

Appendix B

STANDARD DETAILS

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Flow Monitoring

1100	Sanitary Sewer Permanent Flow Monitor Details (Manhole Conduit Installation)
1105	Conduit Trench Backfill Details (Flow Monitors)

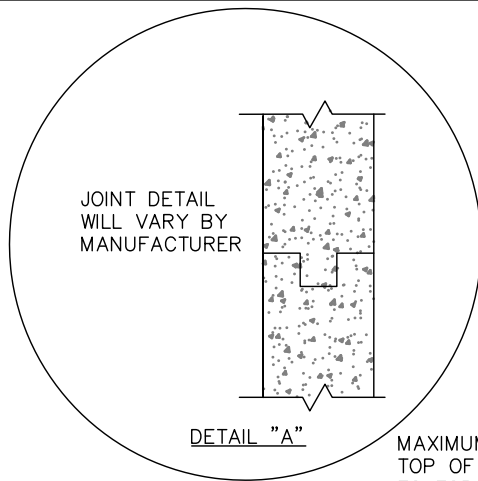
Testing Forms

1200	Air Test Form
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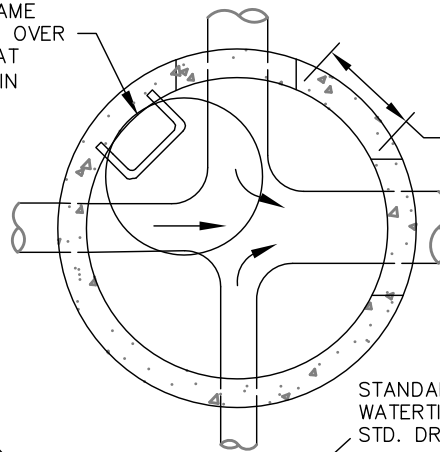
- 1205 Nomograph
- 1210 Manhole Vacuum Test Form
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Computational Aids

- 1250 Average velocities for Estimating Travel Time for Overland Flows
- 1255 Headwater Depth for Corrugated Pipe W/Inlet Control
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- 1275 Rational Method Rainfall Intensities
- 1280 24-Hour Rainfall Depths
- 1285 Design Storm Distribution Chart



LOCATE FRAME
AND COVER OVER
LEDGE OF AT
LEAST 12" IN
WIDTH



8" MIN. BETWEEN
KNOCKOUTS

STANDARD FRAME AND COVER OR
WATERTIGHT FRAME AND COVER. SEE
STD. DRAWING NO. 110, 120, OR 130

SET FRAME IN NON-SHRINK
GROUT

GRADE RINGS (2", 4", OR 6")
MAXIMUM 12" SET IN
NON-SHRINK GROUT

STANDARD ECCENTRIC
36" CONE

MANHOLE SECTION
(VARIABLE 1'-4')

48" MINIMUM

MANHOLE STEPS SEE
STD DRAWING NO. 100

5" MINIMUM

SEE DETAIL "A"

CONSTRUCT
CHANNEL AND MIN
12" SHELF IN FIELD

PIPE
I.D.

NON-SHRINKING GROUT

12" MINIMUM OF 3/4"-0" COMPACTED
BASE MATERIAL

SMOOTH FINISH
CHANNEL TO
3/4 VERTICAL
HEIGHT OF
PIPE

NOTES:

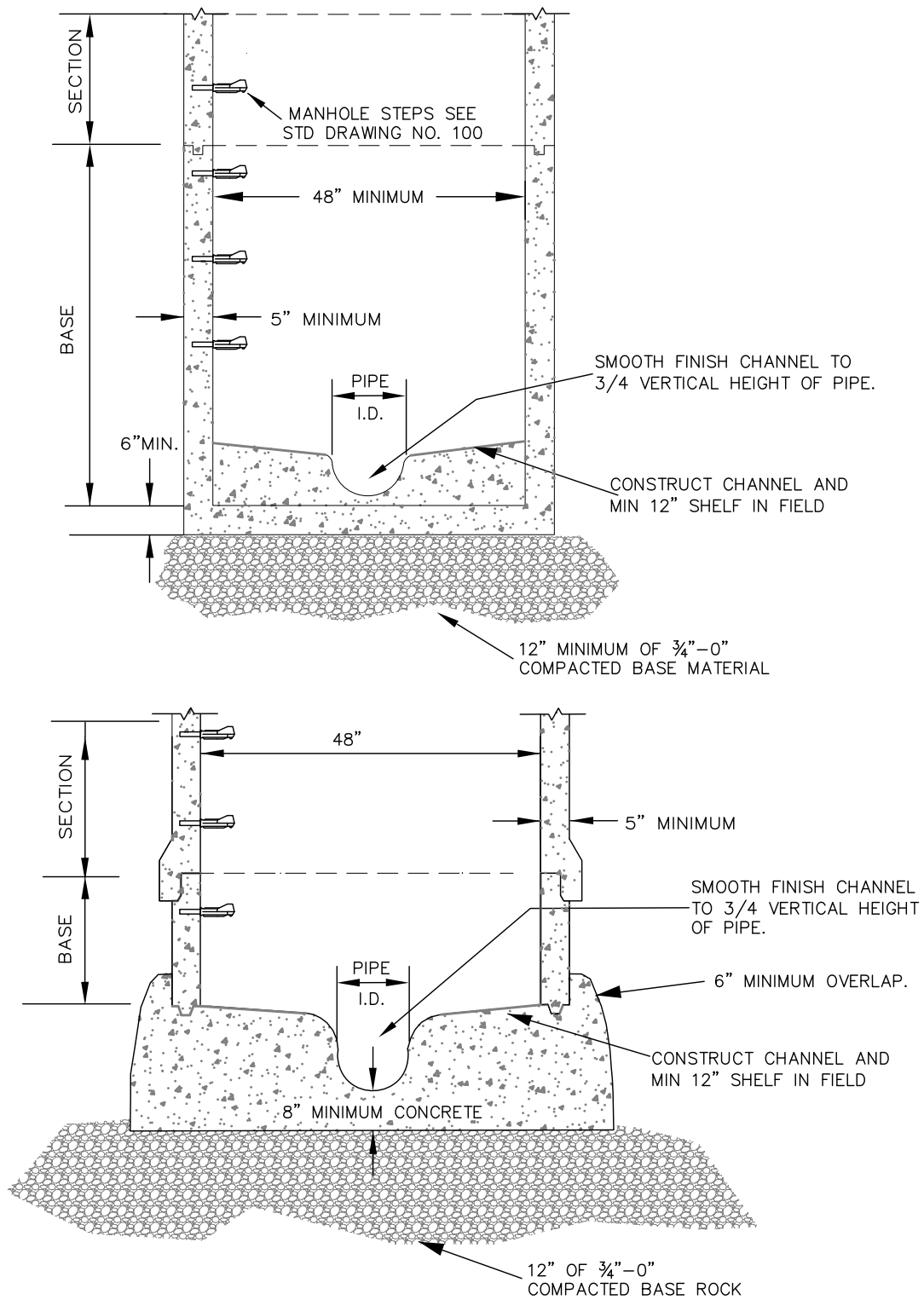
1. ALL PRE-CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478.
2. SEE STD DRAWING 020 FOR POURED IN PLACE CONCRETE MANHOLE BASE.
3. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-443.
4. ALL PIPE CONNECTIONS TO MANHOLE SHALL BE WATERTIGHT.
5. PIPE CONNECTIONS OF 24" OR GREATER SHALL REQUIRE A MANHOLE AND CHANNEL DETAIL.
6. PIPE CONNECTIONS OF FOUR OR MORE MAINLINES SHALL REQUIRE A MANHOLE CONNECTION AND CHANNEL DETAIL.
7. PROVIDE A MINIMUM OF 8" OF INTACT (UNDISTURBED) MANHOLE WALL BETWEEN PIPE BREAKOUTS AS MEASURED ON THE INSIDE FACE OF THE MANHOLE.
8. BREAKOUT OF WALL FOR PIPE SHALL BE 2" MINIMUM AND 4" MAXIMUM CLEAR OF PIPE WALL.
9. THIS DETAIL LIMITED TO MAXIMUM INTERIOR DROP OF 12" FOR SANITARY CONNECTION AND 48" FOR STORM CONNECTION.
10. WATERTIGHT/TAMPER PROOF MANHOLE FRAME AND COVER SHALL BE USED IN ALL EASEMENT AND OFF STREET AREAS. SEE STD DRAWING 130.
11. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-443.

STANDARD MANHOLE

DRAWING NO. 010

REVISED 12-16

CleanWater  Services



NOTES:

1. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, DRAWING NO. 010.
2. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND A SLUMP OF 2" TO 4".

MANHOLE BASE

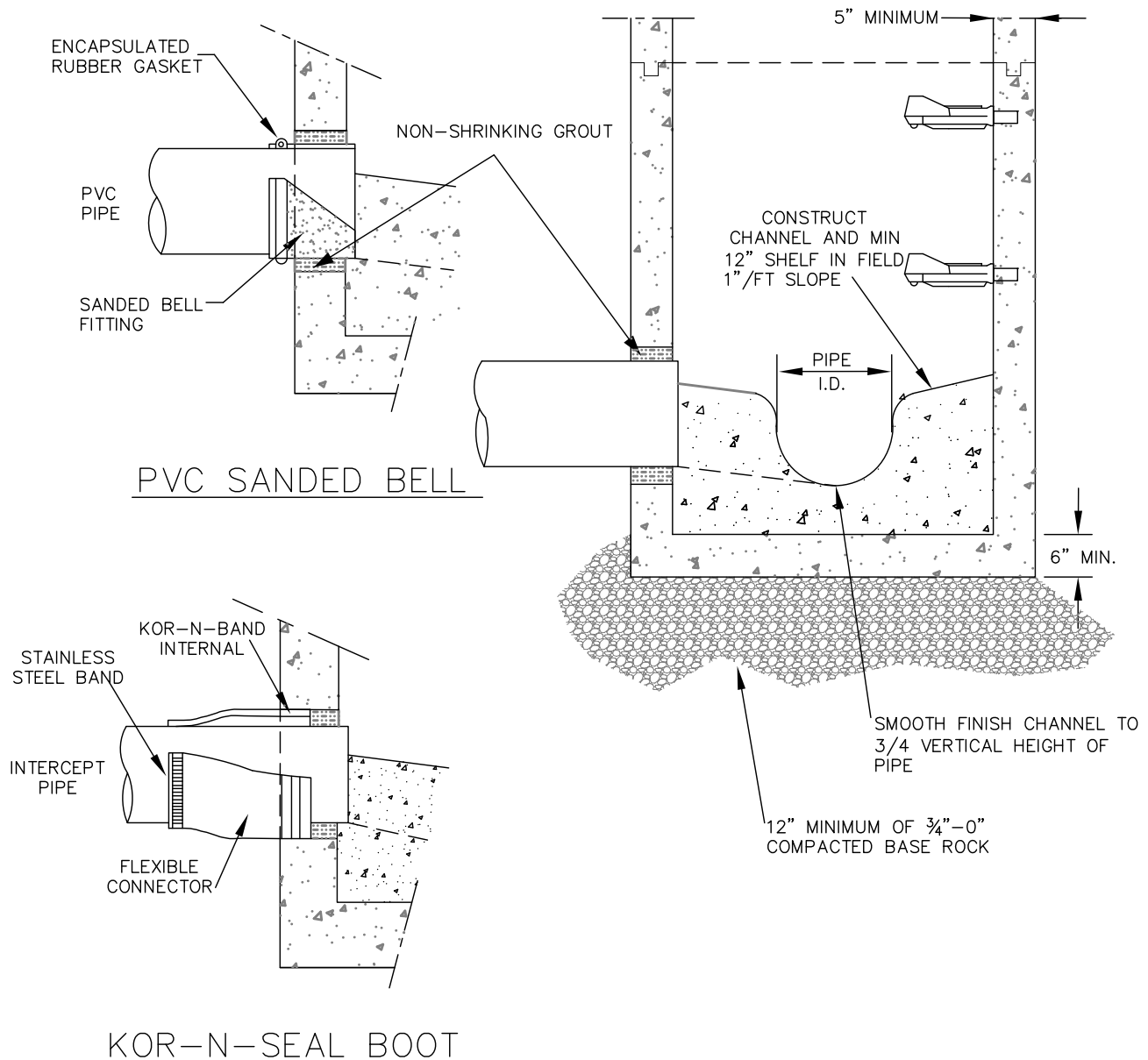
DRAWING NO. 020

REVISED 11-16

CleanWater  Services

NOTES:

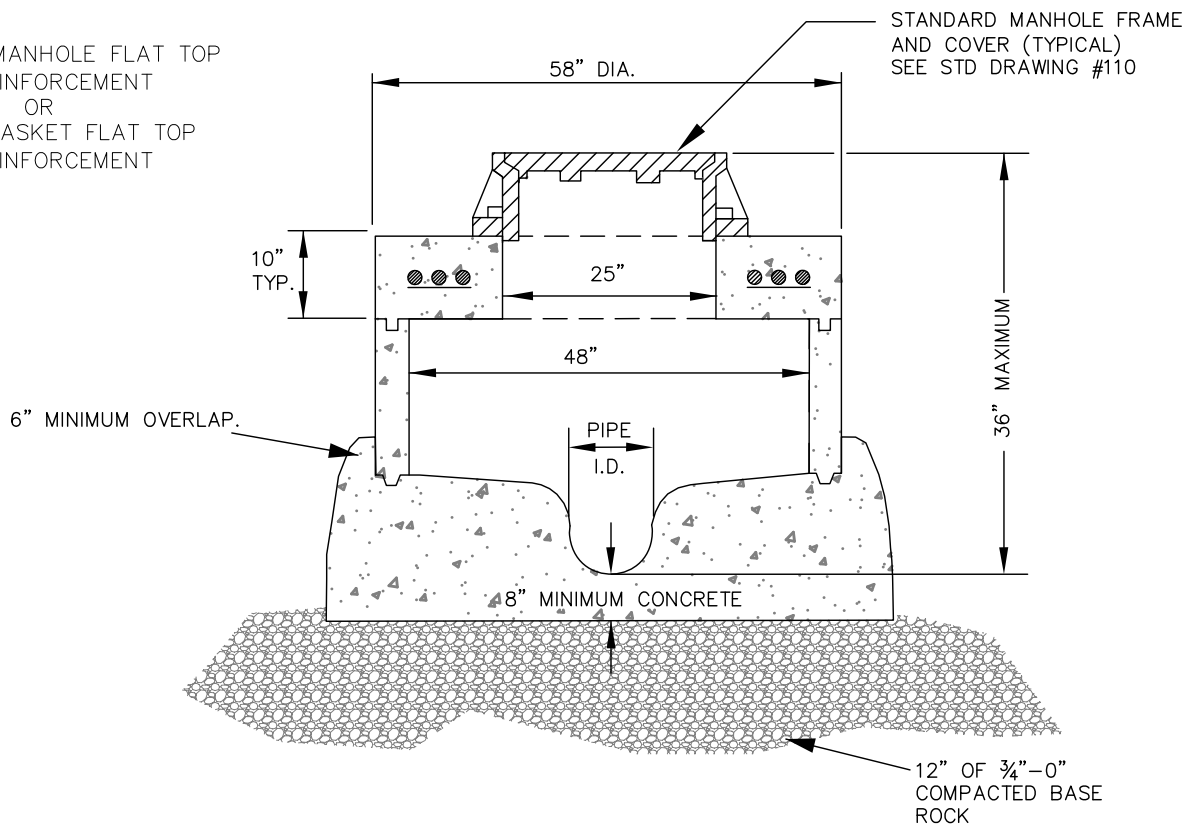
ALL PRE-CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD DRAWING NO. 010.



MANHOLE CONNECTIONS

CleanWater  Services

STANDARD MANHOLE FLAT TOP
W/ REINFORCEMENT
OR
RUBBER GASKET FLAT TOP
W/ REINFORCEMENT

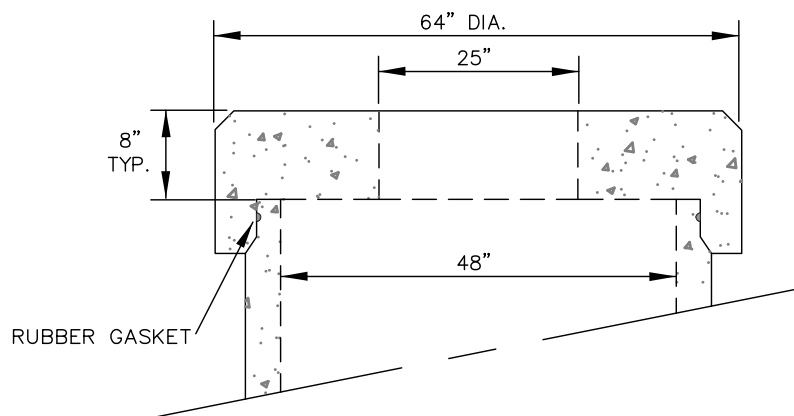


#6 BAR AROUND OUTSIDE OF OPENING
#6 DIAGONALS BOTH SIDES OF OPENING
#6 6" O.C. BOTH WAYS

RUBBER GASKET
FLAT TOP
(OPTIONAL)

NOTES:

1. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-433.
2. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, SEE STD DRAWING NO. 010.
3. CENTER OPENING FLATOP REQUIRED.
4. NO STEPS ALLOWED IN SHALLOW FLAT TOP MANHOLE.
5. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND A SLUMP OF 2" TO 4".



SHALLOW FLAT TOP MANHOLE

DRAWING NO. 040

REVISED 12-16

CleanWater  Services

STANDARD MANHOLE FLAT TOP
W/REINFORCEMENT
OR
RUBBER GASKET FLAT TOP
W/REINFORCEMENT

#6 BAR AROUND OUTSIDE OF OPENING
#6 DIAGONALS BOTH SIDES OF OPENING
#6 6" O.C. BOTH WAYS

SMOOTH FINISH CHANNEL TO
3/4 VERTICAL HEIGHT OF
PIPE

NON-SHRINKING GROUT

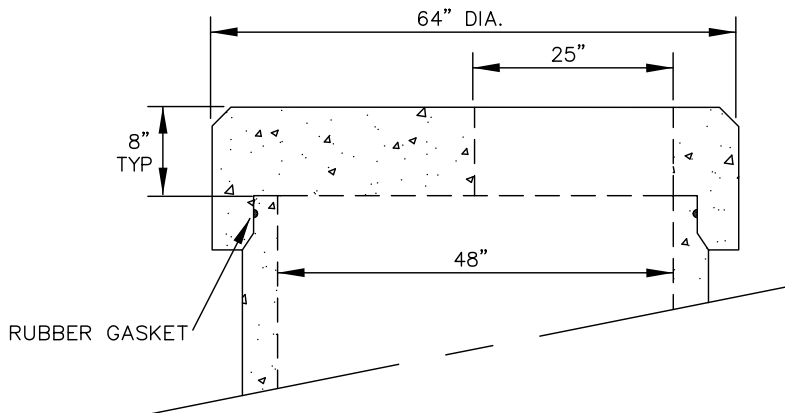
CONSTRUCT
CHANNEL AND MIN
12" SHELF IN FIELD
1"/FT SLOPE

PIPE
I.D.

6" MIN.

12" MINIMUM OF 3/4"-0"
COMPACTED BASE ROCK

RUBBER GASKET
FLAT TOP
(OPTIONAL)



NOTES:

1. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-433.
2. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, SEE STD DRAWING NO. 010.
3. STEPS REQUIRED ON FLAT TOP MANHOLES DEEPER THAN 48" FROM FINISHED GRADE TO I.E. OUT.

FLAT TOP MANHOLE

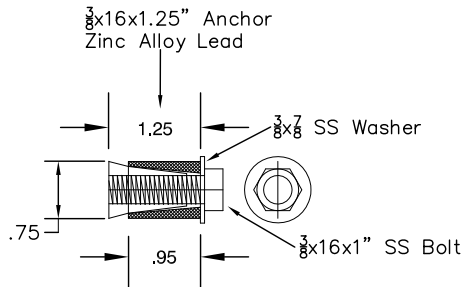
DRAWING NO. 050

REVISED 12-16

CleanWater Services

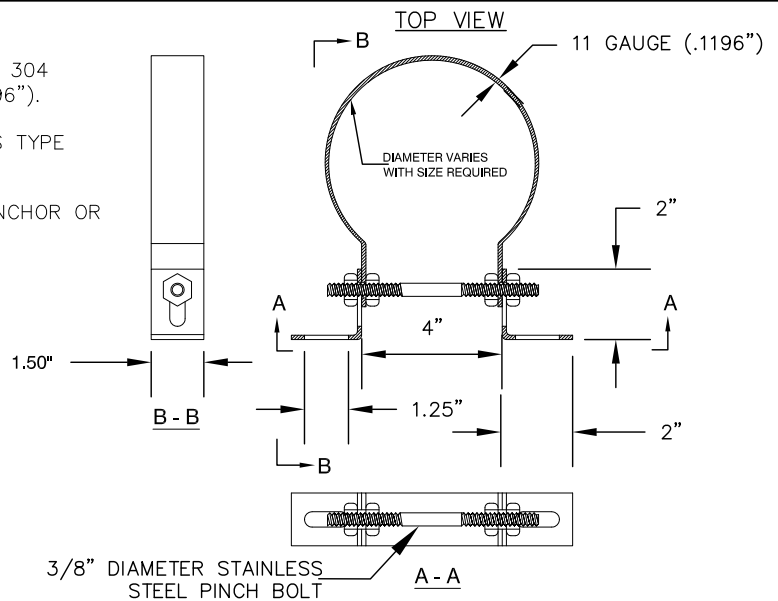
SPECIFICATIONS:

- 1) CLAMP AND BRACKETS ARE TYPE 304 STAINLESS STEEL, 11 GAUGE (.1196").
- 2) 3/8" ϕ PINCH BOLT AND NUTS IS TYPE 18-8 STAINLESS STEEL.
- 3) RELINER CLAMP/BRAKET AND ANCHOR OR APPROVED EQUIVALENTS.



ANCHOR DETAIL

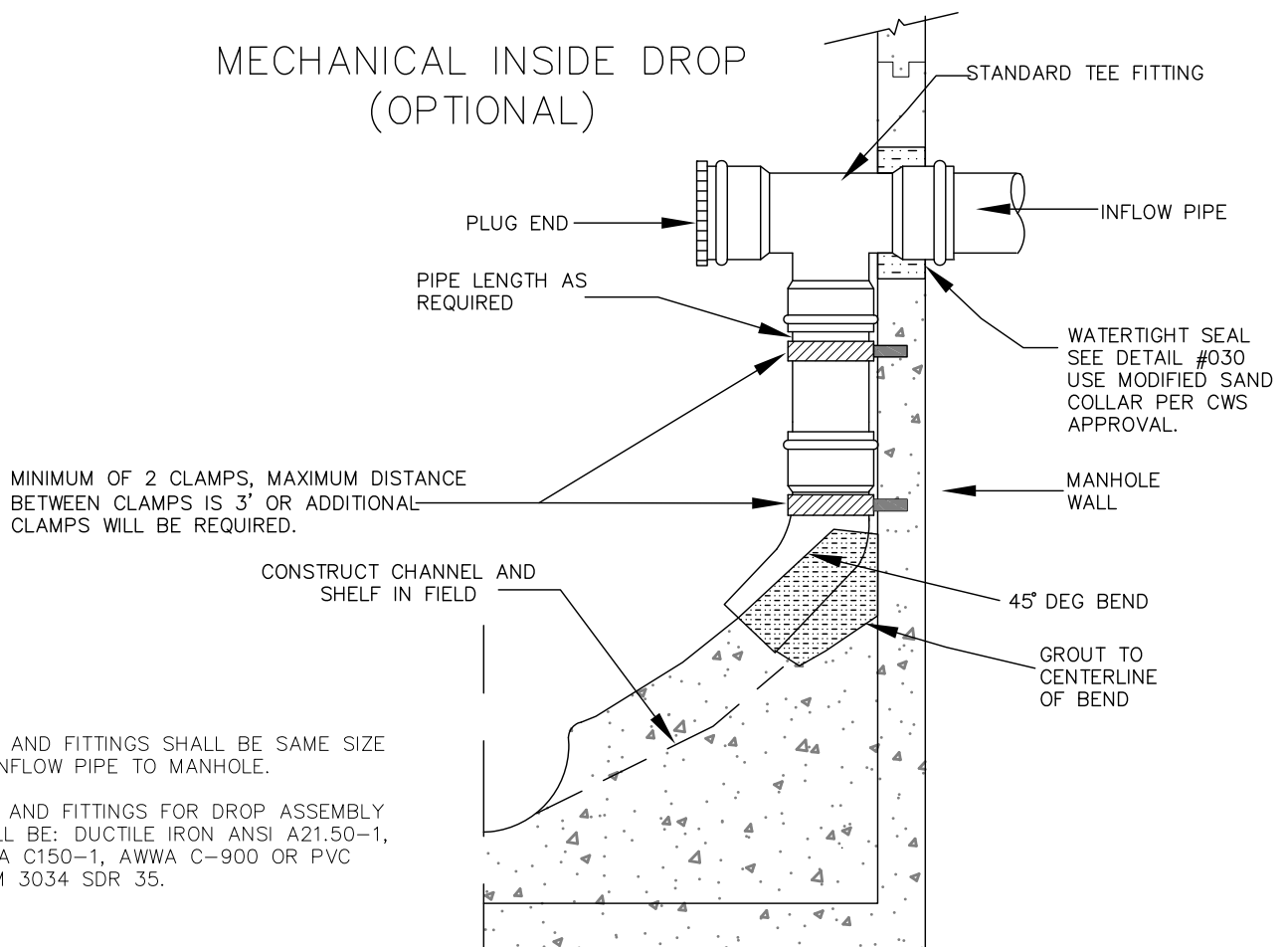
N.T.S.



CLAMP DETAIL

N.T.S.

MECHANICAL INSIDE DROP (OPTIONAL)

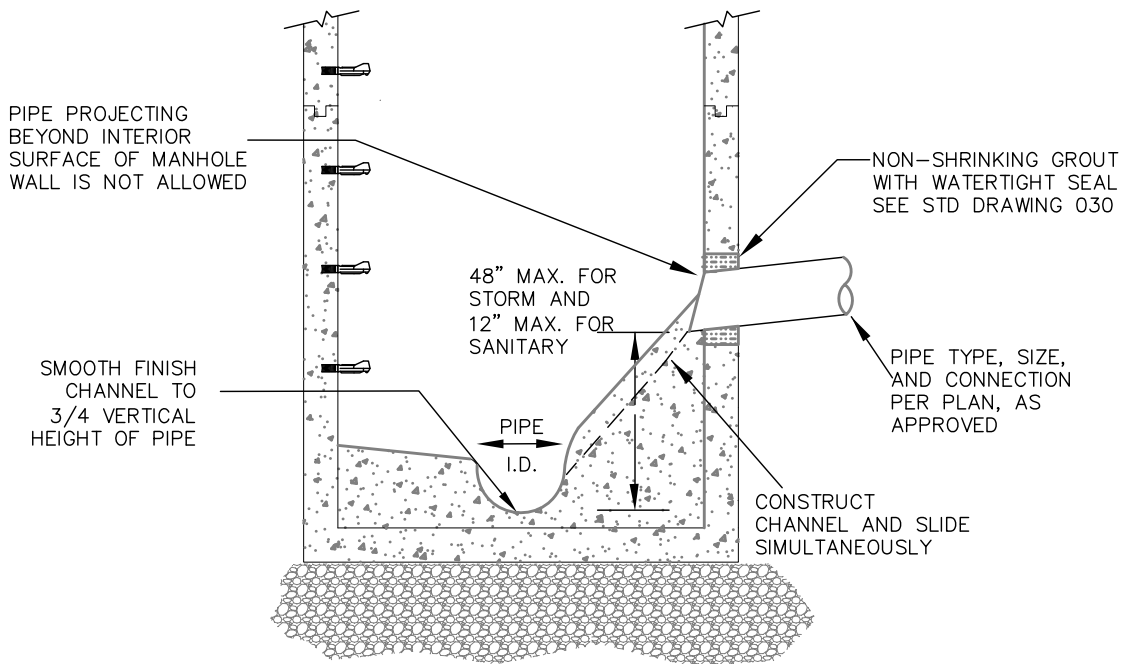


NOTES:

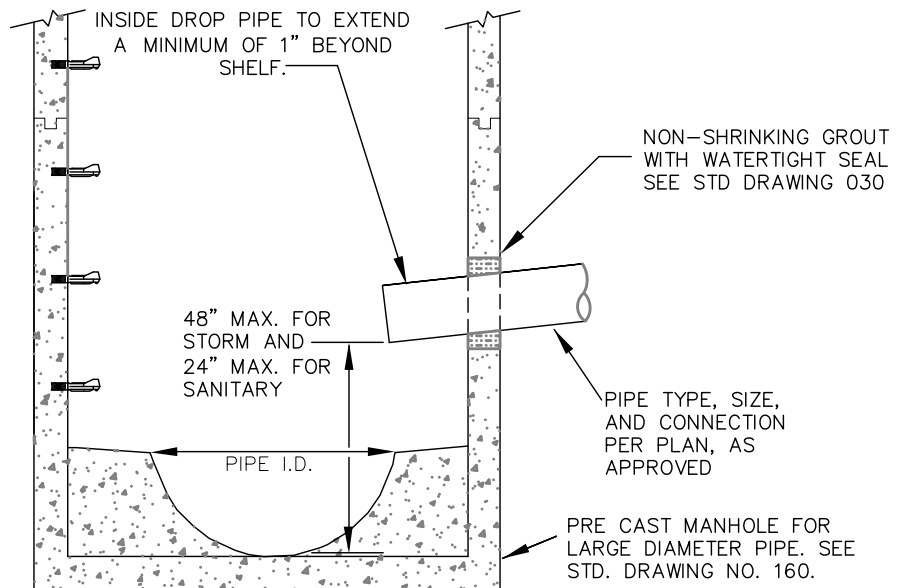
1. PIPE AND FITTINGS SHALL BE SAME SIZE AS INFLOW PIPE TO MANHOLE.
2. PIPE AND FITTINGS FOR DROP ASSEMBLY SHALL BE: DUCTILE IRON ANSI A21.50-1, AWWA C150-1, AWWA C-900 OR PVC ASTM 3034 SDR 35.

MECHANICAL INSIDE DROP MANHOLE

CleanWater Services



OPEN INSIDE DROP
WITH BEAVER SLIDE

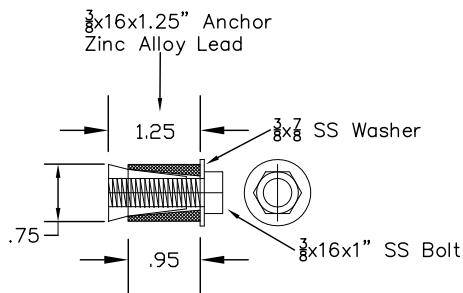


OPEN INSIDE DROP FOR
LARGE DIAMETER PIPE

OPEN INSIDE DROP MANHOLE

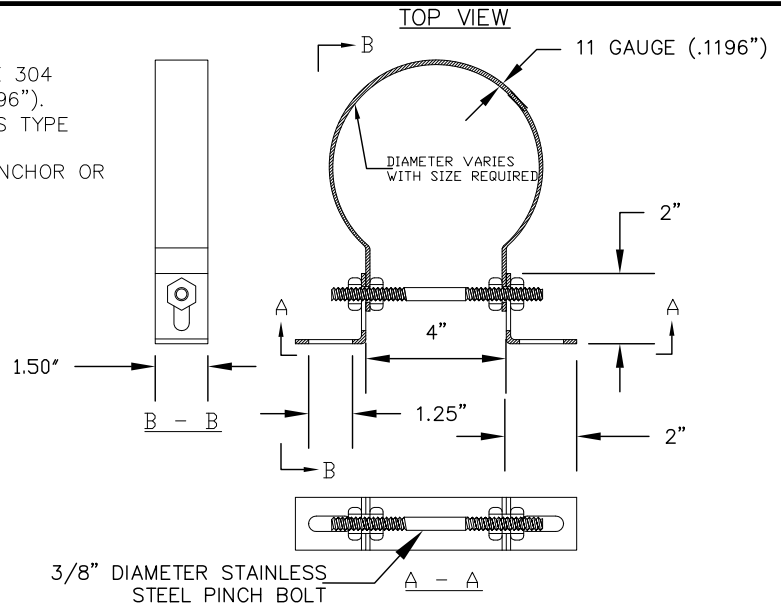
SPECIFICATIONS:

- 1) CLAMP AND BRACKETS ARE TYPE 304 STAINLESS STEEL, 11 GAUGE (.1196").
- 2) 3/8" ϕ PINCH BOLT AND NUTS IS TYPE 18-8 STAINLESS STEEL.
- 3) RELINER CLAMP/BACKET AND ANCHOR OR APPROVED EQUIVALENTS.



ANCHOR DETAIL

N.T.S.

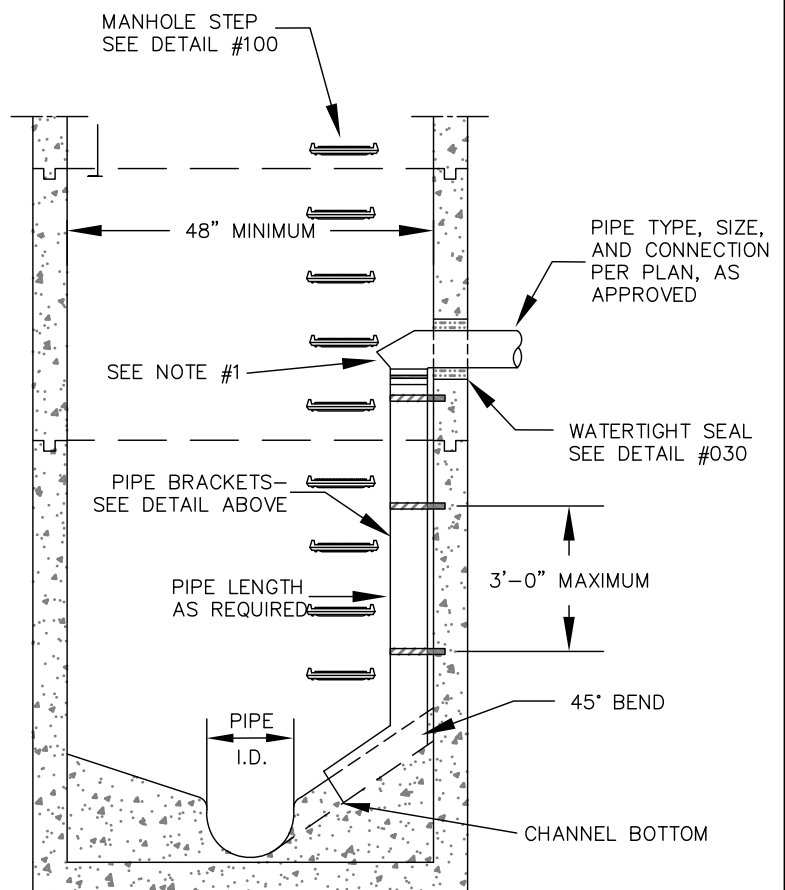
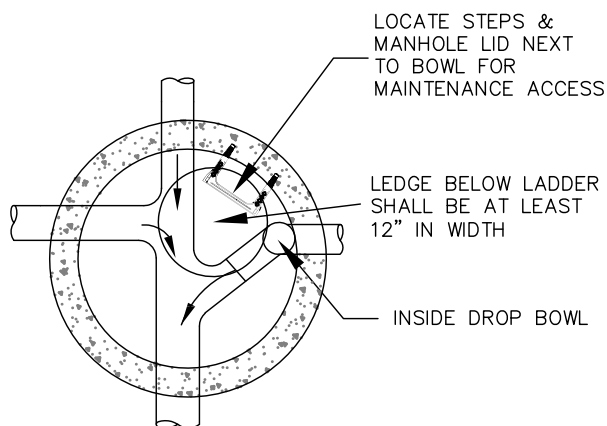


CLAMP DETAIL

N.T.S.

NOTES:

1. DROP BOWL AS MANUFACTURED BY RELINER-DURAN INC. OR APPROVED EQUAL.
2. DROP BOWL TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS (INFORMATION AVAILABLE @ RELINER.COM) OR AS REQUIRED BY DISTRICT OR CITY.
3. PIPE AND FITTING FOR DROP ASSEMBLY SHALL BE: AWWA C150-1, AWWA C-900 OR PVC ASTM 3034 SDR 35.
4. NO MORE THAN ONE DROP BOWL PER MANHOLE WITHOUT WRITTEN APPROVAL BY DISTRICT OR CITY.
5. WRITTEN APPROVAL BY DISTRICT OR CITY IS REQUIRED FOR DROP BOWL INSTALLATION ON PIPELINES WITH A SLOPE OF 5% OR GREATER.

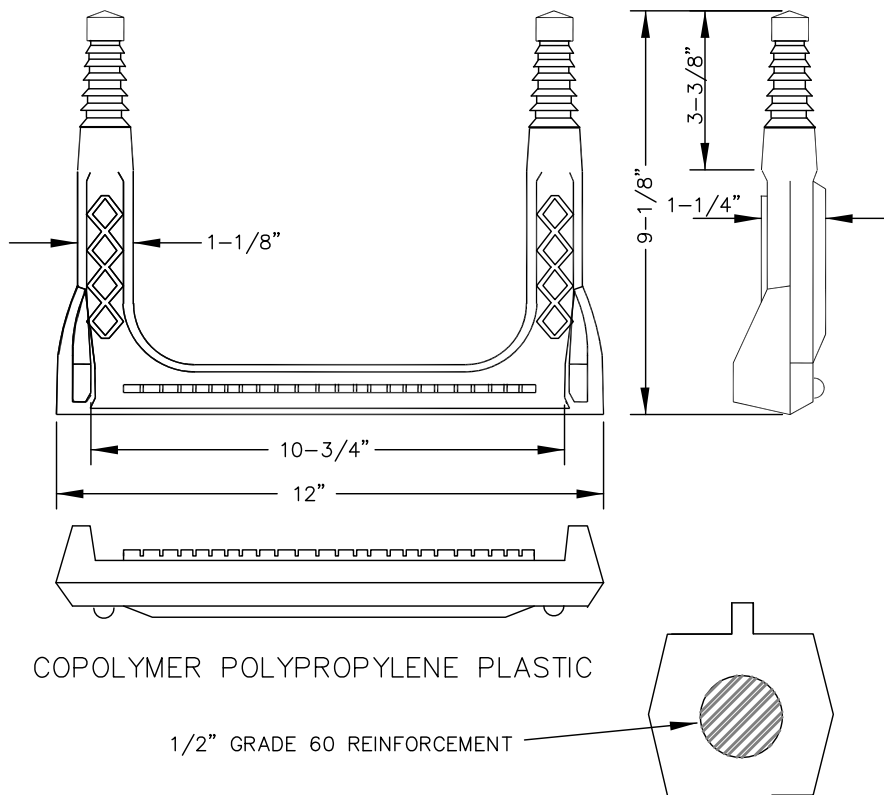


INSIDE DROP MANHOLE W/BOWL

DRAWING NO. 090

REVISED 12-16

CleanWater Services



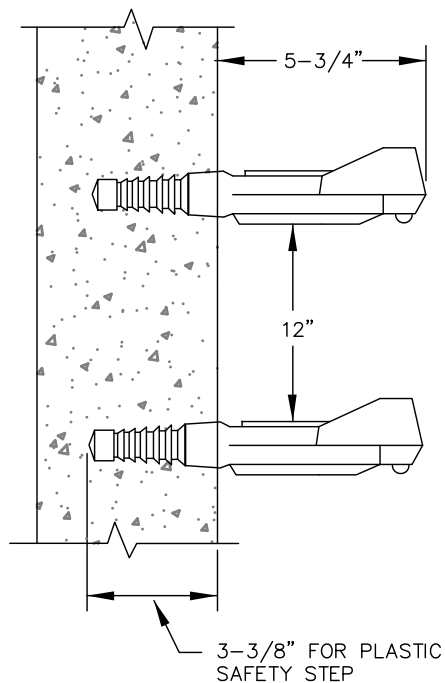
MATERIALS:

PLASTIC:

MUST CONFORM WITH ASTM C-478. STEEL REINFORCING BAR MINIMUM 1/2" GRADE 60. MEETING REQUIREMENTS OF ASTM A-615 ENCAPSULATED WITH INJECTION MOLDED COPOLYMER POLYPROPYLENE WITH SERRATED SURFACES.

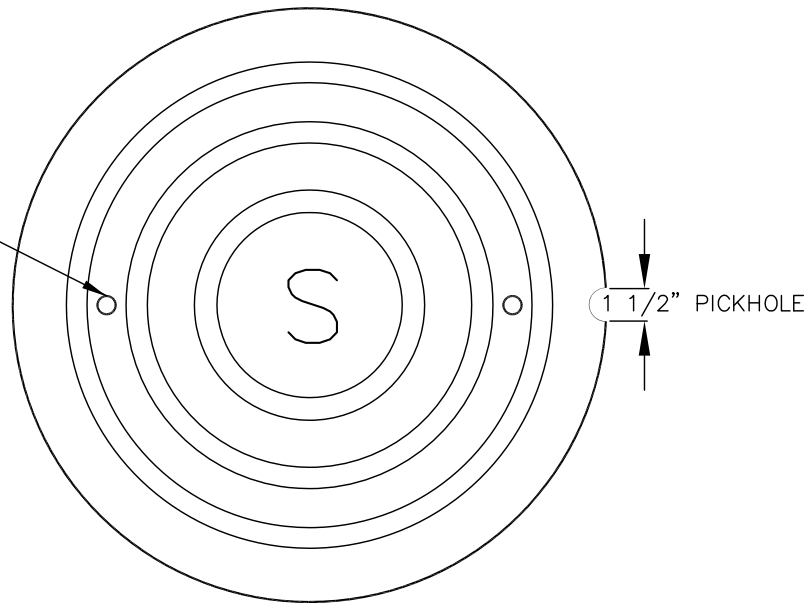
NOTES:

1. ALL STEPS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478.
2. MANHOLE STEPS MUST BE TIGHT AND FIRMLY EMBEDDED.
3. ALL STEPS WITHIN A MANHOLE SHALL BE OF THE SAME DESIGN, TYPE, AND SIZE. (MIXING OF UNMATCHED STEPS IS NOT PERMITTED).
4. STEPS ADJUSTED OR ADDED SHALL BE EPOXIED IN HOLES THAT ARE FREE OF MOISTURE AND DEBRIS. (EPOXY TO MEET ASTM C881).

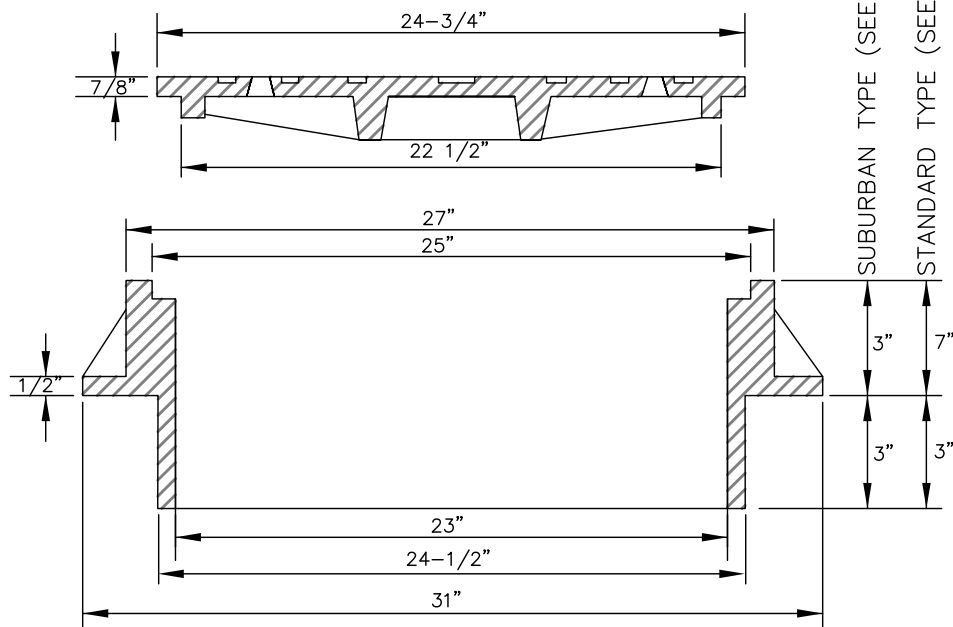


MANHOLE STEP

PRE CAST $\frac{3}{4}$ " CONICAL
HOLES (2) SANITARY
COVER ONLY



COVER TOP



SECTION VIEW

NOTES:

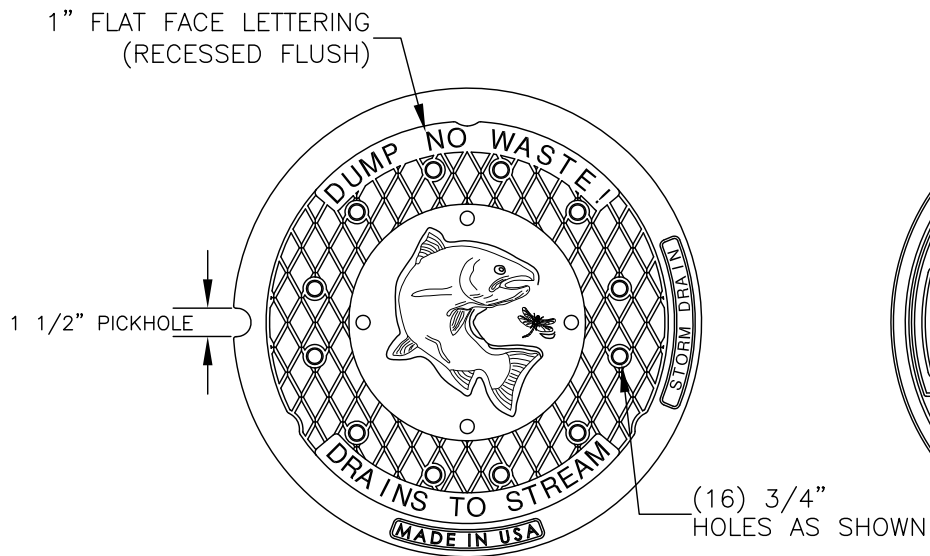
1. SUBURBAN TYPE FOR USE IN TRAFFIC AREAS OF LOCAL AND NEIGHBORHOOD STREETS.
2. STANDARD TYPE FOR USE IN TRAFFIC AREAS OF COLLECTOR AND ARTERIAL STREETS.
3. COVER AND FRAME SHALL BE GRAY CAST IRON ASTM A-48 CLASS 30.
4. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.
5. 1 1/2" PICKHOLE IN LID FOR LIFTING HOOK.

SUBURBAN AND STANDARD MANHOLE FRAME AND COVER SANITARY

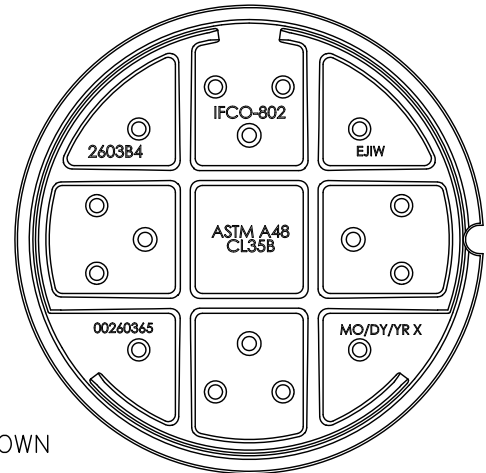
DRAWING NO. 110

REVISED 02-17

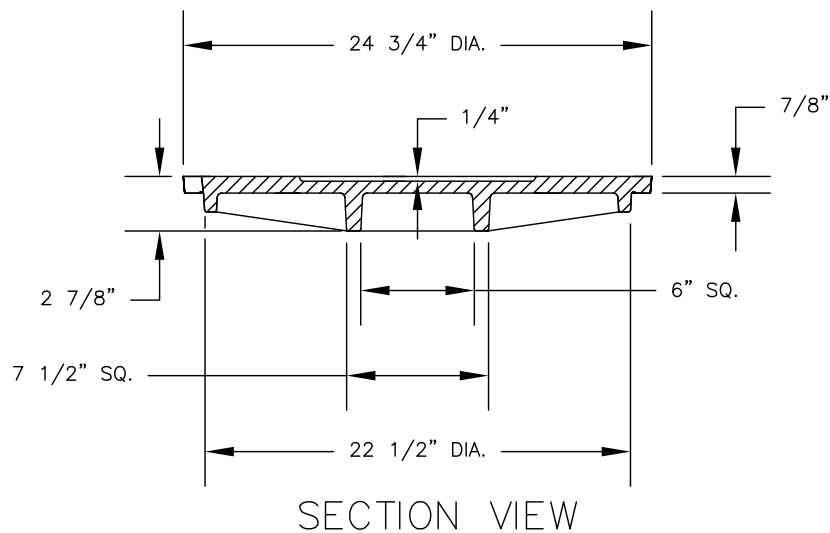




COVER TOP



COVER BACK



SEE DETAIL #110 FOR MANHOLE FRAME SPECIFICATIONS.

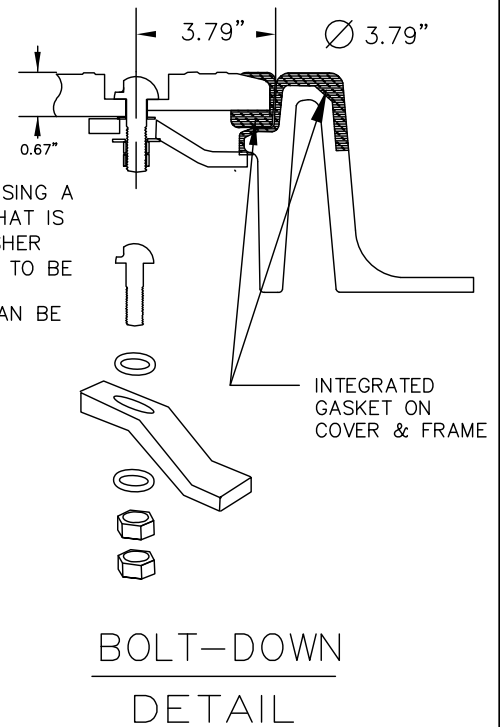
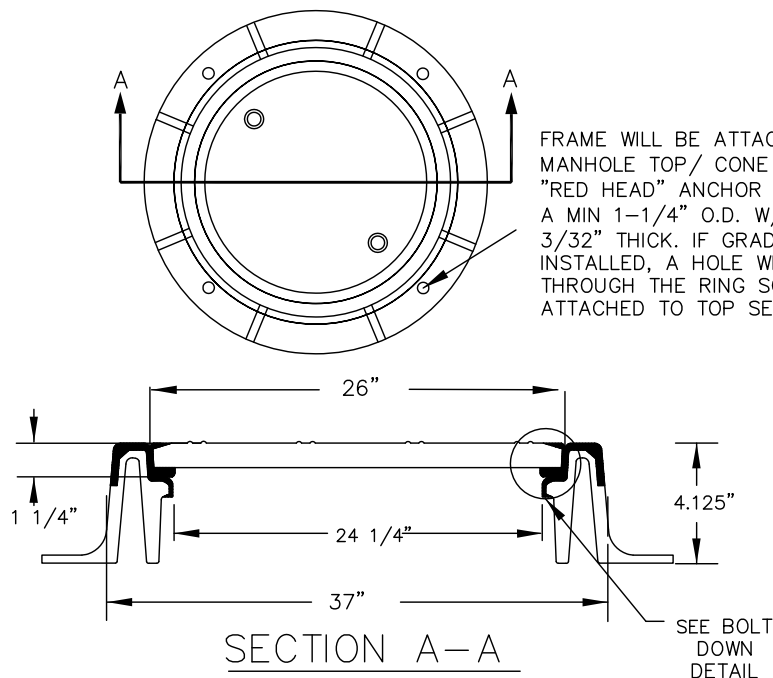
STORM WATER MANHOLE LID

DRAWING NO. 120

REVISED 12-06

CleanWater  Services

WATERTIGHT MANHOLE RING



NOTES:

1. COMPOSITE WATERTIGHT/TAMPER PROOF MANHOLE FRAME AND COVER SHALL BE USED IN ALL EASEMENT AND OFF STREET AREAS.
2. THE WATERTIGHT MANHOLE COVER FRAME SHALL BE GMI 2600 SERIES COMPOSITE FRAME AND COVER MANUFACTURED BY TITUS INDUSTRIAL GROUP, INC. OR ITS EQUAL.
3. THE LOCKING MECHANISM SHALL BE A TWISTLIFT® MANUFACTURED BY TITUS INDUSTRIAL GROUP, INC. OR ITS EQUAL.
4. THE TWISTLIFT® COMPOSITE ACCESS COVER LOCK IS DESIGNED AS A SECURITY BOLT REQUIRING A SPECIAL TOOL TO OPERATE THE QUARTER TURN BOLT AND LIFT THE COVER FROM THE FRAME. IT FUNCTIONS WITH EITHER THE STANDARD CAM LOCK QUARTER TURN PADDLE, OR THE EXTENDED 'SURCHARGE' PADDLE.
5. THE BOLT SHALL BE MACHINED FROM 316 STAINLESS STEEL.
6. THE BOLT FEATURES A DOMED HEAD WITH 3 EQUALLY SPACED 'J' SLOTS RUNNING HORIZONTALLY AROUND THE BOLT HEAD.
7. STANDARD BOLT SIZES ARE 14 MM COARSE THREAD WITH A FLAT MACHINED ON TWO SIDES TO ENGAGE PADDLE.
8. THE PADDLE IS DIE CAST FROM 304 STAINLESS STEEL AND ALSO AVAILABLE IN BOTH STANDARD CAM LOCK DESIGN, OR EXTENDED SURCHARGE CONFIGURATION.
9. THE BOLT AND PADDLE WILL BE ASSEMBLED USING TWO STAINLESS STEEL 14 MM NUT'S, THE BOTTOM NUT IS A STANDARD NUT THAT WILL BE TORQUE TO 35 FT. LBS. TO GIVE THE DESIRED TENSION ON THE BOLT. A SECOND NYLOCK™ LOCK NUT IS USED AS A JAM NUT, AND TORQUE TO 90 FT. LBS. STAINLESS STEEL WASHERS ARE USED TO PROVIDE CONSISTENT TURNING RESISTANCE.
10. A 5/16 STAINLESS STEEL SET SCREW, SET IN A THREADED HOLE IN THE COVER PROVIDES FOR A STOP AT ¼ TURN OF OPERATION.
11. THE BOLT WILL BE OPERATED BY MEANS OF A SPECIALLY MADE OPENING KEY CONSISTING OF A SPECIAL SOCKET ATTACHED TO A 'T' HANDLE USED TO BOTH TURN THE BOLT, AND LIFT OUT THE COVER.
12. ONE SET OF REPLACEMENT OPENING KEYS WILL BE PROVIDED TO CLEAN WATER SERVICES AT TIME OF INSTALLATION.
13. THE BOLT HEAD IS PROTECTED BY A WEATHER RESISTANT PLASTIC DEBRIS CAP. THE CAP IS INCLUDED WITH EACH LOCK.
14. SEE LOCAL JURISDICTION REQUIREMENTS FOR USE IN TRAFFIC AREAS.

WATERTIGHT MANHOLE FRAME AND COVER

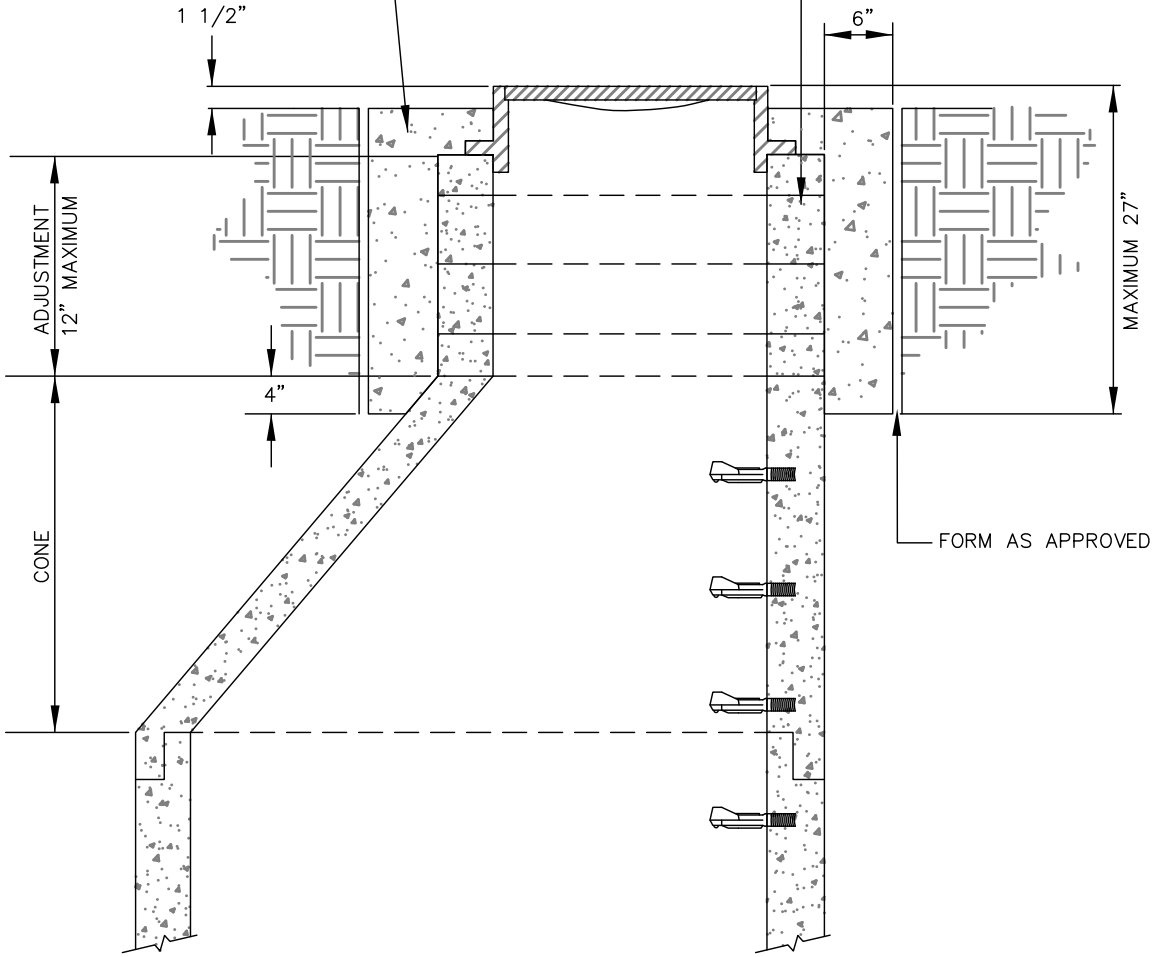
DRAWING NO. 130

REVISED 12-16

CleanWater  Services

CONCRETE FOR CLOSURE COLLAR SHALL BE READY-MIXED CONFORMING WITH ASTM C94, ALTERNATE 2 AND SHALL HAVE A COMPRESSIVE STRENGTH OF 3000 PSI @28 DAYS.

ADJUSTMENT GRADE RINGS AND CASTING FRAME SET IN 1" OF NON-SHRINKING GROUT

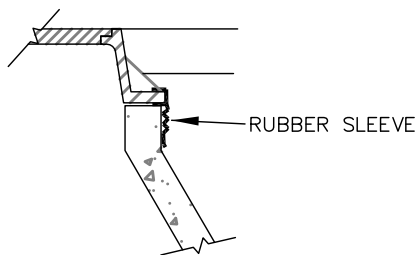


CONCRETE MANHOLE CLOSURE COLLAR

DRAWING NO. 140

REVISED 12-06





NARROW EXTERNAL RUBBER SEAL

TO SPAN CHIMNEY HEIGHTS OF:

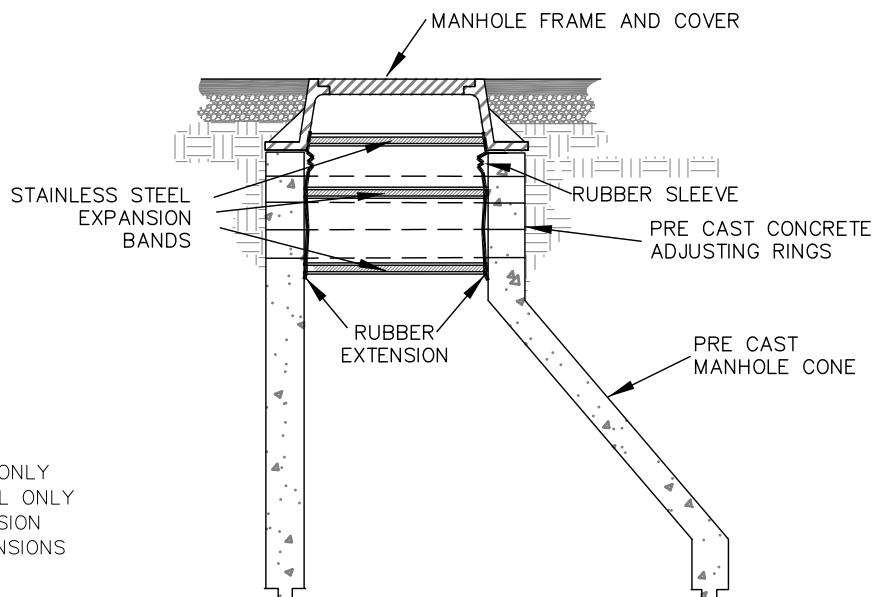
0-3"	-	NARROW (6") SEAL ONLY
OVER 3" - 6 1/2"	-	STANDARD (9") SEAL ONLY
OVER 6 1/2" - 12"	-	STD. SEAL + EXTENSION
OVER 12"	-	SEAL + MULT. EXTENSIONS

NOTES:

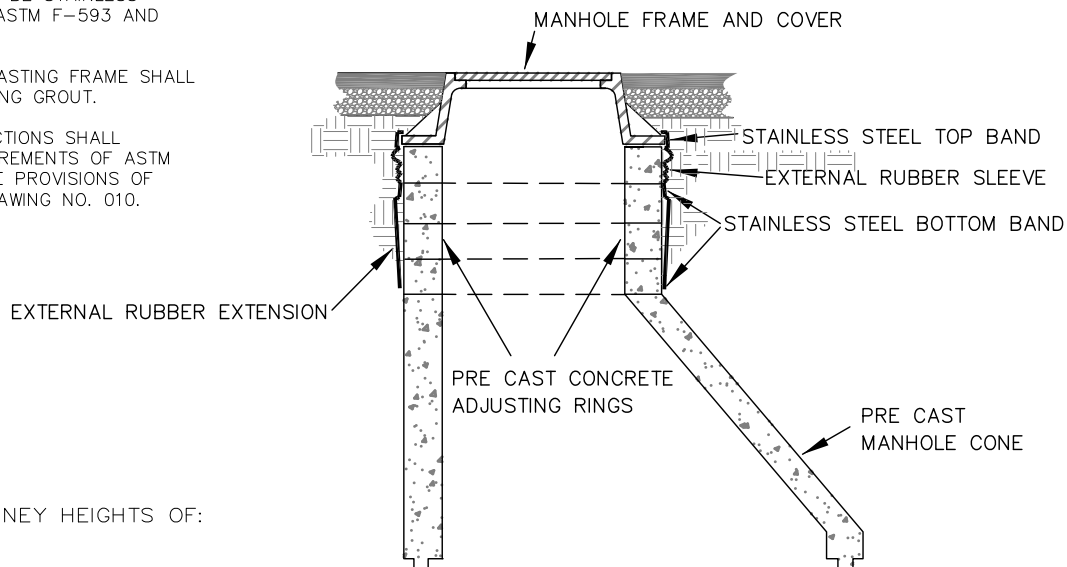
1. SLEEVES AND EXTENSIONS SHALL HAVE A MINIMUM OF $\frac{3}{16}$ " THICKNESS.
2. RUBBER SHALL BE EXTRUDED HIGH GRADE COMPOUND CONFORMING TO ASTM C-923.
3. BANDS SHALL BE FABRICATED FROM 16 GAUGE STAINLESS STEEL CONFORMING TO ASTM A-240, TYPE 304.
4. NUTS AND BOLTS SHALL BE STAINLESS STEEL CONFORMING TO ASTM F-593 AND 594, TYPE 304.
5. ALL GRADE RING AND CASTING FRAME SHALL BE SET IN NON-SHRINKING GROUT.
6. PRE CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478, AND APPLICABLE PROVISIONS OF STANDARD MANHOLE DRAWING NO. 010.

