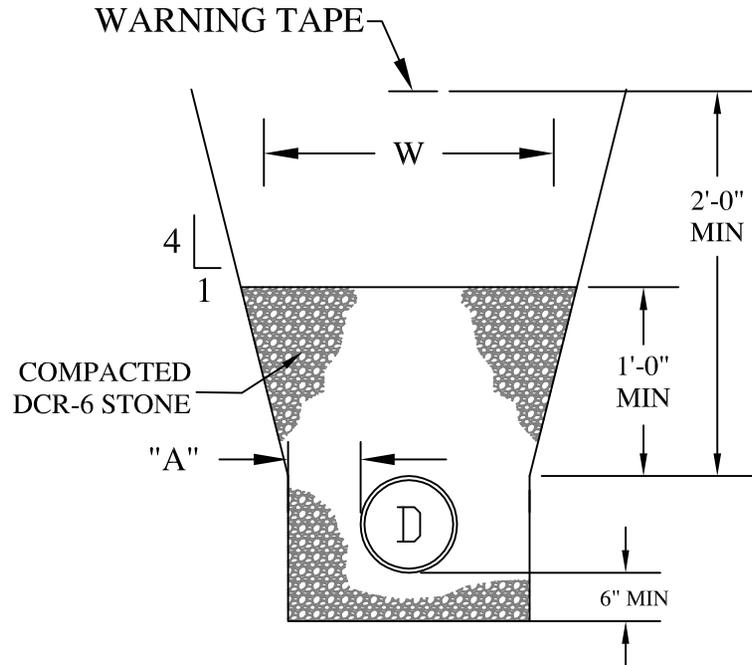


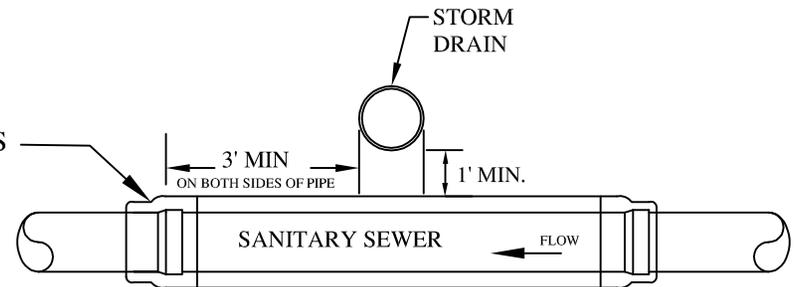
Hagerstown Wastewater Details

- WW101 Trenching, Encasement, and Cradle
- WW102 Manhole Frame and Cover
- WW103 Manhole Cover Grade Ring
- WW104 Precast Concrete Manhole
- WW105 Option 1: Inside Drop Manhole Connection
- WW106 Option 2: Outside Drop Manhole Connection
- WW107 Precast Concrete Shallow Manhole
- WW108 Manhole Steps
- WW109 Plans of Typical Manhole Flow Channels
- WW110 Precast Manhole Pipe Connections (Gaskets)
- WW111 Manhole Pipe Connections
- WW112 Manhole Future Connections
- WW113 Single Sewer House Connection
- WW114 Double Wye House Connection
- WW115 Built-up Lateral Connection
- WW116 Cleanout Assembly
- WW117 Typical Cleanout Safety Protection
- WW118 Tunnel or Jacking Installation, Type I
- WW119 Pipes Through Sleeves, Jacking or Boring Installation Type II, III, and IV
- WW120 Receiving Manhole for Force Main or Low Pressure Sewer Discharge
- WW121 In-Line Flushing Connection Detail
- WW122 In-Line Flushing Connection 1-1/4" Through 4"
- WW123 Terminal Flushing Connections
- WW124 Compression Repair Coupling for Low Pressure Force Mains
- WW125 PVC Pipe Union for Repairing Low Pressure Force Mains
- WW126 Joint Restraint for Force Mains
- WW127 Buttress for Horizontal 90° M.J. Bends
- WW128 Buttress for Force Mains Less Than 90°
- WW129 Air and Vacuum Relief Valve and Vault
- WW130 Required Grading and Landscaping at Grinder Pump
- WW131 Pipe Repair or New Connection Details
- WW132 Manhole Abandonment



GRANDULAR EMBEDMENT

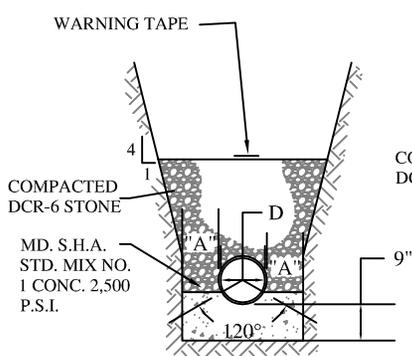
RUBBER BOOT WITH STAINLESS STEEL STRAPS



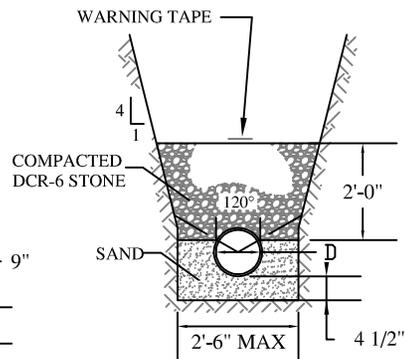
STEEL SLEEVE ENCASEMENT PROFILE

NOTES:

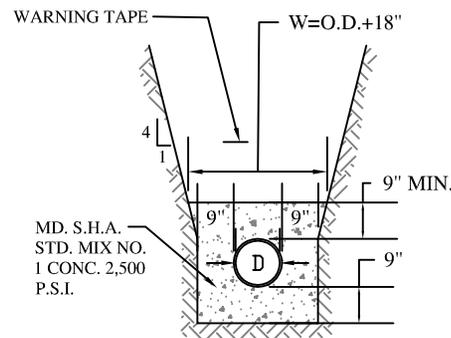
1. TRENCH SHALL BE BRACED WITH SHORING OR PROTECTED WITH TRENCH BOX. (OSHA APPROVED)
 2. BEARING SHALL BE PROVIDED FOR FULL LENGTH OF BARREL.
 3. BELL HOLES SHALL BE DUG.
 4. DIMENSION "A" IS MAXIMUM ALLOWABLE CLEARANCE TO TRENCH WALL OR INSIDE FACE OF BRACING OR SHEETING. 1/2 DIA. PIPE.
 5. MINIMUM "W" SHALL BE PIPE O.D. + 1'-0".
 6. PAVEMENT WIDTH SHALL BE O.D. + 2 "A".
 7. USE OF COMPACTED DCR-6 STONE IS REQUIRED.
 8. AGGREGATE MAY BE WASHED, CRUSHER RUN GRAVEL, CRUSHED STONE OR CRUSHER RUN NO. 6.
- * NOT STANDARD
NEEDS TO BE APPROVED BY ENGINEERING DIVISION.



*LOW CRADLE



*SAND CUSHION



*CONCRETE ENCASEMENT

CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT - WASTEWATER DIVISION

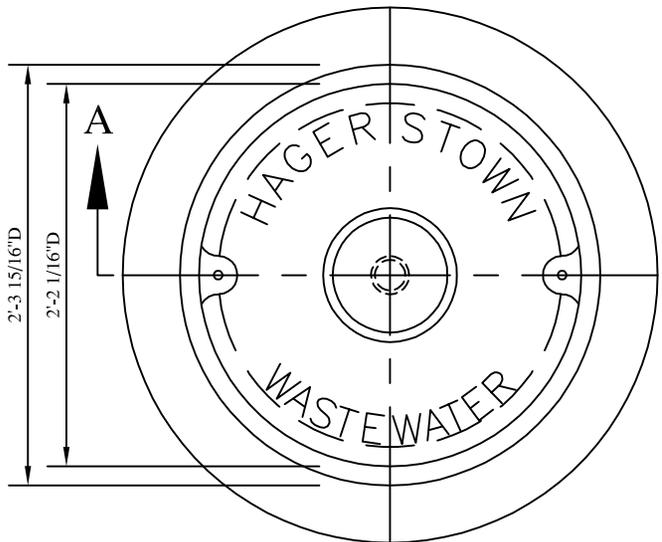
TRENCHING, ENCASEMENT, AND CRADLE

ISSUE DATE: MARCH 2009

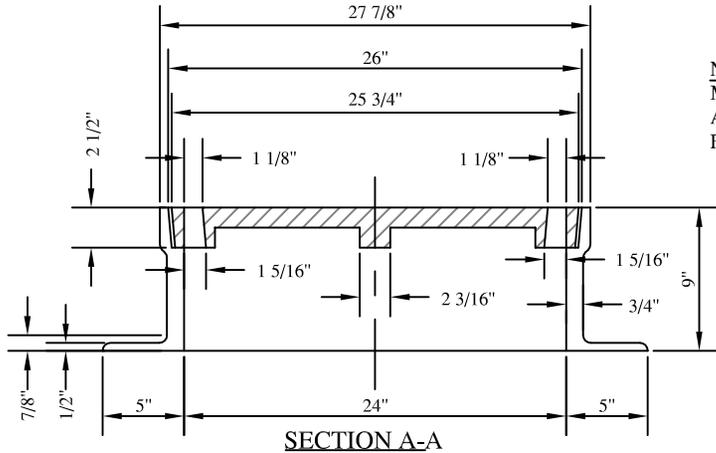
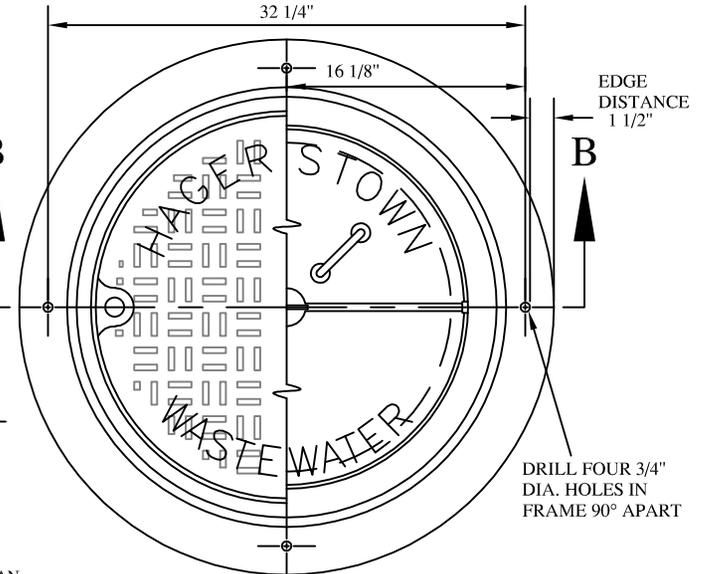
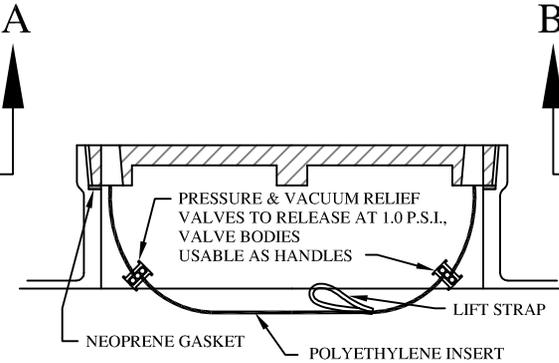
REVISIONS

DETAIL WW101

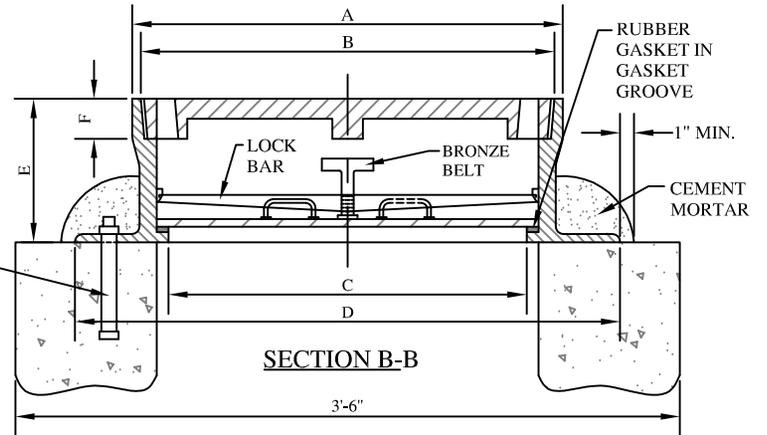




ANTI-INFLOW INSERT IS MANDATORY FOR ALL MANHOLES EXCEPT WATERTIGHT



NOTE:
MATERIAL: CAST IRON
APPROXIMATE WEIGHT: CLASS 30 OR 35
FRAME-250 LBS. COVER-170 LBS.



DIM.	A	B	C	D	E	F	WEIGHT
24" F&C	29 7/8"	27 7/8"	24"	36"	9"	2 1/2"	485 LBS.

WATERTIGHT MANHOLE FRAME AND COVER

AS MANUFACTURED BY E.A. QUIRIN, EAST JORDAN IRONWORKS, OR APPROVED EQUAL MANHOLE COVER TO BE STAMPED HAGERSTOWN WASTEWATER



CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT - WASTEWATER DIVISION

ISSUE DATE: MARCH 2009

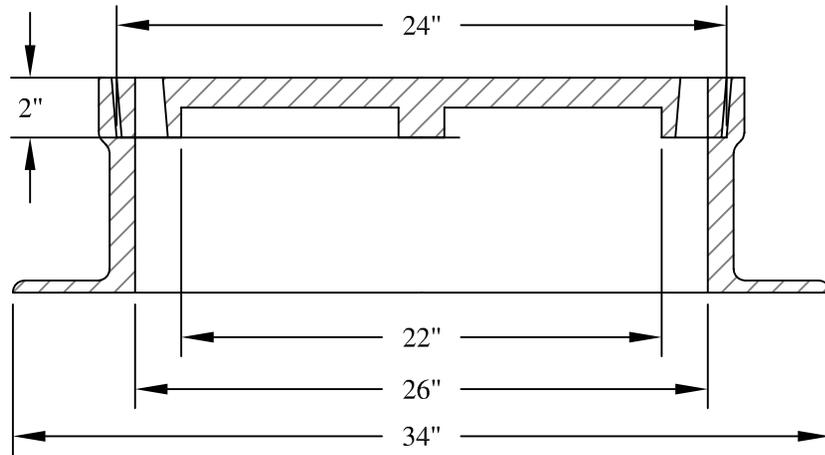
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MANHOLE FRAME AND COVER

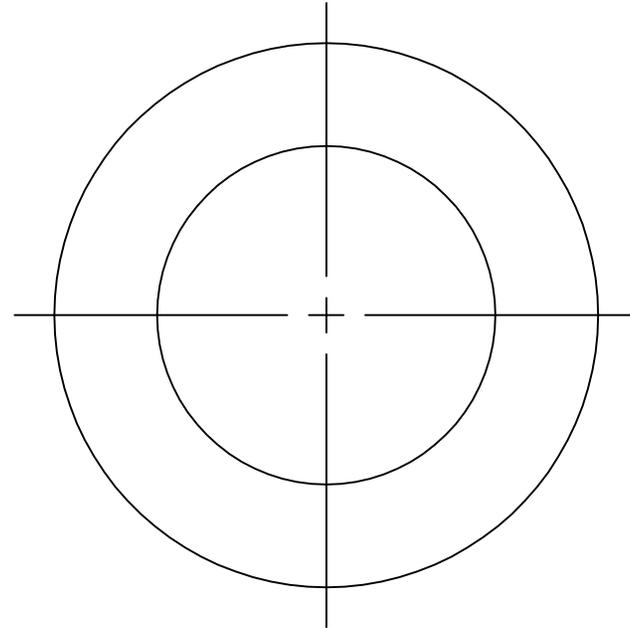
DETAIL WW102

NOTES:

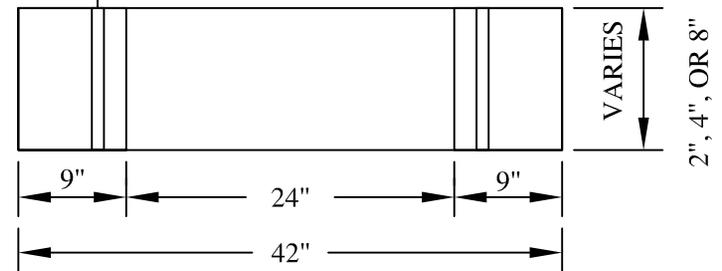
- 1. 4000 PSI TYPE II PORTLAND CEMENT (MIN).
- 2. ADJUST TO FINAL GRADE WITH PRECAST CONCRETE GRADE.
- 3. 4-1" HCL'S IN GRADE RING 90 DEGREES APART.



