



City of Tampa

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ADDENDUM 1

Via E-Mail

DATE: August 12, 2020

Contract 20-C-00040; FAIR OAKS WATER MAIN REPLACEMENT

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: Replace proposal pages P-2 through P-4 with the attached pages P-2R through P-4R.

Item 2: Replace Water Main Workmanship and Materials pages WM-1 through WM-47 with the attached pages WM-1R through WM-47R.

Item 3: Replace plans sheet 12 of 39 with the attached plans sheet 12 of 39.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect.. Questions are to be e-mailed to Contract Administration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Management Supervisor

**Contract 20-C-00040
Fair Oaks Water Main Replacement Project**

Schedule A - Water

Item No.	Description	Unit	Est Qty	Unit Price in Words	Unit Price	Total Price
2100	F&I 4" ductile iron pipe with 5' trench or less	LF	87		\$	\$
2102	F&I 6" ductile iron pipe with 5' trench or less	LF	14,423		\$	\$
2104	F&I 8" ductile iron pipe with 5' trench or less	LF	1,145		\$	\$
2202	F&I 6" HDPE pipe by HDD at various depths	LF	530		\$	\$
2600	Cut and plug 3" and smaller in diameter pipe	EA	18		\$	\$
2601	Cut and plug 4", 6" and 8" diameter pipe	EA	10		\$	\$
3000	F&I 4" wedge-action or flange restraint	EA	5		\$	\$
3001	F&I 6" wedge-action or flange restraint	EA	356		\$	\$
3002	F&I 8" wedge-action or flange restraint	EA	46		\$	\$
3041	Furnish & install 6" bell and MJ restraint on existing pipe	EA	7		\$	\$
3070	Furnish 4" push-on restraint gaskets	EA	5		\$	\$
3071	Furnish 6" push-on restraint gaskets	EA	325		\$	\$
3072	Furnish 8" push-on restrain gaskets	EA	51		\$	\$
4000	F&I 4" ductile iron plug or cap w/DIP, CIP or PVCP	EA	1		\$	\$
4001	F&I 4" ductile iron bends, offsets, sleeves or reducers w/DIP, CIP or PVCP	EA	1		\$	\$
4005	F&I 6" ductile iron bends, offset, sleeves or reducers w/ DIP, CIP or PVCP	EA	55		\$	\$
4006	F&I 6" ductile iron tee w/ DIP, CIP or PVC	EA	42		\$	\$
4009	F&I 8" ductile iron bends, offsets, sleeves or reducers w/ DIP, CIP or PVCP	EA	6		\$	\$
4010	F&I 8" ductile iron tee w/ DIP, CIP or PVC	EA	8		\$	\$
5000	F&I full fire hydrant assembly on new or existing mains	EA	25		\$	\$

Contract 20-C-00040
Fair Oaks Water Main Replacement Project

Item No.	Description	Unit	Est Qty	Unit Price in Words	Unit Price	Total Price
5200	Remove and salvage of fire hydrant	EA	4		\$	\$
6002	F&I 6" gate or tapping valve with box on DIP, CIP or PVC	EA	72		\$	\$
6003	F&I 8" gate or tapping valve with box on DIP, CIP or PVC	EA	7		\$	\$
7002	F&I 8" tapping sleeve and make tap	EA	1		\$	\$
8100	Furnish tap and install 3/4" or 1" meter service on PVC, DIP, or CIP (0-15' HDPE)	EA	82		\$	\$
8101	Furnish, tap and install 3/4" meter service on PVC, DIP or CIP (+15-80' HDPE)	EA	227		\$	\$
8120	Furnish, tap and install 3/4" or 1" meter service on HDPE (0-15' HDPE)	EA	3		\$	\$
8121	Furnish, tap and install 3/4" meter service on HDPE (+15-80' HDPE)	EA	3		\$	\$
9200	Furnish, place and compact limerock base	CY	2,305		\$	\$
9205	Furnish and install asphalt concrete surface Superpave Type SP-12.5	TN	572		\$	\$
9207	Furnish, place, grade and compact Superpave Type SP-9.5 asphaltic concrete overlav	TN	2,021		\$	\$
9208	Mobilization to perform mechanical milling	EA	1		\$	\$
9209	Mechanical milling of asphalt roadways in 1-inch increments	SY-IN	36,709		\$	\$
9210	Restore 6" thick concrete driveway	SY	244		\$	\$
9211	Restore brick pavement, including base material	SY	110		\$	\$
9300	Furnish and install Type "D" concrete curb	LF	40		\$	\$
9301	Furnish and install valley curb	LF	100		\$	\$
9306	Furnish and install asphaltic concrete curb	LF	5		\$	\$
9307	Furnish and install 4" thick concrete sidewalk	SY	101		\$	\$
9309	Grade and sod roadside/ditch bottoms and sides - Bahia	SY	831		\$	\$
9310	Grade and sod roadside/ditch bottoms & sides - St. Augustine	SY	7		\$	\$
9400	Grout abandoned pipe	CY	33		\$	\$
9505	Video photography	LF	16,014		\$	\$

Contract 20-C-00040
Fair Oaks Water Main Replacement Project

Item No.	Description	Unit	Est Qty	Unit Price in Words	Unit Price	Total Price
9910	Valve Box Adjustment or removal	EA	25		\$	\$
9921	F&I blow-off assembly per Detail 2.17	EA	1		\$	\$
9950	F&I new project signs	EA	2		\$	\$
9970	As-Built Survey Installed Pipeline	LF	16,014		\$	\$
9980	Contingency	LS	1	Five hundred thousand dollars and no cents	\$ \$500,000.00	\$ \$500,000.00
9100	Maintenance of Traffic	LS	1	Two hundred and fifty thousand dollars and no cents	\$ \$250,000.00	\$ \$250,000.00
10000	Mobilization	LS	1	Two hundred thousand dollars and no cents	\$ \$200,000.00	\$ \$200,000.00
					SCHEDULE A TOTAL COST	\$

Schedule B - Wastewater

Item No.	Description	Unit	Est Qty	Unit Price in Words	Unit Price	Total Price
100	Contingency	LS	1	Fifty thousand dollars and no cents	\$ 50,000.00	\$ \$50,000.00
102	Maintenance of Traffic	LS	1		\$	\$
408.236	Cured in Place Pipe for 8" Dia. Gravity Sewer (0.236 inch thick)	LF	13,210		\$	\$
601.08	Hydraulic Cleaning & Inspection of 8" Dia. Gravity Sewer	LF	13,165		\$	\$
621	Cleaning & Inspection of Tuberculated Cast Iron or Ductile Iron Sewer, 8" Dia.	LF	45		\$	\$
700	Disposal of Debris	CY	13		\$	\$
2050	Reconnect Service Connections	EA	307		\$	\$
2051	Chemical Grout Unit - chemical grout lateral post liner install	EA	307		\$	\$
4800	Manhole Rehabilitation by Coating System min. 250 mils thickness	SF	1,510		\$	\$
4600.1p	Small Size manhole frame and cover replacement (in pavement)	EA	10		\$	\$
9000	Sewer Bypass with Tanker Truck	E.D.	10		\$	\$
9050.08	Sewage Bypass Pumping for 8" Dia. Sewer	LF	13,210		\$	\$
					SCHEDULE B TOTAL COST	\$
					SCHEDULE A + B TOTAL COST	\$

WATER MAIN WORKMANSHIP AND MATERIALS

W-00 GENERAL REQUIREMENTS

All materials shall be in accordance with these Material Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable law, ordinances and codes. All materials or products that will be in contact with potable water shall be listed by the National Science Foundation (NSF-61 listed) or by an approved certifying agency as conforming to the requirements of ANSI/NSF-61.

Materials provided for construction on or for the City's reclaimed water distribution system shall be in accordance with color coding specifications provided in the Florida Administrative Code (F.A.C.), Chapter 62-610. All piping, pipeline appurtenances (including valves and outlets) shall be color coded to differentiate reclaimed water from domestic or other water. Underground piping which is not manufactured of metal shall be color coded or marked for reclaimed water distribution systems using Pantone Purple 522C using light stable colorants - underground metal pipe shall be color coded using purple as a predominant color. Visible, above-ground portions of the reclaimed water distribution system shall be clearly color coded or marked. All reclaimed water valves shall be appropriately tagged or labeled (bearing the words in English and Spanish: "Do not drink" together with the equivalent standard international symbol) to warn the public and employees that the water is not intended for drinking.

Items designated to be "domestically manufactured" shall be manufactured, assembled and tested in their entirety within the United States of America or its territories. Items designated to be "domestically assembled" may be foreign-manufactured but shall be assembled and tested in their entirety within the United States of America or its territories. Items requiring a "domestic presence" may be foreign-manufactured and/or assembled and/or tested, but the manufacturer shall have a designated representative or agent located within the United States of America, and that representative or agent shall be available to provide on-site service if required by the City of Tampa Water Department (Department).

All materials shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert workmen, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Department, are inferior or are lower grade than indicated, specified or required, shall not be accepted. All materials used in this contract must be approved in advance by the Engineer. In conformance with section G-4.02 of these contract documents, any two items of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer. Unless approved in advance by the engineer, only one manufacturer may be used for each item under this contract.

W-10 DUCTILE IRON PIPE

1. GENERAL

Ductile iron pipe shall be domestically manufactured in accordance with the latest revision of ANSI/AWWA C-151/A21.51. Pipe shall be furnished in 18 or 20 foot laying lengths. Pipe shall be lined with a standard thickness cement mortar lining and seal coated in accordance with the latest revision of ANSI/AWWA C-104/A21.4 and NSF 61. Pipe outside coating shall be an asphaltic coating in accordance with ANSI/AWWA C-151/A21.51, latest revision. All pipe materials used in potable water systems shall comply with NSF Standard 61. Unrestrained joint pipe shall be either the rubber-ring compression-type push-on joint or mechanical joint.

2. PRODUCTS

a) *Push-on Joint Pipe*

- i) Push-on joint pipe shall be supplied with all joint accessories. Accessories shall include gaskets and lubricant in sufficient quantity for the proper assembly of each joint. Gaskets for push-on joints shall be made of ethylene propylene diene monomer (EPDM) rubber, except: Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. All plain ends shall be painted with a circular stripe on the pipe barrel to allow a visual means of checking proper assembly.
- ii) All push-on joints shall be in accordance with ANSI/AWWA C-111/A21.11, latest revision.
- iii) Pressure Class shall be as follows:

<u>Diameter</u>	<u>Min. Pressure Class</u>
4" to 16"	350
> 16"	250

b) *Mechanical Joint Pipe*

- i) Mechanical joint pipe shall be supplied with all joint accessories. Accessories shall include lubricant, gaskets, ductile iron glands, bolts, and nuts, all in sufficient quantity for the assembly of each joint. The bolts and nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy". The follower gland shall be ductile iron. Gaskets for mechanical joints shall be made of ethylene propylene diene monomer (EPDM) rubber.
- ii) All mechanical joints shall be in accordance with ANSI/AWWA C-111/A21.11, latest revision.
- iii) Pressure Class shall be as follows:

<u>Diameter</u>	<u>Min. Pressure Class</u>
4" - 16"	350
>16"	250

c) *Flanged Flexible Joint Pipe*

- i) Flexible-joint pipe shall be push-on, ball-and-socket, freely deflecting, and restrained using a corrosion resistant locking device. Accessories shall include locking segments, rubber retainers, lubricant, and gaskets. Thickness class shall be as follows:

<u>Diameter</u>	<u>Min. Thickness Class</u>
WM-2R	

6"	54
8"	55
12"	56
16"	57

ii) The joint shall be capable of a full 15° free deflection with no reduction in the waterway.

d) *Flanged Pipe*

- i) Flanged pipe shall conform to the requirements of AWWA C115, in nominal 18- or 20-foot lay lengths. The pipe shall be minimum Special Thickness Class 53 rated for a maximum working pressure of 250 psi.
- ii) Flanges shall be ductile iron and shall have long hubs. There shall be no leakage through the pipe threads, and the flanges shall be designed to prevent corrosion of the threads from outside.
- iii) Flanges shall meet the requirements of ASME B16.1, class 125 flanges. Flanges, flange facing, drilling, and protecting shall be as specified for flanged pipe. Bolts and nuts for flanged joints shall be Type 316 stainless steel unless otherwise stated on the Plans or directed by the Engineer.
- iv) Except where otherwise directed by the Engineer, gaskets for flanged joints shall be of the full-face type, meeting the requirements of ANSI B16.21. Gaskets shall be EPDM rubber.

e) *Manufactured Restrained Joint Pipe*

- i) Joints shall be push-on in accordance with ANSI/AWWA C-111/A21.11. Joints shall be secured by wedged locking shims or a follower gland which shoulder against a retaining ring permanently fastened to the spigot end of the pipe within the joint. Gaskets for manufactured restrained pipe joints shall be made of EPDM rubber.
- ii) Pressure Class shall be as follows:

<u>Diameter</u>	<u>Min. Pressure Class</u>
4" -16"	350
>16"	250

3. QUALITY CONTROL AND TESTING

- a) All pipe shall meet or exceed all hydrostatic, performance and acceptance tests as set forth in ANSI/AWWA C-151/A21.51, latest revision.

