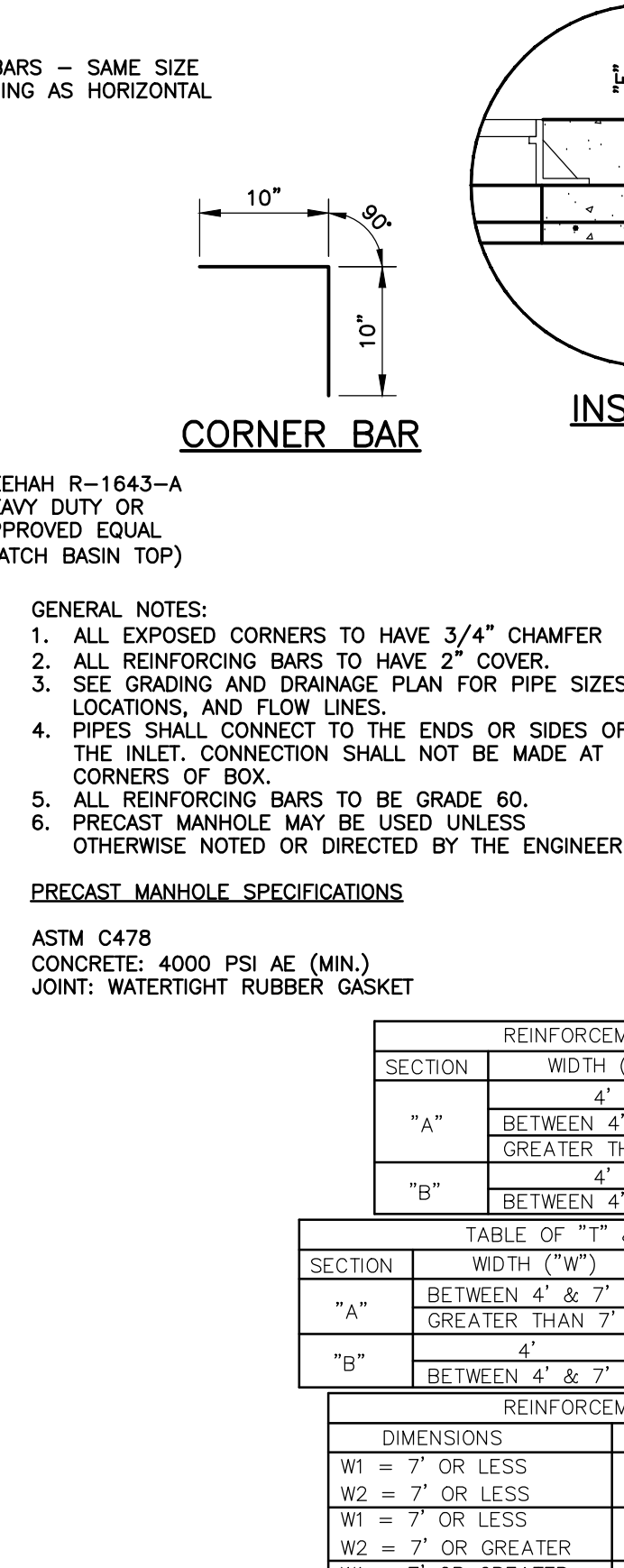
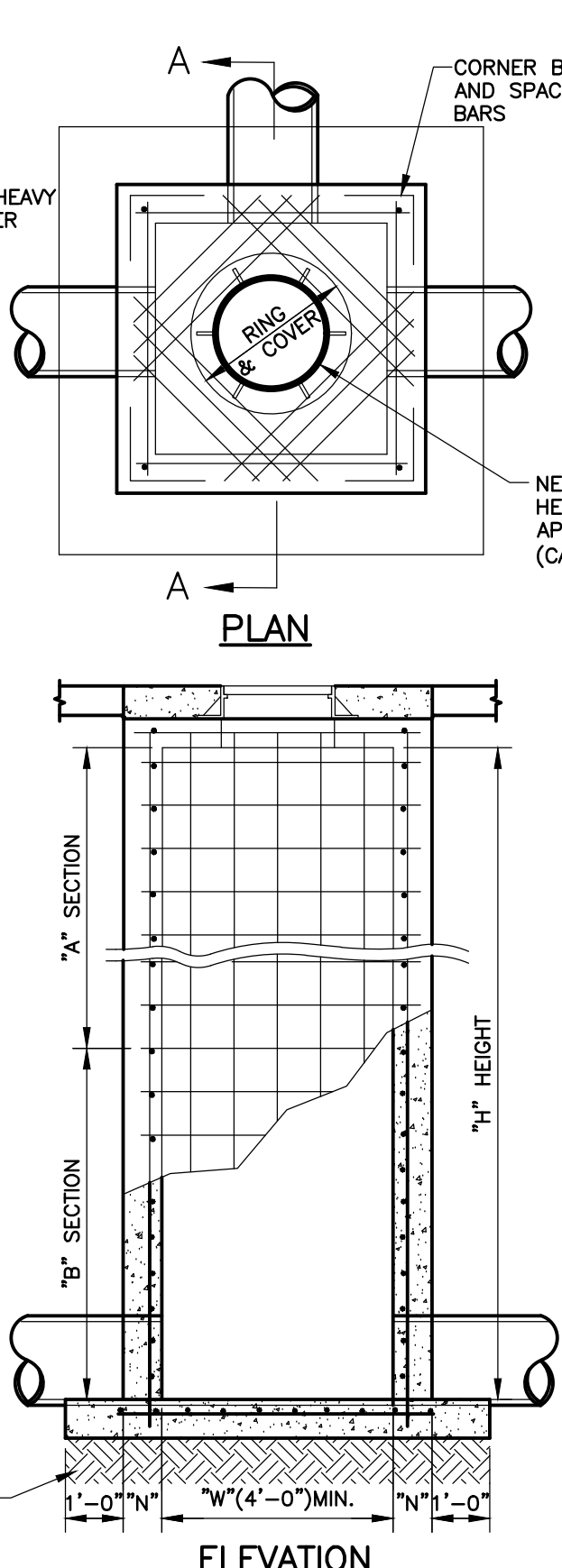
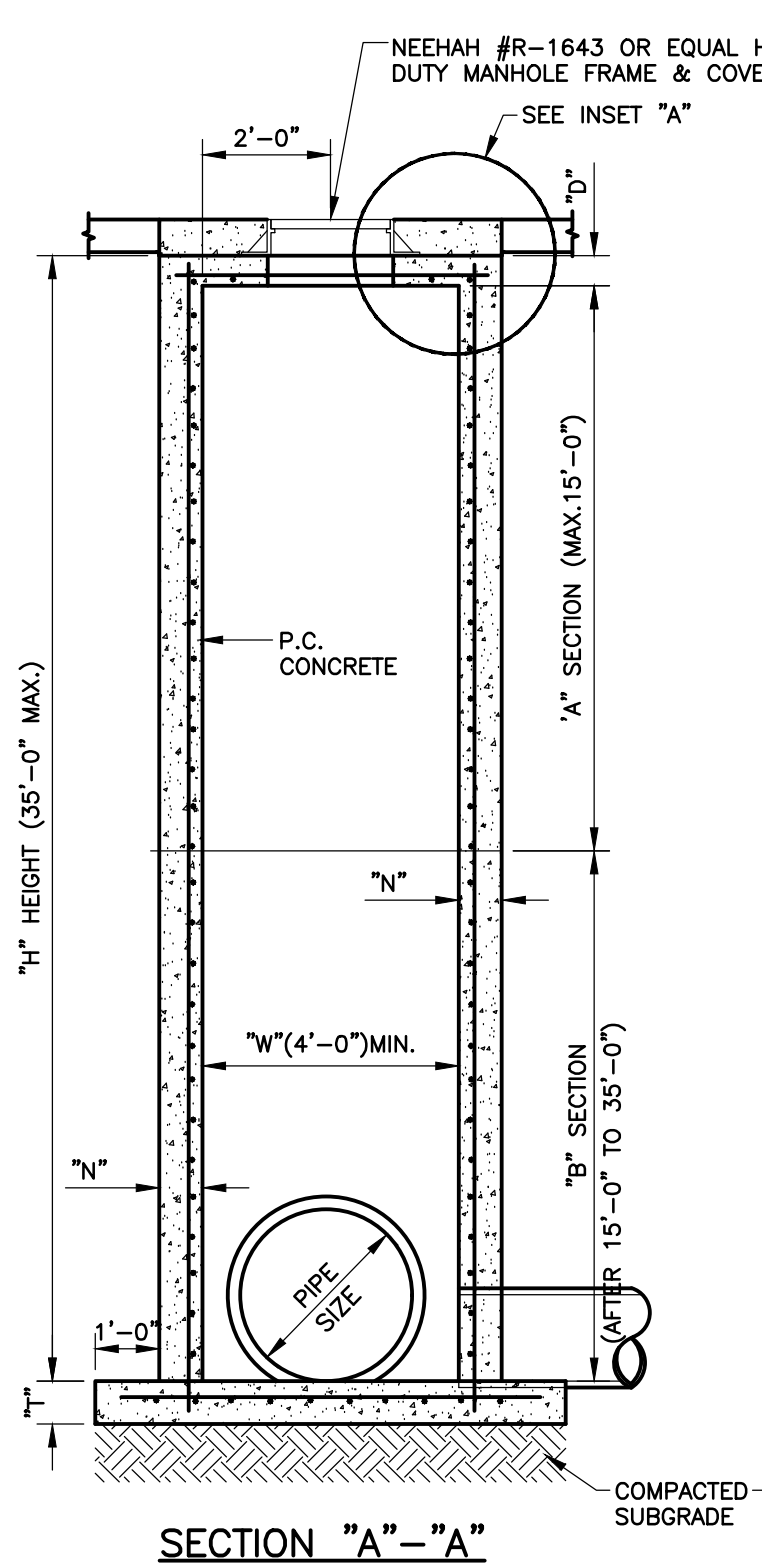


