

WATER SYSTEM DESIGN STANDARDS

The Town of



Public Works & Engineering Services

16801 Westgrove Road
Addison, TX 75001

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THIS DOCUMENT PROVIDES GUIDANCE to developers, engineers, and contractors desiring to install additions to the Town of Addison public water system. The criteria laid out herein are the set minimum standards, more stringent obligations may be required at the direction of the Public Works & Engineering Services.

I. GENERAL

- A. Design criteria for all water systems shall comply with the latest edition of Texas Commission on Environmental Quality (TCEQ) Chapter 290 *Rules and Regulations for Public Water Systems*.
- B. Unless otherwise specified in these design standards, the design engineer and/or contractor shall meet/reference North Central Texas Council of Governments (NCTCOG) wastewater design standards and specifications.
- C. All plans shall be prepared by a Professional Civil Engineer licensed in the State of Texas.
 - 1. All proposed water lines shall be stationed, labeled, and dimensioned.
 - 2. Profile elevations shall be provided for mains a minimum of eight inch (8") in diameter and larger.
 - 3. The engineer shall include in the design plans a summary of pipe sizes, pipe materials, joint materials, fittings, and quantities of each.
- D. Water mains
 - 1. Water mains shall be looped with connections to two different water mains wherever possible.
 - 2. Mains shall be extended through the limits of a development to serve adjacent vacant properties. In phased construction of thoroughfares, the water main shall be extended the entire length of the thoroughfare being constructed.
 - 3. Dead-end mains
 - a. Dead end mains longer than one hundred feet (100') are not permitted unless approved by the Public Works & Engineering Services.
 - b. Approved dead-end mains, including those dead-ended for future extension, shall have a fire hydrant, tee, valves, and plug installed at the end of the main for use by the Town. A minimum of twenty feet (20') of main shall be installed after the valve.
 - c. An automatic flush valve may be required at the discretion of the Public Works & Engineering Services.
 - 4. Minimum cover over the top of pipe, and beneath improved street pavement shall be as follows:
 - a. Lines eight inch or less ($\leq 8''$) shall be four feet (4').
 - b. Lines sixteen inch (16") or twelve inch (12") shall be five feet (5').
 - c. Lines larger than sixteen inch (16") shall be six feet (6').
- E. Valves
 - 1. Valves shall be placed in such a manner as to require preferably two (2), but not more than three (3) valves to shut down each segment; and as may be

required to prevent shutting off more than one fire hydrant/fire service in any one section; or no more than fifteen (15) residences in a single family residential district.

2. Where four inch (4") or larger fire services are connected to Town water mains, valves shall be installed on each side of the Tee connection, and on the service, or as at the direction of the Public Works & Engineering Services.

F. Fire hydrant Assemblies

1. Hydrants shall be placed at a maximum spacing of three hundred feet (300') along all streets and fire lanes.
2. Fire hydrant leads shall be six-inch (6") minimum, and shall not exceed twenty-five feet (25') in length, unless otherwise approved by the Public Works & Engineering Services.
3. Fire hydrants shall be placed on the projection of the property line when possible.
4. No hydrant shall be placed within nine feet (9') vertically or horizontally of any wastewater (Sanitary Sewer) main, manhole, lateral, or service line, regardless of construction or pipe type.

- G. Approved permits from agencies/municipalities other than the Town shall be submitted to the Town prior to construction plan approval.

II. WATER MAIN SIZING

- A. Where applicable, line sizes shall comply with the latest revision of the *Town of Addison Water Master Plan*. The design engineer is responsible for reviewing the following information to determine sizing:

1. Size required by the latest revision of the *Town of Addison Water Master Plan*.
2. Size required by flow calculations for proposed development.
3. Size required by system improvement recommendations within a current Town water system study/report.
4. Size otherwise required by the Director of Public Works & Engineering Services.

- B. The Town prefers standard sizes of 8", 12", 16", 18" & 24" water mains. Other sizes may be special consideration and will require the approval of the Director of Public Works & Engineering Services.

- C. Mains larger than twelve inches 12" must be pre-approved by the Public Works & Engineering Services.