- b) Submittals shall include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, pressure class or thickness class, performance standards, etc. If this documentation is omitted, the ductile iron pipe may be rejected at the sole option of the City.

4. MANUFACTURER

- a) Ductile iron pipe, unless specified below, shall be by U.S Pipe, American (aka American Cast Iron Pipe Company), McWane Cast Iron Pipe Company, Griffin Pipe Products Company, or approved equal.
- b) Flexible Joint pipe shall be "Flex-Lok Boltless Ball Joint Pipe" (American), "USI FLEX Boltless Flexible Joint Pipe" (U.S. Pipe), "Snap-Lok River Crossing Pipe" Griffin Pipe Products), or approved equal.
- c) Manufactured Restrained Joint pipe shall be "Flexring" (American), "TR-Flex" (U.S. Pipe), "Super-Lock" (20-in. & 24-in. pipe) and "Thrust-Lock" (30-in. & 36-in.) (McWane Cast Iron Pipe Company), "Snap-Lok" (Griffin Pipe Products), or approved equal.
- d) Ductile iron pipe shall be domestically manufactured in the United States.

W-11 HDPE (HIGH DENSITY POLYETHYLENE) PIPE

1. GENERAL

HDPE pipe, size 4inch and larger, shall be manufactured in accordance with the latest edition of AWWA C906. Pipe shall be furnished in 40-foot laying lengths.

2. PRODUCTS

- a) Pipe outside diameter shall be ductile iron pipe size.
- b) Standard dimension ratio shall be DR-11. Pressure class shall be 160 psi.
- c) All HDPE pipe, sizes 4-inch and larger, shall meet the requirements of AWWA Standard C 906-99 (or latest revision).
- d) The piping shall be permanently blue-coded to provide water main identification. When pipe is striped, stripes shall be blue, along the entire outside length of the pipe 90 or 120 degrees apart, and shall be made by co- extrusion or impregnation. Fully colored blue pipe co-extruded from permanently pigmented HDPE is also acceptable.
- e) Pipe shall have manufactured markings as following:
 - i) Nominal size and OD base
 - ii) Standard material code designation
 - iii) Dimension

- iv) Pressure class
 - v) AWWA designation (AWWA C906-99)
 - vi) Material test category of pipe
 - vii) Manufacturer's test code
- f) All HDPE pipe shall be installed with tracer wire, per the Tracer Wire specifications.
- g) Stainless steel inserts are required in HDPE pipe ends to facilitate connections to fittings or valves.

1. QUALITY CONTROL AND TESTING

- a) All pipe shall meet or exceed all hydrostatic performance and acceptance tests as set forth in AWWA C906, latest edition. Manufacturer shall furnish an affidavit that all materials delivered comply with standards set forth in these specifications.
- b) HDPE pipe shall be made of resin approved by the National Sanitation Foundation (NSF).
- c) All HDPE pipe shall meet the requirements of NSF Standard 61.
- d) All HDPE pipe shall be made of materials conforming to polyethylene code designation PE 4710, with a minimum cell classification of PE 454474 C or higher.

2. MANUFACTURER

HDPE Pipe provided shall be better than or equal to: CRS "PolyPipe", PE 4710;

Quail Piping, PE 4710; Performance Pipe "DriscoPlex 4000 Series", PE-4710, 4"- 12" diameter

W-12 HDPE TUBING

1. GENERAL

All water service lines two (2) inches in diameter and smaller shall be constructed of high-density polyethylene (HDPE) pressure tubing.

2. PRODUCT

- a) The standard dimension ratio (SDR) shall be 9 for CTS tubing sizes. The average outside diameter, minimum wall thickness and respective tolerances for any cross-section shall be as specified in ASTM D2737. The average inside

diameter, minimum wall thickness, and respective tolerances for any cross-section shall be as specified in ASTM D2239.

- b) Polyethylene extrusion compound from which the PE tubing are extruded shall comply with the applicable requirements for the Type III, color and U.V. code E, Class C, PE 4710, very high molecular weight polyethylene plastic material manufactured in accordance with AWWA C-901, latest revision, as specified in ASTM D1248.
- c) HDPE pressure tubing shall have a color and ultraviolet code E and a minimum cell classification of PE 454474 E as specified in ASTM D3350.
- d) The polyethylene extrusion compound shall be of virgin quality approved for potable water service by the National Sanitation Foundation. The polyethylene extrusion compound shall be manufactured with sufficient and proper ultra-violet color stabilizers.
- e) Polyethylene tubing shall be blue and have U.V. color stabilizers so that the pipe is not affected in color or flexibility for a minimum of four (4) years.

3. QUALITY CONTROL AND TESTING

- a) Environmental stress cracking resistance testing shall be performed in accordance with ASTM D1693, Condition C, and shall have no failures after 5000 hours duration.
- b) When submitting for approval of HDPE not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the HDPE may be rejected at the sole option of the City.

4. MANUFACTURER

All HDPE tubing shall be manufactured by Performance Pipes "DriscoPlex", Endot EndoPure", Vanguard "Bruiser", Charter Plastics "Blue Ice" or approved equal.

W-20 VALVES

1. GENERAL

This section includes all valves to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all valves unless exceptions are shown or stated on the plans or specific provisions.

Resilient Seat Gate Vales ("Valves") provided under this specification shall be suitable for installation on ductile iron or cast iron pipe, and C-900 PVC. Valves shall be manufactured in accordance with AWWA C-509 or AWWA C-515, latest editions, as applicable, and as specified herein.

2. PRODUCT

- a) *Valve Boxes*

- i) Shall be designed to provide access to an underground valve's 2-inch operating nut at a depth of two-feet or greater. Valve boxes shall be suitable for installation in areas subject to heavy vehicle traffic loading.
- ii) Shall include removable valve box cover with "WATER" label as shown on the Standard Dimension Detail titled "Valve Box".
- iii) Shall be manufactured of Class 30 or 35 grey iron.
- iv) Shall consist of four parts: valve box cover, riser, top section, and bottom section.
- v) Shall be the same dimension, within manufacturing tolerances, as shown in Standard Dimension Detail "Valve Box".

b) *Gate Valves (4-inch and larger)*

- i) Gate valve operation
 - (1) Valves installed in public rights-of-way shall be right-hand (clockwise) open.
 - (2) Valves installed on the David L. Tippin Water Treatment Plant property (or at remote pumping locations) shall be left-hand (counter clockwise) open.
- ii) Valve installed below grade shall have mechanical joint ends. Valves installed above grade shall be flanged.
- iii) Mechanical joints and accessories shall be manufactured in accordance with AWWA Standards C-110 and C-111.
- iv) Mechanical joint bolts-and-nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "USalloy", or "ACIPalloy".
- v) Valves stems shall be non-rising and manufactured from stainless steel in accordance with AWWA C-509/C-515.
- vi) Stems, stem-nuts and wedges shall act independently. Stems shall be sealed by at least two O-ring seals, one located both above and below the thrust collar, and shall be replaceable with the valve full open and while subjected to full rated pressure. Stems shall be provided with low-friction torque-reducing thrust bearings located both above and below the stem collar . Thrust washers may be used to separate the thrust collar from iron surfaces.
- vii) Valve bodies and gates shall be cast iron or ductile iron manufactured in accordance with ASTM A126 or ASTM A536 respectively, and AWWA C-509 or AWWA C-515 as applicable.
- viii) All internal and external exposed ferrous surfaces of the valve body and gate shall have an epoxy coating applied to a minimum of eight mils, in accordance with AWWA C-550.
- ix) The wedge shall be bronze manufactured in accordance with ASTM B62. It shall be fully encapsulated with rubber molded in place and bonded in accordance with ASTM D429 A or B as specified in AWWA C-509/C-515. Mechanically attached seats will not be accepted.

- x) Hollow gates shall be provided with a drain in the bottom to flush the internal cavity of foreign material and stagnant water each time the valve is operated.
- xi) Gate valves provided under this specification shall be suitable for installation on ductile iron or cast iron pipe, and C-900 PVC.
- xii) Gate Valves shall have an EPDM Resilient seat.
- xiii) All bonnet bolts, gland bolts, nuts and other trim hardware exposed to the outside environment shall be stainless steel. Thrust collar tie-rod bolts shall be stainless steel.

c) *Tapping Valves*

(Note: Tapping Valve materials specifications shall be equivalent to those listed herein for Gate Valves, except as alternately specified below.)

- i) Tapping valves shall be resilient seat gate valves with one end mechanical joint, and one end flanged.
- ii) Tapping valve interior waterway shall be a full-opening and capable of passing a full-sized shell cutter through the valve.
- iii) Tapping valve shall be provided with a tapping-flange and flanged joint accessories.
- iv) Tapping-flange shall have a raised face or lip designed to engage a corresponding recess in a tapping sleeve as defined in MSS SP-60.
- v) Tapping-flanges shall conform to dimensions and drillings of ANSI B16.1, Class 125, ANSI/AWWA C110/A21.10.
- vi) All tapping valves shall be interchangeable with multiple makes of tapping sleeves.

d) *2-inch Gate Valves*

(Note: 2-inch Gate Valve materials specifications shall be equivalent to those listed herein for Gate Valves, except as alternately specified below.)

- i) 2" Gate Valves shall be resilient seat, have push-on or threaded ends, and be manufactured in accordance with AWWA C-509.
- ii) Valve Ends:
 - (1) Valve ends for push-on joint valves shall conform to AWWA C-111 and shall be suitable for use with iron pipe size plastic pipe as well as iron pipe.
 - (2) Valve ends for threaded joint valves shall have female iron pipe connections compatible with N.P.T. threads as specified in AWWA C-800.

3. QUALITY CONTROL AND TESTING

a) *Valve Boxes*

- i) All valve boxes shall be manufactured of Class 35 grey iron

b) *Gate and Tapping Valves*

- i) The Gate Valve's resilient seat shall be bubble-tight against a 200-psi water working pressure and maintain zero leakage at all times.
- ii) The wedge shall be bronze manufactured in accordance with ASTM B62. It shall be fully encapsulated with rubber molded in place and bonded in accordance with ASTM D429. The wedge rubber coating shall be ethylene propylene diene (EPDM) rubber. Rubber mechanically attached with screws rivets and similar fasteners shall not be acceptable.

c) *2-inch Gate Valves*

- i) Valves shall meet or exceed all testing requirements set forth in AWWA C-509

4. MANUFACTURER

a) *Valve Boxes*

- i) Valve box manufacturers shall have a domestic presence. Valve boxes shall be equal to or better than those made by Bingham & Taylor, Union Foundry, Sunshine Foundry, or Pipeline Components, Inc.

b) *Gate Valve*

- i) Standard valves shall be domestically assembled and shall be Clow F-6100, U. S. Pipe Metroseal 250, AVK Series 25, Mueller Co. (2360 for 2"-12", 2361 for 14"-24"), American Flow Control Series 500 or Series 2500, Kennedy KenSeal 4571, or approved equal.
- ii) Valves shall be domestically assembled and shall be equal to or better than Clow F-6136 OS&Y, U.S. Pipe Metroseal 250, or American Flow Control Series 2500-1.

c) *Tapping Valves*

- i) Tapping valves shall be domestically assembled and shall be equal to or better than Clow F-6114, U. S. Pipe Metroseal 250, Mueller Co. (2360 for 2"-12", 2361 for 14"-24"), American Flow Control Series 500 or Series 2500, Kennedy KenSeal 7571, American AVK Series 25, or approved equal.

d) *2-inch Gate Valves*

- i) All valves shall be domestically assembled and shall be equal to or better than the following:
 - (1) Push-on end valves - Clow 6110 (for PVC)/6100 (for MJ); Waterous Series 500 - P.O.; AVK Series 45
 - (2) Threaded end valves - Clow 6103; Waterous Series 500; American Flow Control Series 2500; AVK Series 03

W-30 RESTRAINT DEVICES

1. GENERAL

This section includes all restraint devices on pipe to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all restraint devices unless exceptions are shown or stated on the plans or specific provisions.

Mechanical restraint devices shall be used to restrain plain ends of ductile iron or PVC pipe to push-on, mechanical, or flange joints which meet ANSI/AWWA C-110/A21.10 and ANSI/AWWA C-111/A21.11, or to restrain joints on existing installed pipes.

2. PRODUCT

a) *Ductile Iron Pipe Restraints*

- i) Push-on Joint pipe Restraint (for 4" - 36" pipe only)
 - (1) Restraint shall be produced by "locking gaskets" consisting of an EPDM rubber gasket with high-strength stainless steel locking elements vulcanized into the gasket, which when activated develop wedging action between the pairs of stainless steel elements spaced around the gasket.
 - (2) Shall withstand the following working pressures:
 - (i) 4" - 16" = min. 350 psi
 - (ii) >16" = min. 250 psi
 - (3) Restraint gaskets shall be UL Listed and FM approved.

ii) Flange Joint Restraint

- (1) Shall attach to the plain end of a pipe by wedge screws to produce a flange which joins to an existing integral companion flange.
- (2) Shall be constructed of ductile iron meeting ASTM A536 and manufactured in accordance with ANSI/AWWA C-110/A21.10 and C-111/A21.11.