NOTE:  
TOP OF MANHOLE TO BE LEVEL WITH FINISH GRADE UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER. USE ADJUSTMENT RINGS AS REQUIRED BUT NOT TO EXCEED 12".



REINFORCEMENT SCHEDULE, BASE

SECTION	REINFORCEMENT
"A"	#4 @ 6" E.W.
"B"	#6 @ 6" E.W.

TABLE OF "W" DIMENSIONS

PIPE SIZE	SKREW OF CROSS DRAIN
30"	4'-0" 4'-2" 4'-4" 4'-6" 4'-8"
36"	4'-0" 4'-2" 4'-4" 4'-6" 4'-8"
42"	5'-3" 5'-5" 5'-7" 5'-9" 5'-11" 6'-1"
48"	5'-10" 6'-2" 6'-4" 6'-6" 6'-8" 6'-10"
60"	7'-0" 7'-2" 7'-4" 7'-6" 7'-8" 7'-10" 7'-12" 7'-14" 7'-16" 7'-18" 7'-20"

DOUBLE FOR "A" SECTION ONLY

PIPE SIZE	SKREW OF CROSS DRAIN
24"	7'-0" 7'-2" 7'-4" 7'-6" 7'-8" 7'-10" 7'-12" 7'-14" 7'-16" 7'-18" 7'-20"
30"	8'-2" 8'-4" 8'-6" 8'-8" 8'-10" 8'-12" 8'-14" 8'-16" 8'-18" 8'-20"
36"	9'-4" 9'-6" 9'-8" 9'-10" 9'-12" 9'-14" 9'-16" 9'-18" 9'-20"
42"	10'-6" 10'-8" 10'-10" 10'-12" 10'-14" 10'-16" 10'-18" 10'-20"
48"	11'-8" 11'-10" 12'-0" 12'-2" 12'-4" 12'-6" 12'-8" 12'-10" 12'-12" 12'-14" 12'-16" 12'-18" 12'-20"

REINFORCEMENT SCHEDULE, WALLS

SECTION	WIDTH ("W")	HOR.	VERT.
"A"	BETWEEN 4' & 7'	#4 @ 9"	#4 @ 10"
	GREATER THAN 7'	#5 @ 4 1/2"	#4 @ 10"
"B"	BETWEEN 4' & 7'	#5 @ 9"	#5 @ 10"

TABLE OF "T" & "N" DIMENSIONS

SECTION	WIDTH ("W")	"T"	"N"	"D"
"A"	BETWEEN 4' & 7'	6" + PIPE THICKNESS	8"	6"
	GREATER THAN 7'	6" + PIPE THICKNESS	8"	8"
"B"	BETWEEN 4' & 7'	6" + PIPE THICKNESS	8"	8"

