SECTION 02610 – SANITARY SEWER PIPE

1. GENERAL

1.1 DESCRIPTION

A. Work included but not limited to:

1. Sanitary sewer gravity pipelines
2. Sanitary sewer pressure pipelines
3. Laterals/service connections

B. Related Work:

1. Section 02200 – Earthwork
2. Section 02536 – Manholes
3. Section 02651 – Sewer and Manhole Testing

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. American National Standards Institute (ANSI):
   a) ANSI/AWWA C104/A21.4 – Cement Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water.
   b) ANSI/AWWA C110/A21.10 – Ductile-Iron and Gray-Iron Fittings, 3" through 48", for Water and Other Liquids.
   c) ANSI/AWWA C111/A21.11 – Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
   d) ANSI/AWWA C151/A21.51 – Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
   e) ANSI/AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12", for Water Distribution.
2. American Society for Testing and Materials (ASTM):
   a) ASTM A53 – Pipe, Steel, black and Hot-Dipped Zinc-Coated, Welded and Seamless.
   b) ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate
   c) ASTM D1785 – Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
   d) ASTM D2241 – Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR-Series).
   e) ASTM D2466 – Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   f) ASTM D2467 – Poly (Vinyl Chloride) (PVC) Socket Type Plastic Pipe Fittings, Schedule 80.
   g) ASTM D2564 – Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
   h) ASTM D3034 – Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and fittings.
   i) ASTM D3139 – Joints for Plastic Pressure Pipes Using flexible Elastomeric.
   j) ASTM D3212 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   k) ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

l) ASTM F679 – Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

3. American Water Works Association (AWWA):
   a) C301 – Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids.
   b) C600 – Installation of Gray and Ductile Cast Iron Water Mains and Appurtenances.

B. Materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner, or acid solder will be rejected.

1.3 SUBMITTALS

A. Submit each manufacturer's certification attesting that the pipe, pipe fittings, joints, joint gaskets and lubricants meet or exceed specification requirements.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Do not place materials on private property without written permission of the property owner.

B. Exercise care during loading, transporting and unloading to prevent damage to materials.

C. Do not drop pipe or fittings.

D. Avoid shock or damage at all times.

E. Take measures to prevent damage to the exterior surface and internal pipe lining.

F. Do not stack pipe higher than recommended by the pipe manufacturer.

G. Store gaskets for mechanical and push-on joints in a cool, dry location out of direct sunlight and not in contact with petroleum products.

2. PRODUCTS

2.1 DUCTILE-IRON PIPE

A. Pipe: ANSI/AWWA C151/A21.50, pressure rating 350 psi; standard cement mortar lining, ANSI/AWWA C104/A21.4, outside coated.

B. Fittings: Ductile-iron or gray-iron, ANSI/AWWA C110/A21.10; provide with standard lining as for ductile-iron pipe, outside coated.

C. Joints (ANSI/AWWA C111/A21.11): Where not specifically indicated on the Contract Drawings, joints may be either mechanical joint or push-on joint.

D. Rubber Gaskets, Lubricants, Glands, Bolts and Nuts: ANSI/AWWA C111/A21.11.

2.2 POLYVINYL CHLORIDE (PVC) SEWER PIPE

A. Gravity Sewer Pipe and Fittings:

1. 15" Nominal Pipe Size and Smaller: ASTM D3034, SDR-35;
   Material - ASTM D1784, 12454-B
2. 18" to 27" Nominal Pipe Size: ASTM F679
3. Flexible Elastomeric Seals: ASTM D3212
4. Seal Material: ASTM F477

2.3 POLYVINYL CHLORIDE (PVC) PRESSURE SEWER PIPE

A. PVC Pressure Sewer Pipe and Fittings – 12" Nominal Pipe Size and Smaller: ASTM D2241, PVC 1120 (12454-B) or PVC 1220 (12454-C) or PVC 2120 (14333-D); SDR 26, 160 psi.

3. EXECUTION

3.1 3.1 PREPARATION

A. Perform trench excavation to the line and grade indicated on the Contract Drawings and as specified.

B. Unless otherwise indicated on the Contract Drawings: Provide 4 feet minimum cover above top of pipe.

C. Provide pipe bedding as shown on the Contract Drawings.

D. Place aggregate in a manner to avoid segregation, and compact to the maximum practical density so that the pipe can be laid to the required tolerances.

3.2 3.2 LAYING PIPE IN TRENCHES

A. Give ample notice to the Engineer in advance of pipe laying operations.

B. Use laser alignment instruments.

C. Lower pipe into trench using handling equipment designed for the purpose to assure safety of personnel and to avoid damage to pipe.

D. Lay pipe proceeding upgrade with the bell or groove pointing upstream.

E. Lay pipe to a true uniform line with the barrel of the pipe resting solidly in pipe bedding material throughout its length.

F. Excavate recesses in pipe bedding material to accommodate joints, fittings and appurtenances.

G. Do not subject pipe to a blow or shock to achieve solid bearing or grade.

H. Lay each section of pipe in such a manner as to form a close concentric joint with the adjoining section and to avoid offsets in the flow line.