- (3) Shall meet ANSI/AWWA C-110/A21.10 and ANSI/AWWA C-111/A21.11, latest revisions.
- (4) Flanges shall have bolt circle and bolt holes which match a Class 125 flange and are compatible with ANSI/AWWA C-115/A21.15.
- (5) Gaskets shall be full faced and made of EPDM rubber.
- (6) Shall withstand 250 psi working pressure.

iii) Mechanical Joint Restraint

- (1) Restraint shall be provided with wedge action devices.
- (2) Restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism (the lug) which, when activated, imparts multiple wedging actions against the pipe, thereby increasing its restraint on the pipe as the joint tries to separate. "Twist-off nuts" shall be used to ensure proper actuating of the restraining device.
- (3) Follower glands shall be manufactured of ductile iron conforming to ASTM A536-80.
- (4) Wedging lug and bolt shall be manufactured of ductile iron which has been heat-treated to a minimum hardness of 370 BHN.
- (5) Glands shall be dimensioned such that they can be used with standard mechanical joints and have tee-head bolts conforming to ANSI/AWWA C-111/A21.11 and ANSI/AWWA C-153/A21.53, latest revision.
- (6) Pipe restrained with retainer glands specified shall be capable of withstanding twice the rated pressure of the restraint device for five minutes with no leakage or movement.
- (7) Wedge action restraints shall withstand the following working pressures:
 - (i) 4" - 16" = min. 350 psi
 - (ii) >16" = min. 250 psi

iv) Existing Pipe Joint Restraint

- (1) Restraint shall be provided with wedge action mechanical devices.
- (2) Split-restraint fittings for mechanical joints on existing pipe installations shall be segmented.
- (3) Split-restraint fittings for existing pipe bell-and-spigot joints shall consist of a split restraint ring installed on the pipe barrel behind the bell.
- (4) Restraint devices shall be ductile iron per ASTM A536, latest revision, min. Grade 60-42-12. Threaded rods shall be high strength low-alloy steel per ANSI/AWWA C-111/A21.11.

3. QUALITY CONTROL AND TESTING

When submitting for approval of restraint devices not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the restraint fittings may be rejected at the sole option of the City.

a) *Ductile Iron Pipe Restraints*

i) Coatings

- (1) Flange Adapters shall be provided with painted "shop coat", or approved equal.
- (2) Retainer glands shall be provided with a bituminous coat.
- (3) Existing pipe push-on joint restraint fittings shall be provided with a bituminous coat.

ii) Burst pressure tests shall be performed as specified in ANSI/AWWA111/A21.11, latest revision.

4. MANUFACTURER

a) *Ductile Iron Pipe Restraints*

- i) Ductile iron pipe push-on joint restraint devices shall be U.S. Pipe "Field-Lok" Gasket, American "Fast-Grip" Gasket, or approved equal.
- ii) Ductile iron pipe flange joint restraint devices shall be approved, equal to, or better than EBAA Iron "Megaflange Series 2100" or "1000 EZ Flange", or Ford Meter Box Company "Uni-flange Series 400-C", or approved equal.
- iii) Wedge action restraint for ductile iron pipe mechanical joints shall be equal to or better than EBAA Iron "Megalug, Series 1100", Tyler/Union TUF Grip TLD, Sigma One-Lok Model SLD, or approved equal.
- iv) Split, wedge-action restraints devices for restraint of existing pipe and fitting joints shall be approved, equal to, or better than EBAA Iron "Megalug, Series 1100SD or HD", or approved equal.

W-40 BRASS FITTINGS

1. GENERAL

All brass fittings for service lines shall be included under this specification.

2. PRODUCT

- a) All fittings shall be manufactured of brass, cast and machined in accordance with AWWA Standard C-800, latest revision.
- b) All fittings shall perform in accordance with AWWA C-800, latest revision.

- c) All brass fittings shall be made of a “No-Lead Brass”, defined for this specification as brass alloy containing not more than one fourth of one percent (0.25% or less) total lead when used with respect to the wetted surfaces of the fitting, as defined by NSF/ANSI 61.
- d) All fittings shall be certified as suitable for contact with drinking water in accordance with ANSI/NSF Standard 61, Drinking Water Components – Health Effects, Section 8. Certification shall be by an accredited certification organization or by a laboratory able to demonstrate that the NSF 61 lead testing protocol was followed.
- e) All brass fittings shall comply with Florida Administrative Code (F.A.C.) 62-555 (latest revision), the Safe Water Drinking Act, as amended, and the U.S Environmental Protection Agency (E.P.A.).
- f) All brass fittings shall be integrally stamped or cast with the manufacturer's name and a marking or trademark identifying that the fitting contains a “no lead” brass alloy (as defined herein), e.g., ‘NL’, ‘EB2’, or ‘FED’, etc.
- g) Curb Stops & Meter Valves
 - i) All curb stops shall be full-port and have a flow passage area equivalent to the fitting outlet flow area.
 - ii) Curb stops shall be of the ball valve design with a full-port opening ball no less than 3/4-inch. 3/4-inch curb stops shall be provided without padlock wings.
 - iii) 1-in. and larger curb stops shall be provided with padlock wings cast on stop body and operating tee cap to provide for locking the stop in closed position.
 - iv) Curb stops for use with copper or plastic service shall have an inlet connection with a pack-joint compression nut (w/ set screw) and an outlet connection with female iron pipe thread (FIP), or shall have an Inside Iron Pipe Thread (FIP) inlet connection and an Inside Iron Pipe Thread outlet connection.
 - v) Meter valves shall be of the ball valve design with a full-port opening ball no less than 3/4-inch. Meter valves shall be provided with padlock wings cast on stop body and operating tee cap to provide for locking the stop in closed position. Meter valves for use with copper or plastic service shall have an inlet connection with a compression joint and a swivel nut outlet connection, or shall have an Inside Iron Pipe Thread (FIP) inlet connection and an Inside Iron Pipe Thread outlet connection.
- h) Corporation Stops
 - i) Corporation stops shall be of the ball valve design. Corporation stop inlet connection shall be the AWWA Taper thread. The outlet connection shall be CTS pack-joint (w/ set screw) for copper or plastic tubing.
- i) Brass Fittings
 - i) Branch connections shall be brass construction with copper compression joint inlet and male iron pipe size outlets.
 - ii) Meter re-setters shall be designed for use with standard 5/8”x3/4" and 1” water meters. Re-setters shall be constructed from brass fittings conforming to the specifications herein, with copper riser pipes. An angle ball valve shall be provided on the inlet riser, saddle nuts and gaskets on inlet and outlet. Pipe connections shall be (nominal) male iron pipe size meter thread on both inlet and outlet.
 - iii) Threaded fittings

- (1) Threaded brass fittings ("Fittings") provided shall be manufactured in accordance with ANSI B16.15, 125 lb.
- (2) Fittings shall be of material conforming to ASTM B62 or B584.
- (3) Threads on all fittings shall be N.P.T. in conformance with ANSI B1.20.3, right hand and shall be smooth, clean and true to form.
- (4) Fittings shall be legibly cast or dye stamped such that the manufacturer's name, initial or other mark can be easily identified.

3. QUALITY CONTROL AND TESTING

- a) Manufacturer shall provide a copy of a letter from NSF International (on NSF letterhead) documenting compliance with NSF/ANSI 61 Annex F.
- b) Certification of the standards must be available and provided, if requested by the City. If requested, an Affidavit of Compliance to these standards and specifications shall be signed and submitted by an officer of the manufacturing firm.

When submitting for approval of brass fittings not listed, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If any of this documentation is omitted, the brass fittings may be rejected at the sole option of the City.

4. MANUFACTURER

- a) Brass fittings and threaded brass fittings shall be domestically manufactured by Mueller Company, Ford Meter Box Company, A.Y. McDonald Mfg. Company, or approved equal.
- b) Curb stops with compression nut inlet connection and female iron pipe thread (FIP) outlet connection:
 - i) FMBC: B41-333-378-NL (for $\frac{3}{4}$ -in), B41-xxx-W-NL (for ≥ 1 -in)
 - ii) A.Y. McDonald: 76102-22 (for $\frac{3}{4}$ -inch), and 76102-22-W (for ≥ 1 -inch)
 - iii) Mueller: P-2517(2 or 0)N (as applicable) or approved equal.
- c) Curb stops with Inside Iron Pipe Thread (FIP) inlet connections and an Inside Iron Pipe Thread outlet connections shall be:
 - i) FMBC: B11-333-NL (for $\frac{3}{4}$ -in), and B11-xxx-W-NL (for ≥ 1 -in)
 - ii) A.Y. McDonald: 76101 (for $\frac{3}{4}$ -in), and 76101-W (for ≥ 1 -in)
 - iii) Mueller: B-20283N (for $\frac{3}{4}$ -in), B-20200N (for ≥ 1 -in), or approved equal.

- d) Meter valves:
 - i) Angle meter valve: FBMC BA43W, Mueller P-24258N, A.Y. McDonald 4602B-22, or approved equal.
 - ii) Straight meter valve (compression x swivel): FBMC B43W, Mueller P-24351N, A.Y. McDonald 6101MW-22, or approved equal.
 - iii) Straight meter valve (FIP x swivel nut): FBMC B13W, Mueller P-24350N, A.Y. McDonald 6100MW-22, or approved equal

- e) Corporation stops for sizes 3/4" – 2" shall be:
 - i) FMBC FB-1000, A.Y. McDonald 4701B-22, Mueller P-25008N, or approved equal.

- f) Branch connections shall be:
 - i) FMBC U48, Mueller P-15363N, A.Y. McDonald 08U2M, or approved equal.

- g) Meter re-setters shall be:
 - i) FMBC VB40 Series, Mueller B-24118R, A.Y. McDonald Series 18, or approved equal.

W-41 MECHANICAL JOINT BOLTS-AND-NUTS

1. GENERAL

All mechanical joint bolts and nuts shall be manufactured in accordance with ANSI/AWWA C-111/A21.11, latest revision, and shall also adhere to the following specification.

2. PRODUCT

- a) All mechanical joint bolts shall be a Tee-head design with hexagonal nuts. Dimensions shall be in accordance with ANSI/AWWA C-111/A21.11.
- b) All bolts and nuts shall be manufactured of high-strength, low alloy steel in conformance with ANSI/AWWA C-111/A21.11 and ASTM A242, latest revisions.
- c) All bolts shall be designed for internal and external threads to conform to ANSI/ASME B1.1 and B1.2. Thread form shall conform to the standards and dimensions of the coarse-thread series Unified Coarse (UNC); external threads shall be made in compliance with Class 2A limits, and internal threads shall be made in compliance with

Class 2B limits. The Contractor is advised that various HDPE MJ adapters may require longer than standard bolts to complete the installation.

3. QUALITY CONTROL AND TESTING

When submitting for approval of mechanical joint bolts and nuts not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the mechanical joint bolts and nuts may be rejected at the sole option of the City.

4. MANUFACTURER

Mechanical joint bolts and nuts specified herein shall be domestically manufactured of Cor-Ten or approved equal by Birmingham Foundry, National Set Screw Corporation or approved equal.

W-42 OFFSETS

1. GENERAL

All ductile iron mechanical joint offsets shall be of ductile iron and manufactured in accordance with and ANSI/AWWA Standards C-110/A21.10 (or C-153/A21.53) and C-111/A21.11, latest revisions.

2. PRODUCT

- a.) Ductile iron mechanical joint offsets shall have a minimum pressure rating of 350 psi.
- b.) Joints shall be mechanical joints in accordance with C-111/A21.11, latest revision. All joint accessories shall be furnished with the fittings. Mechanical joint bolts and nuts shall be domestically manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "ACIPalloy". The follower gland shall be manufactured from ductile iron. The gasket shall be made of EPDM rubber.
- c.) Mechanical Joint fittings furnished shall have either of the exterior coating and interior lining systems described below:
 - (1) Cement Mortar Lining: Fittings furnished shall have a standard thickness cement mortar lining and be seal coated in accordance with ANSI/AWWA C-104/A21.4, latest revision. Fittings shall be listed NSF or by an approved certifying agency as conforming to all requirements of ANSI/NSF 61 and shall have an asphalt exterior coating which conforms to ANSI/AWWA C-110/A21.53.
 - (2) Fusion-bonded epoxy: Fittings shall be coated inside and out with a minimum 8 mils of fusion-bonded epoxy, and be in conformance with the requirements of ANSI/AWWA C-116/A21.16 and AWWA C-550, latest revisions. Fittings shall be listed by an approved certifying agency as conforming to all requirements of ANSI/NSF 61.

3. QUALITY CONTROL AND TESTING

- a) Ductile iron mechanical joint offsets shall meet or exceed pressure, hydrostatic and all other tests set forth in ANSI/AWWA C-110/A21.10 (or C-153/A21.53), latest revision.
- b) Submit in duplicate notarized certificates of conformance that all tests and inspections performed on ductile iron mechanical joint offsets as required by the ANSI/AWWA standards C-110/A21.10 (or C153/A21.53) have been satisfied.
- c) When submitting for approval of ductile iron mechanical joint offsets not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the ductile iron mechanical joint offsets may be rejected at the sole option of the City.