III. WATER MAIN LOCATION

- A. Water mains in public street right-of-way (ROW) shall be five feet (5') from the face of curb, on the opposite side of the wastewater main, or as otherwise directed by the Public Works & Engineering Services. Mains not in ROW shall be centered in a water easement.
- B. In residential developments, water mains shall not cross residential lots unless specifically approved by Public Works & Engineering Services, and if so, the easement shall be located within a single lot along the shared property line.
- C. No public water main shall be located within five feet (5') of the dripline of any tree or within ten feet (10') of the edge of a structure unless approved by the Public Works & Engineering Services.
- D. CROSSINGS
 1. Aerial crossings - water mains installed minimum of ten feet (10') past the toe of the embankment on each side under creeks or ditches - shall be protected by concrete encasement a minimum of ten feet (10') past the toe of the embankment on each side, or as otherwise directed by Public Works & Engineering Services.
 2. Water mains that cross under existing street pavement shall be installed in steel encasement pipe.
 3. Water mains crossing under storm drains shall have a minimum of eighteen inches (18") clearance below the storm drain pipe. One full length of water pipe shall be centered under the centerline of the storm drain pipe.
 4. Water mains crossing or parallel to any wastewater main, lateral, or structure shall be installed as governed by *TCEQ Rules and Regulations for Public Water Systems 30 TAC Chapter 290 Subchapter D, 290.44. (e)* requirements.
 5. Water mains crossing under a new non-pressure rated wastewater main or lateral shall be encased in a high- density steel pipe, twenty feet (20') minimum, centered under crossing. There shall be a minimum of six inches (6") clearance, or as otherwise governed by TCEQ Chapter 290.44. (e) requirements.

IV. WATER SERVICES & METERS

Water services/meter boxes shall be set in the right-of-way or utility easement, located as approved by the Public Works & Engineering Services. Water services and meters shall comply with the following general design standards:

A. GENERAL GUIDELINES

1. Irrigation and fire service meters will be Class 1 turbine type Sensus meters.
2. Domestic meters greater than one inch (1") in size will be Class 1 turbine type Sensus meters.
3. Domestic meters equal to or less than one inch (1") in size will be either positive displacement (disc) type or Class 1 turbine type Sensus meters. Deviations from these guidelines must be approved by the Public Works & Engineering Services.
4. All meters shall be placed in an approved meter "can."

B. WATER SERVICES

1. All services shall include an approved backflow prevention assembly (BPA) immediately downstream of the meter, or as approved by the Public Works & Engineering Services. All service taps shall be inspected and approved by the Public Works & Engineering Services.
2. Allowable tap sizes for water services are: 1", 2", 3", 4", 6", 8", 10", and 12". All other sizes are prohibited unless specifically approved by the Public Works & Engineering Services.
3. No more than two(2) domestic service bullhead connections are permitted on the same mainline, unless specifically approved by the Public Works & Engineering Services.
4. Service connections for domestic and/or fire sprinkler systems are not allowed on fire hydrant leads or dead end mains. Domestic service taps are not allowed on fire service lines, but shall be distinctly separate connections to the main line.
5. Irrigation may be serviced independently from a main or hydrant lead (Town irrigation only), or connected to the domestic service.
6. All non-single-family developments shall have separate fire and domestic connections to the Town's mainline, independent from each other.
7. Domestic and fire service connections shall be separated by a main line valve.
8. Single-family fire protection systems (where required) may connect to the domestic service, or have a separate connection to the main. If separate at the main, appropriate Backflow Prevention Assemblies and meters shall be placed on each service.
9. Services crossing streets shall be installed in steel encasement pipe.

C. WATER METERS

1. Meter shall not be installed in areas accessible by vehicular traffic or designated for parking.
2. Allowable Meter sizes are: 3/4", 1", 1 1/2", 2", 3", 4", 6", 8", 10", and 12"..
3. Any deviation between tap size and meter size must be approved by the Public Works & Engineering Services.
4. One meter is required for each residential, commercial, or industrial service connection per *TAC 30, Title 16, part 2, chapter 24, subchapter E, Rule 24.89*. The size of that service is to be determined by a Licensed Plumber,

- based on a calculation of fixture unit values served.
5. Location of the meter shall be shown on the plans, and placed in either ROW or easement as approved by the Public Works & Engineering Services.
 6. All meters installed shall be set horizontally level in all directions. Exception shall be made for fire service detector meters on vertically mounted backflow prevention assemblies.
 7. Gate valves on the inlet side of the meter are strictly prohibited.

