

**Vandenberg Village
Community Services District**

**Standards for
CONSTRUCTION OF WATER MAINS**



"Pride in Community Service"

June 2003

Standards for CONSTRUCTION OF WATER MAINS

TABLE OF CONTENTS

I.	GENERAL REQUIREMENTS	1
	A. Work to Be Done Within the Vandenberg Village Community Services District .	1
	B. Plans and Specifications	1
	C. Definitions and Terms	1
	D. Alterations	2
	E. Modifications to the Standard Specifications	2
	F. Shut Down of Existing Water Mains	3
II.	MATERIALS	4
	A. General	4
	B. Pipe Certification and Tests	4
	C. Asbestos-cement Water Distribution Pipe	4
	D. PVC Water Distribution Pipe (Polyvinyl Chloride)	4
	E. Ductile Iron Water Distribution Pipe	5
	F. Main Line Fittings and Accessories	6
	G. Service Line Materials and Fittings	8
	H. Copper Setter	10
	I. Water Meters	11
	J. Water Main Gate Valves	11
	K. Water Main Gate Valve Boxes and Covers	11
	L. Angle Meter Stop	11
	M. Water Main Cut-in	12
	N. Fire Hydrants	12
	O. Blowoff Assemblies	13
	P. Combination Air Release Valves	14
	Q. Tracer Wire	16
	R. Back Flow Assemblies	16
	S. Concrete Construction	18
	T. Asphalt Concrete Replacement	18
III.	PUBLICATIONS	19
	A. American Standards Association	19
	B. American Standards Institute	19
	C. American Society of Testing Materials	19
	D. American Water Works Association Standards - Current Edition	19
	E. Federal Specifications	19
	F. Installation Guides	19
	G. Separation Requirements	20
	H. Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR)	20
IV.	CONSTRUCTION METHODS	21
	A. Paving	21
	B. Construction Excavation	21
	C. Removal or Abandonment of Existing Water Mains	22
	D. PVC Pressure Water Distribution Pipe Installation	22
	E. Asbestos-cement Pressure Water Distribution Pipe Installation	23

Standards for CONSTRUCTION OF WATER MAINS

F.	Ductile-iron Water Distribution Pipe Installation	23
G.	Crossing Lines	23
H.	Thrust Blocks	23
I.	Compaction	23
J.	Project Site Maintenance	24
K.	Final Inspection and Tests	24
L.	Clean-up	25
M.	Hot Tapping	26
STANDARD DETAILS		27



"Pride in Community Service"

Standards for CONSTRUCTION OF WATER MAINS

I. GENERAL REQUIREMENTS

A. Work to Be Done Within the Vandenberg Village Community Services District

All labor, equipment, appliances and material, and performance of all operations in connection with construction of water mains, including all valves, fittings, fire hydrants and assemblies, and service connections to each lot and all other necessary appurtenances, within the District shall be in strict accordance with these Standards.

B. Plans and Specifications

Projects shall be constructed as shown on the Plans and shall conform to these Standard Requirements and the "Greenbook" as defined below. The "Greenbook" shall not govern over the Plans and these Standard Requirements.

C. Definitions and Terms

In these Specifications or the "Greenbook" the intent and meaning of the terms that are used shall be as defined in Part 1 of the "Greenbook" except as herein below specifically noted, revised or added.

Agency - The Vandenberg Village Community Services District, State of California

District - The District is the entity identified as such in the Agreement between the District and the Developer or Contractor and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term District means the Vandenberg Village Community Services District or its authorized representative.

Engineer - The District Manager or designated engineer for the Vandenberg Village Community Services District, State of California, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

"Greenbook" - The latest edition of the Standard Specifications for Public Works Construction, including all supplementary pamphlets, published by Building News, Inc.

The Standard Specifications control the general provisions, construction materials, and construction methods for this contract except as amended by the Plans, Special Provisions, or other Contract Documents.

Laboratory - Shall mean any testing agency or testing firm, which has been licensed by the State of California to act in such capacity, and meeting the requirements of the Engineer.

Specifications - The directions, guidelines, provisions and requirements herein pertaining to the materials to be furnished and to the method and manner of performing the work, including and addenda and approved revisions by the District. Whenever the terms "Specifications" or "these Specifications" are used herein it means the provisions set forth in these District Standards.

Standards for CONSTRUCTION OF WATER MAINS

D. Alterations

1. The District reserves the right to make updates, amendments and modifications from time to time following a doption of this document.
2. Changes or modifications to approved plans and/or specifications shall be by mutual agreement in writing and signed by the parties involved, then, and only then may alterations or deviations, increases additions, or omissions in the approved plans or Standards be made.
3. It shall be the responsibility of the Contractor to locate any and all utility lines prior to excavation. The Contractor shall be held responsible for any damage to utility lines during the progress of construction, and if damage should occur, he shall repair the same at his own expense.

The Contractor shall notify the Engineer and the appropriate regional notification center for operations of subsurface installations at least two working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

Underground Service Alert, Southern California (USA)
Telephone: 1-800-422-4133

No excavation shall commence unless the Contractor has obtained the Inquiry Identification Number and so notified the Engineer.

E. Modifications to the Standard Specifications

"Pride in Community Service"
The following are adjustments to the Standard Specification ("Greenbook"):

Record Drawings

Contractor shall maintain a complete and accurate record of all changes of construction from that shown in the approved plans and specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the District.

Monuments

Existing survey monuments shall be protected from damage. All survey monuments damaged or displaced by the Contractor shall be replaced in accordance with the provisions of the Land Surveyor's Act, Code of the State of California, at the Contractor's expense.

Accuracy of Utilities Information

The locations of existing major utilities, whether above ground or underground, may be represented in District documents. The District does not guarantee the accuracy or completeness of this information and it is to be understood that other above ground and underground facilities may be encountered during the course of the work. During construction, in advance of any work performed by the pipe installation crew, the

Standards for CONSTRUCTION OF WATER MAINS

Contractor shall excavate and pothole existing utility facilities to verify locations and allow alignment and grade revisions if necessary. Such revisions in alignment and grade shall be approved by the District.

F. Shut Down of Existing Water Mains

District personnel will operate all gate valves necessary for shut down of existing water mains for all tie-ins. The District makes no guarantee for watertight shutdown. The Contractor shall notify the District 48 hours prior to a required shut down. Public Notice, by the Contractor, of periodic water service interruption shall be coordinated with District water personnel.



Standards for CONSTRUCTION OF WATER MAINS

II. MATERIALS

A. General

1. All materials shall be new and of the type described in these Standards or shown on District approved plans. The Contractor shall furnish all materials. Whenever the following Standards specify by name or number any material or article or the maker or distributor thereof, this is done so only for the purpose of more clearly defining the kind and quality desired, and it is to be understood that the written approval of the District will permit an equivalent which will be equally acceptable.
2. Materials shall be those as hereinafter specified and approved and shall never be less than those as approved by AWW A, ASASTM as last revised.

