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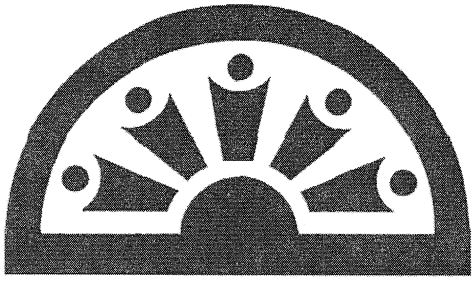

WEST POINT

SANITARY SEWER SYSTEM

SEPTEMBER 2008

STANDARD FOR DESIGN AND CONSTRUCTION SPECIFICATIONS

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CITY OF WEST POINT, GEORGIA
SANITARY SEWER SYSTEM CONSTRUCTION SPECIFICATIONS

1.0 SCOPE

This specification covers the material requirements and installation procedures for all sanitary sewer pipe, structures and appurtenances to be accepted into the City of West Point sewer system. Any sewer pipe, structures or appurtenances which the City has reason to believe are not in conformance with these specifications will not be accepted.

2.0 GENERAL

The contract drawings approved by the City indicate the extent and general arrangement of the sanitary sewer system. If any departure from the approved contract drawings is deemed necessary by the contractor, details of such departures and the reasons therefore shall be substituted to the City as soon as possible for approval. No such departures shall be made without the City's written approval. All approved sewer system plans and these specifications shall be considered as supplementary, one to the other, so that materials and labor indicated, called for, or implied by these specifications and not on the plans shall be supplied and installed as though specifically called for on the plans. No utility system shall be constructed, erected, altered, or repaired unless a certified utility manager or certified utility foreman who holds a current certification is present at the job site of such construction, erection, alteration, or repair of the utility system. Proof of such certification shall be provided to the City prior to the commencement of any utility work. All contractors should be aware of the City's construction specification requirements prior to construction. Sanitary sewer as built including tap locations shall be submitted to the City prior to final approval.

3.0 QUALITY ASSURANCE

Acceptance of all sewer pipe, structures and appurtenances shall be on the basis of the City's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with all applicable standards. Each pipe shall be clearly marked as required by the governing ASTM Standard Specifications to show its class, date of manufacture and the name and trademark of the manufacturer. Latitudes in workmanship and finish allowed by the ASTM Specifications not withstanding all pipe shall be first quality, have smooth exterior and interior surfaces, and be free from cracks, blisters, and other imperfections, and true to theoretical shapes and forms throughout each length. All pipes shall be subject to inspection by the City at the trench and other points of delivery for the purpose of accepting or rejecting

pipe, independent of laboratory tests, which does not conform the requirements of this Section. Pipe, which does not conform, shall be marked as such by the City and shall not be delivered or used in the work. On-the-job repairing of rejected pipe will not be permitted. Any pipe or special items which have been broken, cracked or otherwise damaged before or after delivery or which have failed to meet the required tests shall be removed from the site of the work and shall not be used therein.

4.0 PIPE MATERIALS

4.1 Polyvinyl Chloride Gravity Sewer Pipe (six-inch diameter through 18-inch diameter):

A. Pipe: PVC gravity sewer pipe shall be SDR 26 manufactured in accordance with ASTM D 3034 November 1985 or latest revision, and supplied in lengths of 20-feet. Pipe eighteen (18") inches or larger shall have a minimum wall thickness conforming to ASTM F679 under the classification for PS115 as amended to date.

B. Joints: Joints for pipe and fittings shall be of the bell and spigot type with a confined elastomeric gasket having the capability of absorbing expansion and contraction without leakage. The joint system shall be identical for pipe and fittings and performed in strict conformance with ASTM D 3212 and ASTM F 477.

C. Fittings: Fittings for pipe shall be one piece with no solvent-welded joints. No field fabrication of fittings will be allowed. All such fabrication shall be performed at the factory and the fittings delivered ready for use.

D. Testing: Material acceptance will be on the basis of the City's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with all applicable ASTM standards, latest revisions.

4.2 Ductile Iron Pipe (six-inch diameter through 48-inch diameter):

A. Ductile iron pipe shall conform to AWWA C151 and shall be a minimum of class 50 or greater if specified by the designing engineer. All ductile iron pipe shall have cement mortar lining. Cement mortar lines ductile iron pipe may be acceptable at the City's discretion in limited situations. The City will determine the polyethylene lining for pipe and fittings. Fittings shall conform to AWWA C110 with a rated working pressure of 150 PSI. Pipe and fittings shall be

furnished with a bituminous outside coating. Minimum cover shall be four-feet. Where cover is less than four (4") feet, ductile iron pipe must be used.

B. Joints: Pipe shall have push-on joints. All non-restrained fittings shall be mechanical type. Joints shall conform to AWWA C111. Restrained joint pipe and restrained joint fitting shall be either the bolted joint type or modified push-on joint type with joint restraint using ductile iron components. Restrained joint pipe on piers shall have bolted joints and shall be specifically designed for clear spans of at least 18-feet. Ductile iron pipe must be approved by the City prior to installation and must meet AWWA Standards.

C. Testing: Acceptance of the material will be based upon the City's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with all applicable standards.

4.3 Reinforced Concrete Pipe (24-inch diameter or greater unless approved by the City):

A. Pipe: Pipe shall be reinforced concrete bell and spigot with type two cement and calcareous aggregate conforming to ASTM C 76 for Wall C pipe. Pipe shall be supplied in lengths of at least eight feet.

B. Joint: Pipe shall have rubber gasket type joints with steel and rings conforming to ASTM C 443. A rectangular groove shall be supplied in the spigot end to receive the rubber gasket, and it shall be so formed to a rectangular shape and confined on all four sides. Bell and spigot surfaces shall be accurately formed and smooth to provide a close sliding for with a nominal clearance of 1/16-inch.