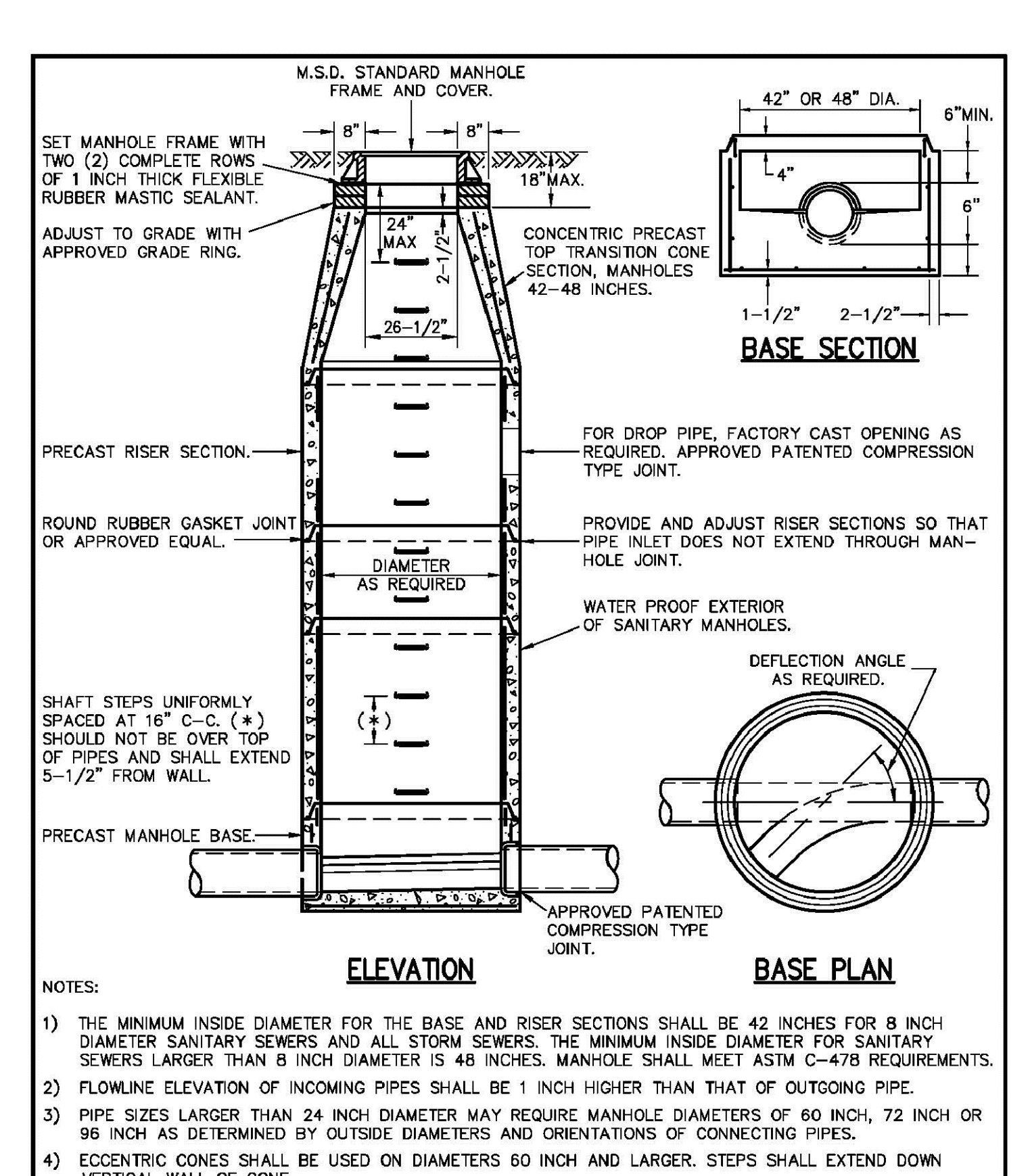
REINFORCEMENT SCHEDULE, TOP

DIMENSIONS	STEEL	SPECIAL PATTERN
W1 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W2 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W1 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W2 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER
W1 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER
W2 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER

GENERAL NOTES:  
1. ALL EXPOSED CORNERS TO HAVE 3/4" CHAMFER.  
2. ALL REINFORCING BARS TO HAVE 2" COVER.  
3. SEE GRADING AND DRAINAGE PLAN FOR PIPE SIZES, LOCATIONS, AND FLOW LINES.  
4. PIPES SHALL CONNECT TO THE ENDS OR SIDES OF THE INLET. CONNECTION SHALL NOT BE MADE AT CORNERS OF BOX.  
5. ALL REINFORCING BARS TO BE GRADE 60.  
6. PRECAST MANHOLE MAY BE USED UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER.

PRECAST MANHOLE SPECIFICATIONS  
ASTM C478  
CONCRETE: 4000 PSI AE (MIN.)  
JOINT: WATERTIGHT RUBBER GASKET

STS-1 STORM SEWER STRUCTURE WITH JUNCTION BOX TOP DETAIL  
NO SCALE



REINFORCEMENT SCHEDULE, BASE

SECTION	REINFORCEMENT
"A"	#4 @ 6" E.W.
"B"	#6 @ 6" E.W.

TABLE OF "W" DIMENSIONS

PIPE SIZE	SKREW OF CROSS DRAIN
30"	4'-0" 4'-2" 4'-4" 4'-6" 4'-8"
36"	4'-0" 4'-2" 4'-4" 4'-6" 4'-8"
42"	5'-3" 5'-5" 5'-7" 5'-9" 5'-11" 6'-1"
48"	5'-10" 6'-2" 6'-4" 6'-6" 6'-8" 6'-10"
60"	7'-0" 7'-2" 7'-4" 7'-6" 7'-8" 7'-10" 7'-12" 7'-14" 7'-16" 7'-18" 7'-20"

DOUBLE FOR "A" SECTION ONLY

PIPE SIZE	SKREW OF CROSS DRAIN
24"	7'-0" 7'-2" 7'-4" 7'-6" 7'-8" 7'-10" 7'-12" 7'-14" 7'-16" 7'-18" 7'-20"
30"	8'-2" 8'-4" 8'-6" 8'-8" 8'-10" 8'-12" 8'-14" 8'-16" 8'-18" 8'-20"
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REINFORCEMENT SCHEDULE, WALLS

SECTION	WIDTH ("W")	HOR.	VERT.
"A"	BETWEEN 4' & 7'	#4 @ 9"	#4 @ 10"
	GREATER THAN 7'	#5 @ 4 1/2"	#4 @ 10"
"B"	BETWEEN 4' & 7'	#5 @ 9"	#5 @ 10"