2" (INCH) THICKNESS
24" (INCH) DIAMETER
SERVICE LOAD HEAVY DUTY
SUITABLE FOR AA5H TO H20/HS20 LOADING
CONDITIONS



CHANNEL TO
RECEIVE ALL
THREAD ROD.



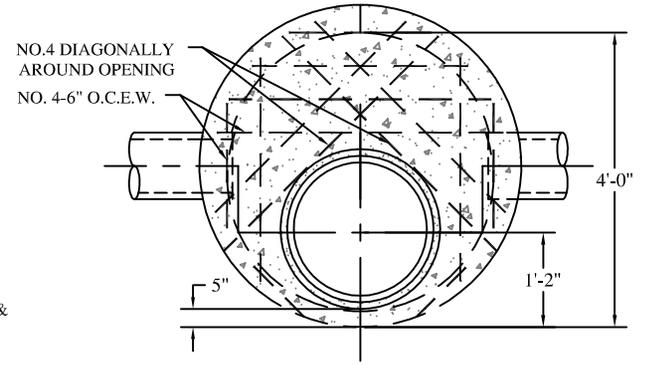
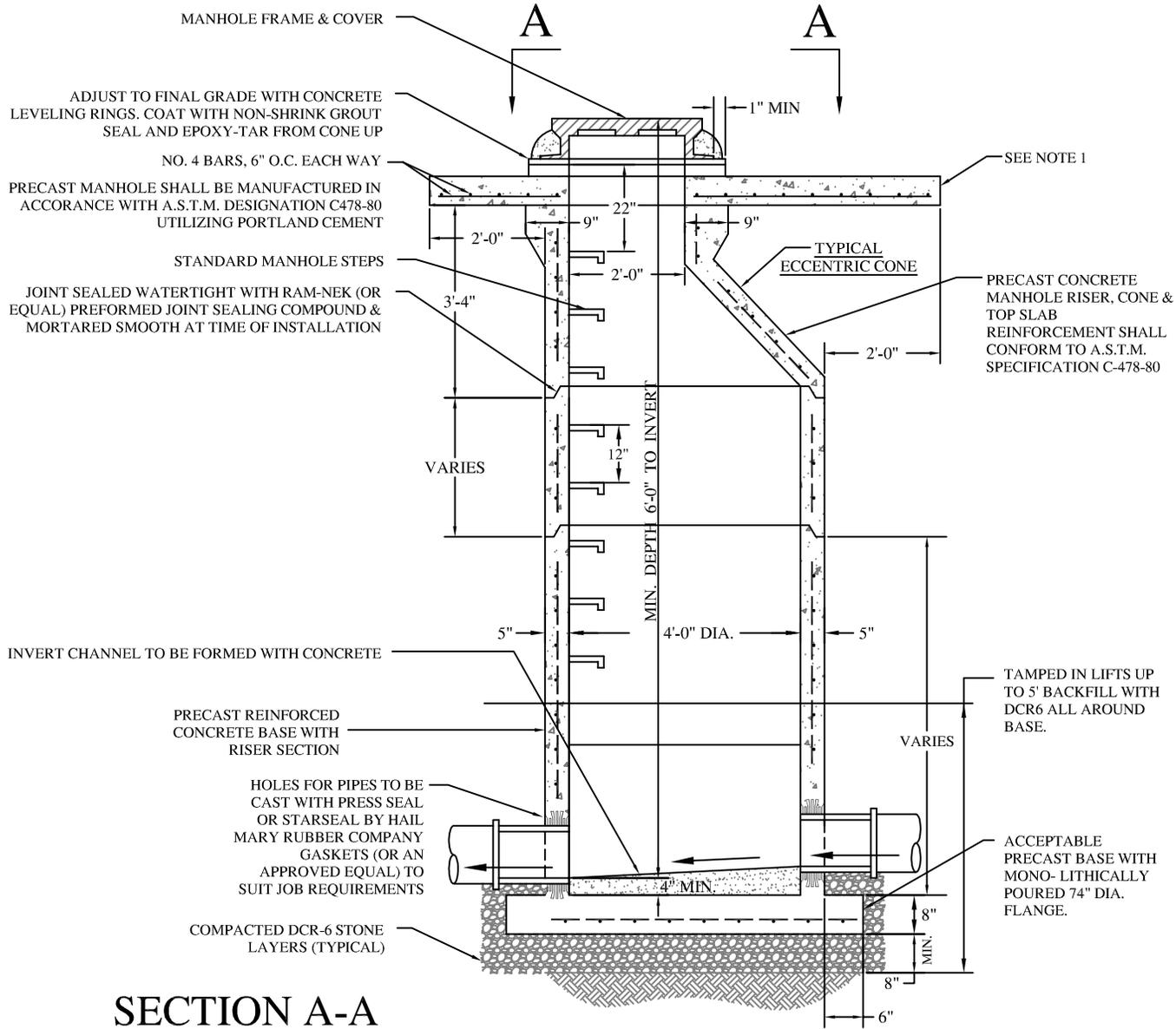
CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT - WASTEWATER DIVISION

MANHOLE COVER GRADE RING

ISSUE DATE: MARCH 2009

REVISIONS

DETAIL WW103



PLAN

NOTES:

1. CONCRETE ONLY IF REQUIRED BY CITY WASTEWATER DIVISION.
2. PRECAST MANHOLE SHALL BE MANUFACTURED IN ACCORDANCE WITH CONCRETE LEVELING RINGS OR BRICK TO MIN. 6"
3. TERMINAL MANHOLE SIMILAR IN ALL RESPECTS EXCEPT INFLUENT CONNECTIONS
4. COMPLETE BACKFILL OF MHANHOLE WITH DIRTY CRUSHER RUN DCR-6.
5. REJECT ANY MANHOLE DAMAGED OR REPAIRED.
6. THE GRADE RINGS UP TO THE FRAME AND COVER NEED TO BE PARGED WITH NON SHRINK GROUT.

SECTION A-A

CITY OF HAGERSTOWN, MARYLAND - UTILITY DEPARTMENT, WASTEWATER DIVISION

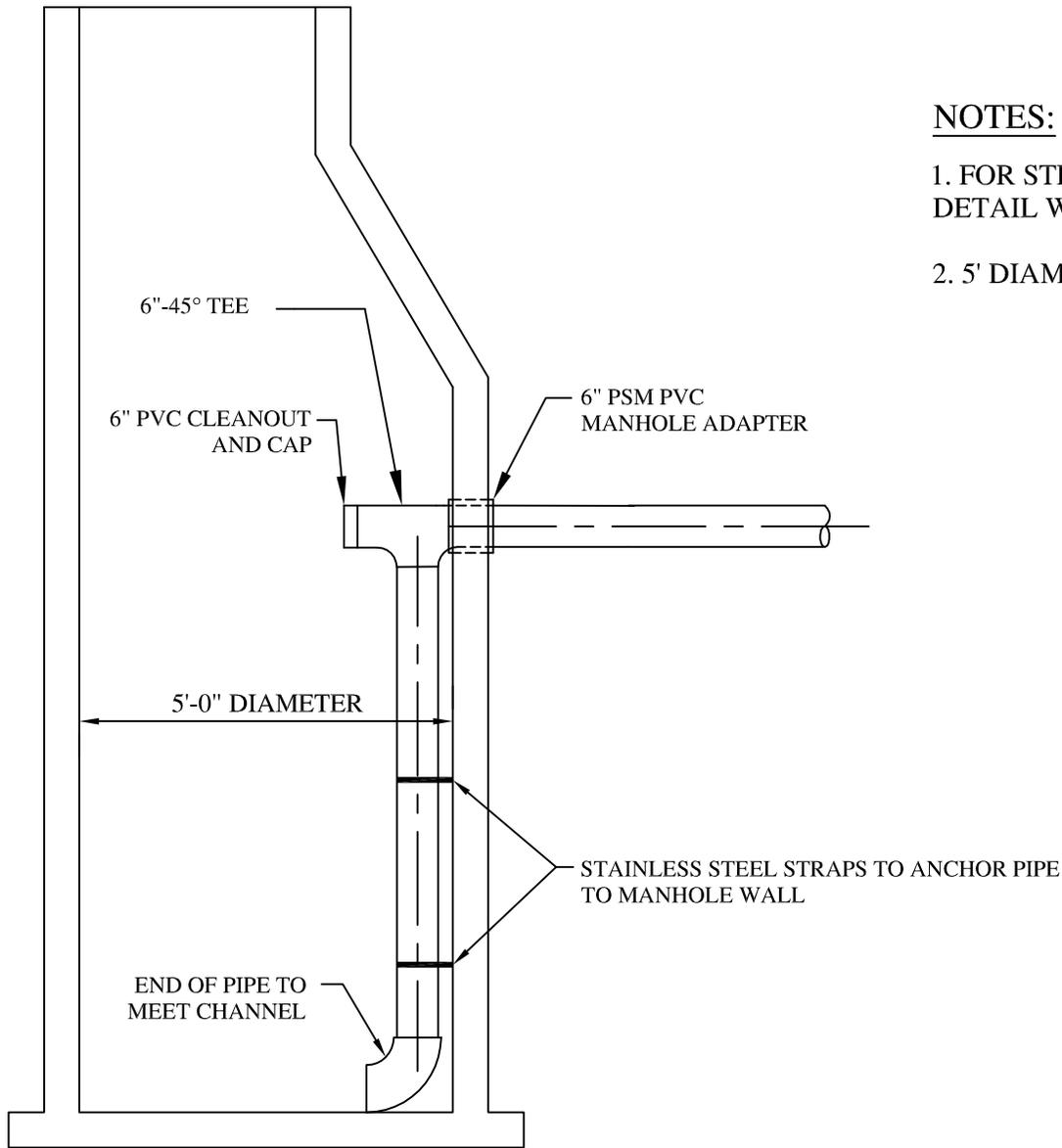
ISSUE DATE: MARCH 2009



PRECAST CONCRETE MANHOLE DETAIL

REVISIONS	

DETAIL WW104



NOTES:

1. FOR STRUCTURE OF MANHOLE SEE DETAIL WW 104.
2. 5' DIAMETER MANHOLE. (FOR 8" MAINS)



CITY OF HAGERSTOWN, MARYLAND - UTILITY DEPARTMENT, WASTEWATER DIVISION

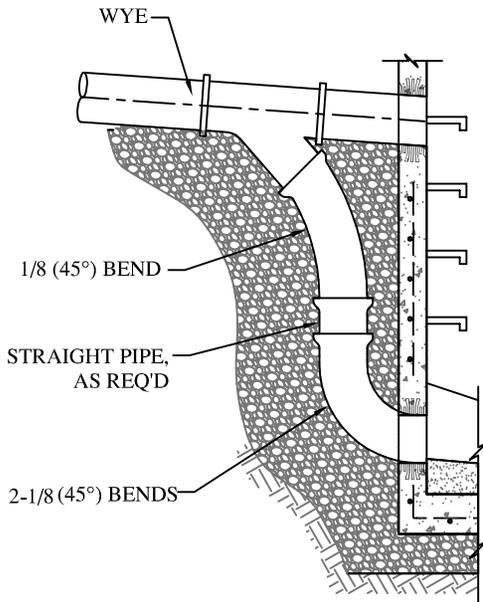
ISSUE DATE: MARCH 2009

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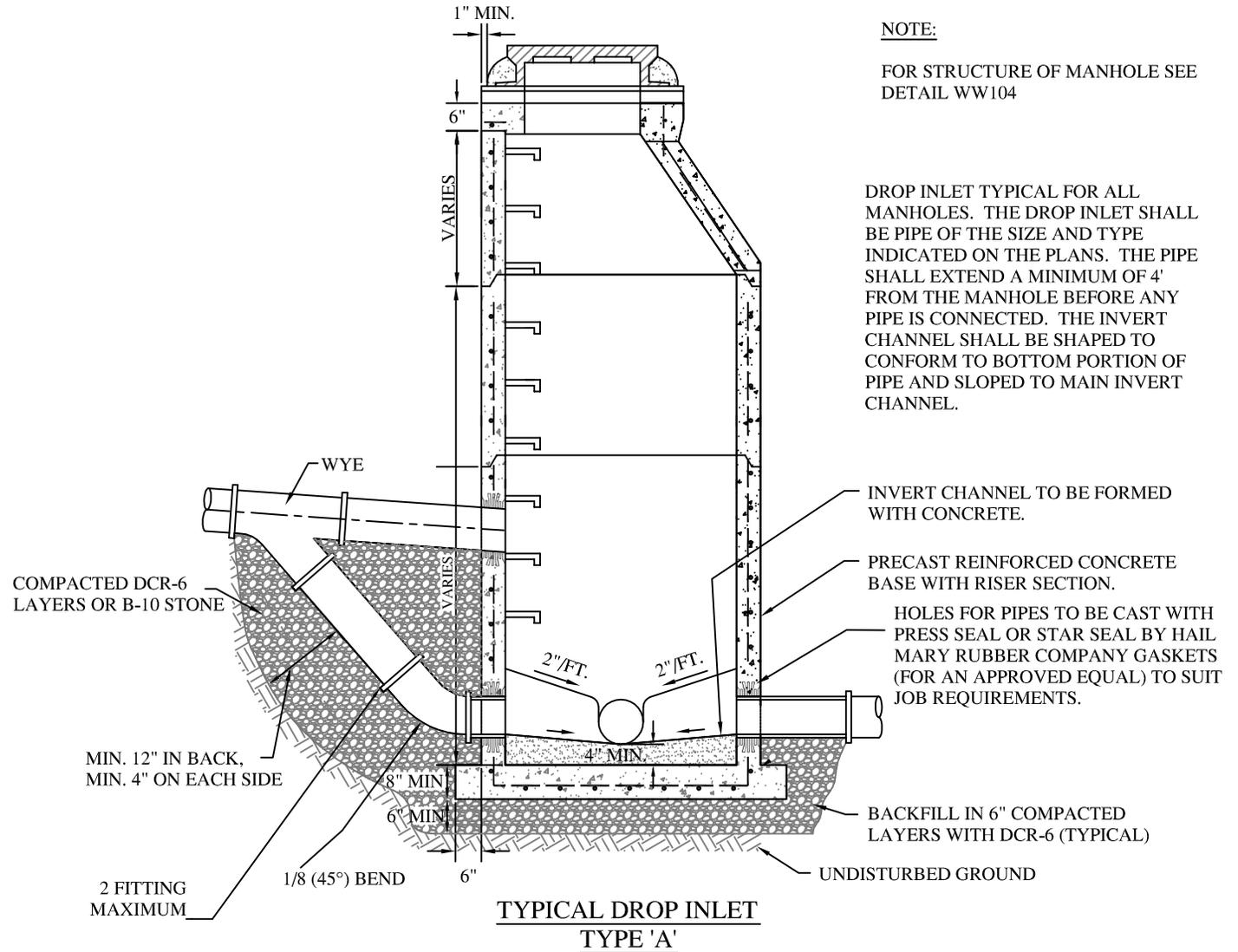
OPTION 1: INSIDE DROP MANHOLE CONNECTION

DETAIL WW105

DROP CONNECTION			
SIZE OF SEWER	TYPE A		TYPE B
	MAX. DROP	MIN. DROP	MIN. DROP
8"	3'-9"	1'-9"	3'-9"
10"	4'-0"	2'-0"	4'-0"
12"	6'-0"	2'-6"	6'-0"
15"	6'-0"	2'-8"	6'-0"



TYPICAL DROP INLET
TYPE 'B'



TYPICAL DROP INLET
TYPE 'A'

NOTE:
FOR STRUCTURE OF MANHOLE SEE
DETAIL WW104

DROP INLET TYPICAL FOR ALL
MANHOLES. THE DROP INLET SHALL
BE PIPE OF THE SIZE AND TYPE
INDICATED ON THE PLANS. THE PIPE
SHALL EXTEND A MINIMUM OF 4'
FROM THE MANHOLE BEFORE ANY
PIPE IS CONNECTED. THE INVERT
CHANNEL SHALL BE SHAPED TO
CONFORM TO BOTTOM PORTION OF
PIPE AND SLOPED TO MAIN INVERT
CHANNEL.

INVERT CHANNEL TO BE FORMED
WITH CONCRETE.

PRECAST REINFORCED CONCRETE
BASE WITH RISER SECTION.

HOLES FOR PIPES TO BE CAST WITH
PRESS SEAL OR STAR SEAL BY HAIL
MARY RUBBER COMPANY GASKETS
(FOR AN APPROVED EQUAL) TO SUIT
JOB REQUIREMENTS.

