

**SECTION 02600
STORM SEWERS**

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. New storm sewers and appurtenances, modifications to existing storm sewer system and installation of roadside ditch culverts.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices:

- 1. Payment for storm sewers, including elliptical pipe or box sections, installed by open-cut or augering with or without casing is on a linear foot basis. Measurement for storm sewers and roadside ditch culverts shall be taken along the center line of pipe from center line to center line of manholes or from end to end of culverts. Payment shall be made for each linear foot installed complete in place, including connections to existing manholes and inlets.
- 2. Payment for storm sewer leads, including elliptical, round or box leads, is on a linear foot basis.
- 3. 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. CFTS – City of Friendswood Technical Specifications.

1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Submit manufacturer's literature for product specifications and installation instructions.
- C. Submit proposed methods, equipment, materials and sequence of operations for storm sewer construction. Plan operations to minimize disruption of utilities serving occupied facilities or adjacent property.

1.5 QUALITY ASSURANCE

- A. The condition for acceptance shall be a watertight storm sewer that is watertight both in at all joints and at connections to manholes or inlets.
- B. Provide manufacturer's certification to Specifications.

1.6 PRODUCT DELIVERY, STORAGE and HANDLING

- A. Comply with manufacturer's recommendations.

- B. Handle pipe or boxes, fittings and accessories carefully with approved handling devices. Do not drop or roll pipe or boxes off trucks or trailers. Do not use sections that are cracked, gouged, chipped, dented or otherwise damaged for installation.
- C. Store pipe or boxes and fittings on heavy timbers or platforms to avoid contact with ground.
- D. Unload pipe or boxes, fittings and appurtenances as close as practical to location of installation to avoid unnecessary handling.
- E. Keep interiors of pipe or boxes and fittings free of dirt and foreign matter.

PART II: PRODUCTS

2.1 PIPE

- A. Provide pipe or boxes for storm sewers in the sizes and types specified, unless otherwise indicated on the Drawings.
- B. In diameters where material alternatives are available, and such alternatives have been approved by the City, provide pipe or boxes from single manufacturer for each pipe or box size, unless otherwise approved by the Project Manager or otherwise shown on the Drawings.
- C. Existing pipe or boxes that have been removed during construction shall not be reused unless approved the Project Manager.

2.2 PIPE MATERIAL SCHEDULE

- A. Storm Sewer Pipe or Boxes: Use pipe or boxes that conform to requirements specified in one (1) or more of the following Sections as shown on the Drawings. Polyvinyl Chloride Pipe shall not be used for storm sewers.
 - 1. Section 02240 – Reinforced Concrete Box (RCB).
 - 2. Section 02245 – Reinforced Concrete Pipe (RCP).
- B. Driveway Culvert Pipe for Streets with Open Ditches: Use pipe or boxes that conform to requirements specified in one (1) or more of the following Sections as shown on the Drawings.
 - 1. Section 02240 – Reinforced Concrete Box (RCB).
 - 2. Section 02245 – Reinforced Concrete Pipe (RCP).
- C. Provide pipe or boxes meeting minimum class, dimension ratio or other criteria indicated.
- D. Pipe or boxes other than those listed above shall not be used for storm sewers.

2.3 BEDDING, BACKFILL and TOPSOIL MATERIAL

- A. Bedding and Backfill Material: Conform to requirements of Sections 02125 – Excavation and Backfill for Utilities, Section 02140 – Utility Backfill Material and Section 02145 – Cement-Stabilized Sand.
- B. Topsoil: Conform to requirements of Section 02905 – Topsoil.
- C. Use cement-stabilized sand material for bedding and backfill in the pipe or box zone for all storm sewers.

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- D. For storm sewer pipes forty-two inches (42 In) in diameter and larger or boxes larger than four feet by four feet (4 Ft x 4 Ft); use suitable on-site material or select backfill from twelve inches (12 In) above the pipe to twelve inches (12 In) below the pavement for backfill.

PART III: EXECUTION

3.1 PREPARATION

- A. Prepare traffic control plans and set up street detours and barricades in preparation for excavation when construction shall affect traffic. Conform to requirements of Section 01555 – Traffic Control and Regulation.
- B. Provide barricades, flashing warning lights and signs for excavations. Conform to requirements of Section 01555 – Traffic Control and Regulation. Maintain barricades and warning lights for streets and intersections while the Work is in progress or where traffic is affected by the Work.
- C. Immediately notify agency or company owning utility lines which are damaged, broken or disturbed. Obtain approval from the Project Manager and agency for repairs or relocations, either temporary or permanent.
- D. Remove old pavements and structures, including sidewalks and driveways, in accordance with requirements of Section 02105 – Removing Existing Pavements and Structures.
- E. Install and operate dewatering and surface water control measures in accordance with Section 01585 – Control of Ground and Surface Water.

