

CITY OF SACRAMENTO



STANDARD SPECIFICATIONS



FOR PUBLIC CONSTRUCTION

ADDENDUM NO. 2 April 2012

CITY of SACRAMENTO
 STANDARD SPECIFICATIONS
 Addendum No. 2

This addendum modifies the City’s Standard Specifications published in June 2007, and Addendum No. 1 issued in August 2009. These changes shall be incorporated into the Standard Specifications, and shall be considered as part of the original documents, as if they were originally provided therein. All other specifications and drawings not modified herein remain unchanged. Revisions considered of interest to city staff, contractors and/or developers are noted herein. Incidental typo errors have been corrected without being noted. This Addendum and the corrected Standard Specifications are viewable on the internet at:

www.cityofsacramento.org/utilities/media-room/publications_standard_specifications.cfm

Items in Addendum No. 2 include:

<u>Section(s)</u>	<u>Description of Change</u>	<u>Addendum Page(s)</u>
10-5.1	Class B Conc gradation (Revise Class “B” to 1” max aggregate).	4 of 81
10-19.4.i	Sewer & Drain Pipe (Change pipe callout to ‘Glass-fiber Reinforced Thermosetting-Resin Pipe’).	5 of 81
10-26	Only allow PVC where pipe dia. is ≤ 8”. Use DIP for 12” dia. Distribution pipe.	6 & 7 of 81
10-27	Change pressure rating of water distribution fittings to 250 psi minimum.	8 of 81
10-27 thru 10-32	Revise bolts, nuts, & gasket specifications (Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or equal. Rubber gasket material shall be hardness (Shore A) 70 to 85).	9, 11, 13-15, 17, & 20 of 81
10-28	Modify CCP & WSP laying lengths to include “ <i>unless otherwise required by the Contract Documents</i> ”)	10 & 12 of 81
10-29	Butterfly Valves (Revise to open left)	16 of 81
10-31.6.l	Fire Hydrants (Revise to open left)	18 & 19 of 81
10-32	Valves (Revise to open left)	20 of 81
10-33	Change dwg reference to W-303, and change from 8” dia steel to 8” dia SDR 35 PVC riser sections around valve stems.	20 & 21 of 81
13-3	Revise plugging pipe ends for Removing/Relocating Pipes & Culverts	22 of 81

<u>Section(s)</u>	<u>Description of Change</u>	<u>Addendum Page(s)</u>
26-4.2 & - 4.3	SS & SD Pipe mat'ls (Revise pipe callouts to 'Glass-fiber Reinforced Thermosetting-Resin Pipe').	23 of 81
26-10.6	CCTV for all SS & SD installations to be performed by the Contractor.	24 of 81
26-12.1& 26-12.5	Revise CCTV Procedures.	25 & 26 of 81
27-3	Revise how to cap & cut pipe ends for water pipe trenching.	27 of 81
27-7.1	Revise so there is no distinction for new valve opening directions north versus south of the American River (All new valves to open counterclockwise).	28 of 81
27-9	Change replacement sidewalk concrete to Class "B" for pipe trench repaving.	29 of 81
37-3	Revise casing pipe spec to AWWA C200 or API 5, X-42 min.	30 of 81
38	See complete new list of details, including deleted drawings.	31-40 of 81
38	Std Detail T-80 (Modified detail shows different trench widths for Flexible versus Rigid pipe; clarifies all compaction per ASTM D1557; modifies Initial Backfill compaction testing; modifies the Notes; and provides for CL 2 AB Trench Backfill at no additional cost over processed native soil).	41 of 81
38	Std Detail W-103 (Use only thrust blocks, not restrained joints, on Fire Hydrants).	42 of 81
38	Std Details W-107 (Revise to show water meter).	43 of 81
38	Std Detail W-203 (Add Notes 3 & 4 for water meters).	44 of 81
38	Std Details W-204 (Revise to show water meter).	45 of 81
38	Std Detail W-303 (Revise to show 8" SDR 35 PVC riser around the valve stem).	46 of 81
38	Std Detail W-304 (Revise Note 2 for valves opening left).	47 of 81
38	Delete Std Detail W-305.	48 of 81
38	Std Detail W-306 (Revise to show 8" SDR 35 PVC riser around the valve stem).	49 of 81
38	Std Detail W-308 (Revise to show valves opening left).	50 of 81
38	Delete Std Detail W-309.	51 of 81
38	Std Detail W-404 (Remove duplicate title info).	52 of 81
38	Std Detail W-406 (Change to show only Type K copper water services).	53 of 81
38	Delete Std Detail W-503.	54 of 81

<u>Section(s)</u>	<u>Description of Change</u>	<u>Addendum Page(s)</u>
38	Std Detail W-504 (Revise to show water meter).	55 of 81
38	Std Detail W-505 (Revise to show water meter, change copper tubing callout, and correct valve reference #'s).	56 of 81
38	Delete Std Details W-506 & W-508.	57&58 of 81
38	Std Detail W-509 (Revise notes and valve locations).	59 of 81
38	Delete Std Detail W-511.	60 of 81
38	Add new Std Detail W-515.	61 of 81
38	Add new Std Detail W-608.	62 of 81
38	Std Detail W-701(Superseded. See revised Std Dwg T-80).	63 of 81
38	Std Detail W-801 (Revise to show 8" SDR 35 PVC riser around the valve stem).	64 of 81
38	Std Detail W-803 (Change Dwg cross reference from W-305 to W-303).	65 of 81
38	Std Detail W-901 (Revise Note 1: PE wrapping requirements).	66 of 81
38	Std Details W-902 & 905 (Revise steel nut, bolt, and stud mat'l specifications).	67&68 of 81
38	Std Detail W-1004 (Correct Test Sta 'traffic' versus 'non-traffic' titles).	69 of 81
38	Std Detail W-1008 (Revise detail sections, and add note that all Transmission Main pipes are to be bonded, i.e., WSP, CCP, & DIP).	70 of 81
38	Std Detail W-1011 (Revise exothermic weld callouts).	71 of 81
38	Delete Std Detail S-21.	72 of 81
38	Std Detail S-40 (Revise grate dimensions).	73 of 81
38	Std Detail S-65 (Revise Dwg to show grate location in rolled curb)	74 of 81
38	Std Detail S-110 (Revise Note 1: Use Type 4 Manholes for $\geq 27"$ Storm Drain pipes).	75 of 81
38	Std Detail S-135 (Change inside drop material to SDR 35 PVC).	76 of 81
38	Std Detail S-140 & S-150 (Revise minimum MH cover & frame dimensions).	77 & 78 of 81
38	Std Details S-260 (Change Carson Industries cleanout box reference).	79 of 81
38	Std Detail S-265 (Change Carson Industries cleanout box reference & delete "Point of Service" callouts).	80 of 81
38	Add new Std Detail S-320 (Pipe closure collar detail).	81 of 81

Addenda No. 1 & 2, together with the published document "City of Sacramento Standard Specifications for Public Construction," dated June 2007 comprise the Standard Specifications for the City of Sacramento as of April, 20, 2012.

10-5 PORTLAND CEMENT CONCRETE

1. Composition:

Portland cement concrete (referred to herein as concrete) shall be composed of Portland Cement, fine aggregate, coarse aggregate, admixtures if used, and water.

Concrete shall be designated as one of the following classes:

Class "A" Concrete shall contain six (6) sacks (564 pounds) of Portland cement per cubic yard and shall have a maximum size of coarse aggregate of one and one-half inches (1½").

Class "B" Concrete shall contain six (6) sacks (564 pounds) of Portland cement per cubic yard and shall have a maximum size of coarse aggregate of one inch (1").

Class "C" Concrete shall contain five (5) sacks (470 pounds) of Portland cement per cubic yard and shall have a maximum size of coarse aggregate of one inch (1").

Class "D" Concrete shall contain five (5) sacks (470 pounds) of Portland cement per cubic yard and shall have a maximum size of coarse aggregate of three-quarters inch (¾").

When approved by the Engineer, fly ash conforming to ASTM C 618 may be used to replace up to 20 percent of the Portland cement requirement for Class A and B concrete except that fly ash shall not replace Portland cement for concrete used to pave alleys.

Should the quantity of ingredients designed to produce a cubic yard of finished concrete result in a yield greater than one cubic yard, the relative proportions of fine and coarse aggregates shall be adjusted as necessary to maintain a constant quantity of Portland cement in each cubic yard of concrete.

Contractor shall determine the mix proportions for all concrete to be used in the work. A mix design for each class of concrete used in the work shall be submitted to the Engineer for approval at least five (5) working days prior to the proposed concrete being incorporated into the work.

2. Proportioning:

The coarse and fine aggregates shall be combined in such proportions

10-19 SEWER AND DRAINAGE PIPE (cont.)

requirements of ASTM C 425. Banded rubber couplings and sleeves conforming to ASTM C 425 are acceptable.

g. Corrugated Metal Pipe

Corrugated metal pipe may only be used for driveway culverts and shall conform to ASTM A 760, Type 1 or !R. Minimum depth of cover shall be 6 inches.

h. Corrugated HDPE Pipe

Corrugated High Density Polyethylene (HDPE) pipe may only be used for driveway culverts. HDPE pipe shall have smooth interior and shall be Type S conforming to AASHTO M 252 for four inch (4") through ten inch (10") diameter pipe and to AASHTO M 294 for twelve inch (12") and larger pipe. Provide Grade 2A2 gasketed joints in conformance with ASTM D 1056. Installation shall be in accordance with manufacturer's standards and ASTM D 2321. Minimum depth of cover shall be 12 inches.

i. Glass-Fiber-Reinforced Thermosetting-Resin Pipe

Unless indicated otherwise in the Special Provisions, Glass-Fiber-Reinforced Thermosetting-Resin Pipe shall conform to the requirements of ASTM D 3262 with a pipe stiffness designation C (36 psi).

10-20 SUBSURFACE DRAINS

Subsurface drains shall comply with Section 68 of the State Specifications.

10-21 RESERVED

10-22 FIELD ASSEMBLED PLATE CULVERT

Field assembled plate culverts shall conform to Section 67 of the State Specifications.

10-23 REINFORCING STEEL

Reinforcing steel shall conform to Section 52, "Reinforcement", in the State Specifications. Unless otherwise provided by the Special Provisions, bar

10-26 WATER PIPE - Distribution (12 inch diameter & smaller) (cont.)

Unless otherwise directed or approved:

- 12-inch diameter buried pipe shall be ductile iron only, and
- 12-inch diameter and smaller pipes placed on bridges shall be liquid-epoxy lined and coated welded steel per AWWA C200 and AWWA 210.

1. Ductile Iron Pipe

All ductile iron pipe shall conform to the following AWWA Standards as listed below:

- a. AWWA C 104 (ANSI A21.4), "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water," if cement-mortar lined.
- b. AWWA C 111 (ANSI A21.11), "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings."
- c. AWWA C 150 (ANSI A21.50), "Thickness Design of Ductile-Iron Pipe."
- d. AWWA C 151 (ANSI A21.51), "Ductile-Iron Pipe, Centrifugally Cast, for Water."

Pipe shall comply with the following requirements:

- a. Size - 4, 6, 8, 12 inch diameter only
- b. Laying Condition - Type 5
- c. Minimum Depth of Cover - Three (3) feet for improved; four and one-half (4 -1/2) feet for unimproved
- d. Working Pressure-150psi
- e. Laying Length - Minimum eighteen (18) foot nominal lengths with allowable trim pipe lengths in accordance with AWWA C 151 and special shorter lengths provided as required by the drawings.
- f. Joints - Push on or mechanical
- g. Restrained Joints - Bolted flanged connections, push-on locking gasket such as "Field-Lok" gaskets as manufactured by U.S. Pipe,

10-26 WATER PIPE - Distribution (12 inch diameter & smaller)(cont.)

push-on joint restraint such as “TR-Flex” as manufactured by U.S. Pipe, wedge action joint mechanism such as “Megalug” as manufactured by EBAA Iron, Inc. or approved equal.

- h. Gasket Lubricant - Minimum required plus 10% additional
- i. Pressure Class-350
- j. Linings-Standard thickness of cement w/ asphalt seal coat.
Coatings-Minimum one (1) mil thick petroleum asphaltic material.
- k. Certification by Manufacturer Required

2. Polyvinyl Chloride Pipe

All polyvinyl chloride pipe in sizes ranging from four through **eight** inch (4”-8”) shall conform to AWWA C 900 “Polyvinyl Chloride (PVC) Pressure Pipe,” or AWWA C 909 “Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe”. Pipe shall be manufactured with cast iron outside diameters (CIOD) for all sizes.

Pipe shall comply with the following requirements:

- a. Size - 4, 6, 8, 12 inch diameter only
- b. Class 150
- c. Dimension Ratio - 18
- d. Laying Length - 20 feet
- e. Joints - Integral bell and spigot joints conforming to the requirements ASTM D 3139 with factory supplied elastomeric gaskets meeting the requirements of ASTM F 477.
- f. Restrained Joints - Bolted flanged connections, Wedge action joint mechanism such as “Megalug” as manufactured by EBAA Iron, Inc. or approved equal.
- g. Gasket Lubricant-Minimum required plus 10% additional
- h. Each pipe length shall be marked showing the nominal pipe size

10-26 WATER PIPE - Distribution (12 inch diameter & smaller)(cont.)

and O.D. base, the AWWA pressure class, the AWWA specification designation, and the seal of the testing agency that verified the suitability of the material.

10-27 WATER PIPE FITTINGS - Distribution (12 inch diameter & smaller)

Water pipe fittings shall be of the material type as indicated on the Plans or specified in the Special Provisions and comply with AWWA standards and AWSI 61. All fittings shall be the regular product of a firm which has successfully manufactured comparable fittings for at least three (3) years.

All water pipe fittings shall be Ductile Iron and shall conform to the following AWWA Standards:

1. AWWA C 104 (ANSI A21.4), "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water," if cement-mortar lined.
2. AWWA C 110 (ANSI A21.10), "Ductile-Iron and Gray-Iron Fittings for Water."
3. AWWA C 111 (ANSI A21.11), "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings."
4. AWWA C 153 (ANSI A21.53) "Ductile-Iron Compact Fittings for Water Service."
5. AWWA C 116 (ANSI A21.16) "Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior surfaces of the Ductile-Iron and Gray-Iron Fittings for Water Supply Service," if fusion-bonded epoxy lined or coated.

Fittings shall comply with the following requirements:

1. Pressure Rating - 250 psi **minimum.**
2. Coatings - Exterior: Minimum one (1) mil thick petroleum asphaltic material coated. Interior: Lined with standard thickness cement and asphaltic seal coated. Or, exterior and interior: Minimum eight (8) mil thick fusion bonded epoxy coated.
3. Joints - Push-On, mechanical, or flange
4. Certification by manufacturer

10-27 WATER PIPE FITTINGS - Distribution (12 inch diameter & smaller) (cont.)

5. Dimensions - AWWA C 153 Compact Fittings are approved.
6. Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.
7. Rubber gaskets for flanged joints shall be full faced with a thickness of eight of an inch ($\frac{1}{8}$ "). The material used for the rubber gaskets shall be hardness (Shore A) 70 to 85 suitable for a minimum of one hundred and fifty pounds per square inch (150 psi), cold water service.

10-28 WATER PIPE - Transmission (greater than 12 inch diameter)

Water Transmission System pipe shall be of the material type as indicated on the Plans or specified in the Special Provisions and comply with AWWA standards and ANSI 61. All pipe shall be the regular product of a firm which has successfully manufactured comparable pipe for at least three (3) years. Pipe shall conform to the following requirements:

1. Welded Steel Pipe (WSP)

All welded steel pipe shall conform to the following AWWA Standards:

- a. AWWA C 200, "Steel Water Pipe - 6 in. and larger."
- b. AWWA M 11, "Steel Pipe - A Guide for Design and Installation" except as modified herein.
- c. AWWA C 205, "Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in. and Larger - Shop Applied."

Pipe shall comply with the following requirements:

- a. Pipe shall be designed for one hundred and fifty pounds per square inch (150 psi) working pressure with an additional seventy-five pounds per square inch (75 psi) allowance for surge. Pipe design shall be in accordance with AWWA M 11 to withstand the simultaneous application of external earth loads , HS-20 live load and internal pressures. The minimum steel cylinder thickness shall be ten (10) gauge. Drawings shall be submitted to the Engineer for approval and shall include the following:
 - i. Pipeline layout showing stations and elevations;

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

- ii. Details of standard pipe, joints, specials and fittings;
 - iii. Calculations for pipe design field welded joint restraint and fittings reinforcement;
 - iv. Details of joint bonding and field welded joint restraint calculations.
- b. The nominal diameter or inside diameter of the pipe and other fabricated steel sections as shown on the plans is the clear diameter of the lined pipe after the application of the interior mortar lining.
- c. Each piece of pipe shall be hydrostatically tested and the stress in the pipe during testing shall not be less than seventy-five percent (75%) of the steel minimum yield strength.
- d. Minimum Depth of Cover shall be three feet (3') in improved and four and a half feet (4½') in unimproved areas.
- e. Laying Length - thirty-two to fifty feet (32'-50'), depending on the shop practice of the manufacturer or fabricator, **unless otherwise required by the Contract Documents**. Sufficient short pieces shall be provided to allow for two foot (2') adjustments within each one-half mile of straight pipe.
- f. Pipe End Finish - The end finish of individual lengths of pipe to be provided under these Special Provisions shall be one of the following types, unless otherwise indicated on the Plans:
- i. Bell and spigot pipe ends for joints with rubber gaskets.
 - ii. Bell and spigot pipe ends for field welded joints.
 - iii. Plain-ends fitted for butt straps for field welded joints.
 - iv. Plain-ends fitted with flanges.
 - v. Plain-ends for mechanically coupled field joints.

The types of joints proposed to be used shall have been thoroughly tested for water leaks at the design pressures. The Engineer may require

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

Contractor to furnish a record of experience in installing the types of joints for comparable sizes of pipe called for on the Plans. Details of the type of pipe joints proposed to be used shall be included with the shop drawings and lay sheets submitted for the pipe.

Cement mortar lining and coating for WSP shall conform to AWWA C 205. Field joints shall be lined and coated to match pipe in accordance with AWWA C 205.

Bell and Spigot Joints with Rubber Gaskets for WSP shall employ joint rings (Carnegie rings) and shall be designed and fabricated to accommodate a rubber O-ring gasket seal in accordance with AWWA C 303.

The field welding of WSP with bell and spigot joint rings (Carnegie rings) or lap joints shall conform to Standard Drawing W-903. Lap joints shall conform to AWWA C 200.

Field welded butt-strap joints shall typically only be used for closure pieces and shall conform to Standard Drawing W-904. The ends of pipes to be fitted with butt straps for field welded joints shall conform to AWWA C 200.

When field conditions warrant and with the approval of the Engineer, straight butt strap welded joints may be used for directional changes in pipe alignment of up to five (5°) degrees.

WSP pipe flanges shall conform and be fitted to plain-end pipe in accordance with AWWA C 207, Class D, and AWWA C 200.

Rubber gaskets for flanged joints shall be full faced with a thickness of eight of an inch ($\frac{1}{8}$ "). The material used for the rubber gaskets shall be hardness (Shore A) 70 to 85 suitable for a minimum of one hundred and fifty pounds per square inch (150 psi), cold water service.

Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

WSP ends for mechanically coupled field joints shall be plain and conform to AWWA C 200 and these Standards Specifications. Mechanically coupled joints shall conform to the material, dimensions, and tests of AWWA C 219.

All plain-end pipe joined by flexible couplings shall be fitted with stiffener rings welded to the exterior pipe surface in a plane perpendicular to the axis of the pipe.

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

- d. The nominal diameter or inside diameter of the pipe and other fabricated steel sections as shown on the plans is the clear diameter of the lined pipe after the application of the interior mortar lining
- e. Laying Length - thirty two to forty feet (32'- 40') for concrete cylinder pipe depending on the shop practice of the manufacturer or fabricator, **unless otherwise required by the Contract Documents**. Sufficient short pieces shall be provided to allow for two foot (2') adjustments within each one-half mile of straight pipe.
- f. Pipe End Finish - The end finish of individual lengths of CCP to be provided under these Standard Specifications shall be one of the following types, unless otherwise indicated on the Plans:
 - i. Bell and spigot pipe ends for joints with rubber gaskets.
 - ii. Bell and spigot pipe ends for field welded joints.
 - iii. Plain-ends fitted for butt straps for field welded joints.
 - iv. Plain-ends fitted with flanges.
 - v. Plain-ends for mechanically coupled field joints.

The types of joints proposed to be used shall have been thoroughly tested for water leaks at the design pressures. The Engineer may require Contractor to furnish a record of experience in installing the types of joints for comparable sizes of pipe called for on the Plans. Details of the type of pipe joints proposed to be used shall be included with the shop drawings and lay sheets submitted for the pipe.

The exposed inside and outside surfaces of the joints, flanges, reinforcement lugs, and all other exposed steel shall be protected from the formation of rust with an AWWA approved coating applied at the time of manufacture or fabrication of the pipe.

The CCP ends shall employ joint rings (Carnegie rings) and shall be designed and fabricated to accommodate a rubber O-ring gasket seal in accordance with AWWA C 303.

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

The field welding of CCP with bell and spigot joint rings (Carnegie rings) or lap joints shall conform to the Drawing W-903, Section 38 of these Standard Specifications. Lap joints shall conform to AWWA C 200.

Field welded butt-strap joints for CCP shall be typically used for closure pieces and shall conform to Standard Drawing W-904. The ends of pipes to be fitted with butt straps for field welded joints shall conform to AWWA C 200.

When field conditions warrant and with the approval of the Engineer, straight butt-strap welded joints may be used for directional changes in pipe alignment of up to five degrees (5°).

Steel pipe flanges for CCP shall conform and be fitted to plain-end pipe in accordance with AWWA C 207, Class D, and AWWA C 200.

Rubber gaskets for flanged joints shall be full faced with a thickness of eight of an inch ($\frac{1}{8}$ "). The material used for the rubber gaskets shall be hardness (Shore A) 70 to 85 suitable for a minimum of one hundred and fifty pounds per square inch (150 psi), cold water service.

Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

CCP ends for mechanically coupled field joints shall be plain and conform to AWWA C 200 and these Standard Specifications. Mechanically coupled joints shall conform to the material, dimensions, and tests of AWWA C 219.

All plain-end pipe joined by flexible couplings shall be fitted with stiffener rings welded to the exterior pipe surface in a plane perpendicular to the axis of the pipe. Stiffener rings shall have minimum dimensions of three eighths inch ($\frac{3}{8}$ ") thick by three inches (3") in width.

Stiffener rings that are to be integral with a joint harness shall be suitably increased in thickness and reinforced with plate gussets to adequately withstand the thrust from adjacent fittings. Stiffener rings and harness rings or lugs shall be installed at the pipe manufacturing or fabrication shop. Material for stiffener rings and plate gussets shall be carbon steel meeting the requirements of ASTM A 36 or ASTM A 283, Grade D.

All mechanically coupled field joints shall be encased with eight (8) mil minimum thickness polyethylene material.

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

All DIP and fittings shall be cement-mortar lined in accordance with AWWA C 104/A21.4.

Pipe shall be lined by a centrifugal process. Fittings shall be lined by a projection method or by hand application.

The entire ductile iron pipeline including fittings, valves and appurtenances shall be encased in polyethylene material with a minimum thickness of eight (8) mil. The polyethylene shall conform to and be installed in accordance with AWWA C 105/A21.5.

The end finish of individual lengths of DIP to be provided under these Standard Specifications shall be one of the following types, unless otherwise indicated on the Plans:

- a. Bell and spigot pipe ends for joints with rubber gaskets.
- b. Mechanically coupled field joints.
- c. Plain-ends fitted with threaded flanges.

The types of joints proposed to be used shall have been thoroughly tested for water leaks at the design pressures. The Engineer may require Contractor to furnish a record of experience in installing the types of joints for comparable sizes of pipe called for on the Plans. Details of the type of pipe joints proposed to be used shall be included with the shop drawings and lay sheets submitted for the pipe.

The exposed inside and outside surfaces of the pipe joints shall be protected from the formation of rust with an AWWA approved coating applied at the time of manufacture of the pipe.

Bell and spigot joints with rubber gaskets for DIP shall conform to the requirements of AWWA C 111/A21.11 regarding push-on joints.

Mechanically coupled field joints, bolts and nuts for DIP shall conform to the requirements of AWWA C 111/A21.11. All mechanically coupled field joints shall be encased with a minimum eight (8) mil thick polyethylene.

Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

10-28 WATER PIPE - Transmission (greater than 12 inch diameter) (cont.)

Ends fitted with threaded flanges for DIP shall conform to the requirements of AWWA C 115/A21.15.

Pipe ends fitted with restraining rings for DIP shall receive approval by the Engineer prior to the installation of the pipe. It is suggested that test documents from the manufacturer's testing documentation be submitted with the required pipe lay sheet submittals.

Restrained Joints for Ductile Iron transmission mains shall be one of the following types:

- a. Flanged and bolted - Flanges shall be in accordance with AWWA C 110 or AWWA C 153 for operating pressures to one hundred and fifty pounds per square inch (150 psi) and surge pressures to two hundred and twenty five pounds per square inch (225 psi).
- b. Push-on locking gasket such as "Field-Lok" gaskets as manufactured by U.S. Pipe.
- c. Push-on joint restraint such as "TR-Flex" as manufactured by U.S. Pipe.
- d. Wedge action joint mechanism such as "Megalug" as manufactured by EBAA Iron, Inc. or approved equal.
- e. Mechanical coupling - Mechanical couplings shall be as specified in section 10-29 of these Standard Specifications.

Fittings and openings for DIP shall conform to the requirements of AWWA C 110/A21.10. Where outlets are required, tees shall be used, with the outlet branch being flanged.

Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

10-29 BUTTERFLY VALVES & FLEXIBLE COUPLINGS (Transmission)

1. General

Butterfly valves shall be short bodied, tight closing, and rubber-seated with flanged ends. Butterfly valves shall comply with the requirements of AWWA C 504, Class 150B and these Standard Specifications. Valves shall be bubble-tight at rated pressures in either direction, and shall be satisfactory for

10-29 BUTTERFLY VALVES & FLEXIBLE COUPLINGS (Transmission) (cont.)

seating surface. Valve seats shall be field adjustable around the full three hundred and sixty degrees (360°) circumference and replaceable without dismantling operator, disc or shaft and without removing the valve from the line. Seats attached to the valve disc are not allowed.

Valve Shaft: All shafts shall be turned, ground and polished and constructed of 18-8 Type 304 stainless steel conforming to ASTM A 276. Valve shaft seals shall consist of self-adjusting "V" type packing capable of replacement without removal of the valve shaft.

Valve Bearings: All valves shall be fitted with non-metallic sleeve-type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed one-fifth of the compressible strength of the bearing or shaft material. Non-adjustable thrust bearings designed to center the valve disc shall be furnished with the valve assembly and be preset at the factory.

Manual Valve Actuator: Manual valve actuators shall be of the traveling nut or permanently lubricated worm gear reducer type suitable for continuously buried and submerged use. All actuator gearing shall be totally enclosed in a rugged case that is both water tight and lubricant tight.

Actuators shall be fully grease packed and totally sealed by gaskets, O-rings, or similar means before shipment. A gasketed removable cover plate shall be provided for maintenance purposes. Actuators shall have a built in packing leak bypass to eliminate possible leakage into the actuator housing. Stuffing boxes are not acceptable.

Manual valve actuators shall be capable of withstanding an input torque of four hundred and fifty foot-pounds (450 ft-lbs) against the open and closed stops. The valve disc shall be moved through its full stroke with a minimum number of turns of the operating shaft consistent with the torque limitations.

The valve actuator mechanism shall be self-locking and shall hold the valve disc rigidly in any intermediate position between full open and fully closed without creeping or fluttering. Machining and fitting of all parts shall be held to close tolerances to reduce backlash and to keep lost motion to a minimum.

The actuator shall be equipped with a standard water works two inch (2") square wrench nut. The actuator shall open the valve left (counterclockwise), and shall be furnished with a position indicator if installed in a vault. Provide valve operating nut extensions in accordance with Standard Drawing W-308 in Section 38 of these Standard Specifications when installed valve operating nut is in excess of thirty inches (30") below finish grade.

10-29 BUTTERFLY VALVES & FLEXIBLE COUPLINGS (Transmission) (cont.)

Valve Exterior Coating: The exterior of the butterfly valves shall be shop coated with two part liquid epoxy per AWWA C550. The coating shall have a nominal thickness of eight (8) mils. Machine finished bearing surfaces shall not be painted. Exposed machined surfaces shall be covered with slush grease or other readily removable protective coating before shipment.

Valve Interior Coating: All interior ferrous surfaces of the butterfly valves, including the disc, which are exposed to fluid flow shall be factory coated with a two part liquid epoxy coating conforming to AWWA C 550 for potable water. The coating shall have a nominal thickness of eight (8) mils.

With no exceptions, all damage to coating incurred during shipping shall be repaired with the original coating material only. The coating shall be NSF/ANSI 61 certified.

Bolts and Nuts: Thru bolts connecting valves to main shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties. Bolts that thread into the valve body larger than 1 inch shall have the same thread pitch as the valve body and conform to ASTM A193 grade B7 having UNC threads.

3. Flexible Couplings

Flexible couplings suitable for water main applications shall be as manufactured by Smith Blair, Inc., Series 411 or 413, or Dresser Industries, Inc., Style 38 or 162, or an approved equal. The steel middle ring of the flexible coupling shall be lined and coated with fusion bonded epoxy per AWWA C 213.

The flexible couplings shall be installed with provision for thrust restraint ties attached to the water main pipe. The thrust restraint ties on the pipe shall be welded lugs, lugs cast integrally with the pipe, or friction collars. Anchor studs placed perpendicular to the long axis of the pipe are unacceptable. Resistance to hydraulic thrust shall be adequate to sustain a force developed by a test pressure of two hundred and twenty five pounds per square inch (225 psi).

Flanged coupling adapters shall be Smith Blair 913, Romac Style FC400 or equal for steel piping with insulating gasket. Couplings shall be provided with thrust ties attached to the pipe with welding lugs, cast-in-place lugs, or friction collars. Lugs shall have a minimum thickness equal to that of adjacent flange and shall have holes the same size as those on the flange. Anchor studs placed perpendicular to the longitudinal axis of the pipe are unacceptable.

10-31 FIRE HYDRANTS (cont.)

half inches (2½") and one (1) pumper nozzle with a nominal inside diameter of four and one-half inches (4½").

- d. Outlet Nozzle Arrangement- Standard Hydrant-Nozzle arrangement requires that the two (2) two and one-half inch (2½") diameter hose nozzles be opposite (180°) of each other. The single four and one-half inch (4½") diameter pumper nozzle shall be at right angles (90°) to the hose nozzles. The horizontal centerline of all nozzles shall be on the same plane and not less than sixteen inches (16") above the hydrant ground flange or bury line.
- e. Three hundred sixty Degree (360°) Nozzle Rotation-Nozzles, or the entire above ground section, shall allow three hundred sixty degree (360°) rotation to the exact desired position after installation.
- f. Outlet Hose Nozzles and Threads-Hose nozzles shall be made of Grade I, VII, or X bronze. The hose nozzles shall be fastened into the hydrant outlet tap by a thread of not less than seven and one half (7½) threads per inch. A pin shall be employed to prevent the threaded outlet hose nozzle from turning or backing out. The cap or hose accepting end of the outlet nozzles shall be threaded with National (American) Standard Fire-Hose Coupling Screw Threads.
- g. Nozzle Cap Materials-Grey cast or ductile iron caps with a recess at the inner end of the thread to retain a gasket. Caps shall be securely chained to the hydrant barrel with a metal chain having links made from stock not less than one-eighth inch (⅛") in diameter. The attachment shall permit free rotation of the cap.
- h. Size of Hydrant- Nominal diameter of main valve shall be a minimum of five inches (5").
- i. Main Valve Seat and Seat Ring- Shall be bronze to bronze in hydrants which have the main valve assembly in the lower end of the barrel. Threads shall be isolated from the waterway by O-ring seals.
- j. Size and Shape of Operating Nut and Outlet Nozzle Cap Nuts shall be the National standard 1½-inch pentagonal, full section without undercutting or hollowing out. A threaded hole not to exceed one-

10-31 FIRE HYDRANTS (cont.)

quarter inch (1/4") in diameter will be allowed in the operating nut for lubrication purposes. Any such hole shall be plugged flush with the top of the operating nut and be water tight.

- k. Operating Stem, Nut, and Lubricate Reservoir-The nut shall be made of bronze. Threads shall be lubricated by an oil or grease reservoir sealed by double O-rings, top and bottom to prevent intrusion of moisture and dirt. Length of operating stem surface in contact with O-ring seals shall be protected by a bronze sleeve.

A weather shield shall be provided to prevent dirt and moisture from entering between the sides of the operating nut and the hold down nut, or bonnet opening. Wet top hydrants are not acceptable.

- l. Direction of Rotation: Hydrants shall open left (counter clockwise).
- m. Stuffing boxes, if used, shall be provided with O-ring seals.
- n. Barrel Drain Outlet-None required. If hydrant is provided with such an outlet, it must be plugged with a threaded bronze or cast iron plug.
- o. Toggle Joint Hydrants-Shall be provided with bronze parts as follows: nozzles, lower threaded stem or spindle, stem nuts, seat ring, gate pins, cotter pins, main valve gate threaded stud, and nut.
- p. All nozzles, caps, operating nuts, O-rings, friction bearing threaded surfaces, and grease fittings shall be lubricated with the appropriate factory recommended lubricating material. All reservoirs designed to hold a designated quantity of lubricant shall be filled to maximum capacity.

- 7. A coat of aluminum exterior paint shall be applied as a color or finish coat over the primer coat on the top (above ground) section. All hydrant bonnets shall be painted with OSHA approved safety paint. The color shall be based on the diameter of the main that the hydrant is connected to, as follows:

Red: for 6" and smaller mains

10-31 FIRE HYDRANTS (cont.)

Yellow: for 8" - 10" mains

Green: for 12" and larger mains

8. Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

10-32 VALVES

1. Gate valves shall be cast iron, bronze disc, parallel seat, and non-rising stem with a two inch (2") square operating nut. Valves shall conform to AWWA C 500. All interior and exterior ferrous surfaces shall be and coated with factory applied epoxy in accordance with AWWA C 550. Minimum thickness shall be eight (8) mils.
2. Resilient - Seated gate valves shall be cast iron, non-rising stem with a two inch (2") square operating nut. Valves shall conform to AWWA C 509. All interior and exterior ferrous surfaces shall be and coated with factory applied epoxy in accordance with AWWA C 550. Minimum thickness shall be eight (8) mils.
3. Valves provided shall open left (counter clockwise), and shall have bonnet and valve body markings in accordance with the indicated AWWA standards. Unless otherwise directed, furnish valves with flange, mechanical, and/or push-on joints in accordance with the plans and special provisions. Provide valve operating nut extensions in accordance with Standard Drawing W-308 in Section 38 of these Standard Specifications when installed valve operating nut is in excess of thirty inches (30") below finish grade.
4. Swing check valves are contained on an approved listing maintained by the Department of Utilities. Alternate swing check valves shall be added to this list upon review, test and acceptance by the Utility Department.
5. Bolts shall be carbon steel ASTM A 193 grade B7 with ASTM A 194 grade 2H heavy hex nuts, or bolts and nuts of equivalent physical properties.

10-33 VALVE BOXES AND COVERS, DROP CAPS, AND SERVICE VALVE BOXES

Valve boxes and valve box covers for streets and alleys, and drop caps in public utility easements shall conform to Standard Drawing W-303. The castings shall be ductile iron with a minimum tensile strength of twenty five

10-33 VALVE BOXES AND COVERS, DROP CAPS, AND SERVICE VALVE BOXES (cont.)

thousand pounds per square inch (25,000 psi). Riser sections shall be (8") dia SDR 35 PVC pipe.

