STANDARD SPECIFICATIONS AND DETAILS OF VIRGINIA AMERICAN WATER GENERAL DISTRIBUTION

General Notes:

1. Contractor shall submit material shop drawing (e.g. product specification sheet) to VAW and obtains approval, before order any materials.

2. Contractor shall install thrust block at all tapping sleeve, BEND, TEE, CROSS, reducer, hydrant, dead-end, blowoff, in accordance with standard details.

3. All buried ductile iron pipe shall be Thickness Class 52 (minimum), and shall apply 12mil blue color polywrap encasement. All buried ductile iron pipe fittings shall be mechanical joint.

4. All copper tube shall be Type "K". Copper tube and brass fittings shall be lead free. Connections shall be compression or flare, and determined by local district engineer.

Alexandria City and Dale City: use flare connection

Hopewell City and Fort LEE district: use compression connection

Maryland Bel Air district: use compression connection

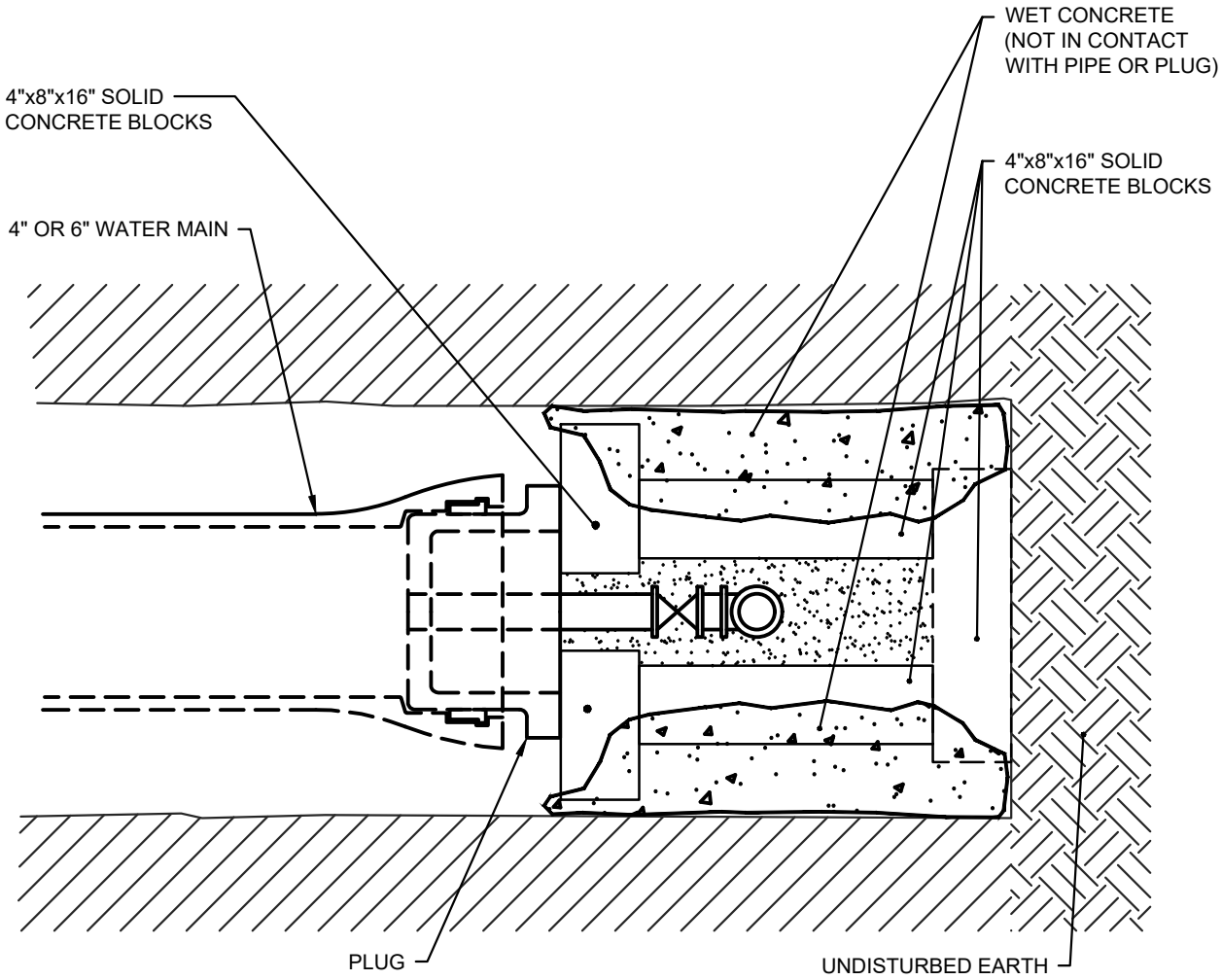
VIRGINIA AMERICAN WATER

STANDARD DETAILS

~~Blow-Off/Flushing Hydrant Assembly~~	~~SD1~~ (DO NOT USE)
~~HDPE Flush Valve~~	~~SD2~~ (DO NOT USE)
Blocking at End of Main With Blow-Off	SD3
2" Blow-Off at End of Main	SD4
6" or 4" Blow-Off Assembly (Optional)	SD5
Thrust Block Details	SD6
In-Line Valve Blocking for PVC Water Main	SD7
Dead-End PVC x DIP Blocking Method	SD8
PVC x HDPE Transition W/ Fire Hydrant	SD9
Double In-Line x Branch Valve Blocking for PVC Water Main	SD10
In-Line x Branch Valve Blocking for PVC Water Main	SD11
Prefabricated Steel Reinforced Concrete Blocking Pad	SD12
Dead-End and Cross Blocking	SD13
Cross Block Side View	SD14
Reducer Thrust Block	SD15
Valve Marking Post	SD16
Thrust Block at Horizontal Bends 6" or Less	SD17
Ditch Check for Slopes Greater than 3.5:1	SD18
Thrust Block at Horizontal Bends (Less than 3 Feet in Thickness)	SD19
Thrust Block at Horizontal Bends (Exceeding 3 Feet in Thickness)	SD20
PVC x HDPE Transition (Without Fire Hydrant or Branch)	SD21
Placement of Anode Test Station & Lead Wires	SD22
Cathodic Protection With PVC Pipe	SD23
Test Station Connection	SD24
Continuity Bonds for Push-on Iron Pipe	SD25
Exothermic Weld Connection	SD26
Dry Barrel Fire Hydrant with Blocking	SD30
Wet Barrel Fire Hydrant with Flange TEE	SD31
Pipe Curve Geometry	SD32
Fire Hydrant Layout - Alternatives	SD33
Fire Hydrant Protection Pipe Bollard	SD34
Fire Hydrant Location	SD36

NOTES:

1. RESTRAINT OF WATER MAIN PIPE LENGTHS NOT SHOWN.
2. SEE DRAWING SD13 FOR LARGER MAIN SIZES.
3. ALTERNATIVE PLAN USING 2" CORPORATION WITH TAPPING SADDLE PERMITTED WHERE APPROVED BY ENGINEER.



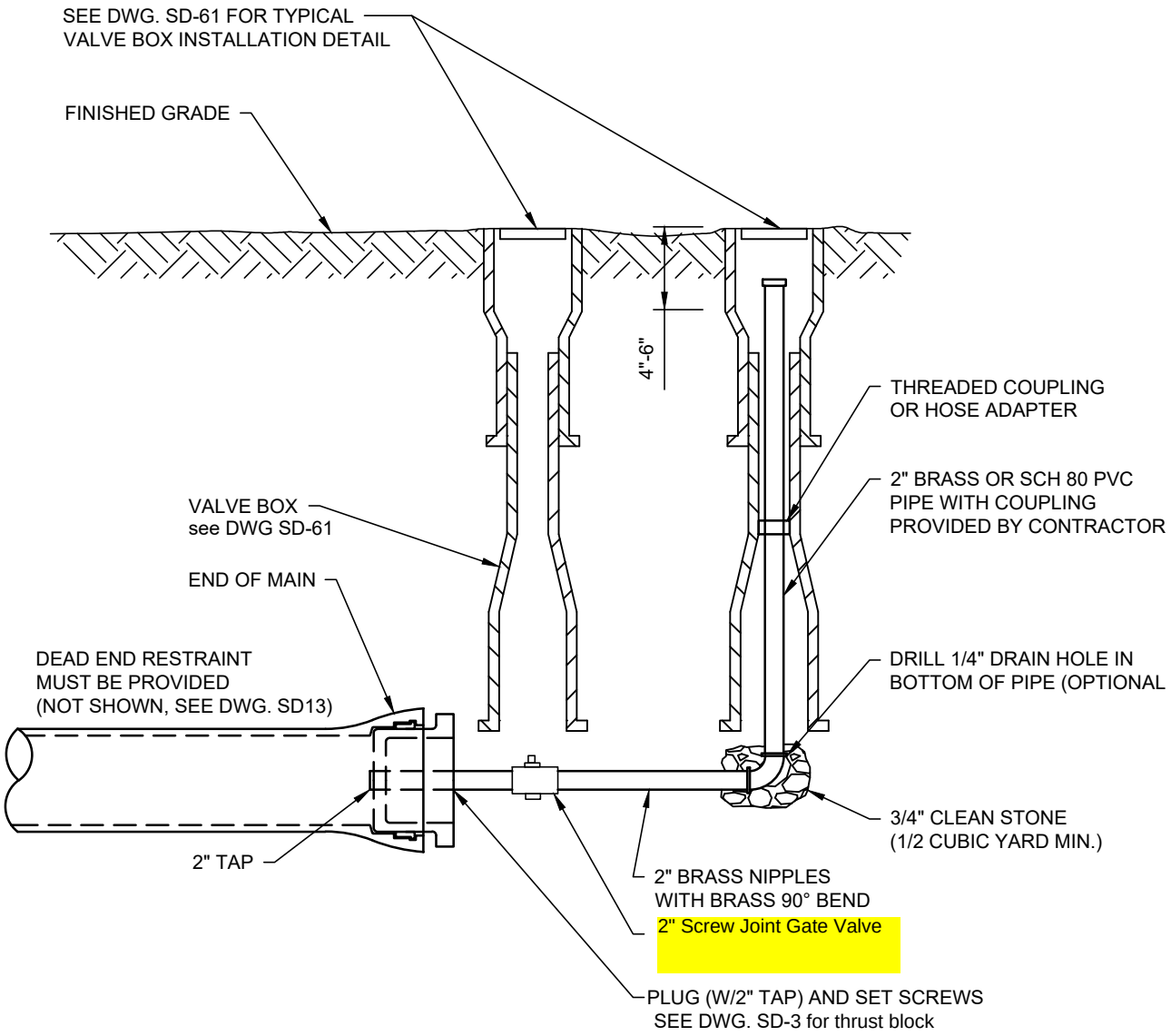
PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

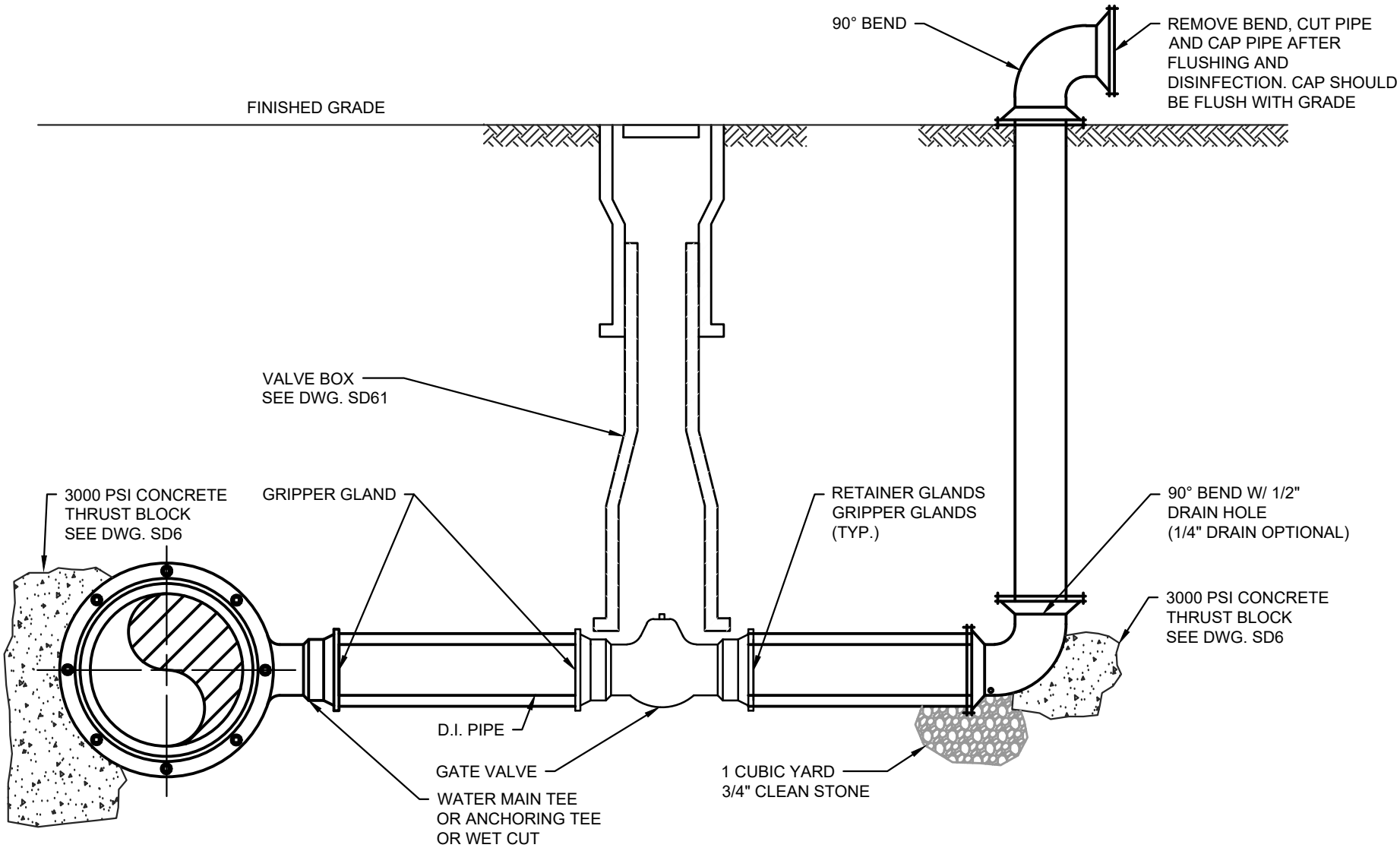
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
BLOCKING AT END OF MAIN WITH BLOW-OFF DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 3



	AMERICAN WATER ENGINEERING 1 WATER STREET CAMDEN, NJ 08102 AMERICAN WATER	**AMERICAN WATER STANDARD CIVIL WATER DISTRIBUTION SYSTEM 2" BLOWOFF AT END OF MAIN DETAIL**	
	DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
	PIPELINE DETAILS	APPROVED	SD- 4



NOTES:

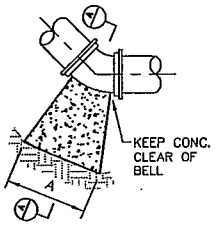
WHERE PERMITTED BY ENGINEER, GATE VALVE MAY BE FLANGExMJ WITH FLANGE END BOLTED DIRECTLY TO FLANGE FACE TEE.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

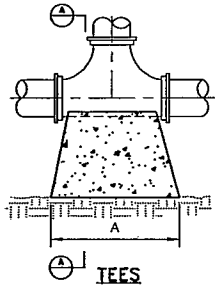
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
4" OR 6" BLOW-OFF ASSEBMLY DETAIL

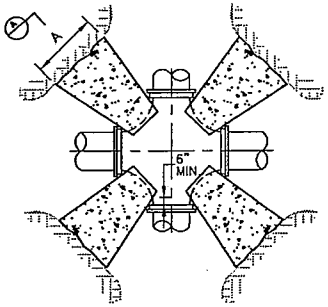
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 5



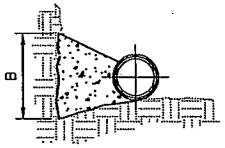
BENDS



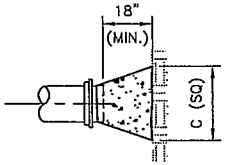
TEES



CROSSES



SECTION (A)
BENDS, TEES & CROSSES



PLUGS

NOTES:

1. COVER OVER TOP OF PIPE SHALL BE BELOW FROST LINE OR 30" MINIMUM, 72" MAXIMUM ACCORDING TO REGULATORY REQUIREMENTS. IF GRADING PLANS RECEIVED BY THE ENGINEER/OWNER WITH THE REQUEST FOR WATER MAIN LAYOUT, INDICATE ADJUSTMENTS TO EXISTING GRADE, THEN PIPE SHALL BE INSTALLED TO MEET MINIMUM AND MAXIMUM COVER FROM PROPOSED GRADES SHOWN ON SAID PLANS.
2. THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF FITTING.
3. NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES,.
4. THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
5. BASED IN 150 PSI STATIC PRESSURE PLUS 50 PSI WATER HAMMER AND 2000 PSF SOIL BEARING.
6. POLYETHYLENE ENCASEMENT ON ALL D.I. PIPE AND FITTINGS.
7. PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
8. ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
9. ALL ANCHOR BOLTS SHALL BE GALVANIZED STEEL, MINIMUM 1/2" DIAMETER. COAT EXPOSED ROD WITH ASPHALT CEMENT AFTER CONCRETE HAS SET.
10. ALL M.J. AND FLG. FITTINGS TO RECEIVE THRUST BLOCKS SHALL HAVE THE FASTENER AREAS FELT WRAPPED AND TAPED PRIOR TO THE CONCRETE POUR TO ALLOW FUTURE ACCESS TO THE FASTENERS AT THE JOINTS.
11. THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
12. PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE MIN 3000 PSI CONCRETE.
13. FOR UNSTABLE SOIL CONDITIONS, CHECK WITH ENGINEER FOR THRUST BLOCK DIMENSIONS.
14. FOR MAIN SIZES GREATER THAN 16", SEE ENGINEER FOR THRUST BLOCK DIMENSIONS.

REQUIRED BEARING AREA ON UNDISTURBED SOIL AND TYPICAL DIMENSIONS

PIPE SIZE	90 DEGREE BENDS			45 DEGREE BENDS			11.25 DEGREE BENDS			22.5 DEGREE BENDS			TEES/PLUGS		
	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"
6	5.3	43	18	2.9	23	18	0.7	6	18	1.5	12	18	3.7	30	18
8	9.2	55	24	5.0	30	24	1.3	8	24	2.5	15	24	6.4	39	24
10	13.8	66	30	7.5	36	30	1.9	9	30	3.8	18	30	9.7	46	30
12	19.4	78	36	10.6	42	36	2.7	11	36	5.3	21	36	13.8	55	36
14	26.0	89	42	14.0	48	42	3.6	12	42	7.2	25	42	18.5	63	42
16	33.7	101	48	18.3	55	48	4.7	14	48	9.4	28	48	23.9	72	48

Area in square feet "A" and "B" in inches

Bearing table area is based on 200 psi maximum with soil bearing capacity of 2000 lbs/square foot.

For higher water pressures or lower soil pressures, consult Engineer for adjustments.

Bearing table area does not include a safety factor.

A safety factor and additional bearing area may be required as directed by the Engineer.

REVISIONS

AMERICAN WATER STANDARD
CIVIL
THRUST BLOCK
DETAILS

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
213 CARRIAGE LANE
DELRAN, NJ 08075

American Water

DRAWN BY RJG
PROJECT ENG'R
APPROVED
DATE 10-16-06
PROJECT #

USE DIMENSIONS ONLY
SCALE N.T.S.

USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

0201-0601-SD6

FOR COMMENTS

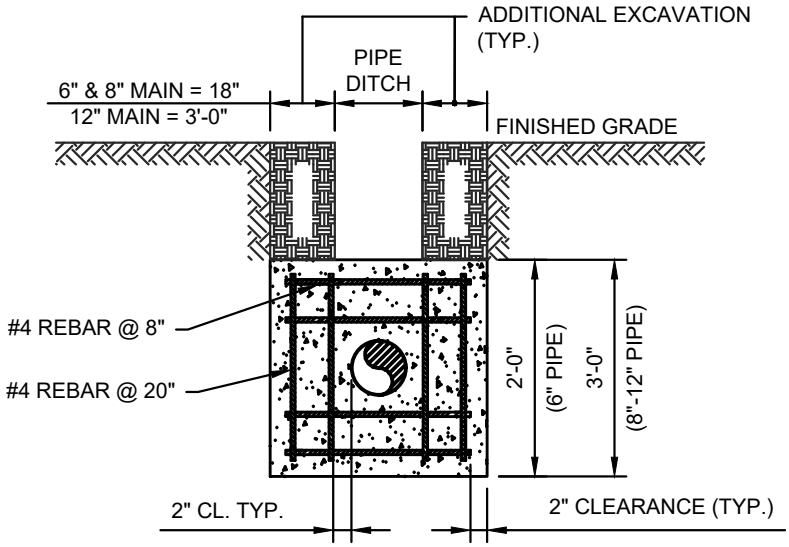
0201-0601-SD6

G:\ACAD\ACADCOM\American Water Standards\Blocking\0201-0601-SD6.dwg
Feb 20, 2007 - 7:42am

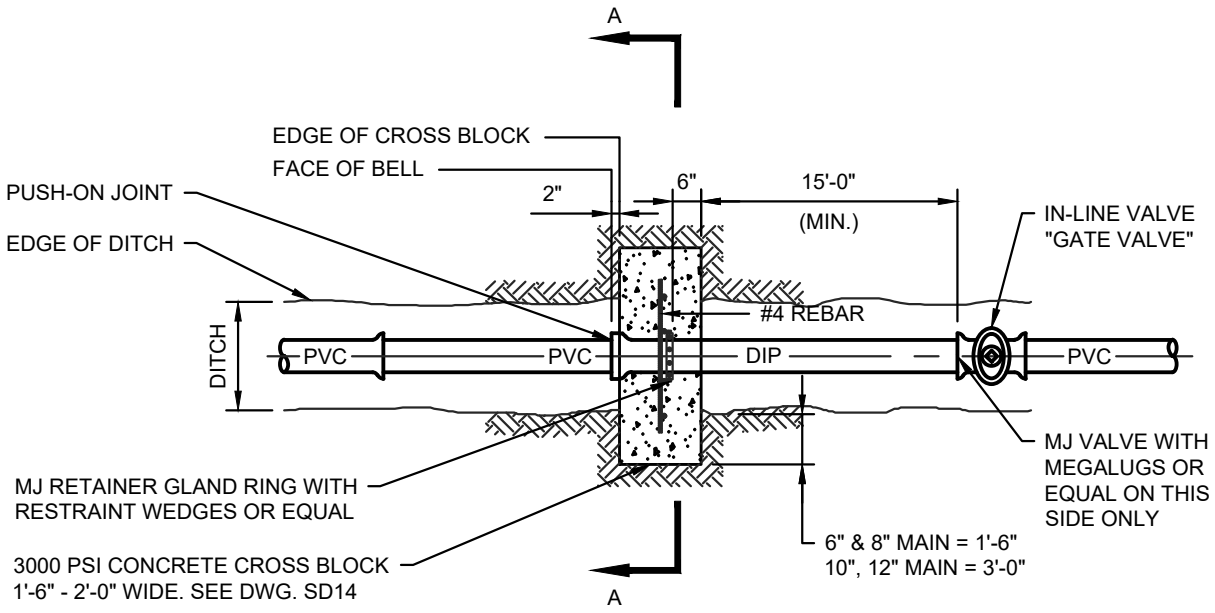
NOTES:

UNDISTURBED SOIL

1. ONE RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS
3. CENTER BLOCK ON PIPE.



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

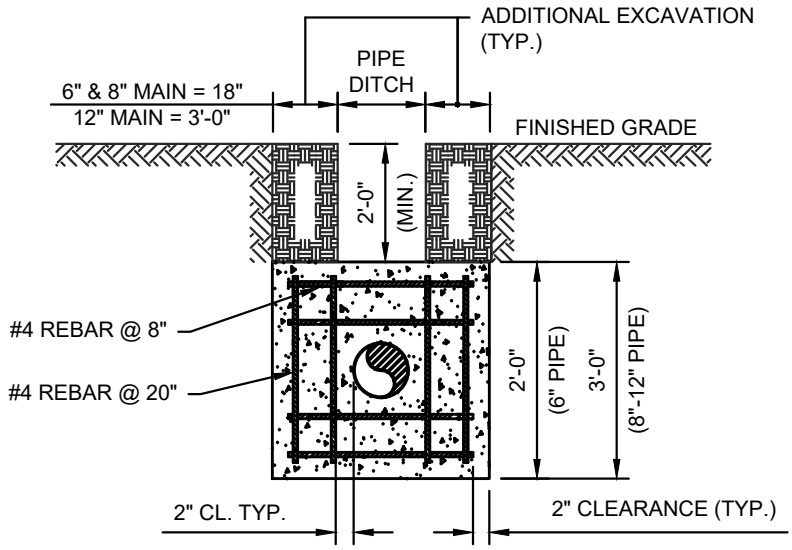
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
IN-LINE VALVE BLOCKING FOR PVC WATER MAIN DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 7

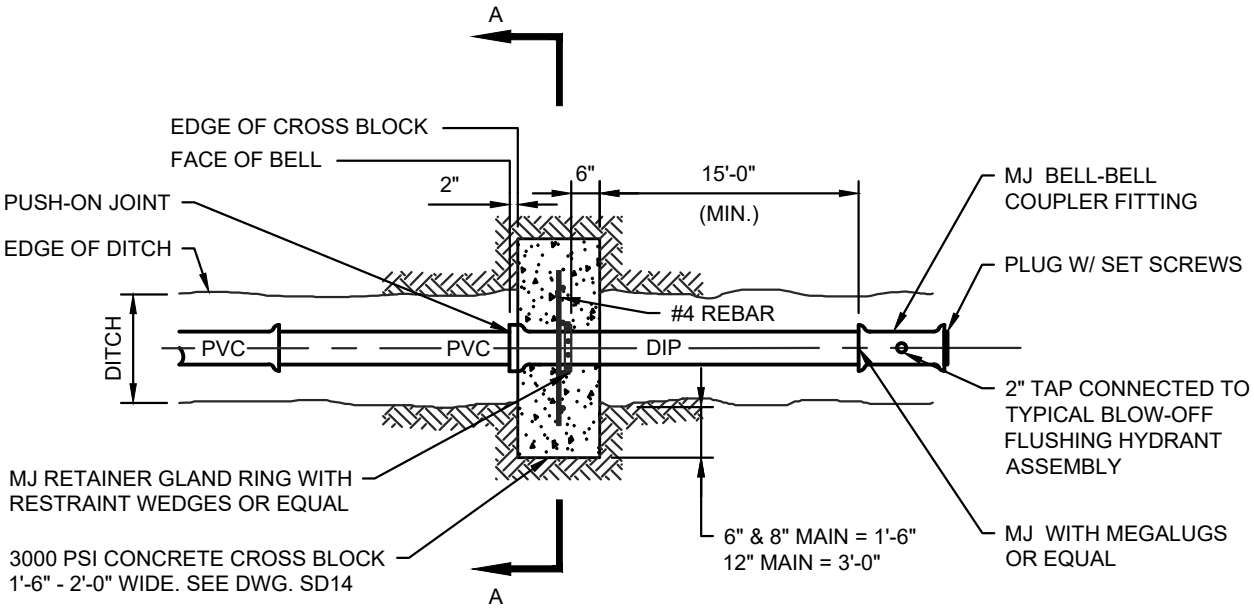
NOTES:

1. RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS.
3. CENTER BLOCK ON PIPE

UNDISTURBED SOIL



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

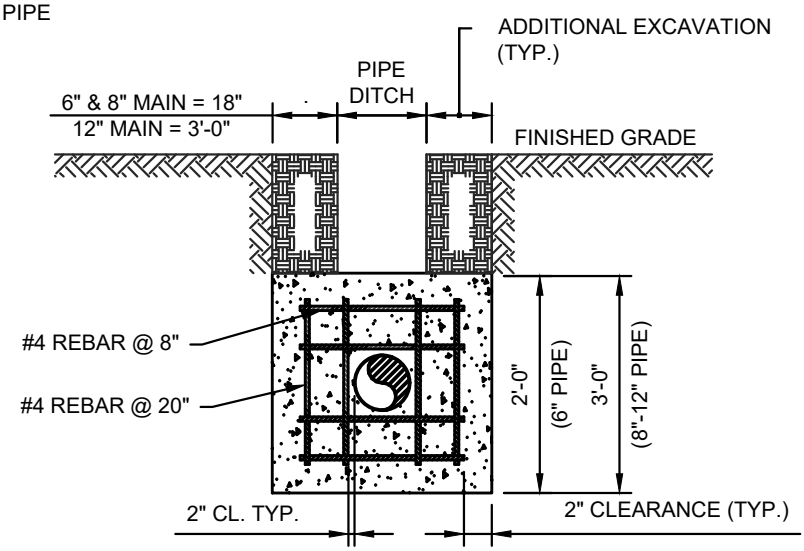
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
DEAD-END PVC x DIP BLOCKING METHOD DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 8

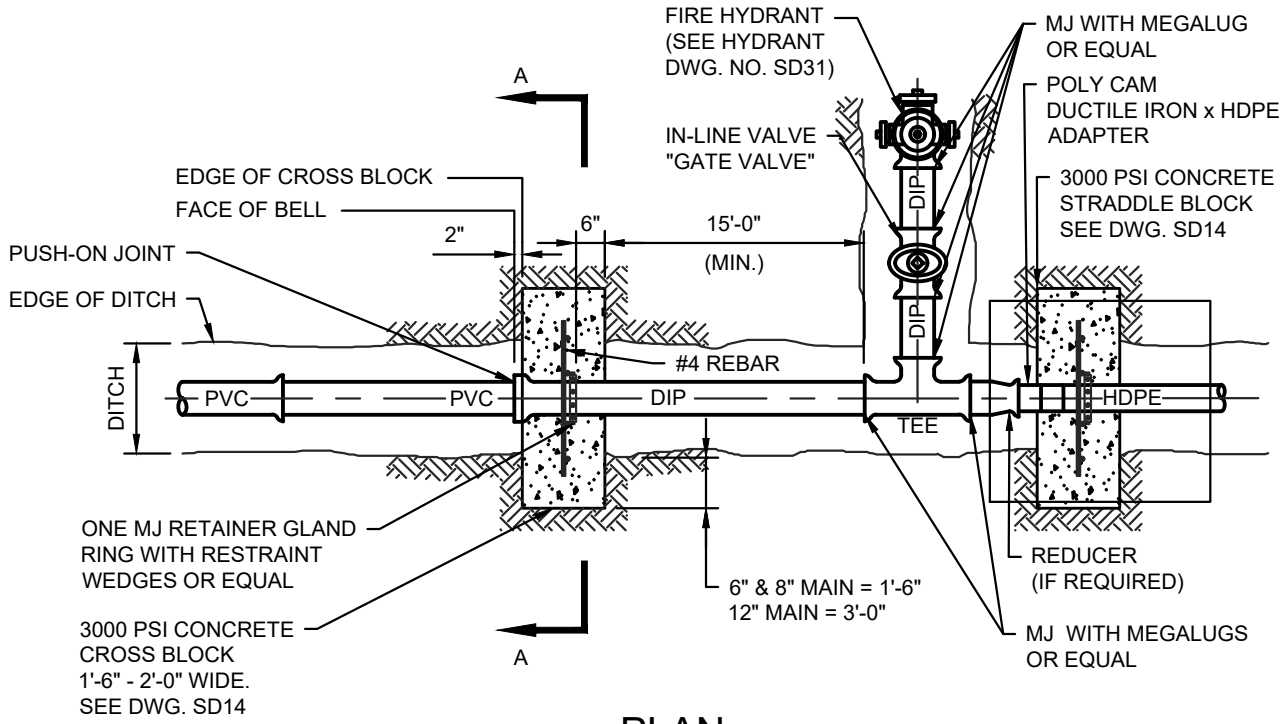
NOTES:

UNDISTURBED SOIL

1. RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS.
3. CENTER BLOCK ON PIPE



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

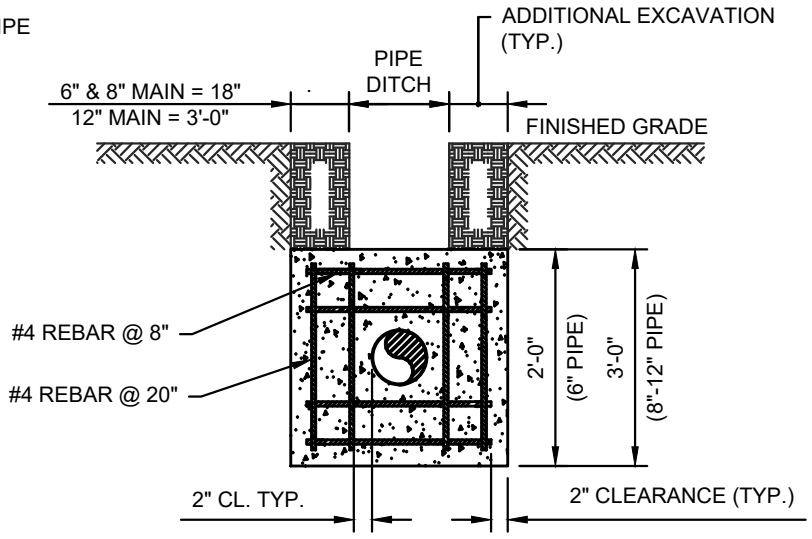
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PVC x HDPE TRANSITION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 9

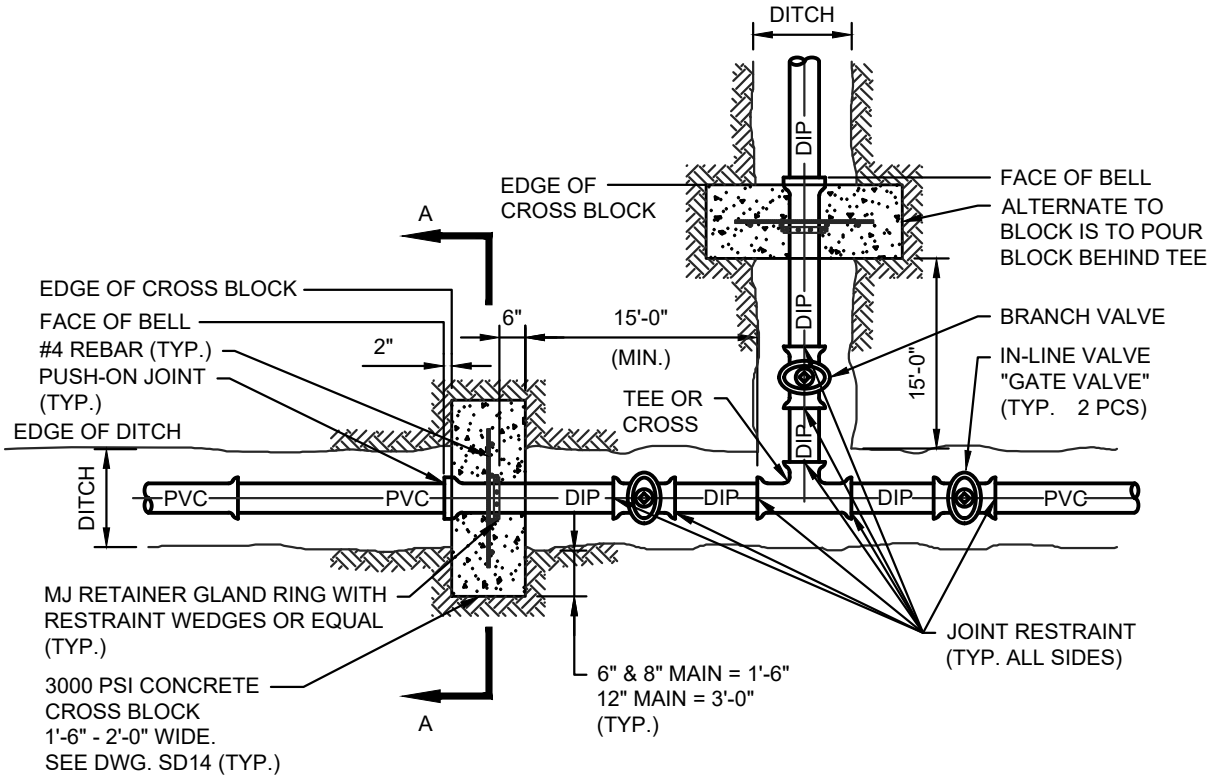
NOTES:

1. RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS.
3. CENTER BLOCK ON PIPE

UNDISTURBED SOIL



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

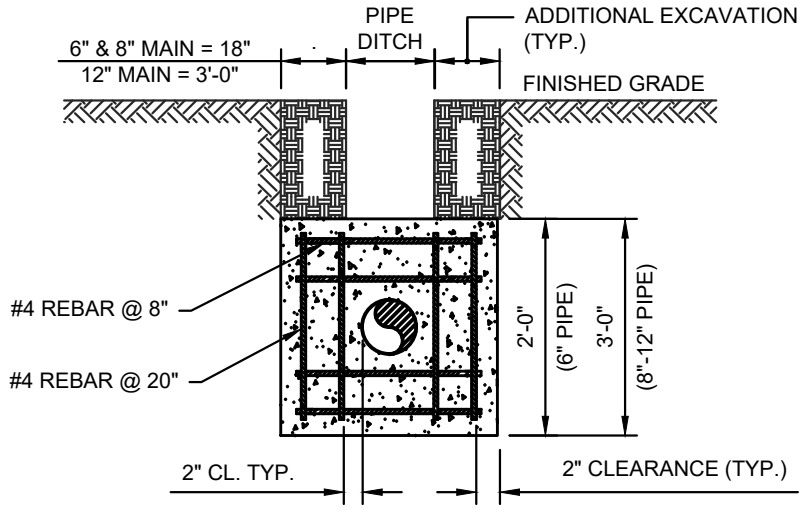
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
DOUBLE IN-LINE x BRANCH VALVE BLOCKING DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 10

