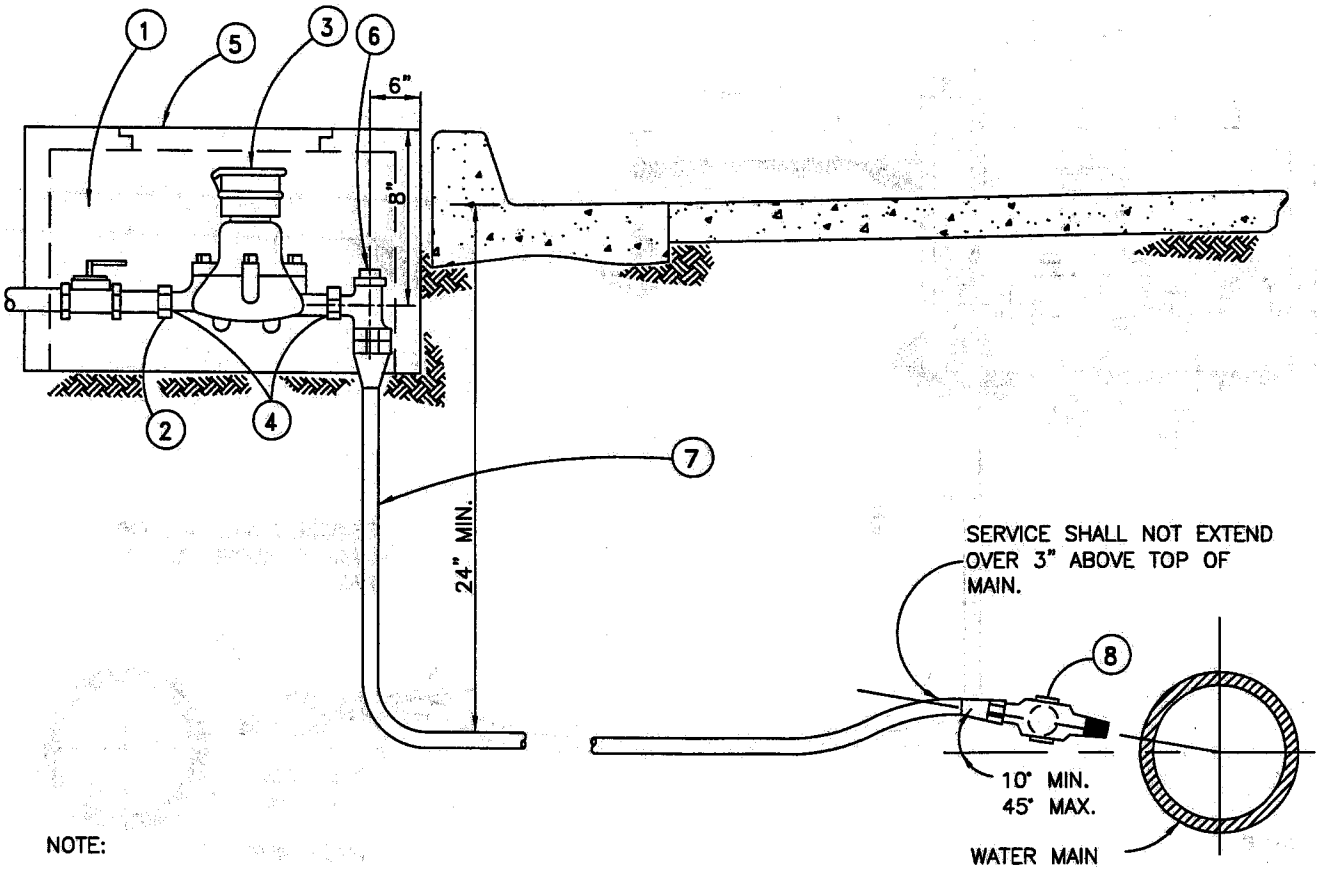


NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

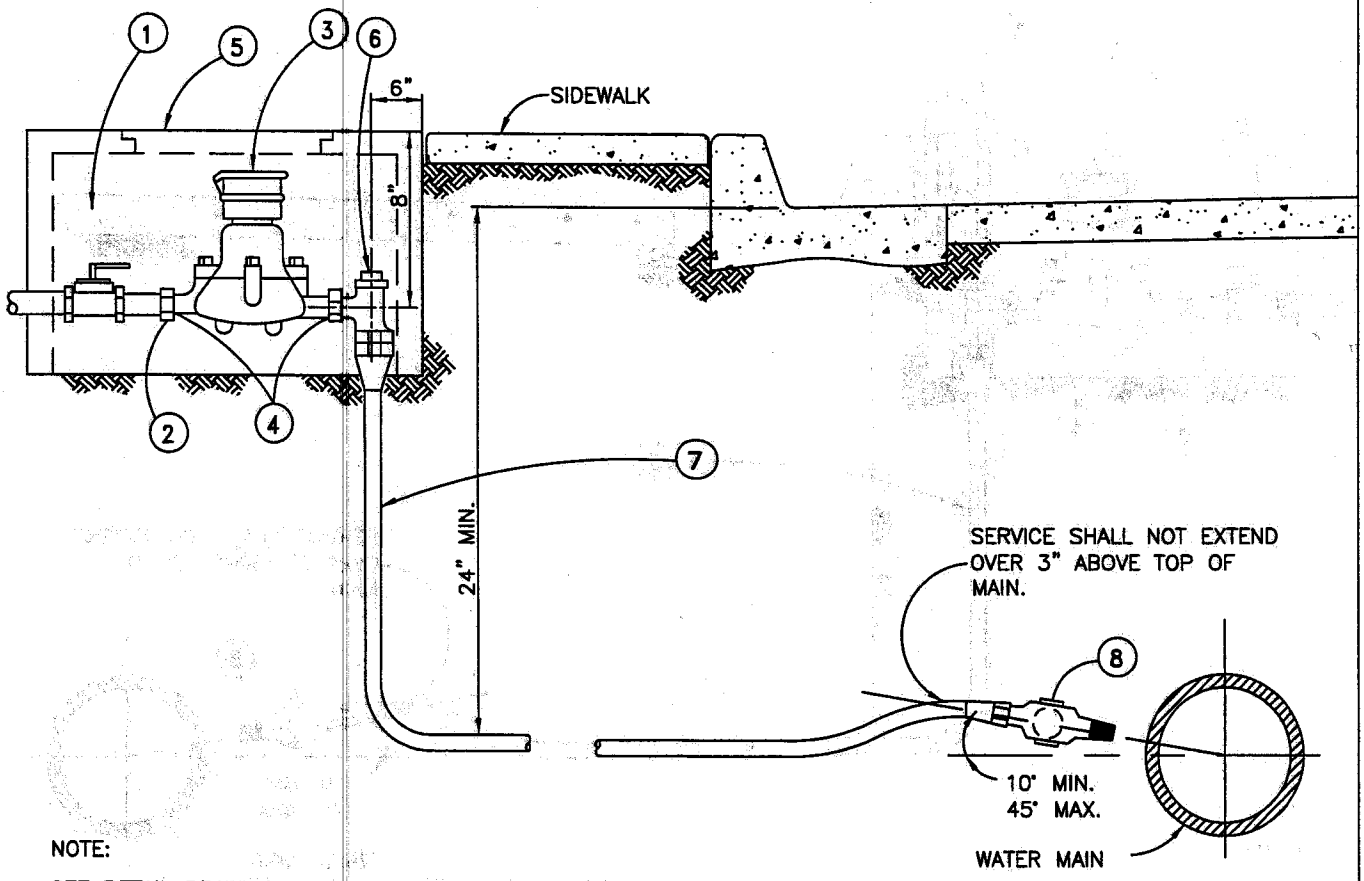
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	1	1" STRIAGHT METER COUPLING	
3	1	3/4" METER	
4	2	1"X 1-1/4" WATER METER BUSHING	
5	1	METER BOX & LID	TO BE INSTALLED BY CONTRACTOR
6	1	1" ANGLE METER STOP	
7	1	1" X REQUIRED LENGTH SERVICE LINE	
8	1	1" CORPORATION STOP	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-7A



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

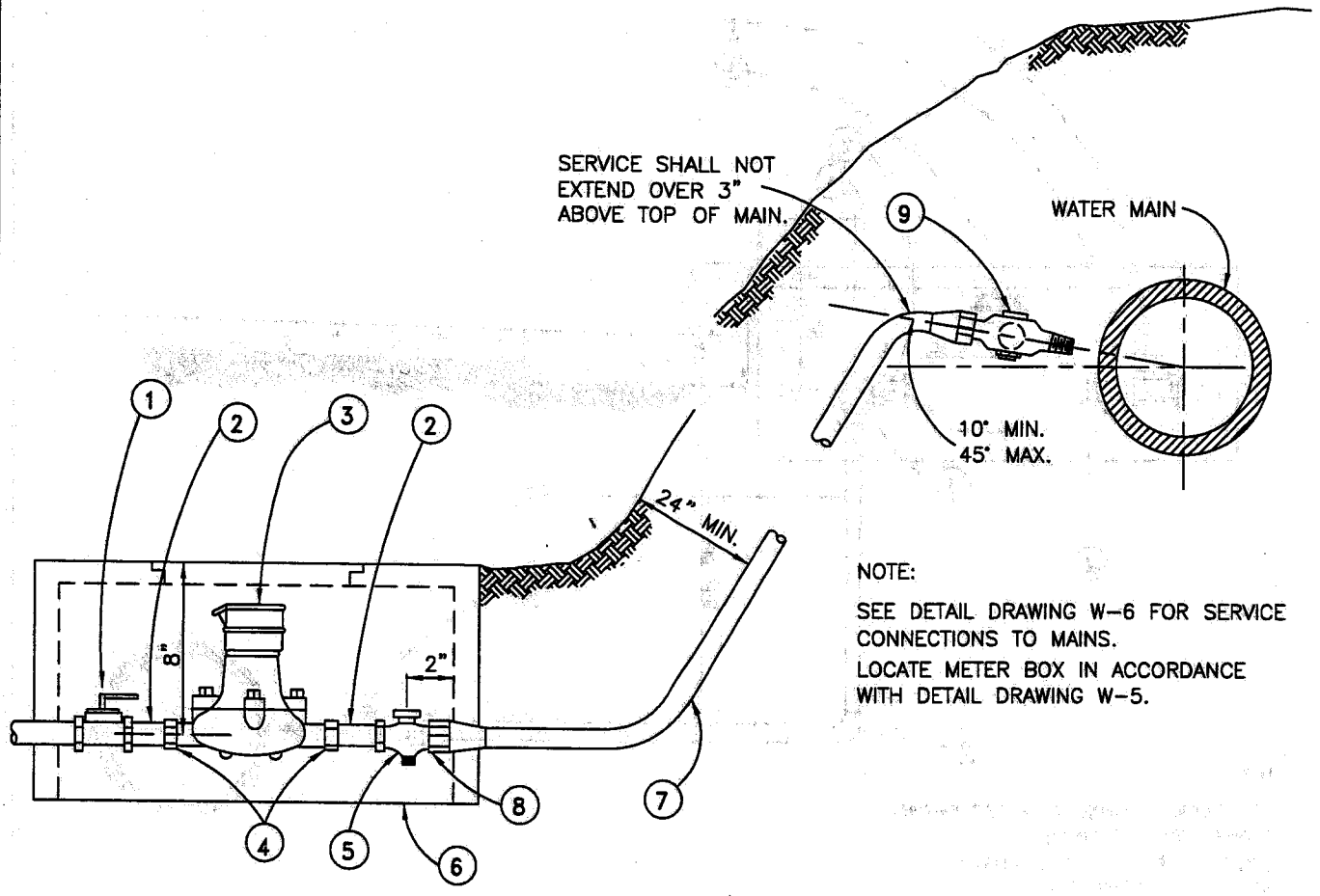
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	1	1" STRIAGHT METER COUPLING	
3	1	3/4" METER	
4	2	1"X 1-1/4" WATER METER BUSHING	
5	1	METER BOX & LID	TO BE INSTALLED BY CONTRACTOR
6	1	1" ANGLE METER STOP	
7	1	1" X REQUIRED LENGTH SERVICE LINE	
8	1	1" CORPORATION STOP	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-7B



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

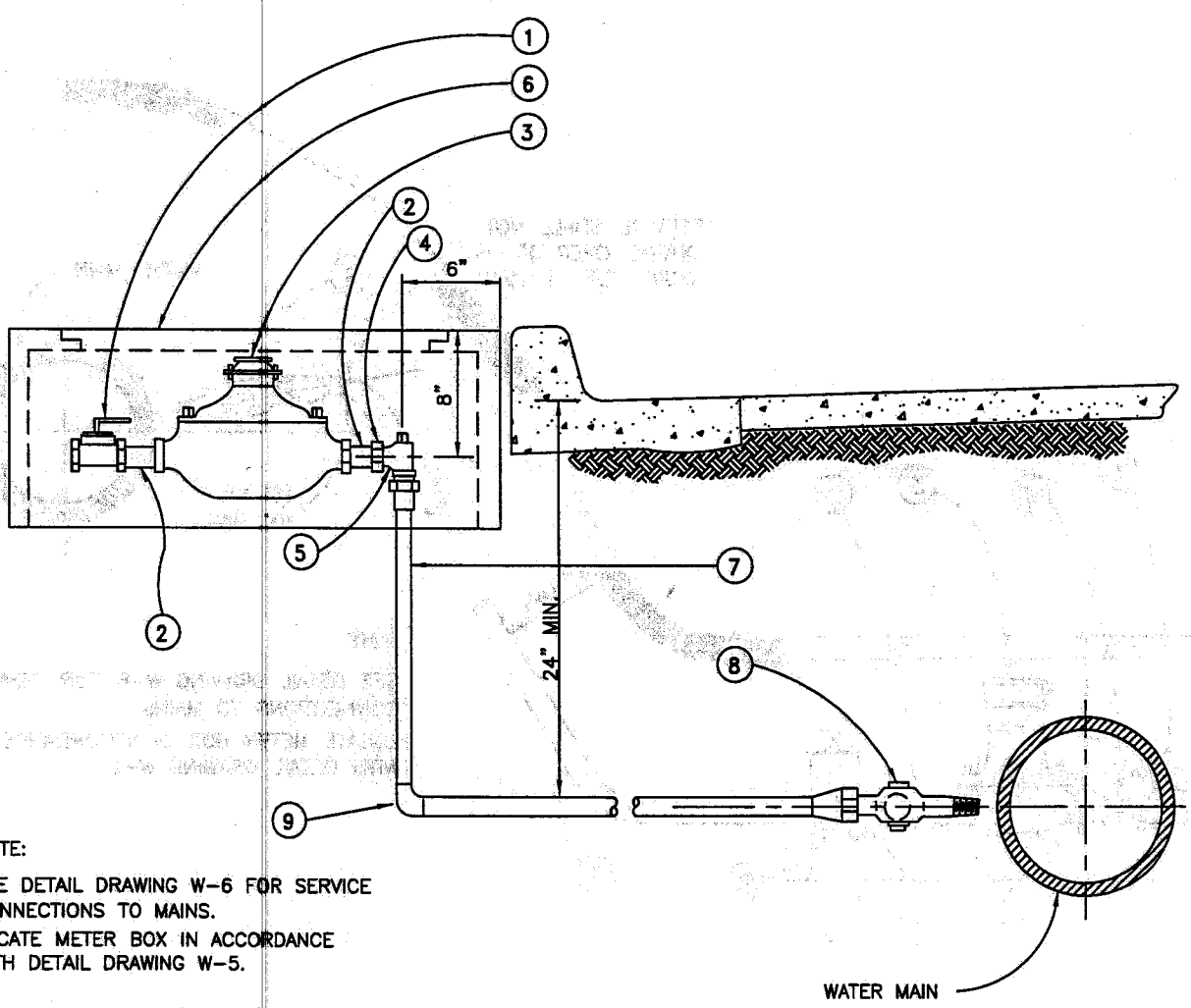
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	2	1" STRIAGHT METER COUPLING	
3	1	3/4" METER	
4	2	1" X 1-1/4" WATER METER BUSHING	
5	1	1" METER STOP	TO BE INSTALLED BY CONTRACTOR
6	1	METER BOX & LID	
7	1	1" X REQUIRED LENGTH SERVICE LINE	
8	1	1" STRAIGHT COUPLING	
9	1	1" CORPORATION STOP	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1" SERVICE INSTALLATION METER BELOW MAIN

APPROVAL DATE: OCT 2005 | W-8



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

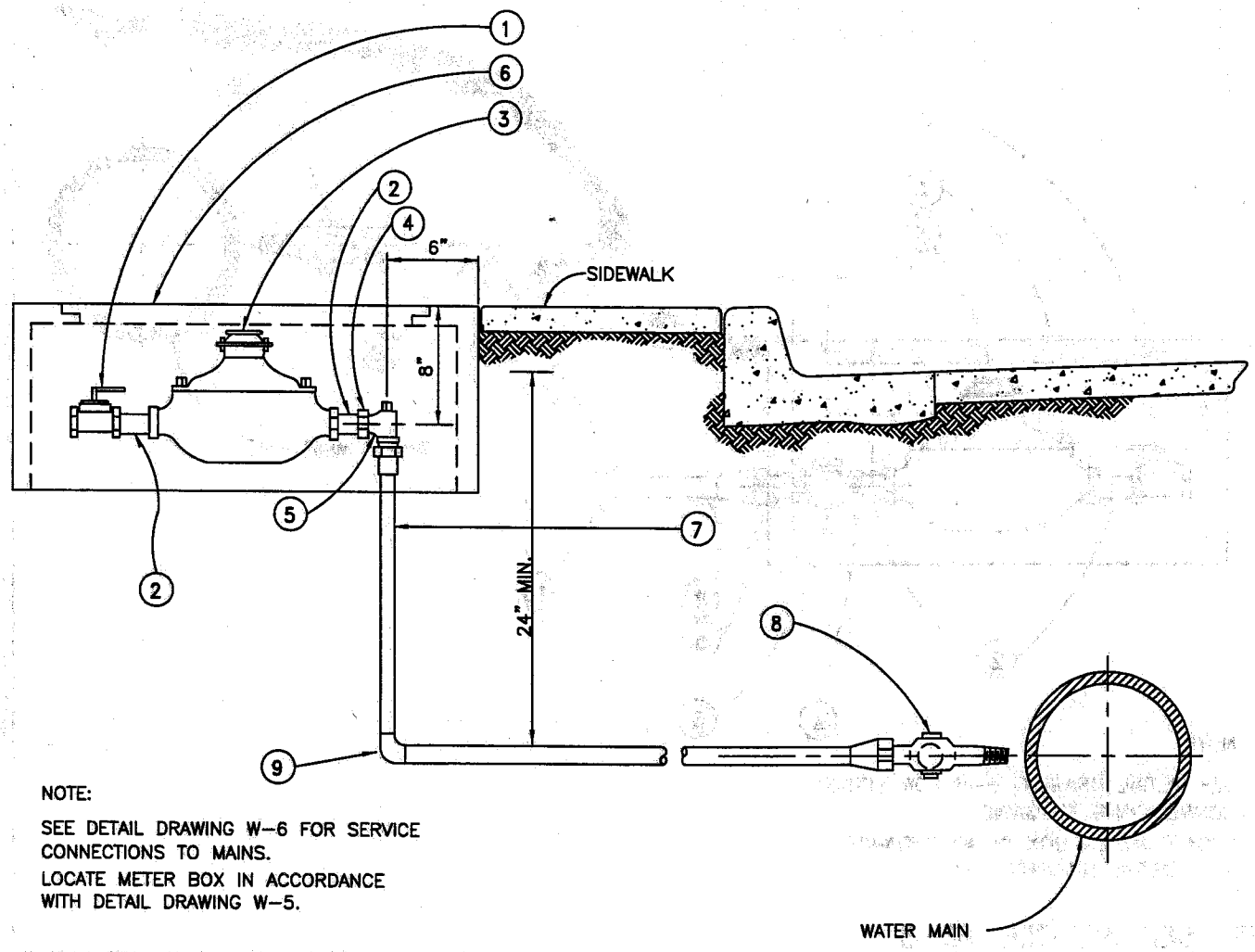
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	2	1" STRIAGHT METER COUPLING	
3	1	1" METER	
4	1	1" X 1-1/2" BRASS BUSHING	
5	1	1-1/2" ANGLE METER STOP	TO BE INSTALLED BY CONTRACTOR
6	1	METER BOX & LID	
7	1	1-1/2" X REQUIRED LENGTH SERVICE LINE	
8	1	1-1/2" CORPORATION STOP	
9	1	1-1/2" X 90° COMPRESSION OR SWEAT ELBOW	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1-1/2" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-9A



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

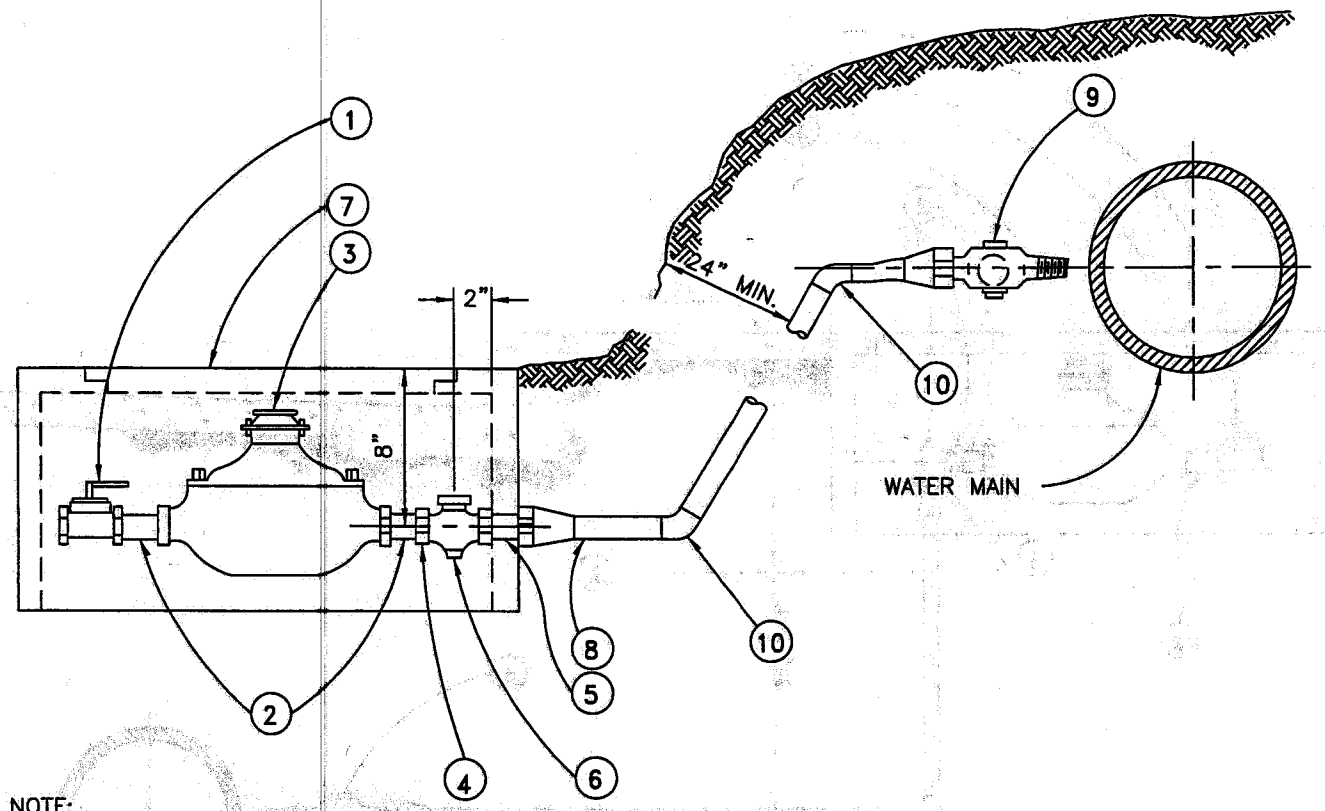
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	2	1" STRIAGHT METER COUPLING	
3	1	1" METER	
4	1	1" X 1-1/2" BRASS BUSHING	
5	1	1-1/2" ANGLE METER STOP	TO BE INSTALLED BY CONTRACTOR
6	1	METER BOX & LID	
7	1	1-1/2" X REQUIRED LENGTH SERVICE LINE	
8	1	1-1/2" CORPORATION STOP	
9	1	1-1/2" X 90° COMPRESSION OR SWEAT ELBOW	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1-1/2" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-9B



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

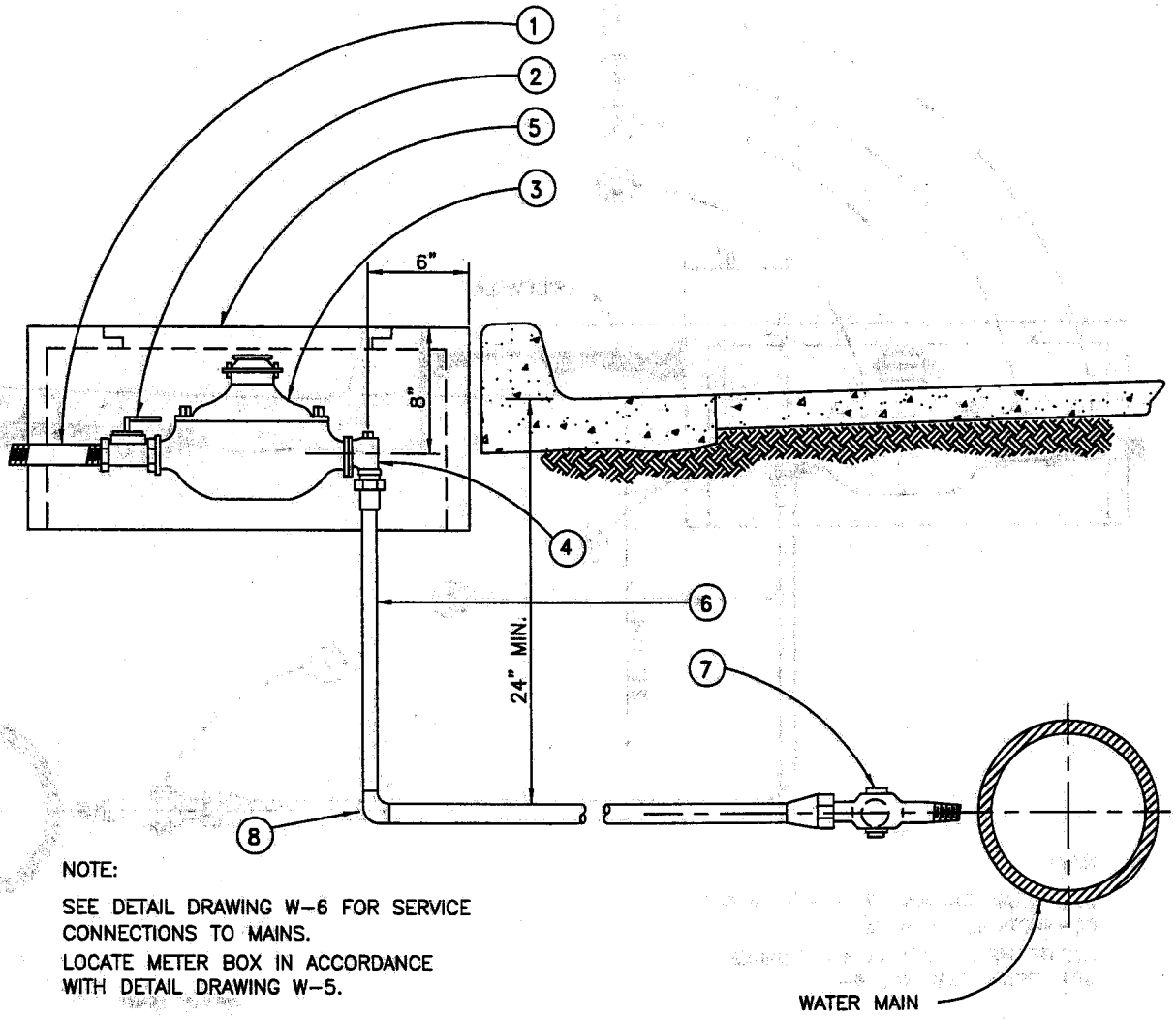
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TO BE INSTALLED BY DISTRICT
2	2	1" STRIAGHT METER COUPLING	
3	1	1" METER	
4	1	1" X 1-1/2" BRASS BUSHING	
5	1	1-1/2" STRAIGHT COUPLING	TO BE INSTALLED BY CONTRACTOR
6	1	1-1/2" METER STOP	
7	1	METER BOX & LID	
8	1	1-1/2" X REQUIRED LENGTH SERVICE LINE	
9	1	1-1/2" CORPORATION STOP	
10	2	1-1/2" X COMPRESSION OR SWEAT ELBOW	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 1-1/2" SERVICE INSTALLATION METER BELOW MAIN

APPROVAL DATE: OCT 2005 | W-10



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

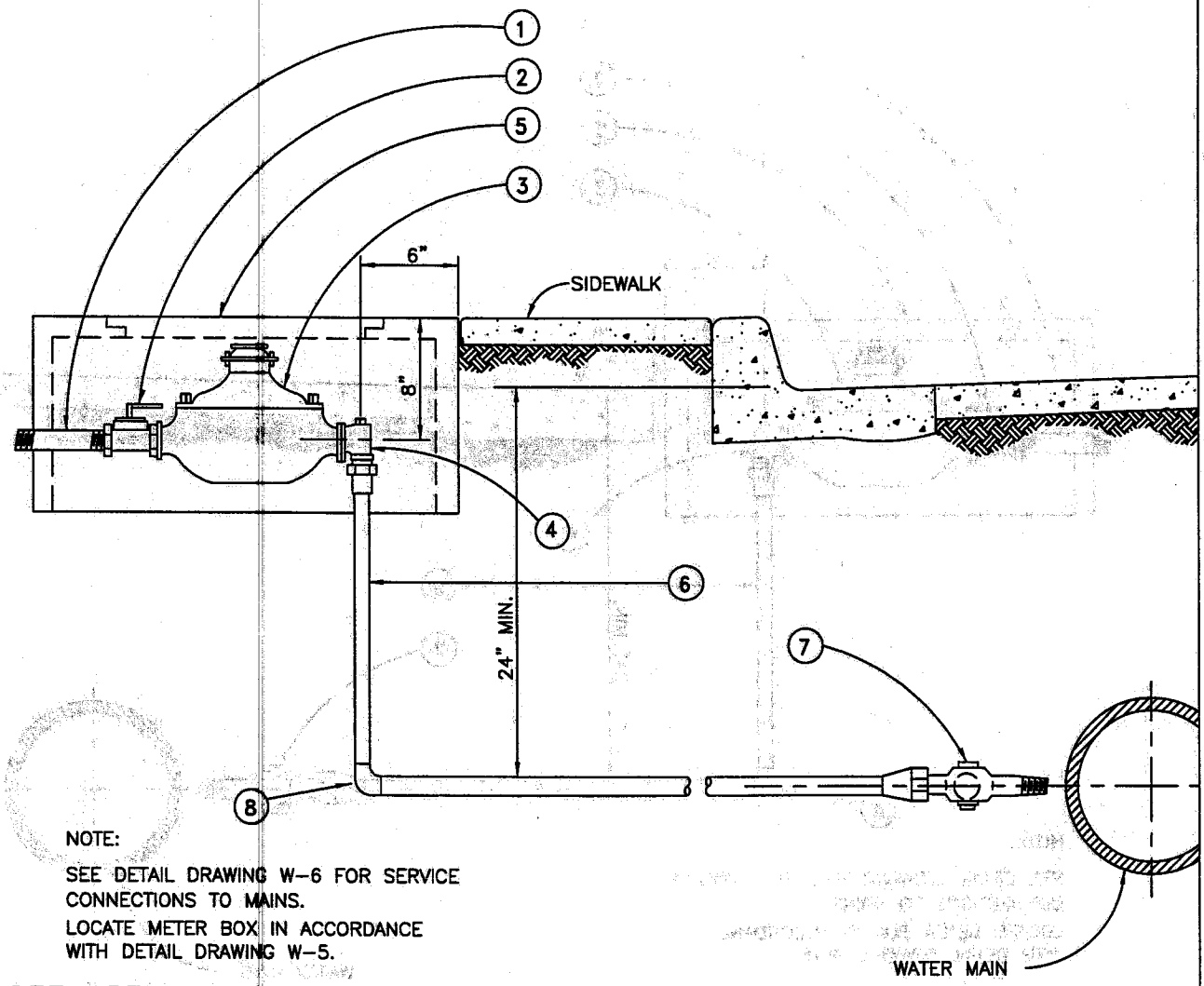
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	2" NIPPLE	TO BE INSTALLED
2	1	2" BALL VALVE	BY
3	1	1-1/2" OR 2" METER	DISTRICT
4	1	2" ANGLE METER STOP	
5	1	METER BOX & LID	TO BE INSTALLED
6	1	2" X REQUIRED LENGTH SERVICE LINE	BY
7	1	2" CORPORATION STOP	CONTRACTOR
8	1	2" X 90° COMPRESSION OR SWEAT ELBOW	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 2" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-11A



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

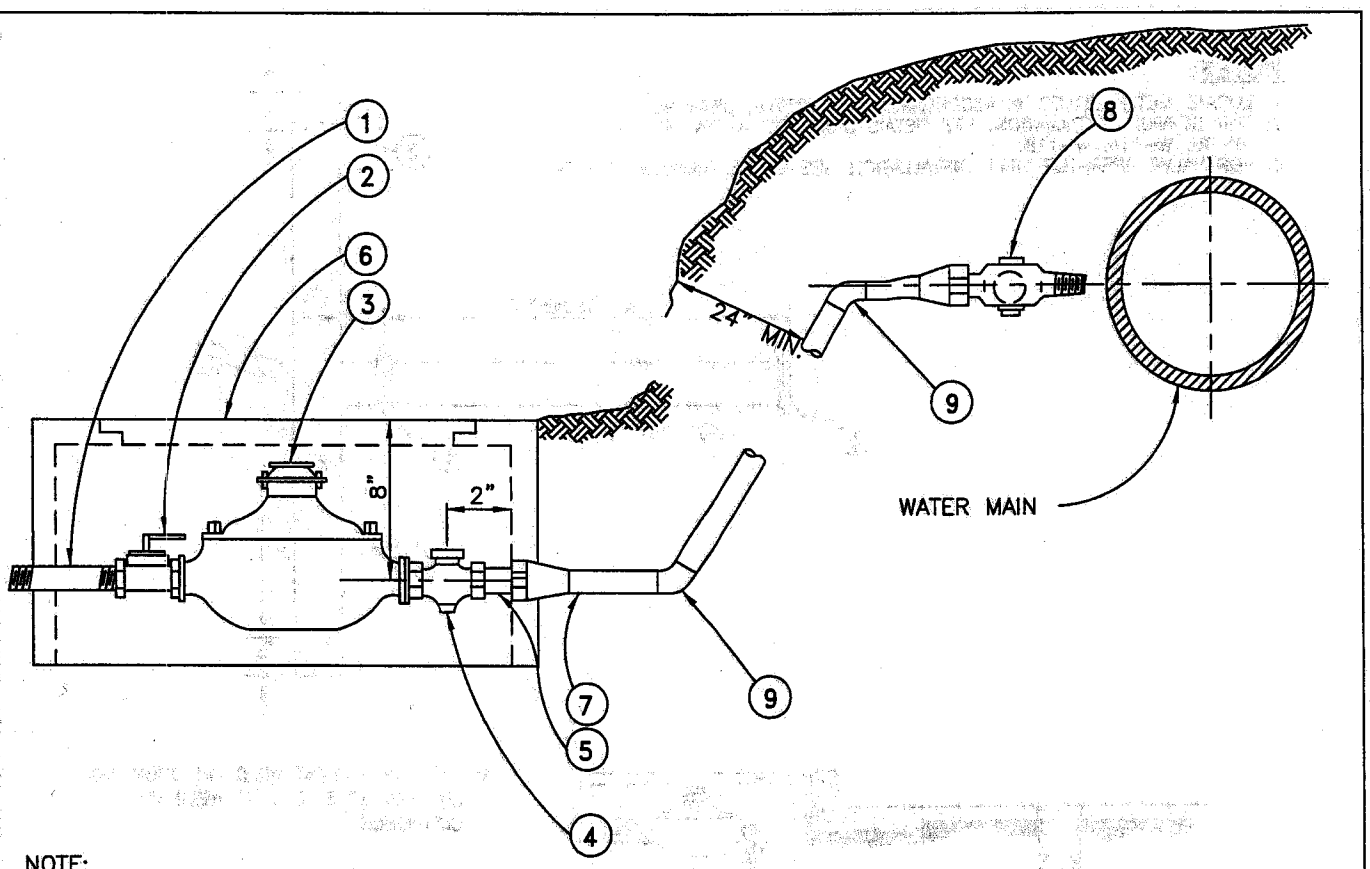
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	2" NIPPLE	TO BE INSTALLED
2	1	2" BALL VALVE	BY
3	1	1-1/2" OR 2" METER	DISTRICT
4	1	2" ANGLE METER STOP	
5	1	METER BOX & LID	TO BE INSTALLED
6	1	2" X REQUIRED LENGTH SERVICE LINE	BY
7	1	2" CORPORATION STOP	CONTRACTOR
8	1	2" X 90° COMPRESSION OR SWEAT ELBOW	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 2" SERVICE INSTALLATION METER ABOVE MAIN

APPROVAL DATE: OCT 2005 | W-11B



NOTE:

SEE DETAIL DRAWING W-6 FOR SERVICE CONNECTIONS TO MAINS.

LOCATE METER BOX IN ACCORDANCE WITH DETAIL DRAWING W-5.

REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	2" NIPPLE	TO BE INSTALLED BY DISTRICT
2	1	2" BALL VALVE	
3	1	1-1/2" OR 2" METER	
4	1	2" METER STOP	TO BE INSTALLED BY CONTRACTOR
5	1	2" STRAIGHT COUPLING	
6	1	METER BOX & LID	
7	1	2" X REQUIRED LENGTH SERVICE LINE	
8	1	2" CORPORATION STOP	
9	2	2" X REQ'D. COMPRESSION OR SWEAT ELBOW	

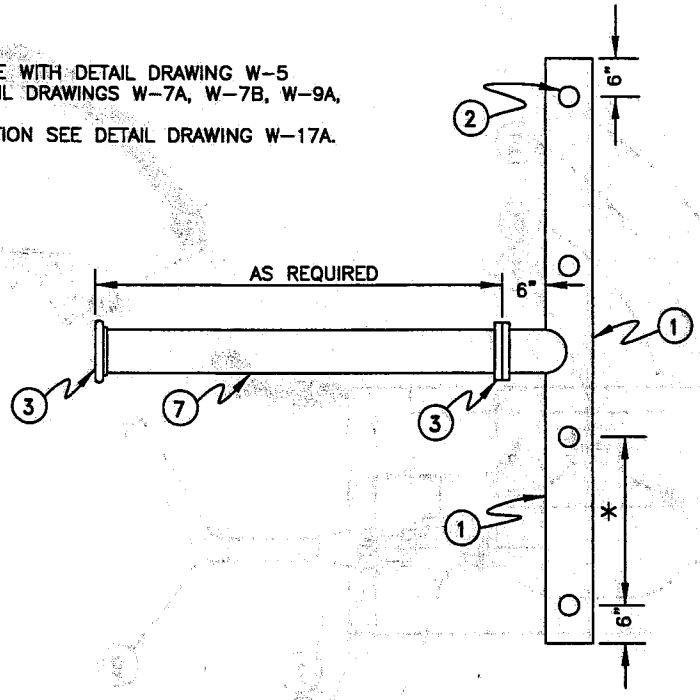
COACHELLA VALLEY WATER DISTRICT

DETAIL OF 2" SERVICE INSTALLATION METER BELOW MAIN

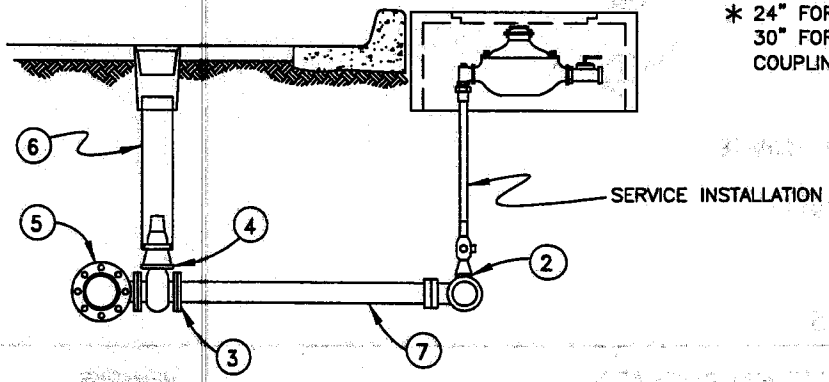
APPROVAL DATE: OCT 2005 | W-12

NOTES:

1. LOCATE METER BOXES IN ACCORDANCE WITH DETAIL DRAWING W-5
2. FOR SERVICE INSTALLATION, SEE DETAIL DRAWINGS W-7A, W-7B, W-9A, W-9B, W-11A, W-11B.
3. FOR VALVE OPERATOR WELL INSTALLATION SEE DETAIL DRAWING W-17A.



* 24" FOR 1-1/4" WELD ON COUPLING
30" FOR 2" & 2-1/2" WELD ON COUPLINGS.



REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1		4" OR 6" SCHEDULE 40 STEEL PIPE	COATED AND LINED IN ACCORDANCE WITH TC-10
2	4 OR 6	WELD ON COUPLINGS	
3	3	4" OR 6" FLANGE	
4	1	4" OR 6" GATE VALVE	
5	1	MAIN SIZE X 4" OR 6" TEE	
6	1	VALVE OPERATOR WELL AND CAP	
7		4" OR 6" CML/CMC, 12 GAUGE	

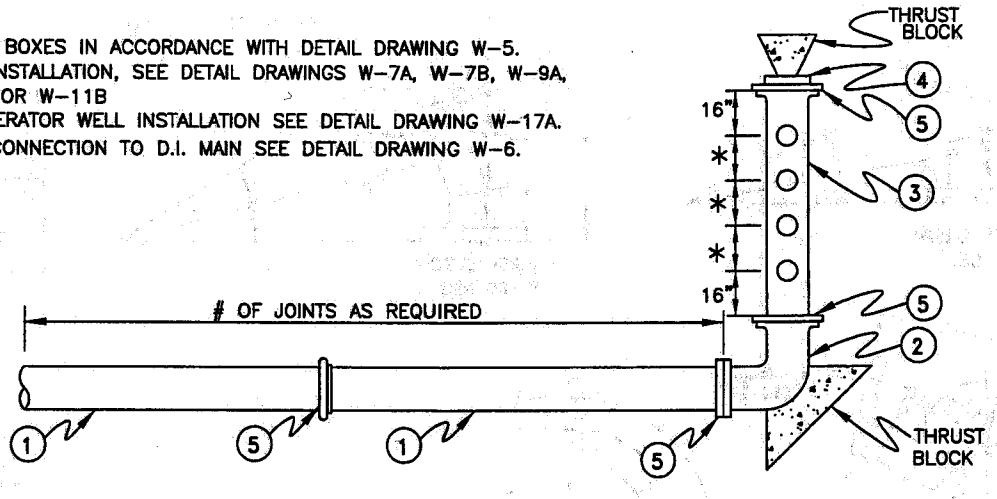
COACHELLA VALLEY WATER DISTRICT

DETAIL OF STEEL METER MANIFOLD ASSEMBLY

APPROVAL DATE: OCT 2005 | W-13A

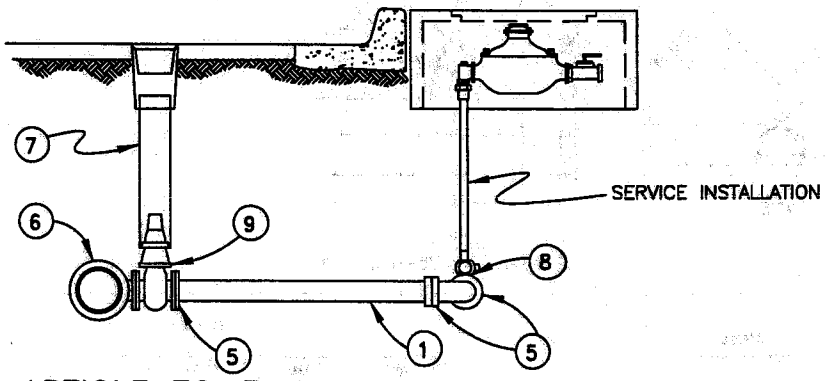
NOTES:

1. LOCATE METER BOXES IN ACCORDANCE WITH DETAIL DRAWING W-5.
2. FOR SERVICE INSTALLATION, SEE DETAIL DRAWINGS W-7A, W-7B, W-9A, W-9B, W-11A OR W-11B
3. FOR VALVE OPERATOR WELL INSTALLATION SEE DETAIL DRAWING W-17A.
4. FOR SERVICE CONNECTION TO D.I. MAIN SEE DETAIL DRAWING W-6.



* 24" FOR 1" CORPORATIONS
* 30" FOR 1-1/2" AND 2" CORPORATIONS

CONCRETE THRUST BLOCKS SHALL BE CONSTRUCTED OF 420-B-2000 CONCRETE



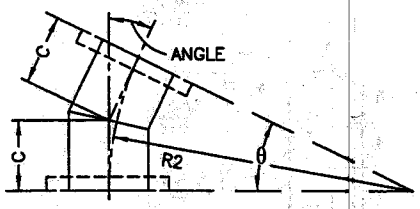
REF: SEE ARTICLE TC-3

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1+	6" OR 8" CL. 350 D.I. PIPE	GENERAL: MECHANICAL JOINT FITTINGS CAN BE USED WITH ENGINEER APPROVED RESTRAINING GLANDS, (REFER TO ARTICLE TC-6) EXCEPT FOR ITEM NO. 4.
2	1	6" OR 8" D.I. "TYTON" 90° ELBOW	
3	1	6" OR 8" CL. 350 D.I. PIPE	
4	1	6" OR 8" D.I. "TYTON" PLUG	
5	4+	6" OR 8" "TYTON" "FIELD LOK" GASKET	
6	1	MAIN SIZE X 6" OR 8" TEE	
7	1	VAVLE OPERATOR WELL AND CAP	
8	1	SERVICE CONNECTION TO MAIN BY DIRECT TAP	
9	1	6" OR 8" FLG X "TYTON" GATE VALVE	

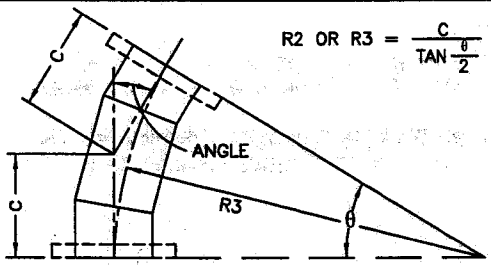
COACHELLA VALLEY WATER DISTRICT

DETAIL OF DUCTILE IRON METER MANIFOLD ASSEMBLY

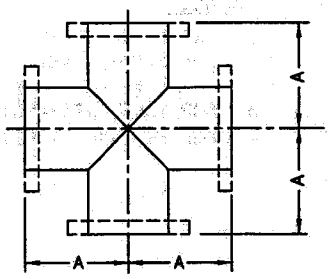
APPROVAL DATE: OCT 2005 | W-13B



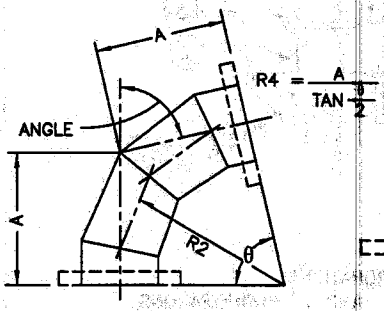
2–PIECE ELBOW
0–30 DEG.



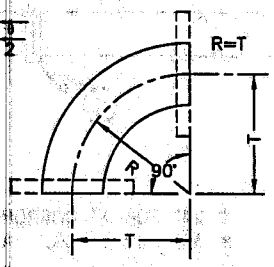
3–PIECE ELBOW
31–60 DEG.



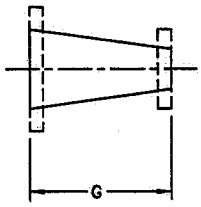
CROSS



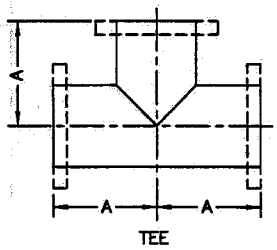
4–PIECE ELBOW
61–90 DEG.



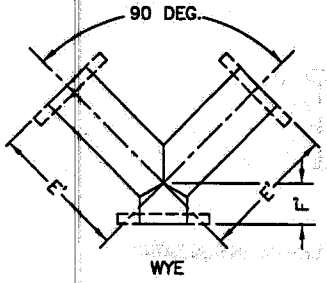
SMOOTH 90–DEG. ELBOW



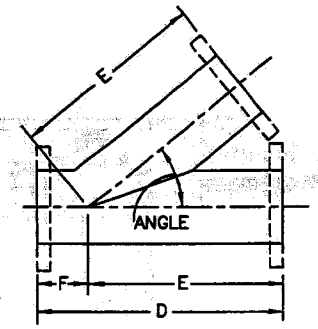
REDUCER



TEE



WYE



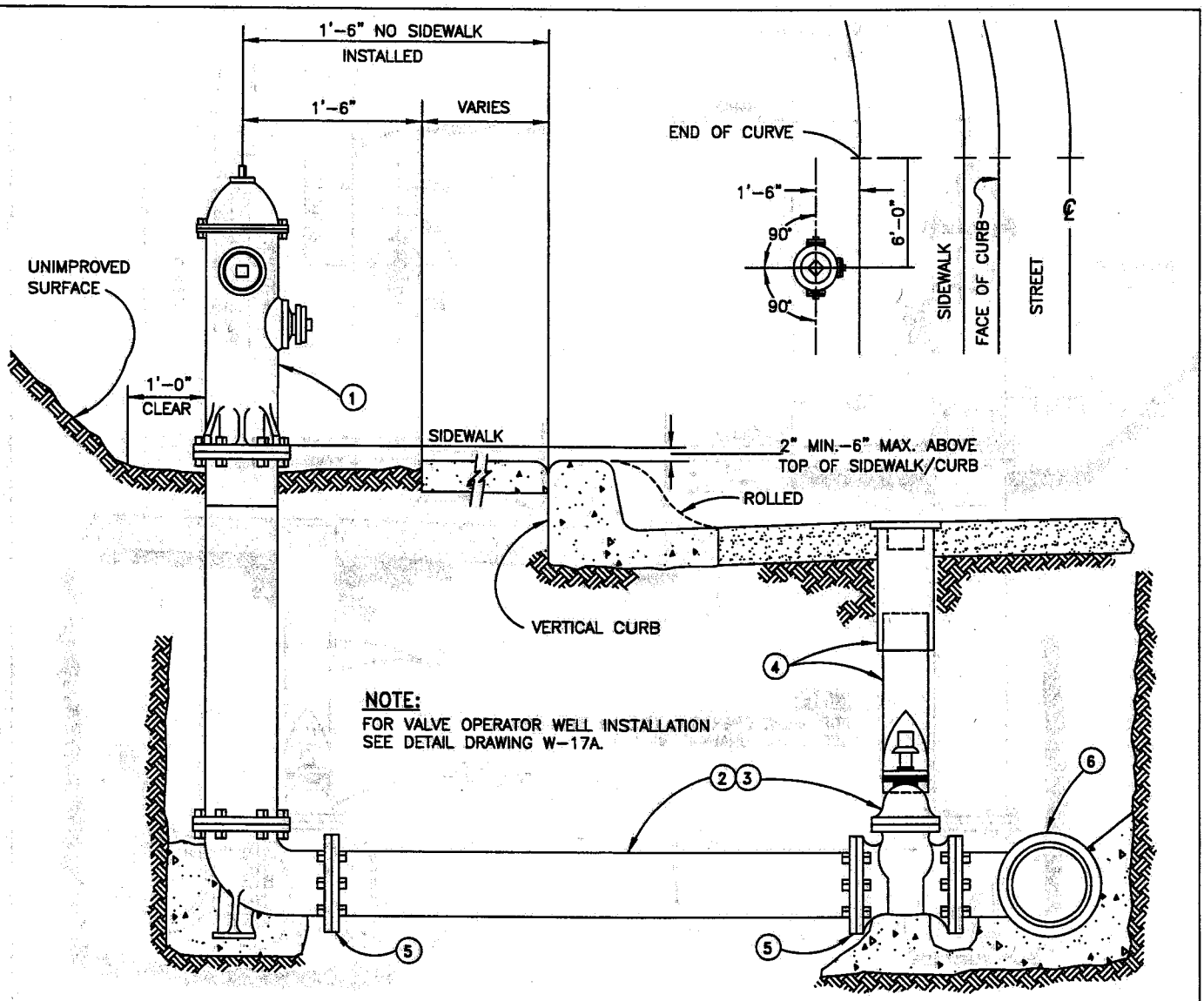
LATERAL
45–DEG. MIN.; 75–DEG. MAX.

NOMINAL DIAM.	TEE		CROSS A + A	LATERAL (45–75 DEG.)		WYE		ELBOWS					REDUCER CONE G
	RUN A + A	OUTLET A		RUN D	OUTLET E	E'	F'	TWO–PIECE (0–31 DEG.) C	THREE–PIECE (31–61 DEG.) C	FOUR–PIECE (61–90 DEG.) A		SMOOTH (90 DEG.) T	
4	13	6.5	13	15	12	6.5	3	4	4	6.5		6	7
6	16	8	16	18	14.5	8	3.5	5	5	8		9	9
8	18	9	18	22	17.5	9	4.5	5.5	5.5	9		12	11
10	22	11	22	25.5	20.5	11	5	6.5	6.5	11		15	12
12	24	12	24	30	24.5	12	5.5	7.5	7.5	12		18	14
14	28	14	28	33	27	14	6	7.5	7.5	14		21	16
16	30	15	30	36.5	30	15	6.5	8	8	15		24	18
18	33	16.5	33	39	32	16.5	7	8.5	8.5	16.5		27	19
20	36	18	36	43	35	18	8	9.5	9.5	18		30	20
22	40	20	40	46	37.5	—	—	10	10	20		33	22
24	44	22	44	49.5	40.5	22	9	11	11	22		36	24
30	50	25	50	59	49	25	10	15	15	25		45	30
36	56	28	56	84	60	—	—	18	18	28		—	36
42	62	31	62	95	69	—	—	21	21	31		—	42
48	68	34	68	104	77	—	—	24	24	34		—	48

COACHELLA VALLEY WATER DISTRICT

DIMENSIONS FOR FABRICATED STEEL FITTINGS (ALL DIMENSIONS IN INCHES)

APPROVAL DATE: OCT 2005 | W-14



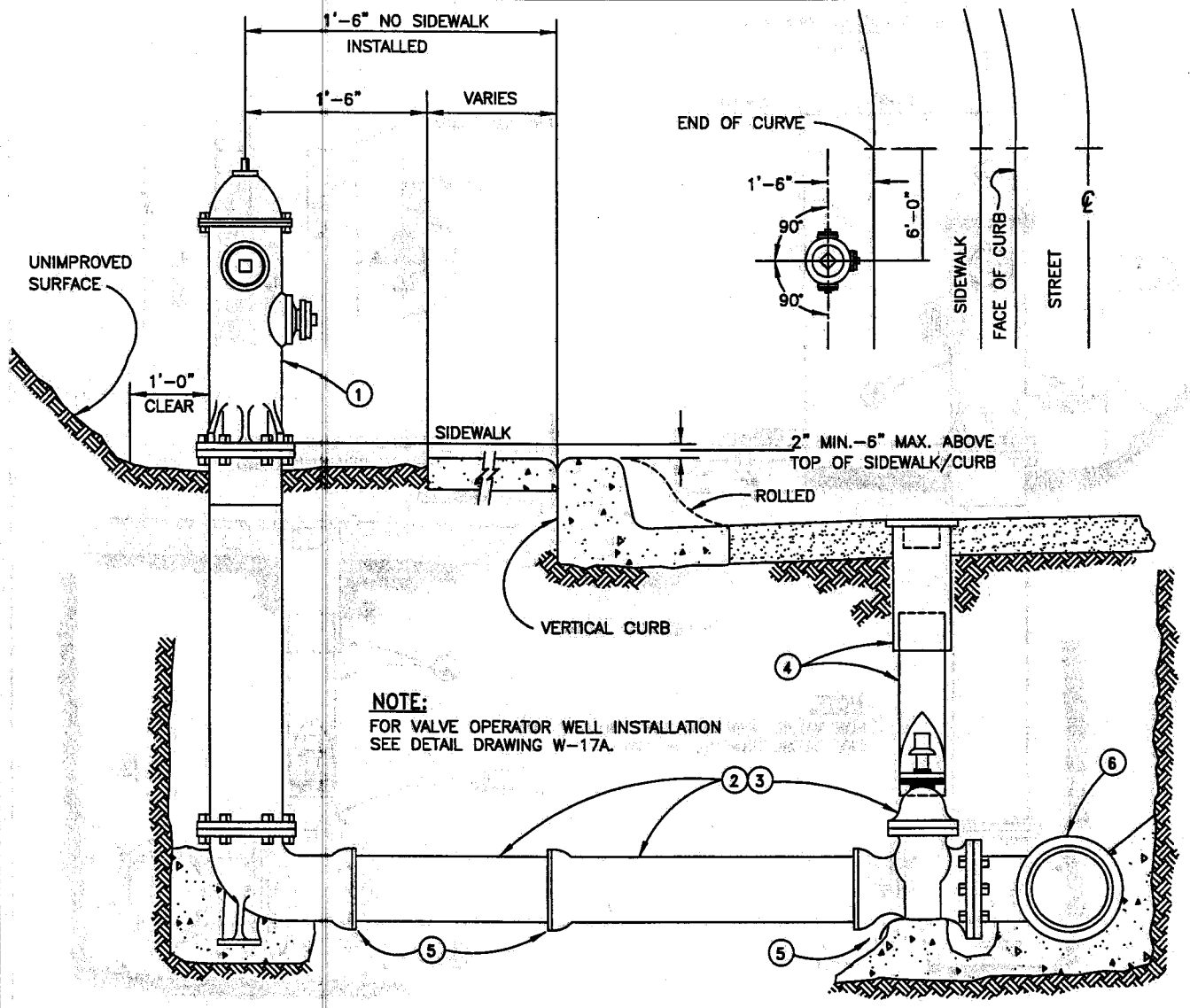
REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	NON CORROSIVE SOIL INSTALLATIONS ONLY, UNLESS OTHERWISE APPROVED BY ENGINEER.
2	1	6" X REQUIRED LENGTH HYDRANT RUN	
3	1	6" FLANGED GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	2	6" FLANGE	
6	1	MAIN SIZE X 6" TEE	CONCRETE SHALL NOT BE POURED DIRECTLY ON BOLTS AND FLANGES.

COACHELLA VALLEY WATER DISTRICT

DETAIL OF DRY BARREL TYPE FIRE HYDRANT INSTALLATION ADJACENT TO SIDEWALK OR CURB FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-15A



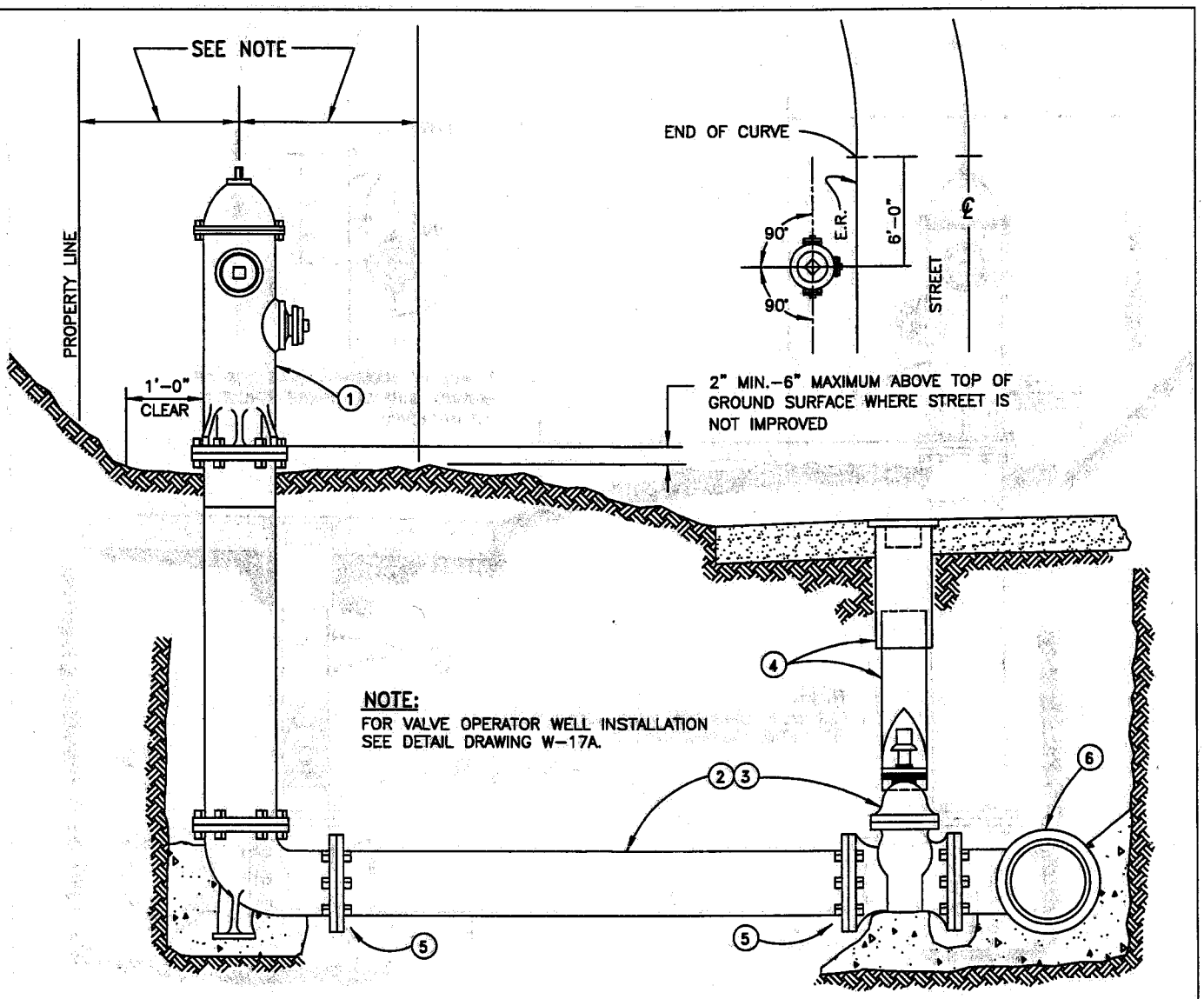
REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	
2	1	6" X # OF JOINTS REQUIRED	DIP-POLYETHYLENE WRAPPED IN CORROSIVE SOIL.
3	1	6" FLG. X "TYTON" OR MECHANICAL JOINT GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	2	6" "TYTON" RESTRAINING GASKET OR MECHANICAL JOINT RESTRAINING GLAND	REFERENCE ARTICLE T-6
6	1	MAIN SIZE X 6" TEE	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF DRY BARREL TYPE FIRE HYDRANT INSTALLATION ADJACENT TO SIDEWALK OR CURB FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-15B



REF: SEE ARTICLE TC-4

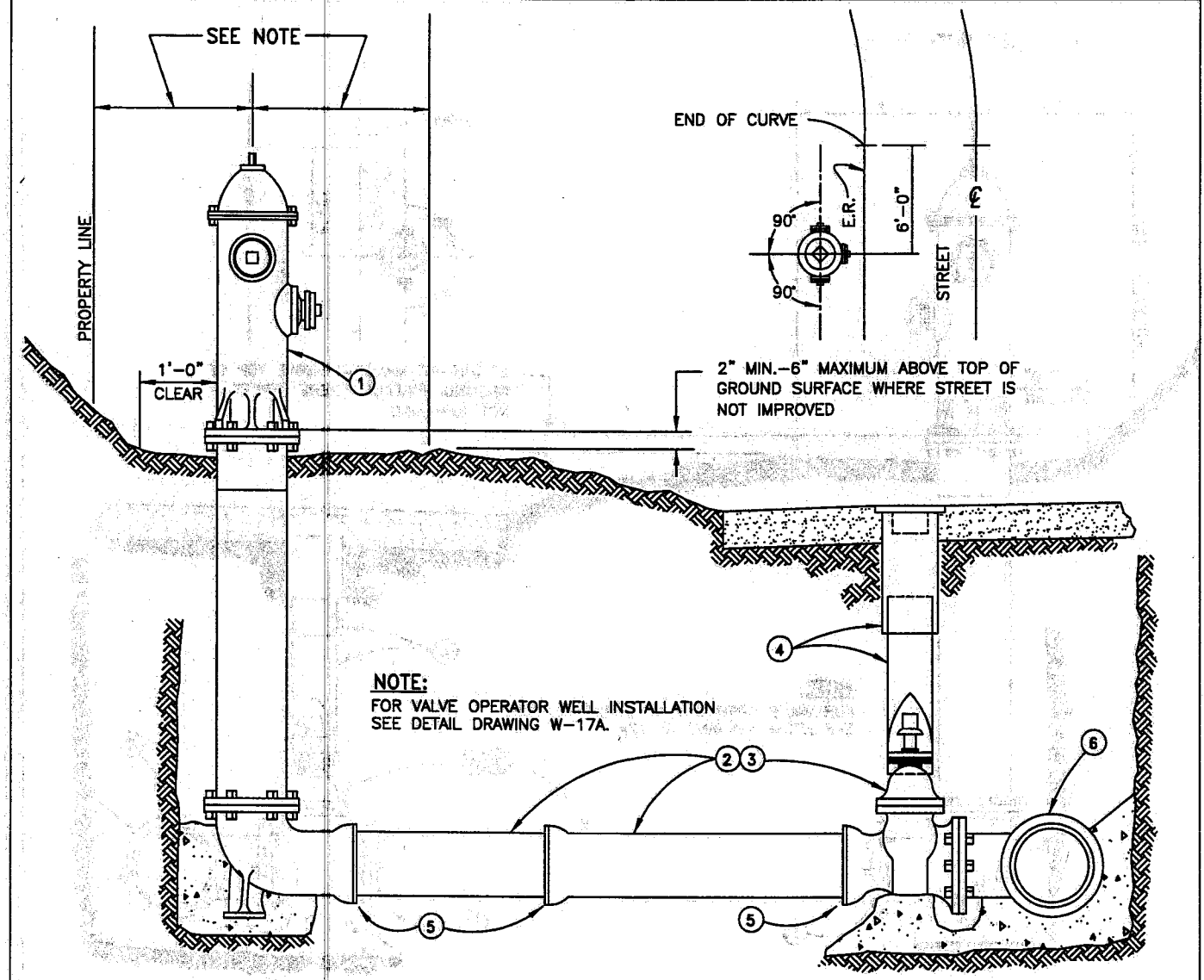
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	CML/CMC-NON CORROSIVE SOIL INSTALLATIONS ONLY, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2	1	6" X REQUIRED LENGTH HYDRANT RUN.	
3	1	6" FLANGED GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	2 +	6" FLANGE	REFERENCE TC-6
6	1	MAIN SIZE X 6" TEE	

NOTE: IF CONCRETE CURBS ARE NOT INSTALLED LOCATE FIRE HYDRANT 1'-6" FROM PROPERTY LINE. MAINTAIN 12" CLEAR AROUND HYDRANT. WHERE STREETS ARE IMPROVED WITH BERM, LOCATE FIRE HYDRANT 1'-6" FROM BERM.

COACHELLA VALLEY WATER DISTRICT

DETAIL OF DRY BARREL TYPE FIRE HYDRANT INSTALLATION UNIMPROVED STREET FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-16A



REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	
2	1	6" X # OF JOINTS AS REQUIRED	DIP-POLYETHYLENE WRAPPED IN CORROSIVE SOIL
3	1	6" FLG. X "TYTON" OR MECHANICAL JOINT GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	2 +	6" "TYTON" RESTRAINING GASKET OR MECHANICAL JOINT RESTRAINING GLAND	REFERENCE TC-6
6	1	MAIN SIZE X 6" TEE	

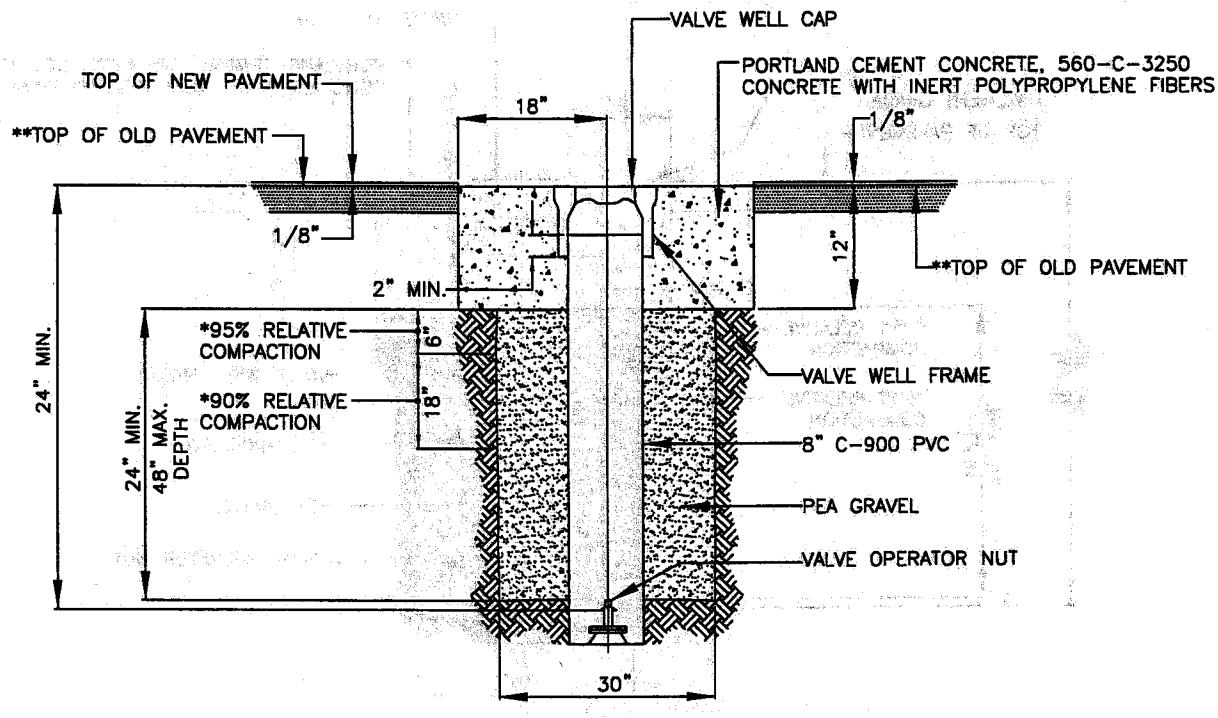
NOTE: IF CONCRETE CURBS ARE NOT INSTALLED LOCATE FIRE HYDRANT 1'-6" FROM PROPERTY LINE. MAINTAIN 12" CLEAR AROUND HYDRANT. WHERE STREETS ARE IMPROVED WITH BERM, LOCATE FIRE HYDRANT 1'-6" FROM BERM.

COACHELLA VALLEY WATER DISTRICT

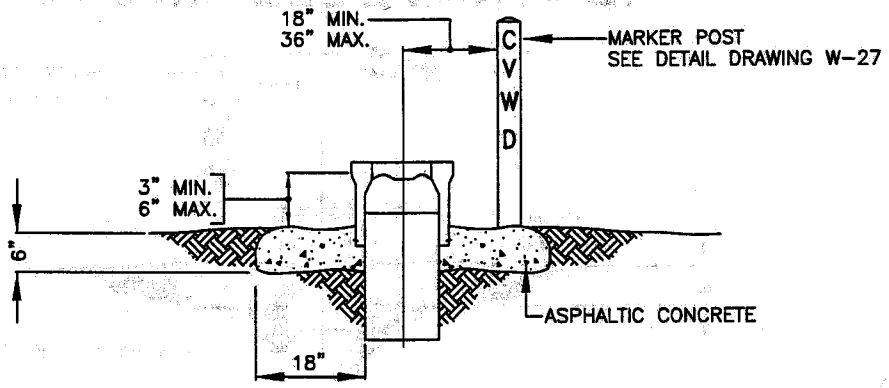
DETAIL OF DRY BARREL TYPE FIRE HYDRANT INSTALLATION UNIMPROVED STREET FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-16B

TYPICAL INSTALLATION (STREET OR ALLEY)



TYPICAL INSTALLATION (UNTRAVELED AREAS)



NOTE:

WHERE VALVE OPERATING NUT IS GREATER THAN 48" BELOW THE SURFACE AN EXTENSION ROD FOR VALVE OPERATION, WITH CIRCULAR CENTERING GUIDE, SHALL BE REQUIRED. THE TOP OF THE EXTENSION ROD SHALL BE MIN. 24" AND MAX. 48" BELOW THE SURFACE.

FOR VALVE OPERATOR WELL CAP SEE DETAIL DRAWING W-18A

FOR MARKER POST SEE DETAIL DRAWING W-27

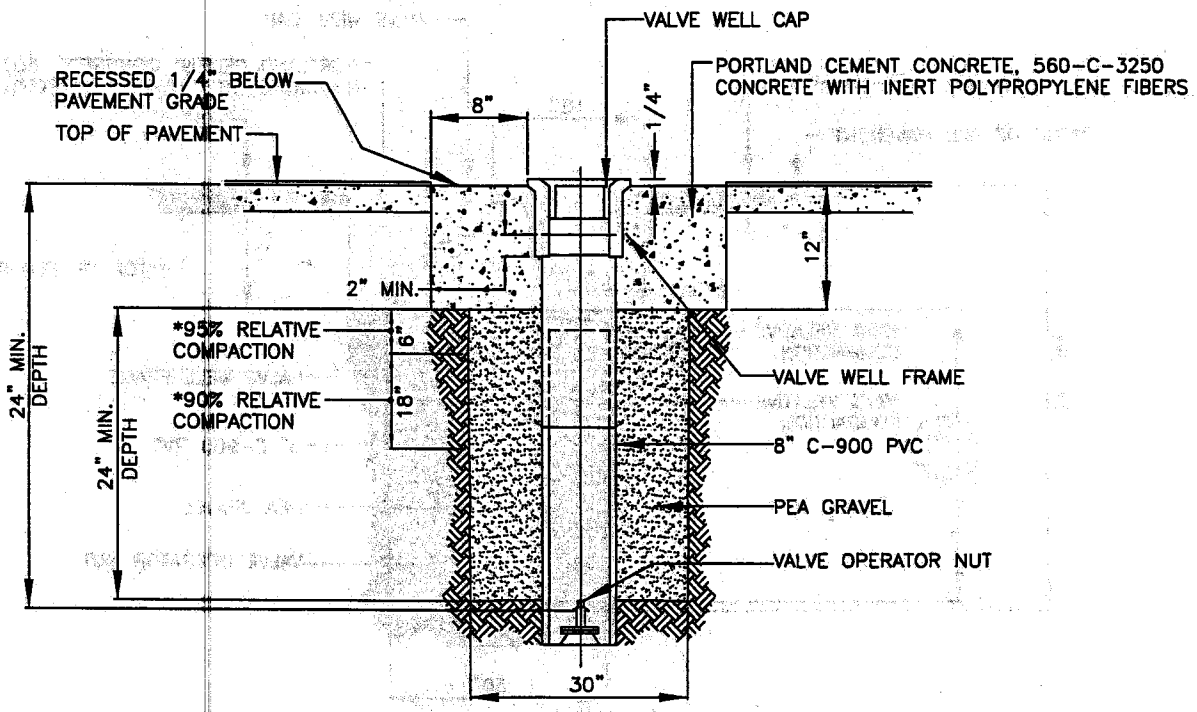
*PER COUNTY OF RIVERSIDE STANDARD No. 818 TRENCH BACKFILL

**DEFINED AS 6 MONTHS OR OLDER

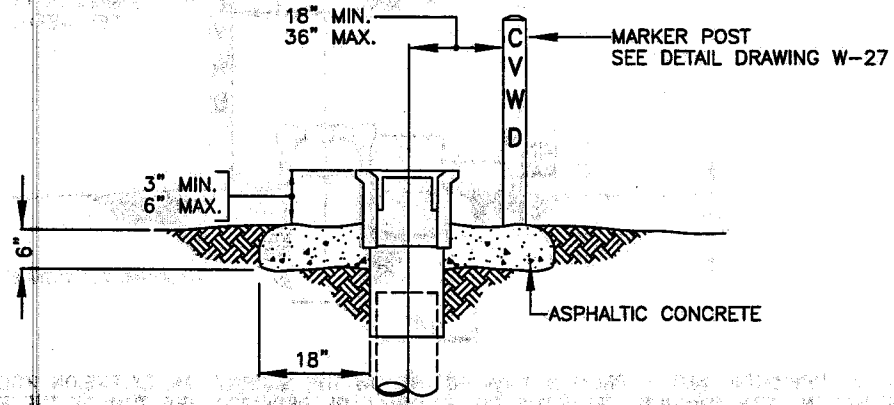
REF: SEE ARTICLE TC-5

WATER DISTRICT	COACHELLA VALLEY WATER DISTRICT
	DETAIL OF DOMESTIC WATER VALVE OPERATOR WELL INSTALLATION
	APPROVAL DATE: OCT 2005 — W-17A

TYPICAL INSTALLATION (STREET OR ALLEY)



TYPICAL INSTALLATION (UNTRAVELED AREAS)



NOTE:

WHERE VALVE OPERATING NUT IS GREATER THAN 48" BELOW THE SURFACE AN EXTENSION ROD FOR VALVE OPERATION, WITH CIRCULAR CENTERING GUIDE, SHALL BE REQUIRED. THE TOP OF THE EXTENSION ROD SHALL BE MIN. 24" BELOW THE SURFACE.