TO SPAN CHIMNEY HEIGHTS OF:

0-4 1/2"	-	CHIMNEY SEAL ONLY
OVER 4 1/2" - 9"	-	SEAL + 7" EXTENSION
OVER 9" - 12"	-	SEAL + 10" EXTENSION
OVER 12"	-	SEAL + MULT. EXTENSIONS

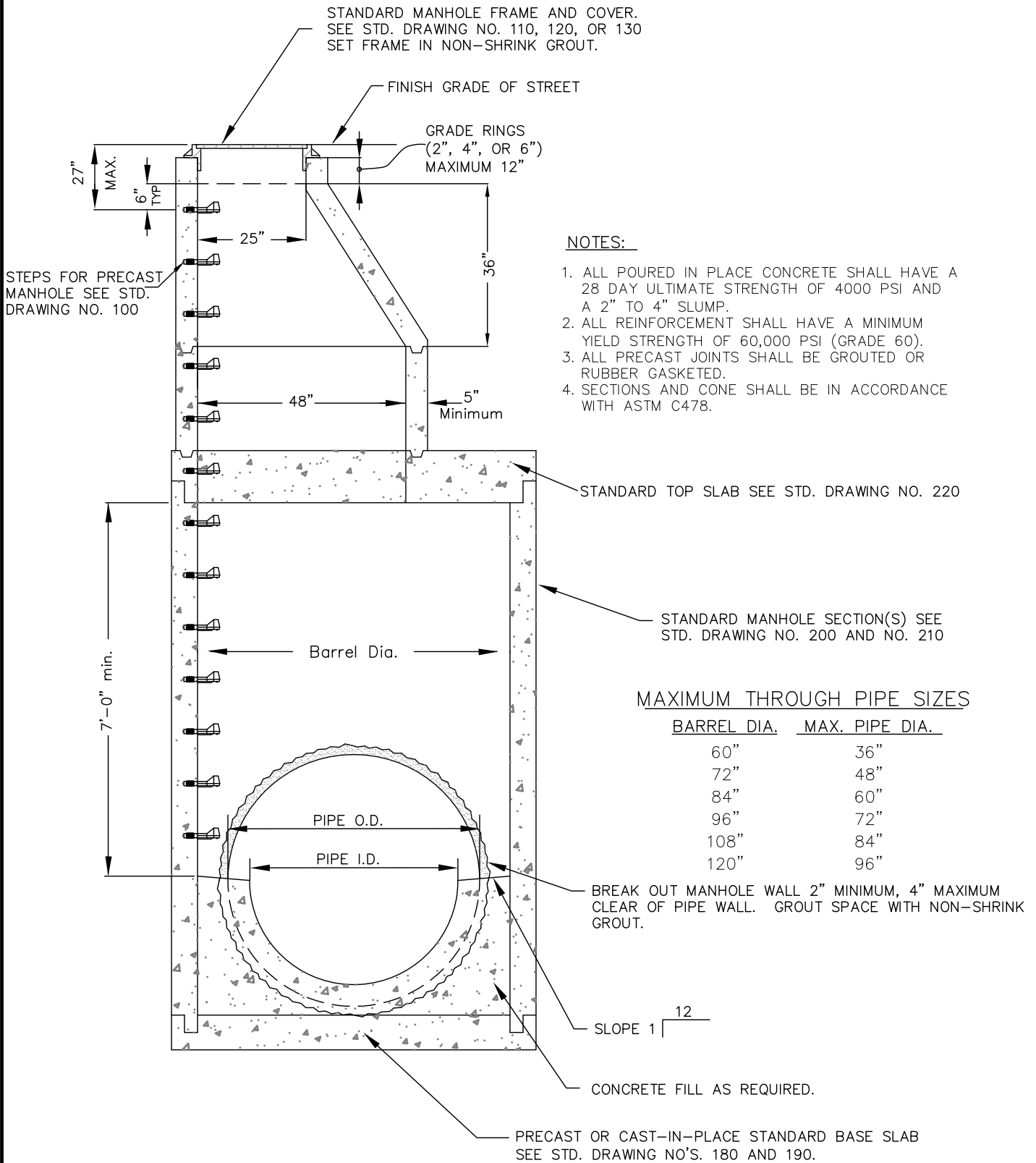


INTERNAL MANHOLE CHIMNEY SEAL



EXTERNAL MANHOLE CHIMNEY SEAL

MANHOLE CHIMNEY SEAL

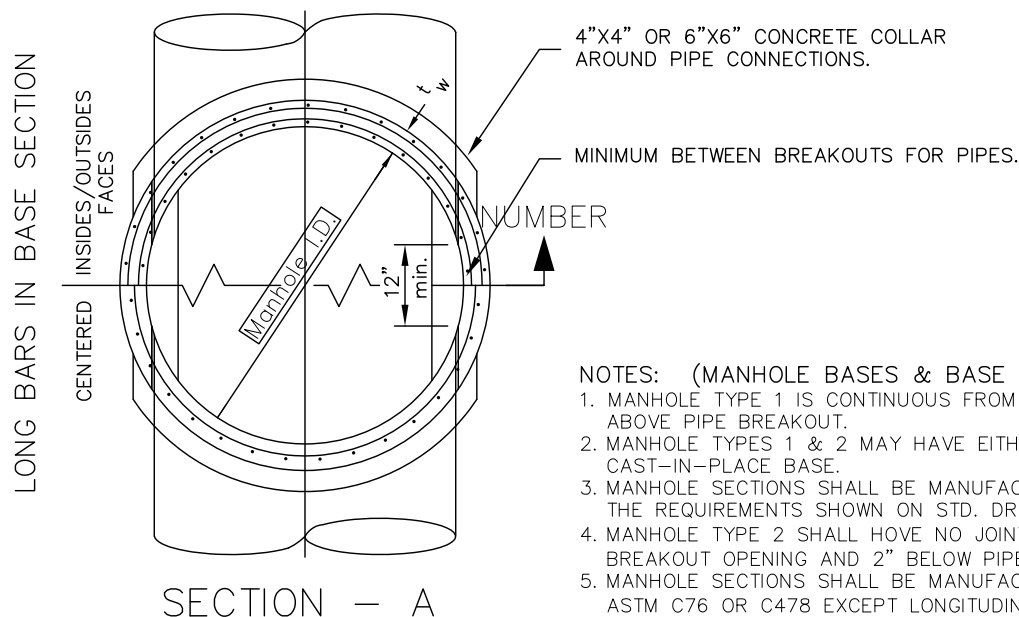
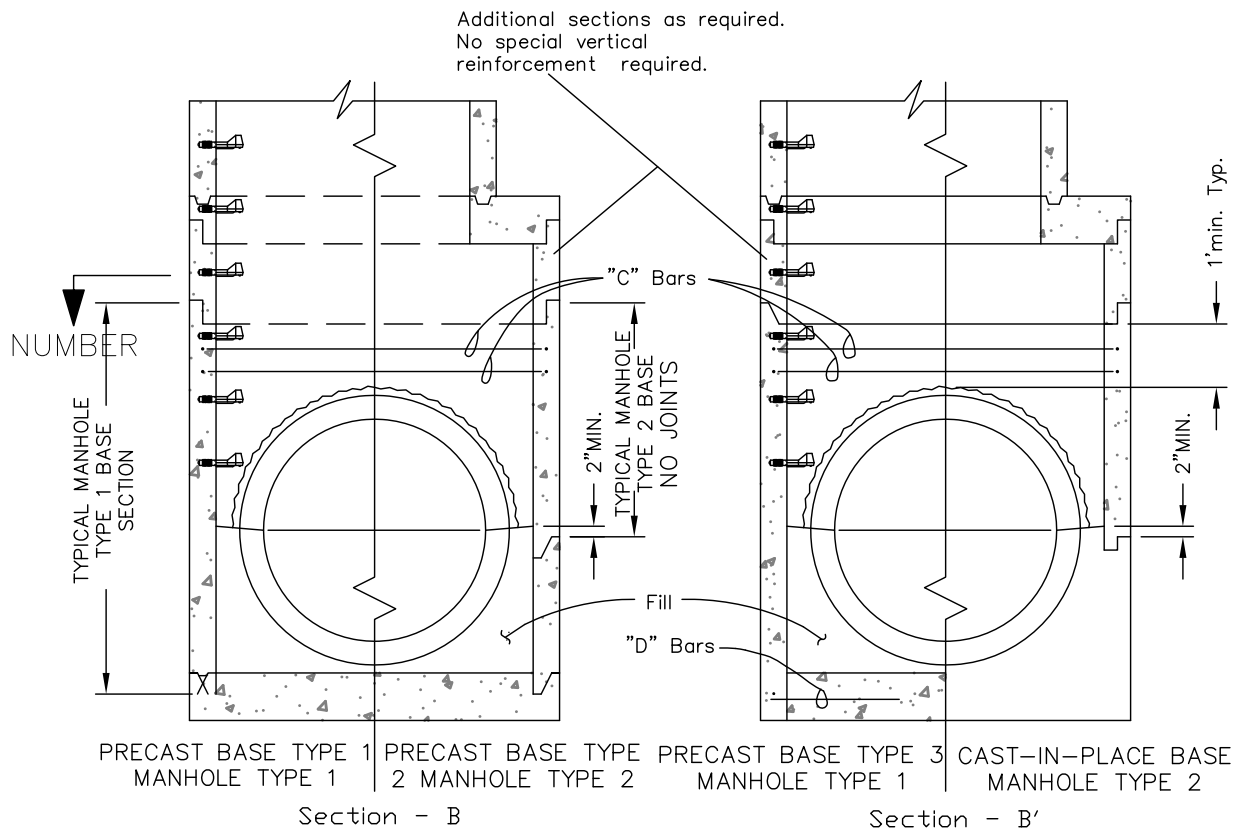


LARGE PRECAST CONCRETE MANHOLE

DRAWING NO. 160

REVISED 12-06

CleanWater Services

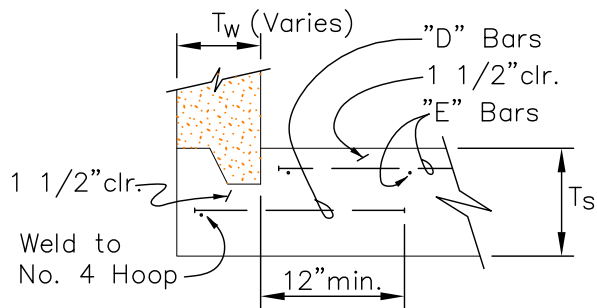


NOTES: (MANHOLE BASES & BASE SECTIONS)

1. MANHOLE TYPE 1 IS CONTINUOUS FROM BOTTOM SLAB TO 12" ABOVE PIPE BREAKOUT.
2. MANHOLE TYPES 1 & 2 MAY HAVE EITHER PRECAST OR CAST-IN-PLACE BASE.
3. MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE TO THE REQUIREMENTS SHOWN ON STD. DRAWING NO. 180 AND 190.
4. MANHOLE TYPE 2 SHALL HAVE NO JOINTS BETWEEN 1' ABOVE PIPE BREAKOUT OPENING AND 2" BELOW PIPE SPRING LINE.
5. MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C76 OR C478 EXCEPT LONGITUDINAL (VERT.) STEEL SHALL MEET OR EXCEED THAT SHOWN ON STD. DRAWING NO. 190.

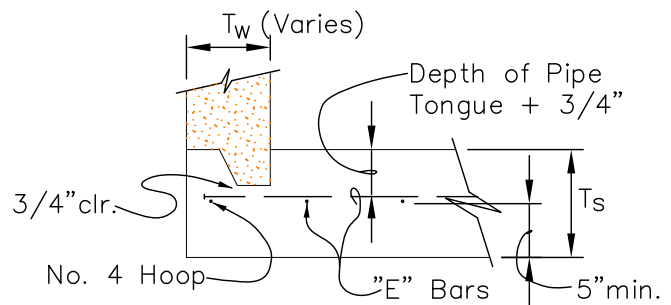
LARGE PRECAST CONCRETE MANHOLE — BASES

CleanWater Services



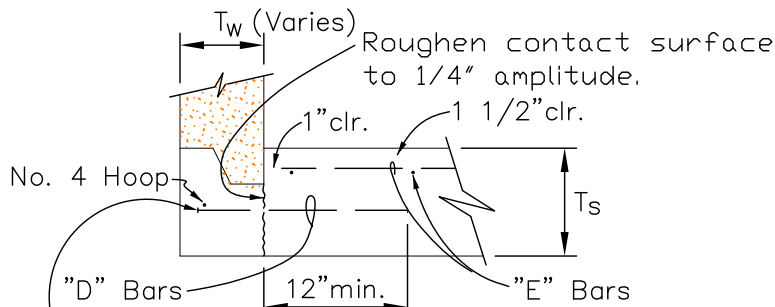
Note: Wall to slab joint shall be grouted when slab is cast separately.

PRECAST BASE SLAB TYPE 1**



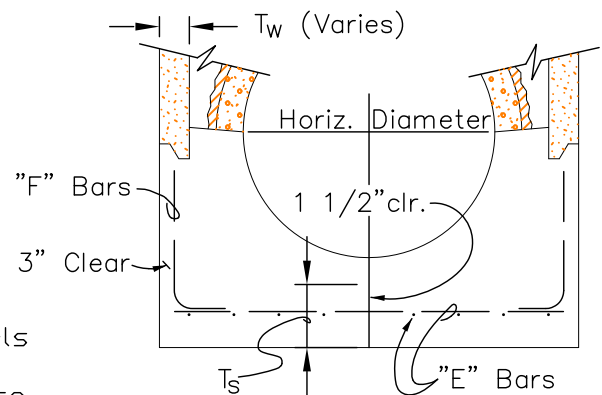
Note: Grout not required for slab cast in contact with manhole section.

PRECAST BASE SLAB TYPE 2**



Note: Expose hoop as required to weld dowels to hoop. Remove only enough concrete to accomplish weld. Patch before casting base to ensure no voids are present.

PRECAST BASE SLAB TYPE 3



CAST-IN-PLACE BASE
(OR PRECAST BASE TYPE 4)

SIZE		60"		72"		84"		96"	
Type	Depth*	0'-15'	15'-30'	0'-15'	15'-30'	0'-15'	15'-30'	0'-15'	15'-30'
1	Ts	8.0"	9.0"	8.0"	9.0"	9.0"	10.0"	9.0"	11.0"
	D Bars	#3 @ 12"	#3 @ 12"	#3 @ 12"	#4 @ 10"	#3 @ 10"	#4 @ 11"	#3 @ 9"	#4 @ 11"
	E Bars	#4 @ 12"	#4 @ 9"	#4 @ 9"	#4 @ 6"	#4 @ 8"	#5 @ 9"	#4 @ 7"	#5 @ 8"
2	Ts	11.0"	12.0"	11.0"	12.0"	12.0"	13.0"	12.0"	14.0"
	E Bars	#4 @ 12"	#4 @ 8"	#4 @ 9"	#5 @ 8"	#4 @ 7"	#5 @ 7"	#4 @ 5"	#5 @ 6"
3	Ts	7.0"	9.0"	7.0"	9.0"	8.0"	10.0"	9.0"	11.0"
	D Bars	#3 @ 12"	#3 @ 12"	#3 @ 12"	#4 @ 10"	#3 @ 10"	#4 @ 11"	#3 @ 9"	#4 @ 11"
	E Bars	#4 @ 12"	#4 @ 9"	#4 @ 9"	#4 @ 6"	#4 @ 8"	#5 @ 9"	#4 @ 7"	#5 @ 8"
4	Ts	7.0"	9.0"	7.0"	9.0"	8.0"	10.0"	9.0"	11.0"
	E Bars	#4 @ 12"	#4 @ 9"	#4 @ 9"	#4 @ 6"	#4 @ 8"	#5 @ 9"	#4 @ 7"	#5 @ 8"
	F Bars	#4 @ 12"	#4 @ 9"	#4 @ 9"	#4 @ 6"	#4 @ 8"	#5 @ 9"	#4 @ 7"	#5 @ 8"

*Invert to Street Grade

Concrete: $f'_c = 4,000$ psi
Steel: $f_y = \text{Grade 60}$

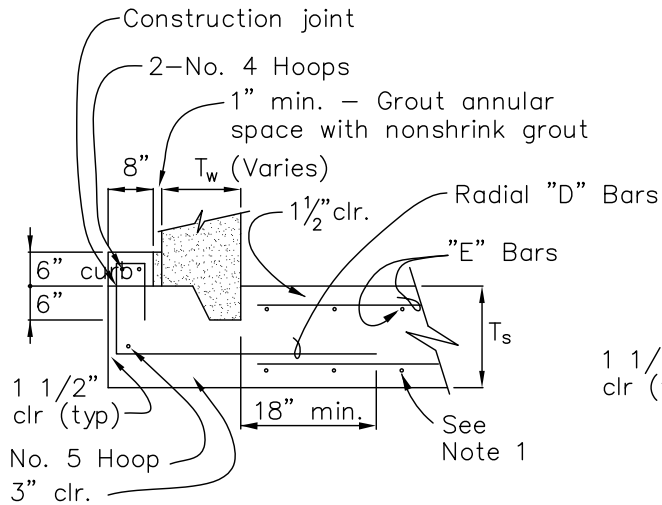
**Fabricator required to cast lifting loops in base slab for handling Type 1 & 2 bases.

LARGE PRECAST CONCRETE MANHOLE – TYPES

DRAWING NO. 180

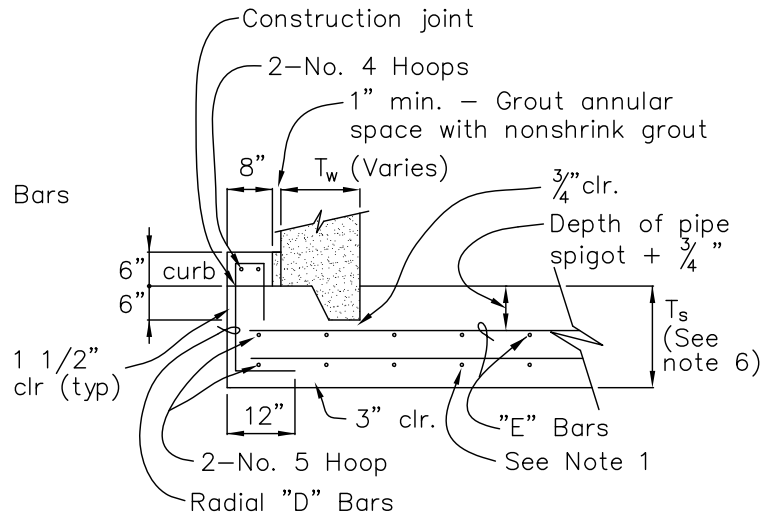
REVISED 12-06

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PRECAST BASE SLAB TYPE 5

1. Add bottom mat of No. 3 bars each way at same spacing as top mat.
2. Wall to slab joint shall be field grouted.
3. Curb is continuous all around base slab.
4. If curb is not cast monolithic with base slab, provide construction joint as shown.



PRECAST OR CAST-IN-PLACE BASE SLAB TYPE 6

1. Add bottom mat of No. 3 bars each way at same spacing as top mat.
2. Wall to slab joint shall be field grouted. Grout is not required for slab cast in contact with manhole section.
3. Curb is continuous all around base slab.
4. If curb is not cast monolithic with base slab, provide construction joint as shown.
5. Base slab Type 6 may be precast or cast-in-place concrete.
6. T_s for base slab Type 6 assumes a 6 1/4" spigot depth. Adjust T_s for actual spigot depth.
7. Curb may be cast in place against riser pipe without grouting.

SIZE		108"		120"	
Type	Depth*	0'-15'	15'-30'	0'-15'	15'-30'
5	T_s	10"	12"	10"	12"
	"D" Bars	No.4 @ 12"	No.5 @ 12"	No.4 @ 12"	No.5 @ 12"
	"E" Bars	No.5 @ 12"	No.5 @ 12"	No.5 @ 12"	No.6 @ 12"
6	T_s	15.5"	17.5"	15.5"	17.5"
	"D" Bars	No.4 @ 12"	No.5 @ 12"	No.4 @ 12"	No.5 @ 12"
	"E" Bars	No.5 @ 12"	No.5 @ 12"	No.5 @ 12"	No.6 @ 12"

*Invert to Street Grade

Concrete: $f'_c = 4,000$ psi

Steel: Grade 60

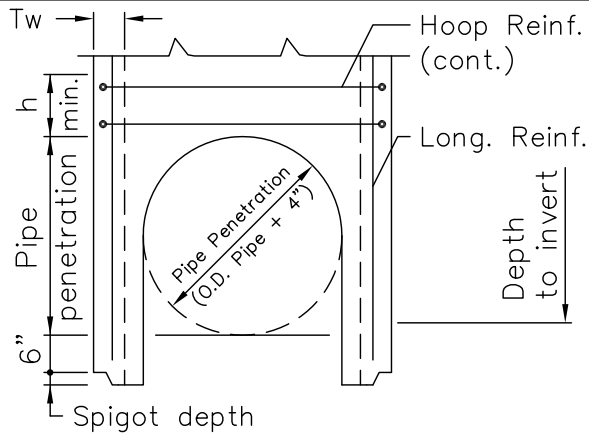
LARGE PRECAST CONCRETE MANHOLE BASE SLABS

DRAWING NO. 190

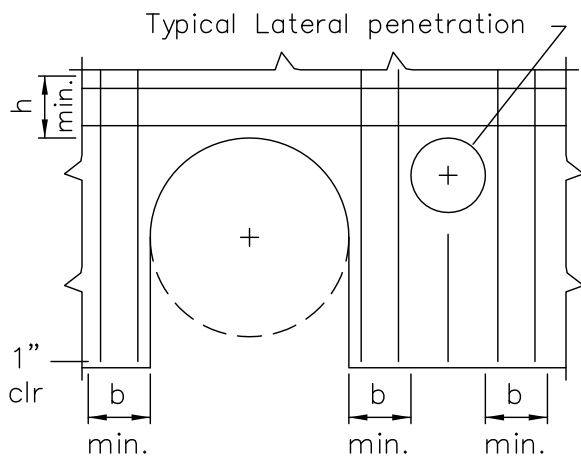
REVISED 12-06

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60"ø Manhole Section			NOTE: MAX. LONG. BAR SPACING IS 12" C.-C.							
	INVERT TO STREET GRADE	$T_w = 5.0"$			$T_w = 6.0"$			$T_w = 6.75"$		
		OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.
TYPE 1	0 Ft to 15 Ft	0.16	0.15	0.24	0.16	0.09	0.20	0.13	0.08	0.17
	15 Ft to 30 Ft	0.32	0.18	0.53	0.25	0.19	0.42	0.22	0.16	0.36
TYPE 2	0 Ft to 15 Ft	0.17	0.15	0.28	0.19	0.09	0.22	0.16	0.08	0.20
	15 Ft to 30 Ft	0.37	0.18	0.63	0.28	0.19	0.48	0.24	0.16	0.42
'C' Bars—1 No. 4 hoop req'd. for less than 2'-0" clr. between blockout and top of section.										
72"ø Manhole Section			NOTE: MAX. LONG. BAR SPACING IS 12" C.-C.							
	INVERT TO STREET GRADE	$T_w = 6.0"$			$T_w = 7.0"$			$T_w = 7.75"$		
		OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.
TYPE 1	0 Ft to 15 Ft	0.19	0.19	0.26	0.17	0.16	0.22	0.16	0.14	0.20
	15 Ft to 30 Ft	0.33	0.28	0.58	0.27	0.23	0.48	0.26	0.26	0.42
TYPE 2	0 Ft to 15 Ft	0.19	0.13	0.28	0.18	0.15	0.23	0.16	0.17	0.28
	15 Ft to 30 Ft	0.36	0.13	0.65	0.29	0.15	0.52	0.26	0.17	0.46
'C' Bars— 2 NO. 5 HOOPS 2" CLR. OF TOP OF MH BARREL } 2 NO. 3 HOOPS 2" CLR. OVER PIPE BLOCKOUTS } REQ'D. FOR LESS THAN 2'-0" CLR. BETWEEN BLOCKOUT AND TOP OF SECTION.										
84"ø Manhole Section			NOTE: MAX. LONG. BAR SPACING IS 12" C.-C.							
	INVERT TO STREET GRADE	$T_w = 7.0"$			$T_w = 8.0"$			$T_w = 8.75"$		
		OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.
TYPE 1	0 Ft to 15 Ft	0.20	0.13	0.26	0.17	0.12	0.22	0.15	0.10	0.20
	15 Ft to 30 Ft	0.33	0.23	0.59	0.28	0.26	0.50	0.30	0.23	0.45
TYPE 2	0 Ft to 15 Ft	0.23	0.15	0.33	0.21	0.17	0.28	0.19	0.19	0.25
	15 Ft to 30 Ft	0.36	0.15	0.65	0.30	0.17	0.55	0.30	0.19	0.49
'C' Bars— 2 NO. 5 HOOPS 2" CLR. OF TOP OF MH BARREL } 2 NO. 3 HOOPS 2" CLR. OVER PIPE BLOCKOUTS } REQ'D. FOR LESS THAN 2'-0" CLR. BETWEEN BLOCKOUT AND TOP OF SECTION.										
96"ø Manhole Section			NOTE: MAX. LONG. BAR SPACING IS 12" C.-C.							
	INVERT TO STREET GRADE	$T_w = 8.0"$			$T_w = 9.0"$			$T_w = 9.75"$		
		OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.	OUTSIDE	INSIDE	ON CTR.
TYPE 1	0 Ft to 15 Ft	0.25	0.18	0.33	0.21	0.16	0.29	0.21	0.14	0.27
	15 Ft to 30 Ft	0.41	0.26	0.77	0.35	0.30	0.66	0.37	0.27	0.59
TYPE 2	0 Ft to 15 Ft	0.26	0.17	0.34	0.22	0.19	0.30	0.20	0.21	0.28
	15 Ft to 30 Ft	0.43	0.17	0.82	0.37	0.19	0.70	0.34	0.21	0.63
'C' Bars— 2 NO. 5 HOOPS 2" CLR. OF TOP OF MH BARREL } 2 NO. 3 HOOPS 2" CLR. OVER PIPE BLOCKOUTS } REQ'D. FOR LESS THAN 2'-0" CLR. BETWEEN BLOCKOUT AND TOP OF SECTION.										
PROVIDE MIN. LONGITUD. REINF. AS SHOWN, 1" CLR. OF INSIDE AND OUTSIDE FACES, OR AT CENTER OF WALL				AREAS ARE IN ² /FT OF CIRCUMFERENCE AND MAY BE WELDED WIRE FABRIC, BARS OR A COMBINATION OF BOTH.						
LARGE PRECAST CONCRETE MANHOLE— LONG. BASE SECTION REINF.										
DRAWING NO. 200							REVISED 12-06			



For Base Slab see 4-08-3A
MANHOLE BASE SECTION
ELEVATION



For Base Slab see 4-08-3A
PARTIAL MANHOLE BASE
SECTION ROLLOUT

Notes:

1. Manufacture manhole base section and risers above in conformance with ASTM C478 except as noted in specifications and herein. Lap length for hoop reinforcement in band "h" shall be 30 bar diameters and laps shall be staggered.
2. Steel reinforcement in bands "h" and "b" is in addition to that required by ASTM C478 and is shown in square inches per foot of band width. Bar spacing shall not exceed 6".
3. Manhole base sections shall have no joints below top of band "h".
4. Concrete: $f'_c = 4,000$ psi
Reinforcement steel: Grade 60
5. There shall be no penetrations in hoop band "h" above main line pipe penetrations or in longitudinal bands "b" next to both sides of all openings.
6. Additional longitudinal reinforcement area can be reduced 50% outside of "b" bands.
7. Thickness "Tw" is minimum manhole base section wall thickness for a given pipe diameter.
8. Do not backfill until concrete fill over the manhole base has achieved 90% of its compressive strength (4,000 psi). For shape of concrete fill see Std. Drawing NO. 650.
9. Provide 6"x6" concrete collar around pipe penetrations per Std. Drawing NO. 655.

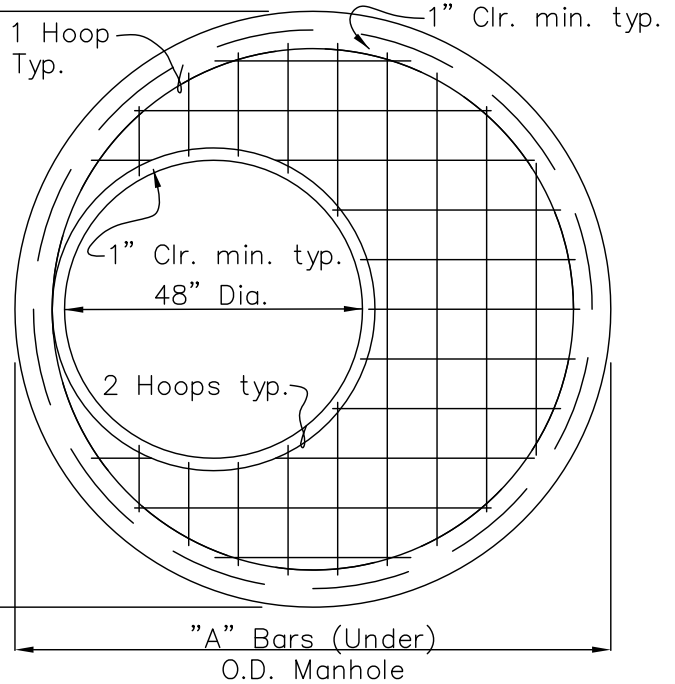
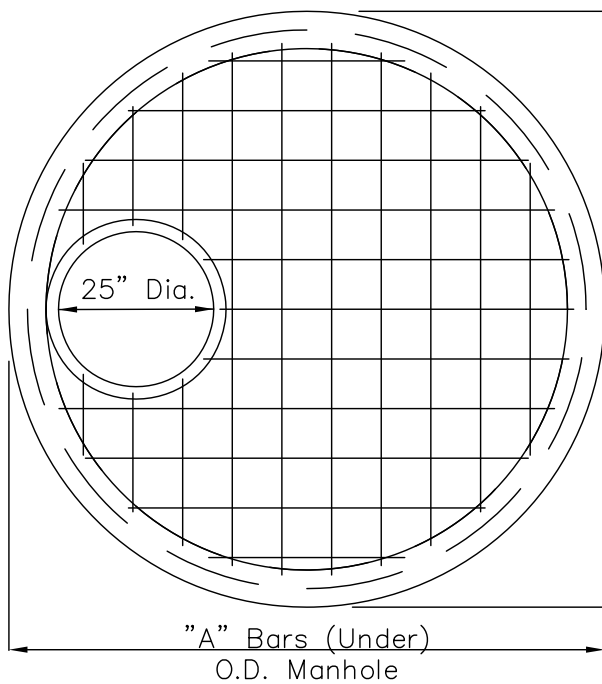
MH Dia. (in)	Thickness Tw min. (in)	Band Width h=b min. (ft)	Depth to Invert max. (ft)	Inside Pipe Dia. (in)	Additional Reinforcement Required			
					Hoop Reinf. (h)		Long. Reinf. (b)	
					Outside Face (in ² /ft)	Inside Face (in ² /ft)	Outside Face (in ² /ft)	Inside Face (in ² /ft)
108	9	1.00	15	48 or less	.381	.381	.260	.260
108	9	1.25	15	54-60	.381	.381	.394	.394
108	10	1.75	15	66-84	.381	.381	.643	.643
108	11	1.00	30	48 or less	.790	.790	.432	.432
108	12	1.25	30	54-60	.790	.790	.576	.576
108	16	1.75	30	66-84	.790	.790	.773	.773
120	10	1.00	15	48 or less	.423	.423	.260	.260
120	10	1.50	15	54-72	.423	.423	.480	.480
120	11	2.00	15	78-96	.423	.423	.713	.713
120	11	1.00	30	48 or less	.880	.880	.432	.432
120	14	1.50	30	54-72	.880	.880	.677	.677
120	17	2.00	30	78-96	.880	.880	.991	.991

LARGE PRECAST CONCRETE MANHOLE
BASE SECTION REINF. 108" & 120"

DRAWING NO. 210

REVISED 12-06

CleanWater Services

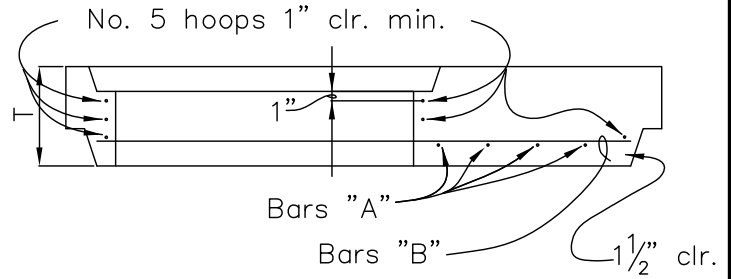


NOTES:

TOP SLAB "A"

TOP SLAB "B"

1. All concrete shall have a 28 day ultimate compressive strength of 4,000 psi.
2. All reinforcement shall have a minimum yield strength of 60,000 psi, (Grade 60).
3. All lap splices shall be 24 bar diameters unless noted otherwise.
4. Add steps as required by Standard Drawing NO. 010

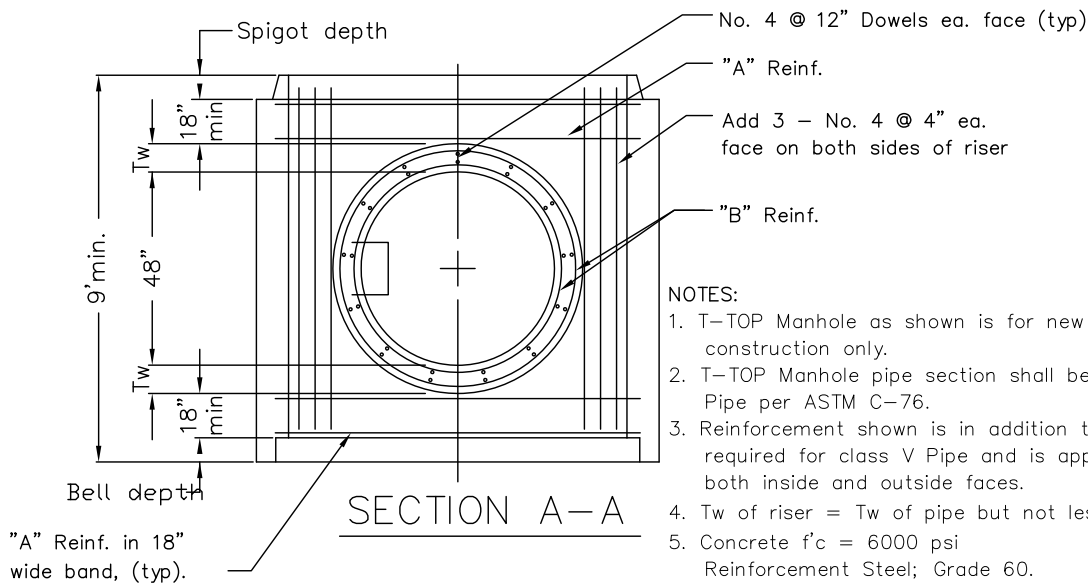


TOP SLAB TYPICAL SECTION

	TOP SLAB "A"			TOP SLAB "B"			TOP SLAB "B"		
	COVER DEPTH								
	6" to 12"			4'-0" to 7'-0"			7'-1" to 22'-0"		
Size	T	"A" Bars	"B" Bars	T	"A" Bars	"B" Bars	T	"A" Bars	"B" Bars
60"	8"	No.5 @ 7½"	No.5 @ 7½"	12"	No.5 @ 9"	No.5 @ 9"	12"	No.5 @ 9"	No.5 @ 9"
72"	10"	No.5 @ 7"	No.5 @ 7"	12"	No.5 @ 9"	No.5 @ 9"	12"	No.5 @ 7"	No.5 @ 7"
84"	11"	No.5 @ 7"	No.5 @ 7"	12"	No.5 @ 6"	No.5 @ 6"	12"	No.6 @ 6"	No.5 @ 7"
96"	12"	No.5 @ 6"	No.5 @ 6"	12"	No.5 @ 6"	No.5 @ 6"	14"	No.6 @ 6"	No.5 @ 6"
108"	N/A	N/A	N/A	12"	No.6 @ 8"	No.6 @ 8"	16"	No.7 @ 9"	No.7 @ 9"
120"	N/A	N/A	N/A	12"	No.6 @ 7"	No.6 @ 7"	16"	No.7 @ 8"	No.7 @ 8"

**LARGE PRECAST CONCRETE MANHOLE
TOP SLABS**





NOTES:

1. T-TOP Manhole as shown is for new pipeline construction only.
2. T-TOP Manhole pipe section shall be Class V Pipe per ASTM C-76.
3. Reinforcement shown is in addition to that required for class V Pipe and is applied in both inside and outside faces.
4. Tw of riser = Tw of pipe but not less than 6".
5. Concrete f'_c = 6000 psi Reinforcement Steel; Grade 60.
6. Maximum invert depth shall be 30'.
7. All pre-cast manhole riser sections shall conform to the requirements of ASTM C-478 and applicable provisions of standard manhole drawing NO. 010

Standard Manhole Frame and Cover. See STD. Drawing NO. 110, 120 OR 130. Set Frame in Non-shrink Grout.

Steps for precast manhole. See STD. Drawing NO. 100

Grout bench

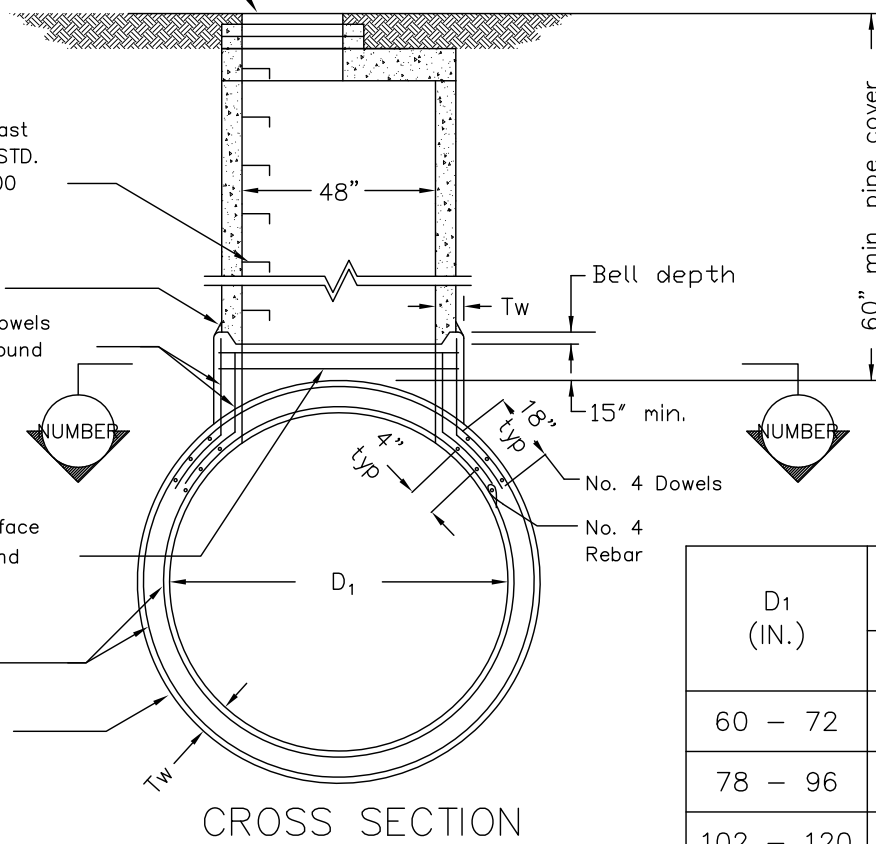
No. 4 @ 12" Dowels ea. face all around

18"

"B" Reinf. ea. face in 15" wide band

"A" Reinf. all around

Class V pipe



D ₁ (IN.)	ADDITIONAL REINF. SQUARE INCHES (TOTAL)	
	"A"	"B"
60 - 72	.177 EA. FACE	.511 EA. FACE
78 - 96	.224 EA. FACE	.584 EA. FACE
102 - 120	.265 EA. FACE	.658 EA. FACE

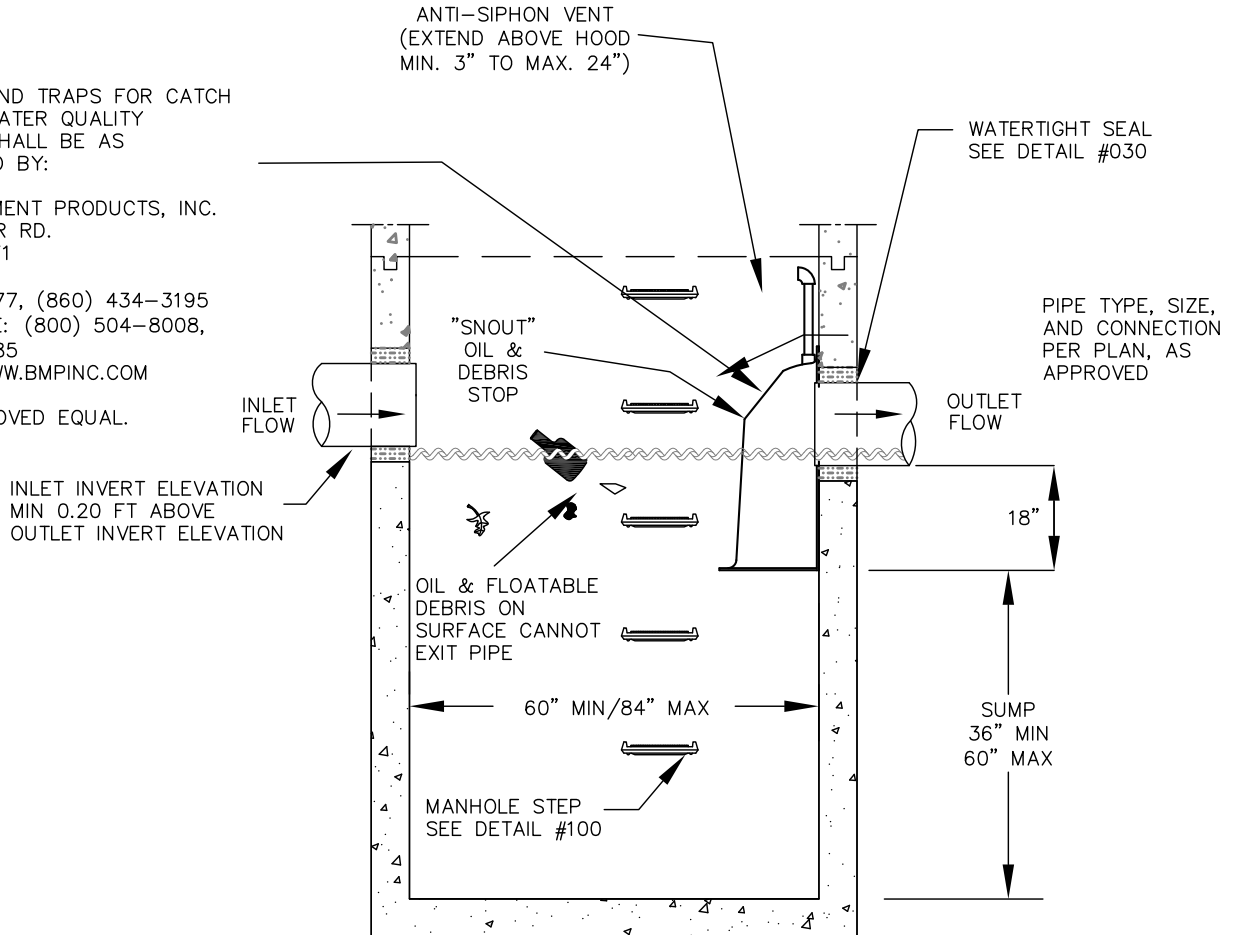
T-TOP MANHOLE WITH 48" RISER

ALL SNOUTS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY:

BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371

(860) 434-0277, (860) 434-3195
FAX TOLL FREE: (800) 504-8008,
(888) 354-7585
WEB SITE: WWW.BMPINC.COM

OR PRE-APPROVED EQUAL.



NOTES:

1. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STD. MANHOLE DRAWING NO. 010.
2. INLET AND OUTLET PIPE NOT TO EXCEED 18" DIA.
3. PROVIDE SPECIAL DETAIL FOR SNOUT 18" DIA.
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY THE OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATIONS.
5. ANCHORING HARDWARE FOR THE HOOD SHALL BE EMBEDDED INTO CONCRETE; ANCHORING INTO GROUT IS NOT AUTHORIZED.
6. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
7. INSTALL PER MANUFACTURER'S INSTRUCTION AND USING MANUFACTURER'S INSTALLATION KIT.

SUMP VOLUME AVAILABLE PER DEPTH OF SUMP

	36" MINIMUM	60" MAXIMUM
60" M.H.=	58.9 CF	98.1 CF
72" M.H.=	84.8 CF	141.3 CF
84" M.H.=	115.4 CF	192.4 CF

PROVIDE SPECIAL DETAIL FOR VOLUME REQUIREMENTS EXCEEDING 192.4 CF

SUMP VOLUME REQUIREMENTS
20 CF/1.0 CFS OF INFLOW
58.9 CF MINIMUM REQUIRED

WATER QUALITY MANHOLE (SNOUT) A

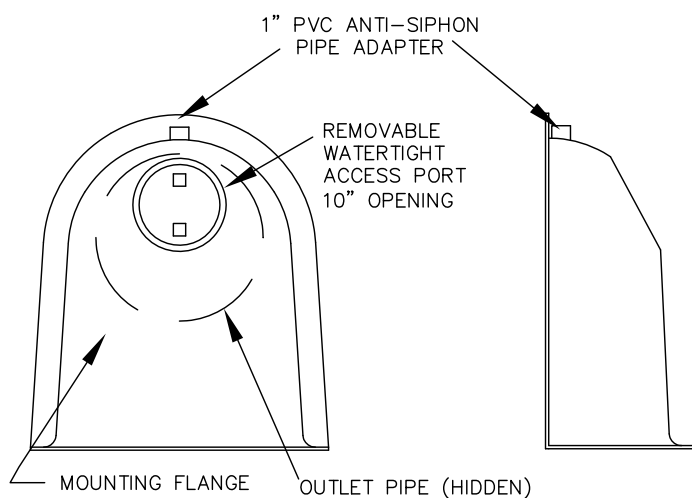
DRAWING NO. 250

REVISED 12-16

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CONFIGURATION DETAIL

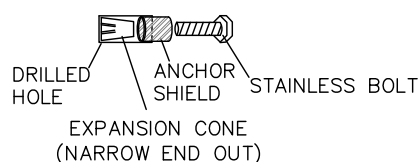
INSTALLATION DETAIL



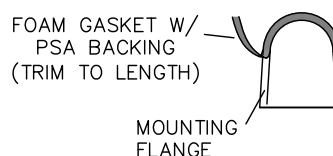
FRONT VIEW

SIDE VIEW

DETAIL A



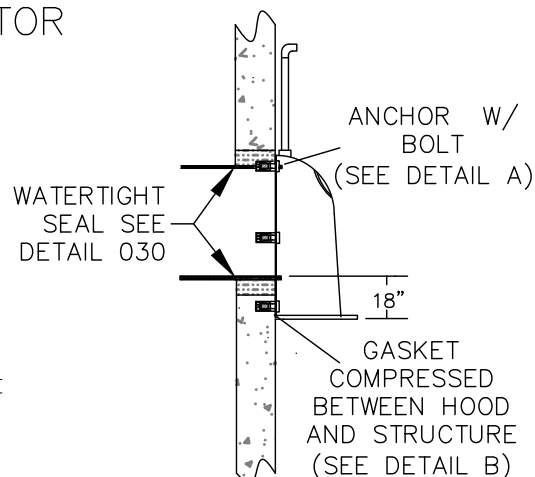
DETAIL B



SNOUT OIL-WATER-DEBRIS SEPARATOR

NOTES:

- ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY BEST MANAGEMENT PRODUCTS, INC. OR PRE-APPROVED EQUAL.
- ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.
- ALL HOODS SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT AS DRAWN. (SEE CONFIGURATION DETAIL)
- THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATION.
- THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A DISTANCE OF 18" FROM I.E. OUT.
- THE ANTI-SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 24" ACCORDING TO STRUCTURE CONFIGURATION.
- THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
- THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH STAINLESS STEEL BOLTS AND OIL-RESISTANT GASKET AS SUPPLIED BY MANUFACTURER. (SEE INSTALLATION DETAIL)
- ANCHOR BOLTS SHALL BE INSTALLED INTO THE CONCRETE OF THE STRUCTURE'S WALL. (NOT WITHIN GROUT)
- INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT.
KIT SHALL INCLUDE:
 - INSTALLATION INSTRUCTIONS
 - PVC ANTI-SIPHON VENT PIPE AND ADAPTER
 - OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
 - 3/8" STAINLESS STEEL BOLTS
 - ANCHOR SHIELDS



BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
TOLL FREE: (800) 504-8008 (888) 354-7585
WEB SITE: WWW.BMPINC.COM

INSTALLATION NOTE:

POSITION HOOD SUCH THAT BOTTOM FLANGE IS 18" BELOW THE PIPE INVERT.

WATER QUALITY MANHOLE (SNOUT) B

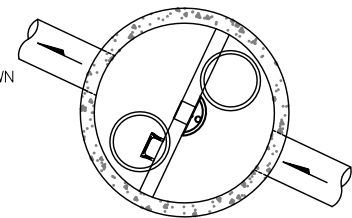
DRAWING NO. 260

REVISED 12-16

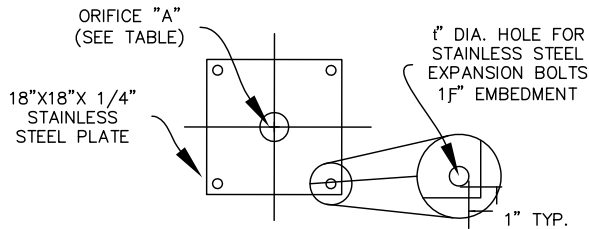
CleanWater Services

NOTES:

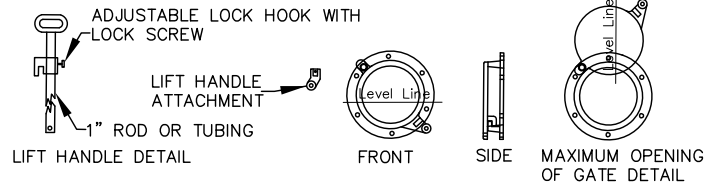
1. BAFFLE WALL SHALL HAVE #4 BAR AT 12" SPACING EACH WAY.
2. PRECAST BAFFLE SHALL BE KEYED AND GROUTED IN PLACE. JOINT BETWEEN CONCRETE BAFFLE AND MANHOLE WALL SHALL BE WATERTIGHT.
3. UPPER FLOW ORIFICE SHALL BE ALUMINUM, ALUMINIZED STEEL OR TREATMENT 1 GALVANIZED STEEL.
4. FRAME AND LADDER OR STEPS ARE TO BE OFFSET SO THAT SHEAR GATE IS VISIBLE FROM THE TOP; CLIMB-DOWN SPACE IS CLEAR OF RISER AND GATE; FRAME IS CLEAR OF CURB.
5. MULTI-ORIFICE ELBOWS SHALL BE PRE-INSTALLED TO INSURE LADDER CLEARANCE.
6. RESTRICTOR PLATE WITH ORIFICE AS SPECIFIED IN THE CONTRACT. OPENING IS TO BE CUT ROUND AND SMOOTH. NEOPRENE GASKET SHALL BE INSTALLED BETWEEN THE ORIFICE PLATE AND CONCRETE BAFFLE TO PROVIDE A WATERTIGHT SEAL.
7. SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION Zg32A OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B. LIFT HANDLE MAY BE SOLID ROD OR HOLLOW TUBING WITH ADJUSTABLE HOOK AS REQUIRED. NEOPRENE RUBBER GASKET REQUIRED BETWEEN RISER MOUNTING FLANGE AND GATE FLANGE. MATING SURFACES OF LID AND BODY SHALL BE MACHINED FOR PROPER FIT. FLANGE MOUNTING BOLTS SHALL BE....."DIAMETER STAINLESS STEEL.
8. SHEAR GATE MAXIMUM OPENING SHALL BE CONTROLLED BY LIMITED HINGE MOVEMENT, STOP TAB OR SOME OTHER DEVICE.
9. ALTERNATE SHEAR GATES DESIGNS ARE ACCEPTABLE, IF MATERIAL SPECIFICATIONS ARE MET AND FLANGE BOLT PATTERN MATCHES.
10. MANHOLE CERTIFICATION REQUIRED FOR TRAFFIC LOADING.



PLAN



RESTRICTOR PLATE, ORIFICE



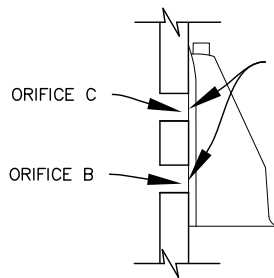
SHEAR GATE
MANUFACTURED BY KENNEDY VALVE OR EQUAL

INSTALLATION NOTE:

POSITION HOOD SUCH THAT BOTTOM FLANGE IS MIN 2" BELOW THE ORIFICE B INVERT.

ONE SNOOT MAY BE USE FOR BOTH ORIFICE C AND B.

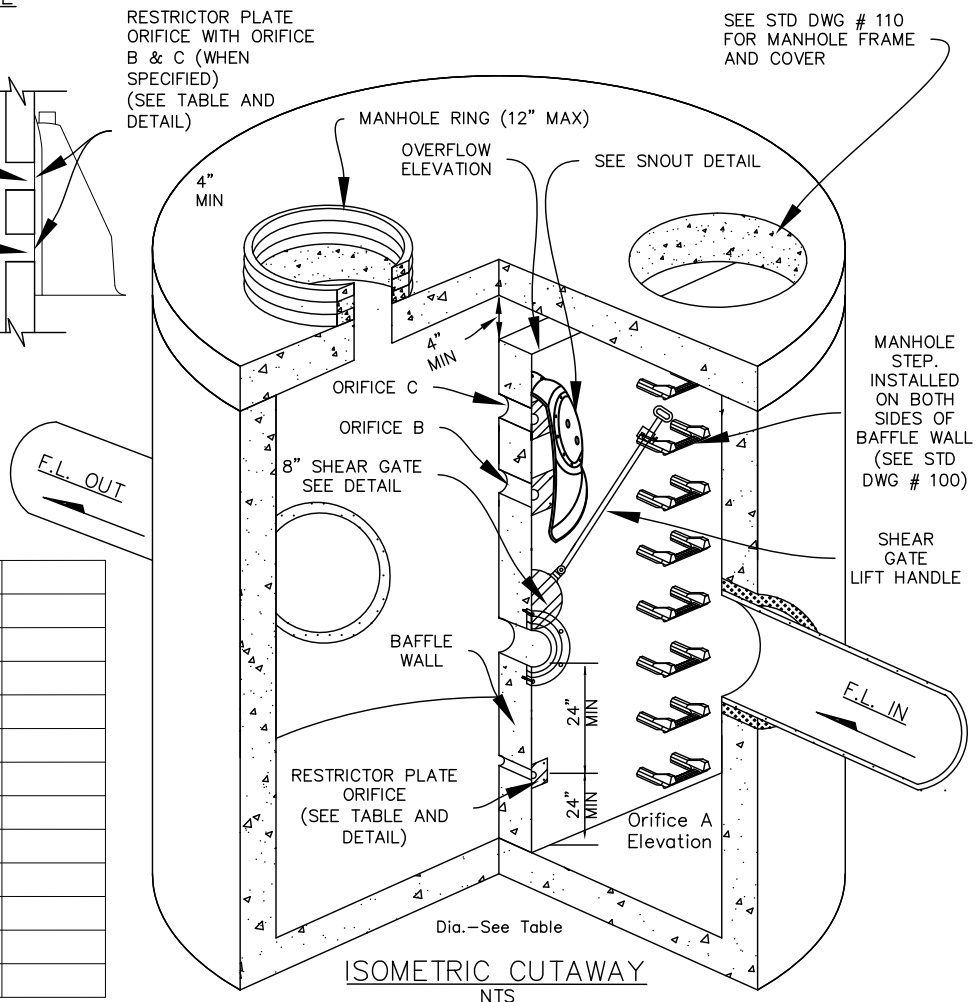
IT MAY NEED BE NECESSARY TO USE TWO SNOOTS AND OFF SET ORIFICES TO MEET PLAN ELEVATION.