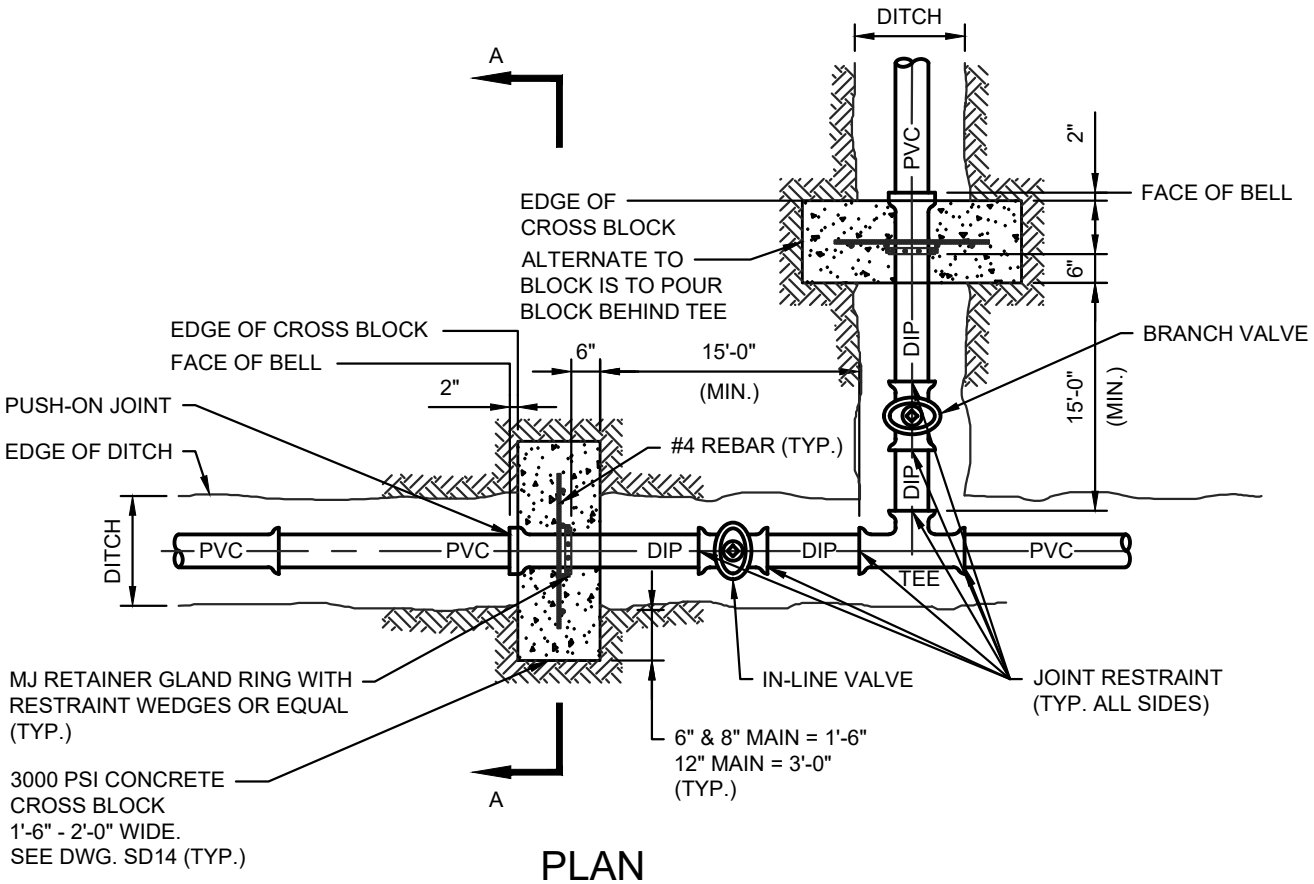
NOTES:

1. RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. ALL VALVES MUST BE RESTRAINED BACK TO CROSS BLOCKS.
3. CENTER BLOCK ON PIPE

UNDISTURBED SOIL



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

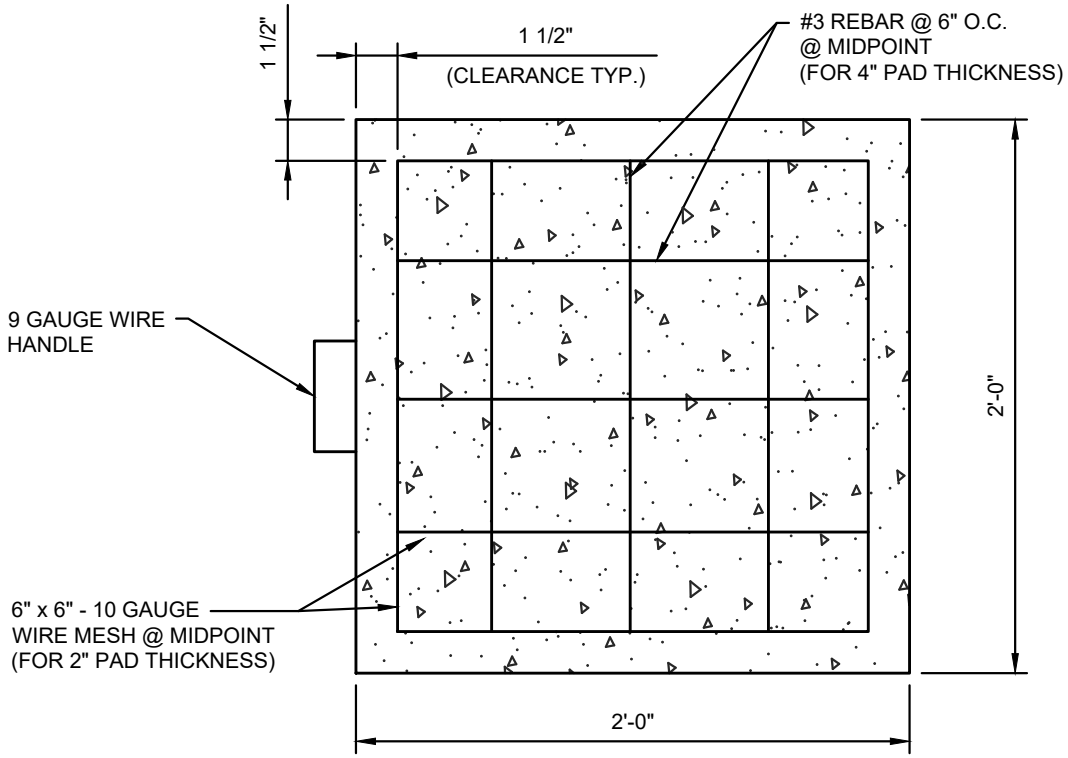
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
IN-LINE x BRANCH VALVE BLOCKING DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 11

NOTES:

1. PAD THICKNESS = 2" OR 4"
2. PROVIDE CERTIFICATION OF REINFORCING WIRE AS REQUIRED.
3. PORTLAND CEMENT CONCRETE USED FOR PAD SHALL BE MIN. 3000 PSI CONCRETE.



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

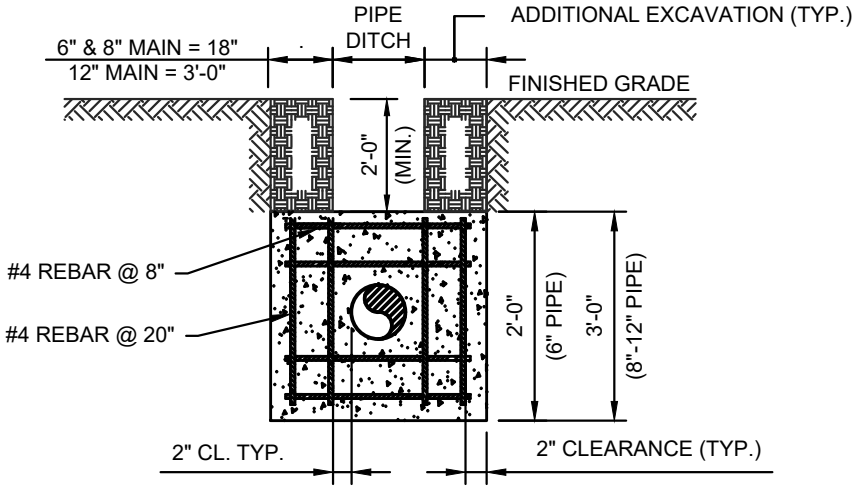
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PREFAB. STEEL REINFORCED CONCRETE BLOCKING PAD DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 12

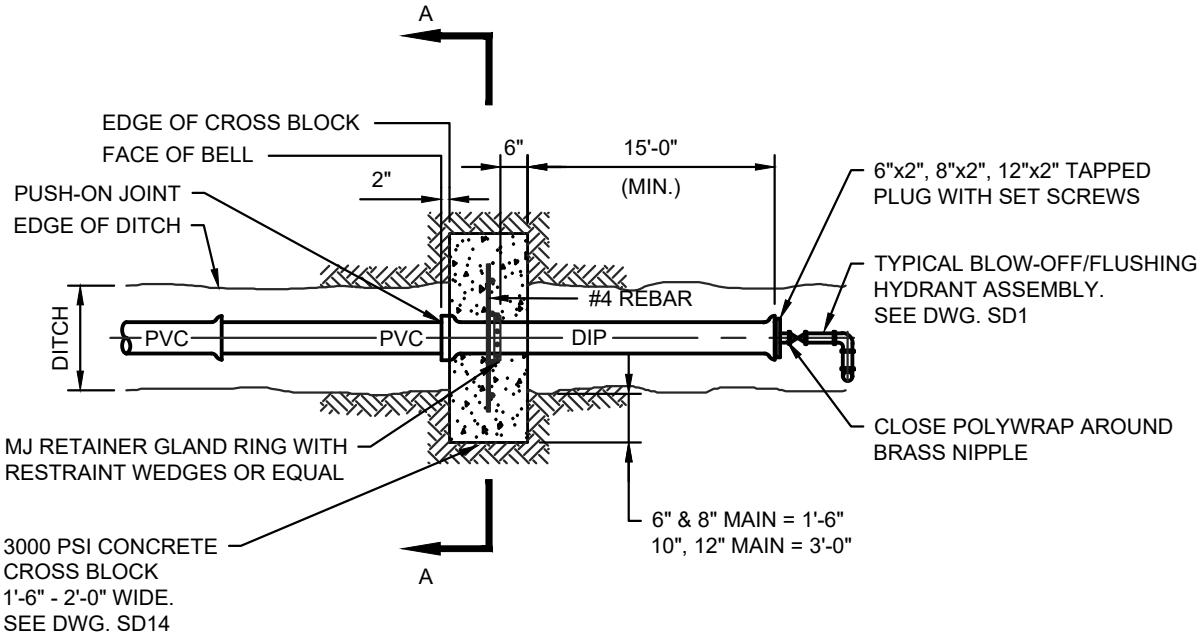
NOTES:

1. ONE RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS.
3. CENTER BLOCK ON PIPE

UNDISTURBED SOIL



SECTION A-A



PLAN

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

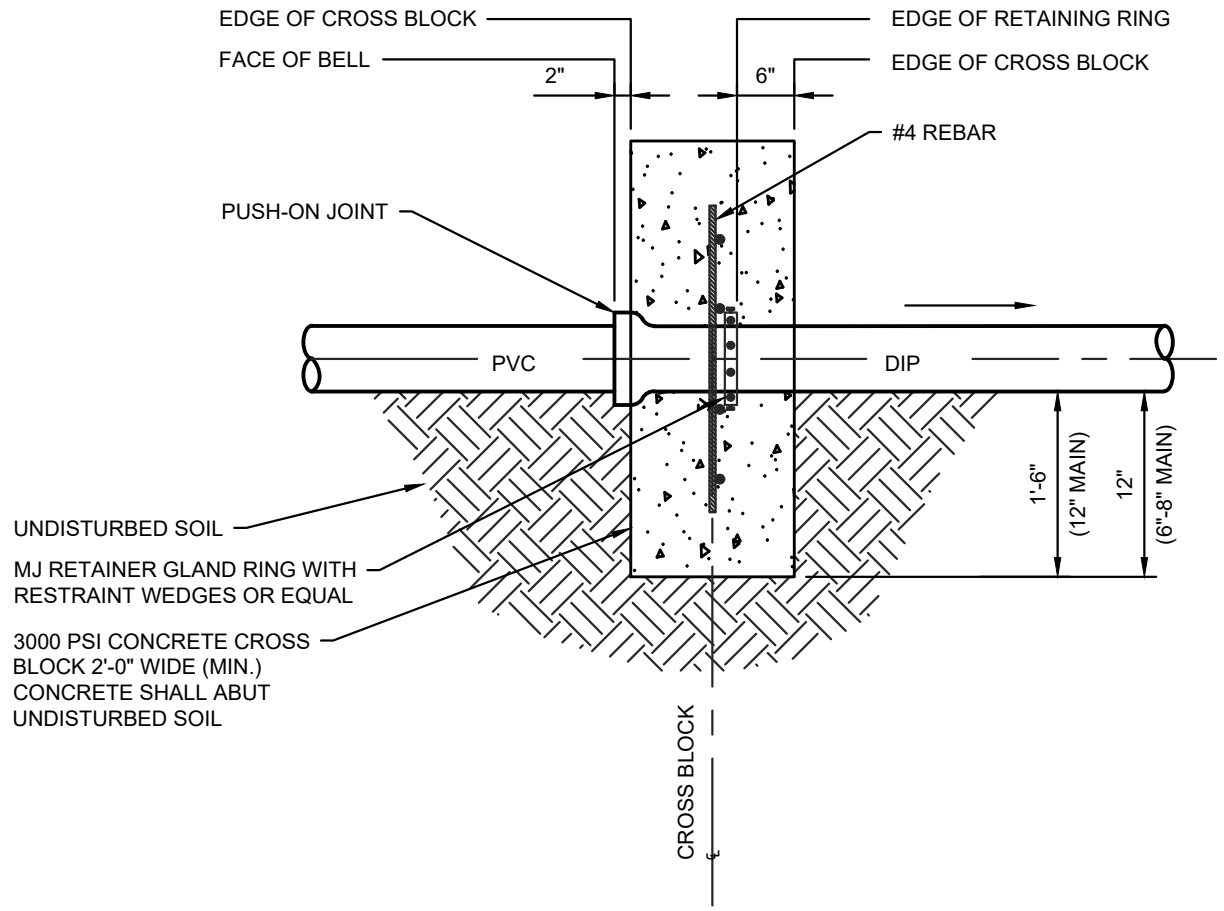
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
DEAD-END AND CROSS BLOCKING DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 13

NOTES:

1. ONE RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. PVC PIPE RESTRAINT REQUIRED IN DIRECTION AWAY FROM CROSS BLOCK NOT SHOWN.
3. PORTLAND CEMENT CONCRETE USED FOR CROSS BLOCKS SHALL BE MIN. 3000 PSI CONCRETE.



CROSS BLOCK SIDE VIEW

CROSS BLOCK KEYED INTO BOTTOM OF DITCH

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

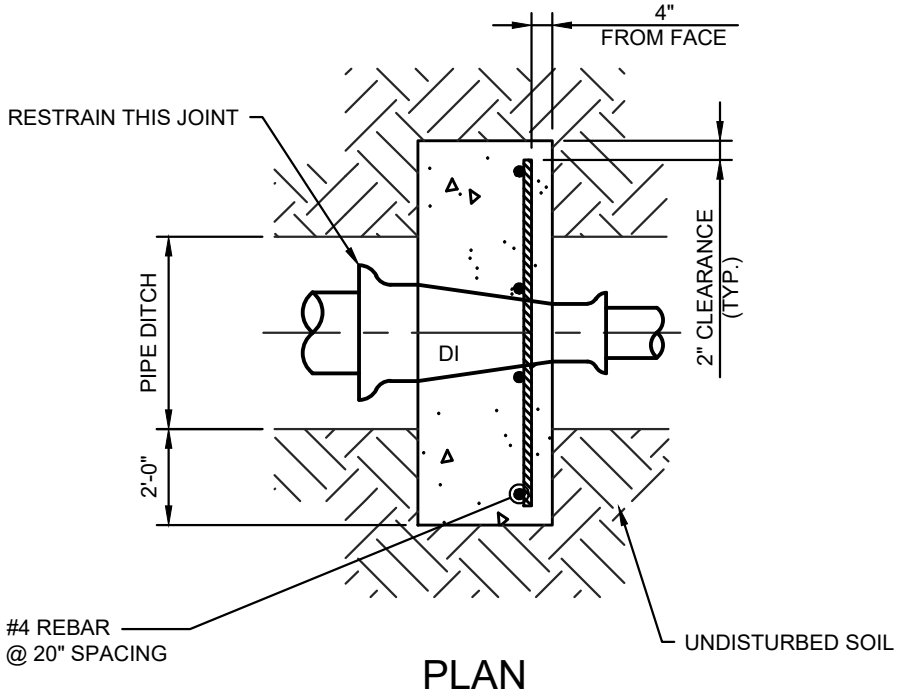
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
CROSS BLOCK SIDE VIEW DETAIL

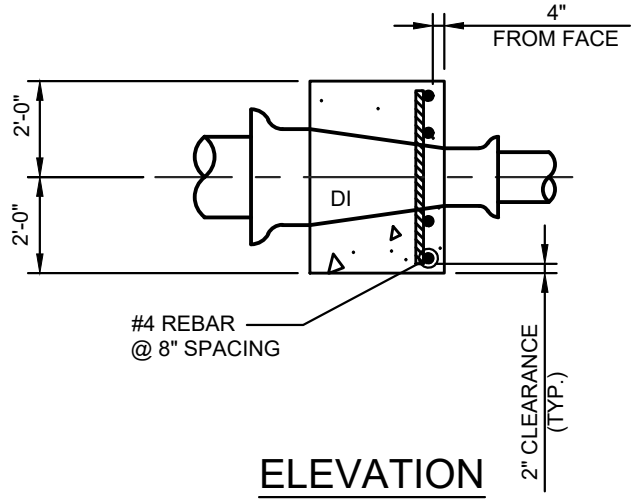
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 14

NOTES:

1. ONLY BELL TO BELL REDUCERS ARE ACCEPTABLE.
2. THE JOINT BETWEEN THE LARGE END OF THE REDUCER AND FOLLOWING PIPE SHOULD BE RESTRAINED AS WELL.
3. AVOID USE OF MEGALUGS ON DIP FITTINGS IN CONCRETE.
4. PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE MIN. 3000 PSI CONCRETE.



PLAN



ELEVATION

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

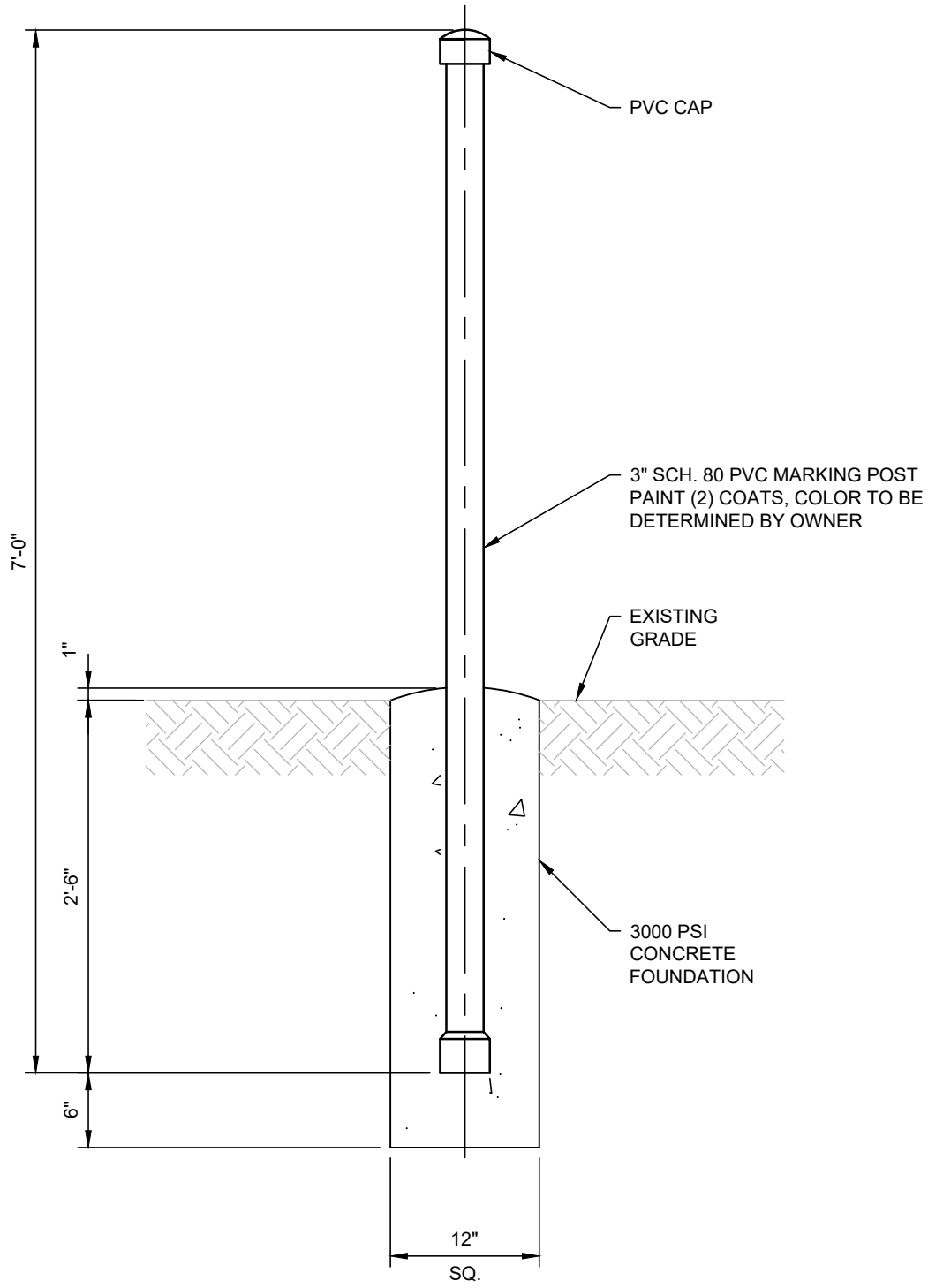
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
REDUCER THRUST BLOCK DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: NTS
STANDARD DETAILS	APPROVED	SD- 15

NOTE:

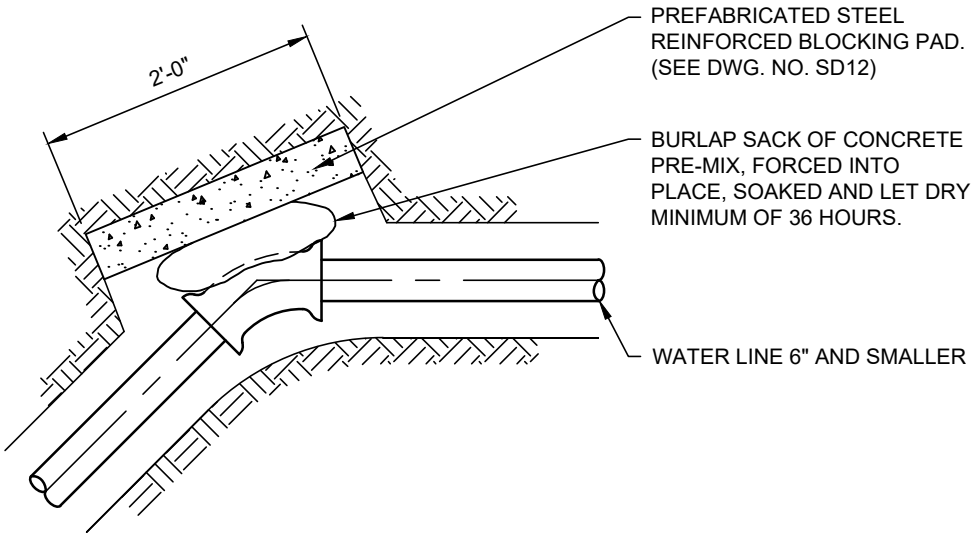
DO NOT LOCATE POST DIRECTLY ABOVE MAIN



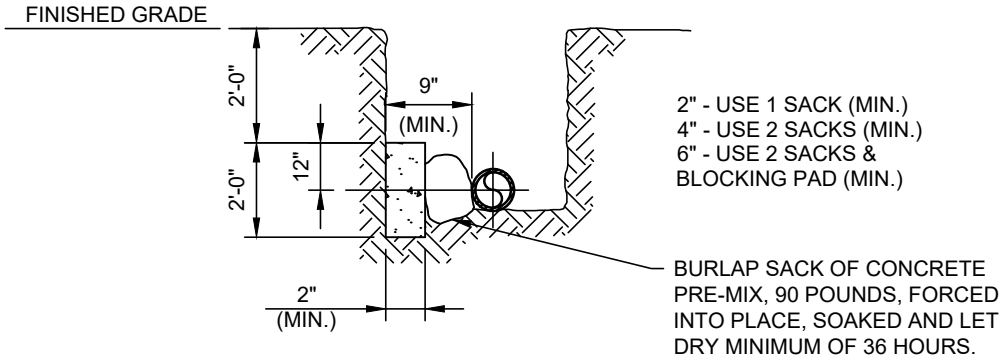
	AMERICAN WATER ENGINEERING 1 WATER STREET CAMDEN, NJ 08102 AMERICAN WATER	**AMERICAN WATER STANDARD CIVIL WATER DISTRIBUTION SYSTEM VALVE MARKING POST DETAIL**	
	DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
	STANDARD DETAILS	APPROVED	SD- 16

NOTES:

1. FOR BLOCKING OF PIPE SIZES 8" AND LARGER, SEE DETAIL DRAWING SD6
2. FOR BLOCKING OF PIPE SIZES 6" AND SMALLER, SUBJECT TO APPROVAL BY ENGINEER.
3. PORTLAND CEMENT CONCRETE USED FOR CROSS BLOCKS SHALL BE MIN. 3000 PSI CONCRETE.



PLAN



ELEVATION

(FOR 2", 4", AND 6" DIA. PIPE ONLY)

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

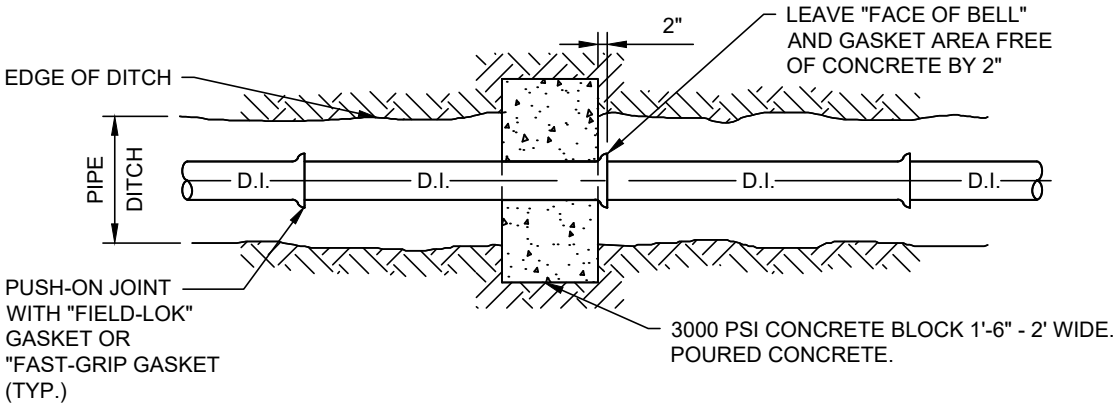
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
THRUST BLOCK AT HORIZONTAL BENDS DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 17

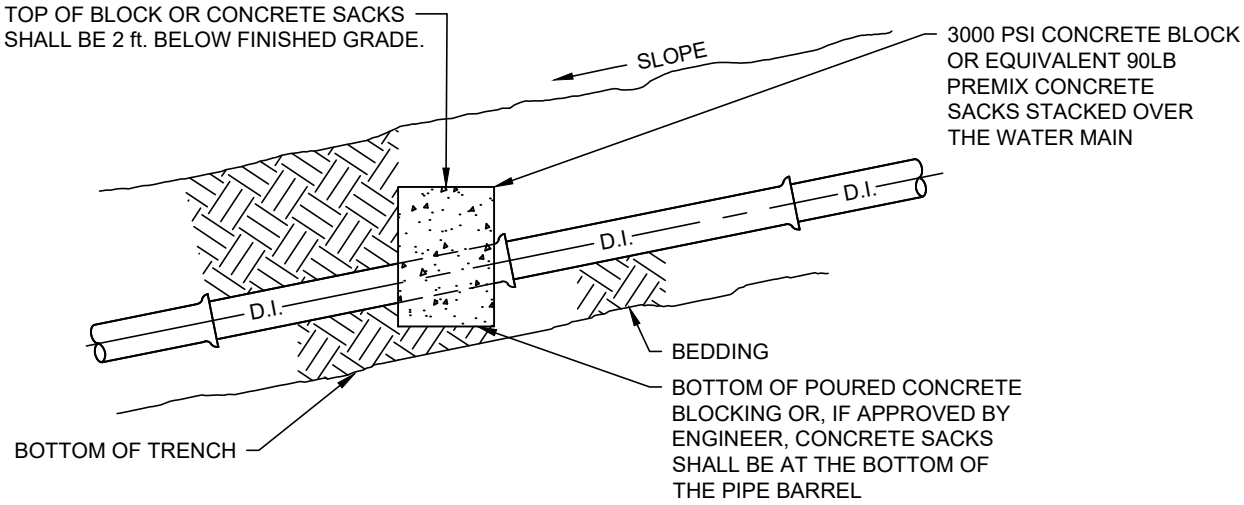
NOTE:

FIELD-LOK GASKET IS THE PREFERRED OPTION OF RESTRAINED JOINT.



DITCH CHECK FOR SLOPES GREATER THAN 3.5:1

PLAN

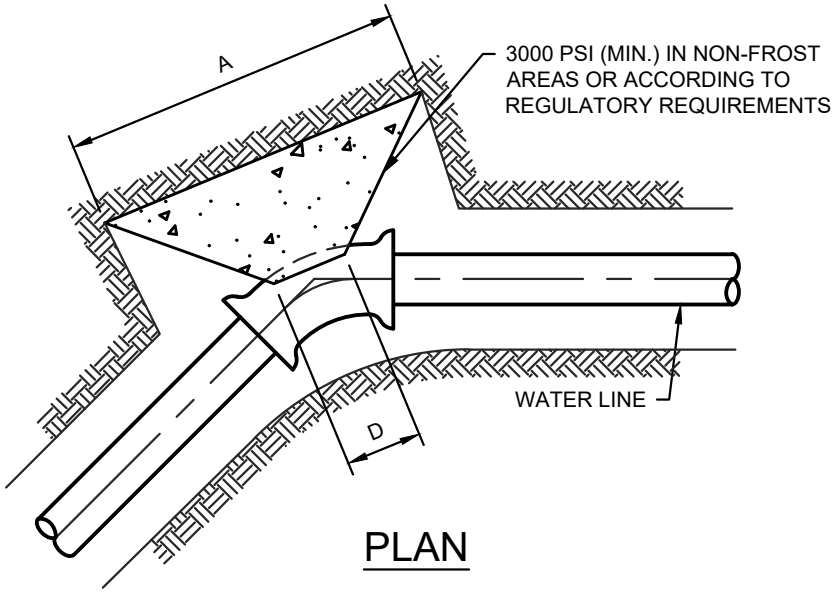


ELEVATION

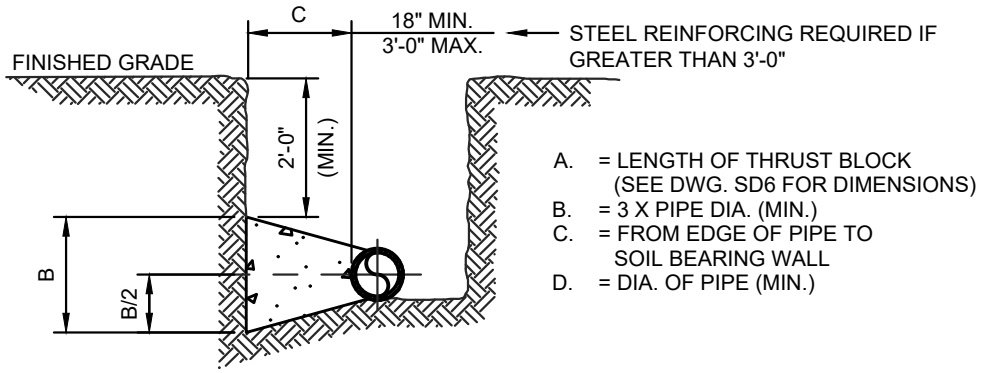
	AMERICAN WATER ENGINEERING 1 WATER STREET CAMDEN, NJ 08102 AMERICAN WATER	**AMERICAN WATER STANDARD CIVIL WATER DISTRIBUTION SYSTEM DITCH CHECK FOR SLOPES GREATER THAN 3.5:1 DETAIL**	
	DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
	STANDARD DETAILS	APPROVED	SD- 18

GENERAL NOTES:

1. COVER OVER TOP OF PIPE SHALL BE BELOW FROST LINE OR MINIMUM 30" IN NON-FROST AREAS OR ACCORDING TO REGULATORY REQUIREMENTS. IF GRADING PLANS RECEIVED BY THE ENGINEER/OWNER WITH THE REQUEST FOR WATER MAIN LAYOUT, INDICATE ADJUSTMENTS TO EXISTING GRADE, THEN PIPE SHALL BE INSTALLED TO MEET MINIMUM AND MAXIMUM COVER FROM PROPOSED GRADES SHOWN ON SAID PLANS.
2. THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF FITTING.
3. NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES.
4. THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
5. DIMENSION "C" BASED ON MINIMUM BEARING AREA. 18" MINIMUM.
6. POLYETHYLENE ENCASEMENT ON ALL D.I. PIPE AND FITTINGS.
7. PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
8. ALL ANCHOR BOLTS SHALL BE COR-BLUE, MINIMUM 1/2" DIAMETER. COAT EXPOSED ROD WITH APPROVED MATERIAL AFTER CONCRETE HAS SET.
9. ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
10. ALL M.J. AND FLG. FITTINGS TO RECEIVE THRUST BLOCKS SHALL HAVE THE FASTENER AREAS KEPT FREE OF CONCRETE TO ALLOW FUTURE ACCESS TO THE FASTENERS AT THE JOINTS.
11. THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
12. PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE 3000 PSI CONCRETE (MIN.).



PLAN



ELEVATION

* BEARING AREAS ARE BASED ON SOIL HAVING AN ALLOWABLE SAFE LATERAL BEARING OF 2000 LBS/SQ.FT. & 200 PSI TEST PRESSURE. AREA MUST BE REVISED FOR SOILS WITH A LOWER BEARING CAPACITY OR HIGHER TEST PRESSURE.

AMERICAN WATER ENGINEERING
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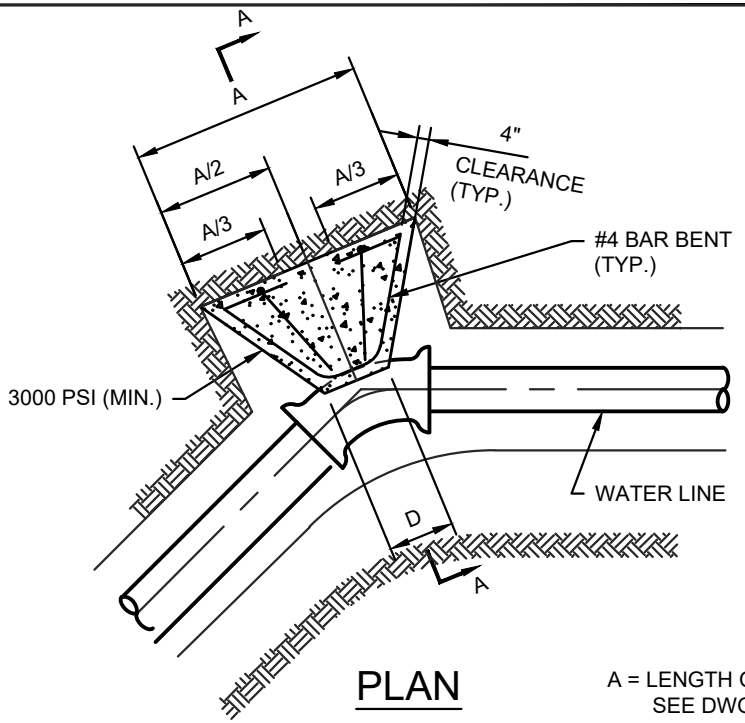
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
THRUST BLOCK AT HORIZONTAL BENDS LESS THAN 3' DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 19

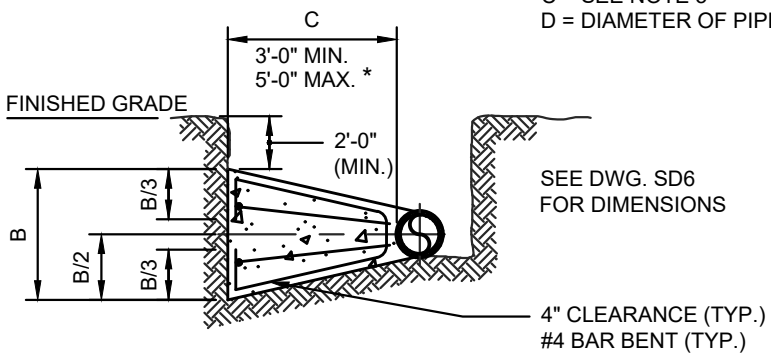
GENERAL NOTES:

1. COVER OVER TOP OF PIPE SHALL BE BELOW FROST LINE OR 30" MINIMUM IN NON-FROST AREAS OR ACCORDING TO REGULATORY REQUIREMENTS. IF GRADING PLANS RECEIVED BY THE ENGINEER/OWNER WITH THE REQUEST FOR WATER MAIN LAYOUT, INDICATE ADJUSTMENTS TO EXISTING GRADE, THEN PIPE SHALL BE INSTALLED TO MEET MINIMUM AND MAXIMUM COVER FROM PROPOSED GRADES SHOWN ON SAID PLANS.
2. THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF FITTING.
3. NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES.
4. THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
5. DIMENSION "C" BASED ON MINIMUM BEARING AREA.
6. POLYETHYLENE ENCASEMENT ON ALL D.I. PIPE AND FITTINGS.
7. PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
8. ALL ANCHOR BOLTS SHALL BE COR-BLUE, MINIMUM 1/2" DIAMETER. COAT EXPOSED ROD WITH APPROVED MATERIAL AFTER CONCRETE HAS SET.
9. ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
10. ALL M.J. AND FLG. FITTINGS TO RECEIVE THRUST BLOCKS SHALL HAVE THE FASTENER AREAS FELT WRAPPED AND TAPED PRIOR TO THE CONCRETE POUR TO ALLOW FUTURE ACCESS TO THE FASTENERS AT THE JOINTS.
11. THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
12. PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE 3000 PSI CONCRETE MINIMUM.