V. WATER SYSTEM EASEMENTS

- A. Water easements shall be sized proportionately to the size and depth of the water main.
 1. Lines less than eight inches (8") in diameter shall be in a minimum ten-foot (10') wide water easement.
 2. Lines equal to or greater than eight inches (8") in diameter shall be in a minimum fifteen-foot (15') wide water easement.
- B. Fire hydrants, and water meters larger than two inches (2") in size located in vaults, outside of public ROW shall be centered in a minimum ten foot by ten-foot (10' x 10') water easement.
- C. Meters less than two inches (2") in size, and their meter boxes, outside of Public ROW shall be set in a minimum ten-foot by ten-foot (10'x 10') water easement.

VI. CROSS-CONNECTION CONTROL

- A. As required by current Town of Addison Ordinances, ALL water services in the Town of Addison shall have a containment Backflow Prevention Assembly (BPA), installed immediately downstream of the meter, or as close as is practical, with no taps, T's, or connections between the meter and the assembly (See TOA Standard Construction Detail. Assembly type will be based on the Degree of Hazard as determined by the Public Works & Engineering Services, using the most current edition of the *Manual of Cross-Connection Control* as published by USC-FCCCHR for guidance.
- B. All backflow assemblies shall be on the most current guidance from TCEQ and the most current edition of the International Plumbing Code, best industry standards, and the manufacturer's recommendations.
- C. Location of Backflow Prevention Assembly (BPA) shall be shown on the plans and must be approved by the Public Works & Engineering Services.
 1. Backflow assemblies shall be placed in approved meter boxes, or vaults complying with TOA Standard Construction Details and NCTCOG.
 2. Reduced Pressure Zone Assemblies (RPZA) shall be installed above ground,

and protected from freezing, with an assembly specifically approved for such use. In no case shall RPZAs be permitted in any below grade installation, or without sufficient drainage capability to prevent immersion of the assembly or flooding the building.

VII. WATER SYSTEM MATERIALS

All materials proposed for inclusion in the Town water system shall be submitted for approval prior to purchase, to verify compliance with the following uidelines:

A. WATER MAINS

1. All water mains twelve inches (12") in diameter or smaller shall be AWWA C-900 PVC pressure pipe (blue), with cast iron outside diameter (C.I.O.D.) or approved equal. Pipes that penetrate concrete vault walls shall be ductile iron. Pipe joints shall be thickened bell with integral rubber ring gasket, assembled with factory supplied lubricant. Joint material shall conform to *ASTM F477* and *ASTM D3139*. Water mains shall have a minimum pressure class rating of 235 psi (DR-18). Pipe for fire service or fire hydrant leads shall have a pressure class rating of 305 psi (DR-14).
2. All water main fittings can be full-bodied, half sized, or compact domestic (USA) ductile iron, mechanical joint type, rated at 250 psi. All mechanical joints shall employ restraining glands (EBAA Mega-Lug or approved equal). All fittings shall be wrapped with 8mil poly prior to embedment and backfill.
3. All mains supplying fire sprinkler systems outside of utility easements shall be U.L. listed, and have a minimum pressure rating of 305 psi.
4. All valves, hydrants, tees, and bends shall have concrete thrust blocks installed. Fittings shall be poly- wrapped (8 mil) prior to pouring the thrust block. Thrust blocks shall be a minimum Class "B" (3000 psi) concrete, and be able to withstand 200 psi test pressure. Concrete shall be poured against undisturbed earth, and formed as needed to prevent covering flanges, glands, or bolts. Reference current NCTCOG thrust block specifications as minimum standard.
5. Where tapping sleeves are approved, they shall be at least one nominal size less than the tapped main, stainless steel type. Approved manufacturers are Mueller, Ford, and Smith-Blair.
6. All fitting and ductile-iron shall be poly-wrapped (8 mil) prior to pouring the thrust block.
7. For water mains installed by bore, rust resistant steel casing (min. one (1) pipe size larger than proposed main, minimum one-fourth-inch (1/4") thick or thicker if deemed necessary by the design engineer or Town Engineer, shall be used with Raci patented casing spacers, or approved equal. No wood skids will be permitted.