BACKFILL IN 6" COMPACTED
LAYERS WITH DCR-6 (TYPICAL)

UNDISTURBED GROUND

CITY OF HAGERSTOWN, MARYLAND - ENGINEERING AND INSPECTIONS DEPARTMENT

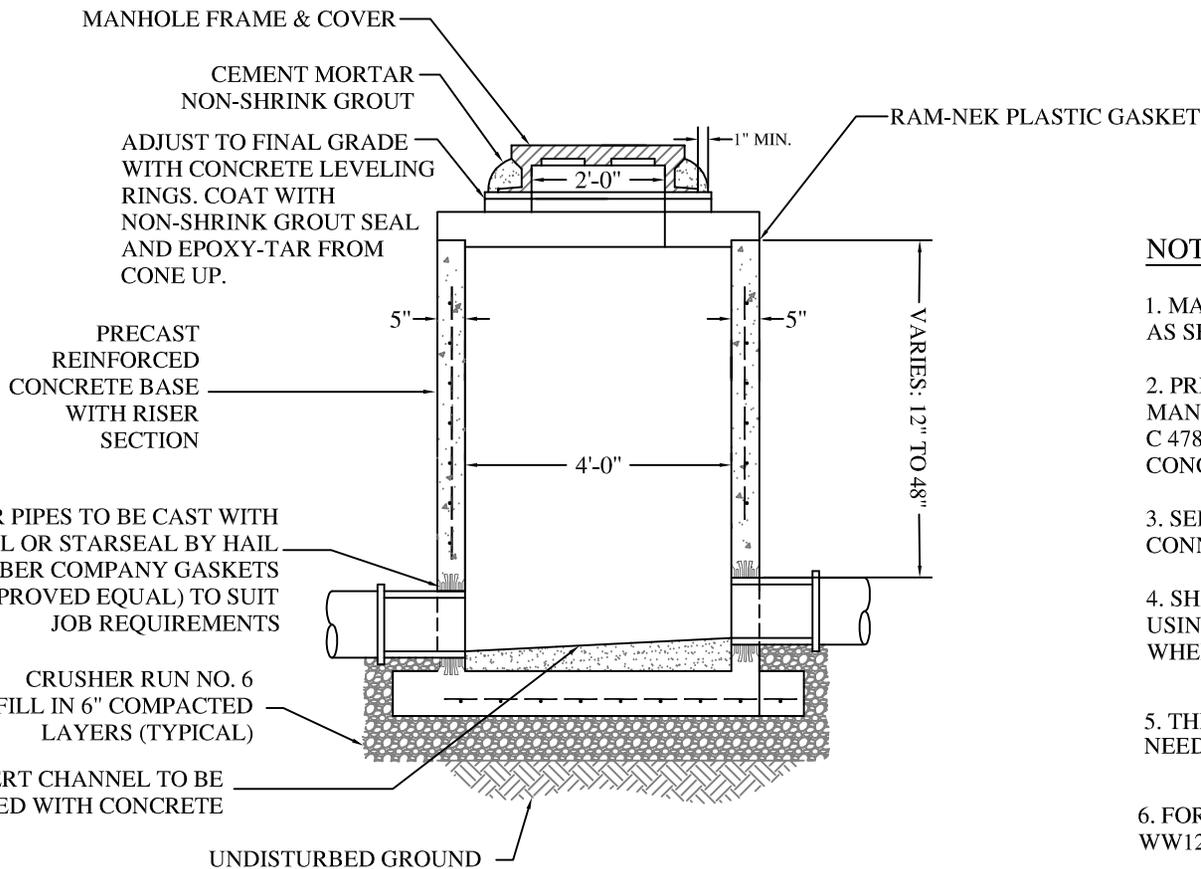
ISSUE DATE: MARCH 2009

REVISIONS

OPTION 2: OUTSIDE DROP MANHOLE CONNECTION

DETAIL WW106





NOTES:

1. MANHOLE FRAME & COVER SHALL BE PLACED AS SHOWN.
2. PRECAST MANHOLE SHALL BE MANUFACTURED IN ACCORDANCE WITH A.S.T.M C 478-80 UTILIZING 4,000 P.S.I. PORTLAND CEM. CONC.
3. SEE WW111 FOR MANHOLE PIPE CONNECTIONS.
4. SHALLOW MANHOLE MAY BE CONSTRUCTED USING PRECAST BASE WITH RISER SECTION, WHERE PERMITTED.
5. THE GRADE RINGS UP TO THE FRAME AND COVER NEED TO BE PARGED WITH NON SHRINK GROUT.
6. FOR STRUCTURE OF MANHOLE SEE WW120



CITY OF HAGERSTOWN, MARYLAND - UTILITY DEPARTMENT, WASTEWATER DIVISION

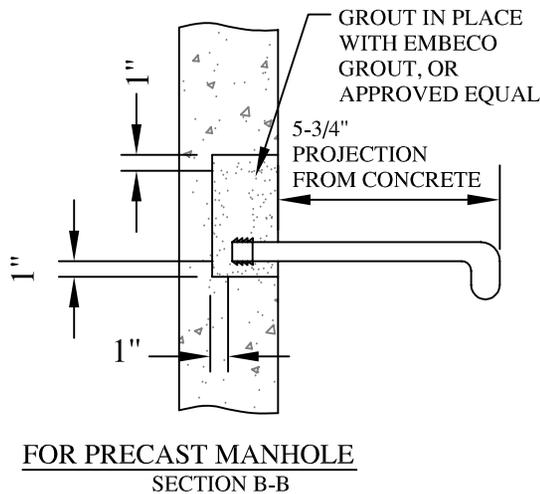
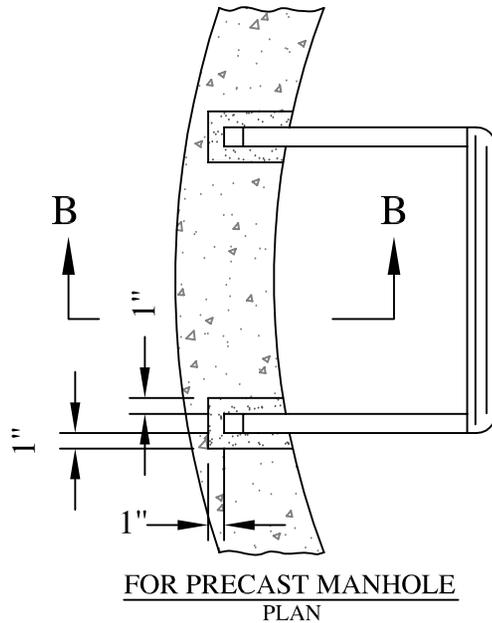
PRECAST CONCRETE SHALLOW MANHOLE

ISSUE DATE: MARCH 2009

REVISIONS

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DETAIL WW107



NOTES:

1. AMERICAN STEP COMPANY INC. STEPS ML10 OR APPROVED EQUAL.
2. PRECAST MANHOLE STEPS-AMERICAN STEP COMPANY INC. ML10 OR APPROVED EQUAL.
3. STEPS INSTALLED BY THE PRECAST MANHOLE MANUFACTURER MUST EQUAL #2 ABOVE.
4. 1/2" DIAMETER DEFORMED REINFORCING STEEL COPOLYMER POLYPROPYLENE OUTER LAYER.
5. POST FABRICATION 3M SCOTCH KOTE 426 (PURPLE) FUSION BONDED EPOXY COATING FOR MAXIMUM CORROSION PROTECTION.



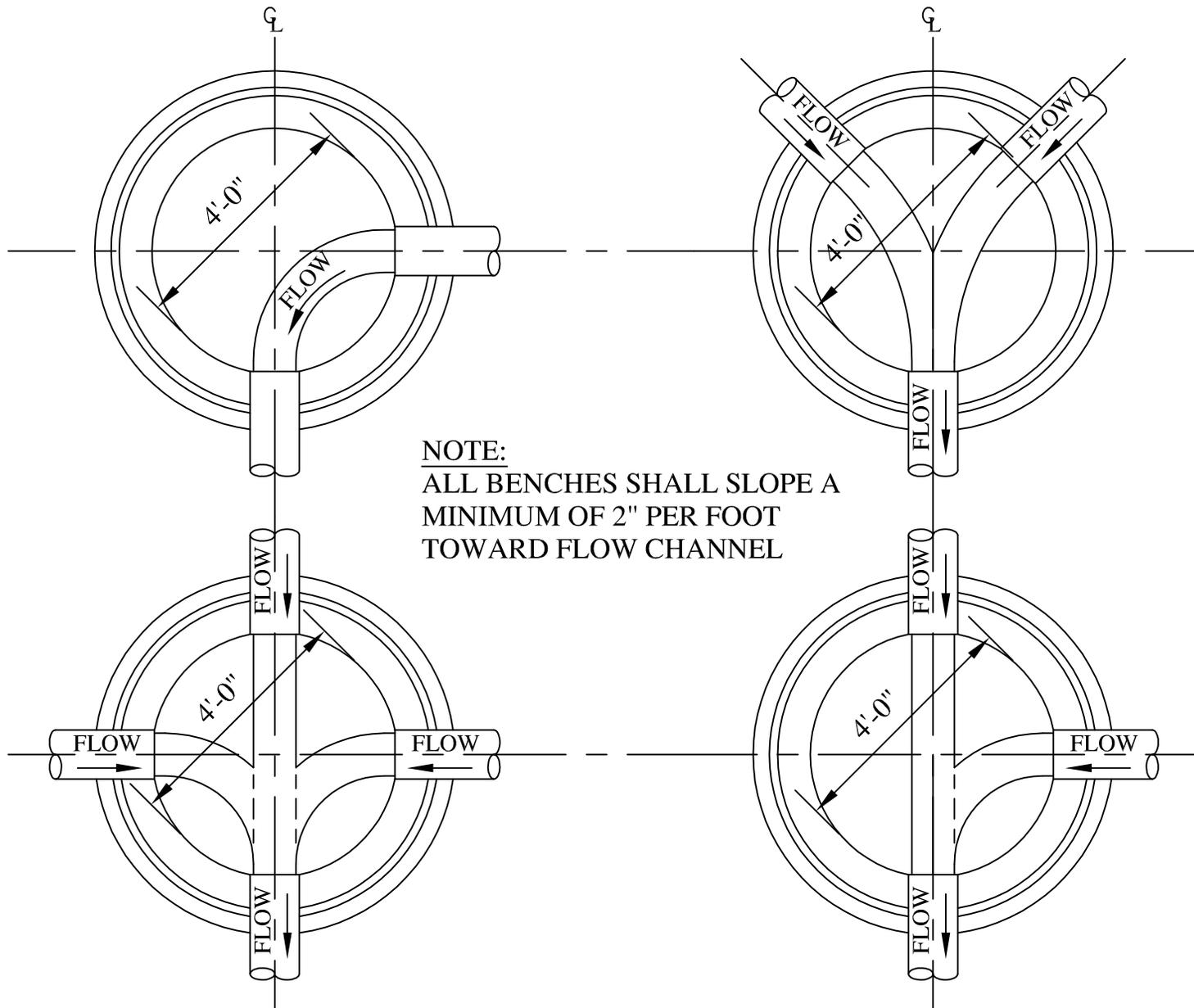
CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

MANHOLE STEPS

ISSUE DATE: MARCH 2009

REVISIONS

DETAIL WW108



NOTE:
 ALL BENCHES SHALL SLOPE A
 MINIMUM OF 2" PER FOOT
 TOWARD FLOW CHANNEL

CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

ISSUE DATE: MARCH 2009

REVISIONS

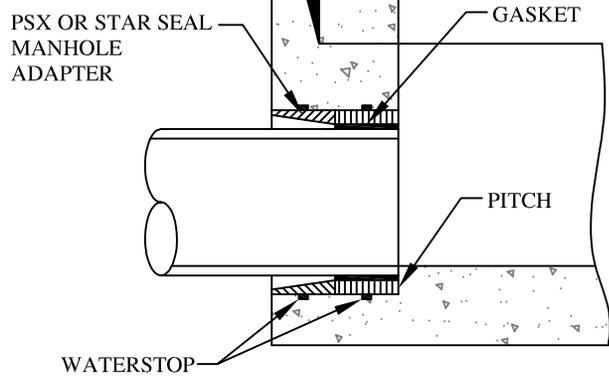
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PLANS OF TYPICAL MANHOLE FLOW CHANNELS

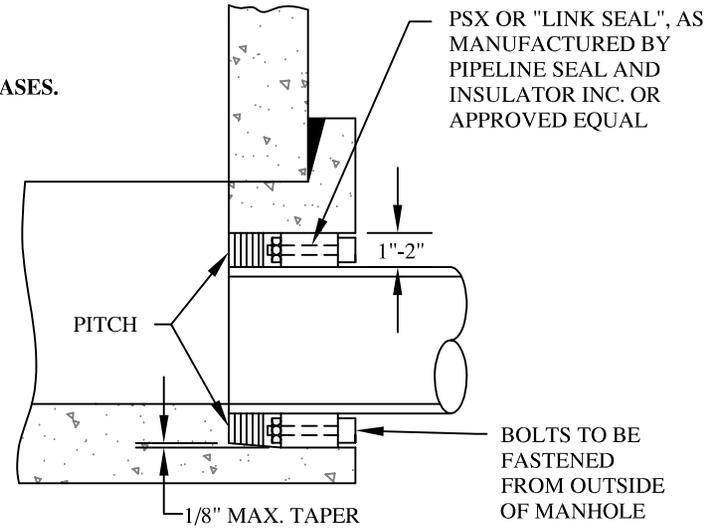
DETAIL WW109



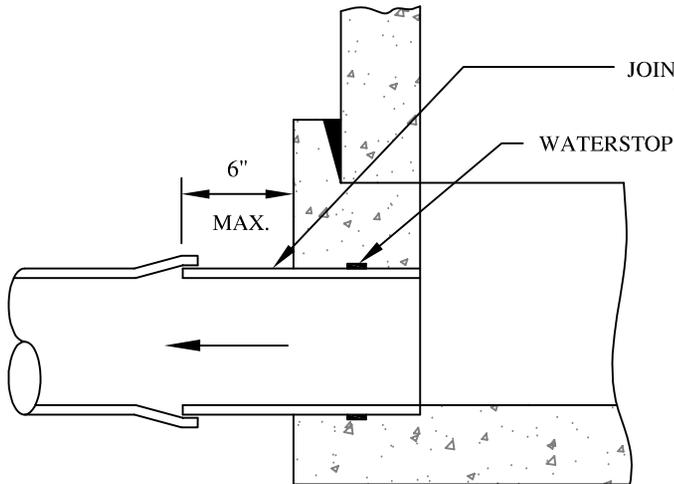
NOTE:
CONNECTIONS ARE SHOWN WITH
STANDARD PRECAST MANHOLE BASES.