PLAN

A = LENGTH OF THRUST BLOCK
SEE DWG. NO. SD6
B = 3xD
C = SEE NOTE 5
D = DIAMETER OF PIPE



SECTION A-A

* SPECIAL DESIGN REQUIRED IF GREATER THAN 5'-0"
* BEARING AREAS ARE BASED ON SOIL HAVING AN ALLOWABLE SAFE LATERAL BEARING OF 2000 POUNDS PER SQUARE FOOT AND 200 PSI TEST PRESSURE. AREA MUST BE REVISED FOR SOILS WITH A LOWER BEARING CAPACITY OR HIGHER TEST PRESSURE.

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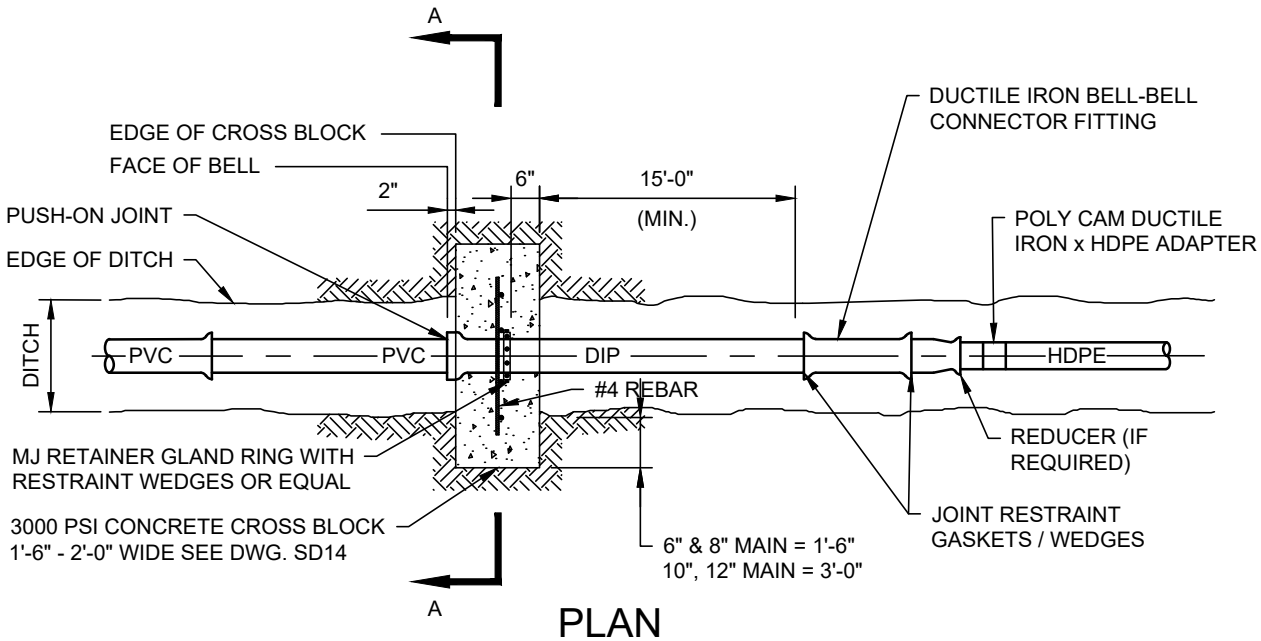
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
THRUST BLOCK AT HORIZONTAL BENDS GREATER THAN 3' DETAIL

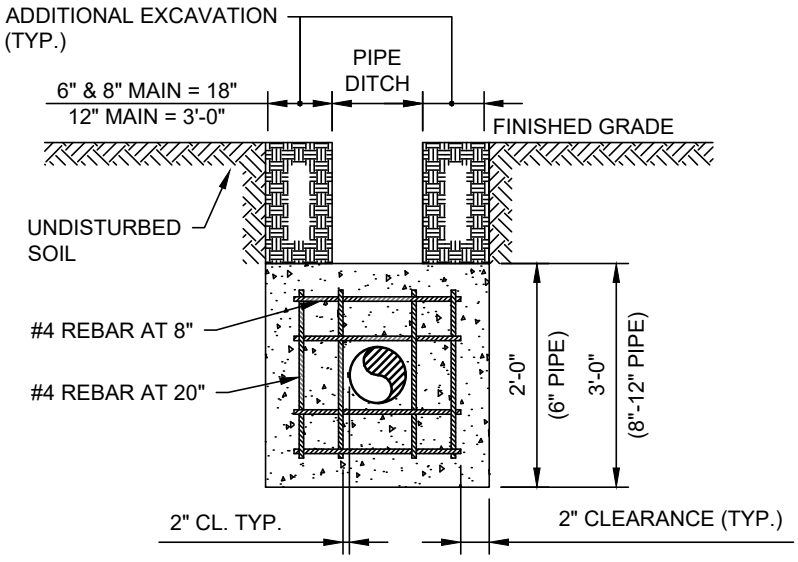
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 20

NOTES:

1. ONE RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTAINED JOINT GASKETS.
3. CENTER BLOCK ON PIPE



PLAN



SECTION A-A

AMERICAN WATER ENGINEERING
1 WATER STREET
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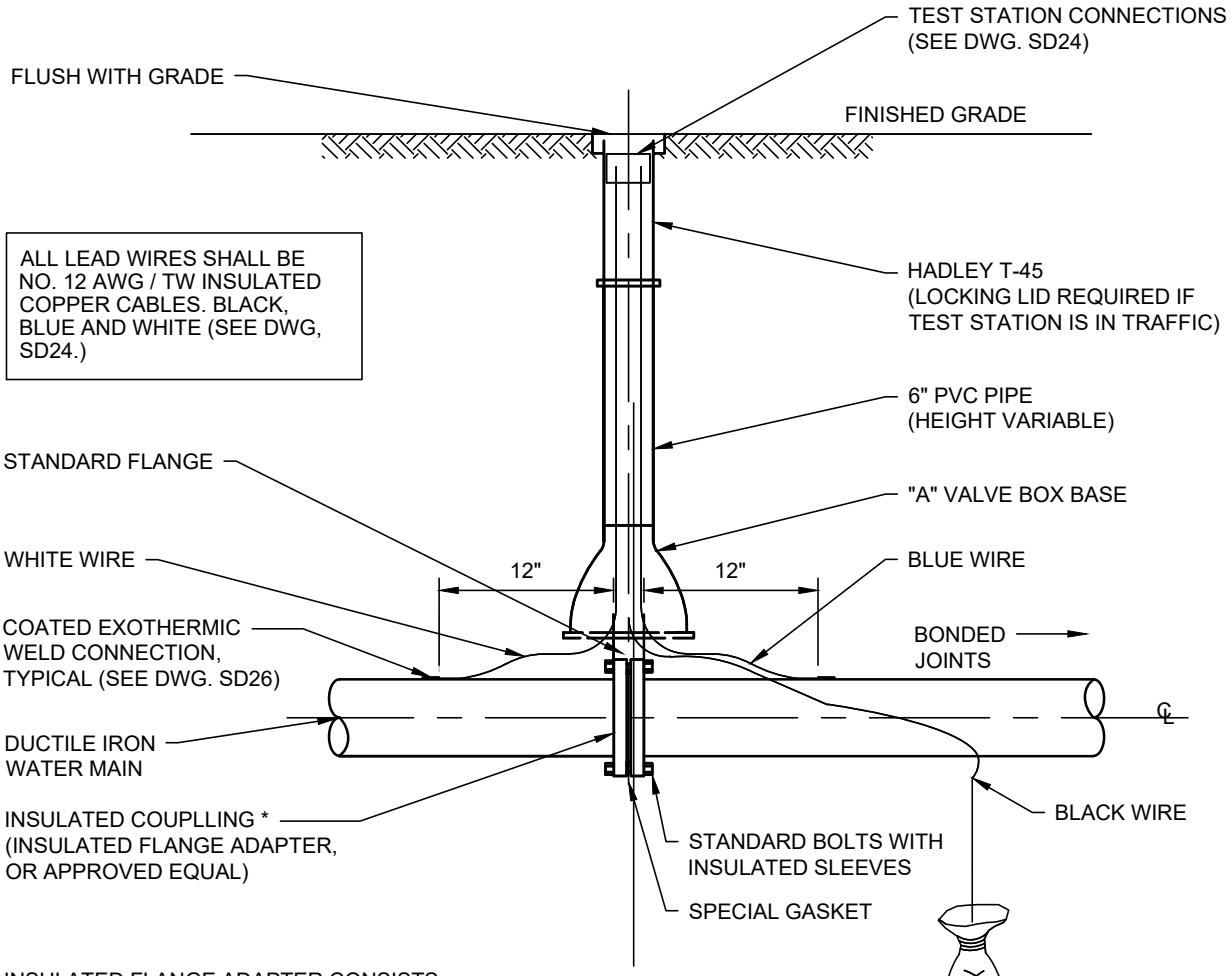
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PVC x HDPE TRANSITION WITHOUT HYDRANT OR BRANCH DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 21



* INSULATED FLANGE ADAPTER CONSISTS OF A DI FLANGED JOINT AND A FLANGE INSULATION KIT WHICH INCLUDES:

- ONE ⅛" THICK STEEL WASHER FOR EACH BOLT.
- ONE INSULATING WASHER FOR EACH BOLT.
- ONE FULL LENGTH INSULATING SLEEVE FOR EACH BOLT.
- ONE TYPE "E" PSI LINEBACKER™ GASKET, PHENOLIC RETAINER / NITRILE SEALING ELEMENT.
- TYPE 304 STAINLESS STEEL BOLTS, 3/4" DIAMETER WITH TYPE 304 STAINLESS STEEL ACCESSORIES.
- ALWAYS INSTALL AT LEAST TWO WIRES.

NOTES:

1. PREFERRED METHOD TO CROSS ANY IMPRESSED CURRENT AREA IS TO INSTALL APPROPRIATE CLASS OF PVC PIPE.
2. INSTALLATION OF CATHODIC PROTECTION SYSTEM SHALL BE DONE IN CONSULATION WITH AGENCY OPERATING INPRESSED CURRENT AREA.
3. DOUBLE POLYWRAP PIPE WITH BONDED JOINTS PLUS ONE PIPE LENGTH ON UNBONDED SIDE.
4. CONTRACTOR SHALL CONDUCT TESTS OF SOIL RESISTIVIY AND RESISTANCE BETWEEN WIRES WITH COMPLETION OF WIRING NOTING DATE AND TIME OF TEST, REPORTING ALL RESULTS TO ENGINEER.

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AMERICAN WATER

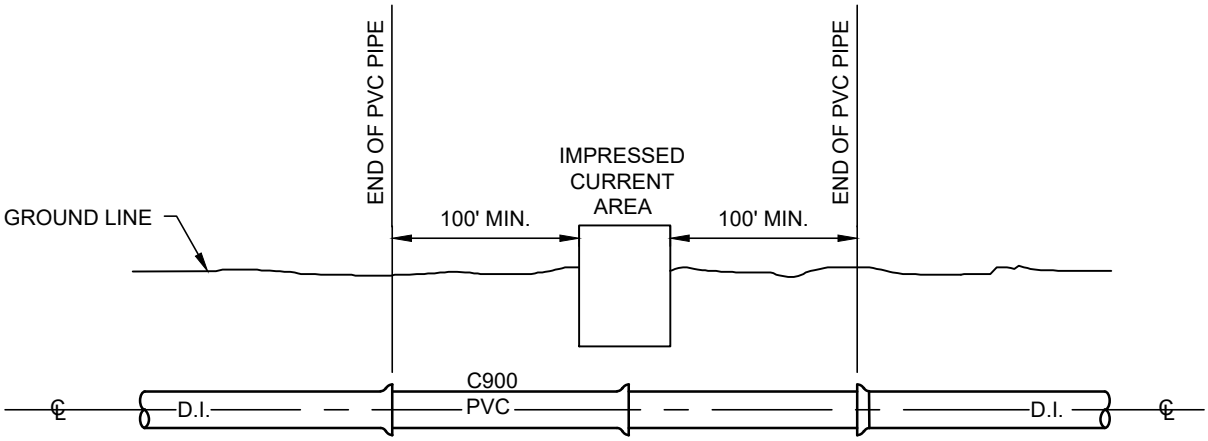
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PLACEMENT OF ANODE BAG TEST STATION & LEAD WIRES DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 22

NOTES:

1. IF PIPE IS BEING CONNECTED TO (OR IS PART OF) A SYSTEM WITH FERROUS PIPE, PVC SHALL BE CLASS 2OO.

2. SEE SD22 FOR ALL PIPE 16" AND LARGER.



TEST STATIONS
AS REQUIRED

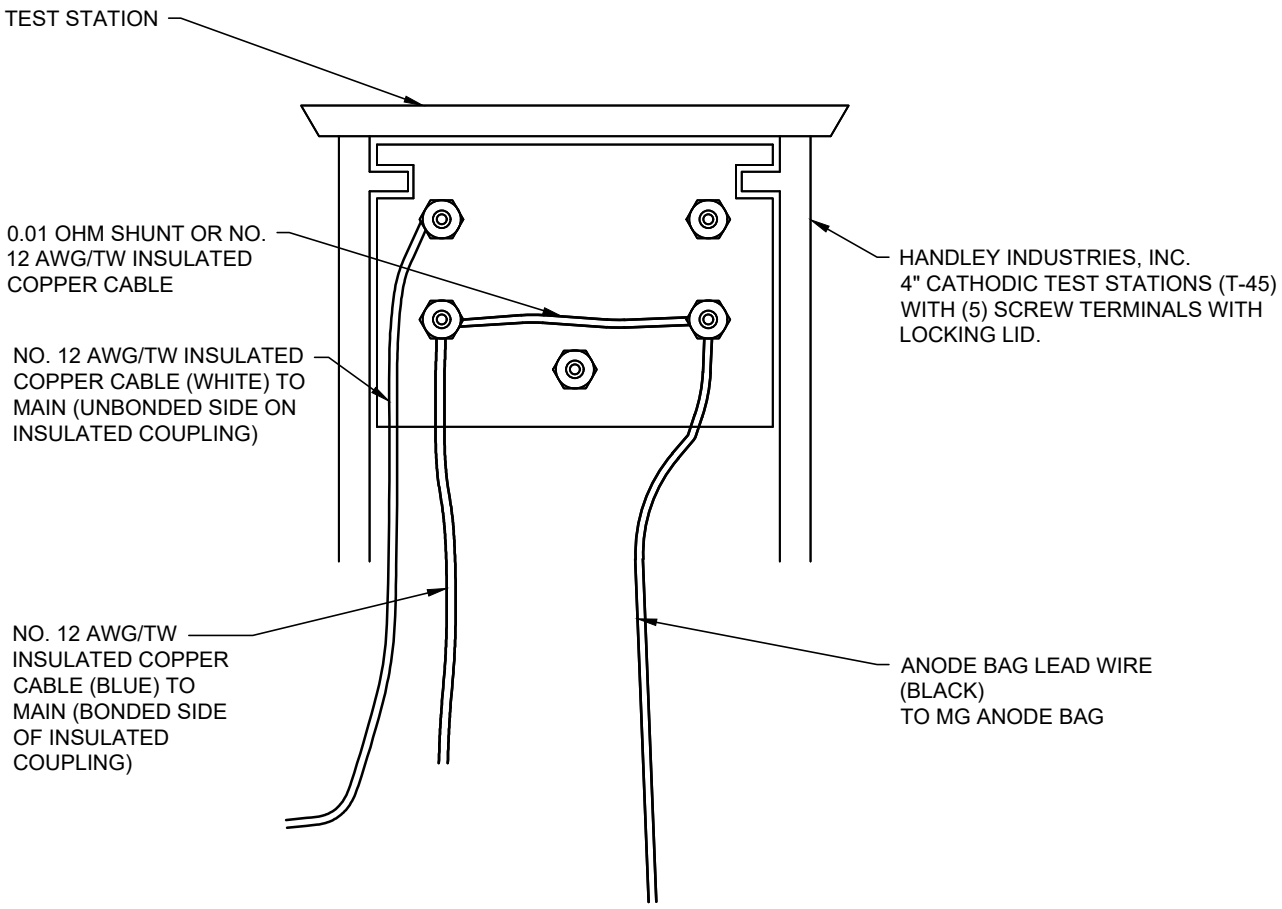
PLAN VIEW

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
CATHODIC PROTECTION WITH PVC PIPE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 23



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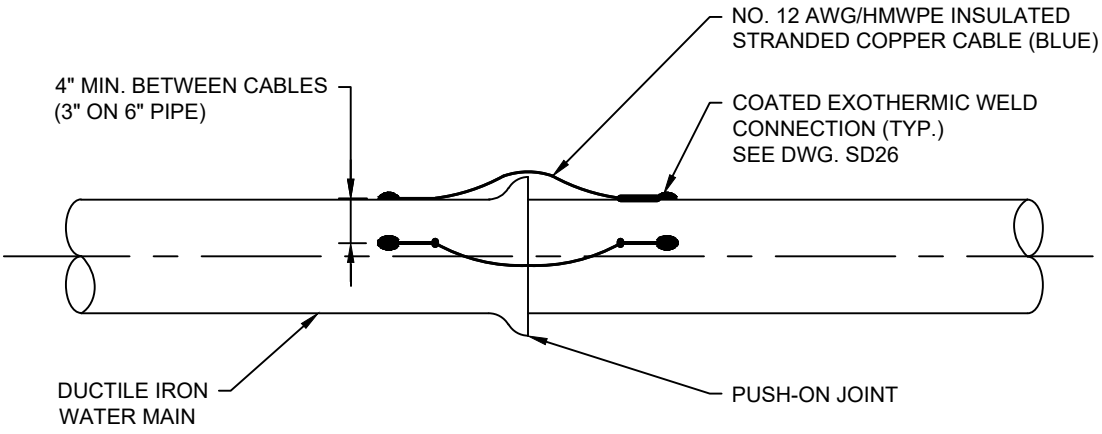
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TEST STATION CONNECTION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 24

NOTES:

1. MINIMUM 2 CONNECTIONS BETWEEN PIPES AS SHOWN.
2. COAT ALL EXOTHERMIC WELDS WITH APPROVED MATERIAL.



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1 WATER STREET
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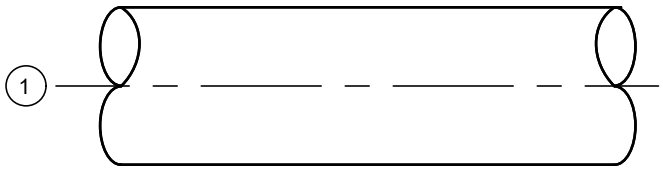
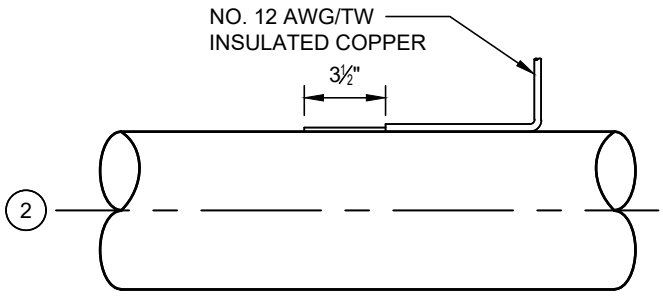
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
CONTINUITY BONDS FOR PUSH-ON DUCTILE IRON PIPE DETAIL

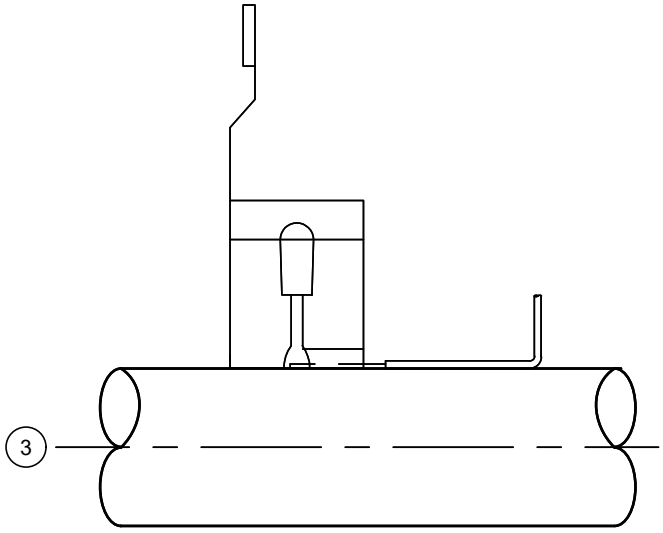
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 25



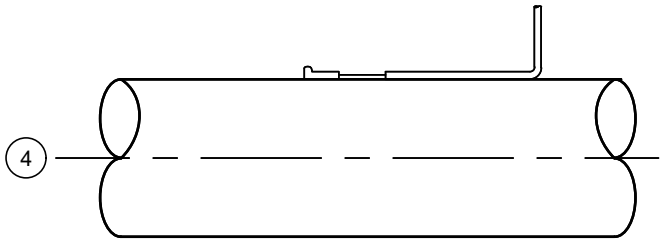
1. REMOVE COATING, FILE SURFACE TO BRIGHT METAL AND DRY.



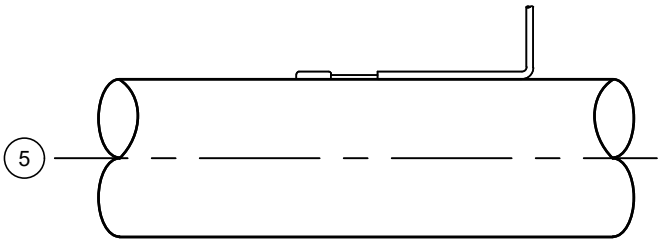
2. STRIP INSULATION FROM WIRE, CRIMP ON COPPER SLEEVE (AS REQ'D), PLACE WIRE AGAINST METAL SURFACE.



3. PLACE PREPARED WELDER OVER WIRE AND HOLD FIRM WHILE MAKING CONNECTION. APPLY SPARK TO SIDE OF WELDER.



4. AFTER WELD COOLS, REMOVE SLAG WITH HAMMER.



5. COAT CONNECTION WITH 3M RUBBERIZED AEROSOL UNDERCOATING PART #051135/08883 OR EQUIVALENT

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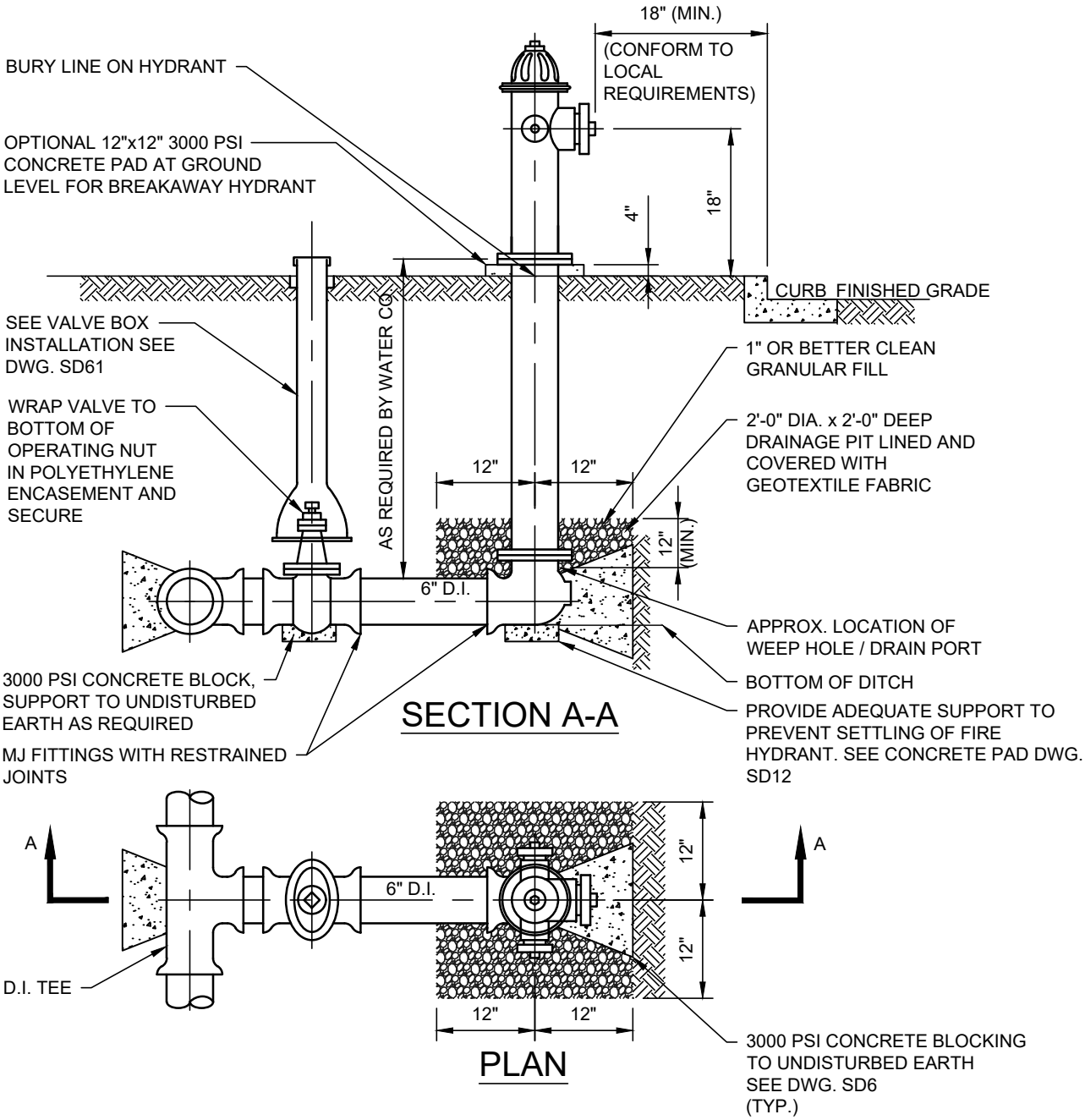
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
EXOTHERMIC WELD CONNECTION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 26



FIRE HYDRANT DETAIL-STANDARD

NOTES:

1. CONTRACTOR TO SUBMIT RESTRAINED DESIGN. ADDITIONAL RESTRAINT (BESIDES BLOCKING) ONLY AS REQUIRED BY ENGINEER.
2. PAINT HYDRANT TO BURY LINE (AND CAN BE DONE PRIOR TO INSTALLATION).
3. APPLY TOUCH UP PAINT AS REQUIRED AFTER INSTALLATION.
4. ALL HYDRANTS SHALL STAND PLUMB AND SHALL HAVE THE PUMPER NOZZLE FACING THE CURB.
5. PORTLAND CEMENT CONCRETE USED FOR THE THRUST BLOCKS SHALL BE MIN. 3000 PSI CONCRETE.

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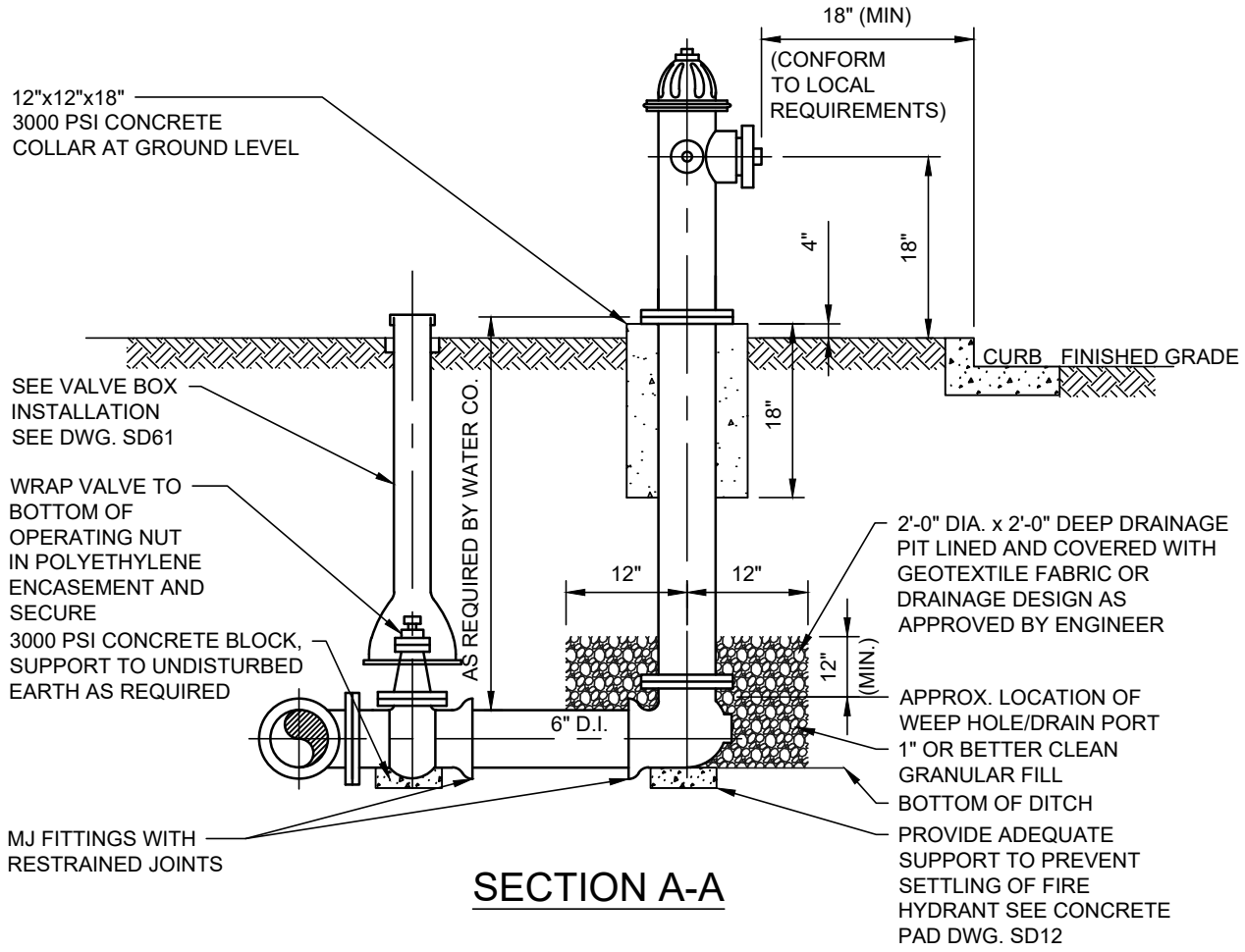
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
DRY BARREL FIRE HYDRANT WITH BLOCKING DETAIL

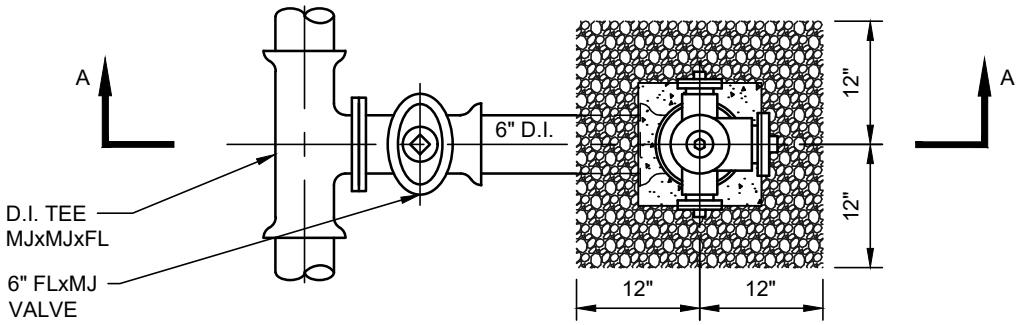
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 30

NOTES:

1. CONTRACTOR TO SUBMIT RESTRAINED DESIGN.
2. PAINT HYDRANT TO BURY LINE (CAN BE DONE PRIOR TO INSTALLATION).
3. APPLY TOUCH UP PAINT AS REQUIRED AFTER INSTALLATION.
4. ALL HYDRANTS SHALL STAND PLUMB AND SHALL HAVE THE PUMPER NOZZLE FACING THE CURB.
5. PORTLAND CEMENT CONCRETE USED FOR THE THRUST BLOCKS SHALL BE MIN. 3000 PSI CONCRETE.



SECTION A-A



PLAN

FIRE HYDRANT DETAIL-STANDARD

AMERICAN WATER ENGINEERING
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CAMDEN, NJ 08102

AMERICAN WATER

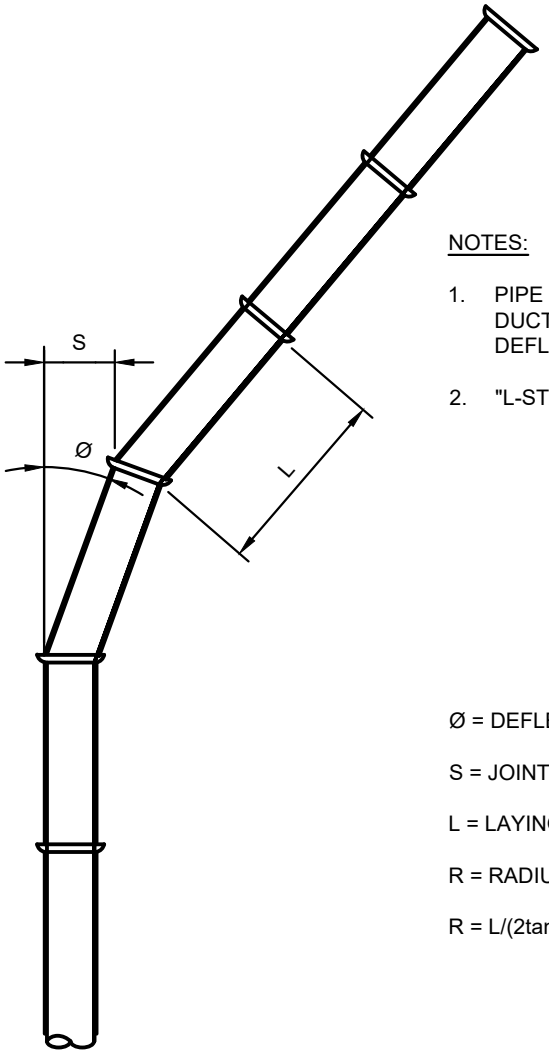
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
WET BARREL FIRE HYDRANT WITH FLANGE TEE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 31

MAXIMUM JOINT DEFLECTION

MAXIMUM JOINT DEFLECTION DUCTILE IRON PUSH ON PIPE						
NOMINAL PIPE SIZE	DEFLECTION ANGLE	MAX OFFSET -S		APPROX RADIUS OF CURVE - R PRODUCED BY SUCCESSION OF JOINTS		CURRENT AW DEFLECTION ANGLE
INCHES	DEGREES	INCHES		INCHES		DEGREES
		L=18 FT	L=20 FT	L=18 FT	L=20 FT	
3	4	15	17	256	285	
4	4	15	17	256	285	
6	4	15	17	256	285	4
8	4	15	17	256	285	4
10	4	15	17	256	285	
12	4	15	17	256	285	4
14	4	9	10	256	285	
16	2.5	9	10	429	476	2.5
18	2.5	9	10	429	476	
20	2.5	9	10	429	476	2
24	2.5	9	10	429	476	1.5

MAXIMUM JOINT DEFLECTION DUCTILE IRON MJ PIPE						
NOMINAL PIPE SIZE	DEFLECTION ANGLE	MAX OFFSET -S		APPROX RADIUS OF CURVE - R PRODUCED BY SUCCESSION OF JOINTS		CURRENT AW DEFLECTION ANGLE
INCHES	DEGREES	INCHES		INCHES		DEGREES
		L=18 FT	L=20 FT	L=18 FT	L=20 FT	table deleted
3	6.5	25	28	158	176	
4	6.5	25	28	158	176	
6	5.5	22	24	182	202	
8	4	16	18	256	285	
10	4	16	18	256	285	
12	4	16	18	256	285	
14	3	11	12	367	408	
16	3	11	12	367	408	
18	2.5	11	10	429	476	
20	2.5	9	10	429	476	
24	1.5	9	8	644	715	



NOTES:

1. PIPE JOINT DEFLECTION ALLOWED ON DUCTILE IRON PIPE ONLY. PIPE JOINT DEFLECTION NOT ALLOWED ON PVC PIPE.
2. "L-STANDARD LENGTH OF PIPE SECTION.