FOR VALVE OPERATOR WELL CAP SEE DETAIL DRAWING W-18B

FOR MARKER POST SEE DETAIL DRAWING W-27

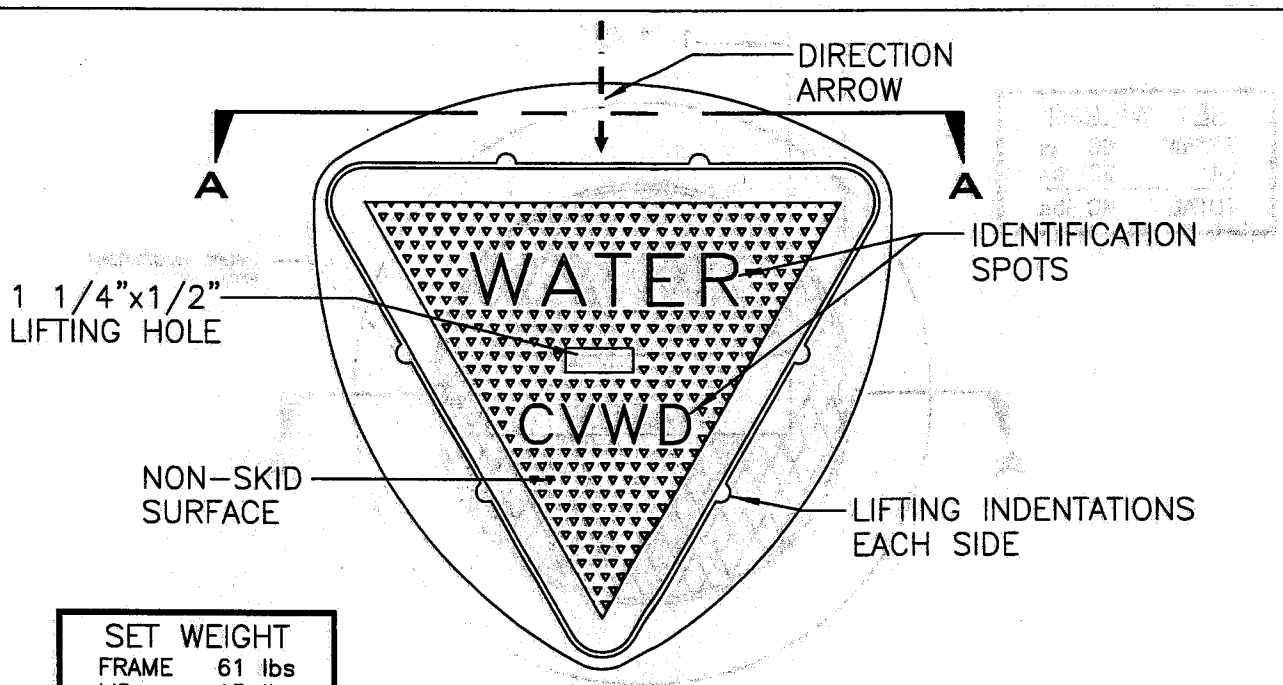
*PER COUNTY OF RIVERSIDE STANDARD No. 818 TRENCH BACKFILL

REF: SEE ARTICLE TC-5

COACHELLA VALLEY WATER DISTRICT

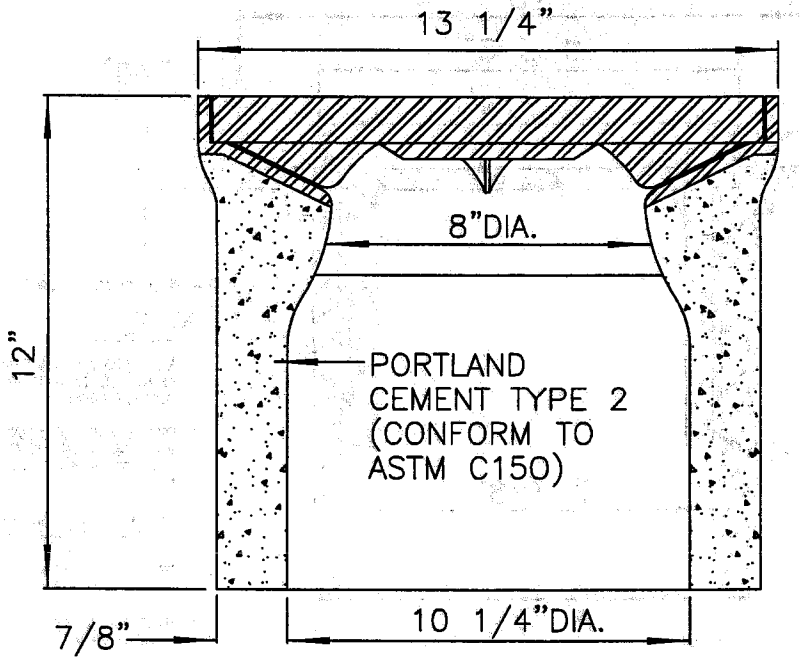
DETAIL OF DOMESTIC WATER BLOWOFF WELL INSTALLATION

APPROVAL DATE: OCT 2005 | W-17B



SET WEIGHT	
FRAME	61 lbs
LID	15 lbs
TOTAL	76 lbs

PLAN VIEW



NOTES:

1. ALL METALLIC MATERIALS SHALL BE CAST IRON OR DUCTILE IRON
2. FRAME AND LID SHALL HAVE CAST SEAT AND SIDE TO ASSURE CLOSE FIT.
3. CASTING SHALL BE DIPPED IN BLACK BITUMINOUS PAINT.
4. FOR INSTALLATION, SEE DETAIL DRAWING W-17A.
5. FRAME AND LID SHALL EXCEED H-20 WHEEL LOADING.
6. APPROVED MODELS:
   - -SBTT LID CVWD WATER & SBTT FRAME W/CONCRETE AS MANUFACTURED BY SOUTH BAY FOUNDRY
   - -V4-T LID AND VALVE BOX AS MANUFACTURED BY J&R CONCRETE PRODUCTS.
   - -4TT CVWD LID & 4TT VALVE BOX AS MANUFACTURED BY BROOKS PRODUCTS.

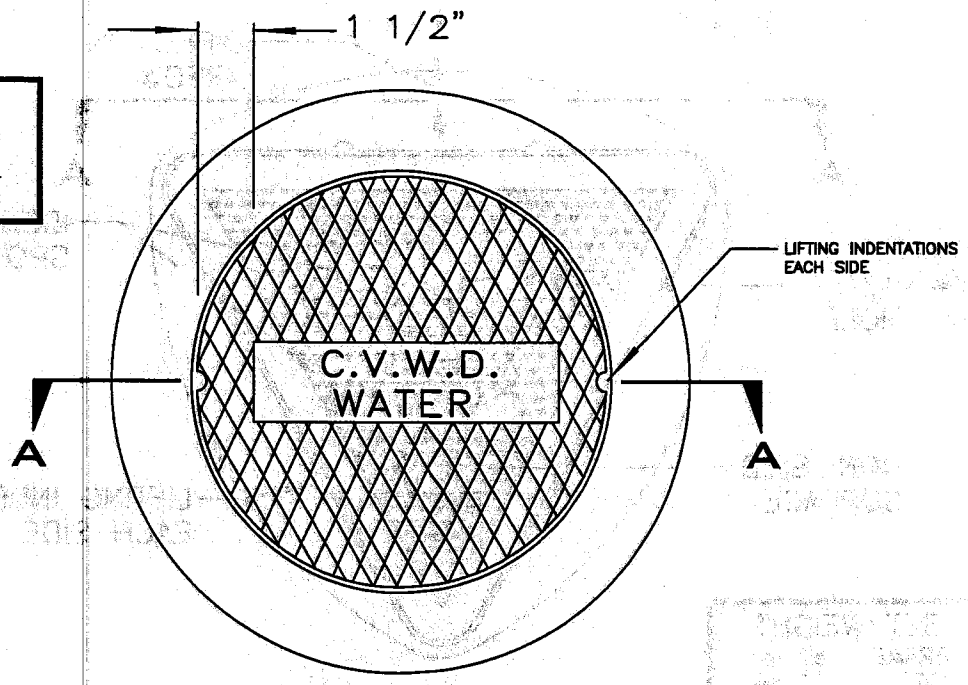
SECTION A-A

COACHELLA VALLEY WATER DISTRICT

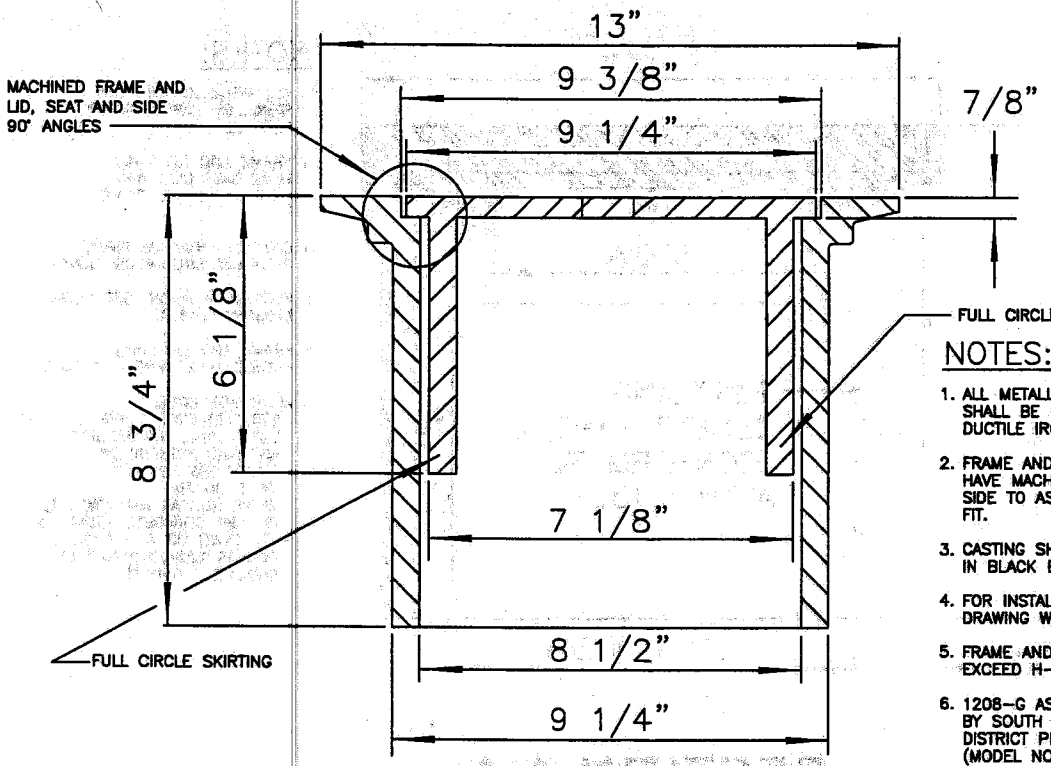
DETAIL OF DOMESTIC WATER VALVE OPERATOR WELL CAP AND FRAME

APPROVAL DATE: OCT 2005 | W-18A

SET WEIGHT	
FRAME	60 lbs
LID	20 lbs
TOTAL	80 lbs



PLAN VIEW



SECTION A-A

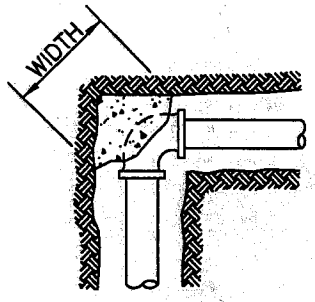
NOTES:

1. ALL METALLIC MATERIALS SHALL BE CAST IRON OR DUCTILE IRON
2. FRAME AND LID SHALL HAVE MACHINED SEAT AND SIDE TO ASSURE CLOSE FIT.
3. CASTING SHALL BE DIPPED IN BLACK BITUMINOUS PAINT.
4. FOR INSTALLATION, SEE DETAIL DRAWING W-17B.
5. FRAME AND LID SHALL EXCEED H-20 WHEEL LOADING.
6. 1208-G AS MANUFACTURED BY SOUTH BAY FOUNDRY AND/OR DISTRICT PRE-APPROVED EQUAL. (MODEL NO. B-5015-B-5038- FOR WATER)

COACHELLA VALLEY WATER DISTRICT

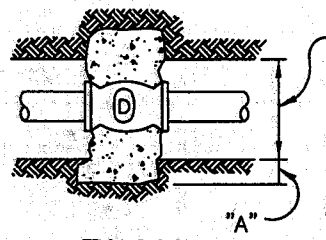
DETAIL OF DOMESTIC WATER BLOWOFF WELL CAP AND FRAME

APPROVAL DATE: OCT 2005 | W-18B

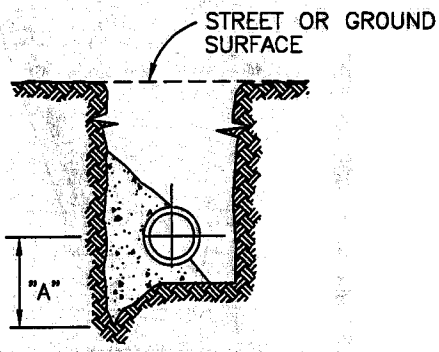


BEND

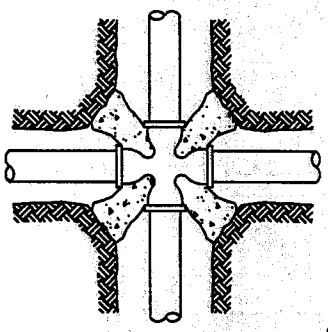
VALVES



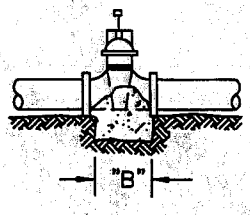
PLAN



TYPICAL SECTION



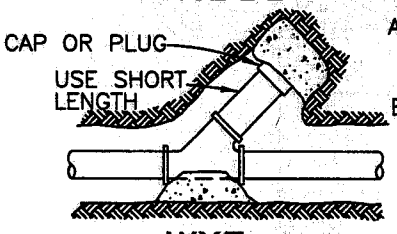
CROSS



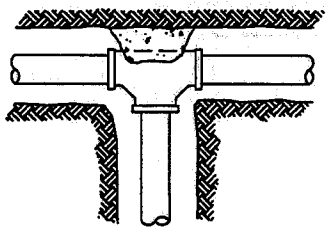
ELEVATION

SECTION:
A= 6" FOR 6"–8" PIPE
12" FOR 12" PIPE
18" FOR 18" PIPE

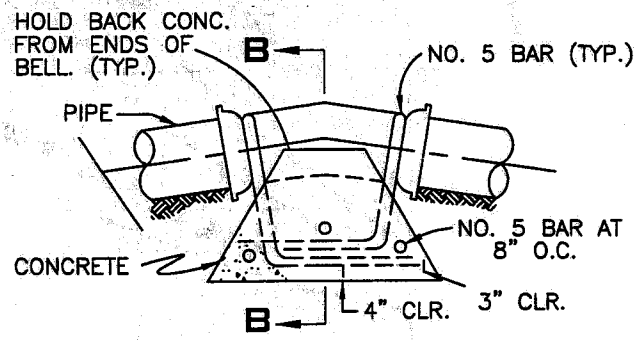
B= TO CLEAR BELLS OR FLANGES



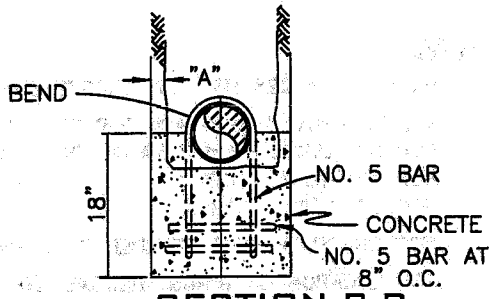
WYE
(SHOWN WITH BRANCH CLOSED)



TEE



SECTIONAL ELEVATION



SECTION B-B
VERTICAL ANCHOR BLOCK

NOTES:

BEARING AREA FOR THRUST BLOCKS SHALL DEPEND ON PRESSURE AND PIPE SIZE.

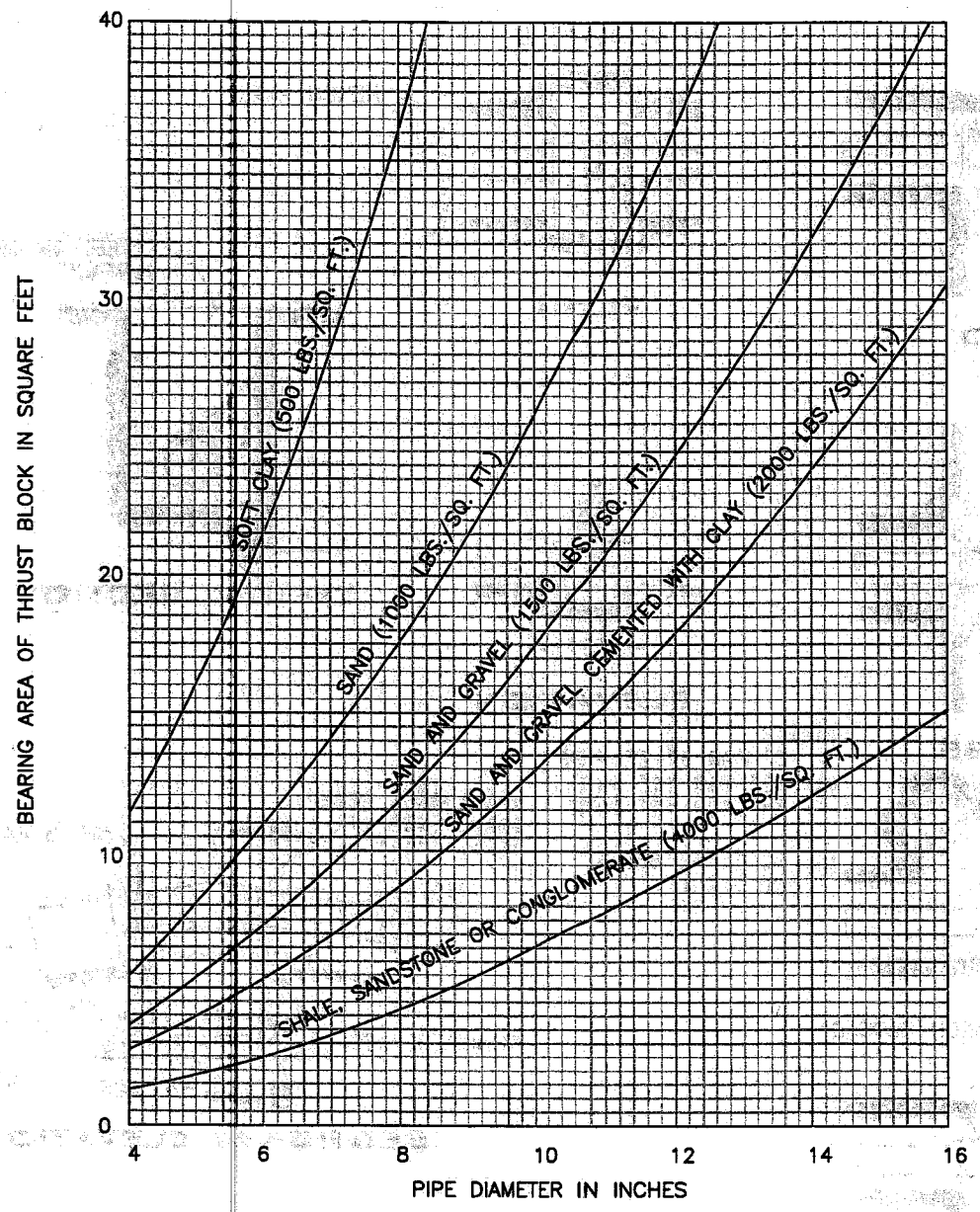
FOR BEARING AREAS SEE DETAIL DRAWING W–20/S–20.

CONCRETE THRUST BLOCKS SHALL BE CONSTRUCTED OF 420–B–2000 CONCRETE.

COACHELLA VALLEY WATER DISTRICT

DETAIL OF CONCRETE THRUST BLOCKS

APPROVAL DATE: OCT 2005 | W-19/S-19



NOTES:

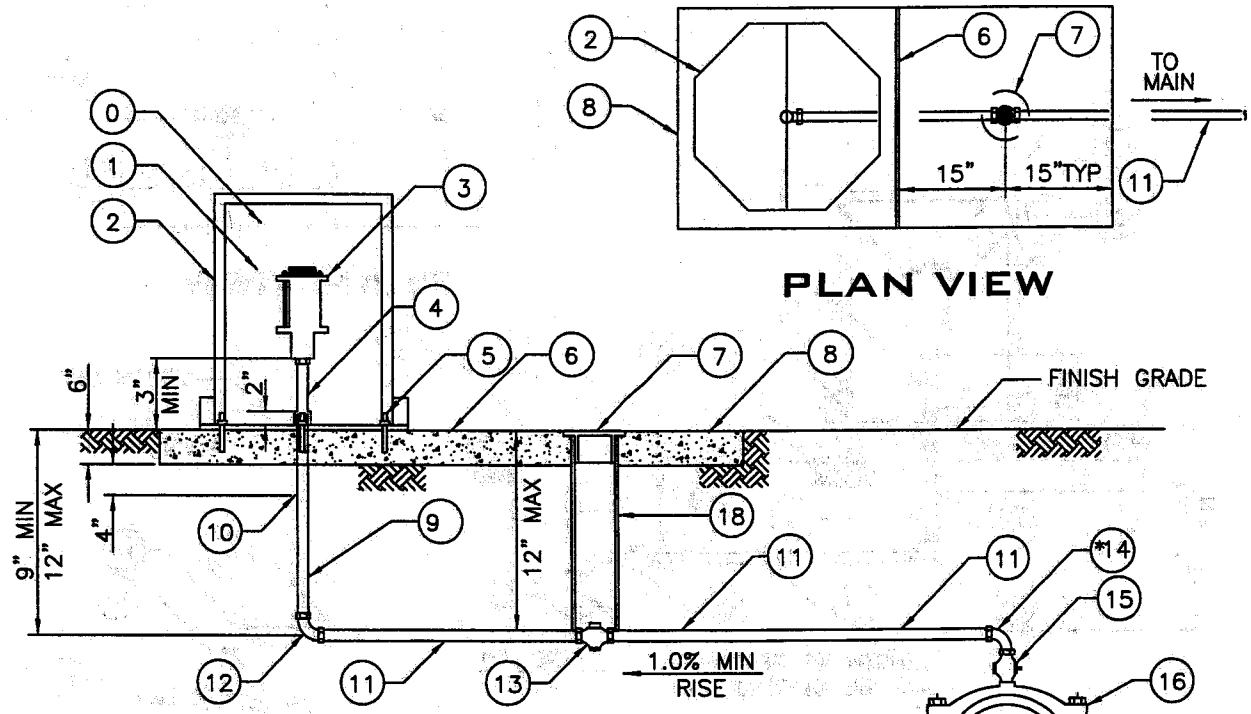
1. BASED ON A 225 PSI TEST PRESSURE AND BEARING VALUES OF DRY SOILS.
2. VALUES FROM CURVES ARE FOR TEES AND DEAD ENDS I.E. STRAIGHT LINE THRUST.
   FOR 90° BENDS: 1.4 X VALUE FROM CURVE.
   FOR 45° BENDS: 0.8 X " " "
   FOR 22-1/2° 0.4 X " " "
3. FOR CONDITIONS NOT COVERED BY CURVES, THRUST DEVICES MUST BE APPROVED BY THE ENGINEER.
4. FOR LOCATION OF THRUST BLOCKS SEE DETAIL DRAWING W-19/S-19.
5. CONCRETE THRUST BLOCKS SHALL BE CONSTRUCTED OF 420-B-2000 CONCRETE.

W-20/S-20

COACHELLA VALLEY WATER DISTRICT

THRUST BLOCK BEARING AREAS

APPROVAL DATE: OCT 2005 | W-20/S-20



NOTES:

1) REFER TO SECTION TC-6 OF THE SPECIFICATIONS
2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
3) LOCATE ENCLOSURE AS SHOWN ON W-22A OR W-22B
4) CONNECTIONS TO CML/CMC MAINS SHALL BE AS SHOWN ON DRAWING W-6
5) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

1"

LEGEND ON PLANS

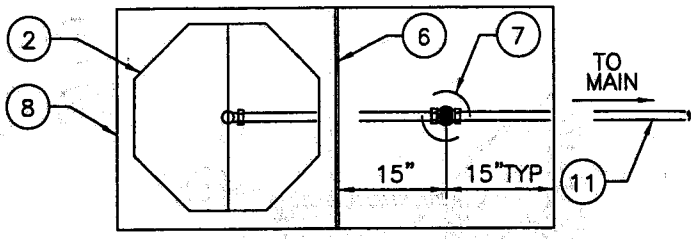
ITEM NO.	SIZE AND DESCRIPTION
0	1" PVC SCH 80 CLOSE NIPPLE & 2 SCH 80 STREET ELLS & INSECT SCREEN
1	1/4" X 2" BRONZE NIPPLE, MIPT X MIPT W/1/4" BRONZE BALLVALVE W/LEVER HANDLE
2	VALVE ENCLOSURE
3	1" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE
4	1" X REQ'D LENGTH PVC SCH 80 PIPE FIPT X FIPT
5	1/2" X 3" STAINLESS STEEL DROP-IN ANCHORS 6 EA
6	1/4" X 1" DEEP WEAKENED PLANE JOINT
7	SEE DETAIL DRAWING W-18A
8	5' X 2' - 6" X 6" THICK CONCRETE SLAB
9	1" X REQ'D LENGTH BRONZE NIPPLE MIPT x MIPT

ITEM NO.	SIZE AND DESCRIPTION
10	1" X 1/2" BLACK FOAM SLEEVE
11	1" X REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
12	1" 90° BRONZE COMPRESSION ELL
13	1" MULLER 300 SERIES BALL VALVE W/ TEE HEAD
14 *	1" 90° BRONZE FIPT X COMP ELL x FIPT * MAY USE A SWEEP IN LIEU OF AN ELBOW FITTING
15	1" BRONZE MIPT X MIPT CORPORATION STOP
16	SIZE X 1" SERVICE SADDLE, IF REQ'D
17	WATER MAIN
18	8-INCH C-900 PVC

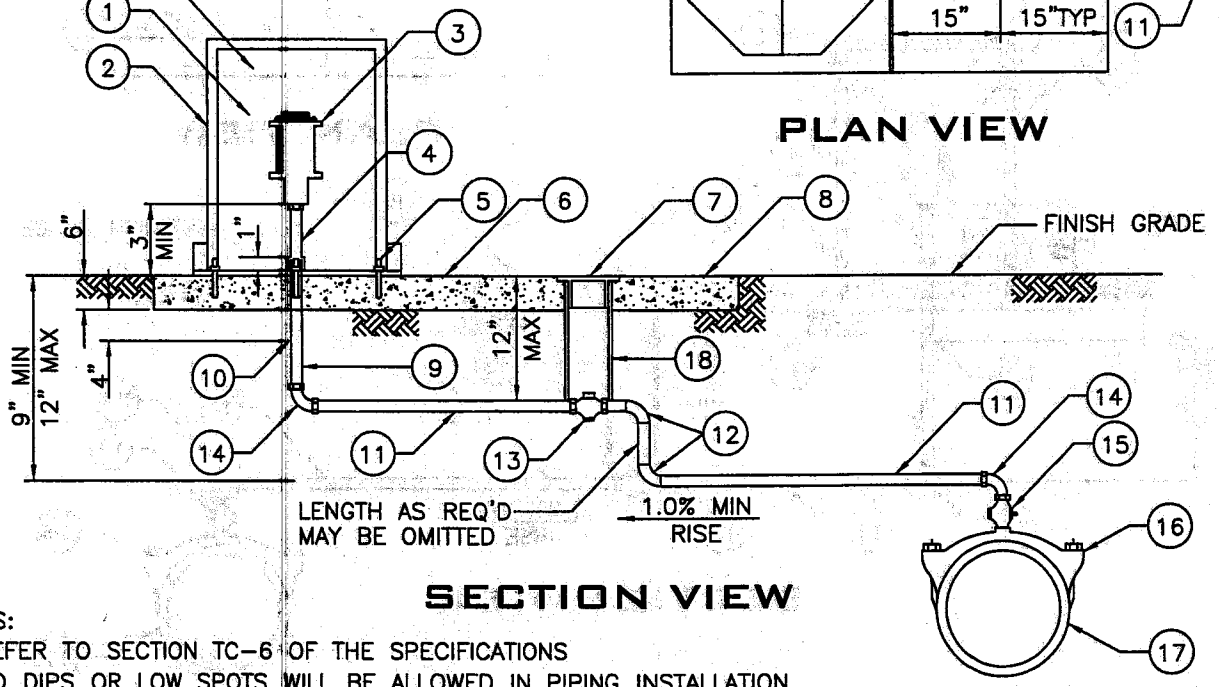
COACHELLA VALLEY WATER DISTRICT

1" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

APPROVAL DATE: OCT 2005 | W-21A



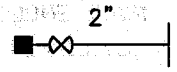
PLAN VIEW



SECTION VIEW

NOTES:

1) REFER TO SECTION TC-6 OF THE SPECIFICATIONS
2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
3) LOCATE ENCLOSURE AS SHOWN ON W-22A OR W-22B
4) AIR & VACUUM VALVES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SECTION TC-6 OF THE SPECIFICATIONS
5) CONNECTIONS TO CML/CMC MAINS SHALL BE AS SHOWN ON DRAWING W-6
6) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST



LEGEND ON PLANS

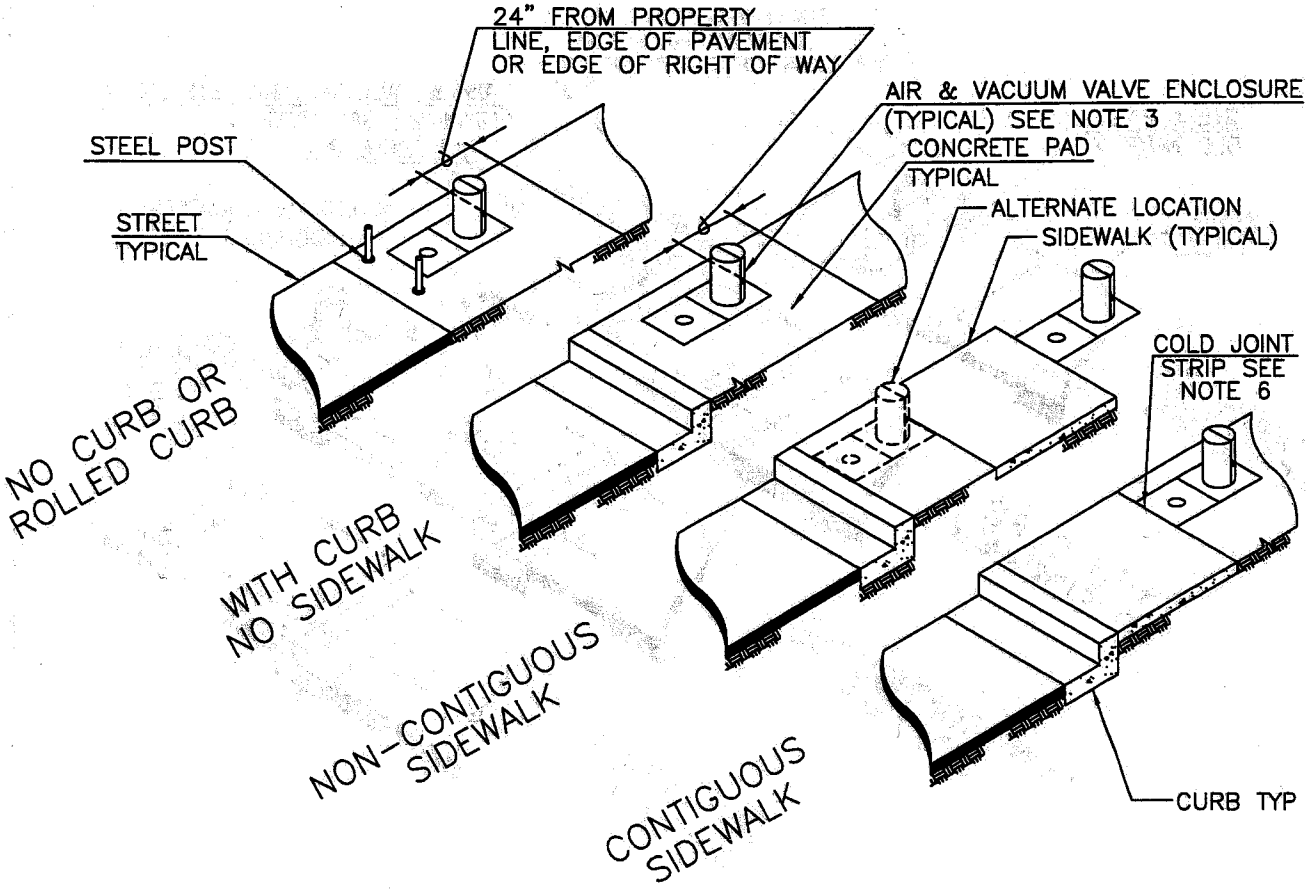
ITEM NO.	SIZE AND DESCRIPTION	ITEM NO.	SIZE AND DESCRIPTION
0	2" PVC SCH 80 CLOSE NIPPLE & 2 SCH 80 STREET ELLS & INSECT SCREEN	9	2" X REQ'D LENGTH BRONZE NIPPLE MIPT X MIPT
1	1/4" X 2" BRONZE NIPPLE, MIPT X MIPT W/1/4" BRONZE BALLVALVE W/LEVER HANDLE	10	2" X 1/2" BLACK FOAM SLEEVE
2	VALVE ENCLOSURE	11	2" X REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
3	2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE	12	2" 90° BRONZE COMPRESSION ELL
		13	2" COMP BALL VALVE W/ TEE HEAD
4	2" X REQ'D LENGTH PVC SCH 80 PIPE FIPT X FIPT	14	2" 90° BRONZE FIPT X COMP ELL
5	1/2" X 3" STAINLESS STEEL DROP-IN ANCHORS 6 EA	15	2" BRONZE MIPT X MIPT CORPORATION STOP
		16	SIZE X 2" SERVICE SADDLE, IF REQ'D
6	1/4" X 1" DEEP WEAKENED PLANE JOINT	17	WATER MAIN
7	SEE DETAIL DRAWING W-18A	18	8-INCH C-900 PVC
8	5' X 2' - 6" X 6" THICK CONCRETE SLAB		

COACHELLA VALLEY WATER DISTRICT

2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

APPROVAL DATE: OCT 2005

W-21B



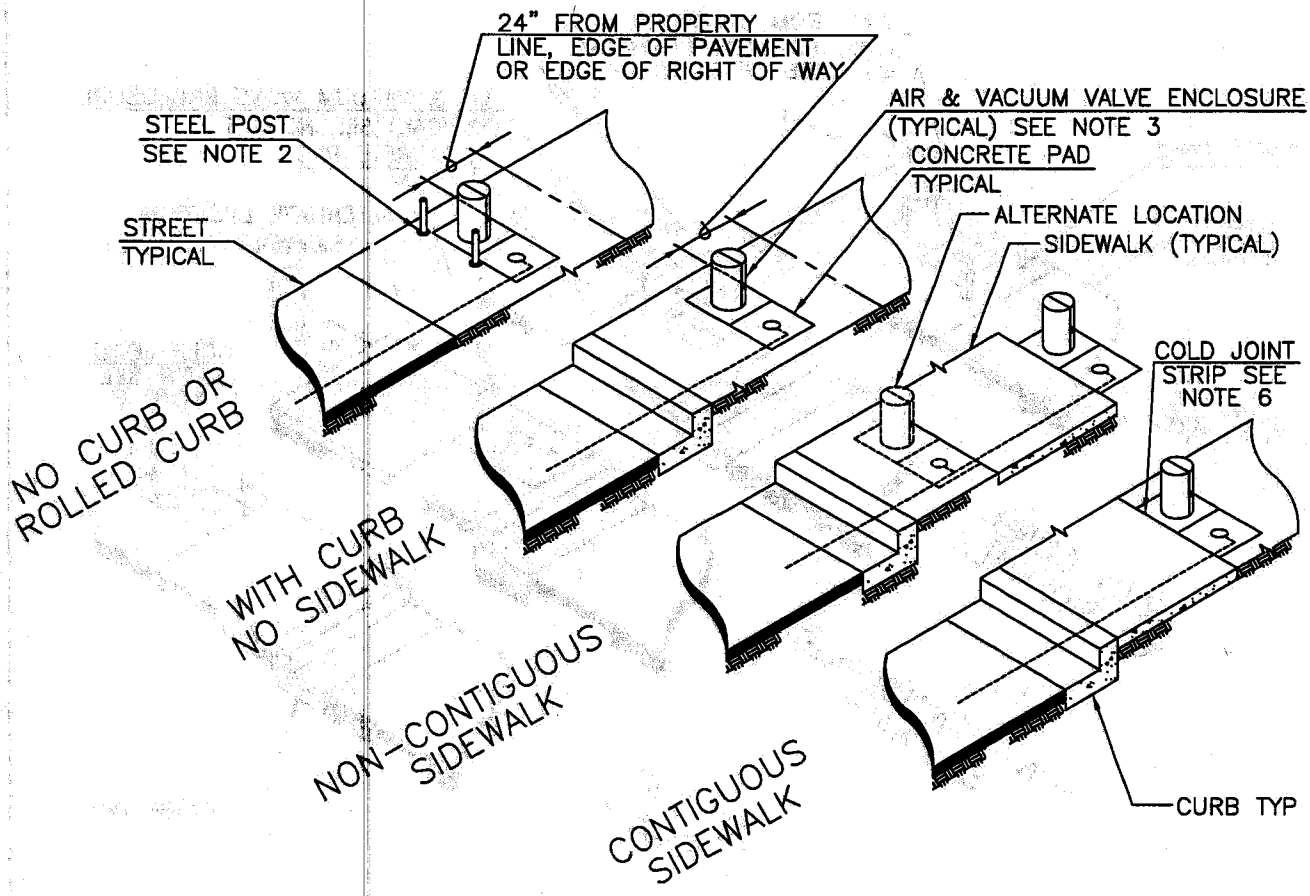
NOTES:

1) REFER TO SECTION TC-6 OF THE SPECIFICATIONS
2) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER
3) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF ENCLOSURE
4) THE ENCLOSURE SHALL BE DESERT TAN AS MANUFACTURED IN ACCORDANCE WITH THE APPROVED MATERIALS LIST
5) ENCLOSURES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DIRECTED BY THE ENGINEER
6) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE SIDEWALK A COLD JOINT STRIP SHALL BE INSTALLED
7) AIR & VACUUM VALVES & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DIRECTED BY THE ENGINEER.
8) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

COACHELLA VALLEY WATER DISTRICT

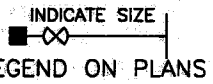
1" AND 2" AIR & VACUUM VALVE ENCLOSURE LOCATIONS

APPROVAL DATE: OCT 2005 | W-22A



NOTES:

1) THIS CONFIGURATION IS ALTERNATIVE AND CAN ONLY BE USED AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER
2) COMBINATION AIR RELEASE & AIR/VACUUM TO BE CONSTRICTED AS SHOWN ON W-21 WITH THE ADDITION OF A 90° BRONZE COMPRESSION ELL LOCATED UNDER CONCRETE SLAB ADJACENT TO BALL VALVE
3) REFER TO SECTION TC-6 OF THE SPECIFICATIONS
4) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER
5) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF ENCLOSURE
6) THE ENCLOSURE SHALL BE DESERT TAN AS MANUFACTURED IN ACCORDANCE WITH THE APPROVED MATERIALS LIST
7) ENCLOSURES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DIRECTED BY THE ENGINEER
8) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE SIDEWALK A COLD JOINT STRIP SHALL BE INSTALLED
9) AIR & VACUUM VALVES & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DIRECTED BY THE ENGINEER.
10) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

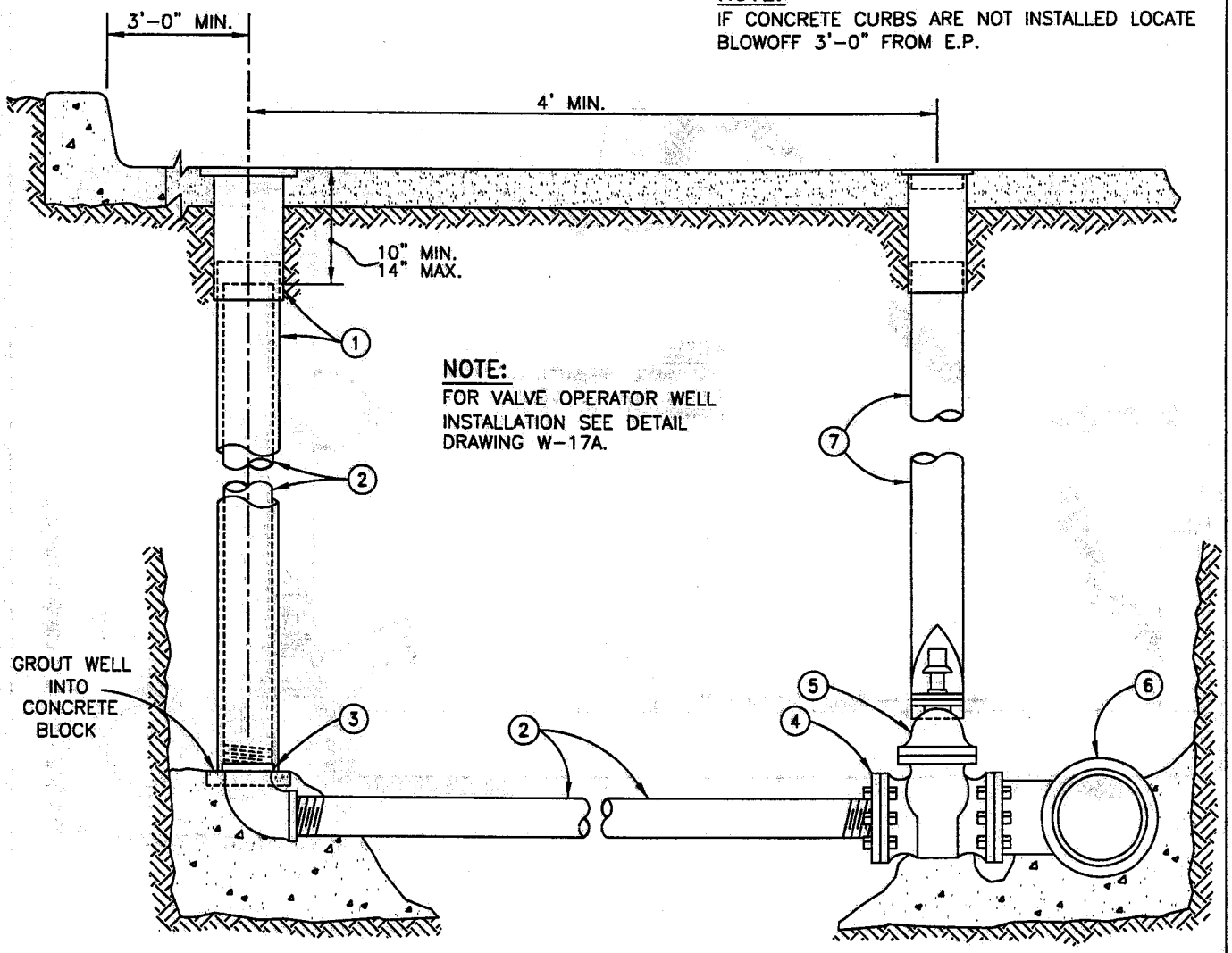


LEGEND ON PLANS

COACHELLA VALLEY WATER DISTRICT

ALTERNATIVE 1" AND 2" AIR & VACUUM VALVE ENCLOSURE LOCATIONS

APPROVAL DATE: OCT 2005 | W-22B



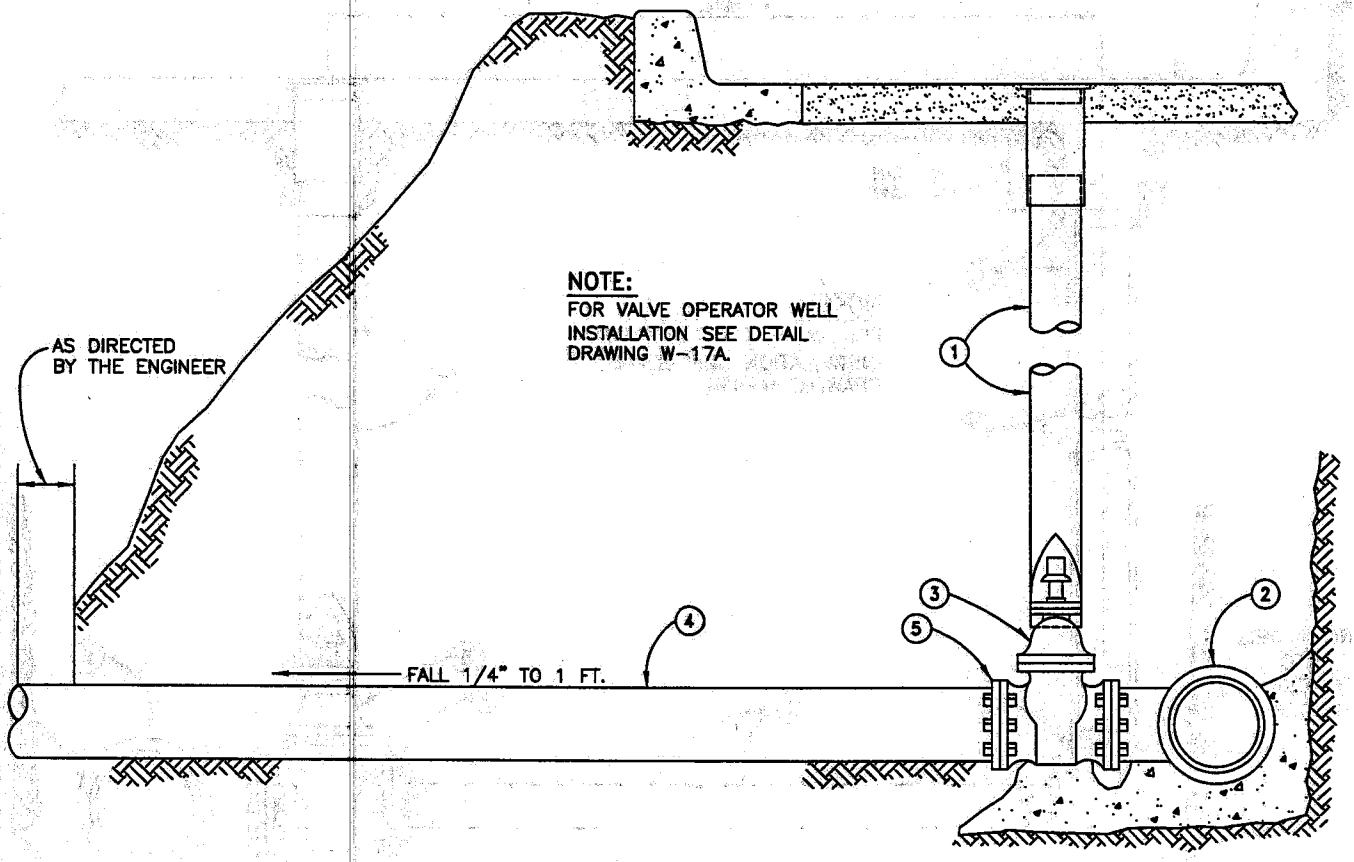
REF: SEE ARTICLE TC-8

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	10" VALVE OPERATOR WELL & CAP	PER STD. DWG W-18B
2	2	4" OR 6" X REQUIRED LENGTH PIPE	GALVANIZED MALLEABLE IRON, THREADED ON ENDS
3	1	4" OR 6" X 90° BEND	GALVANIZED MALLEABLE IRON, INSIDE I.P.T.
4	1	4" OR 6" COMPANION FLANGE	
5	1	4" OR 6" FLANGED GATE VALVE	FLANGED
6	1	MAIN SIZE X 4" OR 6" TEE	
7	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 4" OR 6"
BLOWOFF ASSEMBLY INSTALLATION
BLOWOFF TO STREET

APPROVAL DATE: OCT 2005 | W-23



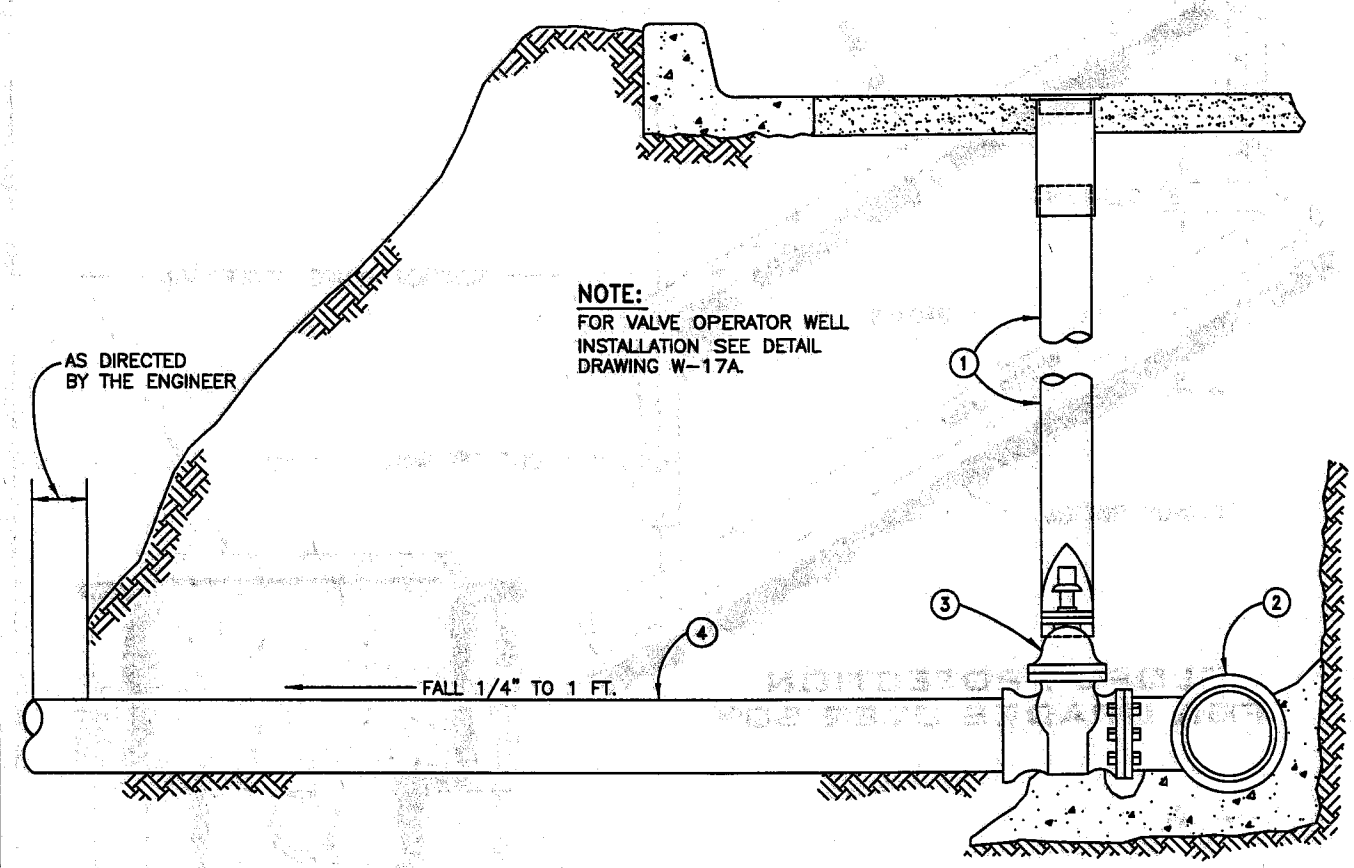
REF: SEE ARTICLE TC-8

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	VALVE OPERATOR WELL & CAP	
2	1	MAIN SIZE X 4", 6" OR 8" FLANGED TEE	
3	1	4", 6" OR 8" FLANGED GATE VALVE	
4	1	4", 6" OR 8" X REQUIRED LENGTH CML/CMC PIPE	
5	1	4", 6" OR 8" COMPANION FLANGE	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 4", 6" OR 8" BLOWOFF ASSEMBLY INSTALLATION BLOWOFF TO CHANNEL FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-25A



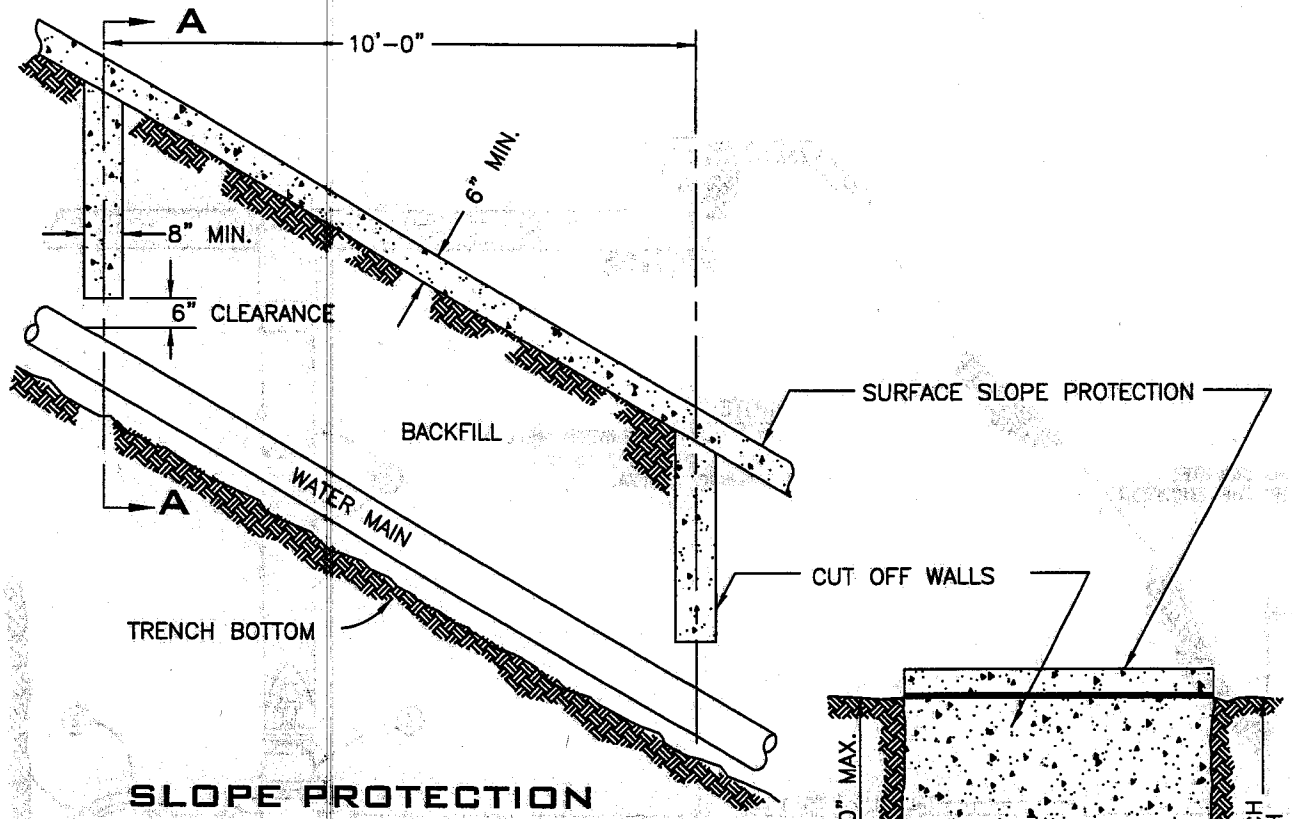
REF: SEE ARTICLE TC-8

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	VALVE OPERATOR WELL & CAP	
2	1	MAIN SIZE X 4", 6" OR 8" TEE	
3	1	4", 6" OR 8" FLANGED BY "TYTON" OR MECHANICAL JOINT GATE VALVE	RESTRAINED JOINT
4	1	4", 6" OR 8" X REQUIRED LENGTH DUCTILE PIPE	RESTRAINED JOINT

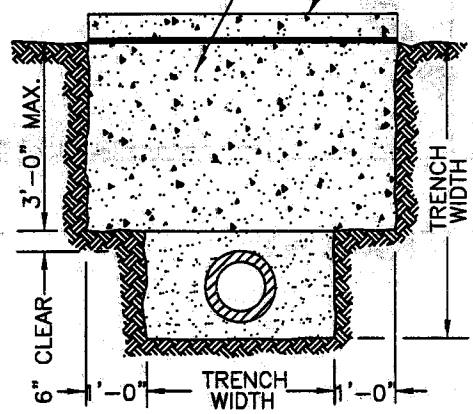
COACHELLA VALLEY WATER DISTRICT

DETAIL OF 4", 6" OR 8" BLOWOFF ASSEMBLY INSTALLATION BLOWOFF TO CHANNEL FOR DUCTILE IRON PIPE

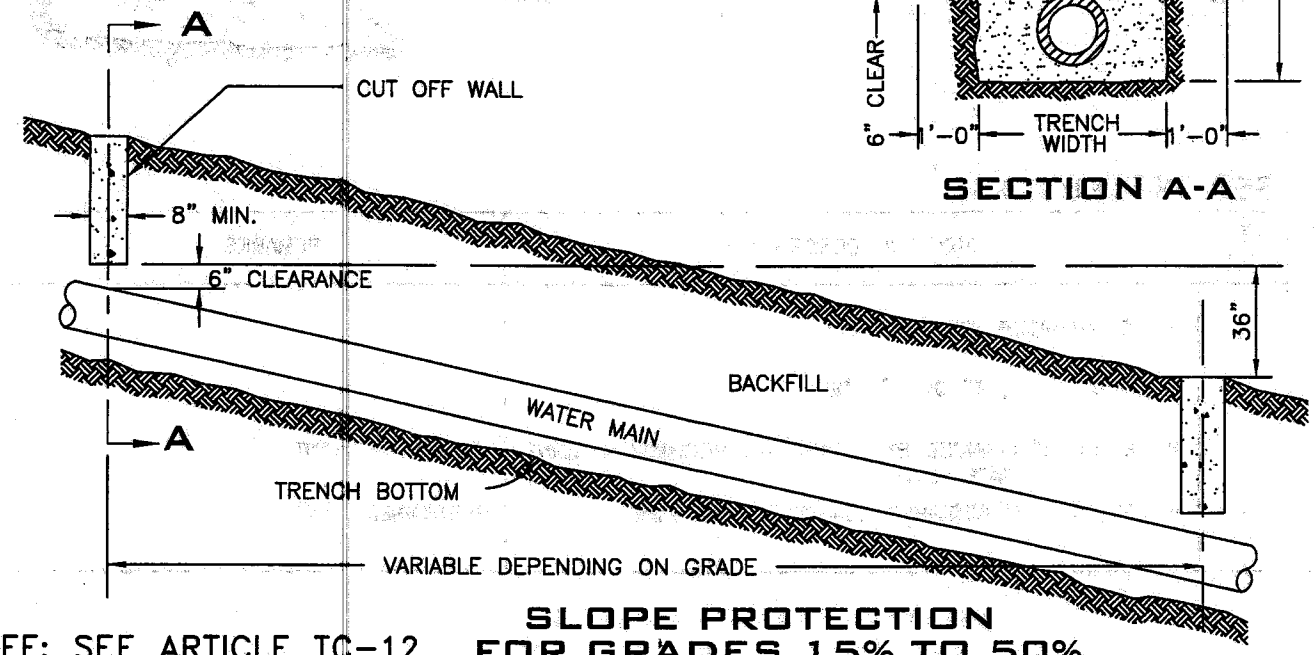
APPROVAL DATE: OCT 2005 | W-25B



SLOPE PROTECTION FOR GRADES OVER 50%



SECTION A-A



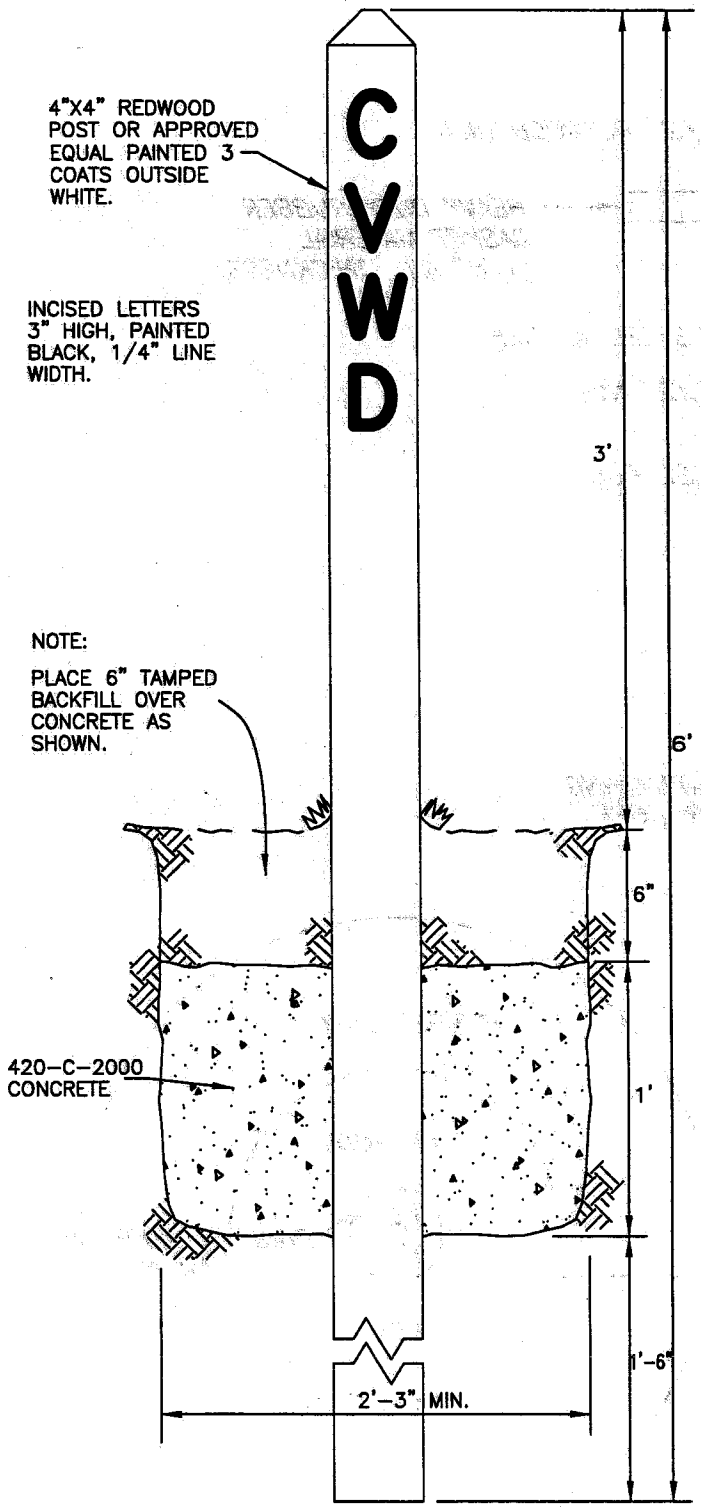
SLOPE PROTECTION FOR GRADES 15% TO 50%

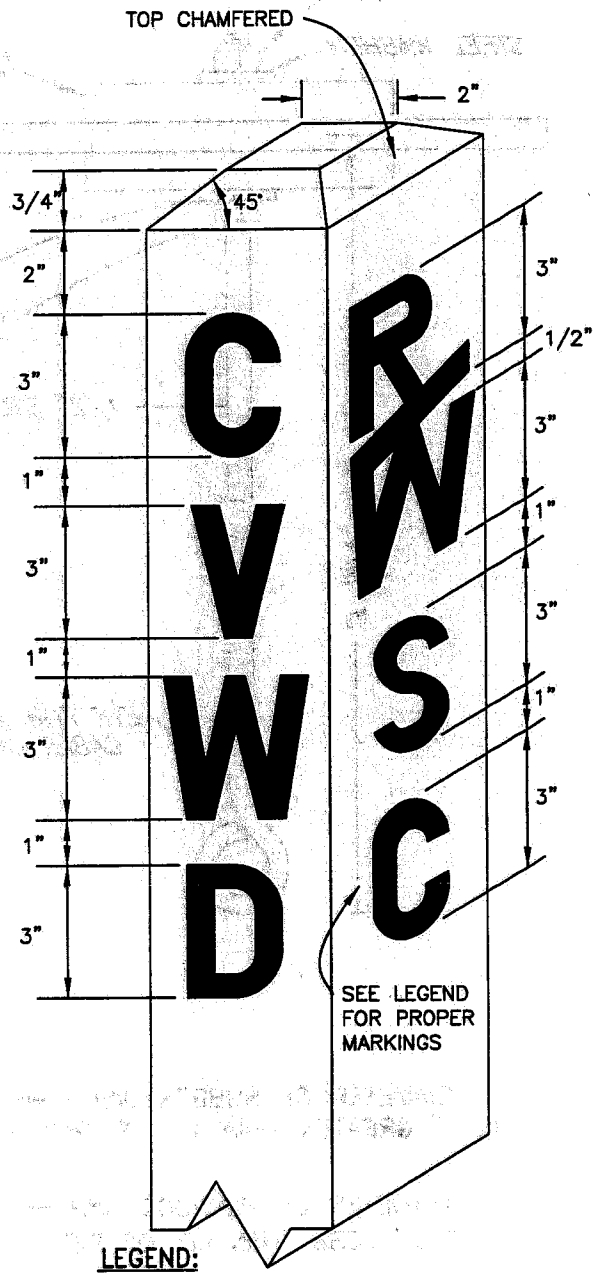
REF: SEE ARTICLE TC-12

COACHELLA VALLEY WATER DISTRICT

DETAIL OF SLOPE PROTECTION

APPROVAL DATE: OCT 2005 | W-26/S-26





LEGEND:

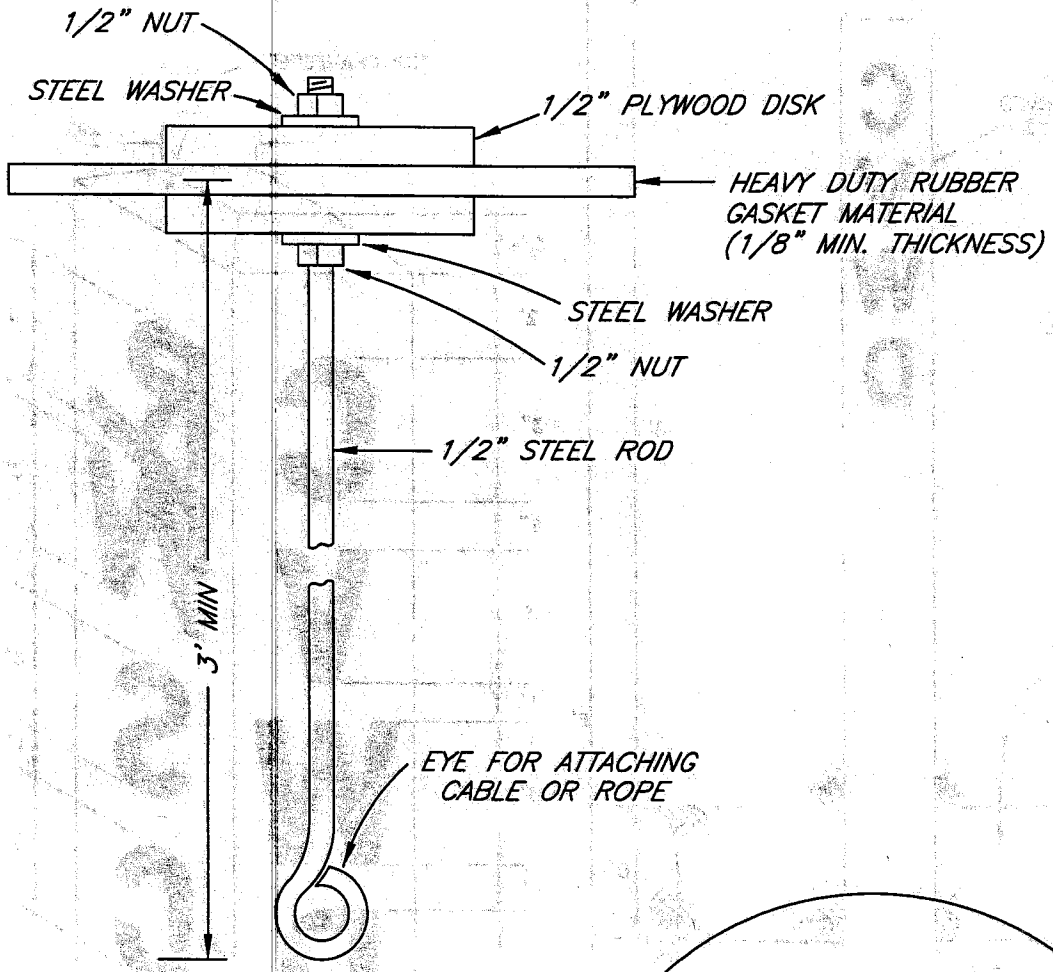
B.O.	=	BLOW-OFF
A.V.	=	AIR-VAC RELIEF VALVE
R/W S.C.	=	RIGHT OF WAY STORM CHANNEL
W.L.	=	WATER LINE
G.V.	=	GATE VALVE
P.R.	=	PRESSURE REGULATOR
B.V.	=	BUTTERFLY VALVE
M.H.	=	MANHOLE
C.P.T.S.	=	CATHODIC PROTECTION TEST STATION

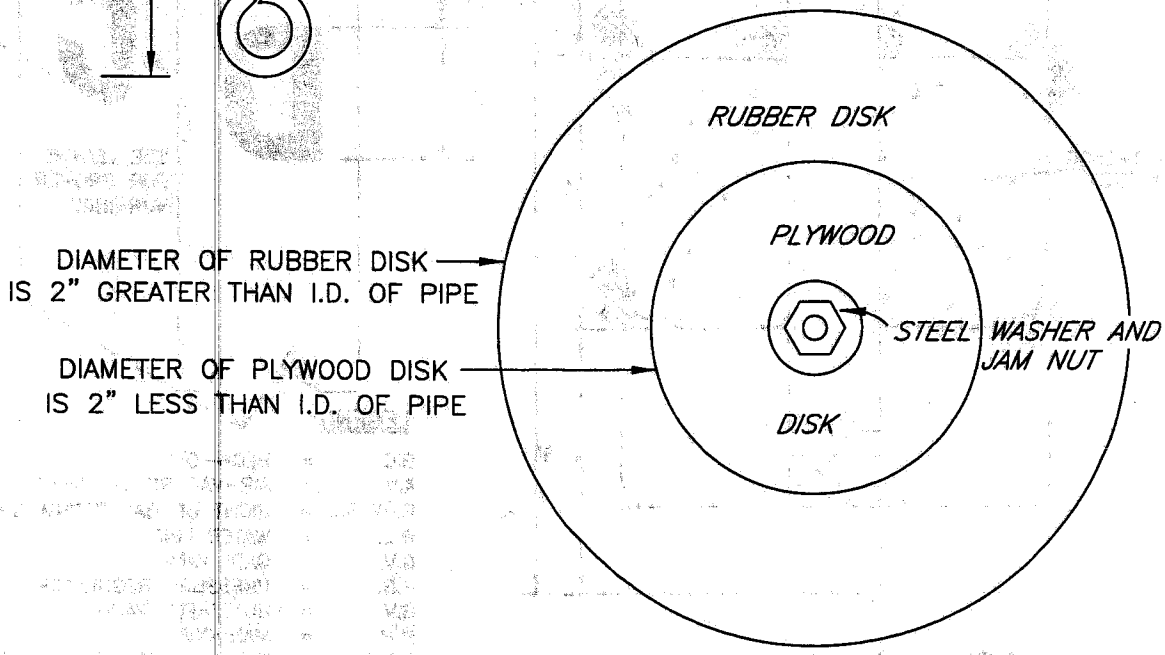
REF: SEE ARTICLE TC-11

COACHELLA VALLEY WATER DISTRICT

DETAIL OF STANDARD 4"X4"X6' MARKER POST FOR DOMESTIC WATER

APPROVAL DATE: OCT 2005 | W-27

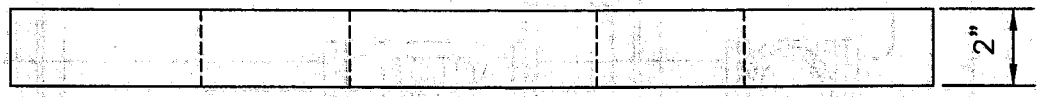


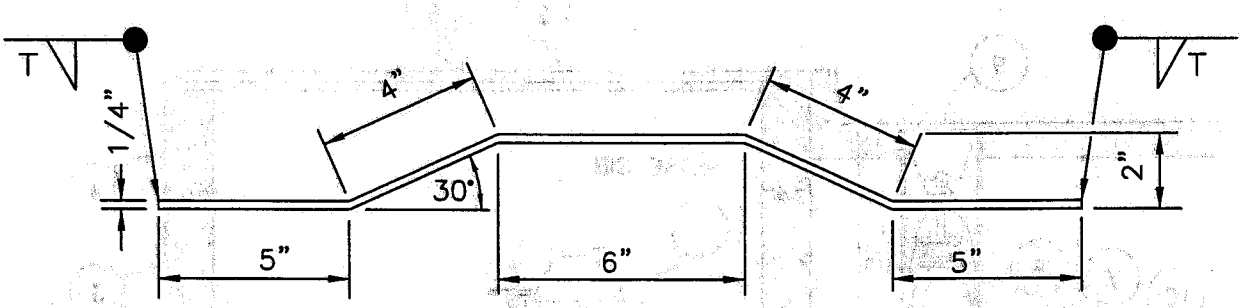


COACHELLA VALLEY WATER DISTRICT

DETAIL OF PIPE CLEANING TOOL (MANDREL)

APPROVAL DATE: OCT 2005 | W-28





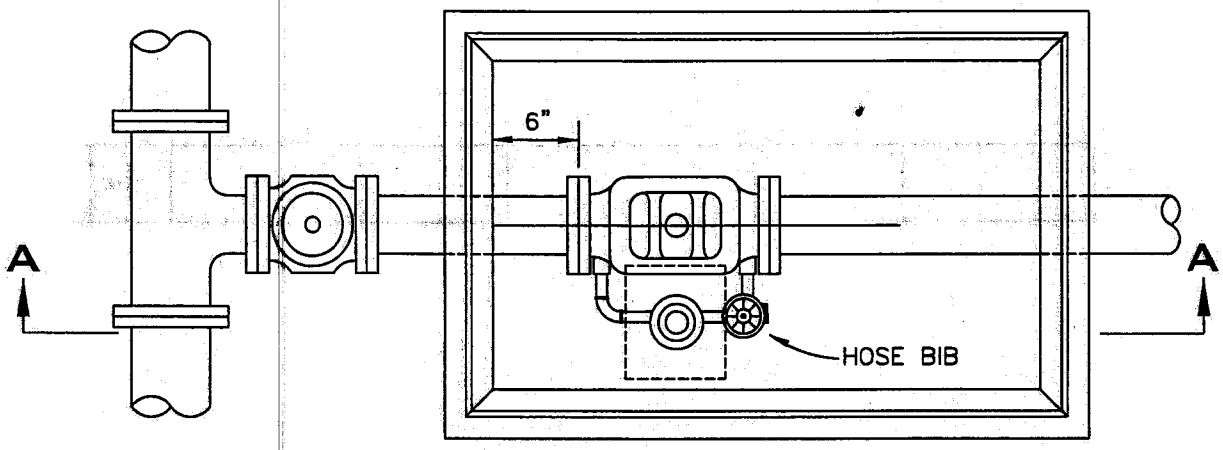
NOTES:

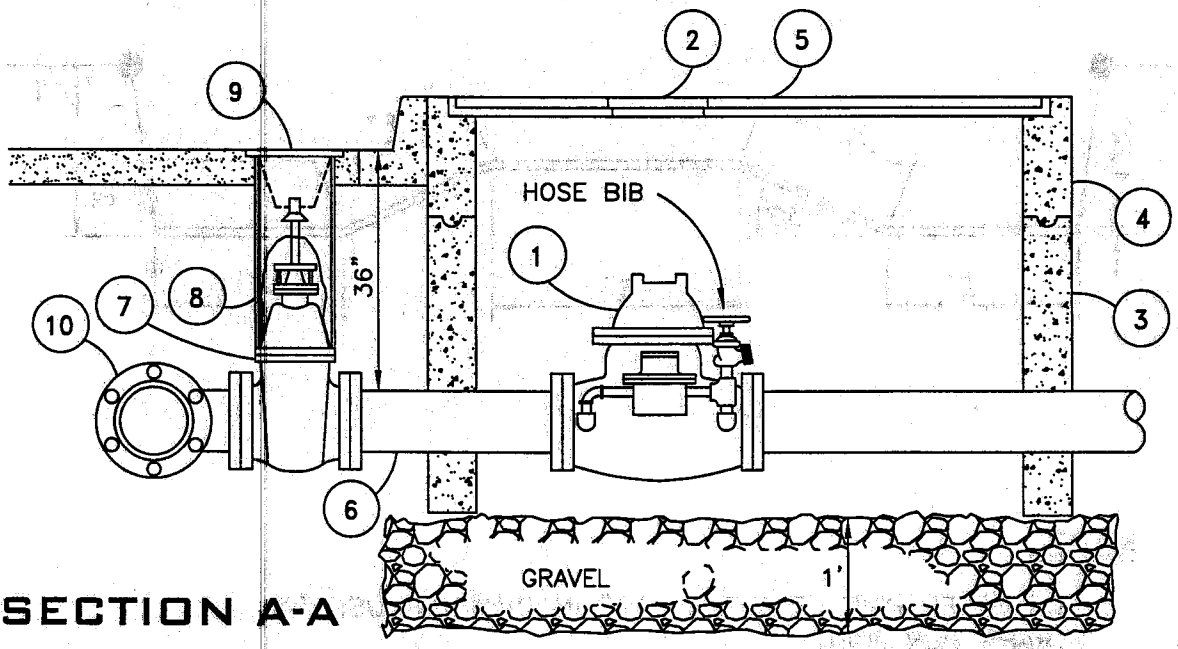
1. FOR STEEL PIPE LESS THAN 12" IN DIAMETER USE TWO. STRAPS PER JOINT.
2. FOR 12" DIAMETER STEEL PIPE, USE THREE STRAPS PER JOINT.
3. FOR 18" AND 24" STEEL PIPE, USE FOUR STRAPS PER JOINT.
4. AFTER INSTALLATION THE STRAPPING SHALL BE COAL TAR COATED AND THE CEMENT MORTAR COATING REPAIRED IN ACCORDANCE WITH ARTICLE TC-9

COACHELLA VALLEY WATER DISTRICT

DETAIL OF STRAPPING FOR STEEL PIPE

APPROVAL DATE: OCT 2005 | W-29





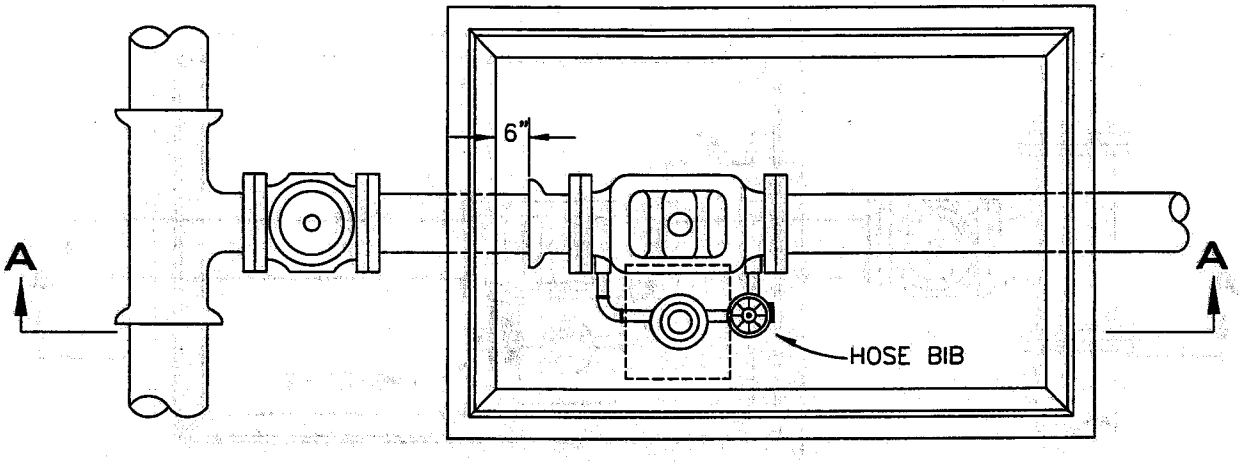
SECTION A-A

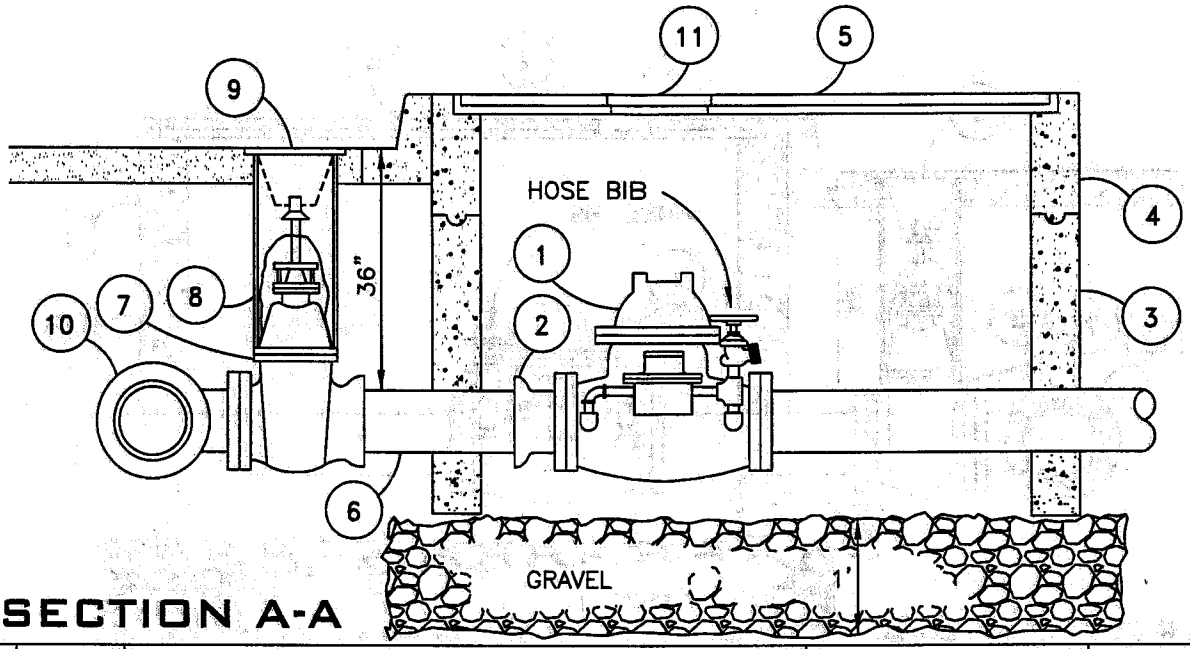
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	4" OR 6" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	8" X 8' HINGED METER READING LID		
3	1	2'-6" X 4'-0" UTILITY BOX W/4" WALLS.	SEE MATERIALS LIST	
4	1	2'-6" X 4'-0" UTILITY BOX TOP SECTION.	SEE MATERIALS LIST	
5	1	2'-6" X 4'-0" UTILITY BOX COVER.	SEE MATERIALS LIST	
6	1	4" OR 6" X REQUIRED LENGTH NIPPLE, FLANGE EACH END.	STEEL, CML/CMC	
7	1	4" OR 6" GATE VALVE, FLANGED.	DISTRICT APPROVED	
8	1	GATE WELL		SEE DWG. W-17A
9	1	GATE WELL CAP	CAST IRON	SEE DWG. W-18A
10	1	MAIN SIZE X 6" OR 4" TEE	CEMENT MORTAR LINED	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 4" OR 6" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-30A





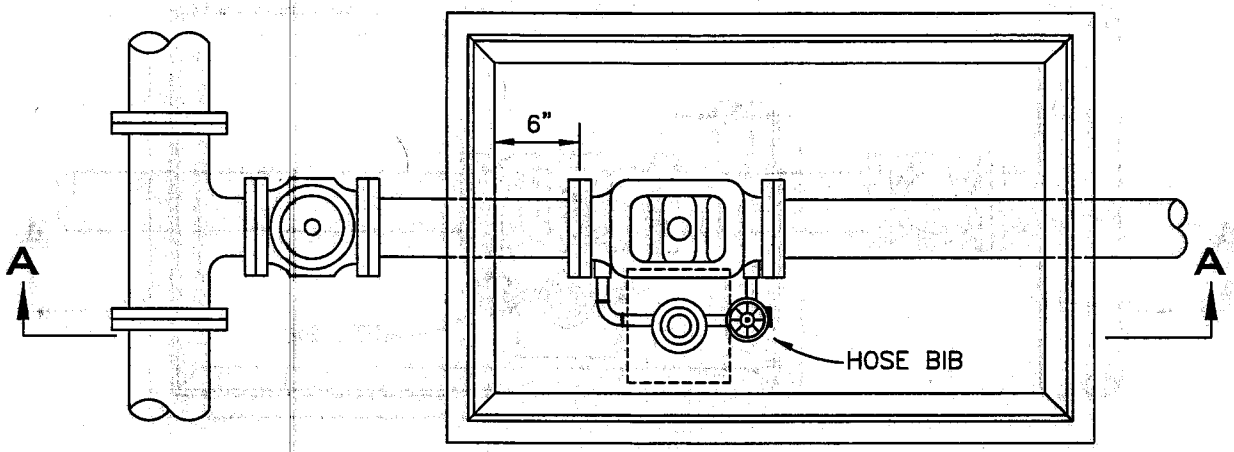
SECTION A-A

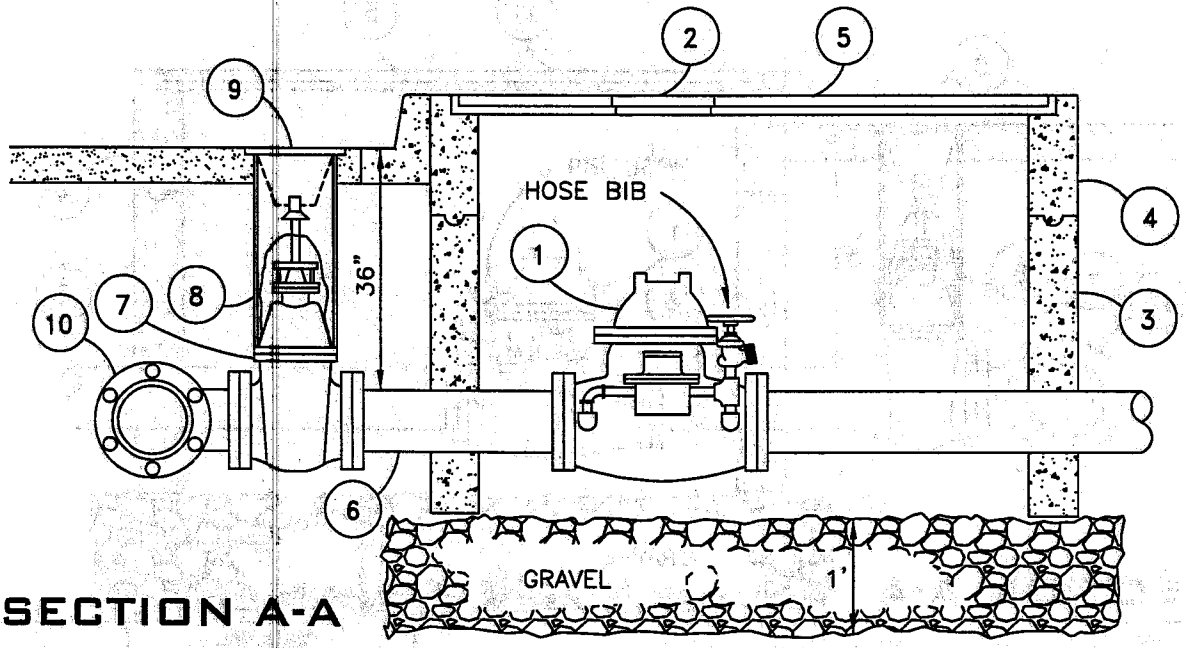
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	4" OR 6" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	4" OR 6" ADAPTER, FLANGED BY "TYTON" OR M.J.	DUCTILE IRON	RESTRAINED JOINT
3	1	2'-6" X 4'-0" UTILITY BOX W/4" WALLS.	SEE MATERIALS LIST	
4	1	2'-6" X 4'-0" UTILITY BOX TOP SECTION.	SEE MATERIALS LIST	
5	1	2'-6" X 4'-0" UTILITY BOX COVER.	SEE MATERIALS LIST	
6	1	4" OR 6" X REQUIRED LENGTH DUCTILE IRON PIPE.	DUCTILE IRON	RESTRAINED JOINT
7	1	4" OR 6" GATE VALVE, FLANGED BY "TYTON" OR M.J.	DISTRICT APPROVED	RESTRAINED JOINT
8	1	GATE WELL		SEE DWG. W-17A
9	1	GATE WELL CAP	CAST IRON	SEE DWG. W-18A
10	1	MAIN SIZE X 6" OR 4" TEE	DUCTILE IRON	
11	1	8" x 8" HINGED METER READING LID		

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 4" OR 6" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-30B





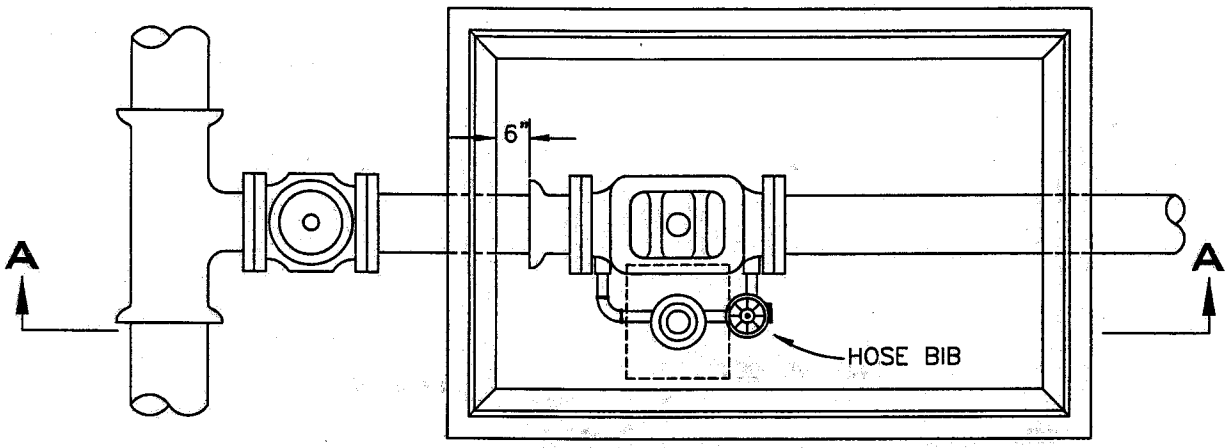
SECTION A-A

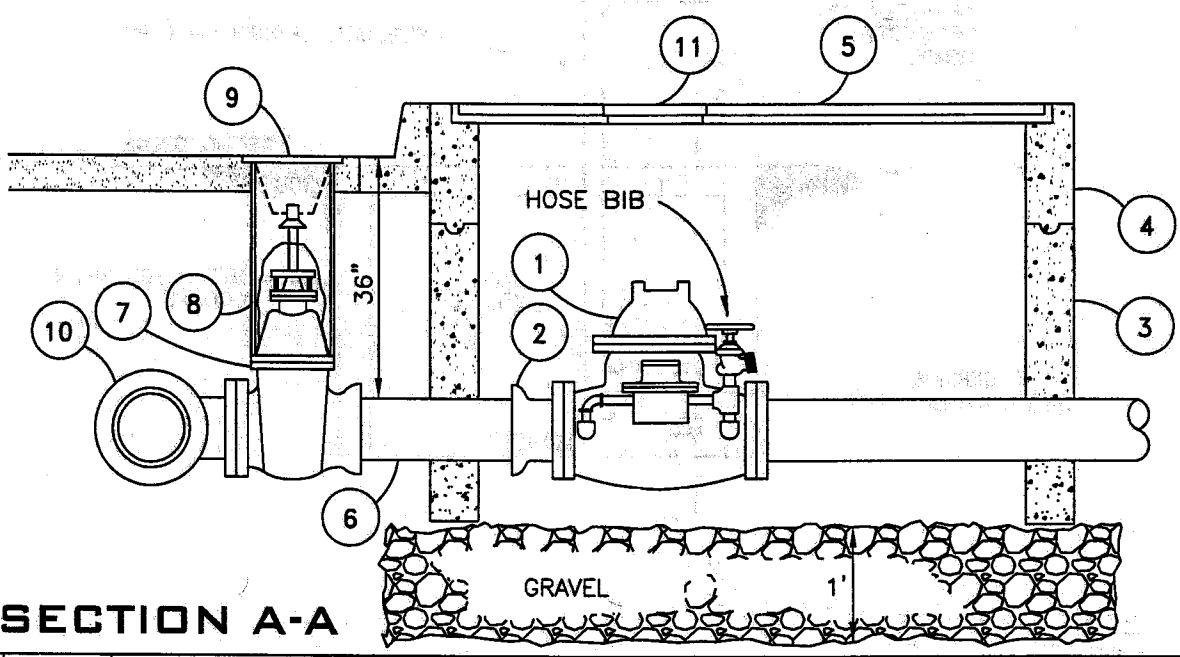
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	8" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	8" X 8" HINGED METER READING LID		
3	1	3'-0" X 5'-0" UTILITY BOX W/4 1/2" WALLS.	SEE MATERIALS LIST	
4	1	3'-0" X 5'-0" UTILITY BOX TOP SECTION.	SEE MATERIALS LIST	
5	1	3'-0" X 5'-0" UTILITY BOX COVER.	SEE MATERIALS LIST	
6	1	8" X REQUIRED LENGTH NIPPLE, FLANGE EACH END.	STEEL, CML/CMC	
7	1	8" GATE VALVE, FLANGED.	DISTRICT APPROVED	
8	1	GATE WELL		SEE DWG. W-17A
9	1	GATE WELL CAP	CAST IRON	SEE DWG. W-18A
10	1	MAIN SIZE X 8" TEE	CEMENT MORTAR LINED	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 8" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-31A





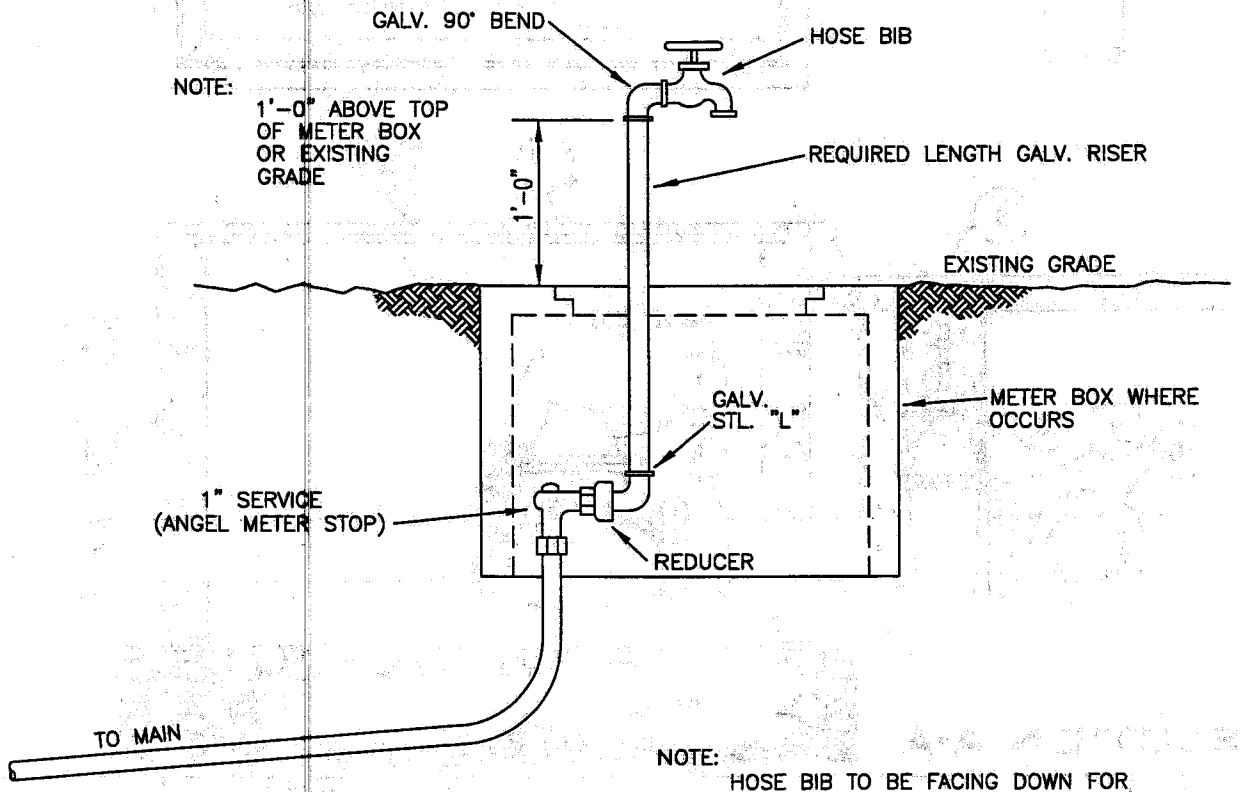
SECTION A-A

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	8" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	8" ADAPTER, FLANGED BY "TYTON" OR M.J.	DUCTILE IRON	RESTRAINED JOINT
3	1	3'-0" X 5'-0" UTILITY BOX W/4 1/2" WALLS.	SEE MATERIALS LIST	
4	1	3'-0" X 5'-0" UTILITY BOX TOP SECTION.	SEE MATERIALS LIST	
5	1	3'-0" X 5'-0" UTILITY BOX COVER.	SEE MATERIALS LIST	
6	1	8" X REQUIRED LENGTH DUCTILE IRON PIPE.	DUCTILE IRON	RESTRAINED JOINT
7	1	8" GATE VALVE, FLANGED BY "TYTON" OR M.J.	DISTRICT APPROVED	RESTRAINED JOINT
8	1	GATE WELL		SEE DWG. W-17A
9	1	GATE WELL CAP	CAST IRON	SEE DWG. W-18B
10	1	MAIN SIZE X 8" TEE	DUCTILE IRON	
11	1	8" X 8" HINGED METER READING LID		

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 8" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-31B



NOTE:

HOSE BIB TO BE FACING DOWN FOR SAMPLE COLLECTION

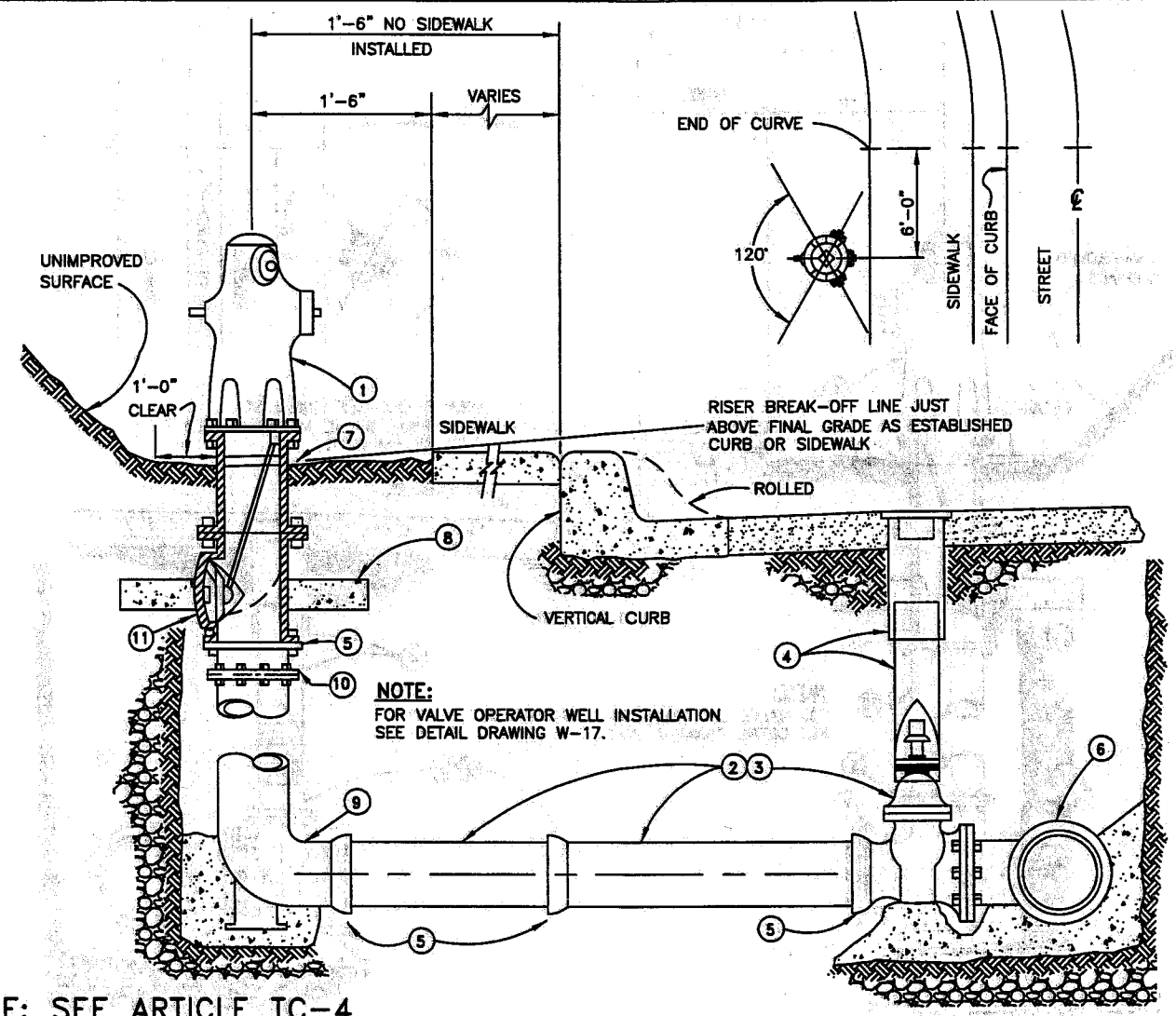
CONTRACTOR TO TURN ANGLE METER STOP TO ON POSITION AFTER INSTALLATION OF SAMPLE RISER

COACHELLA VALLEY WATER DISTRICT

TEMPORARY BACTERIA-SAMPLE RISER DETAIL

APPROVAL DATE: OCT 2005

W-32



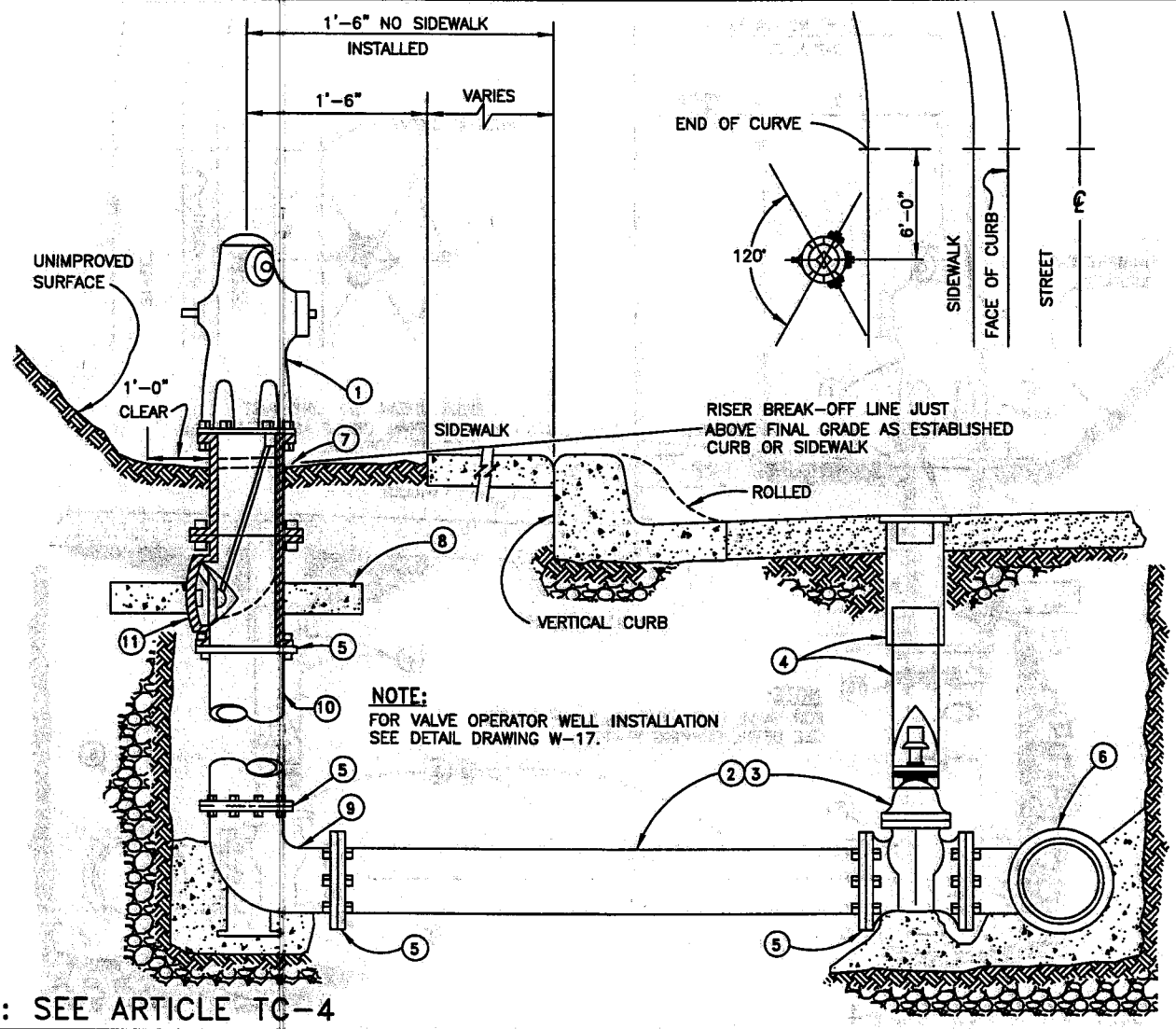
REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	6-HOLE
2	1+	6" X NO. OF JOINTS AS REQUIRED	D.I.P.-POLYETHYLENE WRAPPED IN CORROSIVE SOILS
3	1	6" X "TYTON" OR MECHANICAL JOINT GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	2+	6" "TYTON" RESTRAINING GASKET OR MECHANICAL JOINT RESTRAINING GLAND	REFERENCE ARTICLE T-6
6	1	MAIN SIZE X 6" TEE	
7	1	6" FLANGED C.I. BREAK-OFF RISER - 6" LONG	6-HOLE
8	1	3' X 3' X 6" CONCRETE PAD	CLASS 520-C-2500
9	1	6" 90° BURY, "TYTON" OR M.J. X FLANGED	D.I.P.
10	1	6" X REQURED LENGTH RISER	FLANGED (8-HOLE) D.I.P.
11	1	6" POSITIVE BREAK-OFF VALVE ASSEMBLY	8-HOLE X 6-HOLE

COACHELLA VALLEY WATER DISTRICT

DETAIL OF WET BARREL TYPE FIRE HYDRANT INSTALLATION ADJACENT TO SIDEWALK OR CURB FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-33A



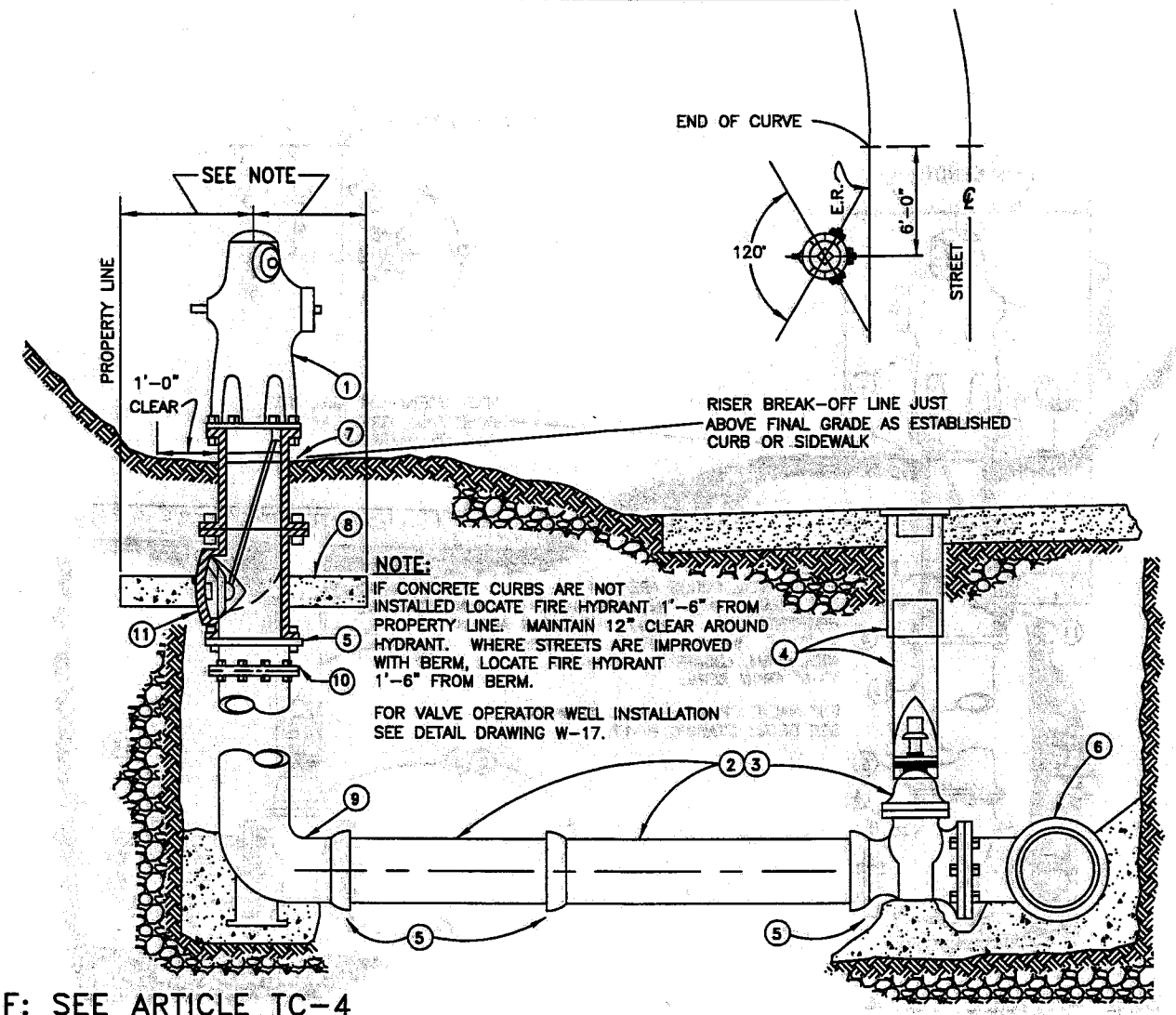
REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	6-HOLE
2	1	6" X REQUIRED LENGTH HYDRANT RUN	CML/CMC-NON CORROSIVE SOIL INSTALLATIONS ONLY, UNLESS OTHERWISE APPROVED BY ENGINEER.
3	1	6" FLANGED GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A
5	4	6" FLANGE	
6	1	MAIN SIZE X 6" TEE	CML/CMC
7	1	6" FLANGED C.I. BREAK-OFF RISER - 6" LONG	6-HOLE
8	1	3' X 3' X 6" CONCRETE PAD	CLASS 520-C-2500
9	1	6" SCH. 40 WELD ELL	COATED AN LINED PER TC-10
10	1	6" X REQURED LENGTH SCHEDULE 40 RISER	COATED AN LINED PER TC-10 FLANGED (8-HOLE)
11	1	6" POSITIVE BREAK-OFF VALVE ASSEMBLY	8-HOLE X 6-HOLE

COACHELLA VALLEY WATER DISTRICT

DETAIL OF WET BARREL TYPE FIRE HYDRANT INSTALLATION ADJACENT TO SIDEWALK OR CURB FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-33B



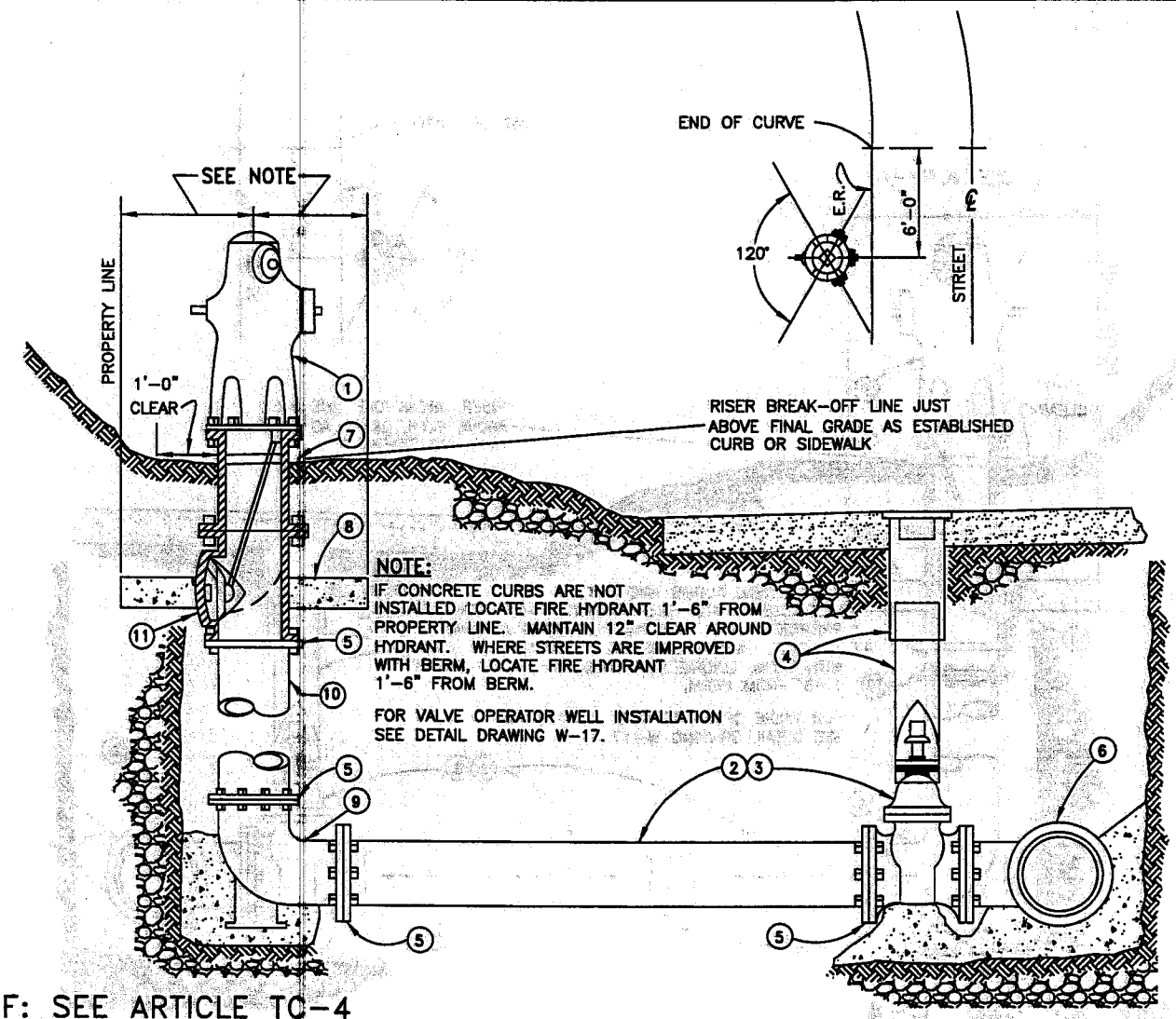
REF: SEE ARTICLE TC-4

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	6-HOLE
2	1+	6" X NO. OF JOINTS AS REQUIRED	D.I.P.-POLYETHYLENE WRAPPED IN CORROSIVE SOILS
3	1	6" X "TYTON" OR MECHANICAL JOINT GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A.
5	2+	6" "TYTON" RESTRAINING GASKET OR MECHANICAL JOINT RESTRAINING GLAND	REFERENCE ARTICLE T-6
6	1	MAIN SIZE X 6" TEE	
7	1	6" FLANGED C.I. BREAK-OFF RISER - 6" LONG	6-HOLE
8	1	3' X 3' X 6" CONCRETE PAD	CLASS 520-C-2500
9	1	6" 90° BURY, "TYTON" OR M.J. X FLANGED	D.I.P.
10	1	6" X REQURED LENGTH RISER	FLANGED (8-HOLE) D.I.P.
11	1	6" POSITIVE BREAK-OFF VALVE ASSEMBLY	8-HOLE X 6-HOLE