SNOUT DETAIL

FLOW CONTROL STRUCTURE TABLE

Diameter Of Manhole (In.)	60" MIN
F.L. (In)	
F.L. (Out)	
Outlet Pipe Diameter (In.)	
Number Of Orifice	
Orifice A Elevation	
Diameter Of Orifice A (In.)	
Orifice B Elevation	
Diameter Of Orifice B (In.)	
Orifice C Elevation	
Diameter Of Orifice C (In)	
Overflow Elevation	
Rim Elevation	



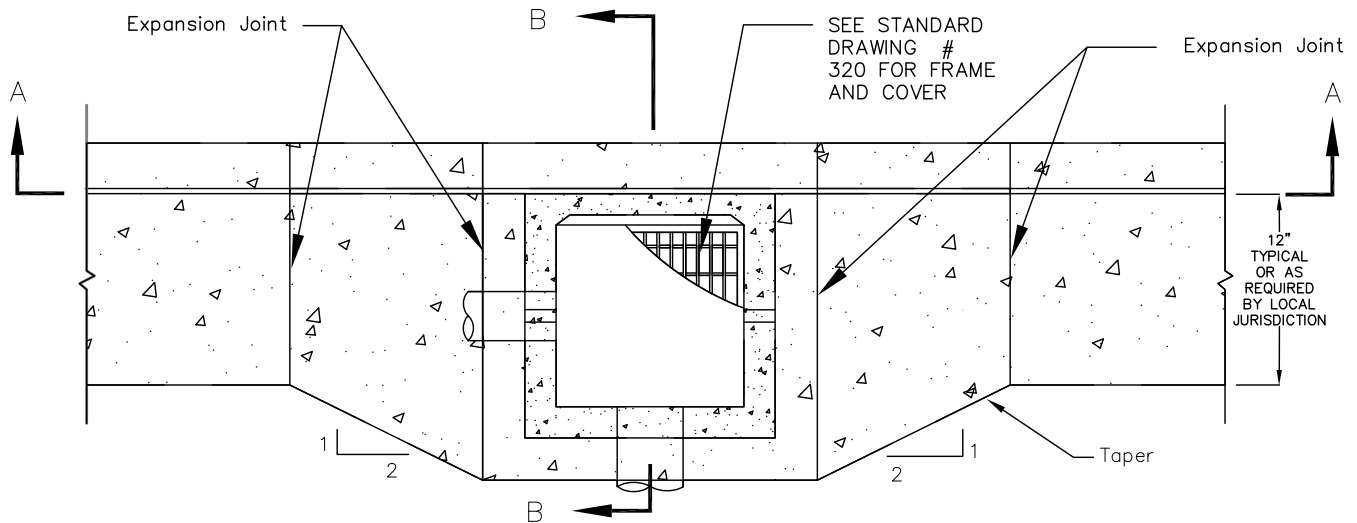
ISOMETRIC CUTAWAY
NTS

FLOW CONTROL STRUCTURE DETAIL

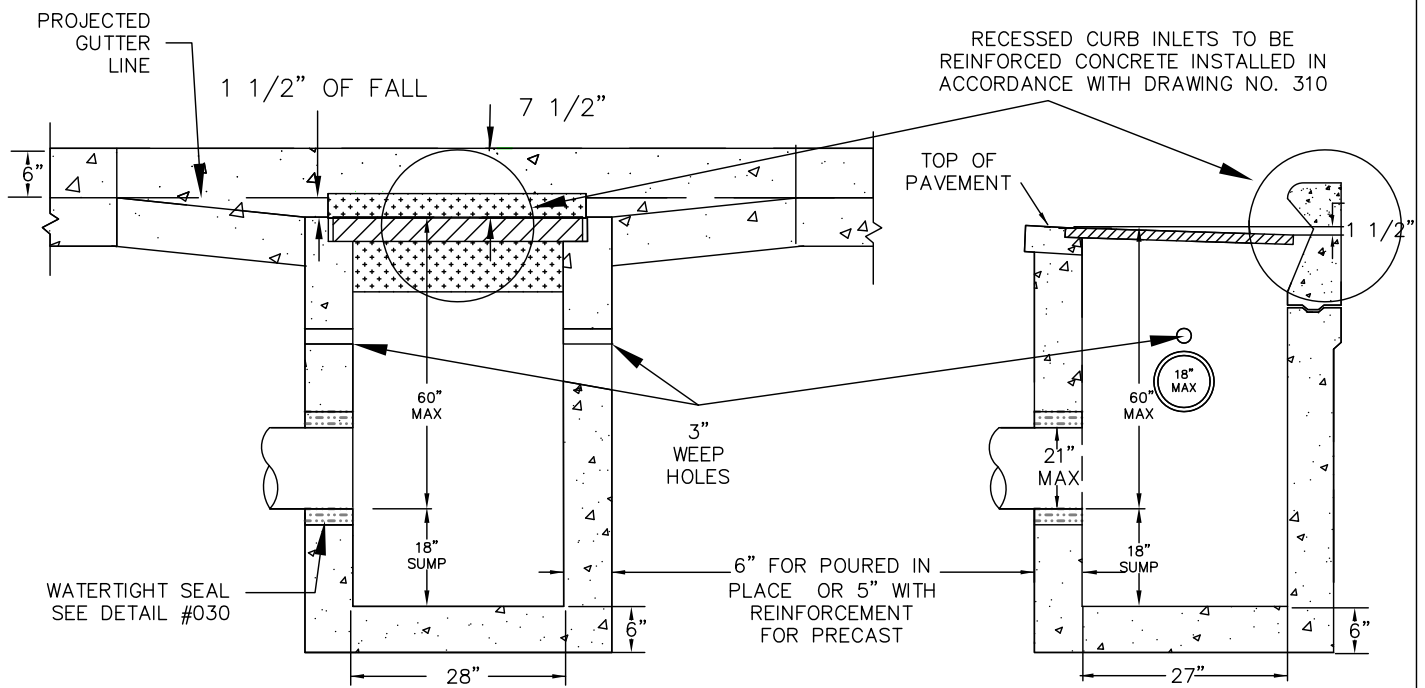
REVISED 02-17

DRAWING NO. 270

CleanWater Services



PLAN VIEW – STANDARD CURB AND GUTTER



SECTION A-A

SECTION B-B

NOTES:

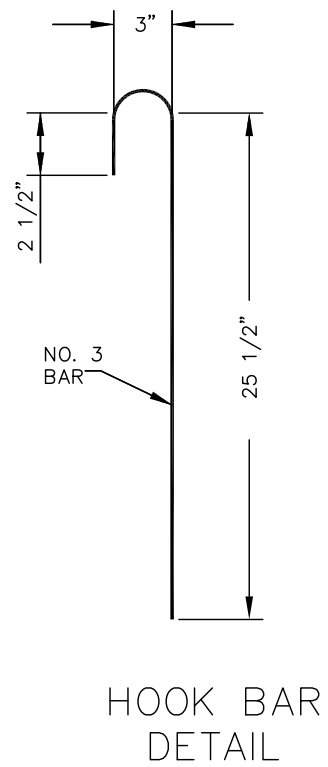
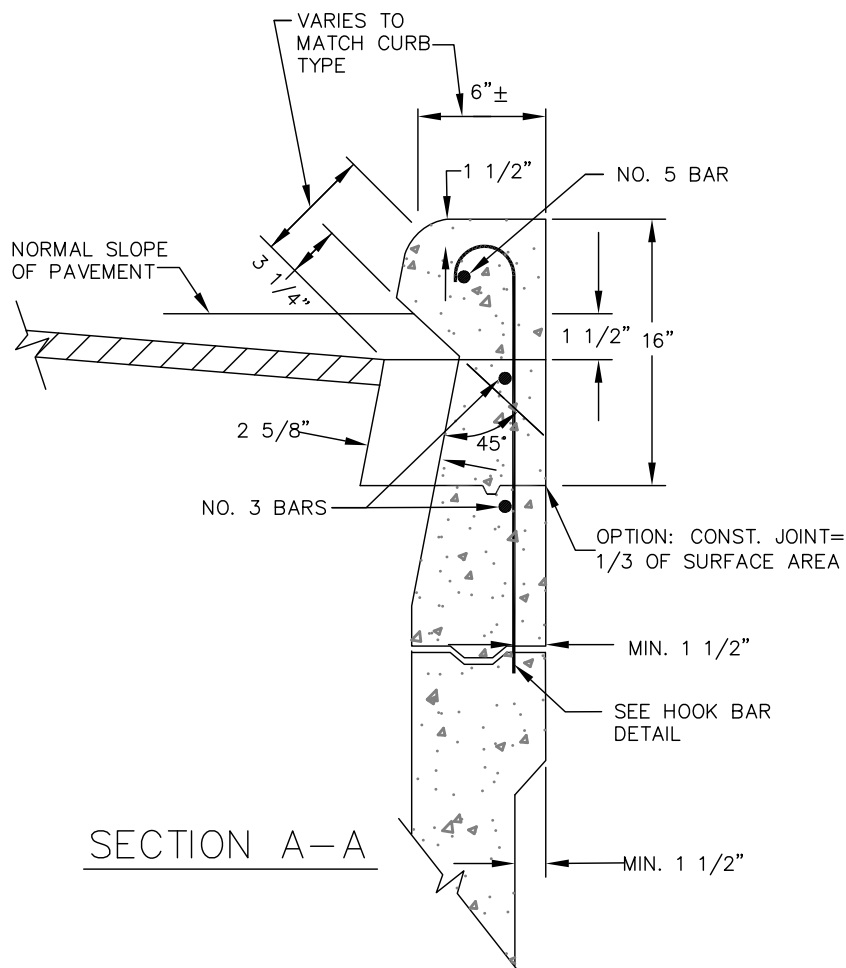
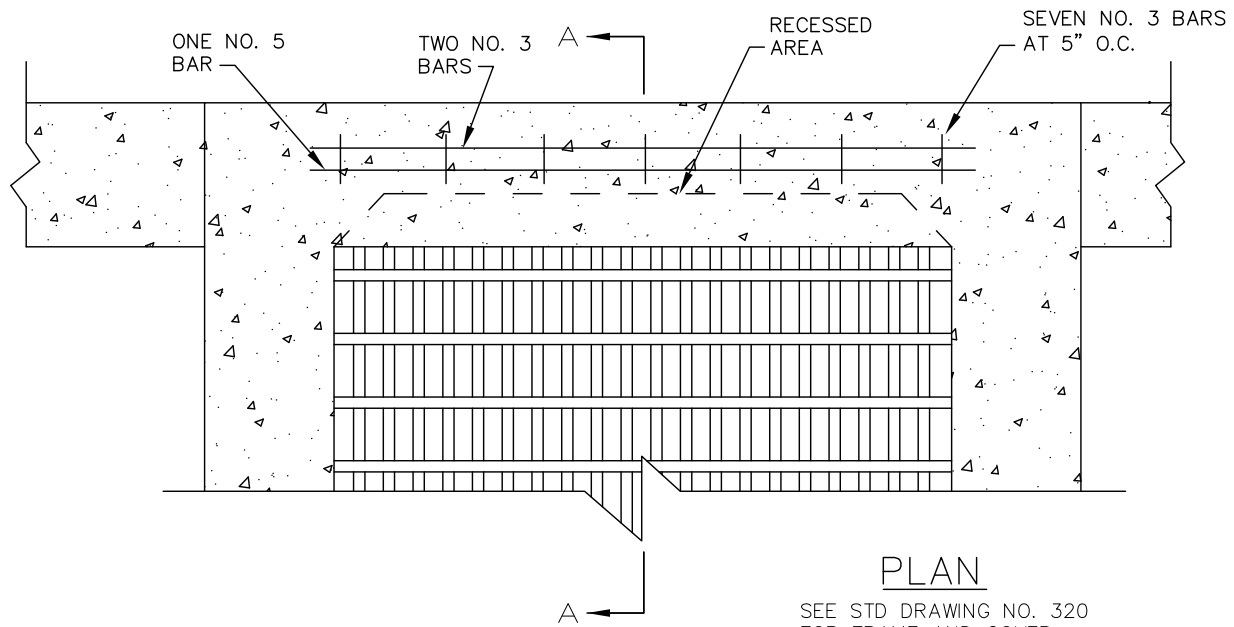
1. CATCH BASIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C-478.
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF $\frac{3}{4}$ "-0" COMPACTED BASE MATERIAL.
3. REINFORCEMENT FOR PRE CAST CATCH BASIN SHALL BE REBAR MEETING ASTM A-615 GRADE 60 OR WELDED WIRE MEETING ASTM A-497.
4. ALL POURED IN-PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
5. CHANNEL REQUIRED IN FLOW THROUGH APPLICATIONS, AS APPROVED. ALL OTHER APPLICATIONS REQUIRE AN 18" SUMP BELOW LOWEST PIPE INVERT.
6. FULL CURB EXPOSURE REQUIRED CANNOT BE LOCATED IN SIDEWALK RAMPS OR RAMP WINGS.

GUTTER & CURB INLET CATCH BASIN (CG-2)

DRAWING NO. 300

REVISED 09-16

CleanWater  Services

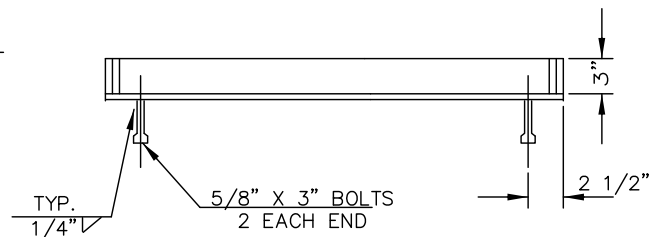
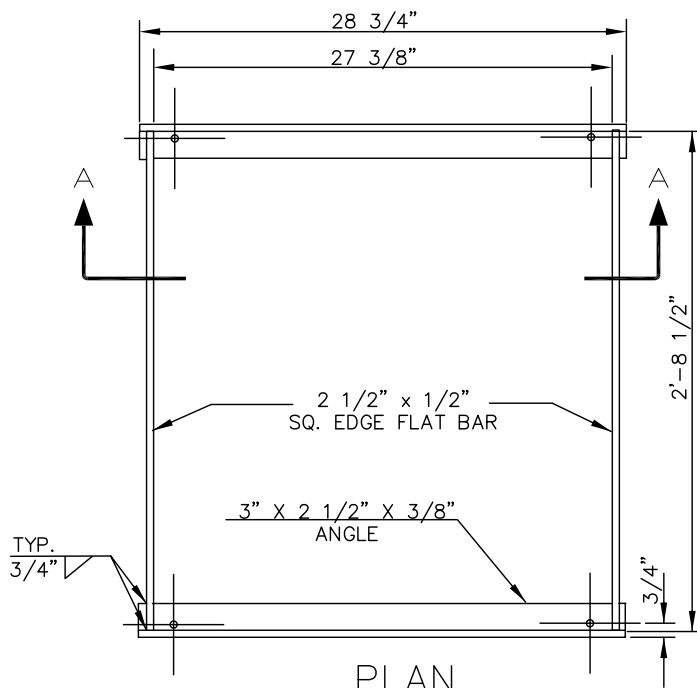


GUTTER & CURB INLET CATCH BASIN (CG-2) REINFORCEMENT

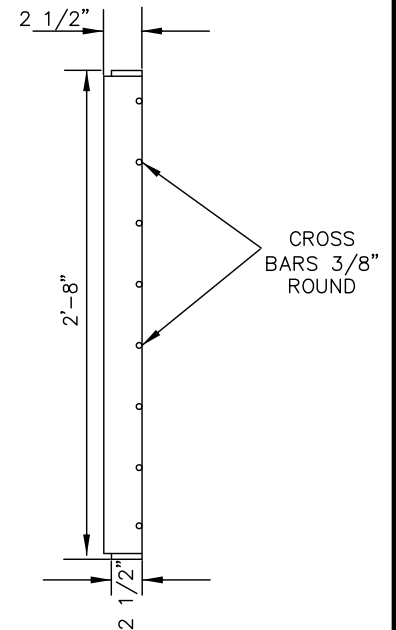
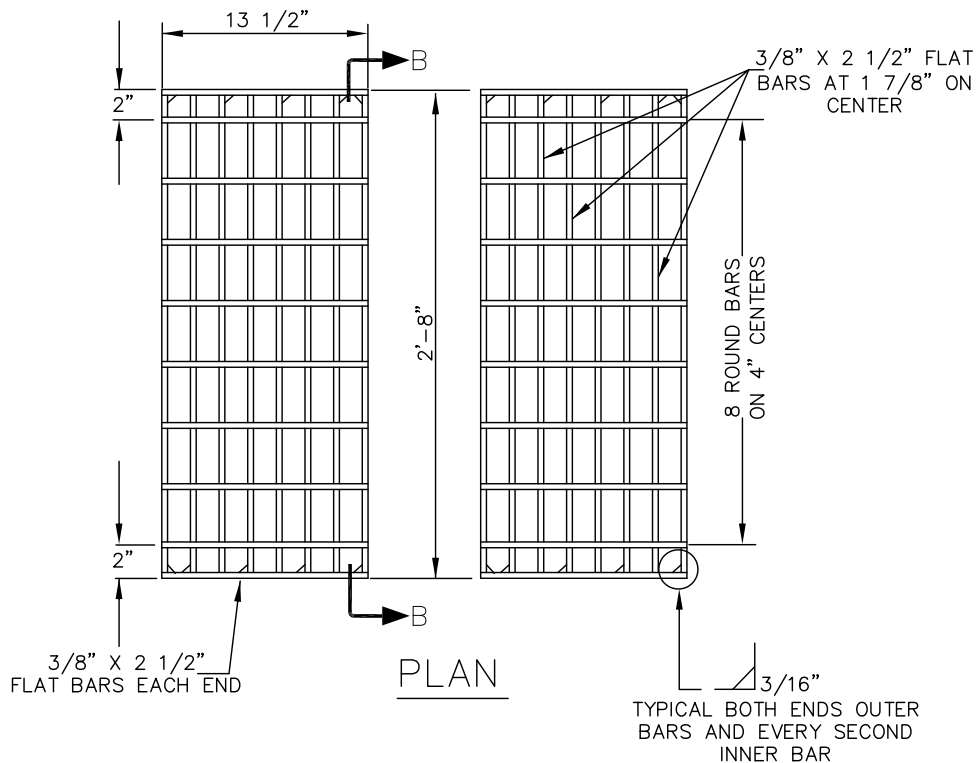
DRAWING NO. 310

REVISED 12-06

CleanWater Services



SECTION A-A



SECTION B-B

NOTE:

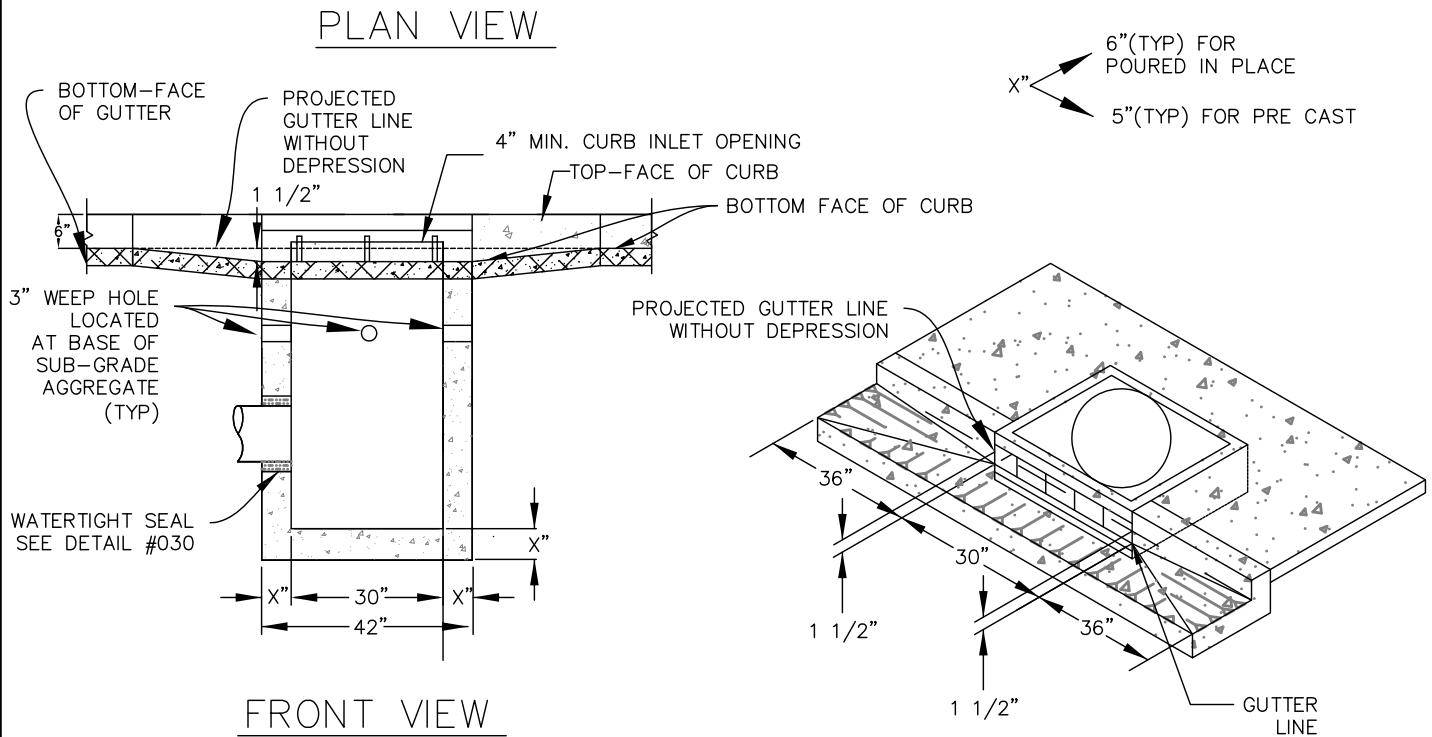
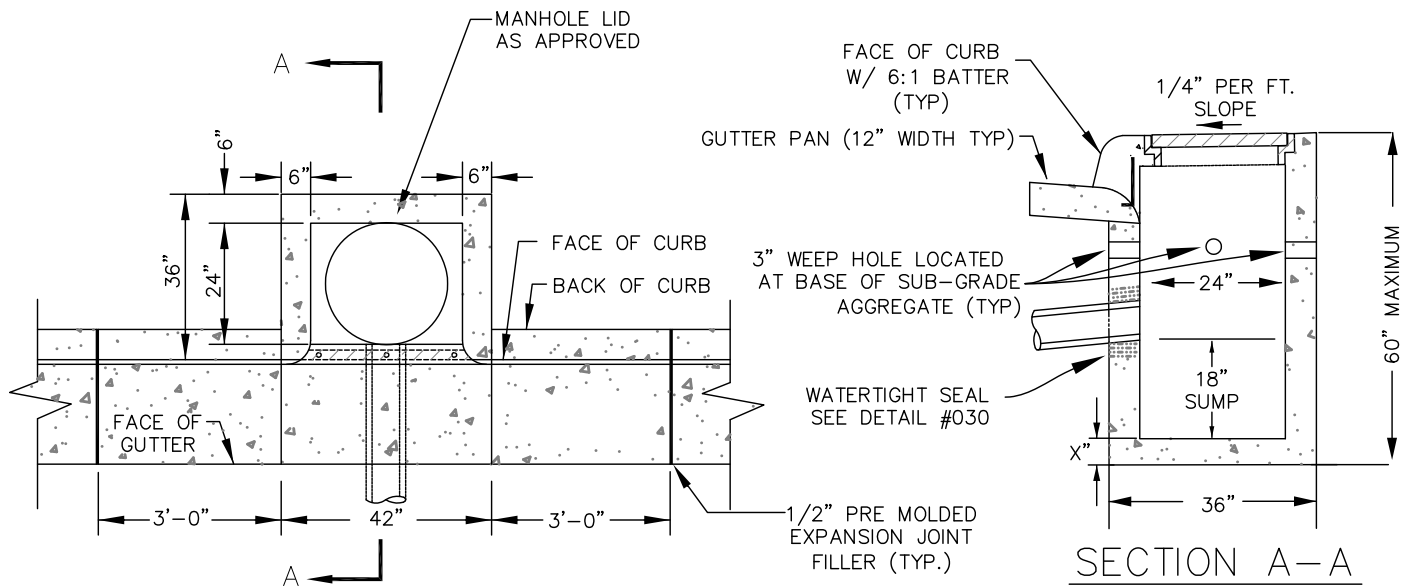
FRAME AND GRATE TO BE NEW STRUCTURAL ASTM A-36 FLAT BAR STEEL OR APPROVED EQUAL.

CATCH BASIN FRAME AND GRATE (CG-2)

DRAWING NO. 320

REVISED 12-06

CleanWater Services



NOTES:

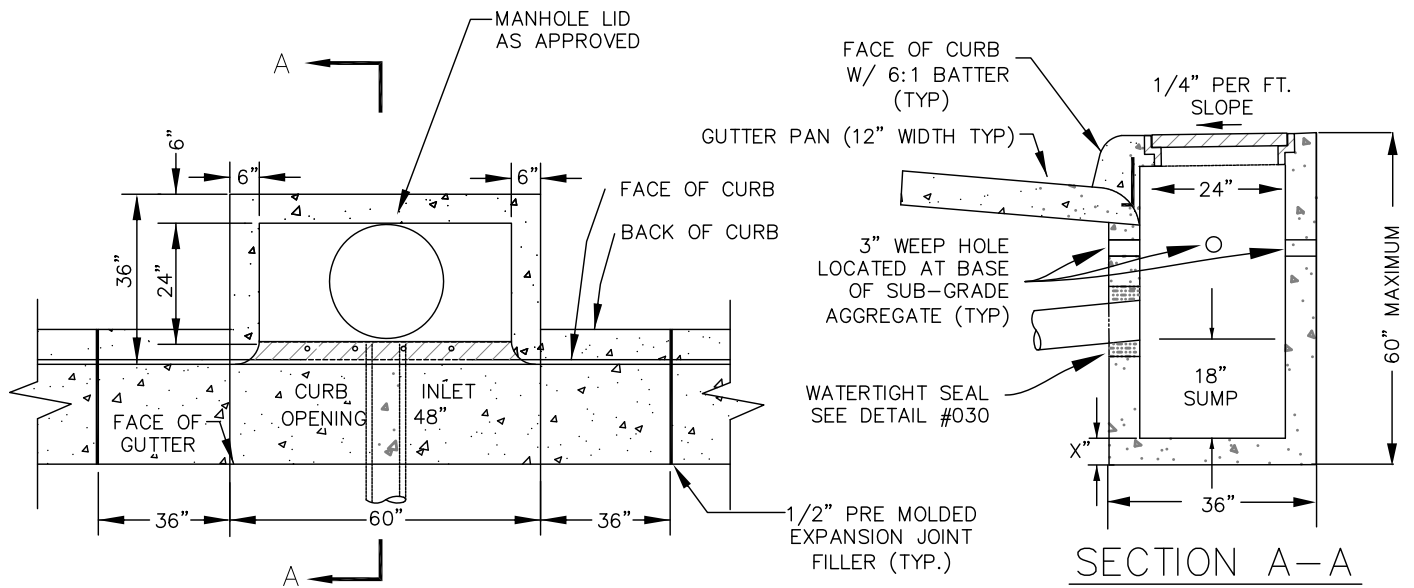
1. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" TO 0" COMPACTED BASE MATERIAL.
3. NON-SUMP INLET CATCH BASINS SHALL BE CHanneled (E.G. FLOW THROUGH CBs).

INLET CATCH BASIN (CG-30)

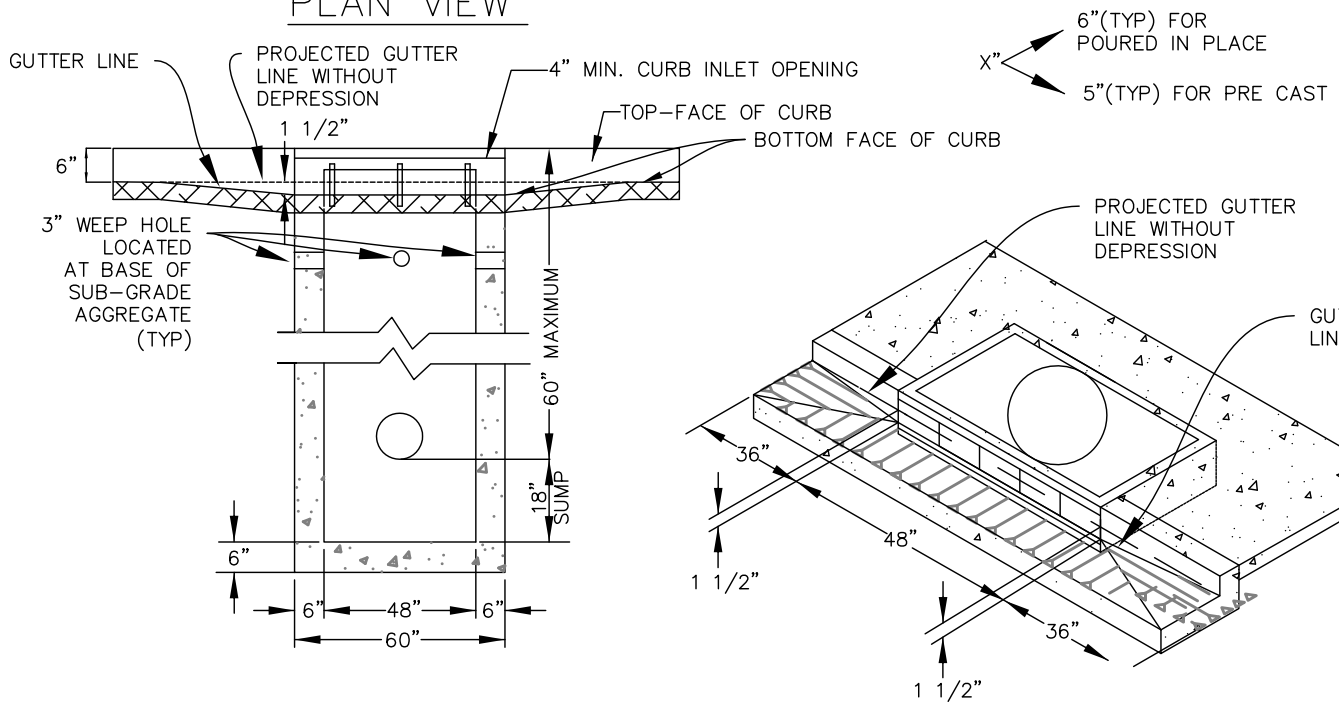
DRAWING NO. 330

REVISED 12-16

CleanWater Services



PLAN VIEW



FRONT VIEW

PERSPECTIVE VIEW SHOWING DEPRESSED GUTTER AT CURB INLET

NOTES:

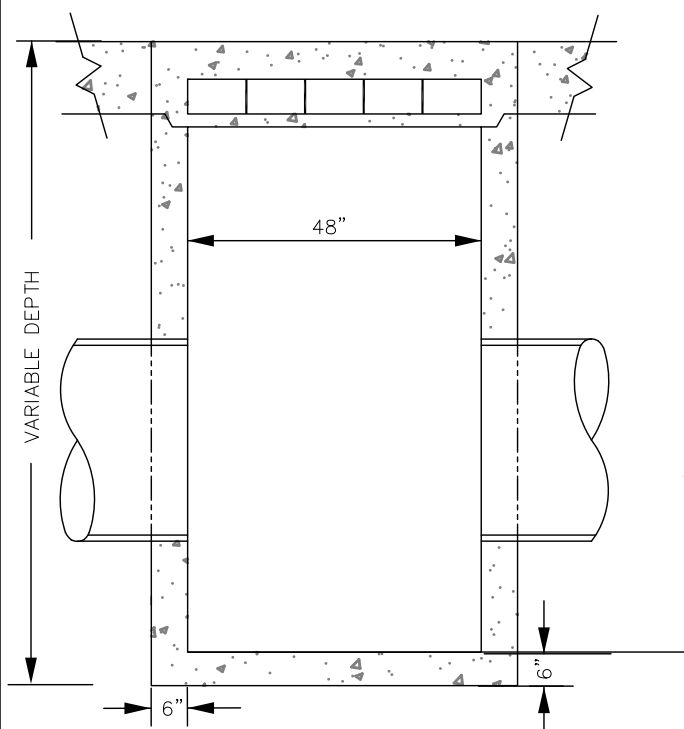
1. ALL FABRICATED METAL PARTS SHALL BE NEW STRUCTURAL, ASTM A-36 STEEL, AND BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
2. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
3. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" TO 0" COMPACTED BASE MATERIAL.
4. NON-SUMP INLET CATCH BASINS SHALL BE CHanneled (E.G. FLOW THROUGH CBs).

INLET CATCH BASIN (CG-48)

DRAWING NO. 340

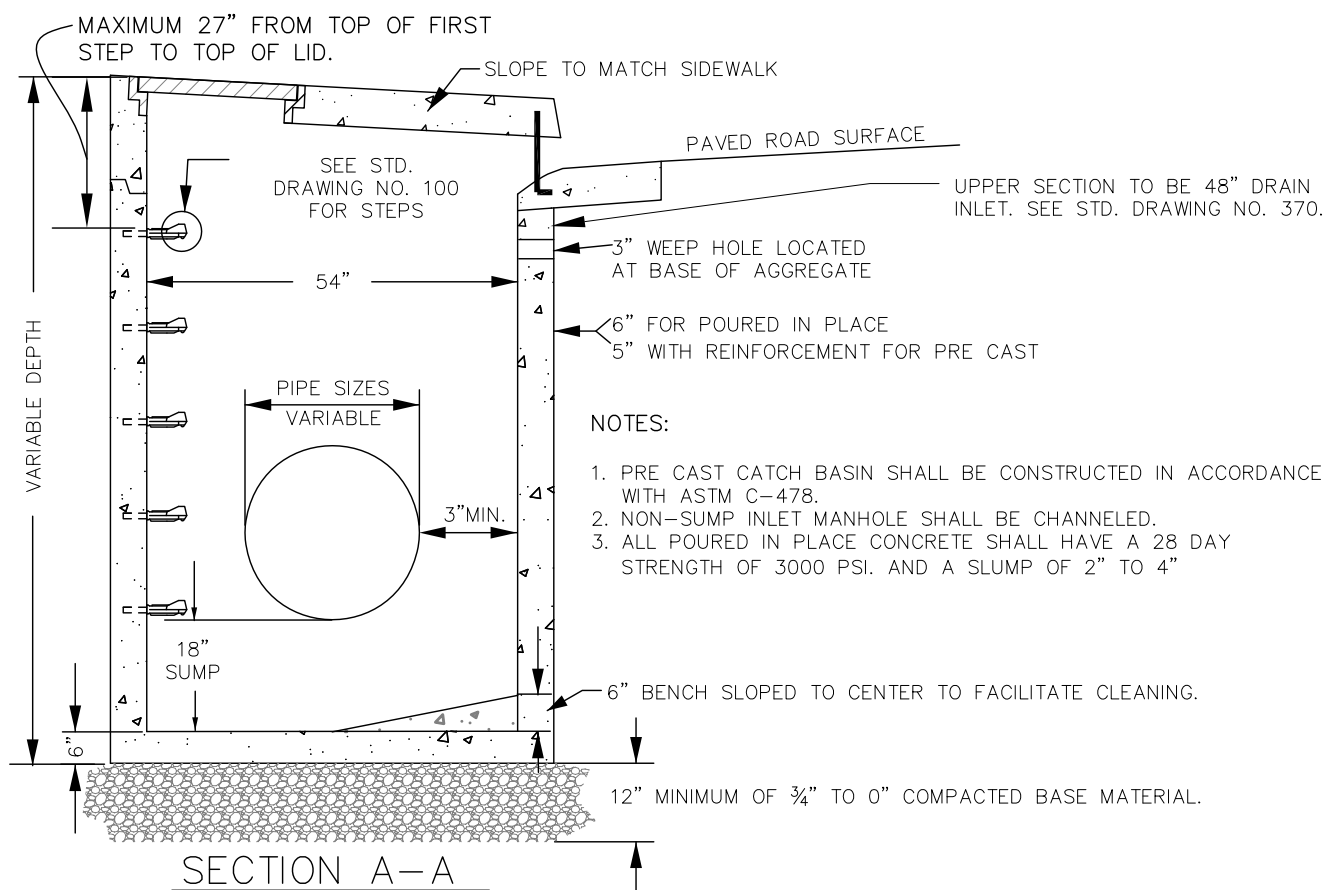
REVISED 12-16

CleanWater Services

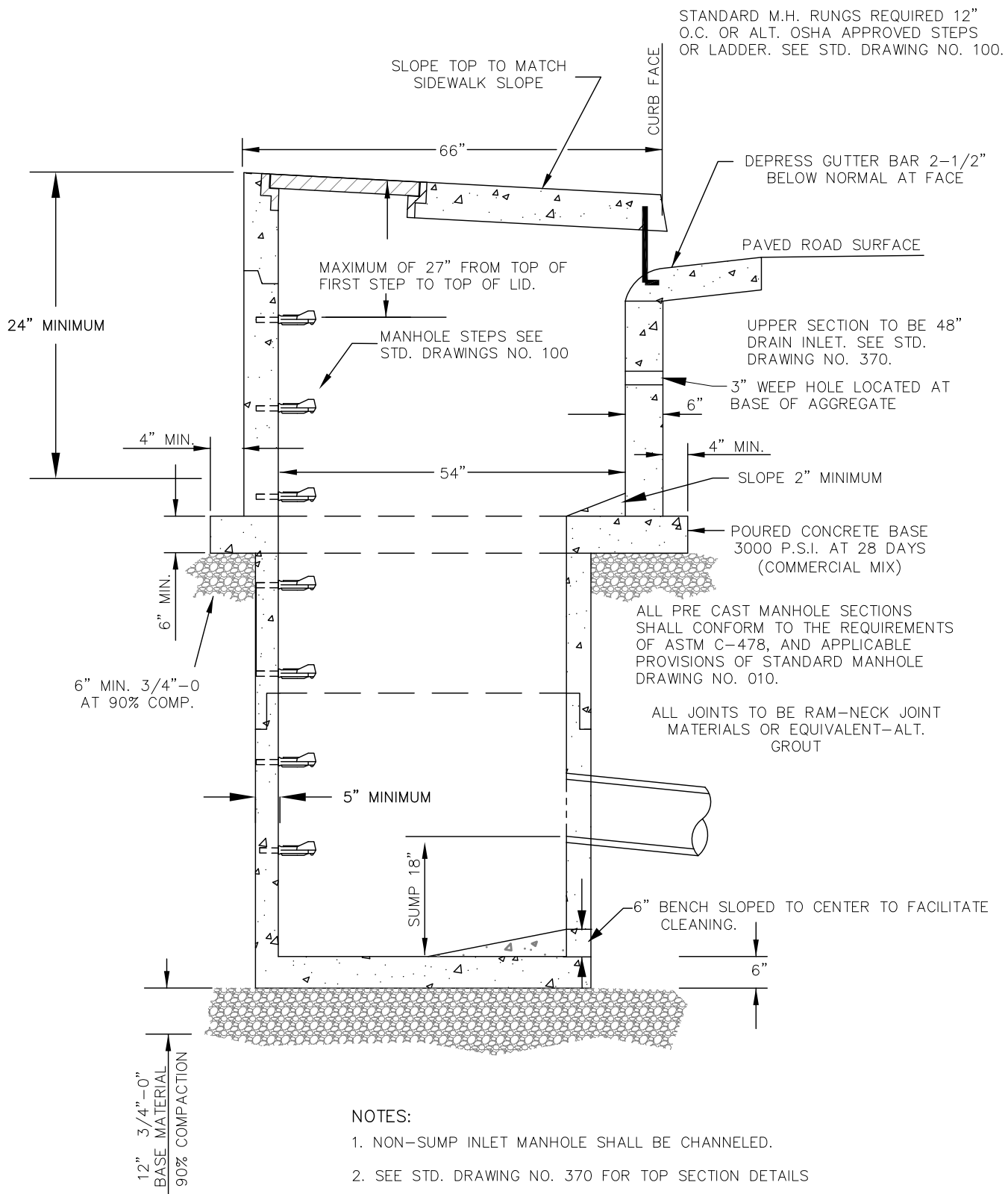


Technical drawing of a square box with a circular feature and a U-shaped cutout. The box has a width of 48 inches and a height of 54 inches. It is shown with top, front, and side views. The top view shows a square with a circle inside, and a U-shaped cutout at the top. The front view shows the box with a circular feature on the top surface. The side view shows the box with a circular feature on the side surface. Arrows A and B indicate the direction of view.

PLAN VIEW



CURB INLET MANHOLE
(CG-48 M.H.)



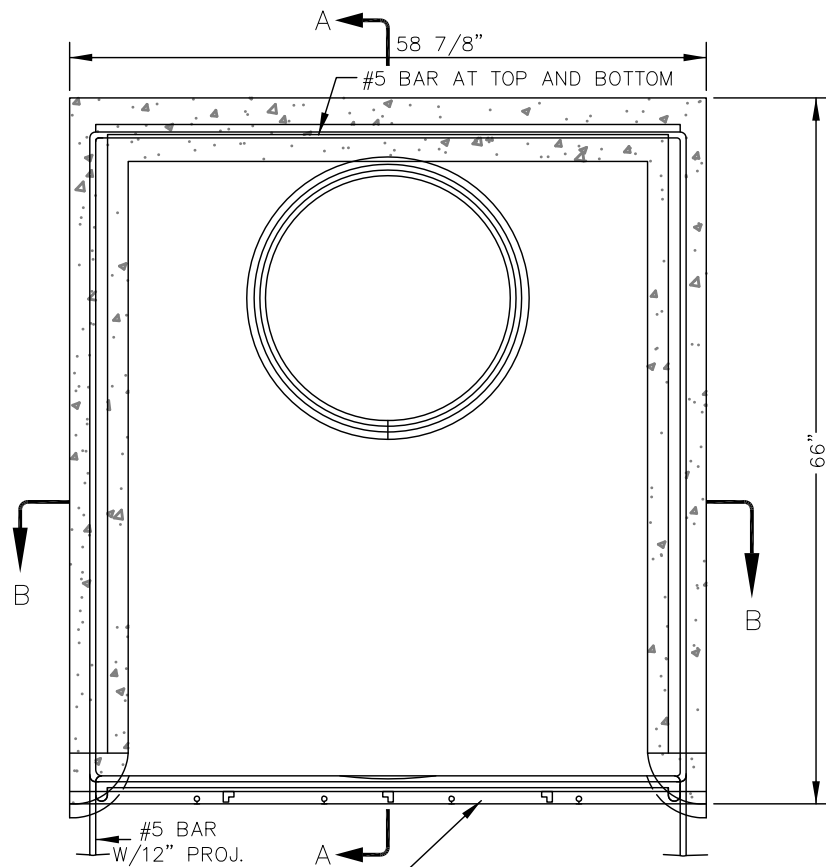
APPROVED FOR USE BY WASHINGTON COUNTY ONLY.

MODIFIED CURB INLET MANHOLE (MOD.CG-48MH)

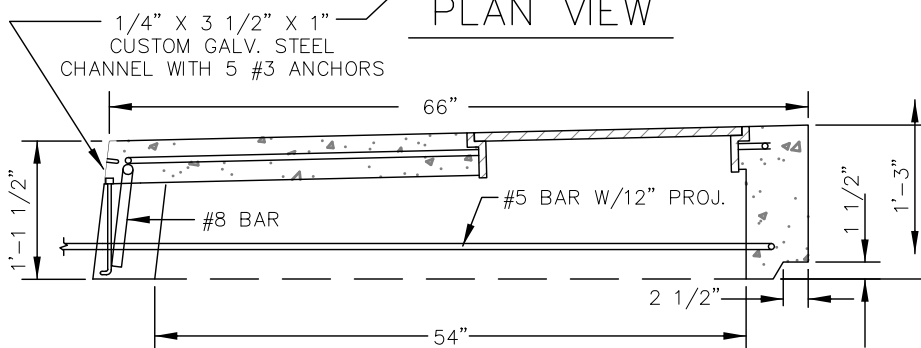
DRAWING NO. 360

REVISED 01-13

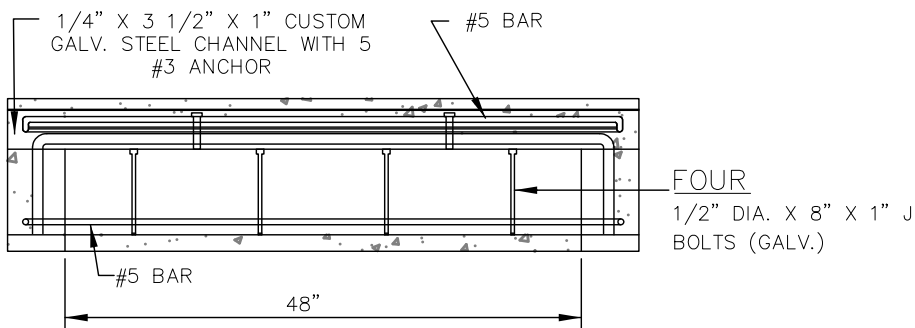
CleanWater  **Services**



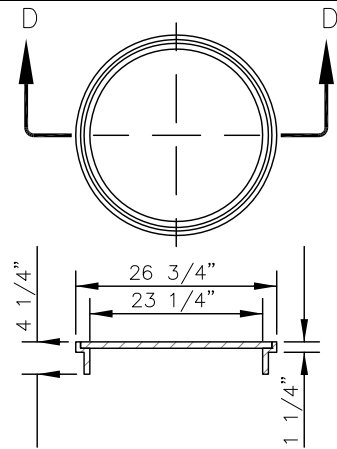
PLAN VIEW



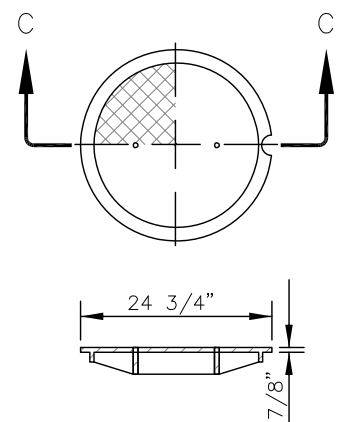
SECTION A-A



SECTION B-B

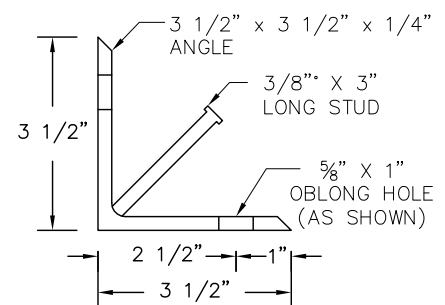


SECTION D-D



SECTION C-C

MANHOLE FRAME
AND COVER
(LIGHT DUTY)



STEEL CHANNEL
DETAIL

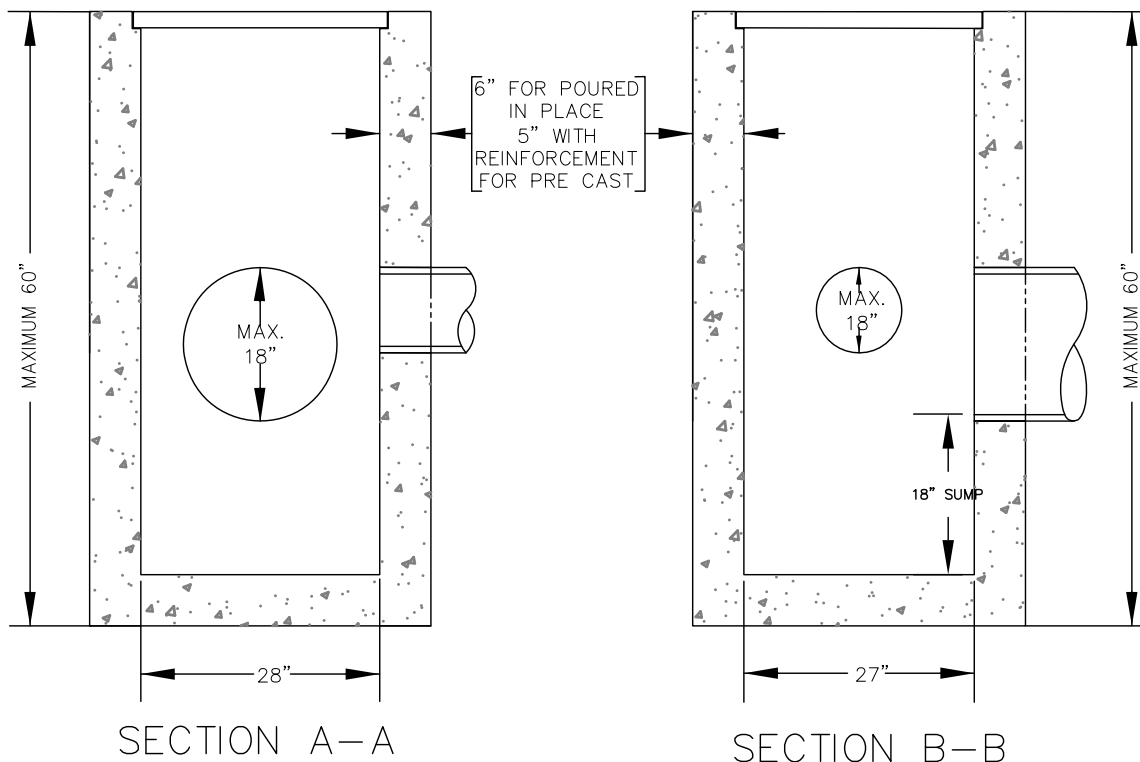
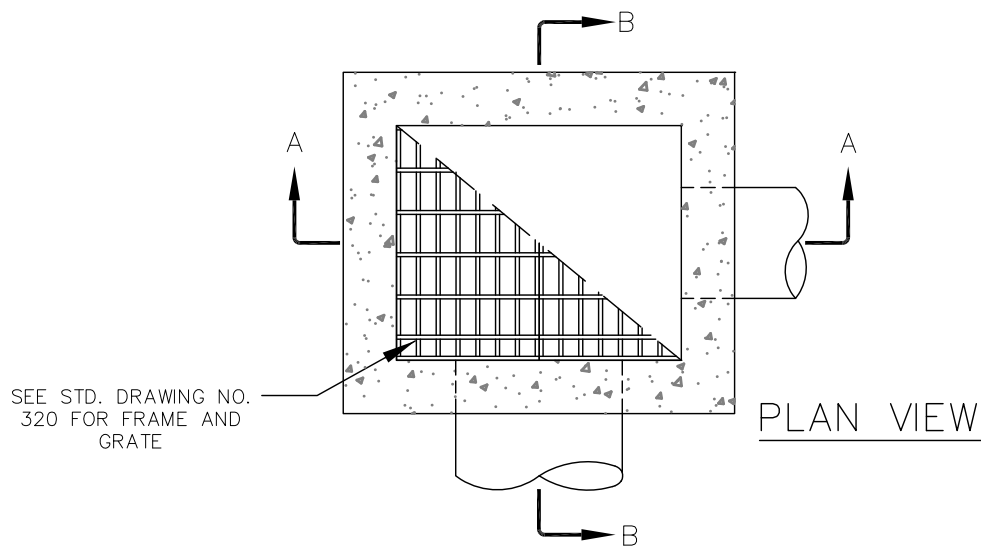
NOTE:
MATERIAL SHALL BE NEW STRUCTURAL ASTM A-36 STEEL

TOP-CURB INLET MANHOLE AND
MODIFIED CURB INLET MANHOLE
(CG-48 M.H. AND MOD. CG-48 M.H.)

DRAWING NO. 370

REVISED 01-13

CleanWater Services



NOTES:

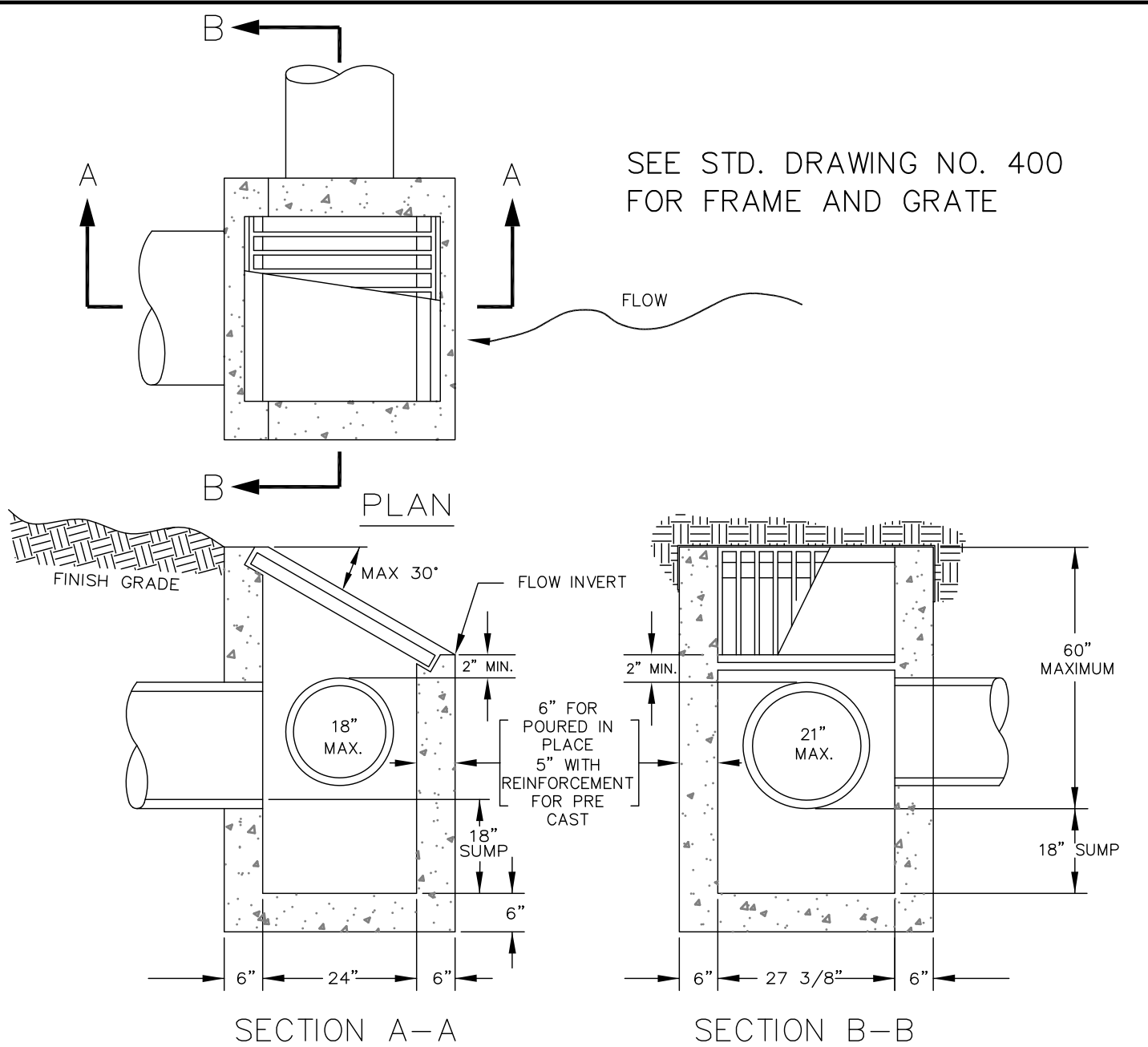
1. ALL PRE CAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C-478.
2. INSTALL STRUCTURE ON MIN. OF 8" OF $\frac{3}{4}$ "-0" COMPACTED BASE MATERIAL.
3. PRE CAST REINFORCEMENT SHALL BE REBAR MEETING ASTM A615 GRADE OR WELDED WIRE MEETING ASTM A497.
4. ALL POURED INPLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
5. AREA DRAINS IN REAR OR SIDE YARDS SHALL NOT BE SUMPED AND SHALL BE PROPERLY CHANNELIZED. DITCH INLETS SHALL BE EQUIPPED WITH AN 18" SUMP.
6. PRE-CAST STRUCTURE'S CONFORMING TO O.D.O.T. TYPE G-2 CATCH BASIN INLET ARE AN ACCEPTABLE ALTERNATE. (ALL GRATE MATERIALS AND DIMENSIONS SHALL MEET C.W.S. STANDARDS AS SHOWN ON DETAIL #320)

AREA DRAIN TYPE II

DRAWING NO. 380

REVISED 01-13

CleanWater  Services

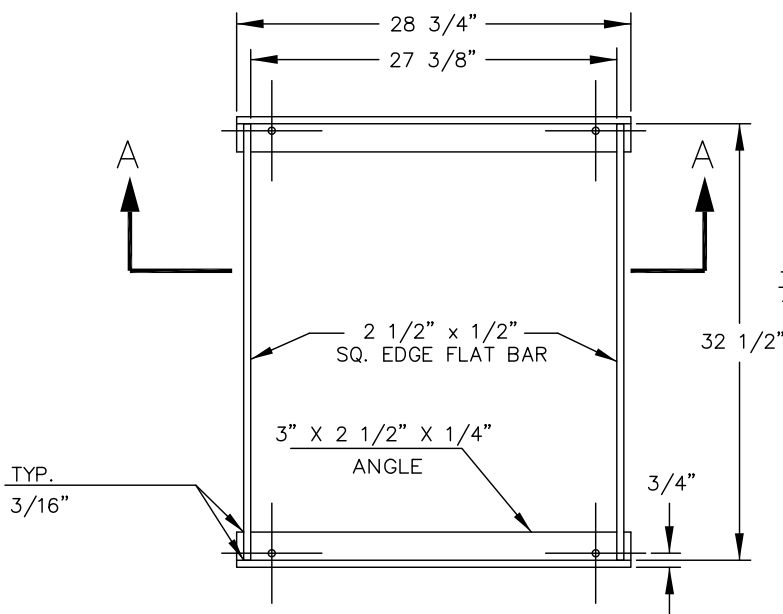


NOTES:

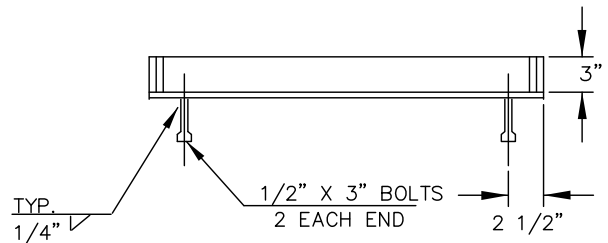
1. ALL PRE CAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C-478.
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" - 0" COMPACTED BASE MATERIAL.
3. PRE CAST REINFORCEMENT SHALL BE REBAR MEETING ASTM A615 GRADE 60 OR WELDED WIRE MEETING ASTM A497
4. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND SLUMP OF 2" TO 4".
5. PRE-CAST STRUCTURE'S CONFORMING TO O.D.O.T. TYPE G-2 CATCH BASIN DESIGN/WITH DITCH INLET TOP ARE AN ACCEPTABLE ALTERNATE. ALL GRATE MATERIALS SHALL MEET C.W.S. STANDARDS AS SHOWN ON DETAIL #400

DITCH INLET

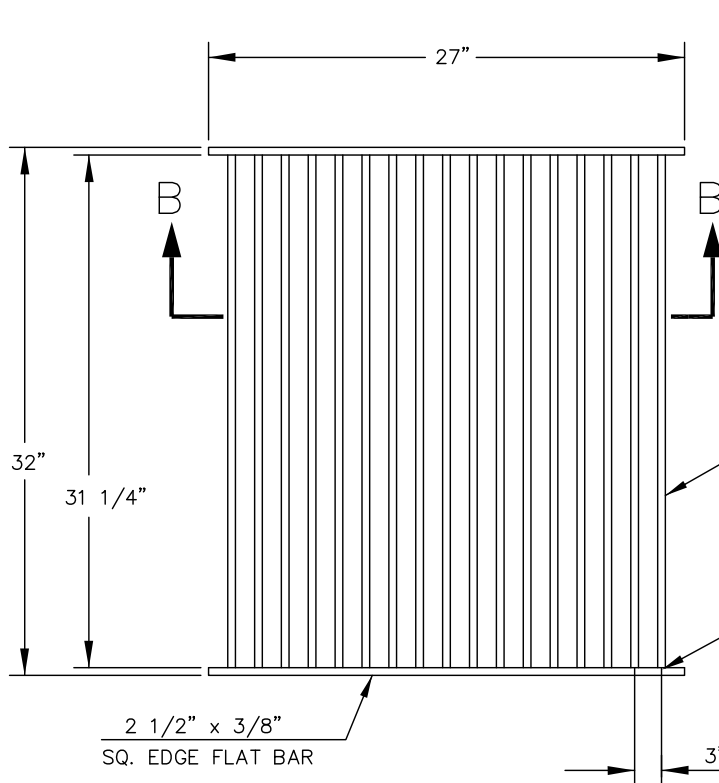




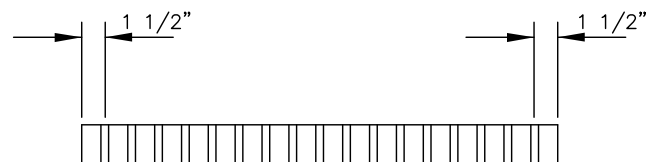
PLAN



SECTION A-A



PLAN



SECTION B-B

NOTES:

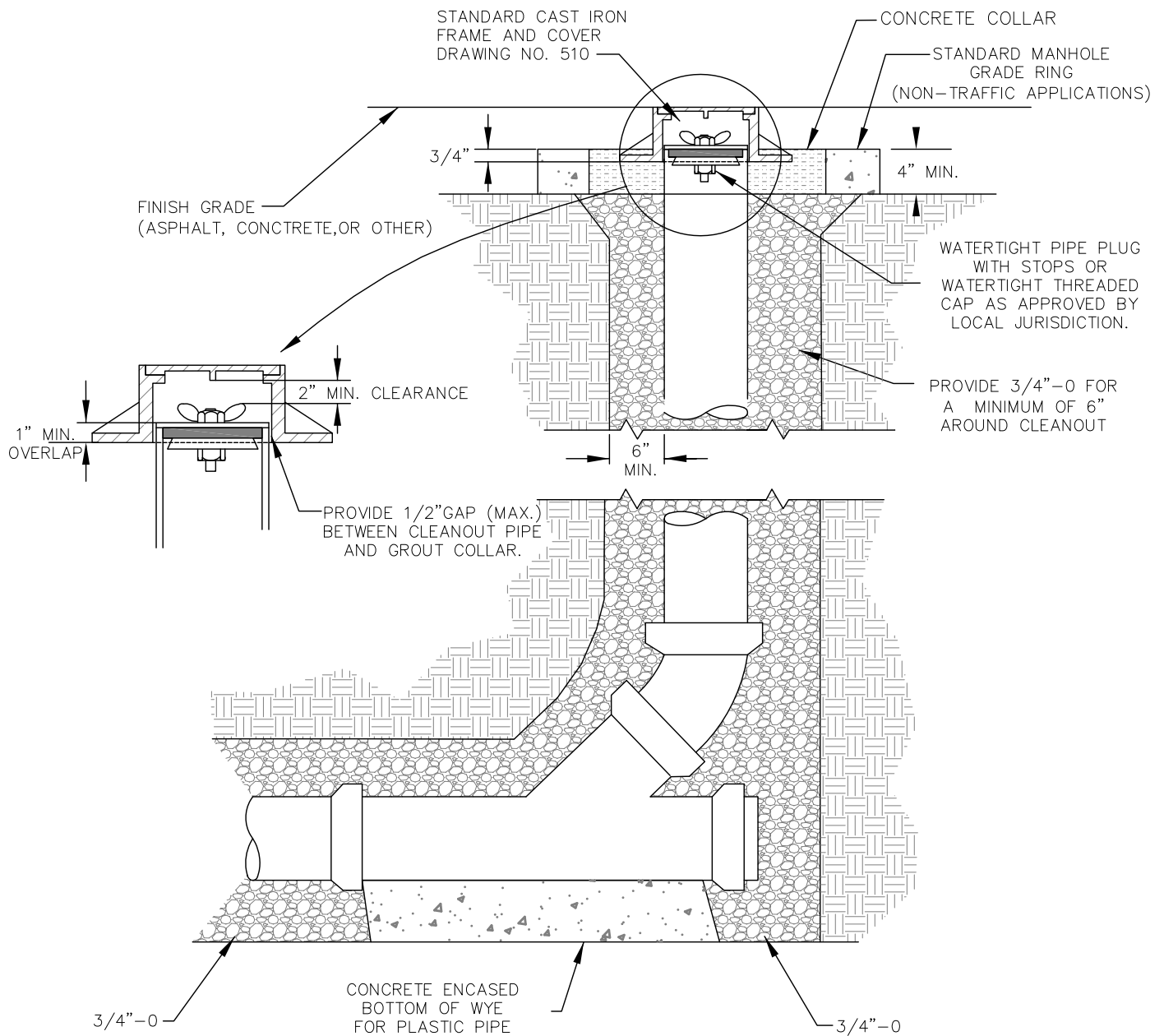
FRAME AND GRATE SHALL BE NEW STRUCTURAL ASTM A-36 FLAT BAR STEEL OR APPROVED EQUAL.

DITCH INLET FRAME AND GRATE

DRAWING NO. 400

REVISED 12-06

CleanWater  Services



NOTE:

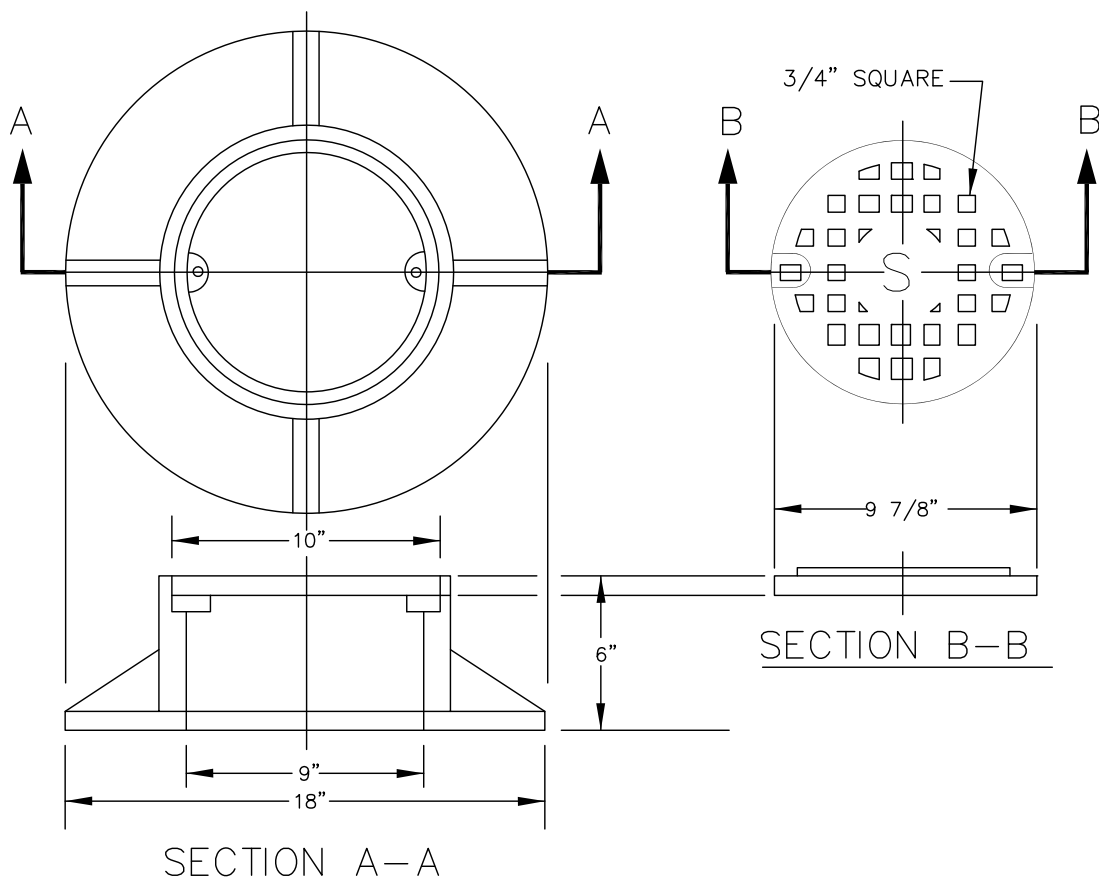
1. CONCRETE ENCASE ENTIRE WYE SECTION AND 45° BEND IF CONCRETE PIPE.
2. STAND PIPE TO BE SAME SIZE AS MAINLINE UP TO AND INCLUDING 8" PIPE.
MAINLINE GREATER THAN 8" SHALL HAVE A 8" STANDPIPE.