Service valve boxes shall be in conformance with Standard Drawings W-305 and W-307. The riser portion shall be as shown.

10-34 WATER SERVICE CONNECTION MATERIALS

Water service material shall be either copper or polyethylene tubing. The Department of Utilities maintains a listing of approved water service connection fittings which establish a standard of material quality. Fitting used shall be limited to those on the list. Alternate material may be added to this list upon review, testing and acceptance by the Department of Utilities.

Copper service tubing shall conform to ASTM B 88, Type K, soft tempered.

Polyethylene tubing shall be two hundred pounds per square inch (200 psi), SDR-9 conforming to ASTM D 2737 and AWWA C 901 standards. Tubing shall be copper tube size and shall be manufactured for use with compression or Mueller Insta-tite fittings. Stainless steel insert stiffeners shall be used at all compression joints. Insert stiffeners shall be flared at one end and beveled at the approximately forty five degrees (45°) at the other end. Stiffeners shall be supplied by the fitting manufacturer. Tubing shall be clearly marked showing manufacturer's trade name, nominal size, type of material, pressure rating, and the seal of approval of an accredited testing laboratory.

Threads for underground water service connection fittings shall conform to AWWA C 800 Threads for Underground Service Line Fittings.

10-35 JOINT MATERIALS FOR CLAY PIPE

Joint materials for vitrified clay pipe shall be an approved type of factory-made mechanical compression joint conforming to the requirements of ASTM C 425. Banded rubber couplings and sleeves conforming to ASTM C 425 are acceptable.

10-36 JOINT MATERIALS FOR CONCRETE PIPE

Joint materials for concrete pipe shall be rubber gasket joints conforming to the requirements of ASTM C 443 and shall be flexible and able to withstand expansion, contraction, and settlement. All rubber gaskets shall be stored in as cool a place as practicable, preferably at 70° F. or less, and in no

The intent of this specification is for Contractor to relocate the fence in a more suitable location without completely rebuilding it and with an absolute minimum of effort and expense. It may not be known how much of any type of fencing Contractor will be required to replace. Contractor shall submit a unit price per lineal foot of fence to replace regardless of type or quantity.

4. Sprinklers and lights

Lawn sprinkler system pipes, heads, and yard lighting systems shall be relocated and re-plumbed to insure continued operation to an equal or better condition.

5. Pipes and Culverts

Pipes and culverts that are no longer to be used shall be removed if they are within two feet (2') of sub-grade. Such pipes that are lower than the aforementioned, shall be removed or the ends shall be plugged with concrete at the option of Contractor. **Concrete plugs installed in the ends of abandoned sewer or stormdrain lines shall be Class "C" or "D" concrete that extends at least two feet (2') into the pipe from the exposed end. Refer to Section 27-3 for capping the ends of water mains.**

6. Abandonment of water service

Abandon the water service by closing corporation stop and crimping and cutting water service adjacent to the distribution main.

7. Existing Utilities

Unless otherwise noted, the location, alignment, and depth of existing underground utilities as shown on the Plans is taken from public records and no responsibility is assumed for the accuracy thereof. For the most part, underground utility services are not shown on the Plans. Attention is directed to the provisions in Section 6-19, "Main and Trunk line Utilities." The cost of relocating existing overhead and/or underground utilities not specified on the plans to be relocated, but which Contractor elects to relocate or cut and reconnect at his/her own convenience shall be borne by Contractor.

13-4 PAVEMENT FOR TRENCH SURFACE RESTORATION

Contractor shall restore surfaces in kind (using the same material as existing) unless otherwise noted on the Plans or Special Provisions.

Prior to the start of work, Contractor shall submit a plan showing types of pipe and locations to the Engineer. Any deviation in the plan thereafter shall not be allowed unless approved in advance by the Engineer.

2. Acceptable Sewer and Combined Sewer Pipe Types

Sewer pipe types shall be as shown on the Plans or as noted in the Special Provisions and shall be of one of the following types unless otherwise noted: Vitreous Clay (VCP); Closed Profile Polyvinyl Chloride (CPPVC); Polyvinyl chloride (PVC); Glass Fiber-Reinforced Thermosetting-Resin; or HDPE Solid Wall Fusion Jointed.

3. Acceptable Drainage Pipe Types

Drainage pipe types shall be as shown on the Plans or as noted in the Special Provisions and shall be of one of the following types unless otherwise noted : Reinforced Concrete (RCP) Class III or Class IV; Closed Profile Polyvinyl Chloride (CPPVC); Polyvinyl Chloride (PVC); Glass Fiber-Reinforced Thermosetting-Resin; or HDPE Solid Wall Fusion Jointed.

26-5 LAYING PIPE

Laying sewer and drain pipe shall conform to Sections 10, 14, 26, and 38. Pipe shall be placed in accordance with the Plans, Special Provisions, manufacturer's recommendations, and as directed by the Engineer.

1. Saw-cutting over existing pipelines

Prior to saw-cutting, Contractor shall mark the exact location of the existing pipeline on the pavement using a ferreting device or equivalent.

2. Manhole connections

All connections to the manholes not cast as part of the manhole base shall be made by use of a coring machine. The annular space between the outside of the pipe and the manhole shall be sealed by using a flexible annular space filler such as "Kor n' Seal Cavity O-Ring" by NPC Inc. or approved equal.

3. Bedding

Bedding shall be Type A clean crushed rock and shall be placed in accordance with these Standard Specifications and the pipe manufacturer's recommendations. The bedding material shall provide uniform support of the full length of the pipe to a width of at least fifty percent (50%) of the pipe

deflection test shall be made by Contractor upon completion and acceptance by the Engineer of all backfill operations and prior to the placement of the finished surface, if any. Deflection testing shall be conducted no sooner than 96 hours following completion and acceptance of all backfill operations, unless otherwise approved by the Engineer.

The deflection testing shall be witnessed by the Engineer and shall be conducted by Contractor's forces and performed at the expense of Contractor. One-hundred percent (100%) of all flexible sewer and drain pipe mainline installed shall be deflection tested for excessive deflection using a pre-sized, rigid mandrel or "Go-No-Go" device 5% smaller than the average inside diameter of the pipe as approved by the Engineer. Mandrel tests may be performed by the City after a 6 month period of time at which time a maximum deflection of 7½% from the base internal diameter, as specified in ASTM D 3034 and ASTM D 2680 for PVC or ABS gravity sewer pipe, respectively will be allowed. The mandrel used shall be the PHOS PVC Sewer Pipe Deflection Gauge or other deflection gauge approved by the Engineer.

The mandrel shall be drawn through the pipe using only the force that can be exerted by one individual on the end of a rope, using no mechanical advantage. Under no conditions shall the mandrel device be attached to the cleaning ball.

Pipe which does not pass all specified mandrel tests shall be replaced at Contractor's expense. Re-rounding or other attempts to reduce deflection beyond the allowable shall not be acceptable. All re-tests for deflection shall be made at the expense of Contractor.

6. Closed Circuit T.V. inspection

Unless otherwise directed, Contractor shall perform Closed Circuit TV camera (CCTV) inspections of all new installations of sewer, combined sewer, and/or storm drain pipes. Comply with Section 26-12 requirements.

26-11 REPAVING TRENCHES

Certain construction projects may require the cutting of existing pavements, the laying of pipe, backfilling and then repaving of the cut pavement. When the trench is in an existing paved area, the pavement shall be sawed or scored and broken ahead of the trenching operations. Before sawcutting the pavement, Contractor shall use a ferreting device or equivalent to determine the exact location of the existing pipes and mark them on the pavement. The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately to a neat and parallel line six inches (6") wider on each side than the trench width required. All cuts in

twelve inches (12”) filled with aggregate base Class 2, conforming to Section 10-7 of these Specifications and compacted to ninety-five percent (95%) relative compaction as determined by ASTM D 1557.

26-12 PROCEDURES FOR TV INSPECTIONS OF PIPING SYSTEMS

1. Standards

Unless otherwise directed or approved by the Engineer, CCTV recording performed for acceptance of new pipelines shall conform to the requirements herein. Submit, in accordance with Section 5-7 of these Standard Specifications, one (1) copy of the DVD and the associated report for approval.

2. Equipment

a. Camera

The camera shall record in color. The footage read-out shall appear on screen away from the central focus of the main. A gauging tool, e.g. ¾” cylinder (size of cylinder shall be indicated on the tape label) shall precede the camera for measuring sags and offsets. Focal distance shall be adjustable through a range of from 6 inches to infinity. The camera shall be tractor driven with a rotating camera head suitable sized for each pipe diameter to be investigated.

b. Recorder

The recorder shall record in DVD format. The submitted DVD(s) shall be 16X DVD-R or +R.

c. Video Quality

The DVD shall be of quality to result in a high-resolution video.

d. Lighting

There shall be sufficient lighting to produce a clear and sharp image of the entire inside periphery of the pipe for all conditions encountered during the work. Lighting is to be adjusted according to the size of pipe. In an eight-inch diameter pipe with joints at five-foot intervals, the lighting shall allow the camera to reveal not less than three consecutive joints, or up to ten feet of unobstructed pipe shall be visible in the monitor picture.

- iv. number of pipes entering MH and sizes
- vi. number of service connections

The DVD shall given to the Engineer and shall become the property of the City of Sacramento upon completion of the televised inspection.

4. Acceptance Criteria

Maximum acceptable sag for sewer pipes is $\frac{3}{4}$ inch, unless otherwise specified in the Special Provisions of the Project Plans. All other criteria as set by the City Standard Specification and/or special conditions shall apply for both sewer and drain pipes. Within two working days from receipt of the tape and report, the Inspector shall review the tape and either approve the main(s) or call for repairs. The Contractor is to be notified in writing of any deficiencies revealed by the television inspection that will require repair. If the Contractor is to make repairs and wishes to review the tape with the Inspector, he/she shall contact the Inspector to set a time for viewing. Upon completion of repairs, the main is to be re-televised. Road base is to be placed, only after approval by the Inspector.

5. Report

Perform and record all CCTV inspections in accordance with the National Association of Sewer Service Companies' (NASSCO's) Pipeline Assessment Certification Program (PACP). CCTV inspections shall be conducted entirely in digital video format and shall be recorded in MPG or AVI format written to a DVD compatible with Granite XP software (version 3.7.4 or City's current version).

Footage measurements shall be displayed and documented on the video. The speed of travel shall be slow enough to detect reverse slope or low spots in pipe grades and to inspect and identify each pipe joint, service connection, etc., but should not, at any time, be faster than 30 feet per minute. All CCTV inspection reports shall be accurate to within +/- 2 (two) feet or less of the total measured footage along the pipe centerline from center of access point to center of access point.

Every section of the pipe (access point to access point) shall be identified on the video display, which shall show: project name, street name, manhole/access point identifications, inspector's name, pipe diameter and length, and date of inspection. In addition to inspecting the pipe, all manholes shall be panned with the CCTV camera.

Documentation of the work shall consist of the DVD, the PACP CCTV Report(s), and the unmodified PACP database. The database shall contain PACP scoring for each inspection observation or defect. The documentation shall note important features and any defects encountered. One copy of each completed DVD and all associated reports shall be submitted to the City for approval.

provided by Contractor for the safe passage of pedestrian and vehicular traffic in accordance with Section 6-10 of these Standard Specifications.

Footbridges adequate for pedestrians shall have a minimum width of five feet (5'). The footbridges shall be designed and constructed to withstand a minimum uniform load of one hundred and fifty pounds per square foot (150 psf). Handrails and support posts shall be made with dressed lumber.

Bridges for vehicle traffic shall be a minimum of twelve feet (12') in width, skid resistant and structurally able to withstand an AASHTO H-20 vehicle load. Temporary bridges shall be installed over the trenches at all intersections whenever excavation is in excess of one-half the street width. Bridges shall also be provided at residential and commercial driveways for the safe access of vehicle traffic onto public streets.

All temporary bridges over excavated trenches shall remain in place for public safety and convenience during the duration of the work. At Contractor's risk, the bridges may be temporarily removed or relocated to accommodate the work as approved by the Engineer.

Unless directed or indicated otherwise, plug or seal the ends of existing pipes cut to install new pipe. As a minimum, provide temporary end covers to prevent dirt from entering pipes that are to be reconnected. The cut ends of abandoned pipes made of plastic, clay, Transite, concrete, or similar materials shall be permanently sealed with a concrete plug extending at least two feet (2') into the cut pipe. Use Class "C" or Class "D" concrete per Standard Specifications Section 10-5. Cut ends of abandoned steel pipes may either be plugged with concrete as above, or sealed by welding quarter inch (¼") thick steel plates onto each end. Cut ends of abandoned pipe that will be removed do not require permanent seals.

When active water mains must be cut, Contractor shall anticipate that existing water system valves do not seal drip tight, and thus pipes downstream of existing valves may become pressurized. Seal the cut ends of active water mains with watertight 150 psi pressure rated end caps suitable for potable water use. Pressure rated end caps shall be left in-place until the cut pipe is restored, or the Engineer determines that the cut pipe is fully isolated and thus is no longer an active main. If end caps are removed from water mains to be abandoned, plug the exposed ends as described above.

Contractor shall be responsible for the control, removal, and disposal of any groundwater that may be encountered in the course of excavating and backfilling trenches or placing pipe. Whenever water or over-saturated soil conditions exist which may interfere with proper installation, trenches shall be dewatered before placement of any pipe or material. Unless approved in

2. Transmission Mains (Greater than 12")

Contractor shall submit to the Engineer for approval, calculations for minimum lengths of restrained pipe where there is unbalanced hydraulic thrust, such as at abrupt changes in horizontal and/or vertical alignment, at tees, valves and caps. Thrust restraint calculations shall be based on an internal test pressure of two hundred and twenty-five pounds per square inch (225 psi). Any demarcations of restrained joint requirements on the Plans indicate only possible segments for restrained pipe joints. Contractor is responsible for verifying the necessity of and minimum lengths for restrained joints. Concrete thrust blocking is not allowed.

Joints shall be restrained when deflection of the pipe at the joint exceeds two-thirds ($\frac{2}{3}$) manufacturer's recommendation. Transmission mains constructed of welded steel pipe or concrete cylinder pipe shall be restrained by field welding the joints. Ductile iron pipe shall be restrained with Field Lok Gaskets, TR Flex, or an approved equal.

Thrust restraints for fittings, elbows, reducers, in-line valves, appurtenances, etc., shall be provided by means of restrained pipe joints, utilizing pipe skin friction for horizontal restraint, and dead load for vertical restraint (uplift). In-line valves shall be considered as a dead end main for thrust restraint calculations. Thrust forces shall be calculated using the internal diameter of the pipeline. Skin friction shall be calculated with allowance for pipe dead and live load. Earth load above the pipe when backfilling prior to testing, and a friction coefficient incorporating the properties of the actual backfill materials shall be used.

The friction coefficient shall not exceed 0.25 for C200 and C303 unless a geotechnical evaluation is submitted. In no case shall the friction coefficient exceed 0.30. For polyethylene encased ductile iron pipe, only skin friction between the encasement and the pipe shall be considered with no allowance for soil cohesion or the internal friction angle of the soil. The skin friction for polyethylene wrapped ductile iron pipe shall be reduced thirty percent (30%) to a maximum of 0.17 unless Contractor submits a geotechnical evaluation.

27-7 APPURTENANCES

1. General

Appurtenances shall comply with the material requirements of Section 10 of these Standard Specifications and shall be installed per the manufacture's recommendations. All new valves and hydrants to open counter-clockwise.

Appurtenances shall be installed at elevations and locations as shown on the Plans. The joints between the main pipe and side fittings shall be

Aggregate base for repair and/or replacement of existing pavement shall meet the requirements for Class 2 aggregate base as contained in Section 10 of these Standard Specifications. Aggregate base shall be placed and compacted in accordance with Section 14 of these Standard Specifications, except that it shall be compacted to a relative compaction of not less than ninety-five percent (95%) as measured by tests specified in Section 14 of these Standard Specifications.

Asphaltic concrete pavement and its placement shall conform to the requirements of Section 22 of these Standard Specifications.

Restoration of existing concrete pavement shall consist of at least six inches (6") of concrete and shall conform to the requirements of Section 19. Concrete surfaces to be replaced shall be colorized, as necessary, to match existing adjacent concrete color by the addition of Lamp Black coloring agent. Contractor shall submit concrete mix design for approval including a proposed proportion of coloring agent appropriate to the shade of adjacent concrete. Where entire alley requires replacement, concrete shall not include coloring agent, unless directed by the Engineer.

Concrete used in the repair and/or replacement of curb, gutter, or sidewalk shall conform to Section 24-1 of these Standard Specifications. Concrete used in the replacement of existing concrete "V" gutter or pavement shall be Class "A" concrete in accordance with Section 10 of these Standard Specifications. Placement of concrete shall conform to the requirements of Section 24 of these Standard Specifications.

Where less than two feet (2') of existing pavement is left between the edge of the trench and the lip of concrete gutter or pavement edge, the narrow strip of existing pavement shall be removed and the area repaved along with the area overlying the trench. All existing asphaltic concrete or concrete pavement adjacent to the pipe trench that has been loosened, cracked, or damaged as a result of Contractor's operations shall be removed and replaced.

Unless otherwise provided on the Plans or in the Special Provisions, pipeline trenches in unpaved portions of street rights-of-way shall have the top twelve inches (12") filled with aggregate base Class 2, conforming to Section 10 of these Specifications and compacted to ninety-five percent (95%) relative compaction as determined by ASTM Designation D1557.

All pavement debris and other excavated material not destined to be used for backfill shall be removed and disposed of outside the limits of the project at Contractor's expense.

RCP Class V flush bell pipe with double-rubber gasket joints, or with fiberglass reinforced epoxy collar, or approved equal type joints may be jacked directly for installation of drainage or sewer facilities. The pipe must be designed to safely bear all loads imposed by jacking in addition to the design D-loads. A cushion material of plywood or hardwood spacers shall be placed in the joints between adjacent pipe sections being jacked in order to distribute the jacking load uniformly throughout the entire pipe length and avoid radial gasket pressures which may over stress the pipe sockets or grooves.

Guide rails shall be accurately set to line and grade to insure installation within tolerances allowed. Maximum length of direct jacking shall be one hundred feet (100'). The diameter of the hole shall not be more than 0.1 foot greater than the outside diameter of the reinforced concrete pipe.

37-3 TWO-PASS SYSTEM

The two-pass system utilizes a conveyance pipe within a casing pipe.

1. Casing Pipe Material

Material for casing pipe shall be either welded steel pipe or reinforced concrete pipe. Joints for the casing pipe shall provide for a rigid and watertight installation. Contractor shall be fully responsible for any or all damage arising from subsidence or any other disturbance due to any boring and jacking operation.

a. Welded Steel Pipe

Contractor is fully responsible for design and selection of steel casing pipe consistent with the requirements herein. Unless otherwise approved, steel casing pipe shall be welded steel with a wall thickness of three-quarter inch ($\frac{3}{4}$ "") conforming to AWWA C 200 or **API 5L pressure pipe X-42 minimum** as appropriate for the project and site subsurface conditions. **Factory hydrostatic testing not required unless otherwise specified.** Field joints shall be either full circumference welded butt joints or integral machined press-fit connections such as Permalok or approved equal. It shall be Contractor's responsibility to provide stress transfer across the joints which is capable of resisting the jacking forces involved.

b. Reinforced Concrete Pipe

Reinforced concrete casing pipe shall conform to ASTM C 76. The design of reinforced concrete pipe shall be based upon dead and live loads and jacking forces. RCP casing pipe shall have double-rubber

Section 38

STANDARD DRAWINGS

38-1 STANDARD DRAWINGS

A. The standard drawings listed follow the Index.

<u>NUMBER</u>	<u>DRAWING TITLE</u>
---------------	----------------------

(TRANSPORTATION)

T-11	STANDARD CURB AND GUTTER DETAILS
T-12	BUS STOP REINFORCED CURB & GUTTER DETAIL
T-13	CURB & GUTTER NEAR TREE DETAILS
T-21	SIDEWALK DRIVEWAY DETAIL
T-22	PLANTER STRIP DRIVEWAY DETAIL
T-31	THROUGH SDWK DRAIN DETAIL (C&G TYPE 1)
T-32	THROUGH SDWK DRAIN DETAIL (C&G TYPE 2)
T-40	SUBDRAIN TRENCH, DETAIL
T-50	CURB RAMP ELEMENTS DEFINITIONS AND STANDARDS
T-60	CURB RAMP GENERAL DETAILS
T-71	SINGLE PAN CURB RAMPS
T-72	DUAL PAN CURB RAMPS
T-73	SINGLE FLARE CURB RAMPS
T-74	DUAL FLARE CURB RAMPS
T-75	SINGLE COMBINATION CURB RAMP
T-76	DUAL COMBINATION CURB RAMPS
T-77	PLANTER STRIP CURB RAMPS
T-78	TRUNCATED DOME STANDARD LAYOUT

<u>NUMBER</u>	<u>DRAWING TITLE</u>
T-79	TRUNCATED DOME DETAIL
T-80	BACKFILL AND RESURFACING IN PAVED AREAS
T-90	CHAIN LINK FENCE AND GATE
T-101	STREET BARRICADE
T-102	CURB, GUTTER AND SIDEWALK BARRICADE
T-103	SIDEWALK BARRICADE
T-110	SIGNS AND BARRICADES AT ENDS OF PAVEMENT WIDENING
T-120	50'-0" CONFORM DETAIL
T-130	18'-0" CONFORM DETAIL
T-140	18'-0" CONFORM DETAIL (WITHOUT KEY CUT)
T-150	SIDE STREET CONFORM DETAIL
T-160	CURB PAINTING
T-170	BIKE LANE/ ROUTE MARKINGS
T-180	CROSSWALK, CENTERLINE AND STOP LEGEND
T-190	DISABLED PARKING SIGNING AND STRIPING
T-200	RAISED PAVEMENT MARKERS (RPM'S)
T-210	OBJECT MARKER DETAIL
T-221	SPEED HUMP DETAIL
T-222	SPEED LUMP DETAIL (A) (w) < 24'
T-223	SPEED LUMP DETAIL (B) (w) ≥ 24' & < 34'
T-224	SPEED LUMP DETAIL (C) (w) ≥ 34' & < 40'
T-226	SPEED TABLE DETAIL
T-227	SPEED LUMP DETAIL (D) (w) ≥ 40'

<u>NUMBER</u>	<u>DRAWING TITLE</u>
T-230	BOLLARD INSTALLATION
T-250	1 FT MEDIAN ISLAND WITH REFLECTORS
T-260	MEDIAN ISLANDS WITH SOCKET JOB & RPM'S
T-270	STANDARD 2" PIPE SIGN MOUNTING
T-280	STANDARD ELECTROLIER SIGN MOUNTING
T-290	STANDARD STREET NAME SIGN
T-301	STANDARD OVERHEAD STREET NAME SIGN
T-302	STANDARD OVERHEAD STREET NAME (SMALL SIGNS)
T-303	OVERHEAD STREET NAME SIGN SWING ARM BRACKET
T-310	METER PIPES DETAIL
T-320	METER PIPE FLANGE JOB
T-330	20' ALLEY CLOSURE WITH 4 BOLLARDS
T-340	STANDARD BOLLARD & METERED PIPE FOOTING
T-350	CONCRETE SURVEY MONUMENT
T-360	TEMPORARY STREET SIGN

(ELECTRICAL)

E-10	GENERAL NOTES
E-20	METERED SERVICE PEDESTAL
E-30	METERED SERVICE PEDESTAL
E-40	UNMETERED SERVICE PEDESTAL
E-50	UNMETERED SERVICE PEDESTAL
E-60	ORNAMENTAL STREET LIGHT STYLE I
E-70	ORNAMENTAL STREET LIGHT STYLE II
E-80	ORNAMENTAL STREELIGHT DETAILS

<u>NUMBER</u>	<u>DRAWING TITLE</u>
E-90	POST TOP LUMINAIRES AND DETAILS
E-100	MAST ARM LUMINAIRE AND DETAILS
E-110	TYPICAL FIXED-TIME SIGNAL PHASING
E-120	TYPICAL 6 AND 8 SIGNAL PHASING
E-130	TYPICAL DETECTOR LOOP LAYOUT
E-140	LOOP SAW CUTTING
E-150	DETECTOR HANDHOLE
E-160	LOOP WINDING PATTERNS
E-170	PEDESTRIAN PUSH BUTTON PLATE & POLE
E-180	OPTICAL DETECTOR LAYOUT
E-190	"T" TRENCH DETAIL & DIRECTIONAL DRILL
E-200	TRENCH DETAIL & DIRECTIONAL DRILL
E-210	CONCRETE PULL BOX
E-220	PULL BOX WITH SWEEP 90°
E-230	ELECTRICAL EQUIPMENT PLACEMENT

(WATER)

W-102	TRACER/LOCATOR WIRE FOR ALL WATER MAINS
W-103	CHANGES IN MAIN ELEVATION & THRUST BLOCKING FOR WATER MAINS
W-104	BACKFILL & REPAIR AT SEWER & DRAIN UTILITY CROSSING
W-105	WATER MAIN "CUT-IN" INSTALLATIONS
W-106	RAISING AND LOWERING EXISTING WATER MAINS
W-107	TYP. CONNECTIONS FOR INTIAL FILLING OF NEW WATER MAIN
W-201	FIRE HYDRANT INSTALLATIONS

<u>NUMBER</u>	<u>DRAWING TITLE</u>
W-202	FIRE HYDRANT PROTECTION
W-203	REQUIREMENTS FOR FIRE HYDRANT USE PERMITS WATER TRUCKS
W-204	PORTABLE WATER TRUCK FILL STATIONS
W-301	STANDARD 2-INCH AND 4-INCH BLOW-OFF
W-302	TEMPORARY 2-INCH SAMPLING DEVICE
W-303	STANDARD VALVE BOX INSTALLATION FOR CITY STREETS, ALLEY EASEMENTS
W-304	STANDARD VALVE BOX AND DROP CAP
W-305	WATER SERVICE BOX INSTALLATIONS (Drawing Deleted)
W-306	RAISING VALVE BOXES AND DROP CAPS
W-307	WATER SERVICE BOX AND COVERS
W-308	VALVE OPERATING NUT EXTENSION
W-309	AREAS OF OPEN LEFT AND OPEN RIGHT GATE VALVES (Drawing deleted)
W-401	LOCATION OF RESIDENTIAL WATER METERS-NEW CONSTRUCTION
W-402	INSTALLATION OF RESIDENTIAL WATER METER SETTER & BOX
W-403	STD WATER SERVICE TAPS 1-INCH THRU 2-INCH
W-404	TAP EXCAVATION REQUIREMENTS ON EXISTING MAINS THRU 12" TAPS
W-405	1" RES. WATER SERVICES WITH METER SETTER
W-406	WATER SERVICE CONNECTION AT HOSE BIBB
W-501	APPROVED INSTALLATION FOR AIR GAP SEPARATION
W-502	SINGLE BACKFLOW ASSEMBLIES FOR BUILDING INSTALLATIONS
W-503	BACKFLOW ASSEMBLIES FOR BUILDING INSTALLATIONS (Drawing deleted)
W-504	INSTALLATION OF METERED TEMP. WTR SVC W/BACKFLOW PREVENTERS
W-505	INSTALLTION OF 2-INCH & SMALLER RP ASSEMBLY WITH WATER METER
W-506	3-INCH & LARGER RP DEVICE WITH WATER METER (Drawing deleted)

<u>NUMBER</u>	<u>DRAWING TITLE</u>
W-507	2" & SMALLER COMMERCIAL METERED WATER SERVICE WITH NO RP DEVICE
W-508	3" AND LARGER METERED WATER SERVICE INSTALLATIONS (Drawing deleted)
W-509	3-INCH AND LARGER METERED WATER SERVICE WITHOUT RP ASSEMBLY
W-510	4-INCH & LARGER FIRE SERVICE WITH DOUBLE CHECK VALVE ASSEMBLY
W-511	3" & LARGER FIRE SERVICE WITH DOUBLE CHECK VALVE (Drawing deleted)
W-515	3"-8" WATER SERVICE BELOW GROUND WITH BYPASS (COMPOUND METERS)
W-601	2-INCH & SMALLER BACKFLOW ASSEMBLY IN MEDIAN STRIP OWNED BY CITY
W-602	2-INCH & SMALLER BACKFLOW ASSEMBLY IN PARK STRIP OWNED BY CITY
W-603	2-INCH & SMALLER BACKFLOW ASSEMBLY IN LANDSCAPE CORRIDOR OWNED BY CITY
W-604	2-INCH & SMALLER BACKFLOW ASSEMBLY IN LANDSCAPED SETBACK OWNED BY CITY
W-605	IRRIGATION SYSTEMS STREET CROSSINGS
W-606	2-INCH & SMALLER RP ASSEMBLY W/METER ON ALL CITY IRRIGATION SYSTEMS
W-607	3-INCH & LARGER RP DEVICE W/METER ON ALL CITY IRRIGATION SYSTEMS
W-608	INSTALLATION OF 3" & LARGER METERED WTR SERV w/ BF ASSEMBLY
W-701	BACKFILL AND RESURFACING IN PAVED AREAS (Superseded. See T-80)
W-702	ACCESS MANHOLE DETAILS
W-801	BUTTERFLY VALVE STANDARD BURIED INSTALLATION DETAIL
W-802	2-INCH AIR VACUUM AND AIR RELEASE VALVE INSTALLATION
W-803	4-INCH COMBINATION AIR AND VACUUM VALVE
W-804	6-INCH BLOW OFF FOR DUCTILE IRON PIPE
W-805	6-INCH BLOW OFF FOR WELDED STEEL AND CONCRETE CYLINDER PIPE
W-901	CASING INSULATOR SPACING ASSEMBLY

<u>NUMBER</u>	<u>DRAWING TITLE</u>
W-902	FLANGE INSULATOR FOR T-MAIN SIDE OUTLET THRU 12-INCH PIPE
W-903	CCP AND WSP JOINT DETAILS
W-904	DETAIL OF FIELD WELDED BUTT-STRAP JOINT
W-905	DIELECTRIC INSULATING FLANGE DETAIL
W-1001	INSULATING JOINT TEST STATION
W-1002	TEST STATION INSTALLATION DETAIL
W-1004	TEST STATION HOUSING DETAIL IN TRAFFIC/NON-TRAFFICE AREAS
W-1005	INSULATING JOINT TEST BOARD DETAIL
W-1006	TEST BOARD DETAIL
W-1008	CCP AND WS PIPE JOINT BOND CABLE DETAIL
W-1009	CCP AND WS PIPE JOINT BOND CLIP DETAIL
W-1011	EXOTHERMIC WELD
W-1012	JOINT BOND CABLE DETAIL
W-1013	GALVANIC ANODE INSTALLATION DETAIL
W-1014	ANODE TEST BOARD DETAIL
W-1015	ANODE CABLE IDENTIFICATION DETAIL

(SEWER AND DRAINAGE)

S-10	TYPE "B" DPOP INLET
S-20	MODIFIED TYPE "B" D.I. (WITH TRAP AND SUMP)
S-21	TYPE "B" DROP INLET ROLLED CURB (Drawing deleted)
S-30	DITCH BOX
S-40	TYPE "B" FRAME AND GRATE
S-42	GUTTER DRAIN NO. 20
S-45	GUTTER DRAIN NO. 21

<u>NUMBER</u>	<u>DRAWING TITLE</u>
S-50	GUTTER DRAIN NO. 22
S-55	GUTTER DRAIN NO. 24
S-60	OPTIONAL GUTTER DITCH INSTALLATION
S-65	ROLLED CURB DROP BOX INLETS
S-66	ROLLED CURB TRANSITION TYPE "B" DROP INLETS
S-67	CURB #4 TRANSITION FOR TYPE "B" DROP INLETS
S-70	STANDARD MANHOLE No. 3
S-80	STANDARD MANHOLE No. 3A
S-90	MANHOLE # 3 (WITH TRAP AND SUMP)
S-110	STANDARD MANHOLE No. 4
S-120	SADDLE TYPE MANHOLE
S-130	INSIDE/OUTSIDE DROP CONNECTION FOR MAIN LINES $\geq 8"$
S-135	INSIDE DROP CONNECTION FOR MAIN LINES & SERVICES $\leq 6"$
S-140	STANDARD MANHOLE HEAD 1, COVER A
S-150	STANDARD MANHOLE HEADS 3 & 4, COVER B
S-160	STANDARD MANHOLE HEAD AND COVER 1-C
S-230	UTILITY CROSSING
S-240	FLUSHER BRANCH
S-250	CONCRETE PROTECTIVE COVERING
S-260	A.B.S SEWER SERVICE
S-265	TYPICAL SEWER SERVICE CLEANOUT LOCATIONS
S-270	PIPE INLET/OUTLET STRUCTURE 22" PIPE & SMALLER
S-280	PIPE INLET/OUTLET STRUCTURE 24" TO 60" PIPES

<u>NUMBER</u>	<u>DRAWING TITLE</u>
S-290	TRASH RACK 24" TO 60" PIPES
S-300	PIPE OUTLET ACCESS CONTROL RACK
S-310	TYPICAL JUNCTION BOX PIPE CONNECTION DETAIL

S-320 CONCRETE CLOSURE COLLAR

(WATER QUALITY)

Q-10	STABILIZED CONSTRUCTION ENTRANCE
Q-20	INLET SEDIMENT CONTROL
Q-30	STORM DRAIN INLET FILTER BAG
Q-40	FIBER ROLLS
Q-50	SILT FENCE - 36"
Q-60	SILT FENCE - 18"
Q-70	STORM DRAIN MESSAGE LAYOUT
Q-80	CONCRETE WASHOUT
Q-90	EROSION CONTROL BLANKETS/MATS SLOPE INSTALLATION

(LANDSCAPING)

L-10	AUTOMATIC FLUSH VALVE DETAIL
L-20	INSTALLATION OF CONTROL VALVE
L-30	DRIP FILTER DETAIL
L-40	INSTALLATION OF MOW STRIP
L-50	INSTALLATION OF SPRINKLER HEADS

38-2 REQUESTS FOR CLARIFICATION

- A. **Contractor** requests for clarification of the plans and/or specifications shall be directed to the ENGINEER in writing. Such requests shall not be received directly from a Subcontractor or Supplier.
- B. Normally, a separate form shall be used for each specific item for which a clarification is required. Requests for clarification for more than one item using a single transmittal form will be permitted only when the items are so functionally related that expediency indicates review of the group of items as a whole.
- C. The ENGINEER will reply to Contractor's request for clarification within fifteen (15) working days following receipt by the ENGINEER.

38-3 DEVIATION REQUESTS

- A. **Contractor** requests for deviation from the plans and/or specifications shall be directed to the ENGINEER in writing. Such requests shall not be received directly from a subcontractor or Supplier.
- B. The ENGINEER will reply to Contractor's request for deviation from the plans within fifteen (15) working days following receipt by the ENGINEER.