B. WATER VALVES

1. Valves sixteen-inch (16") and under shall be Resilient Seat Gate Valves (RSGV). All gate valves shall be of the resilient wedge type conforming to *AWWA C509*, Standard for Resilient Seated Gate Valves, in its most current revision.
2. Valves larger than sixteen-inch (16") shall be approved butterfly valves and shall be submitted for pre-approval by the Public Works & Engineering Services.
3. In addition, all valves sixteen-inch (16") and under shall include the following design criteria:
 - a. In order to maintain a manageable parts inventory and working knowledge of valves, the following resilient seated valves are approved: Mueller A2360-61, AFC 2500 and AVK Series 25.
 - b. Wedge shall be cast or ductile iron, fully encapsulated in synthetic rubber.
 - c. Wedge rubber shall be molded in place and permanently bonded to the iron without screws, rivets or similar fasteners.
 - d. Wedge shall seat against seating surfaces arranged symmetrically about the centerline of the operating stem, so that seating is equally effective regardless of the direction of pressure imbalance across the wedge.
 - e. Valves for underground installations shall be non-rising stem type, opening counter-clockwise by means of a two-inch (2") square operating nut. Valves for installation in a vault shall be of the rising stem type opening counter-clockwise by means of a hand wheel. The word "OPEN" and an arrow indicating direction to open shall be cast in the metal of the nut or hand wheel.
 - f. Stem shall be sealed by at least two O-rings. All stem seals shall be replaceable with the valve fully open and while subject to full rated pressure.
 - g. All bonnet and stuffing box nuts and bolts shall be stainless steel. When placed in vaults, flange bolts and nuts shall be Grade 316 Stainless steel, treated with anti-seize compound.
 - h. The waterway shall be smooth and shall have no depressions or cavities in the seat area where foreign material can lodge and prevent closure. The waterway shall be large enough to accept full size tapping cutter without damaging the interior of the valve.
 - i. The valve body and bonnet shall be epoxy coated, inside and out, with fusion-bonded epoxy. There shall be no chips, cracks, or deep scratches that would defeat the purpose of the coating. Coating shall conform to AWWA C550-90 (most current revision), Standard for Protective Interior Coatings for Valves and Hydrants.
 - j. Buried valves shall be provided with valve boxes consisting of a cast iron base (B&H#2436-B, or #1824- B, or EJIW 8453), a top with cover (B&H#340-1), and a length of six inch (6") PVC DR-14 pipe between the bottom and top sections.

C. DOMESTIC & IRRIGATION SERVICES

1. For meters less than or equal to two inch (2") in size.
 - a. The service saddle shall be one of the following:
 1. Double-strap bronze with CC (AWWA taper) threads: Mueller #BR2B, Ford #202B. (Not for use on PVC mains)
 2. Mueller Servi-Seal™ style 502, 504, 506, or 508; seven inch (7") min. length.
 3. Ford Style FS303-CC.
 4. Tap shall be set at 45° of vertical on the main line.
 - b. The corporation stop shall be AWWA taper thread (CC) by conductive compression connection from the following list:
 1. 1" use Mueller H-15008; or Ford F1000-G.
 2. 2" – use Mueller B-25008 or H-15013; or Ford FB1000-G.
 - c. The curb stop shall be 90° angle stop with lock-wing from the following list:
 1. 1" – use Mueller H-14258 or B-24258; or Ford KV43-332W-G or KV43-444W-G.
 2. 2" use Mueller H-14277; or Ford FV43-666W-G or FV43-777W-G.
 - d. All companion flanges shall be elliptical brass, and all nuts and bolts shall be Grade 316 stainless steel, 5/8"-11 x 2 1/2" hex head. Anti-seize compound is required on the threads of the bolts.
 - e. Saddle and corporation stop must be poly-wrapped (8mil) and hand-backfilled with sand to a depth of twelve inches (12").
 - f. Piping from the corporation stop to the curb stop shall be Endotrace poly, one continuous piece, poly- wrapped (8mil), or HDPE (Endopoly PE3408/PE4710, or approved equal), and embedded in sand six inches (6") in all directions.
 - g. No flared or soldered fittings allowed.

D. DOMESTIC & IRRIGATION METERS

1. All new meters shall be a SENSUS Aqua Metric meter, programmed to read in 1,000 U.S. gallon increments, equipped with a compatible radio unit. Reference Table VII.1 for specifications.
2. Meters less than two inch (2") in size shall be placed in an approved meter "can."
3. Meters two inch (2") and larger in size shall be in a concrete vault and placed within the ROW or an easement.
 - a) Pipe penetrations through vault walls shall be ductile iron, four inch (4") minimum size.
 - b) Meter assembly shall include a two inch (2") test port, with a 2" stainless steel ball valve with stainless steel handle downstream from the meter. Bypass piping (if used) may be one pipe size less than meter size. Bypasses less than eight inch (8") in size shall be inside the vault.

