DIVISION 480

WATER SYSTEM

CONSTRUCTION

Revised July 2012

DIVISION 480

SECTION 481

WATER MAIN CONSTRUCTION

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481.1 SCOPE

The work under this section includes the furnishing, installing, laying, jointing, and testing of all water lines, hydrants, fittings, valves and appurtenances, including necessary service connections required for a complete system as shown on the drawings and specified herein. The work shall also include such connections, reconnections, relocations, temporary services, abandonments, and all other provisions in regard to existing water service operations and modifications required to perform the new work.

481.2 GENERAL REQUIREMENTS

481.2.1 All work shall be proven to be in first class condition and constructed properly in accordance with the drawings and specifications. All defects and leaks disclosed by the tests shall be remedied and re-tested.

481.2.2 All tests and re-tests shall be performed in the presence of the **CITY ENGINEER** or a designated representative. The **CONTRACTOR** shall be responsible for Hydrostatic Pressure Tests and chlorination of the water mains. The **CONTRACTOR** shall be responsible for compaction and density testing and verifying that all valves that were operated during the course of construction are in the open position at the end of construction. Re-testing and any other additional testing required by this section shall be at the **CONTRACTOR'S** expense.

481.2.3 Compaction and density testing are specified in Standard Details 478-5.2A and B, of City of Valdosta, Volume I Standard Specifications for Water and Sewer Construction.

481.2.4 "Asbuilt" drawings of water mains, fire hydrants, valves and services shall be prepared in accordance with Section 486, City of Valdosta, Volume I, Standard Specifications for Water and Sewer Construction.

481.2.5 Dewatering, clearing and grubbing, cleanup and other related site work for water main construction are specified in G.D.O.T. Standard Specifications Construction of Transportation Systems.

481.2.6 Unless otherwise specified, water mains shall be installed according to AWWA C-600-latest.

481.2.7 All installed water mains constructed of PVC shall be installed with a solid copper locating wire(s) as shown on Standard Detail 478-7.1A, City of Valdosta, Volume I Standard Specifications for Water and Sewer Construction.

481.2.8 Boring and Jacking operations shall be in accordance with Section 474, City of Valdosta, Volume I, Standard Specifications for Water and Sewer Construction.

481.2.9 Water mains are to be installed with minimum of 36" cover unless otherwise directed by the **CITY ENGINEER** or as called for on the plans.

481.2.10 Contractor shall contact the **UTILITY DEPARTMENT** a minimum of 24 hours prior to connecting to the **CITY** utility system.

481.3 MATERIALS

481.3.1 All materials required under this section which are necessary for the construction of water mains shall be of the type, model, and manufacturer specified under the applicable specifications of Section 489, of this manual.

481.3.2 Materials not specified herein, or under Section 489 (cited above), shall not be installed in the water main system.

481.3.3 Requests for materials to be approved by the **CITY** shall be made to the **CITY ENGINEER**, in writing, in accordance with set procedures. Copies of the procedure policy may be obtained from the **CITY ENGINEER**.

481.3.4 All materials shall be free from defects impairing strength and durability, and be of the best commercial quality for the purpose specified. It shall have structural properties sufficient to safely sustain or withstand strains and stress to which it is normally subjected and be true to detail.

481.3.5 All pipe, valves, fire hydrants and fittings shall be clearly marked with the name or trademark of the manufacturer, the batch number, the location of the plant, strength designation and pressure rating.

481.3.6 Refer to Section 489 of this manual for materials requiring shop drawing submittals.

481.4 CONSTRUCTION

481.4.1 Excavation, trenching and backfilling shall conform to G.D.O.T. Standard Specifications Construction of Transportation Systems.

481.4.2 Pipe Installation

481.4.2.1 General - The method of pipe laying shall be subject to the approval of the **CITY ENGINEER**. Each pipe length shall be inspected for cracks. Care shall be exercised to keep the pipe in close alignment and at the specified depths as called for on the plans. If approved by the **CITY ENGINEER**, minor changes in alignment and/or depth may be permitted to avoid underground facilities. Upon discovery, any defective pipe which may have been laid shall be removed and replaced with sound pipe, at no additional cost to the **CITY**. It shall be the **CONTRACTOR'S** responsibility to locate all underground utilities in advance of construction to insure that no conflicts occur with the proposed alignment and depth. The **CONTRACTOR** is to furnish the **CITY ENGINEER** all pertinent information so that remedial design can be performed.

481.4.2.2 Laying and Jointing - The pipe shall be laid on an unyielding foundation with uniform bearing under the full length of the barrel of the pipe. Suitable excavations shall be made to receive the bell of each pipe. The spigot end of the pipe shall abut the base of the socket of the adjacent pipe in such a manner that there will be no gaps along the perimeter of the mating halves. Just before jointing the pipe, the mating ends shall be thoroughly cleaned of all dirt, debris, and foreign material. The pipe shall be jointed in accordance with the recommendations of the manufacturer of the pipe and gasket. In all jointing operations, the trench must be de-watered when joints are made, and kept de-watered until sufficient time has elapsed to assure sufficient hardening of the jointing material, or as may be required. The pipe shall not be driven down to grade by striking it with a shovel handle, timber, rammer, or other unyielding object. The **CONTRACTOR** shall take all necessary precautions to prevent flotation of the pipe from flooding of the trench.

481.4.2.3 Locations

481.4.2.3.1 Water mains shall be constructed eight feet (8') off the north or east right of way lines unless otherwise shown on the plans. Water lines to be constructed in easements shall be centered within the boundaries of the easement. If trees or other structures should interfere with the alignment of the water main, the water main shall be adjusted towards the right of way line.

481.4.2.3.2 Minimum depths shall be 36" in all road rights of way and easements. The depth of cover shall be measured from the top of the water main to the finished grade or centerline of roadway directly above the pipe.

481.4.2.3.3 Minimum horizontal clearance between parallel water mains and gravity sanitary sewer mains shall be ten foot (10). Where it is not technically feasible or economically sensible to comply with this requirement the minimum horizontal clearance shall be six foot (6'). See Detail 478-1.4A.

481.4.2.3.4 Minimum horizontal clearance between parallel water mains and storm sewer mains shall be three foot (3'). See Detail 478-1.4A.

481.4.2.3.5 Minimum horizontal clearance between parallel water mains and sanitary sewer force mains shall be ten feet (10') Where it is not technically feasible or economically sensible to comply with this requirement the minimum horizontal clearance shall be six foot (6'). See Detail 478-1.4A.

481.4.2.3.6 Minimum horizontal clearance between parallel water mains and reuse force mains shall be three feet (3'). See Detail 478-1.4A.

481.4.2.3.7 Minimum vertical clearance between water mains and gravity sanitary sewer mains crossing each other shall be twelve inches (12") Where it is not technically feasible or economically sensible to comply with this

requirement the minimum horizontal clearance shall be six inches (6”). See Detail 478-1.4A.

481.4.2.3.8 Minimum vertical clearance between water mains and storm sewer mains crossing each other shall be twelve inches (12”) Where it is not technically feasible or economically sensible to comply with this requirement the minimum horizontal clearance shall be six inches (6”). See Detail 478-1.4A.

481.4.2.3.9 Minimum vertical clearance between water mains and sanitary sewer force mains crossing each other shall be 12”. See Detail 478-1.4A.

481.4.2.3.10 Minimum vertical clearance between water mains and reuse force mains crossing each other shall be 12”. See Detail 478-1.4A.

481.4.2.4 Assembly of Joints - Assemble all joints in accordance with recommendations of the manufacturer. If a lubricant is required to facilitate assembly, it shall have no detrimental effect on the gasket or on the pipe when subjected to prolonged exposure. Proper jointing may be verified by rotation of the spigot by hand or with a strap wrench. If unusual jointing resistance is encountered, or if the insertion mark does not reach the flush position, disassemble the joint, inspect for damage, re-clean the joint components, and repeat the assembly steps. Note that fitting bells may permit less insertion depth than pipe bells. (NOTE: When mechanical equipment is used to assemble joints, care should be taken to prevent over-insertion).

481.4.2.5 Cleaning - All necessary precautions shall be taken to prevent the entrance of mud, sand or other obstructing material into the pipeline. As the work progresses, the interior of the water main shall be cleaned of all dirt, jointing material, and superfluous materials of every description. Prior to final inspection, the **CONTRACTOR** shall flush all water lines constructed under this contract with clean water to assure complete removal of all debris and foreign materials.

481.4.2.6 Bedding and Backfill - Immediately after the pipe has been jointed and inspected, sufficient backfill shall be performed to protect the pipe adequately from injury and movement. Where so indicated on the drawings, or where directed by the **CITY ENGINEER**, the pipe shall be supported by compacted granular fill or concrete cradle or encasement according to the applicable detail shown on the plans. Pipe bedded in compacted granular backfill shall not be supported on blocking, wedges, bricks, or anything except the bedding material. Where concrete cradle or encasement is required, the pipe shall be supported on solid concrete blocks or pre-cast concrete saddles which shall become part of the completed cradle or encasement. Where no other bedding is indicated, pipe shall be placed on a shaped bed of undisturbed material.

481.4.2.7 Early Warning Tape

The **CONTRACTOR** shall install warning tape 12” to 18” on top of pipe.

481.4.3 Maintenance of Service

Maintenance of service is of the utmost importance and no service shall be discontinued without the consent of the **CITY ENGINEER** for each particular interruption of said service. In no case will any service be discontinued without at least twenty-four (24) hours notice given to the **CITY ENGINEER** by the **CONTRACTOR**. To achieve minimum inconvenience to the public and users of the water system, some work on the project may have to be done during "OFF" hours. The **CONTRACTOR** shall take this requirement into consideration when preparing his bid as no additional compensation will be allowed therefore.

481.4.4 Installing Valves

481.4.4.1 Water valves two inches (2") through 10" shall be gate valves. Valves 12" and larger shall be butterfly valves. Valves deeper than five feet (5') will require valve nut extensions, must be welded and one-piece.

481.4.4.2 All valves shall be fitted with a cast iron valve box and cover. Valve boxes shall be long enough to reach from the valve to finished ground level and shall be installed as recommended by the manufacturer. They shall have suitable barrel and shaft extension sections to cover and protect the valve bonnet section. Extension sections fabricated by one piece of ductile iron shall be allowed. No more than one (1) shaft extension shall be used in any one (1) valve installation.

481.4.4.3 Valve boxes shall be installed in vertical alignment and positioned to facilitate the operation of the valve with a standard valve wrench. The box shall be installed as shown on the drawings and shall be set on firmly packed soil and bricks so as to prevent settlement and to prevent bearing on the valve or the main at any point.

481.4.4.4 Installation of valve boxes shall be in accordance with these Specifications and Standard Details 478-4.1A and 478-4.1B.

481.4.4.5 Terminate locating wire(s) on all sizes of PVC and HDPE water mains in the valve boxes in accordance with Detail 478-7.1A.

481.4.5 Adjusting Valve Boxes

481.4.5.1 All valve boxes which lie within the area of finished construction shall be adjusted to finish grade in accordance with these Specifications and Standard Details 478-4.1A and 478-4.1B.

481.4.5.2 Valve boxes shall be protected during construction in accordance with these specifications. Any valve boxes damaged during construction shall be replaced at the **CONTRACTOR'S** expense. Removal and replacement of the valve box during construction may be authorized provided the **CONTRACTOR** insures that sufficient valve ties are available and on site in order to quickly locate the valve.

481.4.5.3 Adjustment of valve boxes shall be subject to the approval of the **CITY ENGINEER** and **UTILITY DIRECTOR**. The **CONTRACTOR** shall maintain vertical alignment and position so as to permit operation of the valve with a standard valve wrench. No more than one (1) extension piece shall be allowed in any installation. Valve box extensions shall be made from six inches (6") cast iron or ductile iron.

481.4.5.4 Abandonment of valves and valve boxes shall be subject to approval of the **UTILITY DIRECTOR**. The **CONTRACTOR** shall close abandoned valves and fill the box with concrete.

481.4.6 Fire Hydrant Installation

481.4.6.1 Where hydrants are to be located at intersections, the hydrant shall be located 25' back from the intersection of right of way lines. Where major highways are involved, the fire hydrants shall be placed on the connecting street.

481.4.6.2 A minimum distance of seven and a half feet (7.5') shall be maintained from any obstruction such as fences, buildings, trees, etc. In no case shall the distance from the right of way line to the fire hydrant be less than three feet (3'), unless an easement is provided to ensure setback requirements.

481.4.6.3 Hydrants shall be set so that a minimum of three feet (3') of clearance is provided between the hydrant operating nut and any obstacles that may hinder opening and closing of the hydrant.

481.4.6.4 Cover over the connecting pipe from the main to the hydrant shall be thirty-six inches (36") minimum unless specified otherwise on the plans.

481.4.6.5 Fire hydrants shall be blocked by concrete or mega-lug restraints on the back side of the hydrant to prevent movement due to water pressure thrust. Gravel or rip rap shall be placed around the base of the hydrant to insure complete drainage of the hydrant when closed. See Standard Detail 488-1.1.

481.4.6.6 Until fire hydrants have been accepted by the **UTILITY DIRECTOR** and are ready for use, the **CONTRACTOR** shall place a bag on a hydrant. The bag will remain on the hydrant until an acceptable flow test has been performed. Other methods may be used with approval from the **UTILTY DIRECTOR.**

481.4.6.7 The **CONTRACTOR** is warned that the **CITY** will flow test all fire hydrants prior to the work being considered for acceptance. Unless required by the **CITY ENGINEER** to prevent erosion prior to the time of flow testing, seeding and mulching (or sodding, if required) and final grading around a hydrant should be

completed after successful flow testing of that hydrant. The **CITY** shall not be responsible for reworking, reshaping, seeding, mulching, sodding or other related work disrupted during hydrant testing and prior to acceptance of the hydrant by the **CITY**.

481.4.6.8 Fire hydrants shall be installed in accordance with these Specifications and Standard Detail 488-1.1. The **CONTRACTOR** shall be responsible for hydrant adjustment to grade.

481.4.6.9 Where adjustment of hydrants becomes necessary the hydrant shall be adjusted by use of a hydrant extension. Only one (1) extension shall be allowed to adjust the hydrant to final grade. Hydrant extension shall be by the same manufacturer as the hydrant. Maximum length of extension is two feet (2').

481.4.7 Service Connections

481.4.7.1 All new service connections shall be constructed in accordance with these Specifications and Standard Detail 488-2.

481.4.7.2 Water services shall be installed near property corners and shall be a single service.

481.4.7.3 All water services shall be installed with a solid copper locating wire(s) in accordance with Standard Detail 478.7.1A. Locating wires shall be installed to a three o'clock, nine o'clock position, or directly above the service pipe. A single locating wire may be used in place of the double wire. The single wire must meet specifications 479-08-04-01 and placed above the pipe. Plastic tie straps shall be used to secure the wire.

481.4.7.4 Water meters shall be located at the right of way line and on the property owner's side of the right of way line.

481.4.7.5 Existing water services that are to be relocated to new water mains shall be relocated as indicated on the plans. The **CONTRACTOR** shall install all new service pipe and fittings including the back side of the meter box.

481.4.7.6 Water services under roads shall be installed in a casing. For three-quarter inch (¾") and one inch (1") piping, install in two inch (2") PVC, HDPE, or steel casing. For two inch (2") piping, install in four inch (4") PVC, HDPE, or steel casing.

481.4.8 Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of the pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

481.4.9 Handling and Cutting Pipe

481.4.9.1 The **CONTRACTOR'S** attention is directed to the fact that cast iron used for pipe and fittings is comparatively brittle. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating.

481.4.9.2 Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

481.4.9.3 In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved, may be cut off by and at the expense of the **CONTRACTOR** before the pipe is laid so that the pipe used may be perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

481.4.9.4 Except as otherwise approved, all cuttings shall be done with a machine having rolling wheel cutters, or pipe saw adapted for that purpose. All cut ends shall be examined for possible cracks caused by cutting.

481.4.10 Sleeve-Type Couplings

481.4.10.1 Couplings shall be furnished with the pipe stop removed. Couplings shall be provided with plain, Grade 27, rubber gaskets and with black, steel, track-head bolts with nuts.

481.4.10.2 To ensure correct fitting of pipe and couplings, all sleeve-type couplings and accessories shall be furnished by the supplier of the pipe.

481.4.11 Setting Appurtenances

481.4.11.1 All valves, fittings and appurtenances installed upon the pipelines shall be set and jointed by the **CONTRACTOR** as indicated on the drawings or as required.

481.4.11.2 Valves shall be set vertically so that stems form a vertical line. Care shall be taken to keep out dirt and sand, and no valves shall be operated until it has been cleaned of sand, grit, or other foreign material.

481.4.12 Piping Support and Thrust Blocking

481.4.12.1 The **CONTRACTOR** shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or specified.

481.4.12.2 All bends, tees, and other fittings in pipelines and sleeve-coupled pipelines buried in the ground shall be backed with Class 1 concrete placed against undisturbed earth where firm support can be obtained or by the use of restrained joints. If the soil does not provide firm support, then suitable tie rods, clamps, and accessories or restrained joints shall be provided to brace the fitting properly. Such tie-rods, etc., shall be zinc plated or coated thoroughly and heavily with an approved bituminous paint after assembly or, if necessary, before assembly.

481.4.12.3 Where buried piping contains fittings which raise or lower the centerline of the pipe, suitable socket clamps, tie rods, or other approved restraining devices shall be used to prevent movement of the fittings. The restraining devices shall be coated thoroughly and heavily with an approved bituminous paint or wrapped.

481.4.13 Nonstandard Fittings and Wall Castings

Fittings having non-standard dimensions and cast especially for this project shall be of approved design. They shall be manufactured to meet the requirements of the same specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect.

481.4.14 Tapped Connections to Cast Iron Pipe

481.4.14.1 Tapped connections in the barrel of cast iron pipe or fittings without bosses shall not exceed the following sizes:

Normal Size of Pipe	Maximum Nominal Size of Pipe
3”	½”
4”	¾”
6”	1”
8”	1 ¼”
10”	1 ½”
12”	2”

481.4.14.2 Where the size of the connection exceeds that given above for the pipe in question, a boss shall be provided on the pipe barrel, the tap shall be made in the flat part of the intersection of the run and branch of a tee or cross, or the connection shall be made by means of a tapped tee, branch fitting and tapped plug or reducing flange, or tapping tee and tapping valve, all as indicated or approved.

481.4.14.3 All drilling and tapping of cast iron pipe shall be done normal to the longitudinal axis of the pipe; fittings shall be drilled and tapped similarly, as appropriate. Drilling and tapping shall be done only by skilled mechanics. Tools shall be adapted to the work and in good condition so as to produce good, clean-cut threads of the correct size, pitch, and taper. Bits must be chlorinated prior to beginning of drilling.

Existing valves will be locked in lieu of providing a gap in the piping and will not be unlocked until clearance is obtained.

481.4.15 Connections to Existing Water Lines

481.4.15.1 Connections to existing water lines shall be where shown on the plans and shall be done as detailed on the plans or as directed by the **UTILITY DIRECTOR**. Connection cannot occur until clearance has been obtained by the **UTILITY DIRECTOR.** Connection of new to existing mains shall be performed in the normal accepted method for connecting mains and shall be done without unduly disrupting service. All connections regardless of how done are subject to the approval of the **UTILITY DIRECTOR** as to method, time, and location.

481.4.15.2 Where proposed lines are connected to existing lines, the **CONTRACTOR** shall take appropriate action to insure that the existing lines do not interfere with the disinfection or pressure testing portions of the work. Failure to do so will not relieve the **CONTRACTOR** of the responsibility of properly disinfecting and pressure-testing the entire system installed. The **CONTRACTOR** shall bear full responsibility for his action or inaction in this matter and shall not claim damages, injuries or additional compensation for his action or inaction.

481.4.15.3 Where new water services are to replace existing water services, the entire existing water service shall be removed to the main except for the valve or corporation stop controlling the service. This shall include the pipe and gooseneck assembly. Refer to Section 481.4.7.3 of these specifications for additional requirements.

481.4.15.4 Water from existing lines cut either by accident or during connection to proposed lines shall not be disposed of in a manner that would be injurious to residents, property or structures.

481.4.15.5 Existing water mains or services reduced to 20 psi, or lower, shall be bacteriologically tested to ensure no contamination. Boil water notices or advisories must be issued to affected customers whether by accident or planned.

481.4.16 Open Cut Pavement Crossings

481.4.16.1 Bases, Sidewalk, Curb and Driveway Repairs - The **CONTRACTOR** shall replace any and all bases, sidewalks, curbs and gutter, and driveways with materials and workmanship sufficient to give an equal and similar surface to the disturbed areas as existed before construction with minimum standards as established elsewhere in the Specifications.

481.4.16.2 Pavement removal and replacement shall be in accordance with City of Valdosta standards when work is within the City of Valdosta right-of-way. Refer to GDOT standards when working within GDOT right-of-way.

481.4.17 Contamination

No water main shall be installed within six feet (6') of a sanitary sewer line, unless the bottom of the water main is at least six inches (6") higher than the crown of the sanitary sewer, or unless special permission is obtained from the **UTILITY DIRECTOR.** In no case shall a water main be placed in the same trench with a sanitary sewer.

481.4.18 Cleaning and Flushing

481.4.18.1 Prior to the pressure and leakage tests, all piping shall be thoroughly cleaned of all dirt, dust, oil, grease and other foreign matter. This work shall be done with care to avoid damage to any inside coating.

481.4.18.2 All lines shall be thoroughly flushed with clean water to clear the lines of all foreign matter.

481.5 INSPECTION AND TESTING

481.5.1 General

All pipe, fittings, valves, and other items shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

481.5.2 Field Testing

481.5.2.1 In this section, the terms "piping" and "pipelines" shall include the pipe, fittings, joints, valves, hydrants and all other appurtenances necessary for the complete work.

481.5.2.2 Except as otherwise directed, all pipelines shall be tested. Pipelines laid in excavation or bedded in concrete shall be tested prior to the backfilling of the excavation or placing of the concrete, and exposed piping shall be tested prior to field painting.

481.5.2.3 All piping to operate under liquid pressure shall be tested in sections of approved length. For these tests the **CONTRACTOR** shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment and all labor required, without additional compensation. The **CONTRACTOR** shall furnish suitable pressure gauges, pumps and measuring tank.

481.5.2.4 Water for testing and flushing shall be furnished by the **CITY** unless otherwise specified by the **UTILITY DIRECTOR**. The **CONTRACTOR** shall make suitable arrangements with the City Utility Department for the monitoring of water consumption and locations to which water may be made available.

481.5.2.5 Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If hydrants, blowoffs, or other outlets are not available at high points for releasing air, the **CONTRACTOR** shall make the necessary taps at such points, and shall plug said holes after completion of the test.

481.5.2.6 All piping shall be subjected to hydrostatic testing in accordance with Section 4 "Hydrostatic Testing" of AWWA C-600-latest. Pressure tests shall be at 150 psi, minimum, for a minimum of two (2) hours duration. No pipe installation will be accepted if the leakage is greater than that determined by the following formula or 5 psi:

$$L = \frac{SD(P)^{1/2}}{133{,}200}$$

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)

481.5.2.7 It is the intent of this section to insure that all parts of the work including but not being limited to pipe, fittings, joints, valves, hydrants, and any other appurtenances are subjected to testing as described herein. To achieve this, all methods of testing shall be approved by the **CITY ENGINEER.**

481.6 DISINFECTION

481.6.1 In this section, the terms "piping," "pipelines," and "water lines" shall include the pipe, fittings, joints, valves, hydrants and all other appurtenances necessary for the complete work.

481.6.2 After pressure testing has been accomplished, the **CONTRACTOR** shall disinfect all potable water lines of all sizes and material.

481.6.3 The **CONTRACTOR** shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in the AWWA Specifications C-651 and C-600. The use of chlorine tablets for disinfection purposes shall not be allowed. The dosage shall be such as to produce not less than 10 ppm after a contact period of not less than 24 hours. After treatment, the line shall be flushed with clean water until the residual chlorine content does not exceed 0.2 ppm.

481.6.4 After disinfection has been accomplished, samples of water for bacteriological analysis shall be collected and tested by the **CITY** or an independent testing laboratory approved by the State of Georgia and the **CITY**. Should these samples or subsequent samples prove to be unsatisfactory, the piping shall be disinfected until satisfactory samples are obtained. Samples shall be taken on two (2) consecutive days and in the presence of and as directed by the Project Inspector by a third party.

481.6.5 It is the intent of this section to insure that all parts of the work, including but not being limited to: pipe, fittings, joints, valves, hydrants, and any other appurtenances are subjected to disinfection as described herein. To achieve this, all methods of disinfection shall be approved by the **CITY ENGINEER** and **UTILITY DIRECTOR**

481.7 ABANDONING WATER MAINS

481.7.1 When water mains are to be abandoned and called for on the plans to be left in place, the **CONTRACTOR** shall cut the water main as required to make connections or install plugs. That portion of the pipe to be abandoned and left in place shall be plugged at locations where the pipe was cut or punctured. Plugging shall be done by grouting the end or punctured area to the satisfaction of the **CITY ENGINEER**.

481.7.2 Water mains to be abandoned and removed shall be cut or disconnected as required.

481.8 ASBUILTS

After all work has been completed on the water main system, the entire project shall be asbuilt in accordance with Section 486 of this manual. This shall include asbuilts of construction plans and preparations of valve tie sheets.

DIVISION 480

SECTION 485

WATER SYSTEM DESIGN, PROCEDURES AND POLICIES

SECTION 485

WATER SYSTEM DESIGN, PROCEDURES AND POLICIES

485.1 GENERAL

485.1.1 This section has been provided to give Developers and Engineers a guideline in the design of water mains and related systems and appurtenances which will eventually become the ownership of the **CITY**. The guidelines set forth hereinafter are intended to be the policy of the **CITY** with regards to certain criteria the **CITY** feels is necessary in the expansion of its water distribution system. Certain items in Sections of Division 480 or as particularly specified in City of Valdosta Ordinances, or policies shall govern over the guidelines specified herein.

485.1.2 Reference to materials under this section are used in general. Refer to Section 489 of this manual for particular sizes, manufacturers, and model numbers.

485.2 DESIGN OF WATER SYSTEM

485.2.1 WATER MAINS

485.2.1.1 Pipe Sizes

485.2.1.1.1 Water main pipe diameters shall be 6", 8", 12", 16", 18", 20", 24", 30", or 36" only. Other size pipe diameters shall not be allowed except that where new water mains are to be connected to existing water mains which are of a lesser diameter (i.e., an 8" main on a 6" main) and the opposite end of the water main cannot be connected to an existing main that has a pipe diameter equal to or larger than the new main, then the pipe diameter of the new main may be the same diameter as the existing main but shall be subject to the approval of the **CITY ENGINEER** and **UTILITY DIRECTOR**.

485.2.1.1.2 Six inch (6″) to 12″ water mains shall be polyvinylchloride (PVC) or ductile iron pipe (DIP) based on pressure. If PVC and ductile iron pipe are the same price, DIP will be used. All PVC pipe shall be potable water blue, have identifying tape and locating wire(s). PVC pipe shall meet requirements of ANSI/AWWA C-900, DR14 and DR18. All HDPE pipe shall be color coded blue striping and locating wire(s). HDPE pipe shall meet requirements of ANSI/AWWA C906, DDR-9 and DR-11.

485.2.1.1.3 12″ to 36″ water mains shall be PVC or DIP based on pressure. PVC pipe shall meet requirements of ANSI/AWWA C905, DR14 and DR18.

485.2.1.1.4 Minimum size mains where fire hydrants or fire systems are to be installed shall be eight inches (8″). All hydrant connections off the water mains shall be six (6″) inches and DIP.

485.2.1.1.5 Sizing of water mains shall be in accordance with the City's master distribution plans.

485.2.1.1.6 Fittings shall be DIP fittings for DIP and PVC installations. Mega-lugs can be used on DIP pipe and on PVC, if they are lower cost than concrete thrust blocks or if concrete thrust blocks can't be used. Mega-lugs on PVC have to be non-penetrating mega lugs, specifically designed for PVC.

485.2.1.1.7 For PVC water mains, DIP tees and valves will be installed at any potential future connection points where the future connection is 6" or larger in diameter.

485.2.1.1.8 Taps on PVC water mains use shall be tapping saddle with straps.

485.2.1.1.9 Locating wire(s) shall be installed on all PVC, HDPE, and PEXa water mains.

485.2.1.1.10 Provide design calculations showing the pressures designed for the water system. The working pressures within the system shall not exceed the pressure class of the pipe with a 1.5 safety factor. PVC C-900, DR-14 is rated at 305 psi, PVC C-900, DR-18 is rated at 235 psi.

485.2.1.1.11 All water mains shall be looped.

485.2.1.1.12 City will maintain all water mains to the point of metering or double detector check assembly location unless the system is private.

485.2.1.2 Locations

485.2.1.2.1 Water mains shall be constructed eight feet (8') off the north or east right-of-way lines unless otherwise authorized by the **CITY ENGINEER**, refer to Section 478-1.3 Water lines to be constructed in easements shall be centered within the boundaries of the easement. If trees or other structures should interfere with the alignment of the water main, the water main shall be adjusted towards the right-of-way line. Permanent easements shall be provided where the adjustment is required beyond the right-of-way limits. Minimum easement width shall be 20′.

485.2.1.2.2 Minimum depths shall be 36" in all road rights-of-way and easements. The depth of cover shall be measured from the top of the water main to the finished grade or the centerline of the roadway directly above the pipe.

485.2.1.2.3 Minimum horizontal clearance between parallel water mains and gravity sanitary sewer mains shall be ten feet (10'). Where it is not technically feasible or economically sensible to comply with this requirement maintain a minimum horizontal clearance of six feet (6'). See Detail 478-1.4A.

485.2.1.2.4 Minimum horizontal clearance between parallel water mains and storm sewer mains shall be three feet (3'). See Detail 478-1.4A.

485.2.1.2.5 Minimum horizontal clearance between parallel water mains and sanitary sewer force mains shall be ten feet (10') Where it is not technically feasible or economically sensible to comply with this requirement maintain a minimum horizontal clearance of six feet (6'). See Detail 478-1.4A.

485.2.1.2.6 Minimum horizontal clearance between parallel water mains and reuse force mains shall be three feet (3'). See Detail 478-1.4A.

485.2.1.2.7 Minimum vertical clearance between water mains and gravity sanitary sewer mains crossing each other shall be twelve inches (12") Where it is not technically feasible or economically sensible to comply with this requirement maintain a minimum vertical clearance of six inch (6"). See Detail 478-1.4A.

485.2.1.2.8 Minimum vertical clearance between water mains and storm sewer mains crossing each other shall be twelve inches (12") Where it is not technically feasible or economically sensible to comply with this requirement maintain a minimum vertical clearance of six inch (6"). See Detail 478-1.4A.

485.2.1.2.9 Minimum vertical clearance between water mains and sanitary sewer force mains crossing each other shall be 12". See Detail 478-1.4A.

485.2.1.2.10 Minimum vertical clearance between water mains and reuse force mains crossing each other shall be 12". See Detail 478-1.4A.

485.2.1.2.11 Water lines, regardless of whether they are City or Developer owned or maintained, shall be constructed to City Standards up to the point of metering and looped.

485.2.1.2.12 All water lines located on private property shall be owned and maintained by the property owner, except where it is to the advantage of the **CITY** to own and maintain the water line, in which case, such water lines shall be within a legally described easement dedicated to the **CITY**. Minimum easement width shall be 20′.

485.2.1.2.13 Water mains shall not be located within six (6′) feet of the center of trees.

485.2.1.3 Termination of Water Mains

485.2.1.3.1 Isolation valves shall be installed on water mains which are plugged for future extension.

485.2.1.3.2 Where it is not technically feasible or economically sensible to comply with looping the water main, a permanent blow-off assembly shall be installed for flushing and sampling of the water main. Fire hydrants or permanent blow-off assemblies shall be provided for this purpose.

485.2.1.3.3 Where water mains are stubbed out for future extension and the distance from the isolation value to the plug is less than 40' a Construction Blow-off Assembly (Standard Detail 488-3.3C) shall be installed.

485.2.1.3.4 Where water mains are stubbed out for future extension and the distance from the isolation valve to the plug is 40' or greater a Temporary Blow-off Assembly (Standard Detail 488-3.3A) shall be installed.

485.2.2 WATER VALVES

485.2.2.3 Water valves shall be placed on either side of the pavement where water mains cross highways consisting of four or more lanes of traffic.

485.2.2.4 Water valves shall be placed at all tees where branch lines are to be installed to provide maximum control of the distribution system. Valves shall be installed adjacent to tees except where valve boxes would fall in a curb face the valve may be adjusted away from the tee, subject to approval of the **UTILITY DIRECTOR**.

485.2.2.5 Water valves shall be placed on all services two (2″) inches or greater. Valves shall be located at the tee.

485.2.3 FIRE SERVICES

FIRE HYDRANTS

485.2.3.1 Hydrant spacing shall be in accordance with Table C105.1 of the International Fire Code.

485.2.3.2 Where hydrants are to be located at intersections, the hydrant shall be located 25’ back from the intersection of right-of-way lines. Where major highways are involved, the fire hydrants shall be placed on the connecting street.

485.2.3.3 A minimum distance shall be maintained of 7 1/2′ to the left, right and front of the hydrant and 4′ to the rear from any obstruction such as fences, buildings, trees, etc. In no case shall the distance from the right-of-way line to the fire hydrant be less than three feet (3’) unless an easement is provided to insure setback requirements. This requirement applies to Fire Department connections (FDC) also.

485.2.3.4 Fire hydrants shall be factory painted white primer.

485.2.3.5 Fire hydrant is required to be no more than 250′ from the front of the building and no more than 500’ to the extreme rear of the building.

485.2.3.6 Existing fire hydrants required to be painted white with the bonnet color coded:
Red: up to 499 GPM
Orange: 500 – 999 GPM
Green: 1,000 – 1,499 GPM
Blue: 1,500 GPM and up

485.2.3.7 Fire hydrants located along vehicle turning radius or commercial vehicle travel lanes shall be installed with concrete filled bollards for protection.

485.2.3.8 In accordance with City Code, prior to any vertical building construction there must be operational fire hydrants within 250′ of the front of the exterior remote portion of the building.

485.2.3.9 Where a fire hydrant and fire department connections (FDC) are both located on the same main downstream from a backflow preventor, a check valve must be installed between the hydrant service tee and the FDC.

485.2.3.10 Fire hydrants shall not be installed near underground electric transformers. Maintain minimum 50′ set back.

485.2.3.11 All fire hydrants shall be City flowed and maintained.

485.2.3.12 All fire hydrants shall have their locations shown by the placement of a blue reflector in the middle of the roadway in accordance with MUTCD.

FIRE PROTECTION SYSTEMS

485.2.3.13 Where fire sprinkler systems are to be installed, double detector check (DDC) or fire flow assemblies shall be installed in the fire lines at the right-of-way line on the property owner's side. No potable water service shall be installed downstream of the DDC location.

485.2.3.14 A Double Detector Check (DDC) Assembly shall be installed on a private fire line where fire hydrant(s) are installed and no connection is made to a building at the nearest potable water tee. No potable water shall be supplied downstream from the DDC location.

485.2.3.15 A Double Detector Check (DDC) Assembly shall be installed on a private fire line where the fire main is connected to a building at the nearest potable water tee. Fire hydrants may or may not have been installed. No potable water shall be supplied downstream from the DDC location.

485.2.3.16 A Fire Flow Assembly shall be installed at the property line where one (1) line is run into a property and at some point downstream from the Assembly and along the main, separate water mains are branched off afterwards for separate potable water and fire systems. A separate potable water meter is not to be installed. A backflow preventer must be installed downstream and adjacent to the fire flow meter assembly in addition a double check valve is required at the branch tee of the fire main. This application shall only be used in special cases approved by the **UTILITY DIRECTOR**.

485.2.3.17 Double detector check (DDC) assemblies or post indicator valves (PIV) shall be installed with electronic tamper switches.

485.2.3.18 Fire department connection (FDC) shall be located facing vehicle travel lanes, fully visible, recognizable and accessible from the travel lane or nearest point of fire department apparatus accessibility and shall be arranged without interference from nearby objects, including buildings, fences, posts, trees, vehicles or other obstructions hindering access.

485.2.3.19 Where fire sprinkler systems are installed requiring the connection of a fire main to a building, a fire department connection (FDC) shall be installed. The location of the FDC must be immediately accessible to fire department vehicles.

485.2.4 WATER SERVICES

485.2.4.1 Water services shall be installed with five feet (5') of property corners and shall be a single service for subdivision lots, both single family and commercial.

485.2.4.2 Minimum size service pipe for three or more meters on one service connection shall be two inches (2").

485.2.4.3 No more than three (3) services shall be installed on one (1) two-inch (2") line, eight (8) services on looped mains unless a licensed Georgia professional engineer provides a hydraulic analysis proving that there will be adequate water flow and pressure.

485.2.4.4 Meters shall be installed as specified in Standard Detail 488-2.

485.2.4.5 For commercial subdivisions, the water service pipe, from the main to the metered location, shall be two inches (2") minimum, regardless of meter size.

485.2.4.6 Water meters shall be located at the right of way line and on the property owner's side of the right of way line.

