



APPENDIX **D**

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Clark County Standard Stormwater and Erosion Control Details



STANDARD NOTES FOR EROSION CONTROL PLAN

1. THE CONTRACTOR SHALL INSTALL AND MAINTAIN BMP'S AS SHOWN AND PERFORM ALL ACTIONS NECESSARY TO PREVENT EROSION, AND CONTROL SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. CONTRACTOR SHALL COMPLY WITH CLARK COUNTY CODE CHAPTER 40.385.
2. ALL EROSION CONTROL MEASURES SHALL BE IN-PLACE AND IN WORKING CONDITION PRIOR TO DISTURBING AND EXPOSING ANY SOIL SURFACES (I.E. SILT FENCE, CONSTRUCTION ENTRANCE, SEDIMENTATION BARRIERS, SEDIMENTATION TRAPS).
3. ALL EROSION PREVENTION AND CONTROL BMP'S SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO INSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. NEEDED REPAIRS SHALL BE MADE AS SOON AS PRACTICABLE. THEY ARE TO REMAIN IN PLACE AND OPERATIONAL DURING ALL PHASES OF CONSTRUCTION. CONSTRUCTION ACTIVITIES SHALL NOT CONTINUE OR RESUME UNTIL REPAIRS TO EROSION CONTROL FACILITIES ARE MADE AND THE FACILITIES ARE FUNCTIONAL. ANY SEDIMENT LEAVING THE SITE OR DISCHARGING TO A SENSITIVE AREA SHALL BE STOPPED AND CONTROLLED IMMEDIATELY. CONTAMINATED AREAS SHALL BE CLEANED AND RESTORED.
4. CLEARING LIMITS AND WORK AREA LIMITS SHALL BE DELINEATED AND MARKED. DO NOT DISTURB MORE AREA THAN NEEDED FOR CONSTRUCTION REQUIREMENTS.
5. ALL SENSITIVE OR CRITICAL AREAS (WETLANDS, STEEP SLOPES, NATURAL WATERWAYS), AND BUFFERS SHALL ALL BE CLEARLY DELINEATED AND CLEARLY MARKED, AND PROTECTED FROM SEDIMENT DEPOSITION.
6. SEDIMENT LADEN RUNOFF SHALL BE PREVENTED FROM ENTERING ALL EXISTING STORM WATER CATCH BASINS AND INLETS AFFECTED BY CONSTRUCTION.
7. NO EXPOSED, BARE SOILS SHALL REMAIN UNSTABILIZED FOR MORE THAN TWO DAYS DURING THE PERIOD OCTOBER 1 THRU APRIL 30 OR FOR MORE THAN SEVEN DAYS DURING THE PERIOD OF MAY 1 THROUGH SEPTEMBER 30. ALL DISTURBED SOIL SURFACES SHALL BE STABILIZED BY A SUITABLE APPLICATION OF "BEST MANAGEMENT PRACTICES".
8. WHERE FEASIBLE, NO MORE THAN 500 FEET OF TRENCH SHALL BE OPEN AT ONE TIME. EXCAVATED MATERIAL SHALL BE PLACED ON THE UP-HILL SIDE OF TRENCHES PROVIDED IT DOES NOT CONFLICT WITH SAFETY REQUIREMENTS.
9. DEWATERING DEVICES SHALL DISCHARGE INTO A SEDIMENT TRAP OR SEDIMENT POND. NO DISCHARGE SHALL BE MADE TO A PAVED STREET OR STORMWATER COLLECTION SYSTEM WITHOUT FIRST REMOVING SEDIMENT.
10. CUT AND FILL SLOPES SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. EROSION SHALL BE CONTROLLED AND PREVENTED BY SUCH MEASURES AS ROUGHENING THE SURFACE, INSTALLATION OF INTERCEPTOR DITCHES, TERRACING, COVERING WITH MATTING, MULCH OR PLASTIC SHEETING. RUNOFF SHALL BE PREVENTED FROM ENTERING A SLOPE AND FROM UNDERCUTTING THE BASE OF SLOPES.
11. ANY SOIL OR DEBRIS TRANSPORTED ONTO ROADWAYS AND SIDEWALKS SHALL BE REMOVED. DEPOSITS SHALL BE COMPLETELY REMOVED BY SHOVELING AND/OR SWEEPING. WASHING SHALL NOT BE UTILIZED UNLESS SPECIFICALLY APPROVED IN WRITING BY THE COUNTY.
12. ALL PERMANENT INFILTRATION SYSTEMS SHALL BE ISOLATED AND PROTECTED FROM SEDIMENT LADEN RUNOFF ENTERING TO AVOID RISK OF REDUCING THE ABILITY OF THE SYSTEMS TO INFILTRATE. ISOLATION AND PROTECTION SHALL NOT BE REMOVED UNTIL THE DRAINAGE AREA TRIBUTARY TO THE SYSTEM IS COMPLETELY STABILIZED.
13. ALL CONVEYANCE CHANNELS, BOTH TEMPORARY AND PERMANENT SHALL BE STABILIZED TO PREVENT EROSION OF THE CHANNEL. STABILIZATION SHALL EXTEND TO AREAS AT OUTLETS AND DOWNSTREAM REACHES VULNERABLE TO EROSION RESULTING FROM FLOW DISCHARGING FROM THE CHANNEL.
14. IF BMP'S SHOWN ARE UTILIZED BUT ARE INSUFFICIENT TO PREVENT SEDIMENT FROM REACHING WATER BODIES, ADJACENT PROPERTIES, OR PUBLIC RIGHTS-OF-WAY; ADDITIONAL BMP'S SHALL BE IMPLEMENTED IMMEDIATELY TO PREVENT FURTHER ENCROACHMENT OF SEDIMENT.