4. MANUFACTURER

Ductile iron mechanical joint offsets shall be manufactured by U.S. Pipe and Foundry Co., American Ductile Iron Pipe, Sigma, Tyler-Union, Union Foundry, or approved equal.

W-43 SOLID SLEEVES

(Ductile Iron, Compact, MJ)

1. GENERAL

Solid sleeves shall be used to join two plain ends of pipe or repair a damaged pipe.

2. PRODUCT

- a.) Solid sleeve lengths shall be up to 24-inches. The solid sleeve shall be capable of having two plain ends of pipe inserted into opposite ends of the sleeve. The sleeve is then to be sealed to the pipe by a mechanical joint at each end of the sleeve.
- b.) All sleeves shall be manufactured of ductile iron. Solid sleeves shall be manufactured in accordance with ANSI/AWWA Standard C-153/A21.53, latest revision. All sleeves shall be rated for a minimum working pressure of 350 psi.
- c.) All solid sleeve sealing ends shall be mechanical joints in accordance with ANSI/AWWA C-111/A21.11, latest revision. All joint accessories shall be furnished with the fittings. All bolts and nuts shall be made of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy". The gasket shall be for a standard Mechanical Joint, in accordance with ANSI/AWWA C-111/A21.11, latest revisions, and be made of EPDM rubber. The follower gland shall be manufactured from ductile iron at least ASTM A536, Grade 70-50-05 in accordance with ANSI/AWWA C-111/ A21.11, latest revision

- d.) All ductile iron compact solid sleeves shall be furnished with a standard thickness cement mortar lining and seal coating in accordance with AWWA Standard C-104, latest revision.
- e.) Fittings shall have an exterior, asphaltic coating which conforms to ANSI/AWWA C-153/A21.53.

3. QUALITY CONTROL AND TESTING

- a) All solid sleeves shall meet or exceed all testing requirements of ANSI/AWWA C-153/A21.53.
- b) When submitting for approval of solid sleeves not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the solid sleeves may be rejected at the sole option of the City.

4. MANUFACTURER

All ductile iron mechanical joint solid sleeves shall be manufactured by U.S Pipe, Sigma, Tyler/Union, American Cast Iron Company, Clow, or approved equal.

W-44 COMPACT ANCHOR FITTINGS - DUCTILE IRON

1. GENERAL

Ductile Iron Compact Anchor Fittings ("Fittings") provided under this specification shall be manufactured in accordance with AWWA Standard C-153 and C-111, latest editions, and as specified herein. Joint accessories shall be provided with fittings.

2. PRODUCT

- a) Tees
 - i) Both joints on the run of all anchor tees shall be mechanical joint in accordance with AWWA Standard C-111, latest edition.
 - ii) All mechanical joints shall be supplied with a joint accessories package (bolts, nuts and gasket) as part of the anchor fitting. MJ Gaskets shall be made of EPDM rubber formulated to resist chloramine degradation. All anchor fittings shall be compatible with mechanical joint connections in accordance with AWWA C-111, latest edition, and shall be capable of mechanical restraint so as to eliminate the need for additional thrust restraints.
 - iii) The standard anchor tee branch shall have an anchoring "plain end" which includes an integral or split follower gland, suitable for connecting to mechanical joint fitting meeting ANSI/AWWA C-111/A 21.11.

b) Anchor Elbow and Anchor Coupling

- i) The Anchor x Anchor elbows and anchor couplings shall have for both ends anchoring "plain ends". These "plain ends" shall have integral or split follower glands, suitable for mechanical joint fittings meeting ANSI/AWWA C-111/A 21.11.

c) Joint Accessories

- i) All T-head bolts and nuts for joints shall be domestically manufactured high-strength, low-alloy steel such as "Corten", "Usalloy," or "ACIPalloy."

- ii) All joint accessories shall be furnished with anchoring fittings.

- iii) All gaskets shall be EPDM rubber.

- (1) All anchoring fittings shall be furnished with either: i) a standard thickness cement mortar lining seal coated in accordance with AWWA Standard C-104, latest edition, and an exterior, asphalt coating which conforms to ANSI/AWWA C-151/A21.51; or, ii) have factory-applied fusion bonded epoxy coatings both inside and outside, in accordance with AWWA C550.

- (2) All fittings shall have a minimum pressure rating of 350 psi.

3. QUALITY CONTROL AND TESTING

- a) All anchor fittings shall meet or exceed acceptance, performance and hydrostatic testing in accordance with AWWA Standard C-153 and C-111, latest editions.

- b) When submitting for approval of ductile iron compact anchor fittings not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the ductile iron compact anchor fittings may be rejected at the sole option of the City.

4. MANUFACTURER

Ductile iron compact anchor fittings shall be manufactured by U.S. Pipe and Foundry Company, Clow, American Ductile Iron Pipe, McWane, Pipeline Components, Inc. or approved equal.

W-45 COMPACT MECHANICAL JOINT FITTINGS-DUCTILE IRON

1. GENERAL

- a) Ductile iron compact mechanical joint fittings shall be manufactured in accordance with ANSI/AWWA C-153/A21.53, latest revisions and the specifications stated herein. Fittings shall be listed by the National Sanitation Foundation (NSF) and shall conform to the requirements of NSF-61.

- b) Whenever the word "fitting" is used in this specification, it shall mean "Compact Ductile Iron Mechanical Joint Fitting".

2. PRODUCT

- a) For fittings larger than 16-inches physical and chemical properties shall be in accordance with ANSI/AWWA C153/A21.53, latest revision. The minimum working pressure for fittings shall be 350. The minimum wall thickness shall not be less than that of pressure class 350 ductile iron pipe.
- b) Joints shall be Mechanical Joint in accordance with ANSI/AWWA C111/A21.11 and C153/A21.53, latest revision, with exceptions noted herein. Mechanical Joint bolts and nuts shall be domestically manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "ACIPalloy". Joints requiring a shorter bolt than called for in ANSI/AWWA C111/A21.11 shall be supplied as required. Gaskets for mechanical joints shall be made of ethylene propylene diene (EPDM) rubber.
- c) Exterior Coating and Interior Lining

Mechanical Joint fittings furnished shall have either of the exterior coating and interior lining systems described below:

- i) Cement Mortar Lining: Fittings furnished shall have a standard thickness cement mortar lining and be seal coated in accordance with ANSI/AWWA C-104/A21.4, latest revision. Fittings shall be listed by an approved certifying agency as conforming to all requirements of ANSI/NSF 61 and shall have an asphalt exterior coating which conforms to ANSI/AWWA C-153/A21.53.
- ii) Fusion-bonded Epoxy: Fittings shall be coated inside and out with fusion-bonded epoxy, and be in conformance with the requirements of ANSI/AWWA C-116/A21.16 and AWWA C-550, latest revisions. Fittings shall be listed by NSF or by an approved certifying agency as conforming to all requirements of ANSI/NSF 61.

3. QUALITY CONTROL AND TESTING

- a) All fittings specified herein shall meet or exceed all hydrostatic, performance, and acceptance tests in accordance with ANSI/AWWA C153/A21.53 latest revision.
- b) When submitting for approval ductile iron compact MJ fittings not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the ductile iron compact MJ fittings may be rejected at the sole option of the City.

4. MANUFACTURER

- a) All manufacturers of ductile iron compact MJ fittings specified herein shall have a domestic presence. The fittings shall be manufactured by U.S. Pipe, Clow, Tyler/Union Pipe, American Ductile Iron Pipe, McWane, Pipeline Components, Inc., Sigma, Star Pipe, or approved equal.

W-46 DUCTILE IRON FITTINGS

1. GENERAL

This section includes all fittings to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all fittings unless exceptions are shown or stated on the plans or specific provisions.

2. PRODUCT

- a) All fittings shall be manufactured of ductile iron.
- b) All fittings below grade shall be mechanical joint.
- c) All mechanical joint bolts shall be a Tee-head design with hexagonal nuts, dimensioned in accordance with ANSI/AWWA C-111/A21.11.
- d) All bolts and nuts shall be manufactured of high-strength, low alloy steel in conformance with ANSI/AWWA C-111/A21.11 and ASTM A242.
- e) All fittings above grade shall be AWWA C110 flanges with a drilling that matches AWWA C115 and ANSI B16.1 class 125 flanges.
- f) Minimum Working Pressure
 - i) Mechanical Joint = 350 psi
 - ii) Flanged Joint = 250 psi
- g) Fitting shall be factory furnished with standard thickness cement lined interiors and asphaltic coated exteriors, or have fusion-bonded epoxy coating inside and out.
- h) Anchor tee branches shall have an anchoring "plain end" which includes an integral or split follower gland, suitable for connecting to mechanical joint fitting meeting ANSI/AWWA C-111/A 21.11.
- i) Anchor x Anchor elbows and anchor couplings shall have for both ends anchoring "plain ends". These "plain ends" shall have integral or split follower glands, suitable for mechanical joint fittings meeting ANSI/AWWA C-111/A 21.11.
- j) Gasket material shall be made of EPDM rubber.

3. QUALITY CONTROL AND TESTING

- a) Fittings shall be listed by the National Sanitation Foundation (NSF), or by an approved certifying agency as conforming to all requirements of ANSI/NSF 61.
- b) All mechanical joint fittings shall meet or exceed ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10
- c) All flanged fittings shall meet or exceed ANSI/AWWA C110/C115/C153 and ANSI/ASME B16.1
- d) Cement lining shall be in accordance with AWWA C104/A21.04
- e) Asphaltic coatings shall meet or exceed ANSI/AWWA C110/A21.10
- f) Fusion-bonded coating and lining shall conform with AWWA C-116 and AWWA C-550, and be listed by NSF (or by an approved certifying agency as conforming to all requirements of ANSI/NSF 61).
- g) Gasket material shall be made of EPDM, in accordance with ANSI/AWWA C-111/A21.11, latest revisions. The follower gland shall be manufactured from ductile iron at least ASTM A536, Grade 70-50-05 in accordance with ANSI/AWWA C-111/ A21.11, latest revision
- h) Mechanical joint bolts and nuts shall be manufactured in accordance with ANSI/AWWA C-111/A21.11. All bolts shall be designed for internal and external threads to conform to ANSI/ASME B1.1 and B1.2. Thread form shall conform to the standards and dimensions of the coarse-thread series Unified Coarse (UNC); external threads shall be made in compliance with Class 2A limits, and internal threads shall be made in compliance with Class 2B limits.

4. MANUFACTURER

- a) Ductile iron fittings shall be manufactured by U.S Pipe, Sigma, McWane, Tyler/Union, American Cast Iron Pipe Company, Clow, or approved equal.
- b) Mechanical joint bolts and nuts shall be domestically manufactured of Cor-Ten or approved equal by Birmingham Foundry, National Set Screw Corporation, or approved equal.

W-47 FLANGED FITTINGS

(Standard Class 125)

1. GENERAL

All standard class 125 flanged fittings shall be manufactured in accordance with ANSI/AWWA Standard C-110/A21.10 and NAPF 200, latest revision.

2. PRODUCT

- a) Standard class 125 flanged fittings shall have a minimum pressure rating of 250 psi. Flanges shall be round type, faced and drilled and shall conform to ANSI B16.1 for cast-iron or bronze pipe flange Class 125.

- b) The joints shall be flanged in accordance with ANSI/AWWA C-110/A21.10 and NAPF 200, latest revision. All necessary hex-head bolts and nuts, and full-faced gaskets for each joint shall be furnished as a Flange Accessory Package and shall conform to ANSI B18.2.2; threads shall be manufactured in accordance with ANSI B1.1. Bolts and nuts shall be high-strength, low-alloy steel such as "Corten", "Usalloy", or "ACIPalloy". Bolt circle and bolt holes shall be drilled and faced to match American National Standard Institute (ANSI) B16.1, Class 125 Flanges.
- c) All standard class 125 flanged fittings shall have a standard thickness cement mortar lining and shall be seal coated in accordance with AWWA Standard C-104, latest revision.

3. QUALITY CONTROL AND TESTING

- a) All standard class 125 flanged fittings shall meet or exceed all test standards set forth in AWWA C-110.
- b) When submitting for approval of standard class 125 flanged fittings not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the standard class 125 flanged fittings may be rejected at the sole option of the City.

4. MANUFACTURER

Standard class 125 flanged fittings shall be manufactured by U.S. Pipe and Foundry Co., American Ductile Iron Pipe, PCI, Tyler-Union, Sigma, or approved equal.

W-48 ELECTROFUSION SOLID COUPLINGS

1. GENERAL

Electrofusion solid couplings shall be used for joining similarly sized sections of HDPE pipe to one another. They will consist of one (1) electrofusion solid coupling.

2. PRODUCTS

- a) The coupling shall be sized to fit 4" to 14" HDPE pipe or 1" or 2" CTS HDPE tubing.
- b) The electrofusion coupling shall be an injection molded fitting designed and manufactured in accordance with ASTM F-1055 and shall meet all provisions of AWWA C906, latest revision. Resin used to produce the coupling shall be virgin, pre-blended resin with a cell classification of 445474C and a PPI listing of PE4710. The resin will comply with ASTM D 3350 and meet or exceed the requirements of NSF 61.
- c) The electrofusion coupling shall incorporate as part of its design a constant 40 volt fusion coil for the purpose of joining the fitting onto the outer pipe wall.