485.2.4.7 Individual meters for Shopping Centers and residential subdivisions may be installed at locations required by the developer unless otherwise specified by the **CITY ENGINEER**. Water lines upstream from the point of individual metering shall be installed to **CITY** standards.

485.2.4.8 Where the service main is two inches or above and on which a two inch (2") or above Gate Valve and Valve Box is installed within the right of way, the developer shall furnish to the **CITY** a "Valve Tie Sheet" as specified in Section 486.3 of this manual.

485.2.4.9 Water services should not be installed within five (5′) feet of electrical transformers and underground electric.

485.2.5 SITE PLANS

The following information is required on site plans prior to approval.

GENERAL

485.2.5.1 Provide an individual plan drawing titled "Utility Plan". The Utility Plan should adhere to or show the following requirements as applicable.

485.2.5.2 All water and sanitary sewer construction shall be in accordance with the latest edition of the Volume I, City of Valdosta Standard Specifications for Water and Sanitary Sewer Construction. A note shall be placed on the plans accordingly.

485.2.5.3 The location of all existing and proposed water mains, water services, water meter boxes, hydrants and valves relative to this site are to be shown. Use the standard City legend as specified in Section 478-1.1.

485.2.5.4 Show size of all water mains existing and proposed.

485.2.5.5 Provide the average daily water demand anticipated in gallons per day. Where irrigation systems are installed (commercial) and connected to the City system, show both potable and irrigation demands.

485.2.5.6 The City of Valdosta shall be granted an easement for the maintenance of the City water system on site if the water main is to be maintained by the City. A note shall be placed on the plans accordingly.

485.2.5.7 Water clearance from the City of Valdosta must be obtained before placing the water system in operation and issuance of partial or final Certificate of Occupancy (CO). Place note on plans accordingly.

485.2.5.8 Water system asbuilt must be submitted to City prior to issuance of Certificate of Occupancy in accordance with Section 486. Place note on plans accordingly.

485.2.5.9 Where existing water mains fall within or are related to the site area show the Official Record (OR) book and page.

485.2.5.10 For each building indicate number of stories and units.

WATER SERVICES/BACKFLOW PREVENTORS

485.2.5.11 City will maintain all water mains two inch (2") in diameter and above to the point of metering and hydrant location unless the water mains are to remain private. Install a note on plans accordingly.

485.2.5.12 Commercial water services should be located at the property line unless water mains are extended on-site and are to be maintained by the City. Number of meters and size

to be shown as applicable. Water services to be installed with a DDC or RPZ are to be installed by licensed plumbing Contractor or licensed underground utility contractor and the testable backflow devices placed above ground.

485.2.5.13 If an existing water services has to be relocated because of construction issues it is to be located at the property line on the property owner's side of the property line.

485.2.5.14 All new backflow preventors are to be installed "By Contractor" above ground and a note should be placed on the plans accordingly.

485.2.5.15 For all commercial sites where any site plan has been submitted for review, major or minor, and any site water meter does not have a backflow preventer existing or proposed one will need to be installed immediately after and adjacent to each meter location requiring backflow prevention. It must be tested immediately after it is installed or repaired by a certified tester. All backflow preventers need to be installed above ground.

485.2.5.16 All commercial water services require a double check valve or a reduced pressure backflow preventer to be installed after the meter and above ground. Freeze protection is recommended for all backflow preventers.

485.2.5.17 Multi family water services require a reduced pressure backflow preventor. Backflow preventor can be installed prior to the meter breast but in any event the backflow preventor will remain private.

485.2.5.18 Only three 5/8" x 3/4" water meters are allowed on one 2" water service line unless a licensed Georgia professional engineer provides a hydraulic analysis proving that there will be adequate water flow and pressure. Up to six (6) may be approved where the service line is looped on both ends.

485.2.5.19 Only two 1″ water meters are allowed on one 2" water service line unless a licensed Georgia professional engineer provides a hydraulic analysis proving that there will be adequate water flow and pressure. Up to three may be approved by the **UTILITY DIRECTOR** in special cases where the service line is looped on both ends (maximum length 200′) or is less than 100′ in length and is connected to a looped 8″ or larger water main.

485.2.5.20 Only one 1-1/2″ water meter is allowed on one 2″ water service line unless a licensed Georgia professional engineer provides a hydraulic analysis proving that there will be adequate water flow and pressure. Up to two may be approved by the **UTILITY DIRECTOR** in special cases where the service line is looped on both ends (maximum length 200′) or is less than 100′ in length and is connected to a looped 8″ or larger water main.

485.2.5.21 Only one 2" water meter is allowed on one 2" water service line unless a licensed Georgia professional engineer provides a hydraulic analysis proving that there will be adequate water flow and pressure.

485.2.5.22 The size of each water meter should be shown.

485.2.5.23 A gate valve shall be provided at the main for all new service lines with 2″ or larger piping.

485.2.5.24 All water service piping, two (2″) inches or less, from the main to the meter or tee at the meter connection, to be PEXa tubing unless otherwise approved by the **UTILITY DIRECTOR.**

485.2.5.25 Service piping from the meter to the structure shall be in accordance with local building codes.

485.2.5.26 All existing meter boxes and backflow preventors that fall in areas of new construction are to be adjusted to the new surrounding grade. Add note if applicable.

485.2.5.27 If an existing water meter box falls in a new or existing driveway location the meter box will need to be relocated out of the driveway/pavement area. Indicate on the plans the meter service to be relocated and show the new location.

485.2.5.28 Water meters are not to be installed in new sidewalks. Meters should be installed on the backside of the sidewalk.

485.2.5.29 Water meters shall be located in grass areas where possible.

485.2.5.30 Where water meters cannot be installed in grass areas due to restrictions or other reasons as approved by the **UTILITY DIRECTOR**, bollards shall be installed. Minimum two required, four preferred.

485.2.5.31 Water services that are to be located onsite shall be located as close as possible to the water main.

485.2.5.32 Sites with multiple units shall have each meter box clearly marked with the unit it serves.

485.2.5.33 Where backflow preventors are located within three foot (3′) of a travel or parking lane, bollards shall be installed. Minimum two required, four preferred.

485.2.5.34 When bollards are called for they shall be installed in accordance with City detail, 478-8.1.

485.2.5.35 When landscaping is to be installed surrounding a backflow preventor, at a maturity of the plantings, the landscaping shall be a minimum of 18″ from the backflow device.

485.2.5.36 When landscaping is to be installed surrounding a backflow preventor, at maturity of the plantings provide, a minimum clear opening access to the device of 24″.

485.2.5.37 When landscaping is to be installed surrounding a fire hydrant, at maturity of the plantings, the landscaping shall be a minimum of seven feet (7′) to the left, right and front of the (largest nozzle) pumper connection and four feet (4′) to the rear of the

hydrant. The front of the hydrant shall have no landscaping installed so as to prohibit access or visibility of the hydrant.

485.2.5.38 All irrigation wells, existing and proposed, shall have a double check type backflow preventor.

485.2.5.39 All irrigation water meters to have an approved backflow preventor.

485.2.5.40 All commercial water services existing and proposed shall have an approved backflow preventor installed immediately after each water meter. Commercial backflow preventors shall be reduced pressure (RP) type.

485.2.5.41 All multifamily water services existing and proposed shall have an approved backflow preventor installed at the meter location. One backflow preventor may be installed prior to a meter location for banks of meters containing two to six meters. Backflow preventor shall be reduced pressure (RP) type.

485.2.5.42 All backflow preventors, regardless of the location relative to the meter, shall be privately owned and maintained. A note shall be placed on the plans accordingly.

485.2.5.43 All dedicated fire mains, with no potable water connections shall have an approved double check backflow preventor with detection meter.

485.2.5.44 All backflow preventors shall be lead free, testable, and installed above ground.

485.2.5.45 A minimum clear zone shall be maintained around the backflow preventor device of 18″ minimum to the front, rear and sides of the device.

485.2.5.46 All new backflow prevention devices shall be tested by certified testers and copies of such tests shall be provided to the City prior to issuance of a Certificate of Occupancy (CO) for the unit to which the device has been installed for. Testing and certification shall be in accordance with 6.1, testing, maintenance, and certification of required backflow preventers of the City's Manual of Cross Connection Control. A note shall be placed on the plans accordingly.

FIRE HYDRANTS/MAINS

485.2.5.47 All fire hydrants shall be City maintained unless otherwise authorized by the **CITY ENGINEER** and **FIRE CHIEF.**

485.2.5.49 Before any vertical construction of buildings can commence a fire hydrant must be online and operational within 500′ of the extreme rear of the building. The hydrant can be existing or a new installation. New hydrants cannot be placed into service until the water main is cleared through the City of Valdosta. A note should be placed on the plans accordingly.

485.2.5.50 Show the location of the nearest existing fire hydrant. Hydrant should be shown in its relative location where possible. If not possible, show the distance from the hydrant to the nearest property corner along vehicle traffic lanes.

485.2.5.51 All City fire hydrants are to be painted by the City of Valdosta Fire Department. Place a note on plans accordingly.

485.2.5.52 All existing private fire hydrants are to be tested and color coded by the Valdosta Fire Department.

485.2.5.53 Provide a clear zone around all fire hydrants. Seven feet (7′) to the left, right and front of the (largest nozzle) pumper connection and four feet (4′) to the rear of the hydrant.

485.2.5.54 All fire mains connected to structures are to be installed with a Double Detector Check Assembly (DDC). No fire hydrants are to be located downstream from the DDC.

485.2.5.55 Location of Double Detector Check Assembly (DDC) shall be at locations approved by the **UTILITY DIRECTOR**.

485.2.5.56 Fire Department Connection (FDC) to be located on all fire mains connected to structures.

485.2.5.57 Location of Fire Department Connection (FDC) to be located between the Double Detector Check Assembly and the structure and must be accessible by fire department equipment.

485.2.5.58 Location of Fire Department Connection (FDC) to be located within 100′ of a City maintained fire hydrant.

485.2.5.59 Double Detector Check Assembly (DDC) to be located in grass areas where possible.

485.2.5.60 Where Double Detector Check Assembly (DDC) cannot be installed in grass areas due to restrictions or other reasons as approved by the **CITY ENGINEER**, bollards shall be installed. Minimum four required.

485.2.5.61 Where Double Detector Check Assembly (DDC) are located within three (3′) feet of a travel or parking lane, bollards shall be installed. Minimum four required.

485.2.5.62 All water mains shall be looped. Easements must be granted if the main is to be looped in the future.

485.2.5.63 All water main piping under the width of the roadway shall be DIP or placed in a casing or sleeve.

485.2.5.64 All water service piping under pavement shall be sleeved with a casing.

485.2.5.65 Where casings or sleeves are called for, casing or sleeve material shall be steel, DIP, PVC or HDPE or other material as approved by the **UTILITY DIRECTOR**.

When landscaping is to be installed a note must be placed on the plans indicating if an irrigation system is to be installed.

485.2.5.66 When landscaping is to be installed and an irrigation system is to be constructed, indicate if the source of water will be by well or irrigation meter. If by well, show location and size of well. If by water meter, show location and size of meter and backflow device.

485.2.5.67 All water mains that are to be City maintained will require an as-built drawing. The drawing shall show the location of all water mains, hydrants, valves, fittings (Tees, bends and reducers). As-built drawing shall be in accordance with Section 486, Volume I, City of Valdosta Standard Specifications for Water and Sanitary Sewer Construction. A note should be placed on the plans accordingly.

485.2.5.68 All City maintained water mains, fire mains, water services and hydrants will require an easement to be provided prior to obtaining a Certificate of Occupancy (CO). Add a note to the plans accordingly.

485.2.6 SUBDIVISION

The following information is required on subdivision plans prior to approval.

485.2.6.1 Provide an individual plan drawing titled "Water Master Plan." The Master Plan shall show the entire subdivision layout with lots, streets, lot numbers, block numbers, proposed water mains, water valves and fire hydrants.

485.2.6.2 Show existing water mains, valves and hydrants relative to the project**.**

485.2.6.3 Show size of all existing and proposed water mains.

485.2.6.4 Fire hydrants spacing shall be in accordance with Table C105.1 of the International Fire Code.

485.2.6.5 Control valves to be placed as required to minimize as much as possible the number of water services that would be out of service due to a break in a water main.

485.2.6.6 Water mains to be looped. The **CITY UTILITY DIRECTOR** should be contacted if the water main cannot be looped.

485.2.6.7 Water services to be located at lot corner.

485.2.6.8 Water services should be at the opposite corner from electric service. If opposite corner cannot be obtained, provide minimum setback of six (6) feet.

485.2.6.9 Fire hydrants to be located minimum of 50′ from electric service.

485.2.6.10 Minimum easement width shall be 20′.

485.3 CONSTRUCTION OF WATER SYSTEM – Install in accordance with Section 481 of this manual.

485.4 POLICIES

485.4.1 EXTENDING CITY WATER

485.4.1.1 The City of Valdosta has developed a master plan for the extension of the water system. Any extensions, either constructed by the **CITY** or by private developers, shall adhere to the plan.

485.4.1.2 Annually, the **CITY** budgets for extending water mains throughout the **CITY**. The extensions stem from written requests to extend water, and from the **CITY** Water Master Plan providing for a chronological method of extending the **CITY'S** water system annually. Water Main extensions will be limited to areas and time frames shown in the **CITY** Water Master Plan that is currently in development.

485.4.1.3 The **CITY** will require that any land or development receiving water services from the **CITY** will annex into the **CITY** if or when it is contiguous to the **CITY**. Property owners will be required to execute the appropriate documents for annexation prior to connection.

485.4.1.4 All new residential, commercial, or industrial structures with needs for potable water in the **CITY** shall connect to the **CITY** water system if available within 200-feet.

485.4.1.5 Where water is required to be extended in order for a development to adhere to the policies set for herein, it is the policy of the **CITY** that the applicant requiring the extension provide a request to the office of the **CITY UTILITY DIRECTOR** for the extension. Written requests shall contain the following information:

A) Owner of the property
B) Owner's address
C) Property Appraiser's tax number
D) Sketch, plan or map showing the location of the property.
E) Legal description of the property

485.4.1.6 All extensions shall be in accordance with the requirements and specifications of this City of Valdosta Volume I, Standard Specifications for Water and Sewer Construction. The cost of the extension shall include but not be limited to administration, engineering, surveying, inspection, testing, permits, pipes, fire hydrants, valves, fittings, appurtenances, construction, financing, and other costs relating to the construction of the extension. The extension shall be designed in accordance with the provisions of this section.

485.4.1.7 Unless deemed appropriate by the **UTILITY DIRECTOR**, water mains providing fire protection or serving as major distribution lines shall be at least eight inches (8") in diameter. The minimum size water main for distribution of any nature shall be six inches (6"). Standard sizes of water mains shall be 6", 8", 12", 16", 18", 20", 24", 30", and 36". The sizes and locations of water mains shall be determined by the **CITY UTILITY DIRECTOR** who shall be responsible for evaluating the needs of the **CITY** as expressed in general terms by the City's Master Water Plan and the needs of a specific area to be served by any proposed extension.

485.4.1.11 For all extensions, any over-sizing required by the applicant and specific items of work required by the applicant shall be paid for by the applicant with no reimbursement.

485.4.1.12 No extension will be made outside the **CITY** limits unless the applicant agrees to annex all property to be served or if the applicant's property is not annexable, agrees by appropriate document to annex into the **CITY** upon the property becoming annexable, and is approved by City Council.

485.4.1.13 In cases where the applicant's property abuts an existing water line but the applicant's use of the property requires a larger diameter water main, and said diameter water main is not required by the **CITY**, the applicant shall bear all costs of the new water main with no provision for reimbursement.

485.4.1.14 When estimating the construction cost of the extension, the length considered shall be the lesser of the distances from the end of the existing water main to the farthest point of the applicant's property or to the termination point consistent with good engineering practice.

485.4.1.15 Construction of the extension shall be in accordance with plans and specifications approved by the **CITY ENGINEER** and may be by contract awarded by the **CITY**, by **CITY** forces, or by the applicant with the approval of the City Council.

DIVISION 480

SECTION 486

WATER SYSTEM

ASBUILTS

SECTION 486
WATER SYSTEM ASBUILTS

486.1 GENERAL

486.1.1 All as-builts for projects are required to be on at least 24" x 36" paper, and shall bear the name, address, and telephone number of the firm preparing the drawing and the date the as-built data is added to the original via the revision block. 3-sets of plans and one electronic copy of the plans are required to be submitted. The electronic AutoCAD drawing files shall be referenced to Georgia State Plane Coordinates, West Zone (NAD 83, 2007 adjustment) and NAVD 88.

486.1.2 Surveyor's statement (with seal and with an original signature on each sheet) shall verify that as-built drawings reflect the true conditions in the field or Engineer's statement (with seal and an original signature on each sheet) shall state that the project will function as was originally intended on the approved construction plans.

486.1.3 Contractors' statement (with an original signature on each sheet) shall verify that all construction specifications and product qualities have been met or exceeded.

486.1.4 "AS-BUILT DRAWING" or "RECORD DRAWING", the name of the project and the date shall be clearly labeled on each sheet.

486.1.5 Street names shall be on all streets. All easements and right-of-ways shall be shown and clearly labeled.

486.1.6 If the utility system is to be private (not to be dedicated to City), then so state on each sheet.

486.1.7 The location and elevation of the benchmark referenced will be shown on the drawing. If the referenced benchmark is not within the project, then a complete description of its location will be provided to assist in future locating.

486.1.8 The locations and description of any utility lines and other installations of any kind or other description known to exist within the construction area. The location includes dimensions to permanent features. The construction area is defined as the area on site that is disturbed.

486.1.9 The locations and dimensions of any changes to buildings and structures.

486.1.10 Correct grade and alignment of roads.

486.1.11 Changes in details of design or additional information such as approved placement details, pipe sizes, material changes, etc.

486.2 ASBUILT PLANS

486.2.1 General

The following information is required on all as-built drawings. The **CONTRACTOR** shall note that additional information may be required by the **CITY ENGINEER** when deemed necessary.

486.2.2 Public Projects (Publicly Funded)

486.2.2.1 Locate valves, fittings, and services that are located within the City right-of-way or easement in three directions horizontally. All fire lines, fire hydrants, and fire appurtenances shall be located. Swing ties should be made from objects that are permanent in nature and visible on the finished surface.

486.2.2.2 On new construction, lot lines may be used to locate water services. Locations shall be perpendicular to the right-of-way and parallel to the water main. Radial ties are not acceptable.

486.2.2.3 Permanent structures that are properly located on the drawings may also be used.

486.2.2.4 All horizontal distances shall be shown to the nearest tenth of a foot (i.e., 56.3'). All vertical distances shall be shown to the nearest tenth of a foot (i.e., 217.6').

486.2.2.5 Show all sizes and types of valves and pipes.

486.2.2.6 Special detail drawings may be required where installations are not shown on approved construction drawings for whatever reason or where required for clarity.

486.2.2.7 Show location and elevations on pipes and fittings where changes in direction occur and at a maximum of every 100’.

486.2.2.8 Typical water service installation details with deviations from original plans shall be noted on as-built drawings.

486.2.3 Private Projects (Privately Funded)

486.2.3.1 Locate valves, fittings, and services that are located within the City right-of-way or easement in two directions horizontally. All fire hydrants, fire lines, and fire appurtenances shall be located. Fire line location shall be shown at a maximum of every 100’ or where there is a change in direction. Swing ties should be made from objects that are permanent in nature and visible on the finished surface.

486.2.3.2 On new construction, lot lines may be used to locate water services. Locations shall be perpendicular to the right-of-way and parallel to the water main. Radial ties are not acceptable.

486.2.3.3 Permanent structures that are properly located on the drawings may also be used.

486.2.3.4 All horizontal distances shall be shown to the nearest tenth of a foot (i.e., 56.3'). All vertical distances shall be shown to the nearest tenth of a foot (i.e., 217.6').

486.2.3.5 Show all sizes and types of valves and pipes.

486.2.3.6 Special detail drawings may be required where installations are not shown on approved construction drawings for whatever reason or where required for clarity.

486.2.3.7 Show location and elevations on pipes and fittings located within the City right-of-way or easement where changes in direction occur and at a maximum of every 100'.

486.2.3.8 Typical water service installation details with deviations from original plans shall be noted on as-built drawings.

486.2.4 Valve Tie Data

486.2.4.1 All in-line valves shall be tied to three (3) reference points, fire hydrants shall be tied to two (2) reference points.

486.2.4.2 All distances shall be measured to the nearest tenth of a foot and shall be measured from the center of the valve cover to the center of circular reference points and to the nearest point of other reference points.

486.2.4.3 All reference points shall be within 100'' of the valve, except when unable to give proper references. A break line may be used as needed.

486.2.4.4 All valves within 100' of an intersection shall be carried on the same sheet.

486.2.4.5 The perpendicular distance between all in-line valves and centerline of the paved road or centerline of right-of-way/easement for unpaved roads shall be shown and drawn to scale. (This is not to be considered as one of the points).

486.2.4.6 All right-of-way or easement widths shall be indicated on each tie sheet and the water main shall have reference points to each.

486.2.4.7 All reducers and bends shall be shown in their relative position. References to reducers and bends shall be shown on the as-built plan sheet.

486.3.3 Acceptable Tie Point Objects (Reference Points)

486.3.3.1 Selection of reference points should be based on: 1) distance between the valve and the reference point; 2) order of the reference point in the tabulation below; 3) field conditions; and 4) the judgment of the registered mapper and surveyor or ultimately the judgement of the **CITY ENGINEER**.

486.3.3.2 Acceptable Reference Points in order of preference:

486.3.3.2.1 Manholes - indicate in parenthesis: (SAN) for sanitary, (STM) for storm, and (TEL) for telephone.

486.3.3.2.2 Concrete utility pole (Indicate pole number in parenthesis).

486.3.3.2.3 Fire Hydrant (center of operating nut).

486.3.3.2.4 Building Corner. (The shape, type, and address of the building shall be shown).

486.3.3.2.5 Wood Utility Pole - (Indicate pole number in parenthesis).

486.3.3.2.6 "X" cut in curb. Cut shall be at least 3" X 3" and ¼" deep and located on the curbs upper vertical face. (Miami type curb shall have the cut made on the customer's side of the curb). Paint the "X" in blue paint.

486.3.3.2.7 Railroad spike in tree (min. 12" dia.) within right-of-way placed two feet (2') above ground extending two inches (2") and on side of tree facing road.

486.3.3.2.8 Intersection of centerline of the street, or street and driveway - The street address of driveway must be shown. (A railroad spike shall be placed at the point of intersection.

486.3.3.2.9 Concrete or metal culvert ends - (The culvert shall be accurately sketched and specified).

486.3.3.2.10 Water Meter Box - (Indicate the street address of the buildings served, in parenthesis).

486.3.3.2.11 Existing concrete monuments.

486.3.3.2.12 Street Sign - (Indicate type of sign in parenthesis).

486.3.3.2.13 Another valve.

486.3.3.2.14 Any of the previous reference points between 100' and 200' from a valve.

DIVISION 480

SECTION 487

WATER SYSTEM

MEASUREMENT AND PAYMENT

SECTION 487
WATER SYSTEM MEASUREMENT AND PAYMENT

487.1 GENERAL

487.1.1 All measurements and payments shall be based on completed work performed in strict accordance with the drawings and specifications, and in accordance with the unit and lump sum prices in the Proposal.

487.1.2 Each unit or lump sum price stated in the proposal shall constitute full compensation for each complete item of work and shall be installed prices, complete.

487.1.3 The **CONTRACTOR** shall be responsible for any debris and foreign matter which is allowed to enter the system as a result of construction and shall be solely responsible for any damage resulting therefrom.

487.1.4 Whenever any authorized change or combination of changes in the plans results in an increase or decrease in the original contract quantities, and the work added or eliminated is of the same general character as that shown on the original plans, the **CONTRACTOR** shall accept payment in full at the original contract unit prices for actual quantities of work done, and no allowance will be made for any loss of anticipated profits because of increases or decreases in quantities; providing, however, that increased or decreased work covered by a supplemental agreement shall be paid for as stipulated in such agreement.

487.1.5 The **CITY ENGINEER** shall have the right to make alterations in the plans or character of the work as may be considered necessary or desirable during the progress of the work for satisfactory completion of the proposed construction, provided that no alteration shall be made which will result in a substantial change in the general plan or character of the work, such as to evade the competitive bidding statute. Alterations provided for herein shall not be considered as a waiver of any conditions of the contract or the bond, nor to invalidate any of the provisions thereof.

487.1.6 These specifications, the plans, special provisions, and all supplementary documents are integral parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In addition to the work and materials specifically called for in the specifications as being included in any specific pay item, additional incidental work, not specifically mentioned, will be included in such pay items when so shown in the plans, or if indicated, or obvious and apparent, as being necessary for the proper completion of the work under such pay item and not stipulated as being covered under other pay items. No additional compensation shall be allowed for such incidental work. In case of discrepancy, computed dimensions shall govern overscaled dimensions, plans shall govern over standard specifications, and special provisions shall govern over both standard specifications and plans unless otherwise specified by the **CITY ENGINEER**.

487.1.7 The **CONTRACTOR** is warned that some abandonments of portions of the water system, as well as connections, replacements, extensions thereto and thereof may necessitate work being done after or before normal work hours, said decision resting solely with the **CITY ENGINEER** and **UTILTY DIRECTOR**. Normally such work will be required

only to maintain service to existing customers or to minimize inconvenience to those customers or members of the public. However, this work shall be considered incidental to the construction and no additional compensation shall be allowed therefore.

487.1.8 Unless otherwise provided in the specifications for the particular items involved, all measurements shall be taken from "finished grades and elevations" for vertical measurements, and from end of pipe to end of pipe horizontally for lineal measurements. The method or combination of methods or measurements shall be those which will reflect, with reasonable accuracy, the actual areas of the finished work as determined by the **CITY ENGINEER**.

487.1.9 Unless provided by specific bid items in the Schedule of Prices Bid, compensation for any and all clearing and grubbing which may be required for the work shall be deemed to have been included in the payments for bid items to which said clearing and grubbing is incidental and no additional compensation shall be allowed therefore.

487.1.10 The **CONTRACTOR** shall not be allowed additional payment or compensation for removing and replacing, relocating, or otherwise protecting or adjusting existing culverts or other existing storm water facilities which may be affected by the construction. The cost thereof shall be included in the cost of bid items to which they are incidental or appurtenant.

487.1.11 Except those items outlined in the Schedule of Prices Bid, the **CONTRACTOR** shall not be allowed additional payment or compensation for removing and replacing, shoring or bracing, relocating, or otherwise protecting or adjusting any and all utilities which may be affected by the construction. Specifically, the **CONTRACTOR** shall adjust all valve boxes and covers to required grades. All methods of adjusting utilities shall be subject to the approval of the **CITY ENGINEER** and **UTILITY DIRECTOR**. The cost of items described herein shall be included in the cost of bid items to which they are incidental or appurtenant.

487.1.12 It is the intent of this contract that all pavement replacement including trench width, resurfacing, and full width be done at the same time.

487.1.13 Pipe which has not been properly laid, bedded, jointed, or backfilled shall not be included for payment in any pay estimate.

487.1.14 The term "finished grade", as used herein, shall mean the final elevation of the accepted work as approved by the **CITY ENGINEER** and in **GDOT** right-of-way, shall be the elevation required and approved by the **GDOT** to conform to its work as proposed or later modified. The **CONTRACTOR** will be responsible for determining the finished grade at any point as required by the **CITY ENGINEER** or **GDOT.**

487.1.15 No additional payment shall be made for the furnishing and installing of locating wire(s). The cost thereof shall be included in the unit price for the particular pipe installation for which it is called.

487.2 DETAILED MEASUREMENT AND PAYMENT

487.2.1 The following list of pay items are standard items used by the **CITY** for water construction. This list includes pay item numbers and the detailed measurement and payment relating to those items. To determine measurement and payment for items not listed below, refer to other sections of the Standard Specifications or Contract Documents of the project.

487.2.2 Reserved

487.2.3 Standard Pay Items

487 WATER SYSTEM

487-01 WATER PIPING

487-01.01 Water PVC Piping

487-01.01.01	1” PEXa Piping	LF
487-01.01.02	¾” PEXa Piping	LF
487-01.01.03	1” Polyethylene Piping	LF
487-01.01.04	2” Polyethylene Piping	LF
487-01.01.05	1” Backflow Preventer	EA
487-01.01.06	2” PVC Water Main	LF
487-01.01.07	2” Polyethylene Piping	LF
487-01.01.08	2” Backflow Preventer	EA
487-01.01.10	4” PVC Water Main	LF
487-01.01.11	6” PVC Water Main	LF
487-01.01.12	8” PVC Water Main	LF
487-01.01.13	10” PVC Water Main	LF
487-01.01.14	12” PVC Water Main	LF

487-1.3 Water DIP Piping

487-01.02.01	4” DIP Water Main	LF
487-01.02.02	6” DIP Water Main	LF
487-01.02.03	8” DIP Water Main	LF
487-01.02.04	10” DIP Water Main	LF
487-01.02.05	12” DIP Water Main	LF
487-01.02.06	14” DIP Water Main	LF
487-01.02.07	16” DIP Water Main	LF
487-01.02.08	18” DIP Water Main	LF
487-01.02.09	20” DIP Water Main	LF
487-01.02.10	24” DIP Water Main	LF
487-01.02.11	30” DIP Water Main	LF
487-01.02.12	36” DIP Water Main	LF

487-1.3 Removal and Replacement

487-01.03.01	Remove and Replace 1” PVC	LF
487-01.03.02	Remove and Replace 2” PVC	LF

487-01.04 PVC Fittings

487-01.04.01	1” PVC Fittings	EA
487-01.04.02	2” PVC Fittings	EA
487-01.04.03	Reserved	
487-01.04.04	6” PVC Fittings	EA
487-01.04.05	8” PVC Fittings	EA
487-01.04.06	Reserved	
487-01.04.10	PVC Flanged Piping and Fittings	LS

Measurement of water mains for payment shall be in linear feet of actual pipe installed end to end.

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, pipe installation, and other items required to complete the installation.

487-01.06 Compact DIP Fittings

487-01.06.01	Reserved	
487-01.06.02	Compact DIP Fittings, 6”	LBS
487-01.06.03	Compact DIP Fittings, 8”	LBS
487-01.06.04	Reserved	
487-01.06.05	Compact DIP Fittings, 12”	LBS
487-01.06.06	Compact DIP Fittings, 14”	LBS
487-01.06.07	Compact DIP Fittings, 16”	LBS
487-01.06.08	Compact DIP Fittings, 18”	LBS
487-01.06.10	DIP Flanged Piping and Fittings	LS
487-01.07.01	4” DIP MJ 22.5° Bend	EA
487-01.07.02	4” DIP MJ 45° Bend	EA
487-01.07.03	4” DIP MJ 90° Bend	EA
487-01.07.04	4” DIP MJ Tee	EA
487-01.08.01	6” DIP MJ 22.5° Bend	EA
487-01.08.02	6” DIP MJ 45° Bend	EA
487-01.08.03	6” DIP MJ 90° Bend	EA
487-01.08.04	6” DIP MJ Tee	EA
487-01.08.05	6” DIP MJ Plug	EA
487-01.09.01	8” DIP MJ 22.5° Bend	EA
487-01.09.02	8” DIP MJ 45° Bend	EA

487-01.09.03	8” DIP MJ 90° Bend	EA
487-01.09.04	8” DIP MJ Tee	EA
487-01.09.05	8” DIP MJ Plug	EA
487-01.10.01	10” DIP MJ 22.5° Bend	EA
487-01.10.02	10” DIP MJ 45° Bend	EA
487-01.10.03	10” DIP MJ 90° Bend	EA
487-01.10.04	10” DIP MJ Tee	EA
487-01.10.05	10” DIP MJ Plug	EA
487-01.11.01	12” DIP MJ 22.5° Bend	EA
487-01.11.02	12” DIP MJ 45° Bend	EA
487-01.11.03	12” DIP MJ 90° Bend	EA
487-01.11.04	12” DIP MJ Tee	EA
487-01.11.05	12” DIP MJ Plug	EA
487-01.12.01	14” DIP MJ 22.5° Bend	EA
487-01.12.02	14” DIP MJ 45° Bend	EA
487-01.12.03	14” DIP MJ 90° Bend	EA
487-01.12.04	14” DIP MJ Tee	EA
487-01.12.05	14” DIP MJ Plug	EA
487-01.13.01	16” DIP MJ 22.5° Bend	EA
487-01.13.02	16” DIP MJ 45° Bend	EA
487-01.13.03	16” DIP MJ 90° Bend	EA
487-01.13.04	16” DIP MJ Tee	EA
487-01.13.05	16” DIP MJ Plug	EA
487-01.14.01	Coated Steel Pipe Supports	EA
487-01.14.02	Stainless Steel Pipe Supports	EA
487-01.14.03	Concrete Pipe Supports	EA
487-01.15.01	Standard DIP Fittings, 18”	TON
487-01.15.02	Reserved	
487-01.15.03	Standard DIP Fittings, 24”	TON
487-01.15.04	Reserved	
487-01.16.01	18” DIP MJ 22.5° Bend	EA
487-01.16.02	18” DIP MJ 45° Bend	EA
487-01.16.03	18” DIP MJ 90° Bend	EA
487-01.16.04	18” DIP MJ Tee	EA
487-01.16.05	18” DIP MJ Plug	EA
487-01.17.01	20” DIP MJ 22.5° Bend	EA
487-01.17.02	20” DIP MJ 45° Bend	EA
487-01.17.03	20” DIP MJ 90° Bend	EA
487-01.17.04	20” DIP MJ Tee	EA
487-01.17.05	20” DIP MJ Plug	EA
487-01.18.01	24” DIP MJ 22.5° Bend	EA
487-01.18.02	24” DIP MJ 45° Bend	EA
487-01.18.03	24” DIP MJ 90° Bend	EA
487-01.18.04	24” DIP MJ Tee	EA
487-01.18.05	24” DIP MJ Plug	EA

Payment for these bid items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include

all costs for excavation, backfilling, dewatering, fitting and accessories installation, and other items required to complete the installation.

487-02 WATER VALVES

487-02.01.01	2” Gate Valve and Valve Box	EA
487-02.01.02	4” Gate Valve and Valve Box	EA
487-02.01.03	6” Gate Valve and Valve Box	EA
487-02.01.04	8” Gate Valve and Valve Box	EA
487-02.01.05	10” Gate Valve and Valve Box	EA
487-02.02.01	Remove and Replace 2” Gate Valve	EA
487-02.02.02	Remove and Replace 4” Gate Valve	EA
487-02.02.03	Remove and Replace 6” Gate Valve	EA
487-02.02.04	Remove and Replace 8” Gate Valve	EA
487-02.03.01	4” Flanged Gate Valve	EA
487-02.03.02	6” Flanged Gate Valve	EA
487-02.03.03	8” Flanged Gate Valve	EA
487-02.04.01	12” Butterfly Valve and Valve Box	EA
487-02.04.02	14” Butterfly Valve and Valve Box	EA
487-02.04.03	16” Butterfly Valve and Valve Box	EA
487-02.04.04	18” Butterfly Valve and Valve Box	EA
487-02.04.05	20” Butterfly Valve and Valve Box	EA
487-02.04.06	24” Butterfly Valve and Valve Box	EA
487-02.05.01	Remove & Replace 12” Butterfly Valve	EA
487-02.06.01	12” Flanged Butterfly Valve	EA
487-02.06.02	Reserved	
487-02.06.03	16” Flanged Butterfly Valve	EA
487-02.06.04	18” Flanged Butterfly Valve	EA
487-02.07.01	4” Flanged Check Valve	EA
487-02.07.02	6” Flanged Check Valve	EA
487-02.07.03	8” Flanged Check Valve	EA
487-02.07.04	10” Flanged Check Valve	EA
487-02.07.05	12” Flanged Check Valve	EA
487-02.08.01	4” Flanged Magmeter	EA
487-02.08.02	6” Flanged Magmeter	EA
487-02.08.03	8” Flanged Magmeter	EA
487-02.08.04	10” Flanged Magmeter	EA
487-02.08.05	12” Flanged Magmeter	EA
487-02.09.01	Air Release Valve Assembly – Type A	EA
487-02.09.02	Air Release Valve Assembly – Type B	EA
487-02.09.03	Air Release Valve Assembly – Type C	EA
487-02.09.01	2” Line Stop	EA
487-02.10.02	4” Line Stop	EA
487-02.10.03	6” Line Stop	EA
487-02.10.04	8” Line Stop	EA
487-02.10.05	10” Line Stop	EA
487-02.10.06	12” Line Stop	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, valve and accessories installation, and other items required to complete the installation.