B. Pipe Certification and Tests

When required by the District, the Contractor shall, at his own expense, furnish documentary evidence, or when specifically requested, certified test results which indicate that the pipe furnished meets all of the requirements of these Standards. Documentary evidence will be considered sufficient when the pipe manufacturer furnishes a notarized certificate indicating that the pipe has been sampled, tested and inspected in accordance with the provisions of all AWW A specifications.

C. Asbestos-cement Water Distribution Pipe

No new asbestos-cement pipe installation is permitted, and this information is only provided to assist with localized repairs or maintenance operations involving asbestos-cement pipe. Asbestos-cement pipe and couplings shall conform to the AWW A C400 for Class 150 or 200 pipe. In addition, the pipe shall have 1 percent or less by weight of uncombined calcium hydroxide as determined by AWW A C400 Appendix, Test for Uncombined Calcium Hydroxide.

Pipe shall be furnished with "Ring-Tite" or "Fluid-Tite" joint couplings complete with rubber rings as recommended by the manufacturer.

All pipe shall be clearly marked with the trade name, nominal inside diameter, class, type, hydrostatic test pressure and date of manufacture. Short lengths shall have the diameter, class, type and "T" to indicate that it has been hydrostatically tested. No pipe shall be of a class less than Class 150.

D. PVC Water Distribution Pipe (Polyvinyl Chloride)

When applicable, PVC pipe installation shall conform to Standard C900 or C909 Pipe Standards. The proposed new standard is C909, Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4-12 inches, for Water Distribution in pressure classes 100, 150, and 200. All PVC water distribution pipe within the District shall be pressure class 200 unless otherwise approved by the District. The standard covers pressure pipe manufactured from starting stock of ASTM 1784 cell class 12454-B materials. The

Standards for CONSTRUCTION OF WATER MAINS

starting stock is then oriented through circumferential expansion. The end result is PVC pipe with a hydrostatic design basis of 7,100 psi.

PVC pipe shall conform to the quality and strength requirements of AWWA C900 which covers PVC pipe in sizes 4-12 inches. Each standard or random length of pipe shall be clearly marked with the Nominal size and O.D. base, Material Code, Dimensional ratio, AWW A pressure class, AWW A designation, manufacturer's trade name and production record code and seal of testing agency.

The standard laying length shall be 20 feet + 1 inch in all classes and sizes. A maximum of 15 percent may be furnished in random lengths of not less than 10 feet each.

AWW A C900 pipe has the same outside diameter (O.D.) as that of cast iron pipe (C.I.P.O.D.) In the sizes furnished.

One gasket shall be furnished with each length of elastomeric-gasket bell end pipe and two gaskets shall be furnished with each coupling where couplings are used.

Pipe surfaces shall be free from nicks, scratches and other blemishes. The joining surfaces of pipe spigots and of integral bell and sleeve reinforced bell sockets shall be free from gouges or other imperfections that might cause leakage.

Three trade names which have been approved by the District are Certaineed's "Vinyl Iron Pipe," John Mansville's "Blue Brute Pipe," and UPONOR ETI "Ultra Blue." Equivalents must be reviewed and approved by the District.

The joints shall be one of the following:

- (1) Integral wall - thickened bell end (bell and spigot with rubber gasket).
- (2) Integral sleeve reinforced bell end.
- (3) Elastomeric gasket coupling.

PVC solvent cement joints, although allowed by AWW A C900, are not approved.

Where couplings are used, they shall meet requirements of AWW A C900. Couplings shall be as furnished by the manufacturer. Couplings shall be marked with the same information as the pipe.

Tapping in PVC pipe shall be saddle taps. No direct taps are allowed. Tap not closer than 2 feet from the end of the pipe or from an existing service tap. Use combination core drill and taps. Do not use twist drills designed for tapping hard-wall pipes.

Gray iron fittings can be used with PVC pipe.

E. Ductile Iron Water Distribution Pipe

The pipe shall be cement-lined Ductile Iron Pipe and shall conform to AWW A C111, C104, C105, C150 and C151 for both quality and strength. Each pipe shall include the letters "D.I." or word "DUCTILE" to indicate the pipe material.

Standards for CONSTRUCTION OF WATER MAINS

Joints shall be push-on joint or of the Mechanical Joint type conforming to the requirements of AWWA C111.

F. Main Line Fittings and Accessories

1. General - All Gray Iron and Ductile Iron Fittings shall be lined with cement mortar lining in accordance with AWWA C104 and C110. All fittings whose lining or outside coating that does not bond firmly or that shows voids or "holidays" upon inspection shall be rejected.
2. Gray Iron and Ductile Iron Fittings
 - a. Fitting types are as follows:

90° bend, 45° bend, 22½° bend, 11¼° bend, Tees and Crosses, Reducers, Caps and Plugs, Connection Pieces, Flanged Bends, Flanged Tees and Crosses, Flanged Reducers.
 - b. Asbestos Cement and Ductile Iron Water Distribution Pipe shall have fittings in accordance with AWWA C110, C153 and C104.
 - c. Gray-Iron Adapters shall be provided as recommended by the A.C. Pipe manufacturer for making the connection between Gray-Iron Fittings, Gray-Iron Pipe, Ductile Iron Pipe, PVC Pipe, and Asbestos-Cement Pipe.
 - d. PVC Water Distribution Pipe shall have fittings in accordance with AWW A C153 and C104 specifications.
 - e. Mechanical Joints:

This is a bolted joint of the stuffing box type. Each joint has a bell provided with an exterior flange having bolt holes and slots, and a socket with gaskets to receive the plain end of the pipe or fitting. The joint also has a sealing gasket, follower gland with boltholes and tee head bolts with hexagonal nuts. Approved steel tee-bolts and nuts for mechanical joint glands are Cor-ten Series 129ON (NAPPCO).

Mechanical joints shall be used with Ductile Iron Pipe and shall be in accordance with AWW A C111. Mechanical joints used with PVC pipe shall be in accordance with AWW A C153. The mentioned AWWA Standards for mechanical fittings covers the joint as well as the gaskets and bolts. M.J. Restraints will be used on all mechanical joints.

- f. Mechanical Joint Restraints for PVC and DIP:

These shall be such that they can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWW A A21.11 and ANSI/AWWA C153/A21.53. Glands shall be manufactured

Standards for CONSTRUCTION OF WATER MAINS

of ductile iron conforming to ASTM A 536-80 and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. The device shall have a working pressure of at least 250 psi. Approved is the EBAA Iron, Inc., Megalug 1100 series for ductile iron pipe/Megalug 1100 PV series for C900 pipe.

g. Push-On Joints:

This is a single rubber-gasket joint in accordance with AWWA C111. Push-On Joints shall be used with asbestos cement pipe and can be used with PVC pipe in place of mechanical joints.

h. Flanges-Bolts and Gaskets:

T-Bolts used on mechanical joints shall be of domestic origin, high strength, low alloy steel bolts only, meeting the current provisions of American National Standard ANSI/AWWA C111/A21.1-90 for rubber gasket joints for cast iron or ductile iron pipe and fittings. Bolt manufacturer's certification of compliance must accompany each shipment.