Ø = DEFLECTION ANGLE

S = JOINT DEFLECTION OFFSET

L = LAYING LENGTH

R = RADIUS OF CURVE

R = L/(2tan(Ø/2))

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AMERICAN WATER

AMERICAN WATER STANDARD
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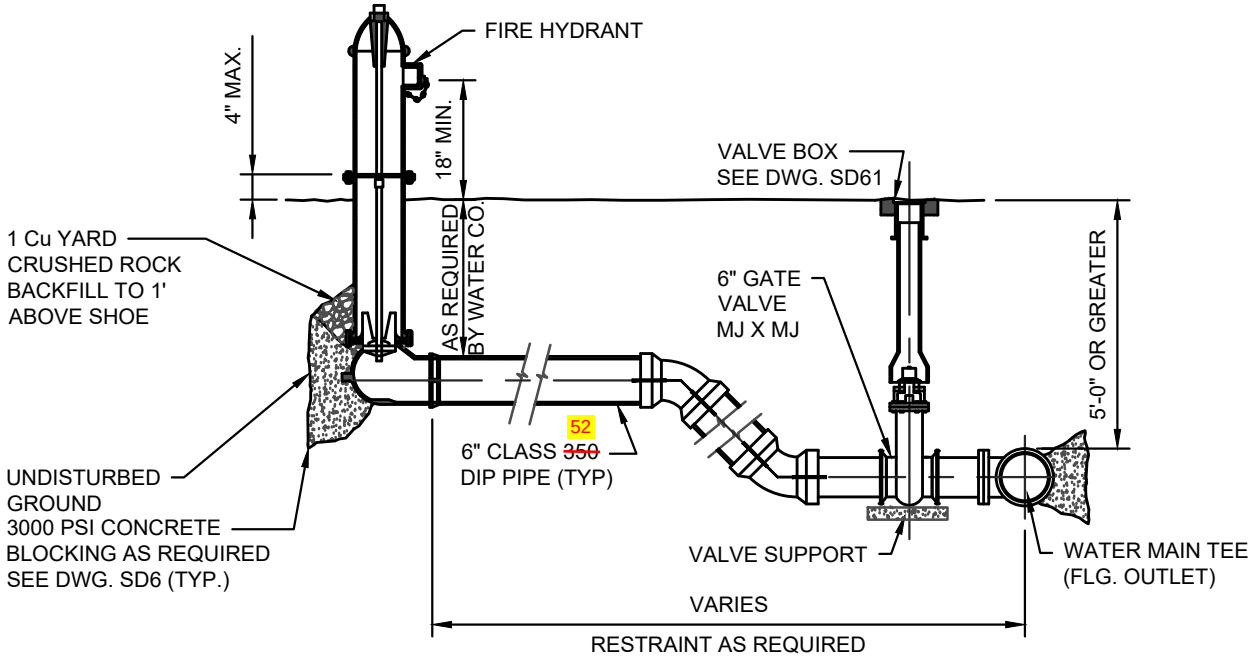
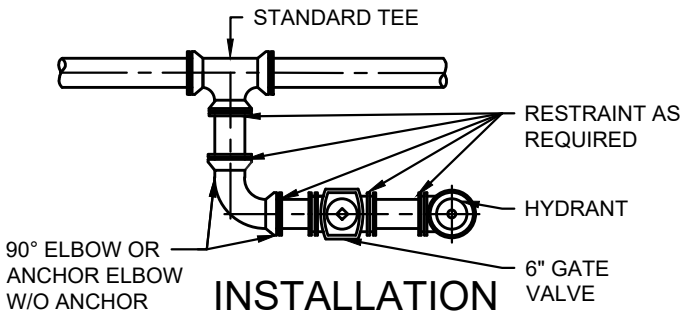
PIPE CURVE GEOMETRY DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 32

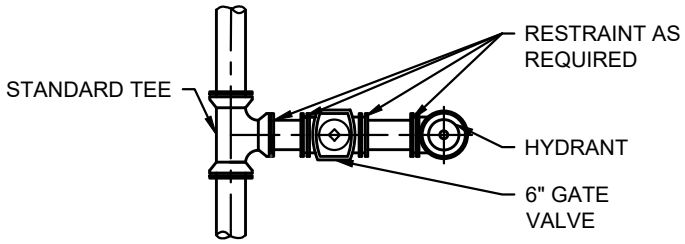


DEEP MAIN INSTALLATION

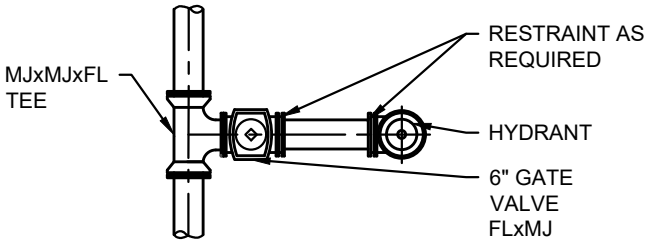
(ALTERNATIVE IS HYDRANT BARREL WITH DEEPER BURY OR BARREL EXTENSIONS PER ENGINEER'S RECOMMENDATIONS.)



INSTALLATION PARALLEL TO MAIN



INSTALLATION PERPENDICULAR TO MAIN



INSTALLATION PERPENDICULAR TO MAIN WITH MJxFLANGE TEE

NOTES:

1. THESE SCHEMATICS DISPLAY ALTERNATIVE LAYOUTS AND DETAIL OF RESTRAINT HAS NOT BEEN PROVIDED HERE.
2. ALL FITTINGS SHALL BE MJ FOR HYDRANT ALTERNATIVES SHOWN.

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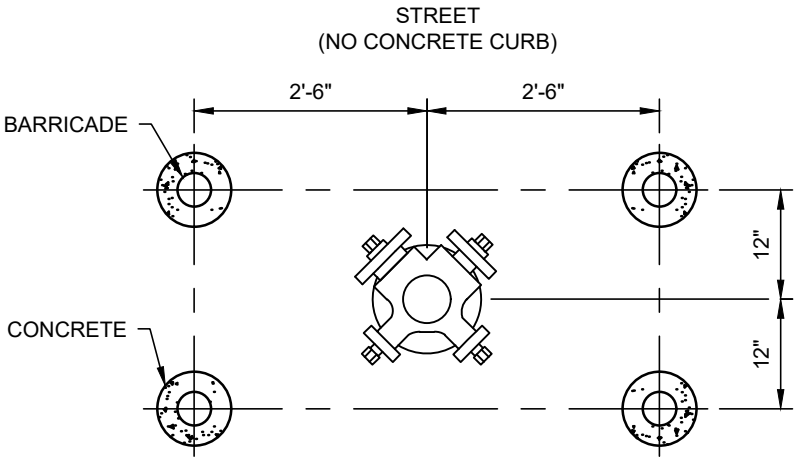
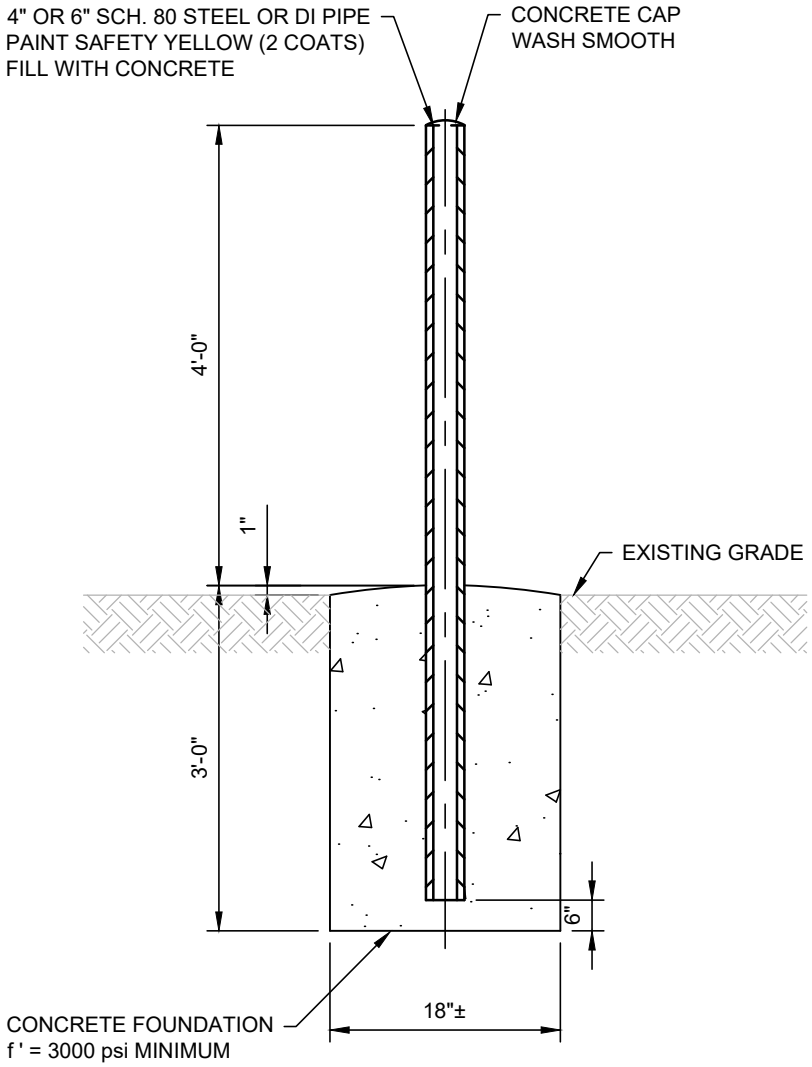
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
FIRE HYDRANT ALTERNATIVES DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 33



PLAN



SECTION

NOTES:

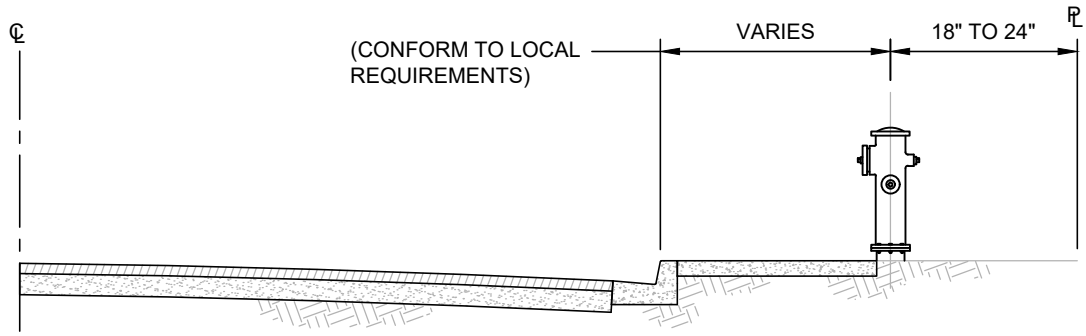
1. SEE PLANS FOR No. OF BARRICADES TO BE USED.
2. THE EXACT LOCATION OF BARRICADES MAY BE CHANGED BY THE ENGR.
3. THE STEEL PIPE ABOVE GROUND SHALL BE PAINTED WITH PRIMER COAT.
4. TWO FINISH COATS OF TNEMEC "SCHOOL BUS YELLOW" SHALL BE USED FOR BARRICADES.
5. BARRICADES FOR FLUSHOUTS, AIR RELEASE VALVES, & VAULT VENTS SHALL BE GIVEN TWO FINISH COATS OF YELLOW PAINT.
6. DO NOT LOCATE BOLLARD DIRECTLY ABOVE MAIN OR HYDRANT LATERAL.
7. BOLLARDS SHALL BE ORIENTED SO AS TO AVOID DISRUPTING HYDRANT OPERATION.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

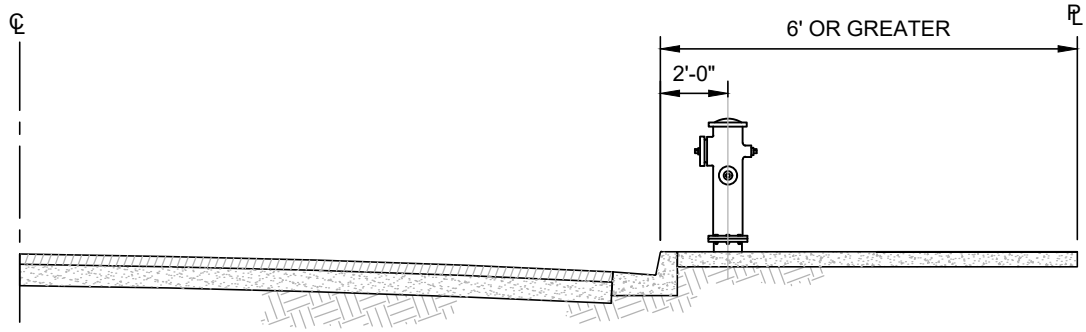
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
FIRE HYDRANT PROTECTION PIPE BOLLARD DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 34



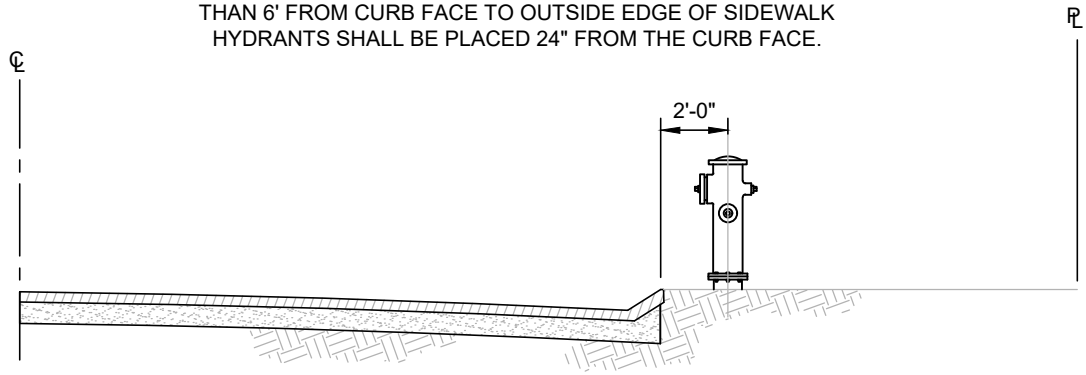
CASE 1

WHEN SIDEWALKS ARE ADJACENT TO CURB, HYDRANTS SHALL BE CENTERED AT BACK OF SIDEWALK.



CASE 2

WHEN SIDEWALKS ARE CONSTRUCTED WITH WIDTHS GREATER THAN 6' FROM CURB FACE TO OUTSIDE EDGE OF SIDEWALK HYDRANTS SHALL BE PLACED 24" FROM THE CURB FACE.



CASE 3

WHEN INVERTED SHOULDER SECTION IS PERMITTED AND CURB, GUTTER AND SIDEWALKS ARE WAIVED, THE HYDRANT SHALL BE CENTERED 24" BEHIND THE EDGE OF PAVEMENT.

NOTES:

1. REQUIREMENT OF LOCAL AUTHORITY HAVING JURISDICTION SHALL PREVAIL. IN THEIR ABSENCE, THE INSTALLATIONS SHOWN MAY BE USED.

2. EXACT HYDRANT LOCATION TO BE FIELD DETERMINED BY LOCAL AUTHORITY HAVING JURISDICTION.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

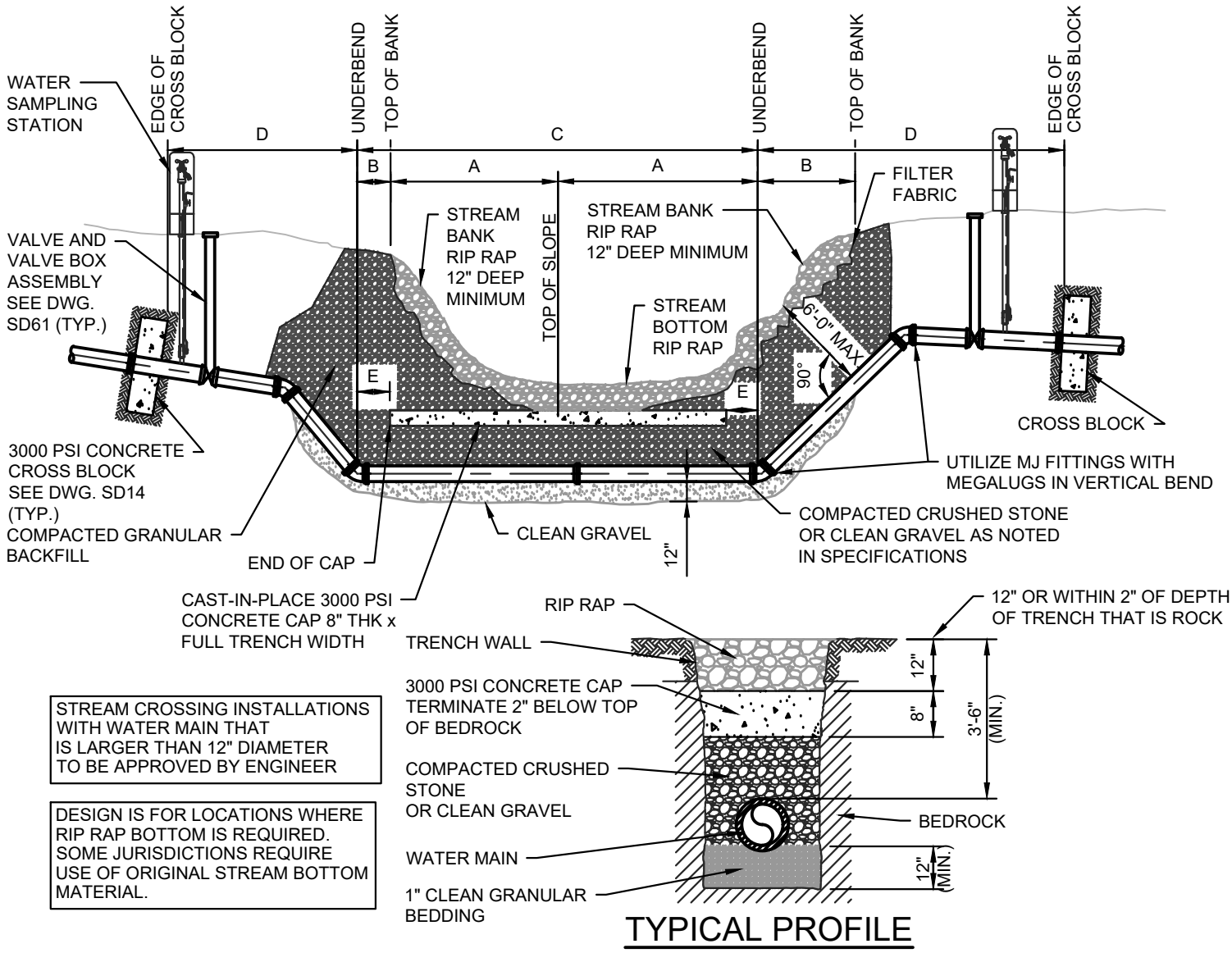
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
FIRE HYDRANT LOCATION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 36

NOTES:

1. ALL PIPE AND FITTINGS SHALL BE MECHANICAL JOINT WITH MEGALUG RESTRAINT.
2. RIP RAP SIZE AND QUANTITY DETERMINED BY ENGINEER.
3. DIMENSIONS A, B, C, D & E DETERMINED BY FIELD REPRESENTATIVE.
4. FOR D.I. OVER/UNDER BENDS SEE WATER MAIN INSTALLATION DETAILS.
5. FOR CONCRETE THRUST RESTRAINT SEE DRAWING SD6.
6. VALVE BOXES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FREQUENT FLOODING. VALVE LOCATION TO BE DETERMINED BY ENGINEER.
7. TR FLEX RESTRAINT JOINT OR EQUAL IS REQUIRED FOR 20 INCH DIAMETER AND LARGER. NON-VERTICAL FIELD CUT JOINTS SHALL BE COMPLETED WITH A GRIPPER RING ON THE SPIGOT END FOR THE JOINT PER MFG. RECOMMENDATIONS. MEGA-LUG TO BE USED ON VERTICAL INSTALLATIONS, VERIFY DESIGN WITH ENGINEER.
8. PIPE SHALL BE KEPT CLEAN AND DRY AT ALL TIMES DURING INSTALLATION.
9. INSTALL WATER SAMPLING STATION APPROXIMATELY 15 FEET FROM STREAM BANK OR AS DETERMINED BY ENGINEER. STATION TO BE PROVIDED BY WATER CO.



STREAM CROSSING INSTALLATIONS WITH WATER MAIN THAT IS LARGER THAN 12" DIAMETER TO BE APPROVED BY ENGINEER

DESIGN IS FOR LOCATIONS WHERE RIP RAP BOTTOM IS REQUIRED. SOME JURISDICTIONS REQUIRE USE OF ORIGINAL STREAM BOTTOM MATERIAL.

TYPICAL PROFILE

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

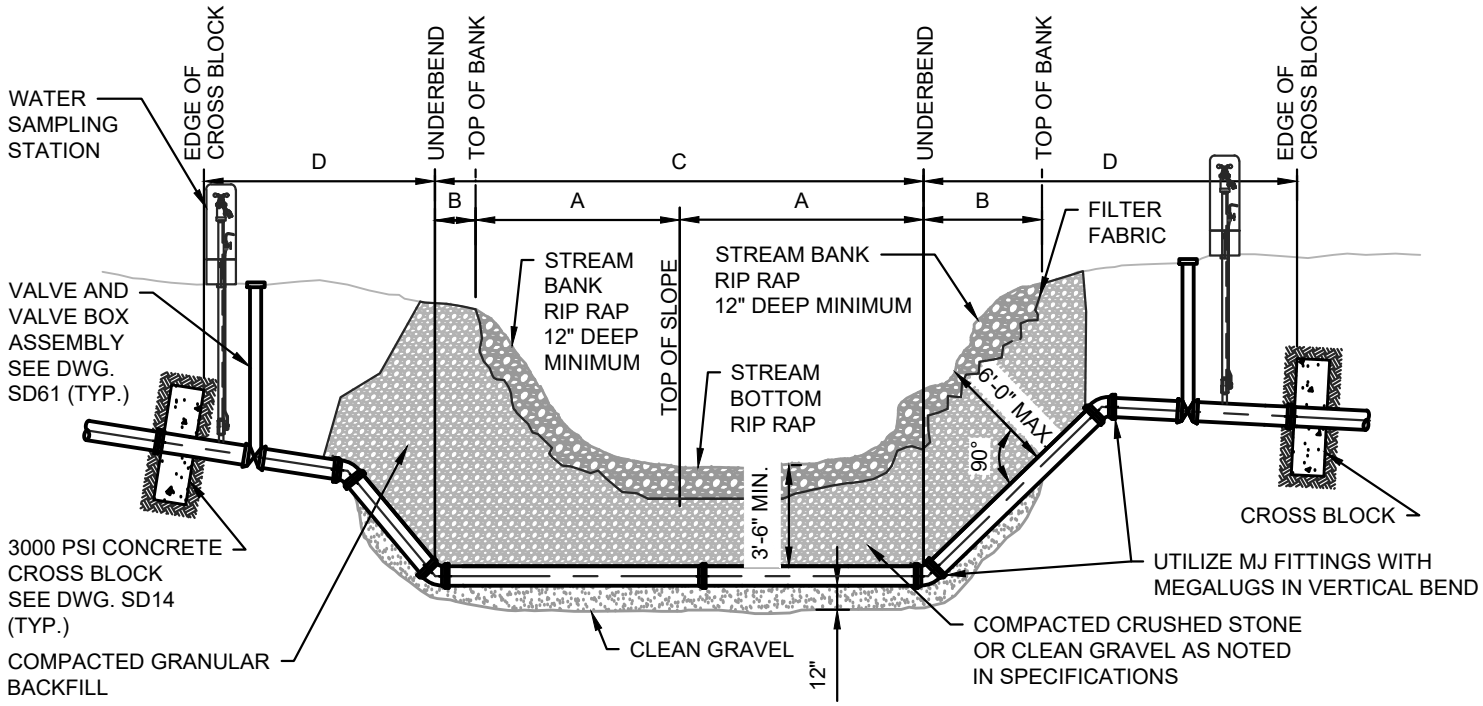
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
SOLID ROCK STREAM BOTTOM FOR OPEN CUT INSTALLATIONS DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 37

NOTES:

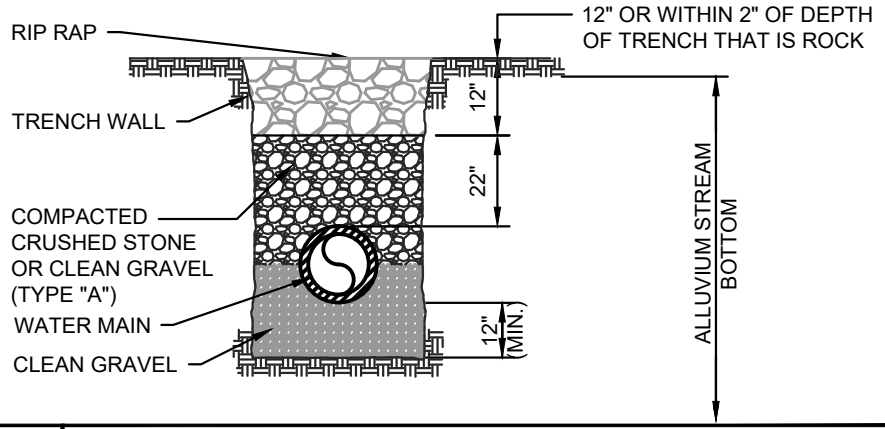
1. ALL PIPE AND FITTINGS SHALL BE MECHANICAL JOINT WITH MEGALUG RESTRAINT.
2. RIP RAP SIZE AND QUANTITY DETERMINED BY ENGINEER.
3. DIMENSIONS A, B, C, D & E DETERMINED BY FIELD REPRESENTATIVE.
4. FOR D.I. OVER/UNDER BENDS SEE WATER MAIN INSTALLATION DETAILS.
5. FOR CONCRETE THRUST RESTRAINT SEE DRAWING SD6.
6. VALVE BOXES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FREQUENT FLOODING. VALVE LOCATION TO BE DETERMINED BY ENGINEER.
7. TR FLEX RESTRAINT JOINT OR EQUAL IS REQUIRED FOR 20 INCH DIAMETER AND LARGER. NON-VERTICAL FIELD CUT JOINTS SHALL BE COMPLETED WITH A GRIPPER RING ON THE SPIGOT END FOR THE JOINT PER MFG. RECOMMENDATIONS. MEGA-LUG TO BE USED ON VERTICAL INSTALLATIONS, VERIFY DESIGN WITH ENGINEER.
8. PIPE SHALL BE KEPT CLEAN AND DRY AT ALL TIMES DURING INSTALLATION.
9. INSTALL WATER SAMPLING STATION APPROXIMATELY 15 FEET FROM STREAM BANK OR AS DETERMINED BY ENGINEER. STATION TO BE PROVIDED BY WATER CO.



TYPICAL PROFILE

STREAM CROSSING INSTALLATIONS WITH WATER MAIN THAT IS LARGER THAN 12" DIAMETER TO BE APPROVED BY ENGINEER

DESIGN IS FOR LOCATIONS WHERE RIP RAP BOTTOM IS REQUIRED. SOME JURISDICTIONS REQUIRE USE OF ORIGINAL STREAM BOTTOM MATERIAL.



AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

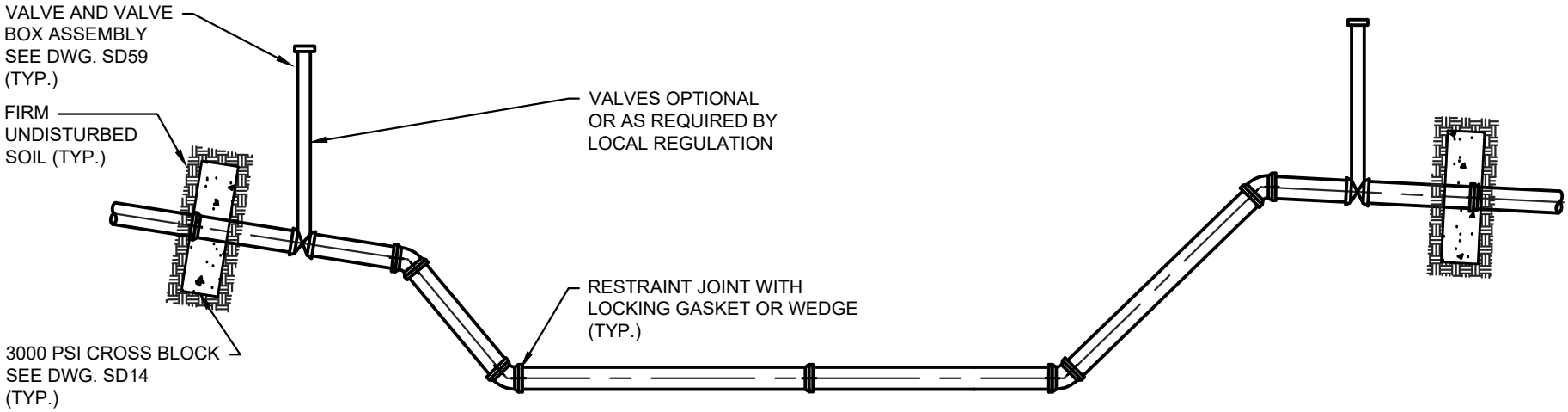
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
ALLUVIUM STREAM BOTTOM CROSSING DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 38

NOTES:

1. TR FLEX RESTRAINT JOINT IS REQUIRED FOR 20 INCH DIAMETER AND LARGER. VERTICAL FIELD CUT JOINTS SHALL BE COMPLETED WITH A GRIPPER RING ON THE SPIGOT END FOR THE JOINT PER MFG. MEGA-LUG TO BE USED ON VERTICAL INSTALLATIONS, VERIFY DESIGN WITH ENGINEER.

2. ALTERNATIVE TO CROSS BLOCKING PER ENGINEER REVIEW IS RESTRAINING JOINTS 75 FEET MINIMUM BEYOND VALVES.



AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

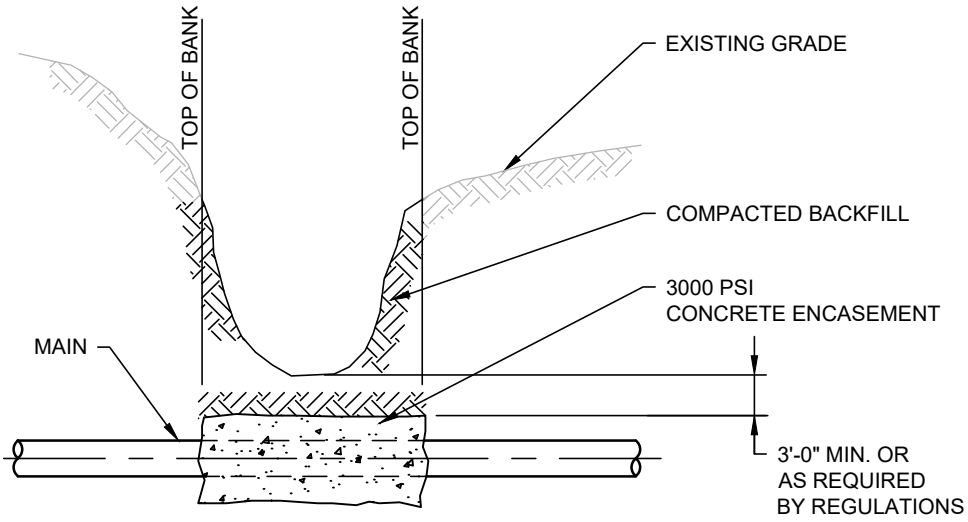
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
UTILITY CROSS WAYS PIPE CROSSING DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 39

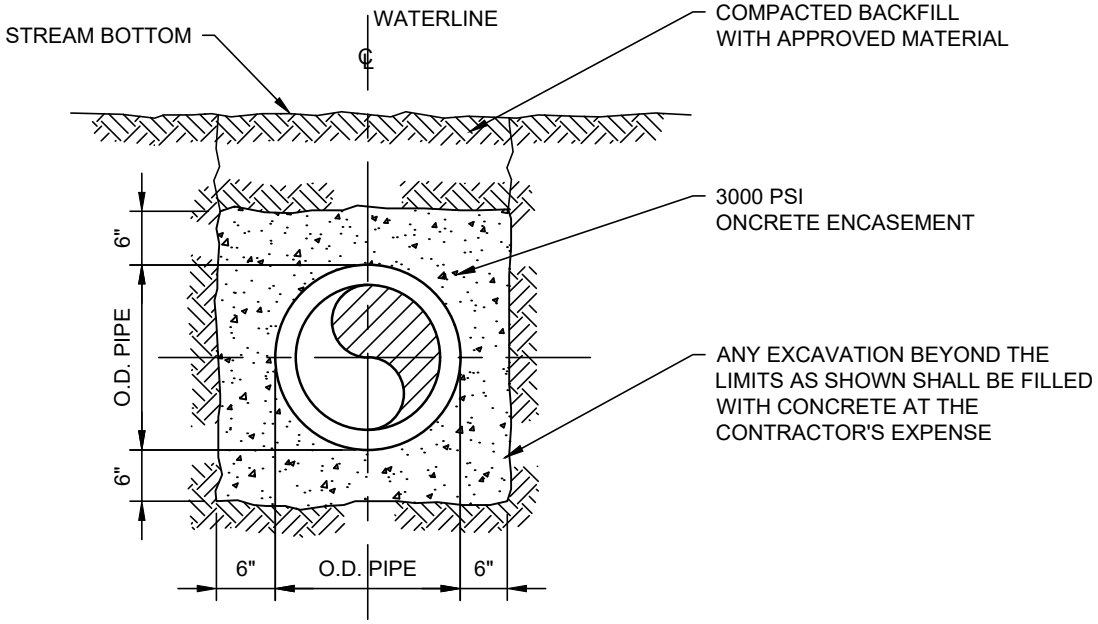
NOTES:

1. MINIMUM ENCASEMENT LIMITS ARE SHOWN ON THE DRAWINGS. THE ACTUAL LIMITS SHALL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION SUCH THAT THE ENCASEMENT TERMINATES AT A PIPE JOINT. THE JOINT SHALL BE FREE OF CONCRETE SO AS TO PROVIDE A FLEXIBLE JOINT.

2. REQUIRED COVER UNDER SMALL CREEKS, WASHES AND DRY STEADY BEDS SHALL BE PER LOCAL REQUIREMENTS.



TYPICAL PROFILE



TYPICAL SECTION

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

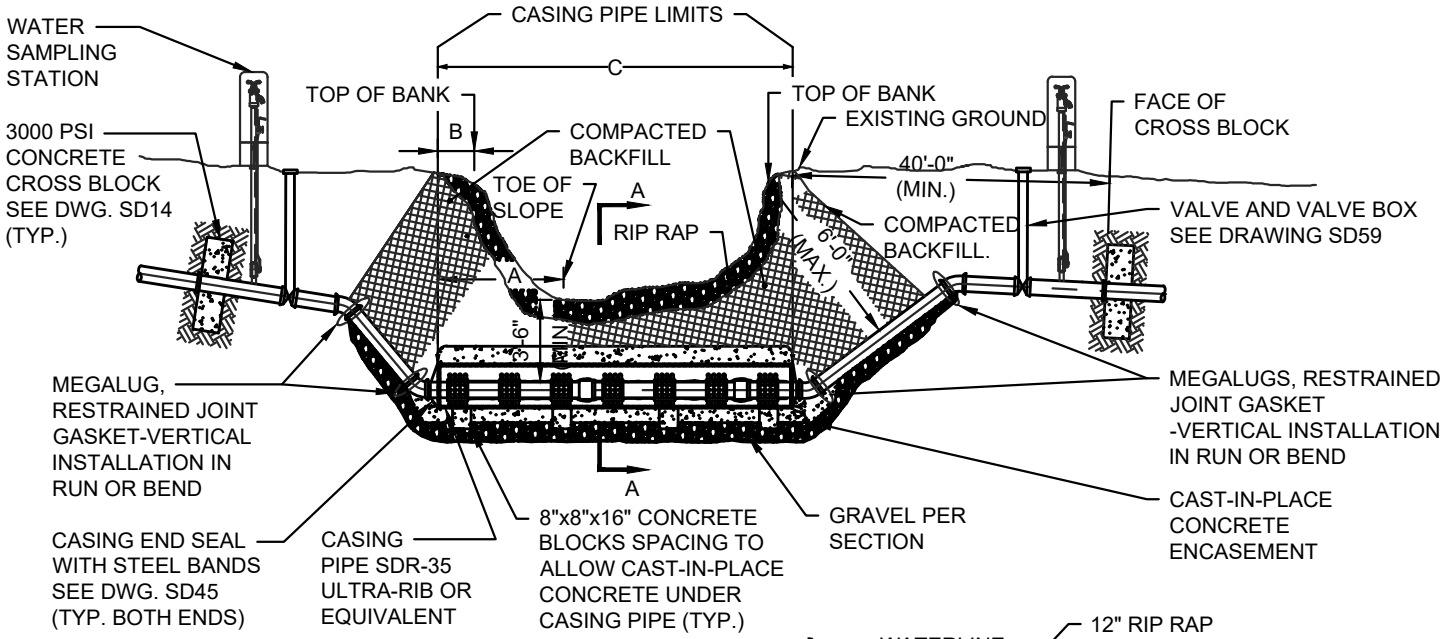
AMERICAN WATER

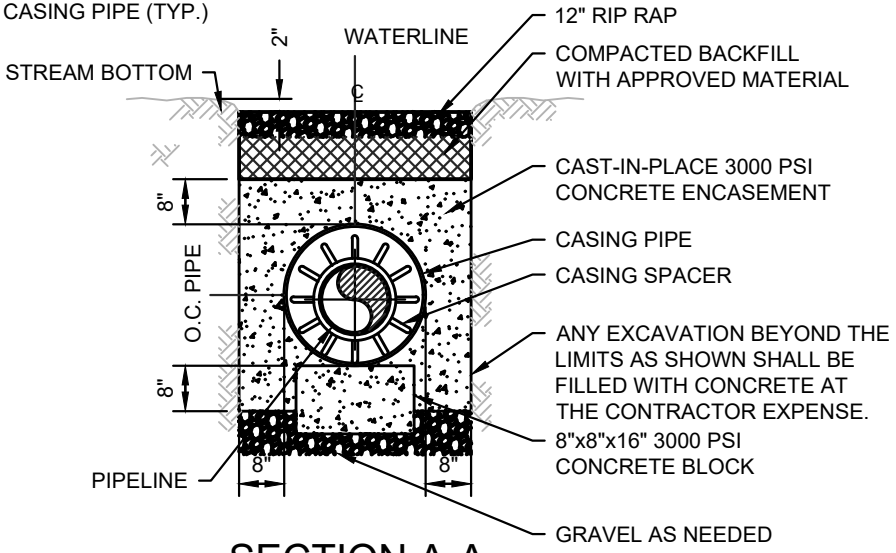
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
MINOR STREAM CROSSING WITH CONCRETE ENCASEMENT DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 40

NOTES:

1. FOR ENCASEMENT SPACER DETAILS AND TYPICAL THRUST RESTRAINT FOR D.I. OVER BENDS AND PIPING SEE WATER MAIN DETAILS, DRAWING SD45.
2. DIMENSIONS A, B & C TO BE DETERMINED BY FIELD REPRESENTATIVE.
3. MINIMUM ENCASEMENT LIMITS ARE SHOWN ON THE DRAWINGS. THE ACTUAL LIMITS SHALL BE DETERMINED AT THE TIME OF CONSTRUCTION SUCH THAT THE ENCASEMENT TERMINATES AT A PIPE JOINT. THE JOINTS SHALL BE FREE OF CAST-IN-PLACE CONCRETE.
4. RIP RAP SHALL BE INSTALLED TO MATCH CONTOUR OF STREAM BOTTOM AND STREAM BANK SIDES. DEPTH OF RIP RAP IS 18 INCHES.
5. ALL PIPE AND FITTINGS SHALL BE PUSH-ON DUCTILE IRON WITH JOINT RESTRAINT GASKETS FOR 16 INCH DIAMETER AND SMALLER.
6. TR FLEX RESTRAINT JOINT IS REQUIRED FOR 20 INCH DIAMETER AND LARGER. NON-VERTICAL FIELD CUT JOINTS SHALL BE COMPLETED WITH A GRIPPER RING ON THE SPIGOT END FOR THE JOINT PER MFG. RECOMMENDATIONS. MEGA-LUG TO BE USED ON VERTICAL INSTALLATIONS.
7. VALVES SHALL BE INSTALLED AT BOTH ENDS OF THE CROSSING. VALVE BOXES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FREQUENT FLOODING, VALVE LOCATION TO BE DETERMINED BY ENGINEER.
8. PROVIDE ANCHORING AS NEEDED TO PREVENT CASING FROM FLOATING.
9. INSTALL WATER SAMPLING STATION APPROXIMATELY 15 FEET FROM STREAM BANK OR AS DETERMINED BY ENGINEER. STATION TO BE PROVIDED BY WATER CO.