TABLE OF "T" & "N" DIMENSIONS

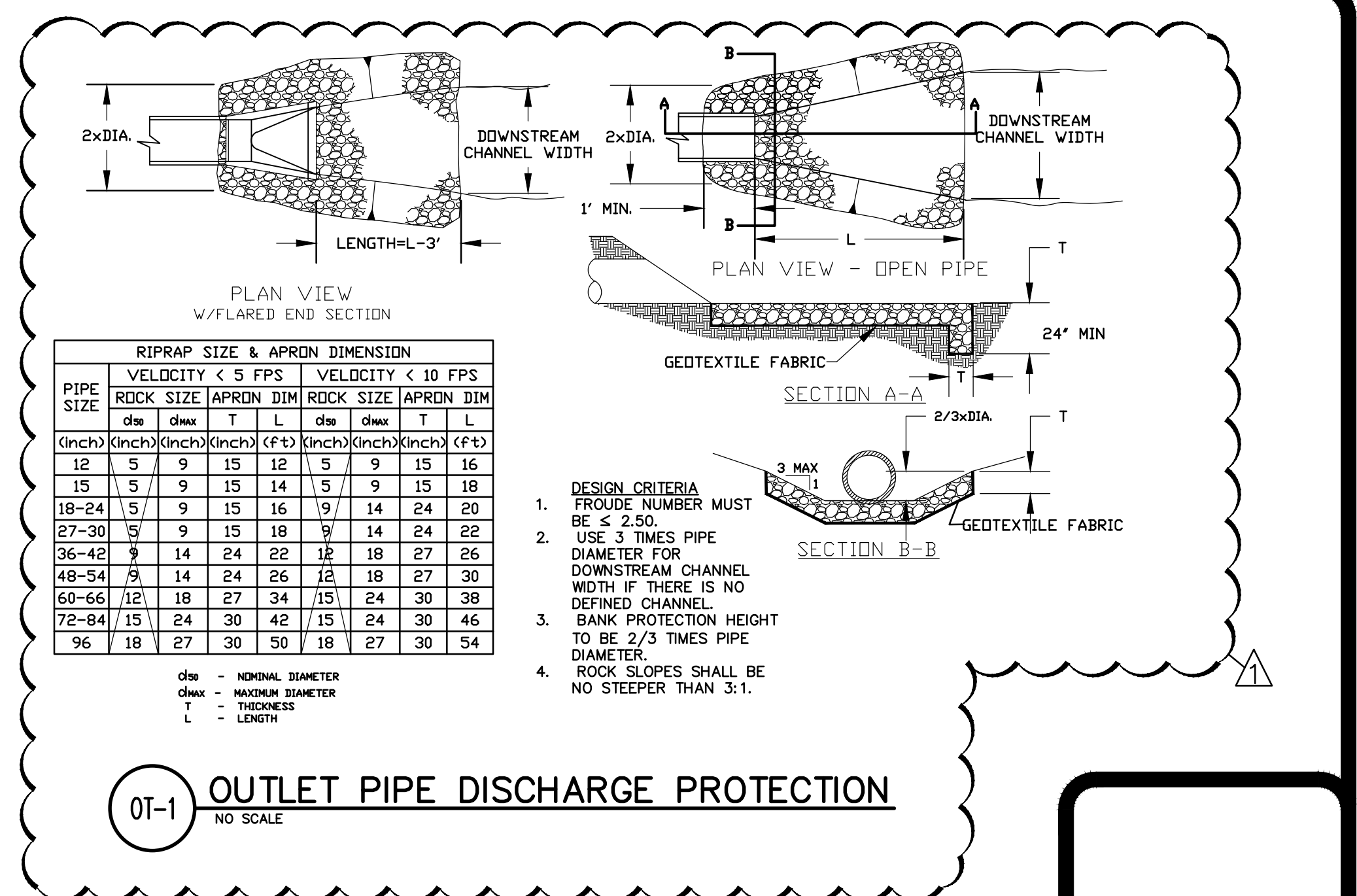
SECTION	WIDTH ("W")	"T"	"N"	"D"
"A"	BETWEEN 4' & 7'	6" + PIPE THICKNESS	8"	6"
	GREATER THAN 7'	6" + PIPE THICKNESS	8"	8"
"B"	BETWEEN 4' & 7'	6" + PIPE THICKNESS	8"	8"

REINFORCEMENT SCHEDULE, TOP

DIMENSIONS	STEEL	SPECIAL PATTERN
W1 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W2 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W1 = 7' OR LESS	#4 @ 8" E.W.	DIAGONAL @ COVER
W2 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER
W1 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER
W2 = 7' OR GREATER	#4 @ 6" E.W.	DIAGONAL @ COVER

NOTES:  
1) THE MINIMUM INSIDE DIAMETER FOR THE BASE AND RISER SECTIONS SHALL BE 42 INCHES FOR 8 INCH DIAMETER SANITARY SEWERS AND ALL STORM SEWERS. THE MINIMUM INSIDE DIAMETER FOR SANITARY SEWERS LARGER THAN 8 INCH DIAMETER IS 48 INCHES. MANHOLE SHALL MEET ASTM C-478 REQUIREMENTS.  
2) FLOWLINE ELEVATION OF INCOMING PIPES SHALL BE 1 INCH HIGHER THAN THAT OF OUTGOING PIPE.  
3) PIPE SIZES LARGER THAN 24 INCH DIAMETER MAY REQUIRE MANHOLE DIAMETERS OF 60 INCH, 72 INCH OR 96 INCH AS DETERMINED BY OUTSIDE DIAMETERS AND ORIENTATIONS OF CONNECTING PIPES.  
4) ECCENTRIC CONES SHALL BE USED ON DIAMETERS 60 INCH AND LARGER. STEPS SHALL EXTEND DOWN VERTICAL WALL OF CONE.  
5) PRIOR TO FABRICATION, SHOP DRAWINGS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL OF MANHOLES ON PIPE DIAMETERS LARGER THAN 24 INCH AND ALSO FOR THOSE STRUCTURES WITH A DROP PIPE CONNECTION.