Table VII.1 – SENSUS Water Meters		
Type of Service	Meter	Radio Unit
Single Family Residence	¾" iPERL TRPL 1000 USG	MXU520M Single Port Touch Coupled
	1" iPERL TRPL 1000 USG	
	1.5"OMNI R2 TRPL 1000 USG	
	2"OMNI R2 TRPL 1000 USG	
Multi-Family Residence	1.5"OMNI C2 TRPL 1000 USG	MXU520M Single Port Touch Coupled
	2"OMNI C2 TRPL 1000 USG	
	3"OMNI C2 TRPL 1000 USG	
	4"OMNI C2 TRPL 1000 USG	
	6"OMNI C2 TRPL 1000 USG	
Irrigation	1.5"OMNI T2 TRPL 1000 USG	MXU520M Single Port Touch Coupled
	2"OMNI T2 TRPL 1000 USG	
	3"OMNI T2 TRPL 1000 USG	
	4"OMNI T2 TRPL 1000 USG	
	6"OMNI T2 TRPL 1000 USG	

E. FIRE SERVICES

1. Fire services less than or equal to two inches (2") in size shall be an approved SENSUS Meter and shall have the appropriate BPA installed downstream of the meter.
2. Larger fire services shall, at minimum, consist of an approved BPA in a building riser room, or a Double-Check Detector Assembly (DCDA) in an exterior vault placed within the ROW or in a water easement. The Degree of Hazard will determine if another assembly is required.
 - a. If a DCDA is placed in public ROW or easement, a valve immediately upstream of the assembly shall be the point of demarcation between the public water system and the customer's private service line, to determine maintenance responsibility.
 - b. If site conditions preclude the installation of the DCDA Riser room at the property line, alternative installations must be approved by the Public Works & Engineering Services. Such cases will require a "demarcation valve" and a 2" service tap to be installed on the upstream side of the valve at the property line. There shall be no taps or T's installed between that valve and the fire service riser.
3. Non-metered sprinklers & water meter piping to property line are responsibility of the owner.

F. FIRE HYDRANT ASSEMBLIES

All fire hydrants installed for use in the Town of Addison shall meet or exceed

AWWA Standard C502-85 (most current revision). Fire hydrants shall have a 5¼" minimum valve opening. Rated working pressure shall be at least 150 psi; test pressure shall be 300 psi and the hydrant shall be capable of flowing 1000 gpm (Class A). All hydrants shall be manufactured in the United States. Hydrant shall be warranted by the manufacturer for a minimum of 5 years. In addition, all hydrants shall include the following design criteria:

1. In order to maintain a manageable parts inventory and working knowledge of fire hydrants, the following hydrant is approved: *East Jordan Iron Works Water Master 5CD250*.
2. All fire hydrants shall be dry barrel type, of the three-way style consisting of two (2) opposing 2- ½" hose nozzles separated by one (1) four-inch (4") pumper nozzle.
3. A clearly visible arrow and the word "OPEN" shall be cast in relief on the top of the fire hydrant. The fire hydrant shall be opened by turning the operating nut in a counter-clockwise direction.
4. The operating nut shall be all bronze, one piece, pentagon measuring 1¼" from point to flat and at least 1¼" in height.
5. The manufacturer's name, size of main valve and year of manufacture shall be cast in relief on the upper barrel section and clearly visible to aid in the identification of repair parts.
6. Lower barrel shall have ground line markings cast in relief and clearly visible approximately two-inches (2") below the flange to aid in proper installation.
7. The fire hydrant shall be a "traffic model" with the upper and lower barrels joined at approximately two- inches (2") above ground line by a separate and breakable swivel flange providing for 360 degree rotation of upper barrel for proper nozzle facing. The "traffic model" safety flange shall employ unweakened stainless steel hex head bolts (*AWWA C502, Sec. 3.2.17*) and fasteners of sufficient strength to bear all test and operating pressures. The stem shall be two-piece, not less than 1¼" in diameter (excluding threading or machined areas) and shall be connected by a breakable stem coupling. The weakened portion of the coupling shall be below the coupling pins to eliminate failure due to excessive torque. All screws, pins, bolts or fasteners used in conjunction with the coupling shall be stainless steel. The coupling shall be made of stainless steel to eliminate failure due to electrolysis and corrosion. The coupling joint shall be located below the top of the lower barrel to prevent vehicle wheel or other forces being applied to stem, which would open the valve mechanism.
8. Shoe and barrel castings shall be fabricated of *ASTM A-126*, Class B gray iron or ductile iron *ASTM A- 536*, but no combination thereof, assuring uniform strength of all cast components.
9. Hose nozzles shall be 2½", and the pumper nozzle shall be four-inch (4") pumper gauge (40480). Chains between the fire hydrant and nozzle caps shall be omitted or removed. Nozzle section shall allow for field replacement of damaged threads without special tools, excavation or disturbing the ground

joint line. Nozzles shall be fastened by mechanical means and secured to prevent nozzles from turning or backing out. Nozzle caps shall be provided with 1¼" pentagon nuts at least 1¼" in height, a recess provided at the inner end of thread for gasket retention. Centerline of lowest nozzle shall be at least eighteen-inches (18") above ground line.