I. Clean and inspect each section of pipe before joining.

J. Assemble to provide tight, flexible joints that permit movement caused by expansion, contraction, and ground movement.

K. Use pipe or fitting manufacturer's recommended lubricant for making joints.

L. If unusual joining resistance is encountered or if the pipe cannot be fully inserted into the bell, disassemble joint, inspect for damage, reclean joint components, and reassemble joint.

M. Assemble joints in accordance with the manufacturer's recommendations.

N. Push-on Joints:

1. Clean the inside of the bell and the outside of the spigot.
2. Insert rubber gasket into the bell recess.
3. Apply lubricant to the spigot end of the pipe, as per pipe manufacturer's recommendations.
4. Insert the spigot end of the pipe into the socket using care to keep the joint from contacting the ground.
5. Complete the joint by forcing the plain end to the bottom of the socket.
6. Mark pipe that is not furnished with a depth mark before assembly to assure that the spigot is fully inserted.

O. Mechanical Joints:

1. Wash the socket and plain end with soap solution.
2. Slip the gland and gasket over the plain end of the pipe.
3. Apply soapy water to gasket.

4. Insert the plain end of the pipe into the bell end and seat the gasket evenly in the socket.
5. Slide the gland into position, insert bolts, and finger-tighten nuts.
6. Bring bolts to uniform tightness; tighten bolts 180 degrees apart alternately.

P. Coupled Joints: Assemble in accordance with the manufacturer's recommendations.

Q. Disassemble and remake improperly assembled joints using a new gasket.

R. Line and Grade:
1. Check each pipe installed as to line and grade in place.
2. Correct deviation from grade immediately.
3. A deviation from the designed grade as shown on the Contract Drawings, or deflection of pipe joints, will be cause for rejection.

S. Place sufficient backfill on each section of pipe, as it is laid, to hold firmly in place.

T. Clean interior of the pipe as work progresses; where cleaning after laying is difficult because of small pipe size, use a suitable swab or drag in the pipe and pull forward past each joint immediately after the jointing has been completed.

U. Keep trenches and excavations free of water during construction.

V. Plug the end of pipe at the end of each work day to prevent trench water, earth, or other substances from entering the pipe.

W. When it is necessary to deflect pressure sewer mains from a straight alignment horizontally or vertically, do not exceed the pipe manufacturer's recommendations.

3.3 WYE BRANCHES

A. Install wye branches at locations indicated on the Contract Drawings concurrently with pipe laying operations.

B. Use standard fittings of the same material and joint type as the pipeline into which they are installed.

C. Use a saddle wye with stainless steel clamps to tap into existing pipeline.

D. Mount saddles with solvent cement or gasket and secure with metal bands.

E. Layout holes with a template and cut holes with a mechanical hole cutter.

3.4 LATERALS

A. A. Construct laterals from the wye branch to a terminal point at the right-of-way or property line or as designated on the Contract Drawings.

B. B. Where the depth of the main pipeline warrants, construct riser type laterals from the wye branch to the terminal point.

C. C. The type of riser, slope, and depth of lateral pipe at the termination point will be made by the Engineer.

D. D. Install an approved watertight plug, braced to withstand pipeline test pressure thrust, at lateral end.

E. Install a temporary marker stake extending from the end of the lateral to 1 foot above finished grade.

3.5 CRADLES AND ENCASEMENT

A. Provide concrete cradles and encasement for pipeline where indicated on the Contract Drawings, or as directed by the Engineer.

3.6 THRUST RESTRAINT

A. Provide thrust blocking or restrained joints for pressure pipeline at all bends, tees, dead ends, and changes in direction.

3.7 CARRIER PIPE IN CASINGS

A. Applicable to casing pipe installed in open cut trenches; for installation by boring, jacking, or tunneling, consult with the Engineer.

B. Provisions regarding pipe laying specified above also apply to carrier pipe installed in casings.

C. Excavate trench to the additional depth and width necessary to accommodate the casing pipe and to maintain the line and grade of the carrier as indicated on the Contract Drawings.

D. Minimum inside diameter of the casing pipe: 4" greater than the largest outside diameter of the carrier pipe joints.

E. Support pipeline within casing so that no external loads are transmitted to the carrier pipe.

F. Attach wooden skids to barrel of carrier pipe; do not rest carrier pipe on pipe joint bells.

G. Fill annular space between carrier pipe and casing pipe with packed sand or grout per Contract Drawings.

H. Close ends of casing.

3.8 STREAM CROSSING

A. Construct sanitary sewer pipeline stream crossings in accordance with the Contract Drawings.

B. Provide concrete encased mechanical joint ductile-iron pipe backfilled with minimum 3" size stone to the level of the stream bed, between the limits of the stream crossing.

C. Do not backfill until concrete has achieved its initial set and concrete work is examined by the Engineer.

3.9 BACKFILLING TRENCHES

A. Backfill pipeline trenches only after examination of the pipe laying by the Engineer.

B. Backfill trenches as specified.

END OF SECTION 02610