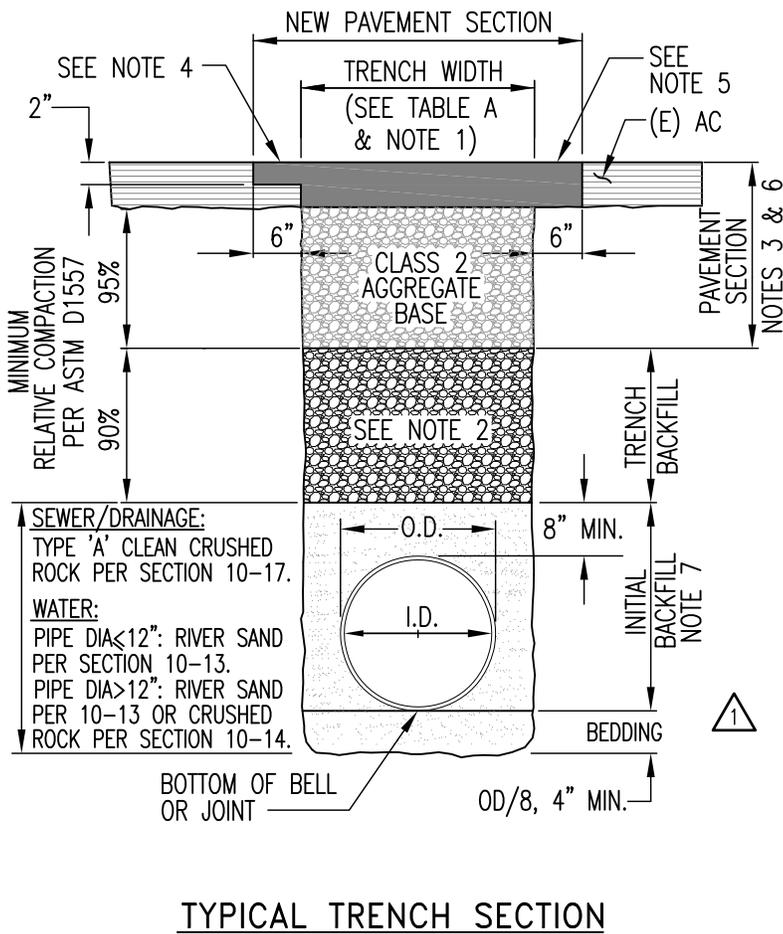


TABLE A			
TRENCH WIDTHS			
PIPE TYPE	PIPE I.D.	MINIMUM DIMENSION	MAXIMUM DIMENSION (4)
RIGID (1)	≤ 12"	PIPE O.D. + 16"	PIPE O.D. + 24"
	> 12"	PIPE O.D. + 20"	PIPE O.D. + 36"
FLEXIBLE (2)	ALL	PER ASTM D2321 (3) OR THE PIPE MANUFACTURER'S RECOMMENDATIONS, WHICHEVER IS GREATER.	

- (1) RIGID PIPE = RCP, VCP & DIP.
- (2) FLEXIBLE PIPE = ALL PIPE OTHER THAN RIGID PIPE.
- (3) ASTM D2321 STATES THAT THE MINIMUM TRENCH WIDTH SHALL BE EQUAL TO THE PIPE O.D. PLUS 16" OR THE PIPE O.D. TIMES 1.25 PLUS 12", WHICHEVER IS GREATER.
- (4) IF THE MAXIMUM DIMENSION AT THE TOP OF THE PIPE IS EXCEEDED, CONTRACTOR SHALL PROVIDE STRONGER PIPE OR IMPROVED BEDDING AND BACKFILL CONDITIONS, AS APPROVED BY THE ENGINEER, TO MEET THE NEW LOADING.

NOTES:

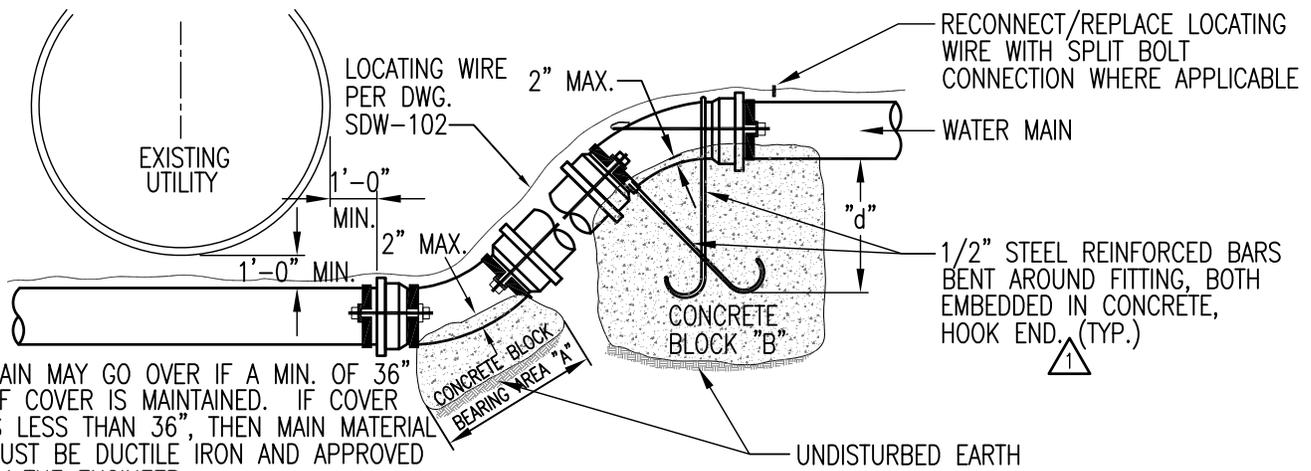
1. EXCAVATION, BACKFILL AND RE-PAVING OF TRENCHES SHALL CONFORM TO THE STANDARD SPECIFICATIONS UNLESS OTHERWISE INDICATED BY THE PLANS, PERMIT, SPECIAL PROVISIONS, OR THE ENGINEER.
2. TRENCH BACKFILL SHALL CONSIST OF CLASS 2 AGGREGATE BASE (AB) OR JOB EXCAVATED, NATIVE SOIL. NO ADDITIONAL COMPENSATION SHALL BE PAID FOR STOCKPILING, DRYING, WETTING OR PROCESSING THE NATIVE SOIL OR AB TO MEET THE MINIMUM STABILITY AND RELATIVE COMPACTION CRITERIA.
3. UNLESS OTHERWISE INDICATED IN THE SPECIAL PROVISIONS, THE NEW PERMANENT PAVEMENT SHALL CONFORM TO THE TYPE AND THICKNESS OF THE PAVEMENT REMOVED. IN NO CASE SHALL THE NEW PAVEMENT SECTION BE LESS THAN FOUR INCHES (4") OF AC ON TWELVE INCHES (12") OF CLASS 2 AGGREGATE BASE (AB).
4. EXISTING AC > 4" THICK: GRIND EXISTING AC 2" DEEP AND 6" WIDER THAN TRENCH ON BOTH SIDES. PLACE NEW AC.
5. EXISTING AC ≤ 4" THICK: SAW CUT AND PLACE NEW AC 6" WIDER THAN TRENCH AS SHOWN ON BOTH SIDES.
6. **NON-PAVEMENT AREAS:** IN NON-PAVEMENT AREAS, THE PAVEMENT SECTION SHALL BE REPLACED WITH JOB EXCAVATED NATIVE SOIL OR OTHER APPROVED BACKFILL COMPACTED TO AT LEAST 90% RELATIVE COMPACTION PER ASTM D1557.
7. SHOVEL SLICE, TAMP, AND/OR VIBRATE MATERIAL UNDER AND AROUND THE PIPE TO A FIRM NON-YIELDING CONDITION TO SATISFACTION OF THE ENGINEER.

REV.	DATE	DESCRIPTION
	4/11/12	Changed per Adendum 2

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

TRENCH BACKFILL AND RESURFACING

APPR'D BY: *Nicholas Theodorak* NO SCALE
DATE: APRIL 2012 DWG. NO. **T - 80**



MAIN MAY GO OVER IF A MIN. OF 36" OF COVER IS MAINTAINED. IF COVER IS LESS THAN 36", THEN MAIN MATERIAL MUST BE DUCTILE IRON AND APPROVED BY THE ENGINEER.

SIZE IN PIPE	6"	8"	12"
MINIMUM DEPTH "d"	6"	8"	20"
YDS. CONCRETE NECESSARY TO PROVIDE WEIGHT, BLOCK "B"	0.8	1-1/3	3
BEARING AREA "A" SQ. FT.	2	3	6.5

NOTE:

1. RESTRAINED JOINTS MAY BE USED IN LIEU OF CONCRETE BLOCKING WITH THE APPROVAL OF THE ENGINEER.
2. FIRE HYDRANTS MUST BE INSTALLED WITH A THRUST BLOCK. RESTRAINED JOINTS ARE NOT ALLOWED.

CHANGES IN MAIN ELEVATION, 6" - 12"

UNDISTURBED EARTH BEHIND ALL BLOCKING

PLUG TO BE TIED BACK

DIRECTION OF WATER THRUST

TYPE OF FITTING

KEEP FACE OF PLUG CLEAR (TYP.)

PLUG TO BE TIED BACK

TEE OR DEAD END		CROSS AND PLUG		90° ELBOW		45° ELBOW		22 1/2° ELBOW		CROSS AND PLUGS		TEE AND PLUG	
MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA	MAIN SIZE	BEARING AREA
6"	2	6"	3	6"	3	6"	2	6"	1	6"	3	6"	3
8"	3.5	8"	5	8"	5	8"	3	8"	1.5	8"	5	8"	5
12"	8	12"	11.5	12"	11.5	12"	5	12"	3.5	12"	11.5	12"	11.5

NOTES:

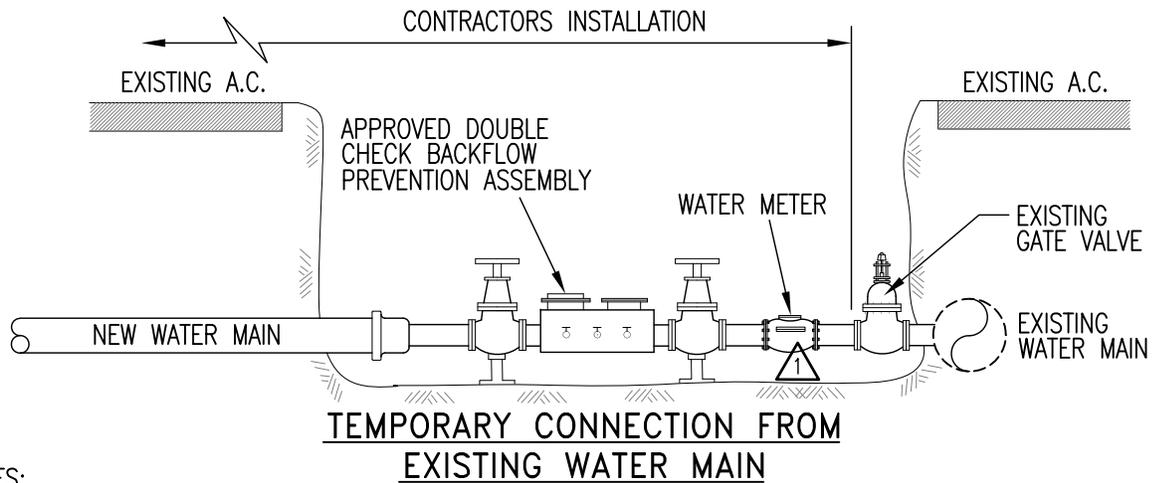
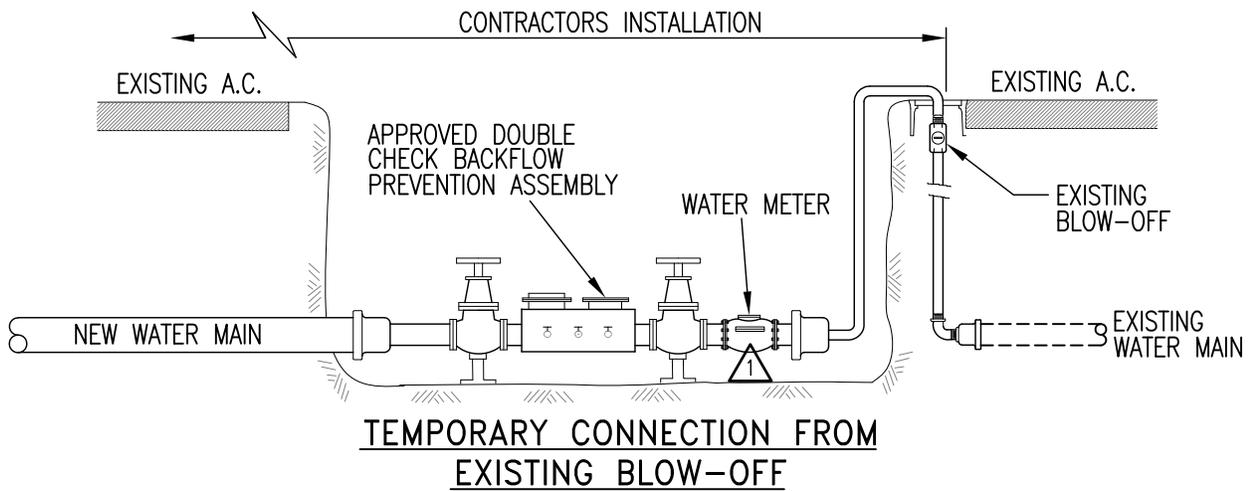
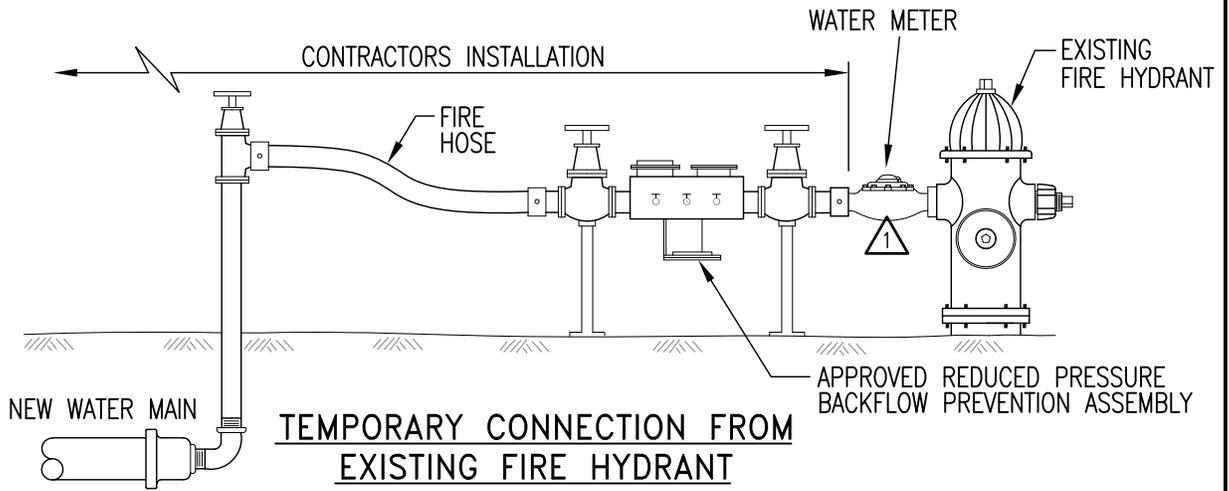
1. ABOVE BEARING AREAS BASED ON 150 PSI SERVICE PRESSURE AND 2000 PSF SOIL BEARING CAPACITY. WHERE SOIL CONDITIONS REQUIRE ADJUSTMENT OF ALLOWABLE BEARING PRESSURE, IN THE OPINION OF THE ENGINEER, REQUIRED BLOCKING AREAS WILL BE ADJUSTED.
2. USE CLASS "D" CONCRETE FOR BLOCKING. SEE STANDARD SPECS.
3. VERTICAL CHANGES IN DIRECTION REQUIRE BLOCKING AS SHOWN ABOVE.
4. CONCRETE THRUST BLOCKING SHALL NOT COMPLETELY INUNDATE FITTING.
5. RESTRAINED JOINTS MAY BE USED IN LIEU OF CONCRETE BLOCKING WITH THE APPROVAL OF THE ENGINEER.
6. MAINTAIN 1'-0" CLEARANCE BETWEEN NEW MAIN AND EXISTING UTILITY SEE W-106.

REV.	DATE	DESCRIPTION
1	01/13/12	NOTE #2 ADDED

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**CHANGES IN MAIN ELEVATION &
THRUST BLOCKING FOR WATER MAINS**

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-103**



NOTES:

1. APPROVED BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED IMMEDIATELY AFTER THEY ARE INSTALLED, RELOCATED OR REPAIRED AND NOT PLACED IN SERVICE UNLESS THEY ARE FUNCTIONING AS REQUIRED.
2. TESTING OF BACKFLOW PREVENTION ASSEMBLIES SHALL BE PERFORMED BY CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTERS.
3. CURRENT LISTS OF APPROVED BACKFLOW ASSEMBLIES AND CERTIFIED TESTERS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE OFFICE, 1395 35TH AVENUE.
4. THE APPROVED BACKFLOW ASSEMBLY SHALL PASS THE REQUIRED TEST PRIOR TO FILLING THE NEW WATER MAIN.

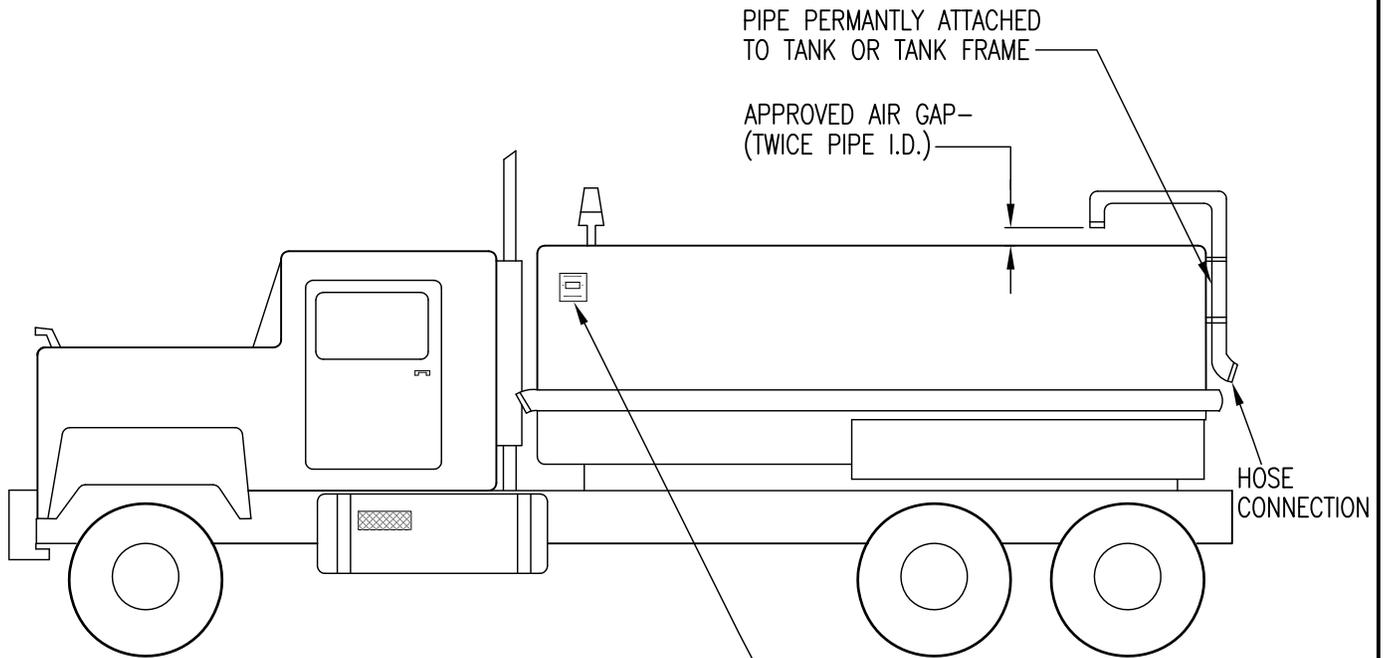
REV.	DATE	DESCRIPTION
1	01-14-11	WATER METER ADDED

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

TYP. CONNECTIONS FOR INITIAL FILLING OF NEW WATER MAIN

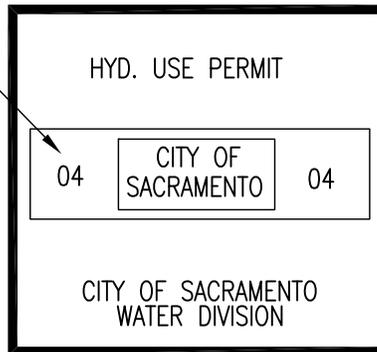
APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-107**

R:\Utilities\New_Std_Details\Water_Uilities\W-203



TYPICAL LOCATION OF FIRE
HYDRANT USE PERMIT.
DRIVERS SIDE OF VEHICLE.

CURRENT ISSUE YEAR



NOTES:

1. "AIR GAP SEPARATION" MEANS A PHYSICAL SEPARATION BETWEEN THE DISCHARGE END OF A POTABLE WATER SUPPLY PIPELINE AND AN OPEN OR NON-PRESSURE RECEIVING TANK.
2. AN "APPROVED AIR GAP SEPARATION" SHALL BE AT LEAST TWICE THE DIAMETER OF THE SUPPLY PIPE MEASURED VERTICALLY ABOVE THE OVERFLOW RIM OF THE RECEIVING TANK. IN NO CASE SHALL THE AIR GAP BE LESS THAN ONE INCH.
3. METER IS REQUIRED FOR FILLING WATER TRUCKS AND PORTABLE EQUIPMENT, CUSTOMER SHALL PROVIDE A SECURITY DEPOSIT AND BE RESPONSIBLE FOR THE SECURITY AND CONDITION OF THE METER FOR DURATION OF THE PERMIT.
4. CUSTOMER SHALL RETURN METER TO RECEIVE REFUND OF SECURITY DEPOSIT LESS ANY UNPAID WATER USAGE FEES, DAMAGED/STOLEN METER WILL RESULT IN FORFEITURE OF ALL OR PART OF THE SECURITY DEPOSIT.

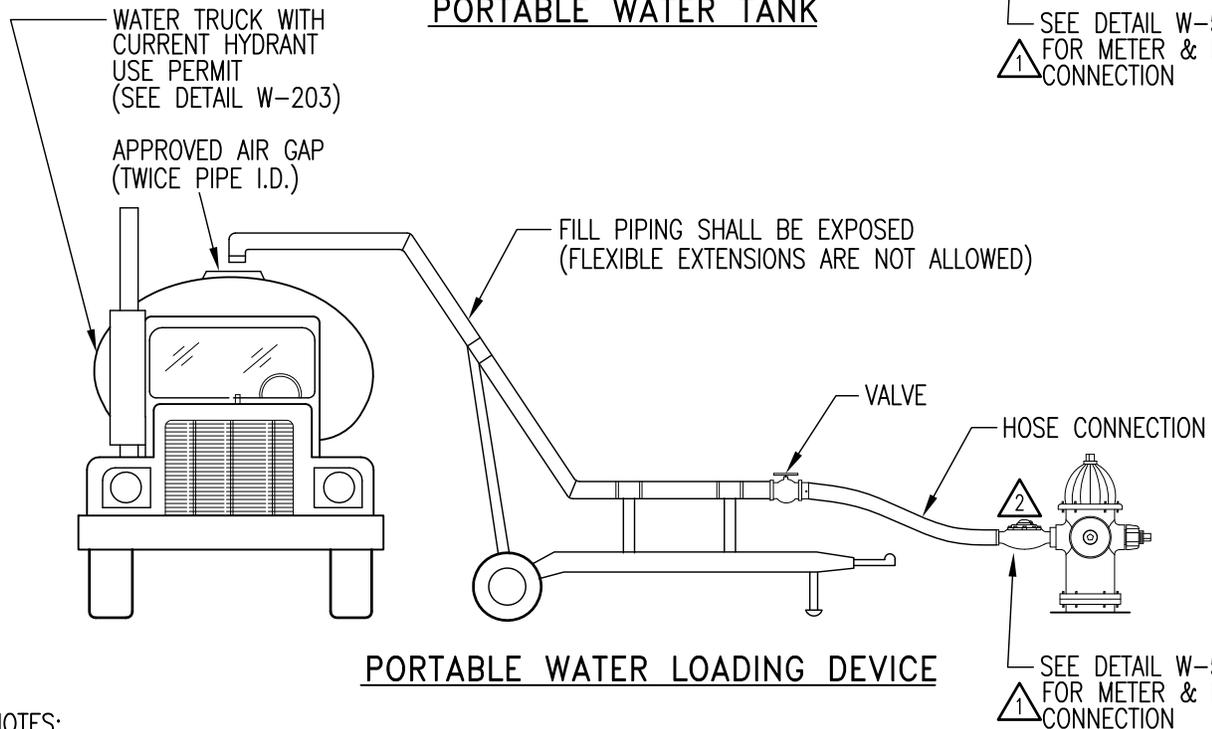
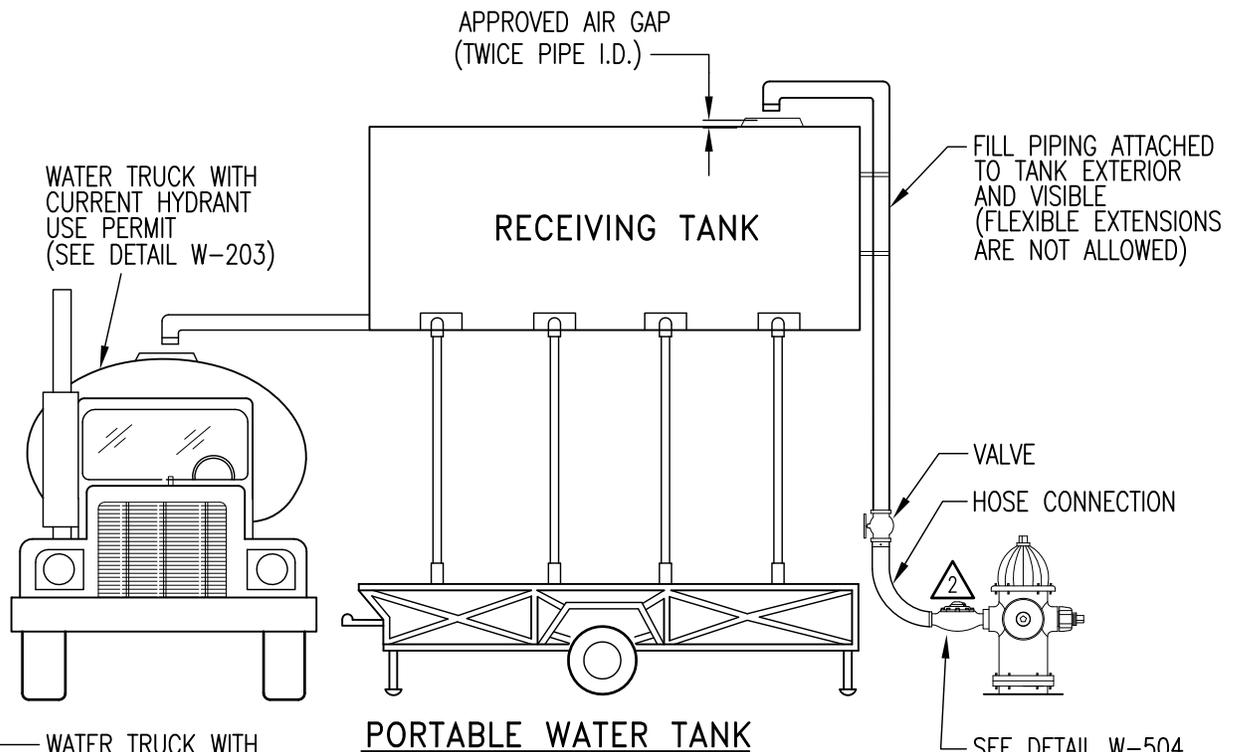
REV.	DATE	DESCRIPTION
1	05-25-10	ADDED NOTE 3 & 4

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

REQUIREMENTS FOR FIRE HYDRANT
USE PERMITS WATER TRUCKS

APPR'D BY: NO SCALE
DATE: MAY 2007 DWG. NO. **W-203**

Addendum #2, Page 44 of 81



NOTES:

1. PORTABLE WATER TRUCK FILL STATIONS SHALL BE INSPECTED ANUALLY BY THE DEPARTMENT OF UTILITIES PRIOR TO THEIR USE. METER & RP DEVICE IS REQUIRED FOR PORTABLE TANKS AND LOADING DEVICES, SEE W-504 FOR CONNECTION DETAIL.
2. ALTERNATIVE WATER TRUCK FILL STATIONS SHALL BE SUBMITTED TO THE DEPARTMENT OF UTILITIES PRIOR TO USE.
3. ONLY WATER TRUCKS WITH CURRENT PERMIT STICKER SHALL BE ALLOWED TO FILL AT PORTABLE WATER TRUCK STATIONS.
4. LOCATION OF PORTABLE WATER TRUCK FILL STATIONS BE SITE SPECIFIC.
5. NO HOSES SHALL BE LAID ACROSS STREETS OR TRAFFIC AREAS.

REV.	DATE	DESCRIPTION
1	05-25-10	NOTE ADDED
2	01-14-11	WATER METER ADDED

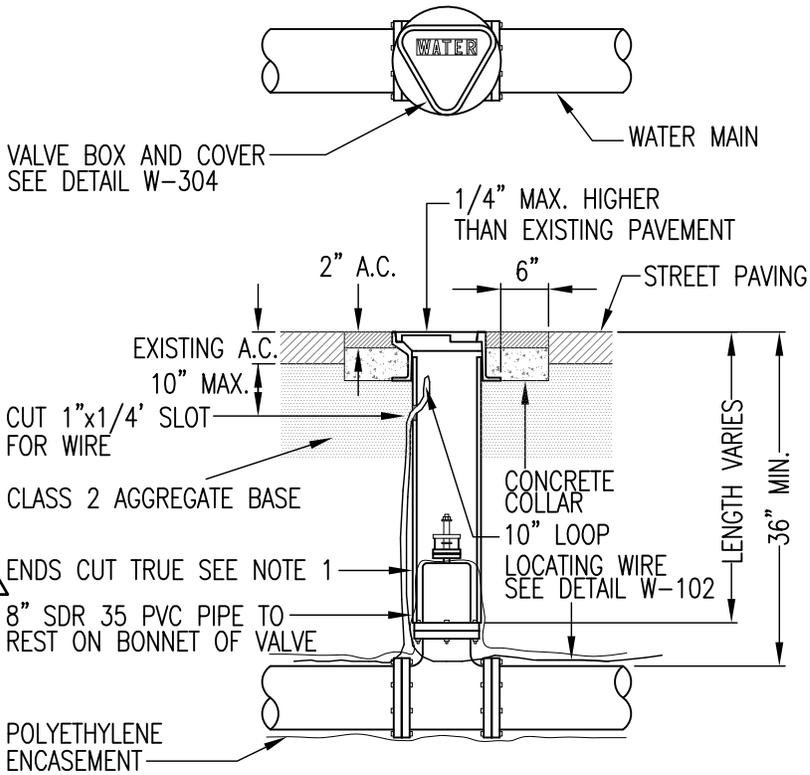
CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

PORTABLE WATER
TRUCK FILL STATIONS

APPR'D BY: NO SCALE
DATE: MAY 2007 DWG. NO. **W-204**

Addendum #2, Page 45 of 81

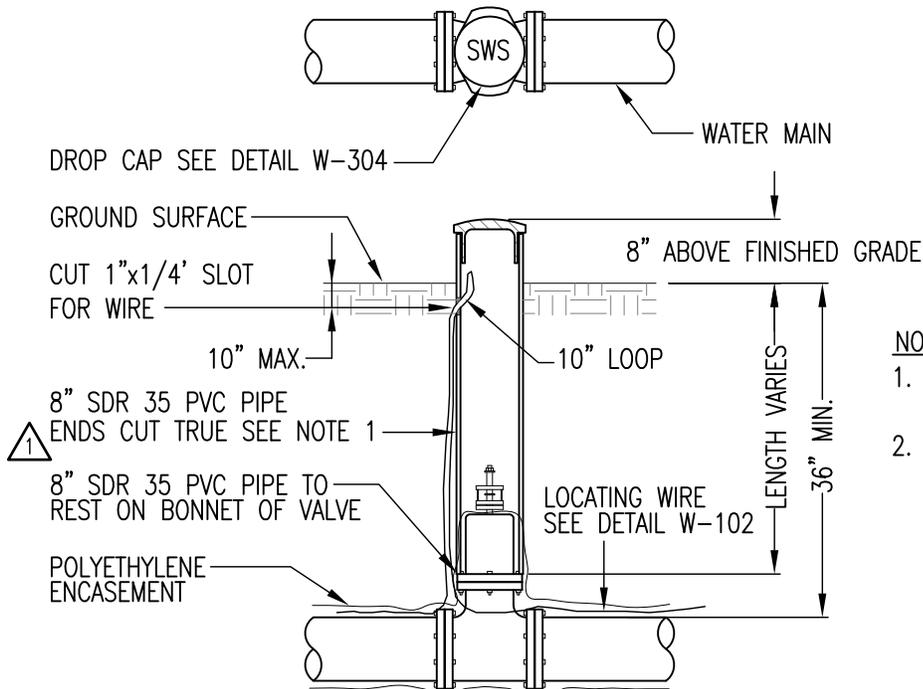
R: \Utilids\New_Std_Details\Water_Utilites\W-204



NOTE:

1. ONE (1) CONTINUOUS PIECE OR WELDED AS ONE PIECE
2. NUT EXTENSION REQUIRED WHEN VALVE NUT IS IN EXCESS OF 30" BELOW FINISH GRADE. SEE W-308.

VALVE BOX INSTALLATION IN CITY STREETS ALLEYS AND PAVED UTILITY EASEMENTS



NOTE:

1. ONE (1) CONTINUOUS PIECE OR WELDED AS ONE PIECE
2. NUT EXTENSION REQUIRED WHEN VALVE NUT IS IN EXCESS OF 30" BELOW FINISH GRADE. SEE W-308.