3.2 EXCAVATION

- A. Earthwork: Conform to requirements of Section 02125 – Excavation and Backfill for Utilities. Use bedding as indicated on the Drawings.
- B. Line and Grade: Establish required uniform line and grade trench from benchmarks identified by the Project Manager. Maintain this control for minimum of one hundred feet (100 Ft) behind and ahead of pipe-laying operation. Use laser beam equipment to establish and maintain proper line and grade of the Work or use of appropriately sized grade boards which are substantially supported.
- C. Trench Excavation: Excavate trenches to the level indicated on the City's Standard Construction Details. Backfill excavation with specified bedding material to level of lower one-third (1/3) of pipe barrel or box. Tamp and compact backfill to provide bedding at indicated grade. Form bedding foundation to a minimum depth of one-eighth (1/8) of pipe diameter or box height, but not less than six inches (6 In).

3.3 PIPE INSTALLATION

- A. Install in accordance with pipe or boxes manufacturer's recommendations and as specified in this Section.

- B. Install pipe or boxes only after excavation is completed, bottom of trench is shaped, bedding material is installed and trench has been approved by the Project Manager.
- C. Install pipe or boxes to line and grade indicated on the Drawings. Place pipe or boxes so that it has continuous bearing of barrel or box bottom on bedding material with no voids and is laid in the trench so interior surfaces of pipe or boxes follows grades and alignments indicated.
- D. Install pipe or boxes with bells of pipe facing upstream of anticipated flow.
- E. Join each section of adjoining pipe or boxes to prevent offsets.
- F. Place and drive home newly laid sections with a sling or come-a-long winches to eliminate damage to sections. Unless otherwise approved by the Project Manager, provide end protection to prevent damage while using back hoes or similar powered equipment to drive home newly laid sections.
- G. Keep interior of pipe or boxes clean as installation progresses.
- H. Keep excavations free of water during construction and until final inspection.
- I. When Work is not in progress, cover exposed ends of pipes or boxes with plugs specifically designed to prevent foreign material from entering pipe.
- J. Storm sewers identified on the Drawings to be abandoned shall be abandoned in general conformance with Section 2515 – Abandonment of Sanitary Sewers.

3.4 PIPE OR BOX INSTALLATION OTHER THAN OPEN CUT

- A. Conform to requirements of Section 02275 – Pipe and Casing Augering for Sanitary Sewers where required.

3.5 INSTALLATION OF APPURTENANCES

- A. Construct manholes to conform to requirements of Sections 02300 – Cast-in-place Concrete Manholes, Section 02305 – Precast Concrete Manholes and Section 02615 – Concrete Brick Manholes for Storm Sewers. Install frames, grate rings and covers to conform to requirements of Section 02315 – Frames, Grates, Rings and Covers.
- B. Install inlets, headwalls and wingwalls to conform to requirements of Section 02605 – Cast-in-place Inlets, Junction Boxes, Headwalls and Wingwalls and Section 02610 – Precast Concrete Inlets, Junction Boxes, Headwalls and Wingwalls.
- C. Rehabilitate existing manholes and inlets to conform to requirements of Section 02320 – Manhole Rehabilitation. Adjust manhole covers and inlets to grade conforming to requirements of Section 02310 – Adjusting Manholes, Inlets and Valve Boxes to Grade.
- D. Dimension for Type C and Type E manholes shall be as shown on the Drawings.

3.6 INSPECTION AND TESTING

- A. Perform post-installation television inspection in accordance with Section 02520 – Television Inspection of Sanitary Sewer Lines. Hand held cameras may be used in storm sewers in lieu of requirements of Section 02520 – Television Inspection of Sanitary Sewer Lines. Clearly stencil distance markings on each joint of pipe or box to indicate distance from starting manhole when using hand-held cameras.

3.7 BACKFILL AND SITE CLEANUP

- A. Backfill trench after pipe or box installation is inspected and approved by the Project Manager.
- B. Backfill and compact soil in accordance with Section 02125 – Excavation and Backfill for Utilities.
- C. Repair and replace removed or damaged pavement and sidewalks as specified in Section 02845 – Pavement Repair and Resurfacing.
- D. In unpaved areas, grade surface as uniform slope to natural grade as indicated on the Drawings. Provide minimum of four inches (4 In) of topsoil and seed according to requirements of Section 02910 – Hydromulch Seeding or Section 02915 – Sodding, as required.

END OF SECTION