STANDARD CLEANOUT

DRAWING NO. 500

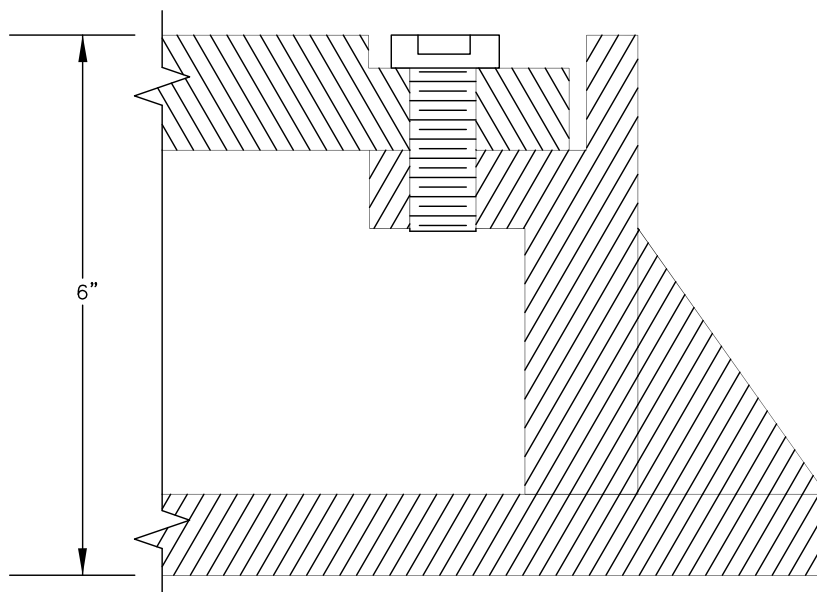
REVISED 01-13

CleanWater  Services



NOTES

1. 1/4" ALLEN HEAD BOLTS
1" LONG RECESSED.
2. ALL PERMANENT CLEANOUTS
TO HAVE BOLT DOWN COVERS.
3. MATERIAL SHALL BE GRAY
CAST-IRON, ASTM A-48,
CLASS 30.

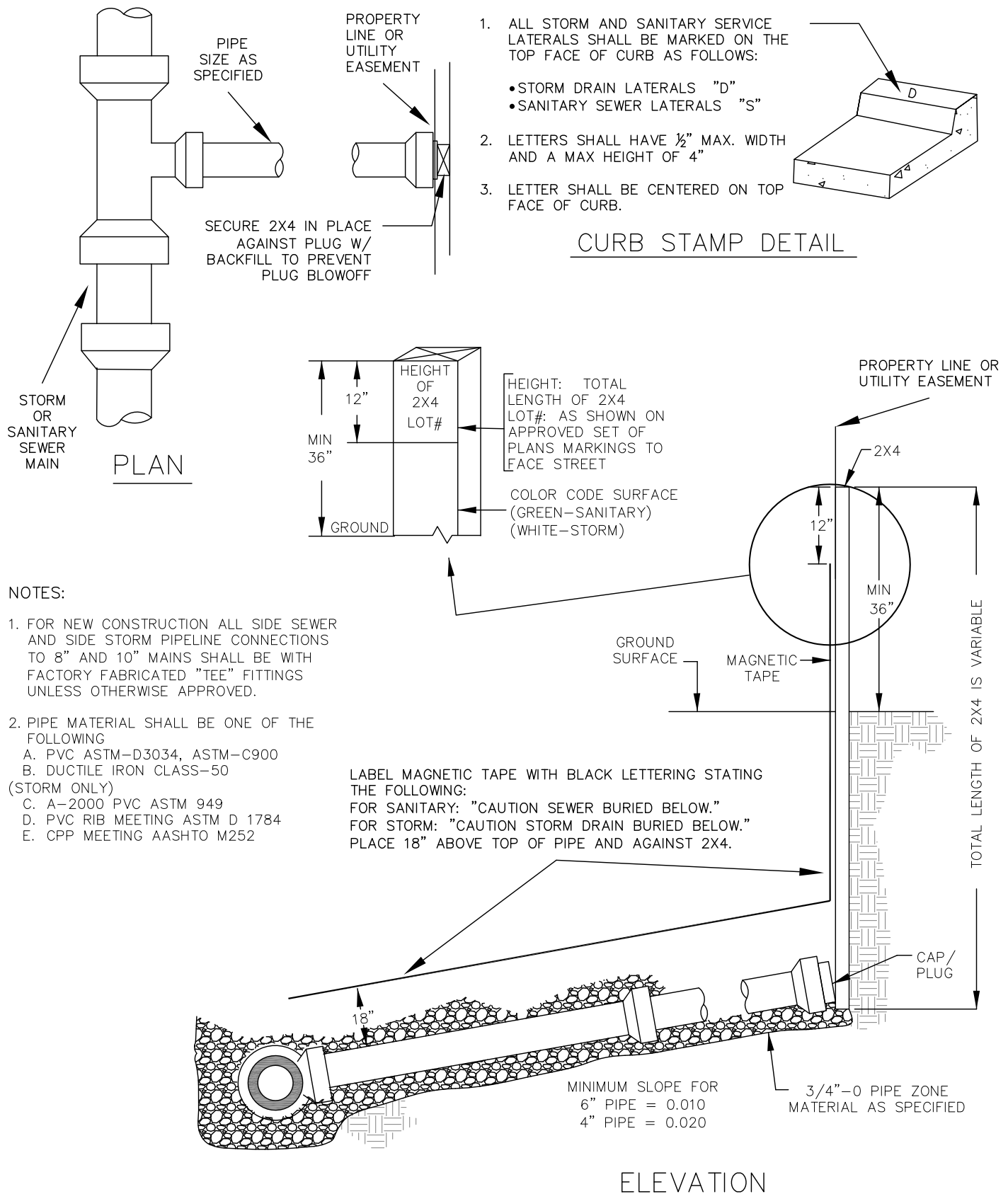


CLEANOUT FRAME AND COVER

DRAWING NO. 510

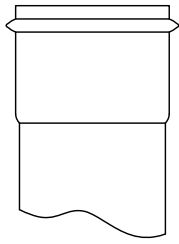
REVISED 12-16

CleanWater  Services

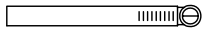


SIDE SEWER / SIDE STORM PIPELINE

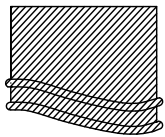
CleanWater Services



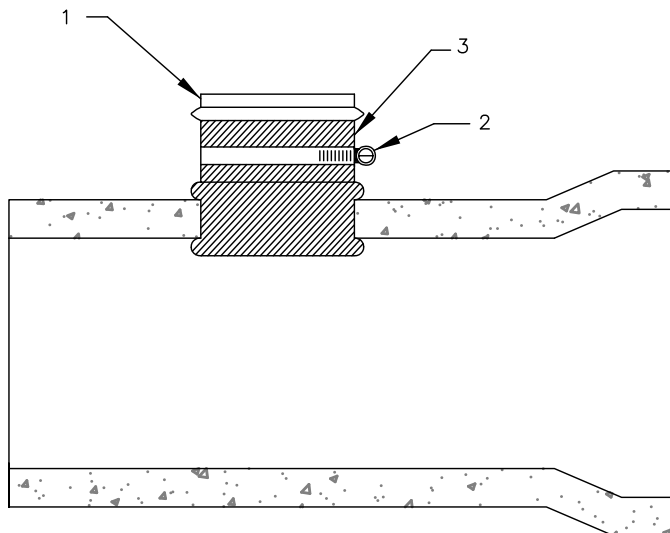
1. PVC HUB SHALL CONFORM TO ASTM 3034, SDR 35 DRIVE INTO CENTER OF RUBBER SLEEVE AFTER SLEEVE IS PLACED IN HOLE.



2. STAINLESS STEEL BAND SECURES UPPER HALF OF RUBBER SLEEVE TO THE PVC HUB. STAINLESS STEEL BAND SHALL BE 300 SERIES, $\frac{9}{16}$ " BAND WIDTH, CADMIUM PLATED CARBON STEEL, AND ATTACHED WITH HEX HEAD SLOTTED SCREW.



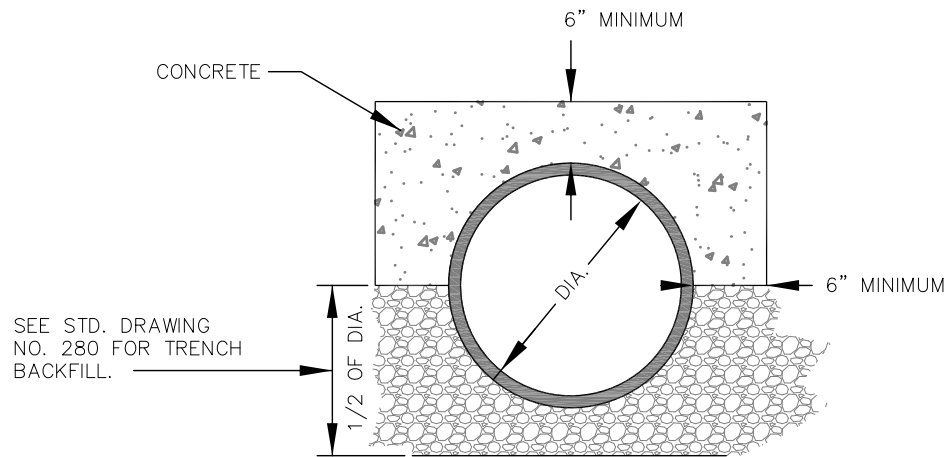
3. COMPLETE RUBBER SLEEVE INCLUDES A MOLDED SEGMENT THAT HOLDS IT IN PLACE.



NOTES:

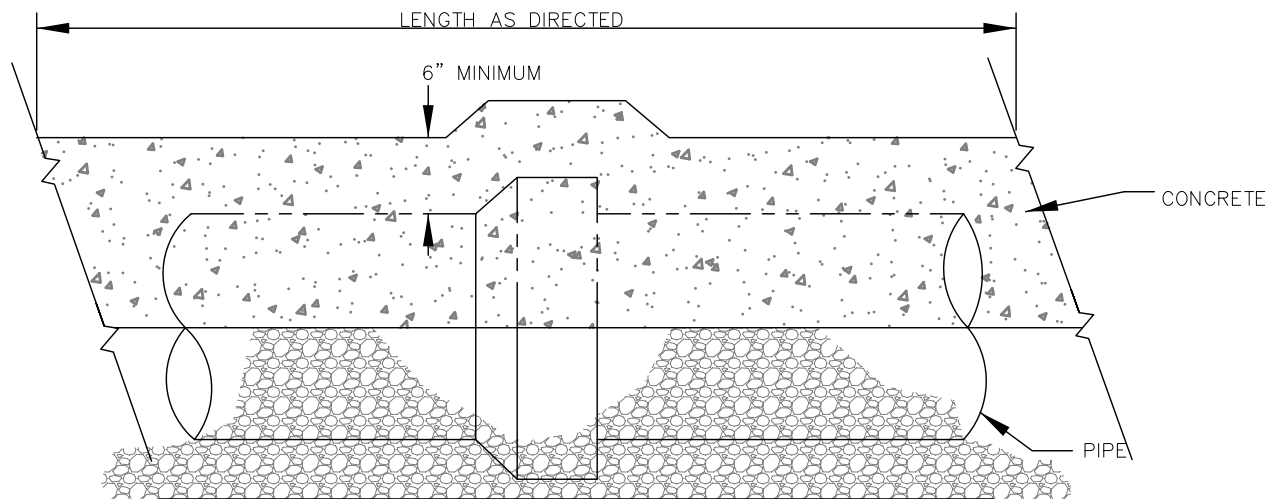
1. ALL INSERTA-TEE HOLES SHALL BE MACHINE DRILLED AND CORED.
2. INSERTA-TEES ARE NOT ALLOWED IN NEWLY CONSTRUCTED SEWER MAINS WITH AN INSIDE DIAMETER (I.D.) OF 10 INCHES OR SMALLER.
3. SEWER MAIN SHALL BE TWO SIZES (NOMINAL I.D.) LARGER THAN THE INSERTA-TEE.

INSERTA-TEE



END VIEW

NOTE:
CONCRETE SHALL HAVE A 28
DAY STRENGTH OF 3000 PSI
AND 2" TO 4" SLUMP.



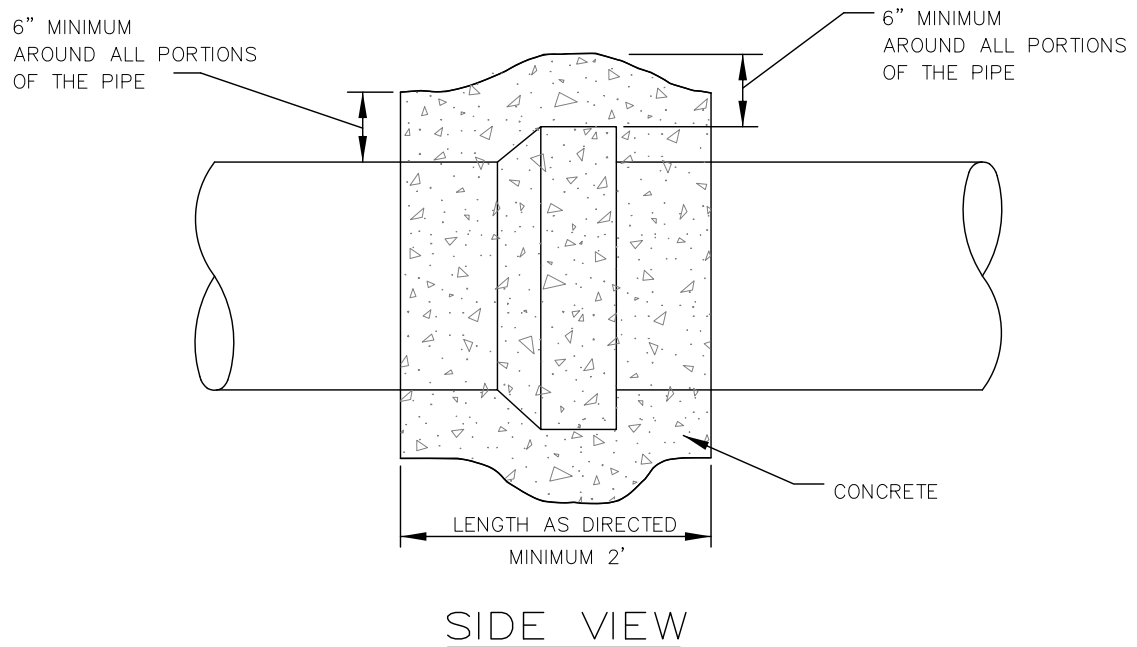
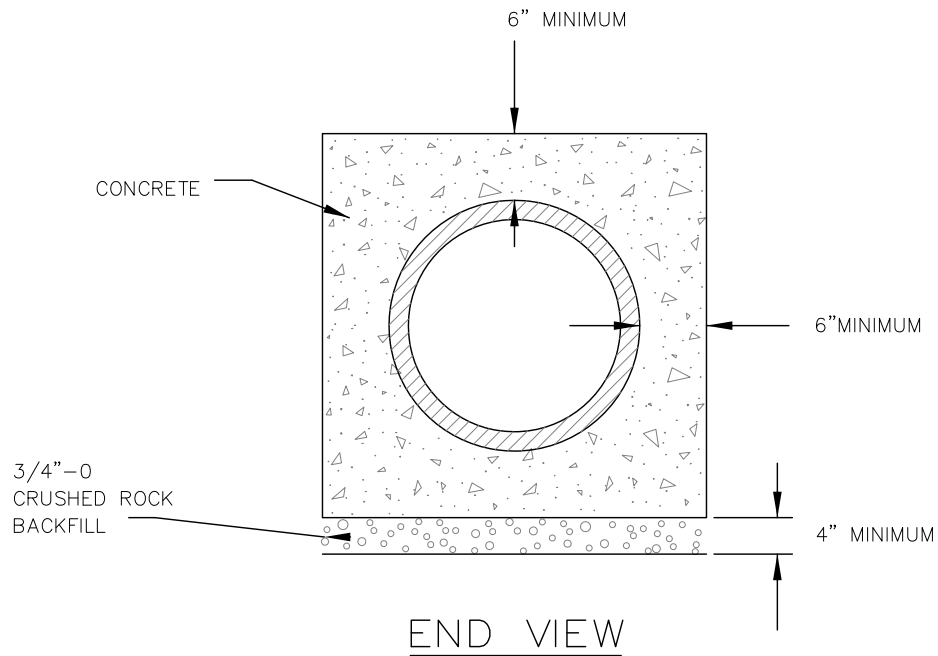
SIDE VIEW

CONCRETE CAP

DRAWING NO. 550

REVISED 01-13

CleanWater  Services



NOTE:

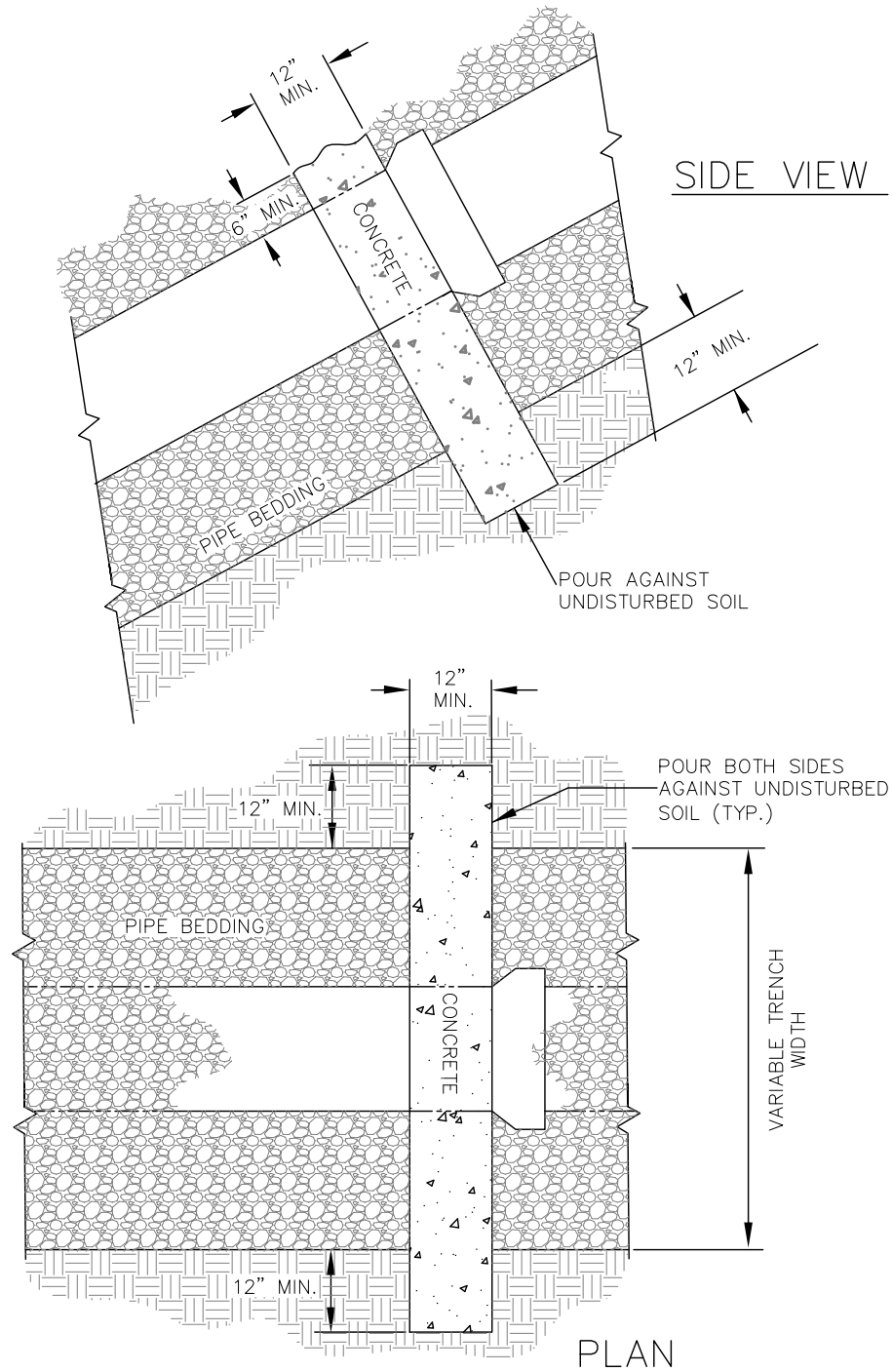
1. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND, 2" TO 4" SLUMP.
2. PRIOR TO INSTALLING THE CONCRETE ENSURE THE JOINT IS SEAL IN A MANNER AS NOT TO ALLOW CONCRETE TO ENTER INTO THE INTERIOR OF PIPE.

CONCRETE ENCASEMENT/ CLOSURE COLLAR

DRAWING NO. 560

REVISED 12-16





SLOPE	MIN. ANCHOR SPACING CENTER TO CENTER
20% - 34%	35'
35% - 50%	25'
51% +	15' OR CONC. ENCASEMENT

NOTE:

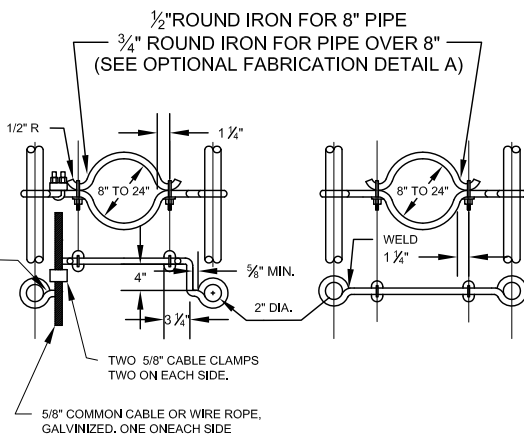
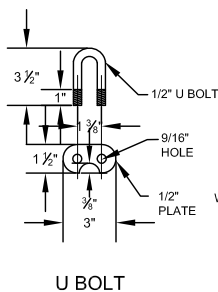
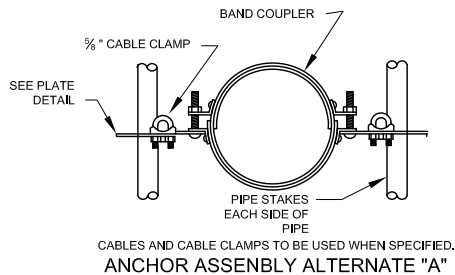
1. CONCRETE ANCHORS TO BE INSTALLED IMMEDIATELY DOWNHILL OF PIPEBELL.
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI, AND 2" TO 4" SLUMP.
3. ODOT "METAL PIPE SLOPE ANCHORS" ARE AN ACCEPTABLE ALTERNATIVE, SEE DETAIL #580.

CONCRETE ANCHOR WALL

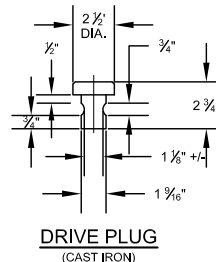
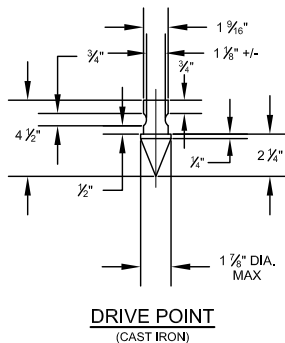
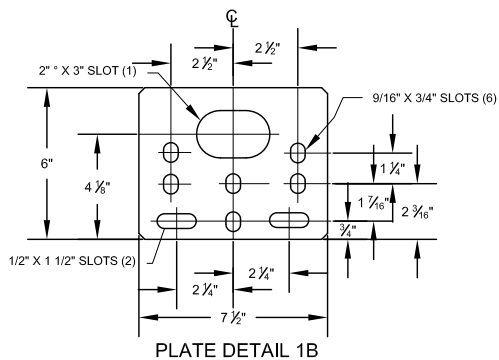
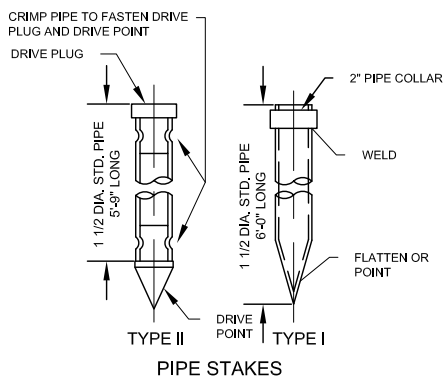
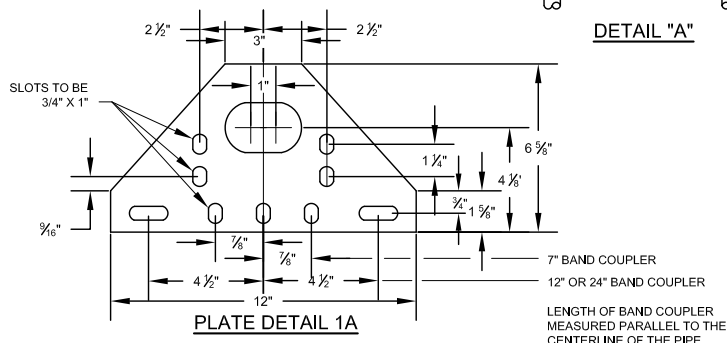
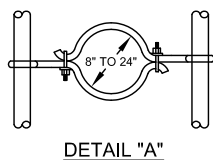
DRAWING NO. 570

REVISED 01-13

CleanWater Services



WITH CABLE **WITHOUT CABLE**
ANCHOR ASSEMBLY ALTERNATE "B"
CABLES AND CABLE CLAMPS TO BE USED WHEN SPECIFIED.



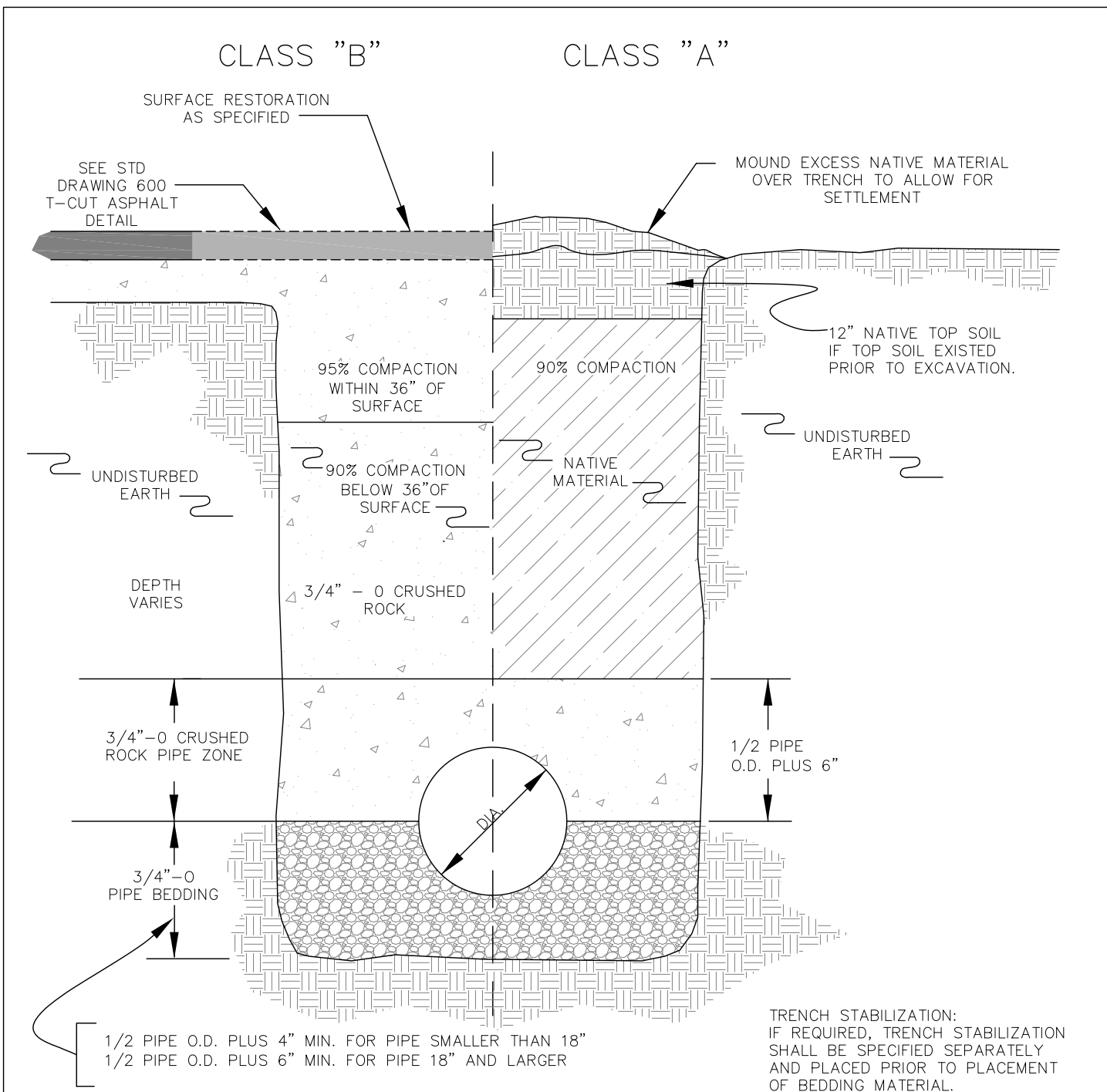
1. ALL PIPE STAKES AND HARDWARE TO BE GALVANIZED AFTER FABRICATION.
2. EITHER ALTERNATE "A" OR ALTERNATE "B" ANCHOR ASSEMBLY MAY BE USED AT CONTRACTOR'S OPTION FOR ANNULARLY CORRUGATED PIPE. ALTERNATE "A" TO BE USED WITH HELICALLY CORRUGATED PIPE.
3. EITHER TYPE 1 OR TYPE 2 PIPE STAKES MAY BE USED WITH EITHER ANCHOR ASSEMBLY ALTERNATE AT THE CONTRACTOR'S OPTION.
4. PLACE SLOPE ANCHOR ASSEMBLIES ON 6 M MAX. CENTERS. ON SLOPES 20 % OR GREATER.
5. PLATE MATERIAL TO BE ASTM A36M 6.3 MM GALVANIZE AFTER FABRICATION.

O.D.O.T. PIPE SLOPE ANCHOR

DRAWING NO. 580

REVISED 12-16

CleanWater Services

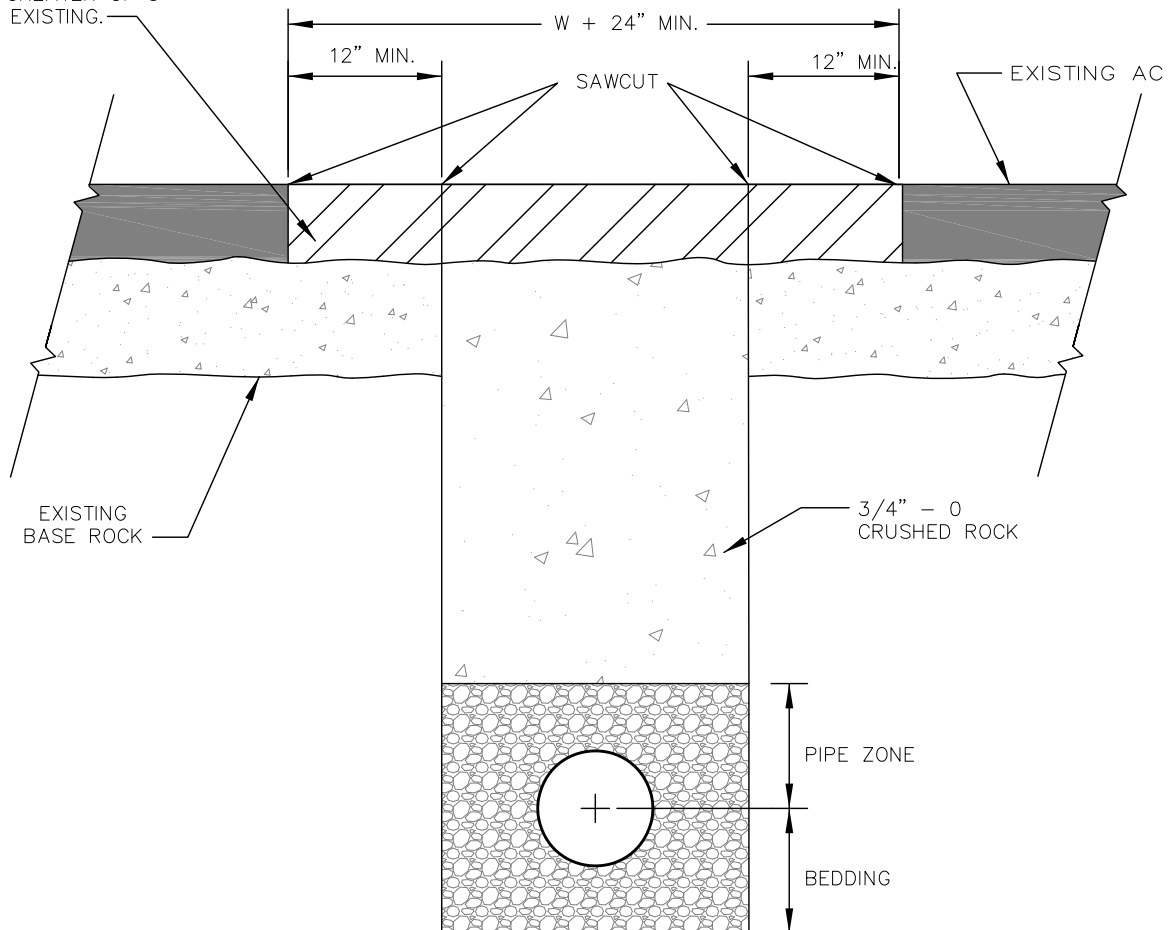


NOTE:

1. ALL COMPACTION REQUIREMENTS PER AASHTO T-99 AND ODOT/APWA SPEC 00405.
2. THE TRENCH WIDTH AT THE SURFACE OF THE GROUND SHALL BE KEPT TO A MINIMUM NECESSARY TO INSTALL THE PIPE IN A SAFE MANNER.
3. THE MINIMUM TRENCH WIDTH IN THE PIPE ZONE SHALL PROVIDE A CLEAR WORKING SPACE OF SIX INCHES OUTSIDE THE MAXIMUM OUTSIDE DIAMETER OF THE PIPE BEING INSTALLED.
4. IN ALL CASES, TRENCHES SHALL BE OF SUFFICIENT WIDTH TO ALLOW FOR SHORING, PROPER JOINING OF PIPE, AND BACKFILLING OF MATERIAL ALONG THE SIDES OF THE PIPE.

TRENCH BACKFILL DETAILS

TACK ALL EXPOSED MATERIAL.
PATCH AC TO GREATER OF 3"
THICKNESS OR EXISTING.



NOTE:

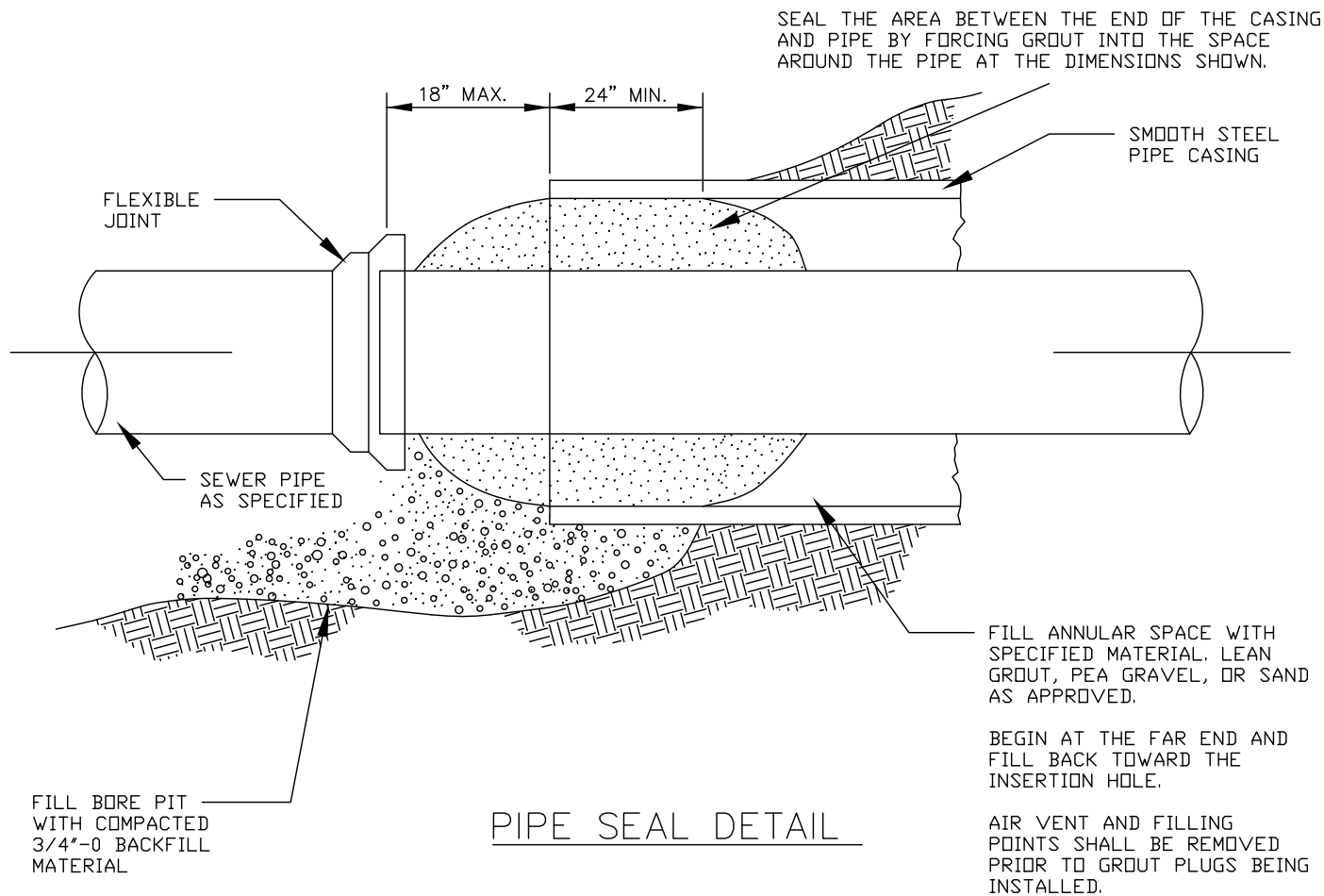
1. TEE CUT TO BE DONE AFTER EXCAVATION AND BACKFILL OF TRENCH.
2. SEE STD. DRAWING NO. 590 FOR BEDDING, PIPE ZONE, AND TRENCH BACKFILL.

T-CUT ASPHALT DETAILS

DRAWING NO. 600

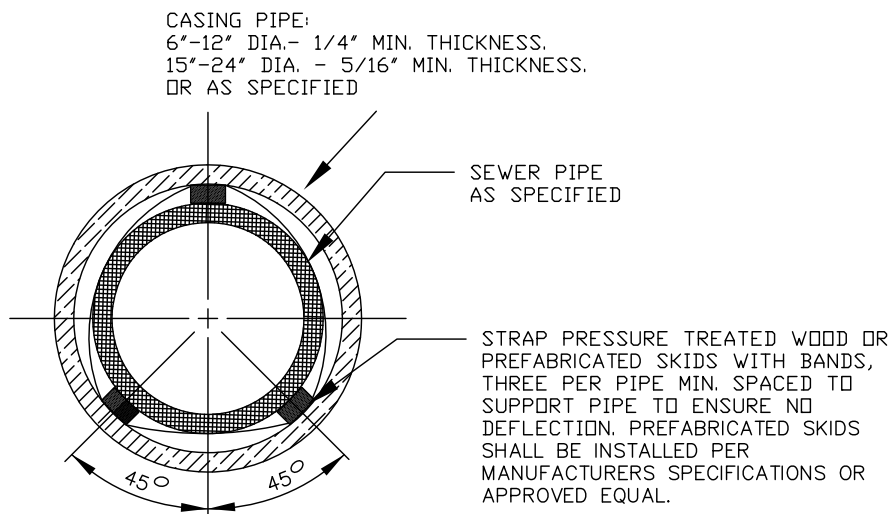
REVISED 12-16

CleanWater  Services

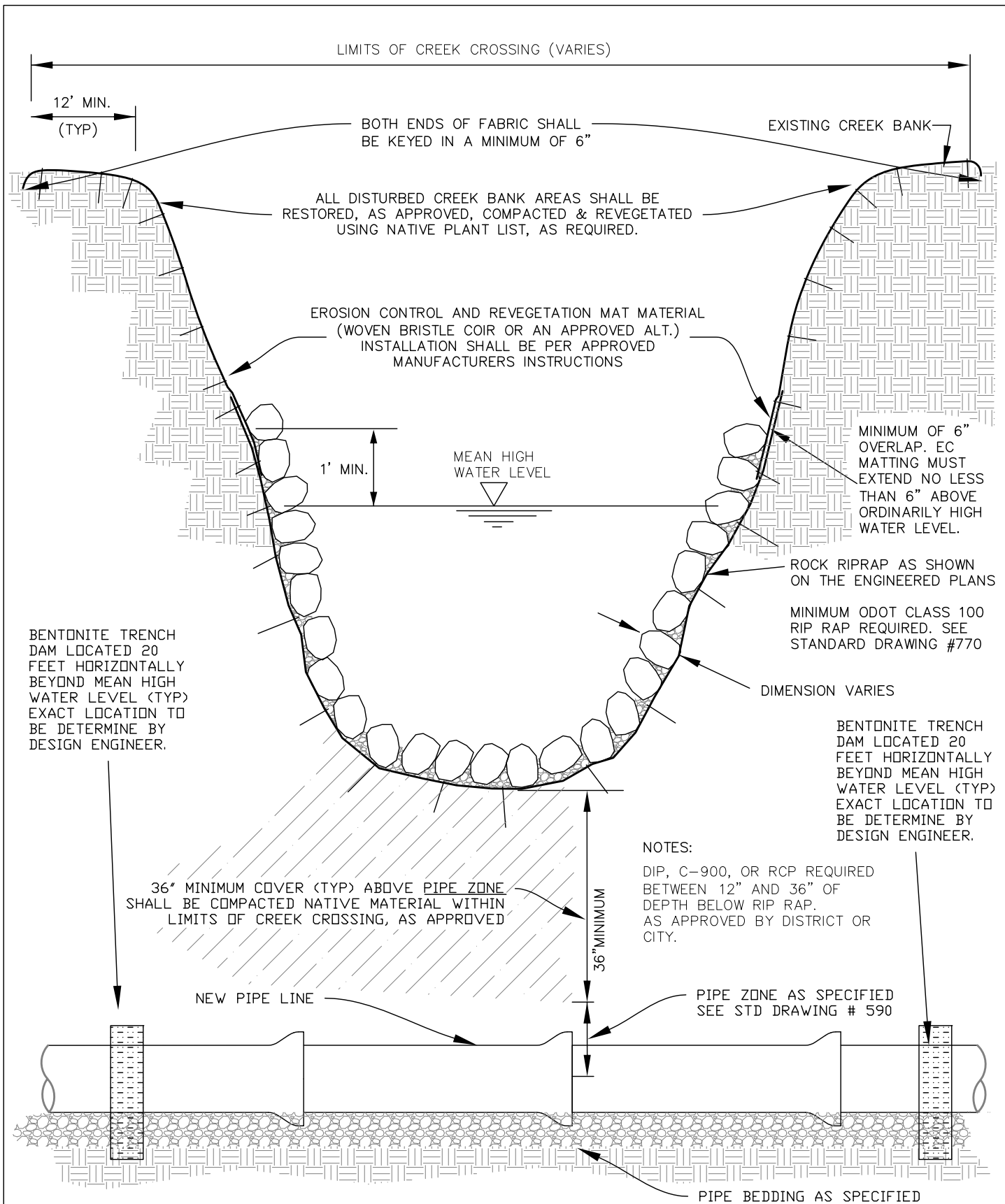


NOTES:

1. PROVIDE PIPE NIPPLE AT TOP OF CASING, AT EACH END OF CASING OR AS SPECIFIED, FOR FILLING AND VERIFYING FILLING OPERATION. (MIN DIAMETER SIZE 4")
2. GROUT SHALL BE PUMPED TO FILL VOIDS AROUND THE CASING DURING THE INSTALLATION. ENGINEER DESIGN REQUIRED.



BORE DETAIL

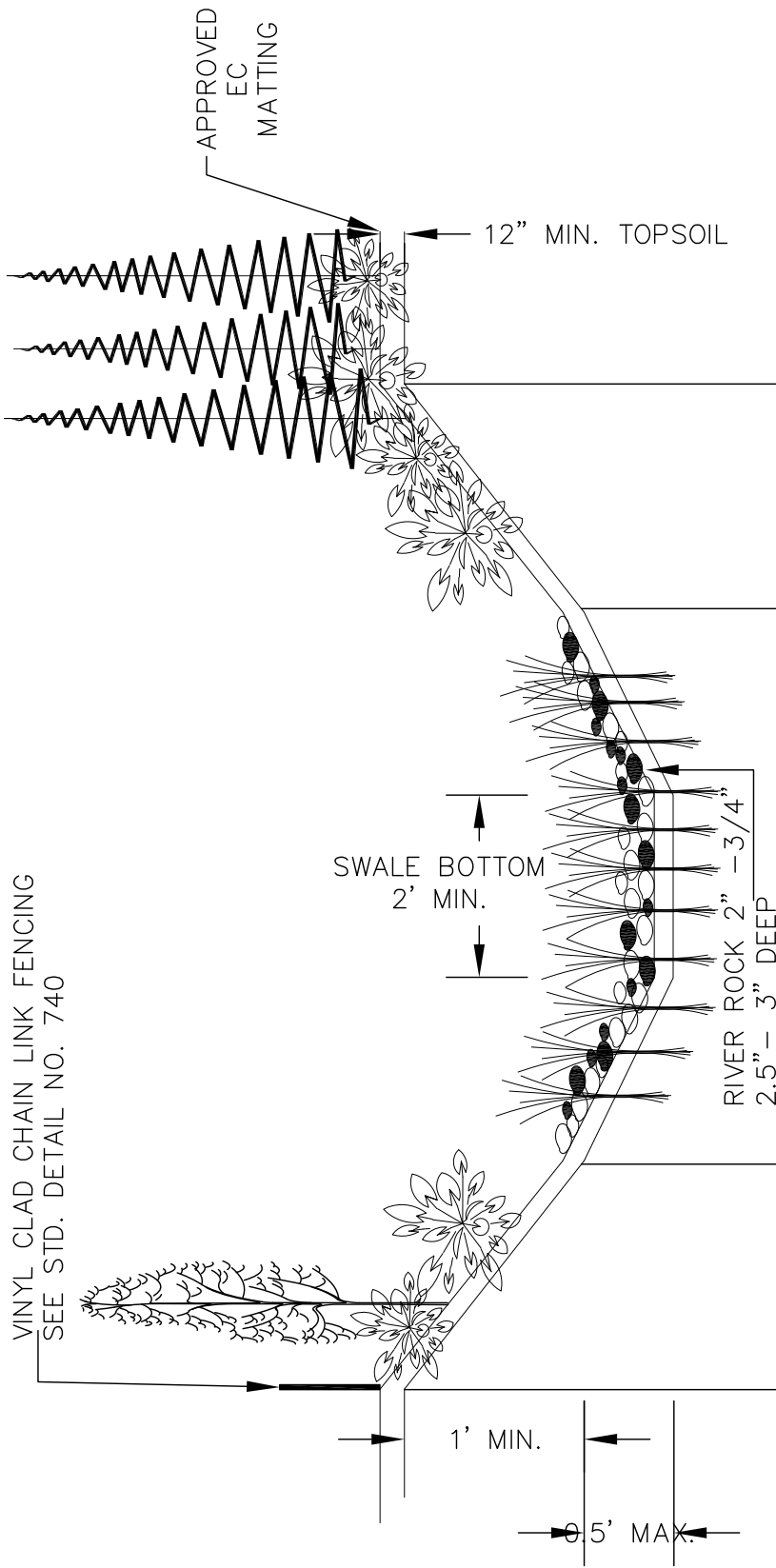


CREEK CROSSING RESTORATION

DRAWING NO. 620

REVISED 12-16





SWALE AREA	FREEBOARD AREA	TREATMENT AREA	FREEBOARD AREA	BUFFER/MITIGATION AREA
EC MATTING	ECONOJUTE*	COCONUT FIBER OR GEOJUTE PLUS*	ECONOJUTE*	ECONOJUTE* (S> 20%)
SEED MIX	LOW GROW MIX SEE NOTE #5	NONE	LOW GROW MIX SEE NOTE #5	AS APPROVED BY DISTRICT OR CITY
MAX. SLOPE	2.5:1	4:1	2.5:1	NA

* OR AS APPROVED

NOTES:

1. REFER TO APPENDIX A, CWS DESIGN & CONSTRUCTION STANDARDS, FOR LANDSCAPING REQUIREMENTS INCLUDING TREE PLACEMENT, TOPSOIL AND PLANTING SPECIFICATIONS.
2. PROVIDE IRRIGATION AS APPROVED BY CWS.
3. JUTE MATTING- GEOJUTE PLUS IN TREATMENT AREA, ECONOJUTE FOR ALL OTHER AREAS, OR SIMILAR FABRICS. COCONUT FIBER IS ALSO ACCEPTABLE.
4. 12-INCHES OF TOPSOIL SHALL BE PLACED THROUGHOUT THE WATER QUALITY TRACT.
5. FREEBOARD AREA SEED MIX, DWARF TALL FESCUE 40%, DWARF PERENNIAL RYE 30%, CREEPING RED FESCUE 25%, COLONIAL BENT GRASS 5%. APPLY AT A RATE OF 120# / ACRE.

WATER QUALITY SWALE

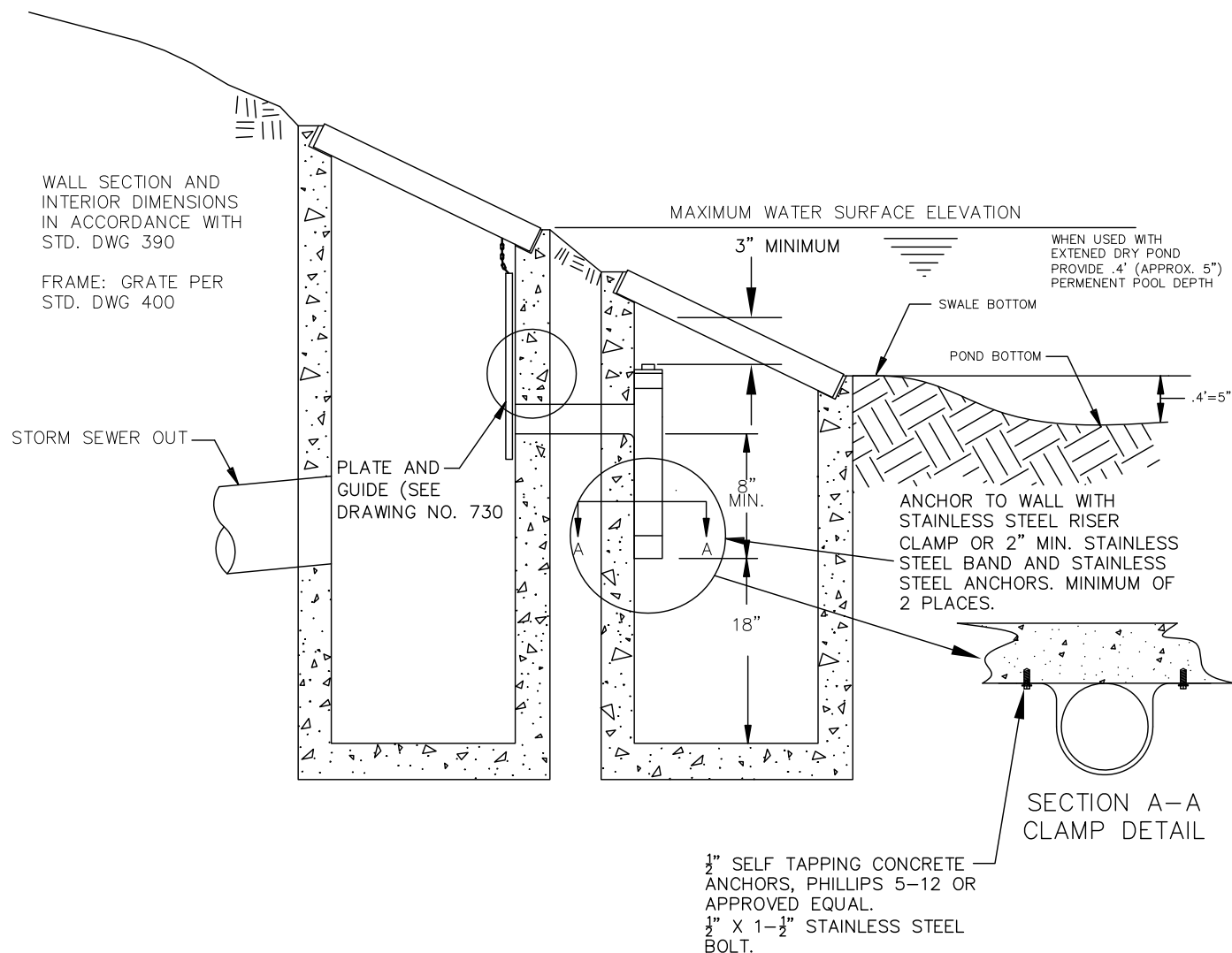
CONSTRUCTION

1. Water Quality Swale shall be over-excavated and filled to final grade with 12-inch amended topsoil. Topsoil amendments shall be garden compost, not conventional fertilizer amendments.
2. A biodegradable Erosion Control Matting shall be placed over the topsoil throughout the swale cross section, fabric shall be held in place in accordance with the manufacturer's installation requirements. Anchor spacing shall be based on 3 fps flow over the fabric.
 - a. Treatment area - high-density jute matting (Geojute Plus or other approved equal)
 - b. All other areas - low-density jute matting (Econo-jute or other approved equal)
3. 2.5-3 inches of 2"- $\frac{3}{4}$ " river run rock shall be placed over the matting evenly throughout the length and width of the swale.
4. Plant materials shall be placed in accordance with the plan and plant table as shown on approved plans.
5. The water quality swale treatment area plantings can be deemed "substantially complete" once active green growth has occurred to an average growth of 3" and plant density is an average of approx. 6 plants (minimum 1-inch plugs or equivalent) per square foot.
6. The facility shall be deemed acceptable to begin the maintenance period when plant growth and density matches the engineer's design as shown on the approved plans and all other requirements have been met. The engineer must certify the facility to be functional, in accordance with the approved plan design to begin the two-year maintenance period.

MAINTENANCE

1. The permittee is responsible for the maintenance of this facility for a minimum of two years following construction and acceptance of this facility per Chapter 2.
2. Irrigation is to be provided per separate irrigation plan as approved.

Note: Irrigation needs are to be met using a temporary irrigation system with a timer during the dry season. Systems should be winterized during the wet season to assure longevity and guard against damage from freezing temperatures. Water source shall be as shown on the approved plans.
3. Engineer or Owners Representative is to visit and evaluate the site a minimum of twice annually (Spring and Fall). The landscaping shall be evaluated and replanted as necessary to ensure a minimum of 80% survival rate of the required vegetation and 90% aerial coverage. Non-native, invasive plant species shall be removed when occupying more than 20% of the site.
4. The facility shall be re-excavated and planted if siltation greater than 3 inches in depth occurs within the two-year maintenance period.



NOTES:

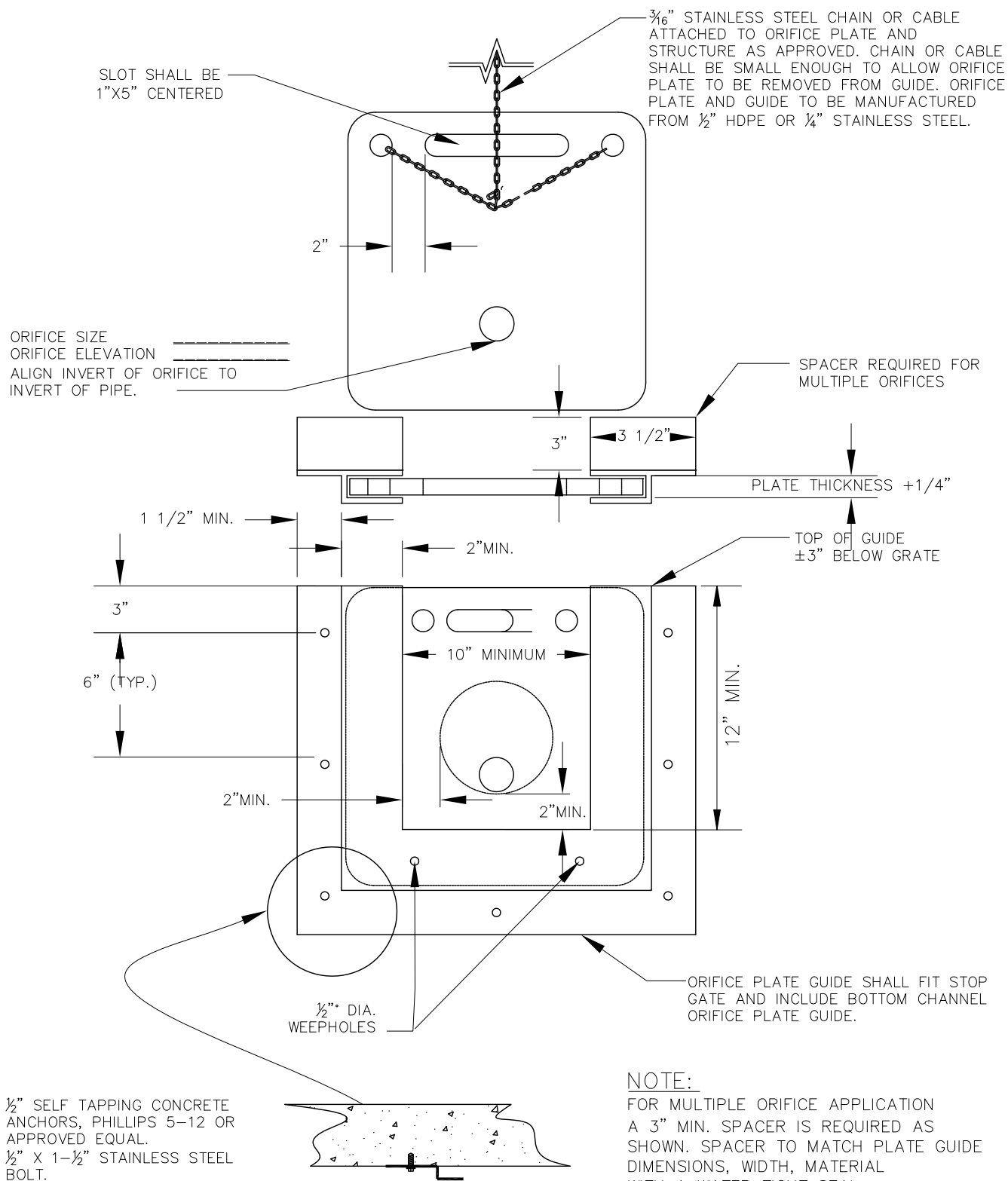
1. CONNECTING PIPE AND TEE SHALL BE 4", 6", OR 8" AWWA C-900 OR ASTM 3034 PVC, AND ONE SIZE LARGER THAN THE ORIFICE OPENING.
2. MAXIMUM ORIFICE OPENING SHALL BE 6" DIAMETER.
3. STRUCTURES SHALL CONFORM TO STANDARD DRAWING NO. 390 DITCH INLET.
4. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWING NO. 400, DITCH INLET FRAME AND GRATE.
5. PLATE AND GUIDE SHALL BE SECURED FLUSH AGAINST WALL OF STRUCTURE AS APPROVED.
6. MAINTENANCE ACCESS REQUIRED TO WITHIN 10' OF CENTER OF BOTH STRUCTURES.
7. FOR APPROVAL OF ALTERNATE STRUCTURES SEE SECTION 1.17.

OUTFLOW CONTROL STRUCTURE

DRAWING NO. 720

REVISED 11-06

CleanWater  Services



ORIFICE PLATE AND GUIDE

DRAWING NO. 730

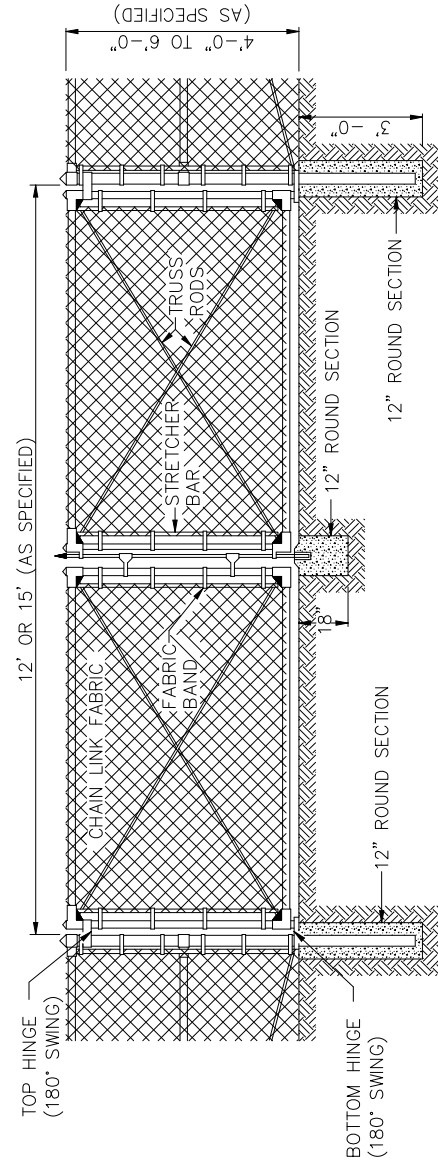
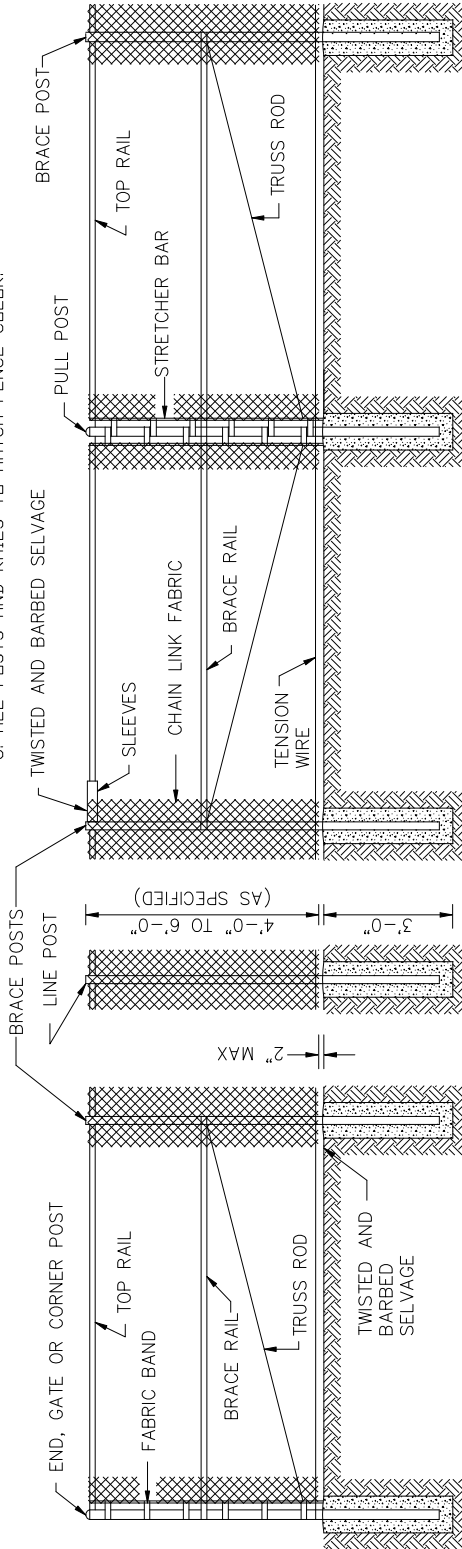
REVISED 12-06

CleanWater  Services

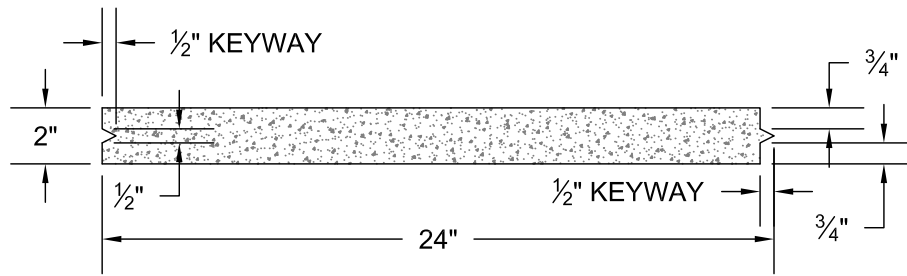
NOTES:

1. ALL FITTINGS, FASTENERS, & AND FABRIC TIES SHALL BE HOT DIP GALV.
2. CONC SHALL BE MIN 2500 PSI @ 28 DAYS.
3. PROVIDE BRACE RAIL BETWEEN END POSTS AND LINE POSTS. LENGTHS AS REQ'D.
4. PROVIDE GATE STOPS AND DROP RECEIVERS SET IN CONCRETE, EACH GATE.
5. PROVIDE EXTENSION ARMS ON LINE, END AND CORNER POSTS & GATE POSTS AS REQ'D.
6. PROVIDE SIGHT OBSCURING SLATS WITH ALL WASTEWATER PUMP STATIONS.
7. CENTER BRACE RAIL NOT REQUIRED WITH FENCE HEIGHT OF 5' OR LESS.
8. ALL POSTS AND RAILS TO MATCH FENCE COLOR.