COACHELLA VALLEY WATER DISTRICT

DETAIL OF WET BARREL TYPE
FIRE HYDRANT
INSTALLATION UNIMPROVED
STREET FOR DUCTILE IRON PIPE

APPROVAL DATE: OCT 2005 | W-34A



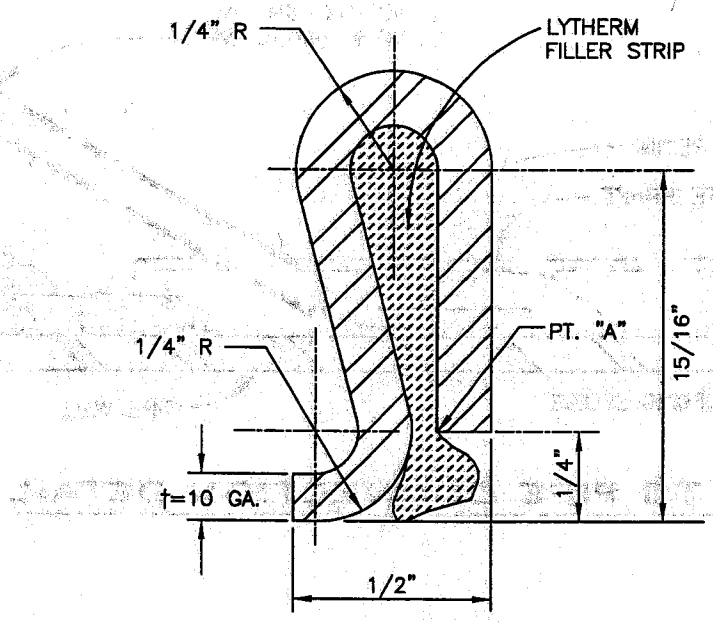
REF: SEE ARTICLE TC-4

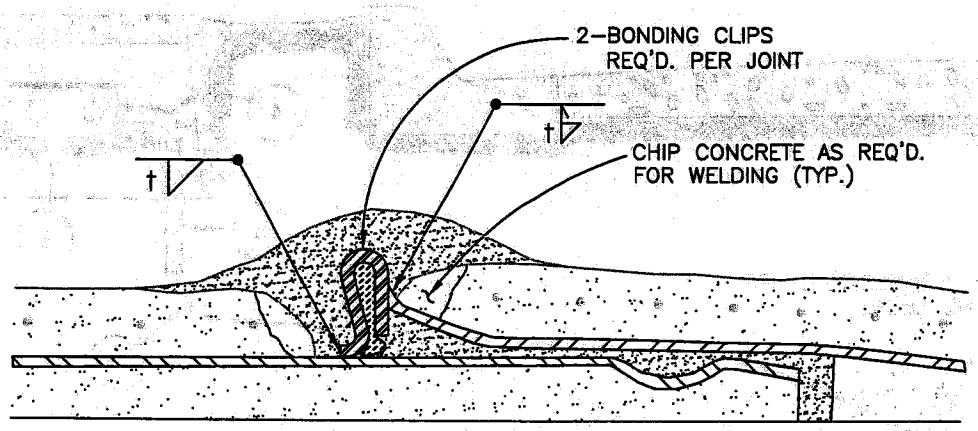
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	6" FIRE HYDRANT	6-HOLE
2	1+	6" X REQUIRED LENGTH HYDRANT RUN	CML/CMC-NON CORROSIVE SOIL INSTALLATIONS ONLY, UNLESS OTHERWISE APPROVED BY ENGINEER
3	1	6" FLANGED GATE VALVE	
4	1	VALVE OPERATOR WELL & CAP	SEE DETAIL DRAWING W-17A.
5	4	6" FLANGE	
6	1	MAIN SIZE X 6" TEE	CML/CMC
7	1	6" FLANGED C.I. BREAK-OFF RISER - 6" LONG	6-HOLE
8	1	3' X 3' X 6" CONCRETE PAD	CLASS 520-C-2500
9	1	6" SCH. 40 WELD ELL	COATED AND LINED PER TC-10
10	1	6" X REQURED LENGTH SCHEDULE 40 RISER	COATED AND LINED PER TC-10 FLANGED (8-HOLE)
11	1	6" POSITIVE BREAK-OFF VALVE ASSEMBLY	8-HOLE X 6-HOLE

COACHELLA VALLEY WATER DISTRICT

DETAIL OF WET BARREL TYPE
FIRE HYDRANT
INSTALLATION UNIMPROVED
STREET FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-34B





FIELD INSTALLATION

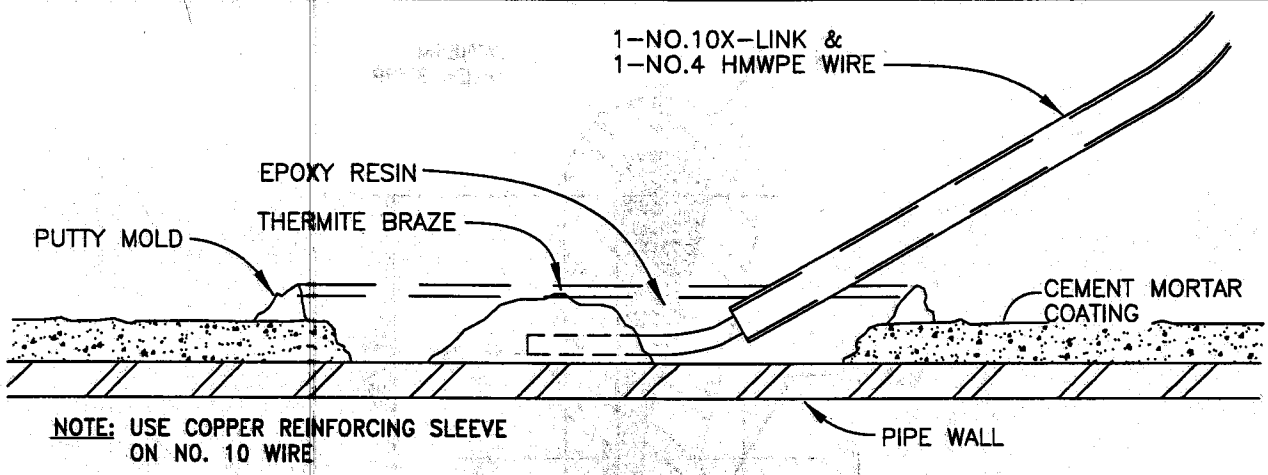
NOTES:

1. STEEL BONDING CLIP:
   MATERIAL SPECIFICATION---ASTM A366 (COMMERCIAL QUALITY)
   CUT LENGTH----------2 1/2" ± 1/16"
   WIDTH--------------1 1/4" ± 1/16"
2. LYTHERM FILLER STRIP TO BE 1" X 1 1/2" WIDE TO OVERLAP SIDES OF CLIP.
3. CRIMP BONDING CLIP OVER FILLER AT "A" TO COMPRESS FILLER.

COACHELLA VALLEY WATER DISTRICT

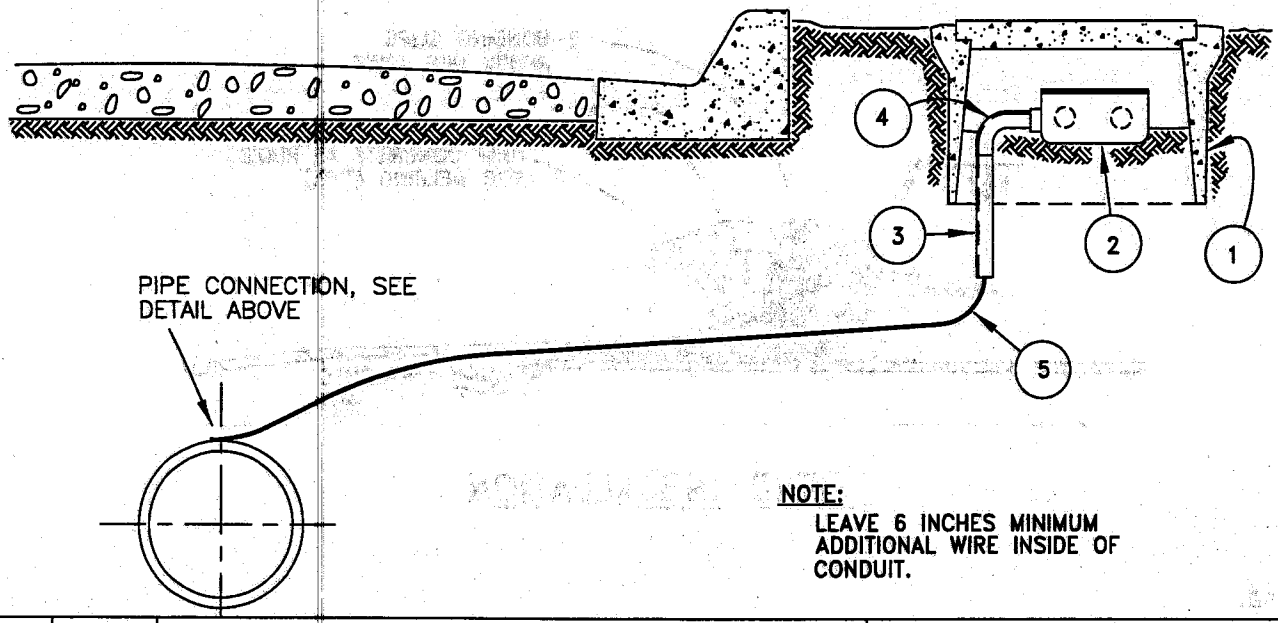
DETAIL OF
STEEL PIPE BONDING CLIP

APPROVAL DATE: OCT 2005 | W-35



NOTE: USE COPPER REINFORCING SLEEVE ON NO. 10 WIRE

WIRE TO PIPE CONNECTION DETAIL



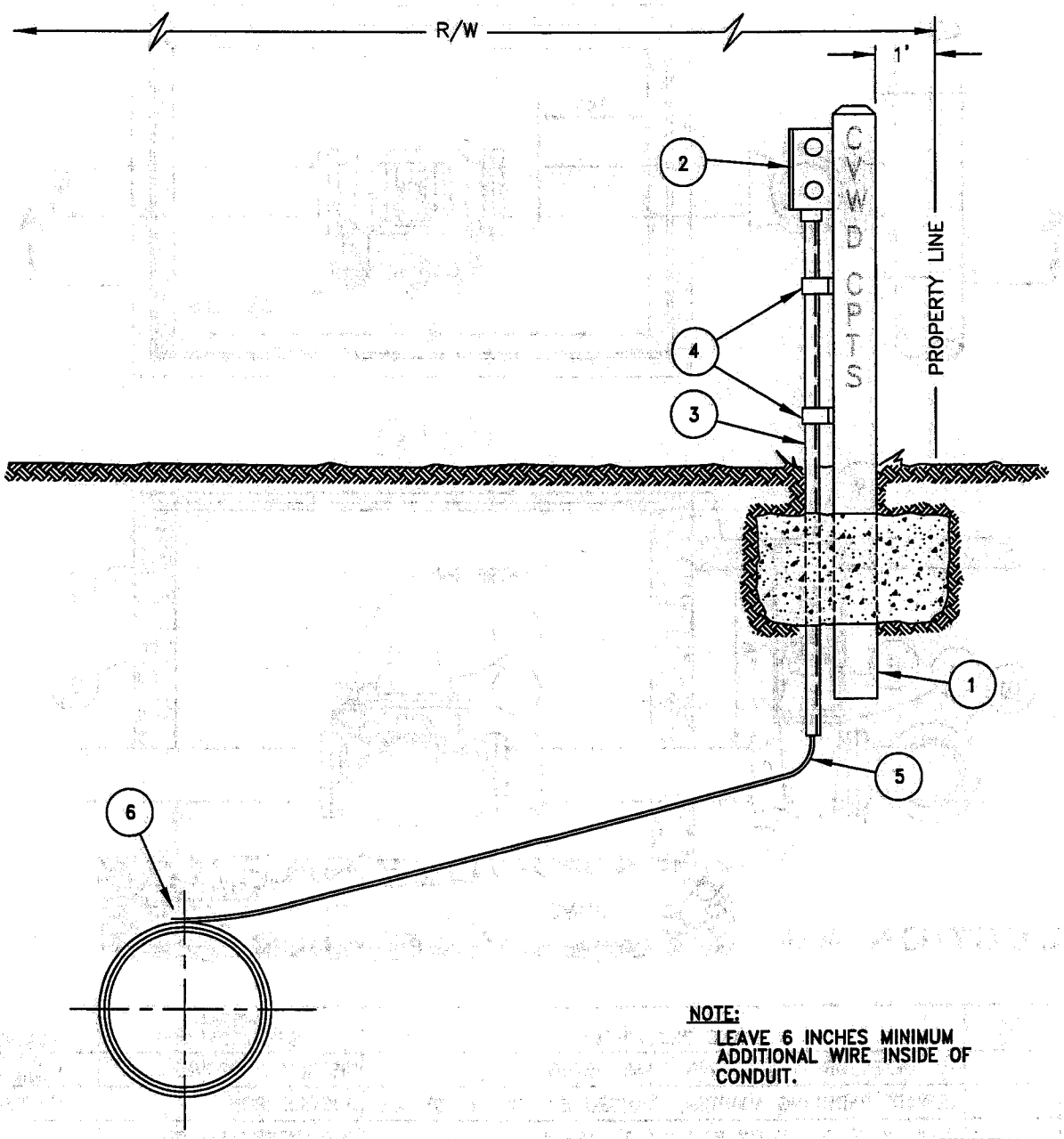
NOTE:
LEAVE 6 INCHES MINIMUM ADDITIONAL WIRE INSIDE OF CONDUIT.

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	BROOKS NO. 33 METER BOX & LID	SEE DETAIL DWG. W-5/S-43
2	1	1" PVC CONDUIT W/ GASKETED COVER TYPE C	
3	18"	1" SCHEDULE 80 PVC CONDUIT	
4	1	1" SCHEDULE 80 LONG RADIUS 90° ELL	
5	1 ea	NO. 10 X-LINK & NO. 4 HMWPE WIRE	

COACHELLA VALLEY WATER DISTRICT

DETAIL OF CATHODIC PROTECTION TEST STATION-IMPROVED AREAS

APPROVAL DATE: OCT 2005 | W-36/S-41



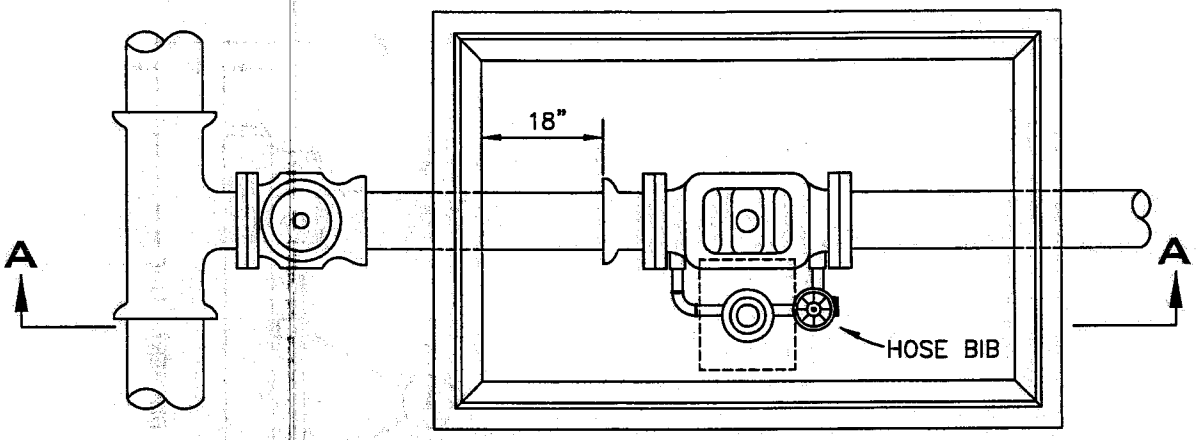
NOTE:
LEAVE 6 INCHES MINIMUM ADDITIONAL WIRE INSIDE OF CONDUIT.

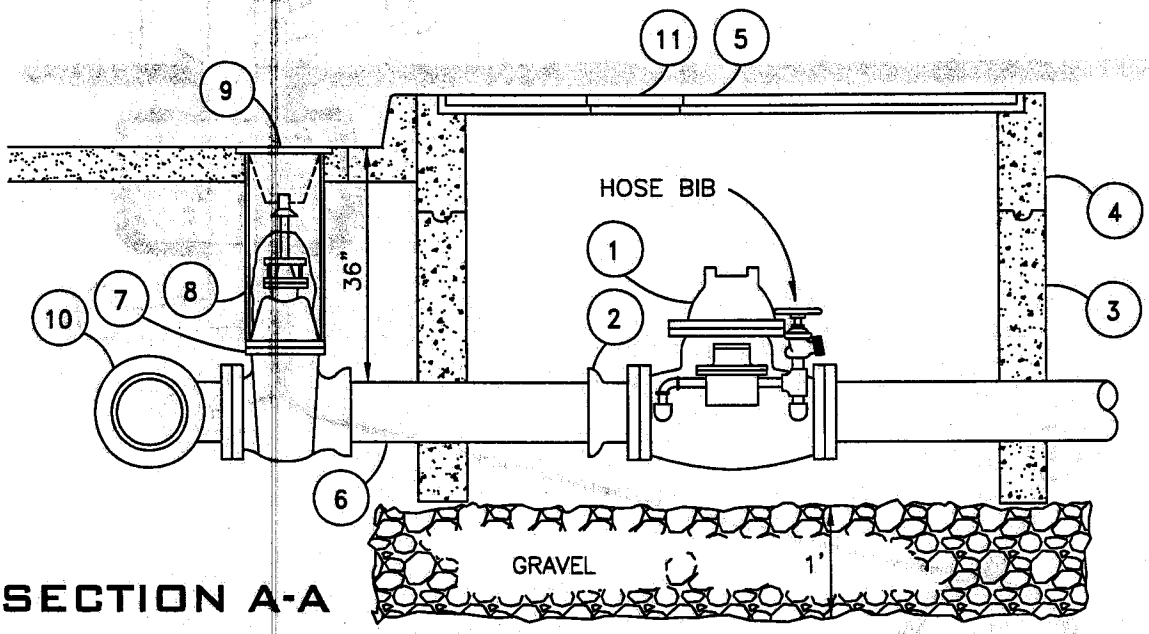
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	STANDARD MARKER	
2	1	1" PVC CONDUIT W/ GASKETED COVER TYPE C	
3	5'	1" SCH. 80 PVC CONDUIT	
4	2	2 HOLE CONDUIT STRAP W/ ALUMINUM NAILS	
5	1 ea	NO. 10 X-LINK & NO. 4 HMWPE WIRE	
6	1	WIRE TO PIPE CONNECTION	SEE DETAIL DWG. W-36/S-41

COACHELLA VALLEY WATER DISTRICT

DETAIL OF CATHODIC PROTECTION TEST STATION-UNIMPROVED AREAS

APPROVAL DATE: OCT 2005 | W-37/S-42





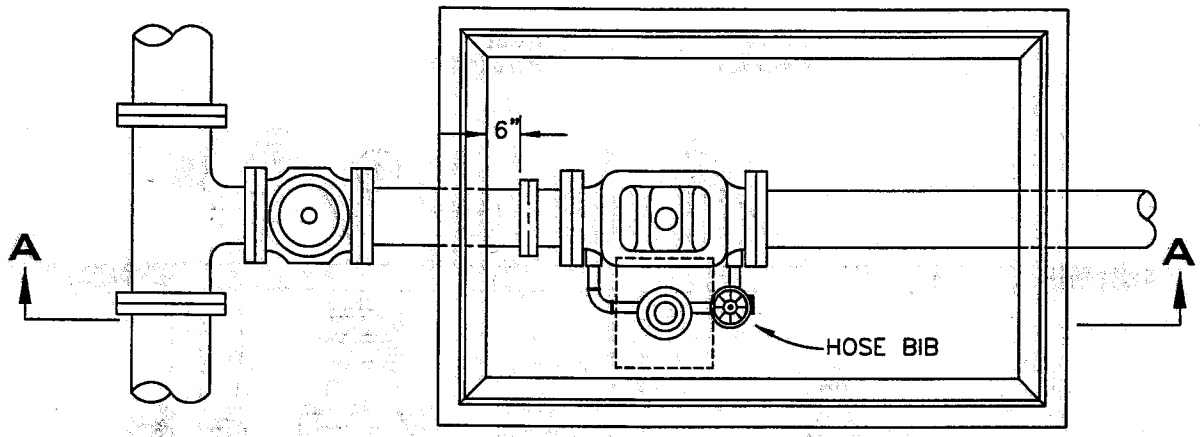
SECTION A-A

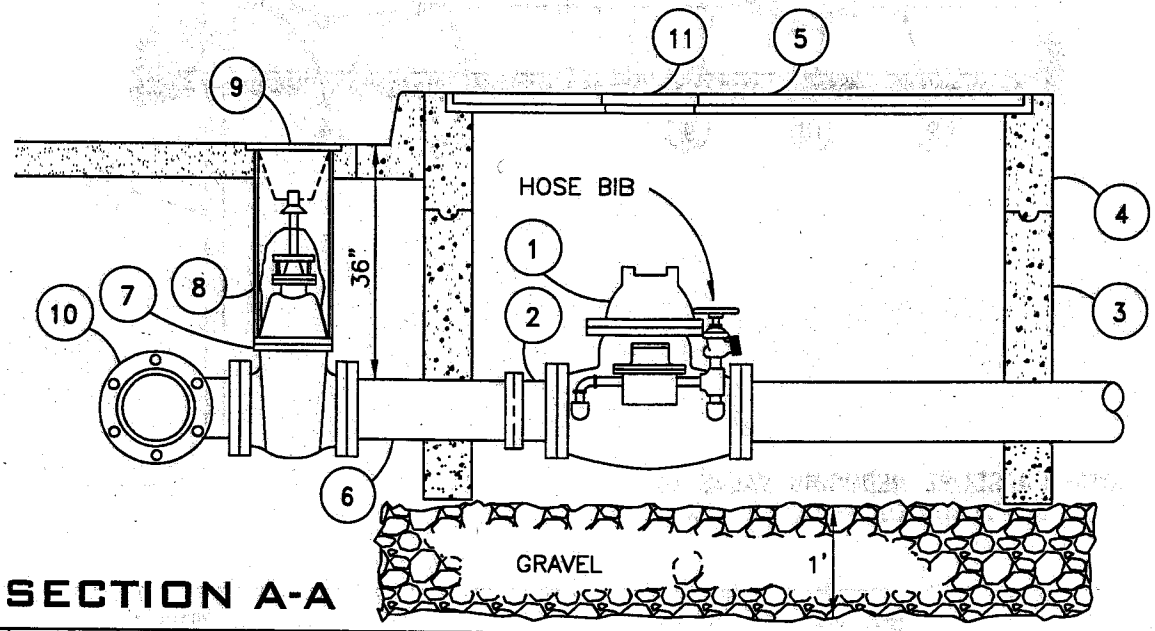
ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	10" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	12"X10" REDUCING ADAPTER, FLANGED BY "TYTON" OR M.J.	DUCTILE IRON	RESTRAINED
3	1	7'-6" X 4'-0" UTILITY BOX W/ 6" WALLS.	SEE MATERIALS LIST	
4	1	7'-6" X 4'-0" UTILITY BOX TOP SECTION.		
5	1	7'-6" X 4'-0" UTILITY BOX COVER.		
6	1	12" X REQUIRED LENGTH DUCTILE IRON PIPE.	DUCTILE IRON	RESTRAINED
7	1	12" GATE VALVE, FLANGED BY "TYTON" OR M.J.	DISTRICT APPROVED	RESTRAINED
8	1	VALVE WELL		SEE DWG. W-17A
9	1	VALVE WELL CAP		SEE DWG. W-18A
10	1	MAIN SIZE X 8" TEE	DUCTILE IRON	
11	1	8" X 8" HINGED METER READING LID		

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 10" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR DUCTILE IRON PIPE

APPROVAL DATE: NOV 2005 | W-38A





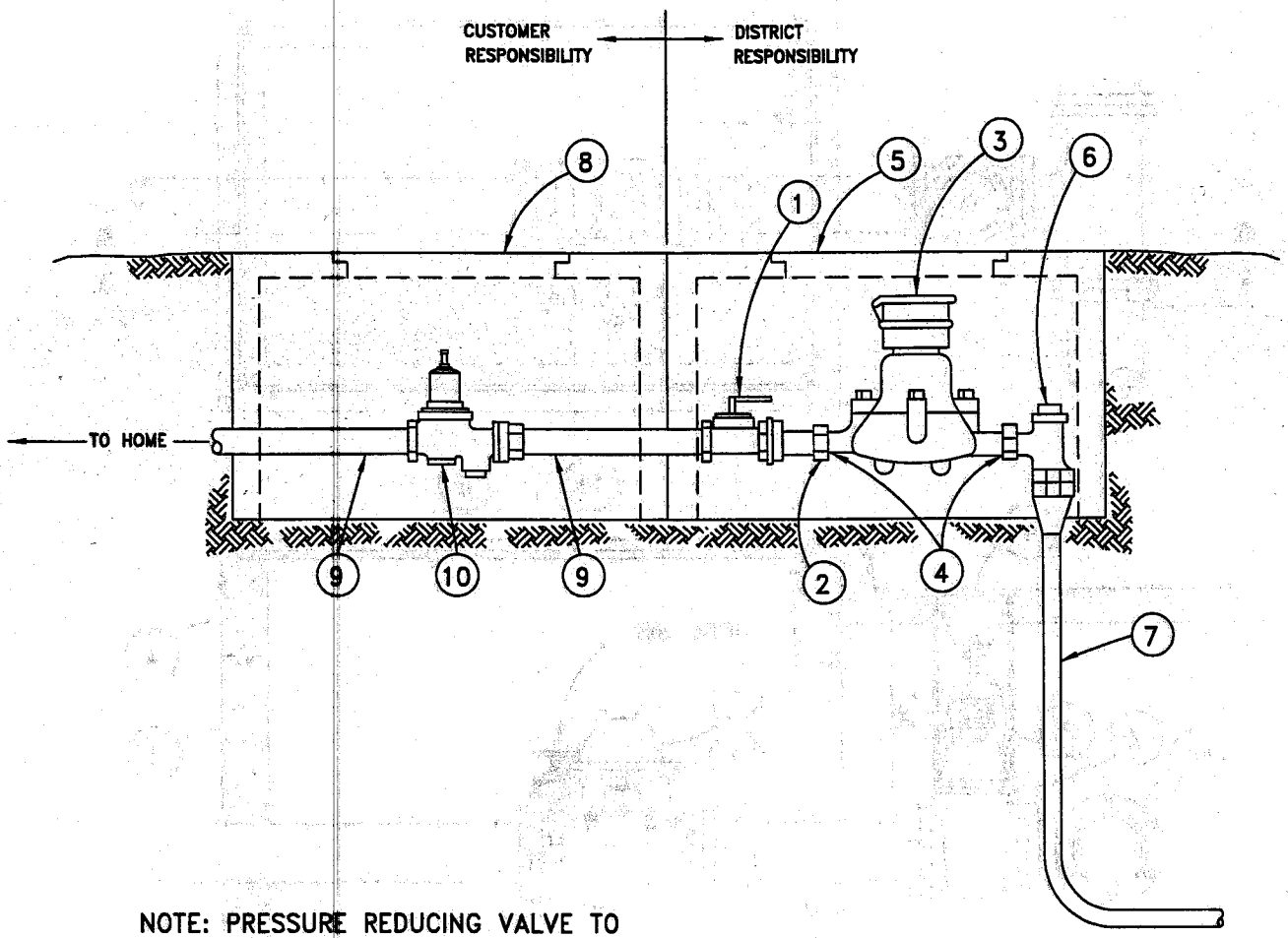
SECTION A-A

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATIONS	REMARKS
1	1	10" DETECTOR CHECK W/BY-PASS METER.	DISTRICT APPROVED	DISTRICT INSTALLED
2	1	12"X10" REDUCER, FLANGED	STEEL CML/CMC	
3	1	7'-6" X 4'-0" UTILITY BOX W/ 6" WALLS.	SEE MATERIALS LIST	
4	1	7'-6" X 4'-0" UTILITY BOX TOP SECTION.		
5	1	7'-6" X 4'-0" UTILITY BOX COVER.		
6	1	12" X REQUIRED LENGTH NIPPLE, FLANGED EACH END	STEEL, CML/CMC	
7	1	12" GATE VALVE, FLANGED BY "TYTON" OR M.J.	DISTRICT APPROVED	
8	1	VALVE WELL		SEE DWG. W-17A
9	1	VALVE WELL CAP		SEE DWG. W-18A
10	1	MAIN SIZE X 12" TEE	CEMENT MORTAR LINED	
11	1	8" X 8" HINGED METER READING LID		

COACHELLA VALLEY WATER DISTRICT

DETAIL OF 10" DETECTOR CHECK WITH BY-PASS METER INSTALLATION FOR CML/CMC STEEL PIPE

APPROVAL DATE: OCT 2005 | W-38B



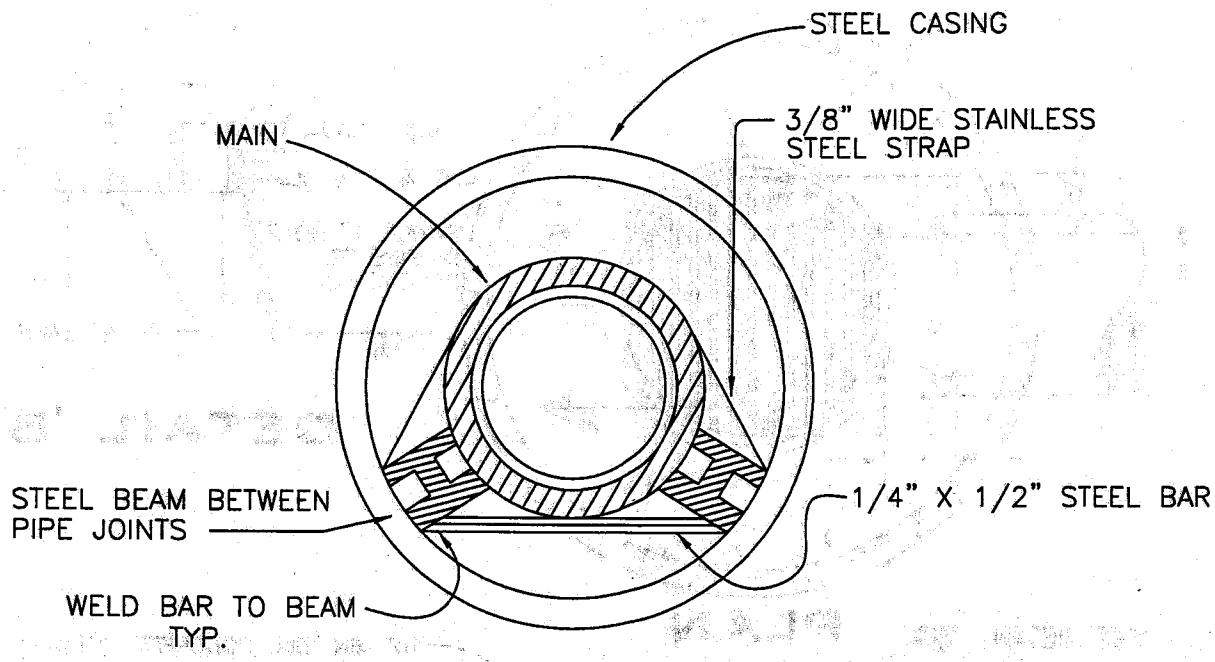
NOTE: PRESSURE REDUCING VALVE TO BE CENTERED IN METER BOX

ITEM NO.	NO. REQ.	SIZE AND DESCRIPTION	REMARKS
1	1	1" BALL VALVE	TYPICAL EXISTING SERVICE MAINTAINED BY CVWD
2	1	1" STRAIGHT METER COUPLING	
3	1	3/4" METER	
4	2	1" X 1/1/4" WATER METER BUSHING	
5	1	METER BOX AND LID	
6	1	1" ANGLE METER STOP	
7	1	1" SERVICE LINE	
8	1	METER BOX AND LID	NOT MAINTAINED BY CVWD
9	1	EXISTING SERVICE LINE	
10	1	1" PRESSURE REDUCING VALVE	

COACHELLA VALLEY WATER DISTRICT

TYPICAL DETAIL OF INDIVIDUAL 3/4" PRESSURE REDUCING VALVE INSTALLATION

APPROVAL DATE: OCT 2005 | W-39



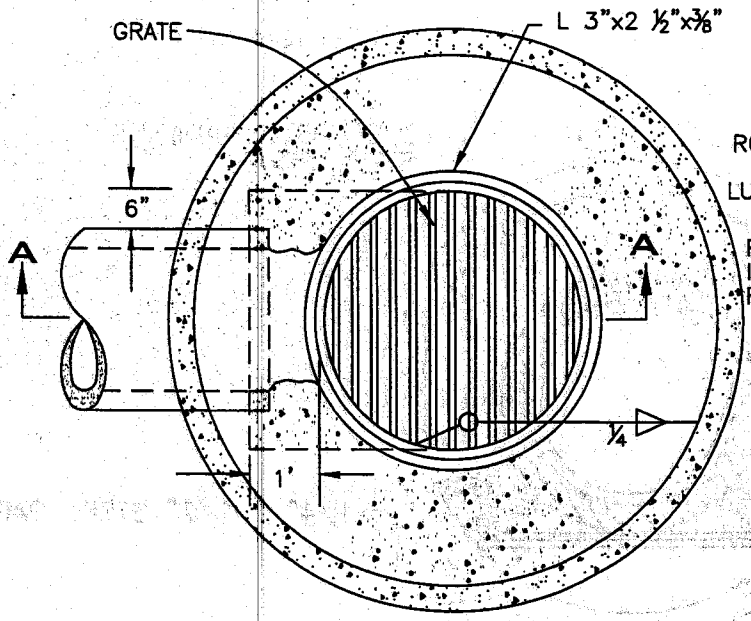
NOTE 1. NO SPIRAL WELD CASING ALLOWED.
NOTE 2. ALL JOINTS WITHIN CASING SHALL BE FULLY RESTRAINED
NOTE 3. CASCADE TYPE CCS PIPE SKID OR CONSTRUCT STEEL "H" BEAM BETWEEN PIPE JOINTS AS SHOWN

NOMINAL PIPE DIAMETER	CASING DIAM.	CASING WALL THICKNESS (BORES LONGER THAN 150')	CASING WALL THICKNESS (BORES 150' LENGTH AND SHORTER)	STEEL BEAM SIZE
8"	18"	.375	.25	W4X13
12"	24"	.375	.25	W4X13
18"	36"	.5	.375	W4X13
24"	42"	.75	.5	W4X13
30"	54"	.75	.5	W4X13
36"	66"	.75	.75	W6X20
42"	72"	.75	.75	W6X20

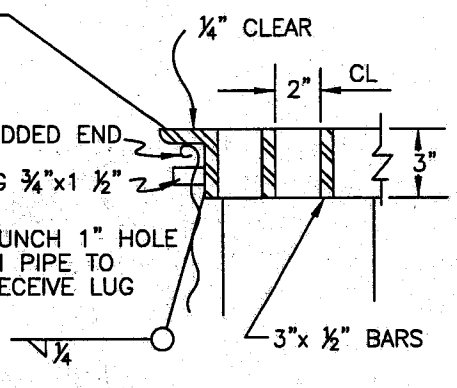
COACHELLA VALLEY WATER DISTRICT

STANDARD CASING FOR DOMESTIC WATER MAINS

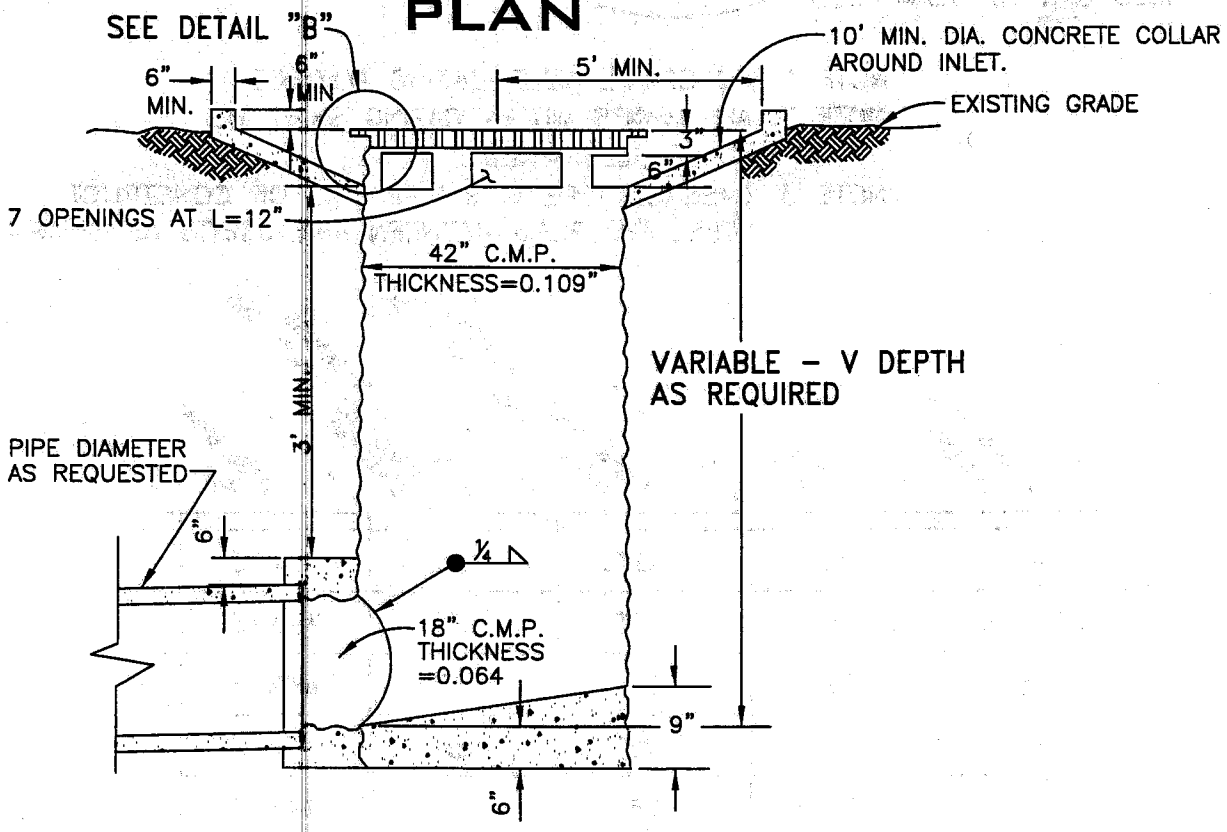
APPROVAL DATE: OCT 2005 | W-40



PLAN



DETAIL "B"