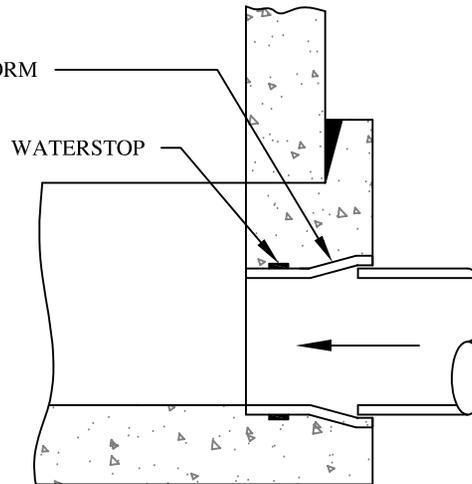
PVC PIPE CONNECTIONS



FLEXIBLE MANHOLE CONNECTIONS



JOINTS SHALL CONFORM
 TO A.S.T.M. C425



DUCTILE IRON OR HDPE PIPE CONNECTION



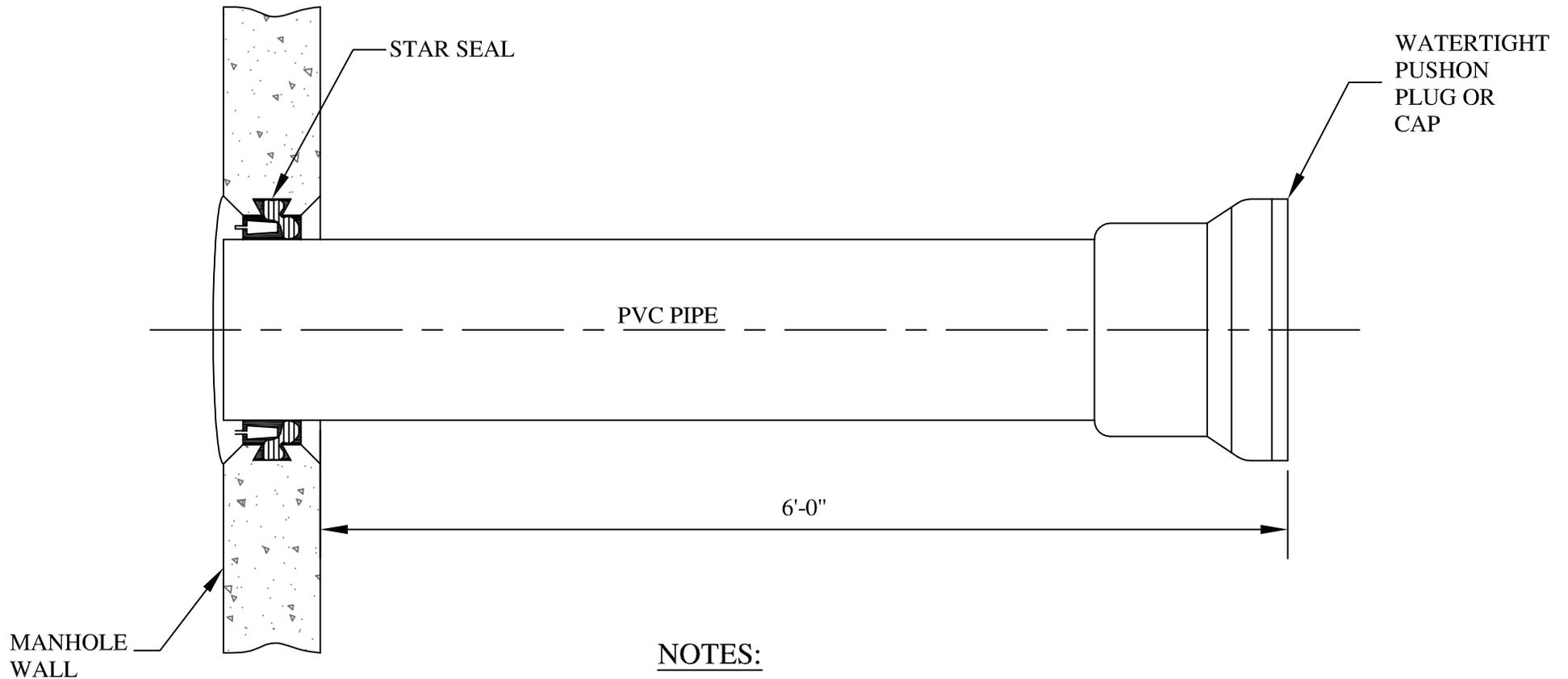
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MANHOLE PIPE CONNECTIONS

DETAIL WW111



NOTES:

1. PVC PIPE PRECAST BASE WITH PIPE TO MANHOLE SEAL.
2. DISTANCE SHOWN OR TO PROPERTY LINE OR TO END OF EASEMENT.



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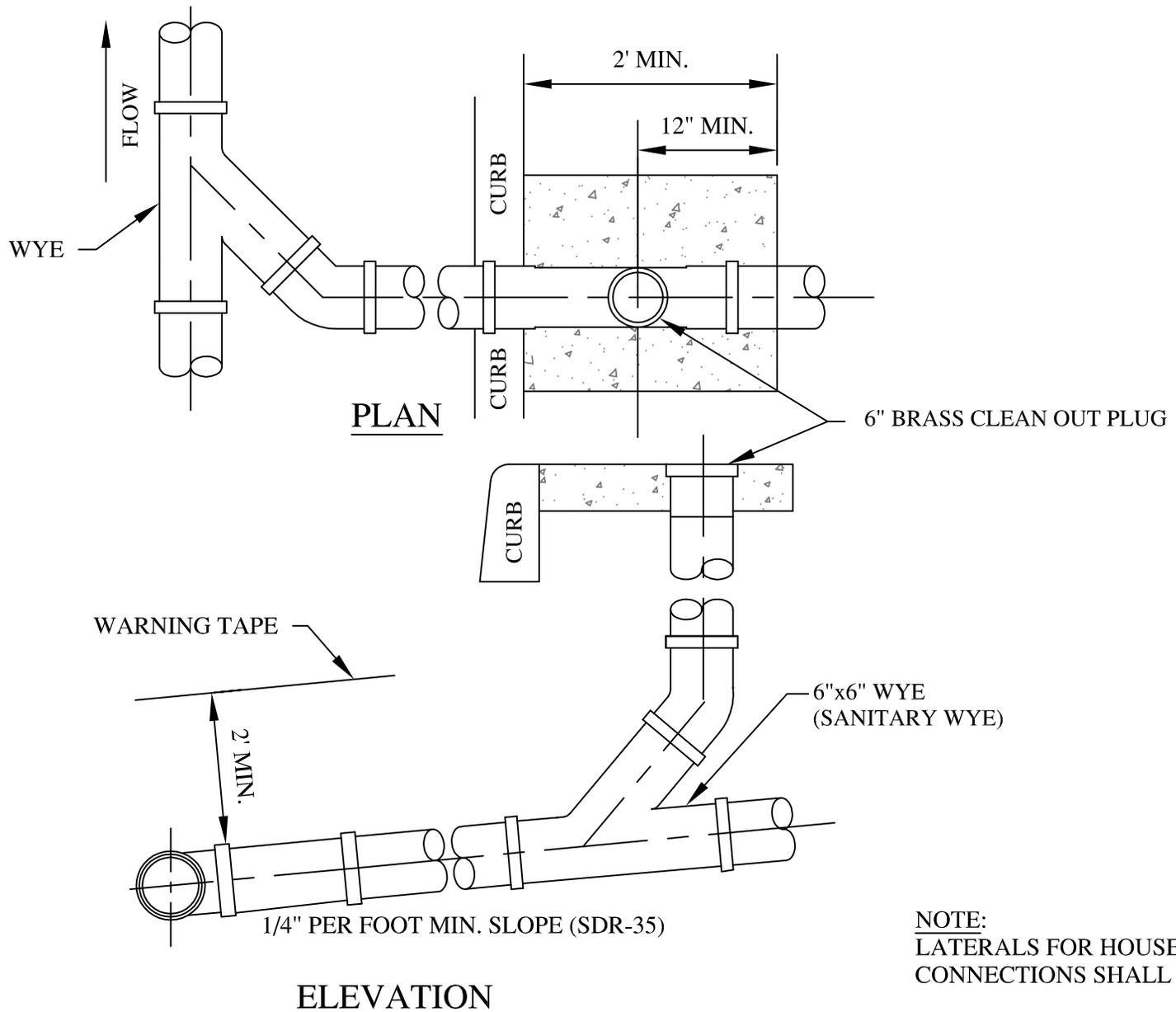
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FUTURE CONNECTIONS

DETAIL WW112



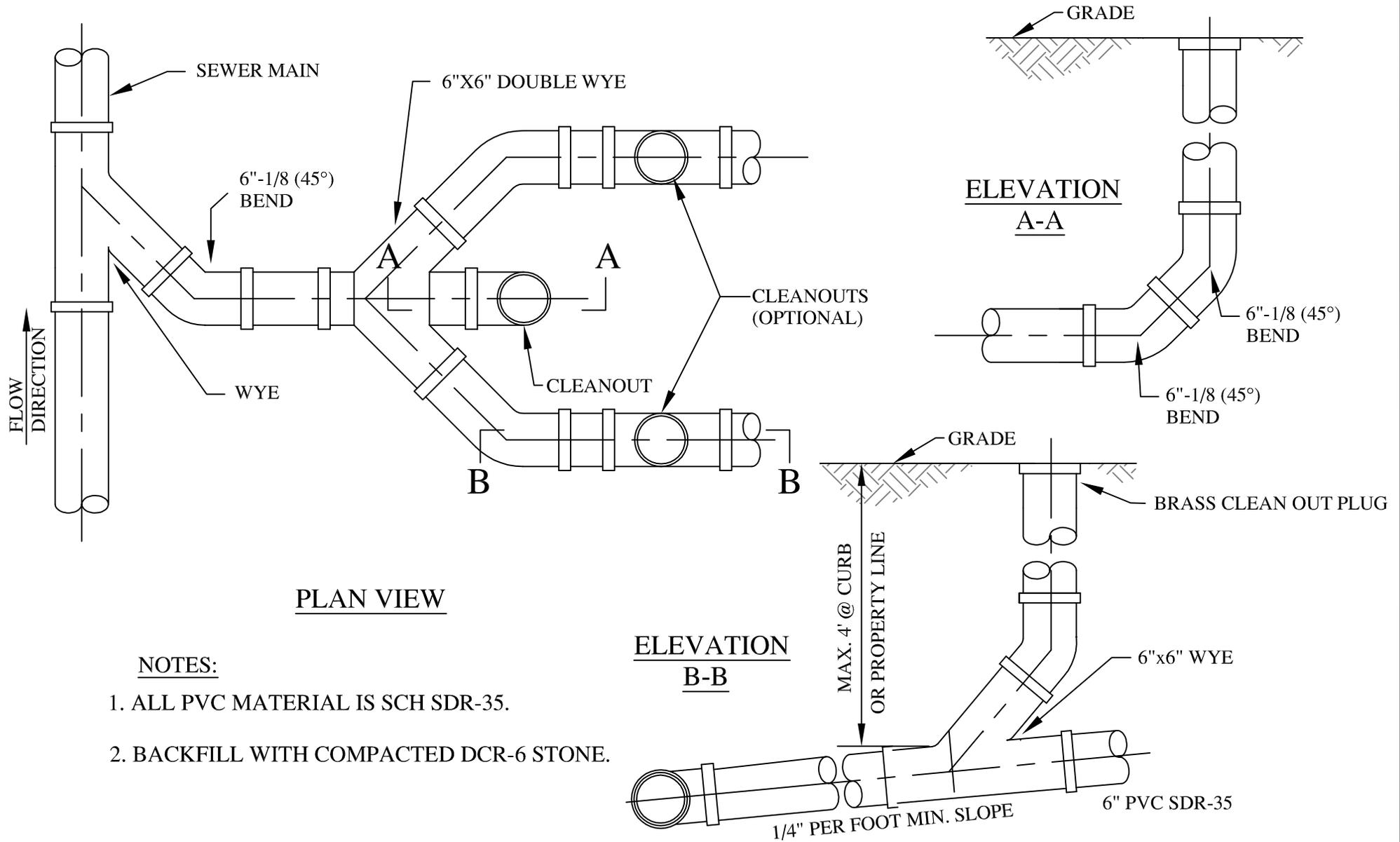
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ISSUE DATE: MARCH 2009

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SINGLE SEWER HOUSE CONNECTION

DETAIL WW113



NOTES:

1. ALL PVC MATERIAL IS SCH SDR-35.
2. BACKFILL WITH COMPACTED DCR-6 STONE.



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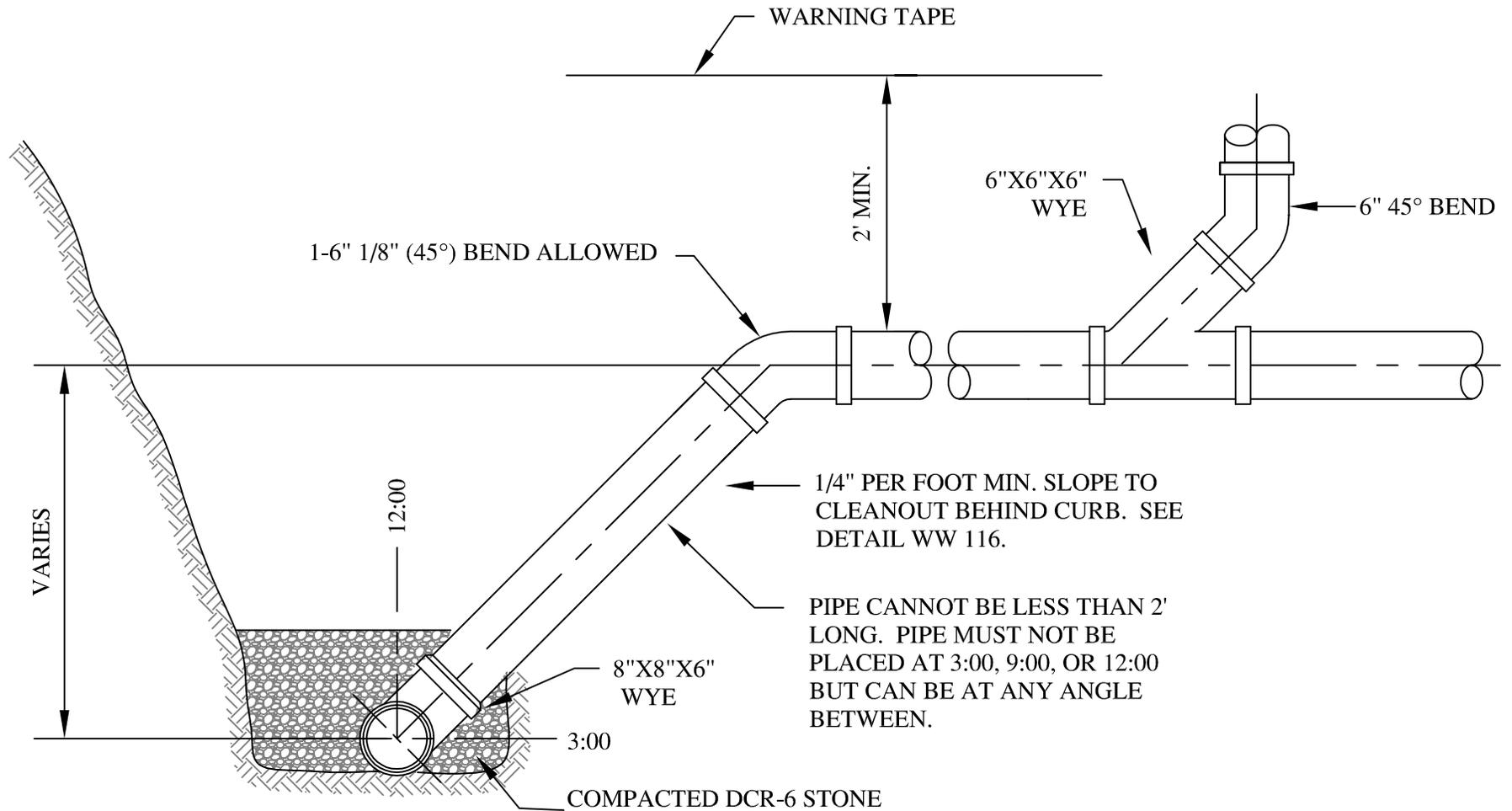
DOUBLE WYE HOUSE CONNECTION

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DETAIL WW114

ALL PVC MATERIAL IS SCH SDR-35



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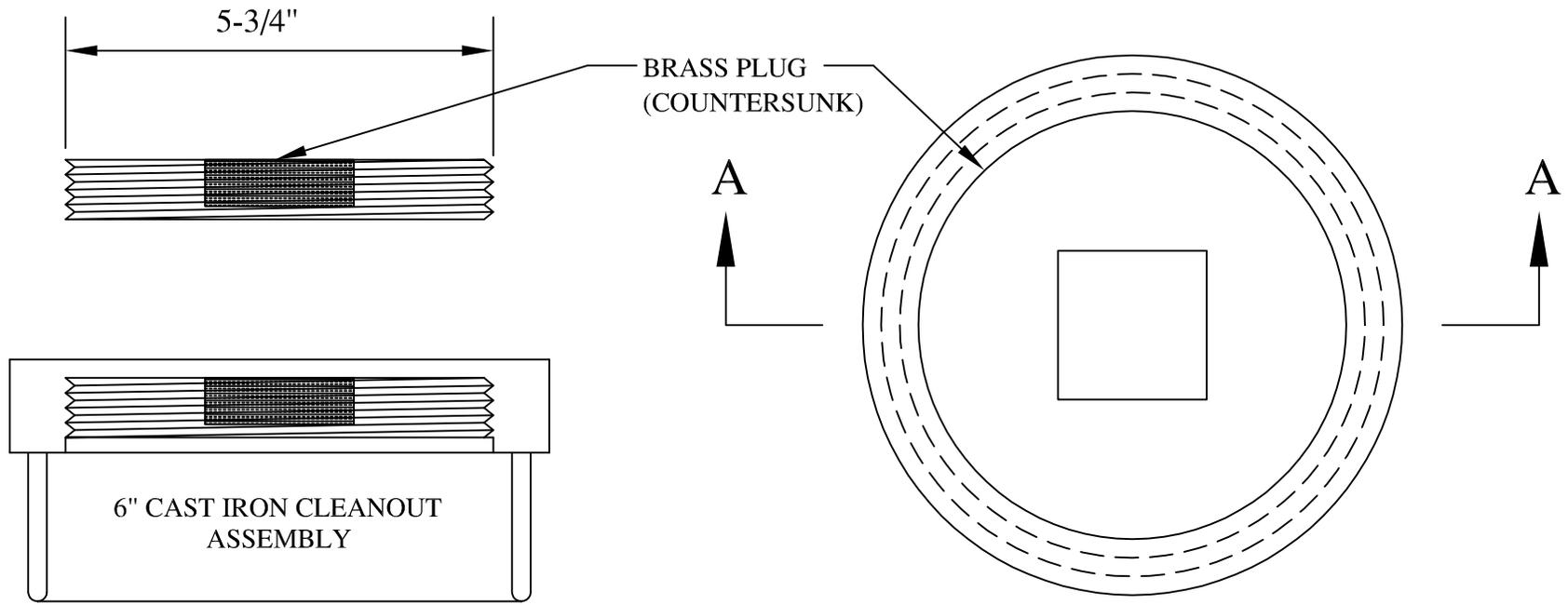
ISSUE DATE: MARCH 2009

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BUILT-UP LATERAL CONNECTION

DETAIL WW115





SECTION A-A

PLAN

- NOTES:
1. FOR DRIVEWAY, ROADWAY, GRASS STRIP, OR SIDEWALK LOCATIONS, A H-20 TRAFFIC LOADING COVER ASSEMBLY SHALL BE UTILIZED.
 2. MEETS ASTM A74-98 AND ASME A112.36 CUT PIPE TO DESIRED LEVEL, LUBE GASKET AND PUSH ON PIPE, TAP WITH LEAD HAMMER TO SEAT, THEN INSTALL BRASS PLUG.