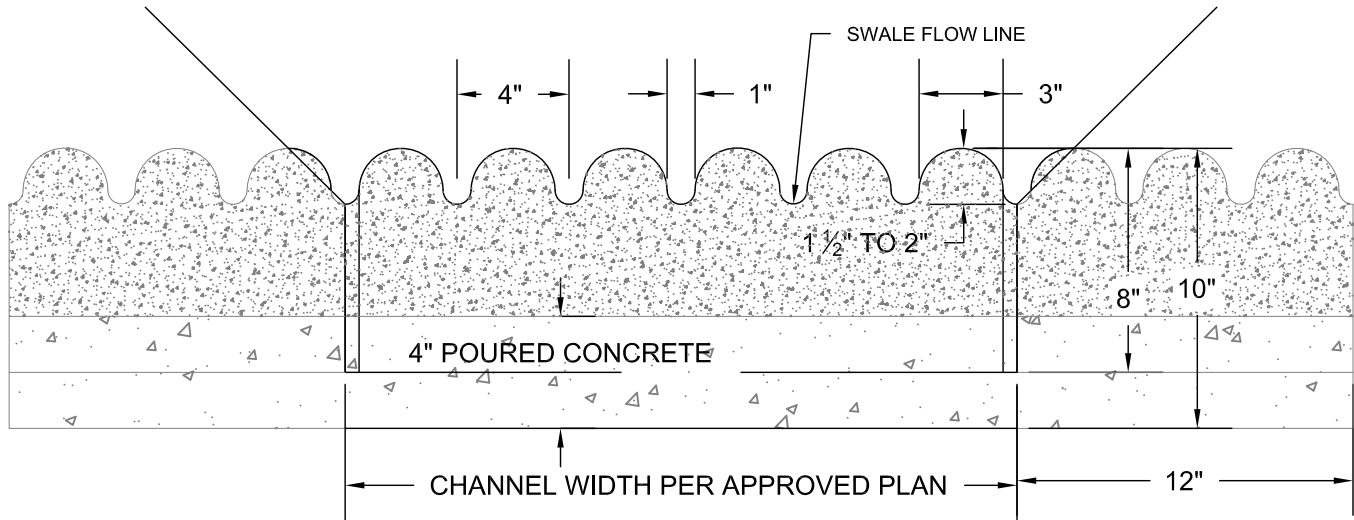
MEMBER	NOMINAL DIA (IN)	MATERIAL
BRACE RAIL	1.660	GALV TUBULAR STL
GATE FRAME	2.00	GALV TUBULAR STL
LINE POSTS	2.375	GALV TUBULAR STL
END & CORNER POST	2.875	GALV TUBULAR STL
CHAIN LINK FABRIC	9 GA. W/GREEN OR BLACK PVC COATING.	
GATE POST	GATE OPENING (ft)	NOMINAL DIA (IN)
	12' OR 15'	4
		GALV TUBULAR STL



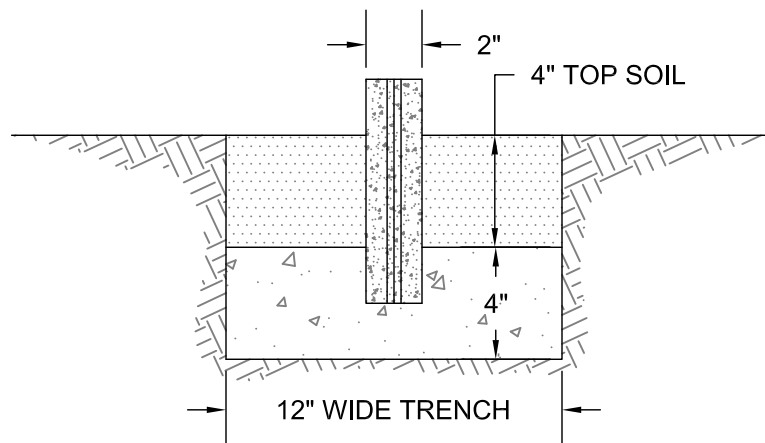
CHAIN LINK FENCE AND GATE



TOP VIEW



FRONT VIEW



SIDE VIEW

CONCRETE SPREADER DETAIL

DRAWING NO. 750

REVISED 11-06

CleanWater  Services

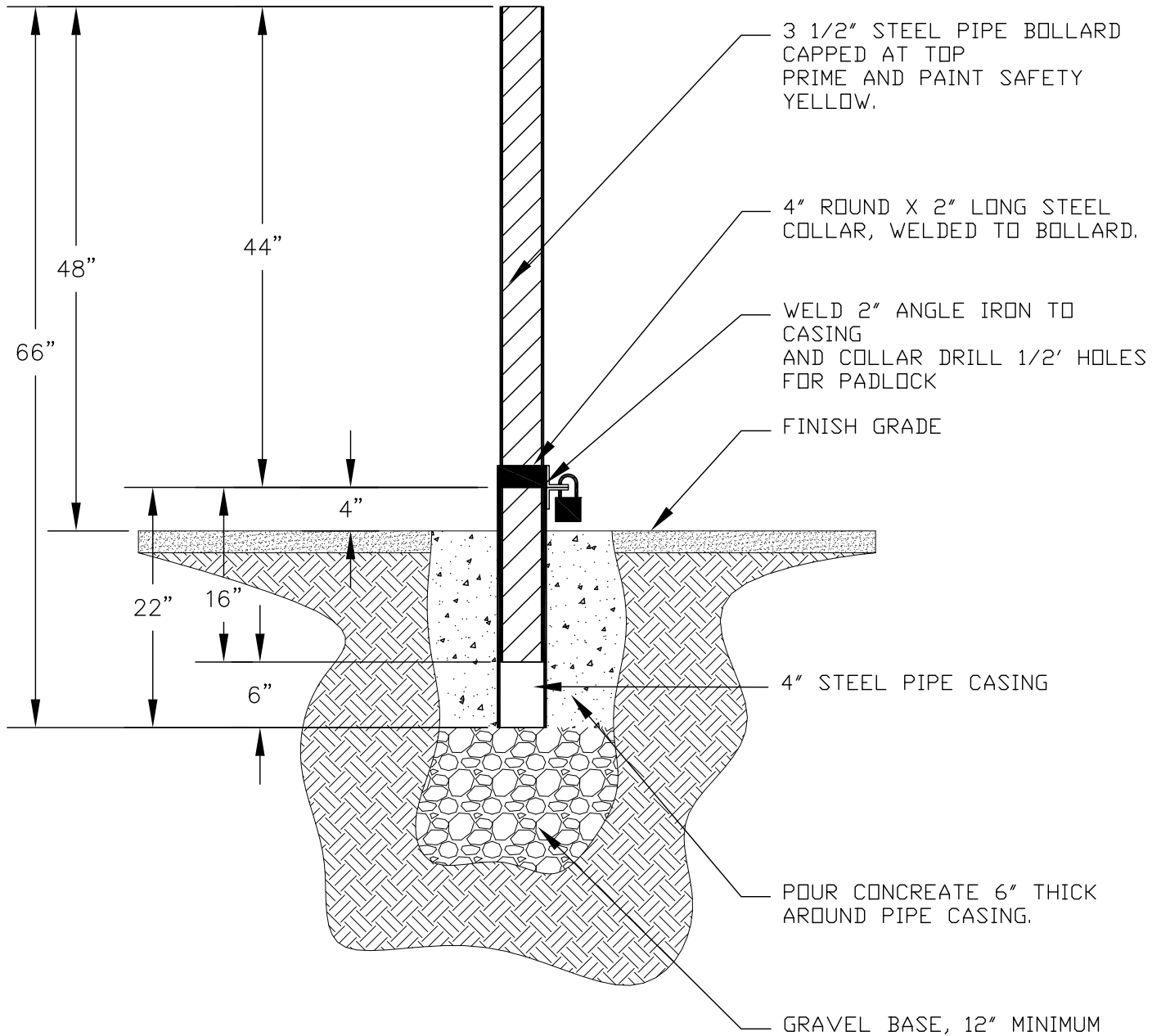
STEEL PIPE SPECIFICATIONS

ASTM A-53 STEEL, SCHEDULE 40,

BLACK, HOT DIPPED, ZINC-COATED, WELDED, SEAMLESS

4-INCH STEEL PIPE O.D. = 4.500" I.D. = 4.026" THICKNESS = 0.237"

3 1/2-INCH STEEL PIPE O.D. = 4.000" I.D. = 3.549" THICKNESS = 0.226"



REMOVABLE BOLLARD

DRAWING NO. 760

REVISED 12-06

CleanWater  Services

RIPRAP:

- ROCK FOR RIPRAP SHALL BE ANGULAR IN SHAPE.
- THICKNESS OF A SINGLE ROCK SHALL NOT BE LESS THAN ONE-THIRD ITS LENGTH.
- ROUNDED ROCK WILL NOT BE ACCEPTED UNLESS APPROVED BY THE DISTRICT.

RIPRAP INSTALLATION:

- EXCAVATE BELOW FINISH GRADE TO DEPTH & DIMENSIONS SHOWN ON APPROVED PLANS.
- INSTALL WOVEN GEOTEXTILE FABRIC.
- PLACE RIP RAP TO FINISH GRADE.

- GRADE RIPRAP SHALL BE THE CLASS AND SIZE OF ROCK ACCORDING TO THE FOLLOWING:

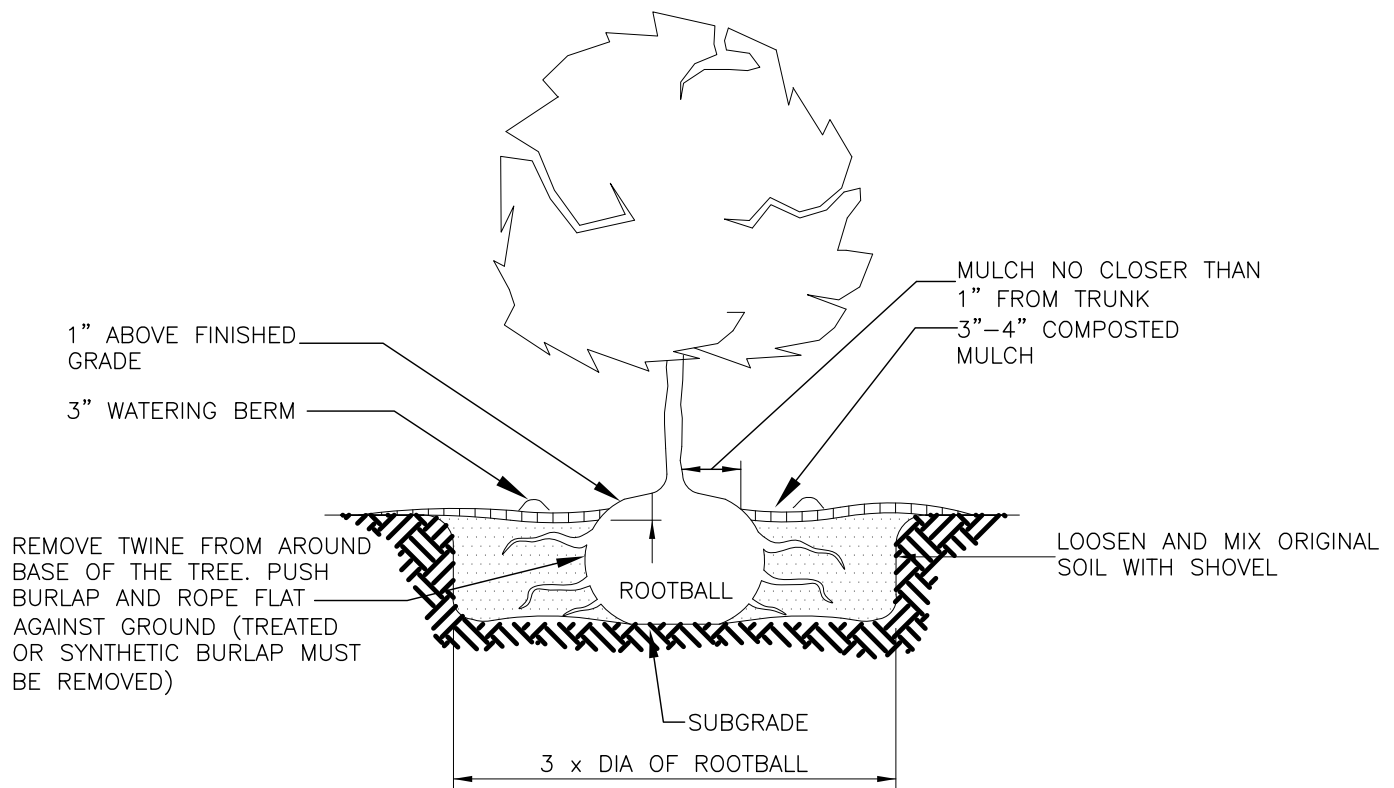
CLASS	CLASS	CLASS	CLASS	CLASS	
50	100	200	700	2000	
WEIGHT OF ROCK (LBS)					PERCENT (BY WEIGHT)
50-30	100-60	200-140	700-500	2000-1400	20
30-15	60-25	140-80	500-200	1400-700	30
15-2	25-2	80-8	200-20	700-40	40
2-0	2-0	8-0	20-0	40-0	10

RIP RAP DETAILS

DRAWING NO. 770

REVISED 3-07

CleanWater  Services



NOTE: IF TREE IS CONTAINER GROWN STOCK, BREAK ROOT BALL APART BEFORE PLACING IN PLANTING HOLE. IF PLANT IS ROOT BOUND MAKE A VERTICAL CUT THROUGH THE LOWER 1/4 OF THE SOIL MASS. PULL OUT AND STRAIGHTEN LARGE, CIRCLING ROOTS.

TREE PLANTING— CONTAINER/ BURLAPPED

DRAWING NO. 780

REVISED 01-07

CleanWater  Services



12"X18" SIGNS SHALL BE PLACED IN A MANNER AS TO CLEARLY IDENTIFY THE SENSITIVE AREA AND VEGETATED CORRIDOR AS WELL AS AT ALL POINTS OF ENTRY SUCH AS THE BEGINNING OF PATHS. TRAIL HEADS AND ANY PLACE THAT THE PUBLIC MAY WANT OR BE ABLE TO ENTER AREA.



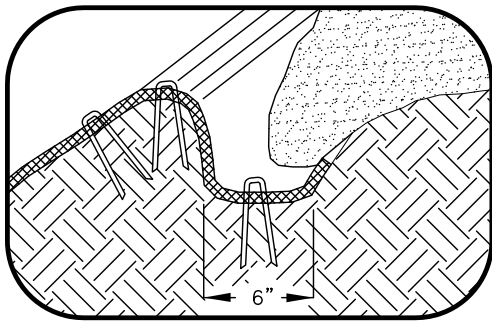
4"X4" SIGNS SHALL BE USED FOR AREAS WHERE A LARGE NUMBER OF SIGNS ARE NEEDED SUCH AS THE BACK OR SIDE YARDS ON EACH LOT ADJACENT TO THE SENSITIVE AREA OR VEGETATED CORRIDOR IN NEW SUBDIVISIONS OF PARTITIONS.

VEGETATED CORRIDOR SIGNAGE

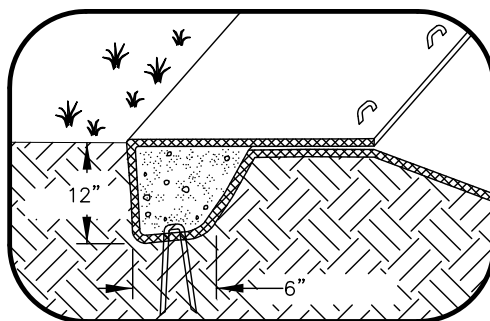
DRAWING NO. 790

REVISED 12-06

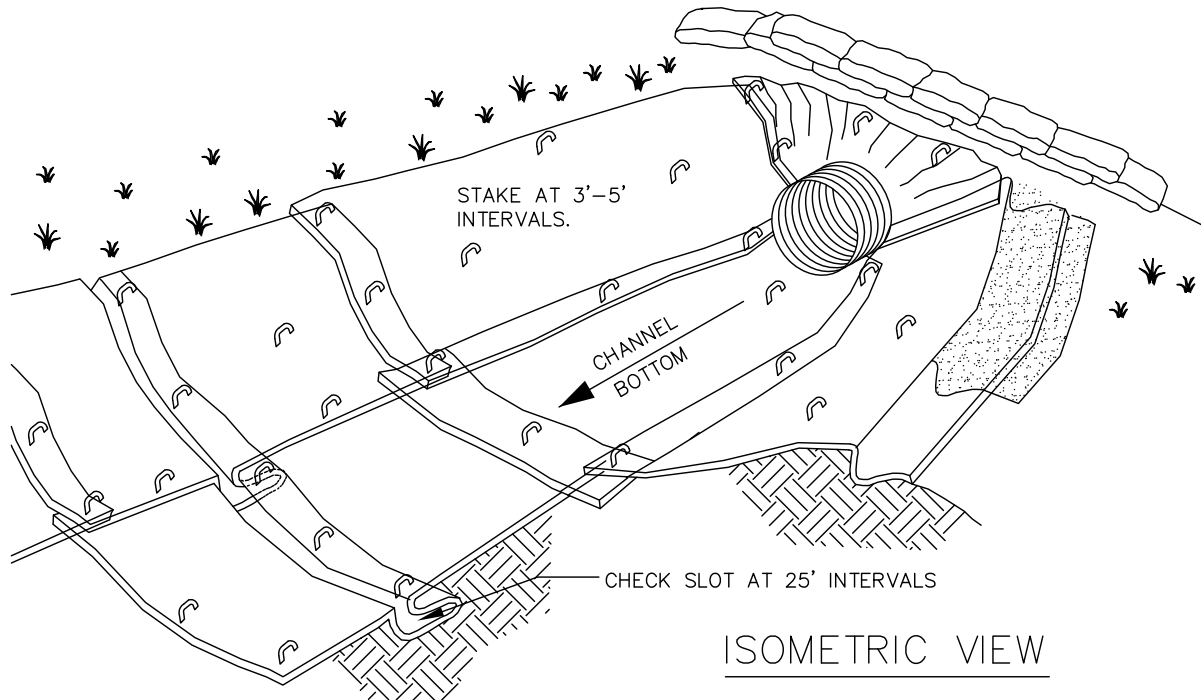
CleanWater  Services



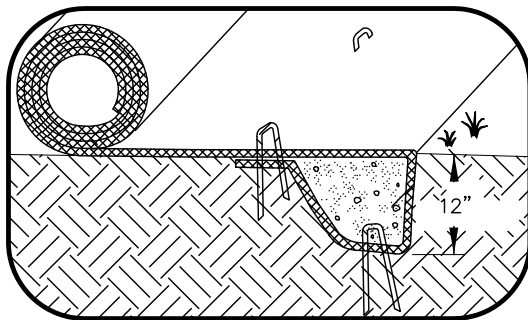
LONGITUDINAL
ANCHOR TRENCH



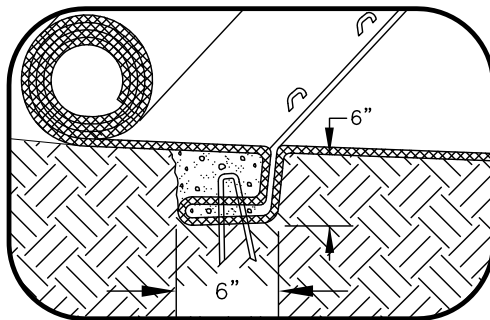
TERMINAL SLOPE AND
CHANNEL ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL
ANCHOR TRENCH



INTERMITTENT CHECK
SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

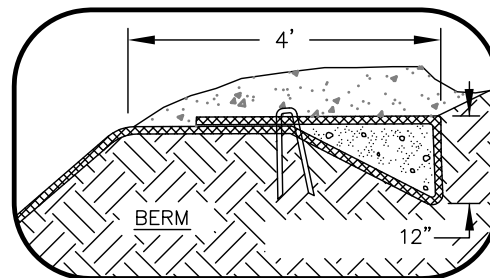
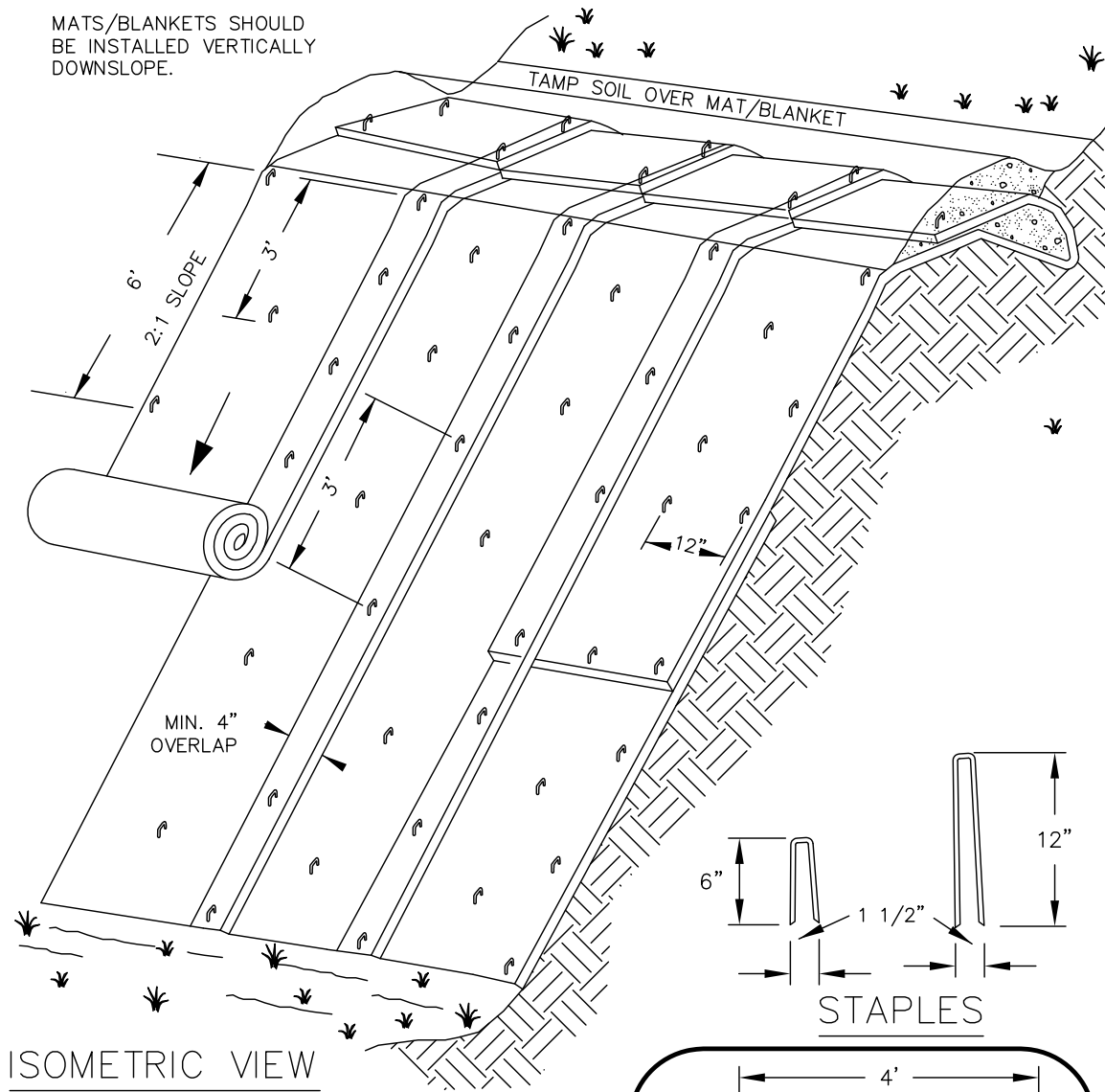
MATting CHANNEL INSTALLATION

DRAWING NO. 800

REVISED 12-16

CleanWater  Services

MATS/BLANKETS SHOULD
BE INSTALLED VERTICALLY
DOWNSLOPE.



NOT TO SCALE

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

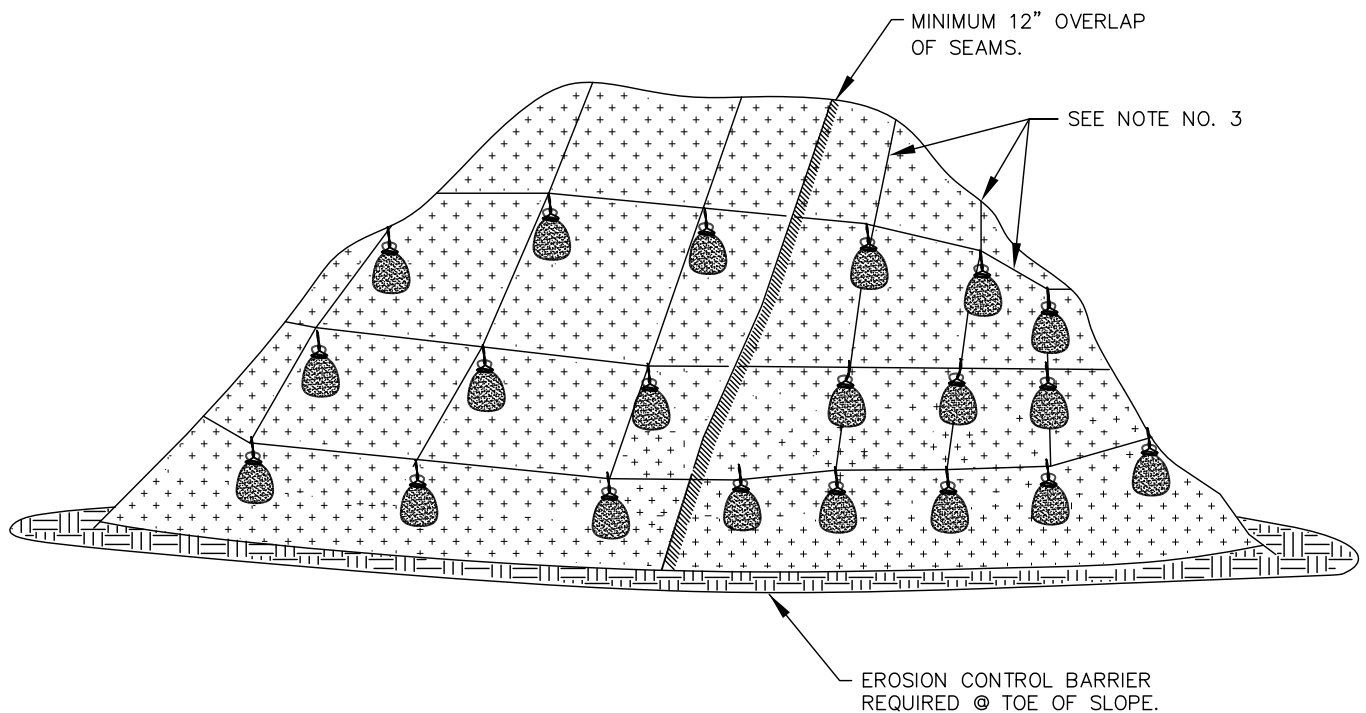
MATTING SLOPE INSTALLATION

DRAWING NO. 805

REVISED 12-16

CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



PLASTIC SHEETING

NOTES:

1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR APPROVED EQUAL ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.
4. PLASTIC TO EXTEND MINIMUM 1' BEYOND TOE OF SLOPE

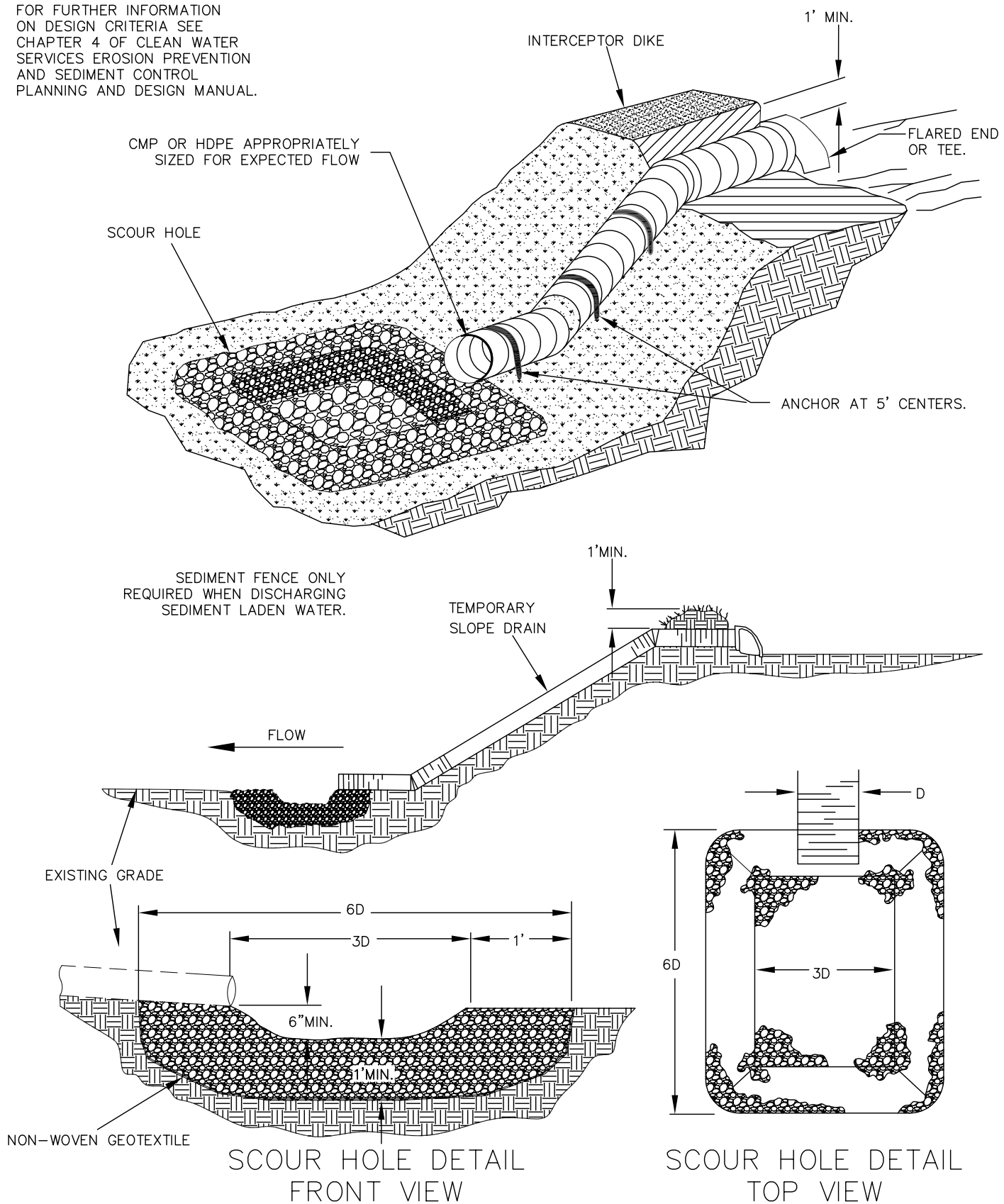
PLASTIC SHEETING

DRAWING NO. 810

REVISED 12-16

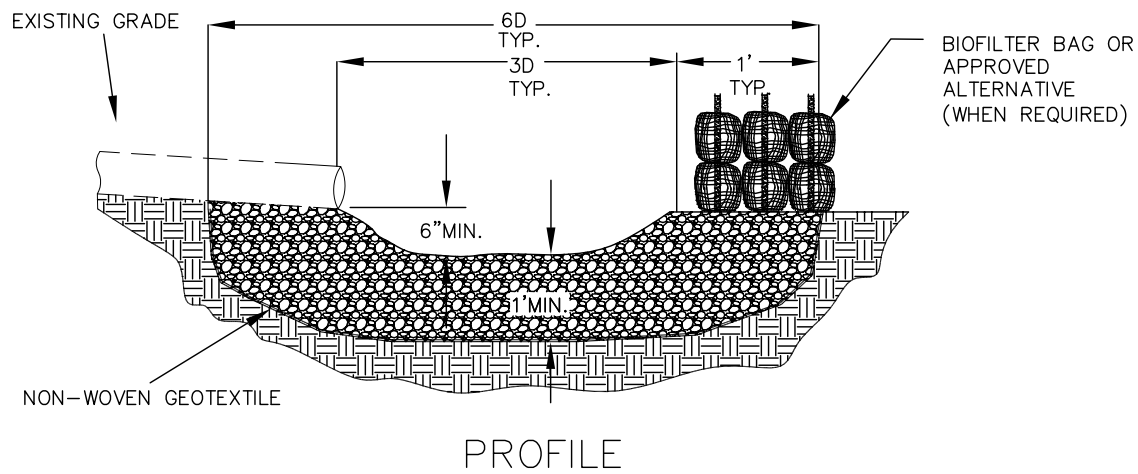
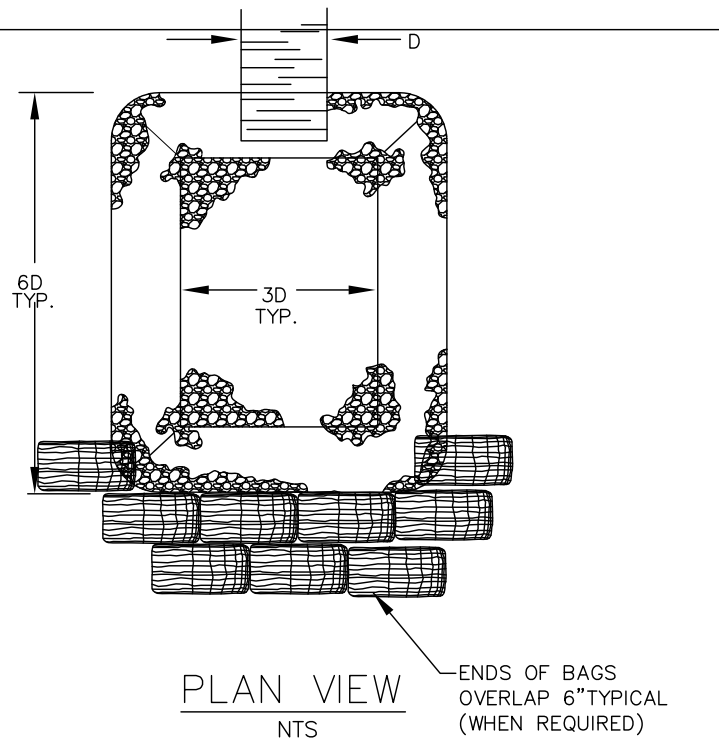
CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



PIPE SLOPE DRAIN

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



NOTES:

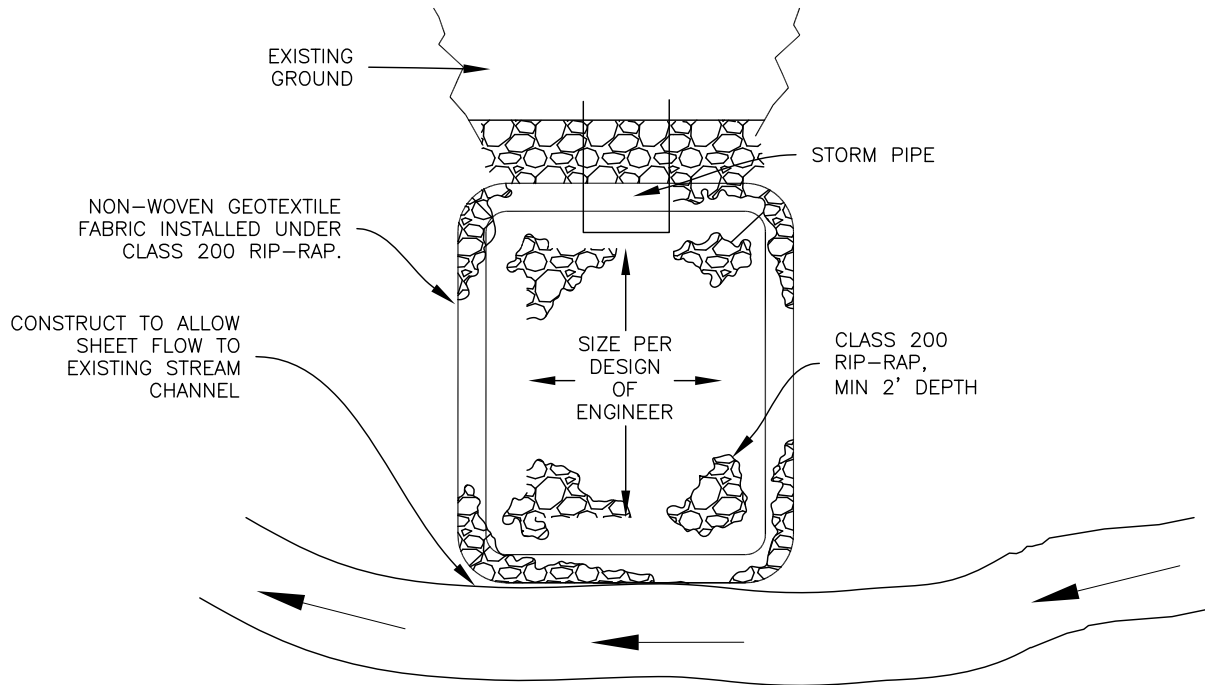
1. BIO BAGS ONLY REQUIRED WHEN DISCHARGING SEDIMENT LADEN WATER.
2. STAKING OF BAGS REQUIRED WITH EITHER METHOD USING (2) 1"x 2" WOOD STAKES OR APPROVED EQUAL PER BAG.

OUTLET PROTECTION RIP RAP

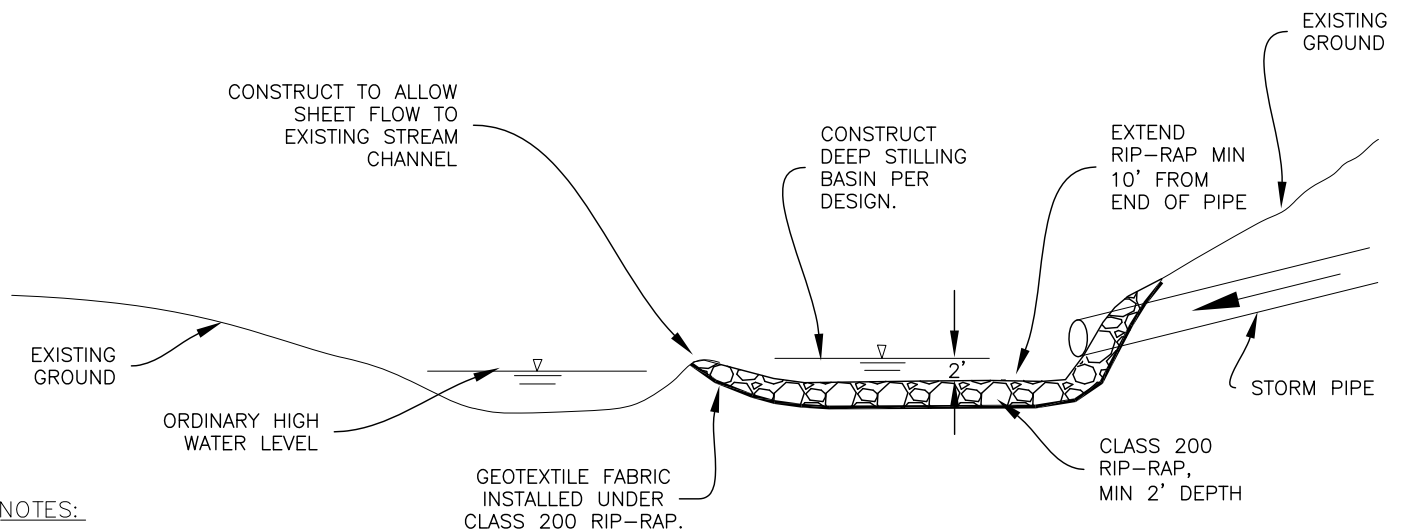
DRAWING NO. 820

REVISED 12-16

CleanWater  Services



PLAN VIEW
NTS



NOTES:

1. CONTRACTOR TO COMPLY WITH CONDITIONS AND REQUIREMENT OF DSL AND CORPS PERMITS.

PROFILE

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

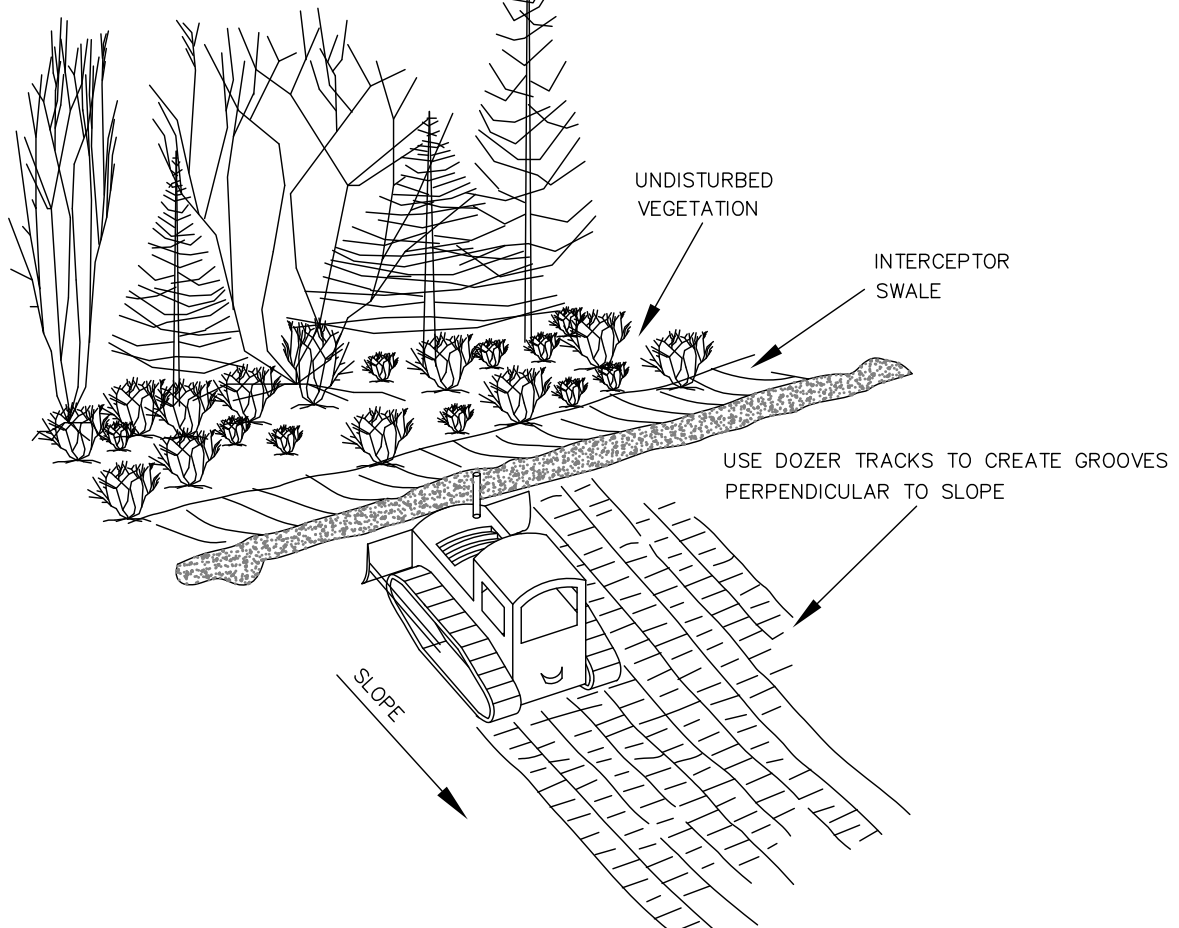
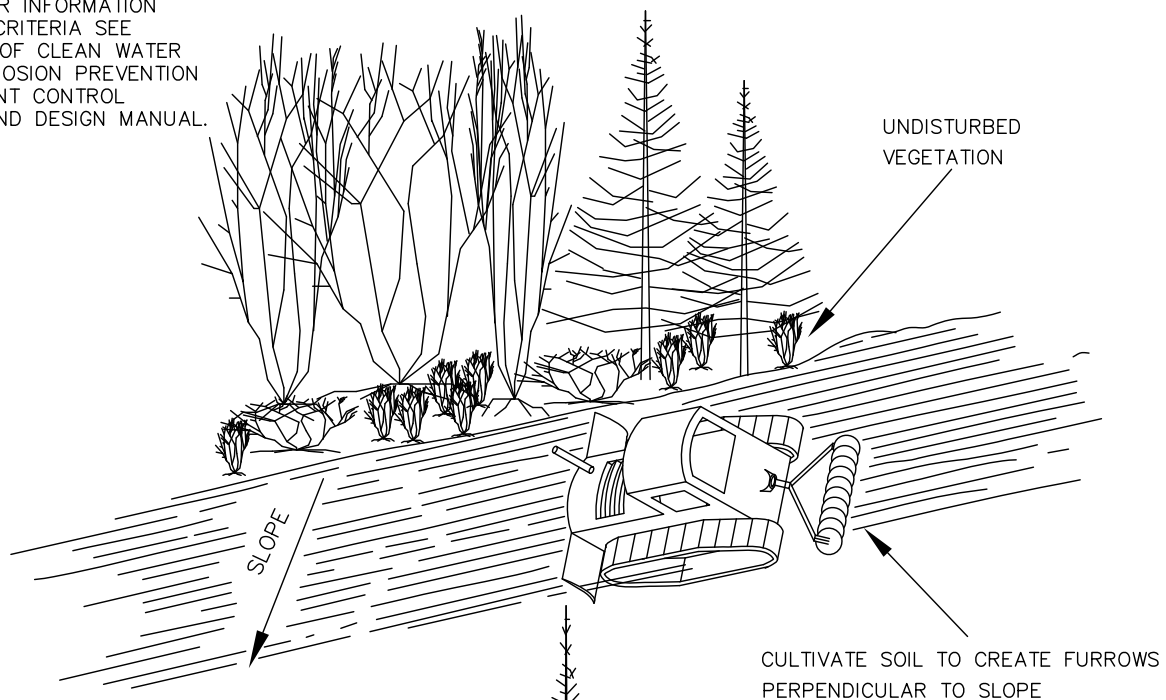
OUTLET PROTECTION STILLING BASIN

DRAWING NO. 825

REVISED 12-16

CleanWater Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



SURFACE ROUGHENING CAT TRACKING

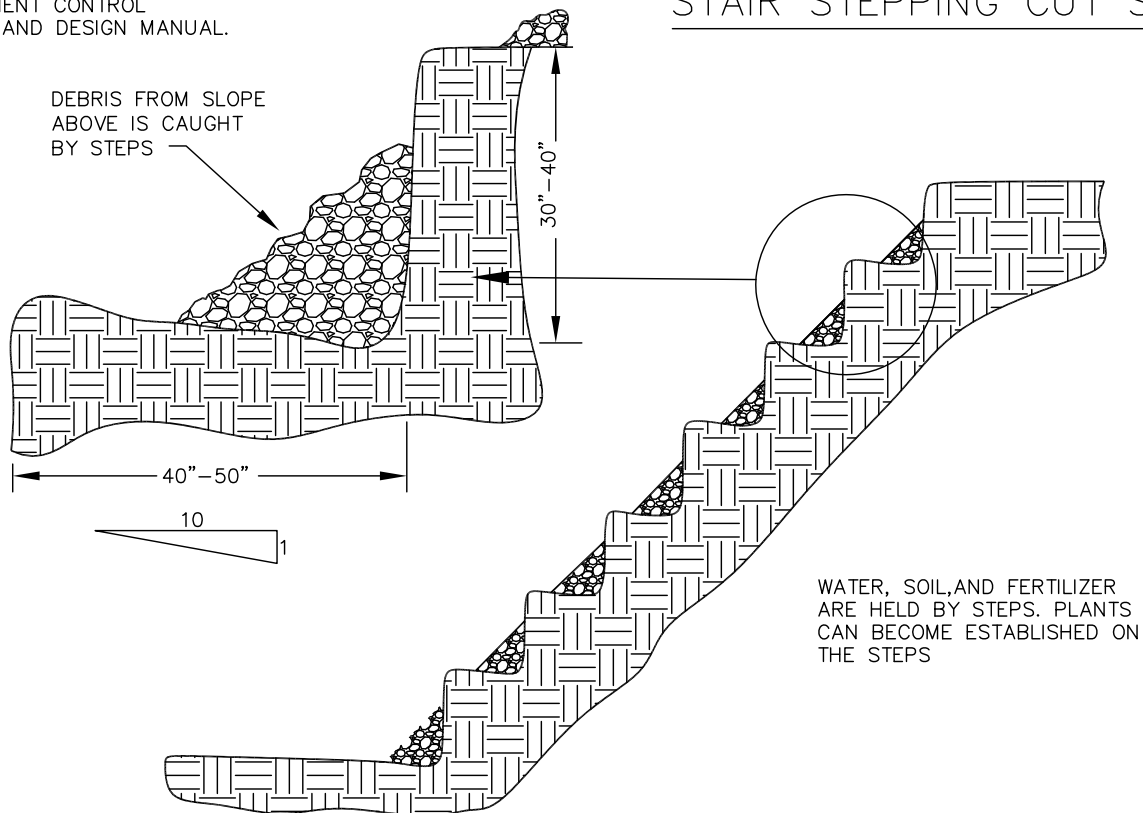
DRAWING NO. 830

REVISED 12-16

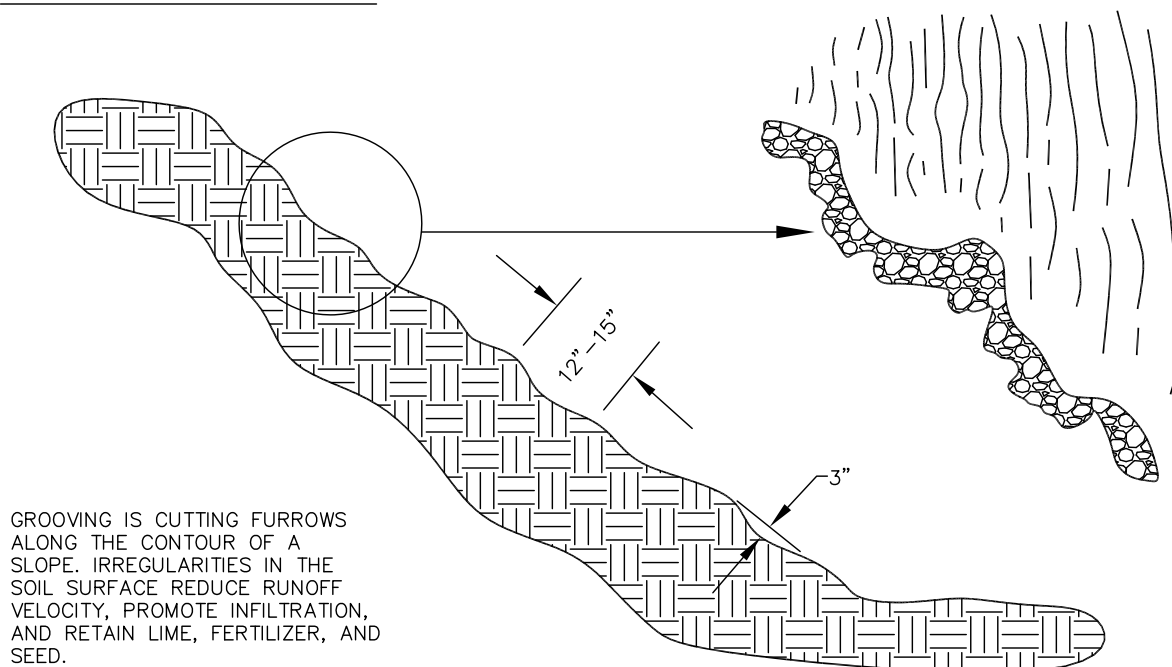
CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

STAIR STEPPING CUT SLOPES



GROOVING SLOPES



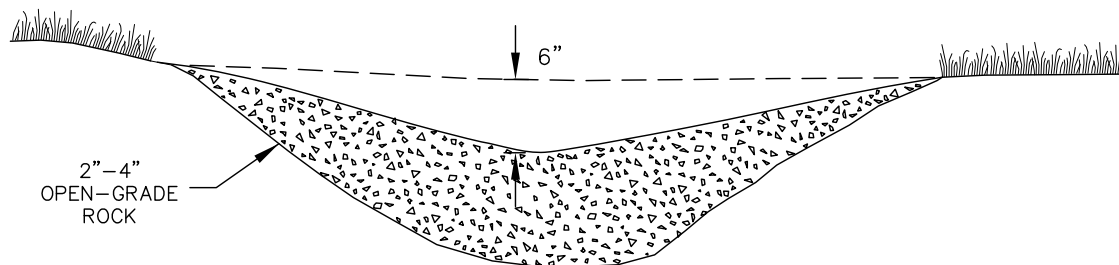
SURFACE ROUGHENING STAIR STEPPING/GROOVING SLOPES

DRAWING NO. 835

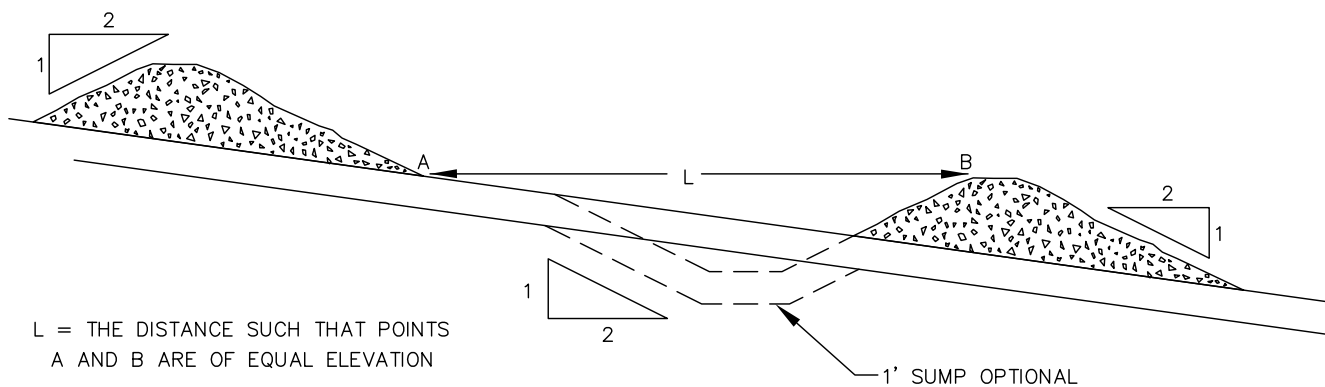
REVISED 12-16

CleanWater Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



ROCK CHECK DAM

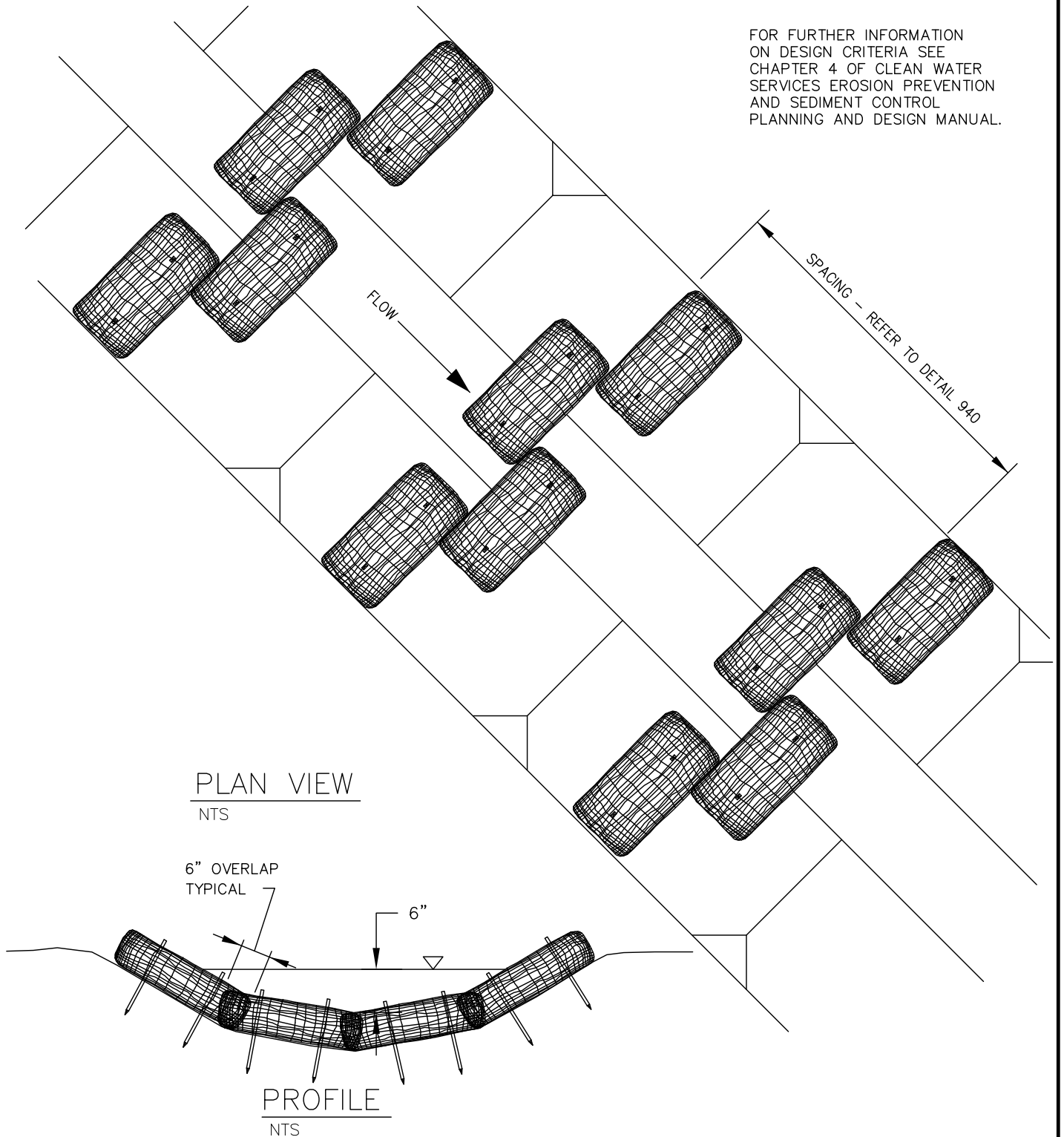


SPACING BETWEEN CHECK DAMS

CHECK DAM
ROCK

CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



NOTES:

1. STAKING OF BAGS REQUIRED USING (2) 1"x2" WOOD STAKES OR APPROVED EQUAL PER BAG.
2. SURFACE MUST BE SMOOTH BEFORE APPLICATION.
3. CHECK DAMS CAN BE CONSTRUCTED USING STRAW WATTLES OR OTHER MATERIALS AS APPROVED BY THE DISTRICT OR CITY.

