SECTION 400 - MATERIALS FOR WATER LINE CONSTRUCTION

401. GENERAL

All materials used in the work including equipment shall be new and unused materials of a reputable U.S. Manufacturer conforming to the applicable requirements of these Specifications, and no materials shall be used in the work until they have been approved by the Authority. Any reference to a A.W.W.A., ANSI or other such specification shall mean the latest revision published.

402. WATER MAIN

1.) Ductile Iron Pipe

Ductile iron pipe shall be thickness Class 50, designed in accordance with A.W.W.A. C150 - latest revision and manufactured in accordance with AWWA C151 - latest revision. Ductile iron pipe shall have an outside bitumastic coating per A.W.W.A. C151 - latest revision. It shall have an inside standard cement lining with bituminous seal coat per A.W.W.A. C104 - latest revision.

Pipe Joints - except where restrained, flange, or mechanical joints are specified, straight pipe joints shall be push on, rubber gasket type such as Fastite or alternate acceptable to the Authority conforming to A.W.W.A. C111-latest revision. Pipe shall be in 18' to 20' nominal lengths with standard deflection pipe sockets. Where restrained joints are shown, the joints shall be "Flex-Ring" type as made by American Ductile Iron Pipe, TR Flex as made by U.S. Pipe or alternate acceptable to the Authority.

Where river crossing pipe is required, the pipe shall be "Flex-Lok Boltless Ball Joint Pipe" as manufactured by American Pipe or alternate acceptable to the Authority. Where specified, flanged pipe shall meet AWWA C151 specifications and be used with fittings meeting AWWA C110 or AWWA C153.

Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied.

2.) Copper Tubing for Water Service Laterals

Service lateral pipe shall be copper service pipe, type K, soft temper, seamless copper tubing, conforming to ASTM B-88, latest revision. Compression joints will be used.

Service line size shall be 3/4" for single residential service and 1" for double residential service. Service line size shall be 1" minimum for all other types of developments. All service lines smaller than four inches in diameter shall be copper. Service lines four inches in diameter and larger shall be ductile iron.

3.) P.V.C. Casing for Services

Long side service lines shall be bored and encased in P.V.C. pipe. PVC casing pipe used for long-side services shall be schedule 40 and a minimum of 2" in diameter for residential developments and 4" in diameter for all other type developments.

4.) Casing Pipe

Casing pipe, where required under the street, shall be smooth steel pipe conforming to A.S.T.M. Designation A-139, Grade B, electric fusion welded steel pipe. The pipe shall have a minimum yield strength of 35,000 psi. The exterior and interior of the pipe shall have a coal tar varnish coating. Minimum wall thickness: 0.250" or as required by the D.O.T. or other governing body having jurisdiction over the crossing.

5.) Ductile Iron Pipe Fittings

Fittings shall be ductile iron and furnished in accordance with AWWA C110 or AWWA C153, latest revisions, and shall be a minimum of 350 psi pressure class rating. Joints shall be mechanical joint with retainer glands conforming to AWWA C111, latest revision, except where approved otherwise by the Authority. Cement mortar lining conforming to AWWA C104 or fusion-bonded epoxy coating conforming to AWWA C116 shall be furnished for fittings.

403. FIRE HYDRANTS

All fire hydrants shall comply in all respects with Authority Standards and shall be designed and manufactured to comply with the latest revision of AWWA C502. The hydrants shall be designed for 250 pounds working pressure. The hydrants shall be of simple design, easy to operate, effectively and positively drained and protected from damage by freezing, and convenient for repairing and replacing parts.

Hydrants shall be equipped with one 4-1/2" diameter pumper nozzle and two 2-1/2" diameter hose connections, which shall have threads meeting the latest requirements of the State Fire Insurance Commission. Hydrants shall have a safety flange on the barrel and a safety coupling on the valve stem to prevent

damage to barrel and stem in case of traffic accident. Hydrants shall be Mueller Company's Super Centurian traffic model, M&H Style 129 traffic model, or U.S. Pipe Metropolitan 250, Model 94.

The connection at the base of the hydrant shall be mechanical joint with ductile iron retainer gland for 6" ductile iron pipe. The valve opening shall meet the requirements of the AWWA Specifications for a 5-1/4" hydrant. The valve, valve seat and inner working parts shall be easily accessible. The height from the surface of the ground to the bottom of the hose nozzle shall be no less than 24". Each hydrant shall be neatly painted with a red reflecting paint.