- d) Installation of the coupling shall utilize a reusable restraining device to hold the coupling in place during the fusion process
- e) The electrofusion couplings shall be of no-leak design.

3. QUALITY CONTROL AND TESTING

When submitting for approval of electrofusion solid couplings not listed in Section 4, the Contractor shall include drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the tapping tee may be rejected at the sole option of the City.

4. MANUFACTURER

All electrofusion couplings shall be manufactured by Central Plastics Company of Shawnee, Oklahoma or approved equal.

W-49 ELECTROFUSION TAPPING TEES

1. GENERAL

Electrofused tapping tees shall be used for tapping water HDPE distribution pipe, tubing to provide a connection for customer's water meters, air release valve connections and temporary water quality sampling points. They shall consist of a single unit made of one (1) electrofusion self-tapping tee and one (1) electrofusion coupling.

2. PRODUCTS

- a) The base section for each coupling shall be sized to fit 4" to 14" HDPE pipe or 2" HDPE tubing. The branch section for each coupling shall be sized to 1" or 2" CTS HDPE tubing.
- b) The electrofusion self-tapping tee shall be an injection molded fitting designed and manufactured in accordance with ASTM F-1055 and shall meet all provisions of AWWA C906, latest revision. Resin used to product the electrofused tee shall be pre-blended, virgin resin with a cell classification of 445474C and a PPI listing of PE4710. The resin shall comply with ASTM D 3350 and meet or exceed the requirements of NSF 61.
- c) The electrofusion self-tapping tee shall incorporate as part of its design a self-contained brass cutter that will retain the pipe coupon after tapping the pipe. It shall also incorporate a constant 40 volt fusion coil for the purpose of joining the fitting onto the outer pipe wall.
- d) Installation of the self-tapping tee shall utilize a metal, reusable under clamp to hold the fitting in place until the electrofusion process is complete.
- e) The tapping tee shall be of no-leak design.

3. QUALITY CONTROL AND TESTING

When submitting for approval of a tapping tee not listed in Section 4, the Contract shall include drawings and brochures that clearly indicate size, dimensions, weights performance standards, etc. If this documentation is omitted, the tapping tee may be rejected at the sole option of the City.

4. MANUFACTURER

All electrofusion tapping tees shall be manufactured by Central Plastics Company of Shawnee, Oklahoma or approved equal.

W-51 ELECTROFUSION CORPORATION SADDLES

1. GENERAL

Electrofused corporation saddles shall be used for tapping HDPE water distribution pipe and tubing to provide water meter service lines, air release points and temporary connections for water quality sampling points. They will consist of a single unit made of one (1) injection molded fitting base and one (1) female threaded outlet ring.

2. PRODUCTS

- a) The base section for each corporation shall be sized to fit 4" to 12" HDPE pipe or 2" HDPE tubing. The threaded outlet ring for each corporation shall be sized with tapered CC threads to fit a 3/4", 1", 1-1/2" or 2" brass corporations.
- b) The electrofusion corporation saddle shall be an injection molded fitting base designed and manufactured in accordance with ASTM F-1055. Resin used to produce the electrofused tee shall be pre-blended virgin resin with a cell classification of 445474C and a PPI listing of PE4710. The resin will comply with ASTM D 3350 and meet or exceed the requirements of NSF 61.
- c) The electrofusion corporation saddle shall incorporate as part of its design a brass 360 alloy threaded outlet that is restrained with a stainless steel 304 compression ring. It will also incorporate a constant 40 volt fusion coil for the purpose of joining the fitting onto the outer pipe wall.
- d) Installation of the electrofusion corporation saddle shall utilize a metal, reusable under clamp for main sizes 2" through 6" to hold the fitting in place until the electrofusion process is complete. Installation of the electrofusion corporation saddle shall utilize a top loading fitting clamp for 8" main sizes to hold the fitting in place until the electrofusion process is complete.
- e) The electrofusion corporation saddle shall be of no-leak design and shall be designed for use on DIP-sized pipe.

3. QUALITY CONTROL AND TESTING

When submitting for approval of an electrofusion corporation saddle not listed in Section 4, the Contractor shall include drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the electrofusion corporation saddle may be rejected at the sole option of the City.

4. MANUFACTURER

All electrofusion corporation saddles shall be manufactured by Central Plastics Company of Shawnee, Oklahoma or approved equal.

W-60 FIRE HYDRANT ASSEMBLY

1. GENERAL

This section includes all hydrants to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all hydrant assemblies unless exceptions are shown or stated on the plans or specific provisions.

2. PRODUCT

a) Pipe

- i) See *Ductile Iron Pipe* Specifications

b) Valve

- i) See *Valve* Specifications

c) Fittings

- i) See *Fittings* Specifications

d) Hydrant

- i) Hydrants shall have a 5¼-inch main valve opening. The main valve shall be of compression-design and shall open against and closing with pressure. The hydrant shall comply with the requirements of Associates Factory Mutual Insurance Companies and have the "FM" symbol cast into the barrel. The hydrant shall be listed with Underwriter's Laboratories. Hydrants shall open by turning the operating nut counterclockwise.
- ii) The hydrant shall be provided with a breakable traffic feature designed so that the nozzle section of the hydrant can be rotated a full 360 degrees. Break couplings shall be made of cast iron, epoxy coated steel, or forged stainless steel. The lower barrel and shoe shall be made of ductile iron, manufactured in accordance with AWWA C-502, latest revision.
- iii) All hydrants shall have two 2½-inch bronze nozzles, 180 degrees apart, and one 4½-inch bronze nozzle. All nozzle centerlines shall be at the same elevation. Nozzle outlet threads to be National Standard fire hose coupling screw thread, as described in Appendix A of AWWA C-502. After being coated with an approved

anti-seize compound as specified herein, hydrant nozzle shall thread or twist-lock into the hydrant nozzle section; a locking device secures the nozzle. Cast iron or ductile iron nozzle caps provided, with gaskets; nozzle cap nut configuration matches hydrant operating nut. Chains are not provided on nozzle caps.

- iv) Hydrant design shall be such that removal of the seat valve drain mechanism, internal rod and all working parts can be accomplished through the top of the hydrant without disturbing the ground-line joint or nozzle section. The shoe inlet shall be mechanical joint, in accordance with AWWA C-111, latest revision. The interior of the shoe and (and upper and lower valves plates, if utilized in design) shall be epoxy-coated in accordance with AWWA C550, latest revision. Accessory kits shall be provided with MJ bolts and nuts and gasket. Mechanical joint nuts and bolts to be manufactured of high-strength, low-alloy steel equal to or better than "Cor-Ten". Main valve gasket and mechanical joint (MJ) gasket made of EPDM.
- v) All above-ground external bolts, studs, and nuts made of low-zinc bronze or stainless steel. Below-ground bolts, studs and nuts shall be made of high-strength, low-alloy steel as specified herein, or of stainless steel. When bolts are used at the break coupling, they shall not be frangible.
- vi) Unless the operating rod is made of stainless steel, the rod shall be sheathed where it passes through a double O-ring seal, sealing the operating threads from the water in the hydrant at all times when the valve is in the open or closed position. Another O-ring shall prevent water from passing between the operating shaft and the sheath. Downward travel of the operating rod and valve assembly shall be controlled by a travel stop device (located in the bonnet only), to prevent the bottom of the main valve from making contact with the epoxy coating of the shoe. Travel stop devices located on the bottom of the operating rod are not acceptable. Bronze operating nuts shall be fully covered with a cast iron or ductile iron weather shield and shall have at least one anti-friction thrust washer to reduce the operating torque when opening the hydrant. The hydrant's bronze main valve seat ring shall thread into a bronze sub-seat or drain ring. The drain outlet for the hydrant shall be eliminated as part of the casting or machining process.
- vii) Hydrant operating threads shall be lubricated with anti-seize compound paste upon assembly. Approved anti-seize compounds are Bostik Never-Seez food-grade (888-603-8558), or Permatex part #82448 (food-grade anti-seize compound). (877-376-2839), or MobilGrease FM102 (food-grade). Approval for other anti-seize compounds shall be requested in writing to the Tampa Water Department, accompanied with a Material Safety Data Sheet from the manufacturer of the compound for review. Anti-seize compound shall not contain any heavy metals.
- viii) When the hydrant is tested for head-loss as described in AWWA C502, Section 5, latest revision, the maximum head-loss shall not exceed 2.5 psi when flowing at 1000 gpm through the 4 ½-inch nozzle.
- ix) Hydrant coatings shall be as specified in AWWA C502 Section 4.02. Additionally, above-ground exterior hydrant coatings shall be minimum 4 mil Dry Film Thickness white primer coating, compatible with Porter high-grade enamel final paint to be applied in the field. Color will be specified by inspector.
- x) If manufacturer uses locking keys to secure the lower barrel to the shoe, all locking keys to be fully coated with a Water Department approved anti-seize compound applied upon assembly

3. QUALITY CONTROL AND TESTING

- a) Pipe

- i) See *Ductile Iron Pipe* Specifications
- e) Valve
 - i) See *Valve* Specifications
- f) Fittings
 - i) See *Fittings* Specifications
- g) Hydrant
 - i) The following shall be provided upon request of the Engineer:
 - (1) Certified affidavit from an officer of the manufacturer that hydrant conforms to AWWA C502, latest revision, and these specifications.
 - (2) Certified test results from an independent testing laboratory indicating that the hydrant conforms to Section 2.8 of this specification.
 - (3) Certification of Underwriter's Laboratories listing.
 - (4) Certification of compliance with Associates Factory Mutual Fire Insurance Companies specifications.

2) **MANUFACTURER**

- a) Pipe
 - i) See *Ductile Iron Pipe* Specifications
- b) Valve
 - i) See *Valve* Specifications
- c) Fittings
 - i) See *Fittings* Specifications
- d) Hydrant
 - i) Hydrants shall be assembled and tested in their entirety within the United States of America or its territories. The manufacturer of hydrants shall have continuously manufactured, catalogued, sold, and had in service the hydrants in the size proposed for a minimum of five years.

Hydrants shall be manufactured by American (Darling B-84-B 5¼), U.S. Pipe (Metro 250 M94, 5 ¼), Kennedy (Guardian K81-D, 5¼), American AVK (Series 2780, Nostalgic, 5¼), or approved equal.

W-70 TAPPING SLEEVES

(Steel, "O-Ring" Type)

1. GENERAL

Tapping sleeves (steel/"O-ring" type) shall be constructed of high strength steel and shall be manufactured in accordance with ASTM A285. Steel tapping sleeves shall be suitable for tapping ductile iron pipe, C-900 PVC pipe, and all pipe manufactured in accordance with ANSI A21 Standards, AWWA, and these specifications.

2. PRODUCT

- a) All tapping sleeves (steel or "O-ring" type) shall be split sleeve design; one half shall contain the outlet hub, gasket and tapping flange; the other half shall form the back. A ¾" NPT test plug shall be provided on the outlet throat of the sleeve for pressure testing the sealed sleeve at 150 psi prior to tapping the pipe. All tapping sleeves shall allow a full-size cutting head to pass through the outlet of the hub.
- b) All bolts and nuts joining the two halves of the sleeve shall be high strength, low alloy steel, such as Cor-Ten, in accordance with AWWA C-111, latest revision.
- c) All tapping sleeve connection flanges shall be a Class 125 flanged joint, conforming to AWWA C207 Class D, ANSI 150 lb. with a counter bore per MSS SP-60 dimensions.
- d) Tapping sleeves shall seal to the pipe by the use of a confined "O-ring" gasket around the tap opening between the sleeve and pipe or by a full circumferential gasket between the sleeve and pipe. Gasket shall be made of EPDM rubber.
- e) All steel tapping sleeves shall be finished with fusion-bonded epoxy coating both inside and outside, in accordance with AWWA C-550, latest revisions.

3. QUALITY CONTROL AND TESTING

When submitting for approval tapping sleeves ("O-ring" type) not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc., which completely substantiates the tapping sleeves compliance with this specification. If this documentation is omitted, the tapping sleeves may be rejected at the sole option of the City.

4. MANUFACTURER

Tapping sleeve (steel/"O-ring" type) manufactures shall be domestically assembled. Tapping sleeves (steel/"O-ring" type) shall be manufactured by JCM 412, Smith Blair 622, Ford Meter Box FTSC, Dresser 610, Mueller H615, U.S. Pipe T9, or approved equal.

W-70 TAPPING SLEEVES

(Steel, "O-Ring" Type)

1. GENERAL

Tapping sleeves (steel/"O-ring" type) shall be constructed of high strength steel and shall be manufactured in accordance with ASTM A285. Steel tapping sleeves shall be suitable for tapping ductile iron pipe, C-900 PVC pipe, and all pipe manufactured in accordance with ANSI A21 Standards, AWWA, and these specifications.