VALVE BOX INSTALLATION IN PUBLIC UTILITY EASEMENTS

REV.	DATE	DESCRIPTION
1	11/29/11	Material Change

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

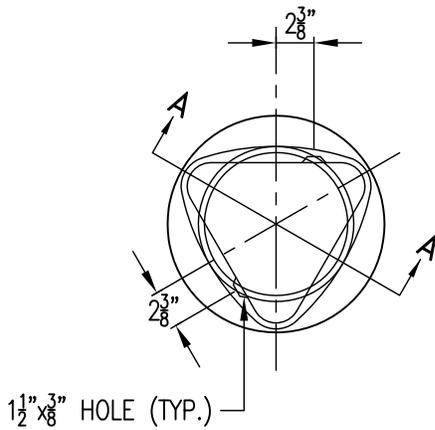
**STANDARD VALVE BOX INSTALLATION
FOR CITY STREETS, ALLEY & EASEMENTS**

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-303**

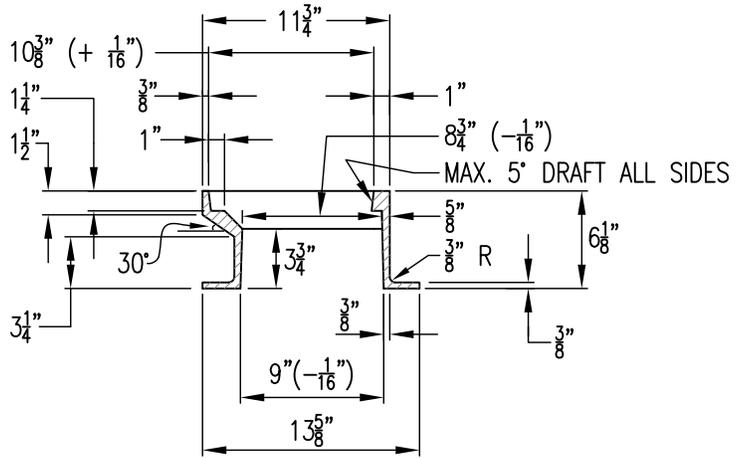
R: \Utilids\New_Std_Details\Water_Utilities\W-303

Addendum #2, Page 46 of 81

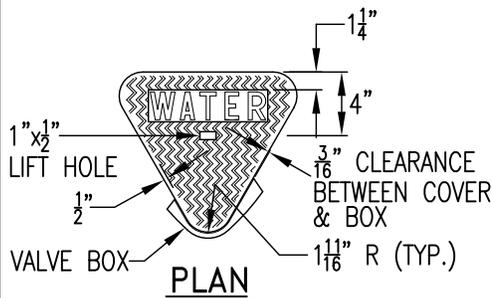
R:\Utilids\New_Std_Details\Water_Uilities\W-304



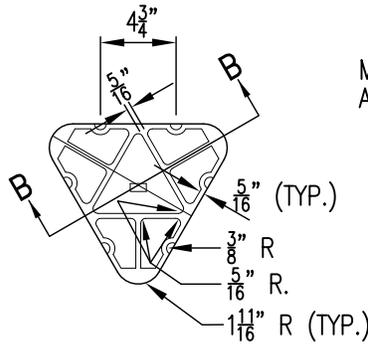
PLAN
VALVE BOX FOR STREETS AND PAVED SURFACES



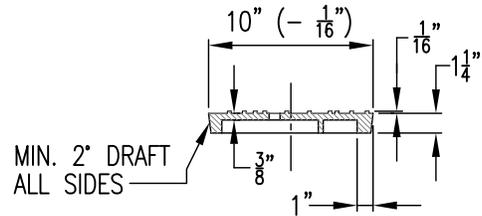
SECTION A-A



PLAN



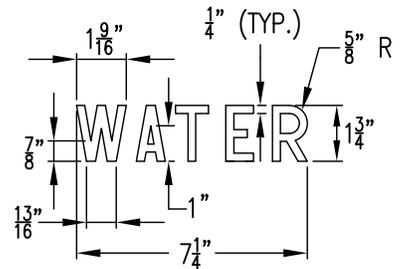
VALVE BOX COVER



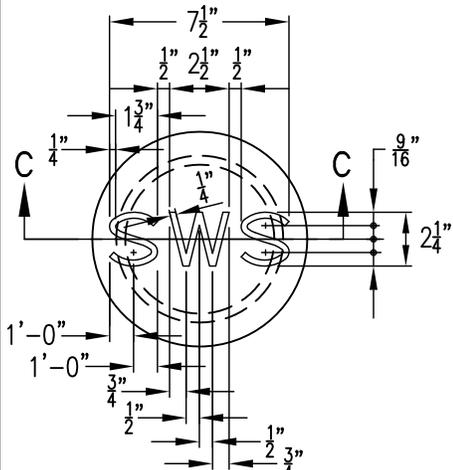
SECTION B-B



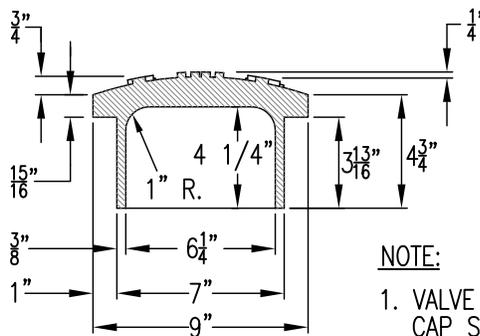
PLAN



LETTERS ON COVER



PLAN & LETTERS ON TOP OF DROP CAP



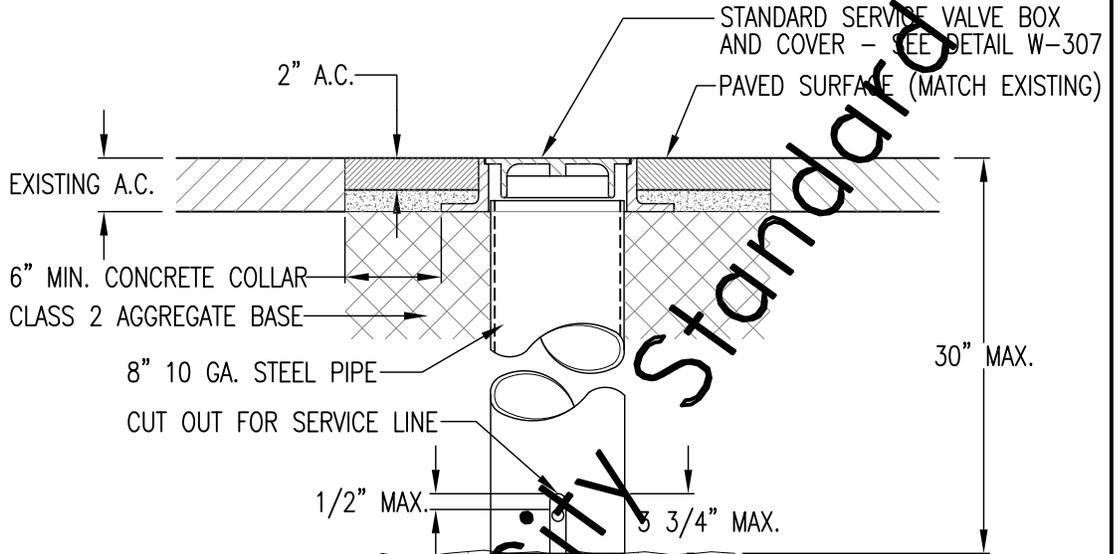
SECTION C-C

DROP CAP FOR PUBLIC UTILITY EASEMENTS

NOTE:

1. VALVE BOX, VALVE BOX COVER AND DROP CAP SHALL BE CONSTRUCTED OF CAST IRON WITH MINIMUM TENSILE STRENGTH OF 25,000 P.S.I.
2. VALVE COVER WITH "L" DESIGNATION SHALL BE USED FOR NEW VALVE INSTALLATION SOUTH OF THE AMERICAN RIVER.

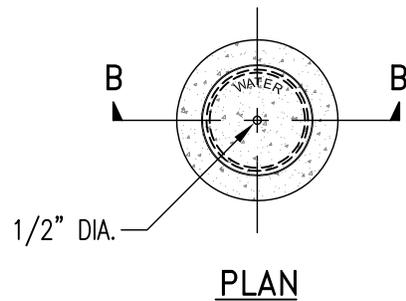
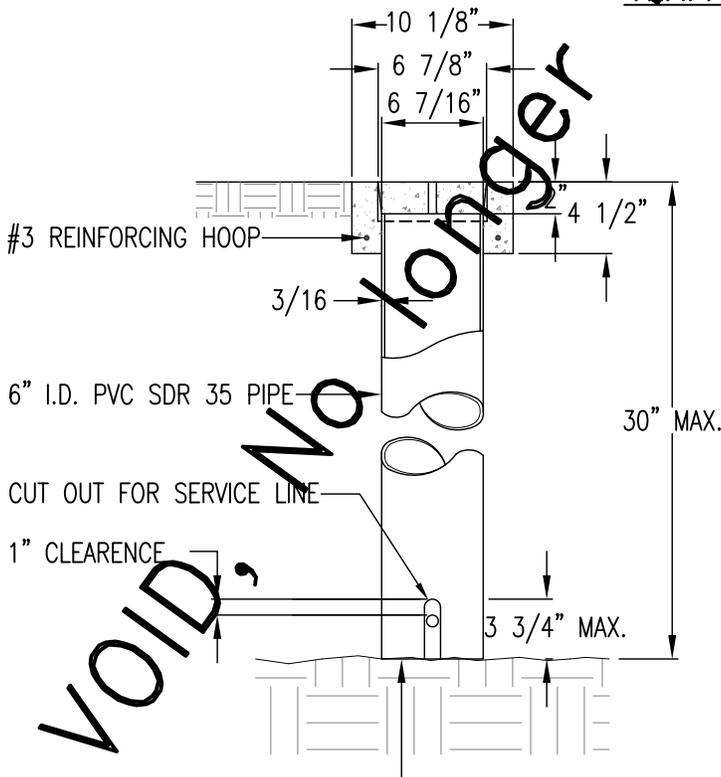
REV.	DATE	DESCRIPTION
1	04-20-12	New Open Left



NOTES:

1. BOX FLANGE IS NOT TO BE SET IN CONCRETE WHERE STREET SURFACE IS ASPHALT
2. THE CAST IRON WATER SERVICE BOX SHALL BE INSTALLED IN ALL PAVED SURFACES

SET ON UNDISTURBED EARTH
**CURB STOP BOX
 TRAFFIC INSTALLATION**

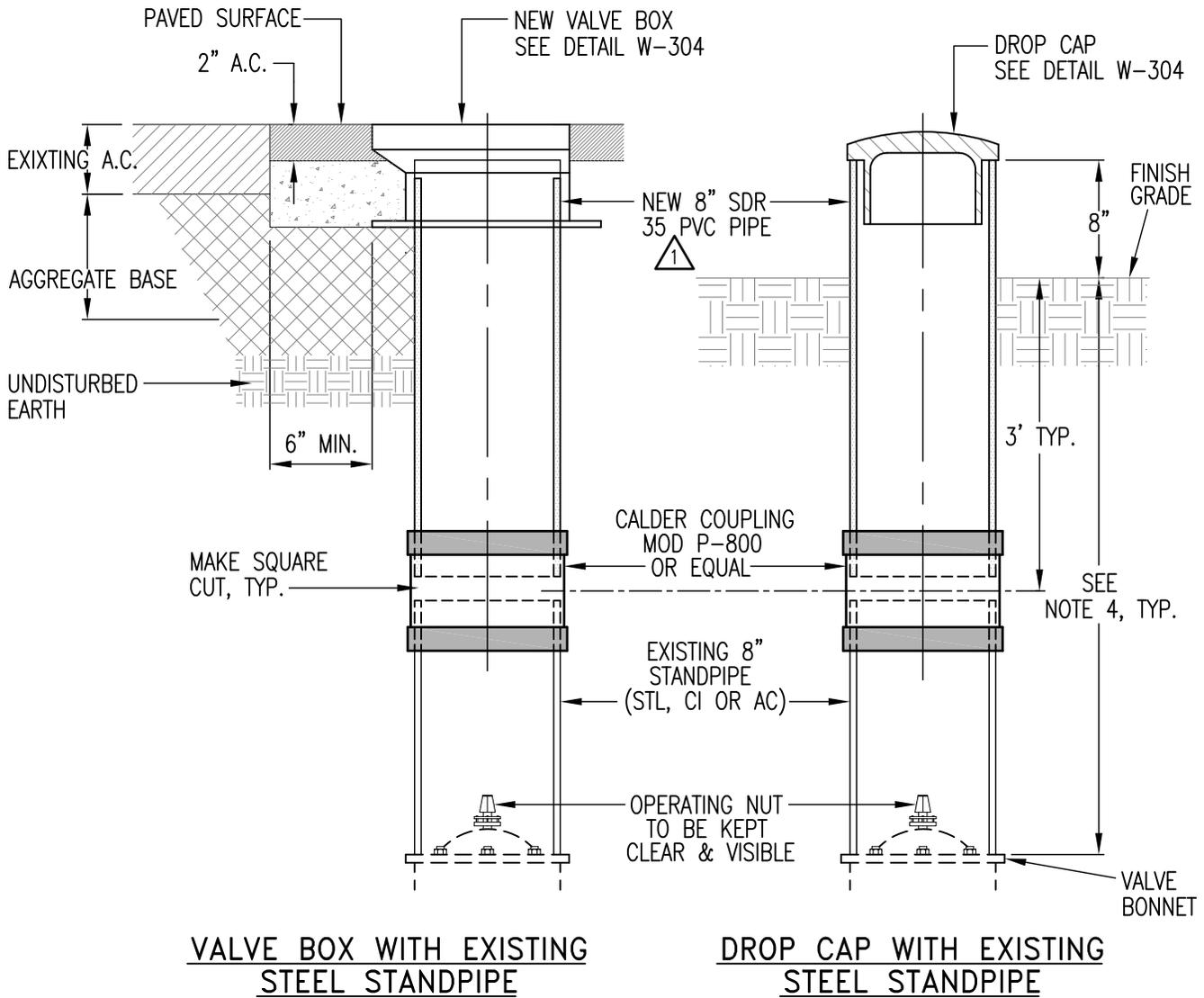


SECTION B-B

**CURB STOP BOX
 NON-TRAFFIC INSTALLATION**

REV.	DATE	DESCRIPTION
△		
△		
△		

APPR'D BY: DOB NO SCALE
 DATE: MAY 2007 DWG. NO. **W-305**



VALVE BOX WITH EXISTING STEEL STANDPIPE

DROP CAP WITH EXISTING STEEL STANDPIPE

NOTES:

1. ALL EXISTING VALVE BOXES THAT MEET THESE STANDARDS WITH BOTTOM FLANGES MAY BE REUSED BY THE CONTRACTOR WITH THE APPROVAL OF THE ENGINEER. EXISTING DROP CAPS INSTALLED IN CITY STREETS AND ALLEYS SHALL BE REPLACED WITH STANDARD VALVE BOXES AND RETURNED TO THE CITY CORPORATION YARD.
2. ALL VALVE BOXES NOT MENTIONED IN NOTE No.1 WILL BECOME THE PROPERTY OF AND DISPOSED OF BY THE CONTRACTOR.
3. TRACER/LOCATOR WIRE SHALL BE ADJUSTED TO 10" PER DETAIL W-102.
4. IF VALVE BONNET DEPTH IS LESS THAN 3' DEEP REPLACE ENTIRE RISER WITH SDR 35 PVC PIPE. IF VALVE BONNET IS MORE THAN 3'-DEEP, EXPOSE JUST THE TOP 3' OF THE RISER CUT SQUARE AS SHOWN @ 3', AND REPLACE TOP 3' w/SDR 35 PVC & CALDER COUPLING AS SHOWN. SEE W-303.

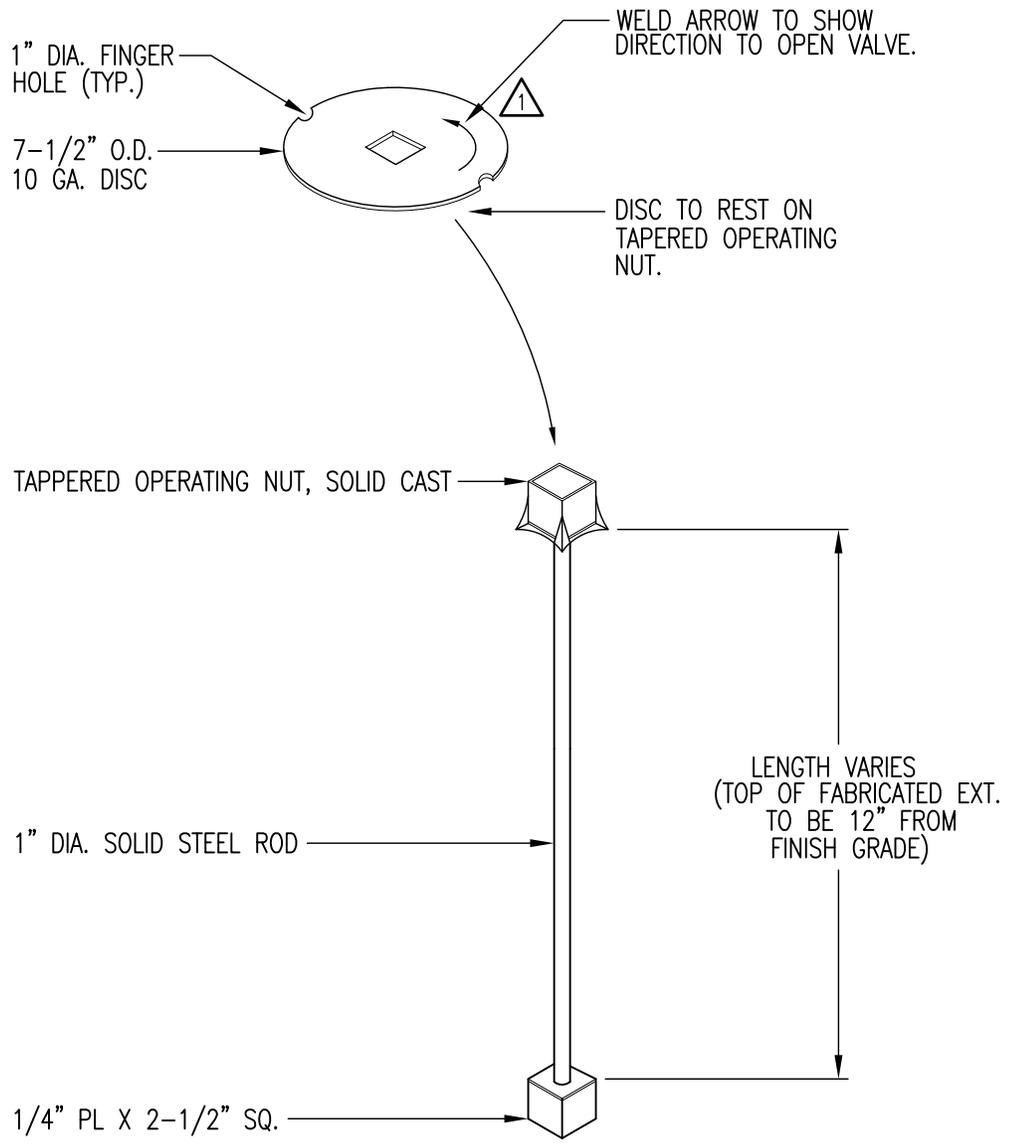
REV.	DATE	DESCRIPTION
1	11/29/11	Material Change SDR 35 PVC

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**RAISING VALVE BOXES
AND DROP CAPS**

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-306**

R: \Utilids_New_Std_Details\Water_Utilities\W-308



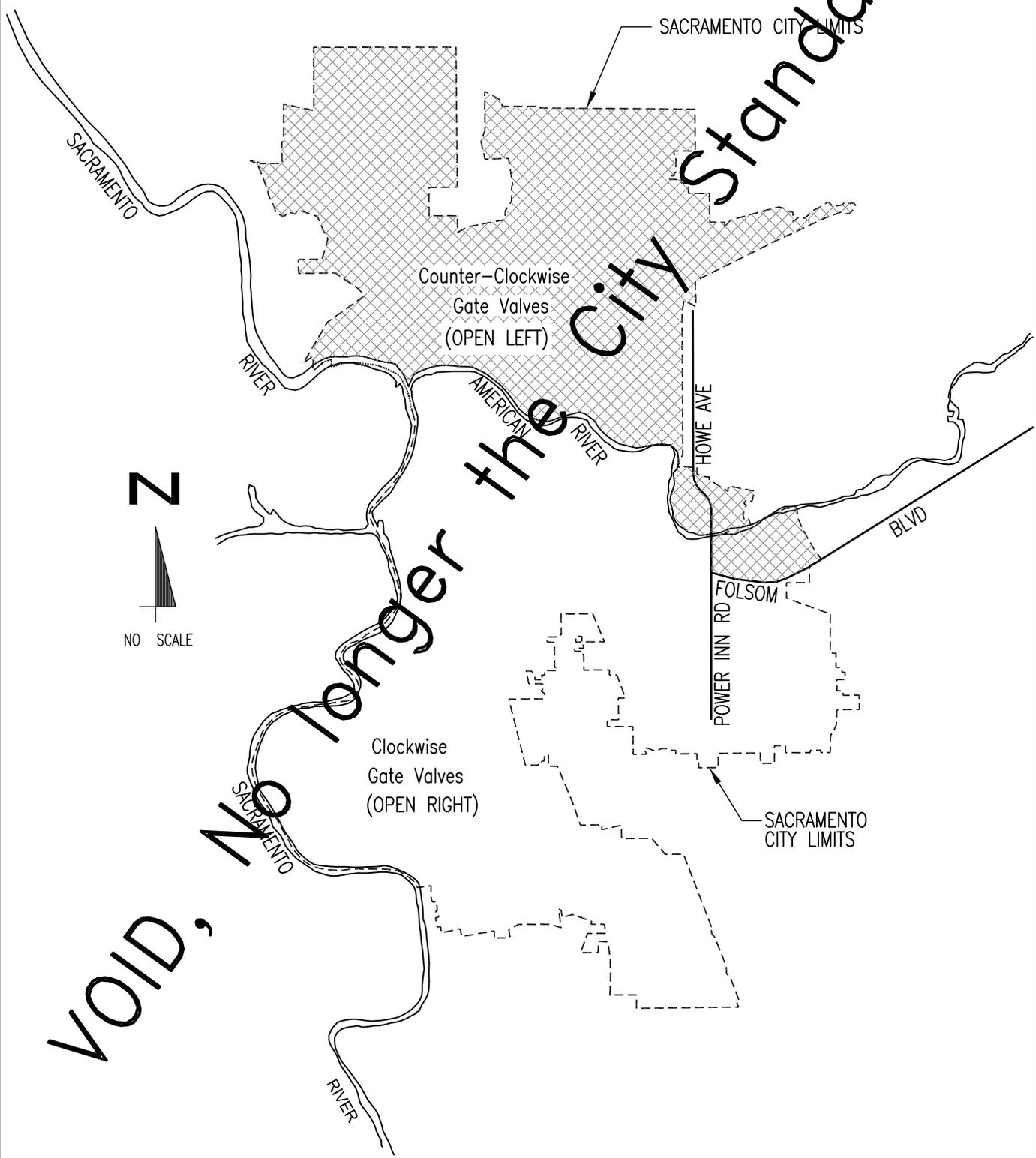
NOTES:

- 1. REQUIRED WHEN VALVE NUT IS IN EXCESS OF 30" BELOW FINISH GRADE.
- 2. SET TOP OF EXTENSION 12" BELOW GRADE.

REV.	DATE	DESCRIPTION
1	01-16-11	CHANGE OPEN LEFT.

R: \Utilists\New_Std_Details\Water_Uilities\W-309

VOID, No longer the City Standard



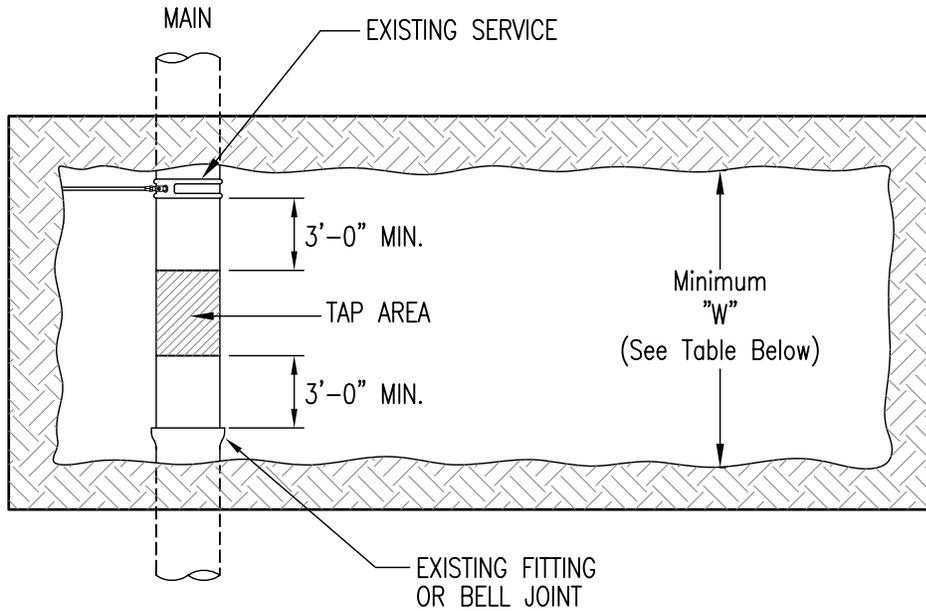
REV.	DATE	DESCRIPTION
△		
△		
△		

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

**AREAS OF OPEN LEFT AND
 OPEN RIGHT GATE VALVES**

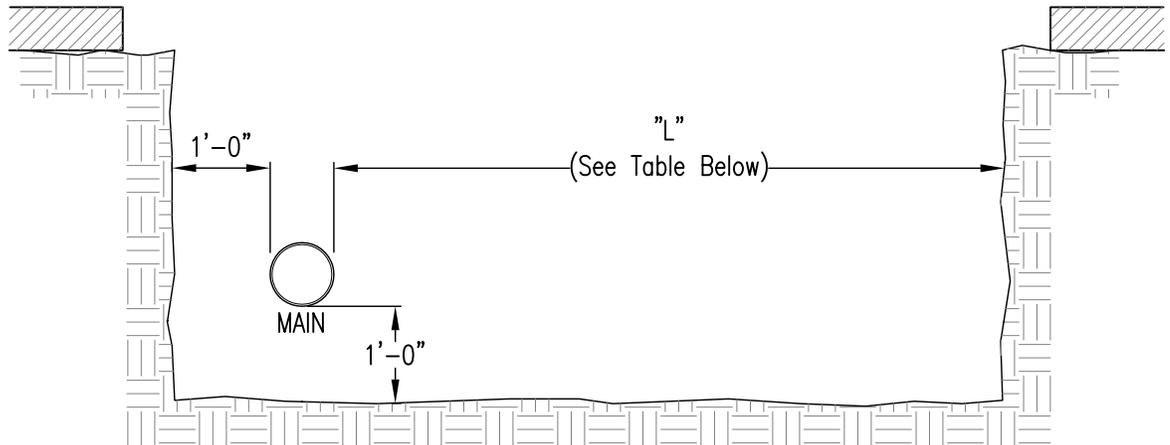
APPR'D BY: DOB NO SCALE
 DATE: MAY 2007 DWG. NO. **W-309**

Addendum #2, Page 51 of 81



NOTE:
 CLEAR SEPARATION OF 3'-0"
 SHALL BE MAINTAINED BETWEEN
 ALL FITTINGS, BELLS, SADDLES, ETC.

PLAN VIEW



SECTION VIEW

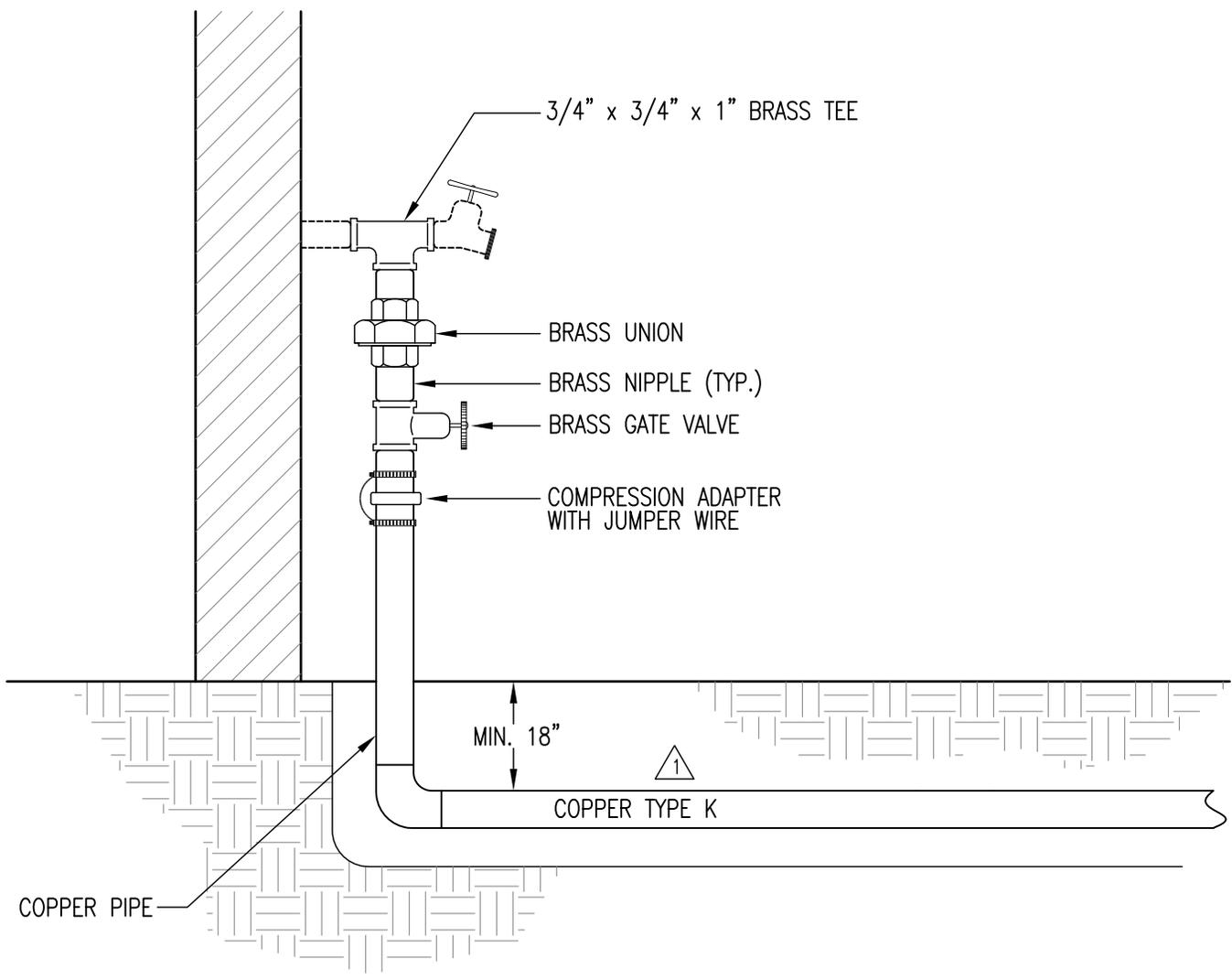
TAP EXCAVATION REQUIREMENTS		
TAP SIZE	DIMENSION "W"	DIMENSION "L"
1" to 2"	3'-0"	5'-0"
4" to 6"	4'-0"	9'-0"
8" to 12"	5'-0"	9'-0"

NOTE:
 CONTRACTOR SHALL ENSURE TRENCH SAFETY AND TRAFFIC CONTROL.



REV.	DATE	DESCRIPTION
1		TITLE CORRECTION

R:\Utilids\New_Std_Details\Water_Uilities\W-406



GENERAL NOTES

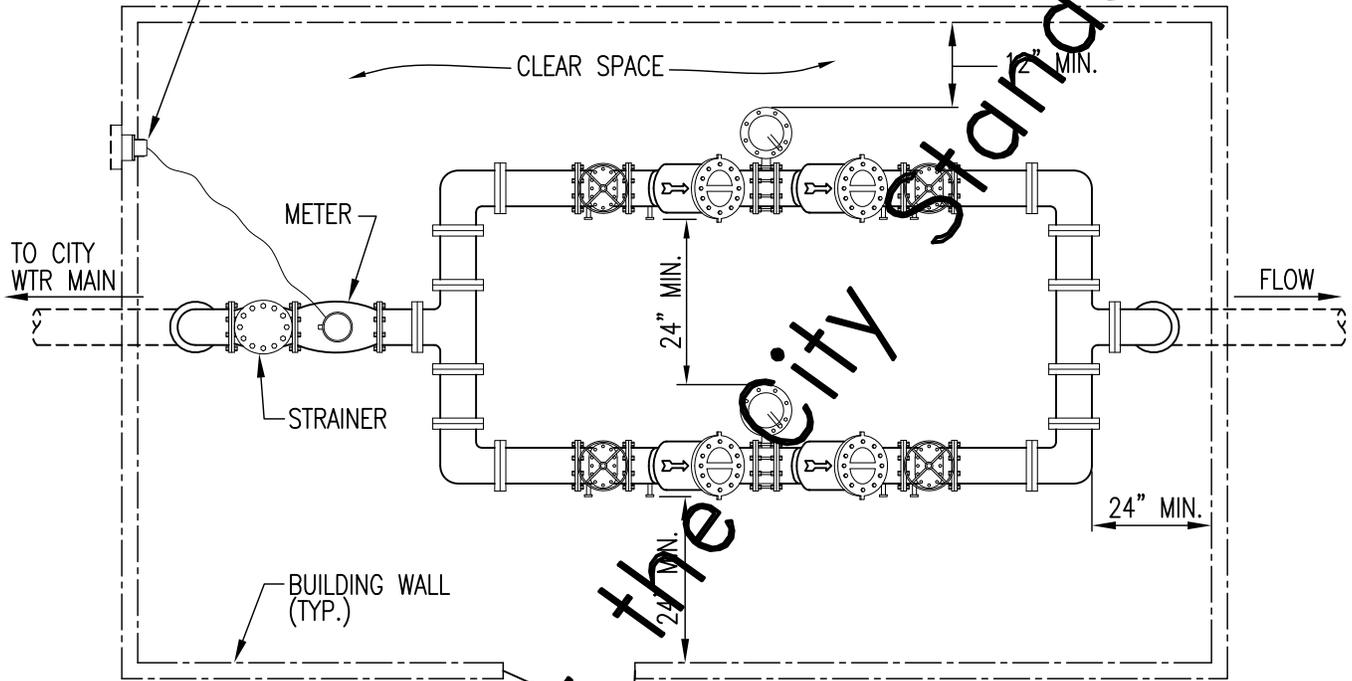
1. WATER SERVICE PIPE SHALL BE 1-INCH IN DIAMETER UP TO ABOVE GROUND TEE.
2. WHENEVER COPPER WATER SERVICE PIPE IS IN DIRECT CONTACT WITH CONCRETE, THE CONTRACTOR SHALL WRAP COPPER PIPE IN 35 MIL POLYKIN OR EQUAL, OR PLACE IN CASING.
3. WATER SERVICE PIPE MAY BE PLACED IN AN EXCAVATED TRENCH AND BACKFILLED, OR DIRECTIONALLY DRILLED.
4. PIPE ALIGNMENT SHALL NOT PASS UNDER ANY STRUCTURE.
5. WATER SERVICES AND THEIR INSTALLATION SHALL MEET APPLICABLE REQUIREMENTS OF SECTION 10 THRU 38 OF THESE SPECIFICATIONS.
6. TO TRANSITION FROM GALVANIZED PIPE TO COPPER PIPE, PLACE A BRASS UNION W/BRASS GATE VALVE BETWEEN GALVANIZED PIPE AND COPPER PIPE.

REV.	DATE	DESCRIPTION
1	03-22-12	Type K Only

CITY OF SACRAMENTO DEPARTMENT OF UTILITIES	WATER SERVICE CONNECTION AT HOSE BIBB	APPR'D BY: <i>DOB</i> NO SCALE DATE: MAY 2007 DWG. NO. W-406
--	--	--

Addendum #2, Page 53 of 81

OWNER/CONTRACTOR SHALL PROVIDE AND INSTALL READER THROUGH CONDUIT FOR A REMOTE METER BUILDING WALL. THE OWNER HAS THE OPTION TO FURNISH AND INSTALL A FLUSH MOUNT OR SURFACE LOCKABLE BOX AND CONDUIT.



**MINIMUM CLEARANCES
FOR PARALLEL INSTALLATION**

NOTES:

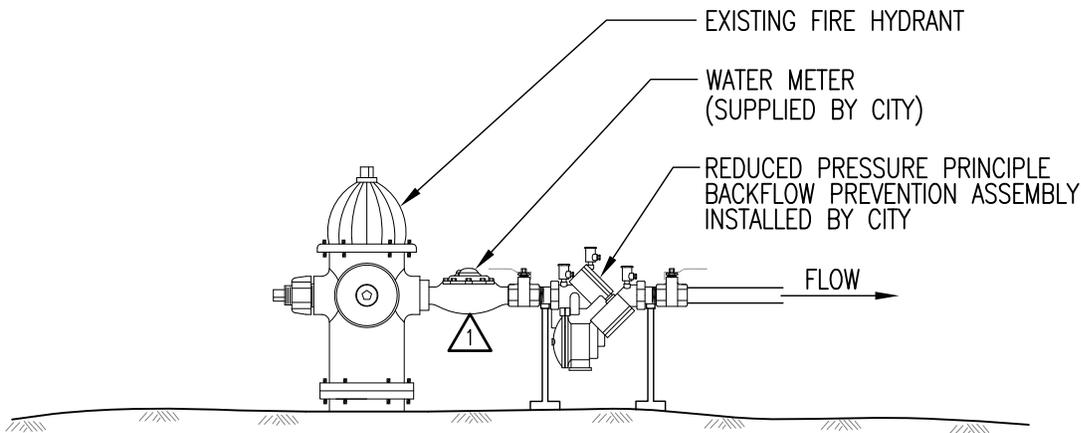
1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. BACKFLOW ASSEMBLIES SHALL BE CONNECTED TO CITY WATER AND TESTED PRIOR TO BEING PLACED INTO SERVICE.
3. POINT OF SERVICE:
 - A. POINT OF SERVICE IS AT THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS AT THE BACK OF SIDEWALK FOR STREETS WITH COMBINED CURB AND SIDEWALK.
 - C. POINT OF SERVICE IS AT THE RIGHT-OF-WAY LINE ON ALL UNIMPROVED STREETS AND ALLEYS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST
4. LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTORS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE COUNTER LOCATED AT 1395 35TH AVE.
5. THE BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND, IN A HORIZONTAL AND LEVEL POSITION. THE ASSEMBLY SHALL BE LOCATED ON THE CUSTOMER'S SIDE AND NO FURTHER THAN FIVE (5) FEET FROM THE POINT OF SERVICE.
6. OUTLETS, TAPS, TEES, OR CONNECTIONS BETWEEN WATER MAIN AND BACKFLOW PREVENTION ASSEMBLY ARE NOT ALLOWED.
7. PVC PIPE SHALL NOT BE USED FOR THE ABOVE GROUND PORTION OF THE INSTALLATION.
8. SUPPORTS REQUIRED FOR ASSEMBLIES 3" AND LARGER.
9. BACKFLOW ASSEMBLIES SHALL NOT BE INSTALLED IN BASEMENTS OR VAULTS.