For underground service stainless steel or cadmium nuts and bolts, type 316 shall be used.

Gaskets shall be ring or full-face type, 1/8 inch thick.

The inherent problem with flanges is that they are rigid and do not provide flexibility. Two keys to their installation are (1) uniform tightening of the bolts, and (2) prevention of bending or torsional strains. Proper anchorage is important to meet the latter objective.

The following couplings and adapters in 3, 4, and 5, shall be used to install or make repairs on the existing piping system. Couplings and adapters shall conform to AWWA C213 requirement fusion bonded epoxy fittings with 316SS bolts and nuts.

3. Flexible Couplings - These are designed to connect plain end pipes with mechanical compression joint to provide a stress relieving, flexible, leak proof joint. They can be ordered in A.C. pipe or cast iron pipe sizes (NOTE: C-900 PVC pipe has the same O.D. as cast iron).
4. Transition Couplings - These are used to connect pipes of the same nominal size but different materials with different outside diameter. AC, CI and PVC pipes can be connected to one another.
5. Flanged Coupling Adapters - These are used to connect plain end pipe to flanged valves, pumps, meters, etc. They eliminate the need for both a flanged spool and couplings. Generally, they are available in sizes through 12 inches.

Standards for CONSTRUCTION OF WATER MAINS

a. DIP Adapter Flange:

Joins plain end Ductile Iron pipe to fittings with flange ends. Flanges must meet the test requirement of ANSI B16.1-125 lb. and 250 lb. Flange material manufacture from ductile iron ASTM A536 Grade 65-45-12. Drilling to ANSI B16.1-125 lb. and 250 lb. Set screw material ANSI 4140 Steel, Tensile 190,000 psi minimum.

Heat-treated and zinc plated with calibrated head that shear off at the precise torque required for proper installation. The flange adapter shall be designed to handle working pressures to 250 psi. Approved are the Uni-Flange 400 Series and the Meg-a-Flange/EBAA-IRON.

b. PVC Adapter Flange:

Joins plain end PVC pipe to a rigid flange connection. Flanges must meet all test requirements of AWWA C900, ASTM D2241, ASTM D1599, ASTM D2992. Approved is the Ford Uni-Flange 900-C Series.

G. Service Line Materials and Fittings

The materials covered in this section include the service line pipe, corporation stop and saddles as well as the meter box and valves inside the meter box. All service lines shall be backfilled per Section 1 of these Standards with screen sand one foot below and one foot above the pipe.

1. Service Piping:

Service sizes $\frac{3}{4}$ " and 1" shall be type K soft annealed copper tubing, in conformance with ANSI/AWWA C800 as designated, shall be manufactured in the United States, and shall be in coils of 60 feet each in conformance with ASTM B88 Type K. Shipping boxes or affidavit must state that the manufacturer meets this requirement. No Sweat Joints allowed on Type K Copper.

Copper service lines must be sleeved with a plastic sleeve to minimize corrosion.

All water connections shall have an accessible valve at the water main, except for 1" and $\frac{3}{4}$ " connections.

1 $\frac{1}{2}$ " and 2" horizontal service runs can be either schedule 80 PVC in conformance with AWWA C800/ASTM D1785-Specifications for PVC Plastic Pipe or Brass in conformance with AWWA C800/ASTM B43. NO GLUEING IS ALLOWED. Pack-joint adapter/coupling shall be used when installing Schedule 80 PVC.

When boring is necessary or called out on plans to install 1 $\frac{1}{2}$ " - 2" service lines across streets or highways the following will apply. 1 $\frac{1}{2}$ " and 2" horizontal service runs shall be HDPE in conformance with ANSI/AWWA C901 current

Standards for CONSTRUCTION OF WATER MAINS

revision. Polyethylene tubing shall be color coded (blue) and be compatible with current fitting and connectors made for HDPE water tubing. The pipe shall have a clear core of virgin natural HDPE providing visible proof of quality and assurance that no regrind material has been used. The pipe shall be CTS-ASTM D2737 standard outside diameter ratio (SODR)=9, 200 PSI PE3408/w/with tracer wire.

3" Horizontal service shall be Class 350 Ductile Iron Pipe or class 200 PVC.

4", 6" and 8" Horizontal service runs shall be either:

- a. PVC C900 Class 200.
- b. Class 350 Ductile Iron Pipe in conformance with ANSI/AWW A C104 and ANSI/AWW A C110.

Vinyl coated solid copper tracing wire, 12 or 14 gauge, shall be used on all non-metallic pipe service runs and shall be stubbed up in the meter box for accessibility.

Copper shall have flare ends on all connectors or pack-joint fitting.

- 2. Corporation Stops - These shall be bronze with a corporation thread on the inlet side. Corporation stops shall be of the ball valve type. The outlet for the pipes shown below shall be as follows:

<u>Service Pipe</u>	<u>Corporation Stop Outlet</u>	<u>Corporation Stop</u>
¾"	CC x Grip Joint - Type	Ford Ball Corp, FB1000-3G
1"	CC x Grip Joint - Type	Ford Ball Corp, FB1000-4G
1½"	IP x IP Thread	Ford F-B 500-6-TA
2"	IP x IP Thread	Ford F-B 500-7-TA

- 3. Service Saddles / Clamps - Clamps shall support 360 degrees of pipe and shall be designed not to deform pipe by over tightening. The saddle / clamps shall be cast from 85-5-5 waterworks bronze in accordance with AWW A C-800.

Approved for PVC pipe are: Ford 202BS or equal (stainless steel & brass) Double Band Saddles for ¾" to 2" taps, CC-taps ¾" & 1", IP-taps 1½" & 2".

Approved for DIP and A.C. pipe are: Ford 101B (all brass) or equal single strap Brass ¾" - 1" with CC corp taps. Ford 202B (all brass) 1½" & 2" with IP corp stops.

- 4. Tapping Saddles - 3", 4", 6" and 8" Hot Taps are allowed on various applications as approved by the District. Approved is the Romac All Stainless

Standards for CONSTRUCTION OF WATER MAINS

SST or Ford All Stainless Fast tapping sleeve see Section 4.IV.M. "Hot Tapping" of these Standards, for construction methods.

5. Meter yokes will conform to:

<u>Service Pipe</u>	<u>Meter yokes</u>
¾"	Ford VBHC73-83W-41-33
1"	Ford VBHC74-84W-41-44

6. The Meter Boxes for ¾", 1", 1½" and 2" meters shall be polymer concrete with rectangular concrete cover with a hinged reading lid manufactured by Brooks.

