SECTION NO. 15

SPECIAL PROVISIONS – DRAINAGE SPECIFICATIONS

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SECTION NO. 15

SPECIAL PROVISIONS – DRAINAGE SPECIFICATIONS

15-01 REINFORCED CONCRETE PIPE:

A. Pipe for storm drains and culverts shall conform to the latest TxDOT Standard Specifications Item 462. All pipes shall be machine made by a process which will provide for uniform placement of zero slump concrete in the form of compaction by mechanical devices which will assure a dense concrete in the finished product. All excavation, bedding, jointing, and backfilling shall be done in accordance with the latest NCTCOG Specifications unless as modified in these Special Provisions.

B. At the request of the City, the Contractor will be required to furnish and use a laying schedule supplied by the manufacturer showing location of all bends, fittings, and beveled end joints required to accurately construct the system, including curves, as shown on the plans. The pipe will not be laid until the requested laying schedule has been reviewed and accepted by the City for construction purposes.

C. The laying schedule shall be based on all pipe joints constructed to the "home" or normal position and the distance between the ends of adjacent pipe sections will be essentially uniform around the periphery of the pipe. OMNI-FLEX® (or approved equal) joint sealer shall be used on all joints and the joint gap range shall not exceed the manufacturer's recommendations.

D. After the trench has been cut to depth below the barrel of the pipe, the bedding shall be brought up to a point slightly above the grade. Bell holes shall be formed, a trough scooped out to grade and the pipe laid and jointed as specified.

E. The pipe shall be bedded in a minimum of 6-inches crushed stone except in rock or in wet or unstable trenches where an additional 3-inches of crushed stone will be added to the standard bedding requirements. Crushed stone shall meet the latest NCTCOG Specifications 504.2.2.1 Crushed Stone Embedment - Aggregate Grade 4. River rock/gravel will be allowed as long as it meets this gradation requirement.

F. After the pipe has been laid and the joints made, crushed stone shall be placed from the bottom of the pipe to the **top** of pipe. The material shall be placed uniformly on both sides of the pipe in order to prevent disturbance of the pipe and, if necessary, blocking shall be placed against the sides of the trench to prevent displacement of the pipe. The material shall be worked under the haunches of the pipe during the time it is being placed. Filter fabric shall be placed over the full width of the embedment prior to trench backfill operations.

G. For the remaining backfill operations, see respective trench backfill specifications in these Special Provisions.

H. Payment for all reinforced concrete pipe shall be based on the contract unit price bid per linear foot of pipe measured along the centerline of the pipe in the trench and shall be full

compensation for all labor and materials necessary to make the complete installation, including but not limited to excavation, bedding, jointing, backfilling and joint sealer. The cost of constructing concrete collars, tees, and wyes shall be considered subsidiary to the unit prices bid for reinforced concrete pipe, unless an item has been provided in the PROPOSAL.

I. If cast in place reinforced box culvert is used, it shall be constructed in accordance with TxDOT Item 462. If multiple precast box sections are used and the void space between culvert walls is less than 6-inches, it shall be backfilled using flowable fill of at least six hundred (600) psi concrete. If the void is 6-inches or more, standard embedment material shall be used.

J. Payment for the box culvert shall be measured by the linear foot of box culvert, including the reinforcing steel using the length between the ends of the culvert barrel along the central axis as constructed. Payment shall be complete in place, including excavation and backfill, furnishing all materials, labor and incidentals, and performing all work necessary to complete the work.

15-02 HIGH DENSITY POLYETHYLENE PIPE (HDPE):

A. HDPE in this section shall refer to High Density Corrugated Polyethylene Smooth Wall Pipe. This item shall govern the furnishing and installation of all HDPE and associated fittings necessary for constructing storm drain facilities, which shall conform to AASHTO M294 specification for High Density Corrugated Polyethylene Pipe and Fittings. The pipes shall be of the sizes, types, and dimensions shown on the plans and shall include all connections and joints to new or existing pipes, storm drain manholes, inlets, headwalls, and other appurtenances as may be required to complete the work.

B. The pipe and fittings shall be manufactured by extrusion or molding methods as called for in AASHTO M294. High density polyethylene material shall meet the requirements of ASTM D 3350 Cell Classification 335420C.

C. Trench width shall be the minimum for proper placement and compaction of embedment and backfill.

D. Embedment material shall be in accordance with manufacturer's specifications.

E. The thickness of bedding material below the pipe shall be 6-inches minimum for all pipe sizes, unless otherwise directed by the City or shown on the plans. For the remaining backfill operations, see the respective trench backfill specifications in these Special Provisions.