Each hydrant shall be tested to 200 psi. The first test shall be made with the valve closed. The second test shall be made with the main valve open but all nozzles closed. While the test is being carried on, the hydrant shall be subjected to a hammer test. Any hydrant showing defects by leakage, sweating, or otherwise shall be rejected. The barrel and all parts shall withstand these tests. These tests shall be made in the field after the hydrants are installed.

Leads from the main line to the fire hydrant shall use 6" ductile iron pipe and shall have a 6" gate valve between the main line and fire hydrant. The valve shall be connected to the main line by using a locked hydrant tee, equal to American Pipe model A-10180 or alternate acceptable to the Authority. Retainer glands or steel rods must be used to insure adequate connection of fire hydrant to valve. When the hydrant is close enough to the valve to allow its use, the hydrant shall be connected to the valve by using a locked hydrant adapter, equal to American Pipe model A-10895 or alternate acceptable to the Authority.

404. VALVES AND ACCESSORIES

1.) Gate Valves

Valves 16" and smaller shall be gate valves. The valves shall be of non-rising stem design, and have an iron body, bronze mounted, resilient seated, meeting all requirements of AWWA C509 or AWWA C515. All interior ferrous surfaces of valves shall have a special epoxy coating meeting the requirements of AWWA C550. Valves shall be designed for a minimum working pressure of 250 psi and shall have 2" square operating nuts, except in meter vaults where handwheels shall be installed. Valves for pipe smaller than 4” in diameter shall have handwheels suitable for use inside standard valve boxes. Valves shall open when turned counter-clockwise.

Valves sized 2" through 12" shall be Mueller Co. A-2360 with mechanical joints or alternate acceptable to the Authority. 16” valves shall be Mueller Co. A-2361 with mechanical joints or alternate acceptable to the Authority. Mechanical joints shall be fitted with retainer glands. Where flange joints are

used, flanges must meet the requirements of AWWA C115, latest revision.

2.) Butterfly Valves

Valves 16" and smaller shall be gate valves. Valves larger than 16” in diameter shall be butterfly valves. All butterfly valves shall be bubble-tight closing at the rated pressure with flow in either direction, and shall be satisfactory for applications involving throttling service and frequent operations or operations after long periods of inactivity. Valves shall meet the full requirements of AWWA C504, latest revision, for 250 psi working pressure and shall be suitable for above ground or buried service.

All interior ferrous surfaces of valves shall have a special epoxy coating meeting the requirements of AWWA C550. Valve bodies shall be equipped with integrally cast mechanical joint ends meeting AWWA C111, latest revision. Mechanical joints shall be furnished with retainer glands.

Butterfly valves installed underground shall come equipped with a manual operator. This manual operator shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Operators shall be equipped with mechanical stop-limiting devices to prevent over travel of the disc in the open and closed positions.

Valves shall open when turned counter-clockwise. Operators shall be fully enclosed and designed for buried operation.

3.) Valve Boxes

Valves boxes for valves shall be approved standard cast iron adjustable shaft boxes having a minimum shaft diameter of 5-1/4". The casing shall be coated with two coats of coal tar pitch varnish. The lids of all boxes shall bear the word "Water" or the letter "W". Boxes shall be Vulcan Pattern VVB-4 or alternate acceptable to the Authority.

4.) Air and Vacuum Relief Valve Assemblies

Air and vacuum relief valves shall be cast iron body and covers, with bronze trim, stainless steel float, Buna-N-seal, and shall be designed for a minimum working pressure of 150 psi. The valves shall be designed to exhaust large quantities of air during the filling period, and small quantities of air which collect in the line while operating under pressure. The valves shall be Empire No. 950 combination air release and vacuum relief valves or alternate acceptable to the Authority. Valves shall be a minimum of 1 inch.

Gate valves between water main and air release valve shall be bronze, solid wedge with screw connection equal to Jenkins Company Figure 370 or alternate acceptable to the Authority. Meter box shall be equal to the DFW Style D-1200 or alternate acceptable to the Authority.