STREAM CROSSING INSTALLATIONS WITH WATER MAIN THAT IS LARGER THAN 12" DIAMETER TO BE APPROVED BY ENGINEER.

DESIGN IS FOR LOCATIONS WHERE RIP RAP BOTTOM IS REQUIRED. SOME JURISDICTIONS REQUIRE USE OF ORIGINAL STREAM BOTTOM MATERIAL.

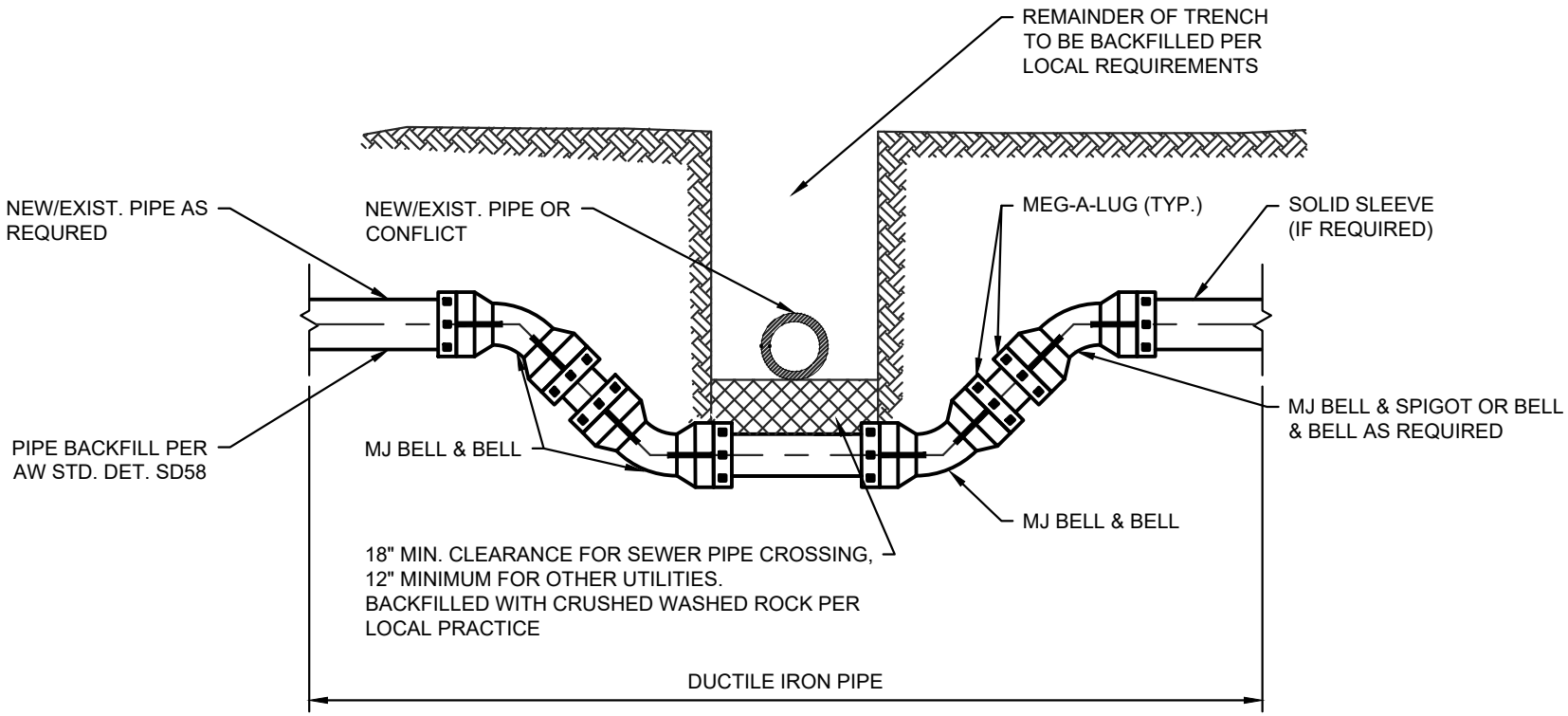
SECTION A-A

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
STREAM CROSSING ENCASED IN CONCRETE DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 41



NOTES:

1. ALL PIPE TO BE JOINT RESTRAINED.
2. PIPE IS TO BE DUCTILE IRON, CLASS 52 (MINIMUM), OR AS OTHERWISE SPECIFIED BY WATER CO..
3. ALL DUCTILE IRON PIPE SHALL BE POLYETHYLENE WRAPPED FOR THE ENTIRE LENGTH.
4. BEGIN/END RESTRAINED JOINT STATIONING TO BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. ALL BENDS & FITTINGS SHALL HAVE STATIONING AND ELEVATION SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. THE BOTTOM ELEVATION OF THE CONFLICT AND THE TOP ELEVATION OF THE DUCTILE IRON PIPE AT THE CENTERLINE OF THE CONFLICT SHALL BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS..

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

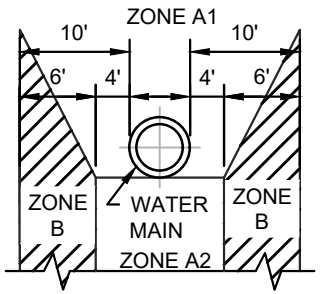
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
VERTICAL REALIGNMENT OF WATER MAINS DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 42

SPECIAL CONSTRUCTION REQUIREMENTS

WHERE REQUIRED WATER MAIN SEPARATION FROM SEWER CANNOT BE MAINTAINED

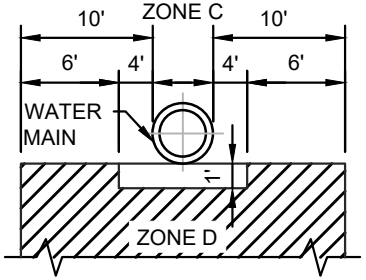
PARALLEL CONSTRUCTION



ZONE A
PARALLEL CONSTRUCTION CLOSE TO PIPE

ZONE B
PARALLEL CONSTRUCTION AT LEAST 4' FROM PIPE

PERPENDICULAR CONSTRUCTION



ZONE C
PERPENDICULAR ABOVE OR EVEN HORIZONTAL

ZONE D
PERPENDICULAR BELOW HORIZONTAL IF AN EXISTING SEWER IS LOCATED WITHIN THESE LIMITS. THE CONDITIONS REQUIREMENTS MAY APPLY (CONFIRM WITH REGULATOR)

IF AN EXISTING SEWER IS LOCATED WITHIN ZONES A1, A2, B, C, OR D OF A PROPOSED WATER MAIN, THE FOLLOWING SPECIAL REQUIREMENTS APPLY:

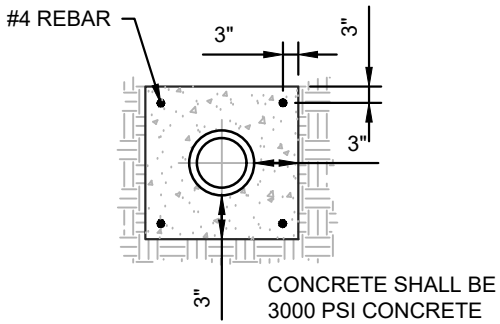
ZONE

A. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE APPROPRIATE HEALTH OR ENVIRONMENTAL REGULATOR.

B. IF THE SEWER DOES NOT MEET ZONE B REQUIREMENTS, THE WATER MAIN SHALL BE OF PRESSURE CLASS 200 PIPE FOR PVC AND CLASS 52 FOR D.I. PIPE. SEWER SHALL BE CONSTRUCTED EQUAL TO WATER PIPE AND TESTED FOR WATER TIGHTNESS.

C. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE HEALTH REGULATOR. IF PERMISSION IS GRANTED, THE SEWER PIPE SHALL BE ENCASED WITH REINFORCED CONCRETE AND THE WATER MAIN SHALL BE OF CLASS 200 PIPE OR EQUIVALENT.

D. THE SEWER SHALL BE ENCASED WITH REINFORCED CONCRETE.



REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS

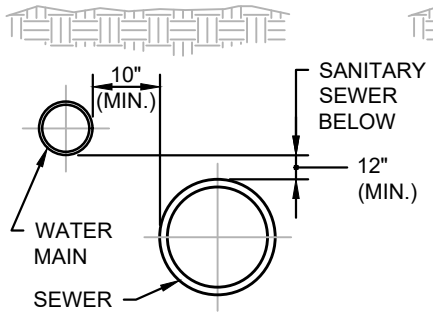
BASIC SEPARATION REQUIREMENTS

WATER MAINS AND SEWERS SHOULD BE SEPARATED AS FAR AS IS REASONABLE IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS WITH SEWERS LOWER THAN WATER MAINS.

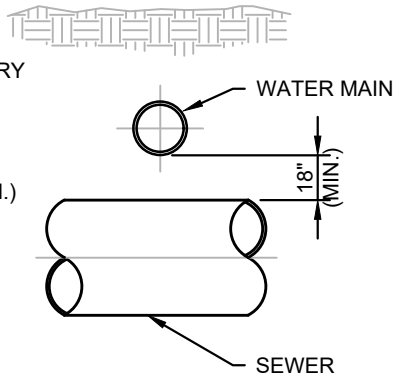
PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWERS SHALL BE AT LEAST 10 FEET.

PERPENDICULAR CONSTRUCTION (CROSSING): PRESSURE WATER MAINS SHALL BE AT LEAST 18" ABOVE SANITARY SEWERS WHERE THESE LINES MUST CROSS.

PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION



AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

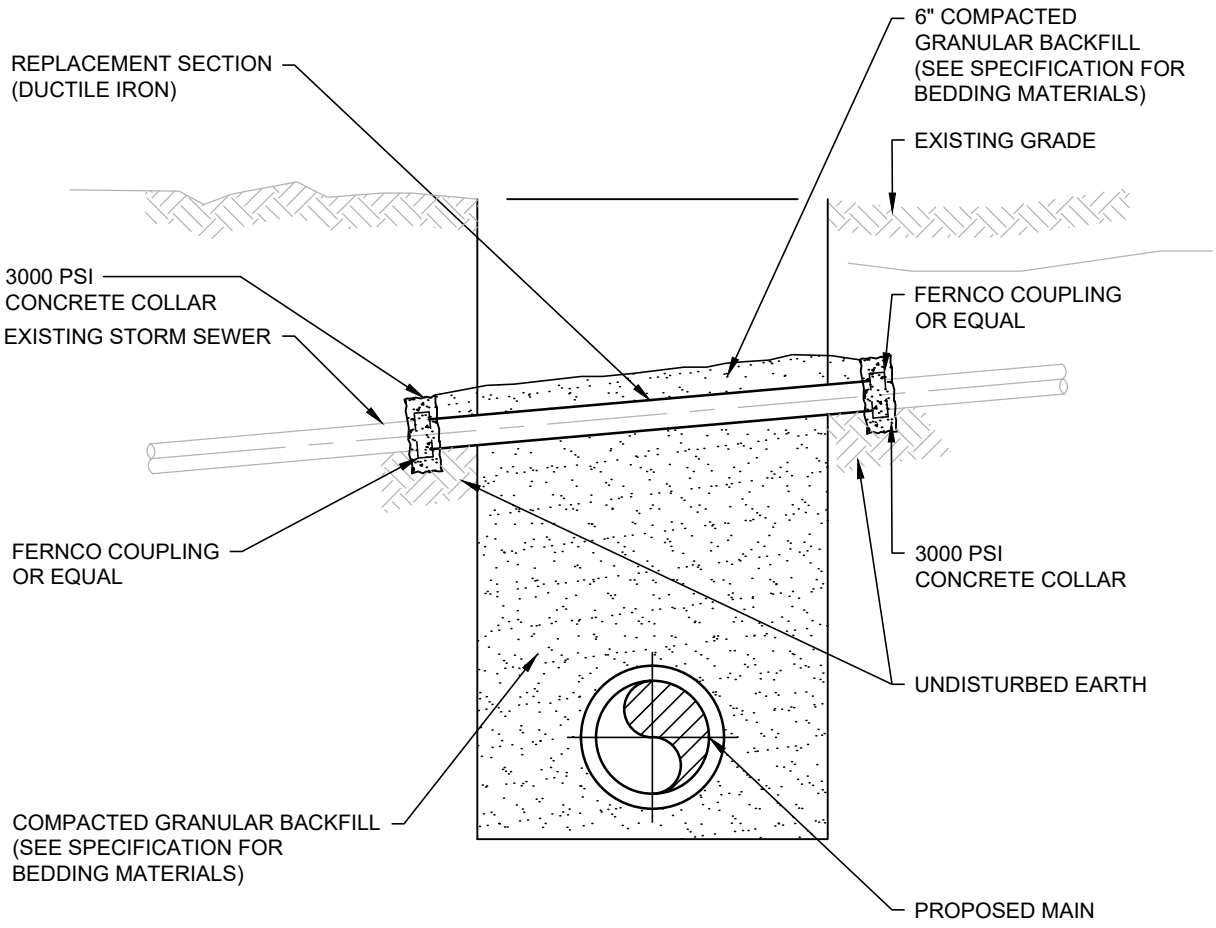
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
SPECIAL CONSTRUCTION REQUIREMENTS FOR WATER MAIN DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 43

NOTES:

1. IF THE EXISTING STORM SEWER IS DAMAGED OR REMOVED DURING CONSTRUCTION IT SHALL BE REPLACED ACROSS THE TRENCH SUCH THAT THE CONCRETE COLLARS ARE SUPPORTED ON UNDISTURBED EARTH.
2. THE CONCRETE COLLAR SHALL BE FORMED AT A JOINT WITH THE EXISTING HOUSE LATERAL USING FERNCO COUPLINGS.
3. THE REPLACEMENT SECTION SHALL BE CLASS 52 DUCTILE IRON PIPE WITH AN INSIDE DIAMETER EQUAL TO THE EXISTING PIPE. ANSI/AWWA C151/A21.51 DUCTILE IRON PIPE SHALL BE USED AS A MINIMUM STANDARD.
4. WHEN THE STORM SEWER OWNER HAS REQUIREMENTS WHICH ARE MORE STRINGENT, THE CONTRACTOR SHALL CONFORM TO THE MORE STRINGENT REQUIREMENTS AND MAKE NO CLAIM FOR ADDITIONAL COMPENSATION OR AN EXTENSION OF TIME BECAUSE OF SUCH REQUIREMENTS.



AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

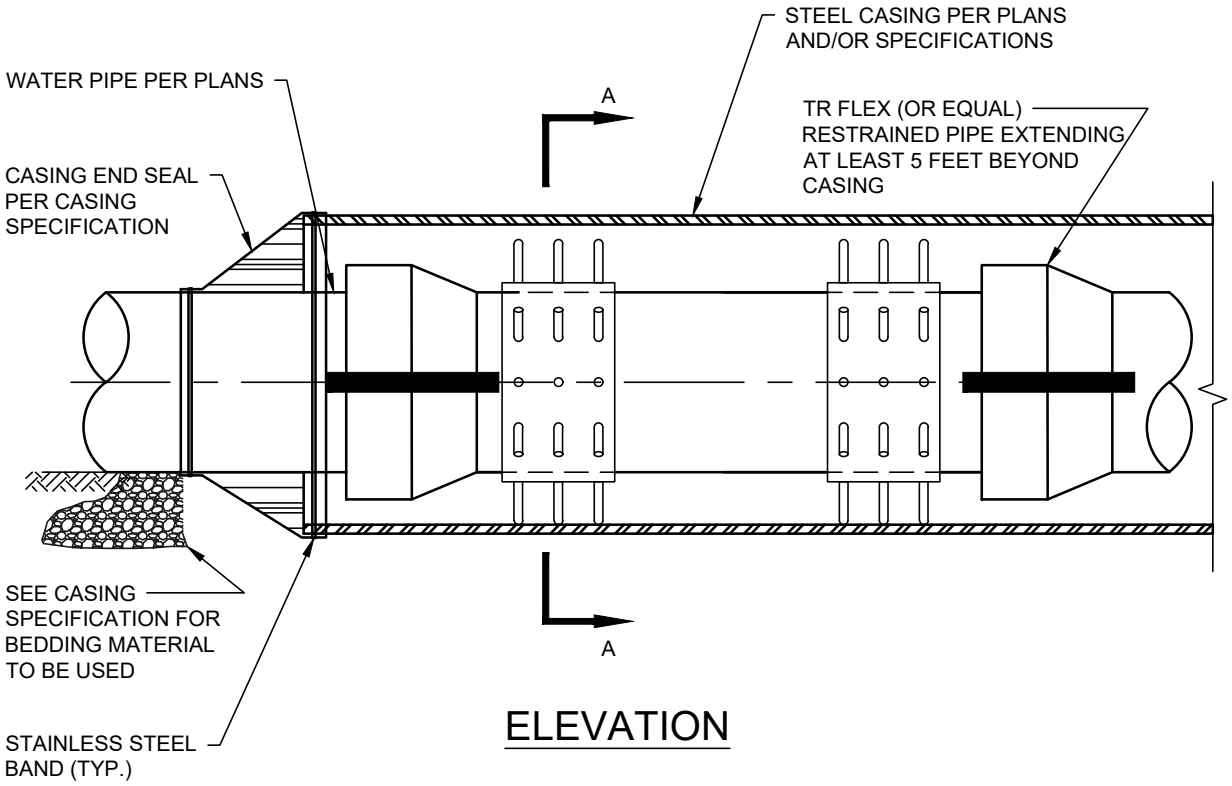
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
STORM SEWER REPLACEMENT DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 44

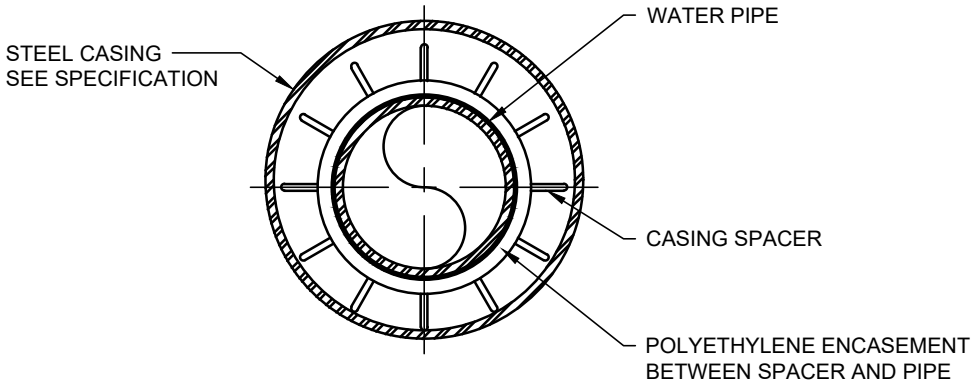
NOTES:

1. RESTRAINT OR EQUALS DEFINED AS REQUIRING NO SPECIAL TOOLS OR SHIMS TO REMOVE PIPE FROM CASING IN THE FUTURE

2. THIS STANDARD APPLICABLE TO 4" DIA. AND LARGER PIPE.



ELEVATION



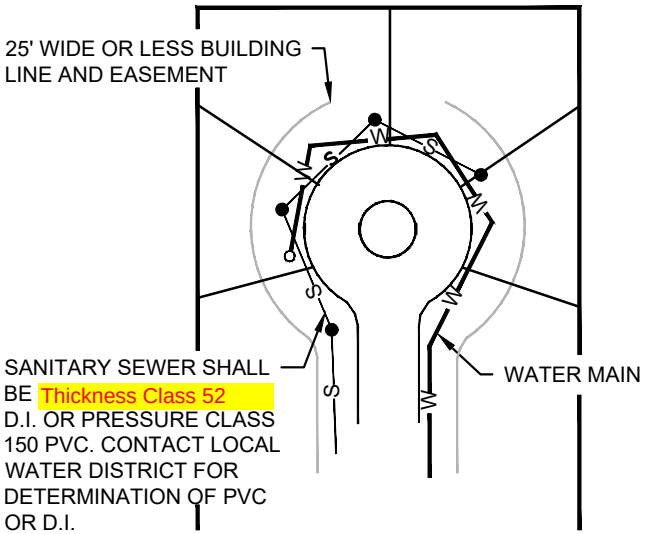
SECTION A-A

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

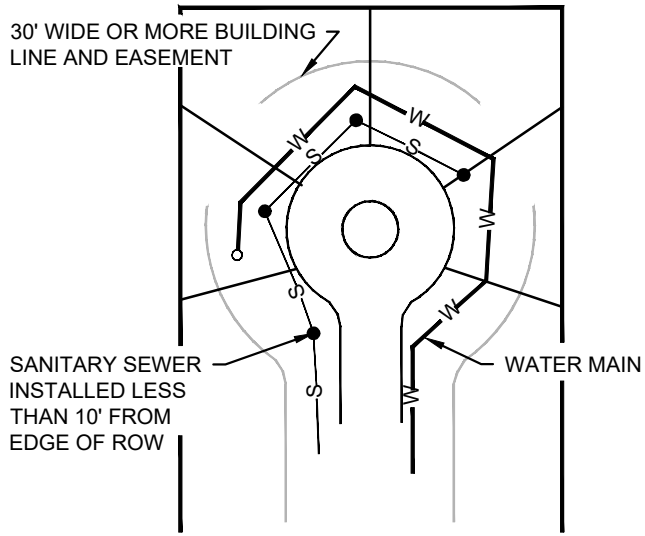
AMERICAN WATER STANDARD CIVIL
WATER DISTRIBUTION SYSTEM CASING INSTALLATION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 45



LAYOUT "A"

BUILDING SETBACK 25' OR LESS CSR 20-8 (SPECIAL CONDITIONS)



LAYOUT "B"

BUILDING SETBACK 30' OR MORE
CSR 20-8 (TEN FOOT SEPARATION)

NOTES:

CUL-DE-SACS THAT ARE DESIGNED WITH THE SANITARY SEWER INSTALLED OR PROPOSED AROUND THE PERIMETER OF A CUL-DE-SAC IN AN EASEMENT MUST MEET THE DNR CODE OF STATE REGULATIONS (CSR) AS OUTLINED BELOW. DUE TO THE WIDTH OF SEWER TRENCHES AND THE RESULTING DISTURBED SOIL OCCUPYING THE ENTIRE EASEMENT.

REGULATIONS NORMALLY REQUIRE 10 FEET SEPARATION BETWEEN THE WATER MAIN AND THE BUILDING LINE WHERE A WATER MAIN IS INSTALLED OR PROPOSED AROUND THE PERIMETER OF A CUL-DE-SAC.

CUL-DE-SACS WITH 30 FOOT WIDE EASEMENT AND BUILDING LINE SHOULD NOT BE AN ISSUE AS LONG AS THE SEWER IS INSTALLED LESS THAN 10 FEET FROM THE EDGE OF RIGHT OF WAY.

HORIZONTAL SEPARATION - SEWER MAINS SHALL BE AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN. THE DISTANCES SHALL BE MEASURED EDGE-TO-EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN TEN FOOT (10') - SEPARATION. DEVIATION ON A CASE BY CASE BASIS, IF SUPPORTED BY DATA FROM THE DESIGN ENGINEER. THIS DEVIATION MAY ALLOW INSTALLATION OF THE SEWER CLOSER TO THE WATER MAIN, PROVIDED THAT THE WATER MAIN IS IN A SEPARATE TRENCH OR AN UNDISTURBED EARTH SHELF LOCATED ON ONE (1) SIDE OF THE SEWER AT AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST EIGHTEEN INCHES (18") ABOVE THE TOP OF THE SEWER. CONSTRUCTOR SHALL NOT PROCEED WITH DEVIATION WITHOUT AW APPROVAL.

CROSSING - SEWERS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF EIGHTEEN INCHES (18") BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER. THE CROSSING SHALL BE ARRANGED SO THE SEWER JOINT WILL BE EQUIVALENT AND AS FAS AS POSSIBLE FROM THE WATER MAIN JOINTS. WHEN A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT DAMAGE TO THE WATER MAIN.

SPECIAL CONDITIONS. WHEN IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS STIPULATED PREVIOUSLY. THE SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE AND SHALL BE PRESSURE TESTED TO ENSURE WATER-TIGHTNESS PRIOR TO BACKFILLING.

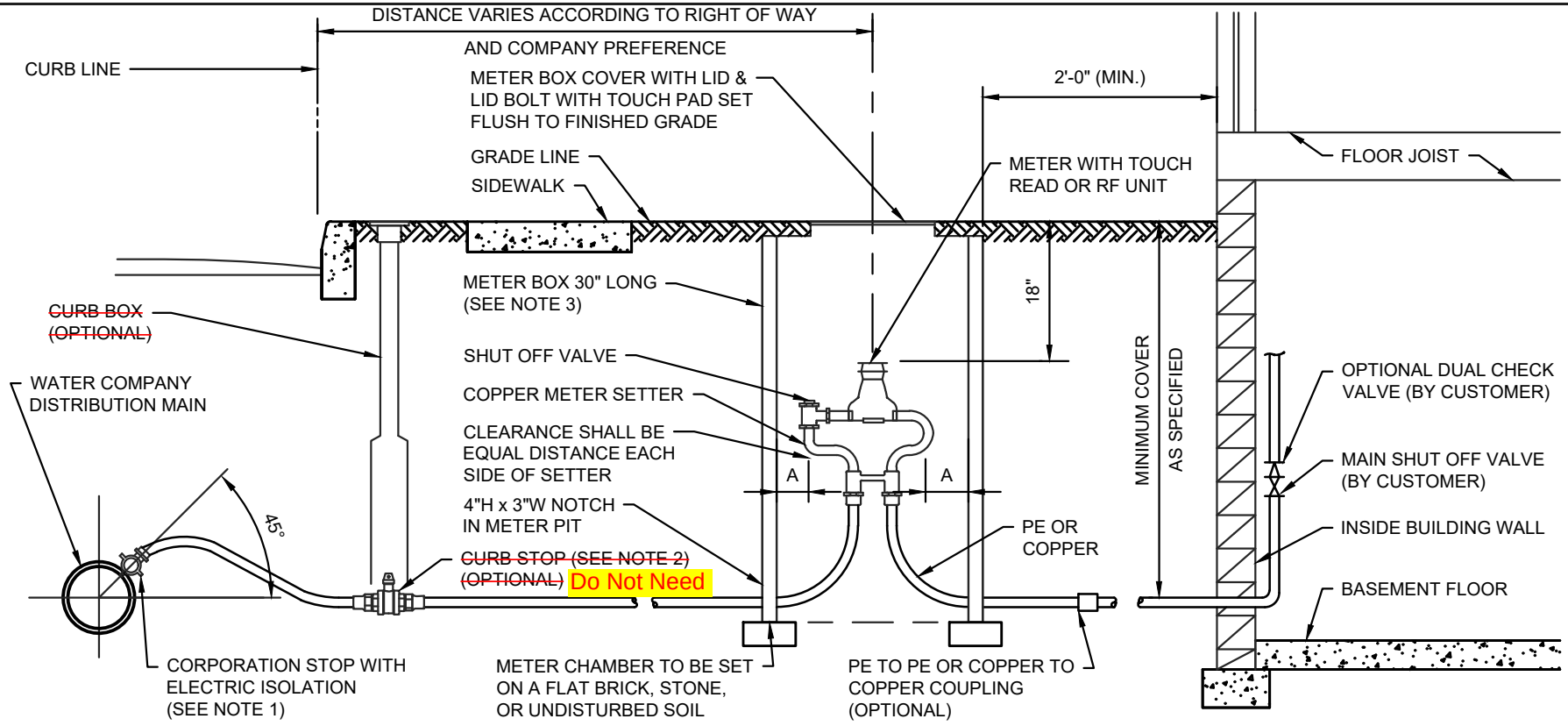
AN AWC DESIGNATED INSPECTOR SHALL VERIFY AND DOCUMENT THE TYPE AND PRESSURE OF SEWER MATERIAL INSTALLED, SHALL VERIFY PRESSURE TESTING FOR WATER-TIGHTNESS, AND SHALL PROVIDE AS-BUILT DRAWINGS OF THE SEWER MAIN SHOWING THE LOCATION OF THE SEWER JOINTS AND MANHOLES. SEWER DOCUMENTATION AND AS-BUILT DRAWINGS FOR LAYOUT "A" SHALL BE SENT TO AWC NEW BUSINESS DEPARTMENT PRIOR TO WATER MAIN CONSTRUCTION.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PROTECTION OF WATER SUPPLIES DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 46



NOTES:

1. CORPORATION STOP WITH STRAIGHT COUPLING NUT. SERVICE SADDLES WILL BE USED FOR ALL TAPS IN A/C, PVC OR CONCRETE MAINS.
2. MATERIAL UTILIZED SHOULD BE TYPE "K" (OR "L" COPPER IF PERMITTED) WITH A COPPER TO COPPER CURB STOP, BOTH ENDS COMPRESSION FITTING, POLYETHYLENE ENCASE AS REQUIRED.
3. 18" I.D. CHAMBER FOR USE WITH 5/8" METER. 20" I.D. CHAMBER FOR USE WITH 1" METER. SQUARE METER PITS MAY BE USED IF LOCAL PREFERENCE EXISTS.
4. METER BOX LOCATION TO BE DETERMINED BY LOCAL AUTHORITY AND AWW.
5. SERVICE LINE AND METER BOX OWNERSHIP VARIES BY LOCAL TARIFF.
6. POLYWRAP SERVICE FROM MAIN TO METER PIT IF SOIL IS CORROSIVE.
7. IN HEAVY FROST AREAS, A PLASTIC INNER LID AND BLANKET CAN BE USED.
8. CONNECTIONS BETWEEN PIPE LENGTHS SHALL BE COMPRESSION OR FLARE AND MAY DEPEND ON LOCAL PLUMBING REQUIREMENT.

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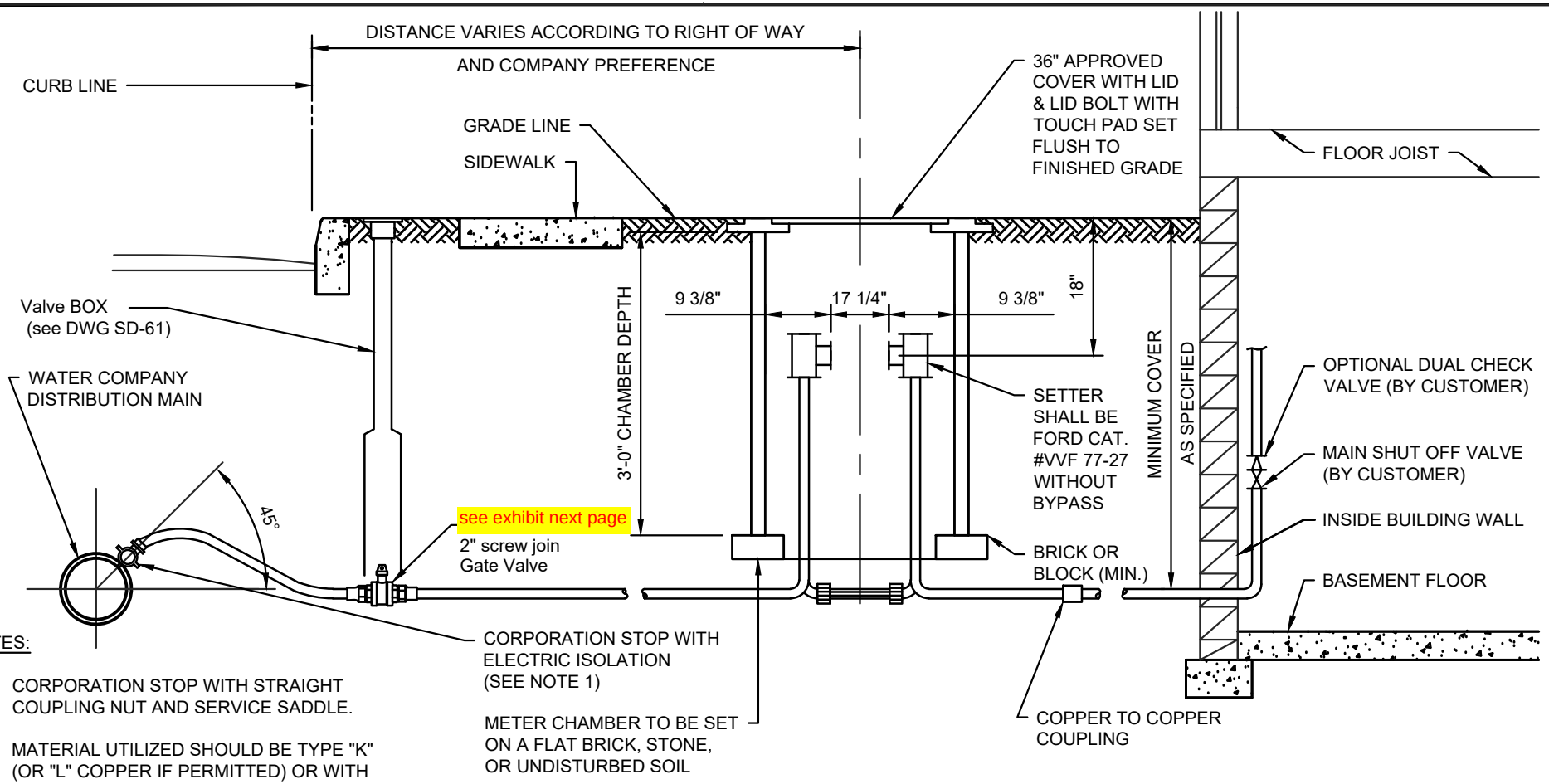
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
EXT. 3/4" WATER METER/COPPER SERVICE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 47



NOTES:

1. CORPORATION STOP WITH STRAIGHT COUPLING NUT AND SERVICE SADDLE.
2. MATERIAL UTILIZED SHOULD BE TYPE "K" (OR "L" COPPER IF PERMITTED) OR WITH A COPPER TO COPPER CURB STOP, BOTH ENDS COMPRESSION FITTING.
3. SERVICE LINE AND METER CHAMBER, OWNERSHIP VARIES BY LOCAL TARIFF.
4. CURB STOP IS OPTIONAL, BASED ON PROXIMITY OF METER CHAMBER TO STREET OR REGULATORY REQUIREMENT.
5. POLYWRAP COPPER SERVICE FROM MAIN TO CURB STOP IF SOIL IS CORROSIVE.
6. CONNECTIONS BETWEEN PIPE LENGTHS SHALL BE COMPRESSION OR FLARED AND MAY DEPEND ON LOCAL PLUMBING REQUIREMENT.

AMERICAN WATER ENGINEERING
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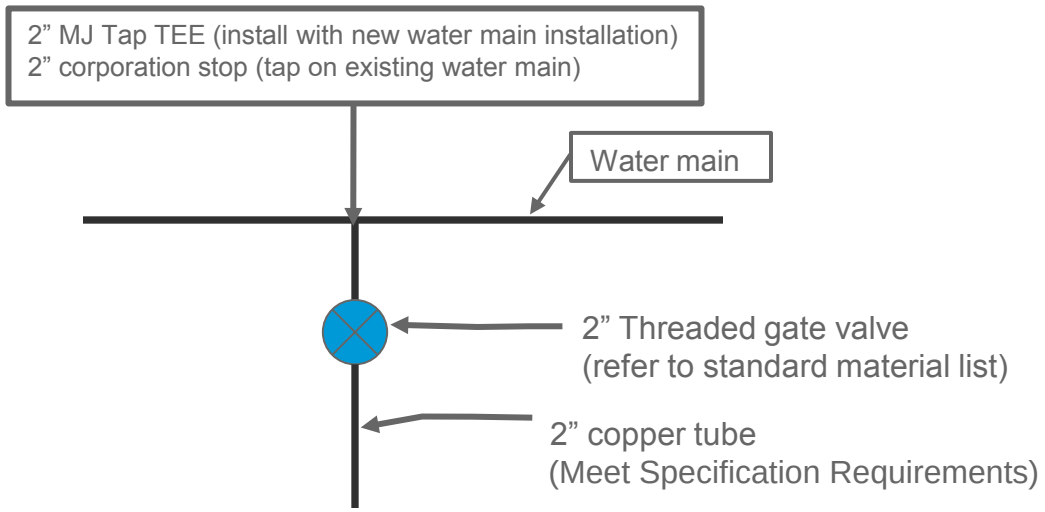
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
EXT. 2" WATER METER/COPPER SERVICE DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 48 (Page 1 of 3)

Typical 2” Copper Domestic and Fire Service Line Installation Exhibit

1. Developer's contractor could only use Method #1.
2. Method #2 must be installed by American Water.



Typical Fitting sequence (Method #1)
(with new water main installation)

- 2” tap TEE (see next page)
- 2”x6” Brass Nipple
- **2” Threaded Gate Valve (screw join)**
- 2” copper x iron male adapter
  (e.g. Mueller H-15425N)
- And then, 2” copper service line starts

Typical Fitting sequence (Method #2)
(tap on existing water main)

- 2” corporation stop with service saddle
- 2” copper tube
- 2” copper x iron male adapter
- **2” Threaded Gate Valve (screw join)**
- 2” copper x iron male adapter
- And then, 2” copper service line starts

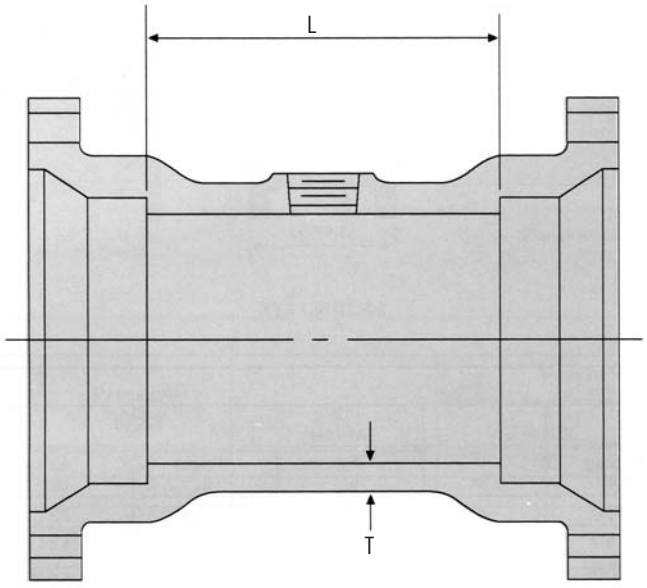
Straight coupling
Copper flare nut x M.I.P.