F. Manufacturer's recommendations for connection methods and materials necessary to accomplish tight and secure joints shall be strictly followed. This includes HDPE connections or HDPE to reinforced concrete pipe.

G. Minimum pipe stiffness at five percent (5%) deflection shall be as stated within AASHTO M294 when tested according to ASTM D 2412. The Contractor shall provide written

certification from the manufacturer that the pipe and related fittings meet the minimum requirements within AASHTO M294. The pipe and fittings may be rejected for failure to meet any of this specification and may be retested to establish conformity in accordance with the specification.

H. Payment for HDPE shall be based on the contract unit price bid per linear foot of pipe measured along the centerline of the pipe in the trench and shall be full compensation for all labor and materials necessary to make the complete installation, including excavation, bedding, jointing, and backfilling. The cost of constructing concrete collars shall be considered subsidiary to the unit prices bid for HDPE.

15-03 UNCLASSIFIED DRAINAGE STRUCTURAL EXCAVATION: The excavation for the construction of the inlets, box culverts, and junction boxes is not classified. Payment for the excavation shall be subsidiary to the unit price bid for each structure in the bid PROPOSAL.

15-04 CONCRETE DRAINAGE STRUCTURES:

A. Junction Boxes and inlets shall be constructed to the size and location shown on the plans. Construction shall be in accordance with "Manhole and Inlets" of the latest TXDOT Specifications unless otherwise noted on the plans or in these Special Provisions.

B. Concrete for all concrete drainage structures, junction boxes, and inlets shall be Class "C" with a minimum compressive strength of thirty-six hundred (3,600) psi at twenty-eight (28) days.

C. The desired slump for Class "C" concrete shall be 3-inches and the maximum allowable slump shall be 4-inches.

D. Air entrainment (4.5 %, +/- 1.5%) is required for all exposed concrete.

E. All concrete shall be vibrated and be cured for a minimum of four (4) curing days. The acceptable methods for curing the concrete are as follows:

1. FORM CURING: Forms left in place in contact with the concrete.

2. WATER CURING: Water curing using either wet mats, water spray or ponding.

3. MEMBRANE CURING: Compound may be used.

F. All weight supporting forms shall remain in place a minimum of four (4) curing days or until seventy percent (70%) of design strength is achieved, whichever occurs first.

G. No precast inlets will be allowed. The unit prices bid for curb inlets shall include all structural excavation, reinforcing steel, manhole rings and covers, transition curb and gutter as shown, and backfilling. Providing neat lines can be cut in the soil, outside forms will not be required from the bottom to the construction joint. Inlet tops shall not be cast until pavement is complete. All inlets will be backfilled by mechanically tamping native

material in layers not exceeding 6-inches and compacted to at least ninety-five percent (95%) density per ASTM D698, +/- two percent (2%) optimum moisture content.

H. Payment shall be made for the concrete drainage structures complete in place at the unit price bid in the PROPOSAL. The payment shall include all work and materials necessary to complete the structure, including excavation and backfill. No additional pay will be made for manhole ring and lid, or grade rings.

I. No precast junction boxes will be allowed unless approved by the City prior to construction. If allowed, the precast junction box must be specifically designed for each application.

J. Refer to Section 13-16 for additional concrete specifications. (Rev. 1/2022)

15-05 UNCLASSIFIED CHANNEL EXCAVATION:

A. Channel excavation shall be in accordance with NCTCOG Specifications. Any fill required to bring the channel to the required lines, grades and cross-sections will be subsidiary to this pay item.

B. Payment for excavation is based on plan quantity. Contractor shall verify excavation/fill quantities and shall notify City in writing of concurrence or disagreement with plan quantities prior to start of construction. Any discrepancies in quantities shall be resolved prior to beginning excavation. No adjustments to plan quantities shall be allowed once excavation/fill activities have begun.

15-06 REINFORCED CONCRETE CHANNEL/SLOPE:

A. Concrete channel/slope shall be used, at the direction of the City, for slope protection. Concrete for channel lining and slope protection shall also be Class "C" concrete having a minimum compressive strength of thirty-six hundred (3,600) psi at twenty-eight (28) days.

B. Payment for this work shall be at the price bid per square yard and include all excavation, slope grading and shaping, concrete, reinforcing steel, and all materials necessary for completion of this item.