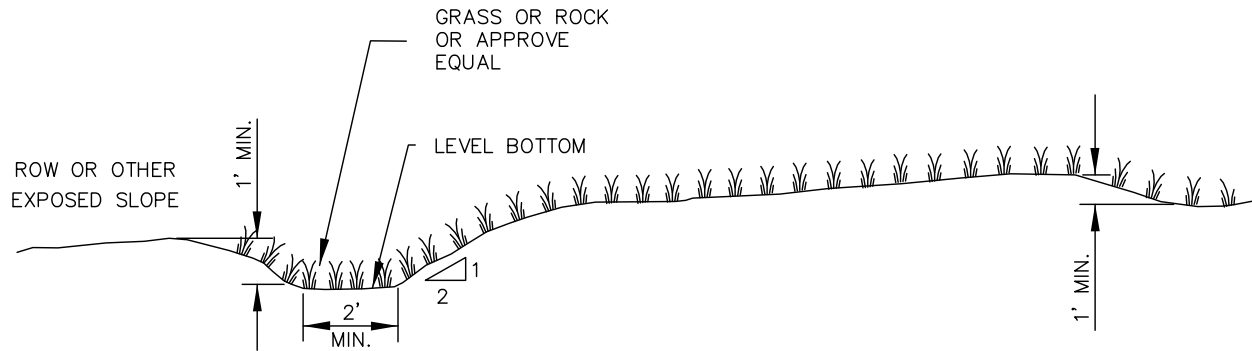
CHECK DAM BIO-FILTER BAG

DRAWING NO. 845

REVISED 12-16

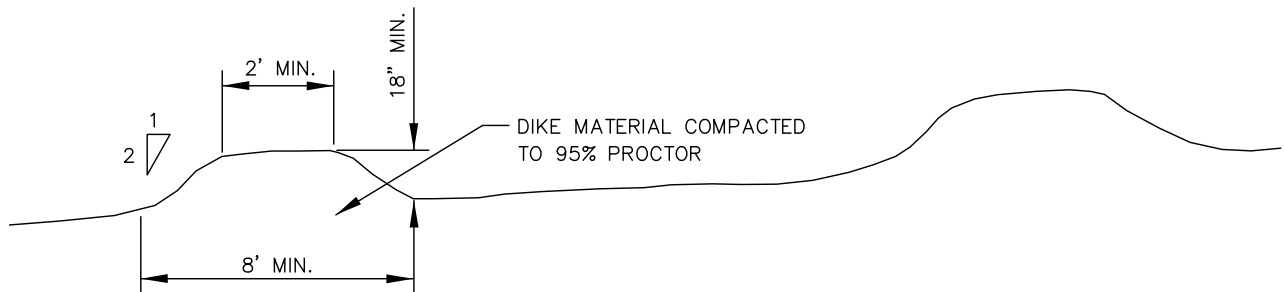
CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



BOTTOM WIDTH	2 FEET MINIMUM; THE BOTTOM WIDTH SHALL BE LEVEL
DEPTH	1 FOOT MINIMUM
SIDE SLOPE	2H:1V OR FLATTER
GRADE	MAXIMUM 5 PERCENT, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET (SUCH AS SEDIMENTATION POND)

DIVERSION SWALE



TEMPORARY DIVERSION DIKE

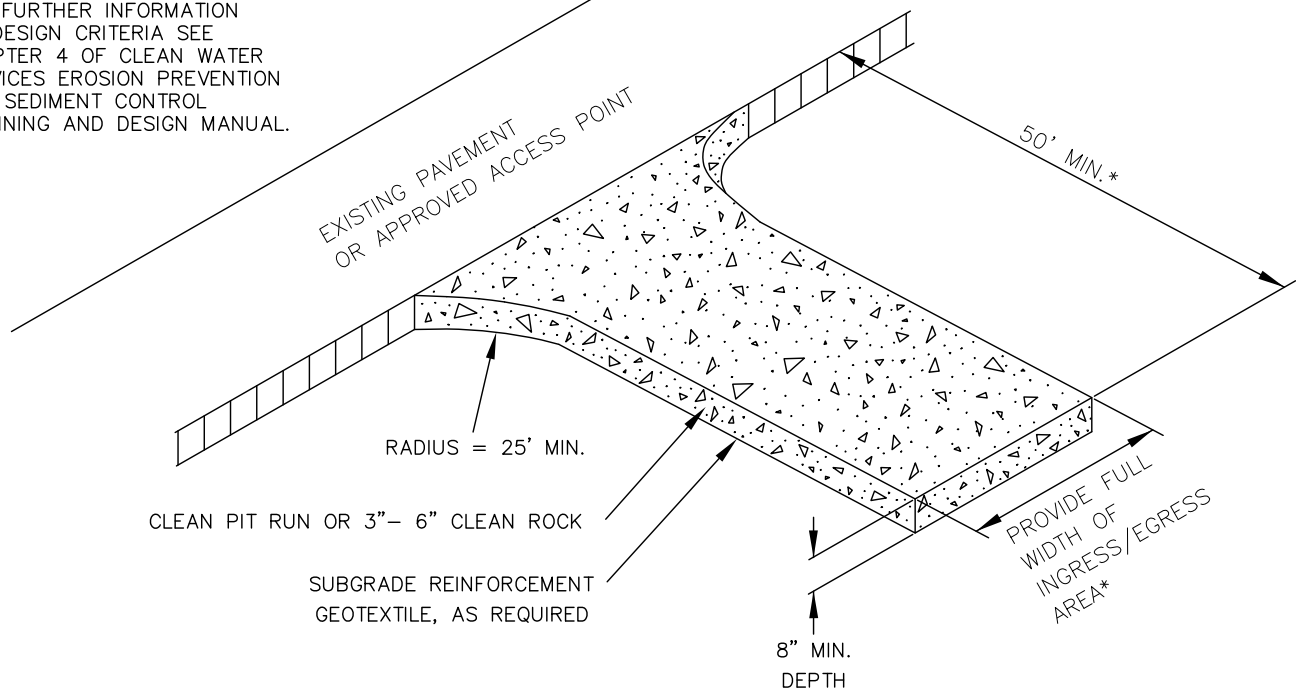
<u>SLOPE</u>	<u>SPACING</u>
<5%	300 FEET
5-10%	200 FEET
10-40%	100 FEET

NOTES:

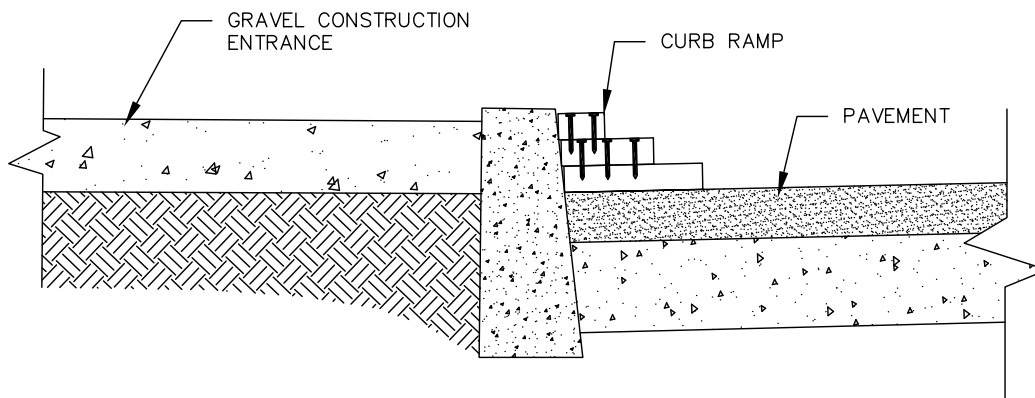
1. IMMEDIATELY UPON CONSTRUCTION, ESTABLISHED VEGETATION OR EROSION CONTROL BLANKETS ARE REQUIRED.

DIVERSION DIKE / SWALE

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



*20' MIN. FOR SINGLE FAMILY AND DUPLEX RESIDENTIAL



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. WHERE RUNOFF CONTAINING SEDIMENT LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM.
5. DIMENSIONS
 - SINGLE FAMILY
20' LONG BY 20' WIDE 8" DEEP OF $\frac{3}{4}$ " MINUS CLEAN ROCK.
 - COMMERCIAL
50' LONG BY 20' WIDE 3-6" CLEAN ROCK, GOVERNING AUTHORITY MAY REQUIRE GEOTEXTILE FABRIC TO PREVENT SUB-SOIL PUMPING.

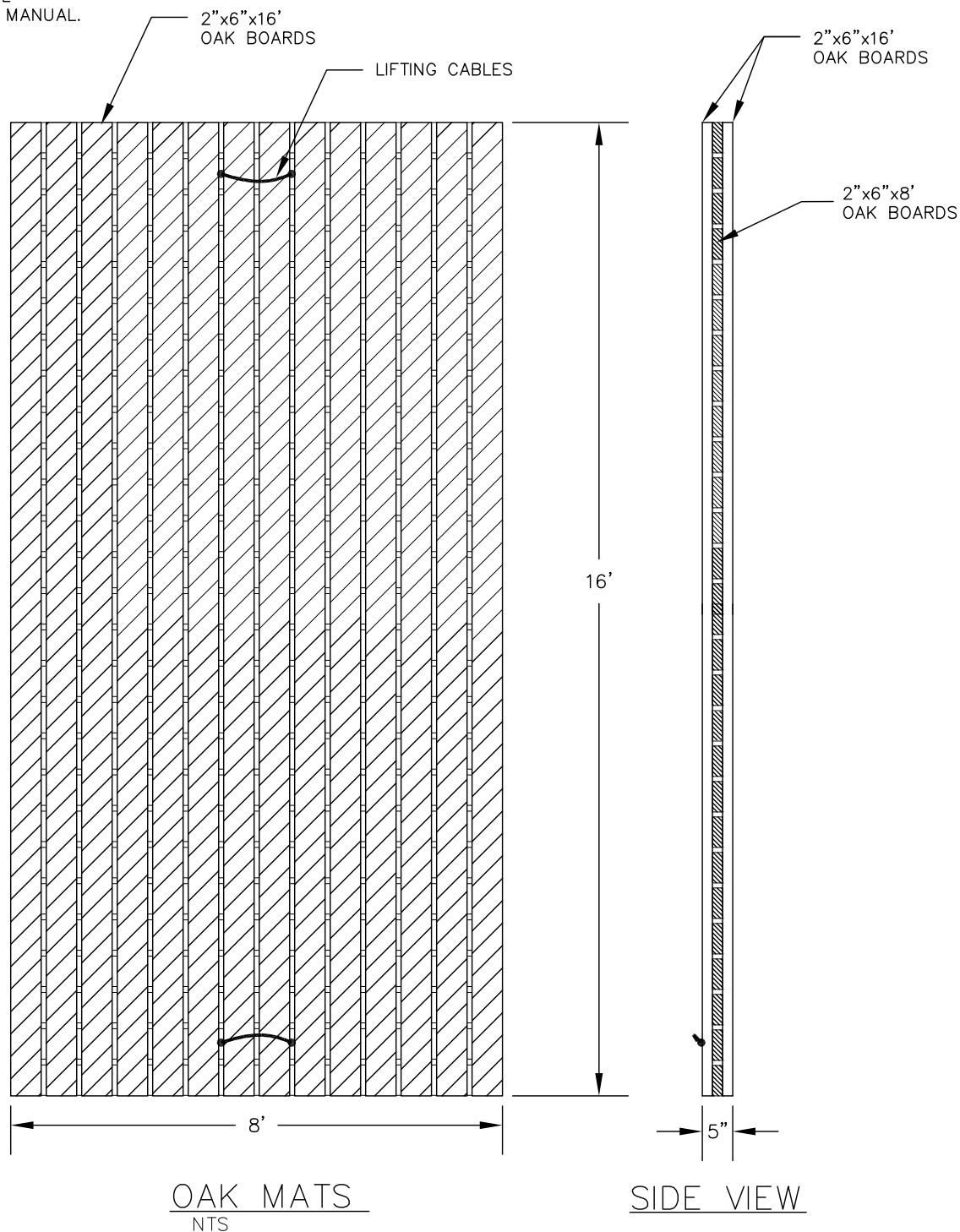
CONSTRUCTION ENTRANCE

DRAWING NO. 855

REVISED 12-16

CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



NOTES:

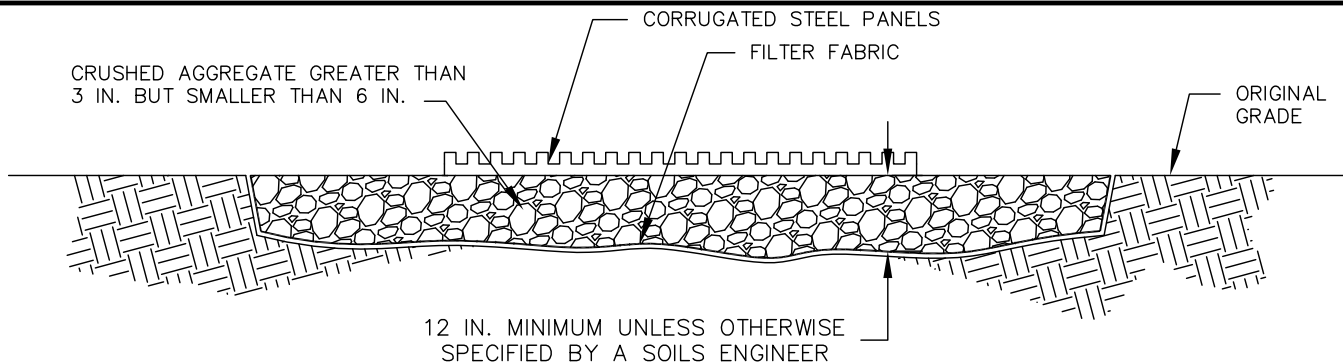
1. CONSTRUCTED OF 2"x6" OAK.

OAK MATS

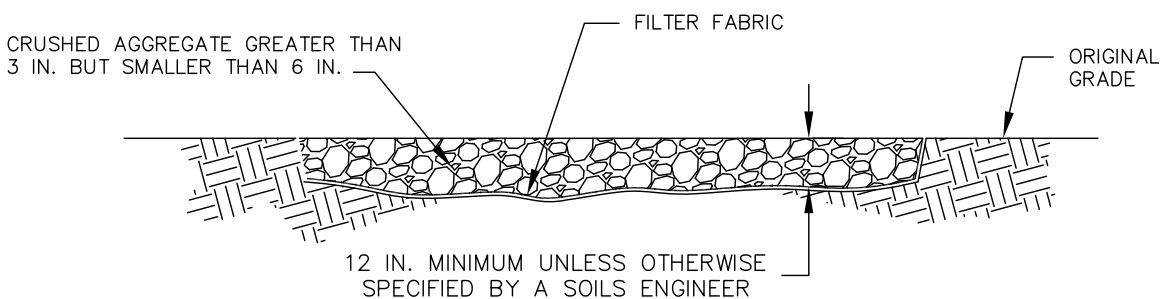
CleanWater  Services

DRAWING NO. 860

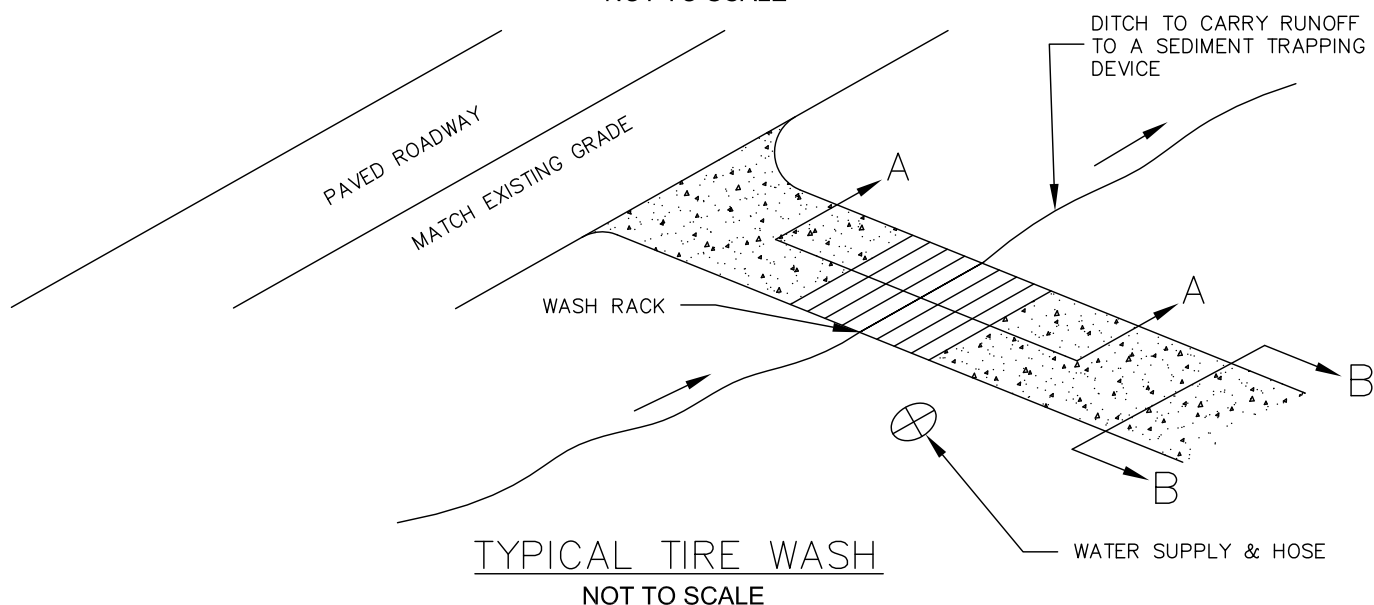
REVISED 12-16



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE



NOTES:

1. MANY DESIGNS CAN BE FIELD FABRICATED OR PRE-FABRICATED UNITS MAY BE USED

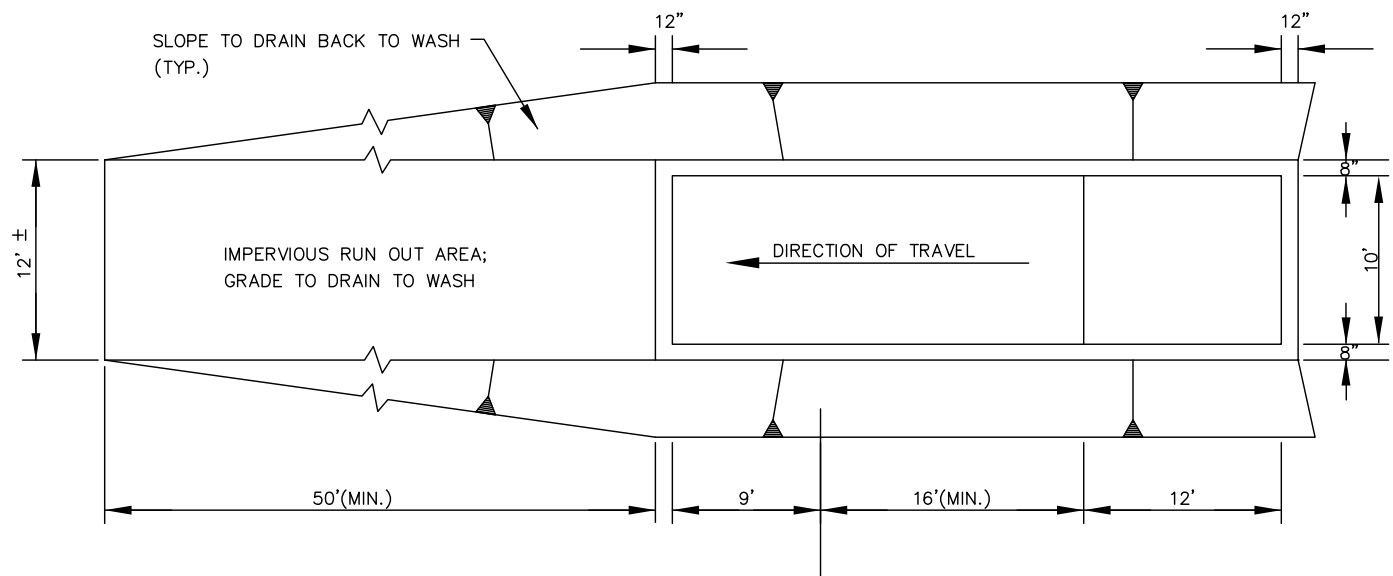
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

TIRE WASH (MANUAL HOSE WASH)

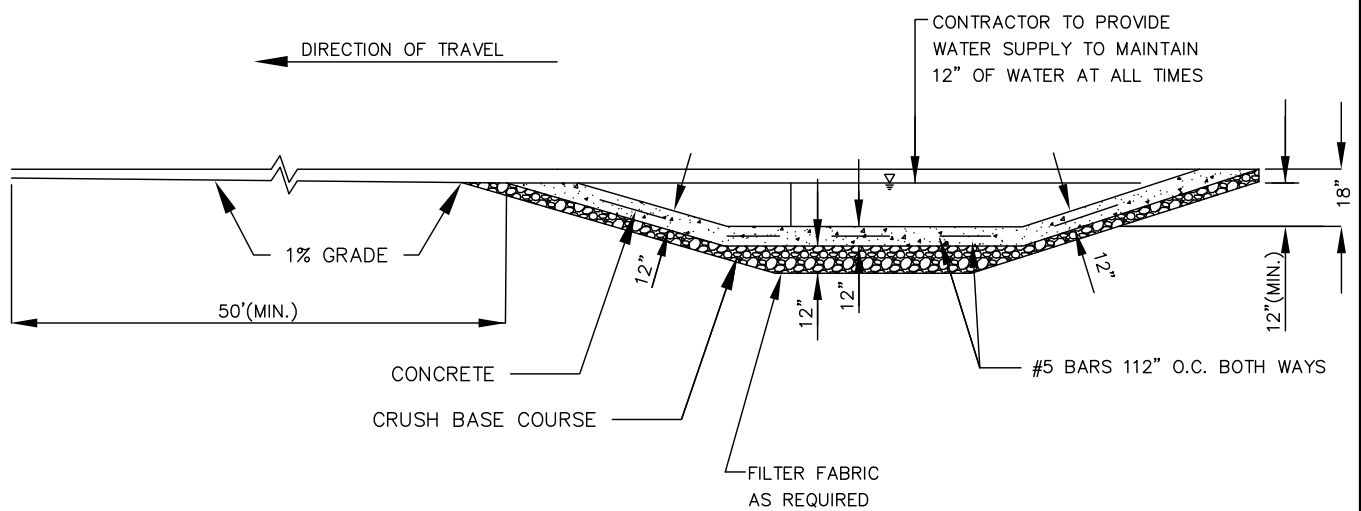
DRAWING NO. 865

REVISED 12-16

CleanWater Services



PLAN VIEW



PROFILE

NOTES:

1. CONTRACTOR TO REMOVE ACCUMULATED SEDIMENT AS NEEDED TO PREVENT TRACKING FROM TIRE WASH; SEDIMENT LADEN WATER MAY BE PIPED TO AN APPROVED SEDIMENT TRAP.
2. USE GEOTEXTILE FABRIC WITH AGGREGATE FOR A TEMPORARY TIRE WASH.

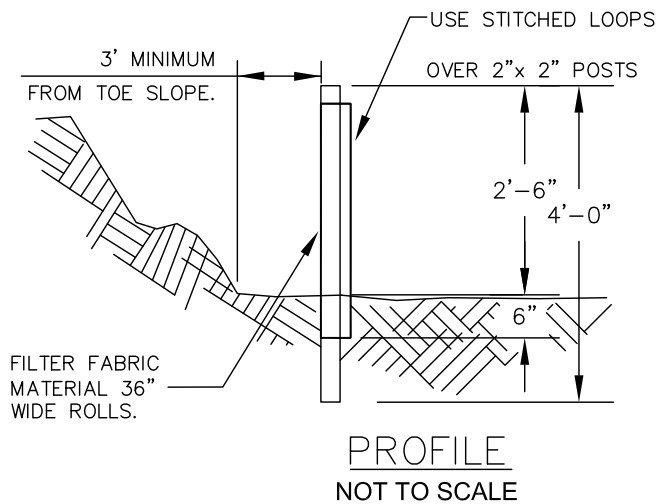
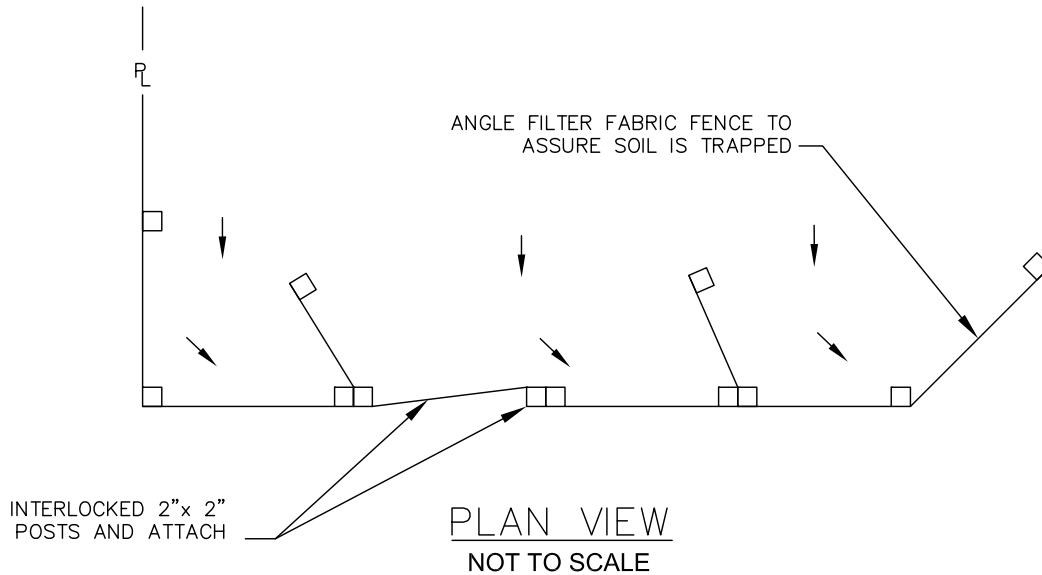
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

TIRE WASH—(DRIVE—THROUGH)

DRAWING NO. 870

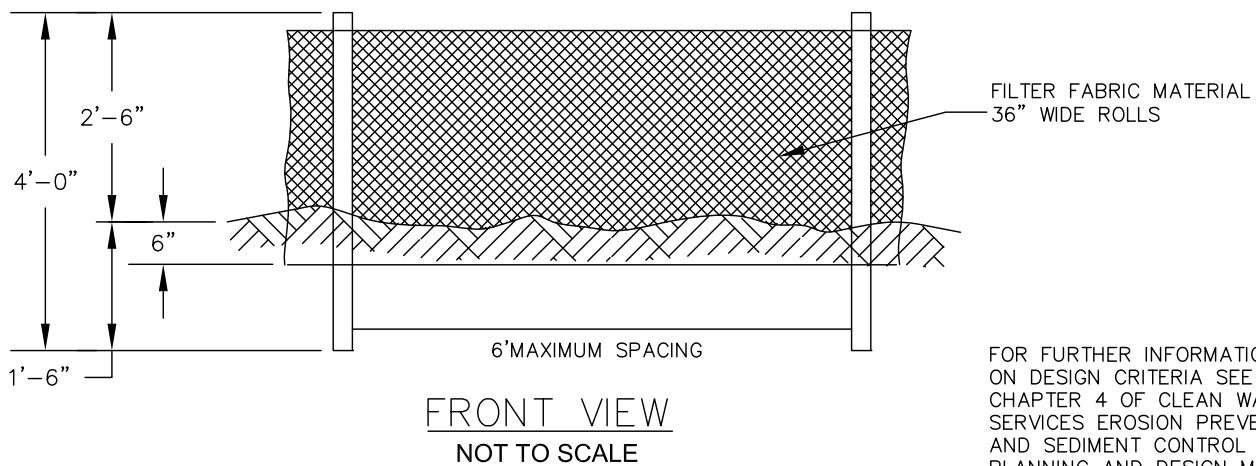
REVISED 12-16

CleanWater Services



NOTES:

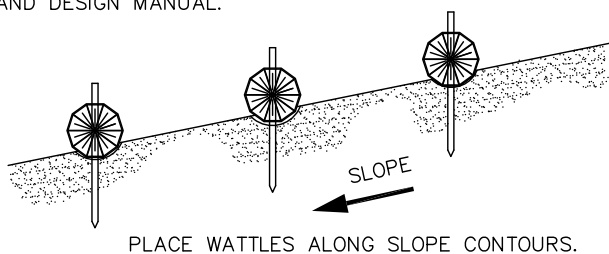
1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. PANELS MUST BE PLACED ACCORDING TO SPACING ON DETAIL NO.940



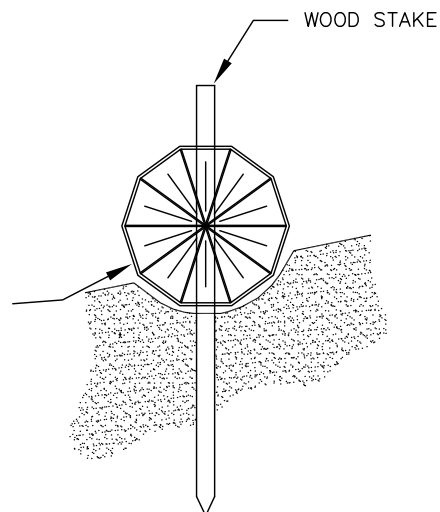
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

SEDIMENT FENCE

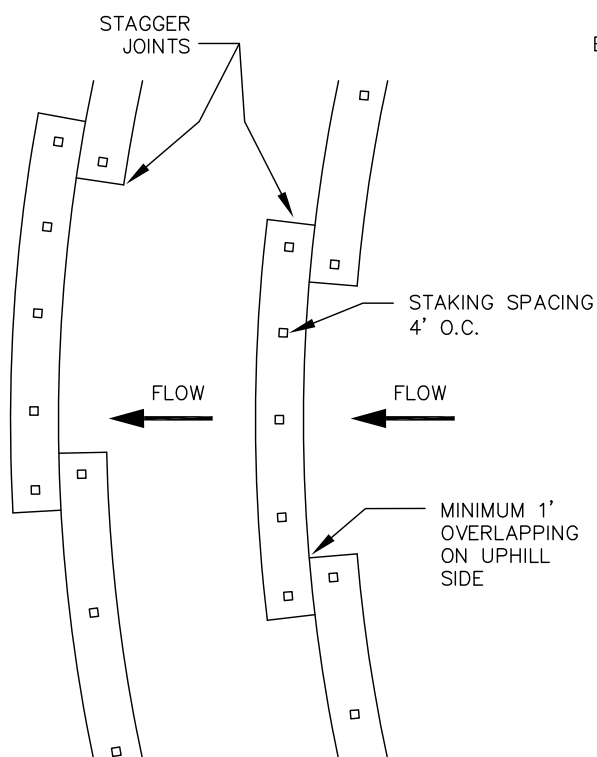
FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



PROFILE
NOT TO SCALE



SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

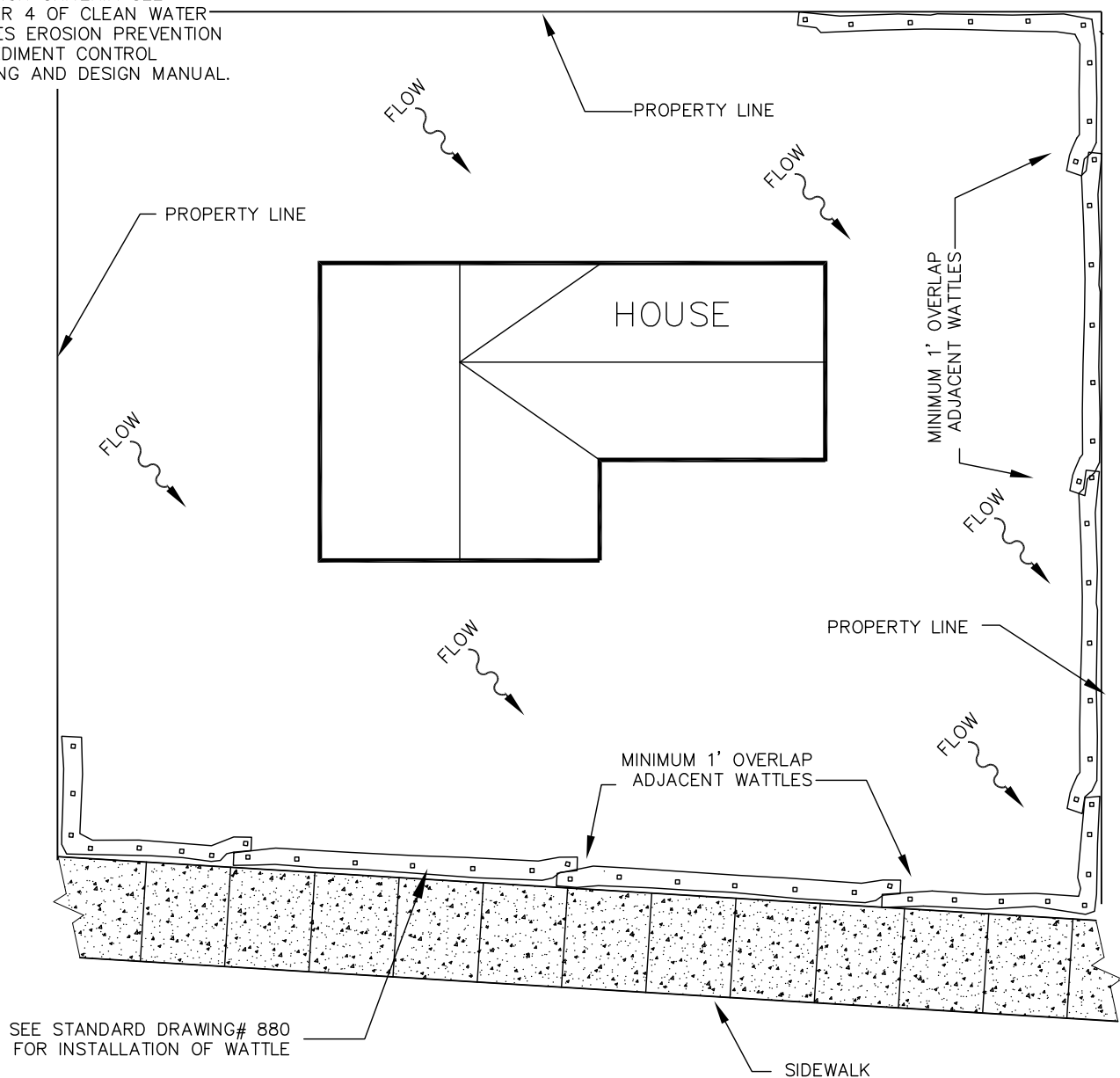
NOTES:

1. STAKING SPECIFICATIONS:
 - a. 1"x2" WOODEN STAKES
 - b. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES, ON STEEP SLOPE OR HIGHLY EROSION SOILS.
2. SPACING IN ACCORDANCE WITH DETAIL 940.
3. REMOVE ALL ROCKS, CLODS, VEGETATION OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED WATTLES WILL HAVE DIRECT CONTACT WITH THE SOIL.
4. INSTALL THE WATTLES IN A 2" DEEP TRENCH, INSURING THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE WATTLE.. THE ENDS OF ADJACENT WATTLES SHALL BE OVERLAPPED 1 FT. MINIMUM TO PREVENT SEDIMENT PASSING THROUGH THE FIELD JOINT.

WATTLES



FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



PLAN VIEW
NTS

NOTES:

1. SEE STANDARD DRAWING # 880 FOR INSTALLATION OF WATTLES..
2. ALTERNATE MATERIALS MAY BE USED AS APPROVED BY DISTRICT OR CITY.
3. PERIMETER MEASURES INSTALLED AS NEEDED.

WATTLES SINGLE FAMILY APPLICATION

DRAWING NO. 885

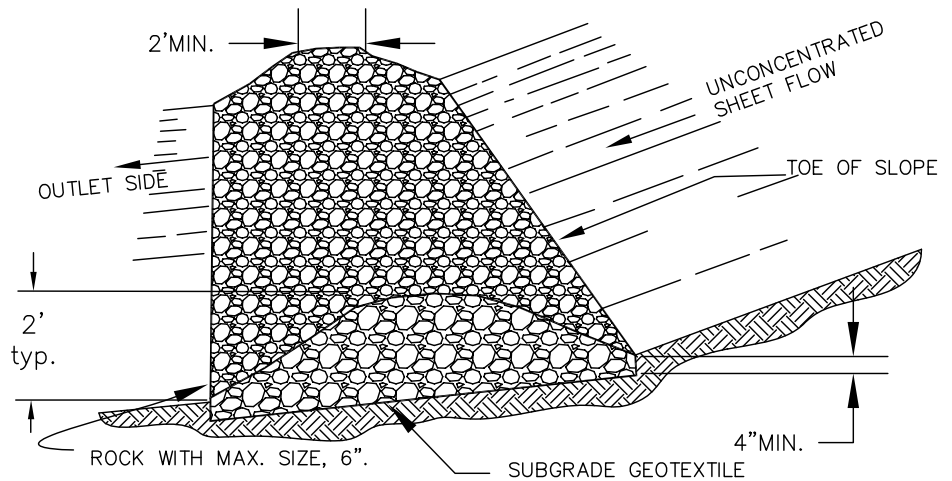
REVISED 12-16

CleanWater  Services

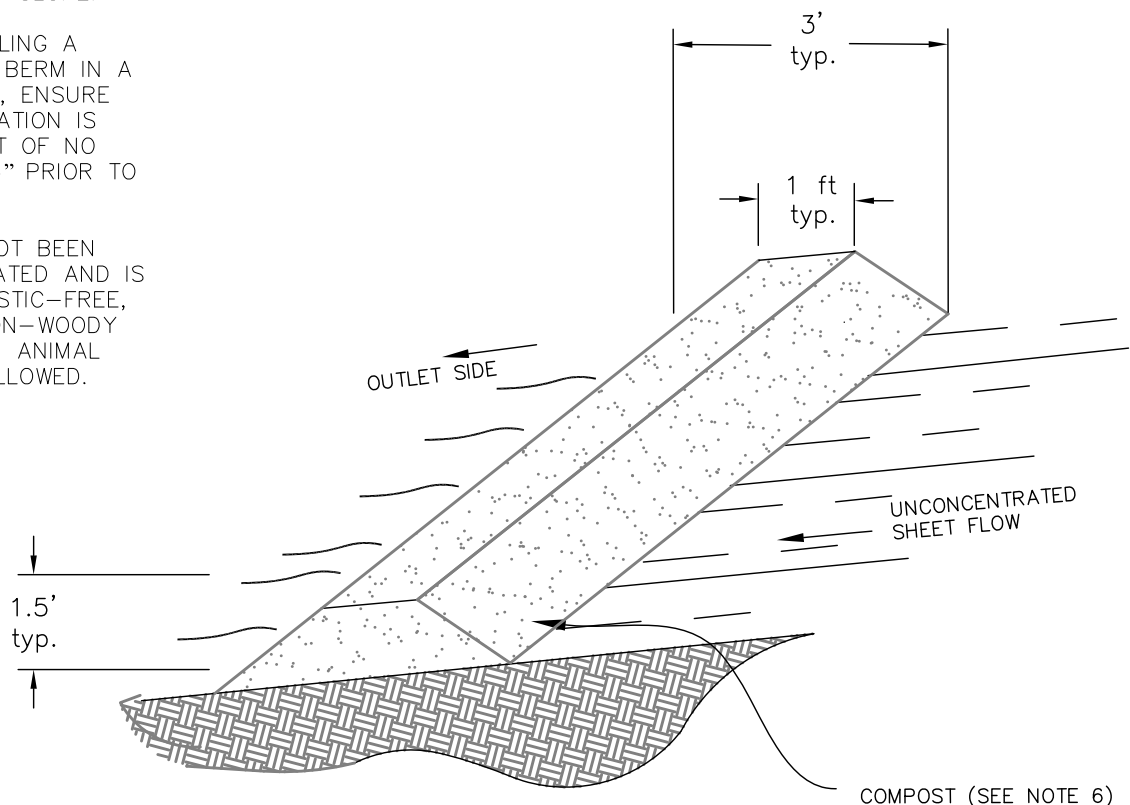
FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

NOTES:

1. DIRECT THE OUTLET SIDE OF THE ROCK/COMPOST FILTER BERMS ONTO A STABILIZED AREA, SUCH AS VEGETATION AND/OR ROCK.
2. EMBED ROCK FILTER BERM A MIN. OF 4" INTO THE EXISTING GROUND/EMBANKMENT.
3. USE ROCK FILTER BERM ON 3:1 OR FLATTER SIDE SLOPES. WITHIN THE SAFETY CLEAR ZONE. USE 6:1 OR FLATTER ON SIDE SLOPES.
4. PLACE COMPOST FILTER BERM'S ALONG OR ON THE GROUND CONTOUR WITH THE ENDS TURNED UP SLOPE.
5. PRIOR TO INSTALLING A COMPOST FILTER BERM IN A VEGETATED AREA, ENSURE THAT THE VEGETATION IS CUT TO A HEIGHT OF NO GREATER THAN 3" PRIOR TO INSTALLATION.
6. COMPOST HAS NOT BEEN CHEMICALLY TREATED AND IS WEED-FREE, PLASTIC-FREE, DECOMPOSED, NON-WOODY PLANT MATERIAL; ANIMAL WASTE IS NOT ALLOWED.

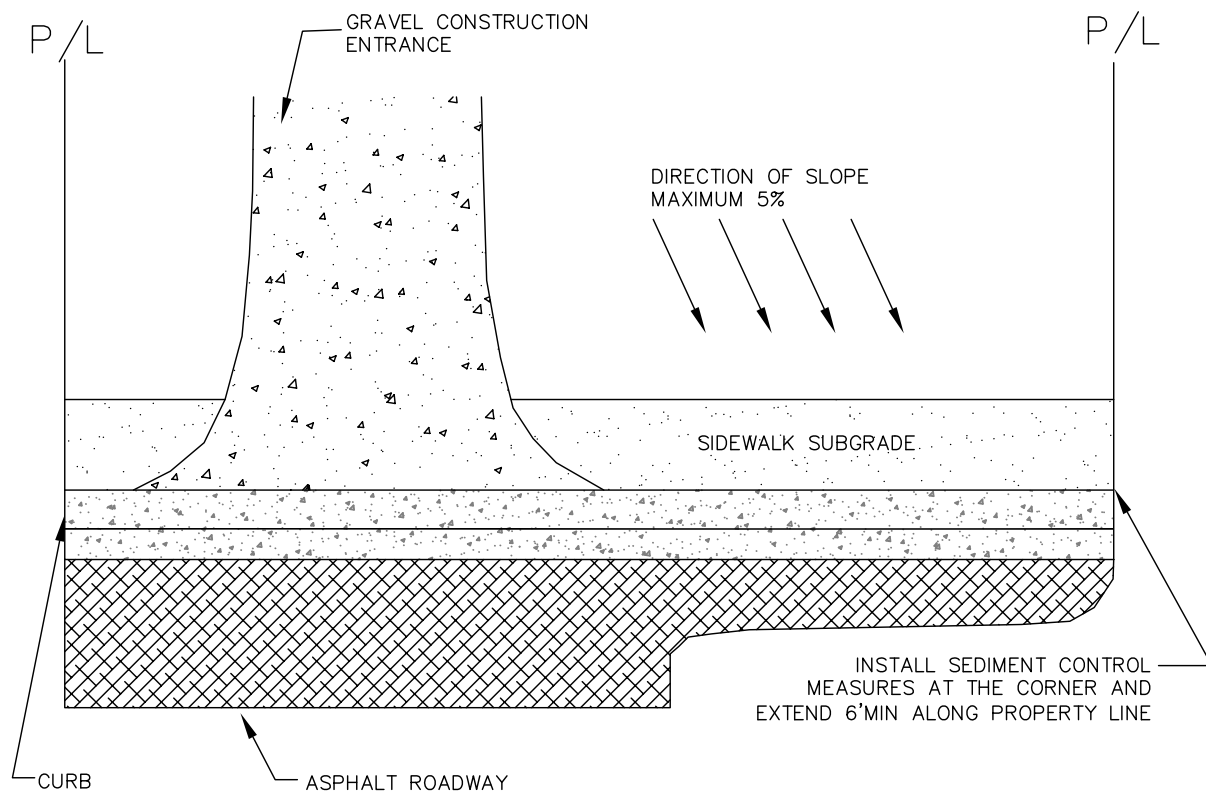


ROCK FILTER BERM

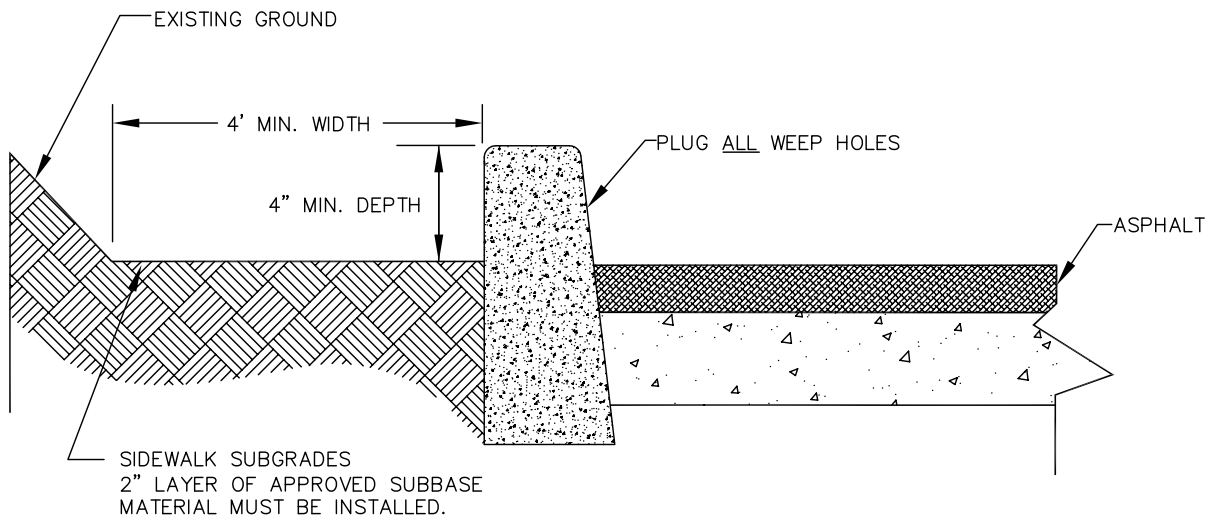


COMPOST FILTER BERM

FILTER BERMS ROCK/COMPOST



PLAN VIEW



PROFILE

NOTES:

1. SIDEWALK SUBGRADE CAN BE USED FOR ALL CONSTRUCTION ACTIVITIES

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

SIDEWALK SUBGRADE

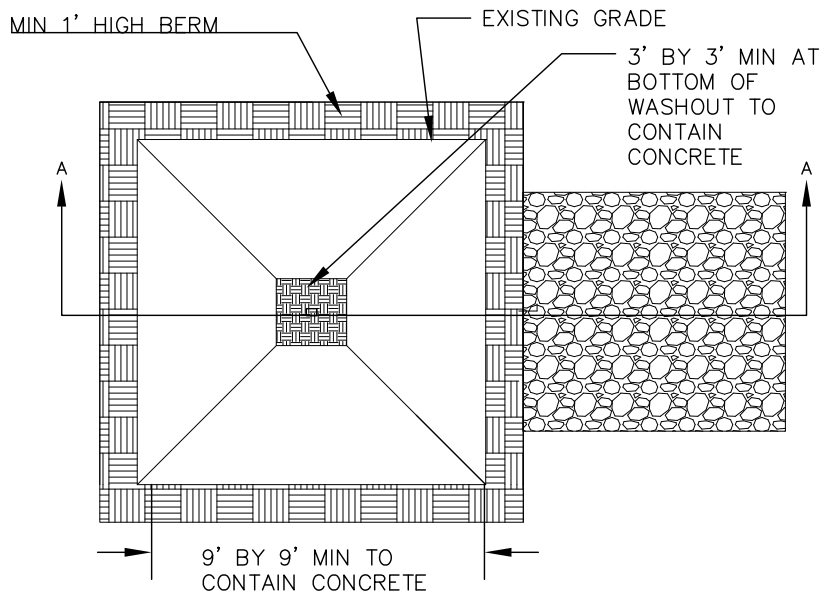
DRAWING NO. 895

REVISED 12-16

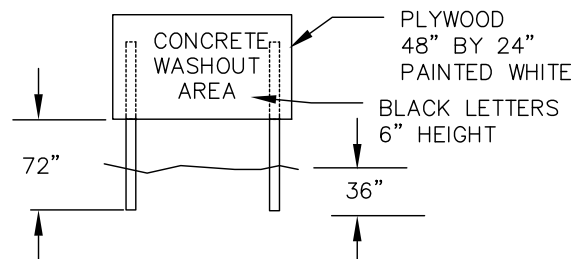
CleanWater  Services

NOTES:

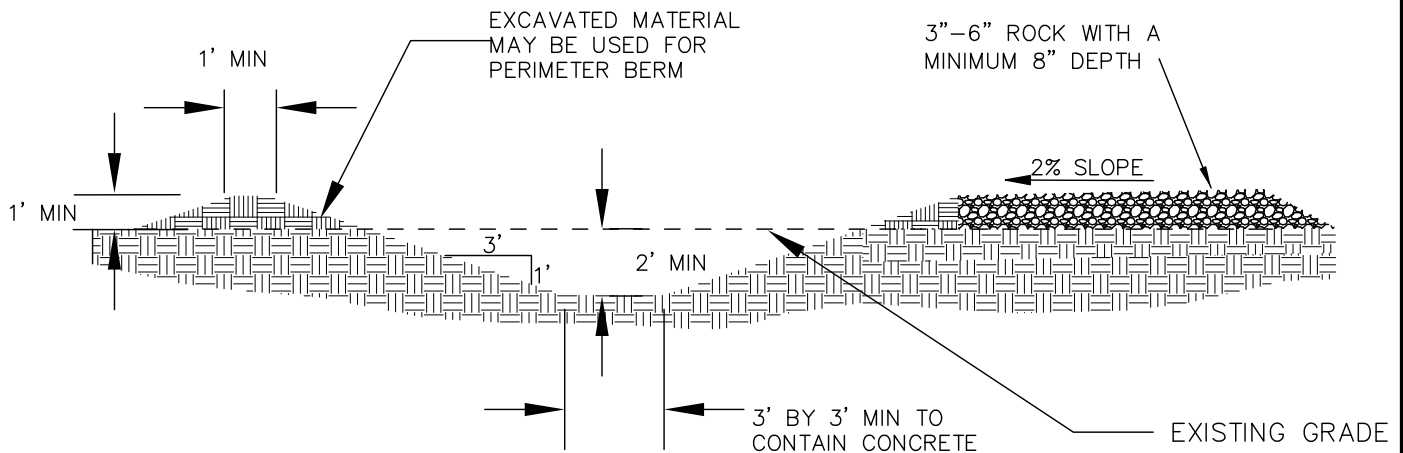
1. WASHOUT FACILITIES SHALL BE MAINTAINED TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM FREEBOARD OF 12 INCHES.
2. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75% FULL.
3. IF THE WASHOUT IS NEARING CAPACITY, VACUUM AND DISPOSE OF THE WASTE MATERIAL IN AN APPROVED MANNER.
4. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FT FROM SENSITIVE AREAS INCLUDING OPEN DRAINAGE FACILITIES AND WATERSOURCES.
5. CONCRETE WASHOUT FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.
6. INSTALL CONCRETE WASHOUT SIGN WITHIN 30 FEET OF TEMPORARY CONCRETE WASHOUT FACILITY.
7. TEMPORARY CONCRETE WASHOUTS MAY BE A PREFABRICATED CONTAINER THAT IS PORTABLE AND REUSABLE.



PLAN
NOT TO SCALE



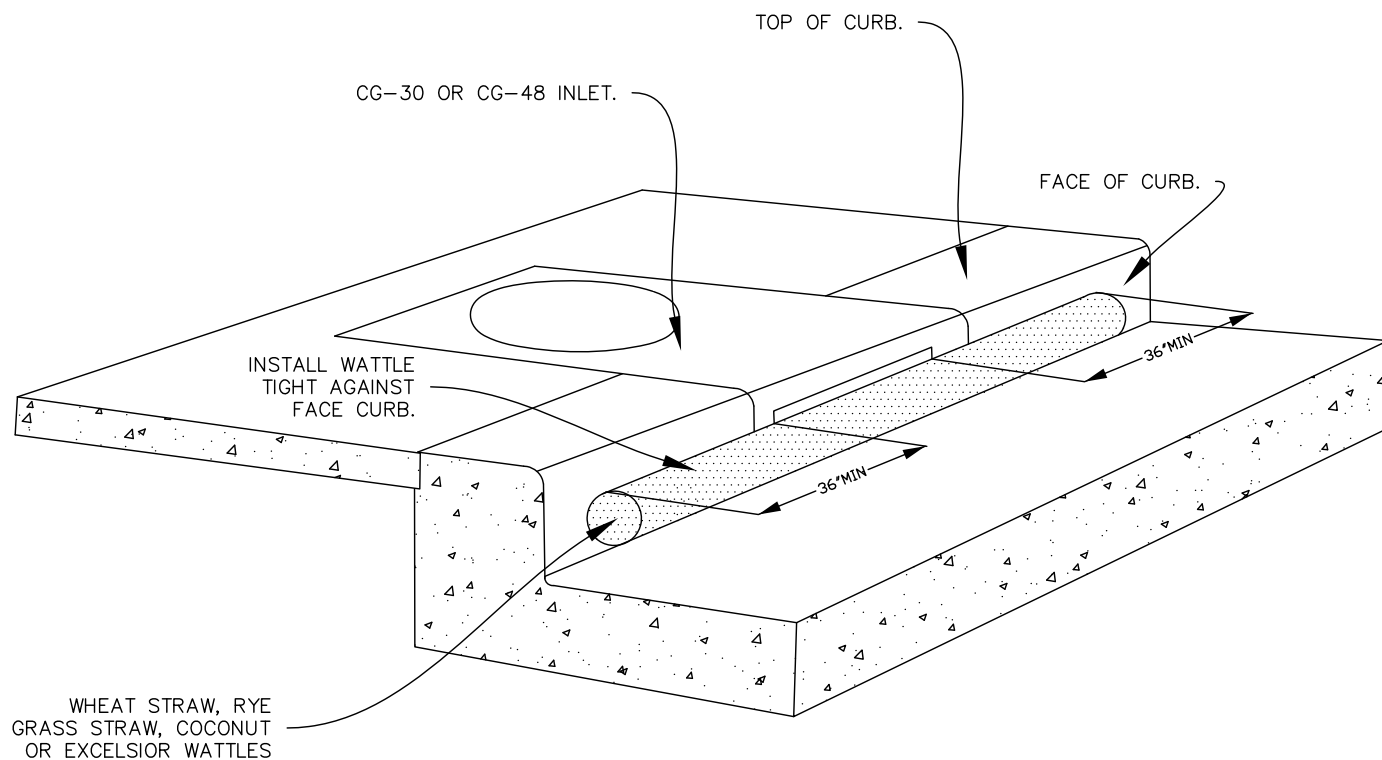
CONCRETE WASHOUT SIGN
DETAIL
(OR EQUIVALENT)
NOT TO SCALE



SECTION A-A
NOT TO SCALE

CONCRETE WASHOUT





PERSPECTIVE VIEW SHOWING WATTLE ALONG GUTTER AT CURB INLET

INSTALLATION NOTES:

1. ONLY ALLOWED USE OF APPLICATION IS ON CG-30 AND CG-48 INLETS UNLESS APPROVED BY CWS.
2. INSTALL WATTLE ALONG INLET WITH WATTLE EXTENDING A MIN OF 36" BEYOND INLET OPENINGS IN EACH DIRECTION.
3. WATTLE MUST BE INSTALLED TIGHTLY AGAINST CURB. MAY REQUIRE ADDITIONAL MEASURES TO ENSURE WATTLE REMAINS TIGHT AGAINST CURB, SUCH AS USING ZIP-TIES TO SECURE WATTLE TO INLET'S TRASH BARS OR USING SANDBAGS TO WEIGHT DOWN WATTLE.

MAINTENANCE NOTES:

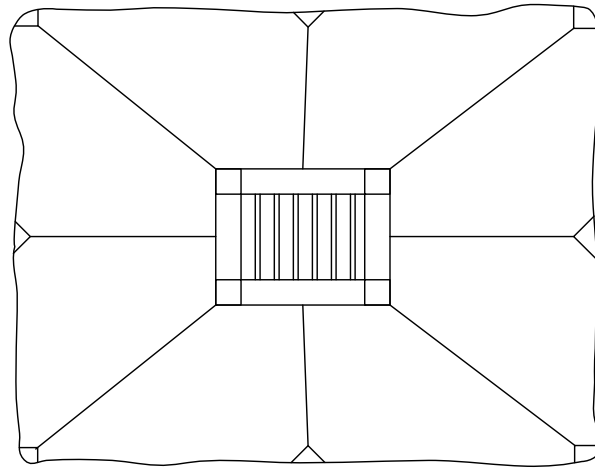
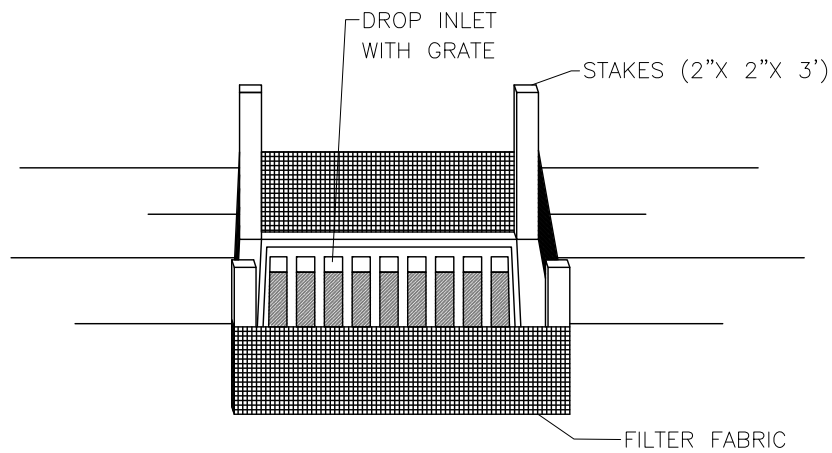
1. ANY VISIBLE SIGN OF SEDIMENT ACCUMULATION TO BE CLEANED UP AT THE END OF EACH WORKDAY.
2. REPLACE WATTLE AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING THE STORM SYSTEM.

CURB AND GUTTER INLET PROTECTION

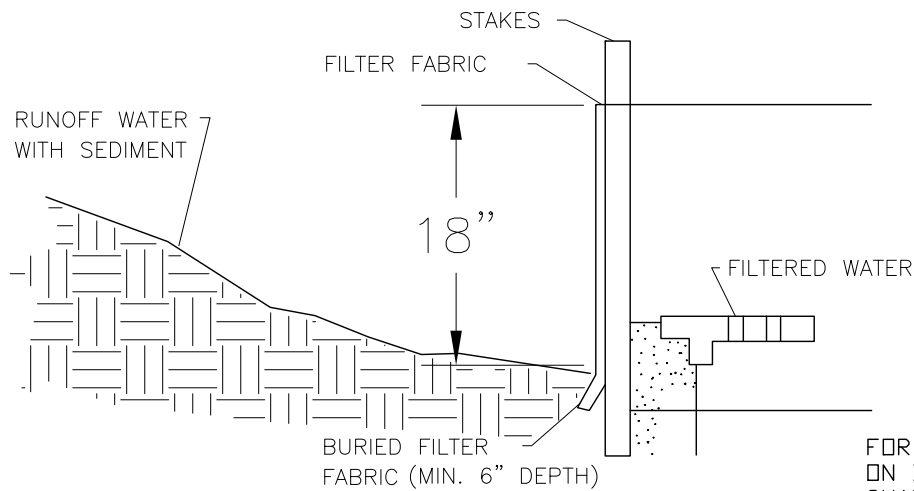
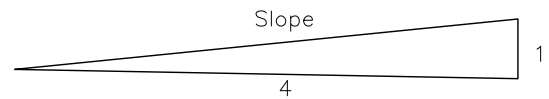
DRAWING NO. 905

REVISED 2-17


CleanWater Services



PLAN VIEW
Slope 4:1



PROFILE

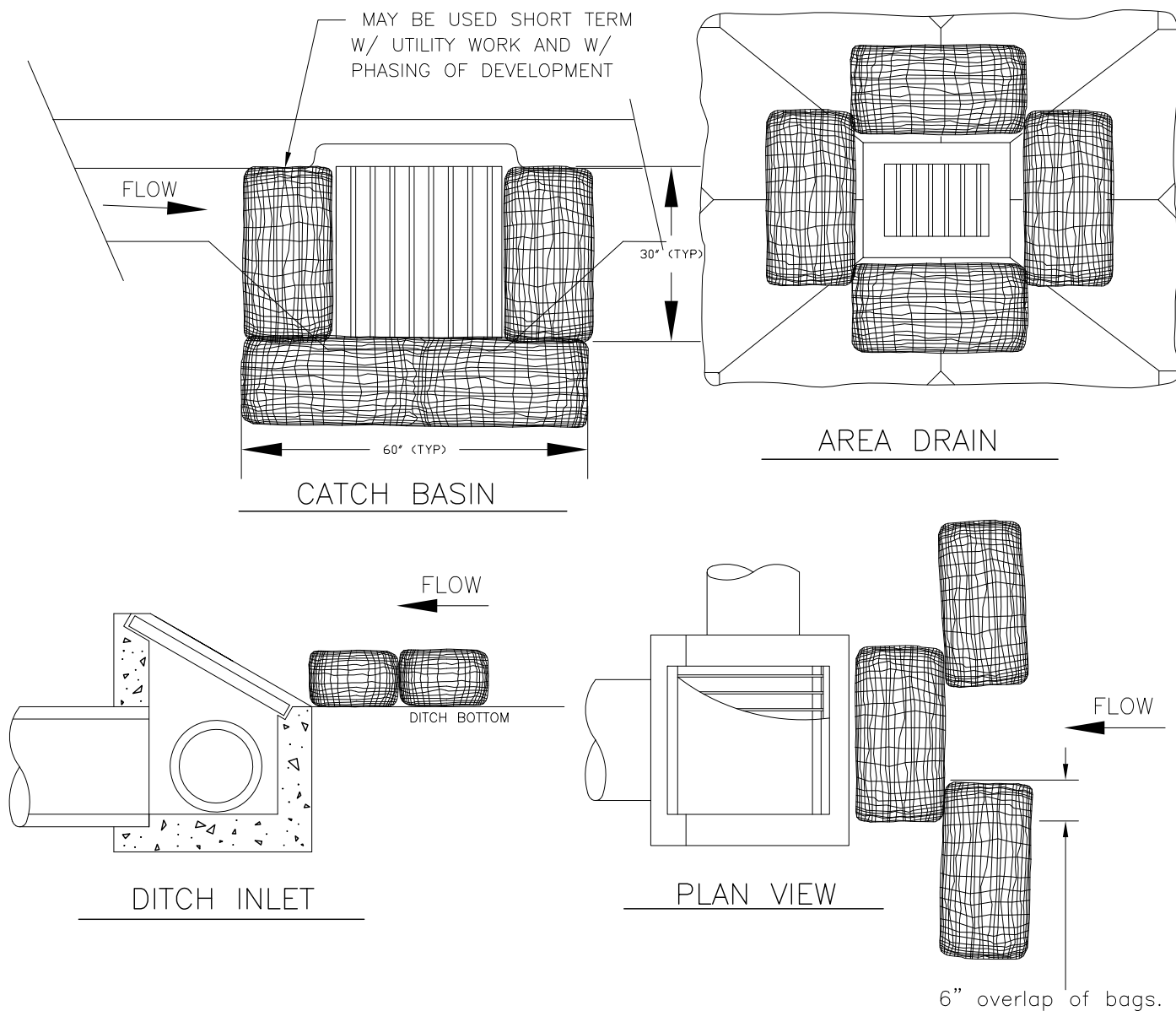
FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 3

DRAWING NO. 910

REVISED 12-16

CleanWater Services

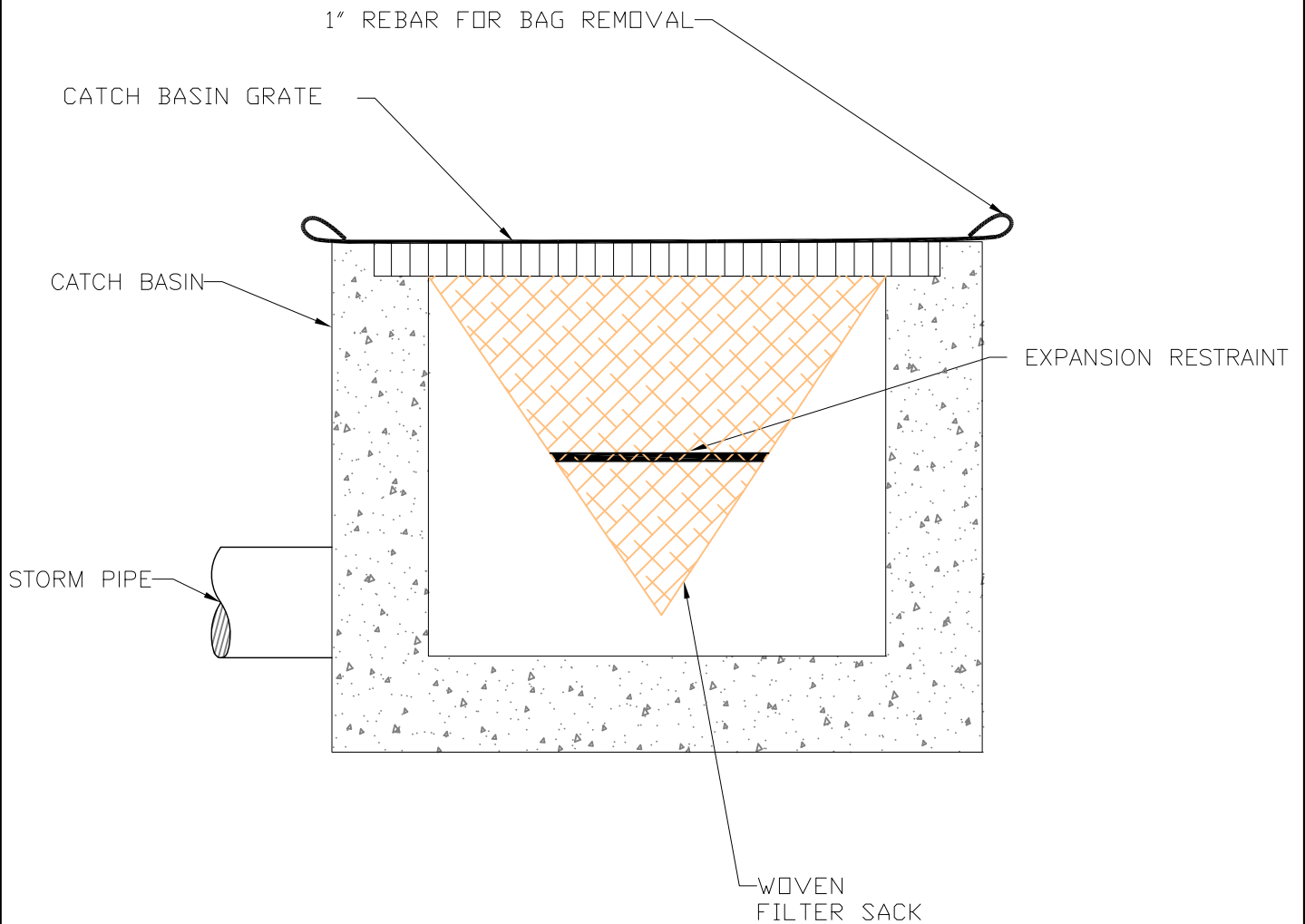


NOTES:

1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.
3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN YOU MUST HAVE 4 BAGS AND THEY SHALL BE OVERLAPPED BY 6".