<u>Meter Size</u>	<u>Box Inside Dimensions</u>	<u>Model Numbers</u>
¾" or 1"	12" x 20" x 12" (#37) Meter Box 12" x 20" (#37) Cover w/Hinged Read	A6000485 A6000484R
1½"	24" x 36" x 18" (#67) Meter Box with 2-piece Steel Traffic Lid. Reading Lid to be custom field cut and welded in field.	A6001974PC-18
2"	30" x 48" x 18" with 2-piece steel Traffic Lid. Reading lid to be custom field cut over meter and welded in field.	A6001430PCX18
3"	3'0" x 6'0" x 24" 4" - 6" by Special Design And as Approved by The District	A6001491A

Traffic lids are not generally approved since the meter boxes should be placed outside the traveled right-of-way, including driveways. Where no other alternative is available and the meter box will be in the traveled right-of-way, then an approved traffic lid shall be used.

H. Copper Setter

Copper setter for 1½" and 2" Flange Meters shall have High By-Pass option and an in line Check Valve. Inlet Flange angle Ball valve with lock wing outlet flanged angle ball valve.

Ford copper setter	1½"	VBB86-95322-07 custom setter
Ford copper setter	2"	VBB87-95322-08 custom setter
Mueller C.S.	1½"	098B2427----00
Mueller C.S.	2"	106B2427----00

Or equal. Confirm with distributor before ordering.

Standards for CONSTRUCTION OF WATER MAINS

Contractor shall install meter service yoke copper setters according to District Specifications and provide meter boxes for protection before meters are set.

One and one half (1½) inch meter services and larger shall have a service valve at the water main and shall be installed with by-pass assemblies according with District Standards. NOTE: Irrigation meter installations do not require bypass assemblies but do require a meter yoke.

I. Water Meters

The make, size, and location shall be determined by the District or his authorized representative. All water meters will be furnished and installed by the District at the expense of the contractor, developer, or individual owner.

No connections are to be made between meter and back-flow assembly.

J. Water Main Gate Valves

All gate valves shall meet all requirements of AWWA C 550 for "Protective Interior Coatings for Valves and Hydrants."

Gate Valves 3" through 20" shall meet all requirements of AWWA C550 and AWWA C509 for "Resilient-Wedge Gate Valves" and approved by the District.

All gate valves shall be ductile iron body, Resilient Wedge Gate Valves (RWGV) with a non-rising stem, a 2" operating nut that opens to the left and equal to American AVK and Mueller. No C low valves unless designated by the District.

Valves shall be "O" Ring seal. Valve ends shall be Flg x M.J. or straight flanged faced and drilled, ASA 125. The ring groove shall be smooth and to the tolerances as specified by the pipe manufacturer and shall accommodate either the Ring-tite or Fluid-tite rubber ring gasket.

K. Water Main Gate Valve Boxes and Covers

Water main gate valve boxes and covers shall be No. 3-RT units as manufactured by Brooks Products, Inc. Valve box extension shall be minimum SDR 35 8" PVC pipe. Valve boxes and PVC Risers shall be installed as shown on the Standard Drawings. PVC risers shall be notch fitted as to not allow backfill material to enter the bottom of the riser and fill over the valve operating nut / key.

L. Angle Meter Stop

These shall be bronze Ball angle meter stops. In a 1½" or 2" size, they shall be a flanged angle meter stop when required.

Standards for CONSTRUCTION OF WATER MAINS

<u>Service Line</u>	<u>Angle Ball Meter Stop</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Type</u>
1½" x & 2" Brass Riser	Meter Valve	MIP Thread	Meter Flange	Jones 1948 Ford BFA13-666W Ford BFA13-777W W/Lock Wing
1½" & 2" Brass Riser	By Pass	FIP Thread	FIP Thread	Jones J-1900W Ford B11-666SW (1.5") Ford B11-777SW (2")

For a 1½" displacement meter installation, use Ford ball angle meter stop BFA13-77W or equal.

M. Water Main Cut-in

When making a cut-in on an existing water main, which incorporates the use of flex couplings, transition couplings, or flange coupling adapters, these fittings will conform to AWW A C213 requirement fusion bonded epoxy to entire fitting with 304 SS BTN's or coated with the thermoplastic polymer, rilisan nylon II.

These types of fittings will conform to AWW A C219-97. Center sleeves and end rings will conform to ASTM A536 Grade 65-45-12 for ductile iron. Steel bolts shall meet ASTM F738 for stainless steel. Nuts shall meet ASTM F836/F836M for stainless steel.

Approved manufacturer source for Fusion Bonded Epoxy Coated Fittings, Romac Industries, Inc.

Approved manufacturer source for Thermoplastic Polymer Rilisan Nylon II Coated Fittings, Viking Johnson/Mueller Company.

N. Fire Hydrants

All fire hydrants installed in the District will be of the Dry Barrel type. The hydrants will conform to AWW A C502 as last revised and equal in all respects to the Mueller A-423. Hydrants will be cast iron construction and have a 6-hole bolt pattern, including hydrant spool extension and hydrant bury. (Hydrant Flange Burys or Spool Extensions will be 8 x 6 hole pattern when required). Hydrants will be painted safety yellow with urethane alkyl gloss enamel.

Steamer or special type fire hydrants may be required by the County Fire Department.

1. **Valve & Stems** - The end of the hydrant valve stem shall be protected against damage and excessive wear by a pentagon, "Dummy Nut" made of a ferrous type metal. Valves shall be of the quick opening type. A standard fire hydrant wrench shall be used to operate the hydrant.

Standards for CONSTRUCTION OF WATER MAINS

2. **Outlet Threads** - The 2½" and 4" outlets shall be equipped with National Standard hose threads and properly capped. Barrel of the hydrant shall be 6" minimum I.D.
3. **Main Line Valve** - All hydrants shall have a gate valve installed on the tee at the main on the hydrant branch.
4. **Hydrant Runs** - Hydrant runs shall be C900 CL.200 or DIP CL 350 cement lined and shall be restrained at the valve and bury by a joint restraint as specified under "Mechanical Joint Restraints for PVC and DIP" of these Specifications or thrust blocks. See Section G, 6" Horizontal Service Runs.
5. **Location of Hydrants** - Fire hydrants shall be spaced and installed as shown on the Plans and/or as directed by the County Fire Department. In no case shall the distance be greater than specified by the Insurance Services Office, Table 5 (residential 500 feet). All hydrants shall be located a minimum of 18" behind the curb face.

O. **Blowoff Assemblies**

Blowoff assemblies are placed at low spots in the line to facilitate line draining and to allow the removal of sediments which accumulate in low areas of the pipeline. Also fire hydrants perform the same functions as blowoff and therefore can substitute for them, providing a bottom outlet tee used to connect to the main line. Design engineers are encouraged to avoid blowoffs by utilizing fire hydrants.

On dead end lines (i.e., cul-de-sacs) where there is not a fire hydrant at the end of the line the engineer should specify the construction of a blowoff valve to drain, and clear the line.