2. PRODUCT

- a) All tapping sleeves (steel or "O-ring" type) shall be split sleeve design; one half shall contain the outlet hub, gasket and tapping flange; the other half shall form the back. A ¾" NPT test plug shall be provided on the outlet throat of the sleeve for pressure testing the sealed sleeve at 150 psi prior to tapping the pipe. All tapping sleeves shall allow a full-size cutting head to pass through the outlet of the hub.
- b) All bolts and nuts joining the two halves of the sleeve shall be high strength, low alloy steel, such as Cor-Ten, in accordance with AWWA C-111, latest revision.
- c) All tapping sleeve connection flanges shall be a Class 125 flanged joint, conforming to AWWA C207 Class D, ANSI 150 lb. with a counter bore per MSS SP-60 dimensions.
- d) Tapping sleeves shall seal to the pipe by the use of a confined "O-ring" gasket around the tap opening between the sleeve and pipe or by a full circumferential gasket between the sleeve and pipe. Gasket shall be made of EPDM rubber.
- e) All steel tapping sleeves shall be finished with fusion-bonded epoxy coating both inside and outside, in accordance with AWWA C-550, latest revisions.

3. QUALITY CONTROL AND TESTING

When submitting for approval tapping sleeves ("O-ring" type) not listed in Section 4, include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc., which completely substantiates the tapping sleeves compliance with this specification. If this documentation is omitted, the tapping sleeves may be rejected at the sole option of the City.

4. MANUFACTURER

Tapping sleeve (steel/"O-ring" type) manufacturers shall be domestically assembled. Tapping sleeves (steel/"O-ring" type) shall be manufactured by JCM 412, Smith Blair 622, Ford Meter Box FTSC, Dresser 610, Mueller H615, U.S. Pipe T9, or approved equal.

W-71 TAPPING SLEEVES

(Mechanical Joint)

1. GENERAL

Tapping sleeves (mechanical joint) shall be constructed of ductile iron. All tapping sleeves shall be suitable for tapping cast iron, ductile iron pipe, C-900 PVC pipe, and all pipe manufactured in accordance with ANSI A21 Standard, AWWA, and these specifications.

2. PRODUCT

- a) Tapping sleeves shall be of the split sleeve design; one half shall contain the outlet hub, gasket, and tapping flange; the other shall form the back of the sleeve. A ¾" NPT test plug shall be provided on the outlet throat of the sleeve for pressure testing the sealed sleeve at 150 psi prior to tapping the pipe. All tapping sleeves shall allow a full-size cutting head to pass through the outlet of the hub.
- b) Tapping sleeves shall be constructed of ductile iron and shall be manufactured in accordance with ASTM A536.
- c) All bolts and nuts joining the two halves of the sleeve shall be high strength, low alloy steel, such as Cor-Ten, in accordance with AWWA C-111, latest revision.
- d) Tapping sleeve connection flanges shall conform to AWWA C-110/ANSI B16.1 Class 125 with counter bore per MSS SP-60 dimensions.
- e) Mechanical joint tapping sleeves shall form a mechanical joint at each end of the sleeve after bolting the halves together. The sleeve shall then be sealed to the pipe by assembling the mechanical joint using split gaskets and follower glands.
- f) All ductile iron sleeves shall have an outside bituminous coating in accordance with AWWA C-110, latest revision.
- g) End and side gaskets shall be made of EPDM rubber.

3. QUALITY CONTROL AND TESTING

When submitting for approval of tapping sleeves (mechanical joint) not listed in Section 4, of this specification include manufacturer drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the tapping sleeves (mechanical joint) may be rejected at the sole option of the City.

4. MANUFACTURER

Tapping sleeve (mechanical joint) shall be domestically assembled. Tapping sleeves (mechanical joint) shall be manufactured by U.S. Pipe Mechanical Joint Tapping Sleeve, Mueller Co. H-615, American Flow Control or approved equal.

W-80 METER SET ASSEMBLY

1. GENERAL

This section includes all meters to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all meters unless exceptions are shown or stated on the plans or specific provisions.

2. PRODUCTS

a) Meter laterals

- i) See *HDPE Tubing* specification

b) Curb and Corporation Stop

- i) See *Brass Fittings* specification

c) Meter

- i) Shall be capable of operating at 150 psi

- ii) The unit of measure shall be in 100 Cubic Feet (ccf)

- iii) Shall have a life expectancy of 20 years

- iv) Shall be magnetic-driven, positive displacement meters of the flat nutating disc type

- v) All meters must be adaptable to a field programmable absolute encoder register without interruption of the customer's service.

- vi) All main case bolts shall be of 300 series non-magnetic stainless steel to prevent corrosion.

- vii) End connections for 1½" and 2" meters shall be either spud type in accordance with ANSI 1.20.1 or oval flange type with gaskets at the City's option.

- viii) Numerals on odometer shall be black on white background except for the two right most numerals which shall be white on black background.

ix) Direct Read Standard Register

- (1) The register shall be of the straight reading sealed magnetic drive type and shall contain six (6) numeral wheels.

- (2) Registers must be hermetically sealed.

- (3) All direct reading register cups shall be copper to prevent corrosion and be covered with a high strength, impact resistant flat glass lens to prevent breakage.

- (4) The lens shall be positioned above the register box to allow for run-off of debris. The register lid shall overlap the register box to protect the lens.
- (5) Registers shall have a bronze or synthetic polymer register box enclosure with the manufacturer's serial number imprinted on top of a hinged reading lid.
- (6) All registers shall have the size, model and date of manufacture stamped on the dial face. The dial shall have a red center sweep hand and shall contain one hundred (100) equally divided graduations at its periphery.
- (7) The register must contain a low flow (leak detection) indicator with a 1:1 ratio to disc nutations to provide leak detection.
- (8) Registers shall be secured to the maincase by means of a plastic tamper-proof seal to allow for inline service replacement. Register seal screws are only accepted when supplied with attached sealing wire to at least one bottom cap bolt with seal wire holes of not less than 3/32" in diameter.
- (9) Registers shall be guaranteed for at least ten (10) years. All meters will be guaranteed for one year on material and workmanship.

x) Measuring Chamber

- (1) The measuring chamber shall be of a two-piece snap-joint type with no fasteners allowed. The chamber shall be made of a non-hydrolyzing synthetic polymer.
- (2) The control block shall be the same material as the measuring chamber and be located on the top of the chamber. The control block shall be located after the strainer.
- (3) The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an "O" ring gasket.
- (4) The flat nutating disc shall be a single piece made from non-hydrolyzing synthetic polymer and shall contain a type 316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller located within the disc slot. The thrust roller head shall roll on the buttressed track provided by the diaphragm.

d) Meter Box & Covers

- i) Water meter boxes ("Meter Boxes") and covers ("Covers) shall be manufactured in accordance with these specifications. Covers provided shall be designed to withstand incidental traffic or heavy traffic ("extra-heavy") loading.
- ii) Meter boxes and covers provided shall be in accordance with City of Tampa Water Department "Standard Details" for meter boxes (see Std. Details 5.10A, 5.11A, 5.12A & 5.13).
- iii) Meter boxes and covers provided for potable water service shall be black in color.
- iv) Meter boxes and covers provided for reclaimed water (RCW) service shall be colored Pantone purple. Covers for RCW meter boxes shall include "NO BEBER", and the universal symbol for DO NOT DRINK [the glass with a line (or "x") through it].

e) Meter Boxes

- i) Meter boxes shall be LLD- or HD-polyethylene of one-piece molded construction, with dimensions as shown in the referenced drawings. The boxes shall be designed to meet the requirements for AASHTO Incidental Traffic H-10 loading.
- ii) All edges shall be clean and smooth for safety during handling. Exterior wall shall be of smooth finish, black in color, and have ultraviolet degradation protection properties for above ground storage (except reclaimed water meter boxes shall be purple). Interior wall shall be of smooth finish and black or white color (except reclaimed water meter boxes shall be purple).
- iii) Meter boxes shall not exceed 25 lbs. in weight, shall have pre-cut pipe entry areas, and be designed to be securely stackable.

f) Meter Box Covers

Meter box covers shall:

- i) be made of modified polyethylene or bulk molded compound composite material to prevent floating in high water conditions; be one-piece molded construction, with dimensions and lettering as shown in the referenced meter box Std. Detail drawings;
- ii) be designed to meet the requirements for AASHTO Incidental Traffic H-10 loading;
- iii) be “anti-float”, demonstrated by having a specific gravity >1.0 gm/cm³ (ASTM D792);
- iv) include snap-lock pockets (slide mounts) on the underside to receive an AMR/AMI device endpoint. Snap-lock slot shall be of size sufficient to allow for a finger force install of an AMI transmitter, and pocket height shall be sufficient to allow a minimum 1/8” air gap;
- v) include minimum #3 rebar or other tested and proven means of enabling magnetic location of the cover when it is buried;
- vi) be sized to fit the appropriate Brooks Products, Inc., Orlando, Florida concrete meter boxes, numbers 36, 37, 66 and Dual H:

Description	¾" Dual	¾" or 1" Single	1½"-2" Single	Dual w/BFP
Meter Box Type	Dual H	#37	#66	13 x 24
Meter Box Cover	16-9/16" x 14-	18-1/8" x 11-1/4"	30-1/2" x 17-1/2"	13 ¾" x 23 ¼"

- vii) Composite covers shall have a minimum coefficient of friction of >0.5 (ASTM 1028), to prevent pedestrian slip hazard.
- viii) Polyethylene covers shall have a molded tread-pattern for skid resistance.
- ix) “Extra-heavy” covers provided shall be designed to meet the requirements for AASHTO Full Traffic H-20 loading.

3. QUALITY CONTROL AND TESTING

a) Laterals

i) See *HDPE Tubing* specification

b) Curb and Corporation stop

i) See *Brass Fittings* specification

c) Meter

i) Brass shall meet SDWA Section 1417 lead free requirements and comply with NSF/ANSI Standard 61.

ii) Must provide documentation of compliance with NSF/ANSI Standard 61. Certification of meter compliance to the NSF performance standard shall be by NSF, UL, or any other ANSI-accredited laboratory.

iii) To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700.

iv) Markings on the upper portion of the casing shall be cast raised and shall indicate size, model, direction of flow, and NSF 61 certification.

v) Shall conform to AWWA Standard C700 (latest revision)

vi) Shall be manufactured in a ISO 9001 facility

d) Meter Box Cover

i) All covers must offer a minimum of a full 10-year warranty against defects, breakage, etc., under normal use conditions.

ii) All HDPE “standard” meter box covers shall be designed to meet the requirements for AASHTO Incidental Traffic H-10 loading. All HDPE “extra-heavy” covers shall meet the requirements for AASHTO Full Traffic H-20 loading.

iii) All covers shall have UL/FM approvals.

4. MANUFACTURER

a) Laterals

i) See *HDPE Tubing* specification

b) Curb and Corporation stop

i) See *Brass Fittings* specification

c) Meter

- i) Meters and meter parts shall be manufactured, assembled, and tested within the United States. Manufacturers may be required to provide proof of where and what percentage of the meter register, chamber, and maincase is manufactured in the United States. Manufacturers shall have a minimum of fifteen (15) years of field and production experience with all sizes and models provided.

d) Meter Box & Covers

Water meter boxes and meter box covers provided shall be equal to or better than:

i) Meter Boxes:

- (1) DFW Plastics, models: DFW37C-12-BODY; DFW39C-12-BODY; DFW1730CH-12-BODY; DFW1324C-12-BODY (for RCW boxes, insert a 5 after the “C” or “CH” in the model name)
- (2) 1015-12 Oldcastle Enclosure Solutions, models: CFXL (#36); 1118-12 BCFXL (#37); 1416-12 BCFXL (Dual); 1730-12 BCFXL (#66); 1324-12 BCFXL (Dual Meter & w/BFPs).

ii) Meter Box Covers:

- (1) DFW Plastics, models: DFW37C-AF1EA TPA-LID; DFW39C-AF1EATPA-LID; DFW1730C-AF1EA TPA LID; DFW1324C-AF1EA TPA-LID (for DFW RCW covers, change the 1 to a 5 in the model name)
- (2) Oldcastle Enclosure Solutions “Fibrelyte”, models: FL9X (36), FL12 (37), FL1416 (Dual), FL36 (66), FL30 (Dual BFP)

W-90 BLOW-OFF ASSEMBLY

1. GENERAL

This section includes all blow-off assemblies to be owned and maintained by the City of Tampa Water Department. Requirements of this section apply to all blow-off assemblies unless exceptions are shown or stated on the plans or specific provisions.

Blow-off assemblies shall be used to remove sediments and stagnant water from non-looping or dead-end water lines.