REV.	DATE	DESCRIPTION
△		
△		
△		

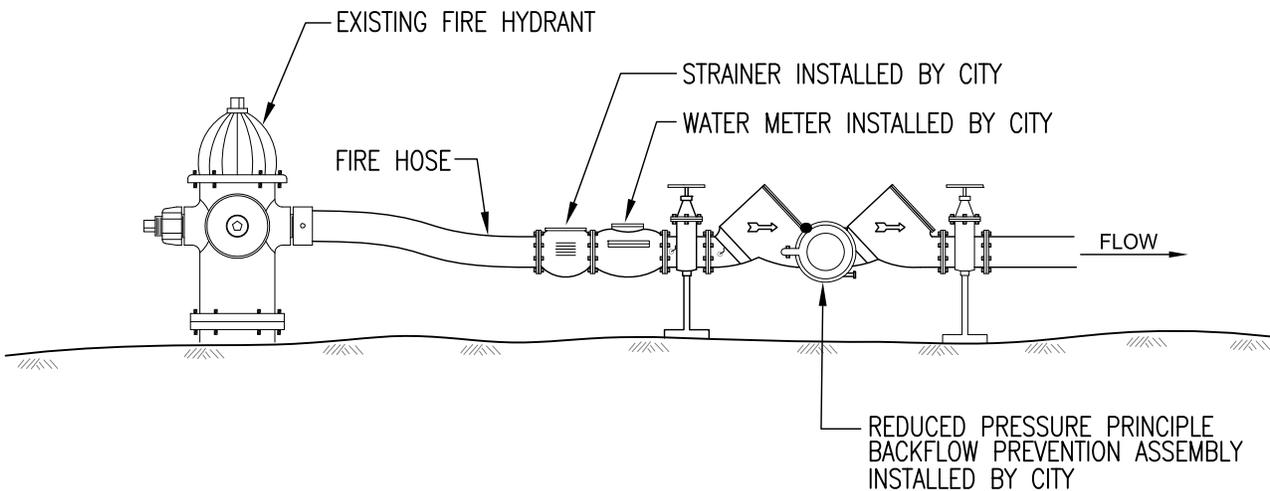
**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**PARALLEL BACKFLOW ASSEMBLIES
FOR BUILDING INSTALLATIONS**

APPR'D BY: DOB NO SCALE
DATE: MAY 2007 DWG. NO. **W-503**



2" TEMPORARY METERED WATER SERVICE WITH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY



4" METERED TEMPORARY WATER SERVICE WITH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY

NOTES:

1. CONTRACTOR/CUSTOMER SHALL BE RESPONSIBLE FOR THE SECURITY AND CONDITION OF THE METER & BACKFLOW ASSEMBLY FOR DURATION OF THE HYDRANT USE PERMIT.
2. CONTRACTOR/CUSTOMER SHALL RETURN METER & BACKFLOW ASSEMBLY TO RECEIVE REFUND OF SECURITY DEPOSIT LESS INSTALLATION, TESTING, AND WATER USAGE FEES.
3. DAMAGED OR STOLEN METER OR BACKFLOW ASSEMBLY WILL RESULT IN FORFEITURE OF SECURITY DEPOSIT.
4. CITY TO PROVIDE TESTING AND INSTALLATION UPON PAYMENT OF SECURITY DEPOSIT.
5. NO HOSES SHALL CROSS STREETS OR TRAFFIC AREAS.

REV.	DATE	DESCRIPTION
1	05-25-10	ADDED 2" METER
2	01-19-11	SIZE CHANGE 3" TO 4"
3		

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

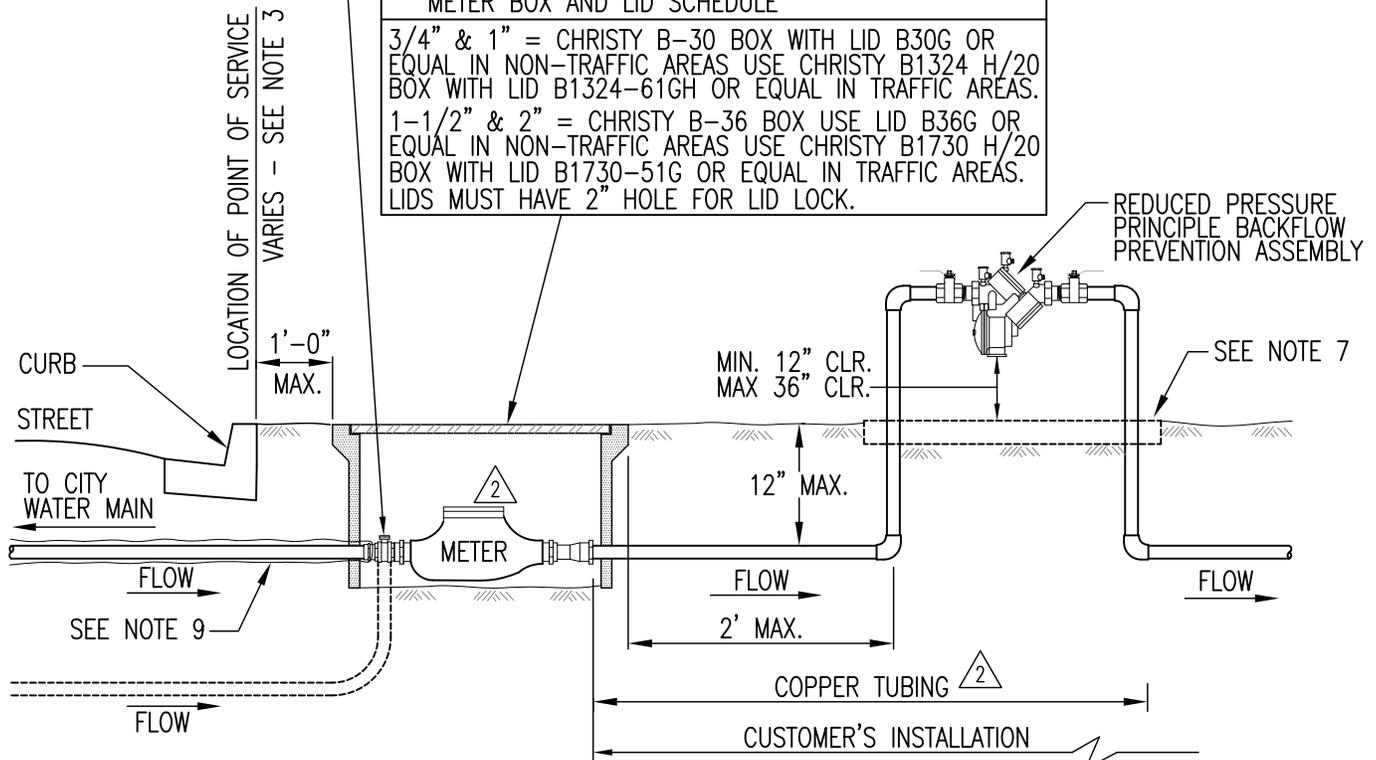
**INSTALLATION OF METERED TEMP.
WTR SVC W/BACKFLOW PREVENTERS**

APPR'D BY: *[Signature]* NO SCALE
DATE: MAY 2007 DWG. NO. **W-504**

STRAIGHT METER VALVE	ANGLE METER VALVE
3/4" & 1" = MUELLER METER VALVE B-24335 OR EQUAL.	1" = MUELLER ANGLE METER VALVE B24335 OR EQUAL.

*PACK JOINTS ARE NOT ALLOWED.

METER BOX AND LID SCHEDULE
3/4" & 1" = CHRISTY B-30 BOX WITH LID B30G OR EQUAL IN NON-TRAFFIC AREAS USE CHRISTY B1324 H/20 BOX WITH LID B1324-61GH OR EQUAL IN TRAFFIC AREAS.
1-1/2" & 2" = CHRISTY B-36 BOX USE LID B36G OR EQUAL IN NON-TRAFFIC AREAS USE CHRISTY B1730 H/20 BOX WITH LID B1730-51G OR EQUAL IN TRAFFIC AREAS. LIDS MUST HAVE 2" HOLE FOR LID LOCK.



INSTALLATION OF 2-INCH AND SMALLER REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY W/WATER METER

NOTES:

- INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
- REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE CONNECTED TO CITY WATER AND TESTED PRIOR TO BEING PLACED INTO SERVICE.
- POINT OF SERVICE:
 - POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER.
 - POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST.
- LISTS OF APPROVED BACKFLOW PREVENTION ASSEMBLIES AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTORS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE COUNTER LOCATED AT 1395 35TH AVE.
- THE BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND, IN A HORIZONTAL AND LEVEL POSITION. THE ASSEMBLY SHALL BE LOCATED ON THE CUSTOMER'S SIDE AND NO FURTHER THAN FIVE (5) FEET FROM THE POINT OF SERVICE OR THE METER.
- OUTLETS, TAPS, TEES, OR CONNECTIONS BETWEEN THE WATER MAIN AND BACKFLOW PREVENTER ARE NOT ALLOWED.
- CONCRETE PAD IS RECOMMENDED IF ASSEMBLY IS PLACED WITHIN A PROTECTIVE ENCLOSURE.
- FREEZE BAGS ARE RECOMMENDED FOR FREEZE PROTECTION.
- 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE IS REQUIRED FOR ALL UNDERGROUND COPPER TUBING.

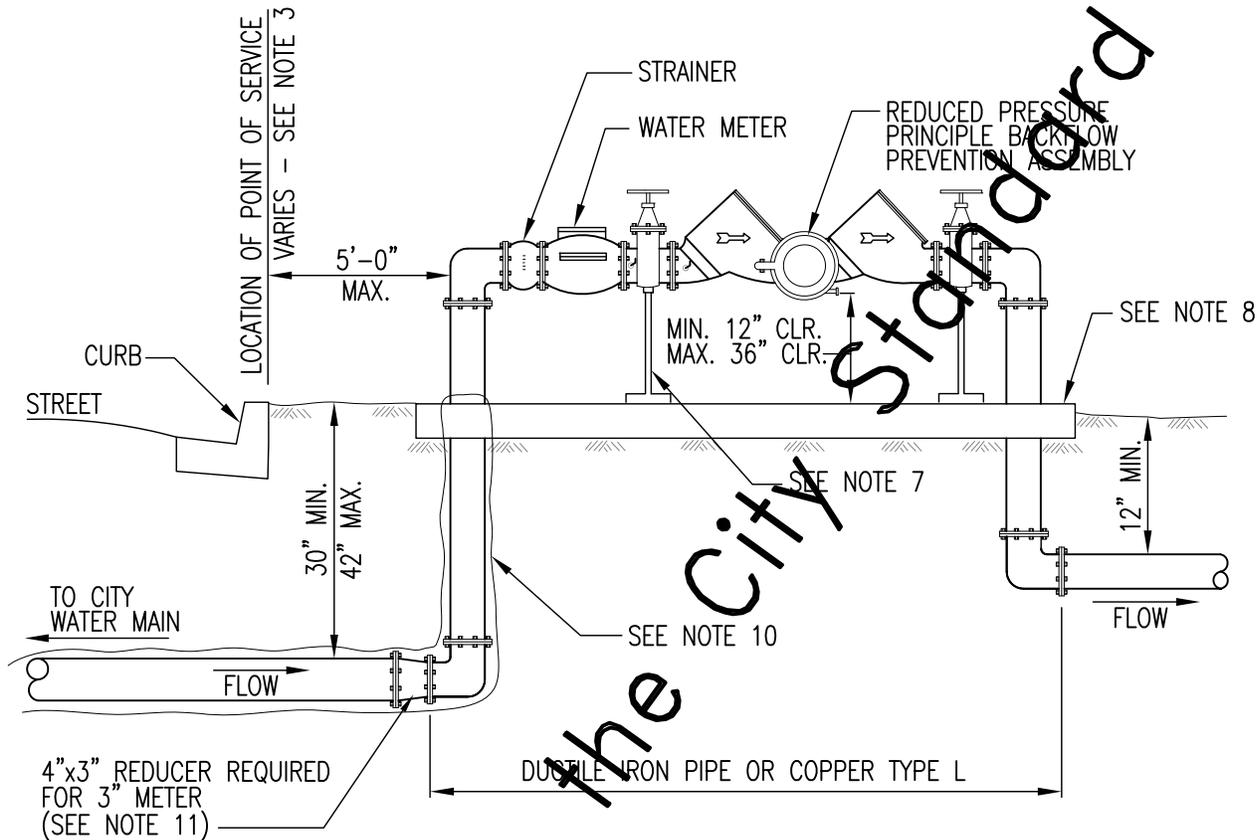
REV.	DATE	DESCRIPTION
△	01/06/09	See Addendum #1
△	11/17/11	Misc Changes
△		

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

INSTALLATION OF 2-INCH & SMALLER
RP ASSEMBLY WITH WATER METER

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-505**

Addendum #2, Page 56 of 81



INSTALLATION OF 3-INCH AND LARGER REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY WITH WATER METER

NOTES:

1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE CONNECTED TO CITY WATER AND TESTED PRIOR TO BEING PLACED INTO SERVICE.
3. POINT OF SERVICE:
 - A. POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER.
 - C. POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST.
4. LISTS OF APPROVED BACKFLOW PREVENTION ASSEMBLIES AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTORS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE COUNTER LOCATED AT 1395 35TH AVE.
5. THE BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND, IN A HORIZONTAL AND LEVEL POSITION. THE ASSEMBLY SHALL BE LOCATED ON THE CUSTOMER'S SIDE AND NO FURTHER THAN FIVE (5) FEET FROM THE POINT OF SERVICE OR THE METER.
6. OUTLETS, TAPS, TEES, OR CONNECTIONS BETWEEN THE WATER MAIN AND BACKFLOW PREVENTER ARE NOT ALLOWED.
7. SUPPORTS ARE REQUIRED FOR ASSEMBLIES 3-INCH AND LARGER.
8. CONCRETE PAD IS REQUIRED.
9. FREEZE BAGS ARE RECOMMENDED FOR FREEZE PROTECTION.
10. 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE IS REQUIRED FOR ALL UNDERGROUND COPPER TUBING AND DUCTILE IRON PIPE.
11. 3" ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4" AND LARGER METERS REQUIRES TAP SIZE EQUIVALENT TO METER SIZE.

REV.	DATE	DESCRIPTION

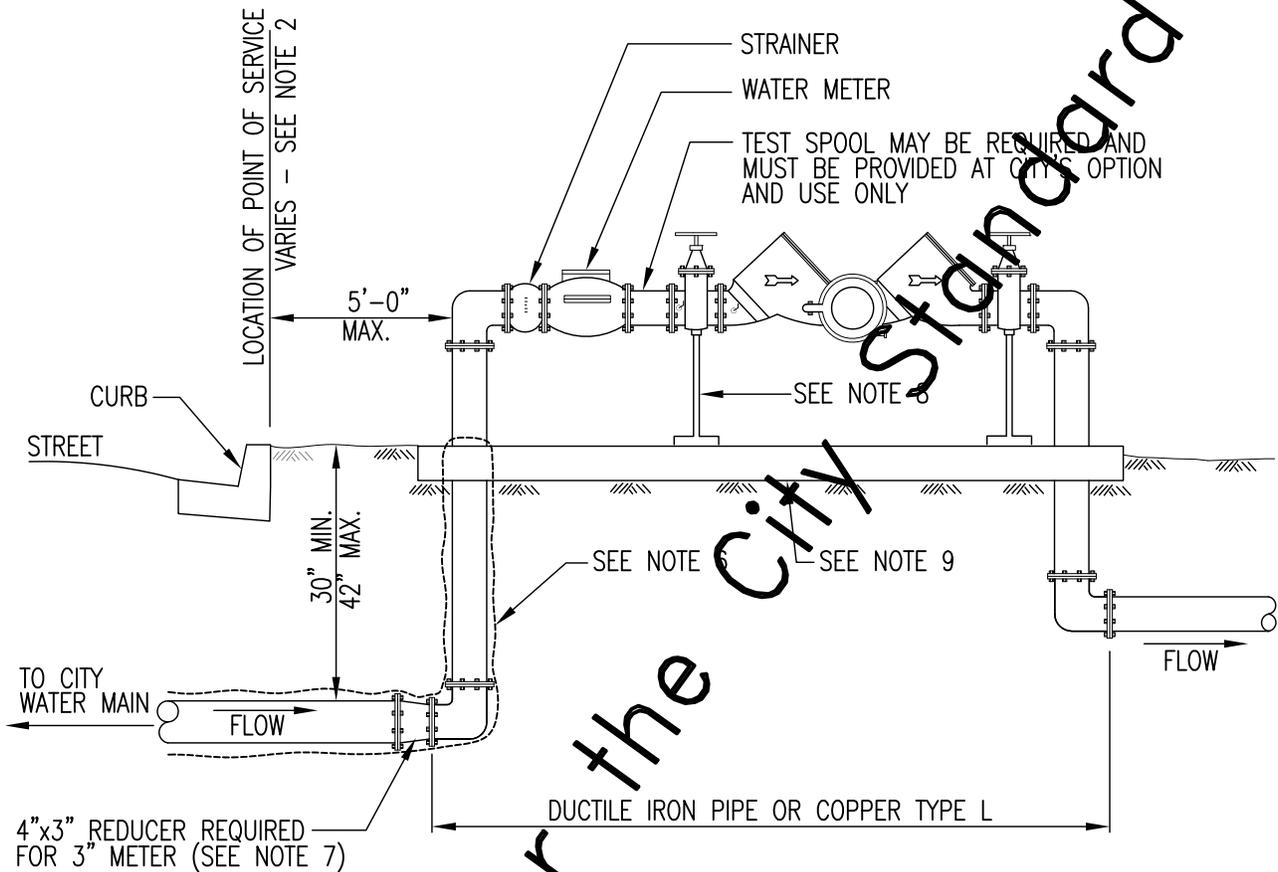
**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**INSTALLATION OF 3-INCH & LARGER
RP DEVICE WITH WATER METER**

APPR'D BY: DOB NO SCALE
DATE: MAY 2007 DWG. NO. **W-506**

Addendum #2, Page 57 of 81

R: \Utilities\New_Std_Details\Water_Utilities\W-506



NOTES:

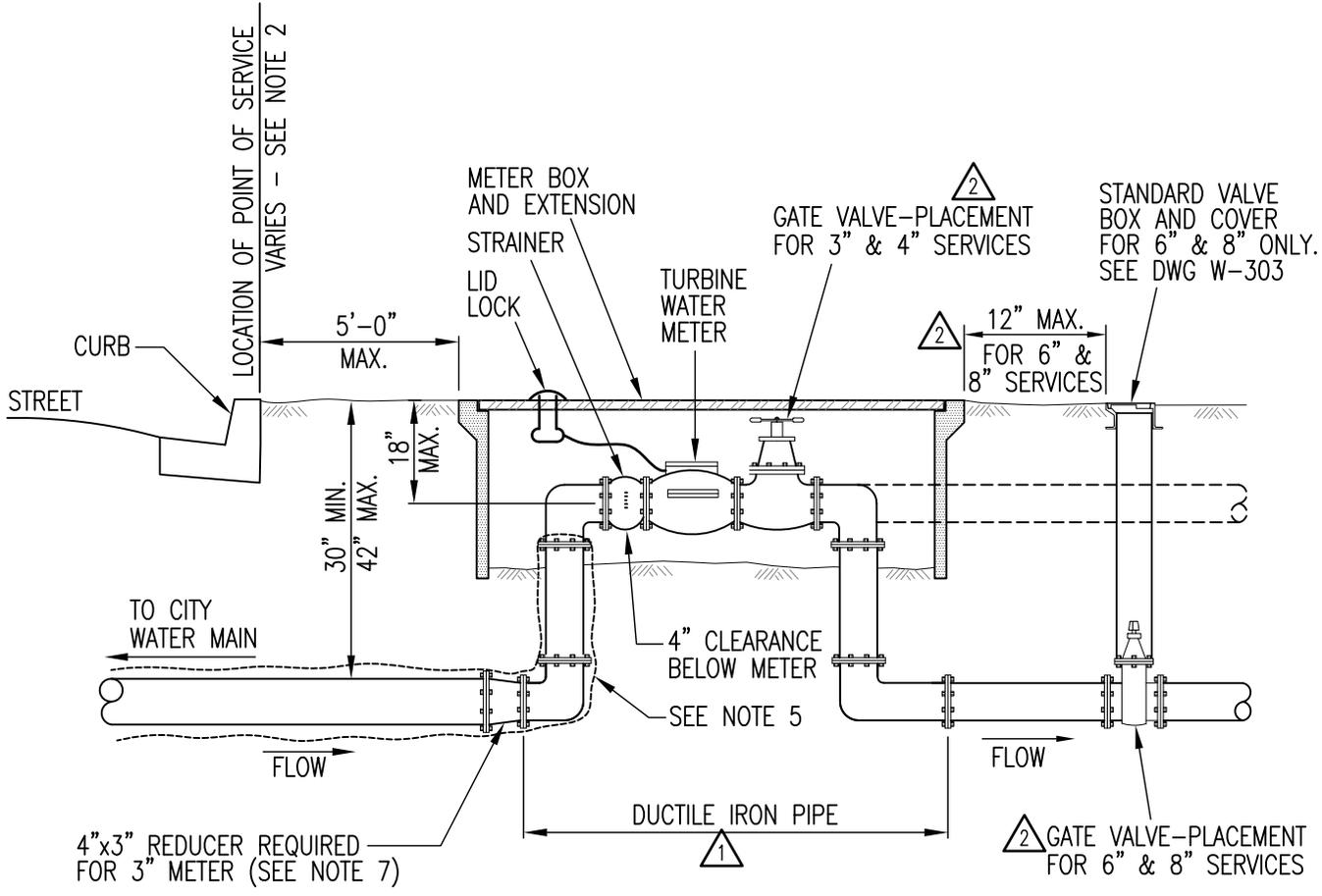
1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. POINT OF SERVICE:
 - A. POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER.
 - C. POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST.
3. A CITY PROVIDED STRAINER AND/OR TEST SPOOL MAY BE REQUIRED.
4. TEST SPOOL, IF REQUIRED, WILL BE INSTALLED BETWEEN THE WATER METER AND THE RP ASSEMBLY. THE TEST SPOOL IS FOR CITY USE ONLY.
5. FOR REDUCED BACKFLOW PREVENTION ASSEMBLY NOTES, SEE DRAWING W-506.
6. 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE IS REQUIRED FOR ALL UNDERGROUND COPPER TUBING AND DUCTILE IRON PIPE.
7. 3" ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4" AND LARGER METERS REQUIRES TAP SIZE EQUIVALENT TO METER SIZE.
8. SUPPORTS ARE REQUIRED.
9. CONCRETE PAD IS REQUIRED.

REV.	DATE	DESCRIPTION
△		
△		
△		

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**3-INCH AND LARGER METERED
WATER SERVICE INSTALLATIONS**

APPR'D BY: DOB NO SCALE
DATE: MAY 2007 DWG. NO. **W-508**



NOTES: ²

1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. POINT OF SERVICE:
 - A. POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER
 - C. POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE DEPARTMENT OF UTILITIES METER SUPERVISOR.
3. A CITY PROVIDED STRAINER AND/OR TEST SPOOL MAY BE REQUIRED.
4. TEST SPOOL, IF REQUIRED, WILL BE INSTALLED BETWEEN THE WATER METER AND THE CHECK VALVE. THE TEST SPOOL IS FOR CITY USE ONLY.
5. 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE SHALL BE REQUIRED FOR ALL UNDERGROUND DUCTILE IRON PIPE. ¹
6. METER BOXES SHALL NOT BE INSTALLED IN SIDEWALKS UNLESS OTHERWISE SPECIFIED/APPROVED BY THE UTILITIES METER SUPERVISOR.
7. THREE-INCH ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4-INCH AND LARGER SERVICES REQUIRES TAP SIZE EQUIVALENT TO METER SIZE.

REV.	DATE	DESCRIPTION
¹	01-06-09	NO COPPER
²	11-16-11	VALVE SIZES/NOTES
³		

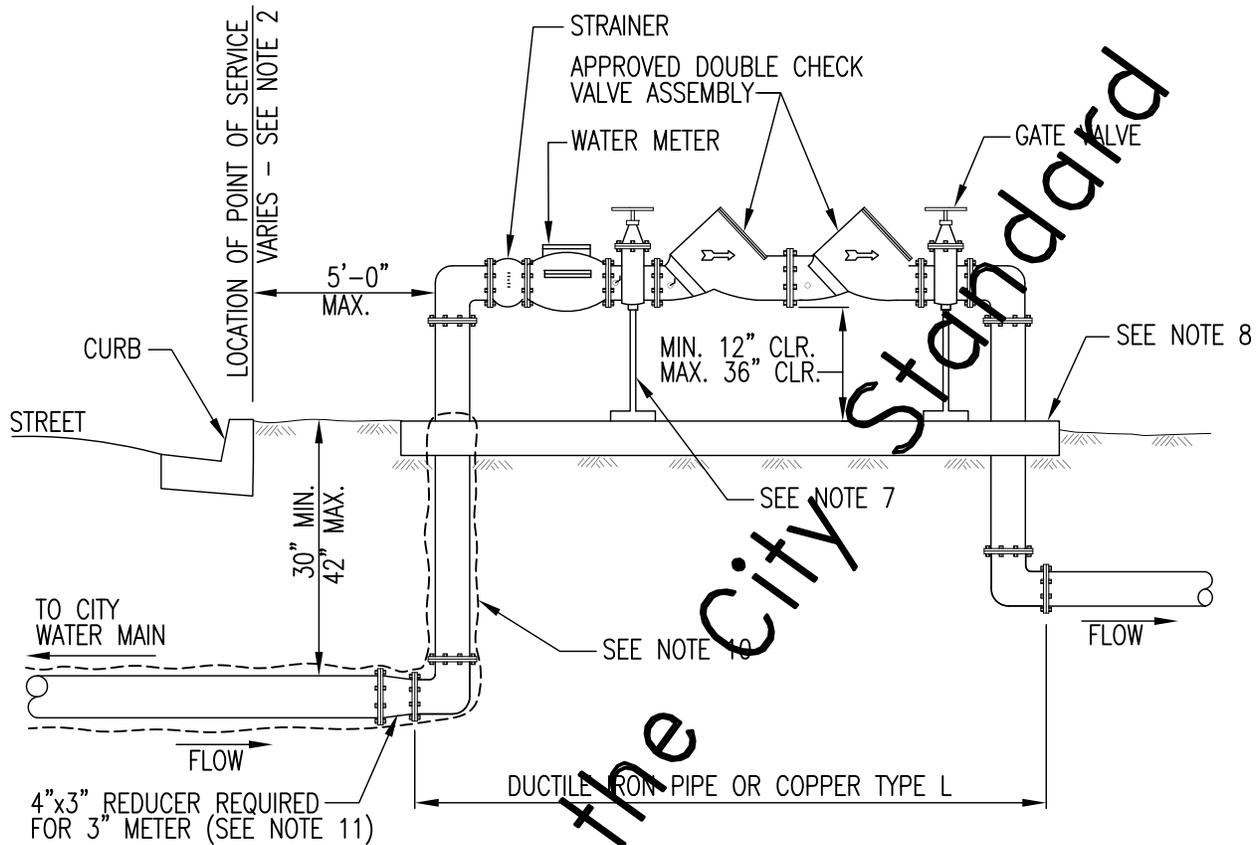
CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

RETROFIT OF 3"-8" WATER SERVICE WITHOUT
BF DEVICE ON LOOPED OR IRRIGATION SYSTEM

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-509**

R:\Utilids\New_Std_Details\Water_Utilities\W-509

Addendum #2, Page 59 of 81



**INSTALLATION OF 3-INCH AND LARGER
DOUBLE CHECK VALVE ASSEMBLY**

NOTES:

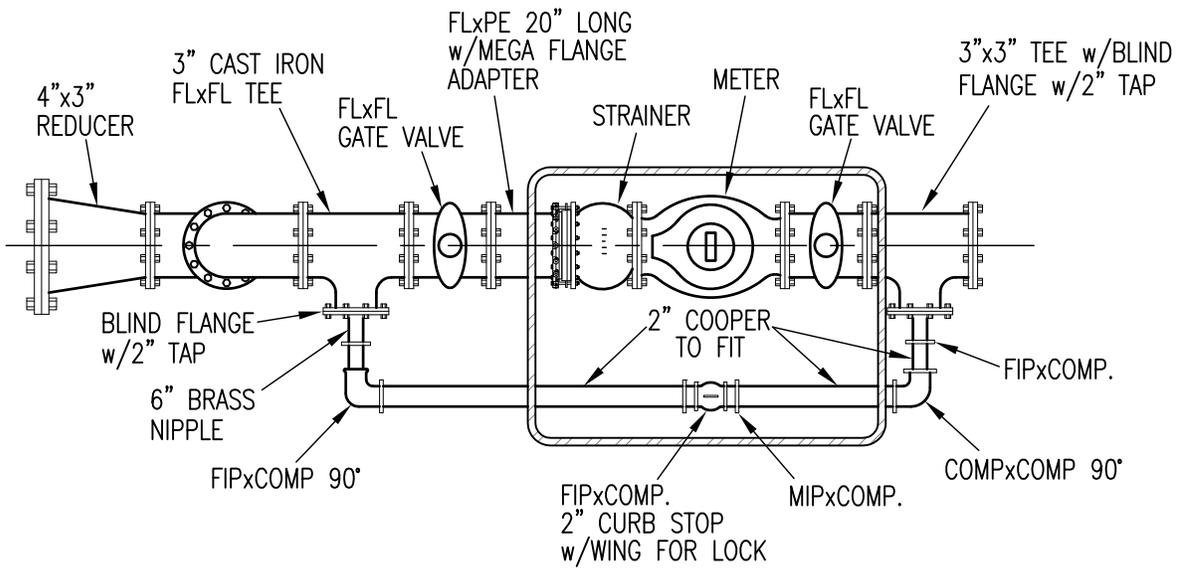
1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. DOUBLE CHECK VALVE ASSEMBLIES SHALL BE CONNECTED TO CITY WATER AND TESTED PRIOR TO BEING PLACED INTO SERVICE.
3. POINT OF SERVICE:
 - A. POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER.
 - C. POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST.
4. LISTS OF APPROVED DOUBLE CHECK VALVE ASSEMBLIES AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTORS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE COUNTER LOCATED AT 1395 35TH AVENUE.
5. THE DOUBLE CHECK VALVE ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND, IN A HORIZONTAL AND LEVEL POSITION. THE ASSEMBLY SHALL BE LOCATED ON THE CUSTOMER'S SIDE AND NO FURTHER THAN FIVE (5) FEET FROM THE POINT OF SERVICE.
6. OUTLETS, TAPS, TIES, OR CONNECTIONS BETWEEN THE WATER MAIN AND BACKFLOW PREVENTER ARE NOT ALLOWED.
7. SUPPORTS ARE REQUIRED FOR ASSEMBLIES.
8. CONCRETE PAD IS REQUIRED FOR ALL DOUBLE CHECK VALVE ASSEMBLIES.
9. FREEZE BAGS ARE RECOMMENDED FOR FREEZE PROTECTION.
10. 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE IS REQUIRED FOR ALL UNDERGROUND COPPER TUBING AND DUCTILE IRON PIPE.
11. 3" ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4" AND LARGER SERVICES REQUIRE TAP SIZE EQUIVALENT TO METER SIZE.

REV.	DATE	DESCRIPTION
1	04-01-09	Title

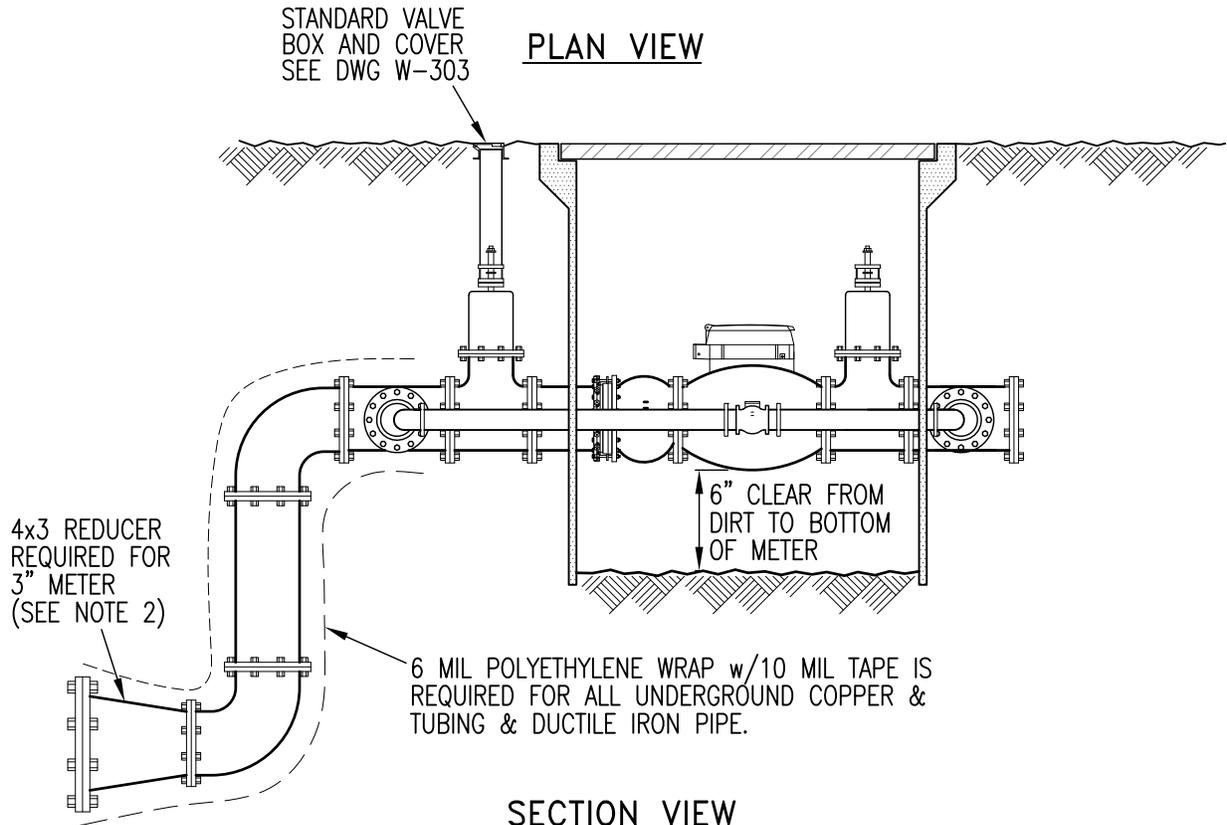
**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**3-INCH & LARGER FIRE SERVICE
WITH DOUBLE CHECK VALVE ASSEMBLY**

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-511**



PLAN VIEW



SECTION VIEW

TYPE AND SIZE BOXES:

- 3" AND 4" IN TRAFFIC = 3048 BOX W/ H2O RATED COVER
- 3" AND 4" IN PLANTER AREA = B48 BOX WITH 2 PIECE CONCRETE COVERS.
- 6" IN PLANTER AREA = B52 BOX WITH 3 PIECE CONCRETE COVERS
- 6" IN TRAFFIC AREA = R10 PIT W/ H2O TRAFFIC RATED STEEL SPRING LOADED COVER
- 8" IN PLANTER AREA = R17 PIT W/ 4 PIECE STEEL COVER
- 8" IN TRAFFIC AREA + R17 PIT W/ H2O RATED STEEL SPRING LOADED COVER

NOTES:

1. ALL BOX LIDS MUST HAVE 2-2" RECESSED HOLES TO ACCOMMODATE LID LOCKS.
2. 3" ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4" AND LARGER METERS REQUIRES TAP SIZE EQUIVALENT TO METER SIZE.