PRECAST CONCRETE MANHOLE  
METROPOLITAN ST. LOUIS SEWER DISTRICT  
Standard Details of Sewer Construction  
Dr. WSH/SAM 2009 SHEET 21  
Ch. J.C.K. (REV)

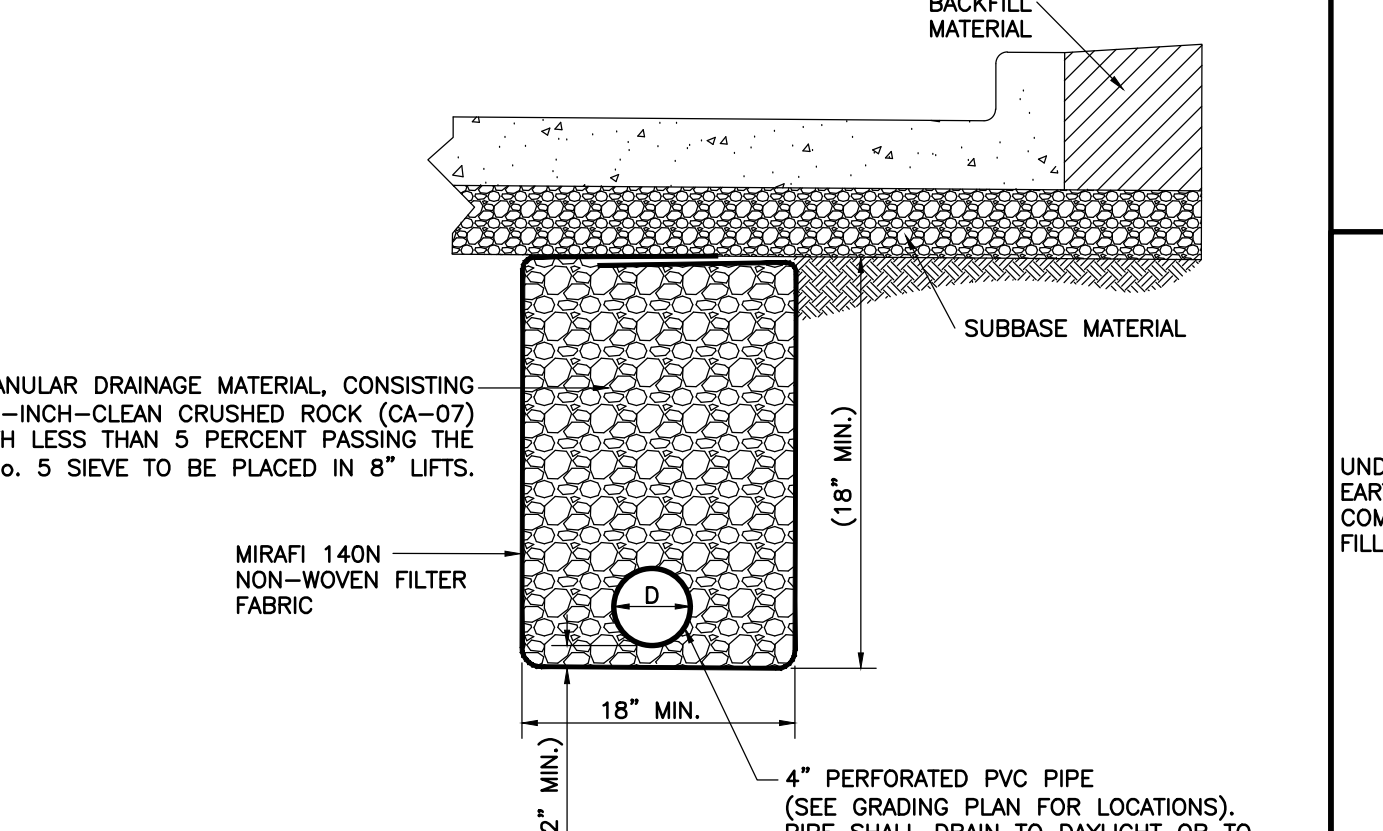
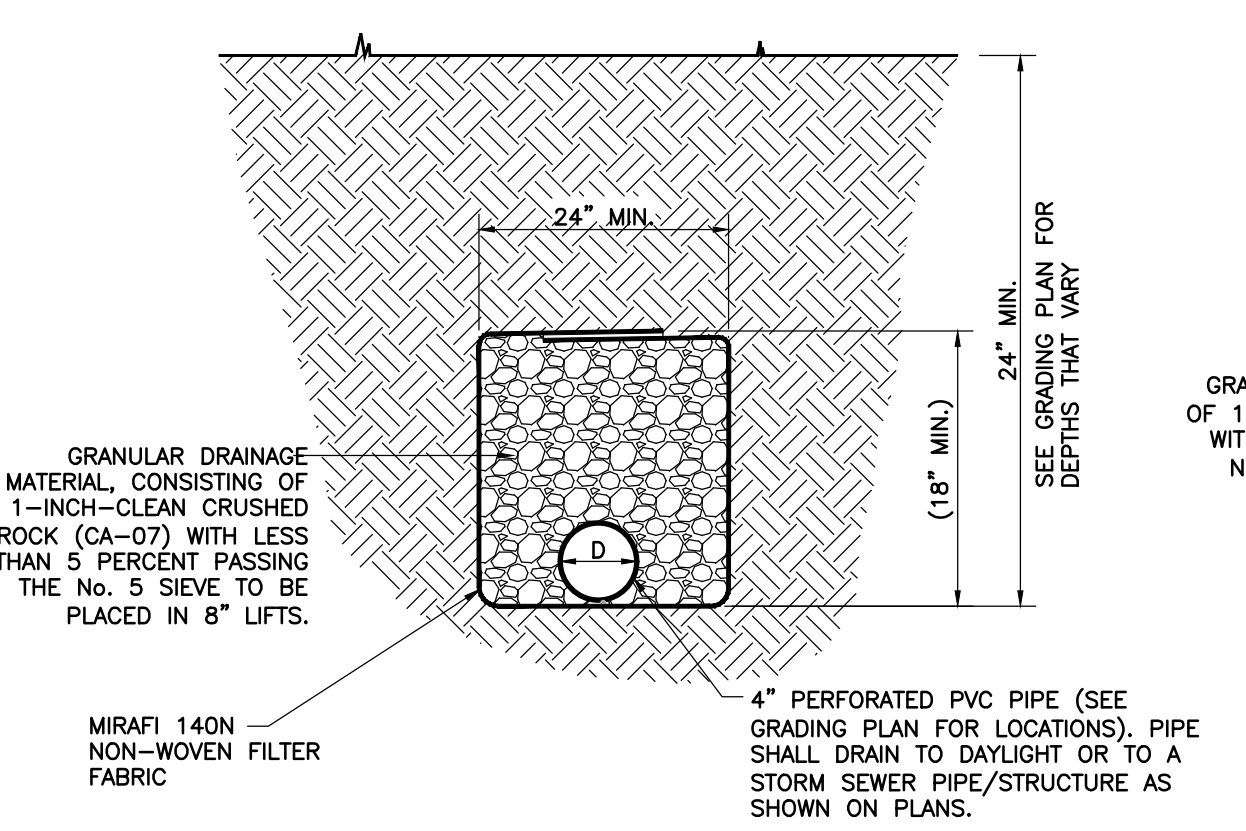


