SECTION 02440
VALVE BOXES, METER BOXES AND METER VAULTS

PART I: GENERAL

1.1 GENERAL REQUIREMENTS
- A. Valve boxes for water service.
- B. Meter boxes for water service.
- C. Meter vaults for water service.

1.2 MEASUREMENT AND PAYMENT
- A. Unit Prices:
  1. No separate payment shall be made for valve boxes under this Section. Include payment in the unit price for Section 02400 – Water Lines.
  2. No separate payment shall be made for meter boxes under this Section. Include payment in the unit price for Section 02430 – Water Tap and Service Line Installation.
  3. Payment for each size of meter vaults is on the unit price basis per vault. Payment shall be made for each vault installed, regardless of depth.
  4. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
  1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.3 REFERENCES
- A. ASTM – American Society for Testing and Materials.
  1. ASTM A48 – Standard Specification for Gray Iron Castings.
  2. ASTM D256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
  3. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
  4. ASTM D648 – Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
  5. ASTM D790 – Standard Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials.
  6. ASTM D2240 – Standard Test Method for Rubber Property-Durometer Hardness.
- B. CFTS – City of Friendswood Technical Specifications

1.4 SUBMITTALS
- A. Conform to requirements of Section 01330 – Submittal Procedures.

B. Submit manufacturers' product data for following items for approval:
   1. Each type of valve box and lid.
   2. Each type of meter box and cover.
   3. Each type of meter vault frame and cover.

C. Submit design calculations and shop drawings for precast vault elements, sealed by a Professional Engineer licensed by the State of Texas.

D. Submit shop drawings for cast-in-place meter vaults for approval if proposed construction varies from the Drawings.

E. Submit manufacturer's certification that plastic meter boxes meet requirements of Paragraph 2.5, Plastic Meter Boxes.

PART II: PRODUCTS

2.1 VALVE BOXES

A. Provide approved Type A, cast-iron/ductile-iron, slide-type, valve boxes. Design of valve box shall minimize stresses on valve imposed by loads on box lid.

B. Cast letter "W" into lid, one-half inch (1/2 In) in height and raised three-thirty-seconds inch (3/32 In), for valves serving potable water lines.

C. Unless otherwise specified, constructed of uncoated cast iron.

D. Riser Pipe:
   1. Provide six inch (6 In) PVC, Class 150, DR 18, riser pipes in accordance with Section 02235 – Polyvinyl Chloride Pipe (PVC) or
   2. Six inch (6 In) ductile-iron, thickness Class 51 riser pipes in accordance with Section 02215 – Ductile Iron Pipe (DIP) and Fittings.
   3. Provide single section of pipe.

E. Concrete for valve box placement:
   1. For locations in new concrete pavement, provide strength and mix design of new pavement.
   2. For other locations, provide concrete for sidewalks conforming to requirements of Section 02805 – Concrete Paving.

F. Valve box lids are to be painted blue.

2.2 METER BOXES

A. Provide meter boxes for five-eighths inch (5/8 In) through one inch (1 In) meters of the following materials:
   1. Non-traffic bearing locations: Cast iron, concrete or plastic.
   2. Traffic bearing locations: Cast iron or concrete.

B. Provide meter boxes for one and one-half inch (1-1/2 In) and two inch (2 In) meters of concrete.

C. Provide meter box with reading lid: Provide lids with spring-type latching devices. Lids shall contain sufficient metal that meter box can be easily

located with metal detector. Cast words “CITY OF FRIENDSWOOD” and "WATER METER" into lid with letters of one-half inch (1/2 In) height and raised three-thirty-seconds inch (3/32 In).

D. Meter box dimensions shall conform to the following approximate dimensions:
   1. Length: At top – fifteen and one-half inches (15-1/2 In); at bottom twenty inches (20 In).
   2. Width: At top – twelve and one-half inches (12-1/2 In); at bottom fourteen and three-quarters inches (14-3/4 In).
   3. Height: Twelve inches (12 In).

E. Extensions: Meter box extensions three (3 In) inches and six inches (6 In) in height shall be available from the manufacturer as a standard item.

2.3 CAST-IRON METER BOXES

A. Cast-Iron Boxes: Clean and free from sand blow-holes or other defects conforming to requirements of ASTM A48, Class 30B. Bearing surfaces shall be machined so that covers seat evenly in frames.

B. Boxes and lids shall have dipped, coal-tar-pitch, varnish finish.

C. Provide lock-type meter boxes when required by the Drawings. Lock mechanisms shall work with ease.

2.4 CONCRETE METER BOXES

A. Concrete Meter Boxes: Made of Class B concrete, with minimum four thousand pounds per square inch (4000 psi) compressive strength, conforming to requirements of Section 03300 – Structural Concrete. Construct to dimensions shown on the Drawings.

B. Castings: Free from fractures, large or deep cracks, blisters or surface roughness or any other defects that may affect serviceability.

2.5 PLASTIC METER BOXES

A. Plastic Meter Boxes: Made of high density polyethylene conforming to the following ASTM standards:
   1. ASTM REQUIREMENT:
      a. D256 Impact Strength = One and nine-tenths foot-pounds per inch (1.9 Ft-Lb/In) (Izod, Notched).
      b. D256 Impact Strength = Six and four-tenths foot-pounds per inch (6.4 Ft-Lb/In) (Izod, Un-Notched).
      c. D638 Tensile Strength (2.0 min.) = Three thousand four hundred pounds per square inch (3400 psi).
      d. D648 Deflection Temperature = One hundred seventy degrees Fahrenheit (170° F).
      e. D2240 Shore D, Hardness, fifty-five (55) to sixty-five (65) Impact Strength, Falling Dart Method: One hundred sixty inch-pounds (160 In-Lb).
      f. D790 Flexural Modulus = Ninety thousand pounds per square inch (90,000 psi).