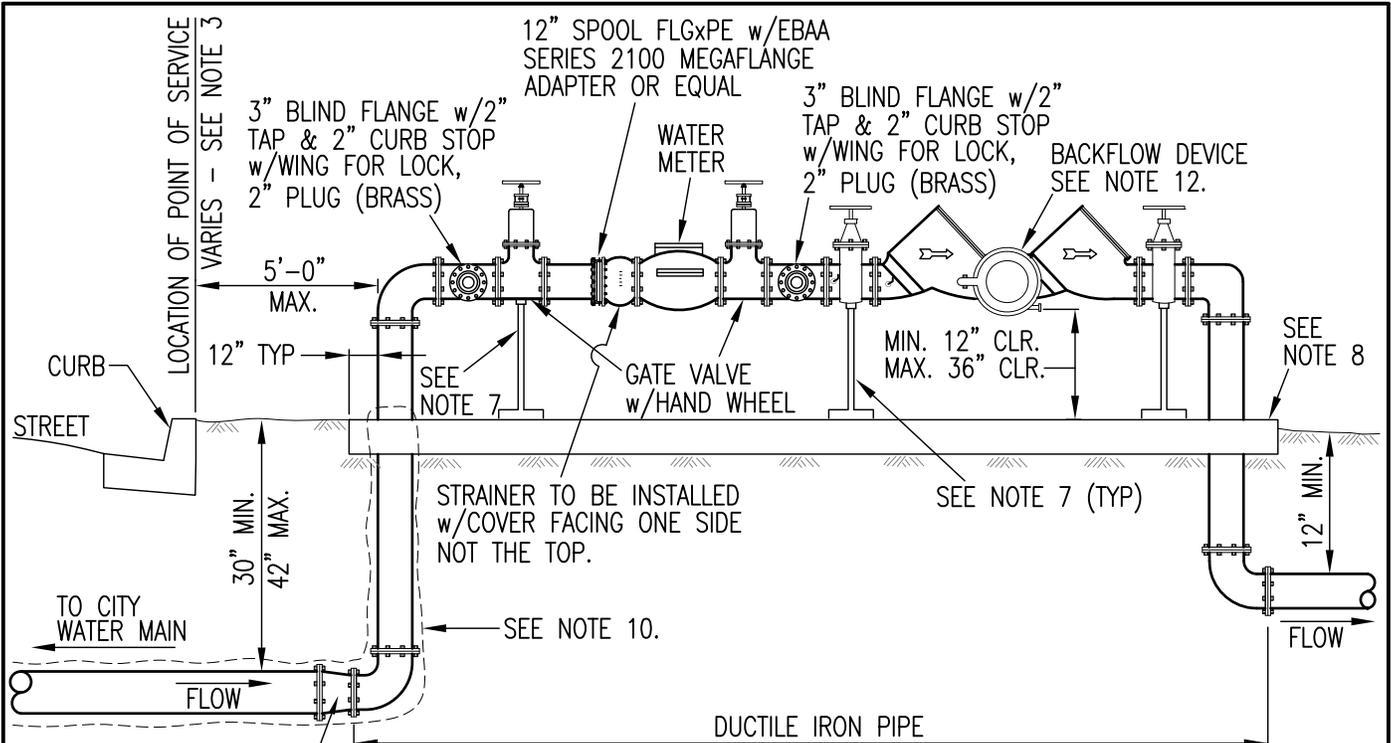
REV.	DATE	DESCRIPTION
1	11-16-11	NEW DETAIL

**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

3" - 8" WATER SERVICE BELOW GROUND
WITH BYPASS (COMPOUND METERS)

APPR'D BY: *Michael O. Benall* NO SCALE
DATE: NOV 2011 DWG. NO. **W-515**

Addendum #2, Page 61 of 81



INSTALLATION OF 3-INCH AND LARGER METERED WATER SERVICE WITH BACKFLOW ASSEMBLY

NOTES:

1. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CURRENT CROSS CONNECTION CONTROL POLICY.
2. REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE CONNECTED TO CITY WATER AND TESTED PRIOR TO BEING PLACED INTO SERVICE.
3. POINT OF SERVICE:
 - A. POINT OF SERVICE IS THE BACK OF CURB FOR ALL CITY STREETS WITH PLANTER STRIPS.
 - B. POINT OF SERVICE IS THE BACK OF SIDEWALK FOR STREETS WITH SIDEWALK CONTIGUOUS WITH CURB AND GUTTER.
 - C. POINT OF SERVICE IS THE RIGHT-OF-WAY LINE ON ALL ALLEYS AND UNIMPROVED STREETS.
 - D. WHERE THE POINT OF SERVICE IS UNCLEAR THE LOCATION SHALL BE DETERMINED BY THE CROSS CONNECTION CONTROL SPECIALIST.
4. LISTS OF APPROVED BACKFLOW PREVENTION ASSEMBLIES AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTORS ARE AVAILABLE AT THE DEPARTMENT OF UTILITIES CUSTOMER SERVICE COUNTER LOCATED AT 1395 35TH AVE.
5. THE BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND, IN A HORIZONTAL AND LEVEL POSITION. THE ASSEMBLY SHALL BE LOCATED ON THE CUSTOMER'S SIDE AND NO FURTHER THAN FIVE (5) FEET FROM THE POINT OF SERVICE OR THE METER.
6. OUTLETS, TAPS, TEES, OR CONNECTIONS BETWEEN THE WATER MAIN AND BACKFLOW PREVENTER ARE NOT ALLOWED. UNLESS SHOWN ON THE DETAIL.
7. SUPPORTS ARE REQUIRED.
8. CONCRETE PAD IS REQUIRED. WIDTH 3'(MIN), LENGTH 12'(MIN) BEYOND EDGE OF PIPE, THICKNESS 4'(MIN)
9. FREEZE BAGS ARE RECOMMENDED FOR FREEZE PROTECTION.
10. 6 MIL POLYETHYLENE WRAP WITH 10 MIL TAPE IS REQUIRED FOR ALL UNDERGROUND COPPER TUBING AND DUCTILE IRON PIPE.
11. 3" ON-SITE WATER SERVICE REQUIRES A 4" TAP, 4"x3" REDUCER, 3" METER AND 3" BACKFLOW ASSEMBLY. 4" AND LARGER METERS REQUIRES TAP SIZE EQUIVALENT TO METER SIZE.
12. DETERMINATION OF THE TYPE OF BACKFLOW ASSEMBLY REQUIRED SHALL BE MADE BY THE COS, DOU'S CROSS CONNECTION SPECIALIST.
13. PROTECTIVE ENCLOSURE IS REQUIRED, FOR CITY OWNED & MAINTAINED ASSEMBLIES. ENCLOSURES FOR ASSEMBLIES 4" AND SMALLER SHALL BE PLACER WATERWORKS PW/E2AW-M (W24"xL72"xH48") OR EQUAL. FOR ASSEMBLIES 6" AND LARGER THE ENCLOSURE SHALL BE PW/E2AW-L (W30"xL84"xH60") OR EQUAL. ALL ENCLOSURES SHALL BE POWDER COATED HUNTER GREEN.

REV.	DATE	DESCRIPTION
1	11-16-11	NEW DETAIL

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

INSTALLATION OF 3" & LARGER
METERED WTR SERV w/ BF ASSEMBLY

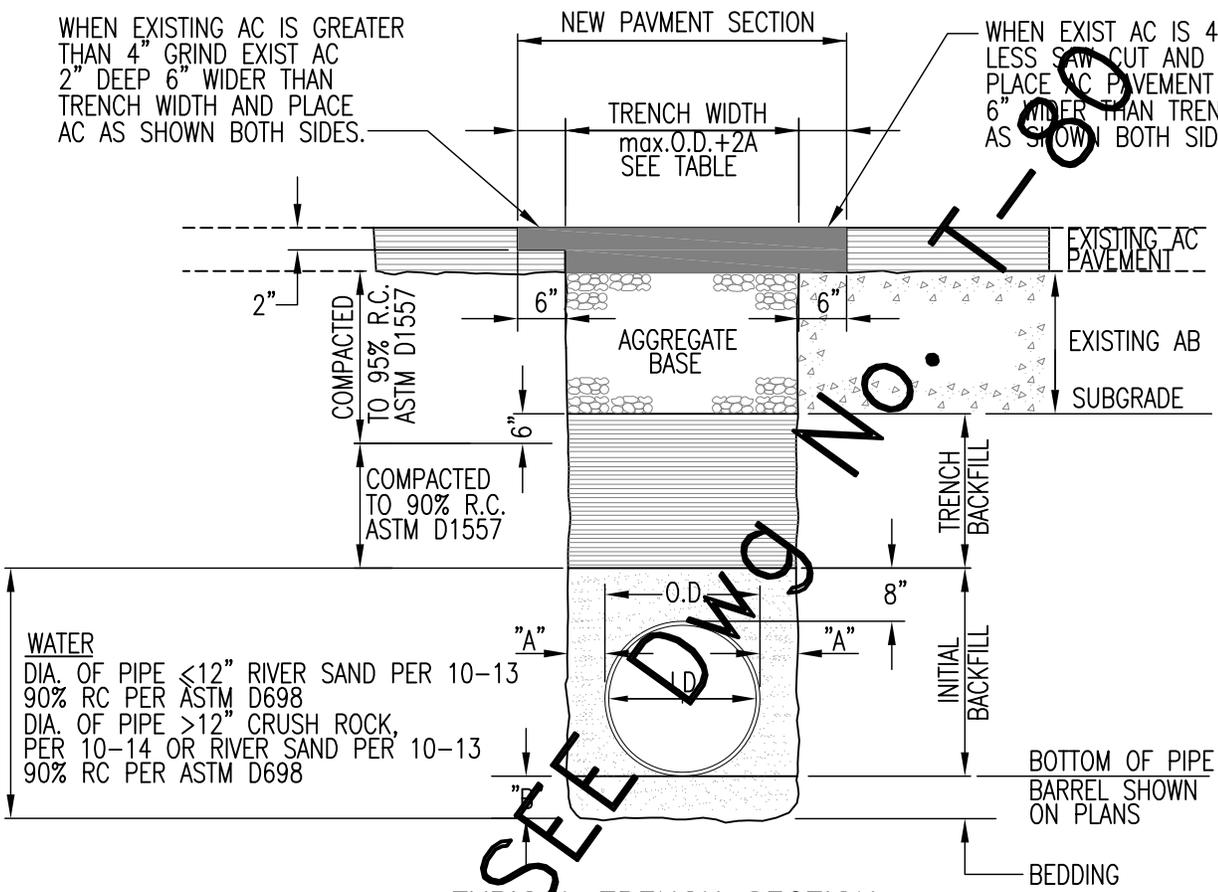
APPR'D BY: *Melvin O. Benall* NO SCALE
DATE: NOV 2011 DWG. NO. **W-608**

R:\Utilids\New_Std_Details\Water_Utilities\W-608

Addendum #2, Page 62 of 81

WHEN EXISTING AC IS GREATER THAN 4" GRIND EXIST AC 2" DEEP 6" WIDER THAN TRENCH WIDTH AND PLACE AC AS SHOWN BOTH SIDES.

WHEN EXIST AC IS 4" OR LESS SAW CUT AND PLACE AC PAVEMENT 6" WIDER THAN TRENCH AS SHOWN BOTH SIDES.



TYPICAL TRENCH SECTION

NOTES:

1. A TACK COAT OF ASPHALTIC EMULSION OR PAVING GRADE ASPHALT SHALL BE APPLIED TO EXISTING A.C. PAVEMENT AT ALL CONTACT SURFACES PRIOR TO PERMANENT A.C. PAVING PER SECTION 22-7 OF STANDARD SPECIFICATIONS.
2. UNLESS OTHERWISE SPECIFIED, PERMANENT PAVEMENT SHALL CONFORM IN QUALITY AND THICKNESS TO THE TYPE OF PAVEMENT REMOVED; BUT IN NO CASE SHALL BE LESS THAN FOUR INCHES (4") OF ASPHALTIC CONCRETE ON TWELVE INCHES (12") OF AGGREGATE BASE CLASS 2.
3. EXISTING PAVEMENT SHALL BE SAWCUT AND REMOVED IN SUCH A MANNER SO AS NOT TO TEAR, BULGE OR DISPLACE ADJACENT PAVEMENT. EDGES SHALL BE CLEAN AND VERTICAL WHEN PRACTICAL, ALL CUTS SHALL BE PARALLEL OR PERPENDICULAR TO STREET CENTERLINE.
4. ALL EXCAVATION AND BACKFILL SHALL, CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
5. R.C. - RELATIVE COMPACTION AS DETERMINED BY ASTM DESIGNATION D 1557 OR 698.
6. NO SOLID BLOCKING PERMISSIBLE BENEATH PIPE.
7. JETTING BACKFILL IS NOT PERMITTED.

TABLE		
DIMENSION NAME	PIPE DIAMETER (INCHES)	DIMENSION (INCHES)
A (MIN. TRENCH CLEARANCE)	≤12	8
	>12	10
B (MIN. BEDDING BELOW PIPE)	≤12	3
	>12	6

REV.	DATE	DESCRIPTION
1	11-16-11	Addendum 2

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

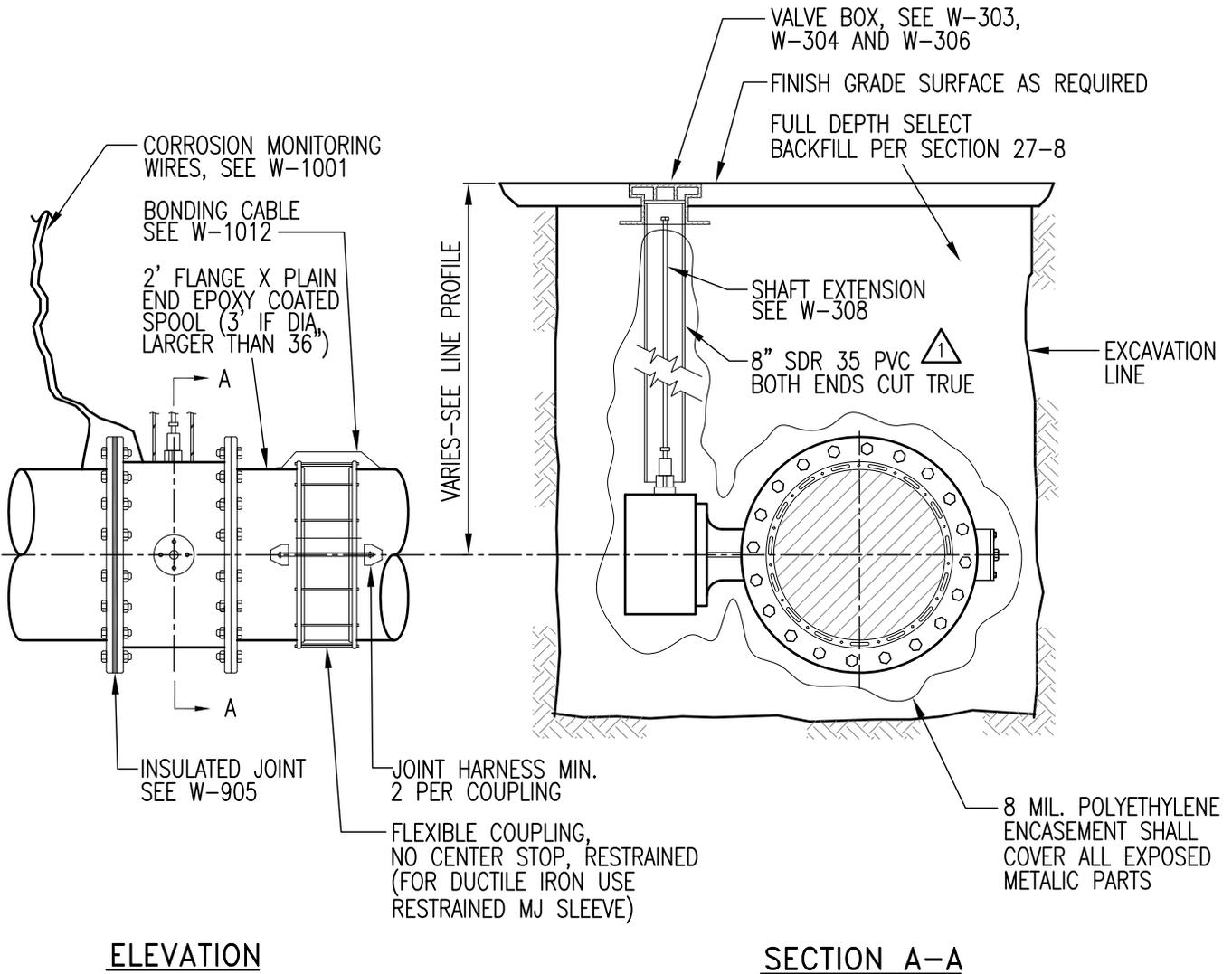
BACKFILL AND RESURFACING
IN PAVED AREAS

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. W-701

R:\Utilids\New_Std_Details\Water_Utilities\W-701

Addendum #2, Page 63 of 81

R:\Utilids\New_Std_Details\Water_Uilities\W-801



NOTE:

1. SEE SECTION 10 FOR VALVE AND COUPLING COATINGS.
2. A ONE PIECE FULL FACED GASKET IS REQUIRED ON ALL FLANGED FITTINGS.

REV.	DATE	DESCRIPTION
1	11/29/11	Material Change

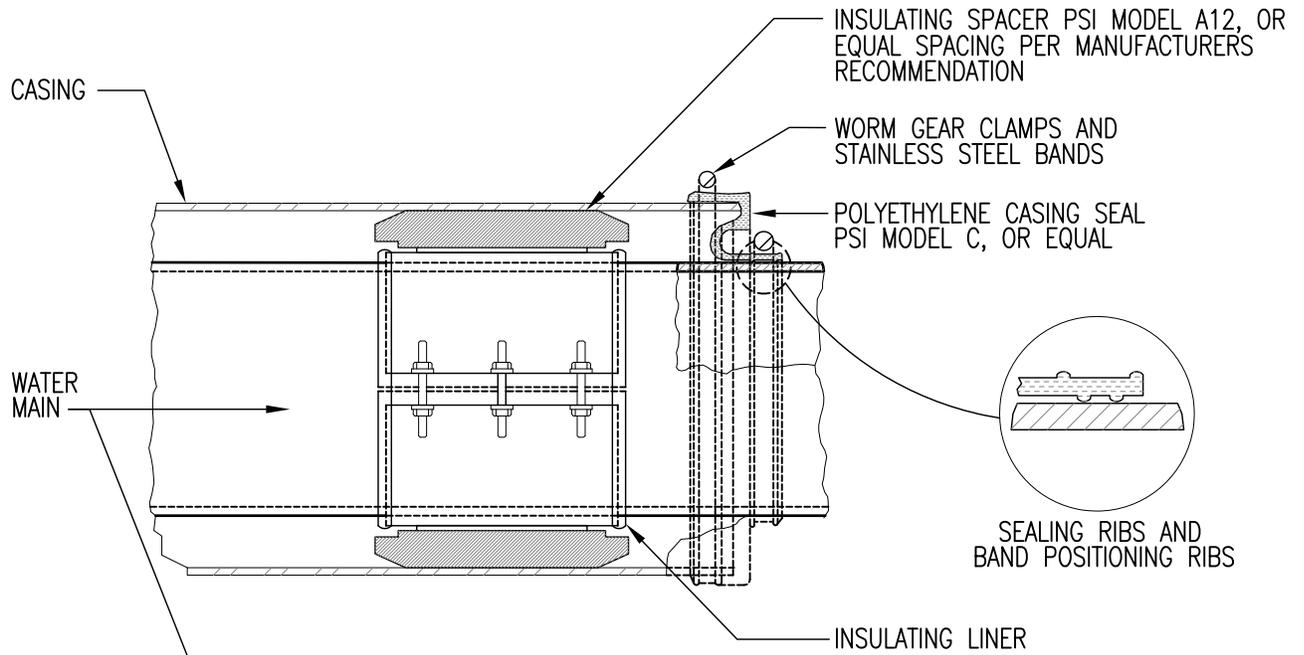
CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

BUTTERFLY VALVE STANDARD
BURIED INSTALLATION DETAIL

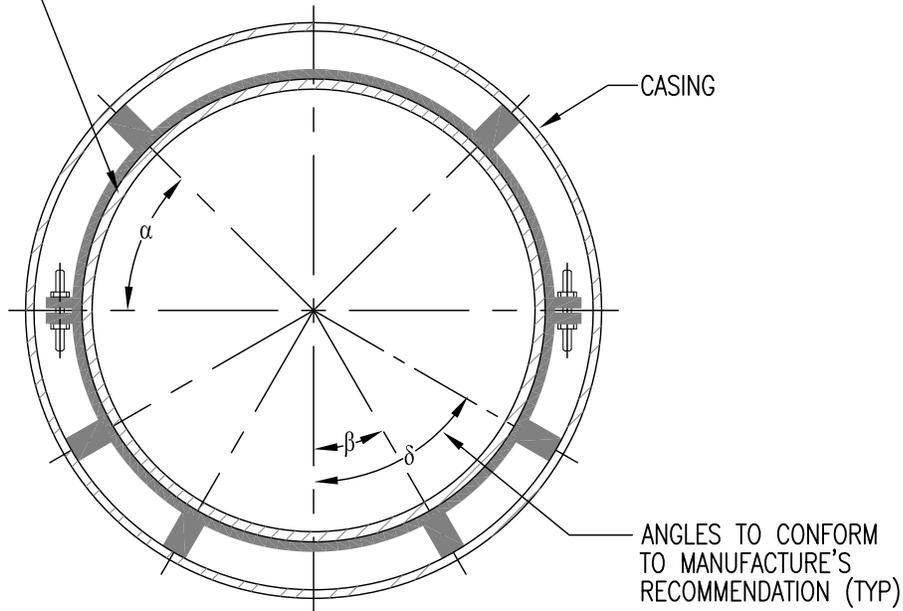
APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-801**

Addendum #2, Page 64 of 81

R:\Utilstds\New_Std_Details\Water_Uilities\W-901



SECTIONAL ELEVATION



SECTION

NOTE:

1. WRAP WSP OR DIP WATER MAINS IN 8 MIL POLYETHYLENE THRU CASING THAT IS TO BE FILLED WITH SAND OR OTHER MEDIA. OMIT POLYETHYLENE WRAP THRU SEALED CASING SECTIONS THAT ARE NOT FILLED.

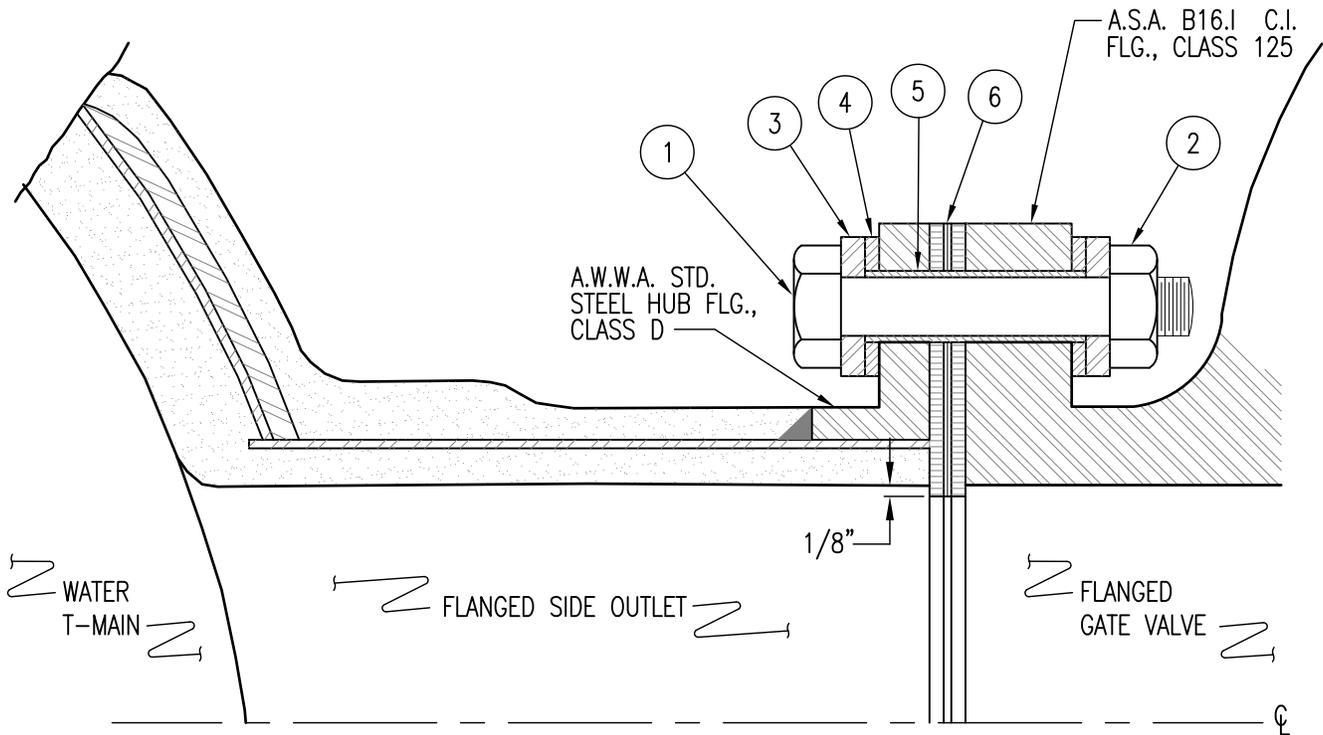
REV.	DATE	DESCRIPTION
1	11-16-11	Note change

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

CASING INSULATOR
SPACING ASSEMBLY

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-901**

Addendum #2, Page 66 of 81



ITEM	DESCRIPTION	NOMINAL SIZE (IN.)				
		PIPE SIZE	6	8	10	12
1.	HEX HEAD BOLT, AM. STD. N.C. THREAD PER ASTM A193, GRADE B7 ▲	QUANTITY	8	8	10	12
		DIAMETER	3/4	3/4	7/8	7/8
		MIN. LENGTH	3 1/2	3 3/4	4	4
2.	HEX NUT, PER ASTM A194, GRADE 2H, SEMI-FINISHED AM. STD. HEAVY SERIES, SIZE AND THREAD TO FIT HEX HEAD BOLT.	QUANTITY	8	8	12	12
3.	STEEL WASHER, 1/4" THICK, ROUND, FACES TO BE FLAT AND PARALLEL, STAINLESS STEEL.	QUANTITY	16	16	24	24
		O. DIAMETER	1 9/16	1 9/16	1 3/4	1 3/4
		I. DIAMETER	13/16	13/16	15/16	15/16
4.	INSULATING WASHER, 1/8" THICK, FABRIC REINFORCED BAKELITE, SLIP FIT OVER SLEEVE.	QUANTITY	16	16	24	24
		O. DIAMETER	1 9/16	1 9/16	1 3/4	1 3/4
		I. DIAMETER	13/16	13/16	15/16	15/16
5.	INSULATING SLEEVE, 1/32" WALL THICKNESS FABRIC REINFORCED BAKELITE.	QUANTITY	8	8	12	12
		I. DIAMETER	3/4	3/4	7/8	7/8
		LENGTH				*
6.	INSULATING GASKET, 1/8" THICK, MICARTA, FULL FACE, AM. STD. CLASS 150 FLANGE DRILLING, NEOPRENE FACED.	O. DIAMETER	11	13 1/2	16	19
		I. DIAMETER	I.D. OF LINED OUTLET, MINUS 1/8"			

* FIELD CUT TO ENGAGE INSULATING WASHERS.

NOTES:

1. VALVE AND FLANGE TO BE WRAPPED WITH 8 MIL POLYETHYLENE ENCASEMENT, AFTER ASSEMBLY.
2. RESISTANCE ACROSS FLANGE TO BE 50,000 OHMS OR HIGHER.
3. COMPONENTS ARE FOR 150 P.S.I. CLASS.

REV.	DATE	DESCRIPTION
▲	09-30-11	MOD. NUTS & BOLTS
▲		
▲		

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

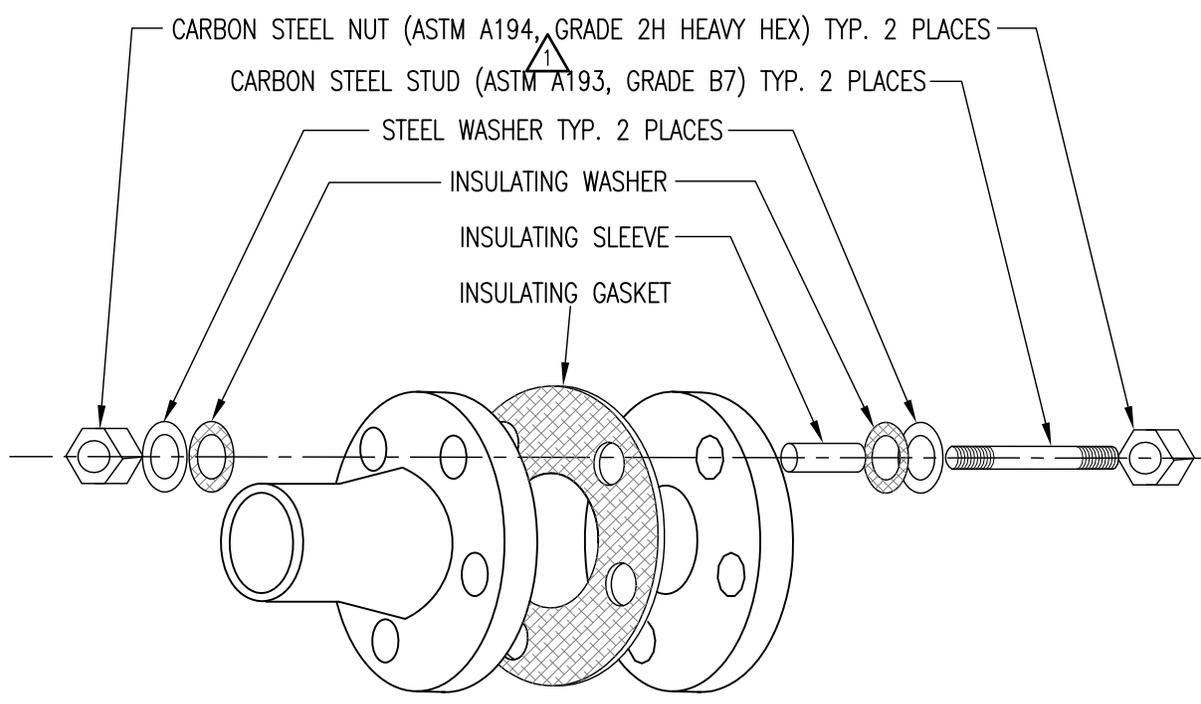
FLANGE INSULATOR FOR T-MAIN
SIDE OUTLET THRU 12-INCH PIPE

APPR'D BY: _____ NO SCALE
DATE: MAY 2007 DWG. NO. **W-902**

R:\Utilids\New_Std_Details\Water_Utilties\W-902

Addendum #2, Page 67 of 81

R: \Utilists\New_Std_Details\Water_Uilities\W-905



DIELECTRIC INSULATING JOINT FLANGE KIT

NOTE:

- 1. HARDWARE QUANTITIES IN INSULATING FLANGE KIT WILL VARY BASED ON GASKET PATTERN AND PIPE SIZE.