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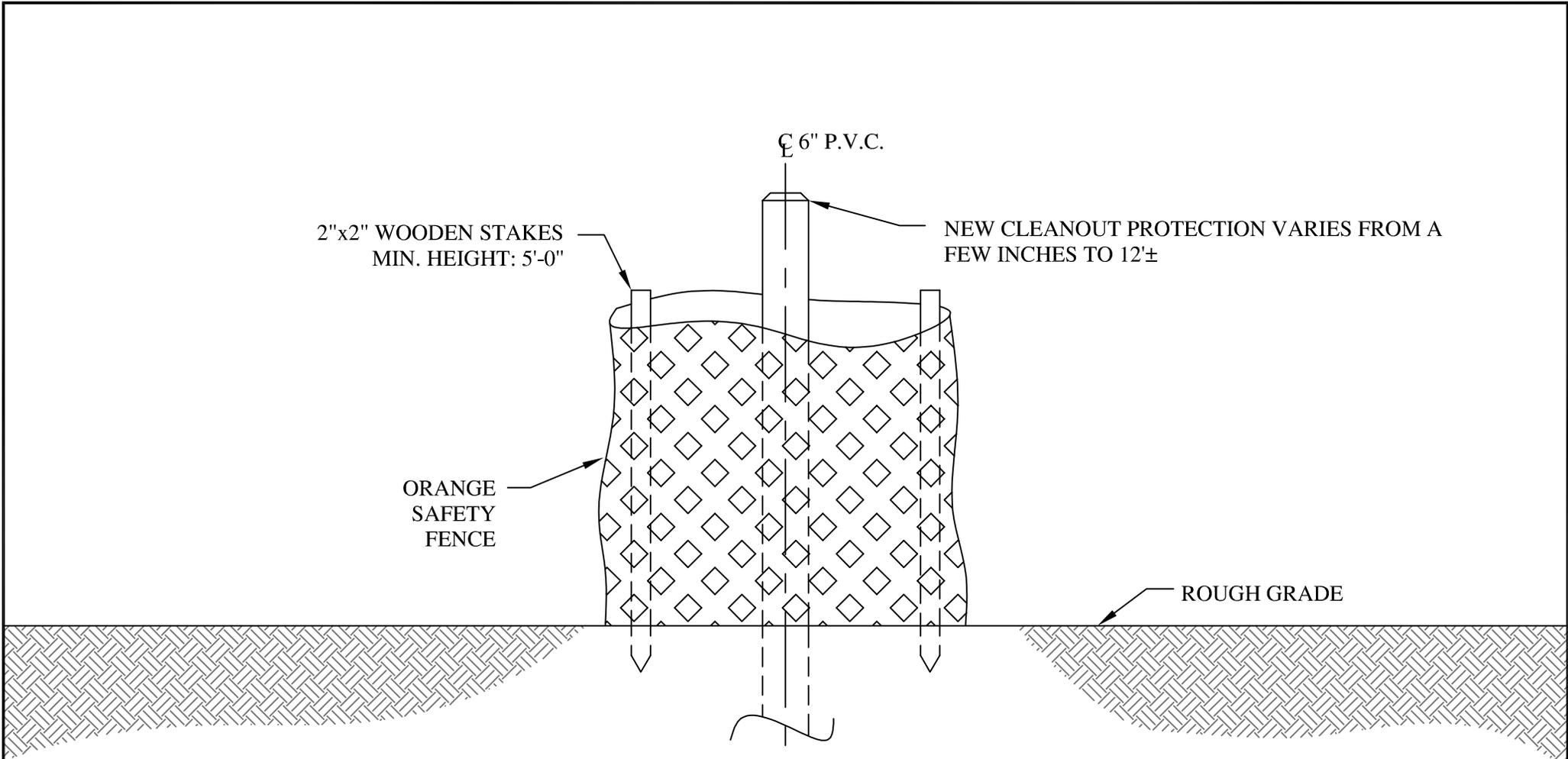
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CLEANOUT DETAIL

DETAIL WW116



2"x2" WOODEN STAKES
MIN. HEIGHT: 5'-0"

6" P.V.C.

NEW CLEANOUT PROTECTION VARIES FROM A
FEW INCHES TO 12'±

ORANGE
SAFETY
FENCE

ROUGH GRADE

NOTES:

1. CONSTRUCT CLEANOUT SAFETY PROTECTION AFTER COMPLETION OF CONSTRUCTION.
2. STANDARD PROTECTION APPLIES TO ALL CLEANOUTS UNTIL CUTOFF AT FINISHED GRADE.



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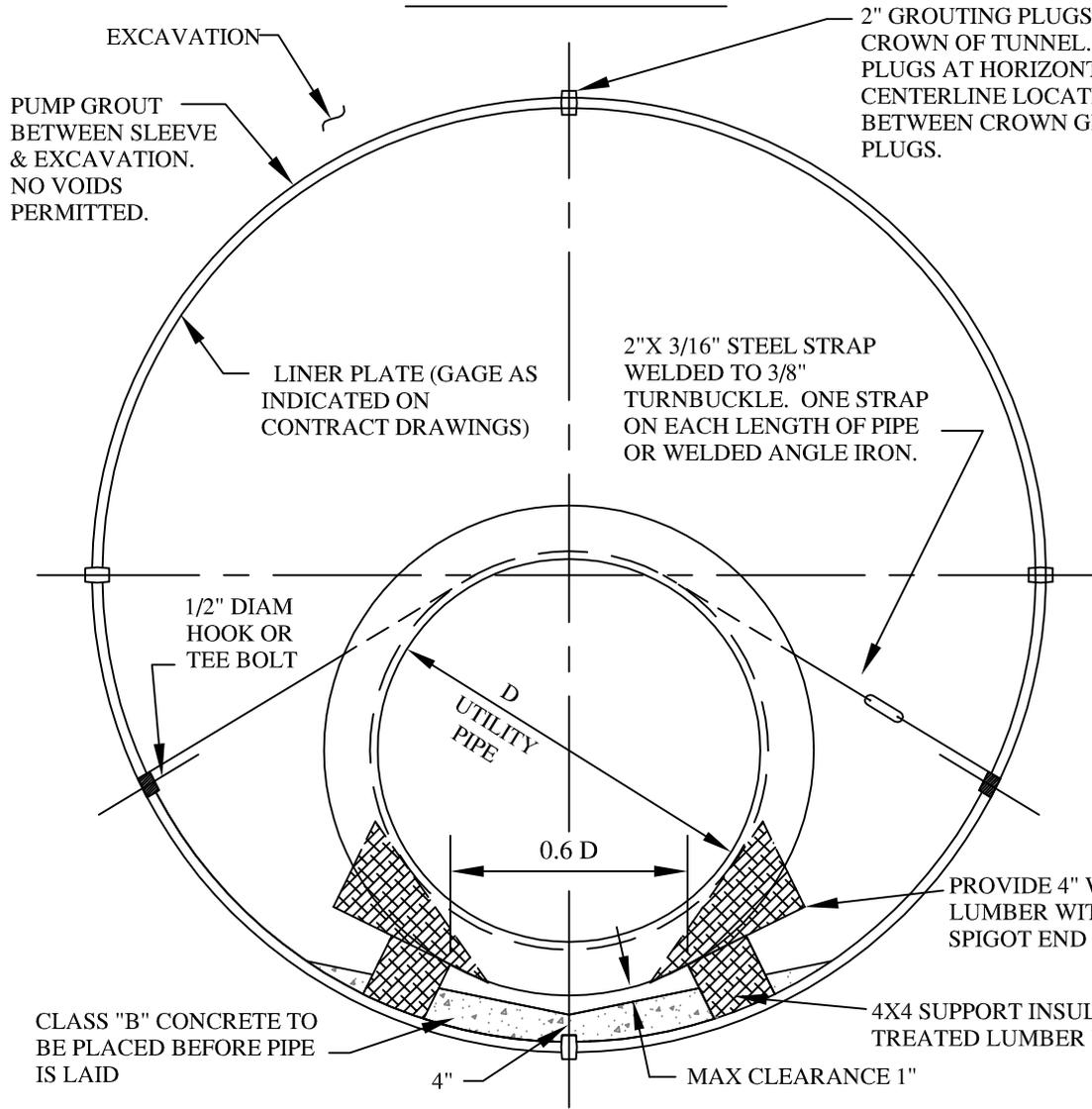
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TYPICAL CLEANOUT SAFETY PROTECTION

DETAIL WW117

PIPE IN SLEEVE



NOTES:

1. PROVIDE ACCESS MANHOLE AT DOWNSTREAM END; 8" BRICK BULKHEAD AT UPSTREAM END UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS.
2. WHEN NOTED ON CONTRACT DRAWINGS, STRAPS MAY BE ELIMINATED IF SLEEVE IS TO BE SAND FILLED AND BULKHEADED AT EACH END. UTILITY PIPE MUST BE BLOCKED IN PLACE DURING FILLING OPERATION.
3. CATHODIC PROTECTION OF CASING TO BE PROVIDED AS NEEDED.

SEWER PIPE SIZE, INCHES	SLEEVE MIN SIZE, INCHES
8-10	36
12-16	42
18-20	48
24	54
30	60
36	72

PROVIDE 4" WIDE WEYERHAEUSER CHOICE DEK OR PRESSURE TREATED LUMBER WITH THOMPSON'S WATER SEAL UNDER BARREL OF PIPE AT SPIGOT END OF EACH PIPE LENGTH.

4X4 SUPPORT INSULATORS WEYERHAEUSER CHOICE DEK OR PRESSURE TREATED LUMBER WITH THOMPSON'S WATER SEAL

CLASS "B" CONCRETE TO BE PLACED BEFORE PIPE IS LAID



CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

TUNNEL OR JACKING INSTALLATION, TYPE I

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DETAIL WW118

NOTES:

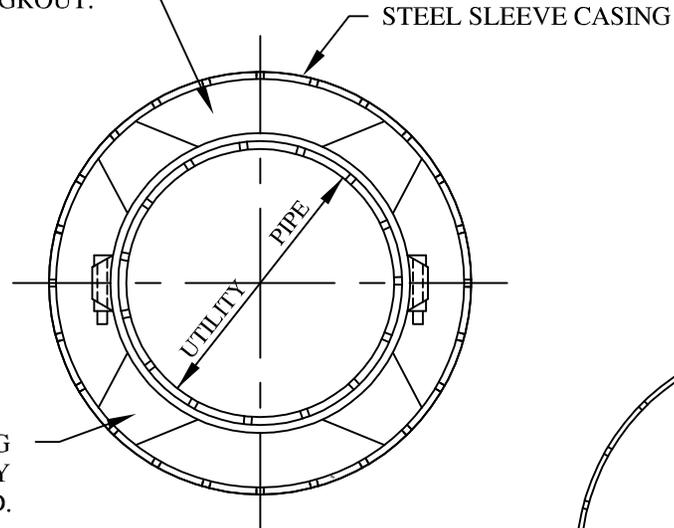
1. WHEN NOTED ON CONTRACT DRAWINGS ANNULAR SPACE IS TO BE COMPLETELY FILLED WITH SAND.

2. CASING INSULATORS TO BE NON CONDUCTIVE CASING INSULATION TYPE AS SUPPLIED BY:
 F.H. MALONEY, HOUSTON, TEXAS
 BRANCE-KRACHY CO. INC., HOUSTON, TEXAS
 MARSHALL HYDE, PORT HURON, MICHIGAN

3. CATHODIC PROTECTION SHOULD BE DESIGNED FOR THE CASING.

ANNULAR SPACE AT EACH END OF CASING SHALL BE SEALED WITH 6" OF CEMENT GROUT.

TYPE II	
PIPE SIZE	SLEEVE
6"	10"
8"	12"
10"	14"
12"	16"

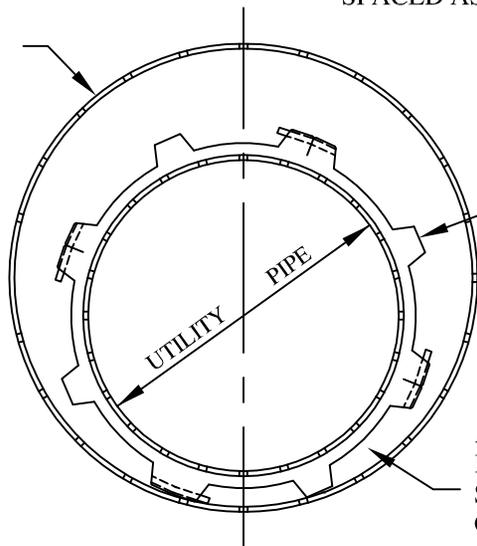


TYPE IV	
PIPE SIZE	SLEEVE
6"	18"
8"	20"
10"	22"
12"	24"

NON CONDUCTIVE CASING INSULATORS TO BE EQUALLY SPACED AS REQUIRED.

STEEL SLEEVE CASING

TYPE III	
PIPE SIZE	SLEEVE
6"	14"
8"	16"
10"	18"
12"	20"
14"	22"
16"	24"



NON CONDUCTIVE CASING INSULATORS TO BE EQUALLY SPACED AS REQUIRED.

ANNULAR SPACE AT EACH END OF CASING SHALL BE SEALED WITH 6" OF CEMENT GROUT.