H-15425N

1/2"‡	1/2" x 3/4"		5/8" x 3/4"	3/4"	5/8" x 1/2"	3/4" x 1/2"
3/4" x 1"	1"	1" x 3/4"	1" x 1-1/4"‡	1-1/4"	1-1/2"	2"

Tee, 4" X 2" Tap MJ X FIP; US PIPE #8000002742
Tee, 6" X 2" Tap MJ X FIP; US PIPE #8000000756
Tee, 8" X 2" Tap MJ X FIP; US PIPE #8000000822
Tee, 12" X 2" Tap MJ X FIP; US PIPE #8000001943

Tapped Tees



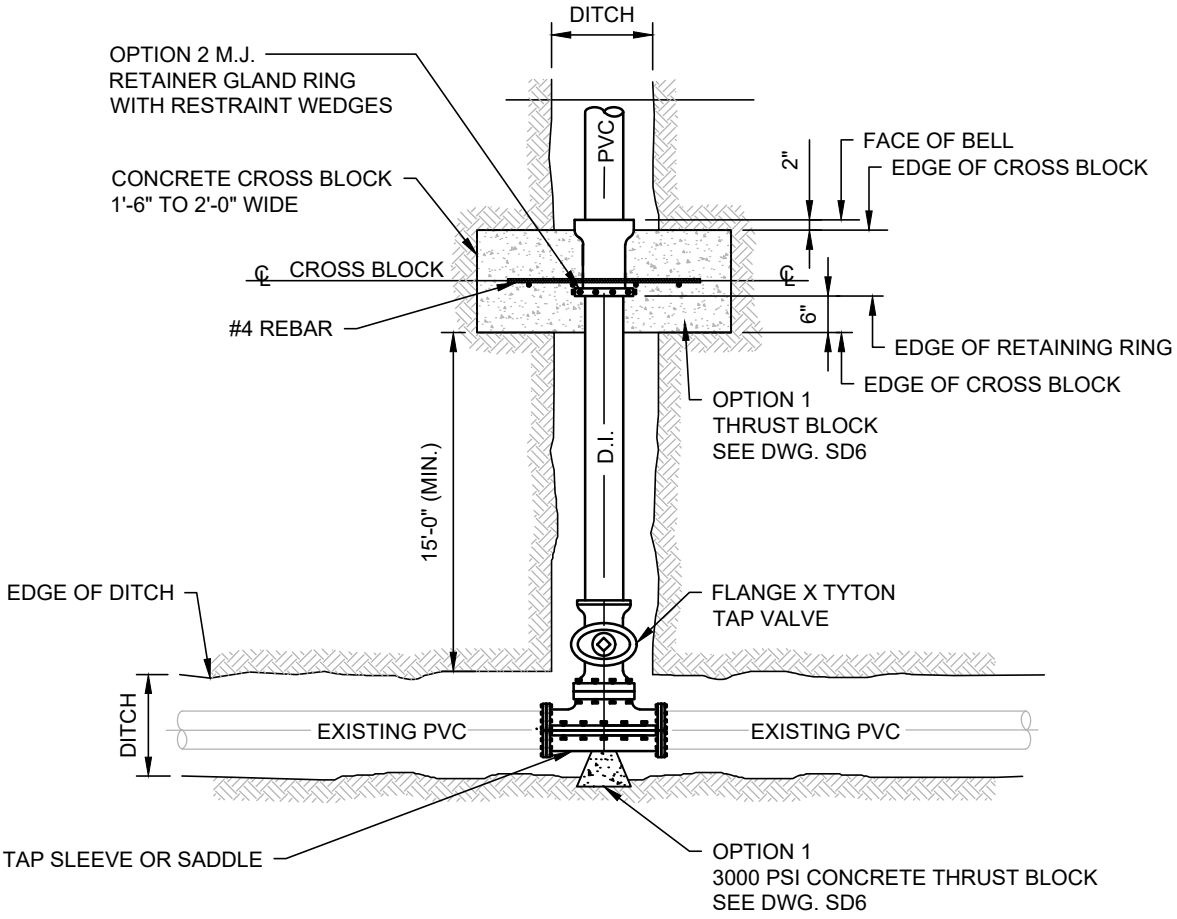
SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches		MAXIMUM TAP IN BOSS	WEIGHT Pounds
		T	L		
3	350	.48	8	2-1/2	35
4	350	.52	8	2-1/2	45
6	350	.55	8	2-1/2	70
8	350	.60	8	2-1/2	95
10	350	.68	8	2-1/2	130
12	350	.75	8	2-1/2	165

Two bosses can be used to make a tapped cross.

For dimensions of Mechanical Joints see page 4.

NOTES:

1. ONE RETAINER GLAND RINGS WITH RESTRAINT WEDGES SHALL BE INSTALLED FACING THE TAPPING SLEEVE.
2. RETAINER GLAND RINGS PER SPECIFICATION.
3. ALL PUSH-ON JOINT PIPE.



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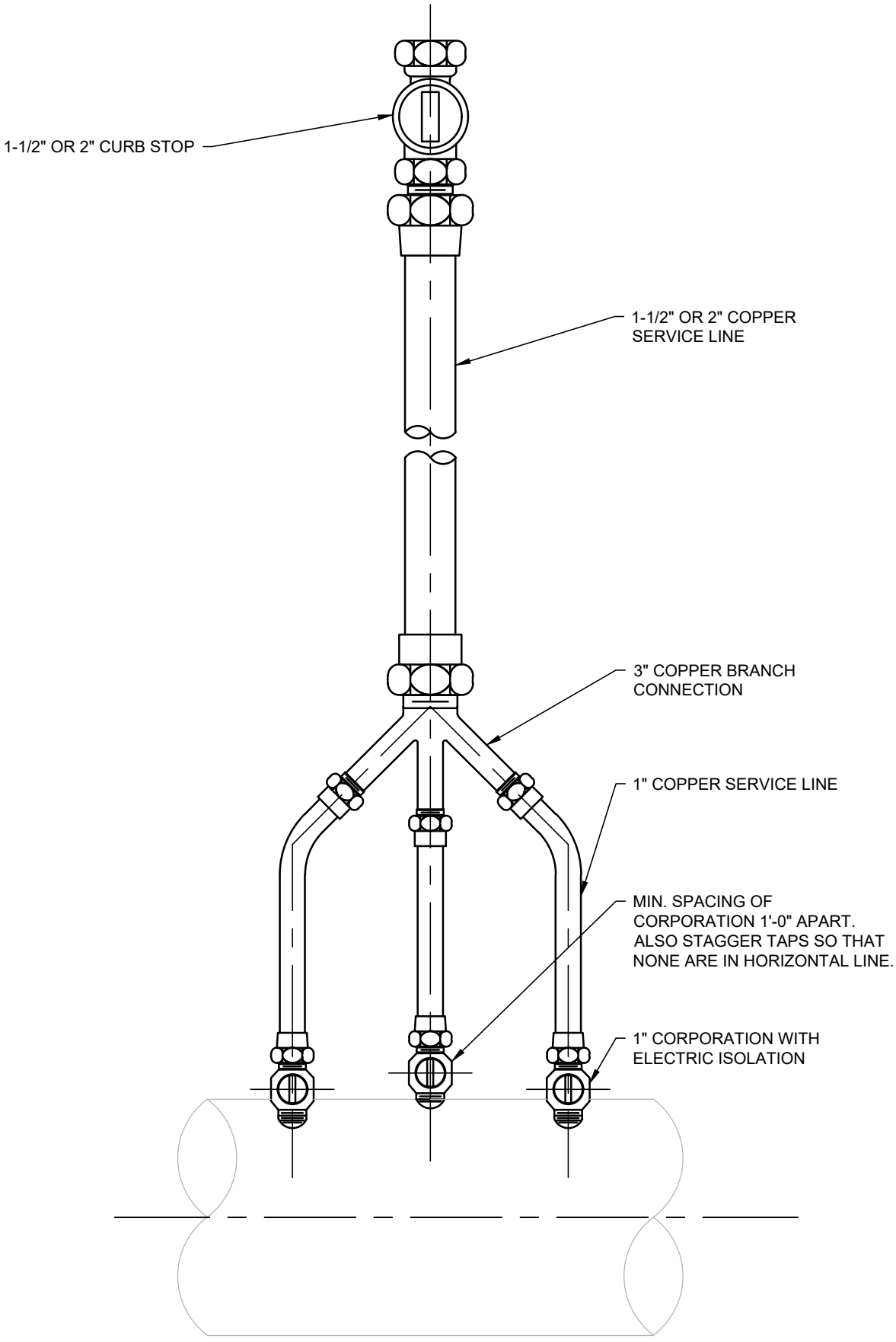
AMERICAN WATER

AMERICAN WATER STANDARD CIVIL
WATER DISTRIBUTION SYSTEM
RESTRAINED PVC TAP DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 49



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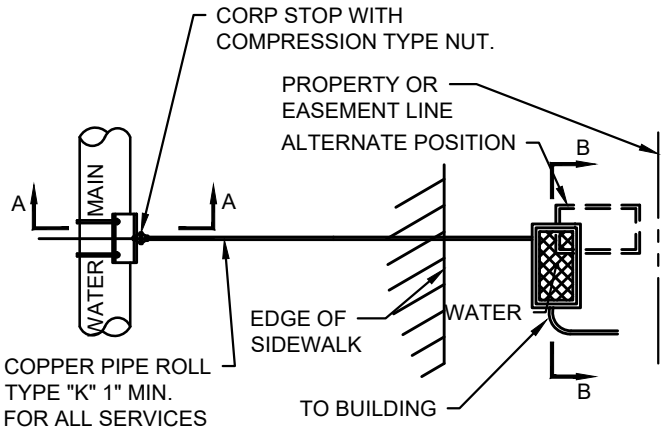
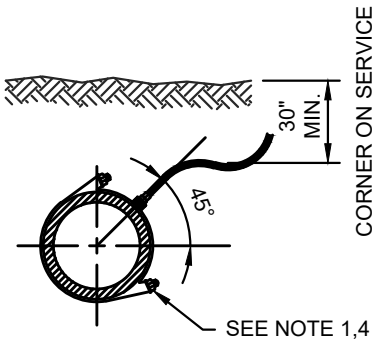
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
1-1/2" & 2" SERVICE LINES DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 50

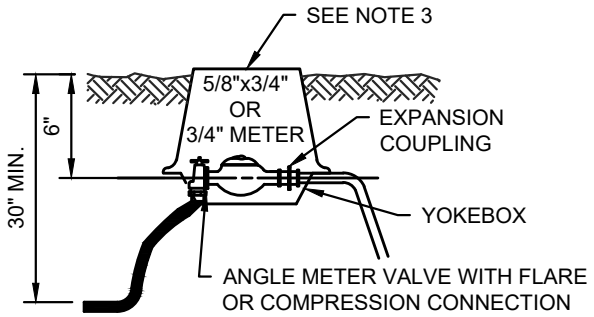


PLAN VIEW



SECTION A-A

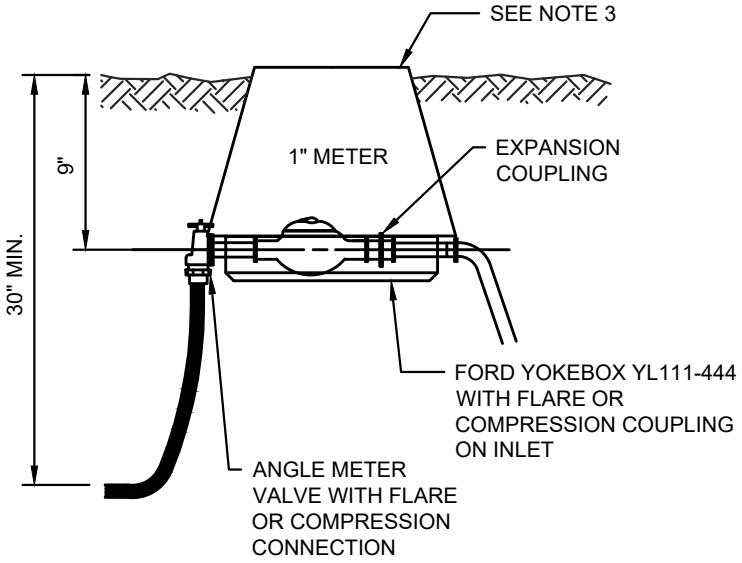
ALL SERVICES



FORD YL241-243 OR MUELLER P1453-J W/ 1" ANGLE INLET CUSTOMER SERVICE PER PLUMBING CODE

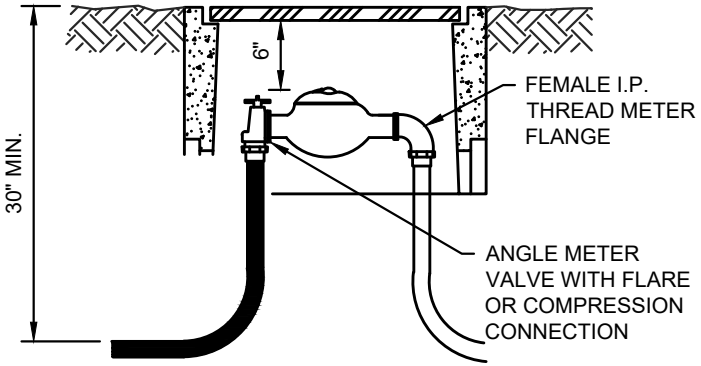
SECTION B-B

1" SERVICE w/ 5/8"x3/4" METER or 3/4" METER



SECTION B-B

1" SERVICE w/ 1" METER



SECTION B-B

1-1/2" & 2" SERVICE w/ CORRESPONDING METER

NOTES:

1. SEE WATER COMPANY MATERIAL SPECIFICATIONS FOR APPROVED SADDLES.
2. METER TO BE SET BY AW UPON PAYMENT OF FEES.
3. LIDS FOR 3/4" & 1" FORD YOKE BOXES TO BE NON-LOCKING LIDS.
4. CHECK FOR SADDLE REQUIREMENTS, IF ANY, FOR DUCTILE IRON TAPS.

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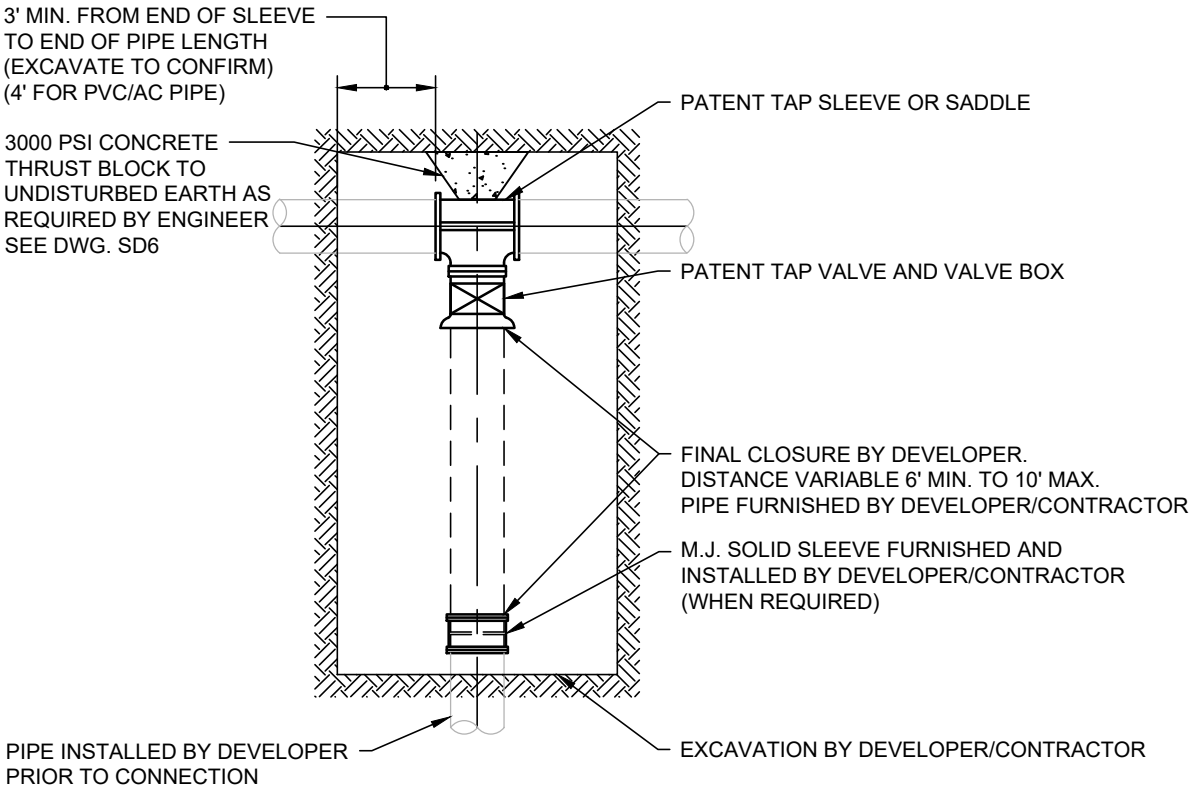
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
POTABLE WATER SERVICE CONNECTION NON-FROST AREAS DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 51

NOTES:

1. TAP CONNECTIONS TO AC (TRANSITE PIPE) 4" AND LARGER REQUIRE AN EXCAVATION 5 FT. IN WIDTH. (MAIN SIZE IS VARIABLE).
2. ALL EXCAVATIONS SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS FOR PROTECTION OF WORKERS.
3. IF PIPE BELL IS EXPOSED IN TAP HOLE OR OTHER OBSTACLES ENCOUNTERED, CONTACT LOCAL WATER COMPANY DISTRICT PERSONNEL FOR FIELD REVIEW BEFORE COMPLETING EXCAVATION.
4. TAP HOLE SHALL BE FREE OF WATER AND MUD TO ALLOW SAFE HANDLING OF HEAVY SLEEVES AND TAPPING MACHINE.
5. CONCRETE BLOCKING BEHIND TAP TO BE PER REQUIREMENTS ON DRAWING SD6.
6. BOTTOM OF EXCAVATION TO BE 12" BELOW BOTTOM OF PIPE AND REASONABLY LEVEL.



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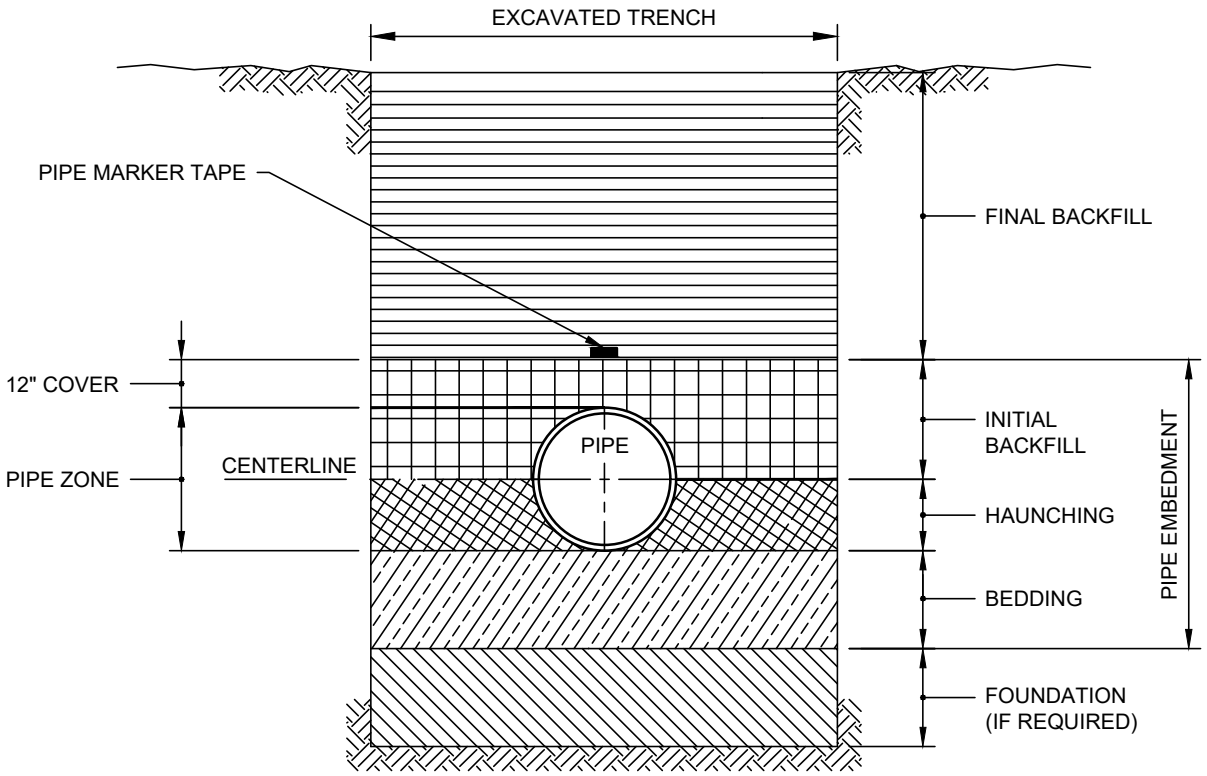
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
PATENT TAP CONNECTION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 52



TRENCH TERMINOLOGY:

FOUNDATION: A FOUNDATION IS NECESSARY ONLY WHEN NATIVE SOILS ARE UNSTABLE. FOR SUCH CONDITIONS, THE TRENCH IS OVER-EXCAVATED AND A LAYER OF SUPPORTIVE MATERIAL IS PLACED AND COMPACTED TO PROVIDE A FIRM FOUNDATION FOR THE SUBSEQUENT PIPE EMBEDMENT MATERIALS.

EMBEDMENT: THIS ZONE IS THE MOST IMPORTANT IN TERMS OF PIPE PERFORMANCE. IT IS DIVIDED INTO THE FOLLOWING SUB ZONES:

- BEDDING: TYPICALLY SIX INCHES OF SUPPORTIVE, COMPACTED MATERIAL. THIS ZONE PROVIDES EVEN SUPPORT FOR THE PIPE AND BRINGS IT TO GRADE.
- HAUNCHING: EXTENDS FROM THE BOTTOM OF THE PIPE TO THE CENTERLINE OF THE PIPE. IT PROVIDES THE MOST RESISTANCE TO PIPE DEFLECTION. SPECIFYING PROPER MATERIALS AND COMPACTION ARE MOST IMPORTANT FOR THIS ZONE.
- INITIAL BACKFILL: EXTENDS FROM THE SPRINGLINE TO A POINT ABOVE THE TOP OF THE PIPE. THIS ZONE PROVIDES SOME PIPE SUPPORT AND HELPS TO PREVENT DAMAGE TO THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. THE COVER EXTENDS FROM THE TOP OF THE PIPE TO THE TOP OF THE INITIAL BACKFILL. THE DEPTH OF COVER SHOULD BE AS MUCH AS NECESSARY TO PROTECT THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. TWELVE INCHES IS A COMMON DEPTH OF COVER.

FINAL BACKFILL: THIS ZONE EXTENDS FROM THE TOP OF THE INITIAL BACKFILL TO THE TOP OF THE TRENCH. THIS ZONE HAS LITTLE INFLUENCE ON PIPE PERFORMANCE, BUT CAN BE IMPORTANT TO THE INTEGRITY OF ROADS AND STRUCTURES.

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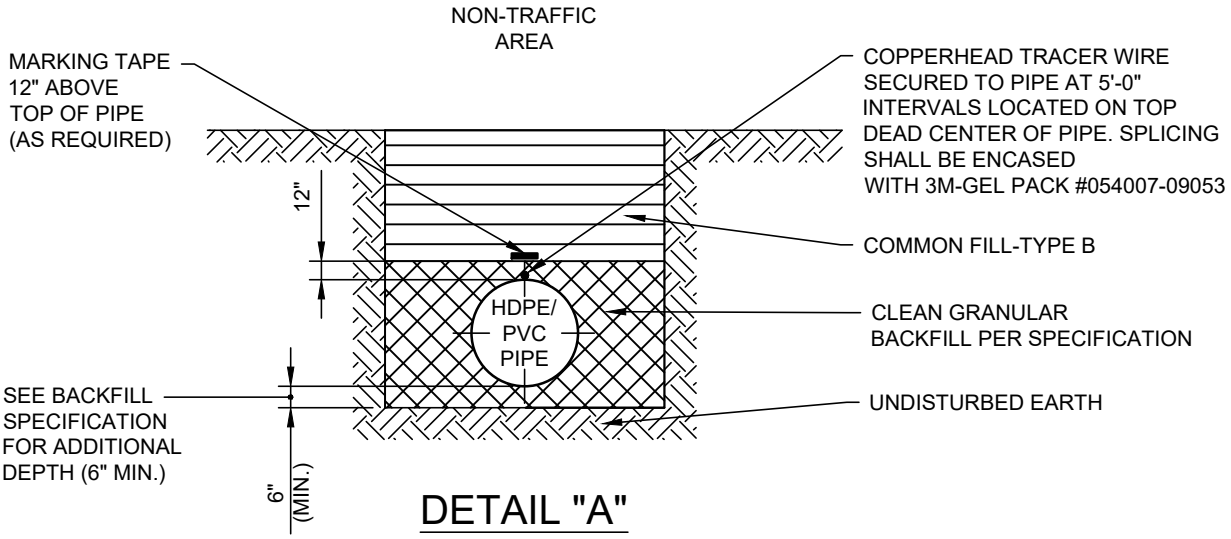
AMERICAN WATER

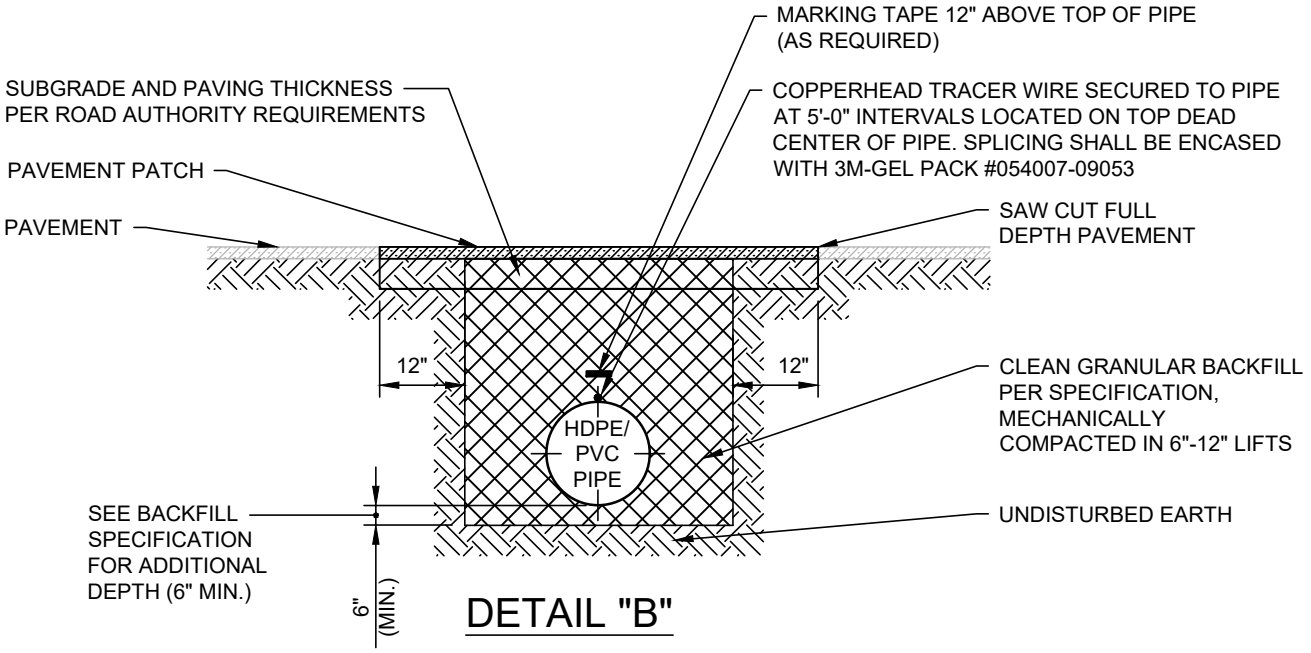
AMERICAN WATER STANDARD CIVIL
WATER DISTRIBUTION SYSTEM
PIPE TRENCH TERMINOLOGY DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 53



DETAIL "A"

HDPE/PVC - ROCK/SOIL
(FOR AREAS NOT TO BE PAVED)



DETAIL "B"

HDPE/PVC - ROCK/SOIL
(FOR PAVED AREAS OR AREAS TO BE PAVED OR WITHIN 18" OF PAVING)

NOTES:

1. CAUTION MUST BE EXERCISED TO ENSURE PROPER PLACEMENT OF EMBEDMENT MATERIAL UNDER THE HAUNCHES OF THE PIPE.
2. CAUTION MUST BE EXERCISED TO PREVENT UNNECESSARY SCRATCHING AND CUTTING OF PLASTIC PIPE DURING BACKFILL.
3. COMMON FILL TYPE "A" MAY BE PERMITTED FOR HAUNCHING AND INITIAL COVER FOR HDPE PIPE. SEE SPECIFICATION 312333. IN ALL CASES 3/4" CLEAN GRANULAR FILL IS REQUIRED AS BEDDING MATERIAL.
4. SEE SPECIFICATION SECTION ~~312333~~ #02210 FOR DESCRIPTION OF BACKFILL AND BEDDING MATERIAL.

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AMERICAN WATER

AMERICAN WATER STANDARD
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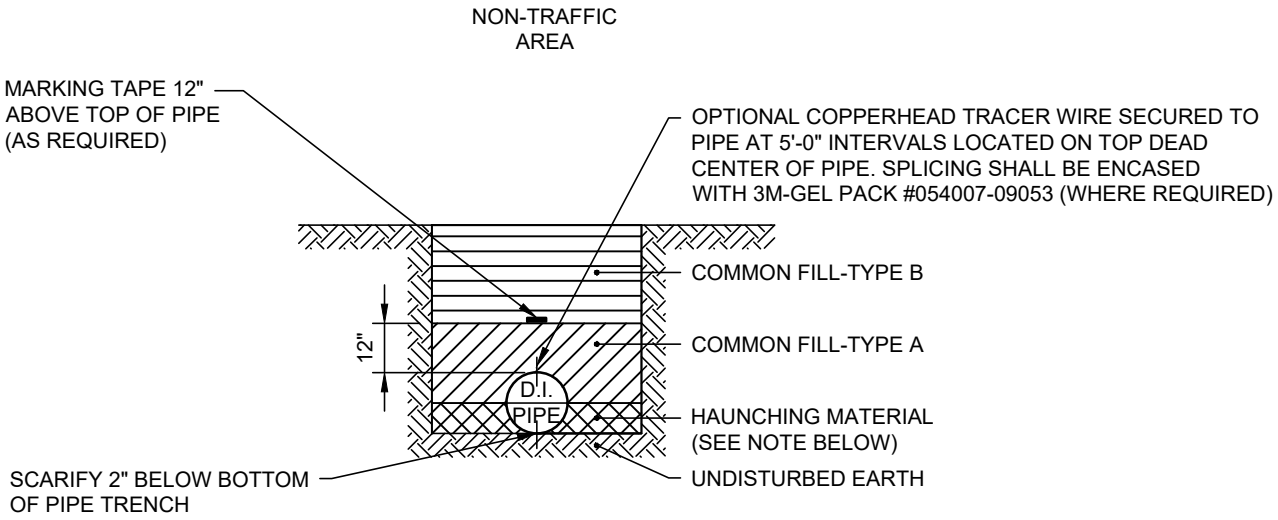
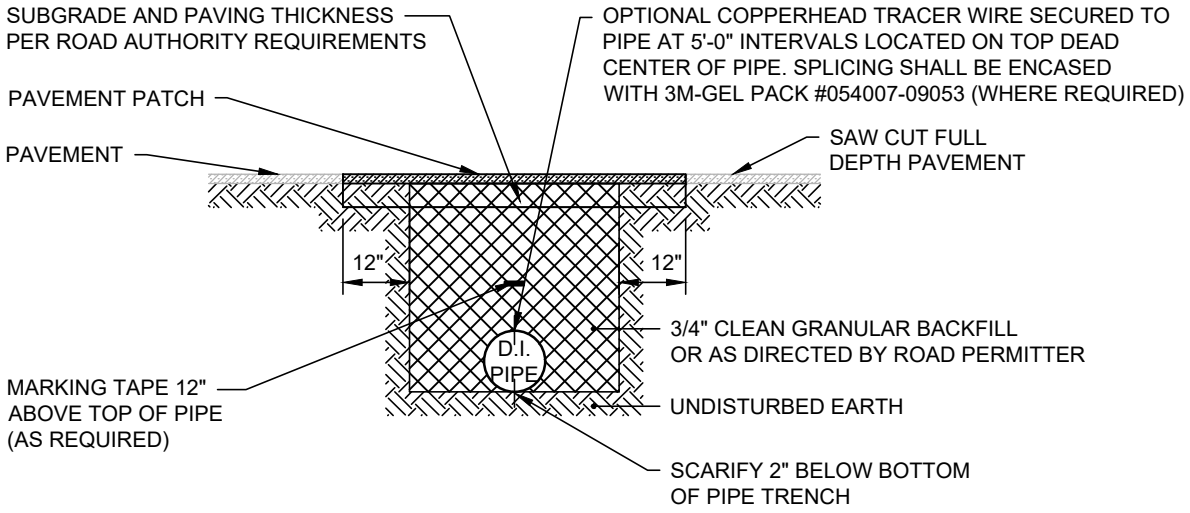
WATER DISTRIBUTION SYSTEM
TRENCH - HDPE & PVC PIPE IN ROCK/SOIL DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 54



DETAIL "A"

D.I. - SOIL
(FOR AREAS NOT TO BE PAVED)



DETAIL "B"

D.I. - SOIL
(FOR PAVED AREAS OR AREAS TO BE
PAVED OR WITHIN 18" OF PAVING)

NOTES:

1. CAUTION MUST BE EXERCISED TO ENSURE PROPER PLACEMENT OF EMBEDMENT MATERIAL UNDER THE HAUNCHES OF THE PIPE.
2. POLYETHYLENE ENCASING ON ALL D.I. PIPE, FITTINGS, VALVES & APPURTENANCES.
3. SEE SPECIFICATION SECTION ~~312333~~ #02210 FOR DESCRIPTION OF BACKFILL AND BEDDING MATERIAL.

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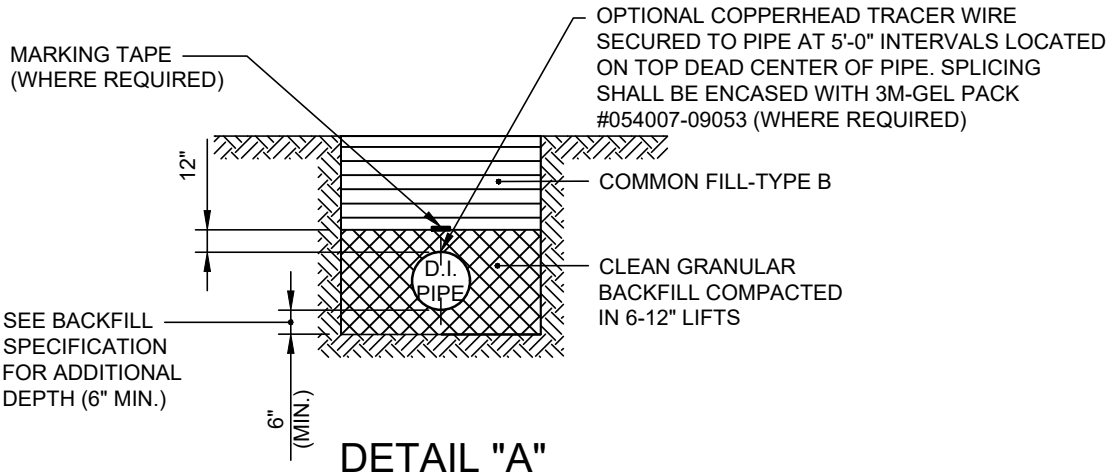
AMERICAN WATER

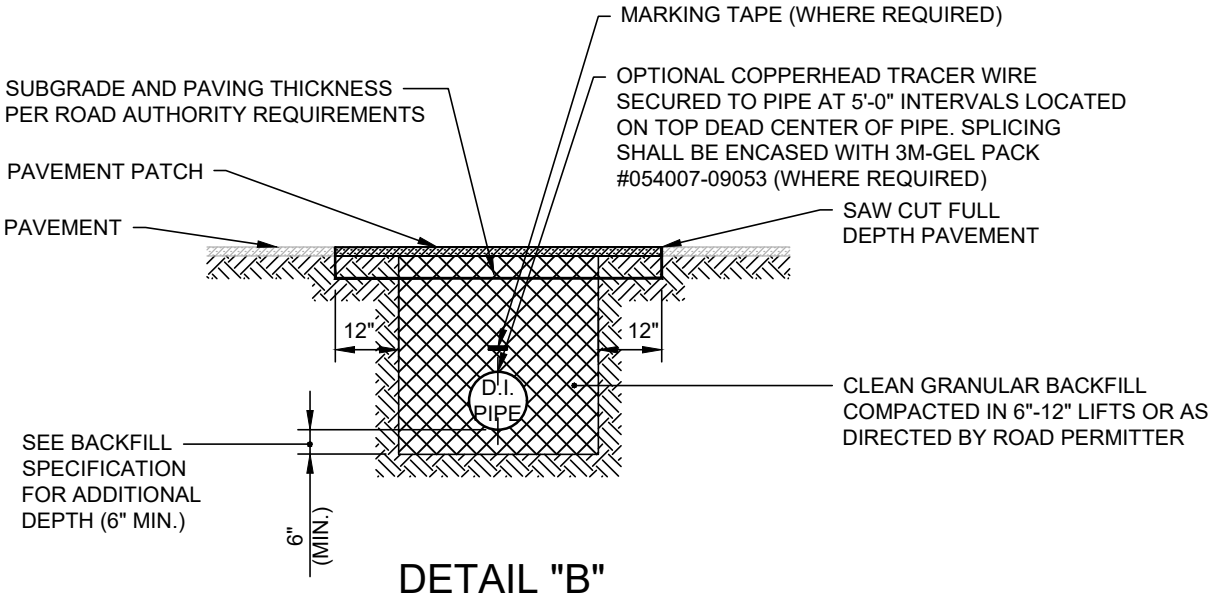
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TRENCH - D.I. PIPE IN SOIL DETAIL

DATE: 23-OCT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 55



DETAIL "A"

D.I. - ROCK/UNSUITABLE SOIL
(FOR AREAS NOT TO BE PAVED)



DETAIL "B"

D.I. - ROCK
(FOR PAVED AREAS OR AREAS TO BE
PAVED OR WITHIN 18" OF PAVING)

NOTES:

1. CAUTION MUST BE EXERCISED TO ENSURE PROPER PLACEMENT OF EMBEDMENT MATERIAL UNDER THE HAUNCHES OF THE PIPE.
2. POLYETHYLENE ENCASING ON ALL D.I. PIPE, FITTINGS, VALVES & APPURTENANCES.
3. CLEAN GRANULAR BACKFILL SHALL BE AS SPECIFIED IN CONTRACT DOCUMENTS.
4. SEE SPECIFICATION SECTION ~~312333~~ #02210 FOR DESCRIPTION OF BACKFILL AND BEDDING MATERIAL.