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 4



CATCH BASIN INSERT

NOTE:

1. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS. SIZE OF FILTER FABRIC INLET SACKS TO BE DETERMINED BY MANUFACTURER.

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 5

DRAWING NO. 920

REVISED 12-16

CleanWater  **Services**

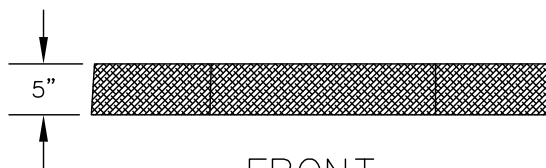
FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

MAY BE USED SHORT TERM W / UTILITY
WORK AND W / PHASING OF DEVELOPMENT

TIGHT TO CURB

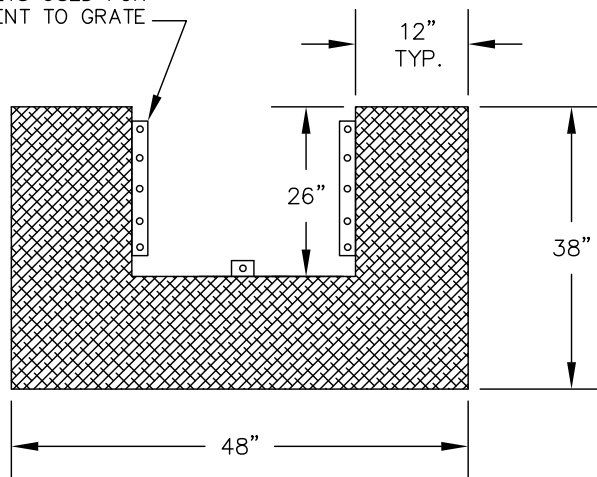
FLOW →

CATCH BASIN

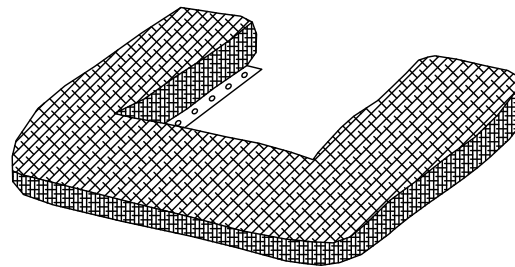


FRONT

GROMMETS USED FOR
ATTACHMENT TO GRATE



TOP



INSTALLATION NOTES:

1. INSTALL SOLID FABRIC SIDE DOWN MESH SIDE UP.
2. ATTACH TO CATCH BASIN GRATE AT A MINIMUM OF 3 LOCATIONS TIGHT TO CURB WITH 1/4" ZIP TIES.

MAINTENANCE NOTES:

1. ANY VISIBLE SIGN OF SEDIMENT ACCUMULATION TO BE CLEANED UP AT THE END OF EACH WORKDAY.
2. REPLACE U - SHAPED FILTER BAG AS NECESSARY TO PREVENT WOOD CHIPS FROM ENTERING THE STORM SYSTEM.

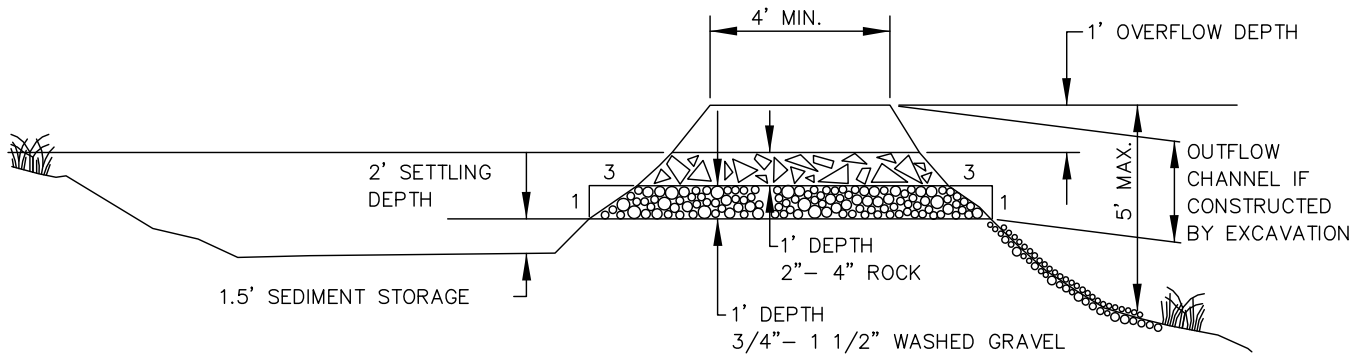
INLET PROTECTION TYPE 6

DRAWING NO. 925

REVISED 12-16

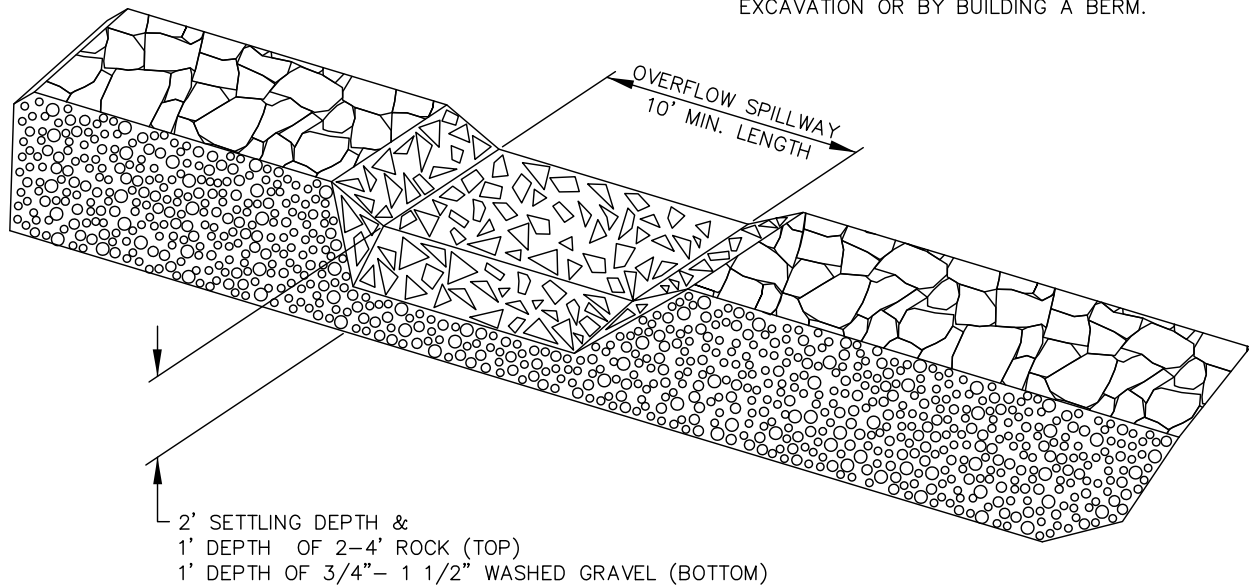
CleanWater  Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



CROSS SECTION
NOT TO SCALE

NOTE: MAY BE CONSTRUCTED BY
EXCAVATION OR BY BUILDING A BERM.



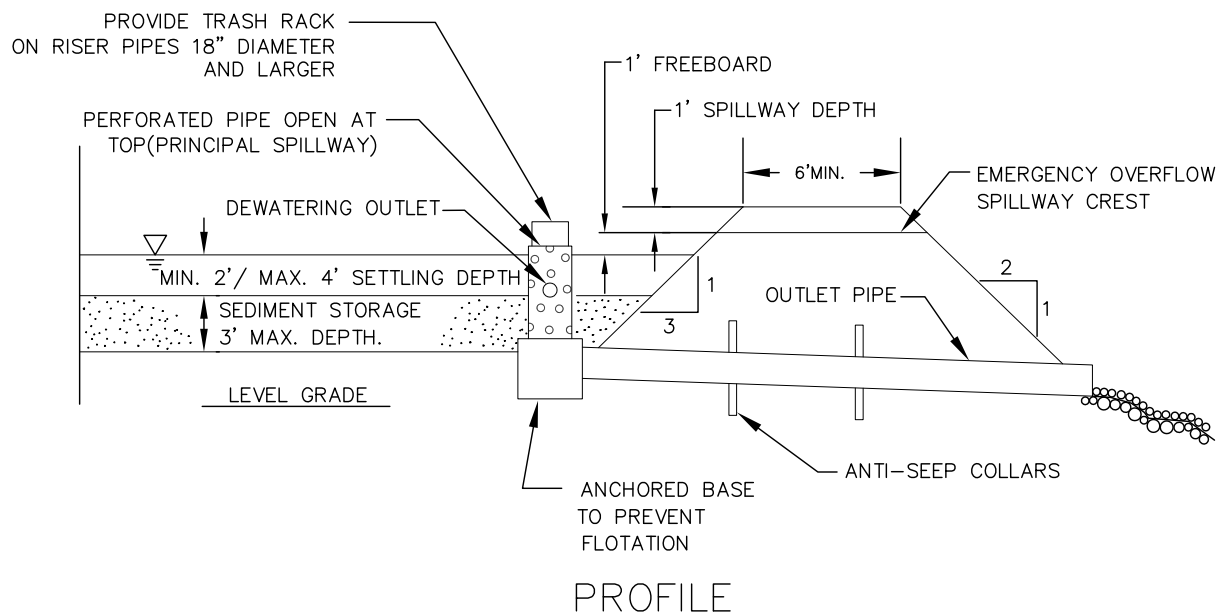
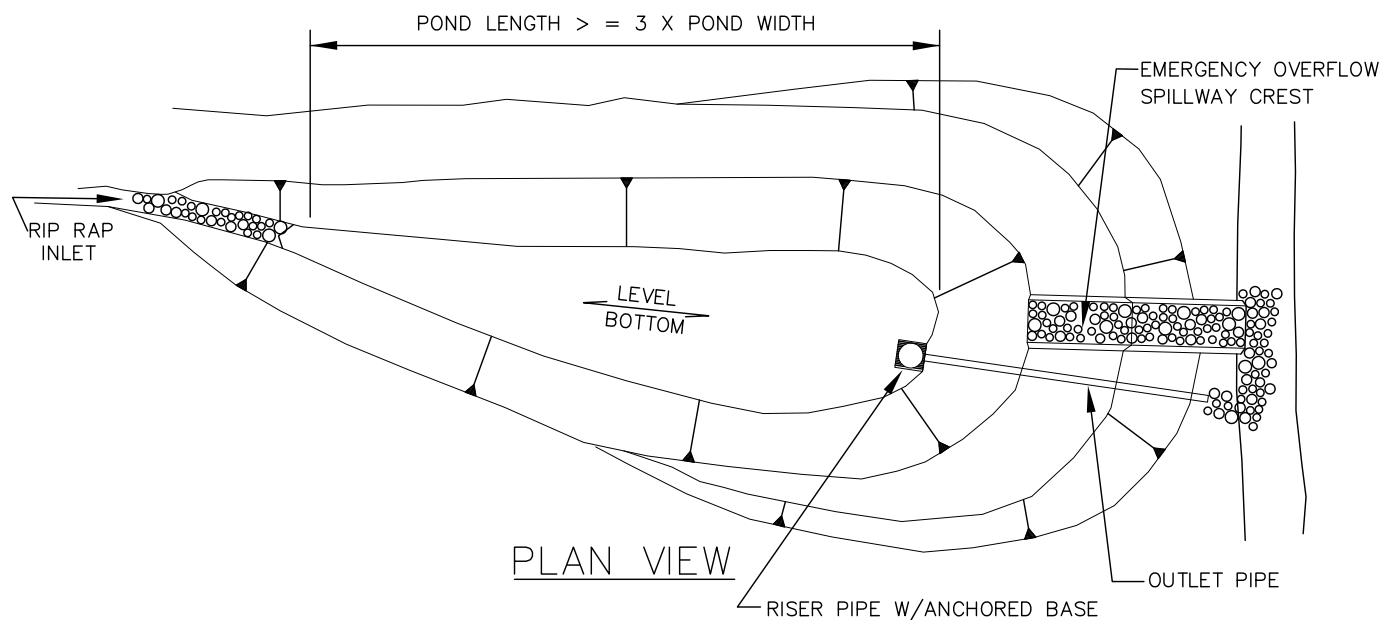
SEDIMENT TRAP OUTLET
NOT TO SCALE

NOTES:

1. A FILTER FABRIC FENCE OR SIMILAR FILTER MUST BE CONSTRUCTED TO FILTER RUNOFF FROM THE SEDIMENT TRAP PRIOR TO DISCHARGE FROM THE CONSTRUCTION SITE.

SEDIMENT TRAP

CleanWater  Services



NOTES:

1. 50' MINIMUM OF HIGHLY VEGETATED AREA AND OR SEDIMENT FENCE IS REQUIRED PRIOR TO DISCHARGING TO STREAM OR WETLAND.

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
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SEDIMENT BASIN

DRAWING NO. 935

REVISED 12-16

CleanWater Services

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

SPACING FOR CHECK DAMS

DITCH GRADE			
	6 INCH	12 INCH	18 INCH
6%	NOT ALLOWED	16 FT O.C.	26 FT O.C.
5%	NOT ALLOWED	20 FT	30 FT
4%	NOT ALLOWED	26 FT	40 FT
3%	15 FT	33 FT	50 FT
2%	25 FT	50 FT	80 FT

BARRIER SPACING FOR GENERAL APPLICATION

INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS

% SLOPE	SLOPE	MAXIMUM SPACING ON SLOPE
10% OR FLATTER	10:1 OR FLATTER	300 FT
>10% OR <15%	>10:1 OR <7.5:1	150 FT
>15% OR <20%	>7.5:1 OR <5:1	100 FT
>20% OR <30%	>5:1 OR <3.5:1	50 FT
>30% OR <50%	>3.5:1 OR <2:1	25 FT

NOTES:

1. FOR MORE INFORMATION REGARDING THESE TABLES SEE CHAPTER 4 TABLES 4-3 AND 4-7 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL DESIGN MANUAL.

SPACING TABLES



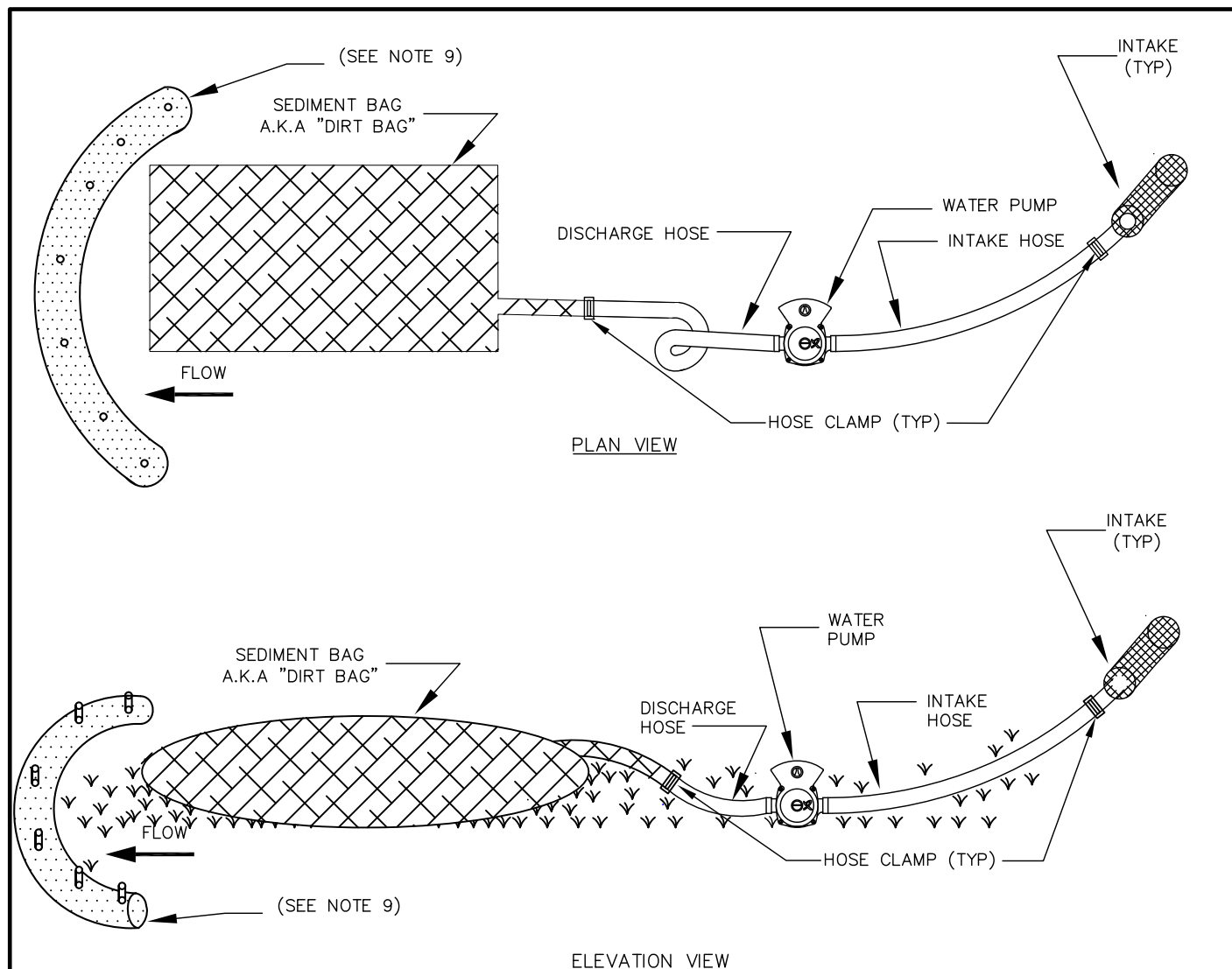
NOTES:

1. WHEN RAINFALL AND RUNOFF OCCURS, A KNOWLEDGEABLE AND EXPERIENCED PERSON IN THE PRINCIPLES, PRACTICES, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENT CONTROLS WHO WORKS FOR THE PERMITTEE MUST PROVIDE DAILY INSPECTIONS OF THE EROSION AND SEDIMENT CONTROLS AND DISCHARGE OUTFALLS.
2. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND FROM OCTOBER 1 THROUGH MAY 31ST EACH YEAR.
3. DURING WET WEATHER PERIOD, TEMPORARY STABILIZATION OF THE SITE MUST OCCUR AT THE END OF EACH WORK DAY.
4. SEDIMENT CONTROLS MUST BE INSTALLED AND MAINTAINED ON ALL DOWN GRADIENT SIDES OF THE CONSTRUCTION SITE AT ALL TIMES DURING CONSTRUCTION. THEY MUST REMAIN IN PLACE UNTIL PERMANENT VEGETATION OR OTHER PERMANENT COVERING OF EXPOSED SOIL IS ESTABLISHED.
5. ALL ACTIVE INLETS MUST HAVE SEDIMENT CONTROLS INSTALLED AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION. UNLESS OTHERWISE APPROVED, A SURFACE MOUNTED AND ATTACHABLE, U-SHAPED FILTER BAG IS REQUIRED FOR ALL CURB INLET CATCH BASINS.
6. SIGNIFICANT AMOUNTS OF SEDIMENT THAT LEAVES THE SITE MUST BE CLEANED UP WITHIN 24 HOURS AND PLACED BACK ON THE SITE AND STABILIZED OR PROPERLY DISPOSED. THE CAUSE OF THE SEDIMENT RELEASE MUST BE FOUND AND PREVENTED FROM CAUSING A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PREFORMED ACCORDING TO THE OREGON DEPARTMENT OF STATE LANDS REQUIRED TIME FRAME.
7. SEDIMENT MUST NOT BE INTENTIONALLY WASHED INTO STORM SEWERS, DRAINAGE WAYS, OR WATER BODIES.
8. SEDIMENT MUST BE REMOVED FROM BEHIND ALL SEDIMENT CONTROL MEASURES WHEN IT HAS REACHED A HEIGHT OF 1/3-RD THE BARRIER HEIGHT AND PRIOR TO THE CONTROL MEASURES REMOVAL.
9. CLEANING OF ALL STRUCTURES WITH SUMPS MUST OCCUR WHEN THE SEDIMENT RETENTION CAPACITY HAS BEEN REDUCED BY 50% AND AT COMPLETION OF PROJECT.
10. ANY USE OF TOXIC OR OTHER HAZARDOUS MATERIALS MUST INCLUDE PROPER STORAGE, APPLICATION, AND DISPOSAL.
11. THE PERMITTEE MUST PROPERLY MANAGE HAZARDOUS WASTES, USED OILS, CONTAMINATED SOILS, CONCRETE WASTE, SANITARY WASTE, LIQUID WASTE, OR OTHER TOXIC SUBSTANCES DISCOVERED OR GENERATED DURING CONSTRUCTION.
12. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS. NUTRIENT RELEASES FROM FERTILIZERS TO SURFACE WATERS MUST BE MINIMIZED. TIME RELEASE FERTILIZERS SHOULD BE USED AND CARE SHOULD BE MADE IN APPLICATION OF FERTILIZERS WITHIN ANY WATER WAY RIPARIAN ZONE.
13. OWNER OR DESIGNATED PERSON SHALL BE RESPONSIBLE FOR PROPER INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES, IN ACCORDANCE WITH CURRENT CLEAN WATER SERVICES STANDARDS AND STATE, AND FEDERAL REGULATIONS.
14. PRIOR TO ANY LAND DISTURBING ACTIVITIES, THE BOUNDARIES OF THE CLEARING LIMITS, VEGETATED BUFFERS, AND ANY SENSITIVE AREAS SHOWN ON THIS PLAN SHALL BE CLEARLY DELINEATED IN THE FIELD. UNLESS OTHERWISE APPROVED, NO DISTURBANCE IS PERMITTED BEYOND THE CLEARING LIMITS. THE OWNER/PERMITTEE MUST MAINTAIN THE DELINEATION FOR THE DURATION OF THE PROJECT. NOTE: VEGETATED CORRIDORS TO BE DELINEATED WITH ORANGE CONSTRUCTION FENCE OR APPROVED EQUAL.
15. PRIOR TO ANY LAND DISTURBING ACTIVITIES, THE BMPs THAT MUST BE INSTALLED ARE GRAVEL CONSTRUCTION ENTRANCE, PERIMETER SEDIMENT CONTROL, AND INLET PROTECTION. THESE BMPs MUST BE MAINTAINED FOR THE DURATION OF THE PROJECT.
16. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAN SEPTEMBER 1ST; THE TYPE AND PERCENTAGES OF SEED IN THE MIX ARE AS IDENTIFIED ON THE PLANS OR AS SPECIFIED BY THE DESIGN ENGINEER.
17. WATERTIGHT TRUCKS MUST BE USED TO TRANSPORT SATURATED SOILS FROM THE CONSTRUCTION SITE. AN APPROVED EQUIVALENT IS TO DRAIN THE SOIL ON SITE AT A DESIGNATED LOCATION USING APPROPRIATE BMPs; SOIL MUST BE DRAINED SUFFICIENTLY FOR MINIMAL SPILLAGE.
18. ALL PUMPING OF SEDIMENT LADEN WATER MUST BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP (I.E. FILTER BAG).
19. THE ESC PLAN MUST BE KEPT ONSITE. ALL MEASURES SHOWN ON THE PLAN MUST BE INSTALLED PROPERLY TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER A SURFACE WATER SYSTEM, ROADWAY, OR OTHER PROPERTIES.
20. THE ESC MEASURES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE MEASURES SHALL BE UPGRADED AS NEEDED TO MAINTAIN COMPLIANCE WITH ALL REGULATIONS.
21. WRITTEN ESC LOGS ARE SUGGESTED TO BE MAINTAINED ONSITE AND AVAILABLE TO DISTRICT INSPECTORS UPON REQUEST.
22. IN AREAS SUBJECT TO WIND EROSION, APPROPRIATE BMPs MUST BE USED WHICH MAY INCLUDE THE APPLICATION OF FINE WATER SPRAYING, PLASTIC SHEETING, MULCHING, OR OTHER APPROVED MEASURES.
23. ALL EXPOSED SOILS MUST BE COVERED DURING WET WEATHER PERIOD.

STANDARD EROSION CONTROL
NOTES FOR SITES LESS THAN 1
DRAWING NO. 945 ACRE

REVISED 12-16





NOTES:

1. THE SEDIMENT BAG SHALL BE MANUFACTURED USING A POLYPROPYLENE 8 OZ. NON-WOVEN GEOTEXTILE SEWN INTO A BAG WITH A DOUBLE NEEDLE, USING A HIGH STRENGTH THREAD.
2. EACH STANDARD SEDIMENT BAG MUST HAVE A FILL SPOUT LARGE ENOUGH TO ACCOMMODATE A 4" DISCHARGE HOSE. STRAPS ARE ATTACHED TO SECURE THE HOSE AND PREVENT PUMPED WATER FROM ESCAPING WITHOUT BEING FILTERED.
3. THE SEDIMENT BAG SHALL MEET OR EXCEED OVERALL BAG REMOVAL EFFICIENCY RATE OF 97.55%.
4. WATER BEING DISCHARGED FROM THE SEDIMENT BAG MUST BE FREE OF ALL SEDIMENT PRIOR TO LEAVING THE SITE OR ENTERING INTO THE STORM SYSTEM.
5. INSTALLING A SEDIMENT BAG ON A SLOPE REQUIRES THE INCOMING WATER TO FLOW DOWNHILL THROUGH SEDIMENT BAG WITHOUT CREATING MORE EROSION. THE NECK OF THE SEDIMENT BAG WILL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE SO AS IT DOES NOT PULL FREE WHEN FILLED.
6. SEDIMENT BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A RATE LESS THAN 50% OF MANUFACTURE'S DESIGNED FLOW RATE.
7. DURING USE, THE SEDIMENT BAG MUST BE MONITORED.
8. DISPOSE OF USED SEDIMENT BAG OFF SITE OR AS APPROVED BY CWS.
9. WHEN APPROPRIATE, INSTALL DOWNSTREAM SEDIMENT CONTROL MEASURES PER CWS STANDARDS.

SEDIMENT BAG

DRAWING NO. 950

REVISED 02-17

CleanWater Services

**Wastewater Pump Station and Force Main
Design Data Summary Table**

BASIN CHARACTERISTICS	
Location	Address and Cross street
Basin Area	XXX Acres
Equivalent Dwelling Units (EDU) Per Acre	X.X
Persons Per EDU	X.X
Population Equivalent	XXXX
Average per Capita Flow	XX GPD
Infiltration and Inflow, Peak Wet Weather Flow (PWWF)	XXX,XXX GPD
Average Daily Flow (ADF)	XXX,XXX GPD
Peak Hourly Flow	XXX GPM

PUMP STATION	
Type	Duplex submersible, non-clog, variable speed pumps
Capacity (per pump)	XXX gpm @ XX feet TDH (static head = XX ft)
Horsepower, HP	XX HP Each with Variable Frequency Drives
Motor Data	Xxx volt xphase xx cycle
Firm Capacity of Pump Station	X.XX MGD (XXX GPM)
Maximum Pump Starts Per Hour	X
Wet Well Volume	XXXX gallons (pumps off to lead pump on)
Level Control Type	Bubbler with duplex Compressors and backup floats
Overflow Point	Manhole Number and Elevation
Overflow location	Description
Average Time to Overflow	Time and Description xx hours at yy gpm Design Average Influent Flow
Telemetry	Auto-Dialer
Transfer Switch	Automatic
Standby Power Type	XXX kW stationary diesel-powered standby generator.
Fuel Tank Capacity	xx Hrs (XXX Gallons)
EPA Reliability Class	1
Flow Meter	X" Magnetic (Description)
Control	Constant Speed or VFD

DATA TABLE SHEET 1 OF 2

WASTEWATER PUMP STATION &
FORCE MAIN DESIGN DATA TABLE



FORCE MAIN	
Type and Length	XXXX feet (Type?)
Forcemain Velocity	X.X feet per second
Profile	Description
Air Release Valve	Quantity? Description?
Discharge Location	Manhole Number and Elevation
Average Detention Time	XX hours
Sulfide Control System	Description?

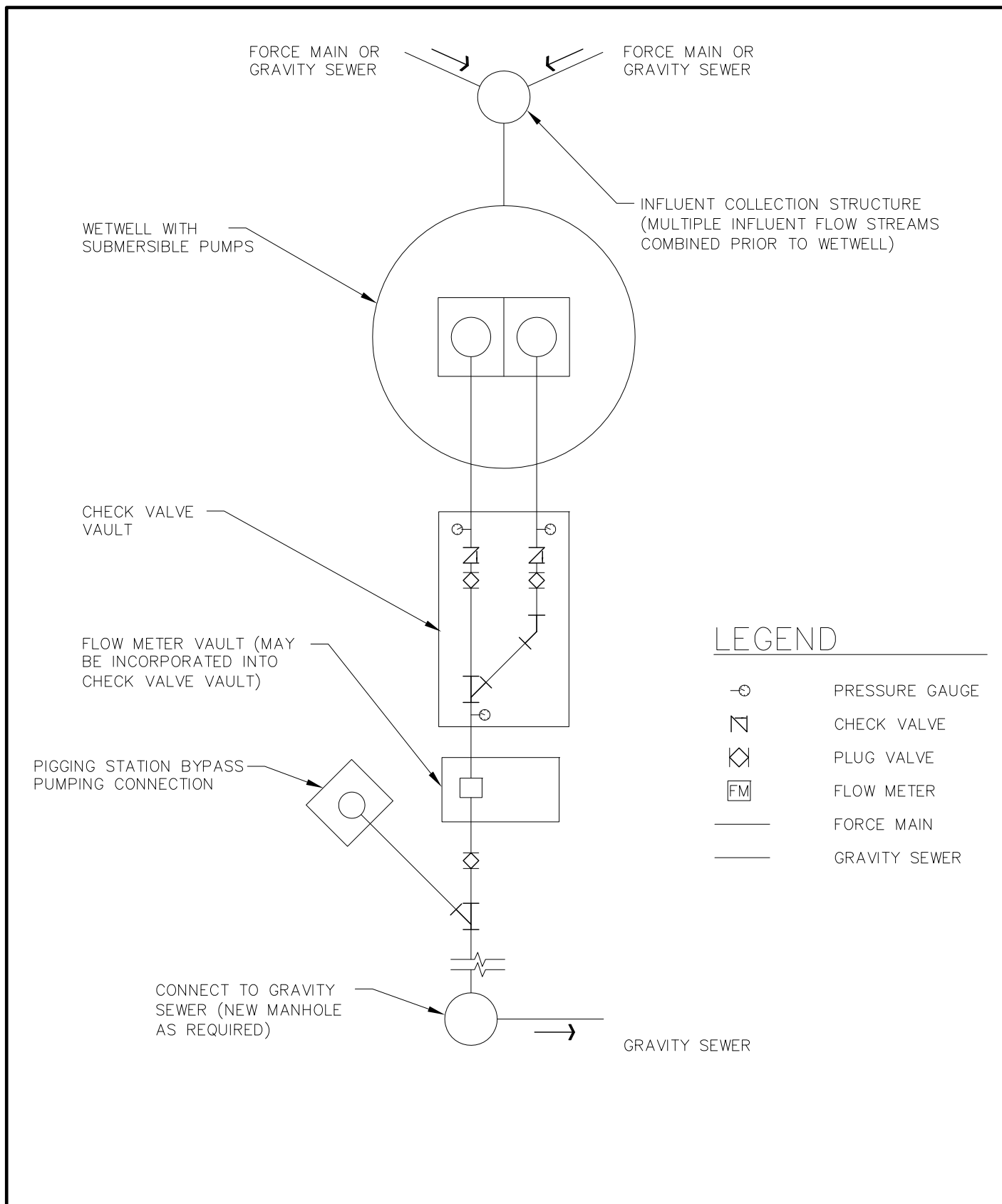
OPERATING LEVELS	
Ground Elevation xxx.xx?	
Overflow Alarm Elevation xxx.xx	Float Control System? (backup)
Lag Pump On/High Water Alarm Elevation xxx.xx	Float Control Backup
Lag Pump On/High Water Alarm Elevation xxx.xx	Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.
Lead Pump On Elevation xxx.xx	Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.
All Pumps Off Elevation xxx.xx	Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.
Wetwell Floor Elevation xxx.xx	Ultrasonic (0.00 Feet)

LANDSCAPING	
Landscaping Area	Square feet and Description
Irrigation System	Type
Control Valves	Number and Type
Backflow Device	Size and Type

DATA TABLE SHEET 2 OF 2

WASTEWATER PUMP STATION &
FORCE MAIN DESIGN DATA TABLE





CONCEPTUAL SITE SCHEMATIC

DRAWING NO. 1003

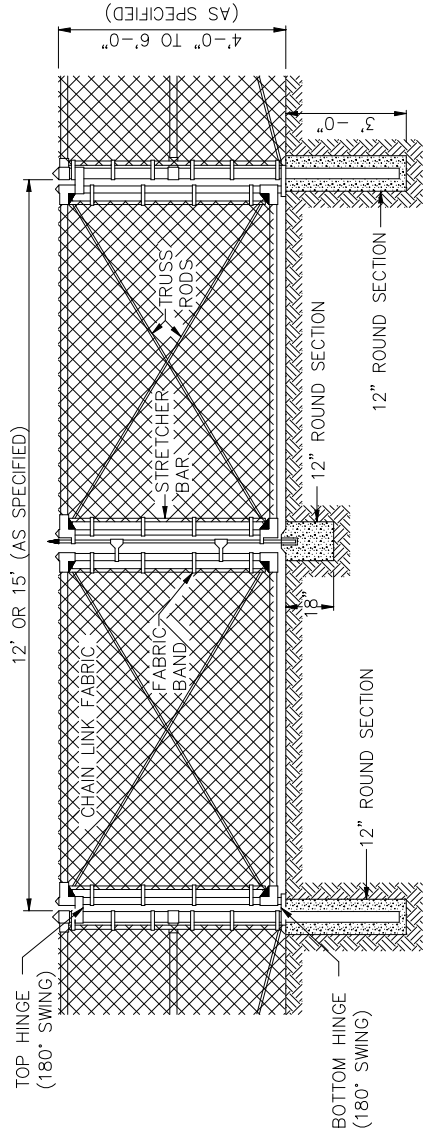
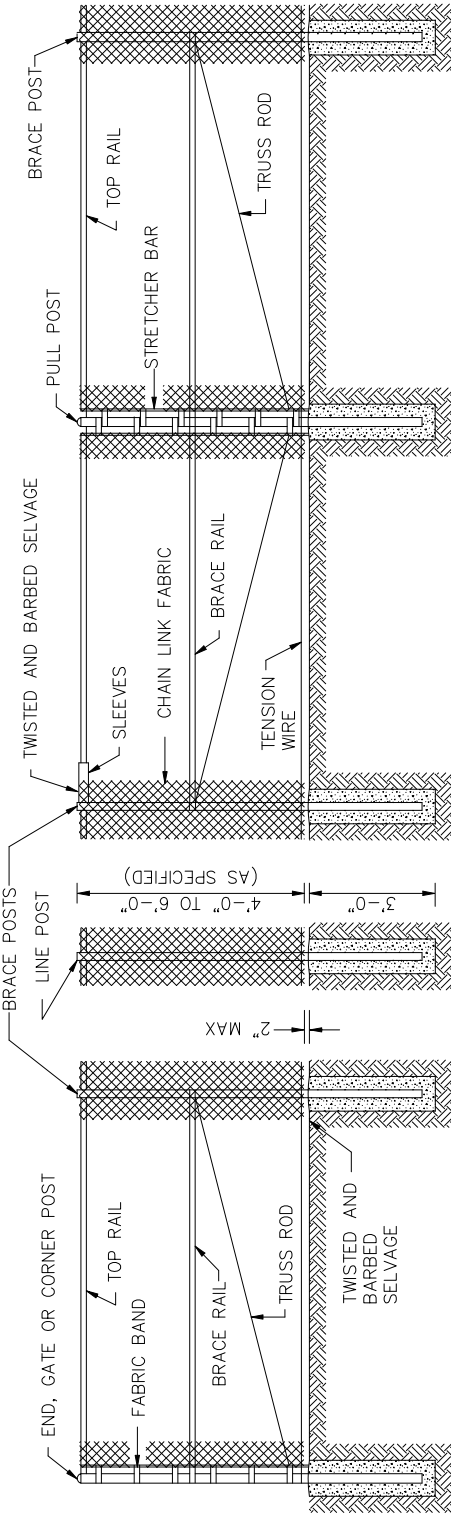
REVISED 12-03



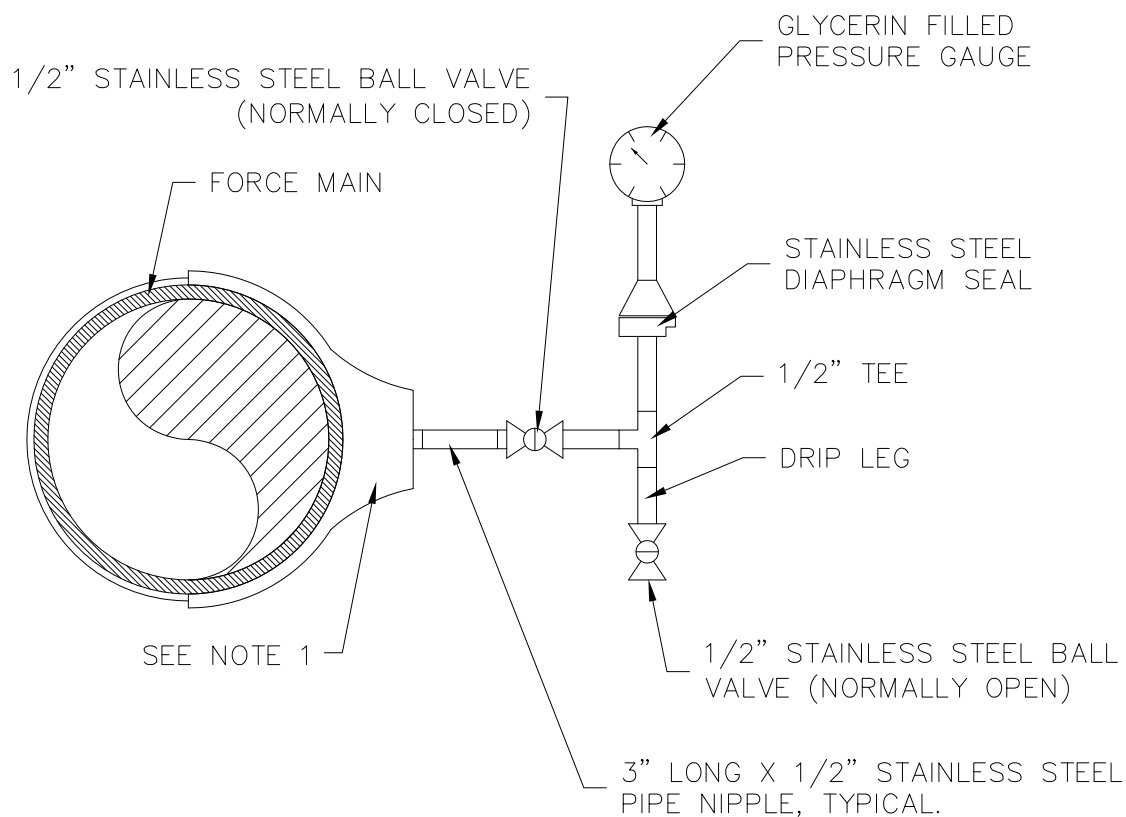
MEMBER	NOMINAL DIA (IN)	MATERIAL
BRACE RAIL	1.660	GALV TUBULAR STL
GATE FRAME	2.00	GALV TUBULAR STL
LINE POSTS	2.375	GALV TUBULAR STL
END & CORNER POST	2.875	GALV TUBULAR STL
CHAIN LINK FABRIC	9 GA. W/GREEN OR BLACK PVC COATING.	
	GATE OPENING (ft)	NOMINAL DIA (IN)
	12' OR 15'	4
		MATERIAL
		GALV TUBULAR STL

NOTES:

1. ALL FITTINGS, FASTENERS, & AND FABRIC TIES SHALL BE HOT DIP GALV.
2. CONC SHALL BE MIN 2500 PSI @ 28 DAYS.
3. PROVIDE BRACE RAIL BETWEEN END POSTS AND LINE POSTS. LENGTHS AS REQ'D.
4. PROVIDE GATE STOPS AND DROP RECEIVERS SET IN CONCRETE, EACH GATE.
5. PROVIDE EXTENSION ARMS ON LINE, END AND CORNER POSTS & GATE POSTS AS REQ'D.
6. PROVIDE SIGHT OBSCURING SLATS WITH ALL WASTEWATER PUMP STATIONS.
7. CENTER BRACE RAIL NOT REQUIRED WITH FENCE HEIGHT OF 5' OR LESS.
8. ALL POSTS AND RAILS TO MATCH FENCE COLOR.



CHAIN LINK FENCE AND GATE

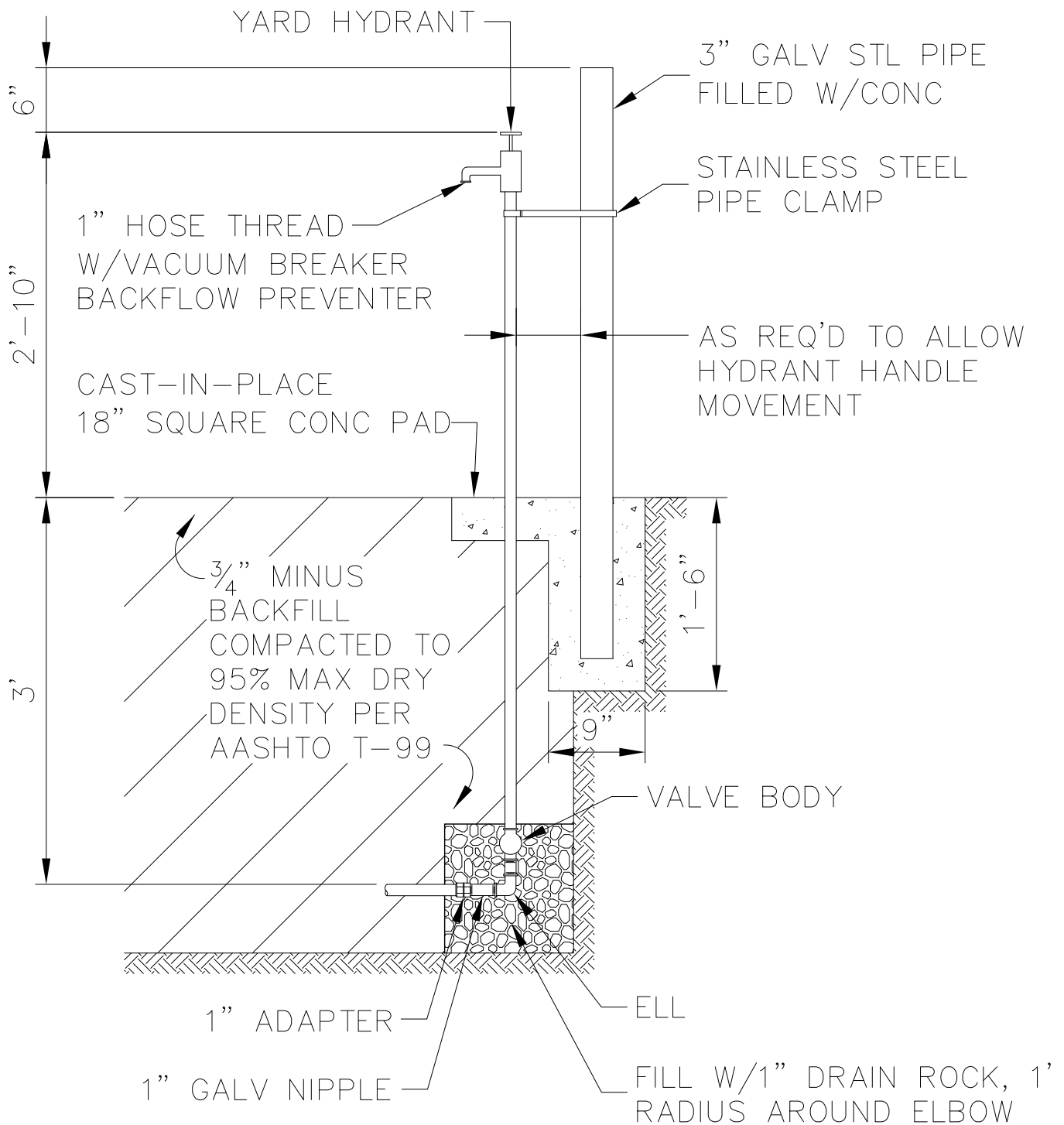


NOTES:

1. INSTALL GAUGE AS SHOWN ON 1/2" DUCTILE IRON PIPE SADDLE WITH STAINLESS STEEL STRAP.
2. ALL PIPE AND FITTINGS SHALL BE SCHEDULE 80 STAINLESS STEEL WITH THREADED ENDS.
3. INSTALL PRESSURE GAUGE AND DIAPHRAGM SEAL PER MANUFACTURERS' REQUIREMENTS.
4. ACCEPTABLE ALTERNATIVE IS FLANGED ANNULAR SEAL, RED VALVE SERIES 45 OR APPROVED EQUAL WITH GLYCERIN FILL.

FORCE MAIN PRESSURE GAUGE



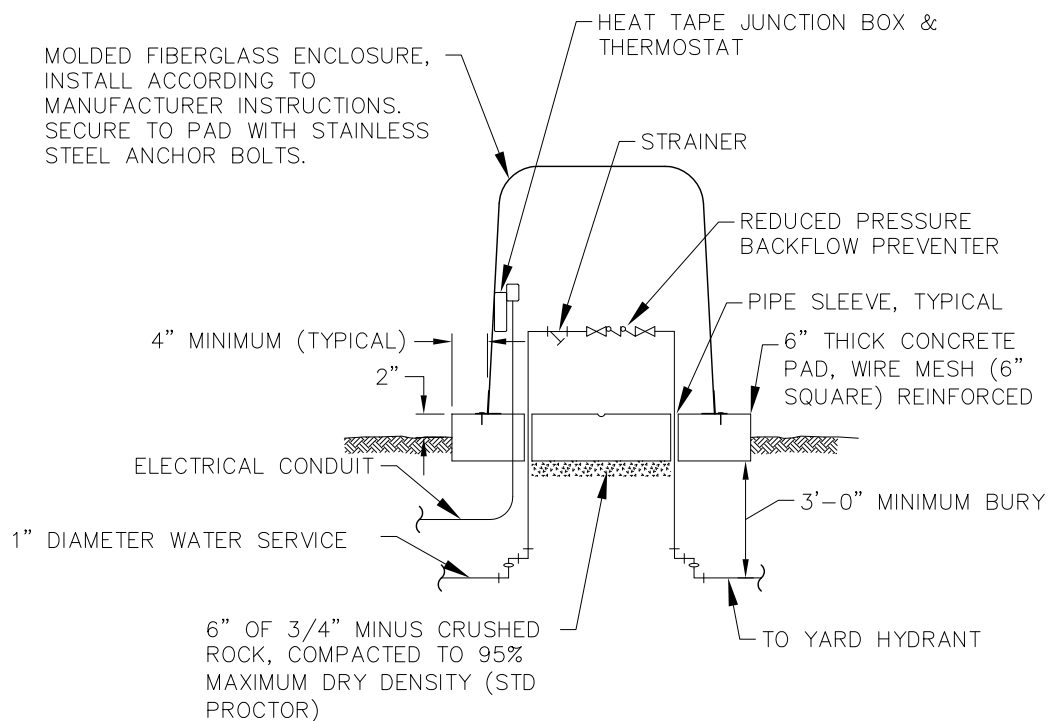


YARD HYDRANT

DRAWING NO. 1009

REVISED 12-03

CleanWater  Services



NOTE:

1. WRAP EXPOSED WATER PIPE WITH HEAT TAPE AND PVC COATED PIPE INSULATION.

REDUCED PRESSURE BACKFLOW PREVENTER

DRAWING NO. 1011

REVISED 12-03

CleanWater Services

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
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IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

DRAWING NO. 1070b



Clean Water Services

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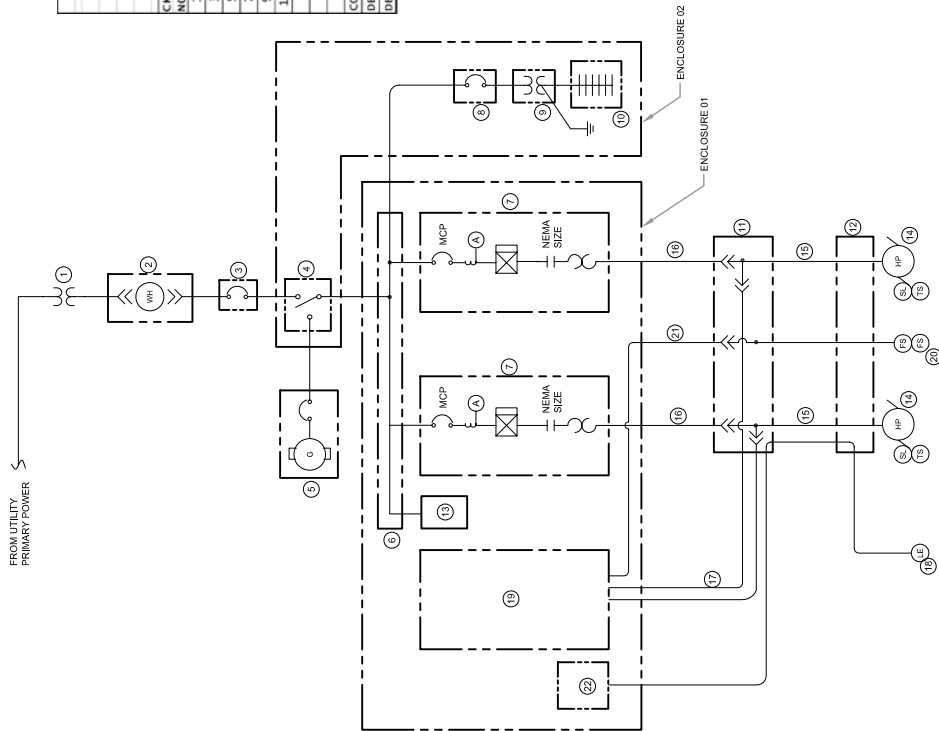
SAMPLE DRAWING

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ELECTRICAL ONE-LINE DIAGRAM

DRAWING NO. 1071

REVISED 2-07



1 ONE-LINE DIAGRAM
SCALE: NTS

PANELBOARD NO:		LOAD CENTER (LP)		BUS RATING (A): 100		ENCLOSURE: NEMA 1	
VOLTAGE:		120/240		MAIN OC DEVICE: 60/2		MOUNTING: SURFACE	
PHASE:		1		INTERRUPTING RATING (KA): 10		LOCATION: ENCLOSURE 1	
WIRE:		3-COND		SERVICE ENTRANCE LABEL: NO		SHORT CIRCUIT RATING: SHORT CIRCUIT RATING	
200% NEUTRAL:		NO					
CKT NO.	DESCRIPTION	CONNECTED LOAD (VA)		OCP		CONNECTED LOAD (VA)	
		LTS	REC	MISC	AMPS	LTS	MISC
1	CONTROL POWER	300			20 1 A	20 1	360
3	ENCLOSURE 1 LIGHTS & HEATER				20 1 B	20 1	300
5	ENCLOSURE 1 DUPLEX OUTLET	360			20 1 A	20 1	
7	ENCLOSURE 2 LIGHTS & HEATER	300			20 1 B	20 1	
9	ENCLOSURE 2 DUPLEX OUTLET				20 1 A	20 1	
11	SPACE				20 1 B	20 1	
LOAD SUMMARY							
		LTS	REC	MISC	SPARE	TOTAL	
CONNECTED LOAD (KVA)		0.6	1.4	0.0	3.3	5.3	240 LINE-TO-LINE VOLTS
DEMAND FACTOR		1.25	NEC	1.00	1.00	20%	22 CONNECTED AMPS
DESIGN LOAD (KVA)		0.8	1.4	0.0	3.3	1.1	27 DESIGN AMPS
							PHASE BALANCE
							PHASE A (KVA)
							PHASE B (KVA)

KEY NOTES:

ITEM	DESCRIPTIONS	COMMENTS	MTR
1	UTILITY XFMR POWER	480V, 3PHASE 4W, 60HZ UNDERGROUND SECONDARY SERVICE 1/2 IMPEDANCE PER UTILITY STANDARDS	SL
2	METER ENCLOSURE	SUITABLE FOR SERVICE ENTRANCE, SS NEMA 4X PROVIDED WITH IN LINE BREAKER	TS
3	MAIN SERVICE BREAKER	480V, 3PHASE, NEMA 1 ENCLOSURE PROVIDED WITH AMMETER (RANGE TWICE FLA)	MCP
4	AUTOMATIC TRANSFER SWITCH	MIN 3 KVA, 480V-120/240V, 1PH	
5	STANDBY GENERATOR	MIN 100AMPS, 120/240V, 1PH, 3W, 12 POLES AIR GAP JUNCTION BOX CONFIGURATION	
6	POWER DISTRIBUTION BLOCK	MOTOR PROVIDED WITH MOTOR OVER TEMP AND SEAL LEAK	
7	COMBINATION MOTOR STARTER PANEL	SUPPLIED BY PUMP MFR	
8	DRY TYPE XFMR	PROVIDE IN CONDUITS	
9	LOAD CENTER	PROVIDE IN CONDUITS	
10	DISCONNECT AIR GAP 480V	CABLE BY MFR, NO SPLICE	
11	UNDERGROUND CABLE TRENCH	OVER FLOW AND HIGH LEVEL	
12	3-PHASE SECONDARY SURGE ARRESTOR	ULTRASONIC LEVEL TRANSMITTER	
13	PUMP SUBMERSIBLE MOTOR		
14	PUMP SUBMERSIBLE POWER AND CONTROL CABLES		
15	PUMP POWER WIRES		
16	PUMP CONTROL WIRES		
17	ULTRASONIC		
18	PUMP SEQUENCE CONTROL PANEL (PSCP)		
19	FLOATS		
20	FLOAT CONTROL WIRES		
21	ULTRASONIC LEVEL TRANSMITTER		
22			

LEGEND:

MTR	MOTOR
SL	SEAL LEAK
TS	MOTOR OVER TEMP SWITCH
MCP	MOTOR CIRCUIT PROTECTOR

GENERAL NOTE:

A. SHOW EQUIPMENT SHORT CIRCUIT RATING.

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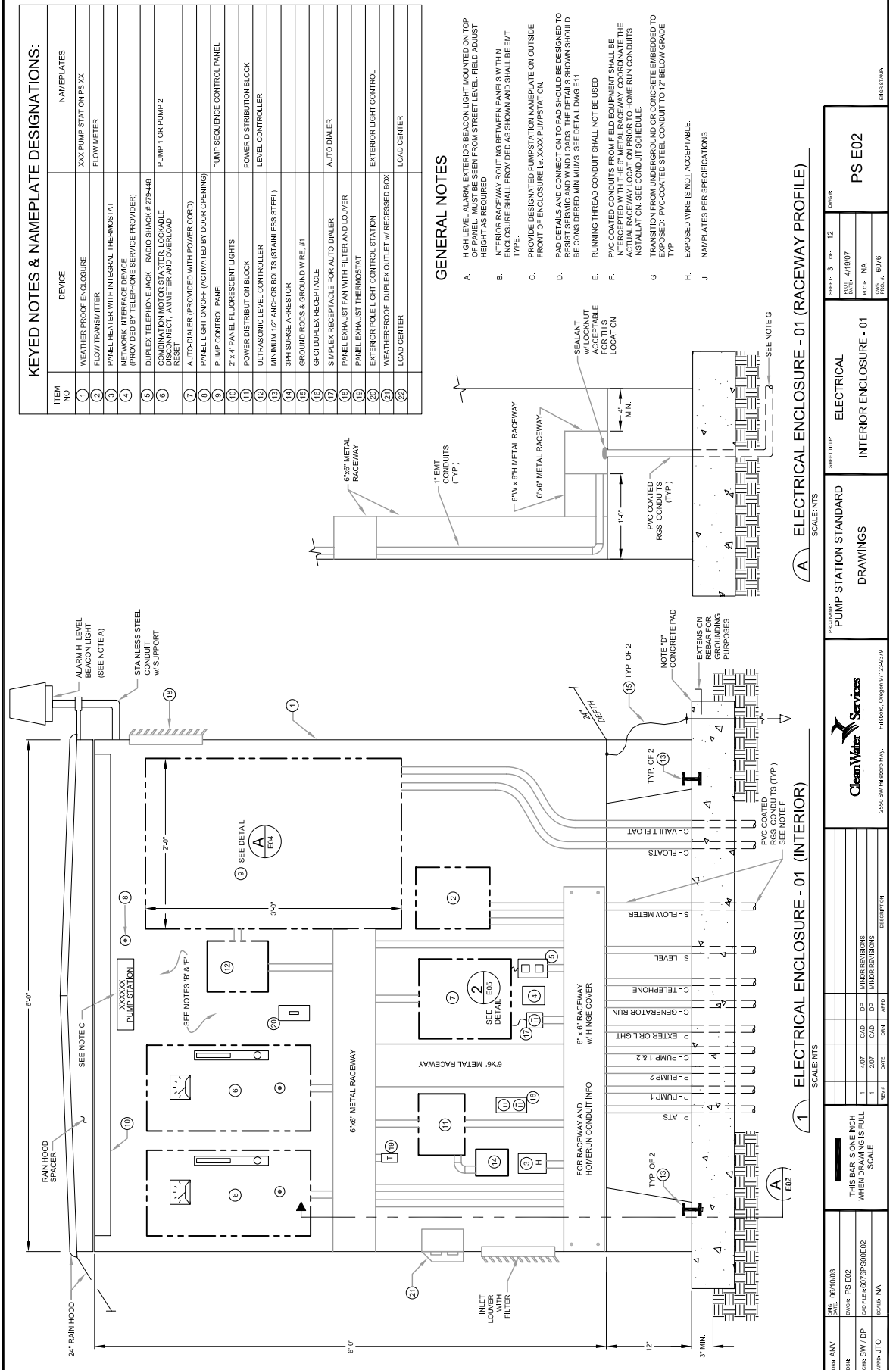
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SAMPLE DRAWING

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ELECTRICAL INTERIOR ENCLOSURE - 01

DRAWING NO. 1072

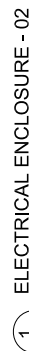
REVISED 4-07

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DRAWING NO. 1073



Clean Water Services



KEYED NOTES & NAMEPLATE DESIGNATIONS:		
ITEM NO.	DEVICE	NAMEPLATE
1	WEATHER PROOF ENCLOSURE	PUMP STATION XXXX
2	LOAD CENTER	LOAD CENTER
3	PANEL HEATER WITH INTEGRAL THERMOSTAT	CIRCUIT LP-2
4	NOT USED	
5	NOT USED	
6	DRY TYPE XMFR PRIM BREAKER	DRY TYPE XMFR PRIM BREAKER
7	DRY TYPE XMFR	
8	O & M RACK	O & M RACK
9	DUPLEX RECEPTACLE	CIRCUIT LP-9
10	2x4 FLOURESCENT LIGHTS	
11	NOT USED	
12	AUTOMATIC TRANSFER SWITCH	AUTOMATIC TRANSFER SWITCH
13	NOT USED	
14	PANEL LIGHT ON/OFF (ACTIVATED BY DOOR OPENING)	
15	GROUND RODS & GROUND WIRE #1	
16	NOT USED	
17	NOT USED	
18	PANEL EXHAUST FAN WITH FILTER AND LOUVER	CIRCUIT LP-2
19	PANEL EXHAUST THERMOSTAT	
20	MINIMUM 1/2" ANCHOR BOLT (STAINLESS STEEL)	
21	KWH METER BASE PER PG&E STANDARDS	
22	MAIN BREAKER SS NEIMA 4X	

GENERAL NOTES:

- | | |
|----|--|
| A. | NOT USED |
| B. | INTERIOR RACEWAYS ROUTING BETWEEN PANELS WITHIN THE RACEWAY SHALL BE WELL COORDINATED AND SHALL BE IMT |
| C. | PROVIDE DESIGNATED PUMP/STATION NAMEPLATE ON OUTSIDE FRONT ENCLOSURE 1/4" XXXX PUMP/STATION. |
| D. | PAD DETAILS AND CONNECTION TO PAD SHOULD BE DESIGNED TO ACCOMMODATE THE MAXIMUM LOADS THAT CAN BE CONSIDERED MINIMUMS. SEE DETAIL DWG E11. |
| E. | RUNNING TRACED CONDUIT SHALL NOT BE USED. |
| F. | PVC COATED CONDUITS FROM FIELD EQUIPMENT SHALL BE INTERFERED WITH THE 6" METAL RACEWAY. COORDINATE THE INSTALLATION. SEE CONDUIT SCHEDULE. |
| G. | TRANSITION FROM UNDERGROUND OR CONCRETE EMBEDDED TO EXPOSED: PVC-COATED STEEL CONDUIT TO 12" BELOW GRADE. TYPE. |
| H. | EXPOSED WIRE IS NOT ACCEPTABLE. |
| I. | KW/METER INSTALLED PER GROSS MAX. HEIGHT. MAIN BREAKER INSTALLED IMMEDIATELY BELOW METER. |
| J. | |

[illegible]

CleanWater Services
550 SW Hillshorn Hwy Hillshorn, Oregon 97123-6379

STATION STANDARD DRAWINGS	SHEET TITLE: ELECTRICAL INTERIOR ENCLOSURE - 02
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SHEET: 4	OF: 12	DWG. #:
PLOT DATE: 4/19/07		
PLC R NA		
DWG 6076		PS E03

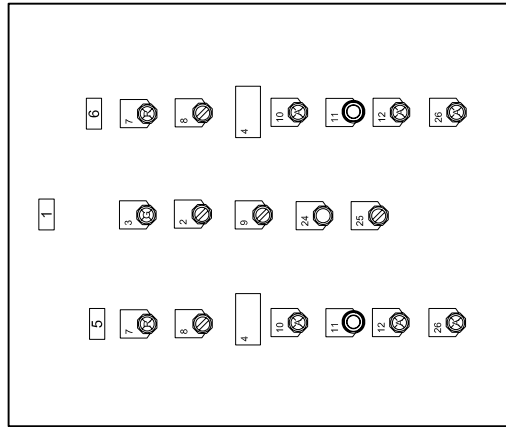
SAMPLE DRAWING

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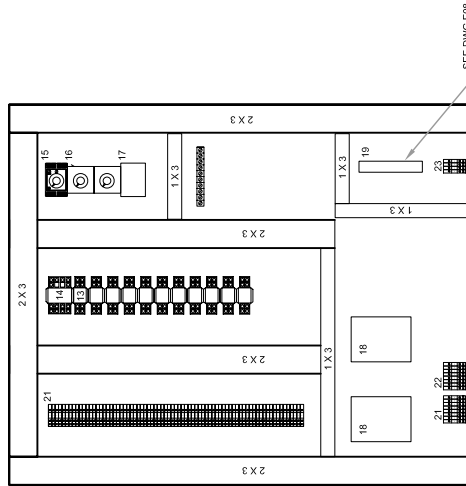
ELECTRICAL CONTROL PANEL DETAIL

DRAWING NO. 1074

REVISED 2-07



FRONT
APPROXIMATE
ENCLOSURE SIZE
37 X 23 INCHES
(SEE NOTES 18, 21)



INTERIOR
APPROXIMATE
ENCLOSURE SIZE
(SEE NOTES 18, 21)

A PUMP SEQUENCE CONTROL PANEL (PSPC) - FRONT AND INTERIOR DETAILS
SCALE: NTS
SEE SHEET E202

KEYED NOTES & NAMEPLATE DESIGNATIONS (PSCP):		
ITEM NO.	DEVICE	NAMEPLATE
1	PUMP SEQUENCE CONTROL PANEL	PUMP CONTROL PANEL
2	SELECTOR SWITCH	CONTROL POWER ON/OFF
3	GREEN LIGHT	CONTROL POWER ON
4	RUN TIME METER	-
5	-	PUMP 1
6	-	PUMP 2
7	RED LIGHT	RUNNING
8	SELECTOR SWITCH	H-O-A
9	ALTERNATOR SELECTOR SWITCH	LEAD SELECTOR PUMP1-ALT-PUMP2
10	AMBER LIGHT	SEAL LEAK
11	RESET PUSHBUTTON	OVER TEMP RESET
12	AMBER LIGHT	MOTOR OVER TEMP
13	RELAYS, 2 POLE	-
14	RELAYS, 4 POLE	-
15	TIMER, OFF DELAY	-
16	TIMERS, ON DELAY	-
17	ALTERNATING RELAY	-
18	SEAL LEAK DETECTOR	-
19	INTRINSICALLY SAFE RELAYS	-
20	FLOAT SWITCHES, NO	-
21	TERMINALS, PUMP SEQUENCE CONTROL PANEL WIRING	-
22	TERMINALS, SEAL LEAK & OVERTEMP WIRING	-
23	TERMINALS, INTRINSICALLY SAFE WIRING	-
24	PUSHBUTTON, 1 NO., 1 NC.	HIGH LEVEL ALARM TEST
25	SELECTOR SWITCH, 2 POS., 1 NO., 1 NC.	HIGH LEVEL BEACON ALARM ENABLE/DISABLE
26	AMBER LIGHT	PUMP FAIL (OVERLOAD)

NOTES:

1. PROVIDE PSCP WITH 10% EXTRA SPACE AND DOOR STOP.
2. PROVIDE NAMEPLATES PER SPECIFICATION.

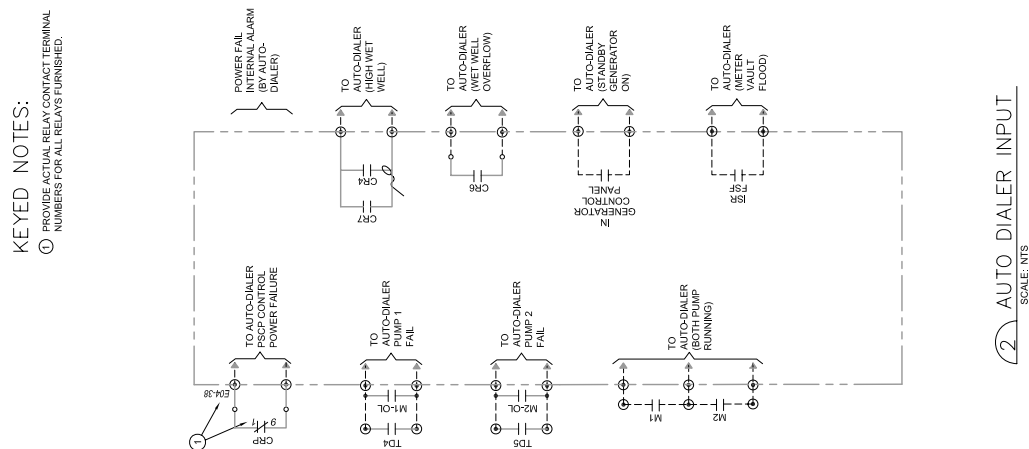
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DATE: 06/10/03	SCALE: NA	THIS DRAWING IS ONE INCH WHEN DRAWING IS FULL SCALE.	DATE: 06/10/03	SCALE: NA
DATE: 06/10/03	SCALE: NA	THIS DRAWING IS ONE INCH WHEN DRAWING IS FULL SCALE.	DATE: 06/10/03	SCALE: NA

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.