SECTION "A-A"

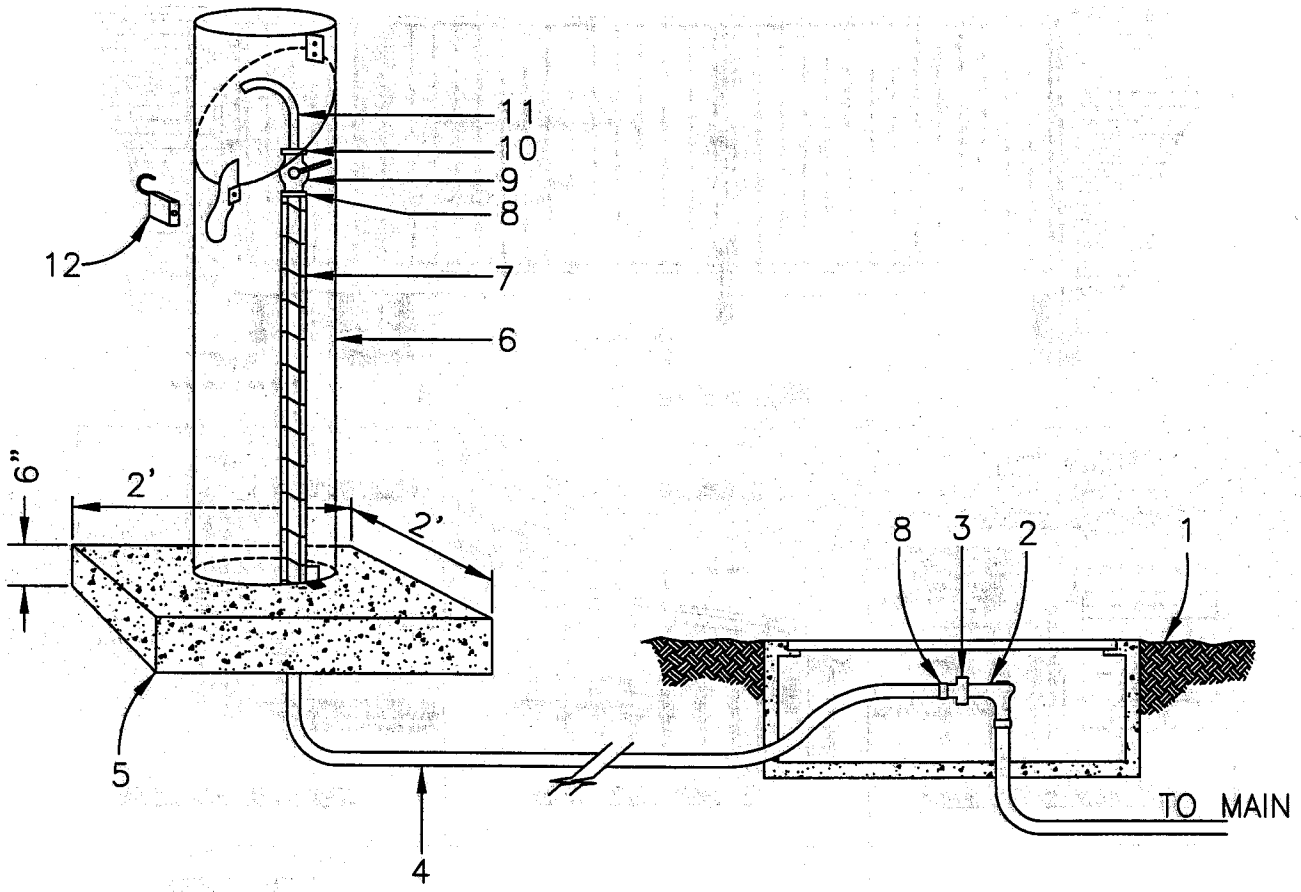
NOTES:

1. GRATE AND FRAME SHALL BE GALVANIZED

COACHELLA VALLEY WATER DISTRICT

INLET FOR BLOW-OFF WATER AT WELL SITES (GRAVITY FLOW ONLY)

APPROVAL DATE: OCT 2005 | W-41

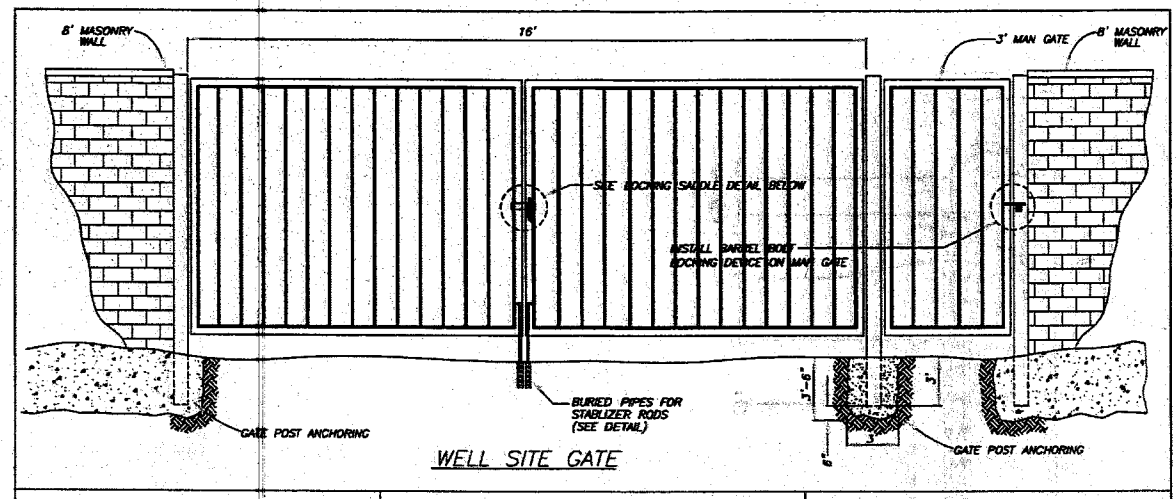


ITEM NO.	SIZE AND DESCRIPTION	REMARKS
1	33-S METER BOX	
2	1" ANGLE STOP	
3	1 1/4" X 3/4" BRASS BUSHING REDUCER	
4	3/4" COPPER TUBING	LENGTH DEPENDS ON RUN
5	CEMENT PAD	
6	STATION CANISTER- BOLTED TO CONCRETE SLAB	
7	PLUMBING INSULATION	
8	3/4' X 3/4" FERRULE FITTING	
9	3/4" X 3/4" BRASS BALL VALVE	
10	3/4" X 3/8" FURRULE FITTING	
11	3/8" COPPER GOOSE NECK	
12	MASTER PADLOCK NO. 2356	DISTRICT SUPPLIED

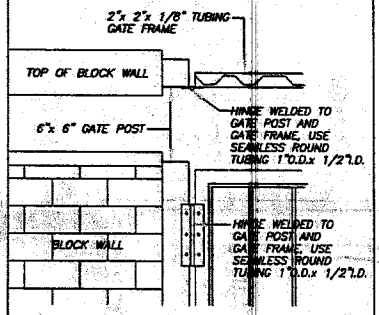
COACHELLA VALLEY WATER DISTRICT

BACTERIOLOGICAL SAMPLE STATION DETAIL

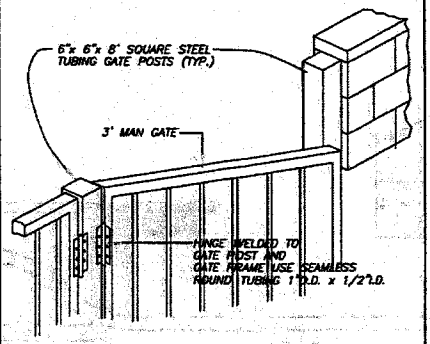
APPROVAL DATE: OCT 2005 | W-42



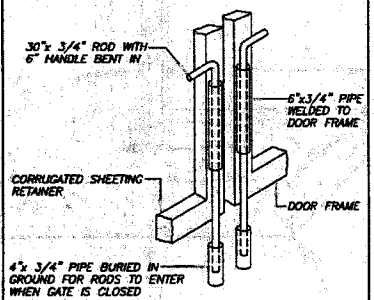
WELL SITE GATE



HINGE DETAIL
TOP VIEW & ELEVATION



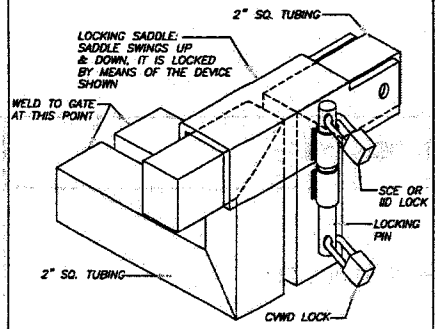
3' MAN GATE DETAIL



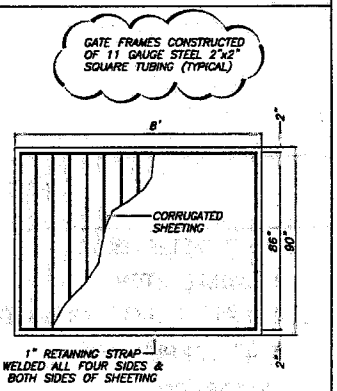
STABLIZER ROD DETAIL

NOTES:

1. GATES TO OPEN INTO THE WELL SITE
2. GATES TO BE PAINTED AN APPROVED COLOR BY C.V.W.D.
3. ALL HINGES TO BE 6 x 6 HEAVY DUTY (69002) MANUFACTURED BY PATTONS CORP. OR APPROVED EQUAL



LOCKING SADDLE
ISOMETRIC VIEW

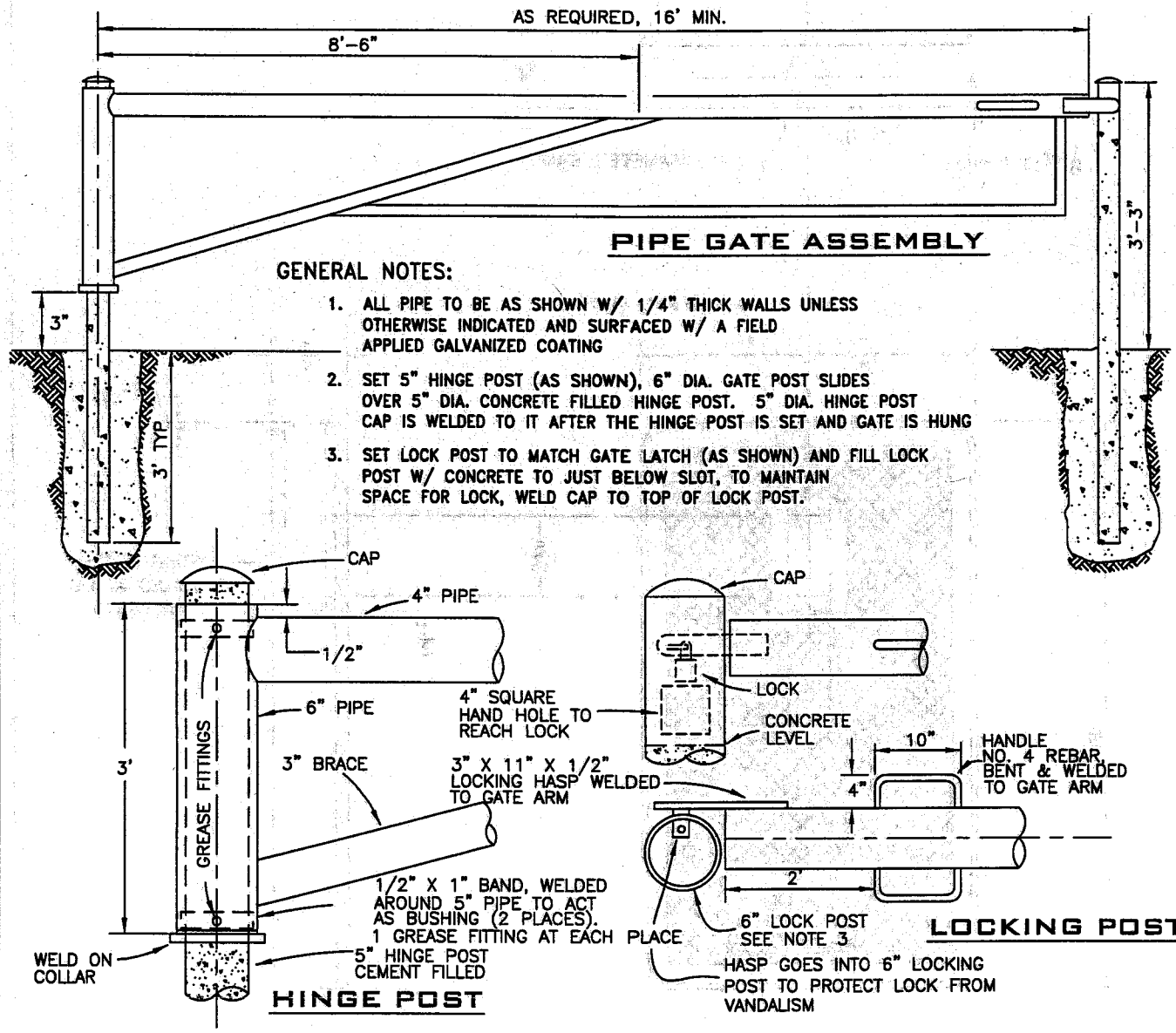


GATE DETAIL

COACHELLA VALLEY WATER DISTRICT

WELL SITE GATES & DETAILS

APPROVAL DATE: OCT 2005 | W-43



PIPE GATE ASSEMBLY

GENERAL NOTES:

1. ALL PIPE TO BE AS SHOWN W/ 1/4" THICK WALLS UNLESS OTHERWISE INDICATED AND SURFACED W/ A FIELD APPLIED GALVANIZED COATING
2. SET 5" HINGE POST (AS SHOWN), 6" DIA. GATE POST SLIDES OVER 5" DIA. CONCRETE FILLED HINGE POST. 5" DIA. HINGE POST CAP IS WELDED TO IT AFTER THE HINGE POST IS SET AND GATE IS HUNG
3. SET LOCK POST TO MATCH GATE LATCH (AS SHOWN) AND FILL LOCK POST W/ CONCRETE TO JUST BELOW SLOT, TO MAINTAIN SPACE FOR LOCK, WELD CAP TO TOP OF LOCK POST.

HINGE POST

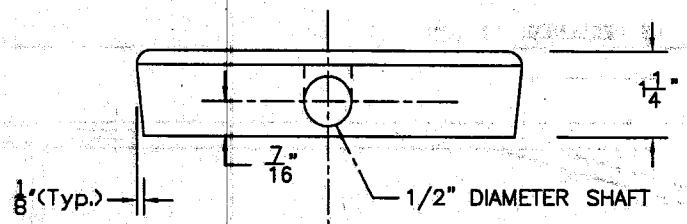
LOCKING POST

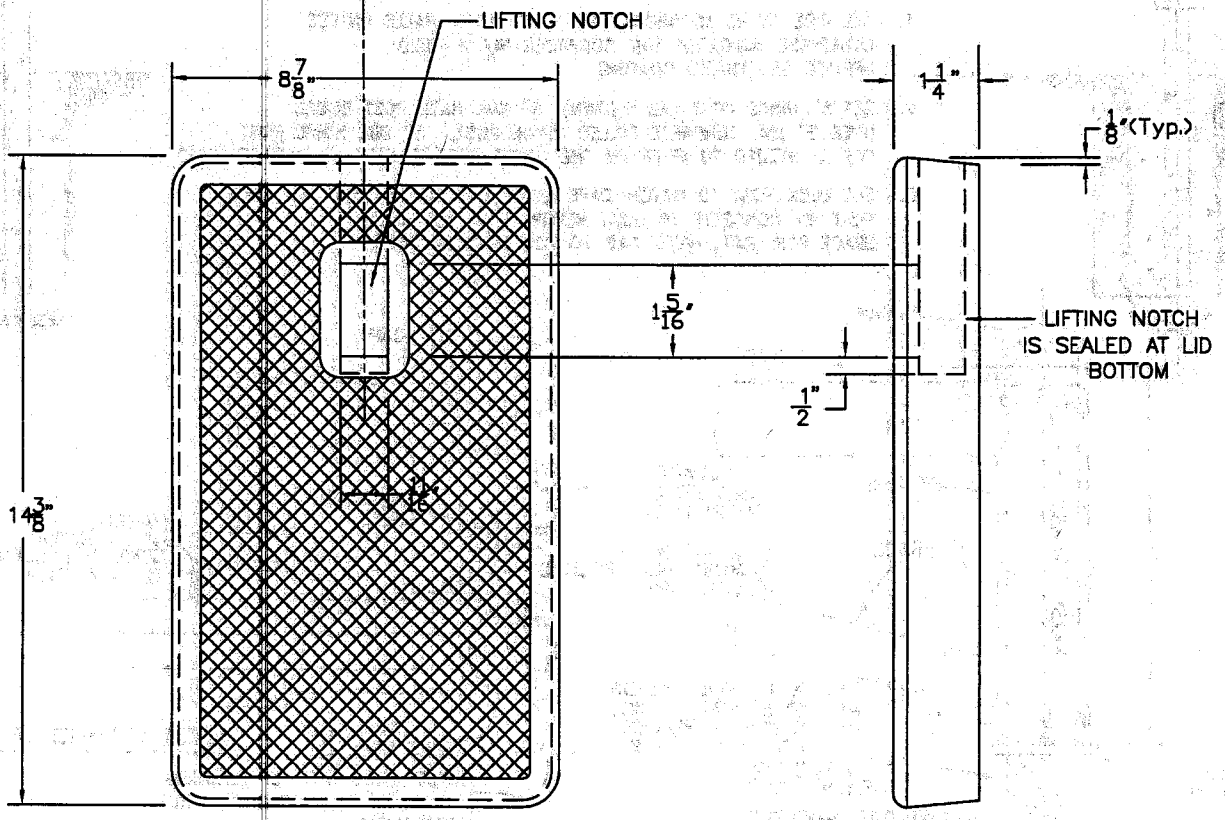
COACHELLA VALLEY WATER DISTRICT

STANDARD PIPE GATE ASSEMBLY

APPROVAL DATE: OCT 2005 | W-44

SIDE VIEW





TOP VIEW

SIDE VIEW

COACHELLA VALLEY WATER DISTRICT	
DETAIL OF DOMESTIC WATER BEE PROOF METER READING LID	
APPROVAL DATE: OCT 2005	W-45

COACHELLA VALLEY WATER DISTRICT
STANDARD SPECIFICATIONS AND DRAWINGS
FOR THE
CONSTRUCTION OF SANITARY SEWER SYSTEMS

COACHELLA VALLEY WATER DISTRICT
POST OFFICE BOX 1058
COACHELLA, CALIFORNIA 92236

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWER SYSTEMS

ENGINEERING DEPARTMENT
OCTOBER 2005

Prepared by
Engineering Department
Sanitation Division

Submitted by: _____
Bruce Clark
Principal Sanitation Engineer

Reviewed by: _____
Mark L. Johnson
Director of Engineering

Approved by: _____
Steve Robbins
General Manager-Chief Engineer

OCTOBER 2005

COACHELLA VALLEY WATER DISTRICT

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF
SANITARY SEWER SYSTEMS

TABLE OF CONTENTS

			PAGE
PART I	-	INTRODUCTION	I-1
PART II	-	TECHNICAL CONDITIONS	
		SECTION	
		TC-1 ENCROACHMENT PERMITS	II-1-1
		TC-2 PIPE AND APPURTENANCES	II-2-1
		TC-3 VALVES AND VALVE OPERATOR WELLS	II-3-1
		TC-4 AIR AND VACUUM RELIEF ASSEMBLIES	II-4-1
		TC-5 CONCRETE VAULTS	II-5-1
		TC-6 THRUST DEVICES	II-6-1
		TC-7 MANHOLES	II-7-1
		TC-8 HOUSE LATERALS	II-8-1
		TC-9 WET WELL, VAULTS AND MANHOLE LINING	II-9-1
		TC-10 FIELD APPLICATION OF PROTECTIVE COATINGS	II-10-1
		TC-11 CARSONITE UTILITY MARKER	II-11-1
		TC-12 SLOPE PROTECTION	II-12-1
		TC-13 CLEAN-OUTS	II-13-1
		TC-14 TELEVISION INSPECTION	II-14-1
		TC-15 EPOXY COATING AND LINING	II-15-1
		TC-16 MID-RANGE PIPE LOCATORS	II-16-1
		TC-17 PAINTING	II-17-1
PART III	-	SPECIAL PROVISIONS	
PART IV	-	DETAIL DRAWINGS	IV-1

COACHELLA VALLEY WATER DISTRICT

STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF
SANITARY SEWER SYSTEMS

PART I - INTRODUCTION

The construction of sanitary sewer systems subject to inspection and approval by the Coachella Valley Water District shall be in accordance with the requirements of the District's Standard Specifications for the Construction of Sanitary Sewer Systems hereinafter referred to as the Standard Specifications. Items not specifically referred to herein shall comply with the latest edition of the Standards of the American Water Works Association and/or Greenbook Standard Specifications and shall be subject to approval by the District. Construction methods, material and disposal of products shall also be subject to current standards established by South Coast Air Quality Management District, Regional Water Quality Control Board and any other local, state or federal agencies having authority in their respective jurisdiction.

The Standard Specifications shall include the following:

1. PART II - TECHNICAL CONDITIONS.

2. The latest edition of the "Standard Specifications for Public Works Construction" (SSPWC) written and promulgated by the Southern California Chapter of the American Public Works Association and the Southern California Districts of the Associated General Contractors of America, complete with latest supplements thereto except as modified in PART III, AMENDMENTS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, and/or as modified or supplemented by PART II, TECHNICAL CONDITIONS.

3. PART III, AMENDMENTS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

4. Coachella Valley Water District detail drawings as follows:

Drawing No.	Title
S-1A	Manhole Collar in Light Traffic Areas
S-1B	Manhole Collar in Heavy Traffic Areas
S-2	Concrete Cradle
S-3	Separation and Construction Requirements for Sewer and Water Lines (Parallel Construction)
S-4	Separation and Construction Requirements for Sewer and Water Lines (Crossings)
S-5	Reinforced Precast Concrete Manhole
S-6	Standard Clean-out
S-7	Trench Backfill Details
S-8A	Reinforced Precast Concrete Drop Manhole (Eccentric)
S-8B	Service Lateral Drop Manhole (For Sewers Over 20-feet Deep)
S-9A	Standard House Lateral Type "A"
S-9B	Standard House Lateral Type "B"
S-9C	Standard House Lateral Type "C"

Drawing No.	Title
S-10A	Manhole Frame and Cover Type "A"
S-10B	Manhole Frame and Cover Type "B"
S-19	Detail of Concrete Thrust Blocks
S-20	Thrust Block Bearing Areas
S-24	Chimney Pipe and Base
S-26	Detail of Slope Protection
S-36	Detail of Valve Operator Well Installation
S-37	Detail of Valve Operator Well Cap and Frame
S-39	Detail of Carsonite Utility Marker
S-40A	Detail of Offset Sewage Force Main Air Release and Air/Vac Assembly
S-40B	Detail of Air Release and Air/Vac Assembly Discharge
S-41	Detail of Cathodic Protection Test Station - Improved Areas
S-42	Detail of Cathodic Protection Test Station - Unimproved Areas
S-43	General Location of Sewer Lateral and Water Meter/Water Service Installation
S-44	Standard Offset Clean-out Detail for Lateral under Driveway with no Sidewalk
S-45	Standard Offset Clean-out Detail for Lateral under Driveway with Sidewalk
S-46	Construction Detail for Structural Encasement of Sewer

These Standard Specifications are for the purpose of defining the requirements for construction and as such do not constitute a definition of the contractual arrangement between Subdivider, Contractor and the District. Therefore, references to measurements and payment and other contractual, nontechnical requirements are not binding on the parties unless specifically referenced.

COACHELLA VALLEY WATER DISTRICT

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF
SANITARY SEWER SYSTEMS

PART II - TECHNICAL CONDITIONS

TC-1 ENCROACHMENT PERMITS

If required, encroachment permits for the construction of the sanitary sewer system shall be obtained from the appropriate governmental agency, by the Developer or Contractor at the Developer's or Contractor's expense, prior to construction. In the event of conflict between the requirements of these Specifications and the requirements of the permits, the requirements of the permits shall govern.

TC-2 PIPING AND APPURTENANCES

2.1 General

This Article covers furnishing and delivering of all pipeline materials necessary to complete the sanitary sewer installation in conformance with the Specifications. The gravity sewer shall be constructed of vitrified clay pipe (VCP). All materials to be installed shall be new and unused.

2.2 Vitrified Clay Pipe

2.2.1 General

Vitrified clay pipe and fittings shall be extra strength and shall conform in every respect with the requirements of the specifications and standards of the Clay Pipe Institute and Sections 207-8 of the "Standard Specifications for Public Works Construction," latest edition, for the size of pipe indicated upon the plans. Vitrified clay pipe shall be of the best quality, vitrified, homogeneous in structure, thoroughly burned throughout the entire thickness, free from cracks or other imperfections and must give a clear metallic ring when struck with a hammer.

2.2.2 Joints

Joints in vitrified clay pipe shall be made using a factory-made mechanical compression joint, consisting of a plastic material (Polyurethane), and shall be "Wedgelock" or "Speed-Seal," or approved equal, and shall conform with the requirements of Section 208.2.3, Type "G" Joints of the "Standard Specifications for Public Works Construction," latest edition.

2.3 Submittals

The Contractor shall submit, in quadruplicate, the drawings of pipe, joints, fittings and other equipment, it may be the brochure or catalog sheets of manufacturer, showing, in sufficient details, the dimensions and manufacturer's tolerances of working pressures.

The Contractor shall also obtain and submit to the District the Manufacturer's Affidavit of Compliance that all basic materials used in VCP production meet the requirements of the standards of this Specification.

2.4 Inspection

2.4.1 General

Inspection by the District shall not relieve the manufacturer of the responsibility of furnishing products that satisfy requirements defined in this standard.

2.4.2 Access

The Inspector shall have free access to that part of the manufacturer's plant involved in work performed to meet requirements of this standard. The manufacturer shall afford the inspector, at no charge, reasonable facilities needed to determine if the pipe meets the requirements of this standard.

2.4.3 Certification

The manufacturer shall furnish a certificate of conformance to this standard.

2.5 Installation

2.5.1 General

All pipe laying shall proceed upgrade with the spigot ends of bell and spigot pipe pointing in the direction of flow. Each pipe shall be laid true to line and grade. No pipe shall be lain in water and all costs for drainage and/or dewatering trenches during construction shall be borne by the Contractor.

Unless specified otherwise, all buried piping shall have a coverage of at least three feet between top of pipe and finished grade. Pipe shall be assembled by hand or by use of a bar and block or by lever pullers. No swinging or stabbing shall be permitted. The "popping-on" of joints is expressly forbidden. All bell and spigot type connection shall be marked on the spigot end to indicate full insertion.

Installation of pipe shall be in accordance with SSPWC 306-1 as amended by Article SP-3 of PART IX, SPECIAL PROVISIONS. Maximum length of trench shall be in accordance with SSPWC 306-1.1.2.

Where unsuitable material is found at the trench bottom, as determined by the Engineer, the unsuitable material shall be removed and replaced by crushed rock as defined by SSPWC 200-2.2 or 200-2.3 except that minimum sand equivalent value shall be 30. Any excess material that is generated by this process shall be disposed of by the Contractor at no additional cost to the District.

2.6 Testing

2.6.1 General

All testing shall be in accordance with SSPWC 306-1.4.4.

2.6.2 Television Inspection

For television requirement, see TC-14, TELEVISION INSPECTION, of this Specification.

TC-3 VALVES AND VALVE OPERATOR WELLS

3.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to furnish, install and test the valves and valve operator wells.

3.2 Materials

3.2.1 Eccentric Plug Valves

3.2.1.1 General

Plug valves shall be of the nonlubricated, eccentric type with resilient faced plugs and shall be furnished with either flanged ends conforming to the ANSI 125/150 lb. standard, with appropriate adapters, or mechanical joint ends in accordance with AWWA C111.

Valve bodies shall be of ASTM A126 Class B cast-iron in compliance with AWWA C507 Section 5.1 and AWWA C504 Section 6.4. Exposed nuts, bolts, springs, washers, etc., shall be of 316 stainless steel. Resilient plug facings shall be of neoprene, suitable for use with wastewater and sludge flow or Nitrile-Butadiene (Hycar) for low pressure air application.

Valves shall be furnished with corrosion resistant seats which shall be in accordance with AWWA C507, Section 7.2 and with AWWA C504, Section 9, Paragraph 9.4.

Valves shall be furnished with replaceable, sleeve-type bearings in the upper and lower journals. These bearings shall be in accordance with AWWA C507 Section 8, Paragraphs 8.1, 8.3 and 8.5, and with AWWA C504 Section 11.

Valves shall be capable of providing drip-tight shutoff up to the full valve rating with pressure in either direction.

3.2.1.2 Manufacturer

Three-inch to 72-inch plug valves shall be eccentric plug valves as manufactured by Dezurik "series 100" or approved equal.

3.2.1.3 Operator

Valves shall be furnished with a worm gear operator with a 2-inch square actuating nut. Valves shall have Type 304 stainless steel bolting.

3.2.1.4 Pressure Rating

Valve pressure rating shall be as follows and shall be established by hydrostatic tests as specified by ANSI B16. Pressure rating shall be 175 psi for valves through 12 inches, 150 psi for valves in sizes 42 through 54 inches. Valves shall provide a drip-tight shutoff up to the full pressure rating. Valves shall be capable of providing drip-tight shutoff up to the full valve with pressure in either direction.

3.2.2 Valve Operator Wells

Valve operator wells for valves shall consist of 8-inch diameter, C-900 PVC pipe, as shown on Detail Drawing No. S-36. Valve operator wells shall be equipped with a cast iron frame with concrete and cast iron lid, marked, as shown on Detail Drawing No. S-37. The caps shall be painted OSHA green for sewer service and Irvine purple for use in reclaimed water service.

3.3 Installation

3.3.1 Valves

Valves shall be installed in accordance with manufacturer's recommendations and these Specifications. Thrust devices shall be installed in accordance with Article TC-6 THRUST DEVICES.

3.3.2 Valve Operator Wells

Valve operator wells shall be installed in accordance with Detail Drawing No. S-36. The caps and upper valve operator well sections shall be placed after the surrounding street surface has been laid.

3.3.3 Valve Operator Nut Extensions

Valve operator nut extensions shall be installed where necessary to maintain the depth below finish grade to the operator nut to no more than three and one half feet. The design of the extension shall be such to ensure the centering of the operator nut within the valve operator well.

TC-4 AIR AND VACUUM RELIEF ASSEMBLIES

4.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to furnish, install and test the air and vacuum relief valve assemblies as indicated in Detail Drawing Nos. S-40A and S-40B.

4.2 Materials

4.2.1 Air and Vacuum Relief Valves

Valve to be stainless steel VENT-O MAT 050RGX1021 with top outlet or A.R.I. D-020, or approved equal, sewage combination air valve with attachments. The manufacturer shall certify the venting capacity and provide installation and maintenance manuals with each air and vacuum relief assembly. The size of the air and vacuum relief assemblies shall be as specified on the Plans or as directed by the Engineer.

4.2.2 Additional Material

Additional material including valve operator wells shall be in accordance with Article TC-3, VALVES AND VALVE OPERATOR WELLS.

4.3 Installation

4.3.1 General

Air and vacuum relief assemblies shall be installed at all high points on a main, where indicated on the Plans, or where directed by the Engineer.

4.3.2 Connections to the Main

Connections to the main shall be at the top of the main in accordance with Detail Drawing No. S-40A.

4.3.3 Service Line

The service shall slope continuously upward from the main to the air and vacuum relief assembly.

4.3.4 Air and Vacuum Relief Assembly

The air and vacuum relief assembly shall be installed in accordance with Detail Drawing Nos. S-40A and S-40B. The Contractor shall install items necessary for the assembled unit to assure its ability to function as intended.

Assembly shall incorporate a flushing valve tap.

4.3.5 Excavation, Bedding and Backfill

Excavation, bedding and backfill for air and vacuum relief assembly service lines shall be in accordance with these Specifications.

4.4 Field Tests

After completion of the installation of air and vacuum relief valve assemblies and before acceptance thereof, the Contractor shall perform such tests as may be necessary to assure proper functioning of components. Defects disclosed by such testing shall be repaired to the satisfaction of the Engineer. Air and vacuum relief valve assemblies shall only be subject to pressure testing at normal operating line pressure.

TC-5 CONCRETE VAULTS

5.1 Scope

This Article covers furnishing and installing concrete vaults.

5.2 Materials

Concrete vaults shall be manufactured by Brooks Series 500 Quickset or equal. The vault shall be topped with two H20 load graded galvanized steel covers with lifting devices or as approved by the engineer.

5.3 Installation

5.3.1 General

Concrete vaults shall be installed where indicated on the Plans, as close to the right-of-way line as possible, or as directed by the Engineer.

5.3.2 Excavation, Bedding and Backfill

Excavation, bedding and backfill for concrete vaults shall be in accordance with these Specifications.

5.3.3 Concrete Vault

The Contractor shall prepare an excavation large enough to accommodate the outside dimensions of the vault as shown on the drawings. Prior to setting, the Contractor shall provide a minimum of 16 inches of 3/4-inch crushed rock in accordance with Detail Drawing No. S-40A to receive the vault. The base shall be compacted and graded level and at proper elevation to receive the vault in relation to the conduit grade or ground cover requirements as designated in the Plans. Sealants used between the joints of the vault sections are at the Contractor's discretion, unless otherwise specified. If grout is used, it should consist of two parts plaster sand to one part cement with sufficient water added to make the grout flow under its own weight. The grout should be poured into a water soaked groove, and filled to the top of groove in the previously set section. If mastic joint compound is used, it should be placed at the bottom of the groove unless a double amount is to be used as a further precaution against leakage. In this case the mastic sealant should be placed on the two shoulders of the groove. The interior of the concrete vault and underside of cover shall be coated with w/50 mil high build polyurethane, Sancon 100 polyurethane and primer or approved equal. See TC-9, WET WELL, VAULTS AND MANHOLE LINING, for application of Sancon system.

TC-6 THRUST DEVICES

6.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to detail, furnish, fabricate, construct, and install thrust devices.

6.2 Materials

6.2.1 Concrete Thrust Blocks

Concrete thrust blocks shall be constructed of 420-B-2000 concrete.

6.2.2 Other Thrust Devices

Materials for other thrust devices shall be as specified on the Plans or as directed by the Engineer.

6.3 Installation

6.3.1 Concrete Thrust Blocks

6.3.1.1 General

Concrete thrust blocks shall be placed between fitting and trench wall or trench bottom, as may be applicable. The bearing face and bottom of a concrete thrust block shall be on undisturbed sound material. Concrete thrust blocks shall be installed in accordance with Detail Drawing No. S-19. Concrete shall be kept behind the bells or flanges of fittings and valves. Form work shall be constructed whenever necessary to confine the concrete to the prescribed dimension for the block. Form lumber shall be removed prior to testing.

6.3.1.2 Upward Thrust

At vertical bends where upward thrust will occur, concrete thrust blocks utilizing reinforcing steel bar collars shall be installed in accordance with Detail Drawing No. S-19.

6.3.1.3 Curing

Concrete thrust blocks shall be allowed to cure for a minimum of 48 hours prior to pressure tests on the pipelines.

6.3.2 Other Thrust Devices

Thrust devices other than concrete thrust blocks shall be approved and installed as directed by the Engineer.

6.3.3 Excavation, Bedding and Backfill

Excavation, bedding and backfill for thrust devices shall be in accordance with these Specifications.

6.4 Location

The Contractor shall construct thrust devices as and where directed by the Engineer, as shown on the Plans and/or as required by these Specifications.

A concrete thrust device shall be provided at all valves, fittings and dead-ends. On slopes greater than 15 percent or at static pipeline pressures greater than 100 psi, thrust devices shall be installed as directed by the Engineer or as shown on the Plans.

6.5 Size

6.5.1 Concrete Thrust Blocks

Concrete thrust blocks shall be designed to have sufficient bearing area and shall be placed as to safely transmit to the surrounding earth, the maximum forces which may occur in the pipeline at that point. The minimum bearing areas of concrete thrust blocks shall be in accordance with Detail Drawing No. S-20.

The depth of concrete thrust blocks below valves shall conform with the following table and shall be full width of the trench.

Size of Valve	Depth of Thrust Block Below Valve
6 inch	6 inches
8 inch	8 inches
12 inch	12 inches
18 inch and up	As directed by Engineer

6.5.2 Other Thrust Devices

Sizes for other thrust devices shall be as specified on the Plans or as directed by the Engineer.

6.6 Coating

Exposed metal surfaces of thrust devices not otherwise protected by galvanizing or cement mortar shall be coated in accordance with Article TC-10, FIELD APPLICATION OF PROTECTIVE COATINGS.