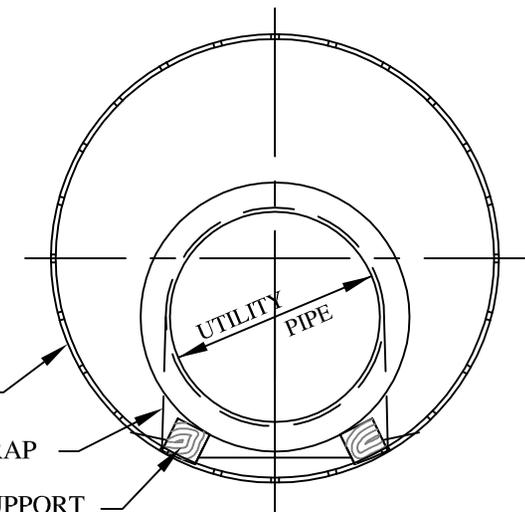
TYPE III

TYPE II

STEEL SLEEVE CASING

STEEL STRAP

2" x 4" SUPPORT INSULATORS:
 WEYERHAEUSER CHOICE DEK OR
 PRESSURE TREATED LUMBER TREATED WITH THOMPSON'S WATER SEAL OR ANGLE IRON



TYPE IV

CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

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PIPES THROUGH SLEEVES, JACKING OR BORING INSTALLATION TYPE II, III, & IV

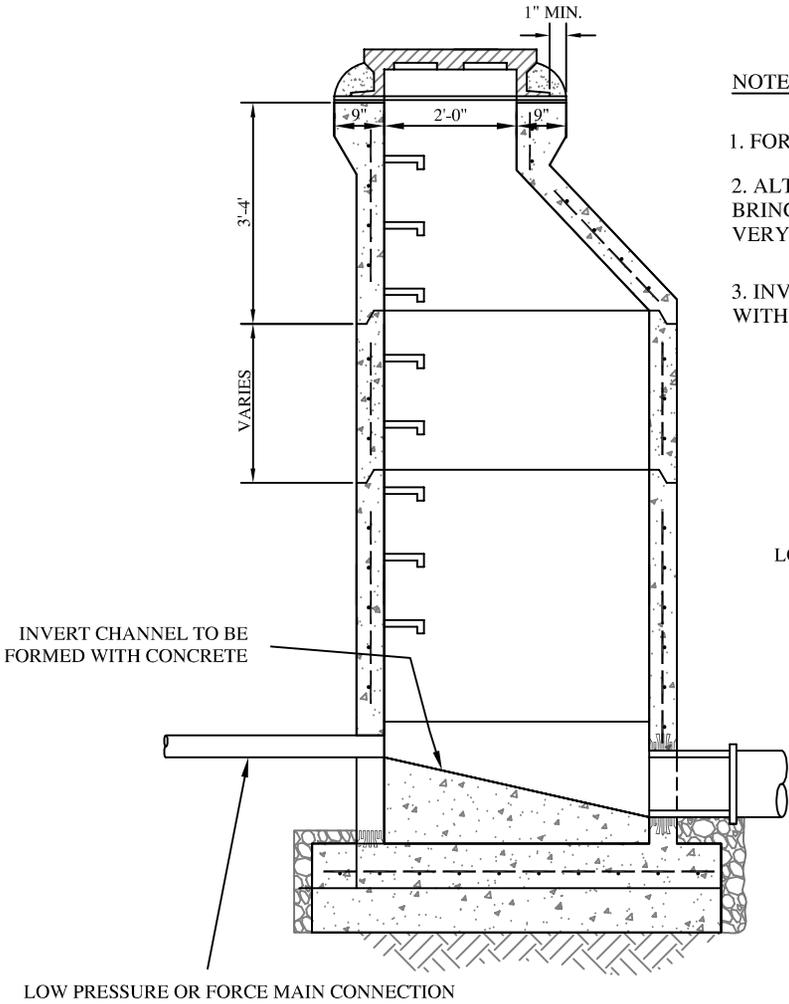
DETAIL WW119



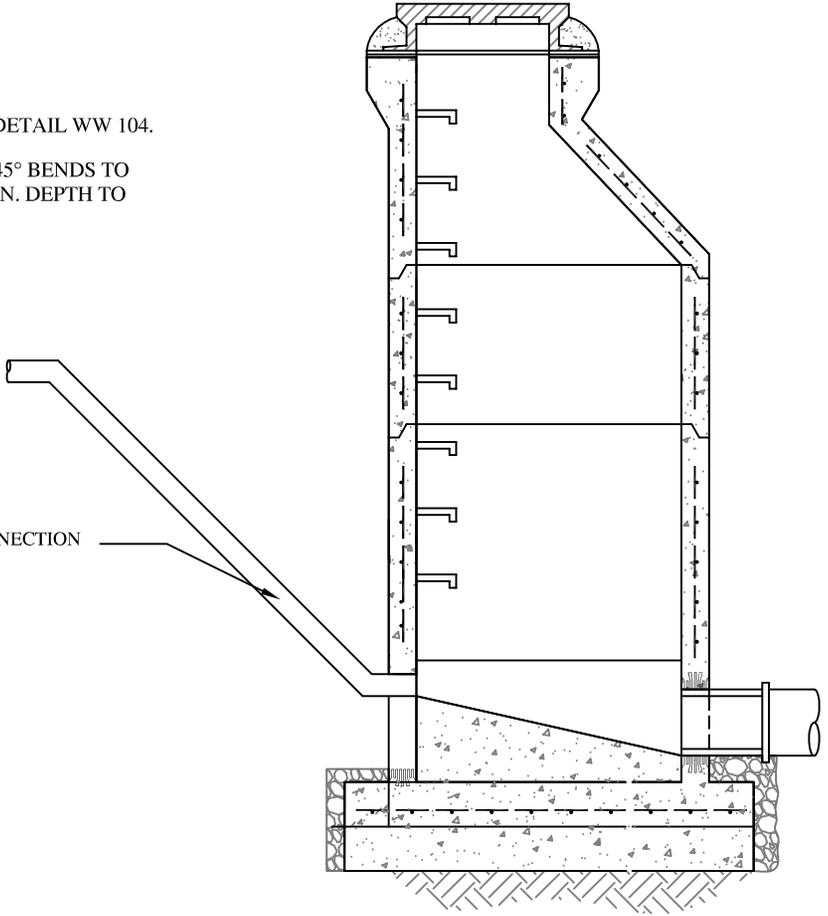
MAX FORCE MAIN DIMENSIONS	WITH	OUTLET PIPE OF DIMENSIONS
6"		8"
8"		12"
12"		18"

NOTES:

1. FOR STRUCTURE OF MANHOLE SEE DETAIL WW 104.
2. ALTERNATE CONNECTION USING 2-45° BENDS TO BRING FORCE MAIN DOWN FROM 4' MIN. DEPTH TO VERY DEEP MANHOLE.
3. INVERT CHANNEL TO BE FORMED WITH CONCRETE.



LOW PRESSURE OR FORCE MAIN CONNECTION



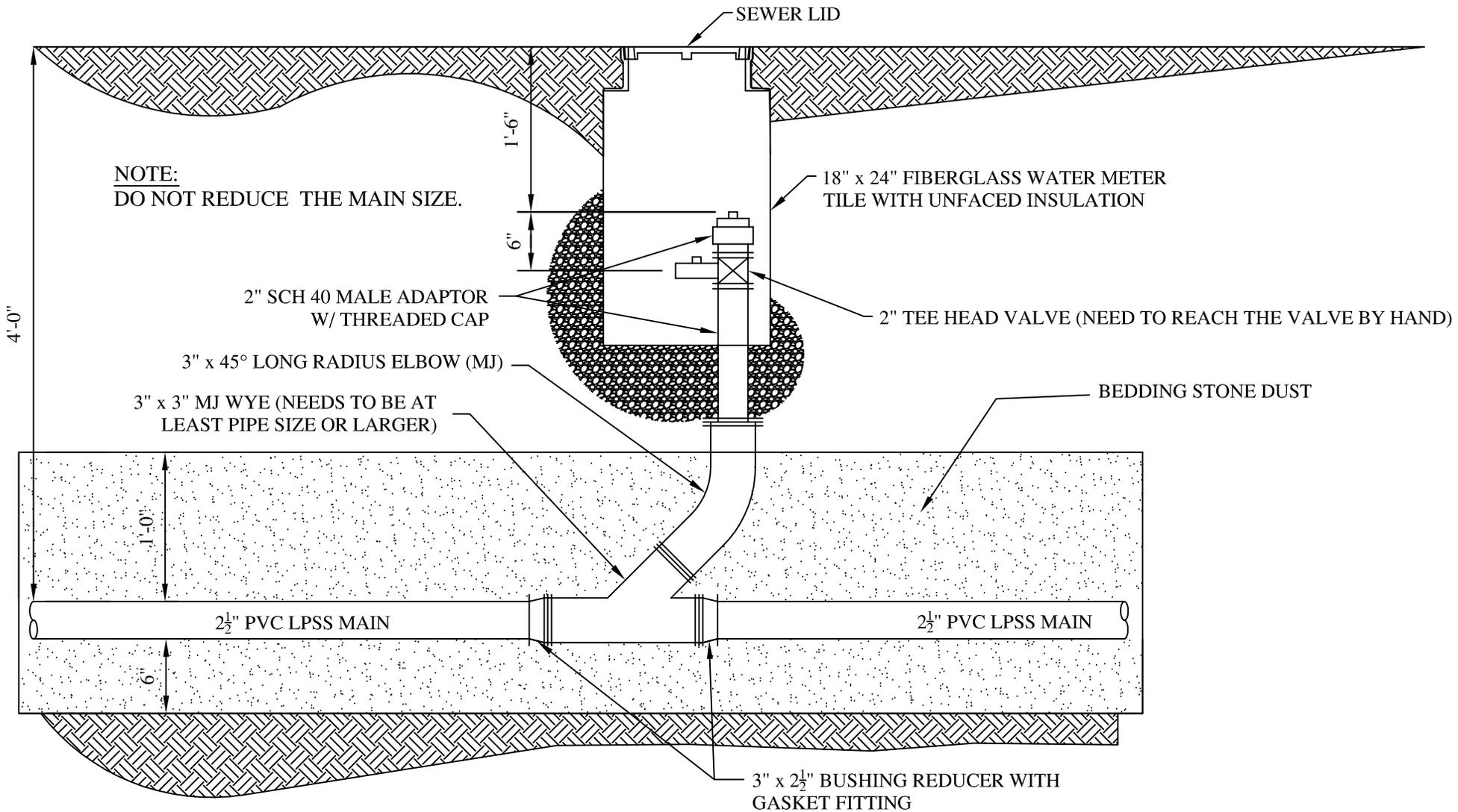
CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

RECEIVING MANHOLE FOR FORCE MAIN OR
LOW PRESSURE SEWER DISCHARGE

ISSUE DATE: MARCH 2009

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DETAIL WW120



CITY OF HAGERSTOWN, MARYLAND - UTILITIES DEPARTMENT, WASTEWATER DIVISION

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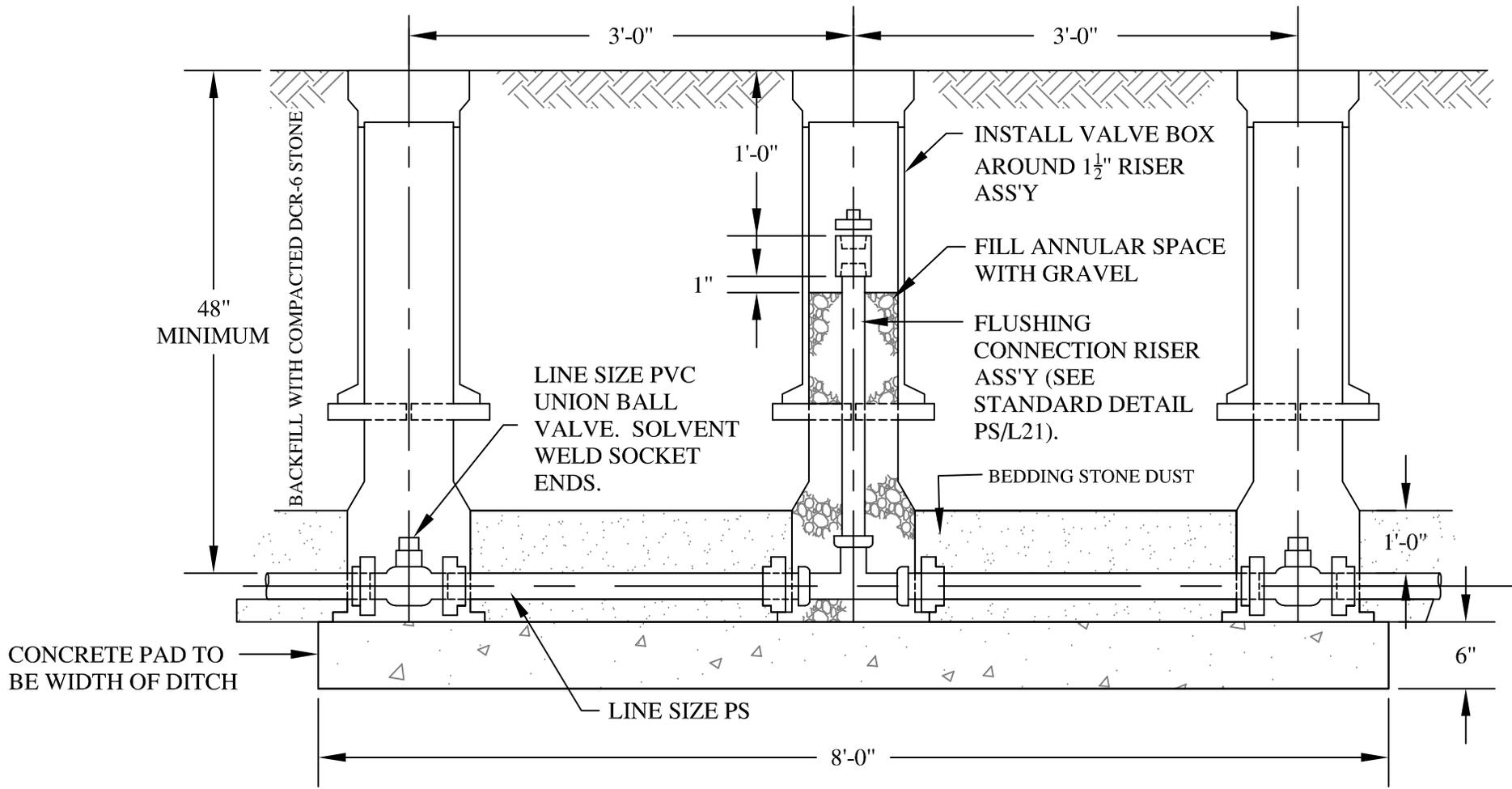
REVISIONS

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IN-LINE FLUSHIN CONNECTION DETAIL

DETAIL WW121

NOTE:
ALL VALVES AND CHECK VALVES
WILL BE TRUE UNION



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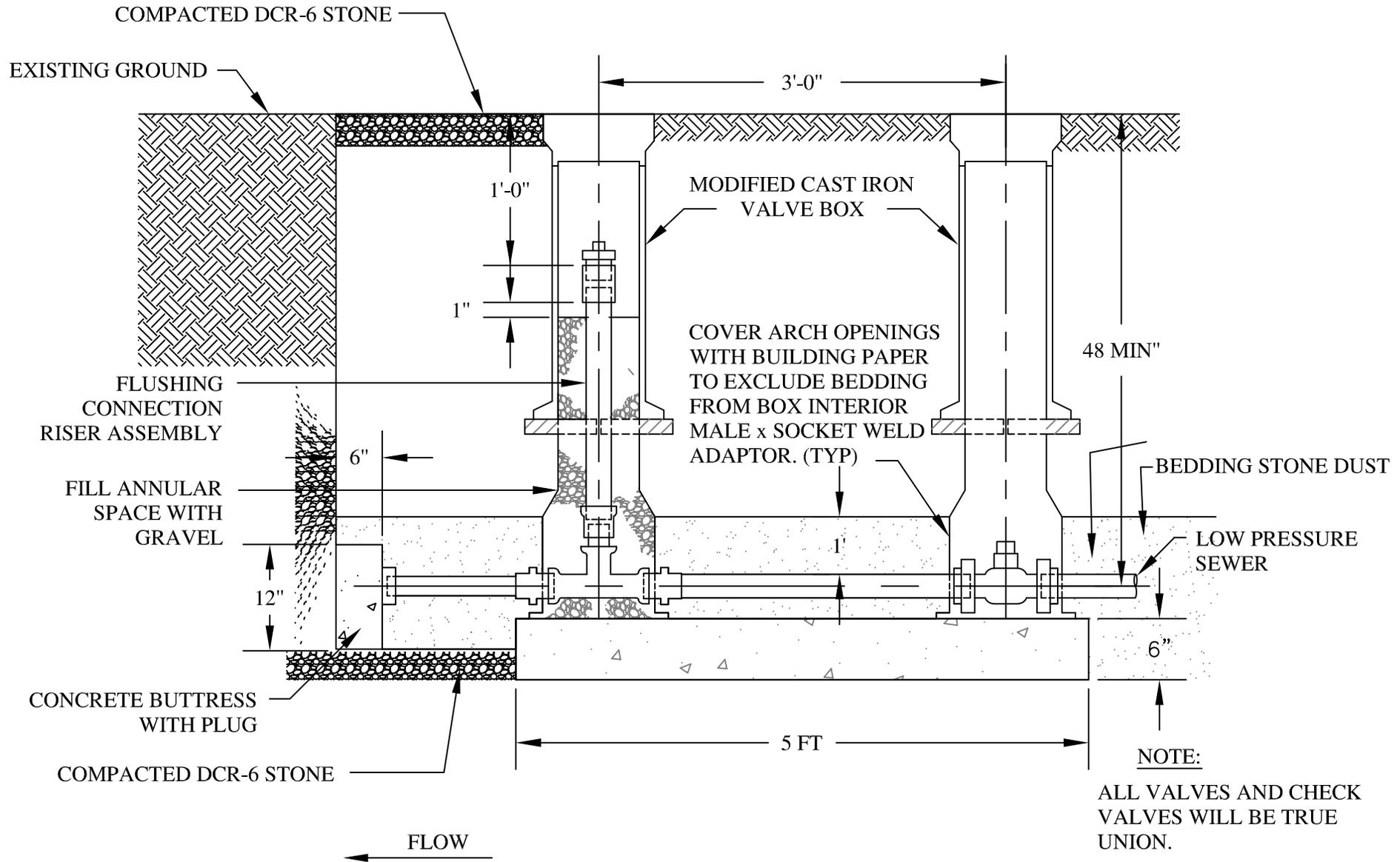
REVISIONS