RIPRAP SIZE & APRON DIMENSION

PIPE SIZE	VELOCITY < 5 FPS	VELOCITY < 10 FPS	
ROCK SIZE	APRON DIM	ROCK SIZE	APRON DIM
12	5 9 15 12	5 9 15 16	
15	5 9 15 14	5 9 15 18	
18-24	5 9 15 16	9 14 24 20	
27-30	5 9 15 18	9 14 24 22	
36-42	9 14 24 22	12 18 27 26	
48-54	9 14 24 26	12 18 27 30	
60-66	12 18 27 34	15 24 30 38	
72-84	15 24 30 42	15 24 30 46	
96	18 27 30 50	18 27 30 54	

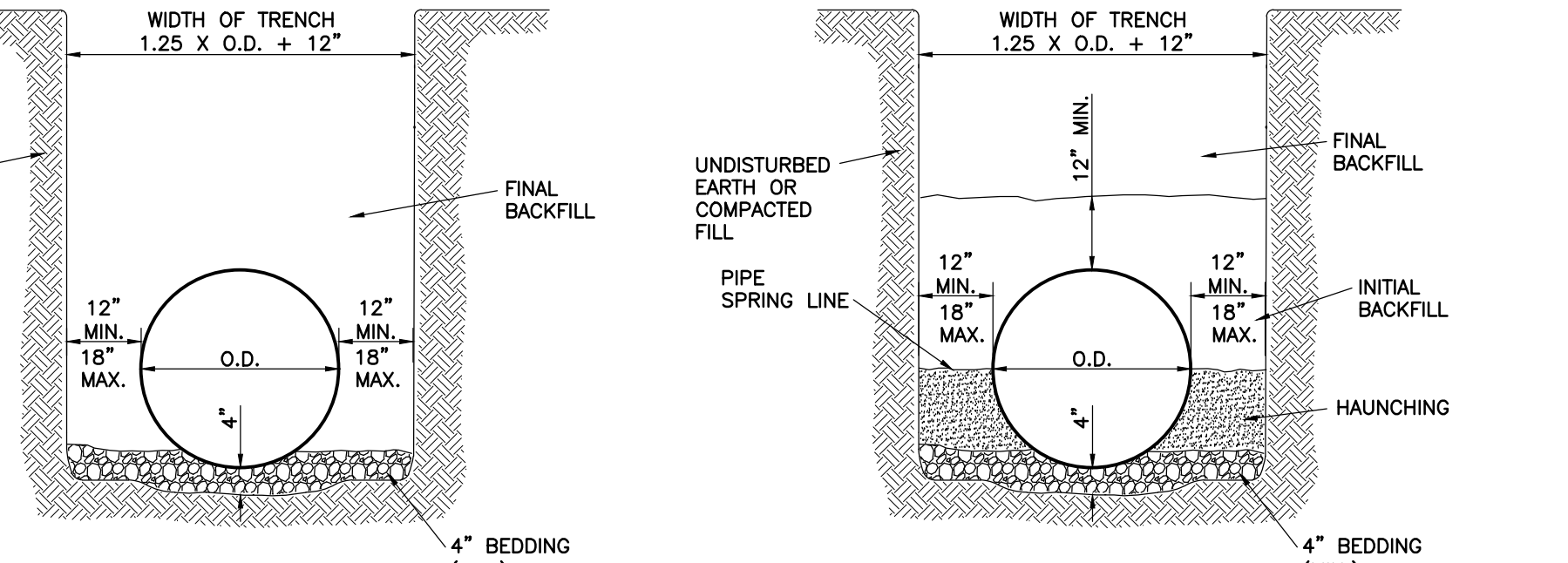
DESIGN CRITERIA  
1. FROUDE NUMBER MUST BE ≥ 2.50.  
2. USE 3 TIMES PIPE DIAMETER FOR DOWNSTREAM CHANNEL WIDTH IF THERE IS NO DEFINED CHANNEL.  
3. BANK PROTECTION HEIGHT TO BE 2/3 TIMES PIPE DIAMETER.  
4. ROCK SLOPES SHALL BE NO STEEPER THAN 3:1.