5.) Tapping Sleeves

Tapping sleeves for existing water mains sized 4" through 12" in diameter for 8" and smaller taps can be either an American Flow Control Series 2800 or a Ford Stainless Style FAST Tapping Sleeve or alternate acceptable to the Authority. The stainless steel FAST style shall only be used in cases where the normal working pressure is less than 125 PSI and the tap is 8" in diameter or smaller. Where the normal working pressure exceeds 125 PSI or the tap is larger than 8" in diameter, the sleeve shall be an American Flow Control Series 2800 or alternate acceptable to the Authority. Both types of sleeves shall have a flanged connection to the tapping valve.

Tapping sleeves for existing water mains sized larger than 12" in diameter shall be an American Flow Control Series 1004 or alternate acceptable to the Authority. The sleeve shall be mechanical joint type with a flanged connection to the tapping valve. It shall be capable of withstanding a working pressure of 250 psi for the pipe size and type shown.

6.) Tapping Valves

Tapping valves shall be American Flow Control Series 2500, mechanical joint by flanged ends, 250 psi, or alternate acceptable to the Authority.

7.) Backflow Preventers for Sprinkler Systems

Double check backflow preventers are required for all metered services. The type of device for backflow prevention shall be determined by the Cross-Connection Control Coordinator. Backflow prevention measures shall be in compliance with the Authority's Cross-Connection Control Program (See Appendix). Backflow preventers for services 2" and smaller in diameter will be installed by the Authority in the meter box. Backflow preventers shall be a Ford HHCH31-323 for ¾" services and a Ford HHS31-344 for 1" services. Backflow preventers for services larger than 2" in diameter will be furnished and installed by the Developer in a meter box or vault located behind the service meter box or vault. Backflow preventers for larger metered services shall be an approved USC device that meets all the requirements of the Authority's backflow prevention ordinance.

8.) Pipe Connection Couplings

Pipe connections between new pipe and existing pipe shall be made with Dresser Style 90 long steel couplings for pipe sizes 2" and below; for pipe sizes above 2", M.J. solid sleeves (long style) shall be used. Spacer rings must be used at all solid sleeve locations. A spacer ring is defined as a short section of pipe cut to fit into the gap between the two plain ends of pipe at the sleeve location. Field joints shall be made to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting, etc.

9.) Curb Stops

All metal parts of curb stops shall be made of bronze. The stops shall be Ford B43-332W with padlock wings or alternate acceptable to the Authority for copper service pipe. The cock shall be operated with a combined cap and tee and shall open when turned counter-clock wise. The stop shall be compression joint inlet with meter swivel nut outlet.

10.) Service Line Couplings

Service line pipe couplings shall be compression style Ford C44 or alternate acceptable to the Authority. Branch connection shall be 1" x 3/4" x 3/4" Ford Y44-243 or alternate acceptable to the Authority. A cut-off valve (such as a Ford B44-444 Curb Stop) shall be installed on the water main side (the 1” side) of the wye and shall be buried without a valve box.

Female compression adapters shall be a Mueller-H-15451 or alternate acceptable to the Authority.
Male compression adapters shall be a Mueller-H-15428 or alternate acceptable to the Authority.

11.) Corporation Cocks

Corporation stops shall have AWWA tapered threaded inlet and compression joint outlet connection for copper service pipe. All metal parts of the stop assembly shall be made of bronze. The stop shall be operated with a tee head and shall open when turned counter-clockwise. Corporation stops for copper service line pipe outlets shall be Ford FB1000 or alternate acceptable to the Authority.

12.) Electric Conductive Wire

Where PVC pipe is allowed to be installed, electric conductive wire shall be

placed in the trench one foot above the pipe. The tracer wire shall be 12 gauge, plastic coated copper wire suitable for this purpose. Foil tape will not be acceptable.

13.) Meter Boxes for Single Family Residential (Subdivisions)

Meter boxes shall be the "Rome" type of meter box as manufactured by Russell Foundry and Mfg. Co. in Alabama and shall be of cast iron, oval shape and have minimum inside dimensions of 19 inches by 10 inches and shall be at least 11 ½ inches deep. Lids shall fit snugly. Lids shall be banded together with a steel strapping and painted with black asphaltic paint before shipping. The combined weight of the box and lid shall be not less than 60 lbs.

The lid shall be of cast iron and shall be designed to rest firmly on the seat inside the box and over-hang to prevent dirt from falling into the seat. The lid shall be easily removed and replaced.