1. **Sizing** - Blowoffs should be sized according to the following criteria:
 - a. In general, a particular section of pipeline should be capable of being drained within 2-4 hours.
 - b. The blowoff should be capable of creating a velocity of not less than 2.5 fps in the pipeline for the removal of sediments. For typical pressures between 45 and 100 psi this velocity can be created by the following:

<u>Pipe Size</u>	<u>Blowoff Size</u>
6"	2"
8"	2" or 4"
10"	4"
12"	4"

Standards for CONSTRUCTION OF WATER MAINS

<u>Pipe Size</u>	<u>Blowoff Size</u>
Above 12"	By special design

* 2" blowoff can be used unless the reach being drained is extensive where a 4" blowoff is desirable.

2. **2" Blowoff Assembly** - Materials shall be as follows:
 - a. Service Lines shall be Brass riser, T-head corporation stop and saddle at the main.
 - b. 2" Ball valve shall be Ford B11-777 with female iron pipe thread on each end and tee head.
 - c. Vault shall be the same as for a meter installation up to 1" (37-H Meter Box).
 - d. Plastic plug shall protect top of ball valve
3. **4" Blow off Assembly** - Materials shall be as follows:
 - a. Service line shall be 4" DIP or C-909 PVC. There shall be a bottom outlet tee on the main.
 - b. 4" Valve shall be R.W.G. Valve.
 - c. Flanged Spool shall be ductile iron cement lined.
 - d. 4" Blind Flange.
 - e. Vault shall be a concrete box with cast iron cover. Approved is Armorcast which is 17" x 30".
 - f. Guard Posts are required where an above ground blowoff is located and subject to damage.
 - g. Tracer wire shall also be stubbed out inside the vault box.

P. Combination Air Release Valves

Per AWW A C-512

Combination air release valves combine both the air release and air and vacuum valves of which is generally specified in the District System.

1. **Location** - Combination air release valves shall be located at all significant high points along the pipeline as approved or required by the District.

Standards for CONSTRUCTION OF WATER MAINS

2. **Sizing** - In order to simplify the selection of the combination air release valves, the following is provided as guidelines for determining the size:

a. Determine the maximum rate of flow which can occur in the line -

$$\text{Rate in CFS} = \frac{\text{G.P.M.}}{7 \times 60} \text{ under filling conditions}$$

$$\text{Rate in CFS} = 0.087 (SD5) \frac{1}{2} \text{ under draining conditions}$$

S = slope or gradient (ft. per foot)

D = diameter of pipe in inches

b. Using the valve in (1) above, the size should be:

<u>CFS Rate</u>	<u>Valve Size</u>
0-5	1"
5-15	2"

c. For most installation involving 8" pipeline the valve will be 1" size.

3. **Mechanical Assembly** - As discussed above, the combination air release assembly has both the features of an air release valve and an air vacuum valve. Both units shall be housed in cast iron body and all internal parts such as the float, bushings, level pins, seat and baffle shall be either stainless steel or brass as furnished by the manufacturer. All assemblies shall be Class 250 fittings.

Approved assemblies are as follows:

<u>Size</u>	<u>APCO Valve No.</u>	<u>Height</u>	<u>Clow Model Design</u>	<u>Crispen Model Design</u>
1"	143C	10"	A	U10
2"	145C	12"	B	U20
3"	147C	15"	C	U30
4"	149C	17"	D	U40

Used only where working pressure under 125 psi for 1" and 165 psi for large sizes.

Standards for CONSTRUCTION OF WATER MAINS

- a. Metal Housing or "Can" shall be per District Standards with a hinged door.
- b. Service Lines shall be ¾ inch or 1 inch Type K soft copper. There shall be a corporation stop at the main. One and one half (1½) and Two (2) inch service lines shall be 2 inch brass T-head corporation stop and saddle at the main.
- c. Ball Valves shall be Ford B11-777 with a female iron pipe thread on each end and tee head.

Q. Tracer Wire

Vinyl coated solid copper tracer wire, 12 or 14 gauge, shall be used on the water distribution pipe and shall be stubbed up outside of pipe riser inside of valve boxes or where required for accessibility in accordance with District Standards.

Marker Tape - In addition to tracer wire, plastic marker tape labeled "water line" shall be installed following compaction of trench backfill at 12" to 18" depth below finish grade or below base course layer in paved areas.

R. Back Flow Assemblies

Ownership of the Backflow Assembly is that of the property owner that it serves from the property served to the shut-off valve in the street or easement and District ownership from the valve to the main.

Only approved Backflow Assemblies shall be installed in the District. All industrial buildings will require backflow assemblies at the meter. On detectors, check backflow assemblies. Water meters will read in cubic feet.

On premises where system backflow protection is required, the backflow assembly shall be installed on the property side of, and adjacent to, the meter to the specified point of use. On the service line there must be no outlet, tee, tap or connection of any sort to or from the supply pipeline between the meter and the prospective assemblies.

Facilities that require uninterrupted water service shall install R.P. Backflow assemblies in parallel. When applicable a Hot-Tap will be the method to install a Fireline to an existing water main. All pipe line material shall conform to AWWA current standards and District Standards.

Immediately after installation of the backflow prevention assemblies, it will be necessary for the Contractor/Owner to have assemblies tested by a certified tester. Tester shall have updated certificate on file with District.

Backflow prevention device enclosures such as Guard Shack™ or approved equal shall be installed when required on the plans.

Standards for CONSTRUCTION OF WATER MAINS

Under the cross-connection regulations of the State of California, the Owner of the premises is required to maintain these assemblies in a continuous state of good repair and to test the assemblies after all repairs and at intervals of one year, unless the condition of the assemblies indicates the necessity for more frequent tests and servicing. Test report forms will be mailed to the Owner 30 days in advance of the next periodic test date. It will be the responsibility of the Owner to have the assemblies tested by a certified Backflow Prevention Assembly Tester. A report form showing the condition of each assembly and repairs made, if any, shall be prepared and forwarded to the assigned Cross-Connection Control coordinator within the 30-day period.

1. **Installation Requirements for DC (Double Check Valve Assembly) -** A DC shall be located as close as practical to the user's point of connection and shall be installed in a manner where it is readily accessible for testing and maintenance. Shall be installed at least 12" and not more than 36" above grade (measured from the lowest point of the assembly), and must have adequate side and top clearance of 18" to allow access for testing and maintenance.

Firelines - DCDA (Double Check Detector Assembly) is subject to the same requirements as set forth above. Water meter must read in cubic feet.

2. **Installation Requirements for RP (Reduced Pressure Principle Assembly) -** An RP must be located as close as practical to the user's point of connection (meter). Must be installed at least 12" and not more than 30" above ground (measured from the lowest point of the assembly, (which is the Differential Pressure Relief Valve) and must have adequate side and top clearances to allow access for testing and maintenance.

If placed in an above grade enclosure, or in a building, there must be at least 24" of clearance between the side of the assembly with test cocks and the side wall of the enclosure or building wall and at least 12" clearance between the other side of the enclosure or building wall. Also, allow adequate clearance for valve operation.

