PART ONE – GENERAL

1.1 This section provides for construction of sanitary sewer manholes and cleanouts complete in place in accordance with these specifications and the construction drawings. The work shall include but not be limited to excavation, backfilling, furnishing all equipment, labor and materials to construct manholes and cleanouts to the lines, grades and locations as shown on the construction plans.

PART TWO - PRODUCTS

2.1 Iron Castings

2.1.1 All iron castings shall be of first quality and shall conform to ASTM A-48, Class 35 or better. Rings and covers shall be Product No. 41320XXNAC5 as manufactured by East Jordan Iron Works with City of Nacogdoches logo. Rings and covers shall be of a heavy traffic type, machine seated and designed not to rock. Hot asphalt varnish coating shall be applied at the foundry.

2.1.2 Manhole rings and covers shall be sized with a twenty-four (24") inch cover diameter unless shown otherwise in the plans.

2.1.3 Each manhole ring and cover shall consist of one of the following types, as designated on the plans or by the City:

(1) Perforated: The cover shall fit the ring smoothly, but need not be gasketed. The cover shall contain a minimum of four (4) holes of approximately three-fourths (3/4") inch diameter.

(2) Self-Sealing: The cover shall be solid with concealed pick holes. The bottom of the cover shall contain a precisely machined groove fitted with a continuous gasket. The gasket material shall be of special composition, with good sealing qualities, abrasion resistance and low compression set.

(3) Self-Sealing Vented: The cover shall be similar to the self-sealing cover above and shall contain a vent hole of 1" diameter located in the center of the cover. An inflow prevention device shall be installed to minimize inflow.

2.1.4 Inflow Prevention Device:

The inflow prevention device shall be designed to minimize inflow into the sanitary sewer manhole. The device shall be load tested to withstand 800 pounds outside of traffic areas and 3000 pounds within traffic areas. The inflow prevention device shall be equal to the "Rainstopper" as manufactured by Southwestern Packing and Seals, Inc. The device shall include gasket, relief valve and handle. The handle shall be designed to withstand a minimum 500 pounds of force before failure.

2.2 MANHOLES

2.2.1 Dimensions: Unless otherwise specified or shown on the plans, manholes shall have an inside diameter of four (4) feet. The cone section shall reduce from full inside diameter to an opening that allows for a manhole cover of 24 inches in diameter.

2.2.2 Precast: The walls of precast manholes shall consist of risers, cones and grade rings conforming to ASTM C-478. Joints shall be watertight and of tongue and groove type, gasketed.

2.2.3 Fiberglass:

(1) When proposing to use fiberglass manholes, the Contractor shall submit to the City complete manufacturing, design and material criteria so that a suitability analysis can be made.

(2) The walls and cone of fiberglass manholes shall consist of fiberglass construction conforming to ASTM D-3753. The walls and cone shall consist of a single manufactured unit extending from the base (or tee) to within eighteen (18") inches of final grade.

(3) One or more concrete grade rings shall be placed between the fiberglass manhole and the cast iron ring and cover. The completed manhole shall be designed for a wheel load of 40,000 pounds.

2.2.4 Other Types: Other materials may be used in manholes upon approval of the City. The Contractor shall submit to the City in writing any proposals for alternate construction materials, including material specifications and structural details.

2.3 CONCRETE

Cast-in-place concrete shall have a minimum 28-day f'c of 3000 psi. All manhole bases shall be poured monolithically.

2.4 MANHOLE ACCESS

The Contractor shall furnish an aluminum extension ladder of sufficient length to reach the bottom of the deepest manhole.

2.5 GROUT

Grout used for invert or other required work shall be "non-shrinking" type with minimum 28-day compressive strength of 8,000 psi.

2.6 CURING

Calcium curing compound not to exceed two percent may be used with approval of the Engineer and at the option of the Contractor to facilitate drying.

PART THREE - EXECUTION

3.1 EXCAVATION

Excavation for manholes and similar structures shall be sufficient to leave at least two (2') feet clearance between the outer surfaces and the embankment or timber that may be used to hold and protect the banks. Any over depth excavation that has not been directed by the Engineer will be considered unauthorized and shall be refilled with sand, gravel or concrete, as directed.
Backfill shall consist of (a) select material from the excavation, placed in maximum 8-inch lifts, compacted to a minimum of ninety-five (90%) percent Standard Proctor density per ASTM D-698; or (b) well-tamped sand-cement at two sacks of cement per cubic yard of mix.

3.2 FOUNDATION AND INVERT

3.2.1 Manholes, including foundations (bases) shall be constructed around main sewer pipes after pipe laying is complete. The concrete base may be precast according to ASTM C-478, or cast-in-place, at the option of the Contractor. A cast-in-place base shall have a minimum thickness of eight (8") inches below Th. bottom of the lowest pipe unless otherwise specified and shall be poured on undisturbed earth. The base shall have a minimum diameter of six (6") inches greater than the outside of the finished manhole barrel.

3.2.2 Manhole inverts shall be carefully constructed to maintain the proper velocities through the manholes and in no case shall the invert section through the manholes be greater than that of the outgoing pipe. The shape of the invert shall conform exactly to the lower half of the pipe it connects. Side branches shall be connected with as large radius of curve as practicable. All inverts shall be troweled to a smooth clean surface. Concrete filling between the sewer invert and walls of manholes shall be flush with the top edges of the invert and shall slope up from the invert at the rate of one (1") inch per foot. The manhole will be self-cleaning and free of areas where solids may be deposited as sewage flows through the manhole from all inlet pipes to all outlet pipes.

3.2.3 All opening created in the barrel of the manholes for pipe entry shall be plastered with grout after the pipe is installed and brushed smooth, with the pipes so entering the barrel of the manhole above the base to be cut even with the inside edge of the manhole. The pipe to manhole connection shall be made watertight by use of adapters, sleeves or other sealing devices as approved by the City.

3.3 MANHOLES

3.3.1 General: The manhole wall shall consist of precast concrete, fiberglass or other approved material as discussed above, with no built-in steps or ladder rungs permitted. The top of the manhole shall consist of a cast iron ring and cover, finished to natural ground or as otherwise designated on the plans or by the City.

3.3.2 Precast Concrete Manholes:

(1) Circular precast sections shall be provided with an approved gasket to seal the joints between sections.

(2) Install precast concrete pipe structures on a previously placed slab foundation (base).

(3) Slab foundation shall be clean and a mastic gasket or waterstop used prior to setting concrete pipe section to provide a watertight joint and manhole.

(4) All grout shall be used within forty minutes after mixing. Grout that has begun to take on initial set shall be discharged and shall not be mixed with additional cement or new grout.

3.3.3 Fiberglass Manholes: Fiberglass manholes shall be installed as specified in the manufacturer's specifications or as modified by the Contractor and approved by the City.

3.4 DROP MANHOLES

When an incoming line is two (2′) feet or more above the flow line of the outgoing line, a drop inlet shall be constructed just outside the manhole as detailed in the plans.

3.5 CLEANOUTS

Cleanouts on sewer mains shall be constructed where shown on the plans in accordance with the details shown on the plans.

3.6 TESTING

Each completed manhole shall be exfiltration tested according to City Specifications. Any manhole that fails this test shall be repaired and retested.

PART FOUR - MEASUREMENT AND PAYMENT

Not Applicable