B. Testing Requirements: Concrete pipe with a diameter of 60-inches or greater shall undergo a certified material test and inspection of manufactured pipe for defects and imperfections defined in paragraph 4.1.2. of ASTM C 76. Concrete pipe with a diameter between 30 inches and 60 inches shall in addition undergo plant load bearing testing. Test results on pipe, joint material, and made-up joints must be performed by an independent testing laboratory approved by the City. Results to be supplied shall include materials, absorption, crushing (where applicable), and hydrostatic leakage on pipe each size in accordance with applicable specifications.

D. Lining: The reinforced concrete pipe shall be epoxy lined.

E. Contractor Inspection: The contractor shall inspect pipe after delivery for laboratory stamp, shape, cracks, uniformity, blisters and imperfect surfaces, hammer test, damaged ends, and gasket grooves. The contractor will not accept or use repaired or patched pipe or pipe with repaired or patched gasket grooves or shoulders.

4.4 Ductile Iron Pipe shall be used for the following conditions:

A. Where depth of soil cover is less than four (4) feet before or after sewer installation.

B. Where depth of soil cover is greater than fifteen (15) feet before or after sewer installation.

C. Where sewer crosses over or under a storm drain pipe.

D. Where sewer crosses over or under a water main.

E. Where sewer crosses over or under a stream or ditch.

F. Other locations deemed necessary by the City of West Point.

5.0 SANITARY SEWER DESIGN CRITERIA

5.1 No gravity sewer conveying raw wastewater shall be less than eight (8") inches in diameter.

5.2 HYDRAULICS

A. Gravity sewer pipe shall have straight alignment and consistent grade change between manholes.

B. Sewers shall yield mean velocities of not less than 2.0 feet per second based on the Manning Formula using an "n" value of 0.013.

C. Recommended and absolute minimum pipe slopes for gravity sewer based on the size of pipe to be installed are summarized in the following table.

Slope Requirements

Diameter	Minimum	Recommended
8-inch	0.40%	0.70%
10-inch	0.28%	0.50%
12-inch	0.22%	0.40%
14-inch	0.17%	0.40%
15-inch	0.15%	0.30%
16-inch	0.14%	0.30%
18-inch	0.12%	0.24%
21-inch	0.10%	0.20%
24-inch	0.08%	0.16%
27-inch	0.07%	0.14%
30-inch	0.06%	0.12%
36-inch	0.05%	0.10%

D. The over sizing of pipe to meet minimum grade requirements shall be prohibited.

E. The maximum slope of a gravity sewer shall be 15.0%. If approved by the City of West Point, slopes between 15.0% and 20.0% may be used with the addition of concrete anchors. The Developer's Engineer shall determine the size and spacing of anchors. The City of West Point shall approve all anchor designs.

5.3 Angle formed by alignment of influent and effluent sewer pipe at manhole shall be greater than (>) or equal (=) to 90° and less than (<) or equal to 270°.

5.4 When increasing the size of gravity sewer pipe, pipe crowns shall be matched at manholes.

5.5 The surcharging of manholes shall be prohibited.

5.6 EXCAVATION

The contractor is to perform all excavation of every description and of whatever substance encountered to the depth shown on the approved construction drawings for all sewers, manholes, piers, conduits, and other appurtenances. All excavation is to be performed in strict conformance with the Occupational Safety and Health Act of 1970 (PL 91-596) or latest applicable

revision. Contractor is responsible for acquiring all applicable city and county permits. Excavation shall be accomplished by open cut, unless otherwise directed. No tunneling shall be done, except as approved by the City or the Georgia Department of Transportation. It is the responsibility of the contractor to ascertain all permits by all governing agencies prior to installing any sewer pipe or appurtenances beneath their roadway pavement.

5.7 Trench Dimensions:

The top portion of the sewer pipe trenches may have sloping or vertical sides to widths, which will not cause damage to adjoining structures, roadways, pavements, utilities, and private property. For untimbered trenches and trenches held by stay bracing only, the width of the lower portion of the trench to a height of two-feet shall be specified in the "Maximum Trench Widths and Depths" Section 6.5. Where skeleton and solid sheeting is used, trench width may be increased to dimensions approved by the city, but shall not be greater than that necessary to clear the walls when lowering pipes into the trench. Where in the opinion of the City trench excavation may damage adjoining poles, roadways, utilities, and private property, the City may order suitable sheeting to be installed for their protection. Such orders shall in no way relieve the contractor from that responsibility of protection of these facilities, nor shall the lack of those orders relieve the contractor from that responsibility. If trenches are excavated to widths in excess of the above limitations, or collapse because of insufficient bracing and sheeting, the developer will be required to use special methods of constructing pipe foundations and backfilling as specified herein. All construction must meet or exceed OSHA Standards. Trench excavation shall not advance more than 600 feet ahead of pipe laying, unless approved. The bottom of all trenches shall be smooth and flat and with backfill material affording full bearing of the pipe barrell. The depth and width required shall be directed by the City. Excavation in excess of the depth required for proper trenching shall be corrected by one of the special methods specified herein, as ordered by the city. Bell holes shall be excavated in a manner which will receive pipe bells of all load, and ensure support is provided throughout the length of the pipe barrel. Excavation in excess of the depths required for manholes and other structures shall be corrected by placing a sub-foundation of Class "C" concrete. If trenches are excavated to excessive dimensions or collapse because of inadequate or improperly placed bracing and sheeting, the pipe shall be laid using the next class of bedding. If over excavation for manholes and other structures occur, the area under the structure or manhole shall be backfilled with granular bedding material to the required grade.