6.7 Field Tests

After completion of the installation of the thrust device and before acceptance thereof, the Contractor shall perform such tests as may be necessary to assure proper functioning of the thrust device. Defects disclosed by such testing shall be repaired to the satisfaction of the Engineer.

TC-7 MANHOLES

7.1 Scope

This Article covers furnishing all labor, supervision, materials, and equipment and performing all operations necessary to construct manholes for gravity sewers.

7.2 Material

Watertight precast reinforced concrete manhole sections shall be manufactured in accordance with ASTM C-478. Riser sections shall be of various heights to bring the top of the structure to the established elevations and to permit ease of handling and installation.

7.3 Installation

7.3.1 General

Excavation and backfill operations shall conform to the provisions of these Specifications.

7.3.2 Installation of Sections

Precast sections shall be set plumb, in accordance with manufacturer's recommendations, and securely bonded together with a minimum thickness of 3/8-inch, Class C Portland cement mortar in accordance with these Specifications. Joints shall be watertight and neatly pointed on the inside.

7.3.3 Access Section

An eccentric cone section shall be installed on the top riser section, on which shall be placed one or more grade rings, which shall form the base for the cast-iron manhole frame and cover, in accordance with Detail Drawing No. S-5.

7.3.4 Manhole Bases

Manhole bases shall be placed concrete, with size and shape in accordance with the Plans, and shall be shaped with metal forms (no hand forming allowed) to provide channels corresponding in size and shape to manhole inlets and outlets. Channels shall be smooth and accurately shaped, and shall vary uniformly in size and shape from inlet to outlet for changes in pipe size. Benching shall be broom finished to provide a non-skid surface.

7.3.5 Manhole Piping

Where pipe branches for future lateral sewers are to be built into the structures, as shown on the Plans, the outer ends shall be securely sealed by a cap or stopper of the same material as the branch.

In laying pipe next to structures, the pipe at the horizontal axis shall not project beyond the inside of the wall of the structure except that portion used as a channel invert, and in no case shall the socket of a vitrified clay pipe be built into the wall of a structure. Pipe fittings, including installation thereof, which are a part of a manhole installation shall conform to SSPWC Sections 207 and 208.

7.3.6 Remodeling Manholes, New Manhole on Existing Sewer

Where a manhole is to be remodeled on an existing sewer, the portion of the manhole bottom to be remodeled shall be removed to a depth sufficient to permit construction of new channels and shelves with concrete at least four inches below the outside of the bell. When a manhole is to be constructed on an existing sewer, the manhole shall be constructed in accordance with Detail Drawing Nos. S-1A, S-1B, S-5, S-8A or S-8B, as applicable. Sewage shall be conveyed across the manhole by means satisfactory to the Engineer. Sewage shall not be permitted to flow over new concrete channels until five days after channel construction is complete.

When new work is to be constructed inside a sewage structure against an existing concrete surface that has been exposed to sewage or a sewage atmosphere, the existing surface shall be prepared as follows:

Soft and loose materials shall be removed and the surface cleaned by sandblasting.

The surface shall be washed with a three percent solution of soda ash (Na_2CO_3) followed by a rinsing with clear water.

The surface shall then be washed with a three percent solution of hydrochloric acid (HCl) followed by a final rinsing with clear water.

7.3.7 Manhole Frame and Cover Sets

Casting shall be in accordance with ASTM A 48, Class 30. The bearing surfaces of the frames and covers shall be machined and the covers shall seat firmly into the frames without rocking. The frames and covers shall be thoroughly cleaned and inspected and painted or dipped with two coats of a commercial quality asphaltum paint. Shop drawings of manhole frames and covers shall be submitted to the Engineer for approval. Manhole frames and covers shall be set to elevations shown on the Plans and in accordance with Detail Drawing Nos. S-10A or S-10B.

7.3.8 Manhole Collars

Manhole collars shall be placed concrete or asphalt in accordance with Detail Drawing Nos. S-1A or S-1B as applicable.

7.4 Testing

The manhole exfiltration test shall be conducted only when required by the Plans. The Engineer shall select the manholes to be tested. If leakage is detected, the Engineer shall determine what additional testing shall be performed.

Each manhole tested shall have all piping inlets and outlets tightly sealed with stoppers and shall be filled with water to a point five feet above the bottom of the manhole base channel at the channel center. The manhole shall be left filled for one hour and then refilled to the original level to compensate for absorption.

One hour after refilling the water level shall be compared to the original level and any subsidence (change) exceeding .10 feet shall be considered unacceptable leakage. Any manholes displaying unacceptable leakage shall be repaired and retested.

TC-8 HOUSE LATERALS

8.1 Scope

This Article covers the furnishing and installation of house laterals connected to new or existing gravity sewers. Unless otherwise specified, only a single dwelling unit per lateral will be permitted. Each lateral shall be stationed.

8.2 Material

House laterals shall be vitrified clay pipe in accordance with SSPWC 207-8. Alternate materials shall be subject to District approval.

8.3 Installation

8.3.1 General

Unless otherwise specified, no 4-inch diameter house laterals shall be constructed into a manhole.

8.3.2 Location

The location of house laterals shall be marked as follows:

A. Streets with curbs: An "S" shall be chiseled or permanently marked on the curb at the location of the house laterals; and an appropriate mid-range or full range magnetic marker manufactured by 3M Electrical Products Division, Scotchmark Marker Locator (EMS) or equal shall be placed two (2) feet below the finished ground surface directly above the terminus of the lateral.

B. Streets without curbs: A magnetic marker as described in A. above shall be placed one foot below the finished ground surface directly above the terminus of the lateral. In areas where the finished ground surface is unknown the marker shall be installed two feet below the assumed finished ground surface.

C. Easements: A magnetic marker as described in A. above shall be placed at wye connection fittings in the sewer main where a lateral is or will be extended. The markers shall be placed two feet below the finished ground surface unless the easement area is paved in which case the marker shall be placed in the paving subgrade at a depth of two feet or less.

8.3.3 Slope

Unless otherwise specified, the depth of house laterals shall be sufficient to provide service to the lowest or most distant point to be served on each lot at a minimum grade of two percent with not less than one foot of cover over the top of the pipe.

8.3.4 Inspection

8.3.4.1 General

House lateral markings shall be verified for accuracy by appropriate District personnel. The termination of laterals and the placement of locators shall be witnessed by appropriate District personnel.

8.3.4.2 Television Inspection

Shall be in accordance with Article TC-14, TELEVISION INSPECTION.

8.3.5 House Connections

Unless otherwise shown on the Plans, the invert of the upper end of the house connection sewer shall be constructed to the elevation shown on the profile, or if no such elevation is shown, to a depth four feet below the top of the existing curb, or where there is no curb, four feet below the grade at the property line, see Detail Drawing Nos. S-9A, S-9B and S-9C. Branches may be rotated upward from the horizontal to any angle between 30 and 45 degrees in order to meet the slope of the house connection sewer. When the branch rotation does not conform to the slope of the house connection sewer, short lengths of beveled pipe may be used for adjustment.

8.3.6 Lateral Connections

8.3.6.1 General

Lateral connections to an existing sewer main shall be performed in a manner so as to minimize any potential damage to the existing sewers. The continuous operation of District sewers during connection of laterals shall be maintained at the Contractor's expense.

8.3.6.2 Saddle Connections

Prior to installing a wye saddle to the receiving sewer, the sewer shall be cored using an approved VCP coring tool. The saddle connection shall be approved for VCP and installed in accordance with the manufacturers' instruction. Under no circumstances shall debris from the work enter the sewer.

8.3.6.3 Wye Connections

Prior to installing a wye fitting in the receiving sewer main, the sewer main shall be cut with an abrasive saw or chain breaker over its entire circumference. An approved wye fitting with approved bandseals in accordance with ASTM C425 with stainless steel shear rings or equal shall be installed in the sewer main. The subgrade immediately below the wye fitting shall obtain a 95 percent compaction or be bedded with 3/4-inch gravel. Under no circumstances shall debris from the work enter the sewer.

TC-9 WET WELL, VAULTS AND MANHOLE LINING

9.1 General

This Article covers the protective coatings to be applied to areas damaged during construction to the inside surface of new or existing wet wells, concrete structures or vaults.

9.2 Materials

9.2.1 Primer

The primer shall be Sancon Epoxy 100 or equal.

9.2.2 Liner

The polyurethane lining shall be Sancon Polyurethane 100 or equal.

9.3 Installation

9.3.1 Surface Preparation

Concrete surfaces shall be allowed to age for 28 days prior to application of polyurethane lining system. Surfaces shall be cleaned of dirt, dust, form oil, during compounds and other deleterious compounds in accordance with Steel Structures Painting Council SSPC-SP7-63 (sweep blasting) on new concrete; and in accordance with SSPWC 500 (pipeline system rehabilitation) on existing concrete cleaning with water blasting using high pressure hydro blast at a minimum pressure of 8,000 psi with a flow of 10 gallons per minute

Following surface blasting, the voids in the concrete greater than 3/16-inch in diameter or depth shall be filled by an approved sacking method where excessive porosity exists. The sacking will be performed in such a manner so as to fill only the voids while wiping clean any excess material on the concrete surface.

9.3.2 Priming or Sealing

Upon completion of surface preparation, the concrete surface shall be completely blown down using clean, dry, compressed air to remove all dust and loose particles or washed down using clean, fresh water. The concrete surface shall be completely dry before application of the primer, sealer or liner.

A primer shall be applied to the surface at a thickness of 3 to 5 mils dry. The primer shall be applied in such a manner that the concrete surface is completely saturated with the primer. Upon sufficient cure time (12 hours at 70 degrees Fahrenheit), the liner may be applied. The primer shall not be applied when ambient temperatures are below 40 degrees Fahrenheit or when ambient temperatures are above 115 degrees Fahrenheit. When concrete surfaces contain abnormal porosity, a second coat of primer may be needed. If this is the case, the application procedures for the second coat of primer are identical to that of the first coat of primer.

9.3.3 Liner

After priming has been completed, Scancon 100 polyurethane liner, or approved equal, shall be applied at a thickness of 100 mils in one continuous coating operation.

The application of polyurethane liners and primer shall be performed by workmen approved by the manufacturer as trained and experienced in applying these types of lining materials. The application equipment shall be in good working order to ensure correct proportions and mixing of components.

TC-10 FIELD APPLICATION OF PROTECTIVE COATINGS

10.1 Scope

This Article covers furnishing the materials and equipment and performing the operations necessary for field application of protective coatings.

10.2 Materials

10.2.1 Coal Tar Epoxy Coating

10.2.1.1 Materials

Coal tar epoxy coatings shall be of the manufacturer and type of one of the following: Bitumastic No. 300-M as manufactured by Koppers Company, Inc., or Engard 463 Coal Tar Epoxy as manufactured by Engard Coatings Corporation. Coatings shall be applied in accordance with manufacturer's recommendations.

10.2.1.2 Couplings

Valves, flanged joints, pipe, couplings and buried metal items, which are not galvanized or coated, shall be thoroughly cleaned and shall be coated with coal tar epoxy coating to a minimum dry film thickness of 16 mils.

10.2.1.3 Exterior Concrete Surface

Concrete vaults, manholes, wetwells and other underground concrete structures, unless otherwise noted, shall have the exterior surface prepared and coating system applied per the manufacturer's recommendation.

10.2.2 Repair

Repair of coatings and linings shall be made with the same material to a minimum thickness equal to the thickness of the original coating or lining on the pipe in accordance with stated manufacturer's recommendation.

TC-11 CARSONITE UTILITY MARKER

11.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to furnish, fabricate and install Carsonite Utility Markers.

11.2 Materials

Marker shall be Carsonite Utility Markers in accordance with Detail Drawing No. S-39.

11.3 Installation

Carsonite Utility Markers shall be installed where shown on the Plans in accordance with Detail Drawing No. S-39. Unless otherwise specified, Carsonite Utility Markers are required if valves, or air vacuum relief assemblies, or manholes are to be installed outside of paved areas, along force mains or other locations specified by the engineer.

11.4 Location

Carsonite Utility Markers shall be located inside the public right-of-way in such a position as to minimized the probability of damage from vehicular impact. Unless otherwise specified, Carsonite Utility Markers shall be located at the point two (2) feet inside the public right-of-way. The offset to the pipe centerline or center of manhole shall be recorded on a brass tag and affixed to the Carsonite Utility Marker. The tag shall face the pipe. If the distance to the edge of right-of-way is excessive, the marker post shall be installed as directed by the appropriate District personnel.

TC-12 SLOPE PROTECTION

12.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to detail and construct slope protection.

12.2 Materials

12.2.1 Cut-off Walls

12.2.1.1 Reinforced Concrete

Reinforced concrete shall be in accordance with SSPWC 201-1.1.2, Concrete Specified by Class. Reinforcing steel shall be in accordance with Grade 40 billet steel of ASTM A 615.

12.2.1.2 Concrete Masonry Units (CMU)

CMU cut-off walls shall be in accordance with these Specifications. Concrete blocks shall be 8"x8"x6" standard block. Reinforcing steel shall be in accordance with Grade 40 billet steel of ASTM A 615.

12.2.2 Surface Slope Protection

12.2.2.1 Concrete

Concrete surface slope protection shall be constructed of 560-C-3250 concrete.

12.2.2.2 Other

Other surface slope protection shall be approved by the Engineer.

12.3 Installation

12.3.1 General

Cut-off walls and surface slope protection shall be constructed in accordance with Detail Drawing No. S-26.

12.3.2 Cut-off Walls

12.3.2.1 General

Cut-off walls shall be a minimum thickness of 8 inches. The top of the wall shall be located just below finish ground grade and the bottom shall be 3 feet below ground grade or 6 inches above top of pipe, whichever is the least. The wall shall extend at least 12 inches into undisturbed soil on each side of the trench as excavated.

12.3.2.2 Reinforced Concrete

Reinforced concrete cut-off walls shall be a minimum of 8 inches thick and shall have No. 4 reinforcing steel bars on 8-inch centers each way. The reinforcing steel bars shall extend the full length of the wall less 3 inches of cover on ends.

12.3.2.3 CMU

CMU cut-off walls shall have No. 4 reinforcing steel bars placed vertically on approximately 8-inch centers and No. 4 reinforcing steel bars placed horizontally every 16 inches on center. Voids in the concrete block shall be filled with cement mortar.

12.3.3 Surface Slope Protection

Concrete surface slope protection shall be a minimum of 6 inches thick. The surface slope protection shall extend at least 12 inches on either side of the trench as excavated.

12.4 Location

12.4.1 General

Slope protection is required wherever the profile of the ground surface above the pipeline exceeds 15 percent and where no pavement or bituminous road surfacing is to be laid over the exposure of the pipe after backfill.

12.4.2 Slopes - 15 to 50 Percent

Where the profile lies between 15 percent and 50 percent, cut-off walls shall be constructed at a horizontal spacing such that the top of each wall, just below finished ground grade, shall be at an elevation not more than 36 inches below that of the bottom of the next adjacent wall uphill.

12.4.3 Slopes - More than 50 Percent

Where the profile exceeds 50 percent, cut-off walls shall be provided on a horizontal spacing of 10 feet, center to center, and surface slope protection shall be provided between walls.

TC-13 CLEAN-OUTS

13.1 Scope

This Article covers furnishing the materials and equipment and performing the operations necessary to furnish and install clean-outs.

13.2 Materials

13.2.1 Clean-Out Covers

Clean-out covers shall be Alhambra A-1240 as manufactured by Alhambra Foundry Company, Ltd., Alhambra, California, or approved equal.

13.2.2 Other Materials

Other materials shall be in accordance with these Specifications and Detail Drawing Nos. S-6.

13.3 Installation

Clean-outs shall be installed where indicated on the Plans or as directed by the Engineer. Clean-outs shall be at the termination of a sewer line, where there is no termination manhole. There shall be a maximum of 200 feet from a clean-out to the nearest manhole. Clean-outs shall be constructed in accordance with Detail Drawing No. S-6.

TC-14 TELEVISION INSPECTION

14.1 Scope

This Article covers furnishing all materials and equipment and performing all operations necessary to produce video media during closed circuit television inspection for sewer mains and for lateral connections on existing sewer mains.

14.2 Material

14.2.1 Equipment

Televising equipment shall include the television camera, television monitor, cables, power source, lights and other equipment necessary to the televising operation. The camera, television monitor and other components of the video system shall be capable of producing a minimum 350 line resolution color video picture.

14.2.1.1 Television Camera

The camera shall be specifically designed and constructed for operation in connection with sewer inspection. The camera shall be operative in one hundred percent (100%) humidity conditions and shall be capable of viewing ninety degrees (90°) to the axis to be inspected so that service connections can be properly inspected. Focal distance shall be adjustable through a range of from one inch to infinity. The camera shall be mounted on skids or tracks suitably sized for each pipe diameter to be investigated.

14.2.1.2 Lighting

Lighting for the camera shall minimize reflective glare. Camera and lighting quality shall be suitable to provide a clear, continuously in-focus picture of the entire inside periphery of the sewer pipe for all conditions encountered during the work.

14.2.1.3 Remote Footage Counter

The remote footage counter shall be accurate to two-tenths of a foot (2/10') over the length of the particular section being inspected and shall be mounted over the television monitor.

14.2.2 Video Media

The video media shall be high quality current technology. Any unacceptable video recordings, or portions thereof, shall be cause for rejection of the video recording and will necessitate re-televising.

14.3 Installation

14.3.1 General Requirements

The Engineer shall be present during the entire televised inspection process. After recording, the Contractor shall turn over the original video media to the inspector.

The lines shall be televised after completion of trench backfill and finished grading but prior to placement of pavement, unless otherwise approved by the Engineer.

The Contractor shall be responsible for the preparation of the sewer before televising. If the flow is such that bypassing of the sewage is required, the Contractor shall make appropriate arrangements with the District to bypass the sewage flow. The Contractor shall perform the bypass operation or secure a Subcontractor to perform the bypass operation under District supervision.

14.3.2 Execution

Televising shall be done one section at a time; each section isolated from the remainder of the sewer line as required. Sufficient water shall be supplied to cause drainage within the isolated section prior to televising.

The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the condition of the sewer line but in no case shall the television camera be pulled at speed greater than 30 feet per minute.

If, during the televising operations, the television camera will not pass through an entire manhole section, the Contractor shall re-set his equipment in a manner so that the inspection can continue opposite the obstruction. If the television camera encounters an obstruction within a section not accessible to a manhole, the Contractor shall remove the obstruction by excavation or other appropriate means, replace whatever pipe is necessary, and re-televise the entire section.

14.4 Documentation

Audio and written documentation shall accompany all video media.

14.4.1 Video Media

14.4.1.1 Labels

The video media and the container shall have printed labels containing the inspector number, media number, date of TV inspection, location, upstream and downstream manhole, or station numbers and job title (name, tract number).

14.4.1.2 Audio

The audio portion of the video media shall include date of inspection, description of pipe size, type and pipe joint length, upstream and downstream manhole or station numbers, description and location of each service connection and other discernible features, and description and location of each defect, including cracked pipe, protruding service taps, off set joints, collapsed sections, presence of scale and corrosion.

14.4.2 Written Documentation

A written report is required which shall include: date of inspection, video media number, location, size, type and length of pipe, direction of flow, beginning and end counter numbers, sketch showing street and cross streets where the TV inspection was made, description and station location of each lateral, and description and location of each defect, such as misalignment, offset joints, protruding service connections, cracked pipe, and split pipe.

TC-15 EPOXY COATING AND LINING

15.1 General

This Article covers furnishing all materials and equipment and performing all operations necessary to furnish and apply epoxy coating and lining.

15.1.1 Epoxy

Where specified or shown, an epoxy coating and lining shall be applied as specified herein. Except where otherwise indicated, ferrous surfaces, exclusive of stainless steel surfaces, in water passages of all valves, 4-inch and larger shall be fusion-bonded epoxy-coated and lined in accordance with AWWA C550-90.

15.1.2 Shop Drawing Submittals

The Contractor shall submit shop drawing for EPOXY COATING AND LINING.

15.1.3 Materials

Except as otherwise provided herein, the material used shall be 100 percent powder epoxy, fusion bonded and shall be 3-M Company primer and "Scotchkote," 206N or approved equal. Where, in the Engineer's opinion, because of the nature of the item being coated and lined, it would be impossible to use fusion-bonded powder epoxy method without causing damage to the item, the use of a liquid epoxy factory applied by the manufacturer of the item being coated will be permitted. Said liquid epoxy shall be 3-M Company "Scotchkote," 309 or Koppers 294 Epoxy Primer and No. 200 HB Epoxy System. The use of liquid epoxy other than those specified, including the equipment manufacturers proprietary coating system, must be reviewed and approved by the Engineer prior to use.

15.1.4 Execution

15.1.5 Surface Preparation

The surface shall be blast-cleaned in accordance with Steel Structures Painting Council SSPC-SP-5 (White Metal Blast Cleaning). The grit size used shall be as recommended by the epoxy manufacturer.

15.1.6 Application

Application of the epoxy coating and lining shall be in accordance with the manufacturer's instructions; provided that, if liquid epoxy is permitted, it shall be applied in not less than 3 spray coats to give the required total thickness.

15.1.7 Thickness of Coating

The minimum dry coating and lining thickness for liquid epoxy shall be 12 mils, provided, however that the thickness of coating in the grooves for valves or fittings designed to receive a rubber gasket shall be approximately 5 mils.

15.1.8 Inspection

Coating and lining thickness shall be checked with a nondestructive magnetic type thickness gage. Coating integrity shall be tested in accordance with AWWA C550-90, Subsection 5.3.3. All pinholes shall be marked, repaired and retested. No pinholes or other irregularities will be permitted in the final coating and lining.

15.1.9 Field Repairs

If small local repairs are necessary, they shall be made using a liquid epoxy recommended by the manufacturer of the epoxy with which the item was initially coated. The surface must first be hand tool cleaned in accordance with SSPC-SP-2 (Hand Tool Cleaning). The repair epoxy material shall be applied in strict accordance with the manufacturer's instruction.

TC-16 MID-RANGE PIPE LOCATORS

16.1 General

This Article covers furnishing all materials and equipment to install mid-range pipe locators.

16.2 Material

Mid-range pipe locator markers manufactured by 3M Electrical Products Division, Scotchmark Market Locator (EMS) Model No. 1258 or equivalent locators shall be placed two feet below the finished ground surface, unless otherwise specified by the drawings.

16.3 Installation

Mid-range pipe locators shall be placed at the end of every lateral, and on a force main at every 500 feet along force main, at horizontal changes in direction cleanouts, and as indicated on contract drawings.

TC-17 PAINTING

17.1 General

This Article covers furnishing all materials and equipment and performing all operations necessary to furnish and apply paint.

17.1.1 Shop Drawing Submittals

The Contractor shall submit shop drawings for PAINTING.

17.2 Materials

17.2.1 Delivery and Mixing

All material shall be delivered to the job in original, unopened containers bearing the manufacturer's name and brand. The paint material shall conform with SSPWC 210.1. Materials shall be thinned only in accordance with the manufacturer's printed instructions, and any material that does not comply with these Specifications shall be removed immediately from the jobsite. All paint, oil, etc., is to be first grade standard manufacture of Sinclair Paint Company, Rustoleum or as specified herein. Unless otherwise specified, no painting shall start without color approval.

17.2.2 Piping, Valving, and Appurtenances

17.2.2.1 Prime Coat

All above grade piping, valving and supports shall receive a prime coat per these specifications. Prime coat shall be "Rustoleum Undercoat" or equal. All primed or finish painted surfaces which are damaged shall be primed prior to refinishing.

17.2.2.2 Finish Colors

All valves, piping and supports shall be given two finish coats of industrial grade white enamel as approved by the District.

17.2.3 Ungalvanized Ferrous Metal in Structures and Above-Ground

17.2.3.1 Surface Preparation

Surfaces shall be sandblasted in accordance with Steel Structures Painting Council SSPC-SP-6 (Commercial Blast Cleaning), except that where, in the Engineer's opinion, sandblasting is obviously inappropriate because the size or location of the surface, or because of the difficulty in protecting adjacent work, such surfaces shall be either power tool cleaned in accordance with SSPC-SP-3 (Power Tool Cleaning) or hand tool cleaned in accordance with SSPC-SP-2 (Hand Tool Cleaning).

17.2.3.2 Protective Coating

Surfaces shall be primed or spot-primed as required. Prime coat shall be 2 mils of "Rustoleum 7673" primer, or equal. Intermediate coat shall be 2 mils of "Rustoleum 7600 Series" off-white, or equal. Finish coat shall be 2 mils of "Rustoleum 7600 Series," or equal. Total of all coats shall be a minimum of 6 mils.

17.2.4 Galvanized Ferrous Metal in Structures and Above-Ground

17.2.4.1 Surface Preparation

Surfaces shall be cleaned in accordance with SSPC-SP-1 (Solvent Cleaning).

17.2.4.2 Protective Coating

Surfaces shall be primed or spot-primed as required. Prime coat shall be 2 mils of "Rustoleum 5281" primer, or equal. Intermediate coat shall be 2 mils of "Rustoleum 5200 Series" off-white, or equal. Finish coat shall be 2 mils of "Rustoleum 5200 Series," or equal. Total of all coats shall be 6 mils.

17.2.5 Buried Galvanized

17.2.5.1 Surface Preparation

Surfaces shall be cleaned in accordance with SSPC-SP-3 (Power Tool Cleaning).

17.2.5.2 Protective Wrapping

Prior to wrapping the pipe with PVC tape, the pipe first shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20 mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils. Application shall be in accordance with the tape manufacturer's instruction.

17.2.6 Underground Coatings

Buried valves, flanged joints, sleeve-type couplings and other buried metal items, which are not galvanized or mortar coated, shall be thoroughly cleaned and shall be coated with coal tar coating to a minimum dry film thickness of 16 mils.

Coal tar coatings shall be of the manufacturer and type of one of the following: Bitumastic super tank solution as manufactured by Koppers Company, Inc., or Engard 463 Coal Tar Epoxy as manufactured by Engard Coatings Corporation. Coatings shall be applied in accordance with the manufacturer's recommendations.

Coal tar coatings shall only be used for the protection of exterior surfaces or underground appurtenances. Coal tar coatings shall not be used for interior linings. See TC-10, FIELD APPLICATION OF PROTECTIVE COATINGS, for additional information.

17.3 Execution

17.3.1 Temporary Work Suspension

The Contractor shall not paint during adverse atmospheric conditions such as high drying winds, dust, high humidity, extreme surface temperatures on exterior work or any other conditions which would affect the quality of the paint finish. Painting shall not be done while carpenters, masons, or other tradesmen are working.

17.3.2 Preparation of Surfaces and Paint Application

Coats shall be of the consistency, coverage, and applied as recommended by the manufacturer's printed instructions. Materials shall be applied so as to be free from sags, runs, or other defects. Brush strokes shall appear in one direction only when finished and no curved marks shall show. All coats shall be thoroughly dry before succeeding coats are applied, and each area shall receive its complete first coat before the second coat or following coat is applied in that area. All primer, second and third coats, shall be applied with a brush. All areas shall be kept clean while painting is in progress.

Each coat shall produce a minimum film thickness as specified herein. In areas where this thickness is not developed, sufficient additional coats shall be applied to produce it. All coating thicknesses specified herein refer to minimum dry film thicknesses.

COACHELLA VALLEY WATER DISTRICT

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF
SANITARY SEWER SYSTEMS

PART III - SPECIAL PROVISIONS

AMENDMENTS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (SSPWC)

SP-1 If any conflict exists between the Standard Specifications for Public Works Construction (SSPWC) and other provisions of this Specification, the other provisions of this Specification shall govern unless otherwise agreed in writing by the parties hereto.

SP-2 The following supplements modify, change, delete from or add to the SSPWC. Where any section of the SSPWC is modified or any paragraph, subparagraph or clause thereof is modified or deleted by these supplements, the unaltered provisions of that section, paragraph, subparagraph or clause shall remain in effect.

The section references and titles used herein identify the section numbers in the SSPWC.

SP-3 Amend the SSPWC as follows:

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS AND SYMBOLS

Delete Part 1 - GENERAL PROVISIONS, excepting therefrom Section 1-2, DEFINITIONS; Section 1-3, ABBREVIATIONS; 1-4, SI; and 1-5 SYMBOLS.

1-2 DEFINITIONS

Delete the definitions of AGENCY, BOARD and ENGINEER, and add the following:

AGENCY - The individual, partnership, corporation, joint venture or other legal entity entering into a contract with the Contractor to have work performed. The word AGENCY shall include the word SUBDIVIDER.

BASEMENT MATERIAL - The material in excavation or embankments underlying the lowest layer of subbase, base pavement, surfacing or other specified layer which is to be placed.

BOARD - The Board of Directors of the Coachella Valley Water District.

ENGINEER - Whenever not qualified, the Chief Engineer of the Coachella Valley Water District, acting either directly or through his properly authorized representative, such representative acting severally within the scope of the particular duties entrusted to them.

MAIN - Any pipeline eight inches in diameter or larger used for the transmission and collection of sewage.

NON-CORROSIVE SOIL - A soil in which the effect of corrosion on underground steel water mains can be neglected for the service life of the pipe as determined by actual observations and conclusions made by a properly qualified person. In addition to the consideration of soil temperature, pH and potential measurements, the resistivity of the soil shall be over 2,000 ohms per cubic centimeter.

SUBDIVIDER - A person who proposes to divide, divides or causes to be divided, real property into a Subdivision for itself or for others, or develops real property. Except that employees and consultants of such Person, acting in such capacity, are not Subdividers.

SUBDIVISION - The division of any improved or unimproved land, shown on the latest equalized county assessment roll as a unit or as contiguous units, for the purpose of sale, lease or financing, whether immediate or future, except for leases of agricultural land for agricultural purposes. Subdivision includes a condominium or a community apartment project as defined in Section 11004 of the Business and Professions Code.

SURFACING - The uppermost layer of material placed on the traveled way or shoulder. This term is used interchangeably with pavement.

1-3 ABBREVIATIONS

1.3.2 Common Usage

Add the following:

Abbreviation	Word or Words
DIP	Ductile Iron Pipe
DR	Dimension Ratio
gpm	Gallons per minute
psi	Pounds per square inch
PVC	Polyvinyl Chloride Pipe or Product
SSPWC	Standard Specifications for Public Works Construction

1.3.3 Institutions

Add the following:

Abbreviation	Word or Words
AASHO	American Association of State Highway Officials
NSF	National Sanitation Foundation
SSPC	Steel Structures Painting Council

1-4 METRIC INTERNATIONAL SYSTEM (SI)

1-4.2 Metric Units

Add the following:

Abbreviation	Units
mg	Milligram
mg/L	Milligrams per liter

1-5 SYMBOLS

Add the following:

Ø	Diameter
Chw	Hazen-William Coefficient

SECTION 201 - CONCRETE, MORTAR AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE

201-1.1 Requirements

201-1.1.2 Concrete Specified by Class

Add the following items to the table:

Construction	Concrete Class	Maximum Slump (Inches)
STREET SURFACE IMPROVEMENTS		
Concrete surrounding manholes, cleanouts and vault frames, drainage facilities for slopes, sidewalks, cross gutters and driveways.	520-C-2500	4
SEWER AND STORM DRAINAGE FACILITIES		
Pipe post foundations; support under junction structure inlets; deadmen for timber bulkheads; wall support under pipe; base or cradle for pipe laid in tunnel or casing; sleepers and reinforced blankets for pipes; and pressure concrete for tunnel backfill.	480-C-2000	5
MISCELLANEOUS		
Concrete for manhole base and slope protection.	560-C-3250	4

201-1.2 Materials

201-1.2.1 Portland Cement

Delete first paragraph and add the following:

The cement to be used or furnished shall be Type V Portland Cement conforming to ASTM C150 unless otherwise specified.

203-1 PAVING ASPHALT

203-1.1 General

Add the following:

The mixes listed in the table below shall be used unless otherwise specified (types shall be in accordance with Subsection 203-6.3.2):

TYPE	USAGE
B (Medium Coarse)	Base course for streets (machine or hand laid) Base course for alleys (machine or hand laid) Base course for trench resurfacing (machine laid)
C1 (Medium)	Wearing surface for streets and alleys (machine laid) Leveling course (machine laid) Overlay (capping) 1½-inch minimum thickness (machine laid) Surfacing for streets, 4 inches total thickness (machine laid)
D1 (Fine)	Wearing surface for streets and alleys (hand laid) Wearing surface for trench resurfacing (machine laid) Asphalt Sidewalks Overlay (capping) less than 1½-inch thick (machine laid) Extruded curb

SECTION 207 - PIPE

Add the following:

Pipe for use in sanitary sewer systems shall be either PVC plastic pipe in accordance with Section 207-17 or vitrified clay pipe in accordance with Subsection 207-8.

207-9 IRON PIPE AND FITTINGS

207-9.2.3 Fittings

Delete the Subsection and add the following Subsections:

Fittings for force main pipelines shall be ductile iron flanged in accordance with AWWA C110 with ductile iron "Tyton" push-on or mechanical joint. All ductile iron fittings shall have a fusion bonded epoxy lining and coating. No compact fittings, AWWA C153, are allowed.

Fittings shall be furnished with flanged joints for connection to valves and "Tyton" push-on or mechanical joints for connection to ductile iron pipe.

207-9.2.4 Lining and Coating

Delete this Subsection and add the following Subsection:

Ductile iron fittings shall be lined and coated with fusion bonded epoxy in accordance with TC-15, EPOXY COATING AND LINING, on the District's specification.

207-9.2.6 Polyethylene Encasement for External Corrosion Protection

Add the following sentence:

Polyethylene encasement shall be the tube type and shall be installed in accordance with AWWA C-105 Installation Method A.

207-17 PVC PLASTIC PIPE

207-17.1 General

Delete this Subsection and add the following Subsection:

PVC pipe shall be used in sanitary sewer systems for force mains, or when necessary for sewer and water separation requirements as specified on Detail Drawing Nos. S-3 and S-4 or as specified on the Plans, or as directed by the Engineer.

PVC pipe couplings shall be in accordance with AWWA C900 or C905 as applicable for pressure pipe with ductile iron pipe equivalent diameters in accordance with AWWA C110 and C150. The minimum rating for PVC pipe shall be DR 14 and DR 18 for C900 and equivalent for C905, respectively, except as stated on Detail Drawing Nos. S-3 and S-4. Standard pipe length shall be 20-foot. Pipe shall be installed within 90 days from the date of manufacture.

Pipe stored on the job site shall be covered with canvas or other opaque material to protect it from the sun's rays and shall be well ventilated to prevent heat build up.

207-17.3 Joining Systems

207-17.3.1 General

Add the following:

Upon the District's request, the Contractor shall furnish for District's approval pipe manufacturers drawings showing dimensions and manufacturers tolerances of pipe and joint to be used on the work. Integral bell joints as recommended by the pipe manufacturer may be used. Only ductile iron fittings lined with fusion bonded epoxy in accordance with TC-15, EPOXY COATING AND LINING, of District's specification shall be used. No PVC fittings will be allowed unless approved by the engineer.

SECTION 208 - PIPE JOINT TYPES AND MATERIALS

208-1 GENERAL

Delete the first sentence and add the following paragraph:

Joints for vitrified clay pipe shall be premolded, plastic factory-made, mechanical compression type similar and equal to "Speed-Seal" or "Wedge Lock" as manufactured by Interpace and Pacific Clay Products, respectively, or the rubber sleeve coupling for plain end vitrified clay pipe equal to "Band Seal" as manufactured by Mission Clay products Corporation. No other type of joint will be permitted, unless approved by the Engineer. Joint material shall comply with the requirements for Type "D" or "G" joints. The shear ring in the Type "D" joint shall be stainless steel.

SECTION 211 - SOILS AND AGGREGATE TESTS

211-2 COMPACTION TESTS

211-2.2 Field Density

Delete this Subsection and add the following Subsection:

Field density tests shall be performed in accordance with the test procedure specified in ASTM D 1556 or ASTM D 2992.
In place densities and moisture contents may be determined by the use of State of California Test Method No. 231-E.

SECTION 300 - EARTHWORK

300-1 CLEARING AND GRUBBING

300-1.1 General

Add the following paragraph:

No trees shall be removed without prior written permission from the Engineer. The cutting down or removal of trees is prohibited between the hours of 6:00 p.m. and
7:00 a.m. and on any Saturday, Sunday or legal holiday unless permission is obtained from the Engineer.

300-1.3 Removal and Disposal of Materials

300-1.3.2 Requirements

(a) Bituminous Pavement.

Delete the second sentence and add the following paragraph:

Cuts at joint lines shall be saw cut only when required on the Plans or by the requirements of an encroachment permit. Loose material shall be removed before the new pavement is laid. Except as approved by the Engineer, no more than 20 working days shall elapse at a specific location between the removal of asphalt pavement and the placing of the final pavement at that location. Where paving is to be done at separate widely spaced areas, the Contractor shall schedule the operations to meet these time limitations and progressively complete work from one end of the project to the other. Unless the placing of the finish course immediately follows the removal of asphaltic wearing surface, temporary pavement shall be placed and maintained in good condition adjacent to all stepped edges in rough areas within the area to be paved to provide a smooth surface for traffic.

SECTION 306 - UNDERGROUND CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS

306-1.1 Trench Excavation

306-1.1.1 General

Add the following paragraphs:

In the event that blasting is necessary in excavating, the blast shall be blanketed with chain links and carpet mats. No blasting shall be done within five feet of any water, gas, sewer or other pipe, main or conduit intersecting the excavation. No blasting will be allowed except by permission in writing from the Engineer.

Any excavation carried down below the grades shown on the Plans or in excess of those ordered by the Engineer shall be refilled in layers and compacted to 90 percent relative compaction or Class 480-C-2000 concrete when approved by the Engineer. Such work shall be done entirely at the Contractor's expense.

The Contractor shall furnish, install and operate all the necessary machinery, piping, appliances and equipment to keep the excavation reasonably free from water during construction and shall dispose of the water as approved by the Engineer. He shall have on at all times hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies. Competent mechanics for the operation of all pumping equipment shall be available at all times and he shall provide all means and facilities necessary to conduct water to the pumps.

The trench and other excavation shall be kept entirely free of water while concrete or pipe is being placed and until all concrete or mortar has set hard.

Water shall be disposed of in such a manner as will not cause injury to public or private property, nor be a nuisance or a menace to the public.

Other methods of water control, other than dewatering, shall be subject to the approval of the Engineer.

306-1.1.3 Maximum and Minimum Width of Trench

Add the following:

The maximum allowable width of trench for vitrified clay pipe, including the width required for sheeting, if necessary, shall be the pipe bell diameter plus 16 inches. For cover on the pipe less than 8 and greater than 4 feet, trench width for VCP pipe is not limited.

The width of trench for pipe or conduit shall be such that there is a minimum of four inches clear between the outer surface of the pipe or conduit and the excavation or the trench timbers.

The excavation for manholes and other structures shall be sufficient to leave at least 24 inches in the clear between their outer surfaces and the embankment or timbering which may be used to protect them.