2. PRODUCT

- a) There are two approved Std. Construction Details for blow-off assemblies - one for four-inch and larger pipe, the second for two-inch pipe.
- b) The Contractor shall furnish all parts for the complete assembly, including but not necessarily limited to gate valves, hydrant adapters, meter boxes, valve boxes, caps or plugs on the water main, a cap on the hydrant adapter, one MJ restraining device or MJ adapter for the cap or plug on the main and all related appurtenances.
- c) The outlet shall have 2-1/2-inch fire hydrant threads and a cap.
- d) Blow-Off Assembly for 4-Inch and Larger Pipe

- i) Blow-off assembly shall connect to the end of the existing pipe through a tapped plug or cap. A two-inch corporation shall be threaded into the tapped cap/plug. Two-inch HDPE tube shall run from the two-inch corporation to a two-inch gate valve.
 - ii) The gate valve shall have a standard operating nut and have a standard valve box, brought to grade in conformance with the appropriate standard detail.
 - iii) Two-inch HDPE tubing shall run from the gate valve and terminate in 2-1/2-inch NST by 2-inch MIP brass hydrant adapter. The adapter shall have a threaded cap and shall be placed in a #37 meter box, set to grade.
- e) Blow-Off Assembly for 2-Inch Pipe
- i) A two-inch gate valve shall be installed on the two-inch pipe.
 - ii) The gate valve shall have a standard operating nut and have a standard valve box, brought to grade, in conformance with the appropriate standard detail.
 - iii) Two-inch HDPE tubing shall run from the gate valve and terminate in 2-1/2-inch NST by 2-inch MIP brass hydrant adapter. The adapter shall have a threaded cap and shall be placed in a #37 meter box, set to grade.

3. QUALITY CONTROL AND TESTING

None specified. The installation shall conform to the appropriate Standard Detail.

4. MANUFACTURER

None specified. The installation shall conform to the appropriate Standard Detail.

W-110 LINE STOPS (4"-42")

1. GENERAL

Line stops shall be used to isolate sections of water mains in order to keep customers in service during water main tie-ins, water main repairs and to compensate for broken valves. The water mains shall remain under pressure during the installation and use.

Line stops shall be constructed of ductile iron or stainless steel (carbon steel is acceptable subject to Engineer approval). All line stop bodies shall be suitable for tapping cast iron, asbestos cement pipe (12" and smaller), ductile iron pipe, C-900 PVC pipe, and all pipe manufactured in accordance with ANSI A21 Standard, AWWA, and these specifications. Line stops on asbestos cement pipe, on pipe greater than 8" and on pipe with taps the same size shall be mechanical joint.

Line stops (steel/"O-ring" type) shall be constructed of high strength steel and shall be manufactured in accordance with ASTM A285. Line stops shall be suitable for tapping ductile iron pipe, C-900 PVC pipe, and all pipe manufactured in accordance with ANSI A21 Standards, AWWA, and these specifications.

2. PRODUCT

- a) Line stop fitting shall be full encirclement, pressure retention type split tee. It shall consist of two segments – an upper flange saddle plate and a lower saddle plate. All bodies shall have a ¾” NPT test plug to verify all seals are secure prior to tapping. Cover plate gasket shall be EPDM. Completion plug O-ring shall be EPDM. Gasket shall be molded from elastomer compounds that resist compression setting and are compatible with water in the 32 to 120 deg. F temperature range.
- b) Line stop sleeve shall have a full-circle rubber gasket and a flanged outlet for bolting to the line stop tapping valve. Sealing may be accomplished by either split end gaskets and mechanical joint ends or a single rubber gasket around the tap opening.
- c) Nuts-and-bolts shall be stainless steel.
- d) Outlet flange shall be ductile iron, stainless steel, or machined from a 150 lb. forged steel flange (ASTM A181 or A105) or from pressure vessel quality steel plate (ASTM A285, Grade C), be flat-faced and drilled per ANSI B16.5

3. QUALITY CONTROL

- a) Catalogs and manufacturer data shall be provided as required by the Engineer. The catalogs and maintenance data shall contain sufficient detail to serve as a guide in the line stop installation and the ordering of repair parts.
- b) The Water Department may request samples of proposed line stops. Samples shall be supplied and/or returned to the Contractor at the Contractor's expense.
- c) Failure to submit samples within 10 calendar days after the date of a written request shall result in rejection of that item.
- d) The sleeves shall be rated at 150 psi hydrostatic with a test pressure of 200 psi. And maintain zero leakage at all times.

4. MANUFACTURER

Line stops shall be domestically assembled equivalent to or better than Advanced Valve Technologies EZ Valve II, Hydra-Stop, JCM 440 Line Stop, or approved equal.

W-130 POLYETHYLENE ENCASEMENT

1. GENERAL

Polyethylene encasement shall conform to the requirements of ANSI/AWWA C-105/A21.5 Method A and shall be 8-mil thick. Polyethylene encasement shall be installed on all buried ductile iron pipe, fittings, valves, and appurtenances where shown on the drawings or as directed by the Water Department as dictated by field conditions. It shall be blue in color.

2. PRODUCT

The raw material used to manufacture polyethylene encasement shall be Type 1, Class A Grade E-1 in accordance with ASTM D-1248

The polyethylene encasement shall meet the following test requirements:

- Tensile Strength → 1200 psi minimum
- Elongation → 300% minimum
- Dielectric Strength → 800 V/Mil thickness, minimum
- Thickness → 0.008" (8-mils minimum nominal, with minus tolerance < 10% of nominal)
- Melt Index → 0.4 maximum

3. QUALITY CONTROL AND TESTING

When submitting for approval polyethylene not listed in Section 4, manufacturer shall include drawings and brochures that clearly indicate size, dimensions, weights, performance standards, etc. If this documentation is omitted, the polyethylene may be rejected at the sole option of the City.

4. MANUFACTURER

All polyethylene encasement shall be domestically manufactured.

W-131 LOCATING (TRACER) WIRE & BOXES

1. GENERAL

All tracer wire installed shall be insulated, blue coated, solid UF (Underground Feeder per National Electric Code Article 339) copper tracer wires for water main location purposes by means of an electronic line tracer.

Curb stop boxes ("boxes") shall be provided to house the ends of tracer wires installed along a pipe and shall be installed directly over the pipe the wire is tracing. Tracer wire ends shall terminate in the curb stop box such that they can be accessed and charged to facilitate locating the buried pipe. Boxes installed in roadways shall be suitable for installation in areas subject to heavy vehicle traffic loading (be H-20 rated) and shall have cast iron rims. Boxes installed out of roadway or sidewalk shall be installed within reinforced concrete pads poured around valve boxes per the Standard Details, or in a separate 12"x12" (min.) x 6" reinforced concrete pad.

2. PRODUCT

- a) Tracer wire for direct bury installations shall be approved insulated copper clad steel (CCS) wire. Wire insulation shall be minimum 30 mil high-density, high molecular weight polyethylene (HDPE) colored to meet the APWA color code standard for identification of buried utilities. Conductor must be at 21% minimum conductivity for locate purposes, and be able to withstand a minimum 450 lb. break load.
- b) Sizes (gauges) for direct bury pipe tracer wire shall be as follows:
 - i) 16-in. and larger ductile iron pipe: 10 AWG
 - ii) PVC pipe: 12 AWG
 - iii) Long-side meter service line (direct bury and directional drilled): 12 AWG
 - iv) Tracer wire for directional drilled or bored-in pipe shall be approved insulated **10 AWG** copper clad steel wire insulated with 45 mil, high-density, high molecular weight polyethylene (HDPE), and rated for direct burial use at 30 volts minimum. Conductor must be at 21% minimum conductivity for locate purposes, and be able to withstand a minimum 1150 lb. break load.
 - v) Tracer wire for Pipe Bursting shall be approved insulated copper clad steel wire, insulated with a 50 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts minimum. Conductor must be at 21% minimum conductivity for locate purposes, and be able to withstand a minimum 4700 lb. break load.
 - vi) Wire splices shall be with wire connectors suitable for buried service (i.e., be corrosion and moisture-proof).
 - vii) Stop boxes shall include locking lids lettered with "WATER" and shall be blue in color. All stop boxes shall be manufactured of high impact ABS plastic; cast iron roadway rims shall exceed ASTM A-48 Class 30. All stop boxes shall consist of a telescoping top and bottom section, with flared or square bottom to prevent settling or pull out of the box.

3. MANUFACTURER

Manufacturer shall be as indicated below or approved equal.

- a) Tracer wire shall be:
 - i) for direct bury pipe: Copperhead High Strength Tracer Wire, or Pro-Trace High-Flex Copper-clad Steel (HF-CCS) PE45
 - ii) for directional drilled pipe: Copperhead SoloShot™ extra-high-strength copper-clad steel (EHS-CCS)
 - iii) for pipe bursting: Copperhead Industries SoloShot™ Xtreme, 7x7 stranded Copper Clad Steel

- b) Wire splices for tracer wire shall be: DBR Kit (by 3M), Snakebite (by Copperhead Industries)
- c) Tracer wire boxes shall be: Bingham & Taylor Cathodic Protection Test Boxes (model P200NFG for non-roadway applications, P4HHD for roadway applications)

W-140 ASPHALTIC CONCRETE

1. GENERAL

Follow the latest FDOT standards Road and Bridge Construction for all asphaltic concrete including but not limited to pay items 9205 & 9207.

2. QUALITY CONTROL AND TESTING

The Contractor will be responsible for providing copies of all necessary plant production tests. The Contractor will be responsible for retesting of any failed sections. The contractor is responsible for all materials testing in section W-171.

W-141 BASE MATERIAL

1. GENERAL

Follow the latest FDOT standards Road and Bridge Construction for all base material.

2. QUALITY CONTROL AND TESTING

The Contractor will be responsible for retesting of any failed sections. The contractor is responsible for all materials testing in section W-171.

W-150 CONCRETE

1. GENERAL

Follow the latest FDOT standards Road and Bridge Construction referencing section 346 for sidewalk, curb and gutter, driveways, and any other associated flat work.

2. QUALITY CONTROL AND TESTING

The Contractor will be responsible for retesting of any failed sections. The contractor is responsible for all materials testing in section W-171.

W-160 ROOT PRUNING

1. GENERAL

The Contractor shall make provisions for tree protection to the satisfaction of the Engineer prior to any excavation. All applicable site inspections by the Planning and Development Department, and permits, shall be obtained prior to commencing work.

The Contractor shall provide root pruning services as directed by the Engineer.

2. PERFORMANCE OF WORK

All root pruning shall be performed by a qualified, licensed tree professional as approved by the Engineer.

All roots designated to be removed shall be severed leaving a smooth, uniform section at the remaining root end to prevent root damage.

Root pruning shall be performed with a chain saw, Dosco root pruner, or equal, as approved by the Engineer.

Root pruning shall not occur within 6 feet of the base of the tree without guidance from Planning and Development Department staff, and no excavation shall occur inside the circumference of the root-pruned area.

W-170 RESTORATION

1. GENERAL

- a) The various street surfaces disturbed, damaged, or destroyed during the performance of the work under this Contract shall be restored and maintained as shown, specified, and directed. Included in this classification are permanent pavement surfaces of all types, pavement bases, curb, curb and gutter, alleys, driveways, and sidewalks.
- b) Service boxes, manhole frames and covers, and similar structures not conforming to the new work shall be set to established grade at the Contractor's expense, and no separate payment will be made therefor.
- c) All portland cement and asphaltic concrete pavements shall be removed in rectangular sections with sawed vertical cuts, or to existing joints, or as directed by the Engineer. Asphaltic concrete pavements and concrete pavement shall be saw cut parallel perpendicular straight line or as directed by the Engineer. The edges shall be trimmed to which a roller may follow. Where reinforced concrete pavement is removed, one foot of existing reinforcement on each side of the excavation shall be left exposed and tied to the replaced reinforcing steel.

2. TEMPORARY RESTORATION

- a) Upon completion of backfilling, the street or sidewalk surface damaged or destroyed shall be promptly placed in condition for safe temporary use. Temporary work shall be maintained in a suitable and safe condition for traffic and pedestrians until the permanent pavement is laid, or until final acceptance of the work.
- b) Pavement surfaces shall be temporarily restored by placing thereon, to proper line, grade and transverse profile, a layer or layers of compacted base material, as specified, conforming to all requirements regarding configuration, thickness, and density as detailed in the Plans, specified, and directed by the Engineer.

- c) Curbs, where possible, shall be temporarily reset in place, as part of the work of temporary restoration of pavement.
- d) Damaged or destroyed sidewalks shall be temporarily restored, immediately upon placing of the backfill.
- e) The temporary pavement shall be maintained by the Contractor and all holes and depressions filled until the permanent pavement is placed.
- f) Crushed concrete or similar material placed in areas where the existing pavement is shell, limerock, crushed stone, or other similar material shall be classified as nonpermanent pavement, will not be measured for separate payment.
- g) Temporary sand and asphalt wearing courses placed on base on which a permanent pavement surface will be constructed shall be incidental to the permanent pavement base work, and no separate payment will be made therefor.
- h) Materials for temporary sidewalk surface shall be incidental to sidewalk replacement, and no separate payment will be made therefor.

3. REPLACEMENT OF CURB, CURB & GUTTER, SIDEWALK & DRIVEWAYS

- a) All permanent restoration of street curb or curb and gutter shall be of the same type and thickness as the curb or curb gutter which abuts. The grade of the restored curb and curb and gutter shall conform with the grade of the existing adjacent curb or curb and gutter.
- b) Except as otherwise specified herein or detailed in the Plans, all permanent restoration of driveways and sidewalks shall conform to the manner of construction as originally placed and to the lines and grades as given by the Engineer. No patching of concrete driveway areas will be allowed between joints or dummy joints.
- c) Where sidewalks are replaced, the replacement shall be the full width of the walk and minimum lengths shall be 60 inches. Restoration of adjacent lawn is incidental to sidewalk replacement, and no separate payment will be made therefor.