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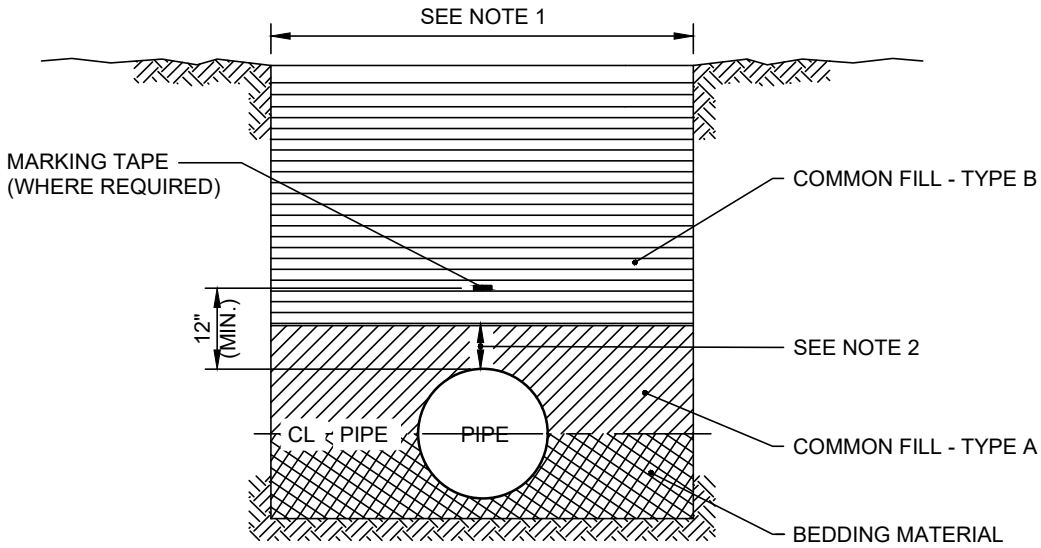
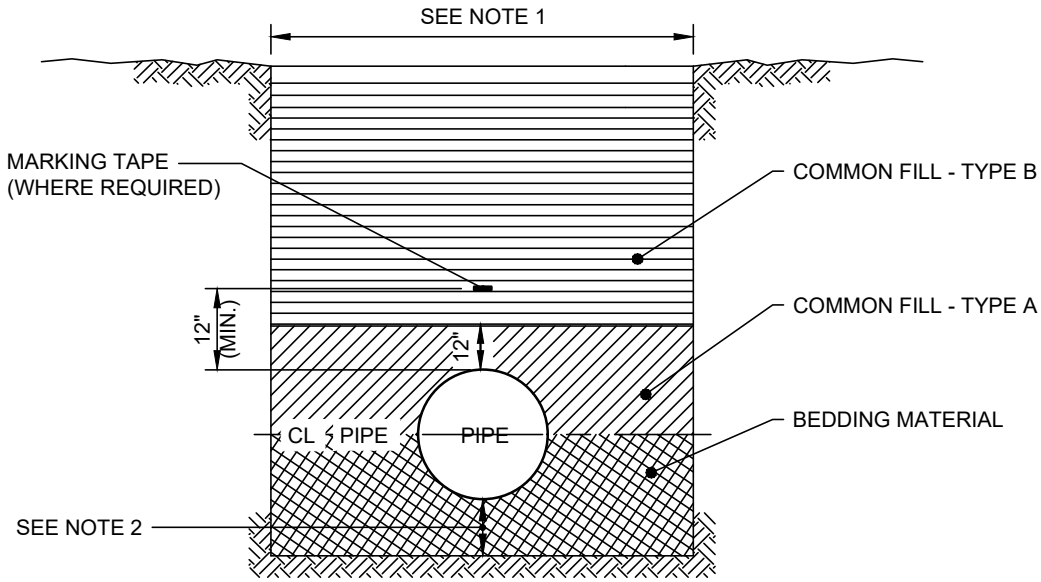
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TRENCH - D.I. PIPE IN ROCK DETAIL

DATE: 23-OCT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 56



SOIL



ROCK

NOTES:

1. IN UPLAND AREAS USE 4" TOPSOIL, SEED, MULCH & FERTILIZE PER SPECIFICATIONS.

   IN WETLAND AREAS, TOP 18" TO BE BACKFILLED WITH NATIVE EXCAVATED SOIL AND REPLANTED WITH NATIVE VEGETATION.

   IN STREAM CHANNELS AND ADJACENT STREAM BANKS, TOP 12" RIP-RAP, VOIDS FILLED WITH NATIVE SOIL.

2. SEE SPECIFICATION SECTION ~~31 23 33~~ TRENCHING AND BACKFILLING.
   #02210

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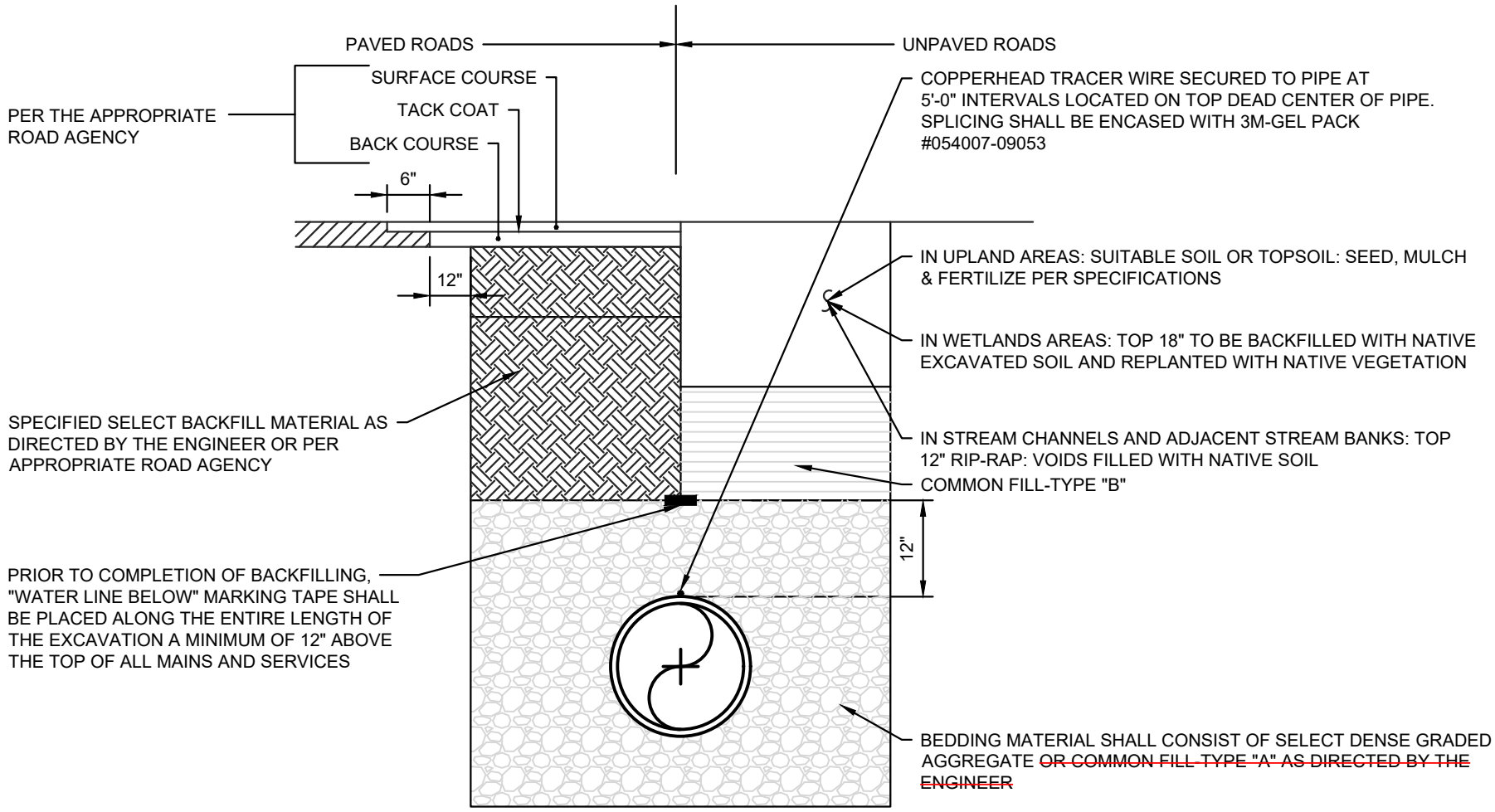
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TRENCH BACKFILL MATERIALS UNPAVED AREAS DETAIL

DATE: 23-OCT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 57



NOTES:

1. ALL BEDDING AND BACKFILL MATERIALS SHALL BE PROVIDED, PLACED AND COMPACTED IN SPECIFIED LIFTS IN ACCORDANCE WITH THE ENGINEER'S DIRECTION OR THE REQUIREMENTS OF THE REGULATING AGENCY HAVING JURISDICTION IF MORE STRINGENT.

2. Virginia state shall use VDOT Asphalt Pavement Restoration Detail for Open Cut Utility Installation. See next page

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1 WATER STREET
CAMDEN, NJ 08102

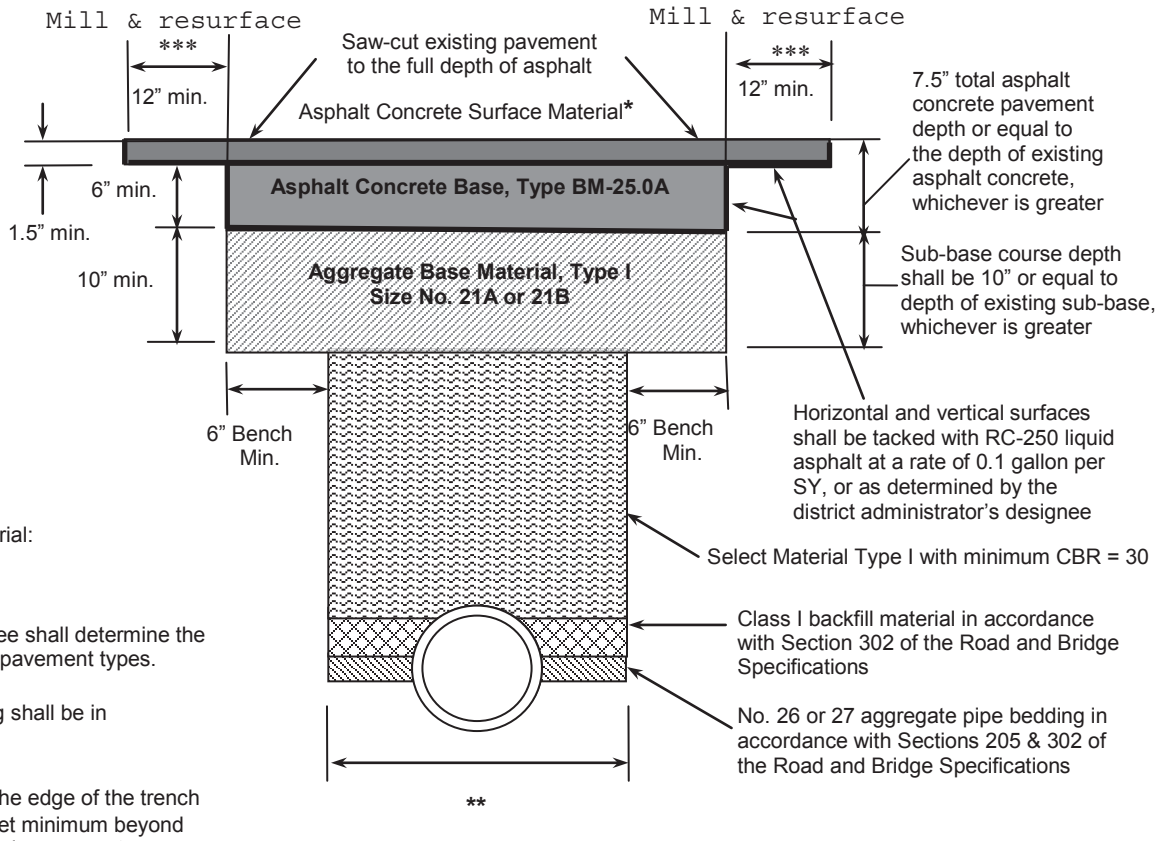
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TRENCH RESTORATION DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 58

LAND USE PERMIT
LUP-OC
Open-Cut Pavement Restoration Requirements

Asphalt Pavement Restoration Detail for Open Cut Utility Installations



NOTES:

* Asphalt Concrete Surface Material:
SM-9.5A for ADT < 10,000
SM-9.5D for ADT > 10,000

The district administrator's designee shall determine the restoration requirements for other pavement types.

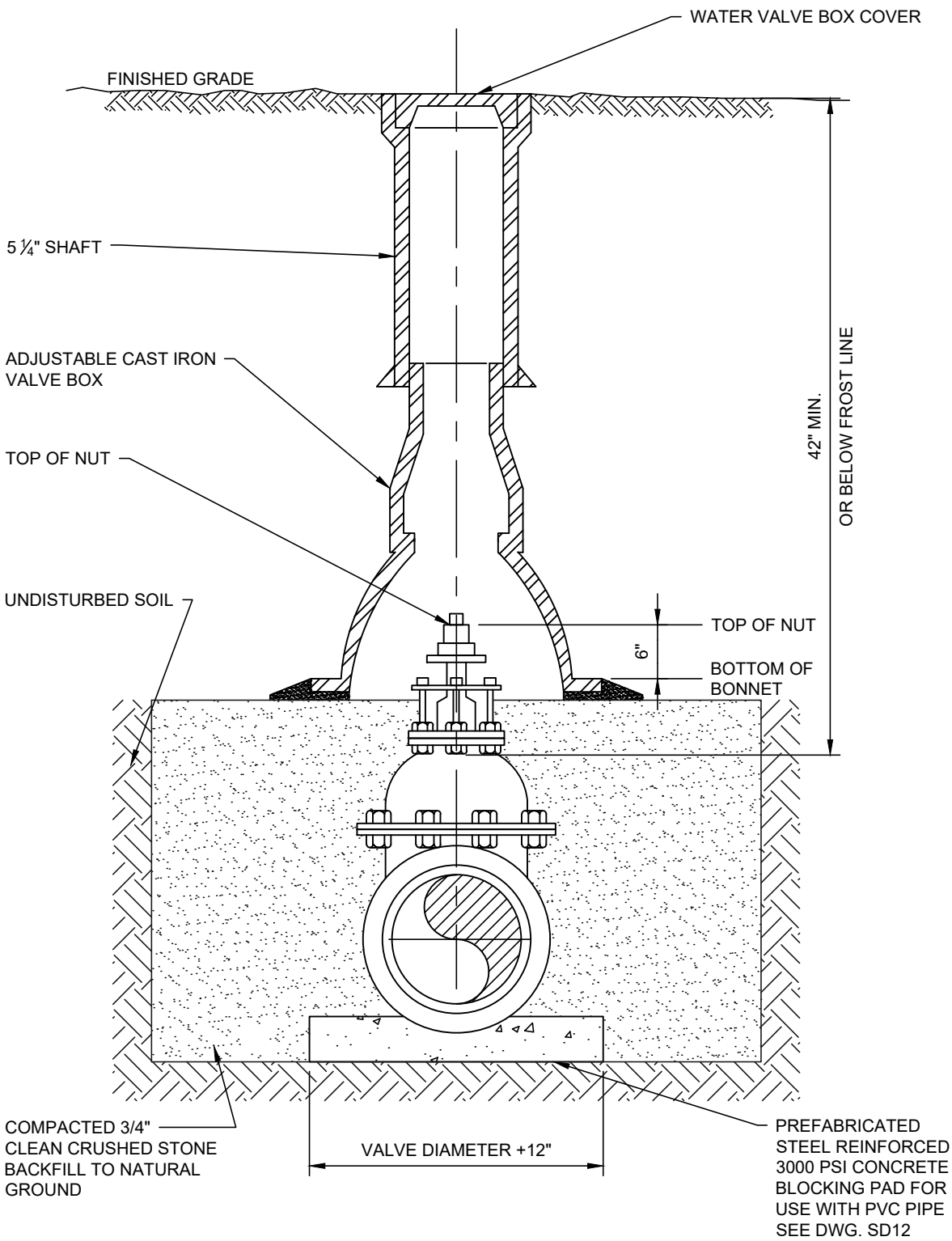
** Trench width and pipe bedding shall be in accordance with VDOT Std. PB-1

*** 12 inches minimum beyond the edge of the trench on longitudinal open cuts, or 25 feet minimum beyond the trench centerline on perpendicular open cuts, or as determined by the district administrator's designee.

Date: August 27, 2014

NOTE:

1. 6"x6" WOOD BLOCK MAY BE USED AS VALVE PAD WHERE APPROVED BY ENGINEER.



AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

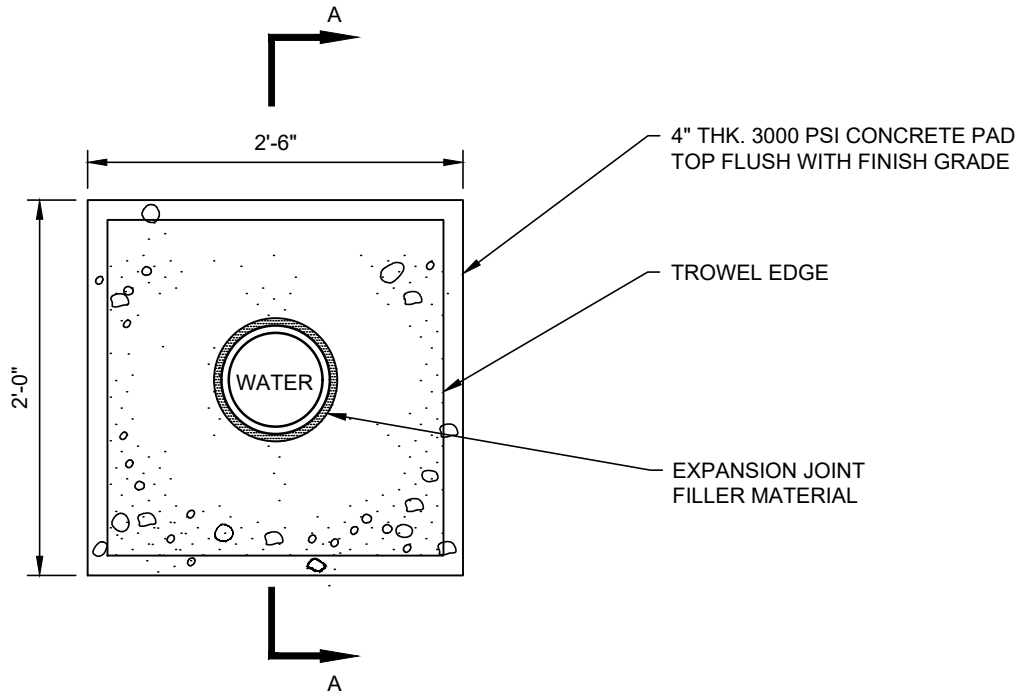
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
VALVE BOX INSTALLATION FROST AREAS DETAIL

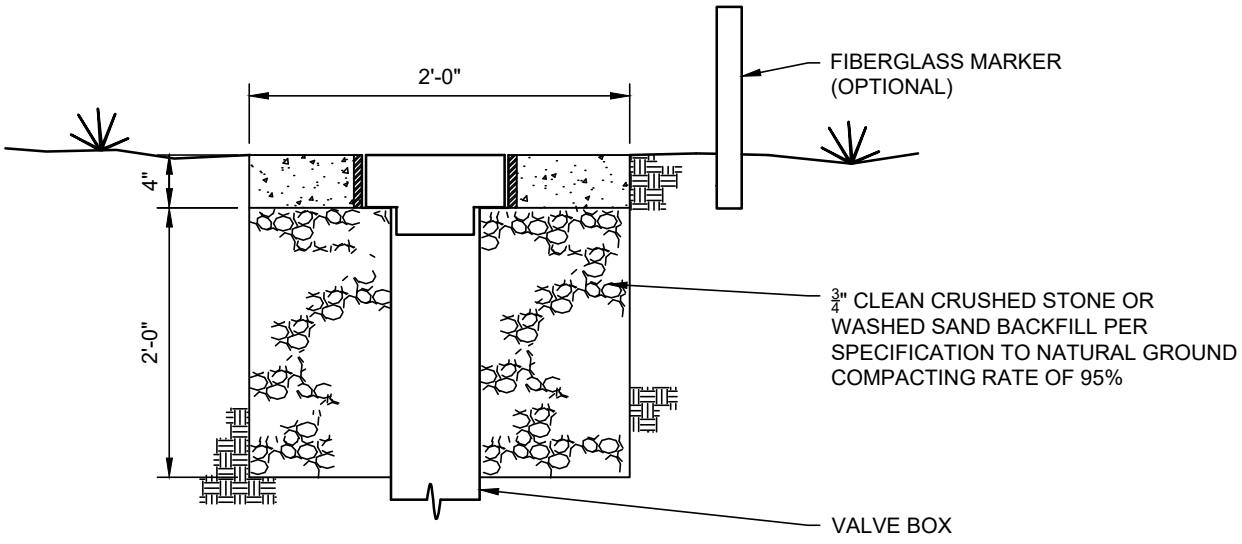
DATE: 23-OCT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 59

NOTE:

1. IF PAD IS NOT TO BE POURED IMMEDIATELY AFTER VALVE BOX INSTALLATION, HOLE SHOULD BE BACKFILLED TO GRADE WITH $\frac{3}{4}$" CLEAN STONE BACKFILL.



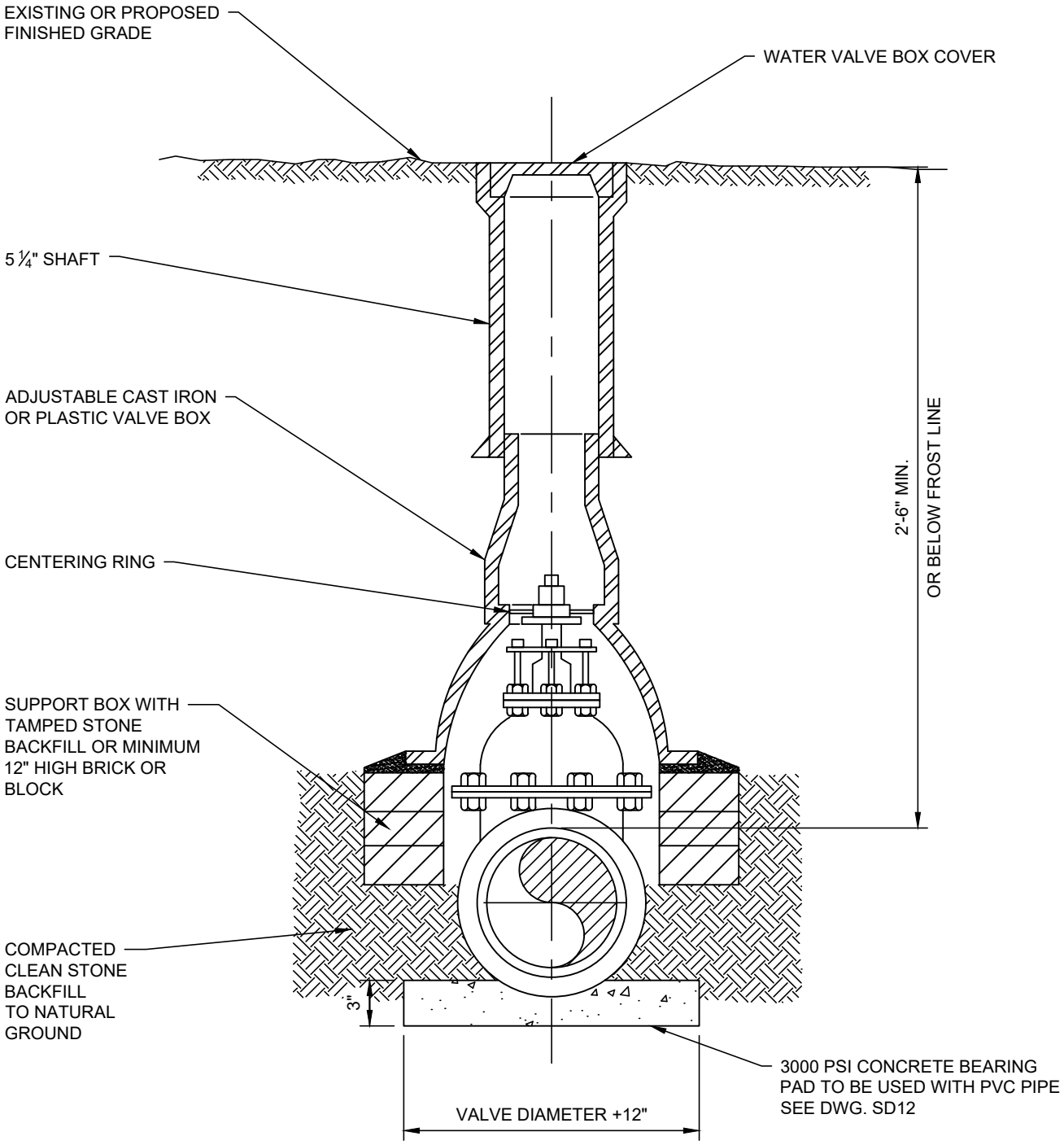
PLAN



SECTION A-A

VALVE BOX DETAIL IN UNPAVED AREAS

	AMERICAN WATER ENGINEERING 1 WATER STREET CAMDEN, NJ 08102 AMERICAN WATER	**AMERICAN WATER STANDARD CIVIL WATER DISTRIBUTION SYSTEM CONCRETE VALVE BOX PAD DETAIL**	
	DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
	STANDARD DETAILS	APPROVED	SD- 60

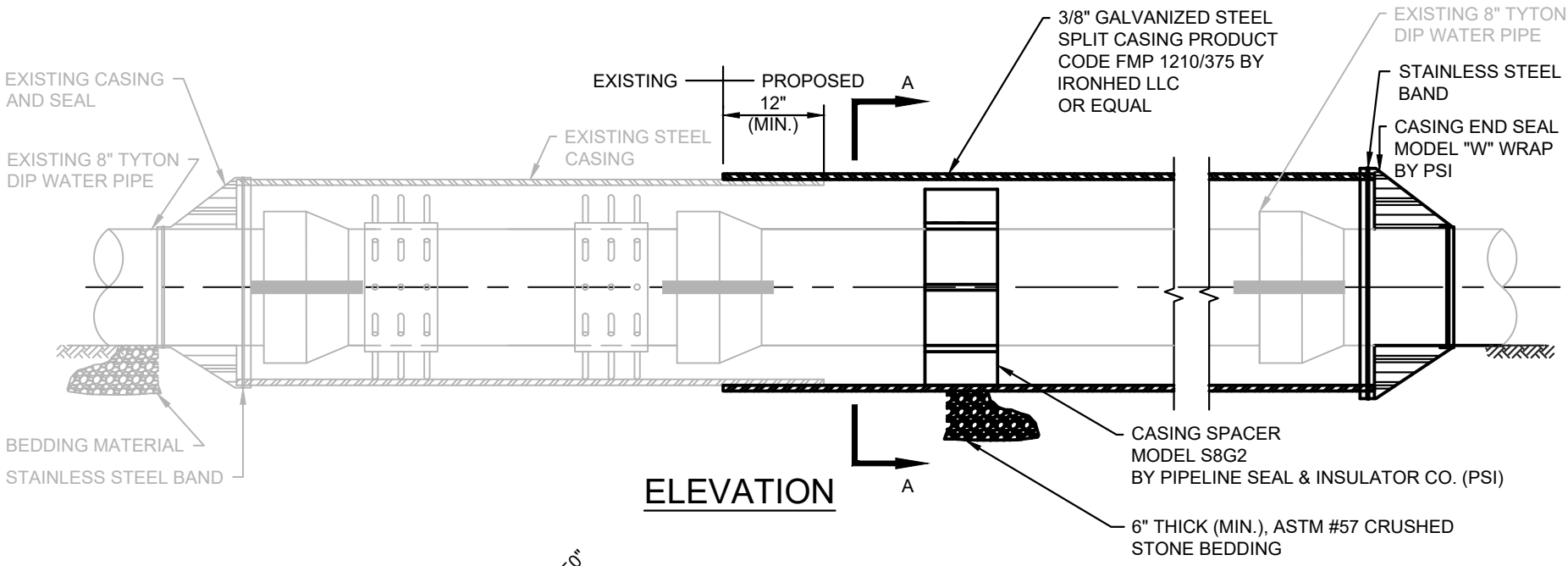


AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

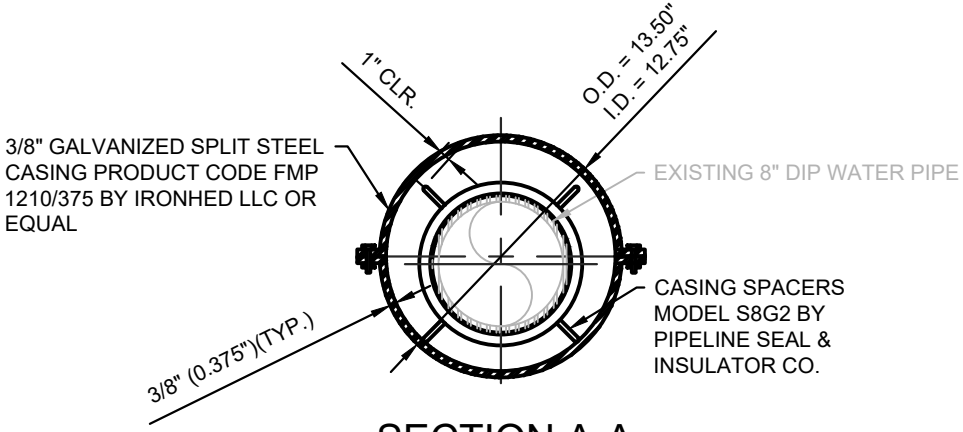
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
OPTIONAL VALVE BOX INSTALLATION FROST AREAS DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 61



ELEVATION



SECTION A-A

NOTES:

1. CONTRACTOR TO CONFIRM EXISTING WATER MAIN PIPE OD AT BELL & BARREL PRIOR TO INSTALLATION OF SPLIT CASING EXTENSION.
2. CASING SPACERS TO BE PROVIDED AND INSTALLED PER MANUFACTURER'S REQUIREMENTS.
3. CONTRACTOR TO REMOVE PORTION OF SPLIT CASING FLANGE AS NECESSARY TO INSTALL CASING END SEAL.

AMERICAN WATER ENGINEERING
1 WATER STREET
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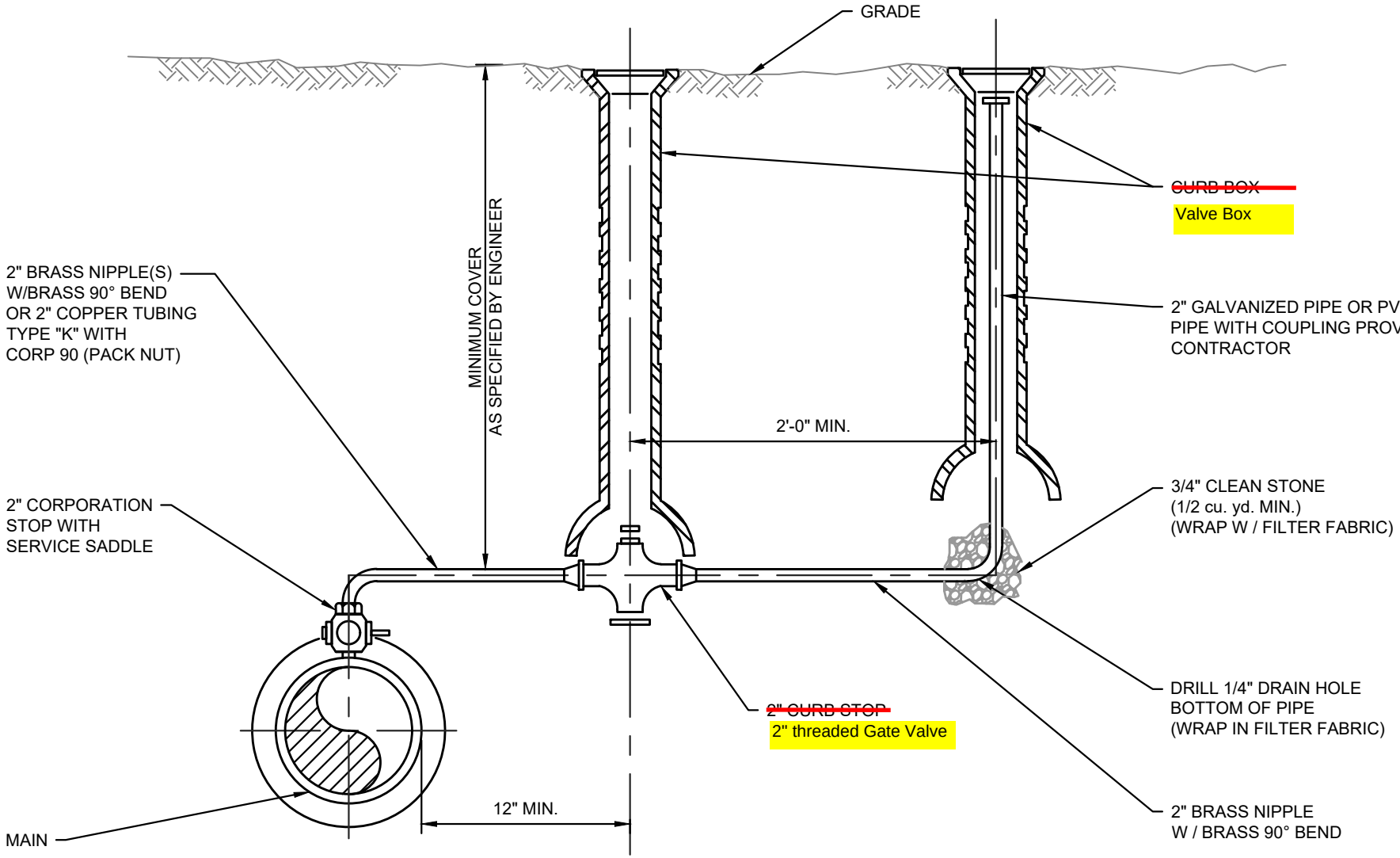
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
CASING EXTENSION INSTALLATION DETAIL

DATE: 17-SEPT-2020	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 62

RESERVED FOR FUTURE USE

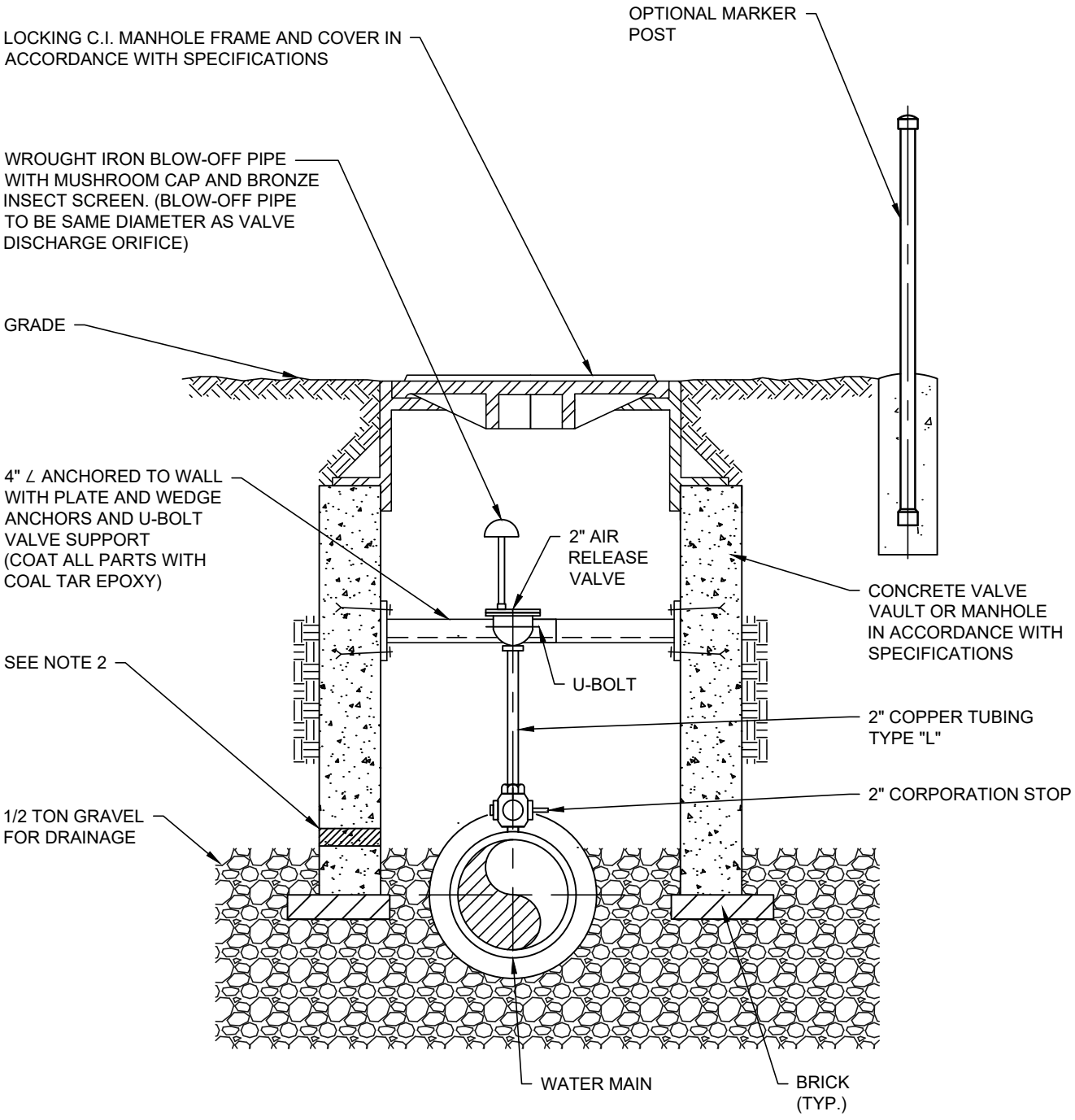


AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
AIR RELEASE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 64



NOTES:

1. THIS DESIGN IS PROVIDED WHERE RISK OF WATER FILLING THE CHAMBER IS MINIMAL AND AIR RELEASE DOES NOT FUNCTION AS VACUUM RELEASE.

