SECTION 02630 – STORMWATER PIPE AND STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers all labor, work, materials and equipment required for the installation of stormwater pipe, structures and all associated appurtenances.

1.02 SPECIFICATION MODIFICATIONS

A. It is understood that throughout this section these Specifications may be modified by appropriate items in section 01015 – Specific Project Requirements or as otherwise indicated on the Contract Drawings.

1.03 RELATED SECTIONS

A. 01000 – General Project Requirements.
B. 01015 – Specific Project Requirements.
C. 01016 – Water Mains Near Sewers.
D. 01300 – Submittals.
E. 01320 – Construction Progress Documentation.
F. 02200 – Earthwork.
G. 02250 – Trenching, Pipe Embedment and Backfill.
H. 02575 – Surface Restoration.
I. 02605 – Drainage Structures.
J. 02624 – PVC Gravity Sewer Pipe.
K. 02686 – Cleaning and Assessment of Gravity Lines.
L. 02702 – Testing Requirements for Sanitary Sewer: Mains and Manholes

1.04 CODES AND STANDARDS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
B. American Association of State Highway and Transportation Officials (AASHTO) standards as cited or referenced herein.
C. American Society for Testing and Materials (ASTM):

ASTM C76-19a	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM F3219	Standard Specification for 6 to 30 in. Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 6 to 60 in. Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM D2412-21	Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM D3212-20	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F477-14	Standard Specification of Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F2306	Standard Specification for 12 to 60 in. Annular Corrugated Profile-Wall Polyethene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications

ASTM D3350-14	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM D3034-16	Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM F679-16	Standard Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

1.05 INFORMATION PROVIDED BY THE CITY

A. As provided in the Contract Documents.

1.06 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.
B. Submittals include, but not limited to, the following:
   1. Pipe Certifications.
   2. Joint Sealant and/or Gaskets.
   3. Product Data.

1.07 QUALITY ASSURANCE

A. The Contractor is responsible for the quality assurance and quality control of the Work.
B. Manufacturer:
   1. Shall be experienced in the design, manufacture and commercial supplying of the specified material for a minimum period of five (5) years.
   2. Shall be experienced in the design, manufacture, and commercial supplying of the specified size of pipe for a minimum period of three (3) years.
   3. Inspection and Testing shall be performed by the Manufacturer's quality control personnel in conformance with applicable standards. Testing may be witnessed by City, Design Professional, or approved independent testing laboratory. The Contractor shall provide certified test reports indicating that materials conform to all standards and specifications.
   4. Shall certify to the above minimum experience requirements.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Pipe, fittings, and accessories shall be handled in accordance with the pipe manufacturer's recommendations.
B. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings.
C. Pipe shall not be stored uncovered in direct sunlight.
D. Pipe materials delivered or stored on site shall be free of all damage, chips, cracks, gouges or ultraviolet (UV) degradation. Damaged materials shall be removed from the site and replaced at no additional cost to the City.
E. See also Section 01000 – General Project Requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials and construction shall be in compliance with KCMO Water's Standard Specifications and Manufacturer's recommendations.
B. Reinforced Concrete Pipe: All reinforced concrete pipe (RCP) as called out on the Contract Drawings, shall be of standard manufacture in accordance with the applicable sections of the Standard Specifications. Pipe materials shall meet or exceed ASTM C76, Class II, III, IV, or

V (per the design), wall B, Reinforced Concrete Pipe (RCP). Reinforced concrete storm sewer pipe shall use synthetic rubber "O-ring" gasketed joints where specified on the plans.

C. Polyvinyl Chloride Pipe: All Polyvinyl Chloride (PVC) pipe for storm sewer pipe shall be a minimum of SDR 21 and comply with Section 02624 with the exception of the color requirement.

D. Dual Wall and Triple Wall Polypropylene Storm Sewer Pipe: Dual wall pipe and fittings 12 inch through 24 inch diameter shall conform to ASTM F3219 and triple wall pipe 30 inch through 60 inch shall conform to ASTM F2764, except as otherwise specified herein. Dual wall polypropylene pipe shall have a smooth interior and annular exterior corrugation. Triple wall polypropylene pipe shall have a smooth interior and exterior with annular inner corrugations. Pipe shall have a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D2412. Pipe shall be joined with an integral bell and spigot joint on all sizes. The joints shall be watertight in accordance with ASTM D3212. The spigot shall have two gaskets meeting the requirements of ASTM F477. The gaskets shall be installed by the pipe manufacturer and shall be covered with a removable, protective wrap to ensure the gaskets are free from debris. A joint lubricant shall be used on the gasket and pipe bell during assembly. Pipe shall have a reinforced bell with a polymer composite band installed by the manufacturer.