Please note that an RP MAY NEVER BE INSTALLED IN AN UNDERGROUND VAULT as the RP requires adequate, fail safe drainage. It is important to ensure adequate drainage for all installations as large volumes of drain water may be encountered.

RPDA (Reduced Pressure Principle Detector Check Assembly) is subject to the same requirements as set forth above.

3. **Information Relative to On-site Protection AVB (Atmospheric Vacuum Breaker) and PVB (Pressure Vacuum Breaker) -** All proposals for on-site protection in lieu of service protection must be evaluated on a case by case basis. In evaluating each case the water purveyor must consider the complexity of the piping system within the user's premise, the degree of the cross connection hazard to be protected against, whether other hazards exist on the site and any other special circumstances which might preclude the use of on-

Standards for CONSTRUCTION OF WATER MAINS

site backflow protection. The final decision rests in the hands of the water purveyor.

A common application of on-site protection are AVB's and PVB's installed on landscape irrigation systems where injection of fertilizers or pesticides (chemigation) is not practiced. Proposals to use AVB'S or PVB'S within an irrigation system in lieu of providing protection at the user connection must be examined on a case by case basis.

In the installation of an AVB no shutoff valves may be located on the discharge side of the AVB. The AVB must be mounted at least 6" above the highest downstream outlet. It should be noted that the current edition of the Uniform Plumbing Code prohibits the installation of an AVB where it will be subject to continuous pressure for more than 12 hours at a time. An AVB will tend to freeze in the open position under these conditions.

A PVB must be mounted at least 12" above the highest downstream inlet. Shut-off valves, either manual or automatic, may be located downstream of the PVB.

No connections are to be made between Meter and Backflow Assembly.

S. Concrete Construction

Concrete construction shall conform to the provisions of Section 303-1, "Concrete and Masonry Construction" of the "Greenbook." Concrete shall be of the appropriate class in accordance with table 201-1.1.2 (A) and shall conform to Section 201-1, "Portland Cement" of the "Greenbook."

T. Asphalt Concrete Replacement

Road compaction, base, asphalt concrete, and pavement markings shall be in accordance with the County of Santa Barbara transportation and engineering standard details and requirements.

Standards for CONSTRUCTION OF WATER MAINS

III. PUBLICATIONS

The following publications as listed below, but referenced to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

- A. American Standards Association**
 - ASA 125 Drill Hole Spacing

- B. American Standards Institute**
 - USAS A 21.1 - 1967 USA Standard for Thickness, Design of Cast-Iron Pipe

- C. American Society of Testing Materials**
 - A-126 Gray Iron Castings for Valves, Flanges & Pipe Fitting
 - A-276 Stainless Steel
 - A-307
 - C-31-59 Compression and Flexure Test Specimens
 - D-2321 Recommended practice for installation of Flexible Thermoplastic Sewer Pipe

- D. American Water Works Association Standards - Current Edition**
 - B300 Hypochlorite
 - B301 Liquid Chlorine
 - C100 Cast-Iron Pressure Fittings
 - C104 Cement Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water
 - C110 Ductile-Iron and Gray-Iron Fittings, 3" through 48", for Water and other Liquids
 - C111 Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
 - C151 Ductile-Iron Pipe for Water and other Liquids
 - C153 Ductile-Iron Compact Fittings, 3" through 12" for Water and other Liquids
 - C400 Asbestos-Cement Distribution Pipe, 4" through 12" NPS, for Water and other Liquids
 - C500 Gate Valves, 3" through 48" NPS, for Water and other Liquids
 - C502 Dry Barrel Fire Hydrants
 - C509 Resilient-Seated Gate Valves for Water and Sewage systems
 - C550 Protective Interior Coatings for Valves and Hydrants
 - C600 Installation of Ductile-Iron Water Mains and Appurtenances
 - C601 Disinfecting Water Mains
 - C603 Installation of Asbestos Cement Pressure Pipe
 - C800 Underground Service Line Valves and Fittings
 - C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12", for Water and other Liquids

- E. Federal Specifications**
 - WW -P-421b, Cast-Iron, Pressure (for water and other liquid)

- F. Installation Guides**
 - J.M. Pipe Installation Guide (latest edition)
 - Certainteed Installation guide (latest edition)

Standards for CONSTRUCTION OF WATER MAINS

- G. Separation Requirements**
State of California, Department of Public Health - Required Separation Between Water Mains and Sanitary Sewers.
- H. Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR)**
Most current edition of the USC FCCCHR manual.



"Pride in Community Service"

Standards for CONSTRUCTION OF WATER MAINS

IV. CONSTRUCTION METHODS

A. Paving

Road compaction, base, asphalt concrete, and pavement markings shall be constructed in accordance with the County of Santa Barbara transportation and engineering standard details and requirements.

B. Construction Excavation

1. **Trenching** - Attention is directed to Section 306-1, "Open Trench Operations," of the "Greenbook."

Trenching for all pipes shall be in open cut to provide a minimum cover of 36" below finish pavement surface or as established by the approved plans.

Where excavation for trenching is in a paved street or alley, or it is necessary to excavate in a paved area, the Contractor will mark out and saw the pavement in a straight line along the trench route to ensure a good and clean joint for patching, with the limits of paving cut to be 6" greater in width on each side of the proposed trench than the trench excavation. If the paving is broken to a ragged edge, the Contractor will be required to re-cut the paving before the paving patch is placed.

2. **Disposal of Excess Material** - Where material is excavated in excess of that required for the site, such excess materials shall be removed and disposed of by the Contractor as directed by the District. All excess material shall be removed from the right-of-way and disposed of by the Contractor. The location of the disposal site shall be the responsibility of the Contractor and shall be subject to the approval of the District - written approval by the disposal site owner and a grading permit issued by the affected public agency must be provided. Removal of excess material shall be done immediately following backfilling operations. Any spoils piles, bedding gravel, base material and the like shall be properly lighted and barricaded for traffic safety. In all cases, such piles shall be placed as far out of the traveled way as is possible.

All material disposed of at the City or County's Sanitary Landfills are subject to payment of current fees.

3. **Removal of Water** - The Contractor shall remove and dispose of all water entering the excavation. Disposal of water shall be done in such manner to prevent damage or nuisance to adjacent property. Sufficient pumping equipment shall be provided to maintain the trench in a dry condition during the bedding and initial backfilling of the pipe. The Contractor shall maintain all natural drainage and restore it to its former condition as soon as possible after preceding through any area.
4. **Backfill** - No backfilling shall be done until the installation to be covered has been inspected and approved for covering. Backfilling shall be carried out in an

Standards for CONSTRUCTION OF WATER MAINS

orderly fashion and, in general, shall be done as soon as approval has been given to cover the pipe. COMPACTION OF BACKFILLING SHALL PROCEED SIMULTANEOUSLY WITH BACKFILLING OPERATIONS.