487-03 FIRE HYDRANTS

487-03.01.01	Fire Hydrant Assembly on 8” Main, Type A	EA
487-03.01.02	Reserved	
487-03.01.03	Fire Hydrant Assembly on 12” Main, Type A	EA
487-03.01.04	Reserved	
487-03.01.05	Fire Hydrant Assembly on 16” Main, Type A	EA
487-03.01.06	Fire Hydrant Assembly on 18” Main, Type A	EA
487-03.01.07	Fire Hydrant Assembly on 20” Main, Type A	EA
487-03.01.08	Fire Hydrant Assembly on 24” Main, Type A	EA
487-03.02.01	Fire Hydrant Assembly on 8” Main, Type B	EA
487-03.02.02	Reserved	
487-03.02.03	Fire Hydrant Assembly on 12” Main, Type B	EA
487-03.02.04	Reserved	
487-03.02.05	Fire Hydrant Assembly on 16” Main, Type B	EA
487-03.02.06	Fire Hydrant Assembly on 18” Main, Type B	EA
487-03.02.07	Fire Hydrant Assembly on 20” Main, Type B	EA
487-03.02.08	Fire Hydrant Assembly on 24” Main, Type B	EA
487-03.03.01	Fire Hydrant Assembly on 8” Main, Type C	EA
487-03.03.02	Reserved	
487-03.03.03	Fire Hydrant Assembly on 12” Main, Type C	EA
487-03.03.04	Reserved	
487-03.03.05	Fire Hydrant Assembly on 16” Main, Type C	EA
487-03.03.06	Fire Hydrant Assembly on 18” Main, Type C	EA
487-03.03.07	Fire Hydrant Assembly on 20” Main, Type C	EA
487-03.03.08	Fire Hydrant Assembly on 24” Main, Type C	EA
487-03.04.01	Fire Hydrant Assembly on 8” Main, Type D	EA
487-03.04.03	Fire Hydrant Assembly on 12” Main, Type D	EA
487-03.05.01	Fire Hydrant Extension	EA
487-03.05.02	Reserved	
487-03.06.01	Remove Existing Fire Hydrant and Plug Tee	EA
487-03.06.02	Remove and Replace Existing Fire Hydrant	EA
487-03.06.03	Relocate Existing Fire Hydrant on 8” Main	EA
487-03.06.04	Reserved	
487-03.06.05	Relocate Existing Fire Hydrant on 12” Main	EA
487-03.07.01	Flow Fire Hydrant to Determine Flow and Pressure	EA
487-03.07.02	Service Fire Hydrant	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, hydrant installation, and other items required to complete the project.

487-04 WATER SERVICES

487-04.01.01	¾" Single Water Service – Short Side	EA
487-04.01.02	¾" Single Water Service – Long Side	EA
487-04.02.01	1" Single Water Service – Short Side	EA
487-04.02.02	1" Single Water Service – Long Side	EA
487-04.02.05	1" Irrigation Water Service w/Backflow Preventer	EA
487-04.03.01	2" Single Water Service – Short Side	EA
487-04.03.02	2" Single Water Service – Long Side	EA
487-04.03.05	2" Irrigation Water Service w/Backflow Preventer	EA
487-04.04.01	Remove and Replace Existing Single Water Service – Short	EA
487-04.04.02	Remove and Replace Existing Single Water Service – Long	EA
487-04.05.01	Remove and Replace Existing 1" Single Water Service – Short	EA
487-04.05.02	Remove and Replace Existing 1" Single Water Service – Long	EA
487-04.05.05	Reserved	
487-04.06.01	Remove and Replace Existing 2" Single Water Service – Short	EA
487-06.04.02	Remove and Replace Existing 2" Single Water Service – Long	EA
487-04.06.03	Reserved	
487-04.07.01	Remove and Relocate Meter Box and Meter	EA
487-04.07.02	Remove and Replace Existing Iron Boxes with Gulf Boxes	EA
487-04.07.03	Reset Existing Gulf Boxes	EA
487-04.07.04	Reserved	
487-04.08.01	Remove and Replace ¾" Copper Tubing	LF
487-04.08.02	Remove and Replace 1" Copper Tubing	LF
487-04.08.03	Remove and Replace 2" Copper Tubing	LF

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, service installation, and other items required to complete the installation.

487-05 WATER TAPS ON EXISTING WATER MAINS

487-05.01.01	Reserved	
487-05.01.02	2" Tap on Existing 6" Water Main w/Valve	EA
487-05.01.03	2" Tap on Existing 8" Water Main w/Valve	EA
487-05.01.04	Reserved	
487-05.01.05	2" Tap on Existing 12" Water Main w/Valve	EA
487-05.04.01	6" Tap on Existing 6" Water Main	EA
487-05.04.02	6" Tap on Existing 6" Water Main w/Valve	EA
487-05.04.03	6" Tap on Existing 8" Water Main w/Valve	EA
487-05.04.04	Reserved	
487-05.04.05	6" Tap on Existing 12" Water Main w/Valve	EA
487-05.04.06	Reserved	
487-05.04.07	6" Tap on Existing 16" Water Main w/Valve	EA
487-05.04.08	6" Tap on Existing 18" Water Main w/Valve	EA
487-05.04.09	6" Tap on Existing 20" Water Main w/Valve	EA
487-05.04.10	6" Tap on Existing 24" Water Main w/Valve	EA
487-05.05.01	8" Tap on Existing 8" Water Main w/Valve	EA

487-05.05.02	Reserved	
487-05.05.03	8” Tap on Existing 12” Water Main w/Valve	EA
487-05.05.04	Reserved	
487-05.05.05	8” Tap on Existing 16” Water Main w/Valve	EA
487-05.05.06	8” Tap on Existing 18” Water Main w/Valve	EA
487-05.05.07	8” Tap on Existing 20” Water Main w/Valve	EA
487-05.05.08	8” Tap on Existing 24” Water Main w/Valve	EA
487-05.06.01	10” Tap on Existing 10” Water Main w/Valve	EA
487-05.06.02	10” Tap on Existing 12” Water Main w/Valve	EA
487-05.06.03	Reserved	
487-05.06.04	10” Tap on Existing 16” Water Main w/Valve	EA
487-05.06.05	10” Tap on Existing 18” Water Main w/Valve	EA
487-05.06.06	10” Tap on Existing 20” Water Main w/Valve	EA
487-05.06.07	10” Tap on Existing 24” Water Main w/Valve	EA
487-05.07.01	12” Tap on Existing 12” Water Main w/Valve	EA
487-05.07.02	Reserved	
487-05.07.03	12” Tap on Existing 16” Water Main w/Valve	EA
487-05.07.04	12” Tap on Existing 18” Water Main w/Valve	EA
487-05.07.05	12” Tap on Existing 24” Water Main w/Valve	EA
487-05.07.06	12” Tap on Existing 30” Water Main w/Valve	EA
487-05.07.07	12” Tap on Existing 36” Water Main w/Valve	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, tap installation, and other items required to complete the installation.

487-06 BORING & JACKING

487-06.01.01	Bore and Jack 18” Steel Casing w/8” DIP	LF
487-06.01.02	Bore and Jack 18” Steel Casing w/8” PVC	LF
487-06.02.01	Reserved	
487-06.02.02	Reserved	
487-06.02.03	Bore and Jack 24” Steel Casing w/12” DIP	LF
487-06.02.04	Bore and Jack 24” Steel Casing with 12” PVC	LF
487-06.03.01	Reserved	
487-06.03.02	Reserved	
487-06.03.03	Bore and Jack 30” Steel Casing w/16” DIP	LF
487-06.03.04	Reserved	
487-06.04.01	Reserved	
487-06.04.02	Reserved	
487-06.04.03	Bore and Jack 36” Steel Casing w/18” DIP	LF
487-06.04.04	Reserved	
487-06.05.01	Reserved	
487-06.05.02	Reserved	
487-06.05.03	Bore and Jack 48” Steel Casing w/24” DIP	LF
487-06.05.04	Reserved	
487-06.05.05	Reserved	
487-06.10.01	2” Casing	LF

487-06.10.02	4” Casing	LF
487-06.10.03	6” Casing	LF
487-06.10.04	8” Casing	LF

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, casing installation, pipe installation, spacers, and other items required to complete the bore and jack installation.

487-07 WATER MAIN UNDER PAVEMENT

487-07.01.01	Push 1” PVC Water Main Under Asphalt	LF
487-07.01.02	Push 2” PVC Water Main Under Asphalt	LF
487-07.02.01	Missile 1” Water Main	LF
487-07.02.02	Missile 1” Water Main w/Casing	LF
487-07.02.03	Missile 2” Water Main	LF
487-07.02.04	Missile 2” Water Main w/Casing	LF

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, directional bore, pipe installation, and other items required to complete the installation.

487-09 BLOW-OFF ASSEMBLIES

487-09.01.01	Reserved	
487-09.01.02	Reserved	
487-09.01.03	Temporary Blow-off Assembly on 6” Main	EA
487-09.01.04	Temporary Blow-off Assembly on 8” Main	EA
487-09.01.05	Reserved	
487-09.01.06	Temporary Blow-off Assembly on 12” Main	EA
487-09.01.07	Reserved	
487-09.01.08	Temporary Blow-off Assembly on 16” Main	EA
487-09.01.09	Temporary Blow-off Assembly on 18” Main	EA
487-09.03.01	Blow-off Assembly on 2” Main	EA
487-09.03.02	Reserved	
487-09.03.03	Blow-off Assembly on 6” Main	EA
487-09.03.04	Blow-off Assembly on 8” Main	EA
487-09.03.05	Reserved	
487-09.03.06	Blow-off Assembly on 12” Main	EA
487-09.03.07	Reserved	
487-09.03.08	Blow-off Assembly on 16” Main	EA
487-09.03.09	Blow-off Assembly on 18” Main	EA
487-09.03.10	Reserved	
487-09.03.11	Blow-off Assembly on 24” Main	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include

all costs for excavation, backfilling, dewatering, blow-off assembly installation, and other items required to complete the installation.

487-11 WATER MAIN CONNECTIONS

487-11.01.01	Connect New 2” Main to Existing 2” Main	EA
487-11.01.02	Reserved	
487-11.01.03	Connect New 2” Main to Existing 6” Main	EA
487-11.01.04	Connect New 2” Main to Existing 8” Main	EA
487-11.01.05	Reserved	
487-11.01.06	Connect New 2” Main to Existing 12” Main	EA
487-11.02.01	Connect New 4” Main to Existing 4” Main	EA
487-11.02.02	Connect New 4” Main to Existing 6” Main	EA
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487-11.03.04	Connect New 6” Main to Existing 12” Main	EA
487-11.04.01	Connect New 8” Main to Existing 6” Main	EA
487-11.04.02	Connect New 8” Main to Existing 8” Main	EA
487-11.04.03	Reserved	
487-11.04.04	Connect New 8” Main to Existing 12” Main	EA
487-11.04.05	Reserved	
487-11.04.06	Connect New 8” Main to Existing 16” Main	EA
487-11.04.07	Connect New 8” Main to Existing 18” Main	EA
487-11.04.08	Reserved	
487-11.04.09	Connect New 8” Main to Existing 24” Main	EA
487-11.05.01	Connect New 10” Main to Existing 6” Main	EA
487-11.05.02	Connect New 10” Main to Existing 8” Main	EA
487-11.05.03	Reserved	
487-11.05.04	Connect New 10” Main to Existing 12” Main	EA
487-11.05.05	Reserved	
487-11.05.06	Connect New 10” Main to Existing 16” Main	EA
487-11.05.07	Connect New 10” Main to Existing 18” Main	EA
487-11.05.08	Reserved	
487-11.05.09	Connect New 10” Main to Existing 24” Main	EA
487-11.06.01	Connect New 12” Main to Existing 6” Main	EA
487-11.06.02	Connect New 12” Main to Existing 8” Main	EA
487-11.06.03	Reserved	
487-11.06.04	Connect New 12” Main to Existing 12” Main	EA
487-11.06.05	Reserved	
487-11.06.06	Reserved	
487-11.06.07	Connect New 12” Main to Existing 18” Main	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, cutting of pipe, connections, accessories, and other items required to complete the installation.

487-12 ADJUSTMENTS

487-12.01.01	Adjust Existing Water Valve Box	EA
487-12.01.02	Reserved	
487-12.02.01	Adjust Existing Water Meter Box	EA
487-12.02.02	Reserved	
487-12.03.01	Adjust Existing Fire Hydrant	EA

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all material costs, excavation, backfill, installation of adjustments, and other items required to complete the project.

487-13 TESTING

487-13.01.01	Piping and Valve Disinfection	LS
487-13.02.01	Hydrostatic Testing	LS
487-13.03.01	Leak Survey on Water Main	LS

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, test equipment, and other items required to complete the project.

487-14 JUMPER CONNECTION

487-14.01.01	Temporary Jumper Connection	EA

Payment for this pay item shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, backflow prevention equipment, piping, valves, and other items required to complete temporary assembly installation.

487-20 ABANDONMENTS

487-20.01.01	Abandon 2” Water Main	LS
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487-20.01.05	Abandon 10” Water Main	LS
487-20.01.06	Abandon 12” Water Main	LS
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487-20.02.02	Abandon Valve and Valve Box	EA

487-20.02.03	Cut and Cap 6” Main and Remove Valve Box	EA
487-20.02.04	Cut and Cap 8” Main and Remove Valve Box	EA
487-20.02.05	Reserved	
487-20.02.06	Remove Existing 8” DIP and Fittings	LF

Payment for these pay items shall be made at the unit price set forth in the bid schedule and shall constitute full compensation for work specified in the contract documents. Payment shall include all costs for excavation, backfilling, dewatering, cutting of pipe, removal of pipe, caps, plugs, and other items required to complete the project.

DIVISION 480

SECTION 488

WATER SYSTEM

STANDARD DETAILS

SECTION 488

WATER SYSTEM STANDARD DETAILS

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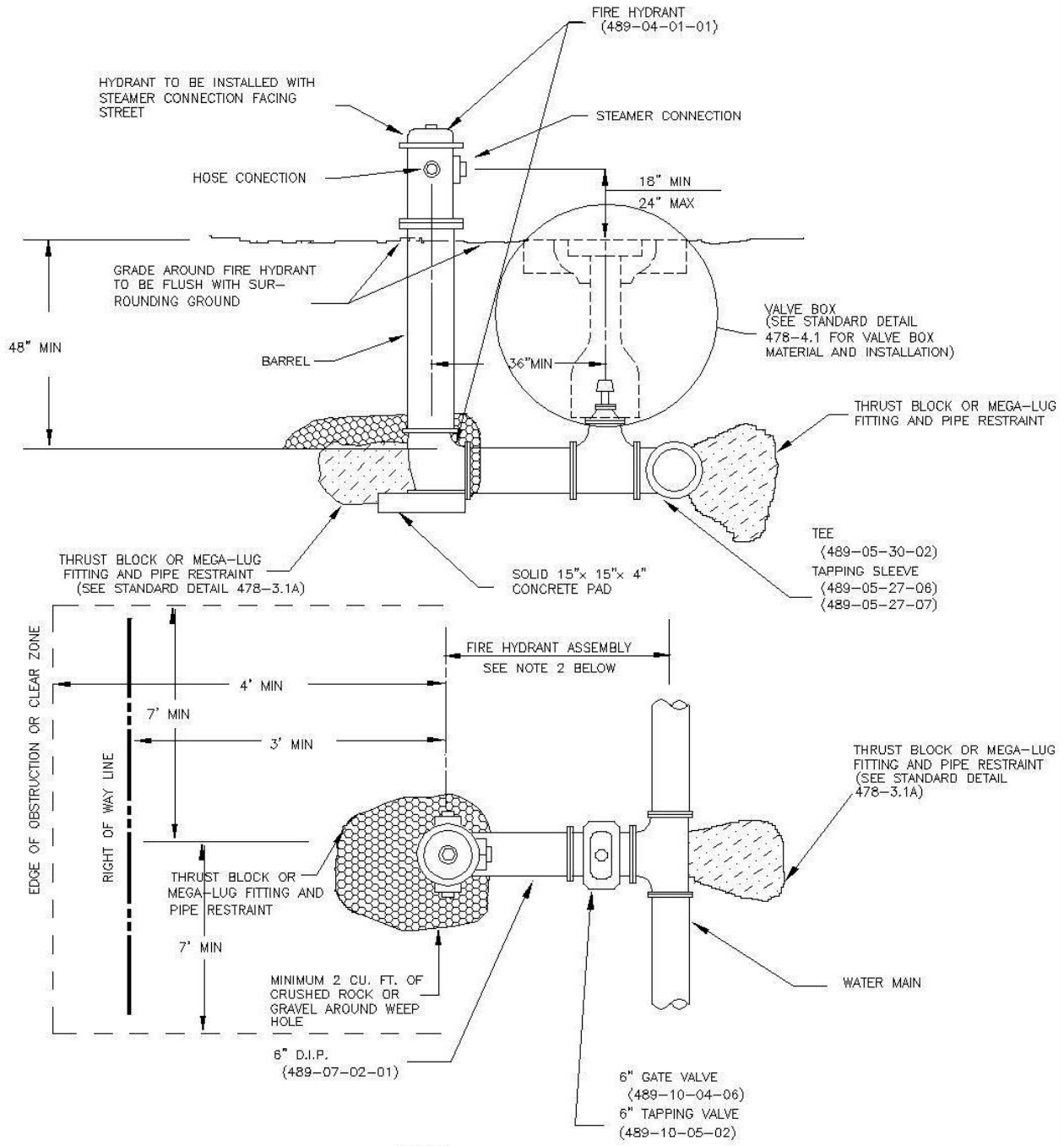
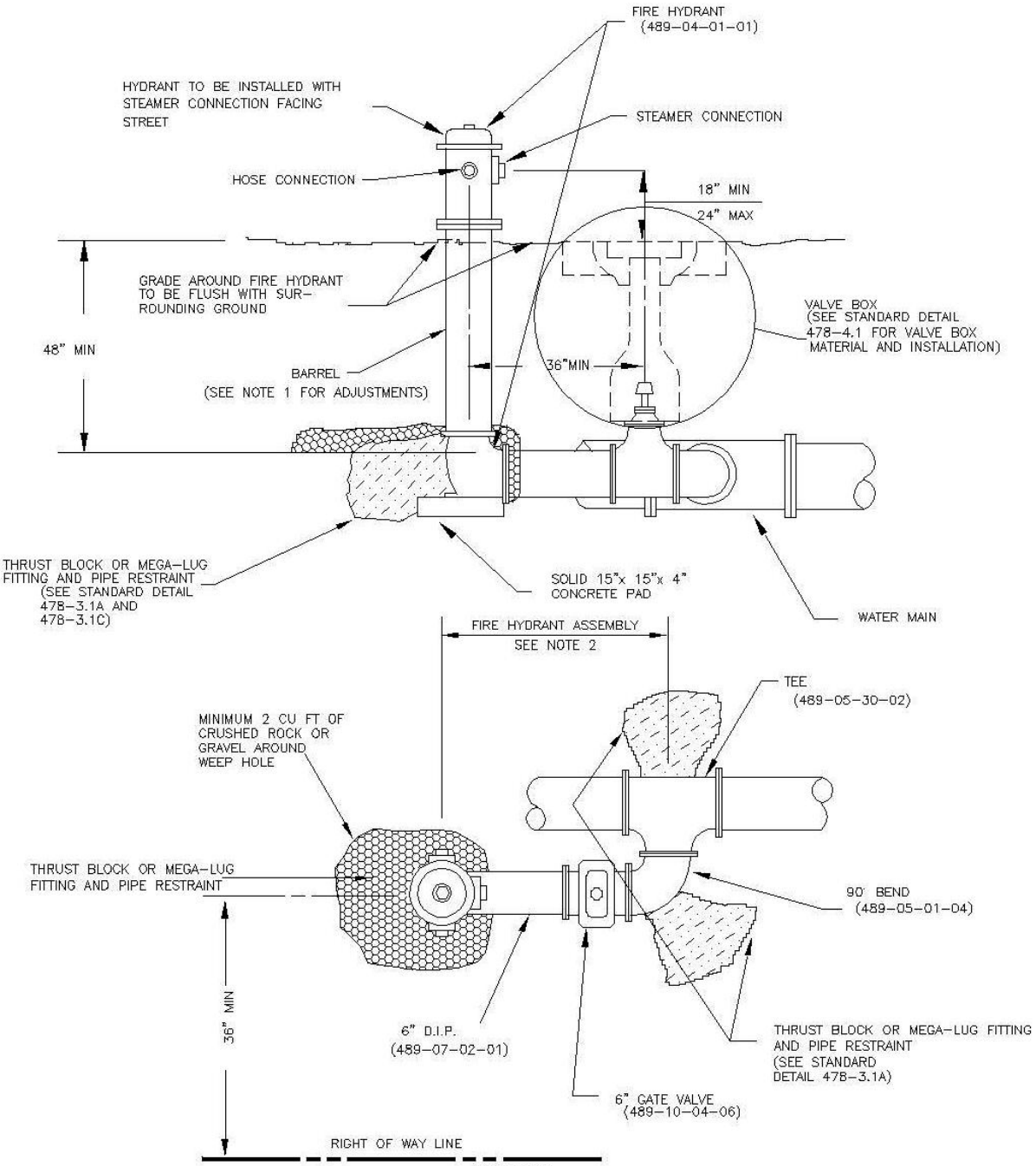


NOTES

1. NO MORE THAN ONE BARREL SECTION SHALL BE ALLOWED WHEN ADJUSTING HYDRANT TO FINISHED GRADE. HYDRANT EXTENSIONS ARE TO BE SAME MANUFACTURER AS HYDRANT. MAXIMUM LENGTH OF EXTENSION SHALL BE 24".
2. FIRE HYDRANT ASSEMBLY INCLUDES TEE, VALVE, VALVE BOX, 6" PIPE AND FIRE HYDRANT.
3. NEW HYDRANTS TO BE INSTALLED WITH "OUT OF SERVICE" DONUT (489-04-99-11). INSTALL ON STEAMER NOZZLE UNTIL HYDRANT IS CLEARED AND ACCEPTED BY FIRE DEPARTMENT. SEE SECTION 481.4.6.6
4. ORIENTATION OF STEAMER CONNECTION SHALL BE AS DIRECTED BY THE ENGINEER.

SPECIFICATION	DATE REVISED:	SECTION
		SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE HYDRANT ASSEMBLY PERPENDICULAR TO MAIN	A 488-1.1

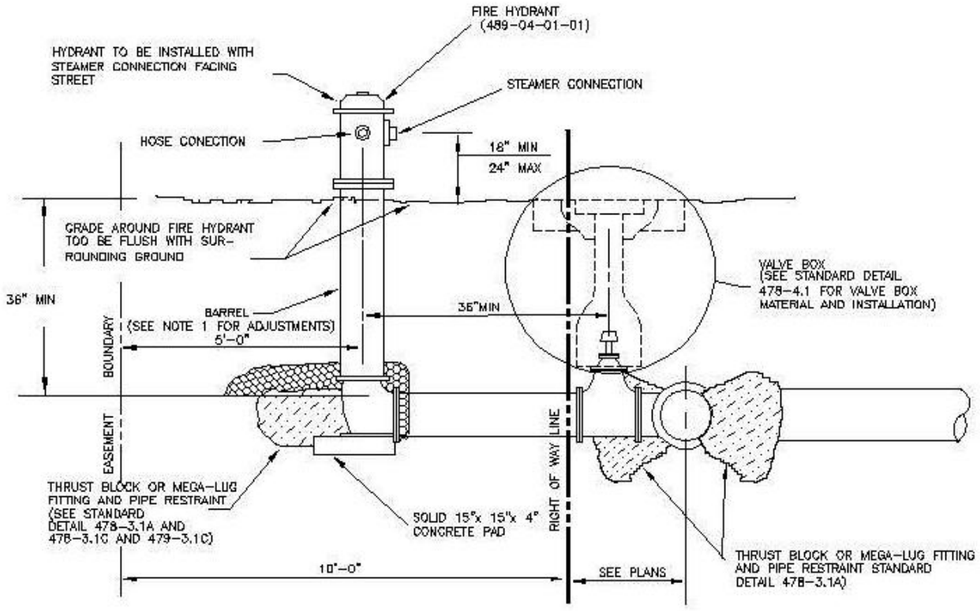


NOTES

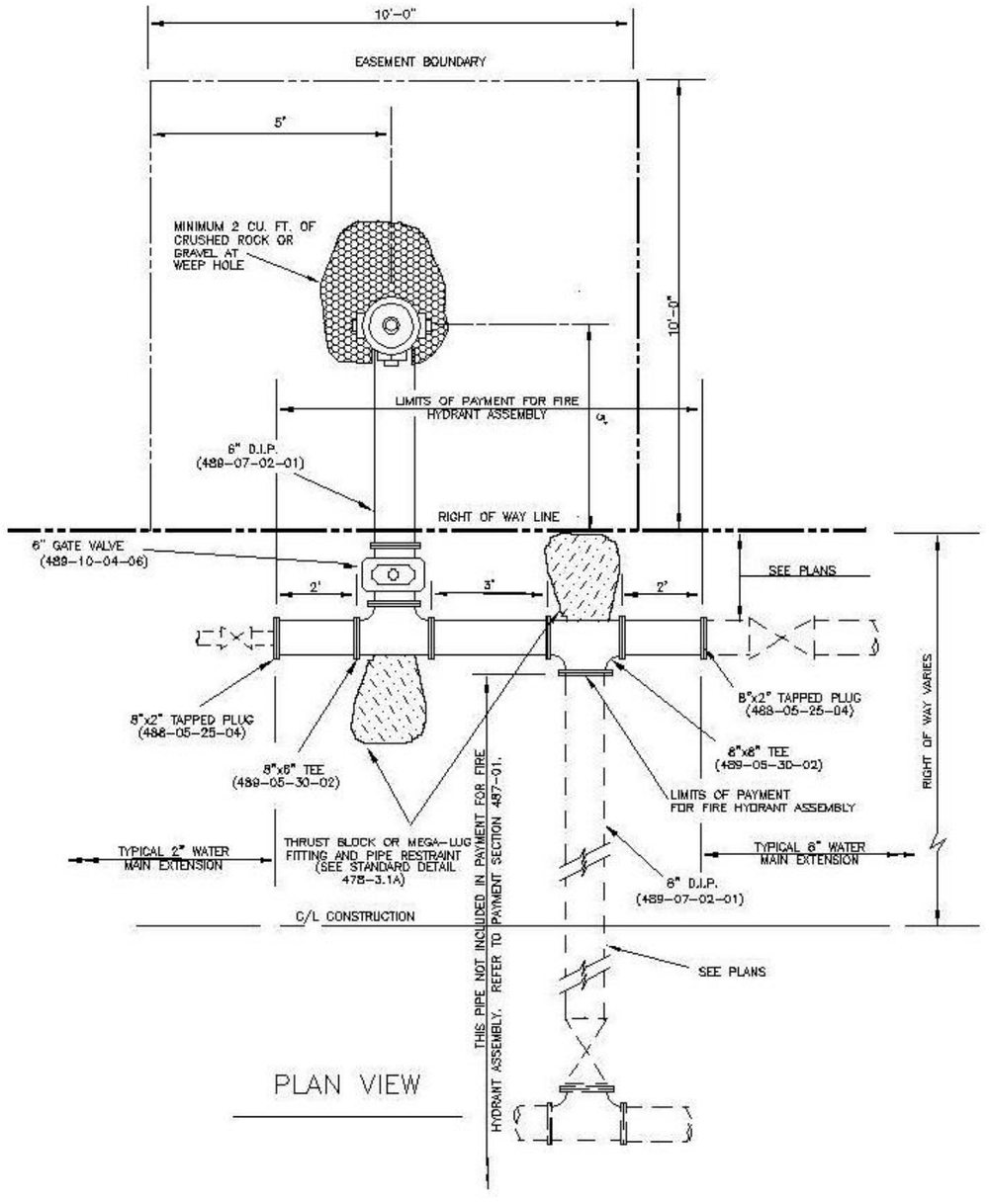
1. NO MORE THAN ONE BARREL SECTION SHALL BE ALLOWED WHEN ADJUSTING HYDRANT TO FINISHED GRADE. HYDRANT EXTENSION TO BE SAME MANUFACTURER AS HYDRANT. MAXIMUM LENGTH OF EXTENSION LIMITED TO 24".
2. FIRE HYDRANT ASSEMBLY INCLUDES TEE, BEND, VALVE, 6" PIPE, AND FIRE HYDRANT.
3. NEW HYDRANTS TO BE INSTALLED WITH "OUT OF SERVICE " DONUT (489-04-99-11). INSTALL ON STEAMER NOZZLE UNTIL HYDRANT IS CLEARED AND ACCEPTED BY FIRE DEPARTMENT. SEE SECTION 481.4.6.6.
4. ORIENTATION OF STEAMER CONNECTION SHALL BE AS DIRECTED BY THE ENGINEER.
5. PROVIDE MINIMUM 7' CLEARANCE LEFT, RIGHT AND FRONT OF HYDRANT, AND 4' MINIMUM TO REAR.

SPECIFICATION	DATE REVISED:	SECTION
		SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE HYDRANT ASSEMBLY PARALLEL TO MAIN	B 488-1.1



SECTION VIEW

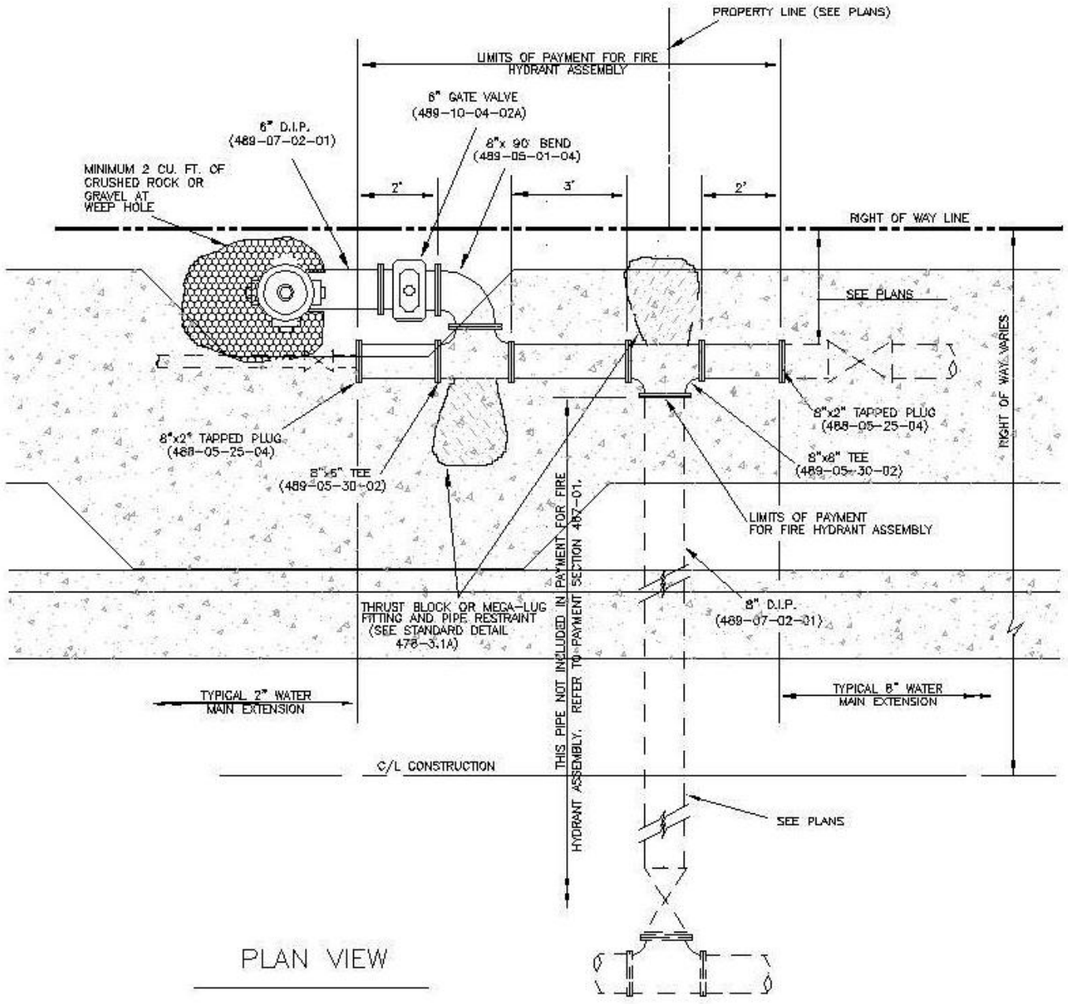


PLAN VIEW

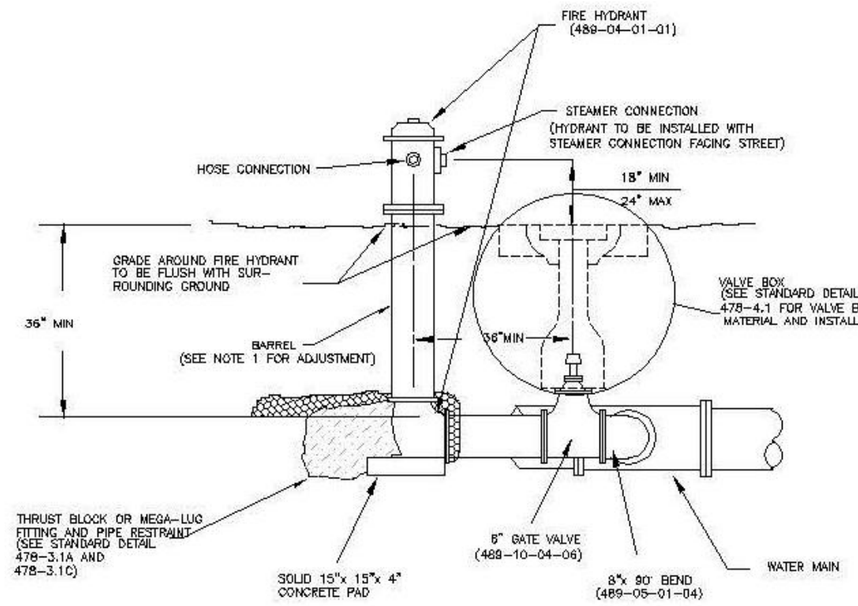
NOTES

1. NO MORE THAN ONE BARREL SECTION SHALL BE ALLOWED WHEN ADJUSTING HYDRANT TO FINISHED GRADE. HYDRANT EXTENSIONS TO BE SAME MANUFACTURER AS HYDRANT. MAXIMUM LENGTH OF EXTENSION IS LIMITED TO 24".
2. REFER TO CONSTRUCTION PLANS FOR ACTUAL LOCATION OF EASEMENT.
3. FIRE HYDRANT ASSEMBLY INCLUDES 8"x8" TEE, 8"x6" TEE, 2-8"x2" TAPPED PLUGS, 6" GATE VALVE AND BOX, 6" D.I.P., FIRE HYDRANT AND 7'-8" D.I.P.
4. NEW HYDRANTS TO BE INSTALLED WITH "OUT OF SERVICE" DONUT (488-04-99-11). INSTALL ON STEAMER NOZZLEL UNTIL HYDRANT IS CLEARED AND ACCEPTED BY FIRE DEPARTMENT. SEE SECTION 481.4.6.6.
5. ORIENTATION OF STEAMER CONNECTION SHALL BE AS DIRECTED BY THE ENGINEER.
6. PROVIDE MINIMUM OF 7' CLEARANCE LEFT, RIGHT AND FRONT OF HYDRANT, AND 4' MINIMUM TO THE REAR.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE HYDRANT ASSEMBLY FOUR LANE HIGHWAY INSTALLATION	C 488-1.1



PLAN VIEW

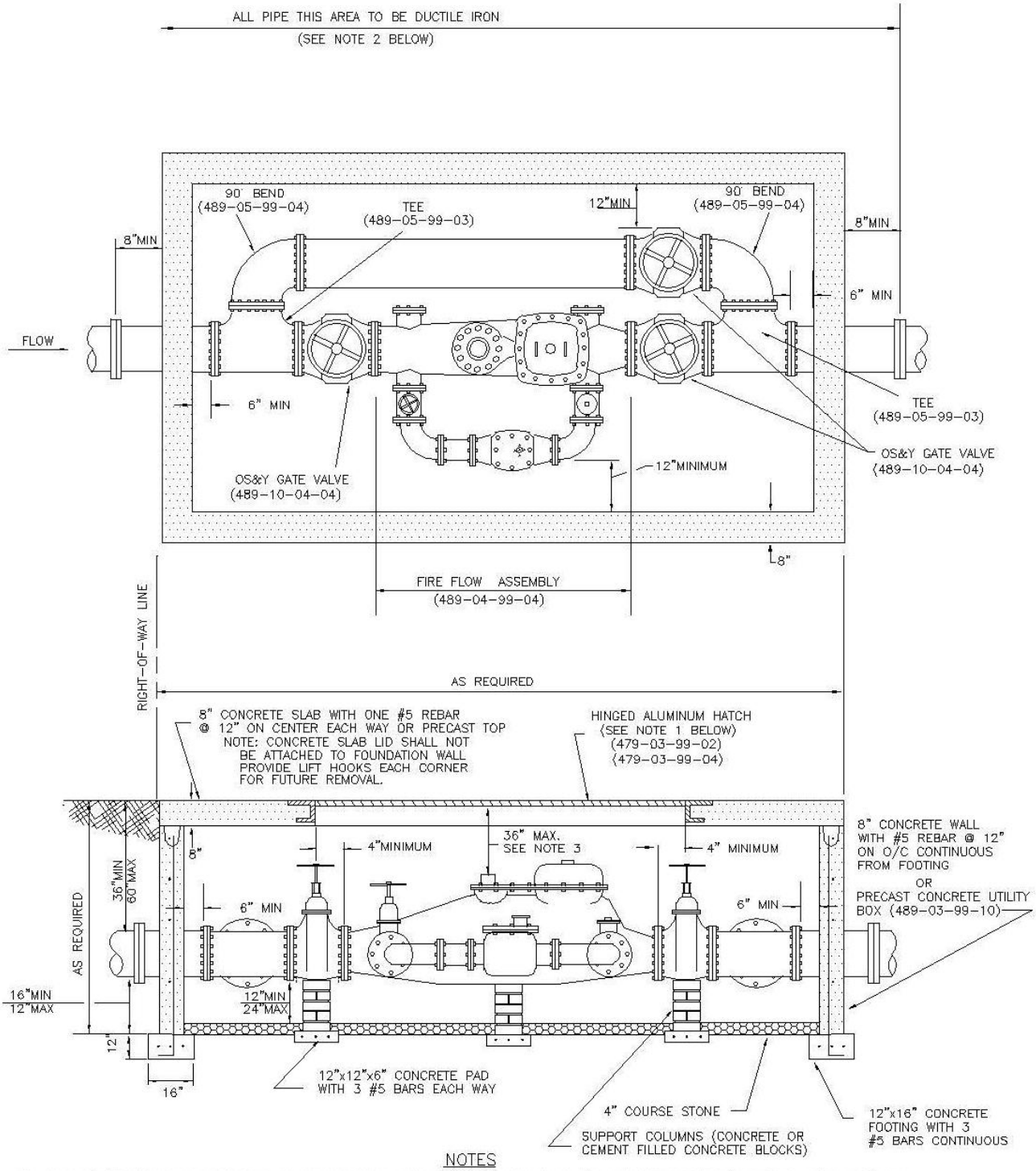


SECTION VIEW

NOTES

1. NO MORE THAN ONE BARREL SECTION SHALL BE ALLOWED WHEN ADJUSTING HYDRANT TO FINISHED GRADE. HYDRANT EXTENSIONS TO BE SAME MANUFACTURER AS HYDRANT. MAXIMUM LENGTH OF EXTENSION IS LIMITED TO 24".
2. FIRE HYDRANT ASSEMBLY INCLUDES (1) 8"x8" TEE, (1) 8"x6" TEE, (2) 8"x2" TAPPED PLUGS, (1) 6" GATE VALVE AND BOX, (1) 6"x90° BEND, (3') 6" D.I.P., (1) FIRE HYDRANT AND (7') 8" D.I.P.
3. NEW HYDRANTS TO BE INSTALLED WITH "OUT OF SERVICE" DONUT (488-04-99-11). INSTALL ON STEAMER NOZZLE UNTIL HYDRANT IS CLEARED AND ACCEPTED BY FIRE DEPARTMENT. SEE SECTION 481-4.6.8.
4. ORIENTATION OF STEAMER CONNECTION SHALL BE AS DIRECTED BY THE ENGINEER.
5. PROVIDE MINIMUM OF 7' CLEARANCE LEFT, RIGHT AND FRONT OF HYDRANT, AND 4' MINIMUM TO THE REAR.