OT-1 OUTLET PIPE DISCHARGE PROTECTION  
NO SCALE



DRAIN TILE DETAIL OUTSIDE PAVED AREAS  
DRAIN TILE DETAIL UNDER PAVED AREAS  
NO SCALE

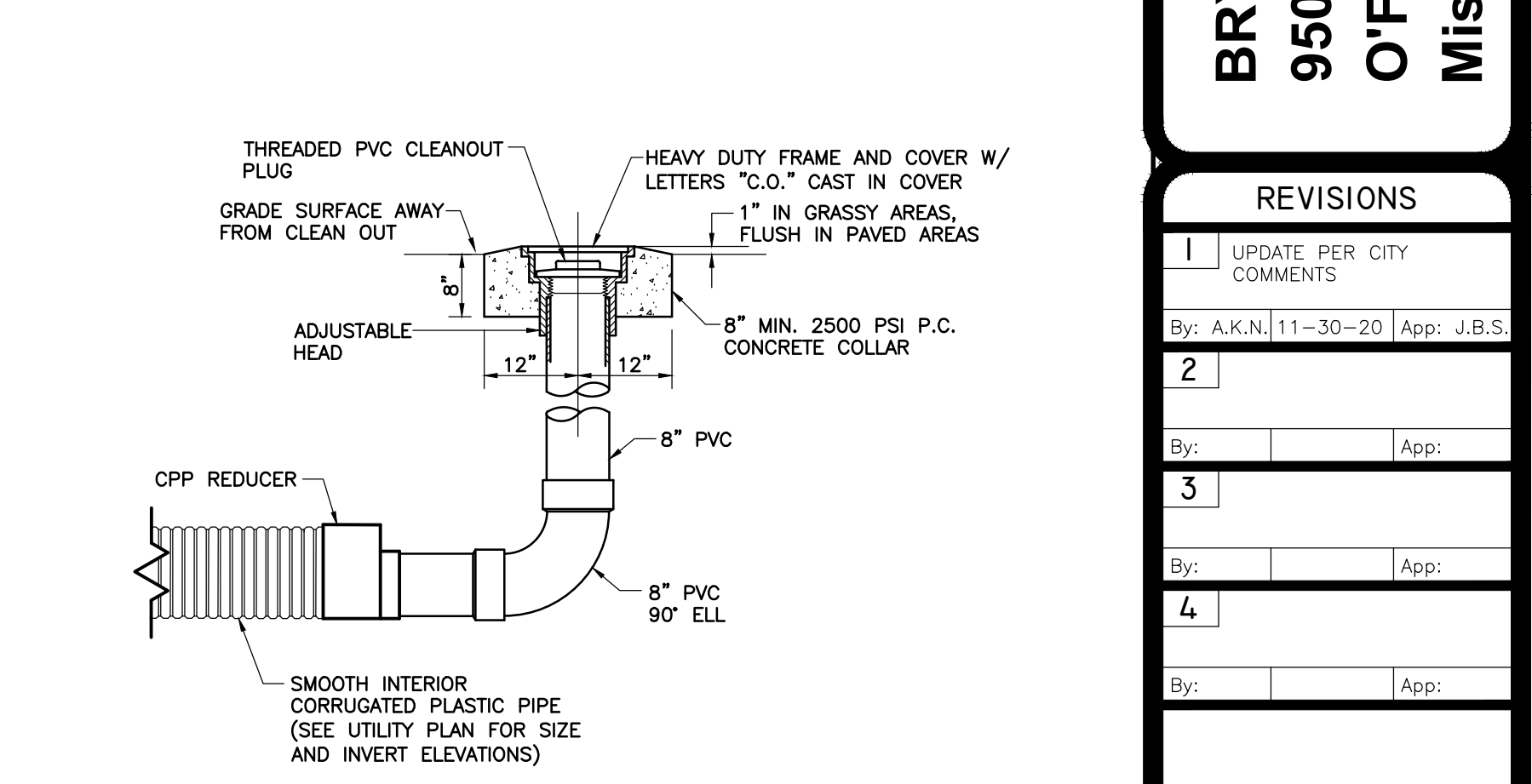
STP-2 DRAIN TILE DETAIL  
NO SCALE



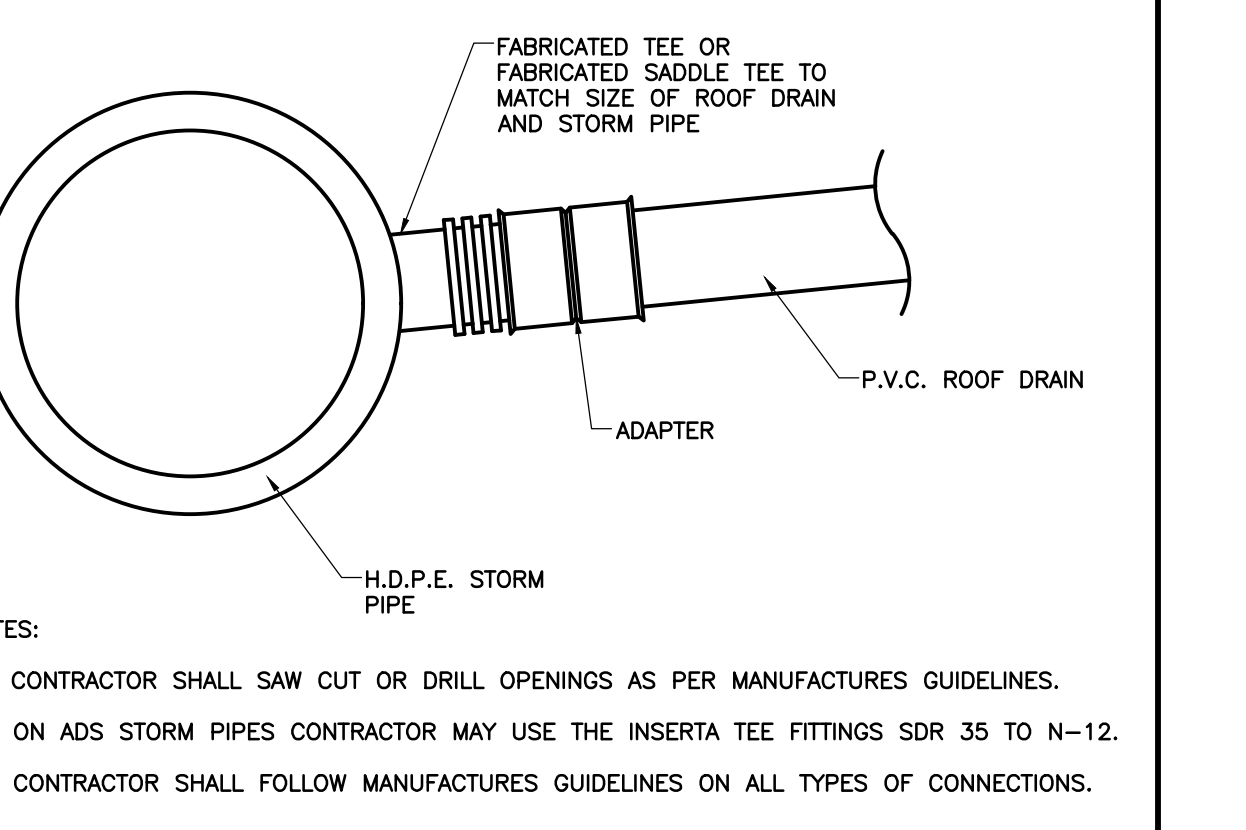
ONLY REINFORCED CONCRETE PIPE (RCP) SMALLER THAN 60" Ø  
ALL PIPE SIZES AND MATERIAL INCLUDING REINFORCED CONCRETE PIPE 60" Ø AND LARGER