Backfill material shall be in conformance with District Standards.

C. Removal or Abandonment of Existing Water Mains

Existing water mains which are being replaced shall be removed where necessary, or abandoned as indicated on the Plans or contract documents and as specified herein. The main to be abandoned or replaced shall be removed when any of the following conditions exist:

1. The alignment of the existing main falls within the trench excavation for the new main.
2. The alignment of the existing main is not more than 1' outside of the standard trench width for the new main.
3. When called out on the Plans or in the contract documents.
4. When required by the District.

When the existing main is shown on the Plans as located outside of the limits of conditions one and two above, but actually falls within these limits, the Contractor shall remove the main as if it were shown correctly. However, the District may, but is not obligated to, change the new main alignment so that conditions one or two above does not exist.

Where portions of the old main and/or services are abandoned and left in place, either the exposed ends of the abandoned main and services shall be tightly plugged with concrete per Section II, Materials, S. Concrete Construction, of these Standards 6" thick, or the abandoned main shall be blown full of concrete sand and the exposed ends and abandoned services shall be tightly plugged with concrete per Section II, Materials, S. Concrete Construction, of these Standards 6" thick, as indicated on the Plans.

All salvaged material from any abandoned water main, its appurtenances and gate valves, shall remain the property of the District at the time of its removal from the trench, unless otherwise specified. Such material shall not be allowed to accumulate along the line of work but shall be removed from the area at the earliest practical time and shall be delivered by the contractor to a location within the District boundaries as directed by the District.

D. PVC Pressure Water Distribution Pipe Installation

Contractor shall install pipe according to the current Installation Guide Booklet for **C-900/C-909 PVC** class water pipe and in accordance with the requirements of ASTM Standard D-2321 and AWWA Standards.

Standards for CONSTRUCTION OF WATER MAINS

E. Asbestos-cement Pressure Water Distribution Pipe Installation

Contractor shall install pipe in accordance with the requirements of AWWA Standard C603.

No power saw cutting or beveling of A.C. pipe and/or couplings shall be allowed. Snap cutting and/or use of flexible couplings is allowable.

F. Ductile-iron Water Distribution Pipe Installation

Contractor shall install pipe in accordance with the requirements of AWWA Standard C600.

G. Crossing Lines

In cases when crossing other utility lines, a 6" minimum clearance is required. Required separation between water mains and sanitary sewers shall be 10' horizontal and 3' vertical, or in conformance with guidelines as established by the State of California Department of Health. Any deviation must have the approval of the District.

Pipe Casing: Carrier pipes to be installed inside casing shall be installed with self-restraining casing spacers. Casing spacers shall provide axial thrust restraint to prevent pipe joint separation during and after installation.

Restrained casing spacers shall be manufactured of high strength ductile iron, ASTM A536, grade 65-45-12. Connecting rods shall be of high strength low alloy material meeting the requirements of ANSI / AWWA C111 / A21.11 Casing runners shall be out of ultra high molecular weight polymer.

Restrained casing spacers shall be provided at all pipe bell joints. In addition casing spacers shall be installed each 10' of the pipeline to support the pipe barrel and the weight of its contents. Restrained casing spacers shall be Ford Uni-flange series or approved equal. Ends of carrier pipe shall have an end seal with stainless steel hose clamps that conforms to the carrier pipe and the casing.

H. Thrust Blocks

Concrete thrust blocks shall be poured in place in back of all fittings, fire hydrants, pipe ends and at all changes of directions. Blocks shall be such as to withstand the thrust of 150 psi working water pressure on the main, or as designated by the District, as outlined per J.M. Pipe Installation Guide, latest edition, utilizing safe bearing load for undisturbed vertical and nearly vertical trench wall as approved by the District.

I. Compaction

1. **Pipe Bedding** - per "Greenbook" Section 306-1.2.1, "Bedding"
2. **Pipe Backfill** - per "Greenbook" Section 306-1.3, "Backfill and Densification"

Standards for CONSTRUCTION OF WATER MAINS

3. **Compaction Tests** - Compaction tests will be made in accordance with ASTM D2922/D3017 or D1557.

Compaction tests shall be furnished to the District by the Contractor and paid for by the Contractor. Such tests are to be made by a testing laboratory approved by the District. The Contractor will furnish one (1) compaction test per each linear 200' of compacted backfill with samples taken at depths determined by the District. In the case where trenching and backfilling is performed in a paved street or alley, one compaction test per two hundred (200) linear feet of the compacted subgrade and of the base material will also be furnished to the District by the Contractor, and any additional tests required by the District to ensure uniform and required compaction over the entire project.

J. Project Site Maintenance

Project site maintenance shall conform to the provisions in Section 7-8, "Project Site Maintenance," of the "Greenbook" and these Standards.

Water needed during the construction phase can be made available through a hydrant meter or a house meter. The Contractor, developer, or individual owner will be responsible for meters to be kept clear of all debris, to ensure access to meter readers and for damage or replacement of meter boxes, meters, meter yokes and service lines during construction. Dwelling units that have meter installations that do not conform to installation specifications will not be signed off.

Water provided by the District approved fire hydrants shall be metered and paid for by the Contractor. Hydrant meters may be obtained through the Engineer. Monthly water service charges and water usage charges will commence upon installation. A service charge will apply for relocating the hydrant meter to another hydrant.

The Contractor shall provide for the application of water for the purpose of controlling dust caused by his operations or by public traffic.

K. Final Inspection and Tests

1. **Hydrostatic Test. For Acceptance of AC and PVC Water Distribution Pipe** - The water main system shall be hydrostatically tested by the Contractor in the presence of the Engineer after all pipe and appurtenances have been installed, and thrust blocks and encasements have been placed and have attained sufficient strength and the required backfill has been partially completed for a section. Joints shall be left uncovered for inspection during the test. Hydrostatic testing will be done according to AWWA Standards C-600 D.I.P., C-603 ACP, and C-605 PVC.

Care is to be used to see that all air is excluded from the pipeline during filling operations by means of an air relief from the highest point of the pipeline system.

Standards for CONSTRUCTION OF WATER MAINS

If no blowoffs are available, it may be required that a tap be made in the line of sufficient size to exclude all air. After the line has been completely filled, it shall be allowed to stand under a slight pressure for a sufficient length of time to allow the escape of air from slight air pockets in the line and fittings. After completion of the testing, the taps shall be tightly plugged unless otherwise directed by the District.

Pipelines shall be tested in sections not more than 1,500' in length using valves when available or by the Contractor placing temporary test ends in sections not more than 1,500' in length.

A test for water tightness shall be made after the pipe, at the lowest point, has been subjected to a normal operating pressure of 100 psi for 24 hours. In this test, the section of pipe shall be subjected to a constant pressure of 200 psi after all air is released from test section for not less than two hours. The Engineer may require up to a four-hour test period.