IN-LINE FLUSHING CONNECTION

1¼" THROUGH 4"

DETAIL WW122





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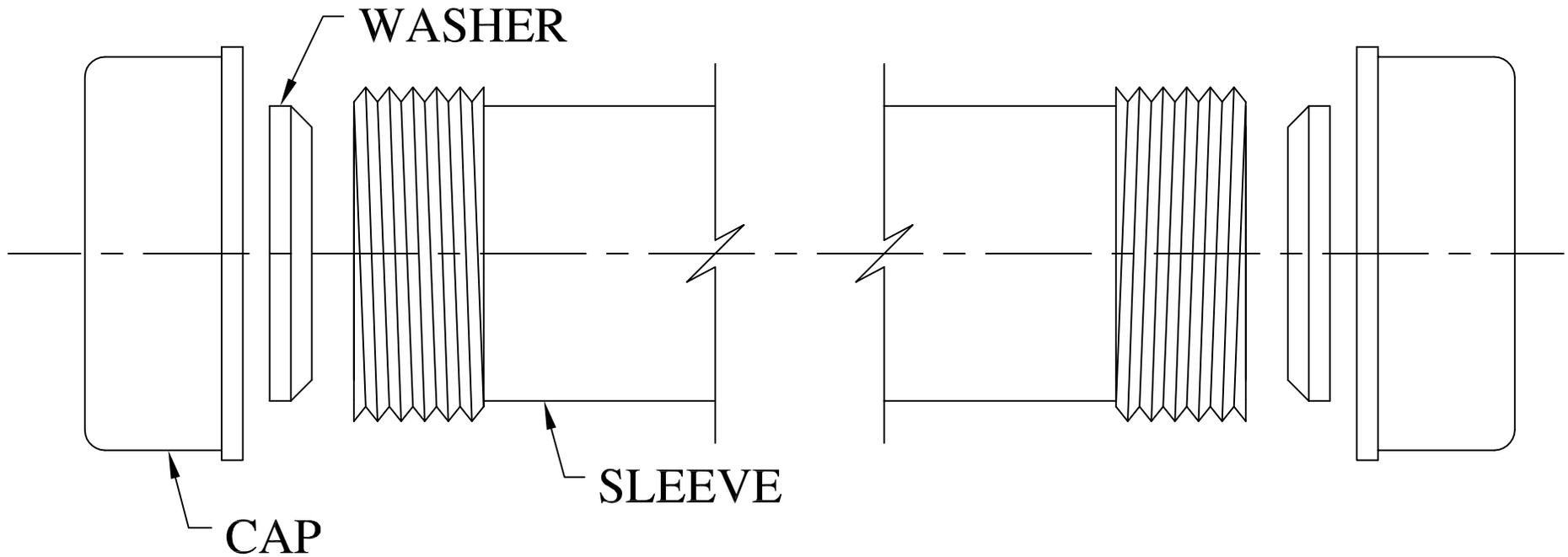
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REVISIONS

TERMINAL FLUSHING CONNECTION

DETAIL WW123





AVAILABLE IN 1" THROUGH 4"

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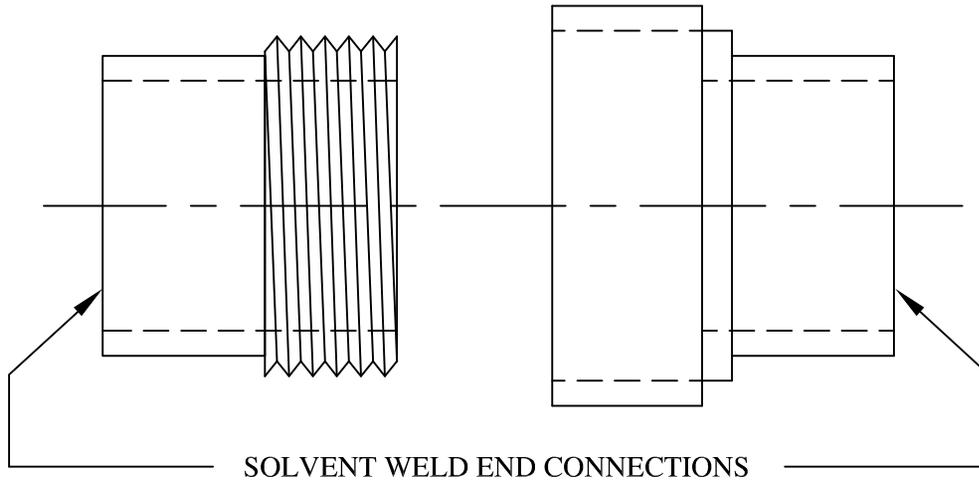
**COMPRESSION REPAIR COUPLING FOR
LOW PRESSURE FORCE MAINS**

DETAIL WW124



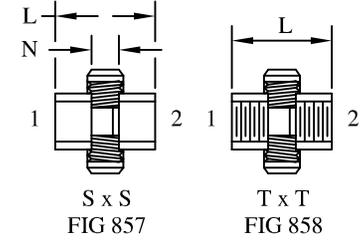
NOTES:

1. SCHEDULE 80
2. THREADING FOR FIGURE 857



AVAILABLE IN $\frac{1}{4}$ " THROUGH 3"

SIZE	SIZE CODE	L	N	L	WEIGHTS*	
		SLIP	SLIP	THREAD	FIG. 857	FIG. 858
$\frac{1}{4}$	002	$1\frac{3}{8}$	$\frac{3}{8}$	$1\frac{17}{32}$	.09	.050
$\frac{3}{8}$	003	$1\frac{19}{32}$	$\frac{13}{32}$	$1\frac{7}{8}$	.11	.065
$\frac{1}{2}$	005	$2\frac{3}{16}$	$\frac{7}{16}$	$1\frac{15}{16}$	.20	.201
$\frac{3}{4}$	007	$2\frac{15}{32}$	$\frac{15}{32}$	$2\frac{1}{32}$	.26	.252
1	010	$2\frac{13}{16}$	$\frac{9}{16}$	$2\frac{1}{2}$	.40	.260
$1\frac{1}{4}$	012	$3\frac{3}{32}$	$\frac{19}{32}$	$2\frac{19}{32}$	.64	.393
$1\frac{1}{2}$	015	$3\frac{1}{2}$	$\frac{3}{4}$	$2\frac{13}{16}$.77	.448
2	020	$3\frac{11}{16}$	$\frac{11}{16}$	$2\frac{13}{16}$	1.052	.967
3	030	$4\frac{21}{32}$	$\frac{29}{32}$	$4\frac{5}{32}$	2.959	1.926



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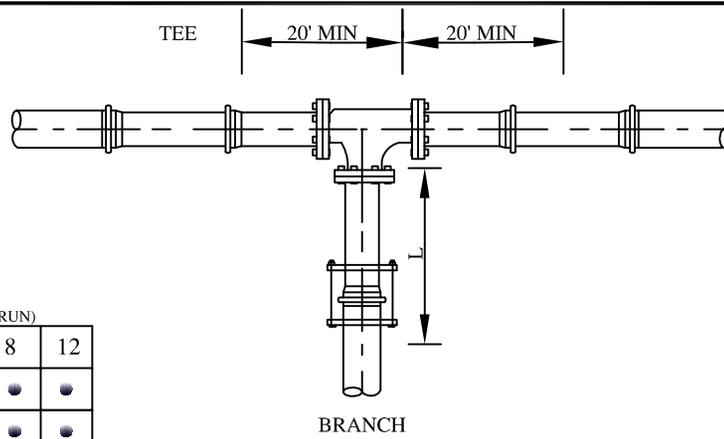
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P.V.C. PIPE UNION FOR REPAIRING LOW PRESSURE FORCE MAINS

DETAIL WW125

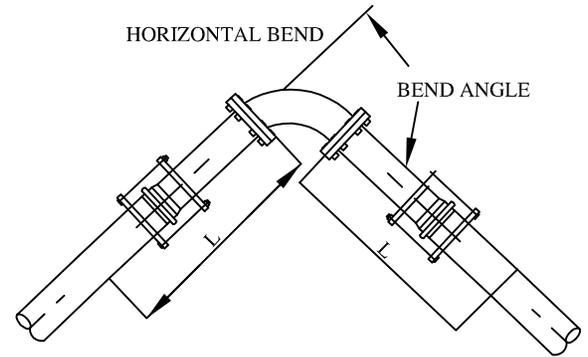




		PIPE SIZE (RUN)			
		4	6	8	12
PIPE SIZE (BRANCH)	4	●	●	●	●
	6	×	●	●	●
	8	×	×	24	●
	12	×	×	×	68

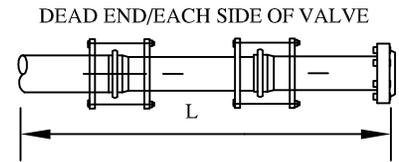
RESTRAINED LENGTHS "L" IN FEET

FOR THIS CONDITION
NEED ONLY RESTRAIN
THE BRANCH OUTLET OF
THE TEE.



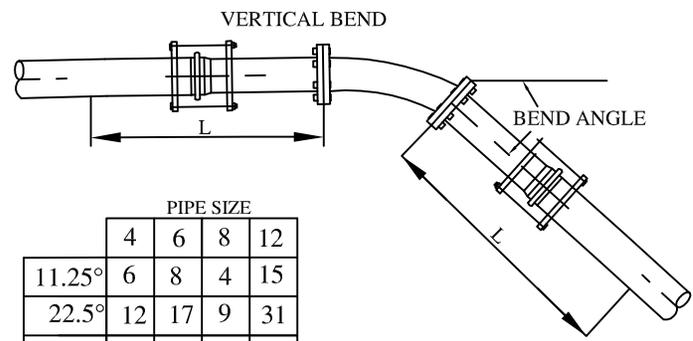
		PIPE SIZE			
		4	6	8	10
BEND ANGLE	11.25°	2	3	4	6
	22.5°	5	7	9	13
	45°	10	14	19	25
	90°	25	34	45	63

RESTRAINED LENGTHS "L" IN FEET



		PIPE SIZE			
		4	6	8	12
RESTRAINED LENGTHS "L" IN FEET		59	84	110	156

- NOTES:
1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED.
 2. FOR TEE, RESTRAIN BOTH RUN-SIDE JOINTS AND INSTALL A FULL LENGTH OF PIPE ON EACH SIDE OF BRANCH.
 3. 36 INCHES MINIMUM DEPTH OF COVER.
 4. A SAFETY FACTOR OF 1.5.
 5. TEST PRESSURE 1.5 TIMES THE PRESSURE RATING OF THE PIPE PER WMWD SPECIFICATIONS.
 6. IF ACTUAL CONDITIONS DIFFER FROM THOSE LISTED ABOVE OR THE REQUIRED RESTRAINED LENGTH CAN NOT BE MET, THE RESTRAINED LENGTH SHALL BE DETERMINED BY THE DESIGN ENGINEER AND APPROVED BY WATER/WASTEWATER ENGINEER.



		PIPE SIZE			
		4	6	8	12
BEND ANGLE	11.25°	6	8	4	15
	22.5°	12	17	9	31
	45°	25	35	19	65

RESTRAINED LENGTHS "L" IN FEET

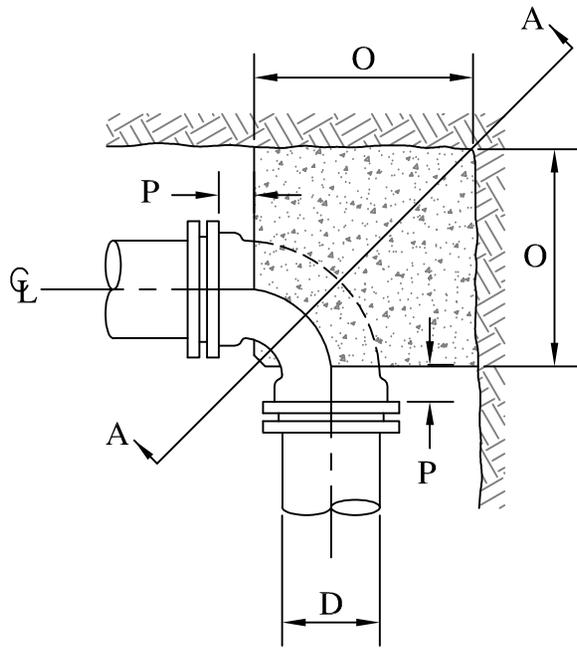


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JOINT RESTRAINT FOR FORCE MAINS

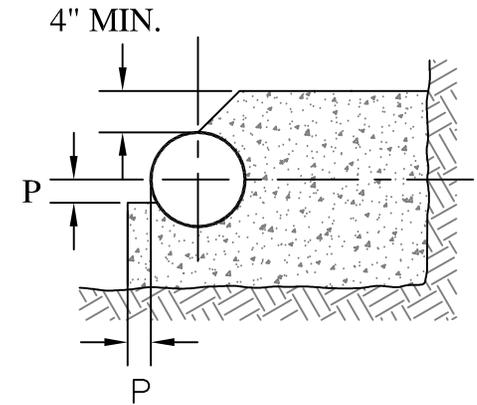
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_____	_____

DETAIL WW126



PLAN

D	O	P
4"	1'-5"	1"
6"	1'-7"	1"
8"	1'-10"	2"
10"	2'-1"	3"
12"	2'-5"	3"
16"	2'-11"	4"
20"	3'-9"	5"
24"	4'-3"	6"
30"	5'-4"	7"
36"	6'-7"	9"



SECTION A-A

NOTES:

1. ALL CONCRETE TO BE 2,500 PSI.
2. THIS DETAIL FOR HORIZONTAL BENDS ONLY.
3. CARRY CONCRETE TO UNDISTURBED EARTH.
4. ALL DIMENSIONS SHOWN ARE MIN.
5. NO CONCRETE SHALL COVER FITTING HARDWARE
6. COVER FITTING WITH POLYETHELEYLENE WRAP. (5 MIL OR GREATER)



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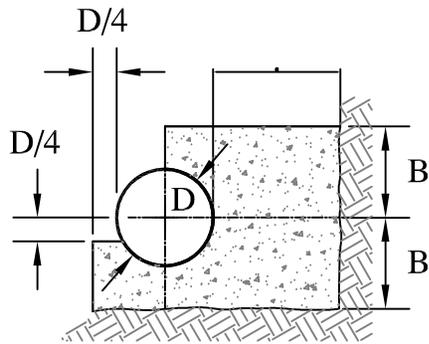
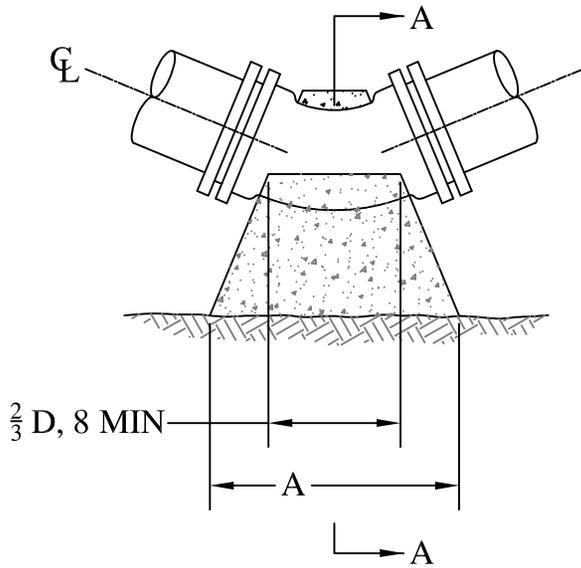
BUTTRESS FOR HORIZONTAL 90° M.J. BENDS

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_____	_____

DETAIL WW127



SECTION A-A

NOTES:

1. ALL CONCRETE TO BE 2,500 PSI.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MIN.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
5. COVER FITTING WITH POLYETHELEYLENE WRAP. (5 MIL OR GREATER)