10. Main valve closure shall be compression type, opening against line pressure and closing with the pressure. Main valve shall be 5¼" in diameter. A bronze seat ring shall thread into a bronze drain ring (or shoe bushing). This bronze shall be low-zinc (less than 16%) to minimize galvanic corrosion. Design shall allow for removal of seat, drain valve mechanism, internal rod and all working parts through the top of the hydrant without disturbing the ground line joint or the nozzle section of the hydrant.
11. Lubrication of the upper stem threads, operating nut threads, and upper and lower thrust collar bearing surfaces and O-ring stem seals shall be done automatically as the hydrant is opened. Lubricant shall be low viscosity, non-toxic, FDA approved oil. Oil reservoirs shall be separated from the waterway by two (2) O-rings.
12. The drain system shall consist of two (2) valves feeding two (2) external discharges. Drain system shall be so designed as to provide for both automatic and intentional force flushing at full line pressure. Drain valve mechanism and outlet shall be all bronze.
13. The interior surfaces of the shoe and lower main valve components shall be epoxy coated in compliance with AWWA Standard C-550. The shoe and lower barrel shall be connected by stainless steel bolts, nuts and fasteners of sufficient size and strength to bear all pressures and forces that the hydrant is subject to, including corrosion, for its warranted life.
14. Hydrants shall be delivered at a minimum, with two (2) coats of primer on upper barrel (*AWWA C-502 Sec. 4.2.3*). Interior and exterior shall be painted as in *AWWA C-502 Sec. 4*, excluding the interior of shoe which shall be painted be as noted in Sec. 2.F.
15. Hydrants shall be complete in all details when supplied. Due and customary care shall be used in preparation for shipment to eliminate damage in handling or transit. Hydrants must be drained and completely closed before shipment.
16. Manufacturer shall supply an Affidavit of Compliance verifying that the hydrant and all materials used in its construction conform to the applicable requirements of the most current form of *AWWA C502* and this supplementary specification, that all specified tests have been performed and that all test requirements have been met.

G. CROSS-CONNECTION CONTROL

1. Stainless steel, brass, or nylon/plastic plugs shall be installed in all test cocks after testing.
2. The use of Teflon tape is required to facilitate removal of plugs for future

testing of the assembly. Plumber's putty or "pipe dope" is unacceptable for this installation.

VIII. CONSTRUCTION

A. CONSTRUCTION METHODS

1. All water mains to be installed under existing roadway, culverts, creeks, and railroads should be installed by bore and steel encased unless otherwise approved by the Town Engineer.
2. For water mains installed by trench construction:
 - a. Trench width shall be a minimum of 24", or pipe O.D. plus 24", whichever is greater.
 - b. Unless otherwise indicated, all pipe embedment shall be NCTCOG Class "B+" or "B-2".
 - c. Finish backfill shall be native soil free of any rocks or clods greater than three inches (3") in diameter and compacted from eight inch (8") loose lifts to 95% Standard Proctor Density at zero to three percent (0-3%) of optimum moisture. If native material is determined to be unsuitable or insufficient, a select fill approved by the Public Works & Engineering Services may be substituted.
 - d. Trenches under pavement may be backfilled with Flowable fill with a minimum compressive strength of 250 psi to a maximum strength of 400 psi, to the level indicated by the pavement thickness, with the prior approval of the Public Works & Engineering Services. A batch design shall be submitted for any flowable fill used within the Public ROW.
 - e. Locator tape shall be placed on top of the sand embedment, prior to final backfill.
 - f. Trench safety plans, as required by OSHA and standard engineering practices, may be required to be submitted for review and approval prior to construction.
3. Alternative methods of trenchless construction may be considered by the Public Works & Engineering Services. Method(s) must be submitted to the Town Engineer for approval during construction plan review.