4. REPLACEMENT OF TRAFFIC MARKINGS & SIGNALIZATION LOOPS

- a) The Contractor shall furnish all labor, equipment and materials to replace, test and maintain all traffic markings (temporary and permanent) and signalization loops removed or damaged by pipeline construction and appurtenance work as shown on the Plans, specified and directed by the Engineer.
- b) The replacement of traffic markings (temporary and permanent), signalization loops and all appurtenant work shall be replaced by the Contractor in kind.
- c) It shall be the Contractor's responsibility to field verify before construction begins all markings and signalization loops to be replaced.
- d) All traffic markings and signalization loops shall conform to the Workmanship and Materials standards set forth in the latest edition of the Florida Department of Transportation Standard and Supplemental Specifications.

- e) Payment for the replacement of temporary and permanent traffic markings, signalization loops and all appurtenant work shall be included in the unit bid price for Permanent Pavement Surface Replacement, Asphaltic Concrete, or as part of the Lump Sum price and no separate payment shall be made therefor.

W-171 CITY MATERIALS TESTING FREQUENCY

1. GENERAL

- a) Contractor is responsible for all testing.

2. TABLE

- a) Shows frequency by materials

Item	Test		Test Frequency
Embankment	Optimum Moisture/Maximum Dry Density of soil (proctor) as determined by AASHTO T180.		Per Soil Type
	Density Test within Right-of-Way (R.O.W.).	98% of Maximum Dry Density as determined by AASHTO T180	One per 200' horizontally, in one-foot lifts (1)
	. Density Test Outside of R.O.W	95% of Maximum Dry Density as determined by AASHTO T180.	One per 200' horizontally, in one-foot lifts (1)
	Gradation (Sieve Analysis) AASHTO T 27, T 11, ND T 89, ND T90.		Per Soil Type
Utility Trench Backfill – over pipelines and around structures from R.O.W. line to R.O.W. line	Optimum Moisture/Maximum Dry Density of soil by AASHTO T180.		Per Soil Type
	98% of Maximum Dry Density (proctor). Soil mix by AASHTO T180.		(1)(2)
Utility Trench Backfill – over pipelines and around structures outside R.O.W. line	Optimum Moisture/Maximum Dry Density (proctor). Soil Mix by AASHTO T180.		Per Material Type
	95% of Maximum Dry Density as determined by AASHTO T180.		(1)(2)

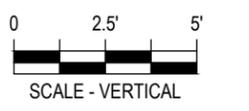
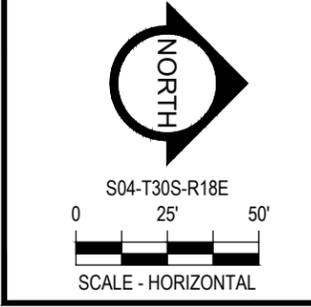
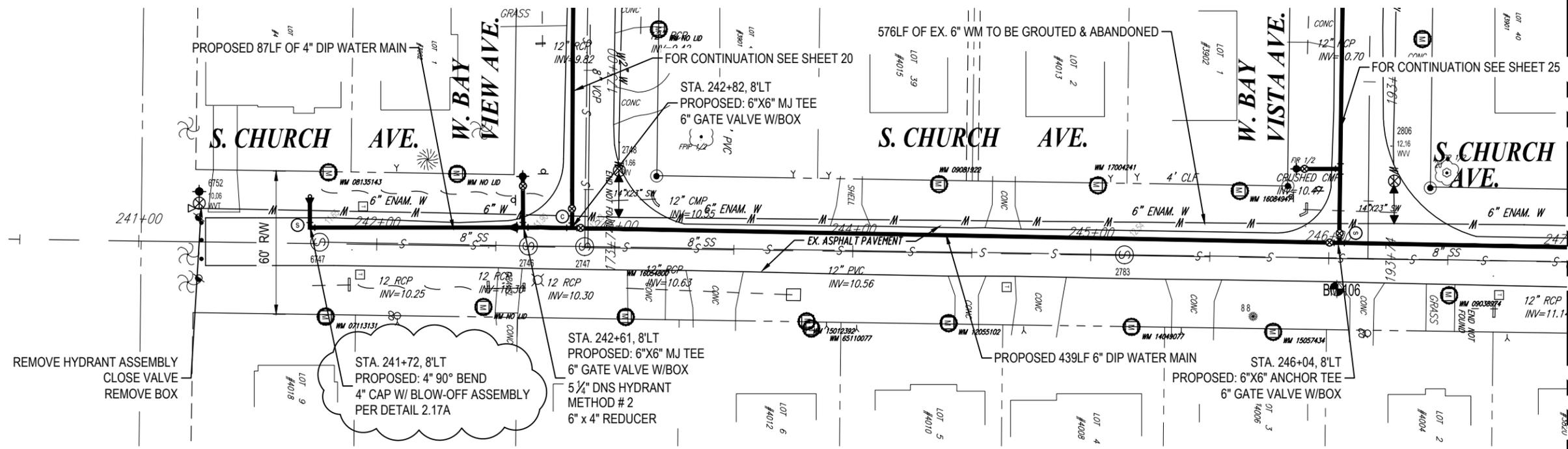
Stabilized Subgrade	Limerock Bearing Ratio (LBR) as per FM 5-515.		Per Soil Type
	Minimum 40 LBR.		Per Material Type (3)
	Minimum 20 LBR (For Soil Cement Only).		Per Material Type
	Subgrade to be used under soil cement shall have a minimum 20 LBR.		Per Material Type
	Moisture/Maximum Dry Density of soil (proctor). Proctor as per FM 5-515.		Per Material Type
	98% of Maximum Dry Density as determined by FM 5-515. No tolerance. Soil Cement - 97% of Maximum Dry Density as determined by AASHTO-T134. No tolerance		(3)(4)
Base (Other than soil cement or crushed concrete)	Limerock Bearing Ratio (FM 5-515). Minimum LBR 100.		Per Material Type/Per Source
	98% of Maximum Dry Density as determined by FM 5-515. No tolerance.		(3)(4)
Item	Test		Test Frequency
Superpave Asphalt	Mix Design		One per FDOT Approved type
	Temperature		(6)
	Maximum Specific Gravity (FM 1-T209)		One per day.
	Extraction/Gradation (FM5-563/FM 1-T030)		
	Thickness. No core shall be less than the specified thickness.		Three cores per production day.
	Straightedge (FM 5-509)		(7)
	Bulk Specific Gravity (MF 1-T166) 90% of Lab Density for Local Roadways (Remove and Replace if not met); and 92% of Lab Density for Collectors and Arterials (Remove and Replace if not met).		(3) see Nuclear Density Testing
Item	Test		Test Frequency
Soil Cement Base	Mix Design		Per Material Type
	Moisture/Maximum Dry Density of soil (proctor) AASHTO T134		Per Material Type
	97% of Maximum Dry Density as determined by AASHTO T134. No tolerance.		(3)(4)

	Compressive Strength of Specimens	One set of three per material type daily
	Cores Thickness Test	(3)
Crushed Concrete Base	Gradation	Per Type of Material/Source (5)
	Abrasion per FM 1-T096	Per Type of Material/Source
	Limerock Bearing Ratio (LBR) as per FM 5-515. Minimum LBR 150.	Per Type of Material/Source
	98% of Maximum Dry Density as determined by FM 5-515. No tolerance.	(4)
Concrete	Temperature (ASTM C1064)	One per set of cylinders
	Slump (ASTM C143)	One per set of cylinders
	Air Content (ASTM C231 or C173 as applicable)	One per set of cylinders
	Compressive Strength Cylinders (ASTM C31 and C39)	One set of four (6x12) inch or one set of five (4x8) inch cylinders for 100 cubic yards or fraction thereof, per class of concrete. Tested as follows: 1 at 7 days, 2 at 28 days, and 1 as reserve tested 56 days is necessary. Three cylinders shall be tested at 28 days if 4x8 inch cylinders are used.

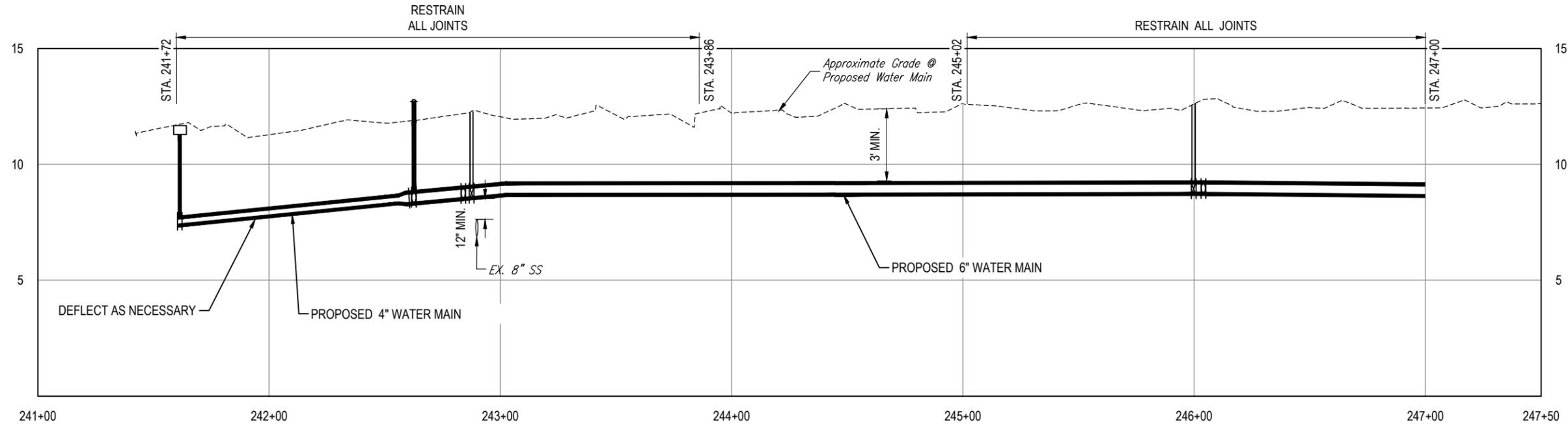
- 1) *Recommend testing methods: FM 1-T238, FM- T204, ASTM D6938, and ASTM D2937.*
- 2) *Tests shall be located no more than 200 feet apart. Tests shall be performed on each lift, except that tests shall not be further apart than one foot vertically. Field Densities shall be taken over all road crossings. Field Densities for Sanitary Lines shall be staggered to include results over service laterals. There shall be a minimum of one test series for each one foot of lift over pipeline between manholes. Tests around structures shall be spiraled in one-foot lifts. For all type pipe, fill to be compacted beneath the haunches using suitable tampers. For pipe less than 24 inches in diameter, backfill in appropriate lifts and test from the top of the pipe and every one foot vertically thereafter. For pipe 24 inches to 72 inches in diameter, backfill in appropriate lifts and test from the springline and every one-foot vertically thereafter. For pipe larger than 72 inches, tests shall begin one foot above the base of the trench.*
- 3) *Tests for base material shall be located no more than 200 feet apart. Tests for asphalt pavement shall be located no more than 500 feet apart. There shall be no less than one test per street. No core shall be less than specified minimum thickness. Nuclear Density Tests may be acceptable if approved by the City Engineer/Engineer of Record.*
- 4) *Testing for the subgrade and base compaction shall be located no more 200 feet apart and shall be staggered to the left, right, and on the centerline of the roadway. The City Engineer may reserve the right to sample and test any material utilized in the construction of the roadway. Testing shall be in accordance with the Testing Schedule and applicable City of Tampa Standard Specifications and latest FDOT Standard Specifications for Road and Bridge Construction. Inspection of the subgrade and base*

shall be conducted by the City Inspector, and shall be approved by the City Engineer/Engineer of Record prior to the base and asphalt construction respectively. Note: The City reserves the right to sample and test any material during construction.

- 5) *Materials requirements as per latest FDOT Standard Specifications for Road and Bridge Construction*
- 6) *Continuous for the five first loads if the temperature is within the master range take a temperature measurement every five (5) loads thereafter or as directed by the Engineer.*
- 7) *For City local roads the straightedge test will be required only if requested by the City Engineer/Engineer of Record.*



MATCHLINE - SEE SHEET 13



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RORY A. JONES, P.E.
 CITY OF TAMPA WATER DEPT.
 306 E. JACKSON ST., 5E
 TAMPA, FLA. 33602
 P.E. #79453

REV NO.	DATE	DESCRIPTION	BY	DESIGNED	CL

FAIR OAKS WATER MAIN REPLACEMENT

PLAN & PROFILE

DATE 05/07/2018



100% PLANS

WORK ORDER NO.	WTR-18-0002
RECORD DRAWING NO.	----
ATLAS PAGE	L-09
SHEET	12 OF 39