2. PROVIDE DAYLIGHT DRAIN WHERE FEASIBLE OR SUMP HOLE WHEN DAYLIGHT DRAIN IS NOT FEASIBLE.

AMERICAN WATER ENGINEERING
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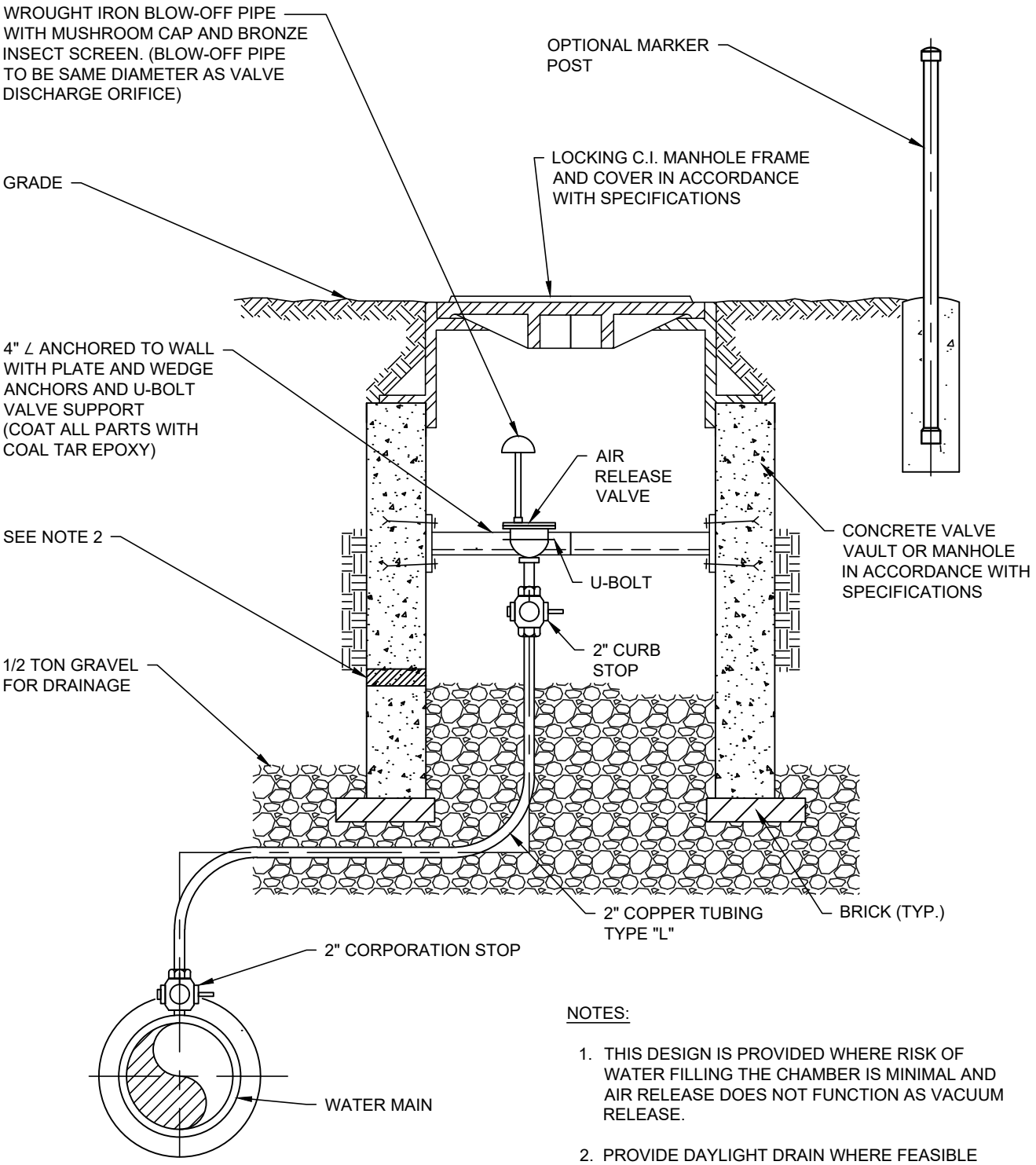
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
SHALLOW BURY AIR RELEASE VALVE ASSEMBLY DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 65



NOTES:

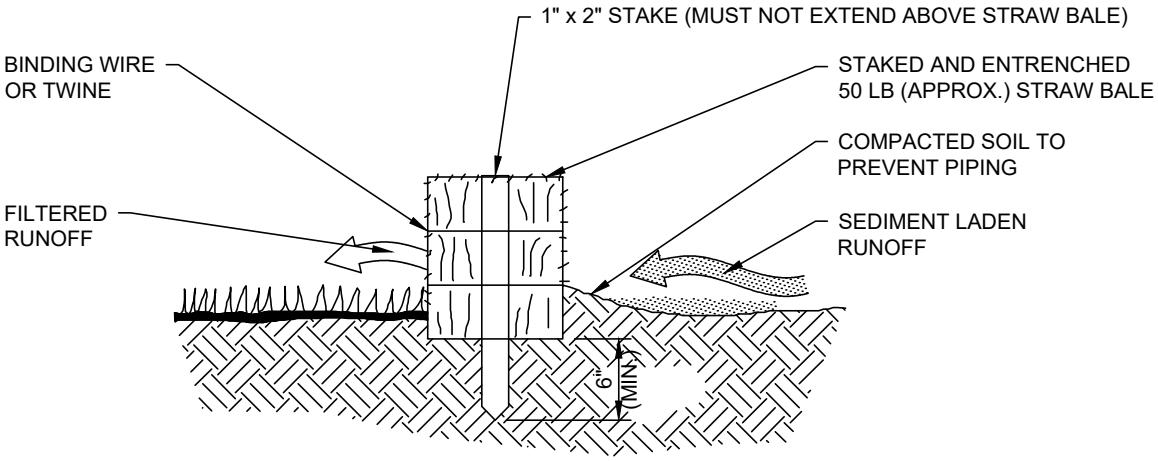
1. THIS DESIGN IS PROVIDED WHERE RISK OF WATER FILLING THE CHAMBER IS MINIMAL AND AIR RELEASE DOES NOT FUNCTION AS VACUUM RELEASE.
2. PROVIDE DAYLIGHT DRAIN WHERE FEASIBLE OR SUMP HOLE WHEN DAYLIGHT DRAIN IS NOT FEASIBLE.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

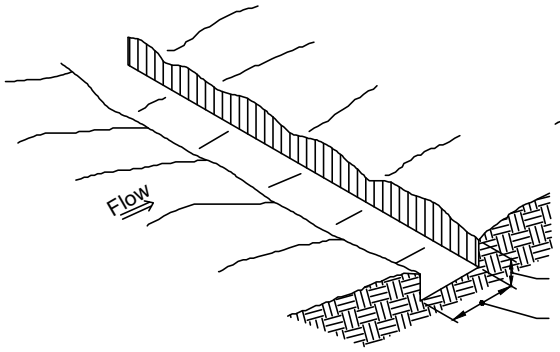
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
DEEP BURY AIR RELEASE VALVE ASSEMBLY DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 66

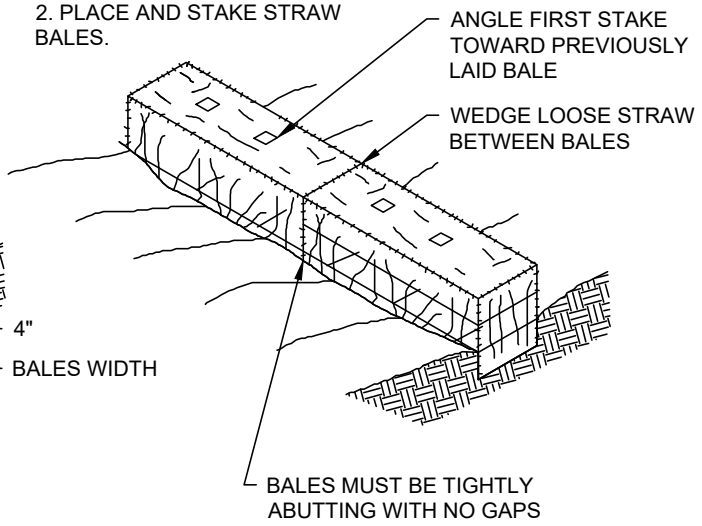


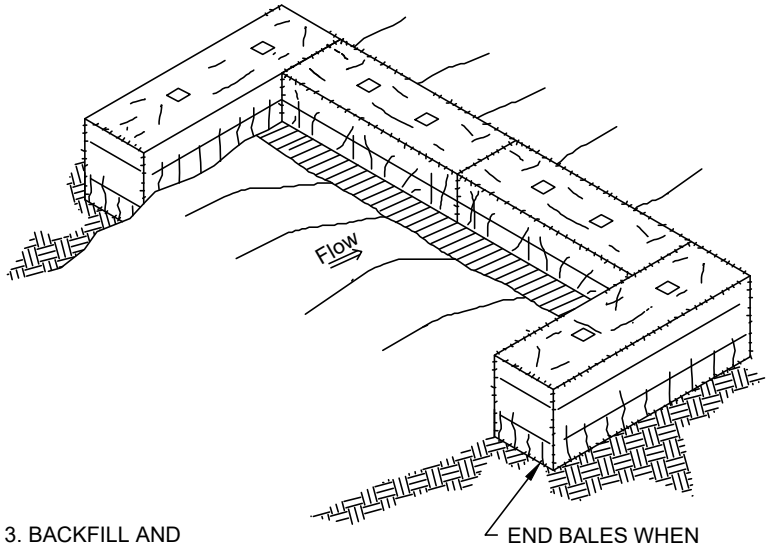
PROPERLY INSTALLED STRAW BALE
(CROSS-SECTION)

1. EXCAVATE THE TRENCH MIN. 4" DEEP.



2. PLACE AND STAKE STRAW BALES.





3. BACKFILL AND COMPACT THE EXCAVATED SOIL.

NOTES:

1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 4" ABOVE GROUND HEIGHT.
2. ANY SECTION, WHICH HAS BEEN UNDERMINED OR TOPPED, MUST BE IMMEDIATELY REPLACED.
3. ENDS OF STRAW BALES MUST BE INSTALLED TO PROHIBIT RUNOFF FROM BEING ALLOWED TO FLOW AROUND ENDS.

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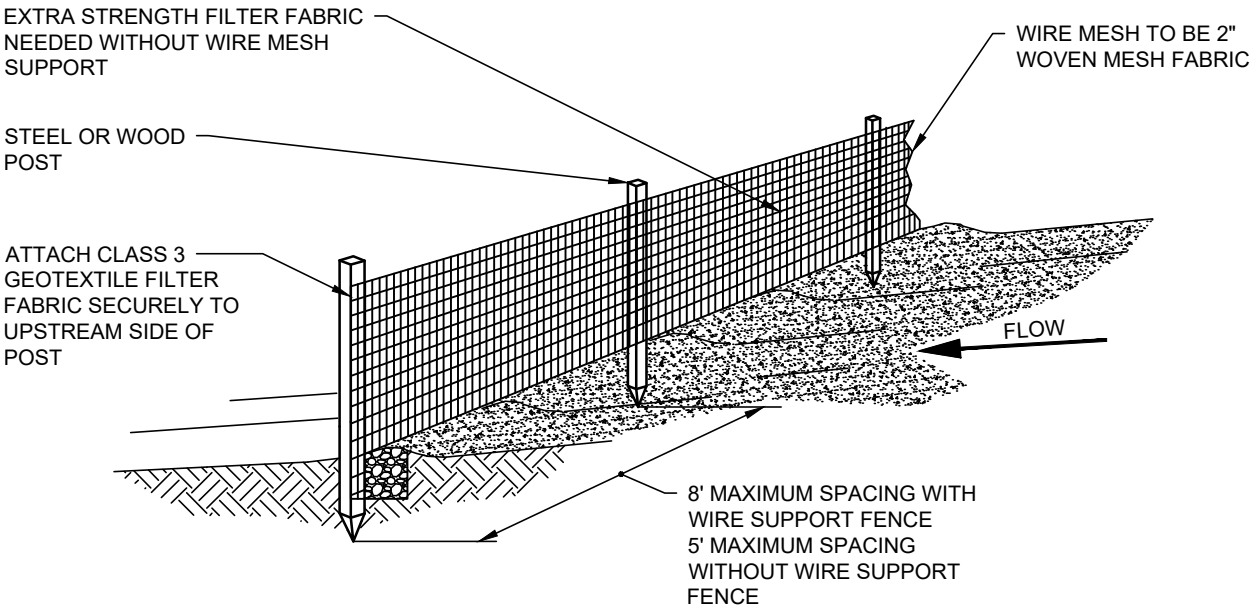
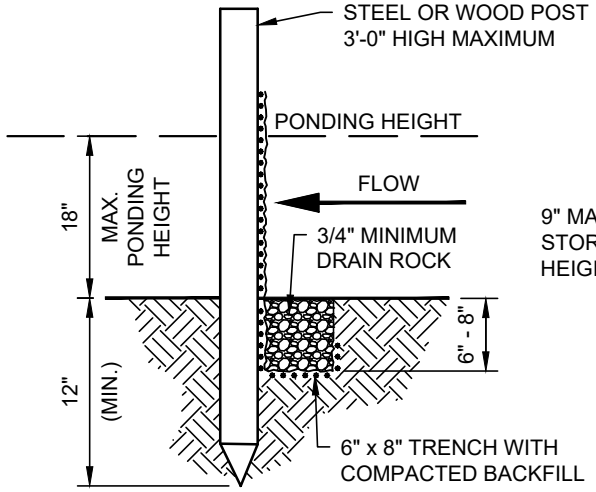
AMERICAN WATER

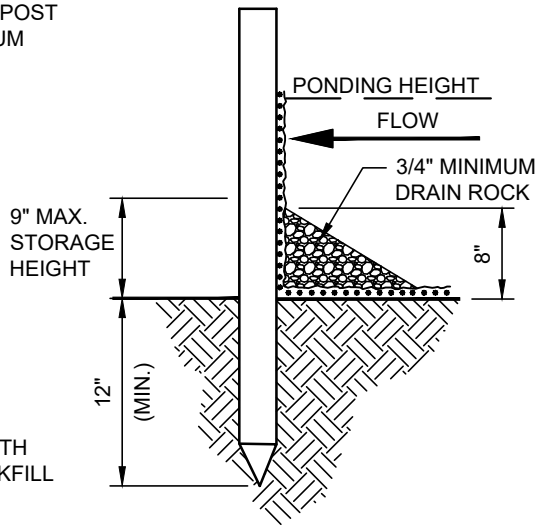
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
TEMPORARY STRAW BALE SEDIMENT BARRIER DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 67





TRENCH DETAIL



INSTALLATION WITHOUT TRENCHING

NOTES:

1. FILTER FABRIC FENCE MUST BE INSTALLED AT LEVEL GRADE. BOTH ENDS OF EACH FENCE SECTION MUST EXTEND AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
2. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 9" ABOVE GROUND HEIGHT OF THE FENCE.
3. ANY FENCE SECTION, WHICH HAS BEEN UNDERMINED OR TOPPED, MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET. (SEE ROCK FILTER OUTLET DETAIL).
4. WHERE ENDS OF FILTER FABRIC COME TOGETHER, THEY MUST BE OVERLAPPED, FOLDED AND STAPLED TO PREVENT SEDIMENT BYPASS. THE TOE ANCHOR MUST BE BACKFILLED AND COMPACTED TO A DENSITY EQUAL TO THE SURROUNDING SOILS.

AMERICAN WATER ENGINEERING
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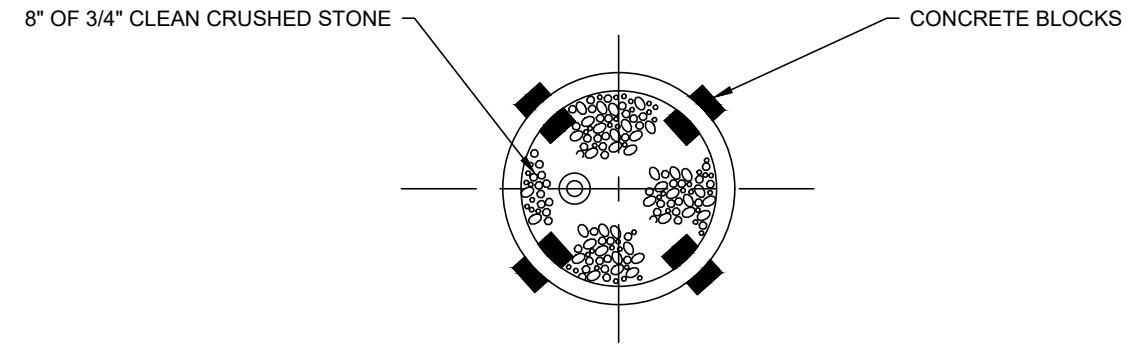
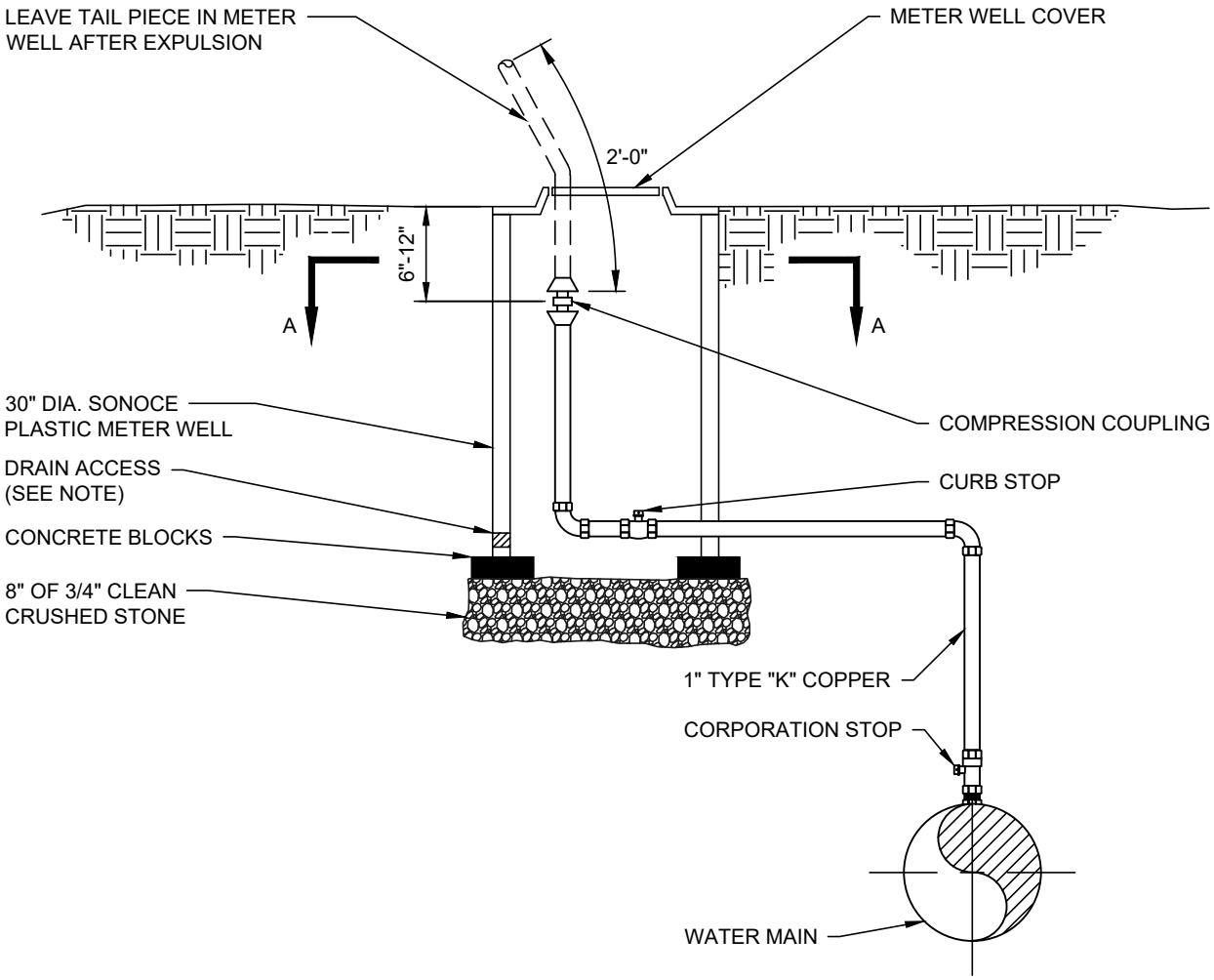
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
SILT FENCE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 68



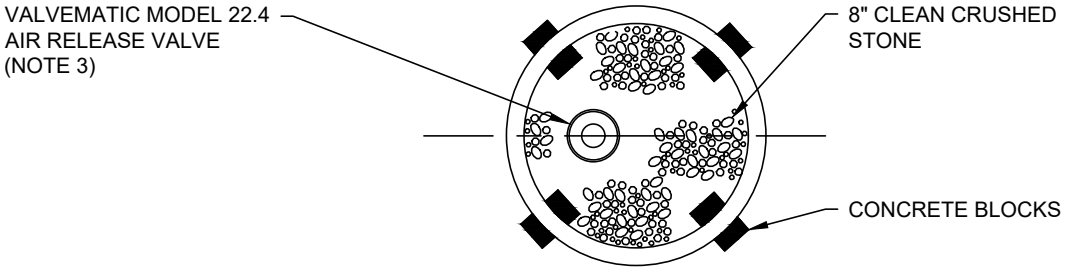
SECTION A-A



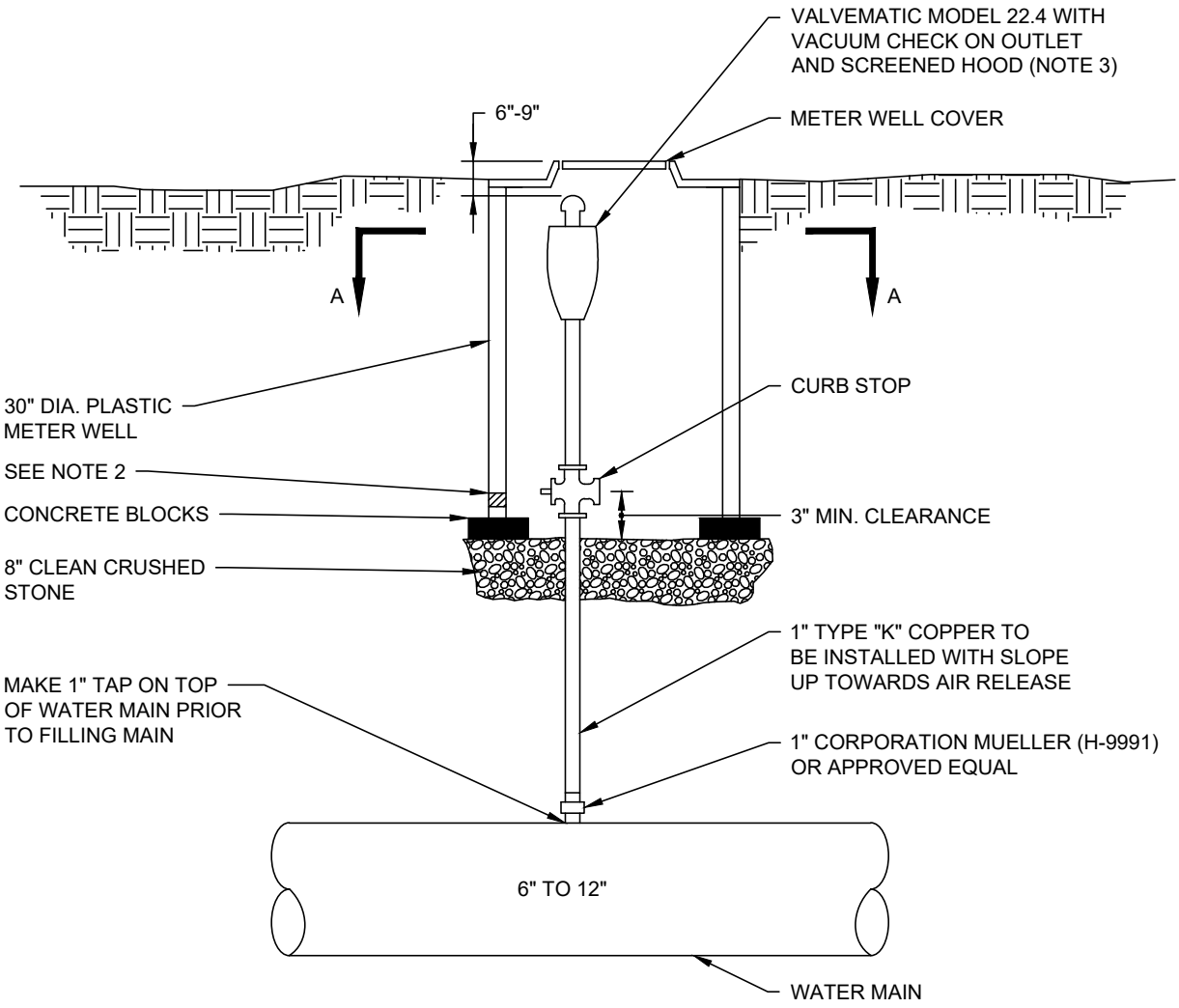
NOTE:

1. PROVIDE DAYLIGHT DRAIN PIPE IF FEASIBLE OR SUMP AT BOTTOM OF PIT IF NOT FEASIBLE.

AMERICAN WATER ENGINEERING 1 WATER STREET CAMDEN, NJ 08102 AMERICAN WATER	**AMERICAN WATER STANDARD CIVIL WATER DISTRIBUTION SYSTEM MANUAL AIR RELEASE VALVE DETAIL**	
DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 69



SECTION A-A



NOTES:

1. DESIGN TO BE USED ONLY IF SECURITY WITH METER WELL COVER IS ADEQUATE.
2. PROVIDE DAYLIGHT DRAIN IF FEASIBLE AND IF NOT, PROVIDE SUMP AT BOTTOM OF CHAMBER.
3. MAXIMUM PRESSURE AIR RELEASE ASSEMBLY CAN WITHSTAND IS 175 PSI. USE VALVEMATIC MODEL 25.6 UP TO 300 PSI.

AMERICAN WATER ENGINEERING
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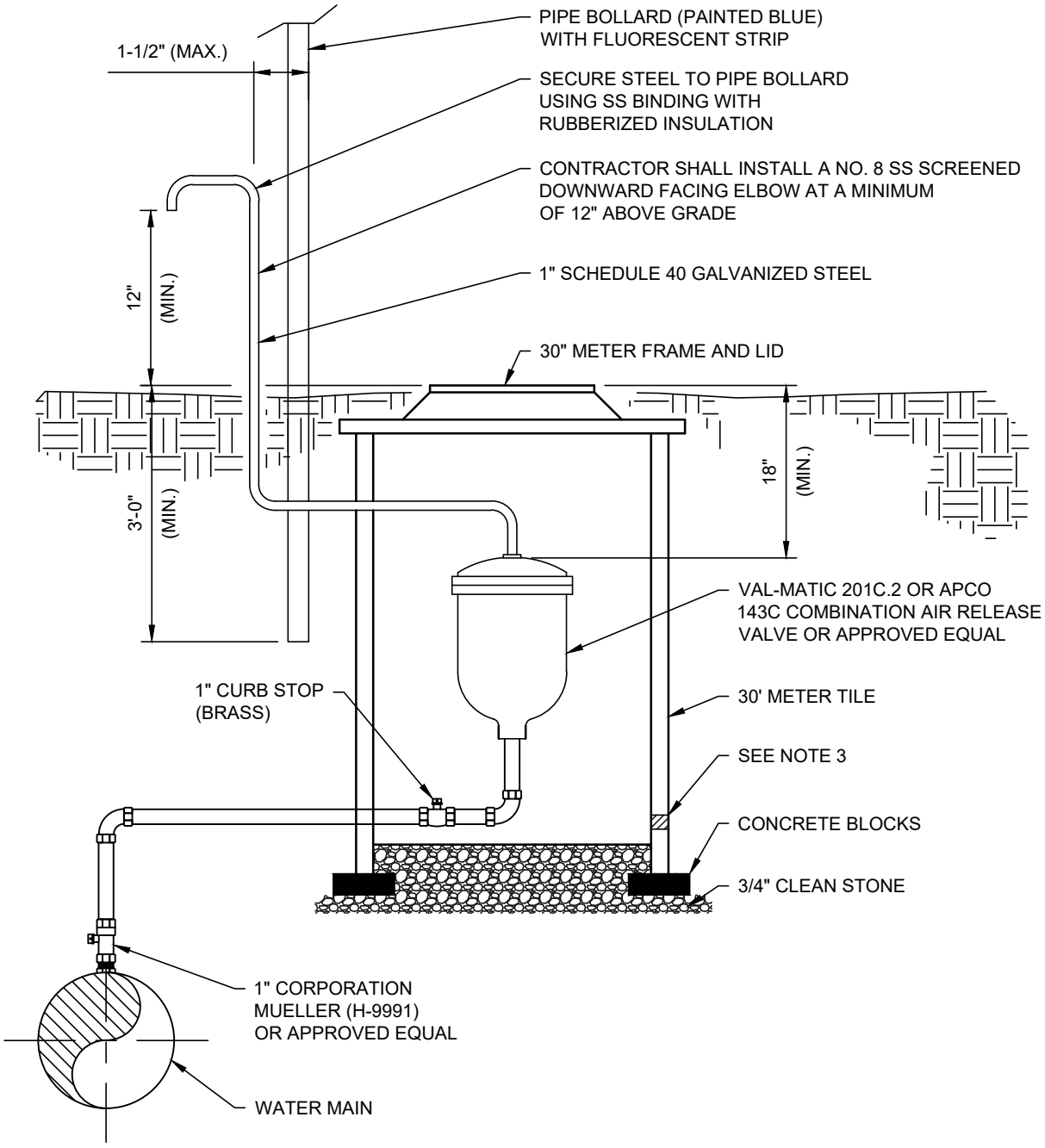
AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
AUTOMATIC AIR RELEASE VALVE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 70



NOTES:

1. THE APPLICATION AND LOCATION MUST BE APPROVED PRIOR TO INSTALLATION. IT IS DESIGNED FOR AREAS WHERE THE RISK OF FILLING THE CHAMBER WITH DISCHARGE EXISTS.
2. THE COMBINATION AIR VACUUM OPTION MUST BE APPROVED BY AN AMERICAN WATER REPRESENTATIVE PRIOR TO INSTALLATION.
3. PROVIDE DAYLIGHT DRAIN WHERE FEASIBLE, OTHERWISE PROVIDE SUMP.

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

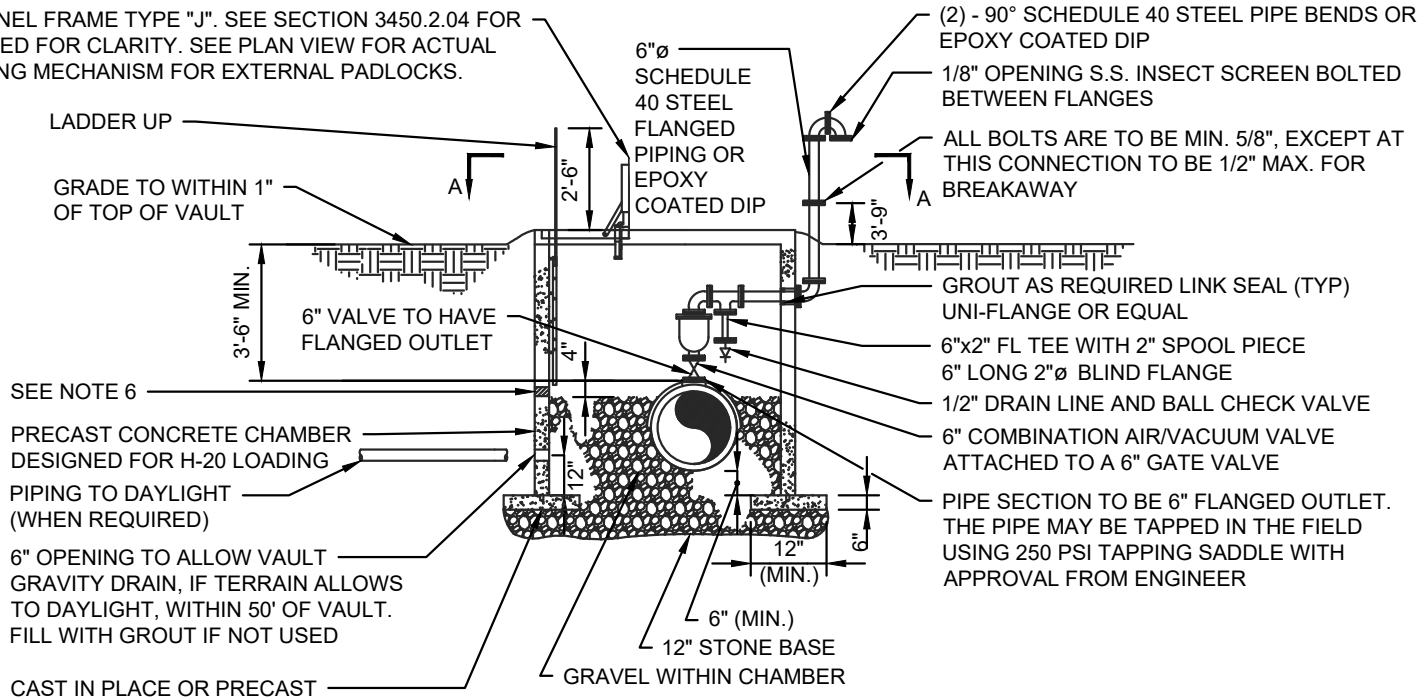
AMERICAN WATER

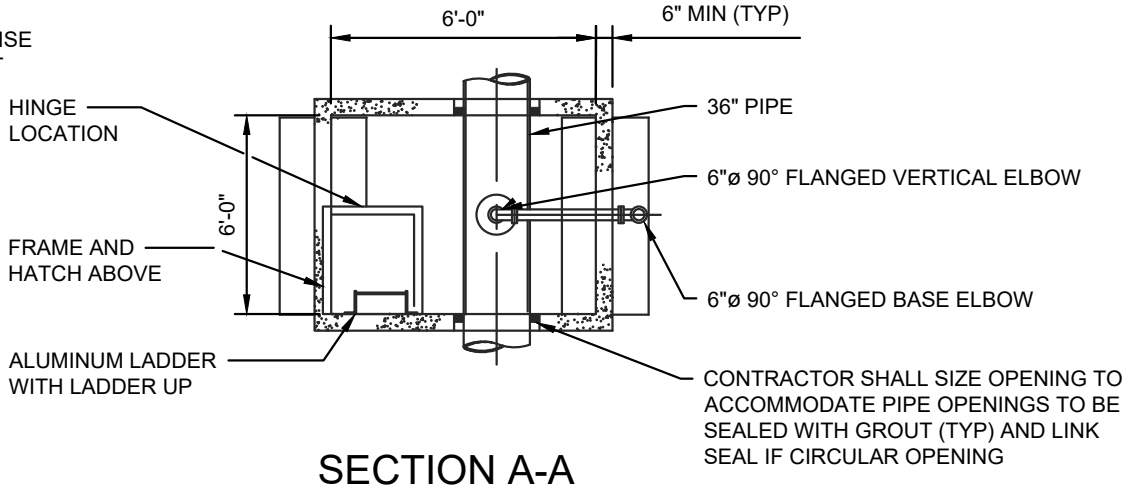
AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
AUTOMATIC COMBINATION AIR RELEASE/VACUUM VALVE DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 71

NOTES:

1. THIS DESIGN IS PROVIDED FOR LOCATIONS WHERE THERE IS A RISK OF THE MANHOLE FILLING WITH DISCHARGE WATER.
2. ALL STEEL DISCHARGE PIPING TO BE PAINTED WITH TNEMEC SERIES 66, 2 COATS 8 MIL, DFT COLOR TO BE BLUE.
3. VAULT TO BE DESIGNED AND MANUFACTURED FOR INTERMITTENT WATER LOADING. PREFABRICATED VAULT MUST HAVE SUBMITTAL INDICATING SUCH. CAST IN PLACE VAULTS MUST HAVE PE SEAL ON CONCRETE, STEEL, AND VAULT DESIGN SUBMITTAL. (DESIGN NOT FOR HIGH TRAFFIC AREAS)
4. PIPE FITTING AND AIR RELEASE SIZES CAN BE CHANGED 4" THRU 6" TO ACCOMMODATE PIPE SIZES 16" THRU 36" WITH APPROVAL FROM THE ENGINEER.
5. ACCESS TO PRECAST CONCRETE CHAMBER MAY BE A 36" CAST IRON MANHOLE LID ASSEMBLY SUBJECT TO APPROVAL BY ENGINEER.
6. PROVIDE DAYLIGHT DRAIN WHERE FEASIBLE, IF NOT FEASIBLE PROVIDE SUMP.





SECTION A-A

AMERICAN WATER ENGINEERING
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

AMERICAN WATER STANDARD
CIVIL
WATER DISTRIBUTION SYSTEM
COMBINATION AIR RELEASE VACUUM 16" TO 36" DETAIL

DATE: 09-OCT-2019	AMERICAN WATER ENGINEERING	SCALE: AS SHOWN
STANDARD DETAILS	APPROVED	SD- 72

Duplex-2″ meter yoke setting exhibit
(fit one outside 36″ meter pit)

For Reference Only