B. MATERIAL SUBMITTALS

1. The design engineer or contractor shall provide material submittals for all materials to be installed in/added to the public wastewater system to the Public Works & Engineering Services for review and approval prior to installation. The submittals shall include the manufacturer's information

C. WATER SYSTEM INSTALLATION

1. Water Pipe
 - a. Line and grade stakes for construction of all water mains and services

shall be furnished by the developer's Engineer or their designated representative. Property lines and corners must be properly staked to ensure their proper alignment. The Town shall not be liable for improper alignment or delay of any kind caused by improper or inadequate surveys by the developer, or by any interference of other utilities.

2. Valves

- a. Mainline shut-downs required to install connection tees and valves during regular business hours must be coordinated with the Public Works & Engineering Services at least seventy-two (72) hours prior to the actual shut-down. Mainline shut-downs outside of regular business hours, must be coordinated with the Public Works & Engineering Services at least five (5) business days prior to the actual shut-down. The contractor is responsible for all overtime costs associated with mainline shut-downs outside of regular business hours. The contractor is required to schedule all main shut-downs after consultation with all affected parties. Verification of those consultations shall be provided to the Town as part of the coordination.
- b. Valves shall be set on a two-foot by two-foot Class B concrete pad.
- c. Flange and MJ bolts shall be Core 10 T bolts on all direct-bury valves.
- d. Valves deeper than five feet (5') will require extensions as directed by the Public Works & Engineering Services.
- e. Buried valves shall be provided with valve boxes consisting of a cast iron base (B&H#2436-B, or #1824- B, or EJIW 8453), a top with cover (B&H#340-1), and a length of six inch (6") PVC DR-14 pipe between the bottom and top sections.
- f. Valve boxes located outside of paved areas require the placement of a reinforced concrete locator pad, 24" x 24" x 6" set flush with the finished grade.
- g. The location of all valves shall be marked on the nearest pavement with the letter "V" stamped or sawn into the pavement. The point of the V shall be pointing toward the valve.
- h. All butterfly valves shall be placed in a vault or manhole.
- i. Once connected to the active Town of Addison water system, operation of any valve shall be by Addison Public Works Dept. exclusively. Operation by others constitutes a violation of Town Ordinance.

3. Fire Hydrant Assemblies

- a. Fire hydrants shall have a minimum four foot (4'), or a maximum five foot (5') lower barrel. Fine grade adjustments are to be made with 45° bends, or with the use of Gradelok™ piping, or other methods, with the approval of the Public Works & Engineering Services, to position the bottom of the breakaway flange two to six inches (2" – 6") above final grade.
- b. Installation shall consist of a mechanical joint by flange Tee, a flange by mechanical joint valve, and approved pipe to a mechanical joint hydrant shoe. All mechanical joints shall be restrained.
- c. Fire hydrants shall be placed a minimum of three feet (3') and a maximum

- of six feet (6') from the edge of a fire lane or roadway (Back of Curb).
- d. All hydrants placed outside of Town ROW shall be in easements and adequately protected from damage by vehicular traffic as approved by Public Works & Engineering Services and the Addison Fire Department. All such protection is the responsibility of the property owner on which the hydrant is placed.
 - e. All hydrants shall be installed so that the large steamer nozzle faces 90° to the fire lane or street, or as directed by the fire Department or the Public Works & Engineering Services.
 - f. A four foot (4') wide non-erodible surface shall be placed around the fire hydrant, and extended to the pavement directly in front of the hydrant.
 - g. Fire hydrants shall be located at street or fire lane intersections, when feasible. When so located, the hydrant shall be placed so that no part of the fire truck will block the intersection or access when connecting to the hydrant.
 - h. Fire hydrants shall be accessible to the Fire Department at all times.
 - i. A blue Stimsonite, Fire-lite™ reflector, Model 88-SSA (or approved other) shall be placed just off-center of the street or fire lane opposite the hydrant (not in wheel path). At intersections, the reflectors shall be placed on both roadways opposite the hydrant.
4. Water Services & Meters
- j. Service saddles shall be placed at a 45° angle on the main. The saddle, corporation stop, and service pipe shall be poly-wrapped, then backfilled by hand with sand to a minimum one foot (1') over the tap. Native fill – no rocks or clods larger than three inches in diameter – may be used to backfill to the surface, in eight inch (8") loose lifts and compacted to 95% if under pavement, or 90% under turf.
 - k. The service curb stop shall be installed at a depth of eight inches (8") to twelve inches (12") below finished grade, usually in advance of paving. After paving, the contractor shall furnish and install the meter box. The meter box is to be set in the ROW or at the utility easement line, near the center of the lot to be served. No meter box shall be installed in an area paved for vehicular traffic, or in vehicular parking areas.
 - l. The Town of Addison does not sell or provide water meters, but rather, the Owner must provide the meter for the initial installation. The meter must comply with all of the current specifications of the Public Works & Engineering Services.
 - m. Water meter boxes shall be installed for each service according to the TOA Standard Construction Details.
 - n. Water meter boxes for \leq two inch (2") meters, shall have a minimum depth of eighteen inches (18") and have at least four inches (4") to six inches (6") of Grade 4 crushed stone, and four inches (4") to six inches (6") of free airspace under the meter inside the box.
 1. Meter boxes and openings shall be large enough to allow access to, and operation of, all meter nuts, flanges, or bolts without