C. Refer to Section 13-16 for additional concrete specifications. (Rev. 1/2022)

15-07 CCTV INSPECTIONS OF STORM DRAIN SYSTEMS:

This section covers the inspection of storm drain systems by closed circuit television (CCTV).

A. The final inspection on all projects shall include a CCTV inspection of the storm drain system installation, including all lateral connections. The CCTV inspection, including furnishing of necessary personnel, equipment, and materials, shall be performed by the Contractor. All defects in the installed facility revealed by the CCTV inspection shall be remedied by the Contractor prior to the acceptance of the project.

B. Prior to pavement placement (if storm drain system is under pavement) or prior to storm drain system acceptance (if storm drain system is in parkway), the Contractor shall inspect all newly constructed storm drain systems by CCTV in accordance to the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment & Certification Programs (PACP) standards, version 7. The Contractor shall provide the City a CCTV inspection video and a PACP inspection report summarizing the inspection with all PACP observation codes with their corresponding Structural Grade and O&M condition grades clearly marked. The video shall be in MP4 video file format with an h.264 codec. The inspection shall be performed by a NASSCO PACP Certified Inspector, and the report shall clearly show the CCTV Inspector's name and registration number. In addition to defects noted for NASSCO PACP standards, the CCTV Inspector must note defects that meet NASSCO PACP definition of 'Joint Offset Small' (JOS), 'Joint Separated Small' (JSS), or 'Joint Angular Small' (JAS). Such defects shall be clearly highlighted, emboldened, circled, or marked in a way to distinguish them from the other observation codes.

C. The storm drain system must be thoroughly cleaned and flushed with water by the Contractor prior to CCTV Inspection.

D. The Contractor will be held liable for all damages to public and private property caused directly and/or indirectly by the CCTV inspection. The Contractor is responsible for any fines, penalties, or other costs imposed upon by the City by any agency or private party as a result of the CCTV inspection or improper discharges by the Contractor. The Contractor must ensure no equipment or other obstructions remain in the line after inspection. All costs associated with retrieving any lodged equipment shall be incidental to the inspection.

E. CCTV inspection report will be accepted by the City if the inspection has a PACP Overall Pipe Structural and O&M rating of 0, and contains no defects meeting the NASSCO PACP definition of JOS, JSS, or JAS. Any defects observed must be corrected by the contractor prior to the acceptance by the City.

F. Payment will be at the unit price per bid per linear foot of CCTV inspection of the storm drain system. (Rev. 9/2021)

15-08 GPS DATA ON STORMWATER ATTRIBUTES:

A. A bid item has been designated in the PROPOSAL to have the Contractor provide the City with GPS data on stormwater attributes installed with this project. Installation includes, but not limited to, construction of new and adjustment or relocation of existing stormwater attributes. Examples of stormwater attributes include: Culverts, Fittings, Inlets, Junction Boxes, Manholes, Open Channels, Bends, Outfalls and Pipes elevations of flowlines within inlets, manholes and at headwalls. Horizontal accuracy will be up to a sub-centimeter. The data will need to be formatted to the following base datum and be based on the latest version of the City's GPS Monument Manual located on Public Works and Transportation's web page:

Note: Coordinates must be attained in Grid Coordinates not Surface Coordinates.

Projected Coordinate System:

NAD_1983_StatePlane_Texas_North_Central_FIPS_4202_Feet

Projection:	Lambert_Conformal_Conic
False_Easting:	968500.00000000
False_Northing:	6561666.66666667
Central_Meridian:	-98.50000000
Standard_Parallel_1:	32.13333333
Standard_Parallel_2:	33.96666667
Latitude_Of_Origin:	31.66666667
Linear Unit:	Foot_US
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

B. The Contractor shall provide the City with GPS data in an ESRI shapefile or geodatabase format on a flash/usb data storage device. The points collected in the field must have a description field that includes a general description of each feature collected such as 10-feet curb inlet and/or the construction plan stationing. The City Staff will need to verify the data and approve it before payment can be made on this item.

15-09 TEMPORARY SHORING: All shoring plans required by the plans or required for the excavation and installation of above ground structures over 4-feet tall shall be sealed by a professional engineer and submitted to the City for approval along with required Trench Safety plans. Soil Nails are allowable as a shoring method, but their location will require City's approval prior to installation. Soil Nails shall be entirely contained within a permanent easement or may be installed within a temporary construction easement if they will be removed prior to the project completion. This work shall be considered subsidiary to structure or excavation bid items.

(Rev. 6/2020)

END OF SECTION