SPECIFICATION		DATE REVISED:	SECTION SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE HYDRANT ASSEMBLY FOUR LANE HIGHWAY INSTALLATION IN R/W	D 488-1.1

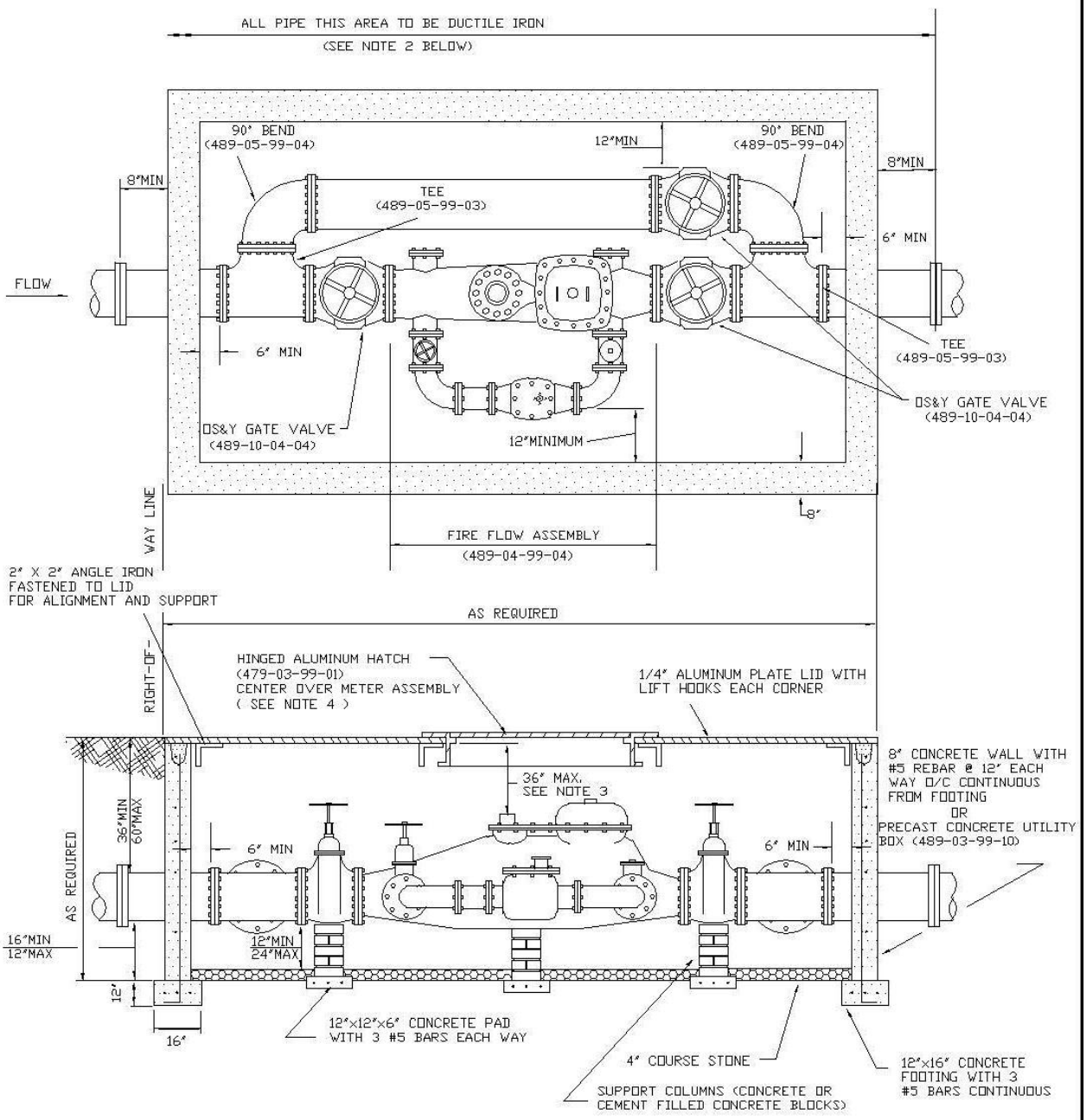


NOTES

1. ALUMINUM HATCH TO BE SIZED SO AS TO PROVIDE A MINIMUM OF 4" CLEARANCE ALL SIDES FOR REMOVAL OF FIRE FLOW ASSEMBLY FROM PIT.
2. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
3. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (489-06-99-10) AS SPECIFIED IN 488-9.1A.

SPECIFICATION	DATE REVISED:	SECTION
		SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE FLOW ASSEMBLY BELOW GROUND-TRAFFIC LID	A 488-1.2

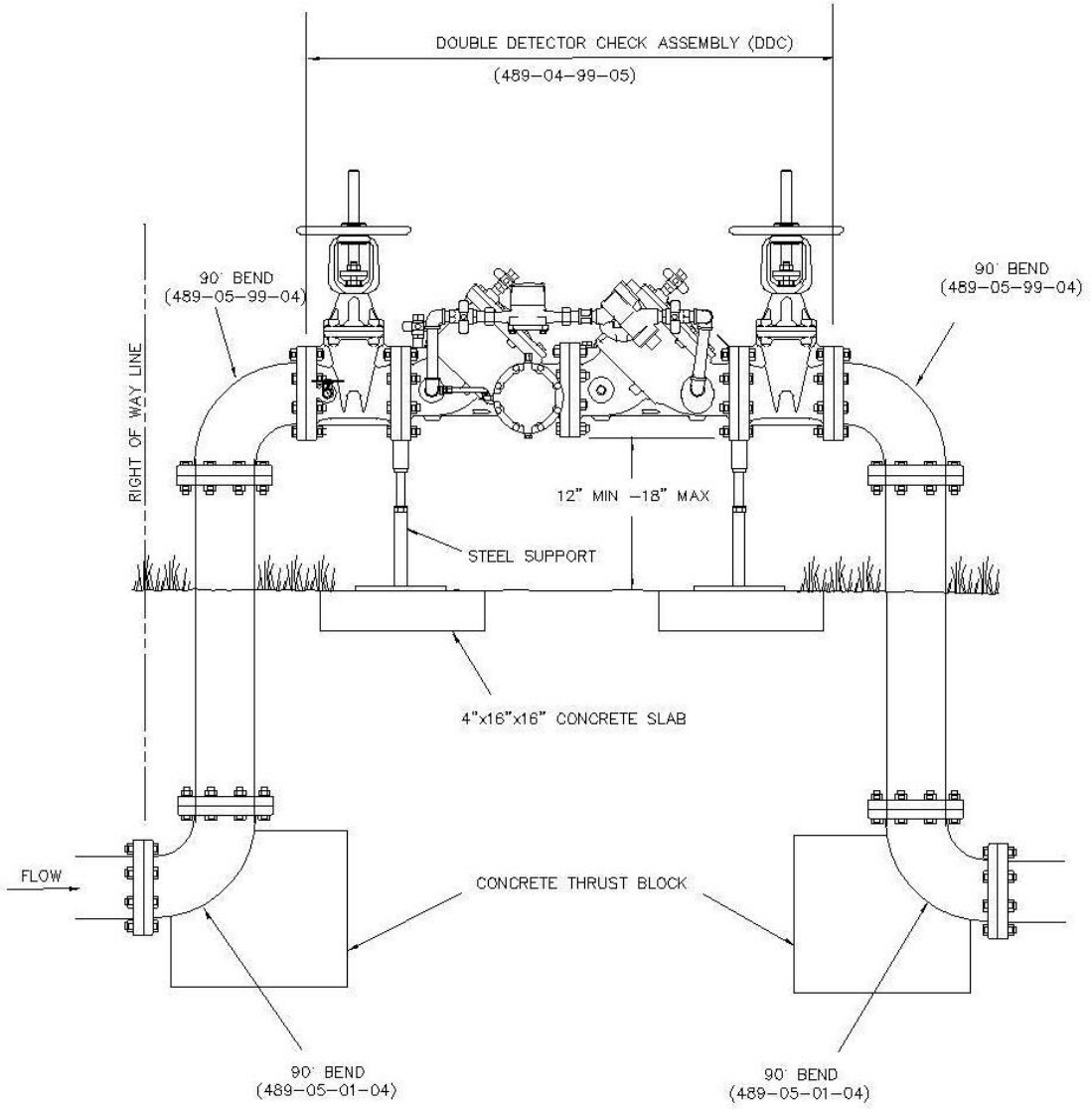


NOTES

1. INSTALL BOLTS TO SECURE LID IN EACH CORNER.
2. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
3. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (489-06-99-10) AS SPECIFIED IN 488-9.1A
4. ALUMINUM HATCH TO BE SIZED SO AS TO PROVIDE 4" CLEARANCE ON ALL SIDES FOR REMOVAL OF EQUIPMENT.

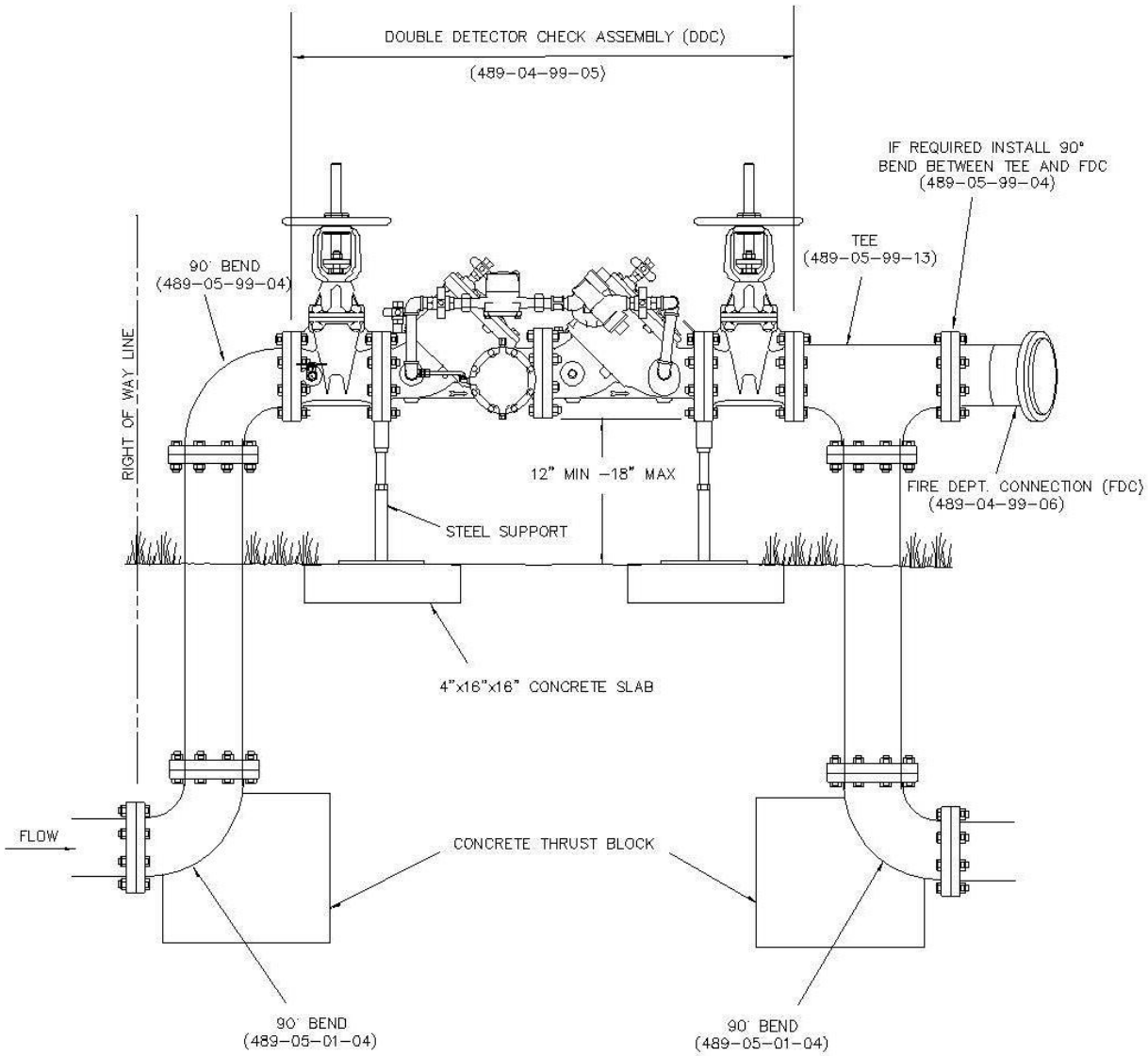
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE FLOW ASSEMBLY BELOW GROUND WITH NON-TRAFFIC LID	B 488-1.2



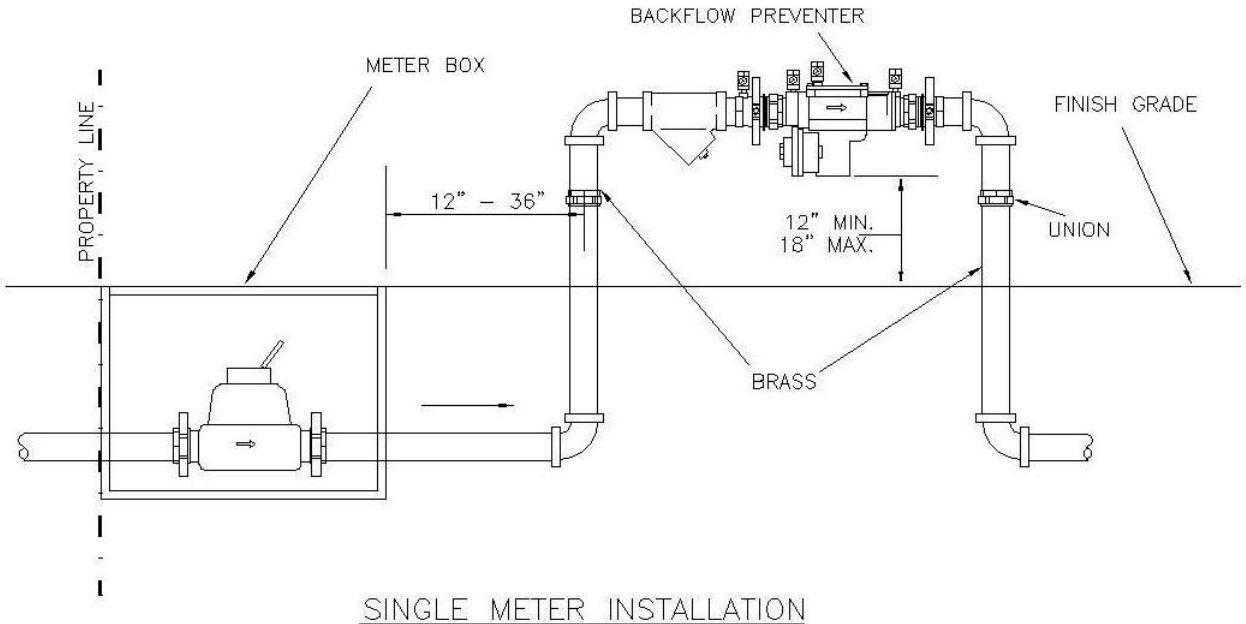
1. FOR FIRE LINES CONTACT CITY FIRE DEPARTMENT FOR ADDITIONAL REQUIREMENTS

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE LINE BACKFLOW PREVENTOR 3" OR GREATER	F 488-1.3

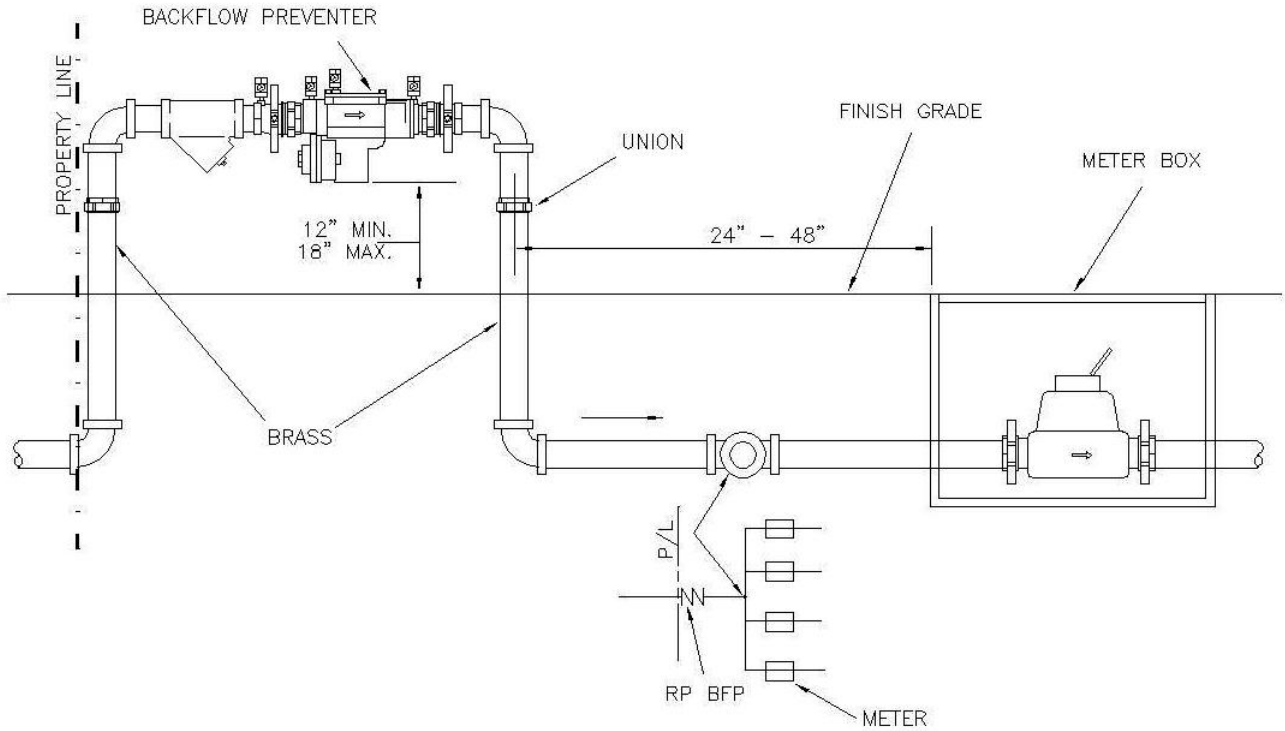


1. FOR FIRE LINES CONTACT CITY FIRE DEPARTMENT FOR ADDITIONAL REQUIREMENTS
2. FDC SHALL BE LOCATED NEAR OR ORIENTED FACING VEHICULAR TRAFFIC LANES, FULLY VISIBLE, RECOGNIZABLE AND ACCESSABLE FROM THE TRAVEL LANE OR NEAREST POINT OF FIRE DEPT. APPARATUS.
3. PROVIDE A CLEAR ZONE OF 7-1/2' TO THE FRONT AND SIDES OF THE FDC.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE LINE BACKFLOW PREVENTOR WITH FDC 3" OR GREATER	G
			488-1.3



SINGLE METER INSTALLATION



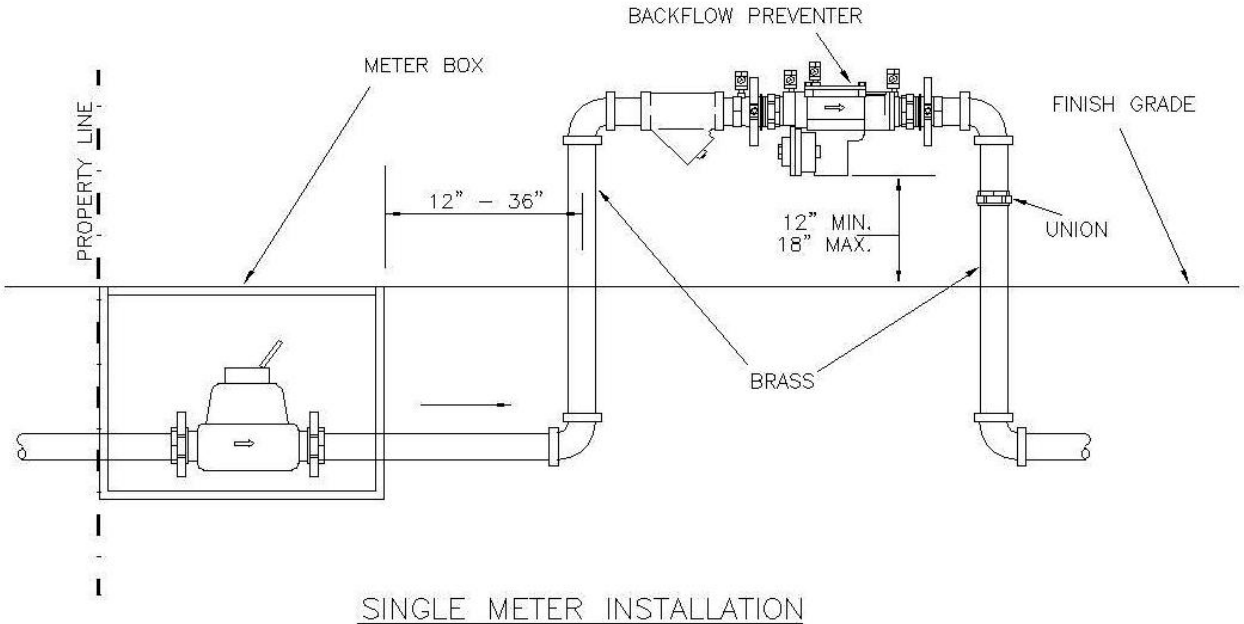
MULTIPLE METER INSTALLATION

1.INSULATE ALL ABOVE GROUND PIPING FOR FREEZE PROTECTION.

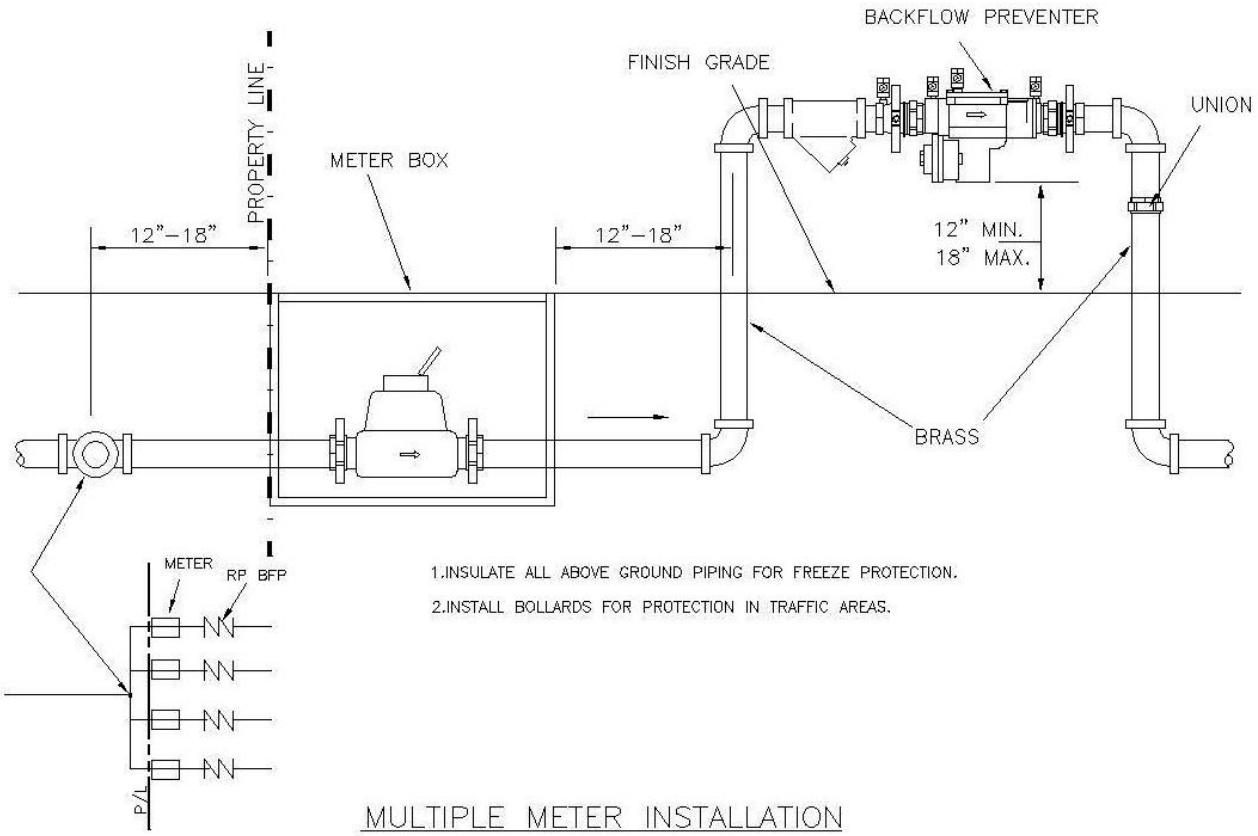
2.INSTALL BOLLARDS FOR PROTECTION IN TRAFFIC AREAS.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	SINGLE & MULTI–FAMILY BACKFLOW PREVENTOR INSTALLATION (LESS THAN 3")	C
			488–1.4



SINGLE METER INSTALLATION



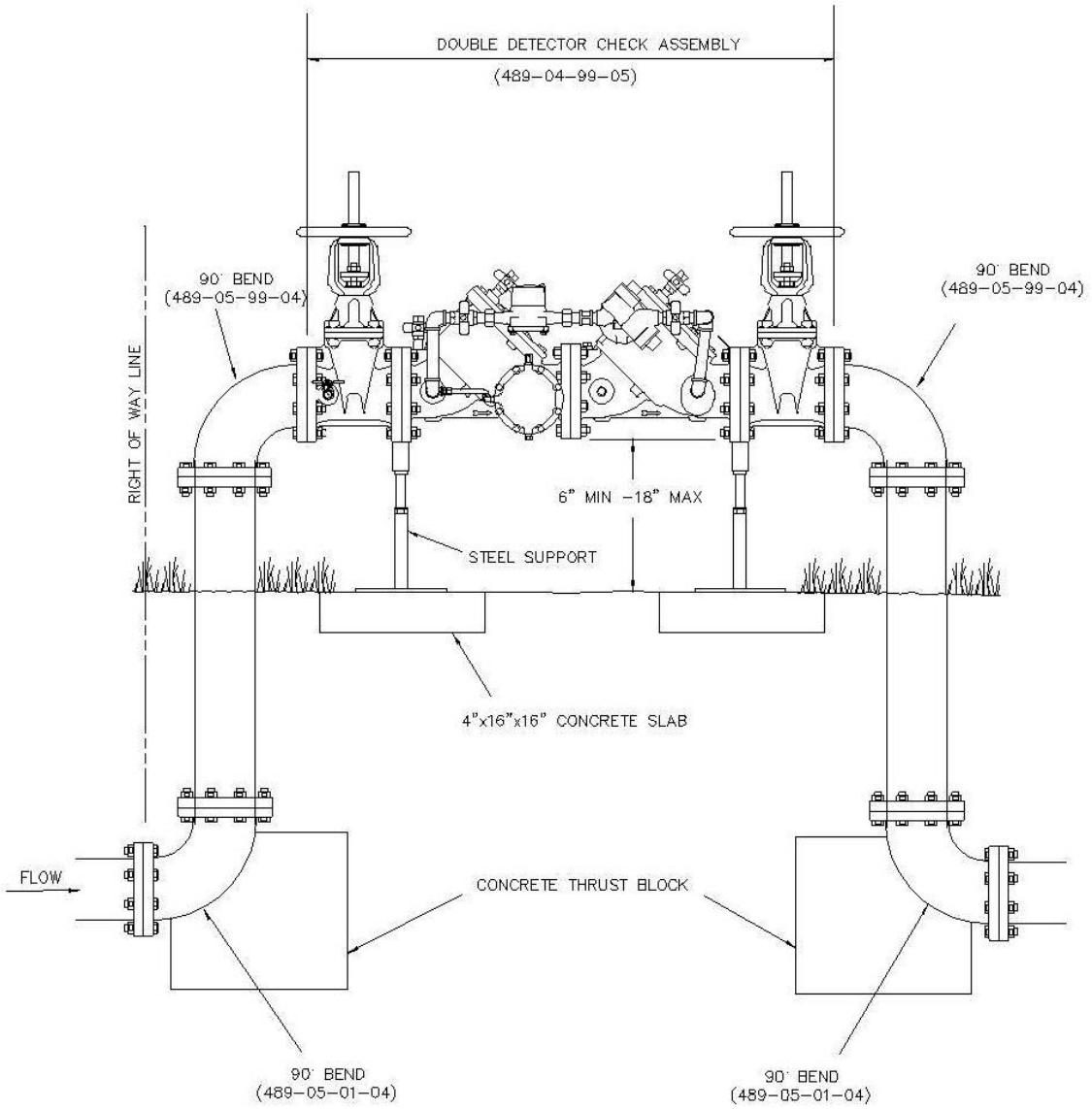
1.INSULATE ALL ABOVE GROUND PIPING FOR FREEZE PROTECTION.

2.INSTALL BOLLARDS FOR PROTECTION IN TRAFFIC AREAS.