- obstruction.
- 2. Openings below grade in the meter box shall be permanently closed to prevent the infiltration of mud or silt into the box.
- 3. A maximum of eighteen inches (18") of copper, brass, or HDPE pipe shall be placed between the water meter and the BPA, or the first fitting after the meter connection.
- o. The BPA shall be installed immediately after the meter in a meter box of the owner's choosing, but with the same characteristics of the meter installation described above. All valves must be accessible and operable, and all test cocks accessible for testing.
- p. During the course of construction, the curb stop will remain locked off at all times, until the BPA is installed and ready for testing by a certified and approved Backflow Device Tester. The Town shall unlock and turn on the service for the test, and re-lock the service after the test. After confirmation of a passing installation inspection and a passing test of the BPA, the owner, or his representative, may apply for service at the TOA Finance Department, 5350 Belt Line Rd, phone number 972-450-7075. Upon completion of the application requirements, the Finance Department will then contact the Water Department with a connect order to turn the water on for service.

D. WATER MAIN ABANDONMENT

- 1. Removal vs abandonment shall be at the Director of Public Works & Engineering Services.
- 2. Abandoned-in-place water mains shall be plugged and grouted with an adequate quantity of flowable fill per NCTCOG standards to form a tight closure.

E. TESTING & REPORTS

- 1. Water System - General
 - a. Water lines shall be hydrostatically tested at 150 psi for four (4) hours. Fire line leads shall be tested at 200 psi for two (2) hours.
 - b. All water mains shall be disinfected according to TCEQ/NCTCOG practices and procedures, and shall pass bacteriological testing for the presence of total coliform bacteria, by a certified water lab.
 - 1. All valves, hydrants, and services shall be operated during the chlorination process to ensure contact with the chlorine solution.
 - 2. High concentrations of chlorinated water shall be de-chlorinated and purged from the water system, into the sanitary sewer system, or other approved disposal methods.
 - 3. After the system has been purged of chlorinated water, contractor shall perform a velocity flush through a fire hydrant(s) to remove any potential debris left in the line. This velocity flush must be de-chlorinated, and may be disposed of into the storm sewer system, or

- other approved disposal methods.
4. All bleeder lines shall be removed upon completion of the testing, by removing the corporation stop and installing a brass plug into the tapping saddle. Plug shall be prepared with Teflon tape.
2. Fire Services
 - a. All large fire services shall pass a 200 psi two hour pressure test, and a bacteriological test, from the service valve to the riser.
 3. Cross-Connection Control
 - a. The plumber/contractor/owner is responsible for having the BPA tested upon installation and initiation of service, by a Tester certified by *Texas Commission for Environmental Quality (TCEQ) rules*, for the specific type of installation (i.e. General, Fireline) and who is registered with the Town of Addison Public Works & Engineering Services. The original of the test report shall be submitted to the Public Works & Engineering Services.
 4. All backfill shall be placed in 8" lifts and compacted to 95% standard proctor density, with testing results provided to the Public Works & Engineering Services.
 5. Additional site or job-specific testing may be required by the design engineer, or at the Public Works & Engineering Services' request to ensure the quality and functionality of the work.
 6. All required testing shall be completed by the contractor and copies of testing reports shall be submitted for review and approval to the Public Works & Engineering Services throughout the course of construction, and prior to any final inspections or issuance of Certificate of Occupancy.
 7. A record of all project contributions to the Town of Addison public water system (materials, quantities, and costs) shall be submitted to the Public Works department prior to infrastructure acceptance.

IX. VARIANCE FROM STANDARDS

Any proposed variation from these standards must be submitted for review and approval by the Public Works & Engineering Services prior to submittal of civil construction plans.