14.) Service Saddles – Double Strapped

Double strapped service saddles are required for services 2-1/2" and smaller in diameter and shall be Ford F202 double strap clamps suitable for use with ductile iron or PVC pipe or alternate acceptable to the Authority. (See Section 404.5 regarding the requirements for 4" and larger diameter taps.)

If a 3" meter is used for the development, the Developer must install 4" D.I.P. from the main to the meter, and then utilize a 4" x 3" reducer at the meter. The Authority will not accept 3" service material.

15.) Meters and Backflow Preventers

Water meters and backflow preventers 2" and smaller in diameter will be installed by the Authority in boxes located at the edge of the street right-of-way. Water meters and backflow preventers larger than 2" in diameter will be furnished and installed by the Developer and set in vaults located at the edge of the street right-of-way. Meters larger than 2" in diameter must have a by-pass. No meter will be set until the meter set fee is paid and a building permit issued for the lot requesting service. Services shall be sized and located as shown in the Details. All meters must register in gallons.

All 3" and smaller meters shall be Sensus Compound Meters or Sensus Displacement Meters equipped with 1000 gallon single registers and a TouchRead PitLid Register compatible with the Authority's meter reading

equipment.

All 4” and larger meters shall be Sensus Compound Meters or Sensus Compact FireLine Fire Service Meter Assemblies equipped with a 5000 gallon register for high flows and a 1000 gallon register for low flows. Each register shall be equipped with a TouchRead PitLid Register compatible with the Authority’s meter reading equipment.

All compound meters and fire service meter assemblies shall come equipped with a test riser provided by Sensus.

The detector meters on the backflow preventers shall be Sensus ¾” meters equipped with a TouchRead PitLid Register compatible with the Authority’s meter reading equipment.

All meters shall be located outside. No in-house meters are permitted.

16.) Polyethylene Tubing For Ductile Iron Pipe

Where required by the Authority, polyethylene encasement tubing shall be manufactured of virgin polyethylene material conforming to the requirements specified in AWWA C105, Section 4.1.1 for linear, low density polyethylene film. The polyethylene film shall have a minimum thickness of 8 mil. Black polywrap shall be used for water mains and green polywrap shall be used for sewer force mains.

17.) Valve Markers

One concrete valve marker shall be furnished and set at each line valve. The marker shall be made of 3,000 PSI concrete, and shall be four feet (4') long and 4" on each side, with two #3 reinforcing bars as shown on the detailed drawings.

The markers shall be set an even number of feet between the center line of the valve and the center line of the aluminum disc in the top of the marker, and the distance in feet between the valve and marker shall be stamped in the marker at the time of setting.

18.) Valve Box Collars

Each valve box shall have a concrete collar. These collars must be a minimum of 3 1/2" thick. They shall be square and sized 24" x 24". Precast collars may be used, provided that they are grouted in place to the valve box. The box is to be flush with or a maximum of 1" above the finished grade. The edge of the valve box is to be 1/2" above the edge of the

concrete collar.

19.) Concrete for Thrust Blocks and Thrust Collars

Concrete for thrust blocks and thrust collars shall have a minimum compressive strength of 3,000 PSI at 28 days.

20.) Subgrade Stabilizer Stone

Stabilizer for subgrade shall be either approved crushed stone or gravel, uniformly graded from 1/4" to 3/4" in size.

21.) Retainer Glands

Retainer glands for mechanical joints shall be EBAA Mega-Lug or alternate acceptable to the Authority.

22.) Locked Fire Hydrant Tee And Adapter

Locked fire hydrant tees shall be American A-10180 or alternate acceptable to the Authority. Locked hydrant adapter shall be American A-10895 or alternate acceptable to the Authority.

23.) "Fast-Grip" Gaskets

Inside of all casings and wherever else required by the Authority, D.I.P. water main joints shall be slip joint restrained by using American Pipe "Fast-Grip" gaskets, U. S. Pipe "Field-Lok" gaskets or alternate acceptable to the Authority.

24.) Nitrile (NBR) Gaskets

In areas where underground fuel storage tanks are located or are known to have been located and as directed by the Authority, the D.I.P. water main joints shall use American Pipe "Nitrile (NBR)" (Acrylonitrile Butadiene) gaskets or alternate acceptable to the Authority.

405. GENERAL REQUIREMENTS

Any pipe, solder or flux used in the installation or repair of the water lines shall be lead-free. Pipes and fittings shall not contain more than 8.0% lead and solder and flux shall not contain more than 0.2% lead.