MULTIPLE METER INSTALLATION

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

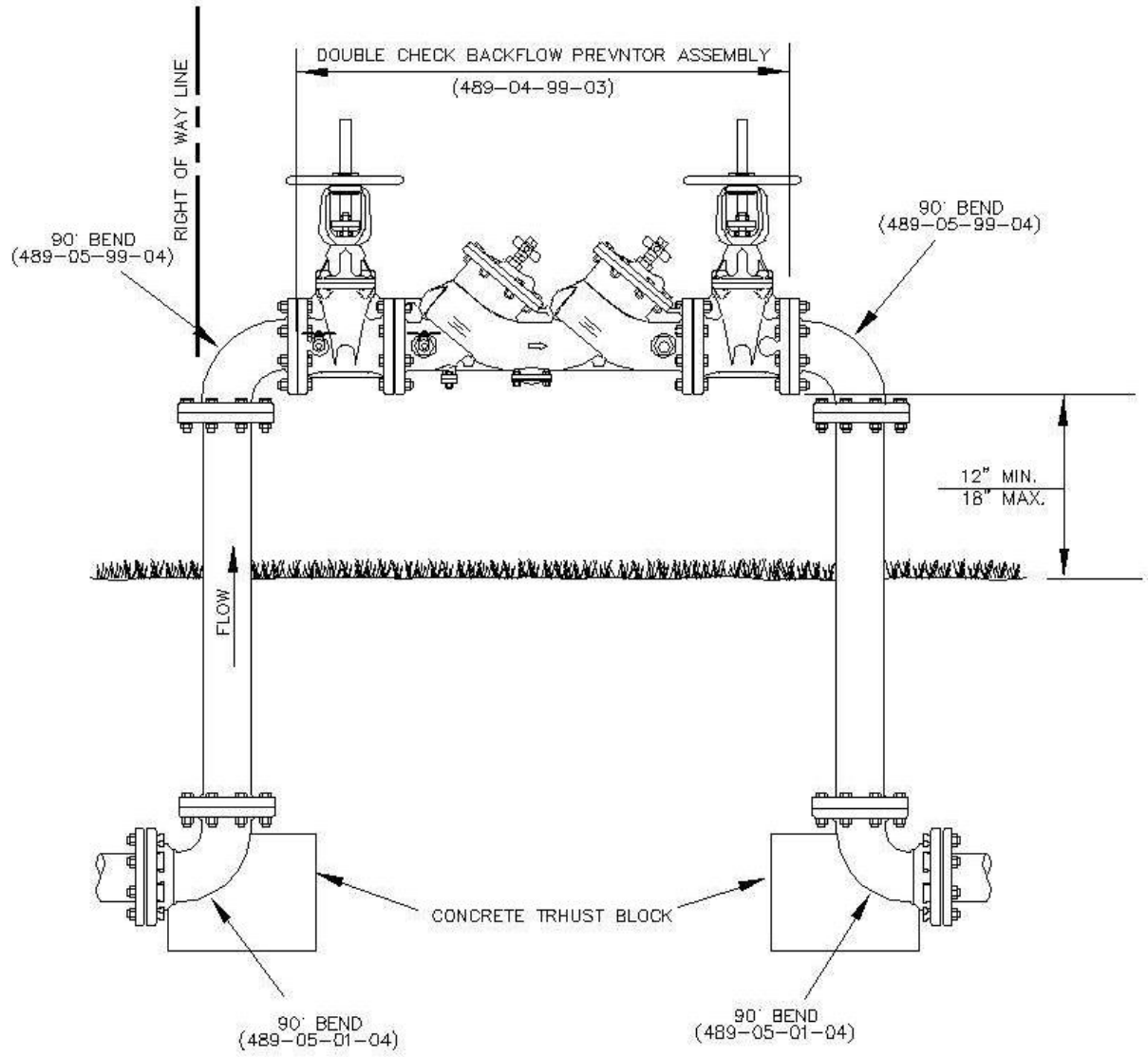
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	COMMERCIAL BACKFLOW PREVENTOR INSTALLATION (LESS THAN 3")	D
			488–1.4



1. FOR FIRE LINES CONTACT CITY FIRE DEPARTMENT FOR ADDITIONAL REQUIREMENTS

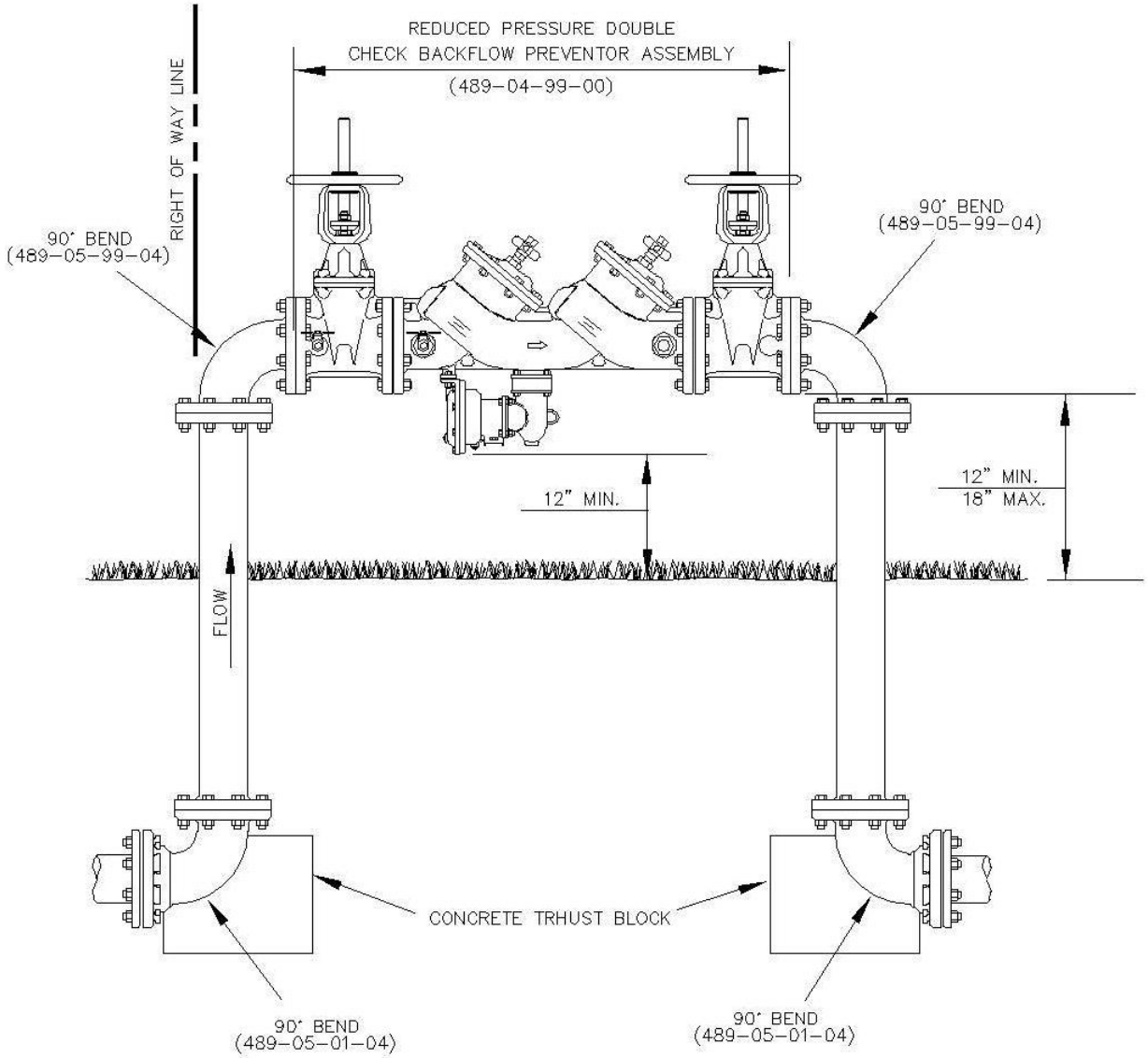
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE LINE BACKFLOW PREVENTOR 3" OR GREATER	E
			488-1.4

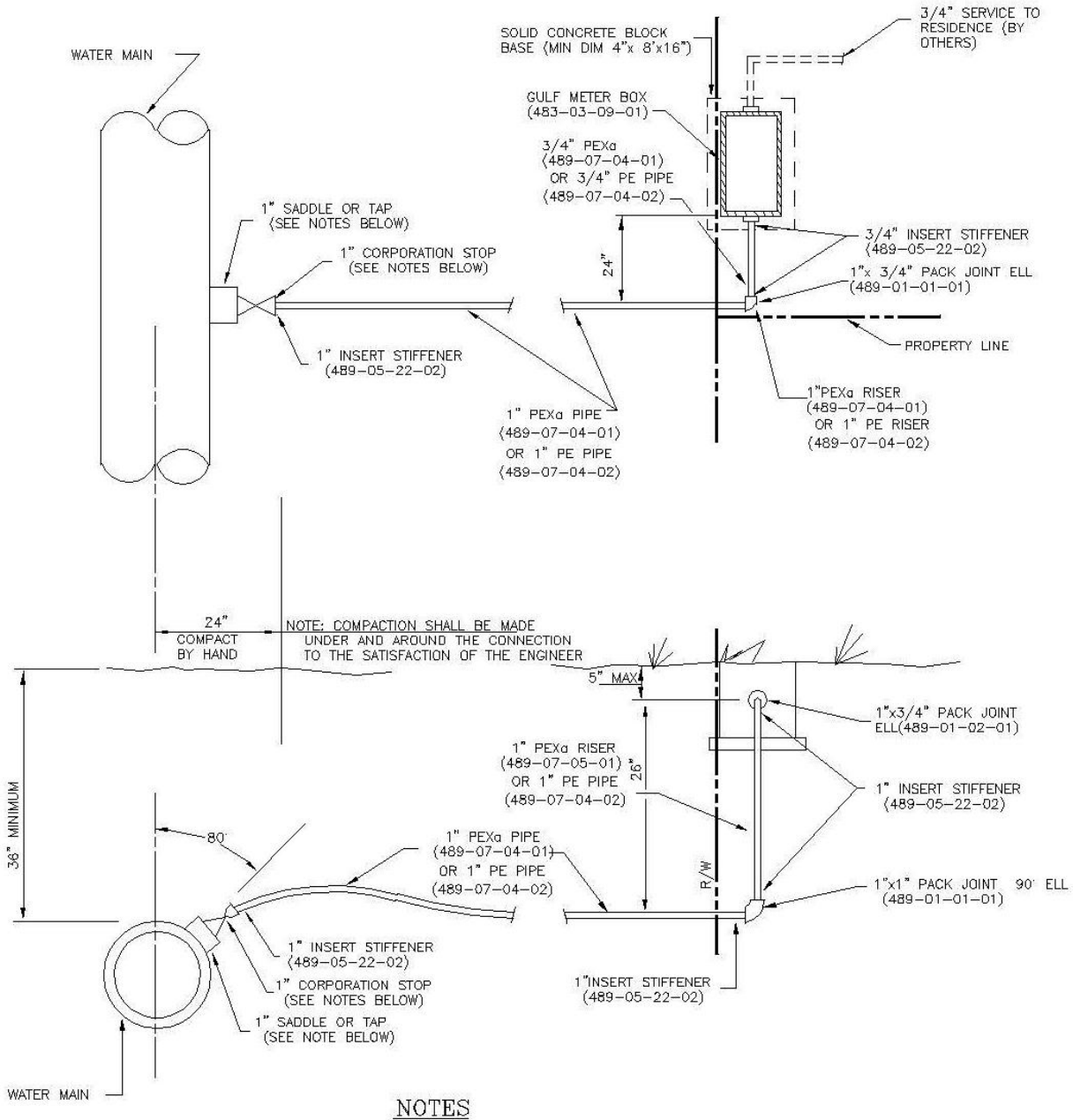


SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	BACKFLOW PREVENTOR 3" AND ABOVE	F
			488-1.4



SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	REDUCED PRESSURE BACKFLOW PREVENTOR 3" AND ABOVE	G 488-1.4

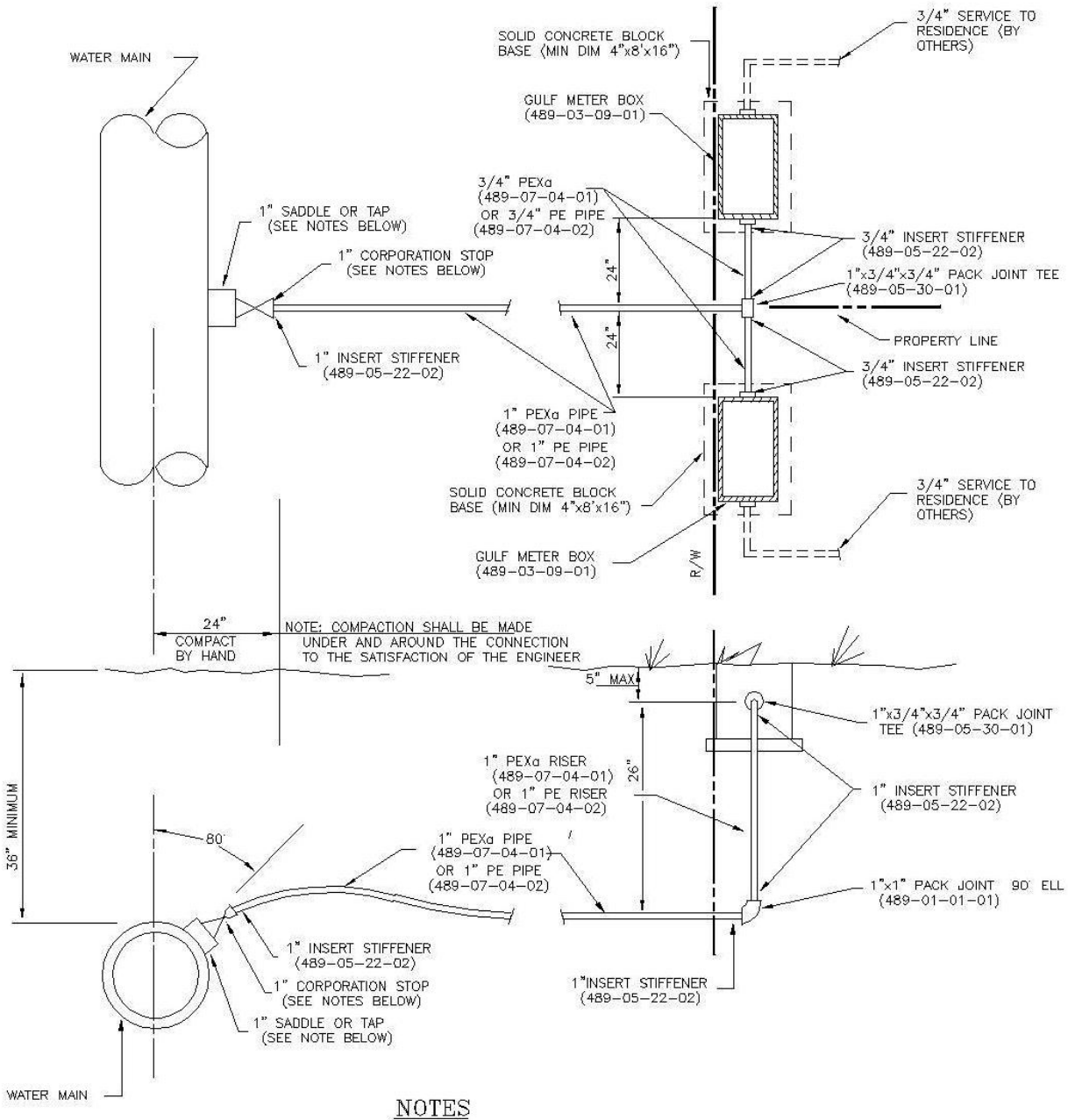


NOTES

1. METER BOXES SET IN PAVEMENT SHALL BE POLYMERE CONCRETE (489-03-09-02) WITH COVER AND METER READERS LID.
2. WATER SERVICE TO BE INSTALLED WITH SOLID COPPER LOCATING WIRE. SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
3. ON NEW 2" PEXa OR PE WATER MAINS, A 2" x 1" TAPPING SADDLE (489-05-02-01) AND 1" CORRPORATION STOP (489-10-02-01) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
4. ON EXISTING 2" GALVANIZED WATER MAINS, A SERVICE CLAMP (489-09-02-01) AND 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
5. ON NEW OR EXISTING WATER MAINS WITH A DIAMETER OF 6" OR LARGER, A 1" TAP SHALL BE MADE INTO THE MAIN AND A 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS. A SADDLE (489-05-02-01) MAY BE USED IN LIEU OF TAP AS APPROVED BY ENGINEER.
6. THE BRASS EXPANSION CONNECTION SUPPLIED WITH THE METER BOX SHALL BE DELIVERED TO THE ENGINEERING INSPECTOR AT THE TIME OF FINAL INSPECTION.
7. LONG SERVICES UNDER PAVEMENT REQUIRE 2" CASING OF PVC, HDPE OR STEEL.
8. WATER SERVICE SHOULD BE PEXa OR EQUAL AS APPROVED BY UTILITY DIRECTOR.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE SINGLE 3/4" WATER SERVICE	A 488-2.1

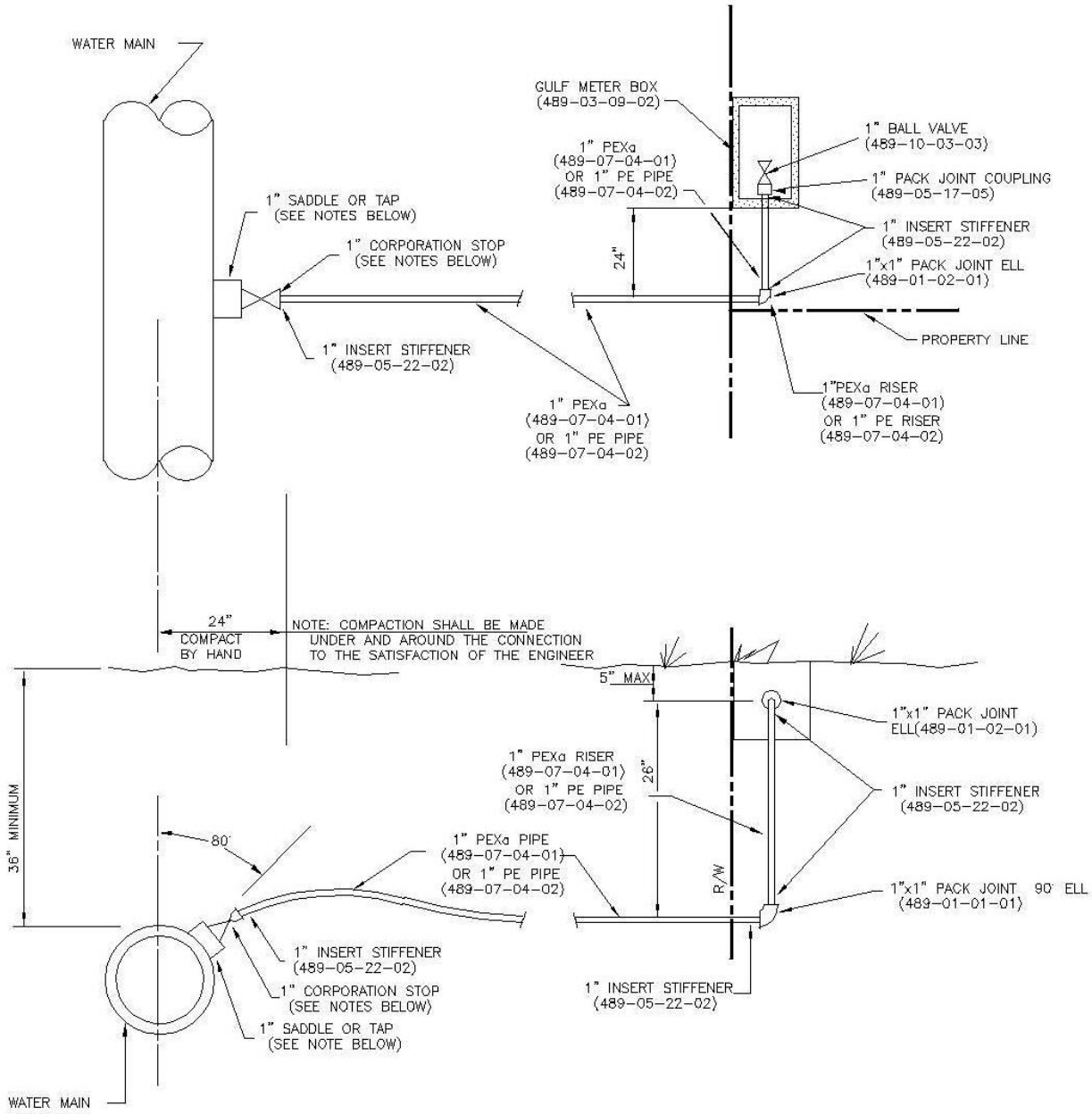


NOTES

1. METER BOXES SET IN PAVEMENT SHALL BE POLYMERE CONCRETE (489-03-09-02) WITH COVER AND METER READERS LID.
2. WATER SERVICE TO BE INSTALLED WITH SOLID COPPER LOCATING WIRE. SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
3. ON NEW 2" PEXa OR PE WATER MAINS, A 2" X 1" TAPPING SADDLE (489-05-02-01) AND A 1" CORPORATION STOP (489-10-02-01) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
4. ON EXISTING 2" GALVANIZED WATER MAINS, A SERVICE CLAMP (489-09-02-01) AND 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
5. ON NEW OR EXISTING WATER MAINS WITH A DIAMETER LARGER THAN 2", A 1" TAP SHALL BE MADE INTO THE MAIN AND A 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS. A SADDLE (498-05-02-01) MAY BE USED IN LIEU OF TAP AS APPROVED BY ENGINEER.
6. THE BRASS EXPANSION CONNECTION SUPPLIED WITH THE METER BOX SHALL BE DELIVERED TO THE ENGINEERING INSPECTOR AT THE TIME OF FINAL INSPECTION.
7. LONG SERVICES UNDER PAVEMENT REQUIRE 2" CASING OF PVC, HDPE OR STEEL.
8. WATER SERVICE SHOULD BE PEXa OR EAQUAL AS APPROVED BY THE UTILITY DIRECTOR.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE DOUBLE 3/4" WATER SERVICE	B 488-2.1

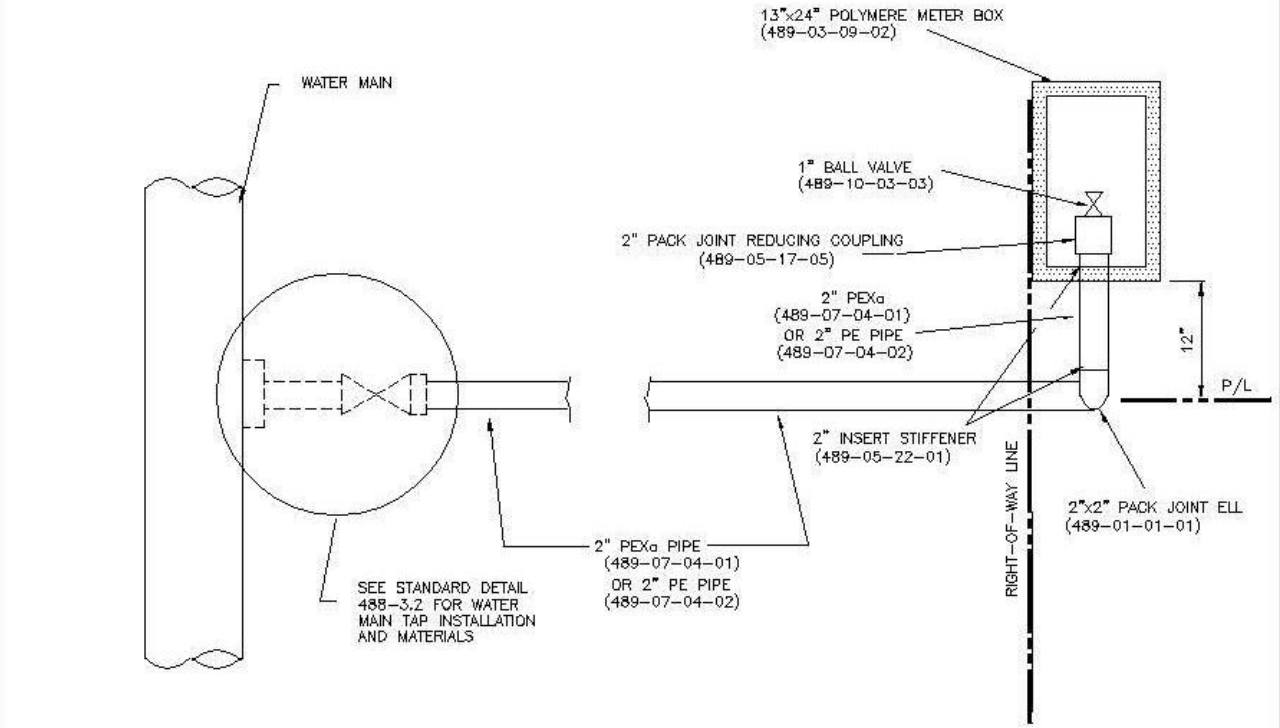


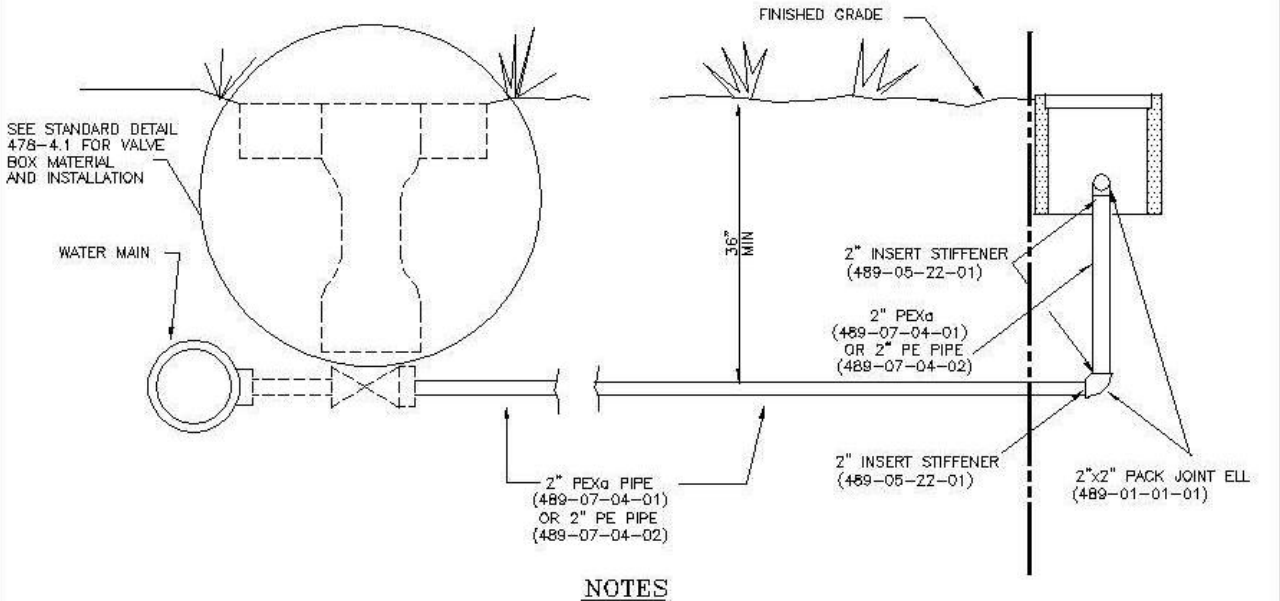
NOTES

1. METER BOXES SET IN PAVEMENT SHALL BE POLYMER CONCRETE (489-03-09-02) WITH COVER AND METER READERS LID.
2. WATER SERVICE TO BE INSTALLED WITH SOLID COPPER LOCATING WIRE. SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
3. ON NEW 2" PEXa OR PE WATER MAINS, A 2" x 1" TAPPING SADDLE (489-05-02-01) AND 1" CORPORATION STOP (489-10-02-01) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
4. ON EXISTING 2" GALVANIZED WATER MAINS, A SERVICE CLAMP (489-09-02-01) AND 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS.
5. ON NEW OR EXISTING WATER MAINS WITH A DIAMETER LARGER THAN 2", A 1" TAP SHALL BE MADE INTO THE MAIN AND A 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING SERVICE CONNECTIONS. A SADDLE (489-05-02-01) MAY BE USED IN LIEU OF TAP AS APPROVED BY ENGINEER.
6. LONG SERVICES UNDER PAVEMENT REQUIRE 2" CASING OF PVC, HDPE OR STEEL.
7. WATER SERVICES SHOULD BE PEXa OR EQUAL AS APPROVED BY THE UTILITY DIRECTOR.

SPECIFICATION	DATE REVISED:	SECTION
		SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE SINGLE 1" WATER SERVICE RESIDENTIAL INSTALLATION	C 488-2.1



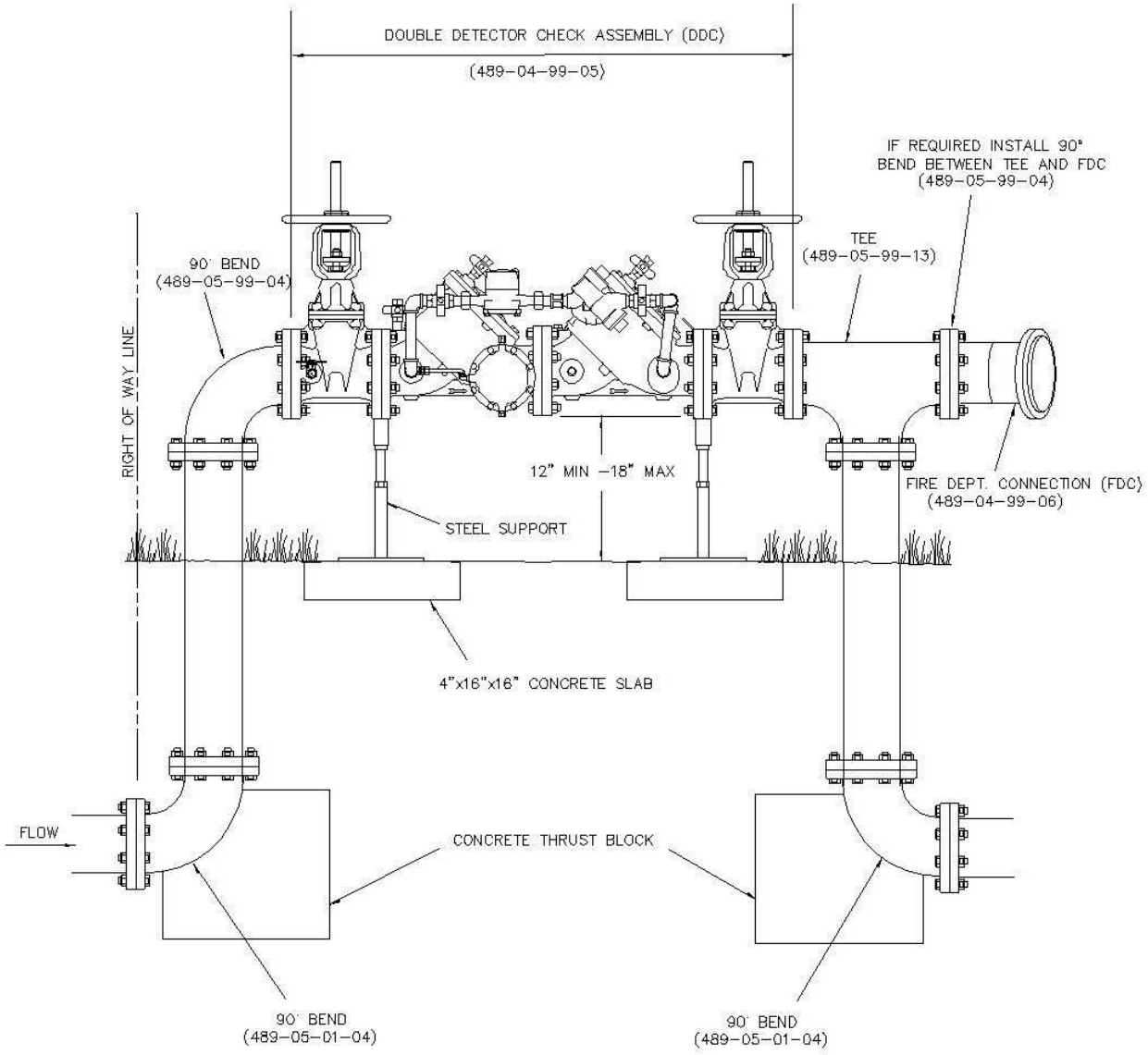


NOTES

1. WATER SERVICE TO BE INSTALLED WITH A SOLID COPPER LOCATING WIRE SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
2. LONG SERVICES UNDER PAVEMENT REQUIRE 4" CASING OF PVC, HDPE OR STEEL.
3. WATER SERVICE TO BE PEXa OR EQUAL AS APPROVED BY UTILITY DIRECTOR.

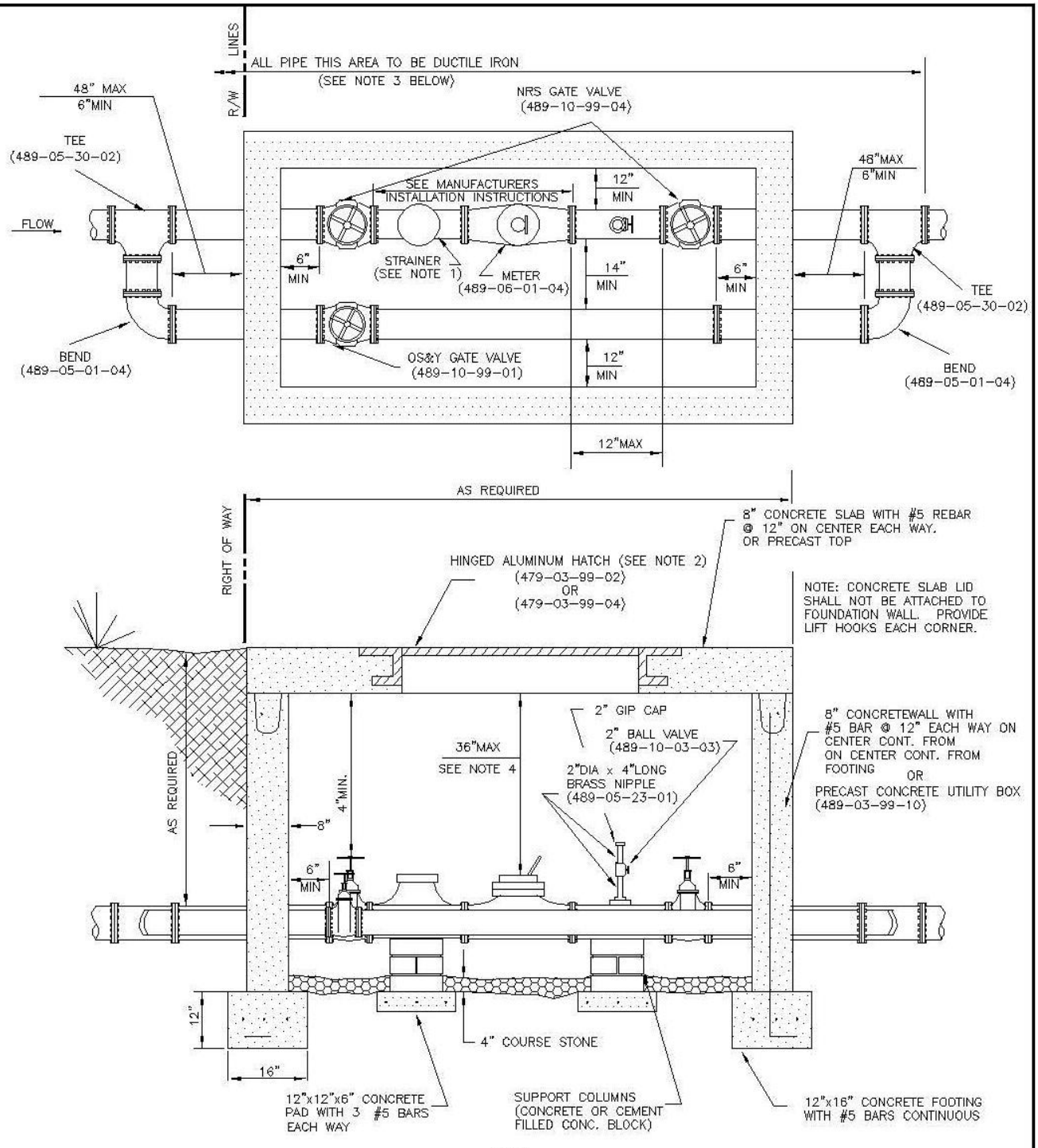
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE SINGLE 1" WATER SERVICE COMMERCIAL INSTALLATION	E 488-2.1



1. FOR FIRE LINES CONTACT CITY FIRE DEPARTMENT FOR ADDITIONAL REQUIREMENTS
2. FDC SHALL BE LOCATED NEAR OR ORIENTED FACING VEHICULAR TRAFFIC LANES, FULLY VISIBLE, RECOGNIZABLE AND ACCESSABLE FROM THE TRAVEL LANE OR NEAREST POINT OF FIRE DEPT. APPARATUS.
3. PROVIDE A CLEAR ZONE OF 7-1/2' TO THE FRONT AND SIDES OF THE FDC.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	FIRE LINE BACKFLOW PREVENTOR WITH FDC 3" OR GREATER	G
			488-1.3

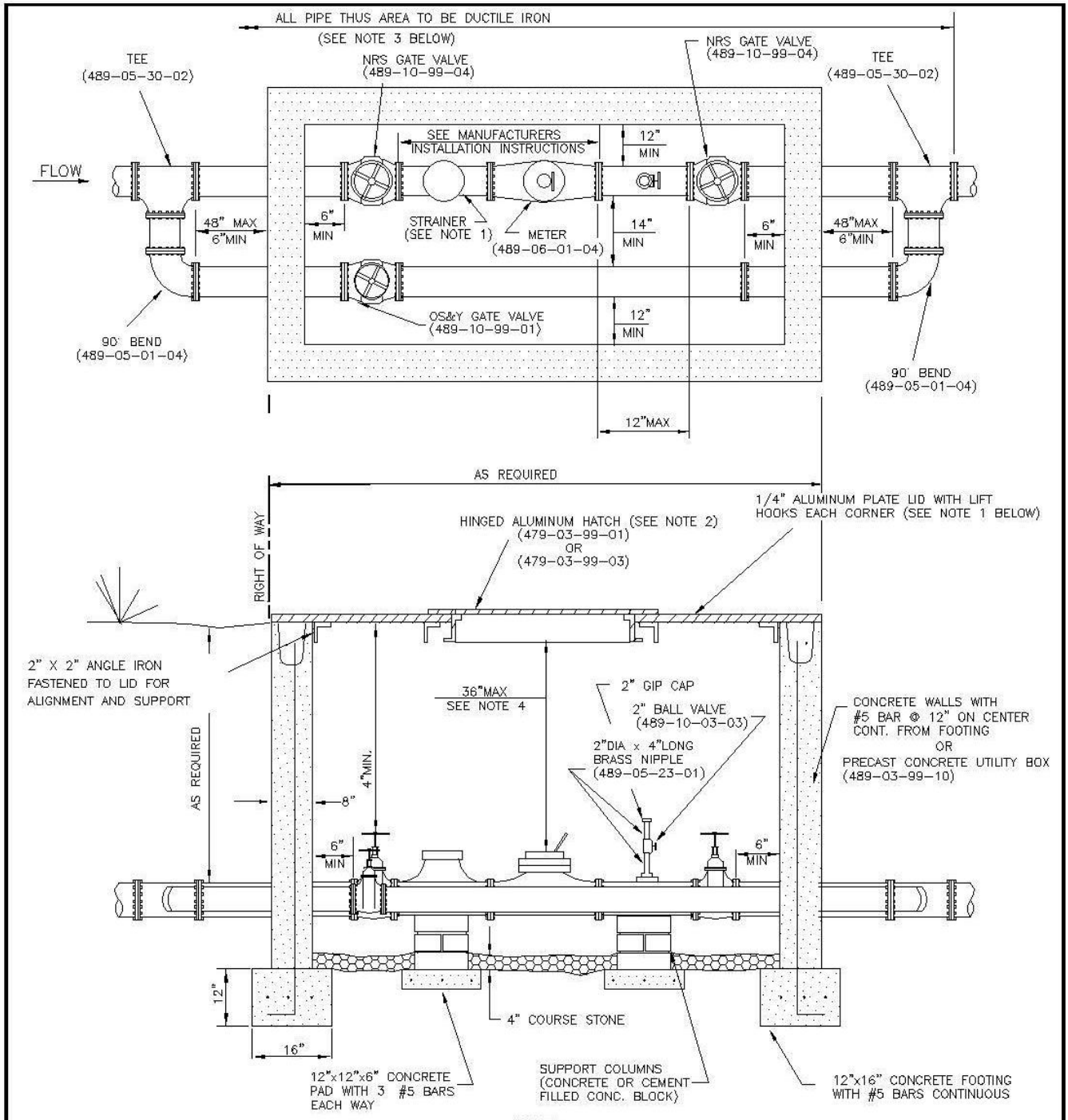


NOTES

1. METERS SHALL BE FURNISHED WITH STRAINERS APPROVED BY THE METER MANUFACTURER AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
2. ALUMINUM HATCH SHALL BE 30" X 30" FOR METERS 3" AND 4". HATCH FOR METERS 6" AND ABOVE SHALL BE 42" X 42".
3. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
4. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (489-06-99-10) AS SPECIFIED IN 488-9.1A.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	COMMERCIAL WATER SERVICE 3" AND ABOVE WITH TRAFFIC LID	I 488-2.1