REV.	DATE	DESCRIPTION
1	09-30-11	MOD. NUTS & BOLTS

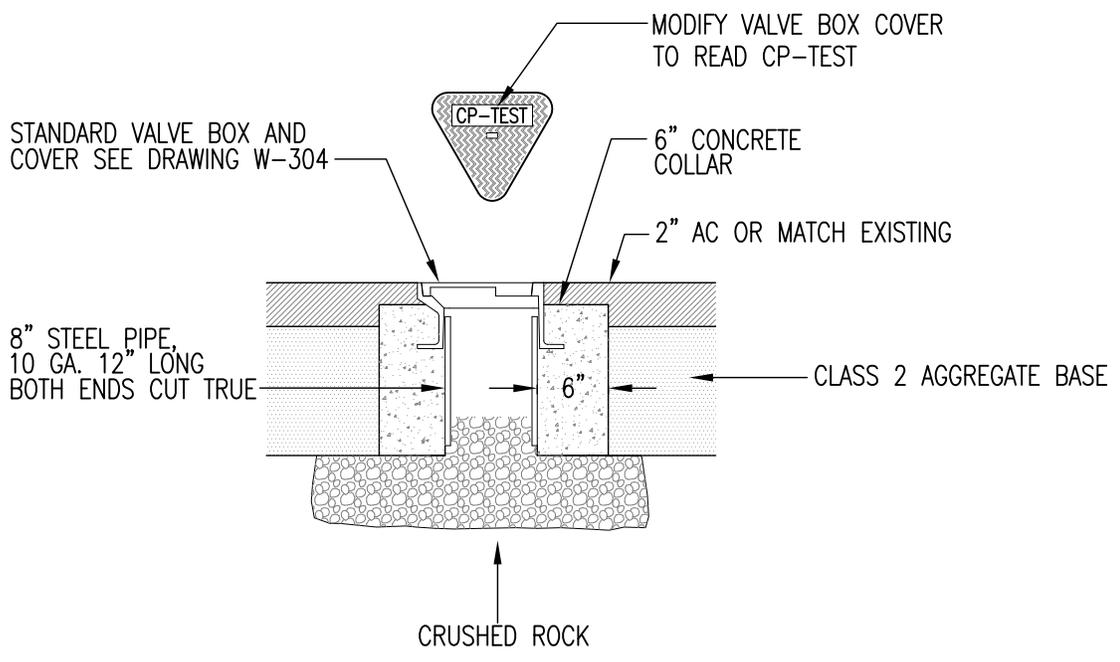
CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

DIELECTRIC INSULATING
FLANGE DETAIL

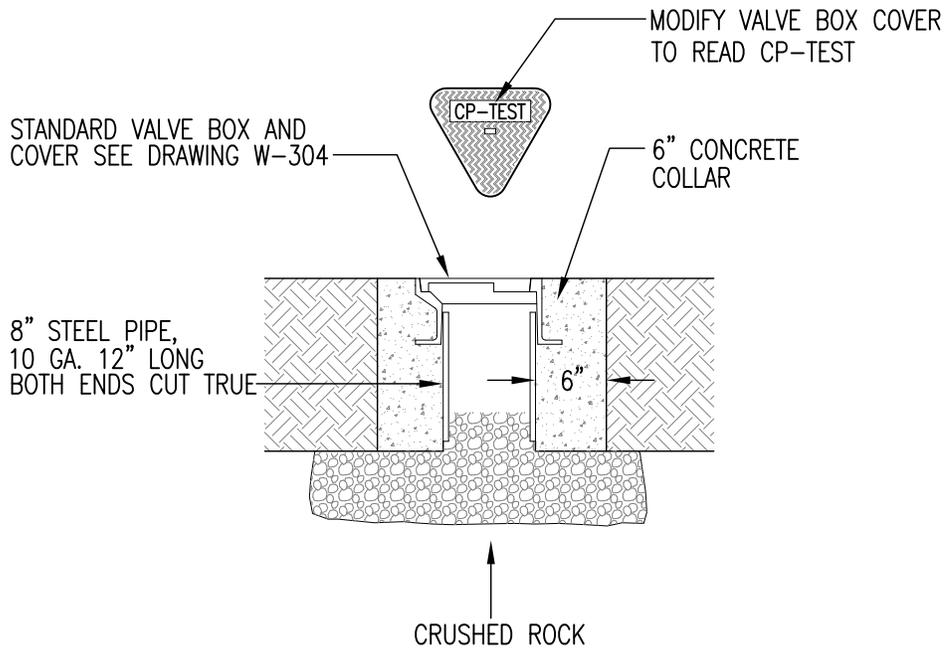
APPR'D BY: _____ NO SCALE
DATE: MAY 2007 DWG. NO. **W-905**

Addendum #2, Page 68 of 81

R:\Utilids\New_Std_Details\Water_Uilities\W-1004



**TEST STATION DETAIL
IN TRAFFIC AREAS**



**TEST STATION DETAIL
IN NON-TRAFFIC AREAS**

REV.	DATE	DESCRIPTION
1	11-16-11	Title Change

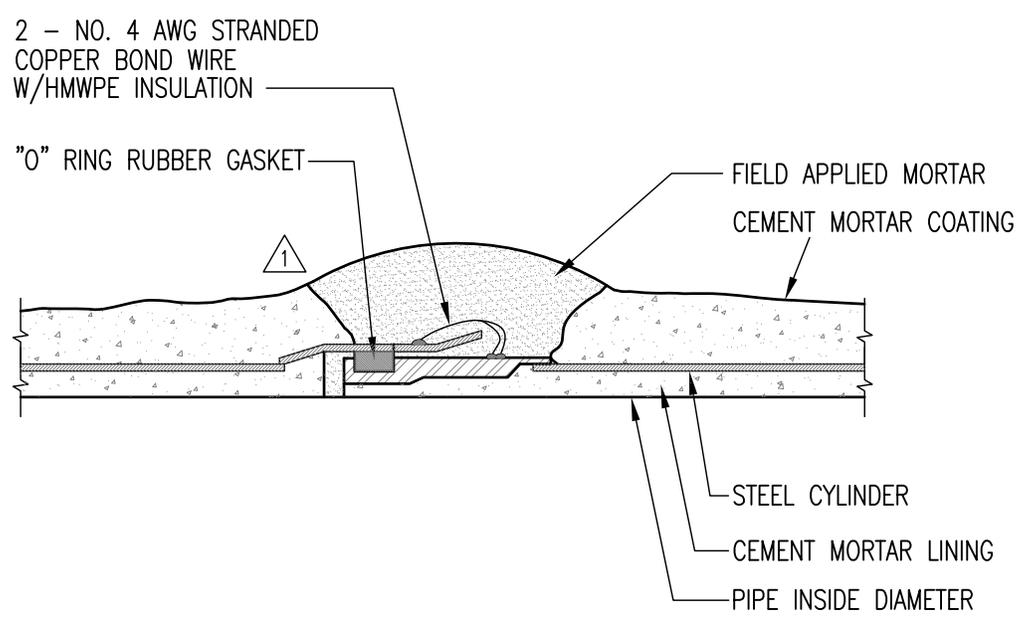
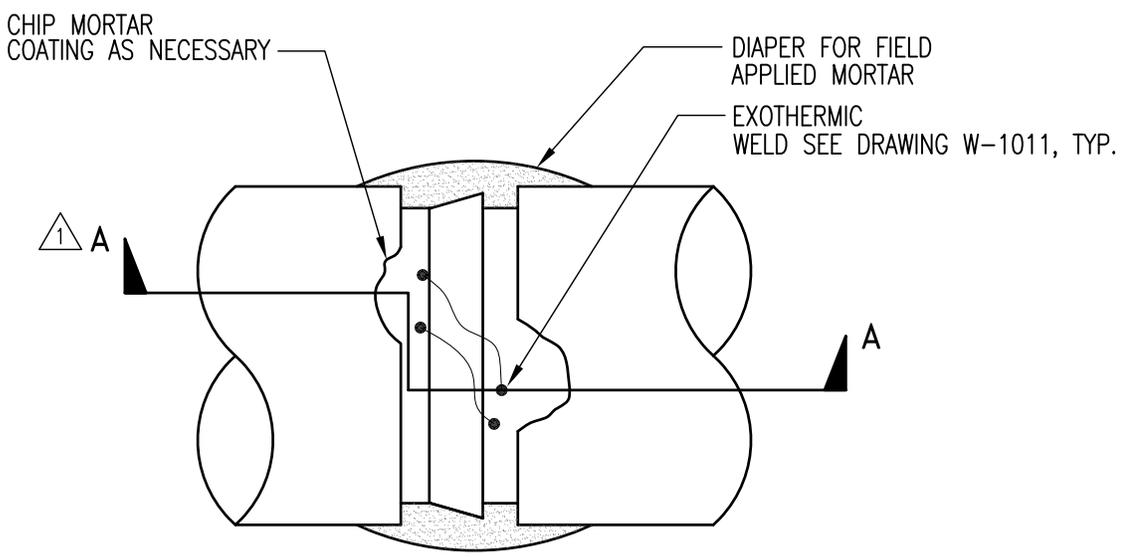
**CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES**

**TEST STATION HOUSING DETAIL
IN TRAFFIC/NON-TRAFFIC AREAS**

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **W-1004**

Addendum #2, Page 69 of 81

R:\Utilids\New_Std_Details\Water_Uilities\W-1008



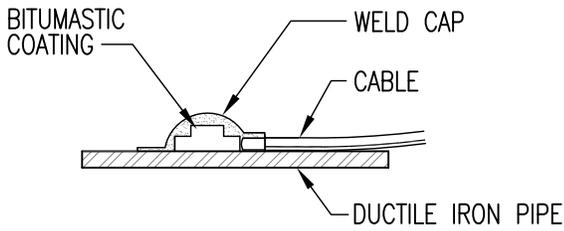
SECTION A-A

NOTE:
 ALL TRANSMISSION MAIN PIPE SHALL BE BONDED. DETAIL SHOWN IS FOR CCP & WSP.

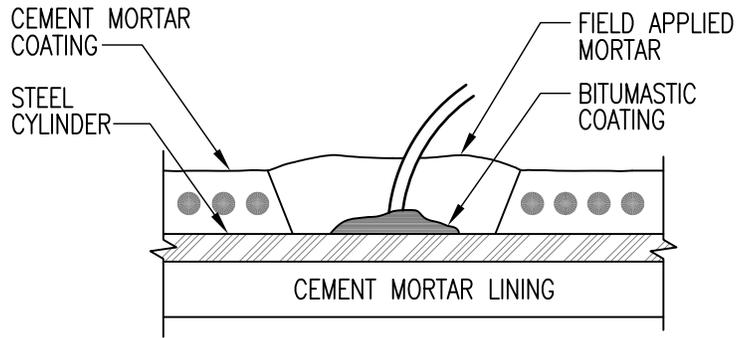
REV.	DATE	DESCRIPTION
1	11-28-11	Revise Sections

CITY OF SACRAMENTO DEPARTMENT OF UTILITIES	CCP AND WS PIPE JOINT BOND CABLE DETAIL	APPR'D BY: <i>DOB</i> NO SCALE
		DATE: MAY 2007 DWG. NO. W-1008

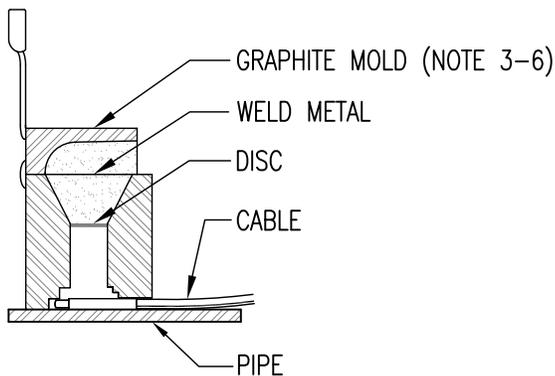
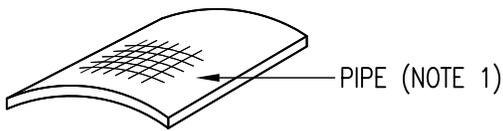
Addendum #2, Page 70 of 81



DUCTILE IRON PIPE

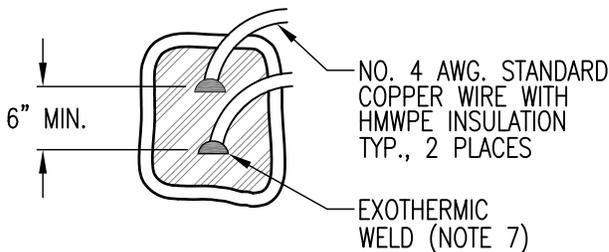


CONCRETE CYLINDER AND WELDED STEEL PIPE



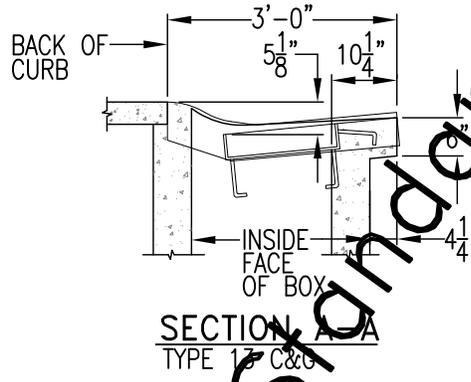
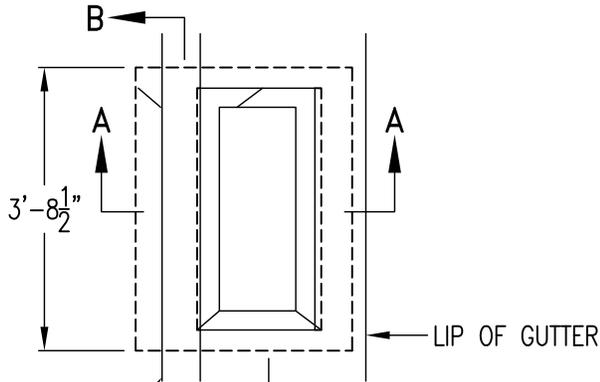
TYP INSTALLATION NOTES:

1. FILE PIPE TO BARE METAL AND CLEAN SURFACE
2. STRIP INSULATION FROM WIRE AND ATTACH SLEEVE
3. HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN.
4. REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER
5. COVER CONNECTION WITH BITUMASTIC COATING OVER ALL EXPOSED METAL. PLACE WELD CAP OVER CONNECTION.
6. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MFG. RECOMMENDATIONS.
7. ALL WIRE WELDS SHALL BE MINIMUM 6 INCHES APART.



REV.	DATE	DESCRIPTION
1	11-16-11	Misc Changes

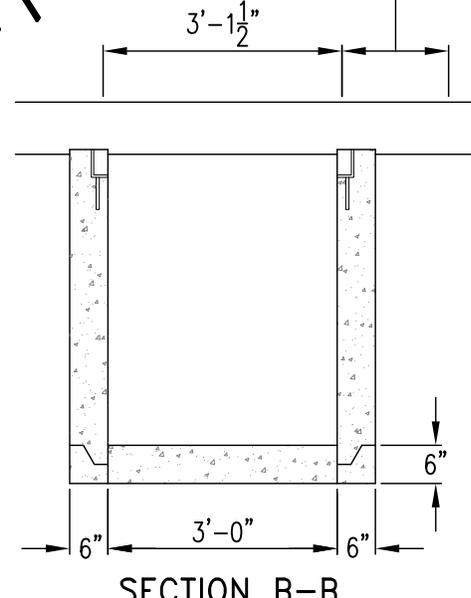
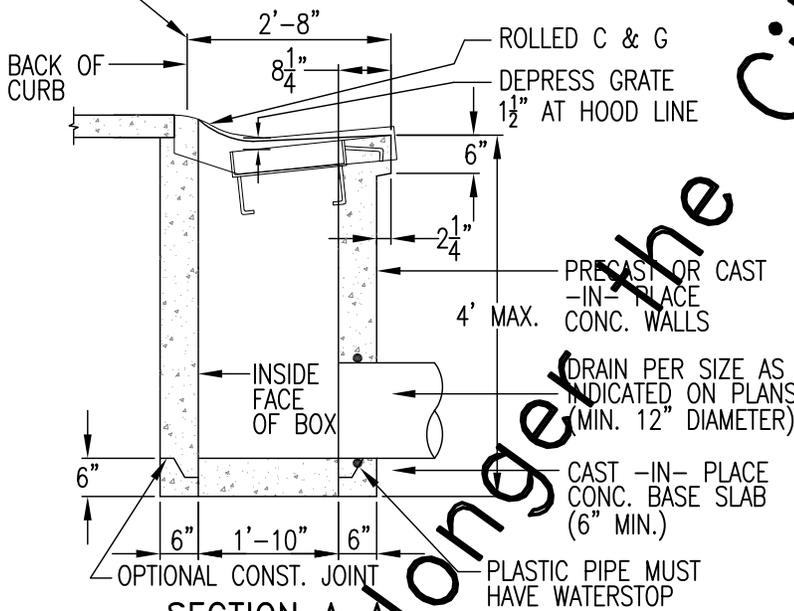
R: \Utilids\New_Std_Details\Water_Uilities\W-1011



PLAN

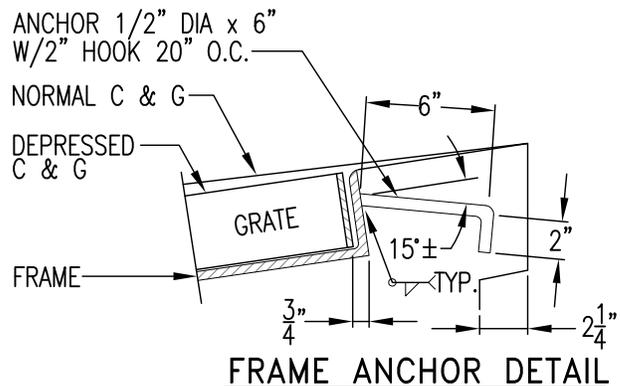
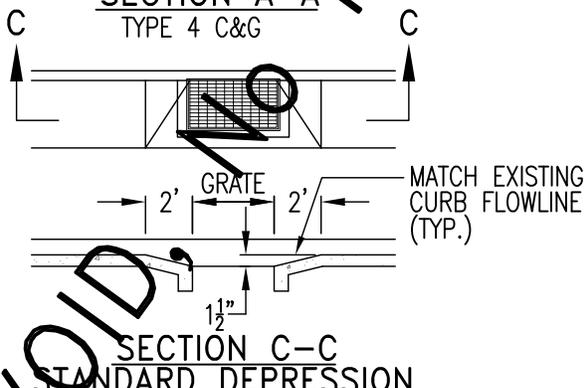
SECTION A-A
TYPE 13 C&G

CONSTRUCT 2' OF ROLLED CURB BEFORE BEGINNING WARP ON TYPE 13 CURB & GUTTER



SECTION A-A
TYPE 4 C&G

SECTION B-B



SECTION C-C
STANDARD DEPRESSION

FRAME ANCHOR DETAIL

NOTES:

- CAST -IN- PLACE CONCRETE INLETS SHALL CONFORM TO SECTION 20 OF THE STANDARD SPECIFICATIONS.
 - MINIMUM WALL THICKNESS: 6"
 - REINFORCEMENT: #4 BARS AT 12" O.C. EACH WAY WITH 2" MIN. COVER FROM INSIDE FACE; ALL WALLS.
 - BOTTOM OF INLET SHALL BE PLACED AT SAME TIME AS SIDE WALLS, UNLESS OTHERWISE APPROVED.
- PRECAST INLETS TO BE RATED FOR H2O LOADING & SHALL BE PRE-APPROVED BY THE ENGINEER.
- FRAME & GRATE SHALL CONFORM TO STANDARD DRAWING S-40.
- OPEN-BACK HOOD MAY BE CAST IRON OR STEEL \triangle

REV.	DATE	DESCRIPTION
1	01-06-09	May be Cast Iron or Steel.

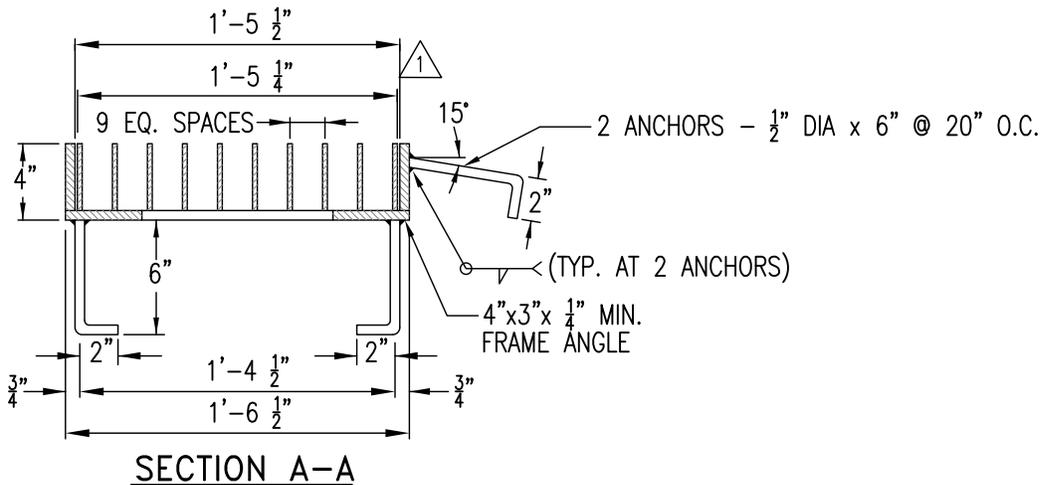
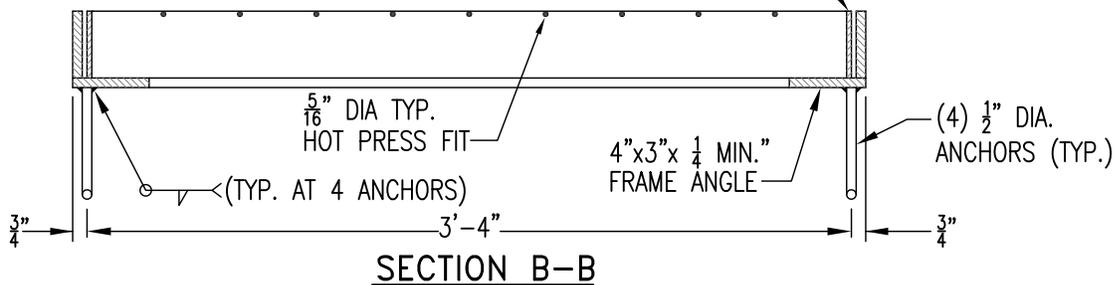
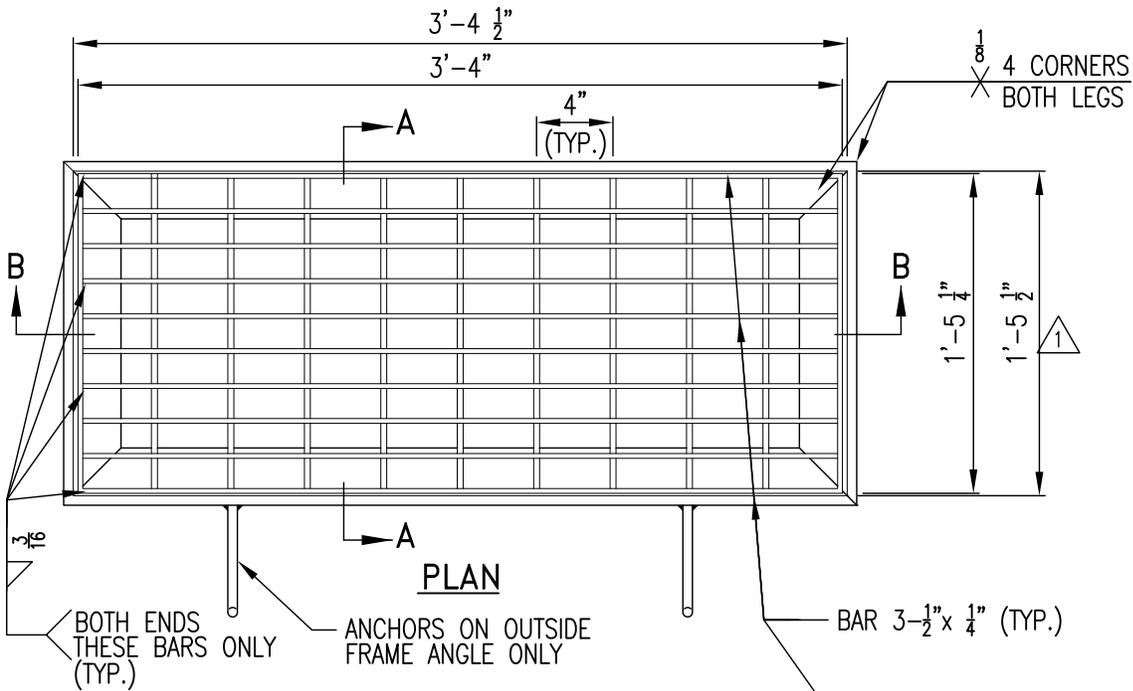
CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

TYPE "B" DROP INLET
ROLLED CURB

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. S-21

R:\Utilids\New_Std_Details\Sewer_Drainage\S-21

Accendum #2, Page 72 of 81



NOTES:

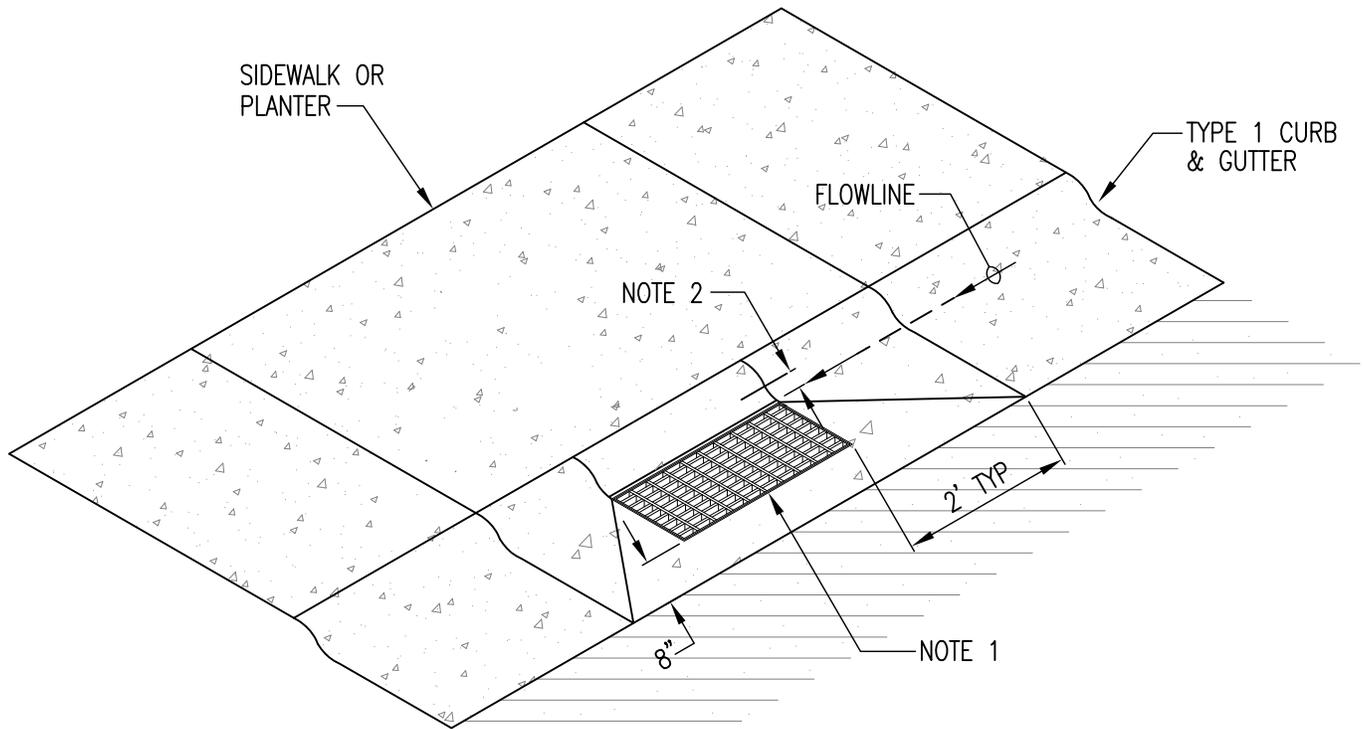
1. GRATE SHALL CONFORM TO REQUIREMENTS OF SECTION 75-1.02 OF CALTRANS STANDARD SPECIFICATION. GALVANIZING IS NOT REQUIRED.
2. ALL WELDS ON FRAME TO BE FULL PENETRATION DOUBLE V-GROOVE WELDS IN CONFORMANCE WITH AMERICAN WELDING SOCIETY STD. A-2.0.
3. LOCATE FRAME ANCHORS TO PROVIDE MINIMUM 2" CLEAR COVER.

REV.	DATE	DESCRIPTION
1	11-16-11	Dim. Changes

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

TYPE "B" FRAME
AND GRATE

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **S-40**



1
NOTES:

1. SEE STD DWG. S-30 SIMILAR, EXCEPT OMIT SIDE INLET OPENINGS. GUTTER CONC POUR 4" MIN THICK ATOP INLET BOX SIDES.
2. DEPRESS BACK EDGE OF GRATE 1 1/2" BELOW DESIGN FLOWLINE. FRONT LIP OF GRATE FLUSH WITH STD GUTTER PROFILE.

REV.	DATE	DESCRIPTION
1	11-16-11	Add Notes

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

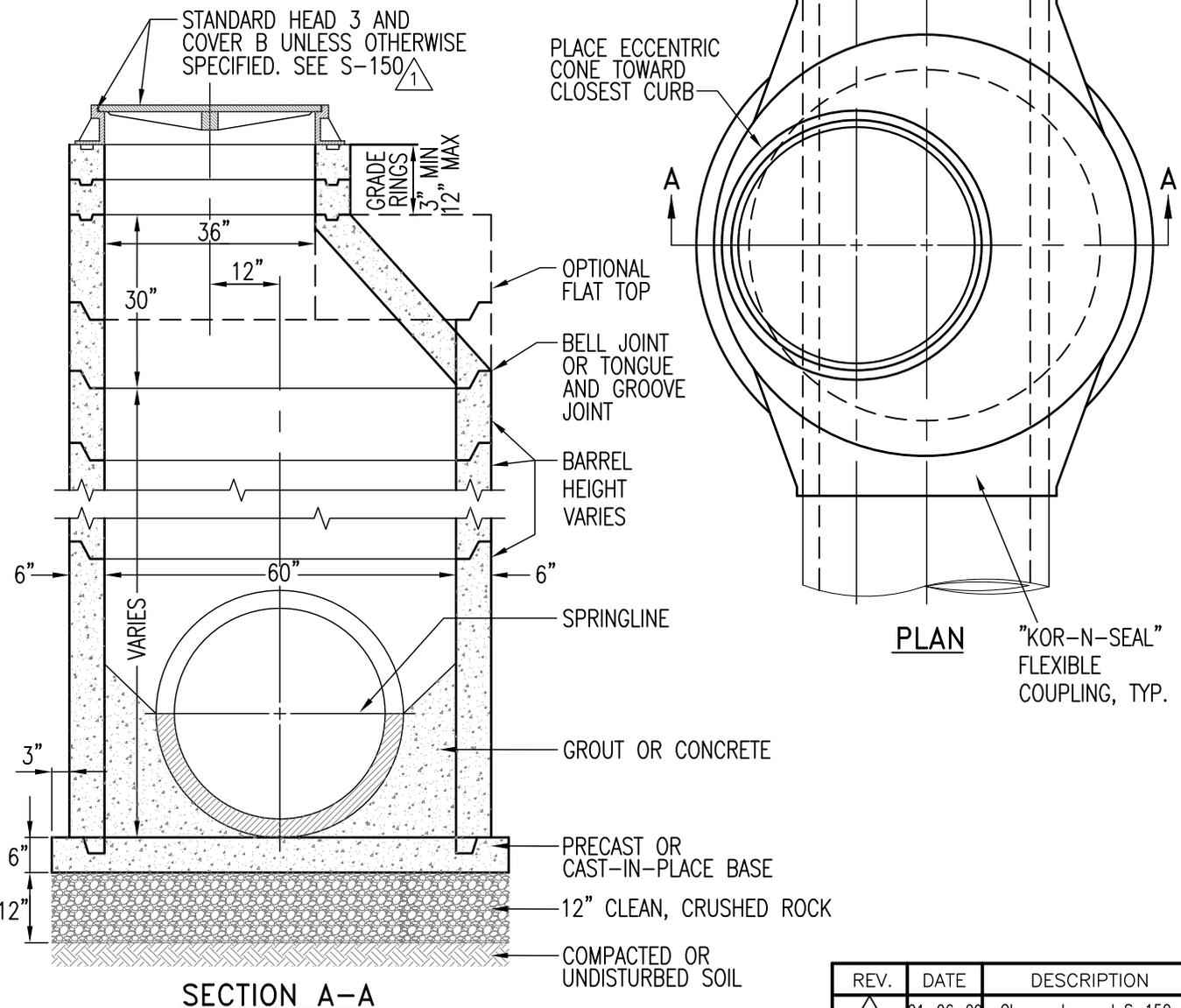
ROLLED CURB
DROP BOX INLET

APPR'D BY: *D. J. B. J.* NO SCALE
DATE: MAY 2007 DWG. NO. **S-65**

Addendum #2, Page 74 of 81

NOTES

1. No. 4 MANHOLES SHALL BE USED OVER SEWER PIPE BETWEEN 21" AND 42" DIA. AND STORM DRAIN PIPE BETWEEN 27" AND 42" DIA. OR AS DIRECTED BY THE ENGINEER. △2
2. MANHOLES SHALL CONFORM TO SEC. 25 OF THE CITY STANDARD SPECIFICATIONS.
3. FLOWLINE MATERIAL FOR SEWER MAINS AND INTERSECTING MAINS SHALL BE VITRIFIED CLAY EXCEPT: IF MANHOLE BASE IS PRECAST CONCRETE, OR MANHOLE BASE IS PLACED OVER MAIN WHICH IS "LAID THROUGH", IN WHICH CASE FLOWLINE MATERIAL SHALL BE SAME AS MAIN. CLAY LINER MAY BE OMITTED FOR MANHOLES WITH MAINS OF 36" DIA. OR LARGER.
4. FLOWLINE MATERIAL FOR STORM DRAIN PIPE SHALL BE THE SAME AS MAIN LINE PIPE WHEN "LAID THROUGH", OR GROUTED TO THE SPRINGLINE MATCHING THE EXITING PIPE DIAMETER.
5. MANHOLE BENCH SHALL SLOPE UPWARDS FROM THE SPRING-LINE OF THE PIPE TO THE PROJECTED LEVEL OF THE CROWN OF THE PIPE AT THE MANHOLE WALL OR 12 INCHES ABOVE THE SPRING-LINE, WHICHEVER IS LESS.
6. CORE OPENING AND USE "KOR-N-SEAL" OR APPROVED EQUAL FLEXIBLE COUPLINGS ON ALL CONNECTIONS TO MANHOLE EXCEPT IF PIPE IS "LAID THROUGH" AND CAST INTO BASE. IF PIPE IS "LAID THROUGH", CONTRACTOR SHALL PROVIDE WATER STOP WHERE PIPE IS CAST INTO BASE.
7. IF MANHOLE IS PLACED IN NON-PAVED AREA, SEE S-70.