D	45°			22 1/2°			11 1/4°		
	A	B	C	A	B	C	A	B	C
4"	1'-0"	6"	9"	8"	6"	9"	8"	6"	9"
6"	1'-3"	7"	9"	9"	7"	9"	8"	7"	9"
8"	2'-0"	8"	9"	1'-0"	8"	9"	8"	8"	9"
10"	2'-6"	9"	11"	1'-6"	9"	10"	10'	9"	9"
12"	2'-11"	11"	1'-2"	1'-9"	10"	11'	1'-0"	10'	9"
16"	3'-8"	1'-3"	1'-5"	2'-4"	1'-0"	1'-2"	1'-4"	1'-0"	9"
20"	4'-9"	1'-6"	1'-10"	3'-2"	1'-2"	1'-4"	1'-8"	1'-2"	10"
24"	6'-1"	1'-8"	1'-11"	4'-0"	1'-4"	1'-6"	2'-0"	1'-4"	1'-0"
30"	7'-9"	2'-0"	3'-1"	5'-0"	1'-7"	1'-9"	2'-6"	1'-7"	1'-1"
36"	8'-11"	2'-6"	3'-4"	5'-9"	2'-0"	2'-0"	3'-0"	1'-11"	1'-2"



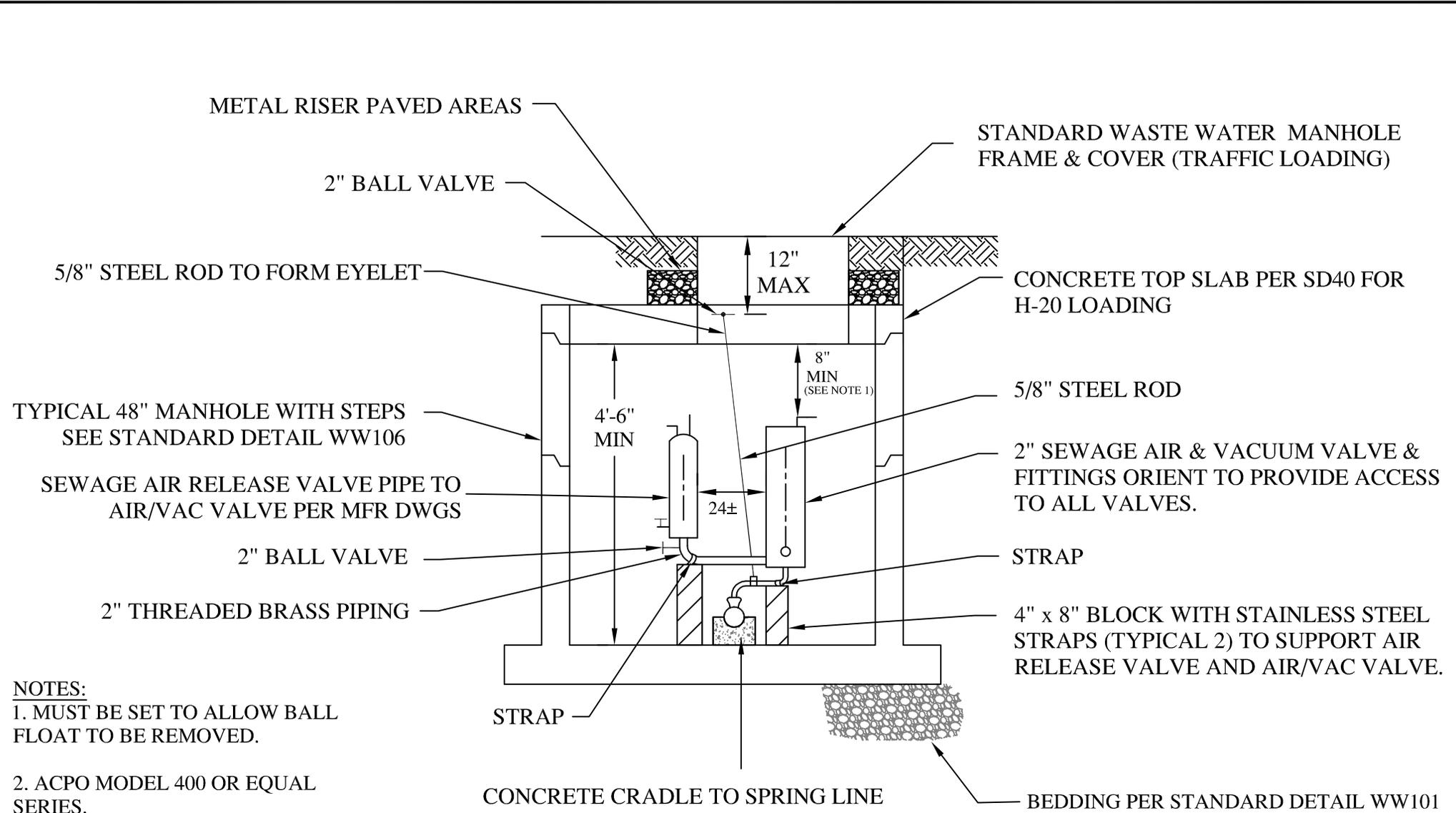
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BUTTRESS FOR FORCE MAINS LESS THAN 90°

DETAIL WW128



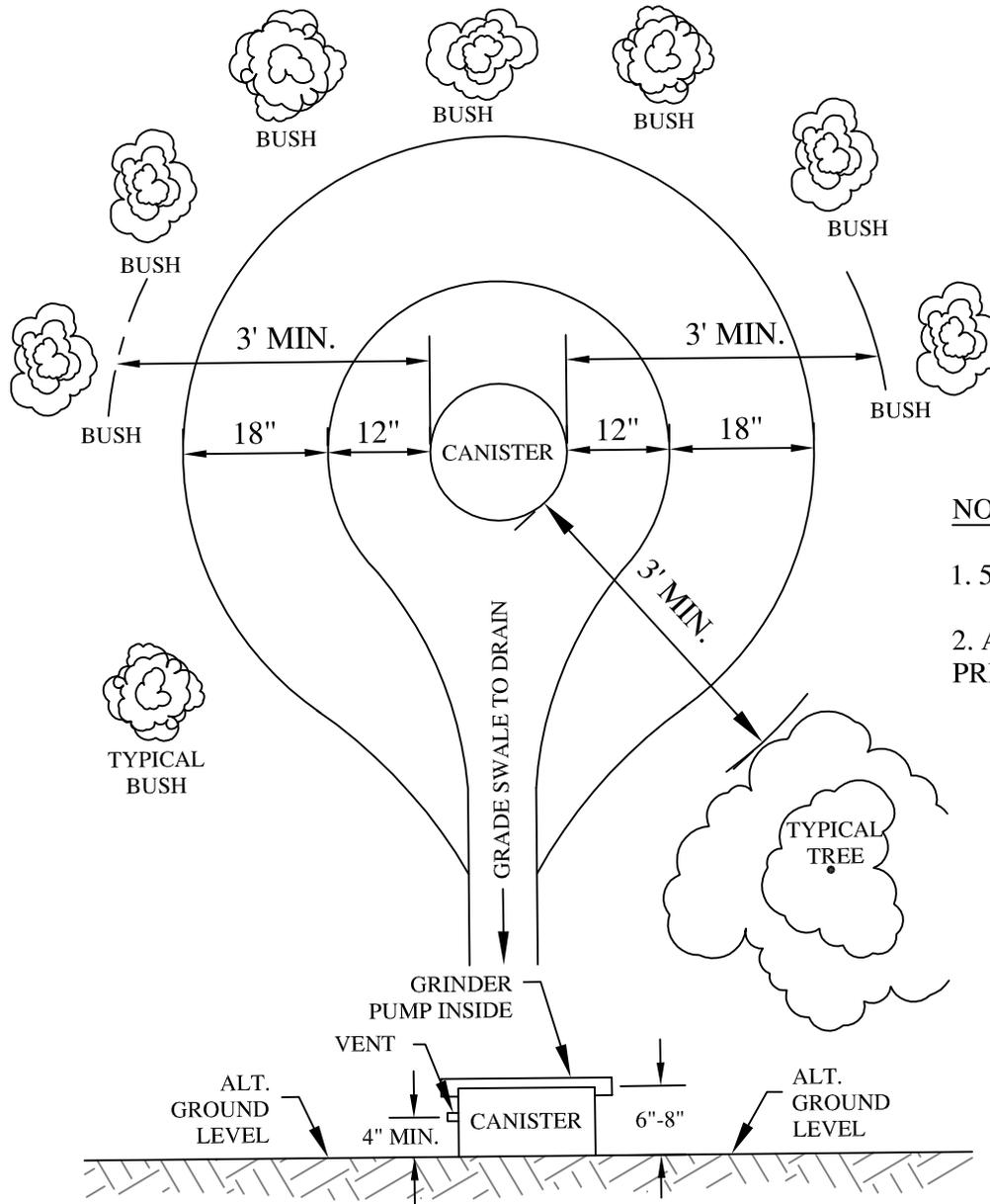
- NOTES:**
1. MUST BE SET TO ALLOW BALL FLOAT TO BE REMOVED.
 2. ACPO MODEL 400 OR EQUAL SERIES.
 3. SPACERS FOR WALL MUST BE SECURED TO THE WALL.



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STANDARD VAULT DETAIL FOR AIR/VAC VALVE

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DETAIL WW129	



NOTES:

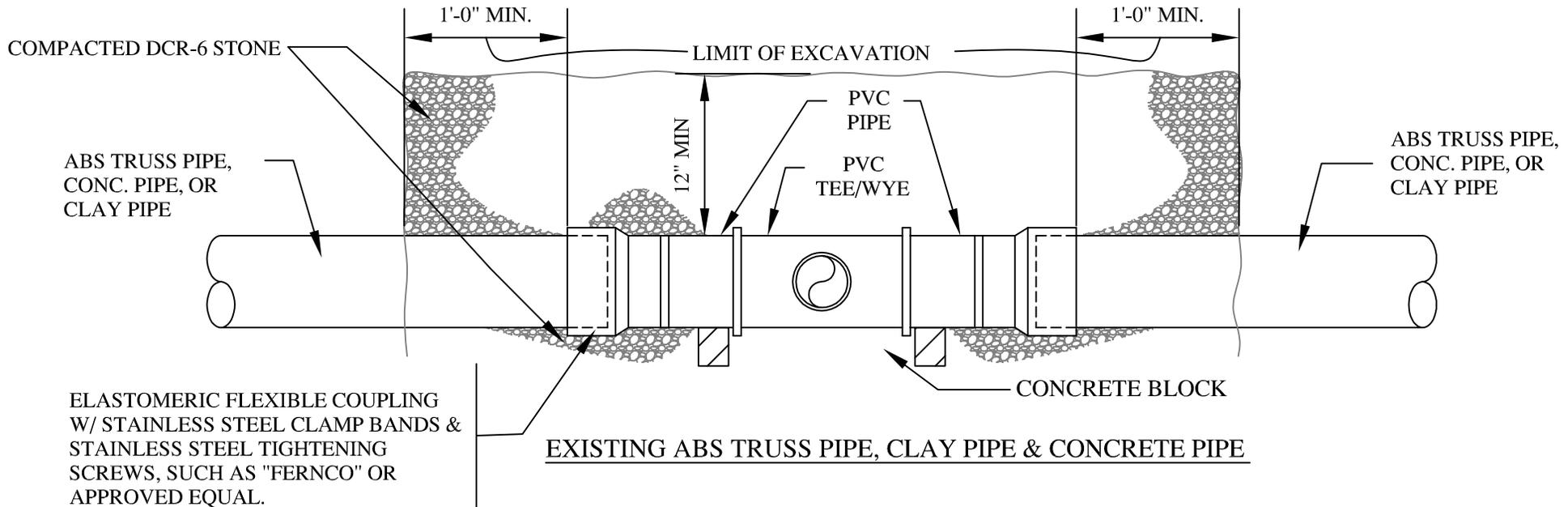
- 1. 5' MAXIMUM MATURE TREE HEIGHT.
- 2. AVOID DENSE HEDGE WHICH WOULD PREVENT ACCESS.



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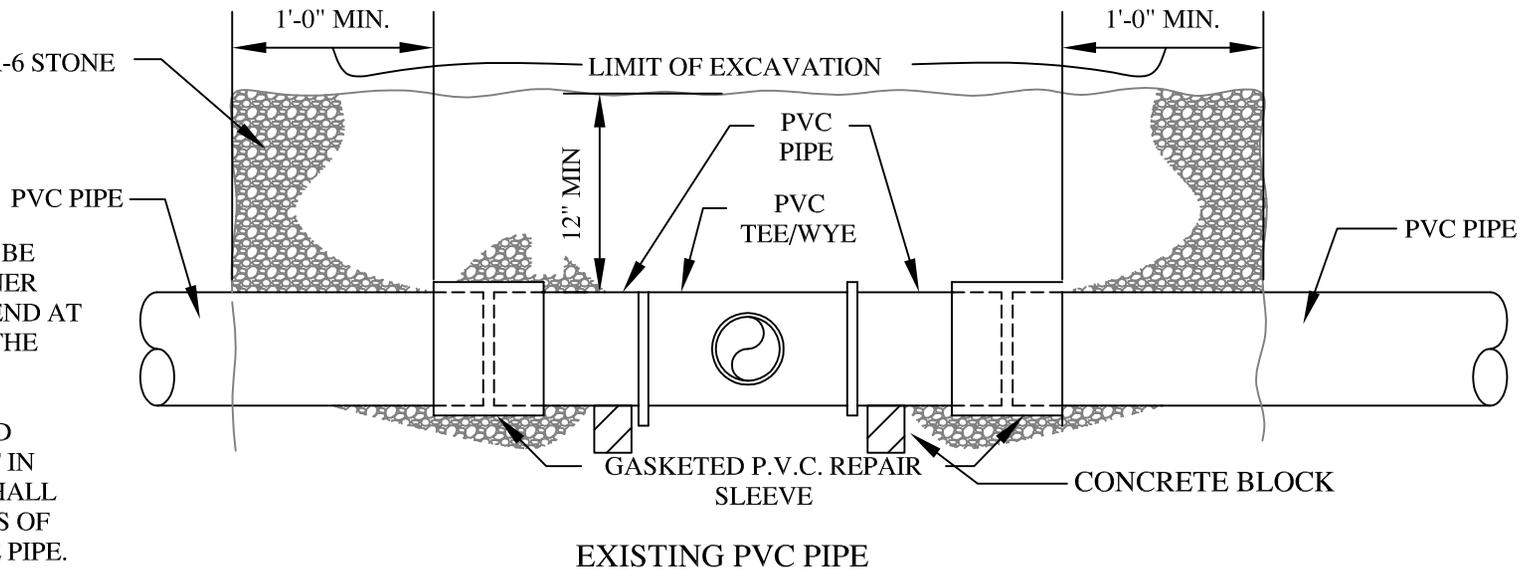
REQUIRED GRADING AND LANDSCAPING AT GRINDER PUMP

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DETAIL WW130	



NOTES:

1. FIELD CUTTING OF PIPE SHALL BE DONE IN A SATISFACTORY MANNER WHICH WILL LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE.
2. PIPE LENGTH BEING INSTALLED SHALL ABUT AGAINST THE NEXT IN SUCH A MANNER THAT THERE SHALL BE NO SHOULDER OR UNEVENNESS OF ANY KIND ALONG INSIDE OF THE PIPE.



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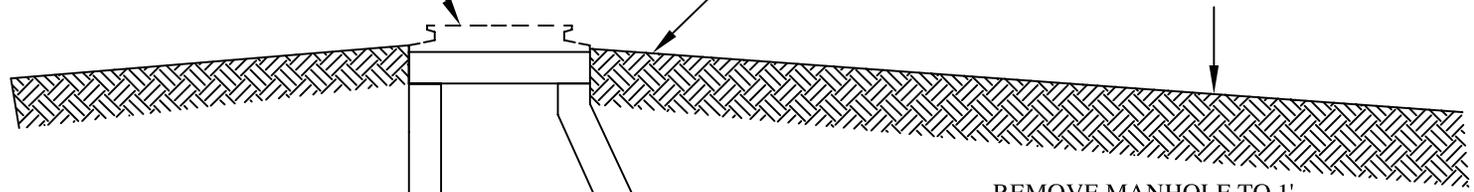
REVISIONS

PIPE REPAIR OR NEW CONNECTION DETAILS

DETAIL WW131

REMOVE MANHOLE
FRAME AND COVER.

EXISTING FINISH
GRADE



REMOVE MANHOLE TO 1'
MINIMUM BELOW FINISHED GRADE

FILL MANHOLE SOLID WITH LEAN MIX CONCRETE

FOR SEWER 15" OR SMALLER
DIAMETER, SET MECHANICAL
PLUGS INTO ALL PIPES ENTERING
MANHOLES AS SHOWN.
FOR SEWERS 18" AND LARGER
DIAMETER, PROVIDE MASONRY
BULKHEAD IN LEU OF
MECHANICAL PLUGS.

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MANHOLE ABANDONMENT

DETAIL WW132