E. High Density Polyethylene Pipe (For use outside of roadways): High density polyethylene (HDPE) pipe and fittings shall conform to ASTM F2306 with annular corrugations and an integral bell and spigot. The manufacturer of the pipe must participate in the AASHTO/National Transportation Product Evaluation Program (NTPEP). The maximum cover depth shall be 30 feet.

   Material for pipe and fitting production shall be HDPE conforming with the minimum requirements of cell classification 435400C for 12" to 60" diameters as defined in ASTM D3350, except carbon black content shall not exceed 4%. Joint tightness shall conform to ASTM D3212. Elastomeric seal (gasket) shall have a basic polymer of synthetic rubber conforming to ASTM F477. Natural rubber gaskets will not be used. Bells shall span over three corrugations.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Storm sewer pipe structures and appurtenances shall be provided, installed and constructed at the locations shown on the Drawings. Materials and construction shall be in compliance with this Section, Related Sections listed in paragraph 1.03 and Section 2600 of the "KCMO Standard Construction Specifications and KCMO Standard Drawings", except as amended herein.

B. Prior to constructing new sewers, the Contractor shall physically locate all utilities within ten (10) feet of the proposed sewers. If there is a utility conflict with the proposed sewers, the Contractor shall notify the City/Design Professional and survey the existing service top elevation and horizontal coordinates. Certified as-built redlines and the utility investigation surveying are the sole responsibility of the Contractor.

C. The Contractor is responsible for determining all conflicted crossings for the proposed storm sewer and submit their service-relocation shop drawings and/or certified sketches for the City/Design Professional's review and approval. (Contractor is also responsible for providing field electronic data such as the location coordinates and spot elevations for the City/Design Professional's use.) It shall be the responsibility of the Contractor to obtain necessary field information for aiding in determining the required minimum length of the existing sanitary or

any other services necessary to clear for the construction of proposed sewers. See also Section 01016 – Water Mains Near Sewers for additional requirements.

D. Existing sewer mains, sanitary sewer service laterals and water service lines that require relocation or adjustment, in the vertical or horizontal alignments shall be performed by the Contractor. Repairs to the damages caused by the Contractor are the sole responsibility of the Contractor.

E. Connection(s) to an Existing System pipe and structures shall be installed per manufacturer's guidelines and recommendations. Where a storm sewer pipe is being connected to an existing drainage structure, the work shall be constructed by sawing and chipping a hole through its sidewall to allow a minimum of three-inches of new concrete around the pipe. The invert shall be chipped away and replaced to shape a new doghouse collar and invert. The interior concrete surfaces shall be grouted smooth with non-shrink grout. Depending on the method and extent of the sidewall demolition, reinforcing bars may need to be doweled into the existing structure at the direction of the City/Design Professional.

F. Pipe Trimming: Pipes connecting to structures shall be cut parallel with the inside face of structures with plane walls. Pipes connecting to other pipes shall be cut parallel with the spring line of the pipe. Projection of the pipe beyond the inside face shall not exceed one inch. Voids shall be grouted with non-shrink grout.

G. Connection of Existing Pipes to New Pipes: Connection to and/or extension of an existing pipe shall be accomplished by using a fabricated non-shear coupling. The connection shall be properly supported to prevent settlement. All work shall be performed to the satisfaction of the City/Design Professional.

H. Pipe Abandonment: Any abandoned pipes left in place shall be filled with Fly Ash Slurry and both ends plugged with concrete or as otherwise specified in the Contract Drawings.

I. Tunneling under or near a tree: Storm sewer pipes within the drip line of a tree marked "Save" shall be installed by tunneling under the roots. Drip line is defined as the diameter of the tree in inches x 10 = drip line diameter in feet. One joint of RCP may be pushed with the excavator bucket. Boring and jacking shall be accomplished in accordance with KCMO 2600; steel casing may not be required for RCP, per the design. There will be no separate payment for tunneling operations of 30' or less.

3.02 ACCEPTANCE TESTING

The Contractor shall perform acceptance testing for all manholes, structures, pipe and all appurtenances in accordance with Section 02702 – Testing Requirements for Sanitary Sewer: Mains and Manholes. The Contractor shall furnish all labor, equipment, materials and provide the testing reports for the required acceptance tests. Pipelines that do not conform to the requirements shall be repaired and/or replaced and shall be retested until the pipeline meets the project requirements. Testing shall be performed in the presence of the City/Design Professional. Testing shall be recorded by the Contractor and a copy shall be submitted to the City/Design Professional. The mandrel or laser profiling testing shall be performed after backfill and compaction operations have been completed and in accordance with Section 02702.

3.03 POST CONSTRUCTION CCTV

A. Contractor shall provide post-construction CCTV video footage for all completed pipe, in accordance with Section 02686 – Cleaning and Assessment of Gravity Lines.

END OF SECTION