1 PUMP SEQUENCE CONTROL PANEL – CONTROL DIAGRAM (PSCP)

Clean Water Services
15W Hillsboro Hwy., Hillsboro, Oregon 97123-6379

**ELECTRICAL
SEQUENCE CONTROL
DIAGRAM**

PS E05

DWG #:	
SHEET: 6 OF 12	
PLOT DATE: 2/28/07	
PLC #:	NA
DWG #:	6076

KSR STAMP:

ELECTRICAL SEQUENCE CONTROL DIAGRAM

DRAWING NO. 1075

REVISÉD 2-07



FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

DRAWING NO. 1076



Clean Water Services



- ① THIS IS REPRESENTATIVE OF PUMP TECH-WARRICK DETECTION (S/D). CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE UNIT PER THE PUMP MANUFACTURER'S RECOMMENDATIONS, AND TO PROVIDE ACCESSORIES AND CONNECTIONS TO THE UNIT. THE UNIT IS TRANSPORTED TO THE OPERATING WELL WITH LEAK PROTECTION, FIELD INSTALL UNIT IN STARTER PANEL.
- ② ALL INDICATING PILOT LIGHTS SHALL BE PUSH-TO-TEST AND LED LAMP TYPE.
- ③ PUMP H2-A4, RTM, AND INDICATING LIGHTS, LOCATED AT FSPCH.
- ④ FOR AUTO DIALER CONNECTIONS SEE DETAIL 2/ DRAWING E05

[illegible]

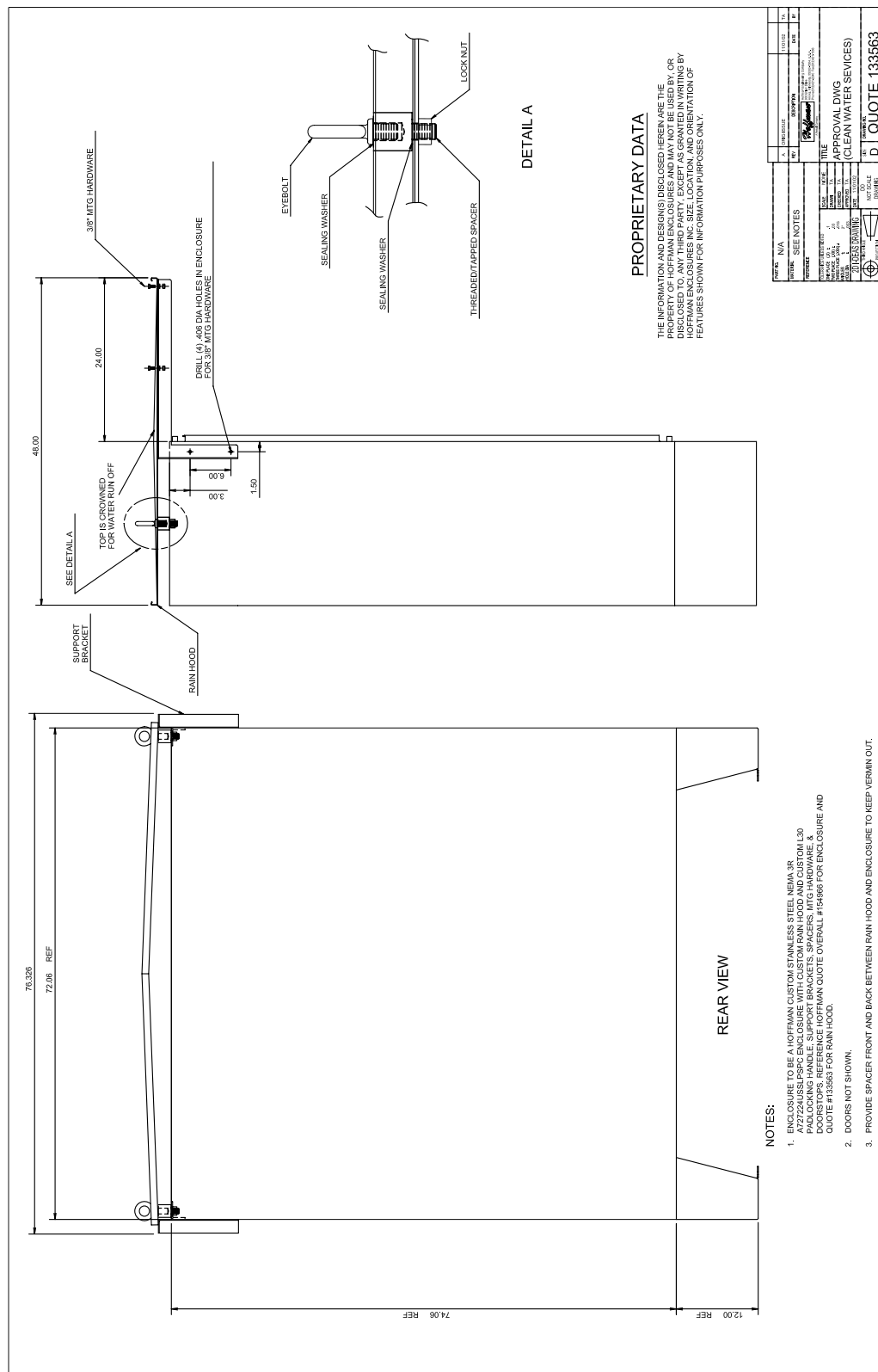
Clean Water Services

PROJECT NAME:	PUMP STATION STANDARD	SHEET TITLE:	ELECTRICAL
	DRAWINGS		CONTROL PANEL DETAIL

SHEET: 7	OF: 12	DWG. #:
PLOT DATE: 4/19/07		
P.L.C.# NA		
DMS 6076		

DISCUSSION

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.



PROPRIETARY DATA

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[illegible]

3. PROVIDE SPACER FRONT AND BACK BETWEEN RAIN HOOD AND ENCLOSURE TO KEEP VERMIN OUT.

SHEET OF
C1310

REV: ANV	CRIS DATE: 06/10/03
REV:	DWG #1 PS E07
REV: SW / DP	CAD FILE #6076PSS
REV: ITC	CONC: N/A

THIS BAR IS ONE INCH
WHEN DRAWING IS FULL

--	--	--	--	--	--



Clean Water Services

PROJ NAME: PUMP STATION STANDARD
DRAWINGS

ELECTRICAL

ENCLOSURE AND RAIN HOOD

DETAIL REFERENCE

PS E07

OVER STAMP.

ELECTRICAL ENCLOSURE AND RAIN HOOD DETAIL

DRAWING NO. 1077

REVISÉD 2-07



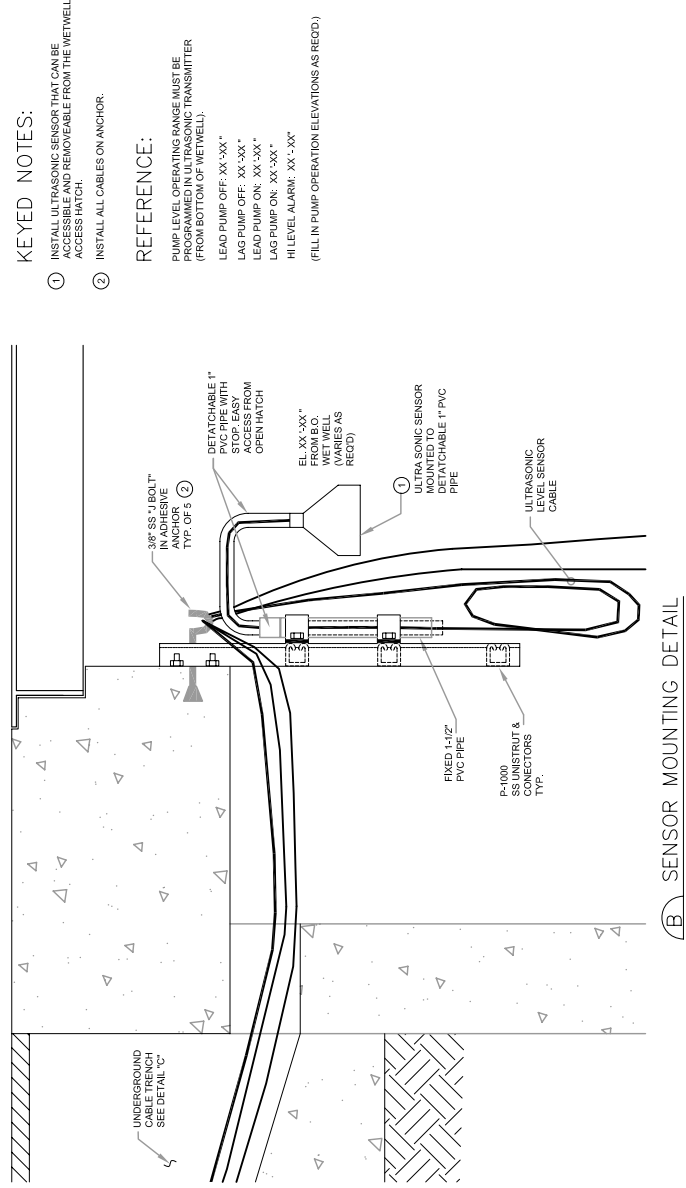
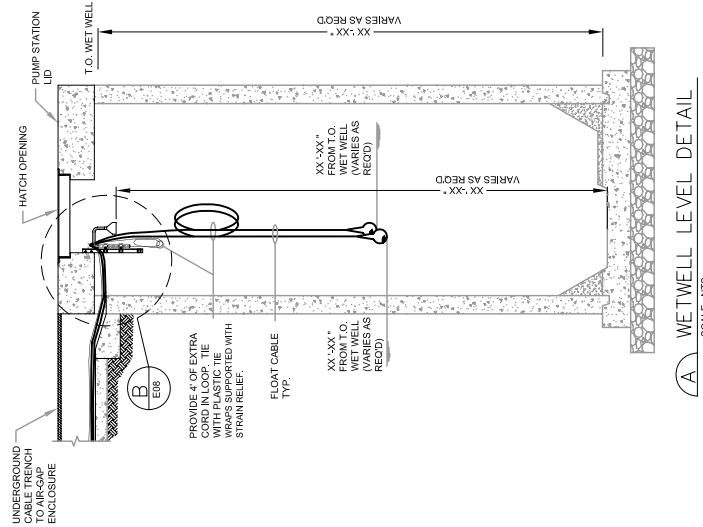
SAMPLE DRAWING

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

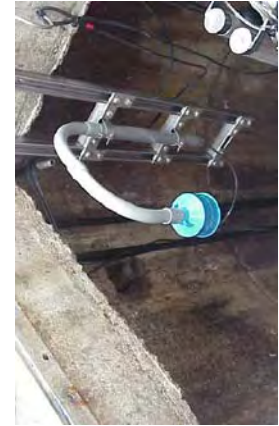
ELECTRICAL WETWELL LEVEL DETAIL

DRAWING NO. 1079

REVISED 4-07



- KEYED NOTES:**
1. INSTALL ULTRASONIC SENSOR THAT CAN BE ACCESSIBLE AND REMOVABLE FROM THE WETWELL ACCESS HATCH.
 2. INSTALL ALL CABLES ON ANCHOR.
- REFERENCE:**
- PUMP LEVEL OPERATING RANGE MUST BE PROGRAMMED IN ULTRASONIC TRANSMITTER (FROM BOTTOM OF WETWELL):
- LEAD PUMP OFF: XX'-XX\"
 - LAG PUMP OFF: XX'-XX\"
 - LEAD PUMP ON: XX'-XX\"
 - LAG PUMP ON: XX'-XX\"
 - HI LEVEL ALARM: XX'-XX\"
- (FILL IN PUMP OPERATION ELEVATIONS AS RECD.)



(C) CABLE TRENCH
NTS

(D) MOUNTED SENSOR
NTS

DATE	06/10/03
DWG BY	PS E09
CHECKED BY	SW / DP
SCALE	NA

THIS BAR IS ONE INCH
WHEN DRAWING IS FULL
SCALE

REV	DATE	BY	CHK	APP	DESCRIPTION
1	2007	CAD	DP		MINOR REVISIONS
2	4/07	CAD	DP		MINOR REVISIONS



**PUMP STATION STANDARD
DRAWINGS**

**ELECTRICAL
WETWELL LEVEL
DETAIL**

DWG. NO.	
SHEET: 10 OF: 12	
PLOT DATE: 4/19/07	
PLC R NA	
CNS PROJ. NO. 6076	

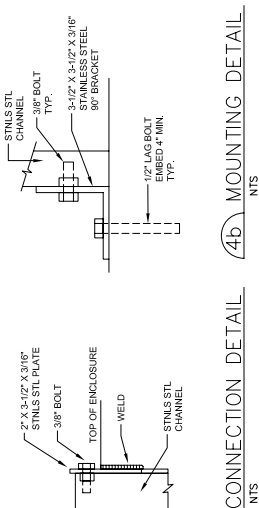
PS E09

FILE STAMP

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

- ① PIN & SLEEVE INTERLOCK. HUBBELL WITH MATCHING PLUG (2 REDS)
- ② CONDUITS TO STARTERS AND PUMP SEQUENCE CONTROL PANEL. NOTE POWER AND CONTROL CONDUITS DOWN INTO GROUND.
- ③ INSTALL EQUIPMENT NAME PLATES ABOVE EACH SWITCH AND RECEPTACLE.
- ④ CABLE CHANNEL TO WELL. SVWERTHEC MOULDED PRODUCTS MODEL NO 128 IS FIBRETON CHANNEL. IN SYSTEM COMPLETE WITH REMOVABLE COVER BUILT TO PARTITION POWER CABLES FROM INSTRUMENTATION CABLES. SEE CIVIL DWGS FOR PENETRATION TO WETWELL DETAIL.
- ⑤ PROVIDE 3P-4W, 20A, 800V SINGLE LOCKING RECEPTACLE IN CAST OUTLET BOX. PROVIDE MATCHING PLUG.
- ⑥ 307K X 307W X 250 (MIN.) 2 DOORS, 145A, 31V STAINLESS ENCLOSURE WITH PALGLOCK LOCKING RING FOR DOOR ATTACHED TO ENCLOSURE DOOR SHALL OPEN GREATER THAN 90 DEG. INSET DOOR FOR DRIP UP.
- ⑦ PROVIDE J-HOOKS & KELLUMS GRIPS TO SUPPORT ALL FLEXIBLE CORDS.
- ⑧ SVWERTHEC HANDHOLE . 48" X 127W X 170D, 2" THICK MIN. WITH REINFORCING WIRE MESH, AND REMOVABLE COVER.
- ⑨ VENDORS CABLES (POWER AND CONTROL) TO SUBMERSIBLE PUMPS LOCATED IN WETWELL.
- ⑩ VENDOR CABLES TO FLOAT SWITCHES MOUNTED IN WET WELL.
- ⑪ VENDOR CABLES TO ULTRASONIC LEVEL TRANSDUCER MOUNTED IN WET WELL.
- ⑫ ALL HARDWARE (FRAMEWORK, ETC.), SHALL BE STAINLESS STEEL.

A. RECEPTACLES AND MATCHING PLUGS FOR PUMP CONTROL CABLES SHALL MATCH THE ACTUAL PUMP PROVIDED CONTROL VOLTAGE.



REFERENCES

CONTENTS

[illegible]


Clean Water Services
 PROJECT: PUMP STATION STANDARD
 SHEET TITLE: ELECTRICAL
 DISCONNECT AIR-GAP JUNCTION BOX DETAIL
 DRAWINGS

SHEET: 11 OF: 12	DWG. #:
PLOT DATE: 2/28/07	
PLC #:	NA
CWS	6076

OVER STAMP.

DRAWING NO. 1080

REVISÉD 2-07



ELECTRICAL
DETAILS



SAMPLE DRAWING

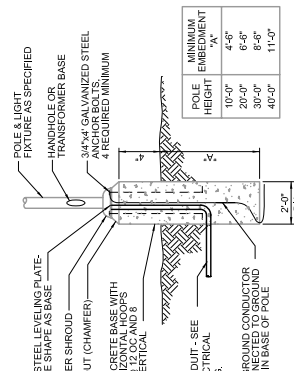
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

TAG NO.	CONDUIT		CONDUIT SCHEDULE		CONDUCTORS		COMMENTS
	FROM	TO	SIZE	DESCRIPTION	LOAD CENTER CENTS 10, 12, 14	TO	
C-J-GEN	ENCLOSURE 02	GENERATOR	1"	2#12	ATS	APPROPRIATE DEVICE PANEL	FOR GENERATOR START CONTROL MONITORING - CONDUCTORS SHALL BE ROUTED TO AUTO DIALER VIA CONDUIT C-PCSP
C-FLOATS	ENCLOSURE 01	DISCONNECT AIR GAP J-BOX	1"	2#12	WIREWAY	GENERATOR CONTROL PANEL	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
C-PCSP	ENCLOSURE 01	ENCLOSURE 02	1"	2#14, 1#14G	AUTO DIALER	WIREWAY	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
C-PUMPS	ENCLOSURE 01	VALVE/METER	1"	2#14, 1#14G	PSCP	WIREWAY	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
C-VAULT	ENCLOSURE 01	VAULT	1"	2#12, 1#12G	PSCP	WIREWAY	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
C-ATV HEAT	ENCLOSURE 02	AIRVAC VALVE	1"	2#12, 1#12G	PSCP	WIREWAY	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-ATS	ENCLOSURE 01	BACKFLOW	1-1/2"	3#1, 1#6G	LOAD CENTER CENTS 1, 3, 5, 7	ATS	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-3P HEAT	ENCLOSURE 02	PREVENTOR	1"	2#12, 1#12G	LOAD CENTER CENTS 1, 3, 5, 7	ATS	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-ATV HEAT	ENCLOSURE 02	PREVENTOR	1"	2#12, 1#12G	LOAD CENTER CENTS 1, 3, 5, 7	ATS	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-C-1-7	ENCLOSURE 01	ENCLOSURE 02	1"	2#10, 1#10G	LOAD CENTER CENTS 2, 4, 6, 8	ATS	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-C-2-8	ENCLOSURE 01	ENCLOSURE 02	1"	2#10, 1#10G	LOAD CENTER CENTS 2, 4, 6, 8	ATS	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-XE	ENCLOSURE 02	TRANSFORMER	4"	PULLSTRING	METER	TRANSFORMER	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-XJUMP 1	ENCLOSURE 01	DISCONNECT AIR	1"	2#12, 1#12G	PUMP 1 MOTOR STARTER	PUMP 1 DISCONNECT	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-XJUMP 2	ENCLOSURE 01	DISCONNECT AIR	1"	2#12, 1#12G	PUMP 2 MOTOR STARTER	PUMP 2 DISCONNECT	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
P-X BKR	ENCLOSURE 01	ENCLOSURE 02	1"	2#10, 1#10G	POWER DISTRIBUTION	TRANSFORMER PRIMARY	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
S-LOW	ENCLOSURE 01	VAULT	1-1/2"	MISC & 1-TBP	FLOW ELEMENT	LEVEL ELEMENT	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
S-ELEV	ENCLOSURE 01	TELEPHONE	1"	MISC	LEVEL TRANSMITTER	TELEPHONE SERVICE	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN
S-TELE	ENCLOSURE 01	TELEPHONE	2"	PULLSTRING	TELEPHONE OUTLET	PEDESTAL	CONDUCTORS SHALL BE ROUTED TO GENERATOR CONTROL PANEL VIA CONDUIT C-P-GEN

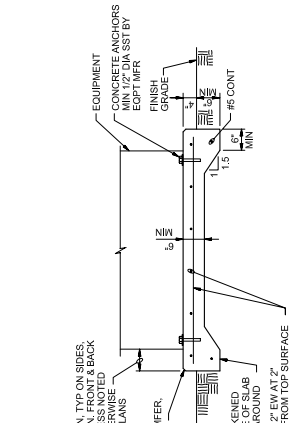
NOTE: THIS IS A SAMPLE CONDUIT SCHEDULE. PROVIDE PER SPECIFIC PROJECT.

KEYED NOTES:

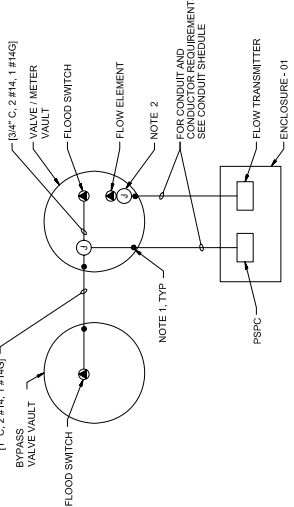
- 1 PROVIDE SEAL-OFF FOR CLASS 1, DIV 2 AREA
- 2 PROVIDE JUNCTION BOX WITH 1/2" DRAIN HOLE IN BOTTOM FOR CABLES TO FLOW ELEMENT MOUNTED BELOW FLOW ELEMENT ELEVATION



TYPICAL LIGHT POLE BASE (1)
NTS



CONCRETE PAD (2)
NTS



VAULT WIRING DIAGRAM (3)
NTS

DATE	06/10/03
BY	DWA
CHECKED	DWA
SCALE	AS SHOWN

PROJECT	2500 SW Hibbard Hwy.
CLIENT	CleanWater Services
LOCATION	Hillsboro, Oregon 97124-5079

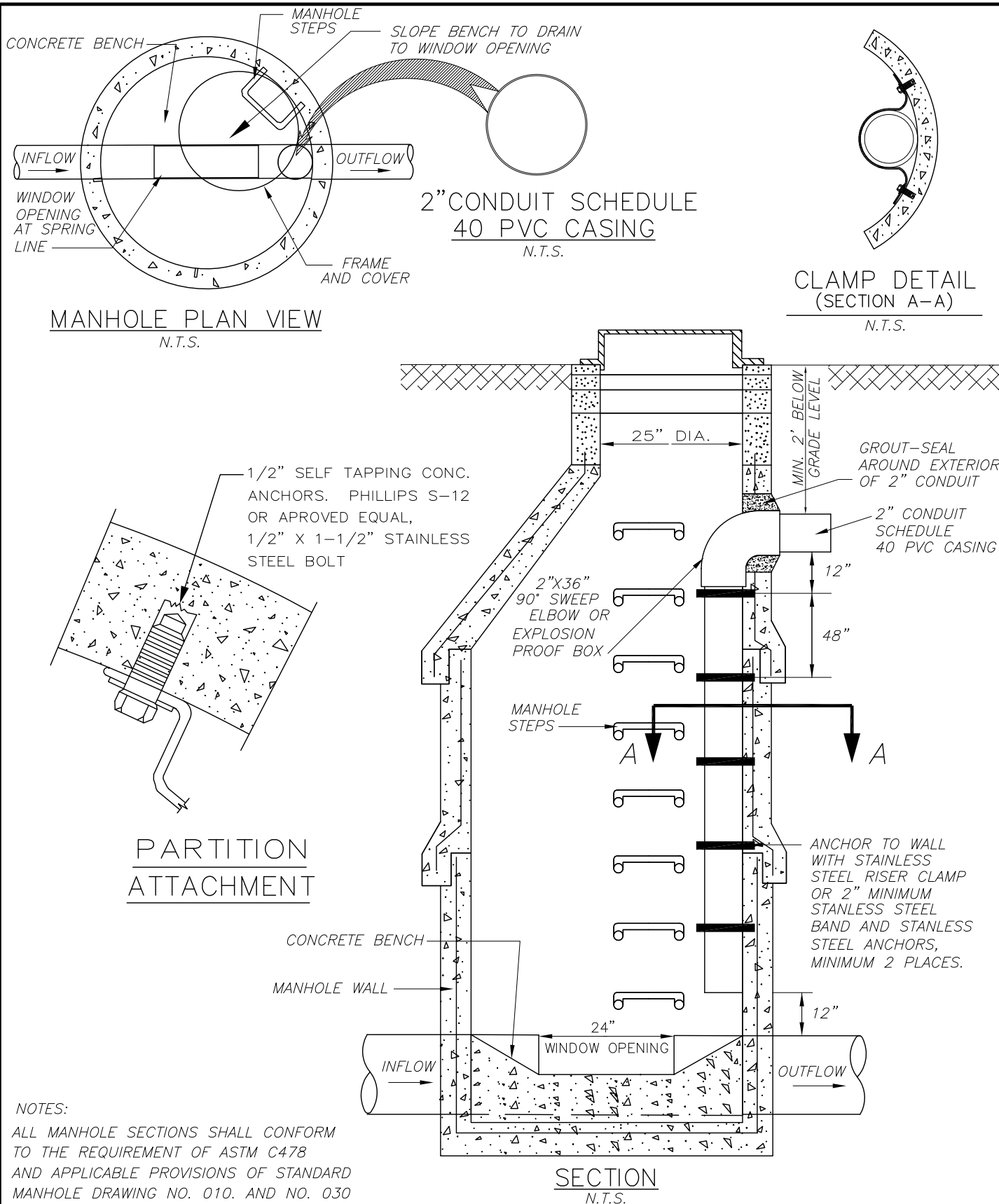
STATION	PUMP STATION STANDARD
DRAWING	DRAWINGS

SHEET TITLE	ELECTRICAL
DETAILS	DETAILS

SHEET	12 OF 12
DATE	2/28/07
SCALE	NA
PROJECT	6076

PS E11

INSTRUMENT



SANITARY SEWER PERMANENT
FLOW MONITOR DERAILS
(MANHOLE CONDUIT INSTALLATION)

DRAWING NO. 1100

REVISED 12-06

CleanWater Services

CLASS B WITH A/C CAP

CLASS B

CLASS A

4" MINIMUM A/C CAP
SAND SEAL EDGES

6" TEE CUT

MOUND EXCESS NATIVE MATERIAL
OVER TRENCH TO ALLOW FOR
SETTLEMENT

TOP ONE FOOT
OF TRENCH SHALL
BE NATIVE TOPSOIL
FROM EXISTING
TRENCH

ALL TRAVELED ROAD
SHOULDERS AND ALLEY
WAYS SHALL BE COMPACTED
CRUSHED ROCK TO GRADE
OR AS SPECIFIED

95% COMPACTED
3/4"-0" ROCK

90% COMPACTED
NATIVE MATERIAL

UNDISTURBED
EARTH

24" MIN.

95% COMPACTION

3/4"-0" CRUSHED ROCK
PIPE O.D. PLUS 6"

2" CONDUIT, SCHEDULE
40 PVC CASING

4' MIN.

UNDISTURBED
EARTH

CONDUIT TRENCH BACKFILL DETAILS

REVISED 02-03

DRAWING NO. 1105

CleanWater  Services

CLEAN WATER SERVICES OF WASHINGTON COUNTY

AIR TEST

PROJECT: _____ DATE: _____

CONTRACTOR: _____ PROJECT #: _____

TESTING COMPANY: _____ INSPECTOR: _____

DATE	LINE	DOWN STREAM MH #	UP STREAM MH #	DIA. (IN.)	LENGHT (FT.)	TIME (MIN.: SEC.)	START TEST	STOP TEST	PASS/FAIL

NOTES: ALL AIR TEST WILL BE PERFORMED IN ACCORDANCE WITH ASTM C924 AND CURRENT CONSTRUCTION STANDARDS RESOLUTION AND ORDER.

INSPECTORS SIGNATURE: _____

AIR TEST
FORM

DRAWING NO. 1200

REVISED 02-03

CleanWater  Services

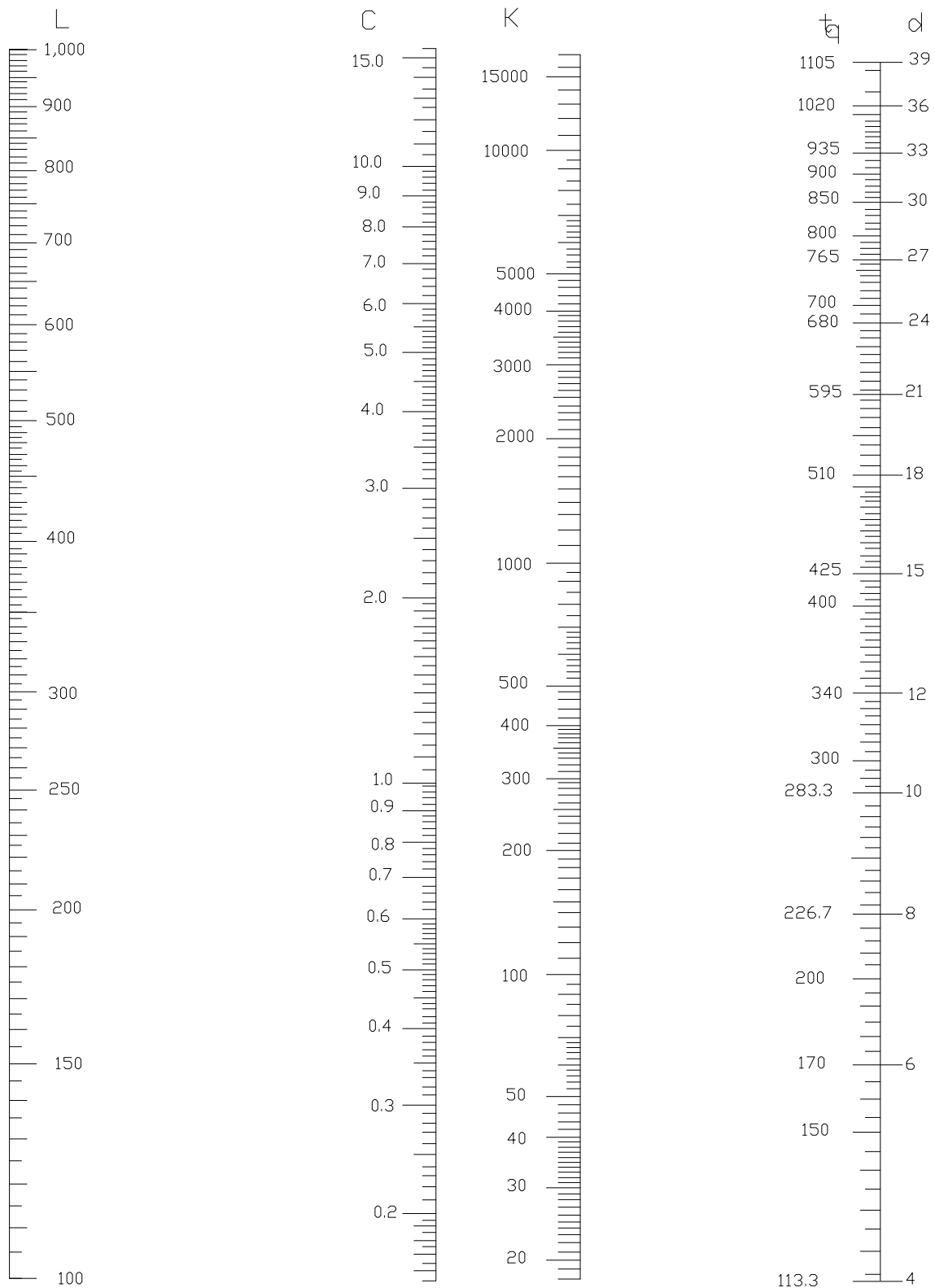


FIG. #1
NOMOGRAPH FOR THE SOLUTION OF $K = .011d^2L$, $C = .0003882dL$, $t_q = K \div C$

NOMOGRAPH

CleanWater  Services

CLEAN WATER SERVICES OF WASHINGTON COUNTY

MANHOLE VACUUM TEST

PROJECT: _____ DATE: _____

CONTRACTOR: _____ PROJECT #: _____

TESTING COMPANY: _____ INSPECTOR: _____

<u>DATE</u>	<u>M.H. #</u>	<u>SIZE</u>	<u>DEPTH</u>	<u>REQUIRED TIME</u>	<u>TIME</u>		<u>NOTES / COMMENTS</u>
					<u>START</u>	<u>END</u>	

NOTES: ALL MANHOLE VACUUM TESTS WILL BE CONDUCTED IN ACCORDANCE WITH ASTM AND CURRENT CONSTRUCTION STANDARDS RESOLUTION AND ORDER.

INSPECTOR'S SIGNATURE: _____

MANHOLE VACUUM
TEST

DRAWING NO. 1210

REVISED 02-03

CleanWater  Services

CLEAN WATER SERVICES OF WASHINGTON COUNTY

MANHOLE HYDROSTATIC TEST

PROJECT: _____ DATE: _____

CONTRACTOR: _____ PROJECT #: _____

TESTING COMPANY _____ INSPECTOR _____

DATE	M.H. #	DEPTH	ALLOWABLE LOSS / HR.	ACTUAL LOSS/HR.	TIME		PASS/FAIL
					START	END	

COMMENTS:

NOTE:

ALL MANHOLE HYDROSTATIC TEST WILL BE CONDUCTED IN ACCORDANCE WITH ASTM AND CURRENT CONSTRUCTION STANDARDS RESOLUTION ORDER, ALLOWABLE LEAKAGE SHALL NOT EXCEED 0.2 GALLONS PER HOUR PER FOOT OF HEAD MEASURED FROM INVERT TO TOP OF FRAME.

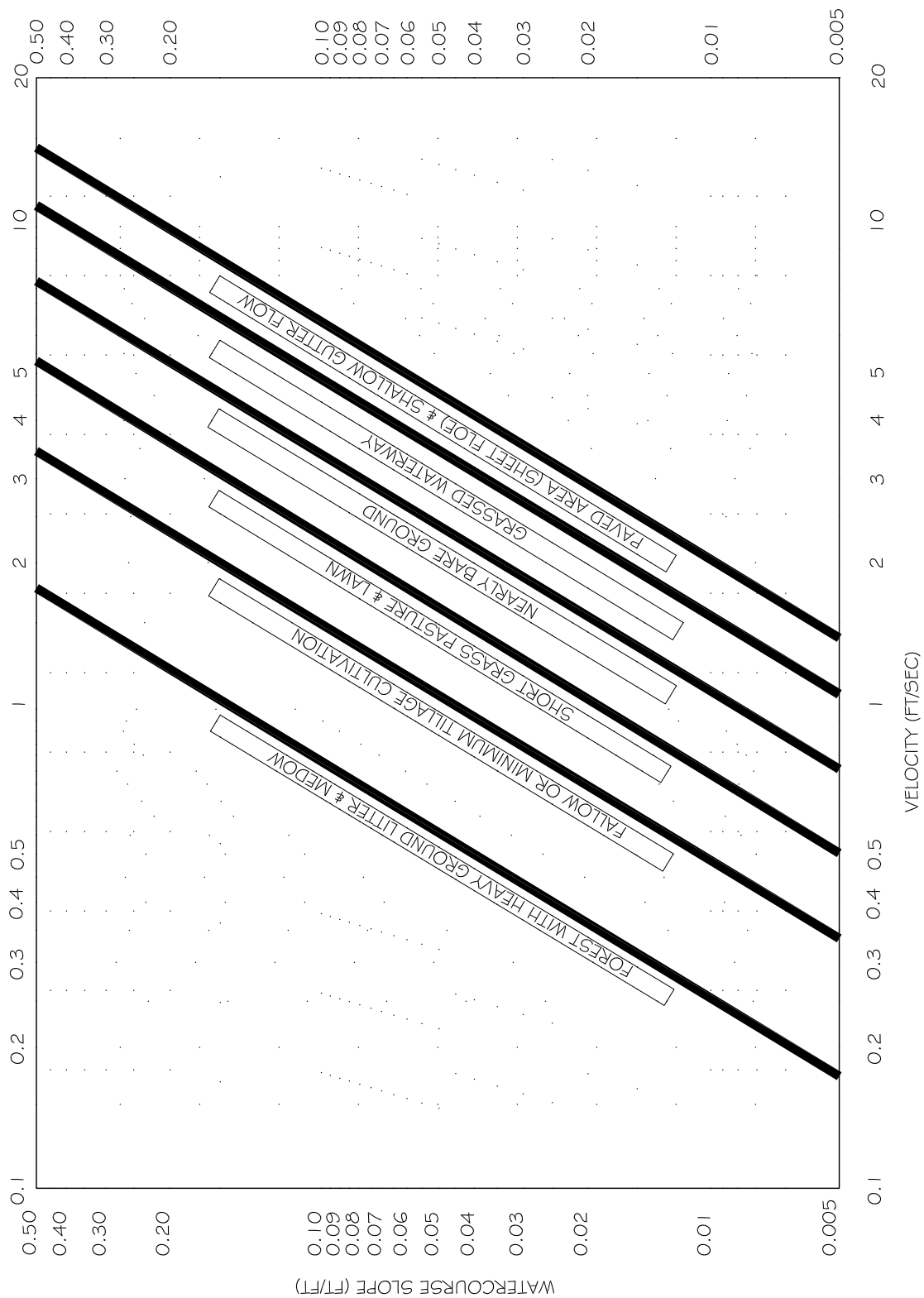
INSPECTORS SIGNATURE: _____

MANHOLE HYDROSTATIC
TEST

DRAWING NO. 1215

REVISED 02-03

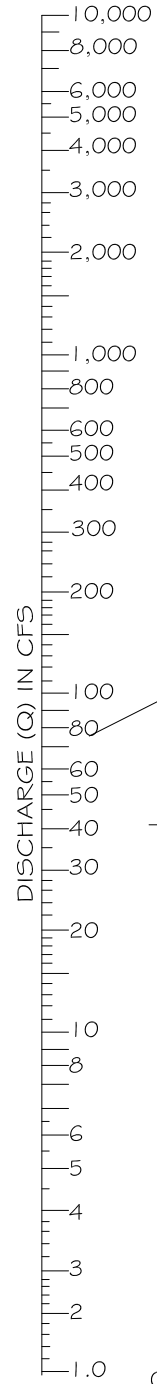
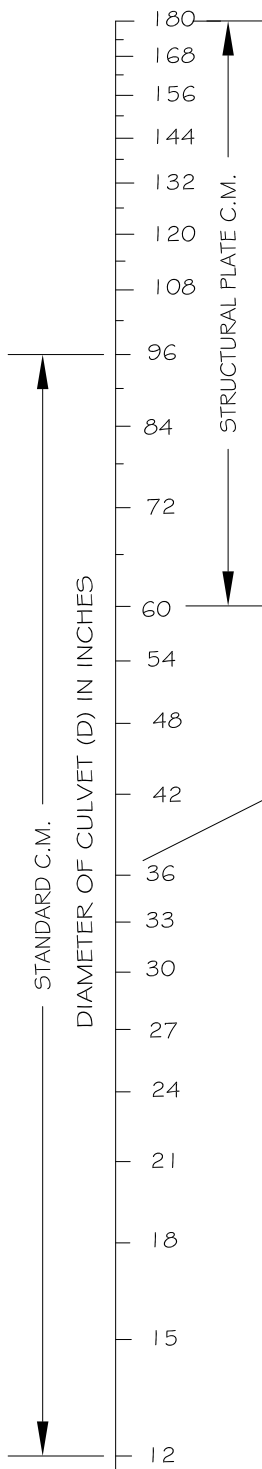
 CleanWater Services



* FOR USE WITH THE RATIONAL METHOD ONLY, FARM SOIL CONSERVATION SERVICE, TECH. RELEASE NO. 55, JANUARY 1975

AVERAGE VELOCITIES FOR ESTIMATING TRAVEL TIME FOR OVERLAND FLOWS*





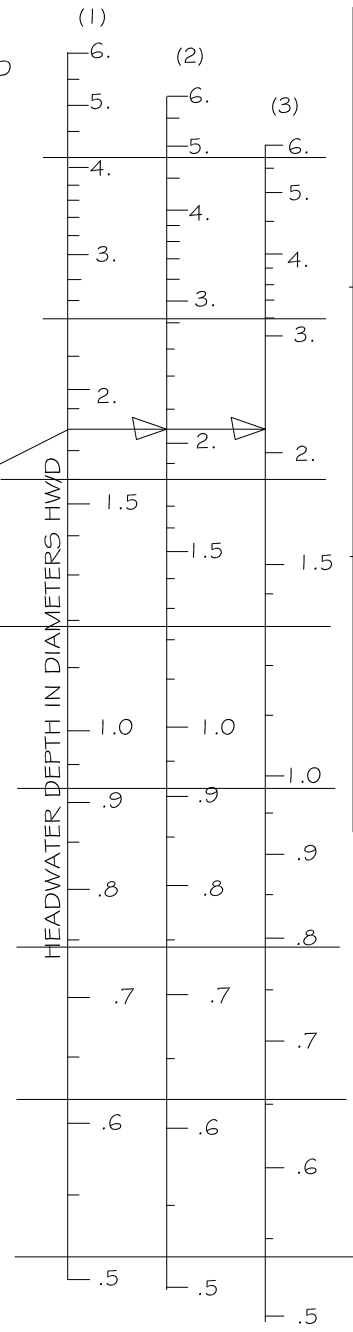
EXAMPLE
 D = 36 INCHES (3.0 FEET)
 Q = 66 CUBIC FEET/ SECOND

	$\frac{HW^*}{D}$	HW (FEET)
(1)	1.8	5.4
(2)	2.1	6.3
(3)	2.2	6.6

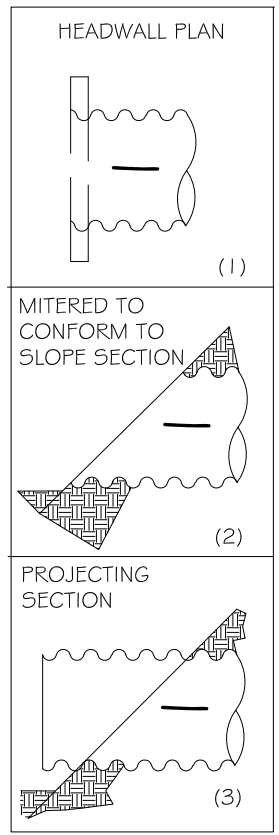
*D IN FEET

$\frac{HW}{D}$ SCALE	ENTRANCE TYPE
(1)	HEADWALL
(2)	MITERED TO CONFORM TO SLOPE
(3)	PROJECTING

TO USE SCALES (2) OR (3) PROJECT HORIZONTALLY TO SCALE (1), THEN USE STRAIGHT INCLINED LINE THROUGH D AND Q SCALES, OR REVERSE AS ILLUSTRATED.

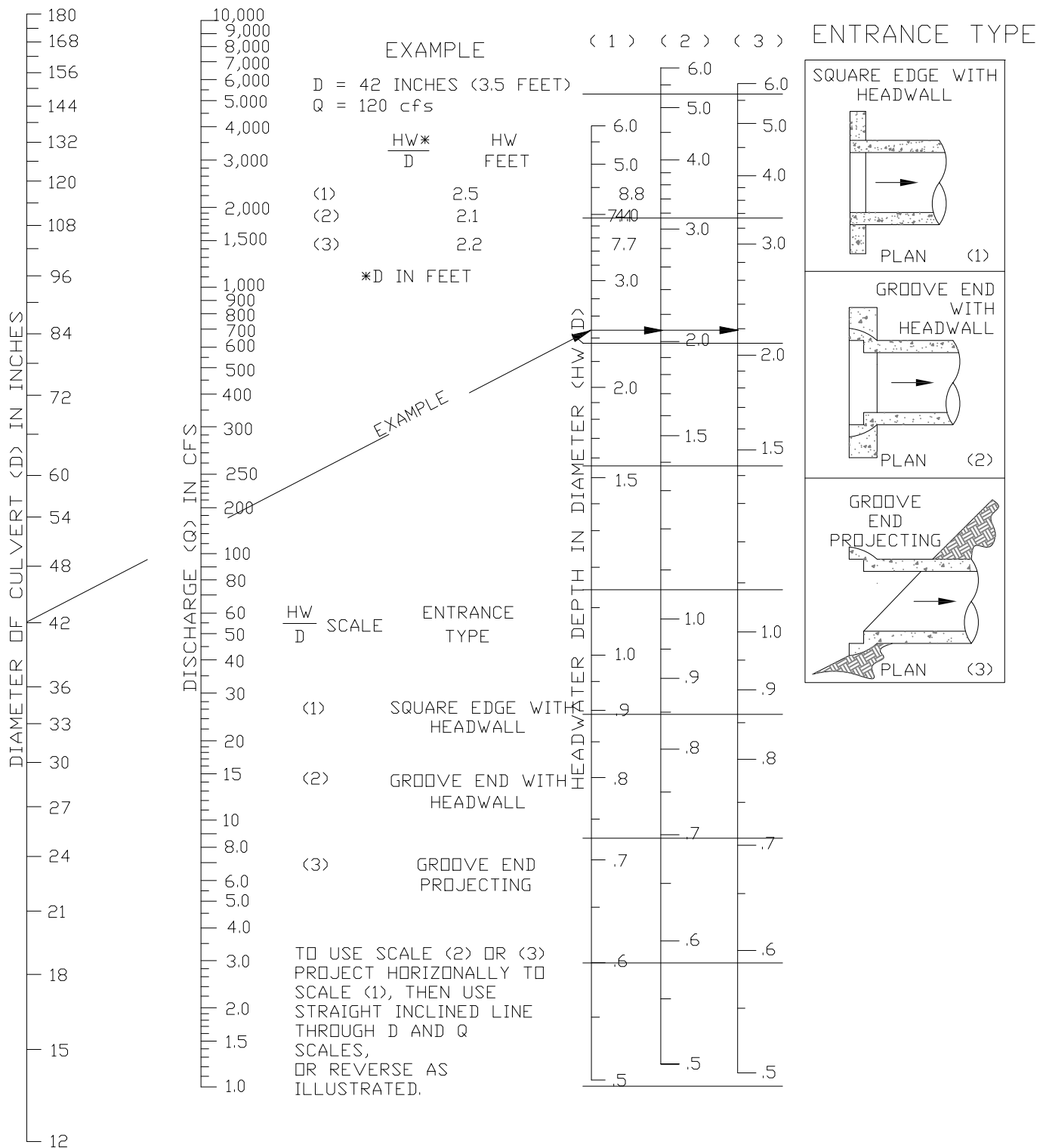


ENTRANCE TYPE

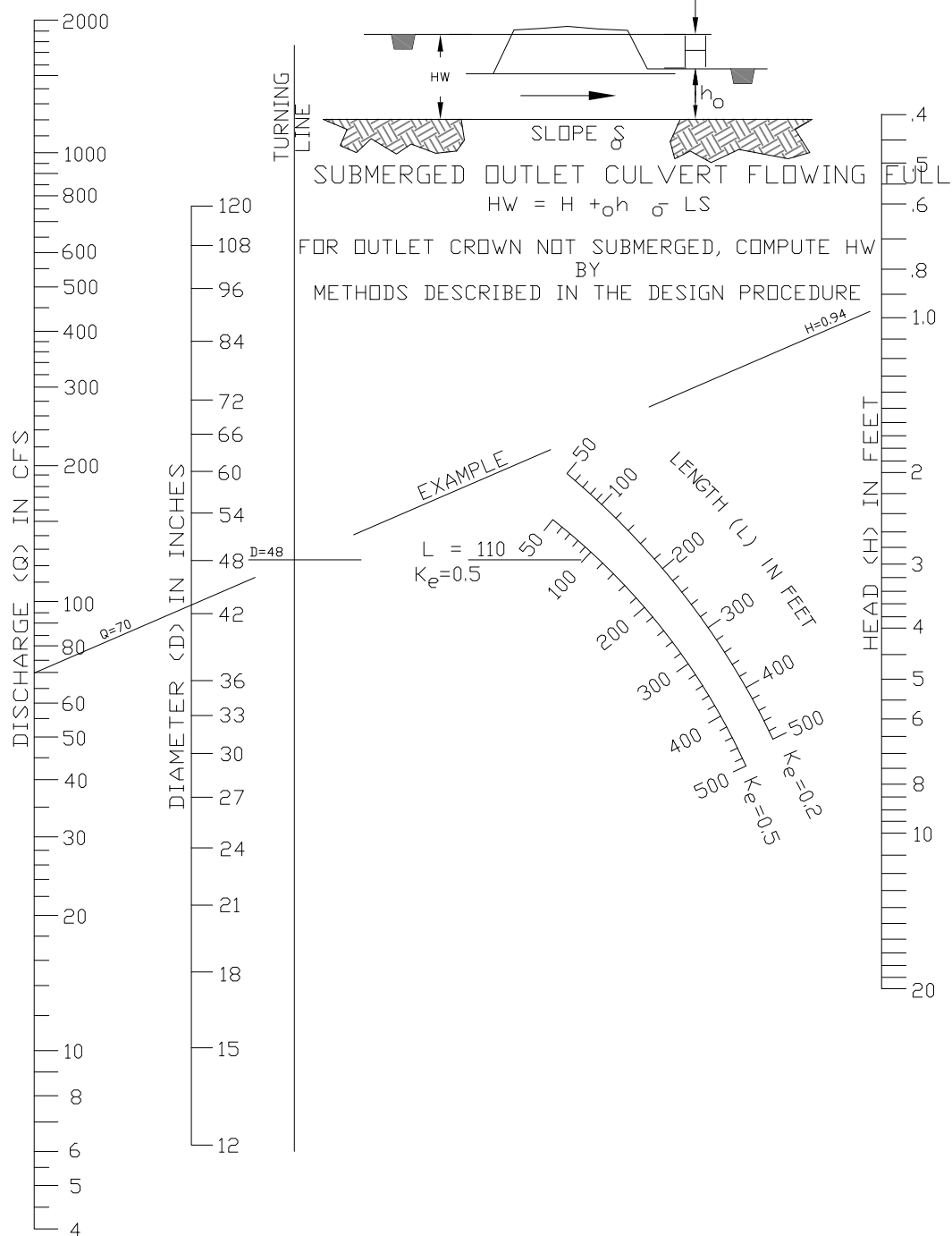


HEADWATER DEPTH FOR CORRUGATED PIPE WITH INLET CONTROL



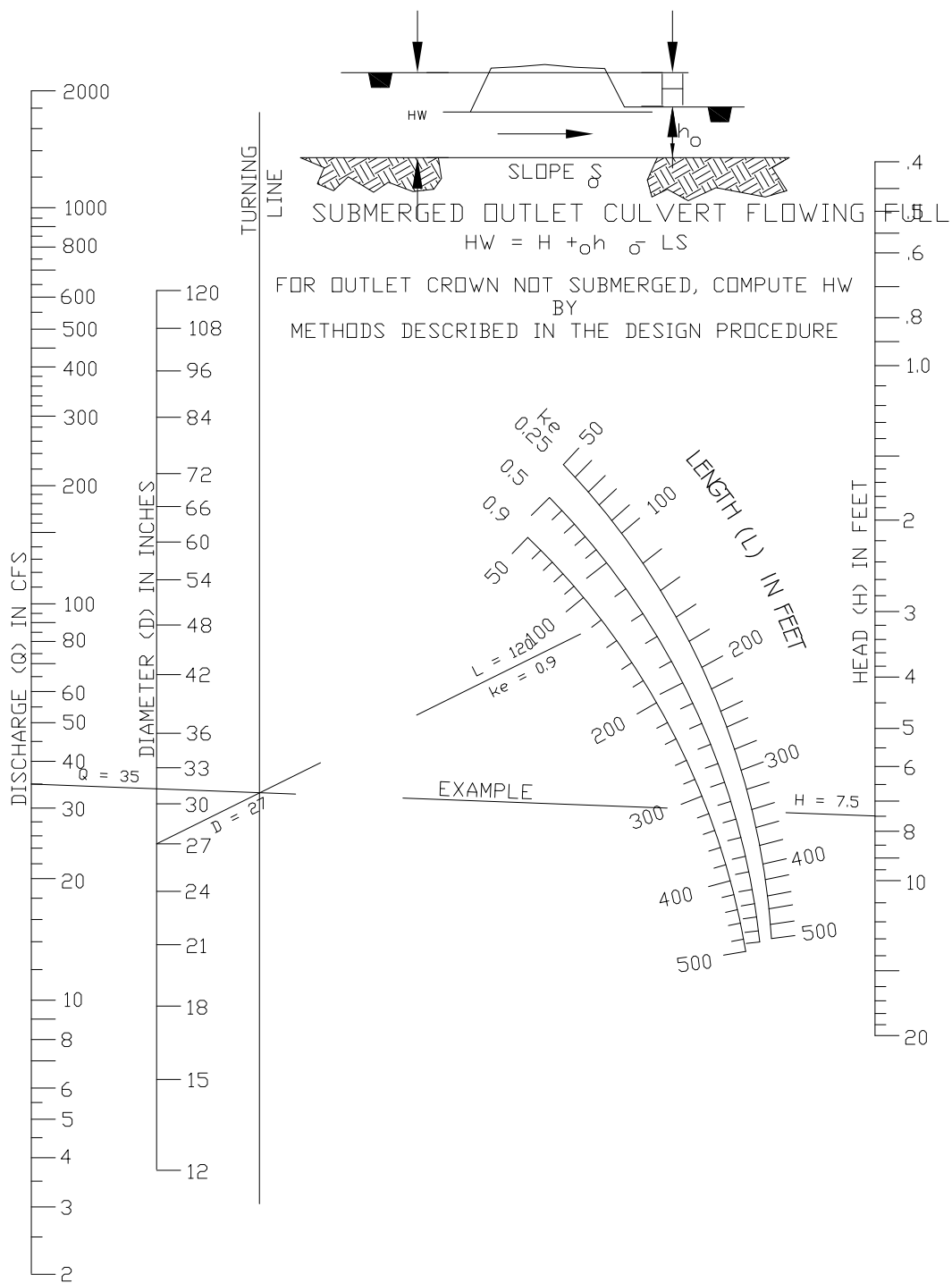


HEADWATER DEPTH FOR SMOOTH
INTERIOR PIPE CULVERTS WITH
INLET CONTROL



HEAD FOR CULVERTS
 (PIPE W / "N" = 0.012), FLOWING
 FULL WITH OUTLET CONTROL

CleanWater  Services



HEAD FOR CULVERTS
(PIPE W / "N" = 0.024), FLOWING
FULL WITH OUTLET CONTROL

CleanWater Services

RATIONAL METHOD RAINFALL INTENSITIES

RAINFALL INTENSITY IS FOR EAST WASHINGTON COUNTY AND IS SHOWN AS INCHES PER HOUR

TIME OF CONCENTRATION (MINUTES)	STORM EVENT: YEAR AND PROBABILITY					
	2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
0	1.90	2.50	3.00	3.40	4.00	4.50
5	1.90	2.50	3.00	3.40	4.00	4.50
10	1.30	1.70	2.20	2.50	3.00	3.50
15	1.10	1.40	1.80	2.10	2.50	2.90
20	0.90	1.20	1.50	1.80	2.10	2.40
30	0.75	0.95	1.20	1.40	1.65	1.90
40	0.60	0.75	1.00	1.15	1.30	1.60
50	0.55	0.70	0.85	1.00	1.15	1.35
70	0.45	0.55	0.70	0.82	0.95	1.10
100	0.40	0.45	0.55	0.67	0.75	0.90
180>	0.35	0.40	0.50	0.60	0.70	0.85

RATIONAL METHOD
RAINFALL INTENSITIES

DRAWING NO. 1275

REVISED 05-07

CleanWater  Services

24-HOUR RAINFALL DEPTHS

RECURRENCE INTERVAL (YEARS)	TOTAL PRECIPITATION DEPTH (INCHES)
2	2.5
5	3.10
10	3.45
25	3.90
50	4.20
100	4.50

24-HOURS
RAINFALL DEPTHS

DESIGN STORM DISTRIBUTION CHART

THE FOLLOWING TABLE CONTAINS THE NRCS TYPE 1A PRECIPITATION DISTRIBUTION. THE TABLE IS FROM THE "SUB BASIN HYDROLOGIC MODELING CRITERIA" BY KRAMER, CHIN, & MAYO INC., 1991

HOUR	PERCENT RAINFALL INCREMENTAL CUMULATIVE		RAINFALL DEPTH (INCHES)					
			2 YEAR 2.50	5 YEAR 3.10	10 YEAR 3.45	25 YEAR 3.90	50 YEAR 4.20	100 YEAR 4.50
1	2.40	2.40	0.06	0.07	0.08	0.09	0.10	0.11
2	2.60	5.00	0.07	0.08	0.09	0.10	0.11	0.12
3	3.20	8.20	0.08	0.10	0.11	0.12	0.13	0.14
4	3.80	12.00	0.10	0.12	0.13	0.15	0.16	0.17
5	4.44	16.44	0.11	0.14	0.15	0.17	0.19	0.20
6	5.18	21.62	0.13	0.16	0.18	0.20	0.22	0.23
7	6.48	28.10	0.16	0.20	0.22	0.25	0.27	0.29
8	16.44	44.54	0.41	0.51	0.57	0.64	0.69	0.74
9	7.58	52.12	0.19	0.23	0.26	0.30	0.32	0.34
10	5.28	57.40	0.13	0.16	0.18	0.21	0.22	0.24
11	4.96	62.36	0.12	0.15	0.17	0.19	0.21	0.22
12	4.32	66.68	0.11	0.13	0.15	0.17	0.18	0.19
13	4.02	70.70	0.10	0.12	0.14	0.16	0.17	0.18
14	3.42	74.12	0.09	0.11	0.12	0.13	0.14	0.15
15	3.28	77.40	0.08	0.10	0.11	0.13	0.14	0.15
16	3.00	80.40	0.08	0.09	0.10	0.12	0.13	0.14
17	2.80	83.20	0.07	0.09	0.10	0.11	0.12	0.13
18	2.40	85.60	0.06	0.07	0.08	0.09	0.10	0.11
19	2.40	88.00	0.06	0.07	0.08	0.09	0.10	0.11
20	2.40	90.40	0.06	0.07	0.08	0.09	0.10	0.11
21	2.40	92.80	0.06	0.07	0.08	0.09	0.10	0.11
22	2.40	95.20	0.06	0.07	0.08	0.09	0.10	0.11
23	2.40	97.60	0.06	0.07	0.08	0.09	0.10	0.11
24	2.40	100.00	0.06	0.07	0.08	0.09	0.10	0.11

DESIGN STORM
DISTRIBUTION CHART

DRAWING NO. 1285

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