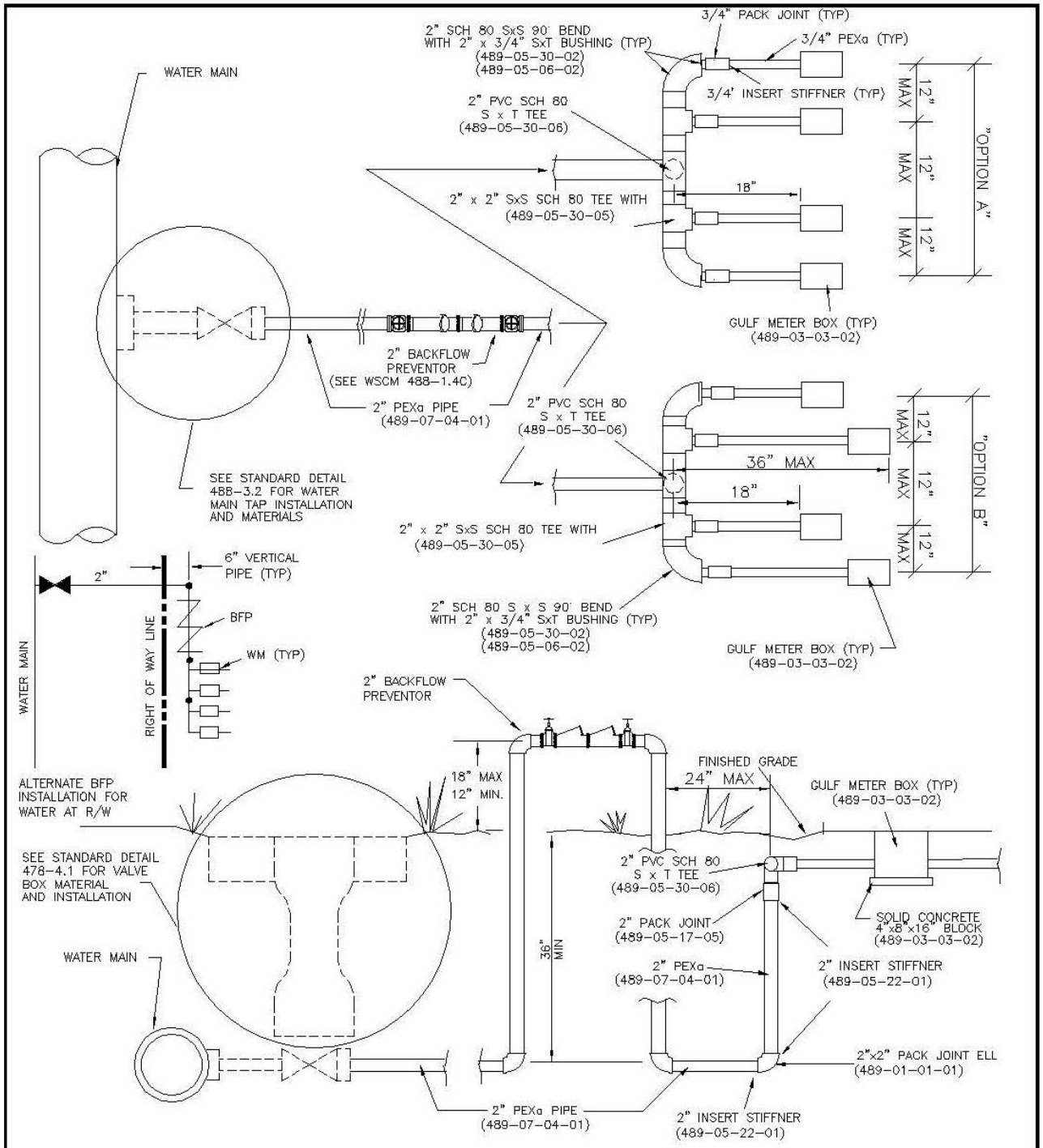


NOTES

1. METERS SHALL BE FURNISHED WITH STRAINERS APPROVED BY THE METER MANUFACTURER AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
2. ALUMINUM HATCH SHALL BE 30" X 30" FOR METERS 3" AND 4". HATCH FOR METERS 6" AND ABOVE SHALL BE 42" X 42".
3. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
4. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (498-06-99-10) AS SPECIFIED IN 488-9.1A.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

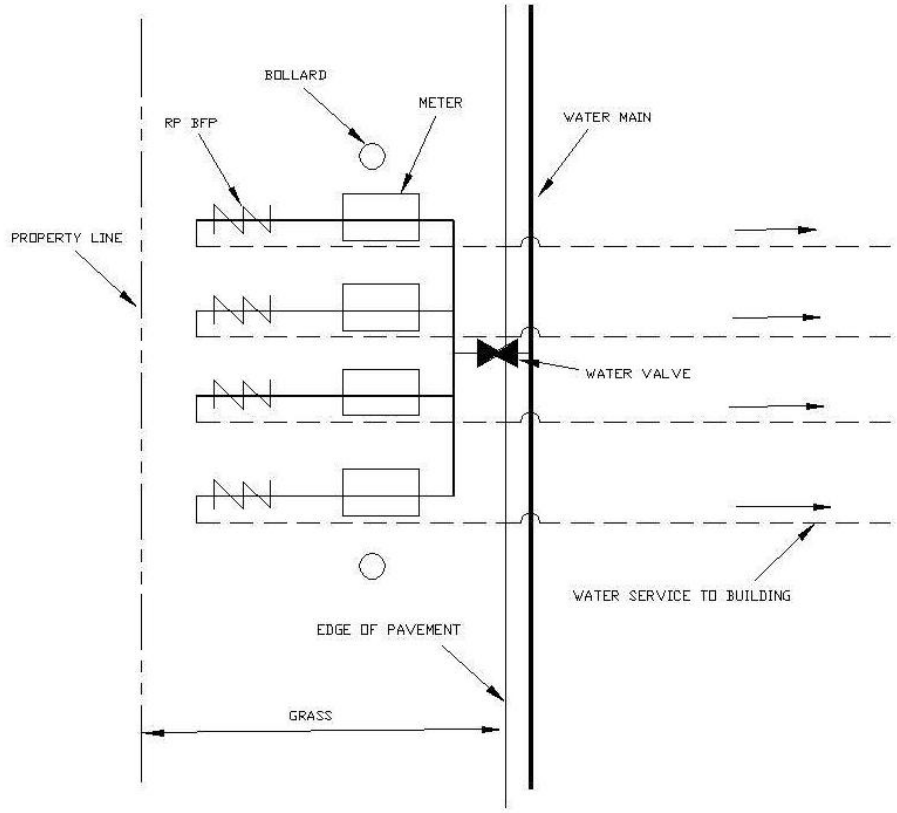
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	COMMERCIAL WATER SERVICE 3" AND ABOVE NON-TRAFFIC LID	J 488-2.1

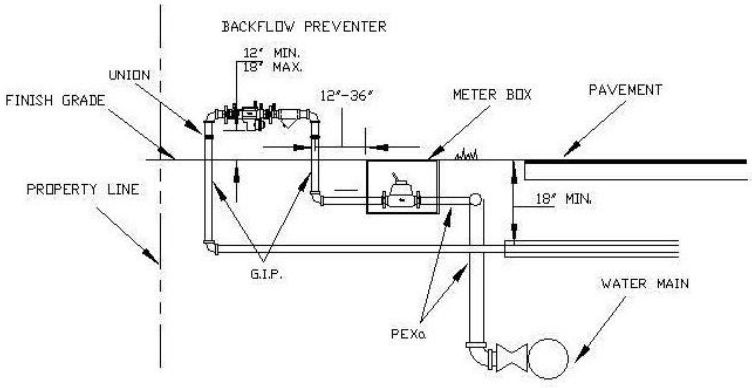


NOTES

1. WATER SERVICE TO BE INSTALLED WITH A SOLID COPPER LOCATING WIRE SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
2. MAXIMUM NUMBER OF METERS ON ONE TWO INCH (2") SERVICE TO BE FOUR (4).
3. LONG SERVICES UNDER PAVEMENT REQUIRE 4" CASING OF PVC, HDPE OR STEEL.
4. ABOVE GROUND PIPING MUST BE INSULATED FOR FREEZE PROTECTION.

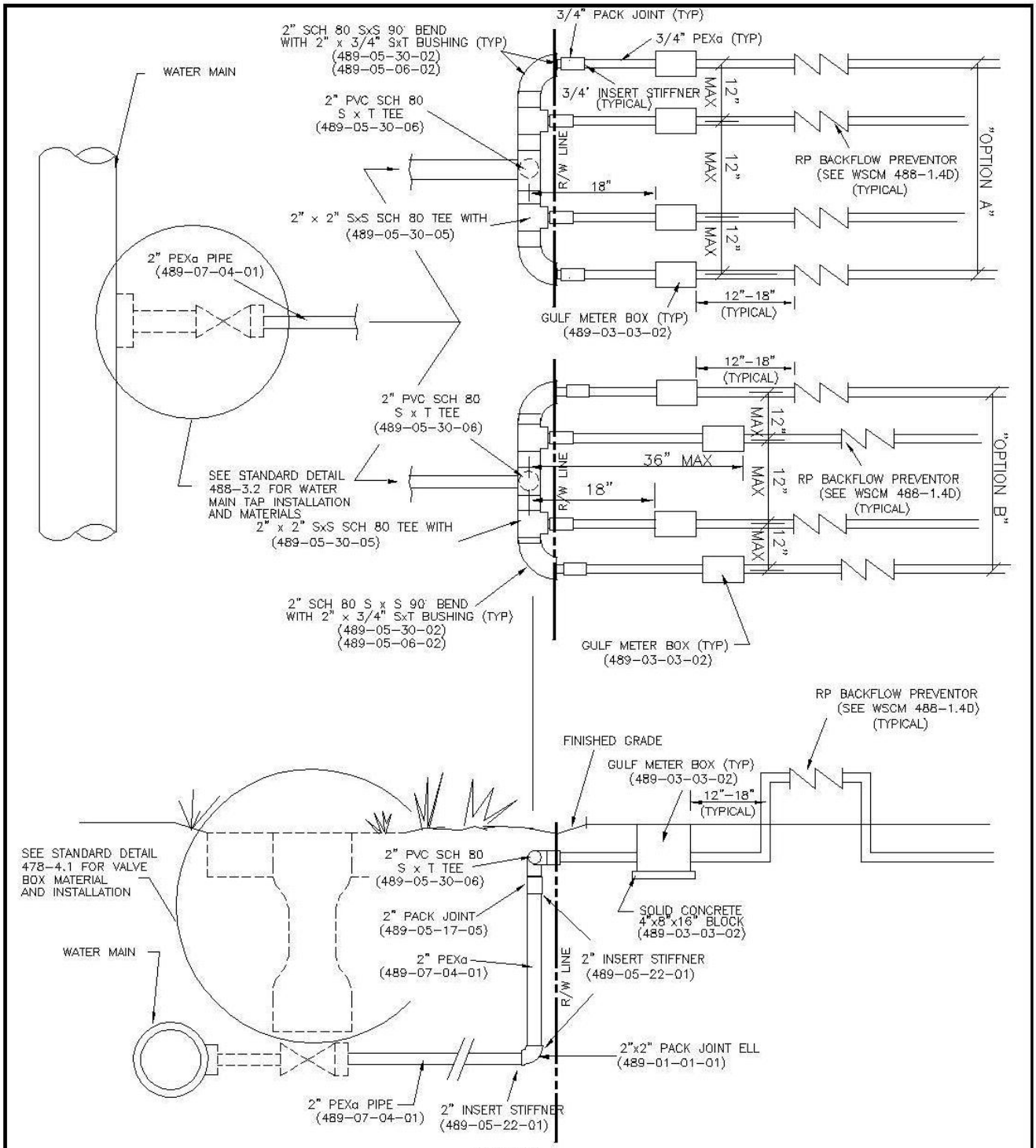
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE MULTI-FAMILY SERVICE INSTALLATION	K 488-2.1





SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

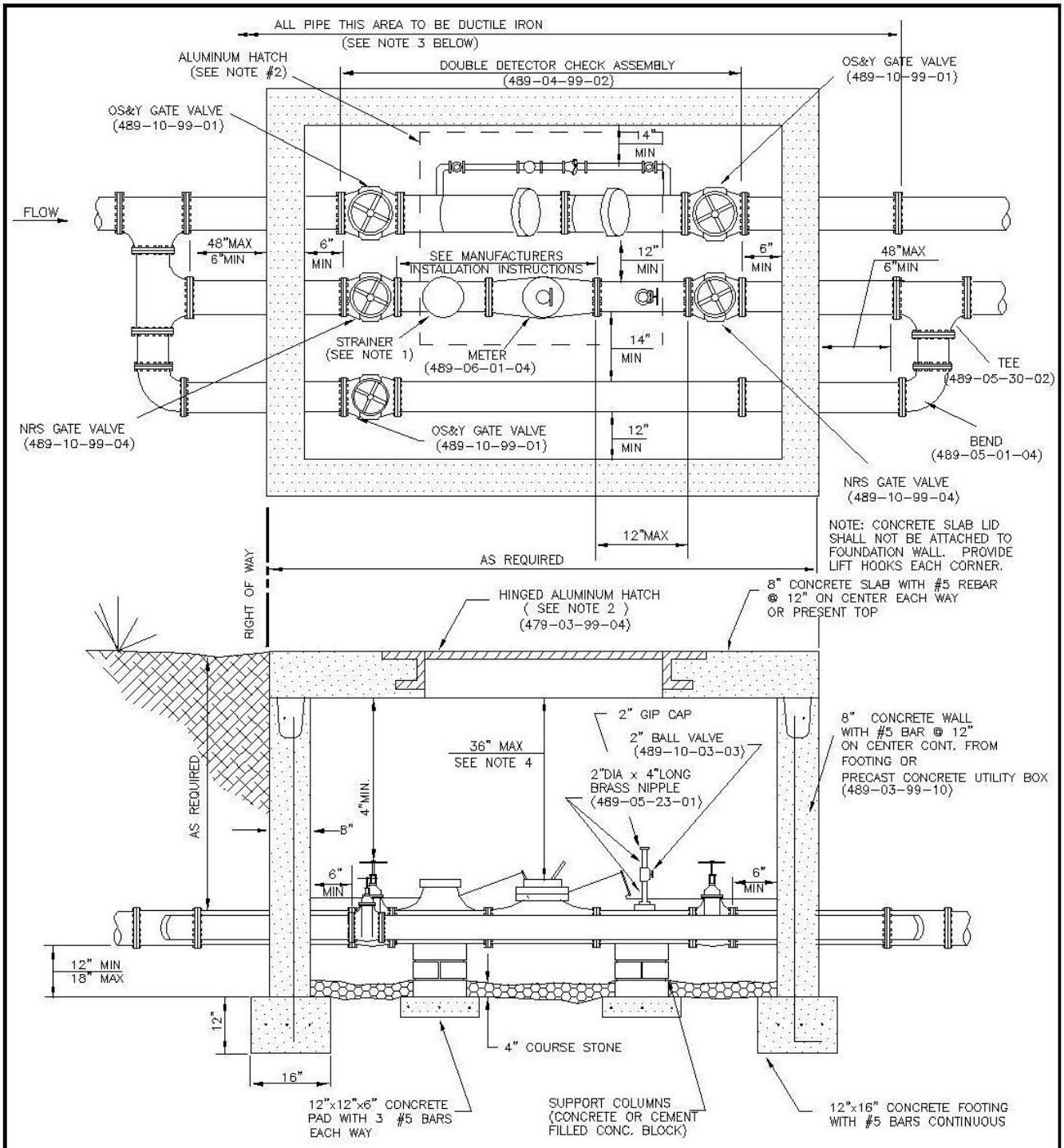
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	COMMERCIAL WATER SERVICE IN DRIVEWAY/PARKING AREAS	M
			488-2.1



NOTES

1. WATER SERVICE TO BE INSTALLED WITH A SOLID COPPER LOCATING WIRE SEE STANDARD DETAIL 478-7.1 FOR LOCATING WIRE INSTALLATION.
2. MAXIMUM NUMBER OF METERS ON ONE TWO INCH (2") SERVICE TO BE FOUR (4).
3. LONG SERVICES UNDER PAVEMENT REQUIRE 4" CASING OF PVC, HDPE OR STEEL.
4. ABOVE GROUND PIPING MUST BE INSULATED FOR FREEZE PROTECTION.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER SERVICE COMMERCIAL MULTIPLE WATER SERVICE INSTALLATION	N 488-2.1

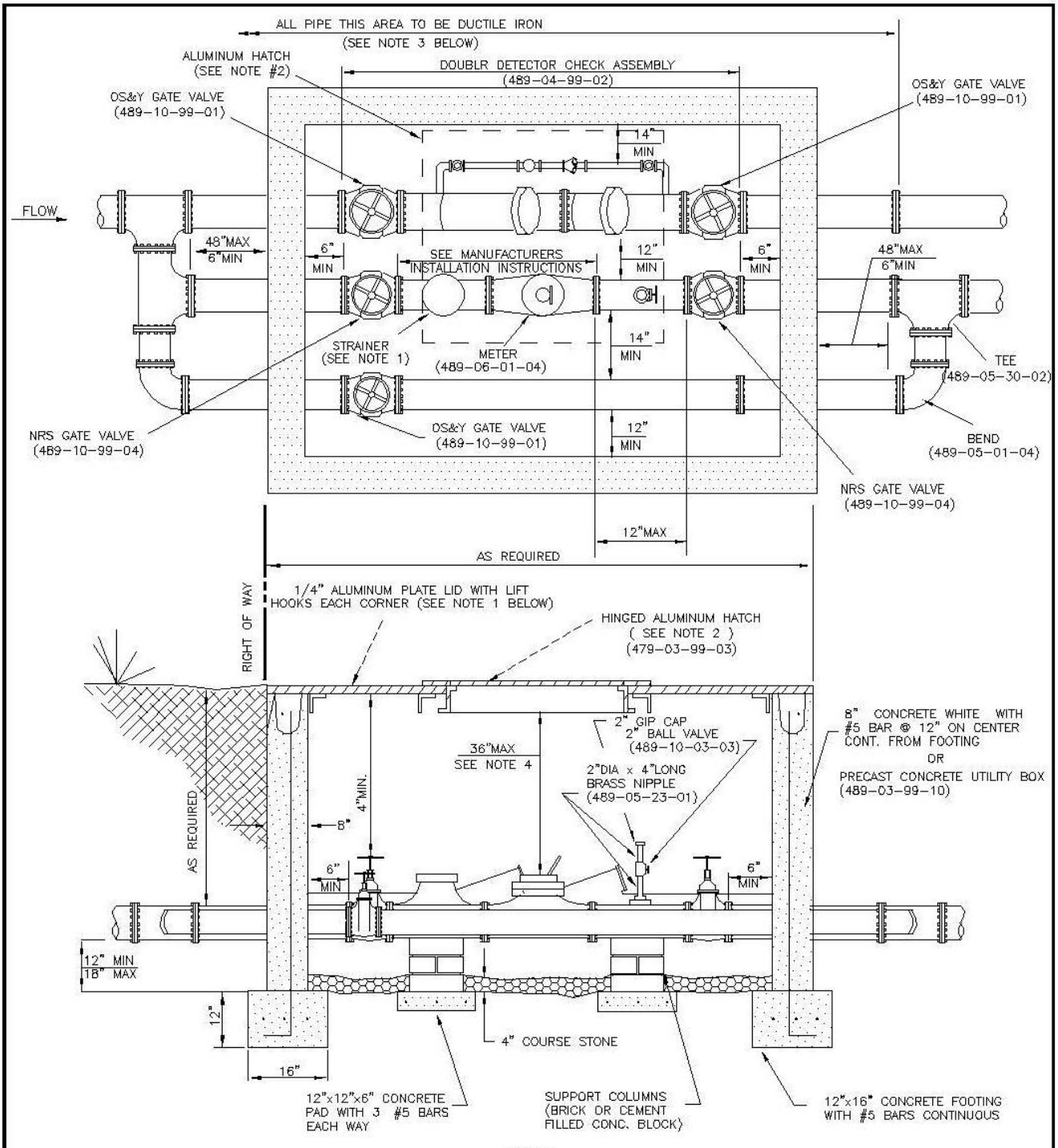


NOTES

1. METERS SHALL BE FURNISHED WITH STRAINERS APPROVED BY THE METER MANUFACTURER AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
2. ALUMINUM HATCH TO BE SIZED TO PROVIDE MINIMUM OF 4" CLEARANCE ON ALL SIDES FOR REMOVAL OF EQUIPMENT.
3. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
4. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (489-06-99-10) AS SPECIFIED IN 488-9.1A.
5. ALL BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED ABOVE GROUND.

SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER/FIRE SERVICE 3" AND ABOVE WITH TRAFFIC LID	A 488-2.2

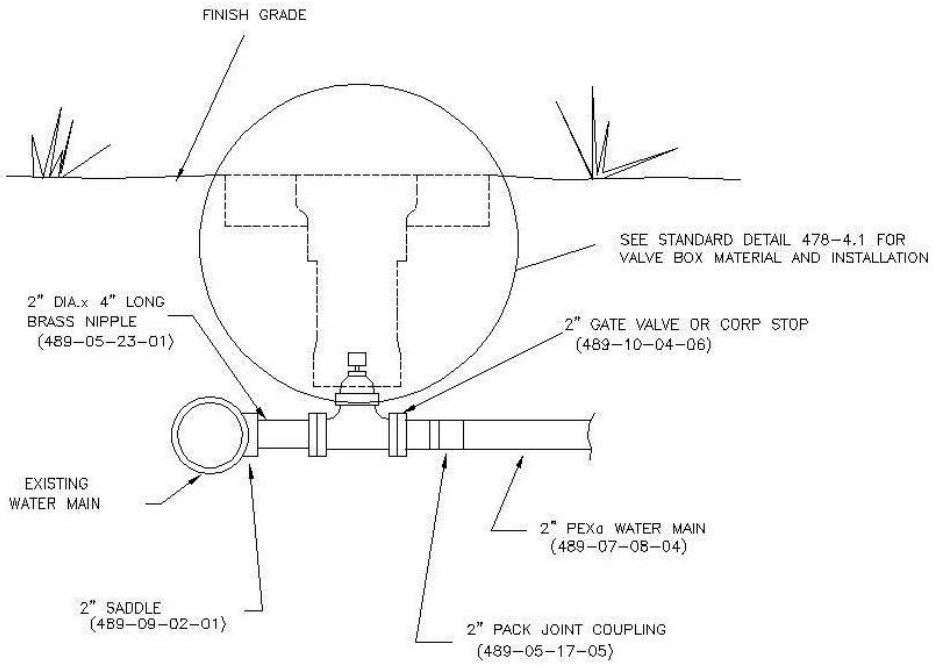


NOTES

1. METERS SHALL BE FURNISHED WITH STRAINERS APPROVED BY THE METER MANUFACTURER AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
2. ALUMINUM HATCH TO BE SIZED TO PROVIDE MINIMUM OF 4" CLEARANCE FOR ALL EQUIPMENT.
3. UNLESS OTHERWISE NOTED, ALL EXPOSED FITTINGS SHALL BE FLANGED AND ALL BURIED FITTINGS SHALL BE MECHANICAL JOINT.
4. METER INSTALLATION GREATER THAN 36" BELOW TOP OF LID REQUIRES INSTALLATION OF A REMOTE READING DEVICE (489-06-99-10) AS SPECIFIED IN 488-9.1A.
5. ALL BACKFLOW PREVENTERS SHALL BE INSTALLED ABOVE GROUND.

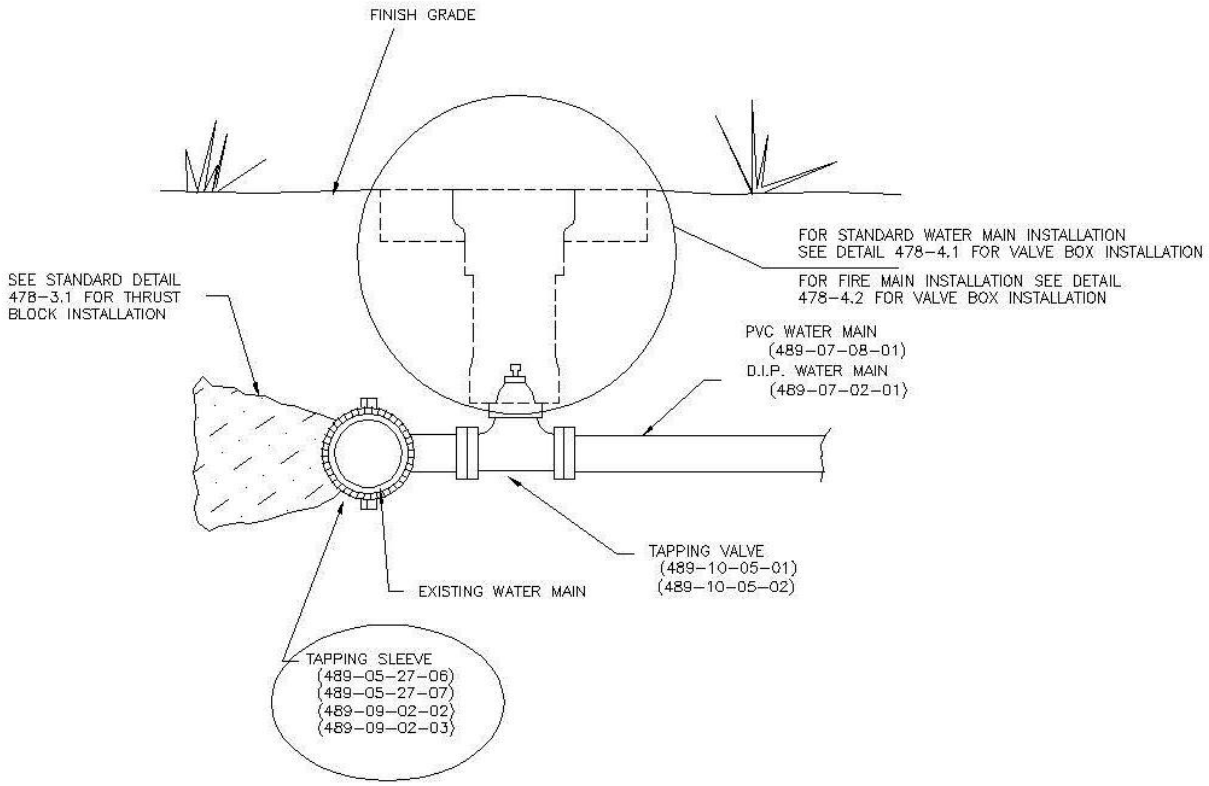
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER/FIRE SERVICE 3" AND ABOVE WITH NON-TRAFFIC LID	B 488-2.2

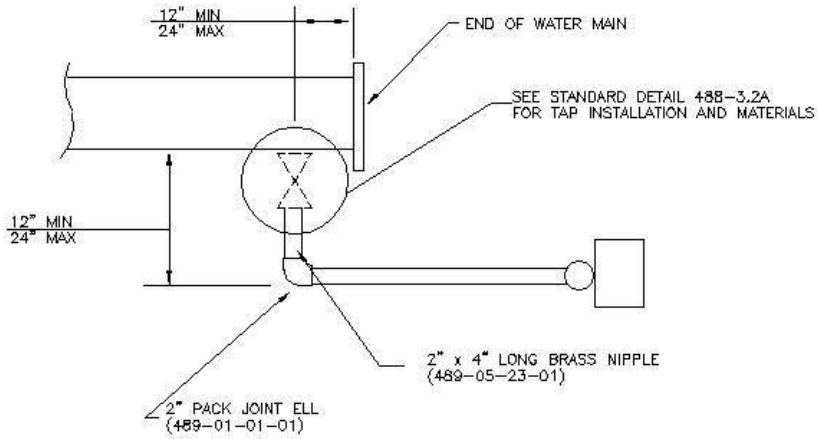


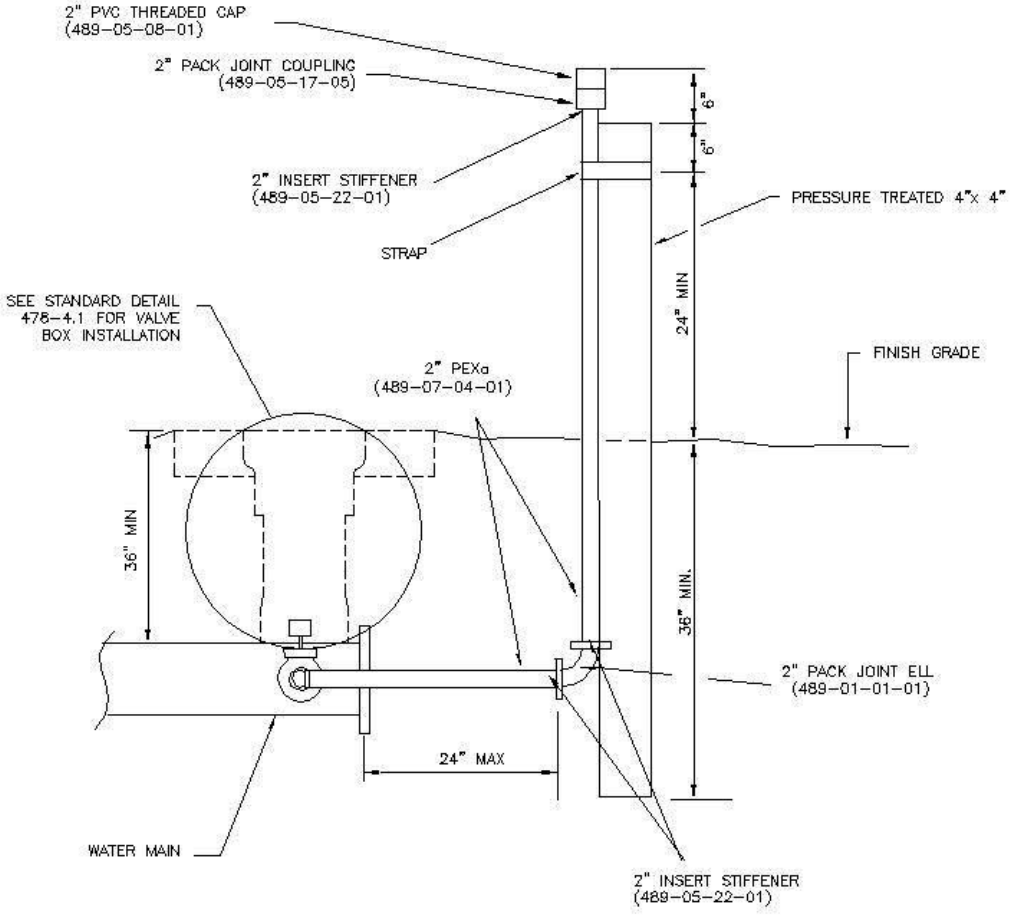
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER MAIN TAP 2" PEXa TO EXISTING MAIN	A 488-3.2

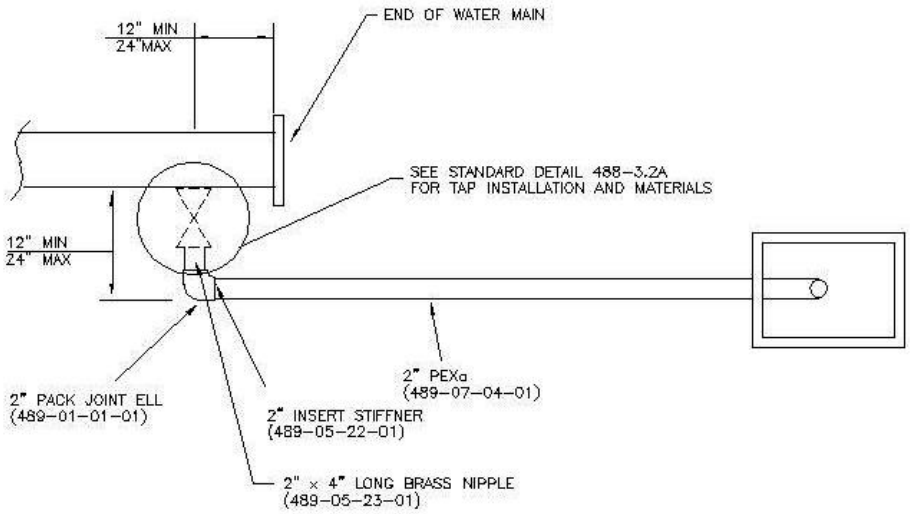


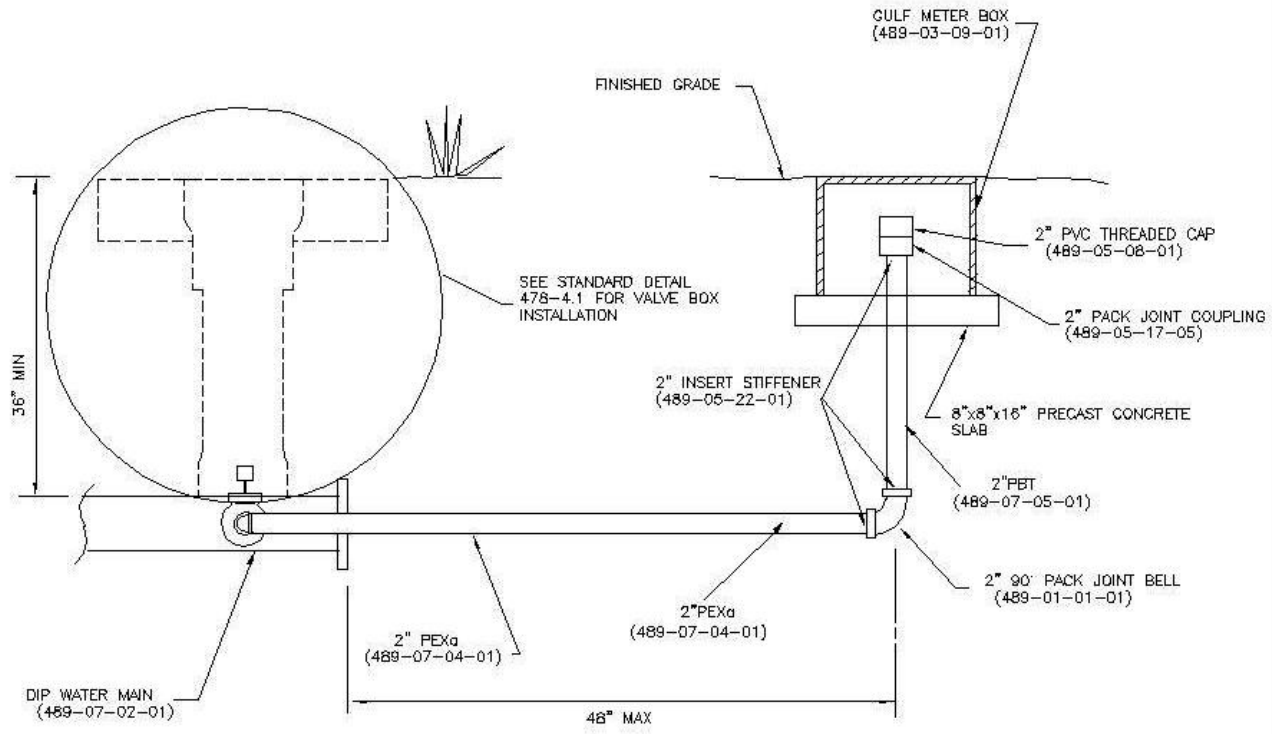
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER MAIN TAP 3" AND ABOVE	B 488-3.2



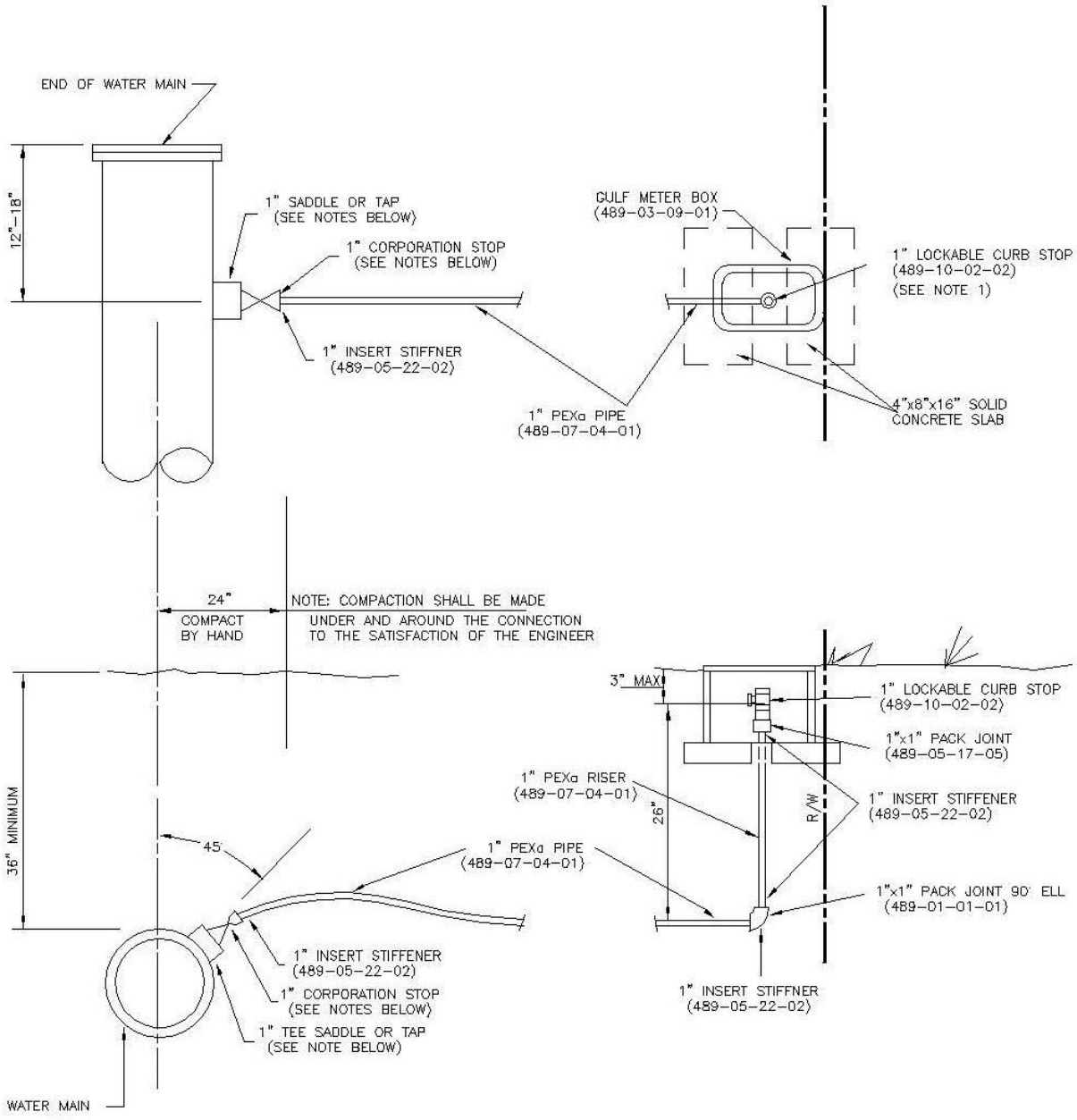


SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	TEMPORARY BLOWOFF ASSEMBLY	A
			488-3.3





SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	PERMANENT BLOWOFF ASSEMBLY	B
			488-3.3

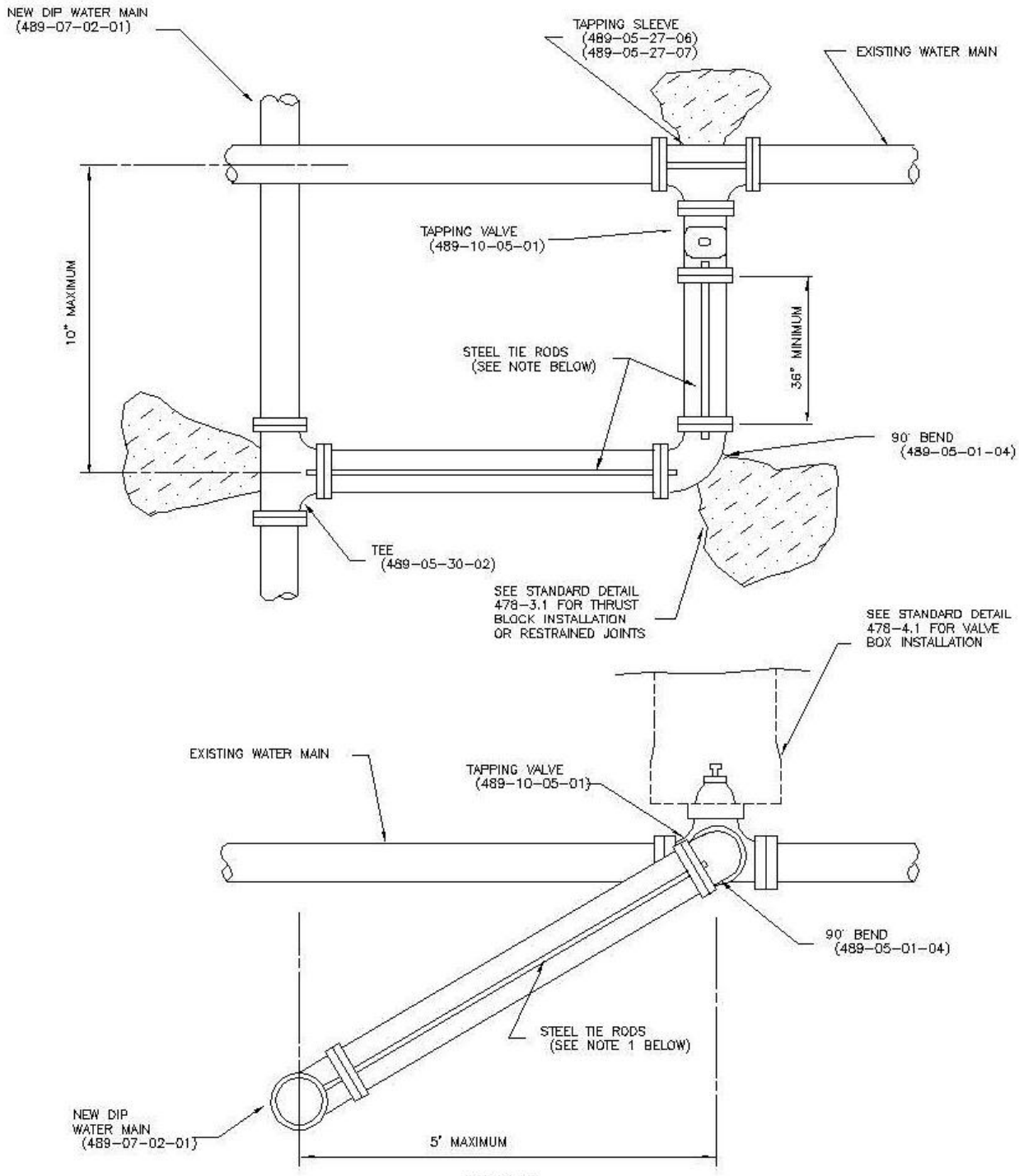


NOTES

1. CURB STOP TO BE FURNISHED WITH LOCKING DEVICE.
2. POLYETHYLENE PIPE TO BE INSTALLED WITH SINGLE SOLID COPPER LOCATING WIRE.
3. ON NEW 2" PVC WATER MAINS, A 2" x 2" TEE (489-05-30-06) , 1" PEXa PIPE, 1" CORPORATION STOP (489-10-02-02), AND 1" BALL VALVE SHALL BE USED WHEN INSTALLING BLOWOFF ASSEMBLY.
4. ON NEW OR EXISTING WATER MAINS WITH A DIAMETER LARGER THAN 2", A 1" TAP SHALL BE MADE INTO THE MAIN AND A 1" CORPORATION STOP (489-10-02-02) SHALL BE USED WHEN INSTALLING BLOWOFF ASSEMBLY. A SADDLE (489-09-02-01) MAY BE USED IN LIEU OF TAP AS APPROVED BY THE DIRECTOR OF UTILITIES.

SPECIFICATION	DATE REVISED:	SECTION
		SHT 1 OF 1

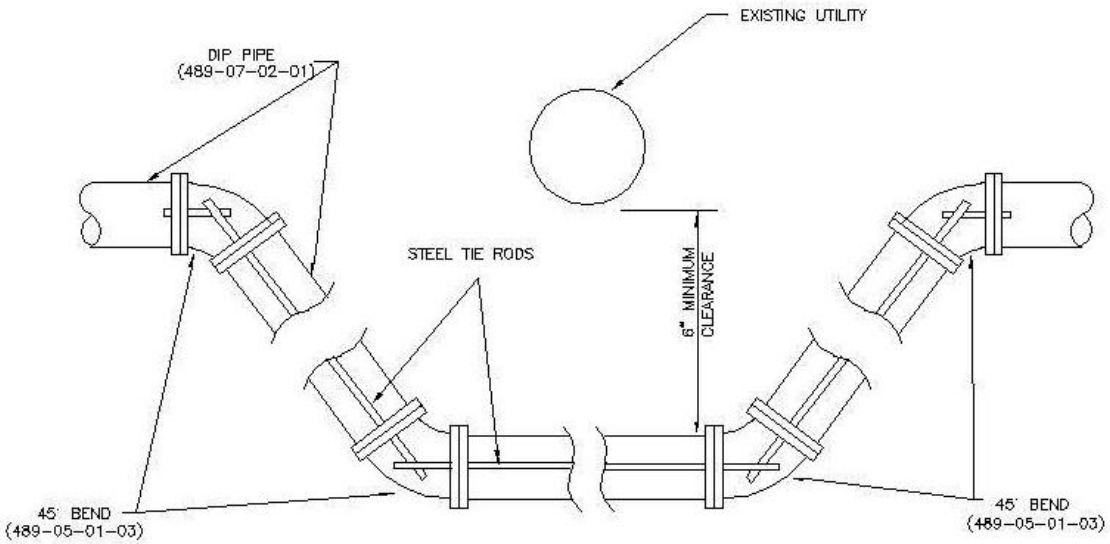
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	CONSTRUCTION BLOWOFF ASSEMBLY	C
			488-3.3



NOTES

1. FOR PIPE DIAMETER UP TO 12" USE TWO (2) 3/4" STEEL RODS. PIPE DIAMETERS OVER 12" USE (3) THREE 3/4" STEEL RODS. RESTRAINED JOINTS MAY BE USED IN LIEU OF RODS.

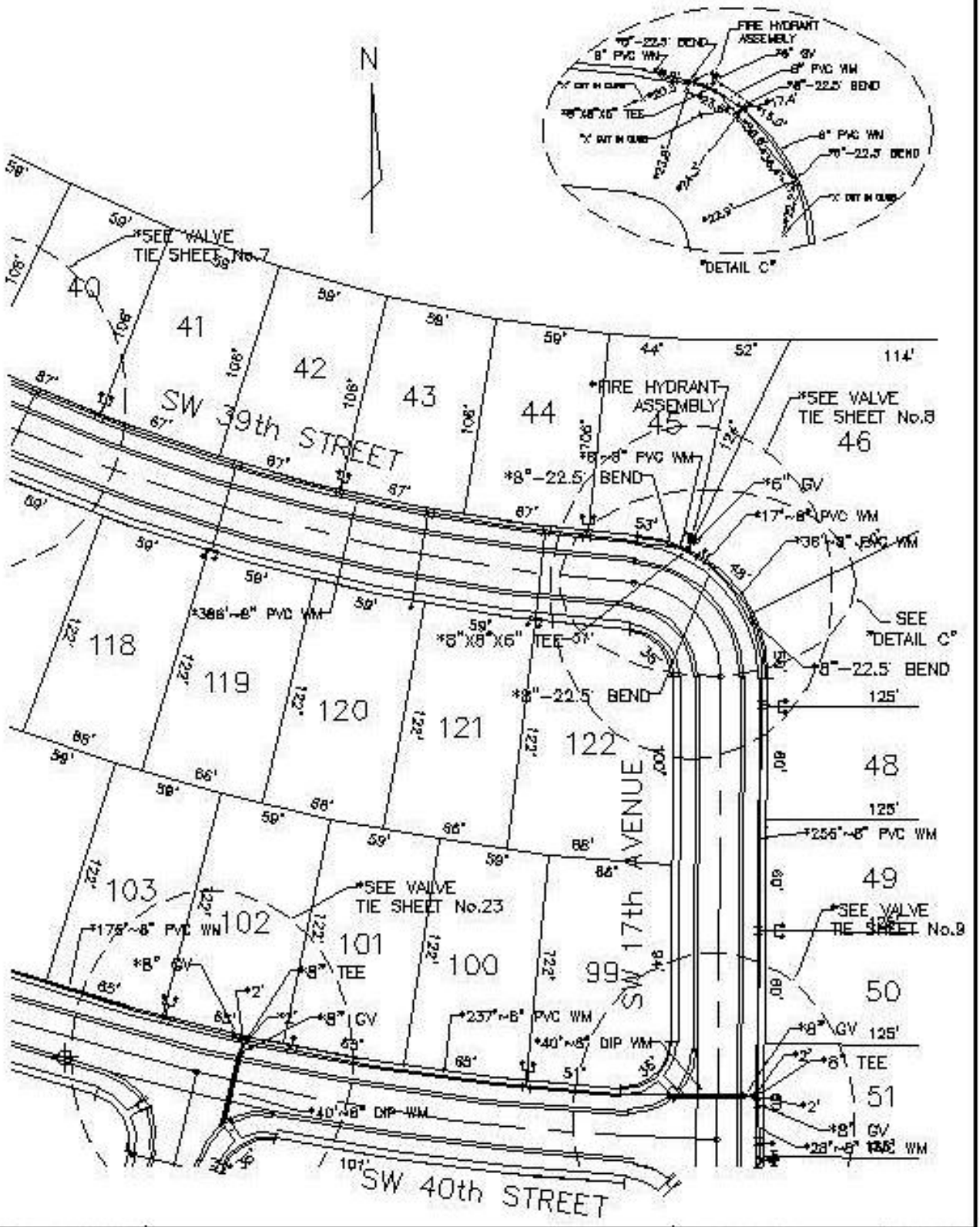
SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	CROSS CONNECTION	A
			488-4.1



NOTES

1. FOR PIPE DIAMETERS UP TO 12" USE TWO (2) STEEL RODS. PIPE DIAMETERS OVER 12" USE THREE (3) 3/4" STEEL RODS. RESTRAINED JOINTS MAY BE USED IN LIEU OF RODS.

SPECIFICATION		DATE REVISED:	SECTION
			SHT. 1 OF 1
CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	WATER MAIN BY-PASS	A
			488-4.2



SPECIFICATION		DATE REVISED:	SECTION
			SHT 1 of 1

CITY OF VALDOSTA	CITY OF VALDOSTA STANDARD DETAIL	TYPICAL WATER ASBUILT DRAWING	A
			488-8.1

DIVISION 480

SECTION 489

WATER SYSTEM

STANDARD MATERIALS SPECIFICATIONS

SECTION 489

WATER SYSTEM STANDARD MATERIALS SPECIFICATIONS

Following is a list of standard materials to be used in the installation of the water main system. Shop drawings are to be submitted in accordance with City of Valdosta, Volume I, General Conditions for Construction. Materials requiring the traditional "Shop Drawing Submittal" are identified by the words "Shop Drawing Required" at the bottom of the specification sheet. All materials must be submitted on Form WSCM001. A copy of Form WSCM001 is provided in the Appendix section of this manual.

The Material Specification Number for each item is located in the upper right hand corner of the specification sheet.

LIST OF WATER MAIN STANDARD MATERIALS

489-01 ADAPTOR COUPLING

489-01-01-01	Coupling, Brass Adaptor Elbow
489-01-02-01	Coupling, Brass Adaptor Reducing
489-01-03-01	Coupling, Ductile Iron Pipe
489-01-03-02	Coupling, Ductile Iron Pipe, Restrained
489-01-04-01	Coupling, Brass Adaptor Corporation Elbow
489-01-06-01	Coupling, Repair, Stainless Steel

489-02 RESERVED

489-03 BOXES & LIDS

489-03-03-02	Lid, Gulf Meter Box
489-03-09-01	Box, Gulf Meter
489-03-09-02	Box, Polymer Meter
489-03-99-10	Box, Precast Concrete Vault
(See 479-03)	Valve Box

489-04 FIRE ASSEMBLIES

489-04-01-01	Hydrant, Fire
489-04-99-01	Detector Check Assembly, Single
489-04-99-02	Detector Check Assembly, Double
489-04-99-03	Check Assembly, Double
489-04-99-04	Fire Flow Assembly
489-04-99-05	Meter, Fire Service Type
489-04-99-10.1.1	Out of Service Marker

489-05 FITTINGS

489-05-01-01	Bend, 11 ¼° Ductile Iron, Mechanical Joint
489-05-01-02	Bend, 22 ½° Ductile Iron, Mechanical Joint
489-05-01-03	Bend, 45° Ductile Iron, Mechanical Joint
489-05-01-04	Bend, 90° Ductile Iron, Mechanical Joint
489-05-03-02	Bend, PVC
489-05-06-01	Bushing, Brass
489-05-07-01	Cap, Ductile Iron, Mechanical Joint
489-05-08-01	Cap, Threaded PVC
489-05-17-03	Coupling, Brass
489-05-17-05	Coupling, Pack Joint
489-05-21-01	Elbow, 90°, Brass
489-05-22-01	Insert, Stainless Steel
489-05-22-02	Insert, Plastic PB
487-05-22-03	Insert, Plastic
489-05-23-01	Nipple, Brass
489-05-25-03	Plug, Solid, Ductile Iron, Mechanical Joint
489-05-25-04	Plug, Tapped, Ductile Iron, Mechanical Joint
489-05-25-05	Plug, Brass
489-05-26-01	Reducer, Ductile Iron, Mechanical Joint
489-05-27-02	Sleeve, Compression
489-05-27-06	Sleeve, Tapping, Steel
489-05-27-07	Sleeve, Tapping, Stainless Steel
489-05-30-01	Tee, Brass Compression Packjoint
489-05-30-02	Tee, Ductile Iron, Mechanical Joint
489-05-30-03	Tee, Ductile Iron, Mechanical Joint, Anchor/Swivel
489-05-30-06	Tee, PVC
489-05-99-01	Bend, 11 ¼° Ductile Iron, Flanged
489-05-99-02	Bend, 22 ½° Ductile Iron, Flanged
489-05-99-03	Bend, 45° Ductile Iron, Flanged
489-05-99-04	Bend, 90° Ductile Iron, Flanged
489-05-99-13	Tee, Ductile Iron, Flanged
489-05-99-20	Restrained Fitting, Mega-Lug, DIP
489-05-99-21	Restrained Fitting, Mega-Lug, PVC

489-06 METERS

489-06-01-02	Meter, Water Positive Displacement, Bronze
489-06-01-04	Meter, Turbine Water
489-06-99-01	Meter, Water Compound Type

489-07 PIPE

489-07-02-01	Pipe, Ductile Iron, Pushon
489-07-02-02	Restrained Joint, Ductile Iron Pipe
489-07-04-01	Pipe, Polyethylene
489-07-04-02	Pipe, Copper
489-07-05-01	Pipe, HDPE, Fusion, 2″
489-07-05-02	Pipe, HDPE, Fusion
489-07-08-01	Pipe, PVC, Pushon
489-07-08-02	Pipe, PVC, Solvent Weld, Schedule 80
489-07-08-03	Restrained Joint Pipe, PVC
489-07-08-04	Pipe PVC, Pushon
489-07-08-05	Pipe, PVC, Fusion

489-08 RESERVED

489-09 SADDLES

489-09-02-01	Saddle, Tapping, Galvanized Steel Pipe
489-09-02-02	Sleeve, Tapping, Cast Iron, DIP, Iron Body
489-09-02-03	Sleeve, Tapping, Cast Iron, DIP, SST Body

489-10 VALVES

489-10-01-01	Butterfly Valve, Mechanical Joint
489-10-01-02	Butterfly Valve, Flanged
489-10-02-01	Corporation Stop
489-10-02-02	Corporation Stop, PE
489-10-02-03	Curb Ball Valve
489-10-04-02	Gate Valve, Resilient Seat Threaded, Bronze Stem
489-10-04-03	Gate Valve, Resilient Seat, NRS, Mechanical Joint, Bronze Stem
489-10-04-04	Gate Valve, Resilient Seat, NRS, Flanged, Bronze Stem
489-10-04-06	Gate Valve, Resilient Seat, Threaded, Stainless Steel Stem
489-10-04-07	Gate Valve, Resilient Seat, NRS, Mechanical Joint, Stainless Steel Stem
489-10-04-08	Gate Valve, Resilient Seat, NRS, Flanged Joint, Stainless Steel Stem
489-10-05-01	Tapping Valve, Resilient Seat, NRS, Mechanical Joint X Flange, Bronze Stem
489-10-05-02	Tapping Valve, Resilient Seat, NRS, Mechanical Joint X Flange, Stainless Steel Stem
489-10-06-01	Air Release Valve
489-10-06-02	Air Release Valve, Plastic
489-10-07-01	Hose Bibb

489-99 RESERVED

MATERIAL SPECIFICATION: 489-01-01-01

NOMENCLATURE:

COUPLING, BRASS ADAPTOR ELBOW

DESCRIPTION:

To connect polyethylene to polyethylene, shall conform to the latest AWWA specifications C-800 (ASTM B-62). Packjoint nut to have a split clamp with stainless steel screw and grooves inside of clamp for additional gripping action. All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER			
SIZE	BEND	FORD	JONES	MUELLER	A Y MC DONALD
¾”	90º	L-44-33		H-15526	4761-22
1”	90º	L-44-44		H-15526	4761-22
2”	90º	L-44-77	J-2611	H-15526	4761-22

MATERIAL SPECIFICATION: 489-01-02-01

NOMENCLATURE:

COUPLING, BRASS ADAPTOR REDUCING

DESCRIPTION:

To connect one inch (1") polyethylene tubing to three quarter inch (¾") polyethylene tubing. Shall conform to latest AWWA specification C-800 (ASTM B-62). All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER		
SIZE	BEND	FORD	A Y MC DONALD	MUELLER
1" — ¾"	90º	L-44-34	4761-22	H15526

MATERIAL SPECIFICATION: 489-01-03-01

NOMENCLATURE:

COUPLING, DUCTILE IRON PIPE

DESCRIPTION:

To connect ductile iron pipe ends together. All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

SIZE	MANUFACTURER
4" – 24"	HYMAX 2000 Couplings DIP MJ to DIP MJ HYMAX 2100 Couplings DIP MJ to DIP Flanged

MATERIAL SPECIFICATION: 489-01-03-02

NOMENCLATURE:

COUPLING, DUCTILE IRON PIPE, RESTRAINED

DESCRIPTION:

To connect ductile iron pipe ends together. All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

SIZE	MANUFACTURER
4" – 12"	EBAA IRON MEGA COUPLING, SERIES 3800 RESTRAINED COUPLING

MATERIAL SPECIFICATION: 489-01-04-01

NOMENCLATURE:

COUPLING, BRASS ADAPTOR CORPORATION ELBOW

DESCRIPTION:

To connect polyethylene to Mueller thread, Mueller thread to iron pipe thread, shall conform to latest AWWA specifications C-800 (ASTM B-62). All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

Inlet: Mueller thread (swivel nut)
Outlet: CTS packjoint

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER
SIZE	BEND	FORD
¾”	90º	L104-33S
1”	90º	L404-44S

MATERIAL SPECIFICATION: 489-01-06-01

NOMENCLATURE:

REPAIR COUPLING, STAINLESS STEEL

DESCRIPTION:

To repair damaged pipe. All repair couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

SIZE	MANUFACTURER
4" – 24"	HYMAX EZ-Max Repair Clamp Ford F1 Series ROMAC Repair Clamp

MATERIAL SPECIFICATION: 489-03-03-02

NOMENCLATURE:

LID, GULF METER BOX

DESCRIPTION:

Cast iron, heavy duty, with legend “WATER METER” on lid.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER
SIZE	TYPE	FORD
7” x 10”	Single Box	

MATERIAL SPECIFICATION: 489-03-09-01

NOMENCLATURE:

BOX, METER, GULF

DESCRIPTION:

To be furnished with lid. Lid to be cast with the legend “WATER METER”.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER	
SIZE	TYPE	FORD	MUELLER
7 ½” x 11”		G148-233	H-1453-3

MATERIAL SPECIFICATION: 489-03-09-02

NOMENCLATURE:

BOX, POLYMER METER

DESCRIPTION:

Constructed of polymer concrete and reinforced by a heavy weave fiberglass type service box. Logo on cover to read "WATER METER". Covers shall be non-locking and have hinged reader lid. Color to be gray. Box and cover to have H-10 load rating unless specified otherwise, also to come with mouse holes on both ends. Boxes to have stacking capability.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER
SIZE	QUAZITE	MID-STATE PLASTICS
13" x 24"	PG1324BB/CA1	MSBC1324-12
17" x 30"		
24" x 36"	PG2436BB/CAP1	MSBC1730-18

MATERIAL SPECIFICATION: 489-03-99-10

NOMENCLATURE:

BOX, UTILITY, PRECAST CONCRETE

DESCRIPTION:

Precast Concrete Utility Box shall meet the requirements of ASTM C478-latest, with the exclusion of Section 10 (a), except as modified herein. Cement shall meet the requirements of ASTM C150-latest, Specification for Portland Cement, Type I/II. Concrete for utility boxes shall be 4,000 PSI and meet the minimum requirements for Class III. Minimum wall thickness shall be six inches. The required minimum strength of concrete and conformance to the design parameters shall be confirmed by testing in accordance with Section 345 of the DOT Standard Specifications except that the **CONTRACTOR** shall be responsible for all testing. Reinforcing shall be #4 GR60 rebar 12" O.C. both ways. Utility box shall be constructed with open bottom.

Where details call for a top slab it shall be six inches (6") thick, 4,000 PSI with #4 GR60 rebar 12" O.C. both ways and furnished with aluminum hatch as specified in Section 479-03.

Where details call for aluminum hatch to be cast with the utility box the hatch shall be as specified in Material Specification 479-03-99-01.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER	
SIZE	TYPE	DEL ZOTTO	HANSON PIPE & PRODUCTS

**** S H O P D R A W I N G R E Q U I R E D *****

MATERIAL SPECIFICATION: 489-04-01-01

NOMENCLATURE:

HYDRANT, FIRE

DESCRIPTION:

Shall conform to AWWA C-502 latest specifications, shall contain: two 2 ½" hoses and one 4 ½" steamer connection with National standard fire hose coupling screw threads, 5 ¼" valve opening, 6" diameter mechanical joint inlet, 1 ½" pentagon operating nut and shall open counter clockwise. Hydrants shall be primed and ready for painting by the Valdosta Fire Department. Bonnet shall be bolted to upper barrel with bonnet bolt & nut. Inside of hydrant shoe to be epoxy coated. Hydrants to have drain holes and be complete with all accessories. All hydrants shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi. All hydrants to have stainless steel stems.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

SIZE	M & H	AVK
36"	STYLE 129	2780 SERIES
42"	STYLE 129	2780 SERIES
42"	STYLE 129	2780 SERIES
60"	STYLE 129	2780 SERIES

*****SHOP DRAWING REQUIRED*****

MATERIAL SPECIFICATION: 489-04-99-01

NOMENCLATURE:

CHECK, DETECTOR ASSEMBLY, SINGLE

DESCRIPTION:

Shall consist of one internally spring loaded "Y" figure check valve with cast iron body, bronze replaceable seat ring with stainless steel stem and spring. All internal cast iron parts shall be epoxy coated. The bypass assembly shall consist of an internally spring loaded double check valve in series with a water meter which shall read in cubic feet and a shutoff gate valve. Valve shall have a minimum pressure rating of 200 psi and meet USC approval and NSF approval for potable water.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	FEBCO	HERSEY	CONBRACO	AMES
4" x ¾"		EDC II		1000 DCV
6" x ¾"		EDC II		1000 DCV
8" x ¾"		EDC II		1000 DCV
12" x ¾"		EDC II		1000 DCV

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-04-99-02

NOMENCLATURE:

CHECK, DETECTOR ASSEMBLY, DOUBLE

DESCRIPTION:

Shall consist of two internally spring loaded "Y" figure check valves having cast iron bodies, bronze replaceable seat rings and stainless steel stems and springs. All internal cast iron parts shall be epoxy coated. The bypass assembly shall consist of a bronze body internally spring loaded double check valve in series with a bronze water meter which shall read in cubic feet and two gate valves. Valves shall have a minimum pressure rating of 200 psi and meet USC approval and NSF approval for potable water.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	FEBCO	HERSEY	AMES	CONBRACO
3" x ¾"		DDC II		
4" x ¾"	806YD	DDC II	3000-DCDA	
6" x ¾"	806YD	DDC II	3000-DCDA	
8" x ¾"	806YD	DDC II	3000-DCDA	
12" x ¾"	806YD	DDC II	3000-DCDC	

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-04-99-03

NOMENCLATURE:

CHECK ASSEMBLY, DOUBLE

DESCRIPTION:

Shall consist of two internally spring loaded "Y" figure check valves having cast iron bodies, bronze replaceable seat rings and stainless steel stems and springs. All internal cast iron parts shall be epoxy coated. Valve shall have a minimum pressure rating of 200 psi and meet USC approval and NSF approval for potable water.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER				
SIZE	FEBCO	HERSEY	WATTS	CONBRACO	AMES
3"	805YD	NO. 2	709RW		2000-SS
4"	805YD	NO. 2	709RW		2000-SS
6"	805YD	NO. 2	709RW		2000-SS
8"	805YD	NO. 2	709RW		2000-SS
12"	805YD	NO. 2	709RW		2000-SS

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-04-99-04

NOMENCLATURE:

FIRE FLOW ASSEMBLY

DESCRIPTION:

Shall consist of an internal spring loaded "Lever" check valve, magnetic drive, mainline proportional meter, bypass turbine meter, bypass check valve and shutoff valve. Valve shall meet UL and FM approvals. Meters to read in cubic feet. Assembly shall meet NSF approval for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	HERSEY	NEPTUNE	SENSUS
4"	MFM-MHR		FIRELINE
6"	MFM-MHR	PROTECTUS III	FIRELINE
8"	MFM-MHR	PROTECTUS III	FIRELINE
12"	MFM-MHR		FIRELINE

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-04-99-05

NOMENCLATURE:

METER, FIRE SERVICE TYPE

DESCRIPTION:

This specification covers fire service type water meters Type II devices with a strainer and check valve sizes six inch (6") through 10". The meters to be furnished will equal or exceed the requirements of AWWA C-703-latest revision with particular reference to flow capacity, pressure loss, accuracy, physical dimension and material construction.

AFFIDAVIT OF COMPLIANCE: A copy of the affidavit of compliance from the manufacturer must accompany each bid and shall certify that the meters bid will be furnished in full compliance with the requirements of the specification and those of AWWA C-703-latest revision.

INSPECTION AND TEST: The successful bidder shall supply actual test results for each and every water meter by meter serial number for each shipment of meters, and shall be responsible for delivery of all meters in first class condition.

MAINCASE: Shall have a copper alloy containing not less than 75% copper and be coated with a polymerized coating. Meters shall operate without leakage or damage to any part at a minimum pressure rating of 200 psi. The size, model, and direction of flow shall be marked permanently on outer case of all meters. The name of the manufacturer shall be marked permanently on the lid of the register box. The serial number of the meter shall be imprinted on the lid and on meter main case.

REGISTRATION: The register shall be permanently hermetically sealed, magnetic drive, low torque registration, straight reading, cubic foot, low flow indicator. All meter shall come with remote register readouts that are battery operated and shall not register higher than 1,000 cubic feet on one revolution on either remote register.

CONNECTION: The main case connection shall be flanged and round type. All meters shall be NSF approved for potable water use.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	NEPTUNE	SENSUS	WATER SPECIALITIES
6"	HP PROTECTUS III	FM-720-R1	FSA-01
8"	HP PROTECTUS III	FM-720-R1	FSA-01
10"	HP PROTECTUS III	FM-720-R1	FSA-01

MATERIAL SPECIFICATION: 489-04-99-10

NONENCLATURE:

HYDRANT OUT OF SERVICE MARKER

DESCRIPTION:

Heavy duty plastic marker installed on hydrant nozzle and stenciled with "OUT OF SERVICE" on one side in bold black paint. Marker to fit four and a half inch (4 ½") steamer nozzle. Color to be high visibility orange. Must be installed on all new hydrants until flow tested and put in service.

SIZE

4 ½"

MATERIAL SPECIFICATION: 489-05-01-01

NOMENCLATURE:

BEND, 11 ¼°, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36. All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	11 ¼º
8"	11 ¼º
12"	11 ¼º
16"	11 ¼º
18"	11 ¼º
20"	11 ¼º
24"	11 ¼º
30"	11 ¼º
36"	11 ¼º

MATERIAL SPECIFICATION: 489-05-01-02

NOMENCLATURE:

BEND, 22 ½°, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	22 ½º
8"	22 ½º
12"	22 ½º
16"	22 ½º
18"	22 ½º
20"	22 ½º
24"	22 ½º
30"	22 ½º
36"	22 ½º

MATERIAL SPECIFICATION: 489-05-01-03

NOMENCLATURE:

BEND, 45°, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	45°
8"	45°
12"	45°
16"	45°
18"	45°
20"	45°
24"	45°
30"	45°
36"	45°

MATERIAL SPECIFICATION: 489-05-01-04

NOMENCLATURE:

BEND, 90°, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	90°
8"	90°
12"	90°
16"	90°
18"	90°
20"	90°
24"	90°
30"	90°
36"	90°

MATERIAL SPECIFICATION: 489-05-03-02

NOMENCLATURE:

BEND, PVC

DESCRIPTION:

Shall be pressure rated to 200 psi working pressure and shall conform to ASTM D2466, ASTM D2467 latest edition. All fittings to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	TYPE
2” 45°	SCHEDULE 80

MATERIAL SPECIFICATION: 489-05-06-01

NOMENCLATURE:

BUSHING, BRASS

DESCRIPTION:

Shall have hex head, shall be threaded.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

SIZE	TYPE
2” X 1”	

MATERIAL SPECIFICATION: 489-05-07-01

NOMENCLATURE:

CAP, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All caps shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE
6"
8"
12"
16"
18"
20"
24"
30"
36"

MATERIAL SPECIFICATION: 489-05-08-01

NOMENCLATURE:

CAP, PVC, THREADED

DESCRIPTION:

Shall be pressure rated Schedule 80 with female iron pipe threads to 200 psi working pressure and shall conform to ASTM D2464. All caps to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE

2”

MATERIAL SPECIFICATION: 489-05-17-03

NOMENCLATURE:

COUPLING, BRASS

DESCRIPTION:

Coupling, compression connection for copper tube size polyethylene tubing to male iron pipe threads. All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	MUELLER	JONES	FORD	A Y MC DONALD
¾”	H-15428	J-2605	#C84-33	4758-22
1”	H-15428	J-2605	#C84-44	4758-22
2”	H-15428	J-2605	#C84-77	4758-22

MATERIAL SPECIFICATION: 489-05-17-05

NOMENCLATURE:

COUPLING, PACK JOINT

DESCRIPTION:

Coupling, compression connection for copper tube size polyethylene tubing to male iron pipe threads. All couplings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	MUELLER	JONES	FORD
¾”	H-15428	J-2605	#C84-33
1”	H-15428	J-2605	#C84-44
2”	H-15428	J-2605	#C84-77

MATERIAL SPECIFICATION: 489-05-21-01

NOMENCLATURE:

ELBOW, BRASS REGULAR 90°

DESCRIPTION:

Shall have schedule 40 threads, regular elbow brass pipe threads. All fittings to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

SIZE	BEND
½"	90º
¾"	90º
1"	90º
1 ¼"	90º
1 ½"	90º
2"	90º
4"	90º

MATERIAL SPECIFICATION: 489-05-22-01

NOMENCLATURE:

INSERT, STAINLESS STEEL

DESCRIPTION:

For polyethylene tubing, 200 psi minimum pressure rating. All inserts shall be NSF approved for potable water use.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	MUELLER	FORD
2”	506141	55

MATERIAL SPECIFICATION: 489-05-22-02

NOMENCLATURE:

INSERT, PLASTIC

DESCRIPTION:

For polyethylene tubing, 200 psi minimum pressure rating. All inserts shall be NSF approved for potable water use.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	MUELLER	MARS	JONES
¾			
1”			

MATERIAL SPECIFICATION: 489-05-23-01

NOMENCLATURE:

NIPPLE, BRASS

DESCRIPTION:

Shall have threaded ends. All brass nipples shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

SIZE

¾" x 1 "
¾" x 1 ½"
¾" x 3"
¾" x 4"
¾" x 6"
1" x 1 ½"
1" x 2"
1" x 3"
1" x 4"
1" x 6"
1 ¼" x 1 ½"
1 ¼" x 2"
1 ¼" x 3"
1 ¼" x 4"
1 ¼" x 6"
2" x 1 ¾"
2" x 2"
2" x 2 ½"
2" x 3"
2" x 4"
2" x 6"
4" x 8"

MATERIAL SPECIFICATION: 489-05-25-03

NOMENCLATURE:

PLUG, SOLID, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All plugs shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE

6"
8"
12"
16"
18"
20"
24"
30"
36"

MATERIAL SPECIFICATION: 489-05-25-04

NOMENCLATURE:

PLUG, TAPPED, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All plugs shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	TAP SIZE
6"	2"
8"	2"
12"	2"
16"	2"
18"	2"
20"	2"
24"	2"
30"	2"
36"	2"

MATERIAL SPECIFICATION: 489-05-25-05

NOMENCLATURE:

PLUG, BRASS

DESCRIPTION:

Shall have threads. All plugs shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

SIZE

¾”
1”
2”

MATERIAL SPECIFICATION: 489-05-26-01

NOMENCLATURE:

REDUCER, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All plugs shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE

8" x 6"
12" x 6"
12" x 8"
16" x 8"
16" x 12"
18" x 8"
18" x 12"
18" x 16"
20" x 8"
20" x 12"
20" x 16"
20" x 16"
24" x 12"
24" x 16"
30" x 16"
30" x 24"
36" x 16"
36" x 24"
36" x 30"

MATERIAL SPECIFICATION: 489-05-27-02

NOMENCLATURE:

SLEEVE, COMPRESSION

DESCRIPTION:

Shall be galvanized, and shall have a protected gasket. All sleeves shall be NSF approved for potable water and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	SMITH-BLAIR	DRESSER	TELSCO INDUSTRIES	ROMAC
½"	522-08400-003	Style #65	700 SERIES	
¾"	522-10500-003	Style #65	700 SERIES	
1"	522-13200-003	Style #65	700 SERIES	
1 ¼"	522-13200-003	Style #65	700 SERIES	
1 ½"	522-19000-003	Style #65	700 SERIES	
2"	522-23800-003	Style #65	700 SERIES	

MATERIAL SPECIFICATION: 489-05-27-06

NOMENCLATURE:

SLEEVE, TAPPING, STEEL

DESCRIPTION:

Body: Carbon Steel; flanges: AWWA C207 Class D, ANSI 150 lb. drilling, to have test plug w/¾" NPT, and recessed cavity for mating tapping valves; Gasket: Grade 60, gasket compounded to use water, oil, salt solutions, mild acids, bases & natural gas. Bolts, washers, and nuts: 18-8 stainless steel type 304. Finish: Fusion bonded epoxy coated to an average of 12 mil thickness inside and out. (AWWA C213-79). Sleeves shall be NSF approved for potable water and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	SMITH-BLAIR	DRESSER	JCM	ROMAC
8" x 6"	622-09050600-031	610-08X06	412-0905X6 ESS	FTS420SSFE
8" x 8"	622-09050800-031	610-08X08	412-0905X8 ESS	FTS420SSFE
10" x 6"	622-11100600-031	610-10X06	412-1110X6 ESS	FTS420SSFE
10" x 8"	622-11100800-031	610-10X08	412-1110X8 ESS	FTS420SSFE
10" x 10"	622-11101000-031	610-10X10	412-1110X10 ESS	FTS420SSFE
12" x 6"	622-13200600-031	610-12X06	412-1320X6 ESS	FTS420SSFE
12" x 8"	622-13200800-031	610-12X08	412-1320X8 ESS	FTS420SSFE
12" x 12"	622-13201200-031	610-12X12	412-1320X12 ESS	FTS420SSFE
16" x 6"	622-17400600-031	610-16X06	412-1740X6 ESS	FTS420SSFE
16" x 8"	622-17400800-031	610-16X08	412-1740X8 ESS	FTS420SSFE
16" x 12"	622-17401200-031	610-16X12	412-1740X12 ESS	FTS420SSFE
16" x 16"	622-17401600-031	610-16X16	412-1740X16 ESS	FTS420SSFE
24" x 6"	622-25800600-031	610-24X06	412-2580X6 ESS	FTS420SSFE
24" x 8"	622-25800800-031	610-24X08	412-2580X8 ESS	FTS420SSFE
24" x 12"	622-25801200-031	610-24X12	412-2580X12 ESS	FTS420SSFE
24" x 16"	622-25801600-031	610-24X16	412-2580X16 ESS	FTS420SSFE
24" x 24"	622-25802400-031	610-24X24	412-2580X24 ESS	FTS420SSFE
36" x 6"	622-36000600-031	610-36X06	412-3600X8 ESS	FTS420SSFE
36" x 8"	622-36000800-031	610-36X08	412-3600X8 ESS	FTS420SSFE
36" x 12"	622-36001200-031	610-36X12	412-3600X12 ESS	FTS420SSFE
36" x 16"	622-36001600-031	610-36X16	412-3600X16 ESS	FTS420SSFE
36" x 24"	622-36002400-031	610-36X24	412-3600X24 ESS	FTS420SSFE
36" x 30"	622-36003000-031	610-36X30	412-3600X30 ESS	FTS420SSFE

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-05-27-07

NOMENCLATURE:

SLEEVE, TAPPING, STAINLESS STEEL

DESCRIPTION:

Body: 18-8 stainless steel; Lugs: 18-8 stainless steel; Bolts, washers & nuts: NC rolled thread, 18-8 stainless steel; Gasket: Virgin SBR compounded for water service, full wrap around design. Flange: 18-8 stainless steel, to have ¾" NPT test plug. All sleeves to be NSF approved for potable water and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER				
SIZE	ROMAC	FORD	JCM	DRESSER	MUELLER
8" x 6"	SST-9.45X6" FLG	Fast-945X6	432-0863X6	630-08X06	H304550945
8" x 8"	SST-9.45X8" FLG	Fast-945X8	432-0863X8	630-08X08	H304550945
10" x 6"	SST-11.45X6" FLG	Fast-1145X6	432-1000X6	630-10X06	H304551145
10" x 8"	SST-11.45X8" FLG	Fast-1145X8	432-1000X8	630-10X08	H304551145
10" x 10"	SST-11.45X10" FLG	Fast-1145X10	432-1000X10	630-10X10	H304551145
12" x 6"	SST-13.56X6" FLG	Fast-1350X6	432-1275X6	630-12X06	H304551356
12" x 8"	SST-13.56X8" FLG	Fast-1350X8	432-1275X8	630-12X08	H304551356
12" x 12"	SST-13.56X12" FLG	Fast-1350X12	432-1275X12	630-12X12	H304551356
16" x 6"	SST-17.80X6" FLG	Fast-1780X6	432-1740X6	630-16X06	H304551780
16" x 8"	SST-17.80X8" FLG	Fast-1780X8	432-1740X8	630-16X08	H304551780
16" x 12"	SST-17.80X12" FLG	Fast-1780X12	432-1740X12	630-16X12	H304551780
16" x 16"	SST-17.80X16" FLG	Fast-1780X16	432-1740X16	630-16X16	H304551780
24" x 6"	SST-26.00X6" FLG	Fast-2380X6	432-2360X6	630-24X06	H304552410
24" x 8"	SST-26.00X8" FLG	Fast-2380X8	432-2360X8	630-24X08	H304552410
24" x 12"	SST-26.00X12" FLG	Fast-2380X12	432-2360X12	630-24X12	H304552410
24" x 16"	SST-26.00X16" FLG	Fast-2380X16	432-2360X16	630-24X16	H304552410
24" x 24"	SST-26.00X24" FLG	Fast-2380X24	432-2360X24	630-24X24	H304552410
36" x 6"	SST-38.00X6" FLG	Fast-3780X6		630-36X06	
36" x 8"	SST-38.00X8" FLG	Fast-3780X8		630-36X08	
36" x 12"	SST-38.00X12" FLG	Fast-3780X12		630-36X12	
36" x 16"	SST-38.00X16" FLG	Fast-3780X16		630-36X16	
36" x 24"	SST-38.00X24" FLG	Fast-3780X24		630-36X24	
36" x 30"	SST-38.00X30" FLG	Fast-3780X30		630-36X30	

MATERIAL SPECIFICATION: 489-05-30-01

NOMENCLATURE:

TEE, BRASS COMPRESSION PACKJOINT

DESCRIPTION:

To connect polyethylene to polyethylene. Shall conform to AWWA specification C-800 (ASTM B-62). Packjoint nut to have a split clamp with stainless steel screw and grooves inside of clamp for additional gripping action. Tee shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	FORD	MUELLER	JONES	A Y MC DONALD
¾" x ¾"x 1"	T444-334	H-15381	J-2617	4760-22
2" x 2" x 2"	T444-777			

NOMENCLATURE:

TEE, DUCTILE IRON, MECHANICAL JOINT

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE

6" x 6"
8" x 6"
8" x 8"
12" x 6"
12" x 8"
12" x 12"
16" x 8"
16" x 12"
16" x 16"
18" x 6"
18" x 8"
18" x 12"
18" x 18"
20" x 6"
20" x 8"
20" x 12"
20" x 20"
24" X 6"
24" X 8"
24" x 12"
24" x 16"
24" x 18"
24" x 24"

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SIZE

30” x 6”
30” x 8”
30” x 12”
30” x 16”
30” x 24”
30” x 30”
36” x 8”
36” x 12”
36” x 16”
36” x 24”
36” x 30”
36” x 36”

MATERIAL SPECIFICATION: 489-05-30-03

NOMENCLATURE:

TEE, DUCTILE IRON, MECHANICAL JOINT, ANCHOR/SWIVEL

DESCRIPTION:

Shall be ductile iron fitting with mechanical joint ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-153 latest for compact fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Tables WSCM 110 and 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE

6" x 6"
8" x 6"
8" x 8"
12" x 6"
12" x 8"
12" x 12"
16" x 8"
16" x 12"
16" x 16"
18" x 6"
18" x 8"
18" x 12"
18" x 18"
20" x 6"
20" x 8"
20" x 12"
20" x 20"
24" X 6"
24" X 8"
24" x 12"
24" x 16"
24" x 18"
24" x 24"

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MATERIAL SPECIFICATION: 489-05-30-03

SIZE

30” x 6”
30” x 8”
30” x 12”
30” x 16”
30” x 24”
30” x 30”
36” x 8”
36” x 12”
36” x 16”
36” x 24”
36” x 30”
36” x 36”

MATERIAL SPECIFICATION: 489-05-30-06

NOMENCLATURE:

TEE, PVC, SCHEDULE 80

DESCRIPTION:

To be pressure rated at 200 psi and conform to ASTM D2466 and ASTM D2467. All fittings shall be NSF approved for potable water use.

SIZE

2” x 2” x 1”
2” x 2” x 2”

MATERIAL SPECIFICATION: 489-05-99-01

NOMENCLATURE:

BEND, 11 ¼°, DUCTILE IRON, FLANGED

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-110 latest for standard fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All fittings to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	11 ¼°
8"	11 ¼°
12"	11 ¼°
16"	11 ¼°
18"	11 ¼°
20"	11 ¼°
24"	11 ¼°
30"	11 ¼°

MATERIAL SPECIFICATION: 489-05-99-02

NOMENCLATURE:

BEND, 22 1/2°, DUCTILE IRON, FLANGED

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-110 latest for standard fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All fittings to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	22 ½º
8"	22 ½º
12"	22 ½º
16"	22 ½º
18"	22 ½º
20"	22 ½º
24"	22 ½º
30"	22 ½º
36"	22 ½º

MATERIAL SPECIFICATION: 489-05-99-03

NOMENCLATURE:

BEND, 45°, DUCTILE IRON, FLANGED

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-110 latest for standard fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All fittings to be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	45º
8"	45º
12"	45º
16"	45º
18"	45º
20"	45º
24"	45º
30"	45º
36"	45º

MATERIAL SPECIFICATION: 489-05-99-04

NOMENCLATURE:

BEND, 90°, DUCTILE IRON, FLANGED

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-110 latest for standard fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All fittings shall be NSF approved for potable water use and shall have a minimum pressure rating of 200 psi.

SIZE	BEND
6"	90º
8"	90º
12"	90º
16"	90º
18"	90º
20"	90º
24"	90º
30"	90º
36"	90º

MATERIAL SPECIFICATION: 489-05-99-13

NOMENCLATURE:

TEE, DUCTILE IRON, FLANGED

DESCRIPTION:

Shall be ductile iron fitting with flanged ends, shall be cement mortar lined and bituminous sealed, shall conform to ANSI/AWWA C-110 latest for standard fittings three inch (3") through 36". All fittings to be furnished with accessories. Refer to Table WSCM 111 for estimated weights of fittings. All fittings to be NSF approved for potable water use.

SIZE

6" x 6"
8" x 6"
8" x 8"
12" x 6"
12" x 8"
12" x 12"
16" x 6"
16" x 8"
16" x 12"
16" X 16"
24" X 6"
24" X 8"
24" x 12"
24" x 16"
24" x 24"
30" x 6"
30" x 8"
30" x 12"
30" x 16"
30" x 24"
30" x 30"
36" x 8"
36" x 12"
36" x 16"
36" x 24"
36" x 30"
36" x 36"

MATERIAL SPECIFICATION: 489-05-99-20

NOMENCLATURE:

RESTRAINED FITTING, MEGA-LUG, DIP

DESCRIPTION:

Shall be ductile iron conforming to ANSI/AWWA C151/A21.51. All restrained mega-lugs shall be furnished with accessories and have a minimum pressure resistance of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

SIZE	MANUFACTURER
4″ - 48″	EBAA IRON – SERIES 1100
4″ - 48″	SIGMA – ONE LOK SERIES SLD

MATERIAL SPECIFICATION: 489-05-99-21

NOMENCLATURE:

RESTRAINED FITTING, MEGA-LUG, PVC

DESCRIPTION:

Shall be ductile iron conforming to ANSI/AWWA C111/A21.11. All restrained mega-lugs shall be furnished with accessories and have a minimum pressure resistance of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

SIZE	MANUFACTURER
	EBAA IRON – SERIES 2000

MATERIAL SPECIFICATION: 489-06-01-02

NOMENCLATURE:

METER, WATER POSITIVE DISPLACEMENT BRONZE

DESCRIPTION:

This specification covers cold water meter - positive displacement type, sizes ⅝" x ¾", 1" x 1", 1 ½" x 1 ½" and 2" x 2". The water meters to be furnished will equal or exceed the requirements of AWWA C-700-95-latest revision with particular reference to flow capacity, pressure loss, accuracy, physical dimension, and material construction.

AFFIDAVIT OF COMPLIANCE: A copy of the compliance from the manufacturer must be submitted and shall certify that the meters bid will be furnished in full compliance with the requirements of this specification and those of AWWA C-700-77-latest revision. Meter to be NSF approved for potable water.

INSPECTION AND TEST: The successful bidder shall supply actual test results for each and every water meter by meter serial number for each shipment of meters, and shall be responsible for delivery of all meters in first class condition.

MAINCASE: Shall be of high grade bronze containing not less than 75% copper and withstand a working pressure test of 200 psi without leakage at gasket. Size, model, and direction of flow shall be marked permanently on outer case of all meters. The name of the manufacturer shall be marked permanently on the lid of the register box. The serial number of the meter shall be imprinted on the lid and on meter main case.

REGISTRATION: The register shall be permanently hermetically sealed, no fogging, large numerals, tempered glass lens, cubic foot, magnetic drive, low torque registration, straight and AMI reading, and low flow indicator.

CONNECTION: Shall be flanged and/or screwed ends as designated. If flanged, shall come with companion flanges, gaskets, bolts and nuts.

APPROVED MANUFACTURING AND CATALOG NUMBERS

		MANUFACTURER
NUMBER	SIZE	SENSUS
06-02-0058	⅝" x ¾"	SRII
06-02-0100	1" x 1"	SRII
06-02-0150	1 ½" x 1 ½'	SR
06-02-0200	2" x 2"	SR

MATERIAL SPECIFICATION: 489-06-01-04

NOMENCLATURE:

METER, WATER TURBINE

DESCRIPTION:

This specification covers cold water meters - turbine type, sizes 1 ½", 2", 3", 4", and 6". The water meters to be furnished shall be Class II, horizontal shaft and equal or exceed the requirements of AWWA C-701-latest revisions with particular reference to flow capacity, pressure loss, accuracy, physical dimension and material construction.

AFFIDAVIT OF COMPLIANCE: A copy of the affidavit of compliance from the manufacturer must be submitted and shall certify that the meters bid will be furnished in full compliance with the requirements of this specification and those of AWWA C-701-latest revision.

INSPECTION AND TEST: The successful bidder shall supply actual test results for each and every water meter by meter serial number for each shipment of meters, and shall be responsible for delivery of all meters in first class condition.

MAINCASE: Shall be of high grade bronze containing not less than 75% copper and with operating pressure test of 200 psi without leakage at gasket. Size, model, and direction of flow shall be marked permanently on outer case of all meters. The name of the manufacturer shall be marked permanently on the lid of the register box. The serial number of the meter shall be imprinted on the lid and on meter main case.

STRAINER: Turbine meter must be able to use strainer without the additional piping up stream and down stream to control accuracy of the meter. Strainer to come with meter only upon request.

REGISTRATION: The register shall be permanently hermetically sealed, no fogging, large numerals, tempered glass lens, cubic foot, magnetic drive, low torque registration, straight and AMI reading, and low flow indicator.

CONNECTION: Shall be flanged and shall come with companion flanges, gaskets, bolts, and nuts.

Meter shall be NSF approved for potable water use.

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APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	KENT	NEPTUNE	SENSUS	MASTER METER
1 ½”	T-3000	HP	“W” TURBO	1 ½”
2”	T-3000	HP	“W” TURBO	2”
3”	T-3000	HP	“W” TURBO	3”
4”	T-3000	HP	“W” TURBO	4”
6”	T-3000	HP	“W” TURBO	6”

MATERIAL SPECIFICATION: 489-06-99-01

NOMENCLATURE:

METER, WATER COMPOUND TYPE

DESCRIPTION:

This specification covers compound type water meters, sizes two inch (2") through six inch (6"). The meters to be furnished will equal or exceed the requirements of AWWA C-702-latest revision with particular reference to flow capacity, pressure loss, accuracy, physical dimension and material construction.

AFFIDAVIT OF COMPLIANCE: A copy of the affidavit of compliance from the manufacturer must be submitted and shall certify that the meters bid will be furnished in full compliance with the requirements of this specification and those of AWWA C-702-latest revision. Meter shall be NSF approved for potable water use.

INSPECTION AND TEST: The successful bidder shall supply actual test results for each and every water meter by meter serial number for each shipment of meters, and shall be responsible for delivery of all meters in first class condition.

MAINCASE: Shall be of high grade bronze containing not less than 75% copper and withstand a working pressure of 200 psi without leakage or damage to any parts. The size, model, and direction of flow shall be marked permanently on outer case of all meters. The name of the manufacturer shall be marked permanently on the lid of the register box. The serial number of the meter shall be imprinted on the lid and on the meter main case.

REGISTRATION: The register shall be permanently hermetically sealed, no fogging, large numerals, tempered glass lens, cubic foot, magnetic drive, low torque registration, straight and AMI reading, and low flow indicator.

STRAINER: Compound meter must be able to use strainer without the additional piping up stream and down stream to control accuracy of the meter. Strainer to come with meter only upon request.

CONNECTION: Shall be flanged, and come with companion flanges, gaskets, bolts, and nuts.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	KENT	SENSUS	NEPTUNE
2"	C-3000	SRH	TRU/FLO
3"	C-3000	SRH	TRU/FLO

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE	KENT	SENSUS	NEPTUNE
4”	C-3000	SRH	TRU/FLO
6”	C-3000	SRH	TRU/FLO

MATERIAL SPECIFICATION: 489-07-02-01

NOMENCLATURE:

PIPE, DUCTILE IRON, PUSHON, CEMENT LINED

DESCRIPTION:

Pipe shall be ductile iron conforming to the latest requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, Pressure Class, rated for a minimum 200 psi working pressure (or project requirements, whichever is greater) plus a 100 psi minimum surge allowance and a 2 to 1 factor of safety, using a Type II laying condition and a depth of cover of four (4') feet. Ductile iron pipe shall be manufactured in the U.S.A. and each piece shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture. Pipe diameters 4" through 12" shall be class 350 minimum, diameters 14" through 20" shall be class 250 minimum and pipe diameters 24" and larger shall be class 200 minimum. Pipe shall have an exterior bituminous coating applied by airless spray method. Pipe shall have an interior cement mortar lining applied in accordance with ANSI/AWWA C104/A21.4, latest revision. All pipe shall be furnished with Push-On type joints. Joints shall be in accordance with ANSI/AWWA C111/A21.11, latest revision, and be furnished complete with all necessary accessories. The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, country where cast, year in which the pipe was produced, and the letters, "DI" or "Ductile" shall be cast or stamped on each length of pipe. Pipe shall be NSF approved for potable water use and bear the NSF logo. Pipes with cracked or chipped linings or defective pipes will be rejected. Ductile iron pipes shall have blue co-axial stripes on the outer skin at 90º intervals.

SIZE	CLASS
6"	350
8"	350
10"	350
12"	350
14"	250
16"	250
18"	250
20"	250
24"	200
30"	200
36"	200

*****SHOP DRAWING REQUIRED*****

MATERIAL SPECIFICATION: 489-07-02-02

NOMENCLATURE:

RESTRAINED JOINT PIPE, DUCTILE IRON

DESCRIPTION:

Joint shall be restrained using grip gaskets or lock-rings as described below.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER

AMERICAN	Ductile Iron Pipe, Fast-Grip Restrained Gaskets, Lok-Ring restrained rings.
MC WANE	Ductile Iron Pipe, Field Lok Restrained Gaskets, Super-Lock restrained rings.
GRIFFIN	Ductile Iron Pipe, Field Lok Restrained Gaskets, Snap-Lok restrained rings.
U. S.	Ductile Iron Pipe, Field Lok Restrained Gaskets, TR Flex Gripper restrained rings.
EBAA IRON	Ductile Iron Pipe, Mega-lug Restraint Harness, Series 1700

MATERIAL SPECIFICATION: 489-07-04-01

NOMENCLATURE:

PIPE, PEXa

DESCRIPTION:

Shall have a minimum pressure rating of 200 psi. Shall conform to ASTM specifications F876 and ASTM F877, SDR9, copper tube size outside diameter, and shall conform to AWWA C-904 latest. Pipe shall be NSF approved for potable water use and color blue.

SIZE

¾”
1”
2”

MATERIAL SPECIFICATION: 489-07-04-02

NOMENCLATURE:

PIPE, POLYETHELENE

DESCRIPTION:

Shall have a minimum pressure rating of 200 psi. Shall conform to ASTM specifications D-2737, PE 3408, copper tube size outside diameter, and shall conform to AWWA C-901 latest. Pipe shall be NSF approved for potable water use and color blue.

SIZE

¾”
1”
2”

MATERIAL SPECIFICATION: 489-07-05-01

NOMENCLATURE:

PIPE, HDPE, FUSION

DESCRIPTION:

HDPE directional bored pressure pipe shall conform to C901 AWWA latest edition with a DR-11, 160 psi or DR-9, 200 psi pressure rating, with color coded blue striping. Pipe shall be NSF approved for potable water use and bear the NSF logo.

SIZE

2” C901

MATERIAL SPECIFICATION: 489-07-05-02

NOMENCLATURE:

PIPE, HDPE, FUSION

DESCRIPTION:

HDPE directional bored pressure pipe shall conform to C906 AWWA latest edition with a DR-11, 160 psi or DR-9, 200 psi pressure rating, with color coded blue striping. Pipe shall be NSF approved for potable water use and bear the NSF logo.

SIZE

4”	C906
6”	C906
8”	C906
10”	C906
12”	C906
16”	C906
18”	C906
20”	C906
24”	C906

MATERIAL SPECIFICATION: 489-07-08-01

NOMENCLATURE:

PIPE, PVC, PUSHON

DESCRIPTION:

PVC pressure pipe shall conform to C-900/C905 AWWA latest edition with a 200 psi pressure rating, DR-18 or DR-14, color blue, gasketed bell joint. Pipe shall be NSF approved for potable water use and bear the NSF logo. All PVC pipe shall be installed and hydrostatically tested in accordance with AWWA C605.

The pipe manufacturer must supply a certificate of application that the pipe has met requirements of C-900/C-905 AWWA latest edition.

SIZE

4″	C900PVC
6″	C900PVC
8″	C900PVC
10″	C900PVC
12″	C900PVC
16″	C905PVC
18″	C905PVC
20″	C905PVC
24″	C905PVC
30″	C905PVC
36″	C905PVC

MATERIAL SPECIFICATION: 489-07-08-02

NOMENCLATURE:

PIPE, PVC, SOLVENT WELD, SCH 80

DESCRIPTION:

Schedule 80 PVC pressure pipe conforming to ASTM D-1785, 200 psi pressure rating, color blue. Pipe shall be NSF approved for potable water use.

SIZE

¾”
1”
2”

MATERIAL SPECIFICATION: 489-07-08-03

NOMENCLATURE:

RESTRAINED JOINT PIPE, PVC

DESCRIPTION:

Joint shall be restrained using Certa-Lok C900 restrained joint PVC piping system or bell restraint harnesses.

APPROVED MANUFACTURING AND CATALOG NUMBERS

MANUFACTURER	
CERTAIN TEED	Certa-Lok C900/RJ Restrained Joint, Mechanical Gland Adapters for DR 14 and DR 18 pipe.
EBAA IRON	Bell Restraint Harness for C900 PVC Pipe, Series 1600 for DR 14 and DR 18 pipe.

MATERIAL SPECIFICATION: 489-07-08-04

NOMENCLATURE:

PIPE, PVC, PUSHON

DESCRIPTION:

CL 200 PVC pressure pipe shall conform to ASTM D2241-SDR 21, 200 psi, color blue, gasketed bell joint. Pipe shall be NSF approved for potable water use and bear the NSF logo.

SIZE

2”

MATERIAL SPECIFICATION: 489-07-08-05

NOMENCLATURE:

PIPE, PVC, FUSION

DESCRIPTION:

PVC directional bored pressure pipe shall conform to C900 and C905 AWWA latest edition with a DR-18, 200 psi pressure rating, color blue. Pipe shall be NSF approved for potable water use and bear the NSF logo.

SIZE

4”	C900
6”	C900
8”	C900
10”	C900
12”	C900
16”	C905
18”	C905
20”	C905
24”	C905
30”	C905
36”	C905

MATERIAL SPECIFICATION: 489-09-02-01

NOMENCLATURE:

SADDLE, TAPPING

DESCRIPTION:

Tapping saddle, outlet for galvanized steel pipe (Schedule 40), outlet for iron pipe size PVC pipe. Bolts, Electro-galvanized or ductile iron, type double strapped with neoprene gasket, triple strapped on a saddle. Saddle shall be NSF approved for potable water use and shall have a pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER				
SIZE	FORD	BAKER	MUELLER	ROMAC IND.	SMITH-BLAIR
2" x ¾"	F202-250-CC3	181-250-3/4"cc			313-0256-06-000
2" x 1"	F202-250-CC4	181-250-1"cc	H-13000 Series		313-0256-08-000
4" x 2"	F202-473-IP7	181-525-2" IPT	H-13000 Series	202-4.8 x 2" IP	313-0480-14-000
6" x 2"	F202-760-IP7	181-720-2" IPT	H-13000 Series	202-6.9 x 2" IP	313-0690-14-000
8" x 2"	F202-979-IP7	181-963-2" IPT	H-13000 Series	202-9.05 x 2" IP	313-0905-14-000
10" x 2"	F202-1200-IP7	181-1200-2" IPT	H-13000 Series	202-11.1 x 2" IP	313-1110-14-000
12" x 2"	F202-1438-IP7	181-1426-2" IPT	H-13000 Series	202-13.2 x 2" IP	313-1320-14-000
14" x 2"	F202-1668-IP7	181-1666-2" IPT	H-14 x 2	202-14 x 2	313-14 x 2
16" x 2"	F202-1888-IP7	181-1888-2" IPT	H-16 x 2	202-16 x 2	313-16 x 2
18" x 2"	F202-18 x 2	181-18 x 2	H-18 x 2	202-18 x 2	313-18 x 2
20" x 2"	F202-20 x 2	181-20 x 2	H-20 x 2	202-20 x 2	313-20 x 2
24" x 2"	F202-24 x 2	181-24 x 2	H-24 x 2	202-24 x 2	313-24 x 2

MATERIAL SPECIFICATION: 489-09-02-02

NOMENCLATURE:

SLEEVE, TAPPING

DESCRIPTION:

Tapping saddle, mechanical joint for cast iron, ductile iron pipe, iron body with 3/4″ test plug. Bolts, Electro-galvanized or ductile iron. Sleeve shall be approved for potable water use, shall have a pressure rating of 200 psi and shall be certified to ANSI/NSF61.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE OF MAIN	MUELLER
6″	H-615
8″	H-615
10″	H-615
12″	H-615
14″	H-615
16″	H-615
18″	H-615
20″	H-615
24″	H-615

MATERIAL SPECIFICATION: 489-09-02-03

NOMENCLATURE:

SLEEVE, TAPPING

DESCRIPTION:

Tapping saddle, mechanical joint for cast iron, ductile iron pipe 304 stainless steel body with 3/4″ test plug. Bolts, Electro-galvanized or ductile iron. Sleeve shall be approved for potable water use, shall have a pressure rating of 200 psi and shall be certified to ANSI/NSF61.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER		
SIZE OF MAIN	DRESSER	MUELLER	ROMAC IND.
6″	630	H-304	SST
8″	630	H-304	SST
10″	630	H-304	SST
12″	630	H-304	SST
14″	630	H-304	SST
16″	630	H-304	SST
18″	630	H-304	SST
20″	630	H-304	SST
24″	630	H-304	SST

MATERIAL SPECIFICATION: 489-10-01-01

NOMENCLATURE:

BUTTERFLY VALVE, MECHANICAL JOINT

DESCRIPTION:

AWWA butterfly valve neoprene seated. Shall conform to AWWA C504 latest revision. Shall have a pressure rating of 175 psi working pressure. Standard mechanical joint, cast iron and dimension shall comply with AWWA C-111 and shall contain two inch (2") square operating nut, open counter clockwise, be epoxy coated on inside, tar coating on outside and be complete with accessories. Neoprene seat can be on disc or body. Valve shall be NSF approved for potable water and bear the NSF logo.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	MUELLER	DE ZURIK	PRATT	M & H/CLOW
12"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
14"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
16"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
18"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
20"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
24"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
30"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500
36"	B3211-20	CLASS 200 MJ	GROUND HOG	STYLE 4500

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-01-02

NOMENCLATURE:

BUTTERFLY VALVE, FLANGED

DESCRIPTION:

AWWA butterfly valve shall conform to AWWA C504, latest revision. Shall have pressure rating of 175 psi working pressure with flanged ends, short body type. Valves shall have ASTM A126, Class B cast iron body with 125-pound full faced flanges drilled in accordance with ANSI B16.1. Valves shall have wheel handles, open counter clockwise, be epoxy coated inside and out and be complete with accessories. Neoprene seat can be attached to body or the disc. Valve shall be NSF approved for potable water and bear the NSF logo.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER			
SIZE	MUELLER	DE ZURIK	PRATT	M & H
12”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
14”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
16”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
18”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
20”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
24”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
30”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500
36”	B3211-20	CLASS 200MJ	GROUND HOG	STYLE 4500

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-02-01

NOMENCLATURE:

STOP, CORPORATION

DESCRIPTION:

Corporation stop standard IP thread inlet, with outlet copper tube size packjoint - for polyethylene, shall meet AWWA specification C-800 (ASTM B-62). Packjoint nut to have a split clamp with stainless steel screw and grooves inside of clamp for additional gripping action. Corporation stop shall be NSF approved for potable water use and shall have a pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	FORD	MUELLER
1” x 1”	F-1100	H-15028
2” X 2”	F-1100	H-15028

MATERIAL SPECIFICATION: 489-10-02-02

NOMENCLATURE:

STOP, CORPORATION, PE

DESCRIPTION:

Corporation stop standard CC thread inlet with outlet copper tube size packjoint - for polyethylene, shall meet AWWA specification C-800 (ASTM B-62). Packjoint nut to have a split clamp with stainless steel screw and grooves inside of clamp for additional gripping action. Corporation stop shall be NSF approved for potable water use and shall have a pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	FORD	MUELLER
¾"	F-1000	H-15008
1"	F-1000	H-15008

MATERIAL SPECIFICATION: 489-10-02-03

NOMENCLATURE:

CURB BALL VALVE

DESCRIPTION:

Inlet and outlet female iron pipe thread, tee head winglock. Shall meet AWWA specification C-800 (ASTM B-62). Shall be full port opening through valve throat. Valve shall be NSF approved for potable water use and be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	FORD	MUELLER
¾”	B 11-323W	B 20200
1”	B 11-444W	B 20200
2”	B 11-777W	B 20200

MATERIAL SPECIFICATION: 489-10-04-02

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, THREADED, BRONZE STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, open counter clockwise, conform to AWWA C-509 latest, be epoxy coated on inside, tar coating on outside, have threaded ends, cast iron body o-ring type stem and non-rising bronze stem. Valve shall be NSF approved for potable water use and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	AVK	MUELLER
2"	SERIES 03	A2360-8

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-04-03

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, N.R.S., MECHANICAL JOINT, BRONZE STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, open counter clockwise, conform to AWWA C-509 latest and shall be epoxy coated on inside, tar coating on outside. Shall have mechanical joint ends and come with accessories. Shall have cast iron body, o-ring type stem and non rising bronze stem. Valve shall be NSF approved for potable water and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	M & H	AVK
2"	STYLE 4067-01	SERIES 25
4"	STYLE 4067-01	SERIES 25
6"	STYLE 4067-01	SERIES 25
8"	STYLE 4067-01	SERIES 25
10"	STYLE 4067-01	SERIES 25

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-04-04

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, N.R.S., FLANGED JOINT, BRONZE STEM

DESCRIPTION:

Shall contain circular operating wheel, open counter clockwise, conform to AWWA C-509 latest and shall be epoxy coated inside and out. Shall have flanged ends, cast iron bodies, o-ring type stem and be non-rising bronze stem. Valve shall be NSF approved for potable water and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	M & H	AVK
4”	STYLE 4067-02	SERIES 25
6”	STYLE 4067-02	SERIES 25
8”	STYLE 4067-02	SERIES 25
10”	STYLE 4067-02	SERIES 25

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-04-06

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, THREADED, STAINLESS STEEL STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, open counter clockwise, conform to AWWA C-509 latest, be epoxy coated on inside, tar coating on outside, have threaded ends, cast iron body o-ring type stem and non-rising stainless steel stem, grade 304 SST. Valve shall be NSF approved for potable water and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE	AVK
2″	03-063-35

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-04-07

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, N.R.S., MECHANICAL JOINT, STAINLESS STEEL STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, open counter clockwise, conform to AWWA C-509 latest and shall be epoxy coated on inside, tar coating on outside. Shall have mechanical joint ends and come with accessories. Shall have cast iron body o-ring type stem and non-rising stainless steel stem, grade 304 SST. Valve shall be NSF approved for potable water and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE	AVK
4″	25-100-XO-ZVI-001
6″	25-150-XO-ZVI-001
8″	25-200-XO-ZVI-001
10″	25-300-XO-ZVI-001

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-04-08

NOMENCLATURE:

GATE VALVE, RESILIENT SEAT, N.R.S., FLANGED JOINT, STAINLESS STEEL STEM

DESCRIPTION:

Shall contain circular operating wheel, open counter clockwise, conform to AWWA C-509 latest and shall be epoxy coated inside and out. Shall have flanged ends, cast iron bodies, o-ring type stem and non-rising stainless steel stem, grade 304 SST. Valve shall be NSF approved for potable water and bear the NSF logo. Valve shall be pressure rated for 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE	AVK
4″	25-100-46
6″	25-150-46
8″	25-200-46
10″	25-300-46

***** SHOP DRAWING REQUIRED *****

MATERIAL SPECIFICATION: 489-10-05-01

NOMENCLATURE:

TAPPING VALVE, RESILIENT SEAT, N.R.S., MECHANICAL JOINT X FLANGE, BRONZE STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, shall open counter clockwise, shall conform to AWWA C-509 latest, and shall be epoxy coated inside and out. Shall be flanged by mechanical joint and come with accessories. Shall have cast iron body, o-ring type stem and non rising bronze stem. Shall have the aligning ring to align valve to sleeve. Valve shall be NSF approved for potable water use and bear the NSF logo. Valve shall have a pressure rating of 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	M & H	AVK
4"	STYLE 4751-01	SERIES 25
6"	STYLE 4751-01	SERIES 25
8"	STYLE 4751-01	SERIES 25
12"	STYLE 4751-01	SERIES 25
16"	STYLE 4751-01	SERIES 25
24"	STYLE 4751-01	SERIES 55
30"	STYLE 4751-01	SERIES 55

MATERIAL SPECIFICATION: 489-10-05-02

NOMENCLATURE:

TAPPING VALVE, RESILIENT SEAT, N.R.S., MECHANICAL JOINT X FLANGE, STAINLESS STEEL STEM

DESCRIPTION:

Shall contain two inch (2") square operating nut, shall open counter clockwise, shall conform to AWWA C-509 latest, and shall be epoxy coated inside and out. Shall be flanged by mechanical joint and come with accessories. Shall have cast iron body, o-ring type stem and non rising stainless steel stem, grade 304 SST. Shall have the aligning ring to align valve to sleeve. Valve shall be NSF approved for potable water use and bear the NSF logo. Valve shall have a pressure rating of 175 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE	AVK
4"	45-100-61
6"	45-150-61
8"	45-200-61
12"	45-300-61
16"	
24"	
30"	

MATERIAL SPECIFICATION: 489-10-06-01

NOMENCLATURE:

AIR RELEASE VALVES

DESCRIPTION:

Shall be of the type designed for use in water distribution systems to exhaust entrapped air. Valve shall be simple lever type and be constructed and tested to 175 psi working pressure, have stainless steel inner working parts with a cast iron body and cover, NPT threaded inlet and outlets. Valve shall be NSF approved for potable water use.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	EMPIRE	VAL-MATIC
⅜" x 1/16"	FIG 910-H	MODEL 15
⅜" x 3/32"	FIG 910	MODEL 22
⅜" x ⅛"		MODEL 25

MATERIAL SPECIFICATION: 489-10-06-02

NOMENCLATURE:

AIR RELEASE VALVES, PLASTIC

DESCRIPTION:

Shall be of the type designed for use in water distribution systems to exhaust entrapped air. Valve shall be simple lever type and be constructed and tested to 175 psi working pressure, have PVC inner working parts with a PVC body and cover, NPT threaded inlet and outlets. Valve shall be NSF approved for potable water use.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER
SIZE	ARI
⅜" x 1/16"	D-040
⅜" x 3/32"	D-040
⅜" x ⅛"	D-040

MATERIAL SPECIFICATION: 489-10-07-01

NOMENCLATURE:

HOSE BIBB

DESCRIPTION:

Brass, open counter-clockwise, iron pipe thread up stream, hose thread down stream. Hose bib shall be NSF approved for potable water use. Hose bibb shall have a pressure rating of 200 psi.

APPROVED MANUFACTURING AND CATALOG NUMBERS

	MANUFACTURER	
SIZE	CONBRACO	RED-WHITE VALVE CO.
¾”	NO. 35-202-10	RW 5313