sound, hard homogenous and uniformly burned.

3. Mortar: ASTM C270, Type S (A-2) using Portland cement.

4. Aggregate for Mortar: ASTM C144

5. Concrete: See Specification Item 421. Use Class "A" Concrete.

B. Construction Methods: Salvage existing rings and/or covers and reuse unless damaged. Where ring is to be replaced remove all grout material from, around, and under ring to top of brick/precast concrete. When manhole is located in paved surface, accomplish removal by making a neat six-foot square cut in pavement surface. (Saw cut concrete surfaces.) Raise elevation of manhole using bricks and mortar and/or precast concrete throat rings with mortar joints. Set cast iron frame in full mortar bed so that top of frame is flush with surrounding pavement when in paved areas, is two-inches above natural ground in non-ponding area, or to height specified or directed in bar ditches or other low ponding areas. After mortar has set, backfill excavated area with compacted bank-sand in earth locations (cement-stabilized sand in paved area) and restore natural ground surfaces to condition equivalent to that existing prior to construction. For replacement of paved surfaces see applicable Specification Item.

926.4 Protection of Work: In accordance with General Conditions and Special Conditions of the Agreement. Additionally, Contractor will repair/replace at his expense any damage resulting from manhole rehabilitation.

926.5 Measurement:

A. Measure manhole rehabilitation per vertical foot as measured from base of manhole (excluding invert) to bottom of cast-iron frame. Pay for manhole rehabilitation at Contract unit price bid for depth measure.

B. No separate measurement or payment for salvaging or reinstallation of existing manhole rings and/or covers. Include cost of same in Contract price bid for bid item of which it is a component.

C. Measure replacement of manhole cover per each. Pay for replacement of manhole cover, furnished, installed, and measured as stated at Contract unit price per each.

D. Measure replacement of manhole ring per each. Pay for replacement of manhole ring furnished, installed, and measured as stated at Contract unit price per each.

E. No separate measurement or payment for removal and replacement of paved surfaces in connection with manhole rehabilitation. Include cost of same in Contract price bid for bid item of which it is a component.

F. No separate measurement or payment for by-pass pumping. Include cost of same in Contract price bid for bid item of which it is a component.

G. Measure adjustment of manhole ring height per each. Pay for adjustment of existing manhole ring height as stated at Contract unit price per each.

END OF ITEM 926