No pipe installation will be accepted until or unless the leakage for the section of line tested is less than the rate of leakage specified in Table I (for AC Pipe) or Table II (for PVC Pipe). In calculating leakage, the Engineer will allow for the number of joints added to the pipeline, owing to the use of pipe length smaller than 13' for which the data in Table I or II applies. If the test leakage in any section is greater than that permitted, the Contractor shall locate and repair the defective joints at his own expense until the leakage by test is within the permitted allowance. The Contractor shall supply all equipment necessary for making the pressure test and the leakage test and shall make said tests at this own expense.

- "Pride in Community Service"*
2. **Hydrostatic Test Acceptance of Ductile-Iron Water Distribution Pipe** - Contractor shall perform hydrostatic testing in accordance with the requirements of AWWA Standard C600. "Installation of Ductile-Iron Water Mains and their appurtenances."
 3. **Disinfecting Water Mains** - Contractor shall perform Disinfection in accordance with the requirements of AWWA C651-99
 4. **Verification of Water Main Disinfection** - Verification of Water Main Disinfection shall be in accordance with the requirements of AWWA C651-99

L. **Clean-up**

The Contractor shall clean-up and dispose of all trash, broken pavement, debris and excess material and shall remove his equipment from the site of the work as soon as it is completed. Streets shall be swept and washed to remove dust and mud.

Standards for CONSTRUCTION OF WATER MAINS

M. Hot Tapping

Per AWW A 605 Section 6.4.2.2. - The drilling machine shall operate with a cutting tool classified as a core-cutting tool of the shell design that retains the coupon cut while penetrating the pipe wall. Twist drill bits and auger bits are prohibited.

Corporation stops are to be located at least one foot from the pipe ends. If two insertions are made, one on each side of the main, they should be separated by at least 18 inches measured along the pipe length. Multiple insertions made on the same side of the main are to be staggered 30° around the circumference as well and separated by at least 18 inches.

Hot tapping shall only be done in the presence of the Engineer or his representative. The tapping mechanism shall be of the self-purging type so that cutting chips, shavings and coupon are removed from the tapping machine and do not enter the pipeline.

Tapping sleeves shall be of high tensile cast iron construction specifically designed to withstand the strains and vibration of the tapping machine. The tapping sleeve must have gaskets at each end of the sleeves. Sleeves with only an o-ring around the tapped hole are not approved.

Approved tapping sleeves:	Romac SST-304.55 or Ford Style Fast All S.S. or approved equal
Size:	3-12 inches
Tapping Valve:	Resilient-Seated gate valve

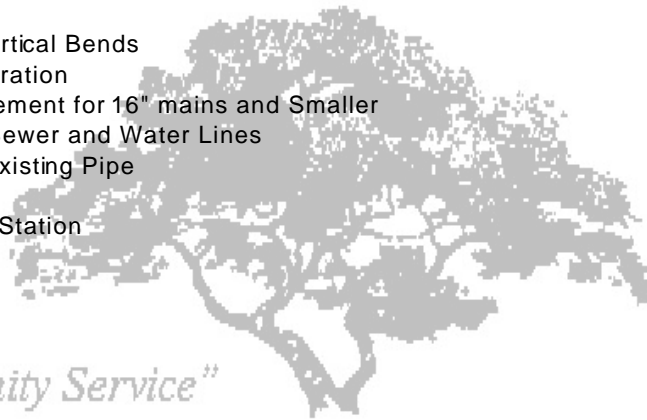
Note: Larger sizes require special approval.

"Pride in Community Service"
Pressure Test @ 200 psi, 1-hour with water pressure new service lines must be sterilized in accordance with District Specifications. 3/4" and larger hot taps shall not be within 2' of center to center of another service taps. New service lines installed in the same trench shall have a 2' parallel separation.

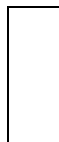
Standards for CONSTRUCTION OF WATER MAINS

STANDARD DETAILS

- 100 Utility Service Laterals, Symbols and Abbreviations
- 101 Modification of Sewer Lateral over Water Main
- 102 Cross with 4 Valves Flg. x Rt.
- 103 Tee with 3 Valves Flg. x Rt.
- 104 2"-6" Blowoff Installation
- 105 Combination Air Release Valves
- 106 3"-12" Cross-Connection Control Wet Fire Sprinkler System with Fire Dept. Connection
- 107 Backflow Prevention Device Enclosure
- 108 4-8 Meter Manifold
- 109 1 ½" & 2" Service and Meter Installation
- 110 ¾" x ¾", 1" Water Service Connections
- 111 3" Meter with By-Pass
- 112 4" through 6" Service Installation
- 113 Hydrant Installation
- 114 Concrete Anchor Blocks for Vertical Bends
- 115 Typical Casing Spacer Configuration
- 116 Water System Support Requirement for 16" mains and Smaller
- 117 Separation Requirements for Sewer and Water Lines
- 118 3", 4" and 6" Connections on Existing Pipe
- 119 Water Line Invert
- 120 Installation of Water Sampling Station



"Pride in Community Service"



Checklist for New Developments/Construction
CONSTRUCTION INSPECTION
FOR DISTRICT USE

Construction of water and wastewater facilities by developers which are an extension to the District facilities.

Project Name: _____

Tract/APN: _____

- Before any inspections are made, it is essential that the District's Standard Specifications or adopted Standard Specifications for water and wastewater facilities are read and understood thoroughly.
- The construction/improvement plan should be studied and the construction site visited.
- Inspections/visits should be accomplished prior and during each phase.
- Inspect the installation for workmanship and completeness in accordance with the plans and specifications.
- Special attention should be given to critical areas such as thrust blocks, manholes, and all required tests.
- Complete the inspection report and date of inspection of tests.
- Before acceptance of the development, all of the foregoing must be accomplished in a manner satisfactory to the District.

Additional Criteria: *"Pride in Community Service"*

- Service lines to be marked with L (= Lot) + # (number), i.e. L-1 or L-2
- Sewer extension stubs to be marked at curb by "S."

Checklist for New Developments/Construction

CONSTRUCTION INSPECTION

FOR DISTRICT USE

Construction of water & wastewater improvements which are an extension to the District's facilities.

Project Name: _____ Tract/APN: _____

CWIP Number: _____

Name of Construction Contractor: _____

	Quantity / Verified	Date
Materials delivered to job site		
Total lengths of pipe		
Pipe material and diameter		
Total number of valves		
Type and size of valves in accordance with Project Plans		
Workmanship of installation		
Service laterals installed and meter boxes installed set to grade		
Thrust blocks installed per District specifications		
Manholes per District specifications		
Backfill of trenches and compaction tested (Contractor's responsibility)		
Hydrostatic test of lines to District specifications		
Test PSI		
Number of leaks detected		
Leaks repaired and re-tested		
Disinfection of lines to VVCSD 50-100 mg/l dosage observed?		
Daily residual during detention time		
Flushed out lines		
Number of Bacti samples taken		
Lab results		
Results sent to SDHS-ODW		
Cross connection		