B. Meter boxes shall meet the following test requirements:
   1. Static Load: Not less than two thousand five hundred pounds (2500 psi) using six inch (6 In) disc with direct compression exerted at center of top of meter box with solid plastic lid.
   2. Deflection: Not less than one thousand pounds (1000 Lbs) load required to deflect top edge of meter box one-eighth inch (1/8 In).

C. Meter box body, without lid, shall weigh approximately seven pounds (7 Lbs).

2.6 METER VAULTS

A. Meter vaults may be constructed of precast concrete or cast-in-place concrete unless a specific type of construction is required by the Drawings.

B. Concrete for Meter Vaults: Class B concrete, conforming to requirements of Section 03300 – Structural Concrete with minimum compressive strength of four thousand pounds per square inch (4000 psi) at twenty-eight days (28 D).

C. Reinforcing steel for meter vaults: Conform to requirements of Section 03200 – Reinforcing Steel.

D. Grates and Covers: Conform to requirements of Section 02315 – Frames, Grates, Rings and Covers.

PART III: EXECUTION

3.1 EXAMINATION

A. Obtain approval from the Project Manager for exact location of meter vault.

B. Verify lines and grade are correct.

C. Verify compacted subgrade shall support loads imposed by vaults.

D. At no time shall a valve box, meter box or meter vault be installed in a driveway, sidewalk or wheelchair ramp.

3.2 VALVE BOXES

A. Install riser pipe with suitable length for depth of cover indicated on the Drawings or to accommodate actual finish grade.
   1. Install with bell on top of valve.
   2. Place riser pipe in plumb, vertical position.

B. Install valve box and riser piping plumbed in a vertical position. Provide six inches (6 In) telescoping freeboard space between riser pipe top butt end and interior contact flange of valve box, for vertical movement damping. End of riser pipe resting on valve shall be notched out sufficiently to provide a snug fit around the valve bonnet and to center valve inside of pipe.

C. Set, align and adjust valve box so that lid is level with final grade.

D. Install twenty-four inch by twenty-four inch (24 In x 24 In) concrete valve collar using Class A concrete, conforming to requirements of Section 03300 – Structural Concrete with minimum compressive strength of three thousand pounds per square inch (3000 psi) at twenty-eight days (28 D).
E. Paint covers of new valve boxes in blue when installed for completion and acceptance by the City.

3.3 METER BOXES

A. Install cast iron or plastic boxes in accordance with manufacturer's instructions.
B. Construct concrete meter boxes to dimensions shown on the Drawings.
C. Adjust top of meter boxes to conform to cover elevations specified in Paragraph 3.5, Frame and Cover for Meter Vaults.
D. Do not locate under paved areas unless approved by the Project Manager. Use approved traffic type box with cast iron lid when meter must be located in paved areas.
E. Locate Meter Boxes in the City right-of-way, perpendicular to the centerline of the roadway.

3.4 METER VAULTS

A. Construct concrete meter vaults to dimensions shown on the Drawings. Do not cast in presence of water. Make bottom uniform. Verify lines and grades are correct and compacted subgrade shall support loads imposed by vaults.
B. Precast Meter Vaults:
    1. Install precast vaults in accordance with the manufacturer's recommendations. Set level on a minimum three inch (3 In) thick bed of sand conforming to requirements of Section 02140 – Utility Backfill Materials.
    2. Seal lifting holes with cement-sand mortar or non-shrink grout.
C. Meter Vault Floor Slab:
    1. Construct floor slabs of six inch (6 In) thick reinforced concrete. Slope floor one-quarter inch per foot (1/4 in/ft) toward sump. Make sump twelve inches (12 In) in diameter or twelve inches (12 In) square and four inches (4 In) deep, unless other dimensions are required by the Drawings. Install dowels at maximum of eighteen inches (18 In), center-to-center for keying walls to floor slab.
    2. Precast floor slab elements may be used for precast vault construction
D. Cast-in-Place Meter Vault Walls:
    1. Key walls to floor slab and form to dimensions shown on the Drawings. Minimum wall thickness shall be four inches (4 In).
    2. Cast walls monolithically: One (1) cold joint shall be allowed when vault depth exceeds twelve feet (12 ft).
    3. Set frame for cover in concrete.

3.5 FRAME AND COVER FOR METER VAULTS

A. Set cast iron frame in a mortar bed and adjust elevation of cover as follows:
   1. In unpaved areas, set top of meter box or meter vault cover two inches (2 In) to three inches (3 In) above natural grade.
   2. In paved areas, set top of meter box or meter vault cover flush with adjacent concrete but no higher than one-half inch (1/2 In).

3.6 BACKFILL

A. Provide bank run sand in accordance with Section 02140 – Utility Backfill Materials and backfill and compact in accordance with Section 02125 – Excavation and Backfill for Utilities.
B. In unpaved areas, slope backfill around meter boxes and vaults to provide a uniform slope one to five (1:5) slope from top to natural grade.
C. In paved areas, slope concrete down from meter box or vault to meet adjacent paved area.

END OF SECTION