GENERAL NOTES:  
1. BEDDING SHALL BE CLASS I-A WORKED BY HAND. IF GROUNDWATER IS ANTICIPATED, THEN BEDDING SHALL BE CLASS I-B COMPACTED TO 85% STANDARD PROCTOR. (SEE SPECIFICATIONS FOR GRADATION)  
2. HAUNCHING SHALL BE WORKED AROUND THE PIPE BY HAND TO ELIMINATE VOIDS AND SHALL BE CLASS I-A OR CLASS I-B OR CLASS II COMPACTED TO 85% PROCTOR.  
3. INITIAL BACKFILL SHALL BE CLASS I-A WORKED BY HAND, OR CLASS I-B OR CLASS II COMPACTED TO 85% STANDARD PROCTOR.  
4. INITIAL BACKFILL NOT UNDER PAVED AREAS SHALL BE CLASS III COMPACTED TO 90% STANDARD PROCTOR.  
5. FINAL BACKFILL UNDER PAVED AREAS SHALL BE CLASS I-B COMPACTED AS NOTED IN NOTE 6.  
6. FINAL BACKFILL NOT UNDER PAVED AREAS SHALL BE CLASS IV-A COMPACTED TO 95% STANDARD PROCTOR.  
7. ALL MATERIALS ARE CLASSIFIED IN ACCORDANCE WITH ASTM D 2321-LATEST EDITION.  
8. ALL MATERIALS SHALL BE INSTALLED IN MAXIMUM 8" LOOSE LIFTS IN ACCORDANCE WITH ASTM D 698. CLASS III AND IV-A MATERIALS SHALL BE COMPACTED NEAR OPTIMUM MOISTURE CONTENT.  
9. FILL SALVAGED FROM EXCAVATION SHALL BE FREE OF DEBRIS, ORGANICS AND ROCKS LARGER THAN 3".  
10. ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES. (SEE SPECIFICATIONS)  
11. CONTRACTOR TO OBTAIN AND FOLLOW INSTALLATION REQUIREMENTS FOR STORM SEWER FROM PIPE MANUFACTURERS FOR EACH TYPE OF PIPING MATERIAL.

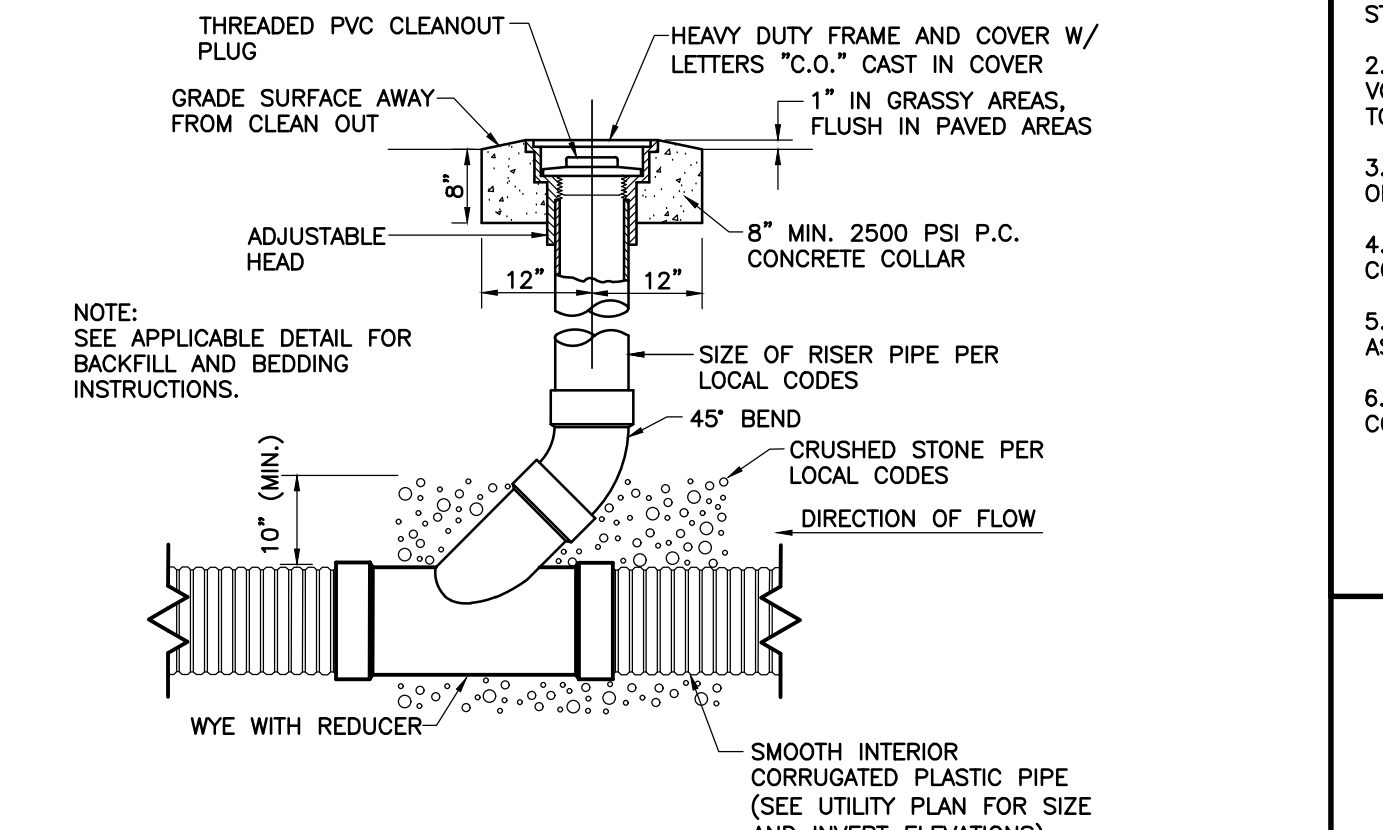
STT-1 STORM SEWER TRENCH AND BEDDING DETAIL  
NO SCALE



STS-10 STORM SEWER CLEANOUT DETAIL (TYPE I)  
NO SCALE



ROOF DRAIN/STORM PIPE CONNECTION DETAIL  
NO SCALE



STS-11 STORM SEWER CLEANOUT DETAIL (TYPE II)  
NO SCALE

Three working days prior to the start of any excavation on this site the Contractor shall contact 1-800-344-7483 for utility location information.  
The contractor shall verify and implement all the required Federal Occupational Safety and Health Administration (OSHA) and/or OSHA approved state-plan regulations established for the type of construction required by these plans.

PERMIT SET  
Rick G. Rohlfing, P.E. #E-29409  
State of Missouri  
Registered Professional Engineer  
for BFA, Inc. Professional Engineer Corporation #000472  
11/30/20  
Date

bfaeng.com TELEPHONE: (636) 239-4751  
DRAWN J.A.K.  
CHECKED R.G.R.  
DATE 11/30/2020  
SCALE AS NOTED  
JOB No. 5918  
SHEET NAME DTL-4  
DETAIL SHEET 4

BRYAN CROSSING LOT 2, LLC  
950 Bryan Road  
O'Fallon, St. Charles County,  
Missouri 63366

REVISIONS

NO.	DATE	BY	APP.	DESCRIPTION
1				UPDATE PER CITY COMMENTS
2				
3				
4				