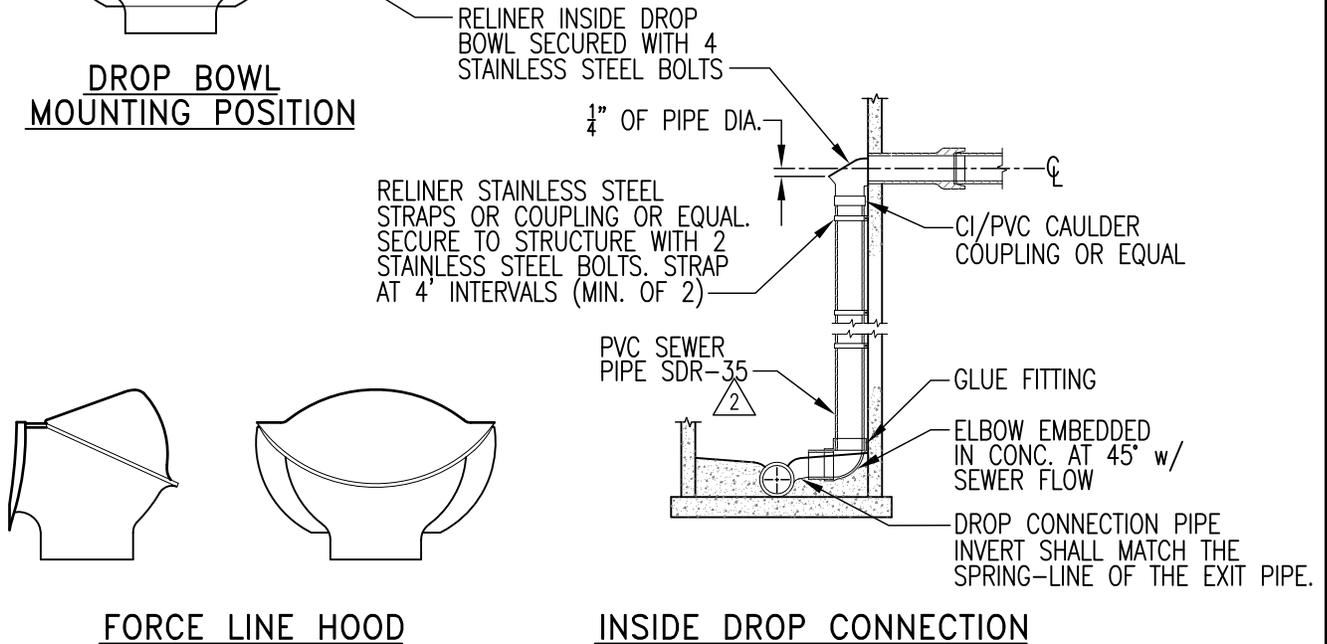
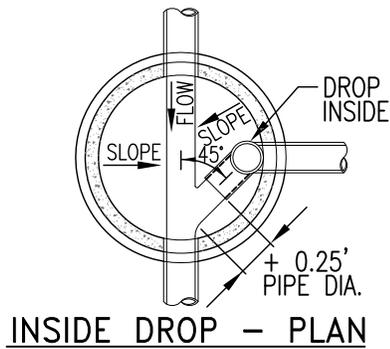
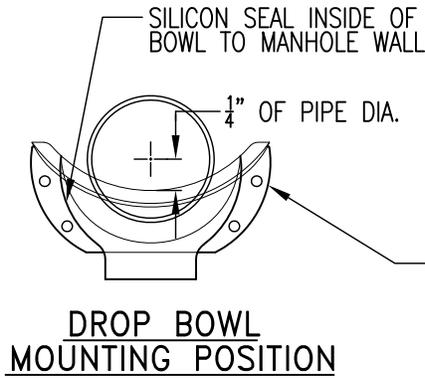
REV.	DATE	DESCRIPTION
1	01-06-09	Change to read S-150
2	03-22-12	Change per Std's
△		

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

STANDARD MANHOLE
No. 4

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **S-110**

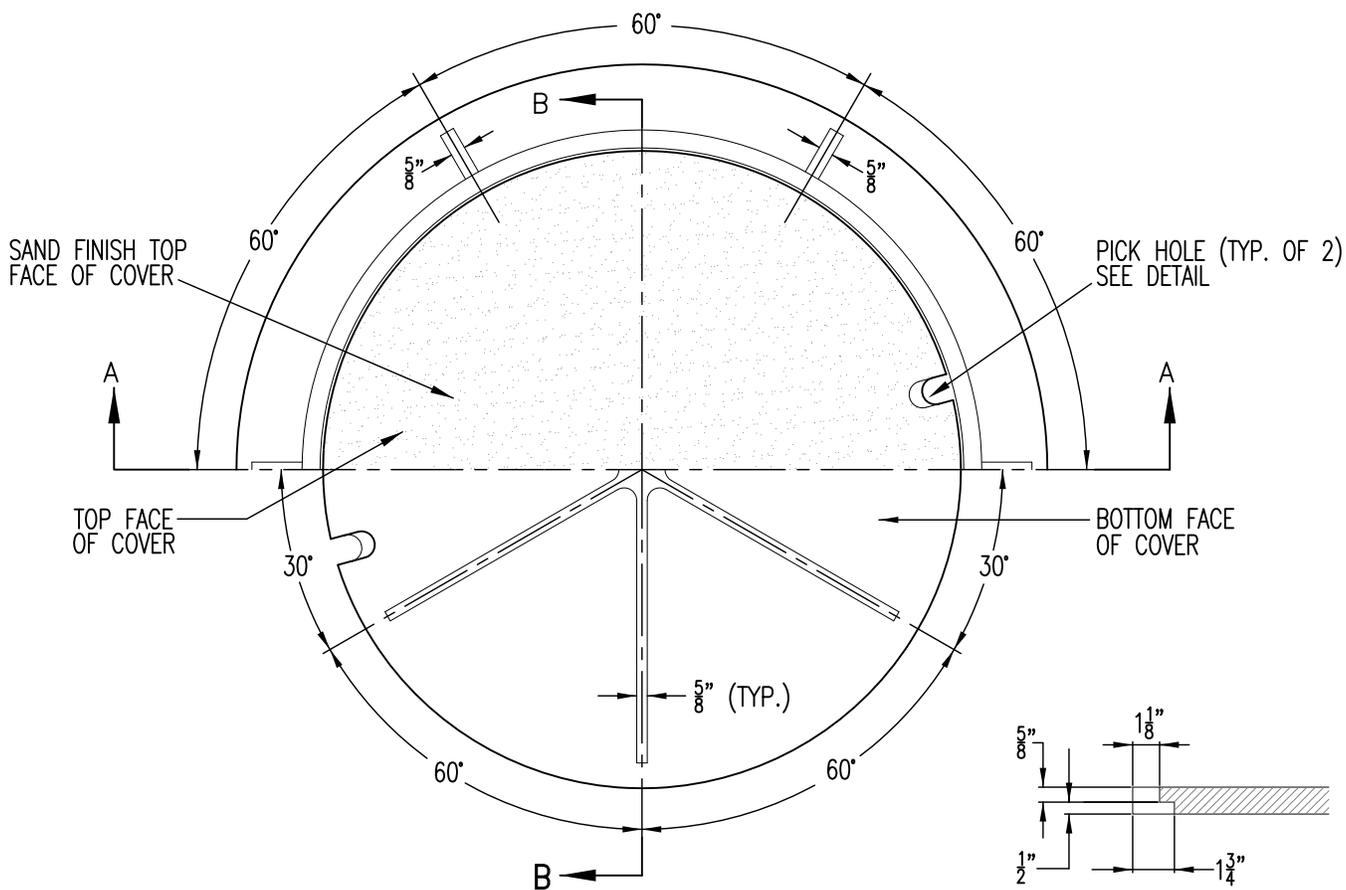
Addendum #2, Page 75 of 81



NOTES:

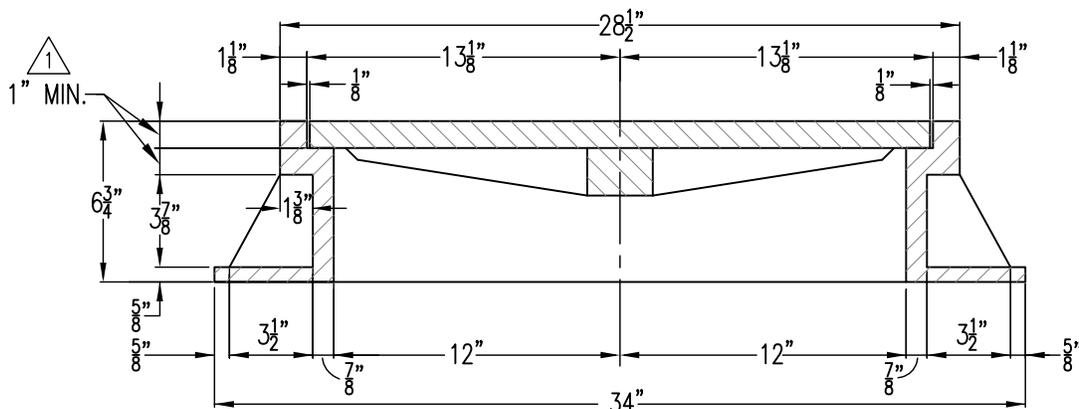
1. ALL INSIDE DROP CONNECTIONS FOR SERVICES AND COLLECTOR SEWERS SHALL USE THE DROP BOWL AS PRODUCED BY: RELINER-DURAN, INC. 53 MT. ARCHER RD. LIME, CT 06371 (860)434-0277 FAX: (860)434-3195 OR EQUAL.
2. DROP BOWL MODEL "A-4" SHALL BE USED FOR ALL LINES UP THROUGH FULL 6" INLETS. DROP BOWL MODEL "A-6" SHALL BE USED FOR ALL 8" INLETS. DROP BOWLS MODEL "B-8" SHALL BE USED FOR ALL 10" INLETS. LINES LARGER THAN 10 SHALL BE AS DIRECTED BY THE DIRECTOR.
3. THE FORCE LINE HOOD SHALL BE ATTACHED ON MODELS "A-4" & "A-6" WHEN THE INCOMING LINE IS FROM A FORCE MAIN OR THE SLOPE IS S=0.03 OR GREATER.
4. SECURE DROP PIPE TO MANHOLE WALL WITH RELINER-DURAN, INC STAINLESS STEEL ADJUSTABLE CLAMPING BRACKETS OR EQUAL
5. ATTACH THE DROP BOWL & EACH CLAMPING BRACKET TO THE MANHOLE WALL WITH 3/8"x3 3/4" RAMSET/RED HEAD BOLTS HELD INPLACE WITH 2 STAGE EPOXY PASTE. EPOXY SHALL MEET THE FOLLOWING REQUIREMENTS:
 - A. EPOXY PASTE SHALL BE A TWO COMPONENT, 100% SOLID SYSTEM. EPOXY SHALL BE SIKADUR 31 HI-MOD GEL BY SIKA CORPORATION (PHONE (592)941-0231) OR EQUAL.
 - B. THE EPOXY SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI IN 28 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM D695 AT 73 DEGREES.
 - C. THE EPOXY PASTE SHALL DEVELOP A MINIMUM TENSILE STRENGTH OF 3,000 PSI IN 14 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM D638.
 - D. THE EPOXY PASTE SHALL DEVELOP A MINIMUM BOND STRENGTH OF 2,000 PSI IN 2 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM C882. (HARDENED CONCRETE TO HARDENED CONCRETE)
 - E. MANUFACTURER'S INSTRUCTIONS SHALL BE PRINTED ON EACH CONTAINER IN WHICH THE MATERIALS ARE PACKAGED.

REV.	DATE	DESCRIPTION
1	03-23-09	NEW DETAIL
2	11-16-11	Sch. change

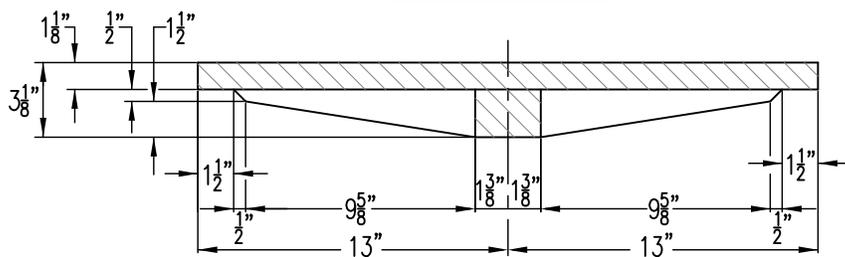


HALF PLAN OF HEAD AND COVER

PICK HOLE DETAIL



SECTION A-A



SECTION B-B

NOTE: \triangle

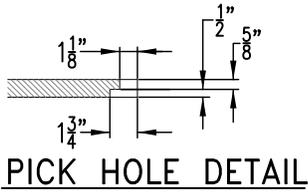
- ALL CASTINGS TO CONFORM TO ASTM A48, CLASS 30, AND BE H-20 TRAFFIC RATED.

REV.	DATE	DESCRIPTION
1	11-16-11	Size/Note Changes
\triangle		
\triangle		

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

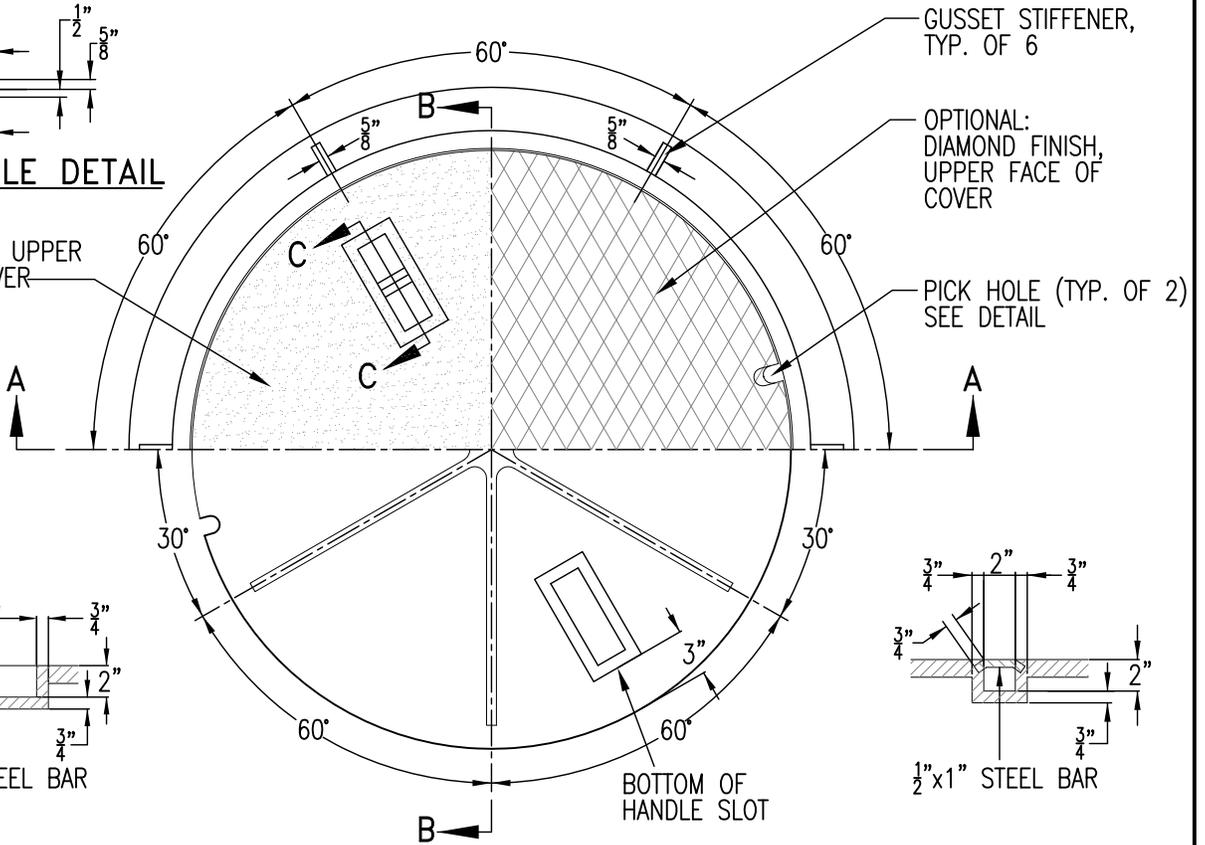
STANDARD MANHOLE
HEAD 1, COVER A

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. S-140



PICK HOLE DETAIL

SAND FINISH, UPPER FACE OF COVER

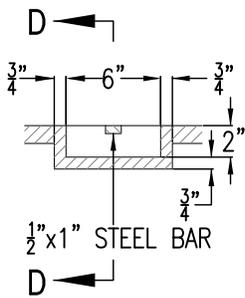


CUSSET STIFFENER, TYP. OF 6

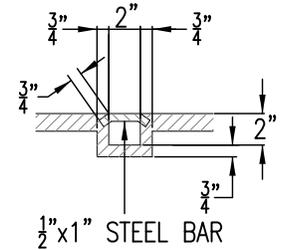
OPTIONAL: DIAMOND FINISH, UPPER FACE OF COVER

PICK HOLE (TYP. OF 2) SEE DETAIL

BOTTOM OF HANDLE SLOT



1/2"x1" STEEL BAR

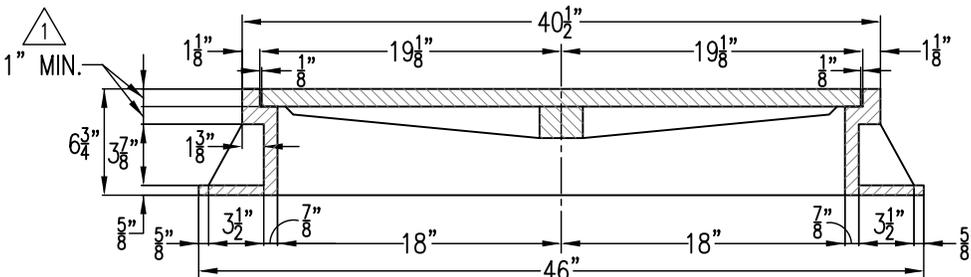


1/2"x1" STEEL BAR

SECTION C-C HANDLE SLOT DETAIL

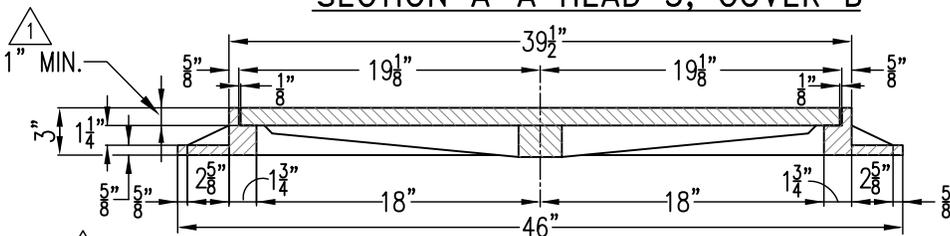
HALF PLAN OF HEADS 3 & 4, COVER B

SECTION D-D HANDLE SLOT DETAIL

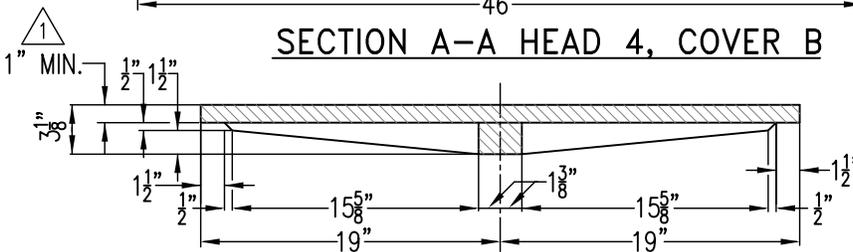


SECTION A-A HEAD 3, COVER B

NOTES:
ALL COVERS TO BE H-20 TRAFFIC RATED



SECTION A-A HEAD 4, COVER B



SECTION B-B, COVER B

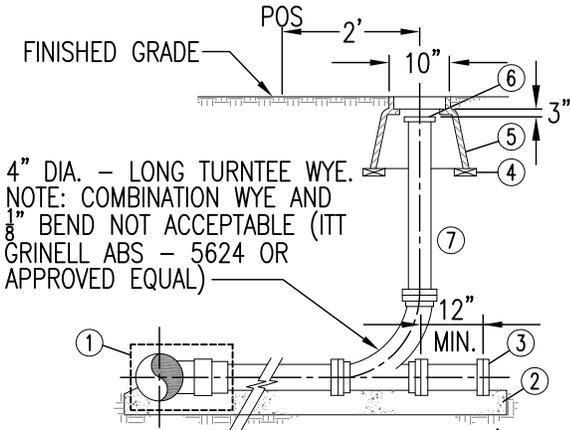
REV.	DATE	DESCRIPTION
1	11-16-11	Note/Size Changes

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

STANDARD MANHOLE
HEADS 3 & 4, COVER B

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **S-150**

Addendum #2, Page 78 of 81

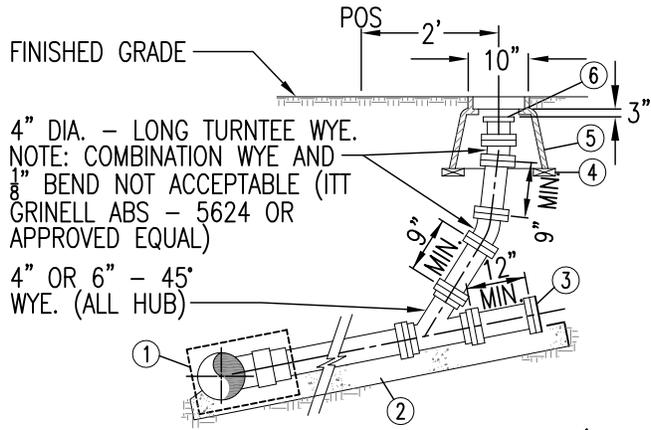


4" DIA. - LONG TURNTEE WYE.
NOTE: COMBINATION WYE AND
 $\frac{1}{8}$ " BEND NOT ACCEPTABLE (ITT
GRINELL ABS - 5624 OR
APPROVED EQUAL)

4" DIA - SERVICE SLOPE LESS THAN $1\frac{1}{4}$ "/FT

- ① - SEE "CONNECTION DETAIL."
- ② - CRUSHED ROCK BEDDING; SEE STD. SPEC., SECTION 26.
- ③ - 4" OR 6" DIA. ABS SLIP CAP.
- ④ - PROVIDE 2" x 3" x 8" REDWOOD, PRESSURE TREATED OR MASONRY SUPPORT.
- ⑤ - 10" SEWER CLEAN-OUT BOX WITH LOCK BOLT FLUSH COVER (GREEN COLOR) CARSON IND. MODEL NO. 910-10 BODY w/ 910-3 LID, OR APPROVED EQUAL.
- ⑥ - 4" OR 6" DIA. MECHANICAL WING NUT PLUG, CHERNE INDUST., OR APPROVED EQUAL SECURE WITH A LOOSE FIT AND PEEN END OF BOLT OR OTHERWISE SCORE THREADS TO PREVENT REMOVAL OF WING NUT.
- ⑦ - BACKFILL IN CONFORMANCE WITH SEC. 26 OF THE STD. SPECS.

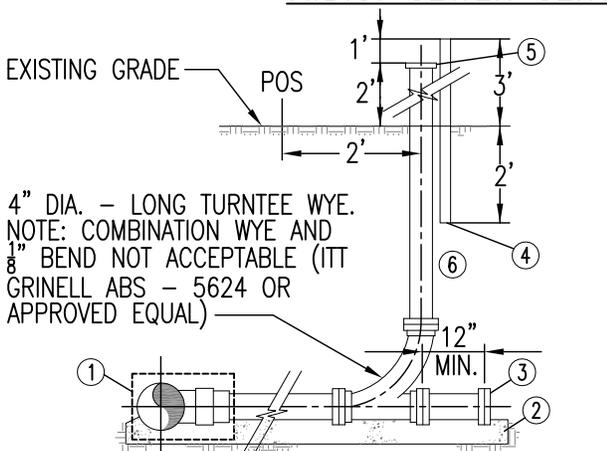
A.B.S. SEWER SERVICE WITH CLEANOUT BOX



4" DIA. - LONG TURNTEE WYE.
NOTE: COMBINATION WYE AND
 $\frac{1}{8}$ " BEND NOT ACCEPTABLE (ITT
GRINELL ABS - 5624 OR
APPROVED EQUAL)

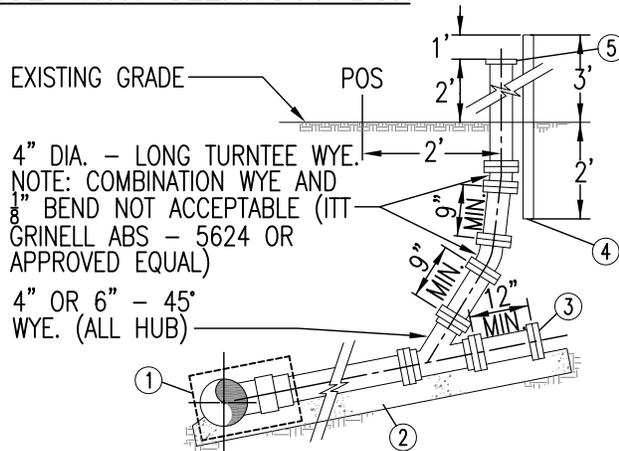
4" OR 6" - 45°
WYE. (ALL HUB)

4" DIA - SERVICE SLOPE GREATER THAN $1\frac{1}{4}$ "/FT
6" DIA. - ALL SLOPES



4" DIA. - LONG TURNTEE WYE.
NOTE: COMBINATION WYE AND
 $\frac{1}{8}$ " BEND NOT ACCEPTABLE (ITT
GRINELL ABS - 5624 OR
APPROVED EQUAL)

4" DIA. - SERVICE SLOPE LESS THAN $1\frac{1}{4}$ "/FT



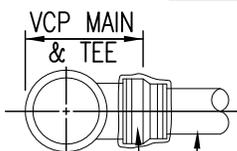
4" DIA. - LONG TURNTEE WYE.
NOTE: COMBINATION WYE AND
 $\frac{1}{8}$ " BEND NOT ACCEPTABLE (ITT
GRINELL ABS - 5624 OR
APPROVED EQUAL)

4" OR 6" - 45°
WYE. (ALL HUB)

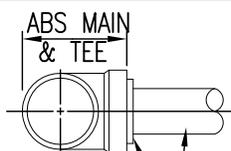
4" DIA. - SERVICE SLOPE GREATER THAN $1\frac{1}{4}$ "/FT
6" DIA. - ALL SLOPES

- ① - SEE "CONNECTION DETAIL."
- ② - CRUSHED ROCK BEDDING; SEE STD. SPEC., SECTION 26
- ③ - 4" OR 6" DIA. ABS SLIP CAP.
- ④ - 2" x 4" x 5' REDWOOD OR APPROVED EQUAL PAINTED GREEN ON THE TOP 12".
- ⑤ - 4" OR 6" WELD-ON ABS OR APPROVED EQUAL CAP.
- ⑥ - BACKFILL IN CONFORMANCE WITH SEC. 26 OF THE STD. SPECS.

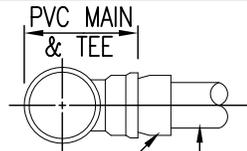
A.B.S. SEWER SERVICE WITHOUT CLEANOUT BOX



4" OR 6" - FLEXIBLE
COUPLING, FERNCO
OR APPROVED EQUAL
NO BUSHINGS ACCEPTABLE



NOT MORE THAN ONE
ADAPTER OR BUSHING
PERMITTED AT EACH
CONNECTION.



4" OR 6" - PVC
ADAPTER BY "INSERTA TEE"
OR APPROVED EQUAL.

4" OR 6" DIA. - ASTM D 2661
ABS - DWV (SCHEDULE 40).

4" OR 6" DIA. - ASTM D 2661
ABS - DWV (SCHEDULE 40).

V.C.P. SEWER MAIN A.B.S. SEWER MAIN

CONNECTION DETAIL

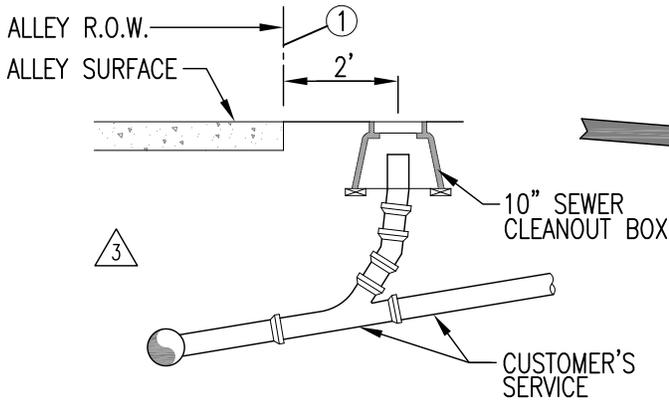
P.V.C. SEWER MAIN

REV.	DATE	DESCRIPTION
1	11-16-11	Lid Change

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

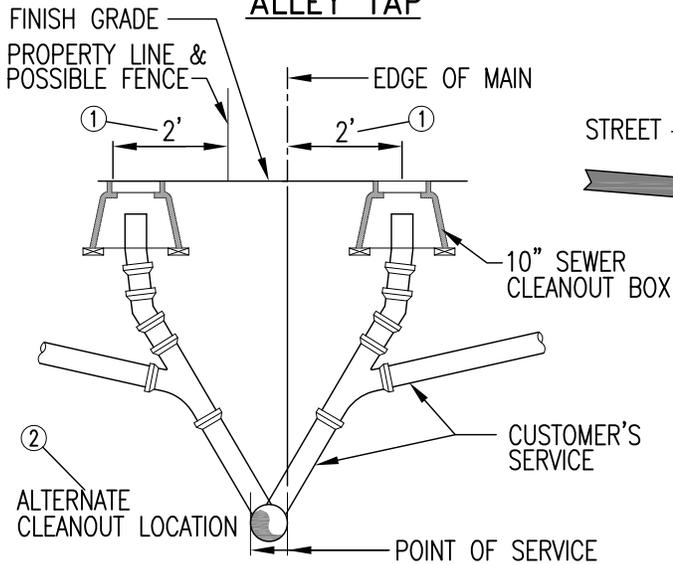
A.B.S. SEWER SERVICE

APPR'D BY: *DOB* NO SCALE
DATE: MAY 2007 DWG. NO. **S-260**



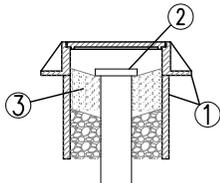
① IF BUILDING IS ON R.O.W. LINE, CONSTRUCT CLEANOUT WITHIN 2' OF FACE OF BUILDING. 1

ALLEY TAP



- ① WHEN APPLICABLE, ADJUST CLEANOUT LOCATION TO AVOID CONFLICT WATER MAIN. 1
- ② USE ALTERNATE CLEANOUT LOCATION WHEN MAIN IS LOCATED OUTSIDE PROPERTY LINE. 1

EASEMENT TAP

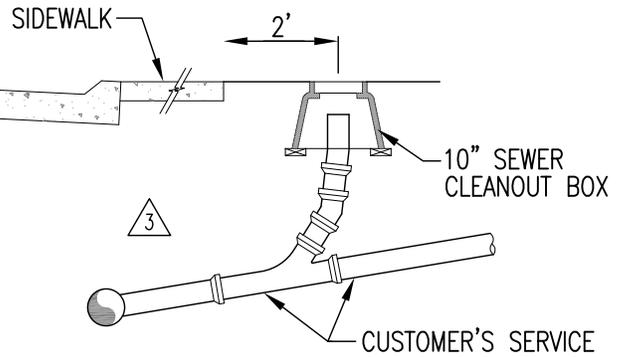


- ① CAST-IRON CLEAN-OUT AND COLLAR ASSEMBLY
- ② 4" OR 6" DIA. MECHANICAL WING NUT PLUG, CHERNE INDUST., OR APPROVED EQUAL. (PROVIDE 3" CLEARANCE BETWEEN TOP OF CAP AND BOTTOM OF COVER)
- ③ GROUT 2" THICK MINIMUM, SLOPE TO TOP OF PIPE. CAP AND BOTTOM OF COVER)

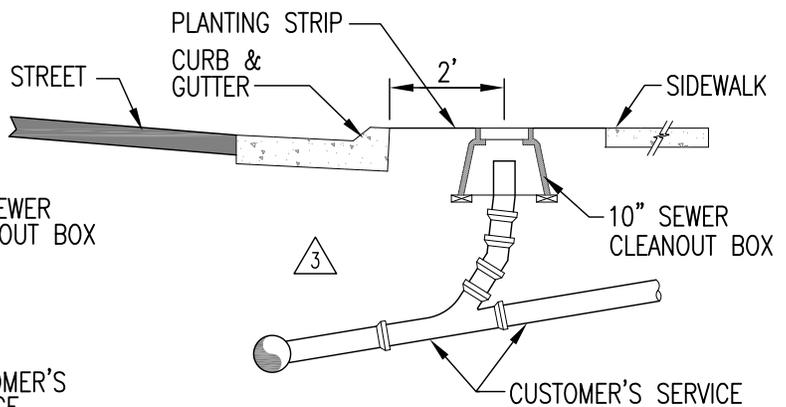
CAST-IRON CLEAN-OUT BOX

NOTES:

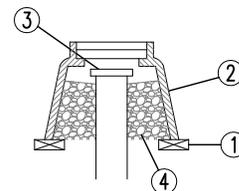
- 1. CLEANOUTS LOCATED IN NON-TRAVELED WAY SHALL HAVE CARSON BOX OR APPROVED EQUAL. 2
- 2. CLEANOUTS IN TRAVELED WAY SHALL HAVE CAST IRON CLEANOUT BOX AS SHOWN ABOVE. 1



STREET TAP WITH SIDEWALK



STREET TAP WITH PLANTING STRIP



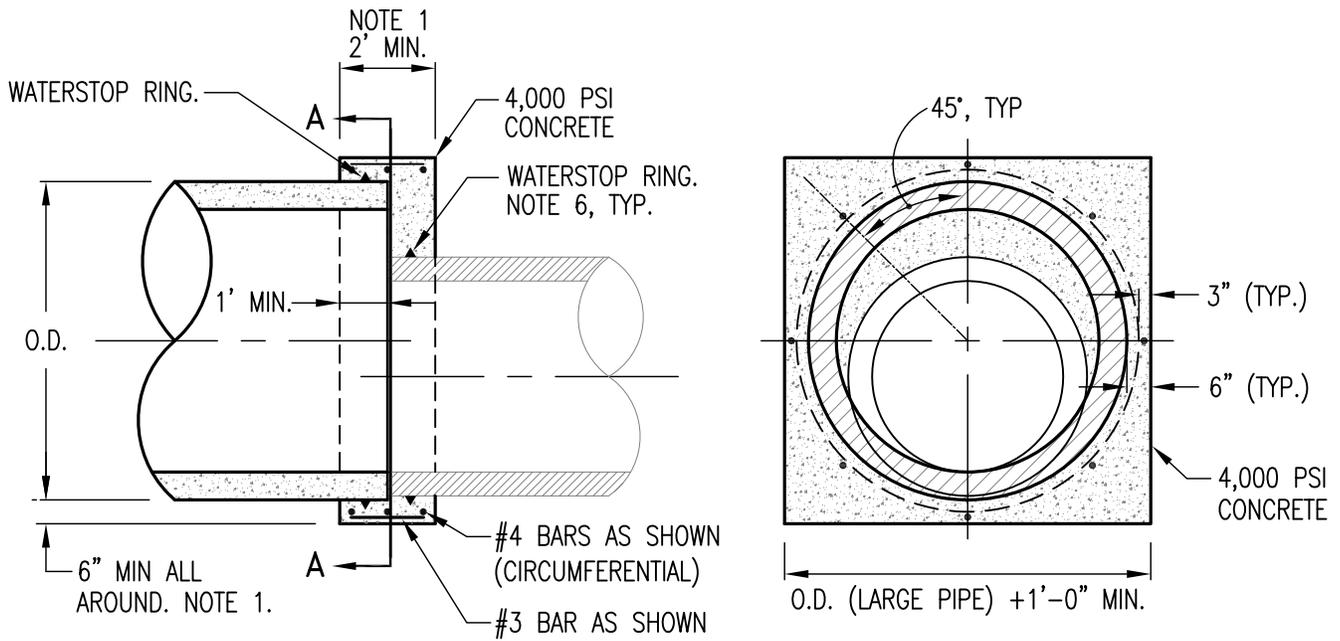
- ① PROVIDE 2" x 3" x 8" REDWOOD, PRESSURE TREATED OR MASONARY SUPPORT.
- ② 10" SEWER CLEAN-OUT BOX WITH LOCK BOLT COVER (GREEN COLOR) CARSON IND. MODEL NO. 910-10 BODY w/ 910-3 LID OR APPROVED EQUAL. 2
- ③ 4" OR 6" DIA. MECHANICAL WING NUT PLUG, CHERNE INDUST., OR APPROVED EQUAL. (PROVIDE 3" CLEARANCE BETWEEN TOP OF CAP AND BOTTOM OF COVER)
- ④ BACKFILL IN CONFORMANCE WITH SEC. 26 OF THE STD. SPECS.

CARSON BOX

REV.	DATE	DESCRIPTION
1	03/23/09	Addendum #1
2	11/16/11	Box Changes
3	01/10/12	Delete POS

APPR'D BY: *[Signature]* NO SCALE
DATE: MAY 2007 DWG. NO. S-265

R: \Utilities\New_Std_Details\Sewer_Drainage\S-265



SECTION A-A
N.T.S.

NOTES:

1. THE CONCRETE CLOSURE COLLAR SHALL BE A MINIMUM TWO (2) FEET LONG AND SHALL PROVIDE AT LEAST SIX (6) INCHES OF COVERAGE AROUND ALL PORTIONS OF THE LARGEST DIAMETER PIPE. THE COLLAR SHALL BE PLACED IN ONE POUR AND CONCRETE SHALL NOT BE PLACED OR Poured IN WATER.
2. PORTLAND CEMENT CONCRETE, CLASS "B" SHALL BE USED WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. THE MAXIMUM WATER TO CEMENT RATIO SHALL BE 0.5.
3. REMOVE ALL LOOSE MATERIAL AND SOIL FROM THE PIPE SURFACES ON WHICH CONCRETE WILL BE PLACED.
4. FORM COLLAR SUCH THAT NO CONCRETE ENTERS THE PIPES.
5. THE REINFORCING STEEL SHALL BE GRADE 60.
6. AN APPROVED WATER STOP RING SHALL BE INSTALLED ON EACH PIPE.
7. TYPE "A" CLEAN CRUSHED ROCK SHALL BE PLACED AS A BASE UNDER THE CLOSURE COLLAR TO A MINIMUM DEPTH OF FOUR (4) INCHES. THE CRUSHED ROCK BASE SHALL EXTEND Laterally A MINIMUM OF TWELVE (12) INCHES BEYOND THE OUTSIDE FOOTPRINT OF THE CLOSURE COLLAR. THE CRUSHED ROCK SHALL BE THOROUGHLY WET AND TAMPED UNTIL A FIRM, UNYIELDING CONDITION IS ACHIEVED AS DETERMINED BY THE ENGINEER.
8. THE TRENCH SHALL NOT BE BACKFILLED UNTIL THE CONCRETE HAS SUFFICIENT STRENGTH AS DETERMINED BY THE ENGINEER.

REV.	DATE	DESCRIPTION
1	11-16-11	New Detail

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES

CONCRETE CLOSURE
COLLAR

APPR'D BY: *Melvin O. Benall* NO SCALE
DATE: NOV 2011 DWG. NO. **S-320**

Addendum #2, Page 81 of 81