NO.	REVISIONS	DATE	BY
1	CODE REFERENCE CHANGE	02/06/09	PC

DWG: ECN.DWG

SHEET 1 OF 2

 <p align="center"> Department of Public Works CLARK COUNTY WASHINGTON <i>proud past, promising future</i> </p>	STANDARD NOTES FOR EROSION CONTROL PLAN	STANDARD ECN1
	APPROVED  COUNTY ENGINEER	5/23/08 DATE



STANDARD NOTES FOR EROSION CONTROL PLAN (CONTINUED)

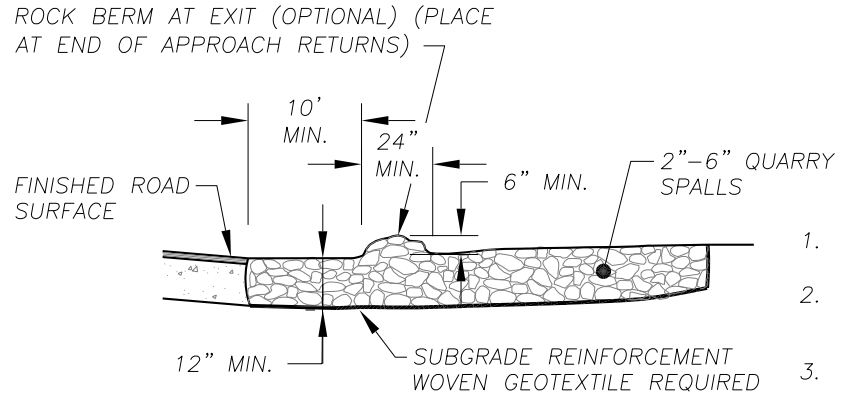
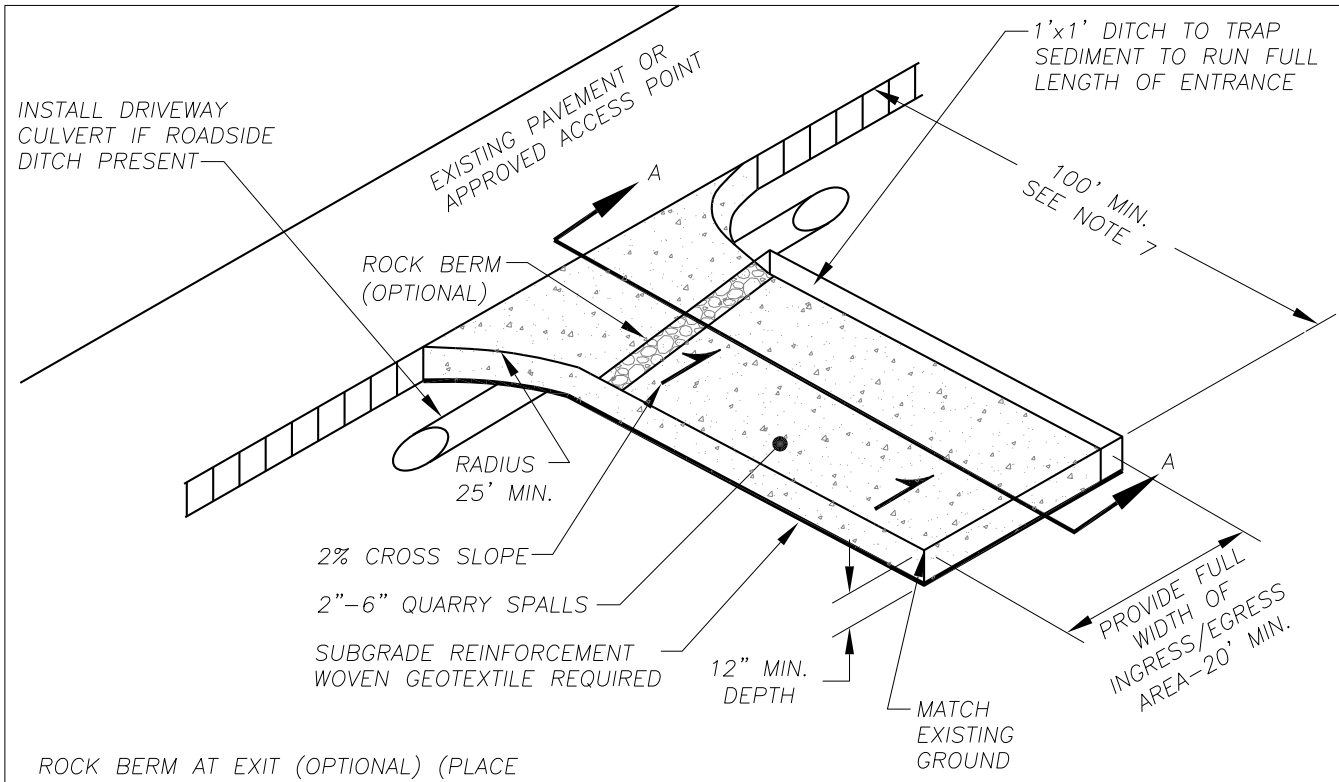
15. STABILIZED AREAS SHALL BE PROVIDED FOR EMPLOYEE PARKING AND STORAGE OF CONSTRUCTION MATERIALS. ERODIBLE STOCKPILES OF EARTHEN MATERIALS, SUCH AS TOPSOIL, SILTY AND CLAYEY SOILS; AND LANDSCAPE MATERIALS, SHALL BE COVERED WHEN NOT BEING INCORPORATED IN THE WORK. EROSION CONTROL BMP'S SHALL BE UTILIZED AS NECESSARY TO PREVENT SEDIMENT LADEN RUNOFF FROM LEAVING OR SEDIMENT BEING TRANSPORTED FROM THESE AREAS FROM VEHICLE ACTIVITY.
16. ALL POLLUTANTS OTHER THAN SEDIMENT THAT OCCUR DURING CONSTRUCTION SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORM WATER.
17. THE CONTRACTOR SHALL KEEP AN INSPECTION LOG OF THE CONDITION OF THE EROSION CONTROL FACILITIES. EROSION CONTROL FACILITIES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RAINFALL. THE INSPECTION LOG SHALL BE KEPT AT THE PROJECT SITE AT A DESIGNATED LOCATION AND SHALL BE AVAILABLE FOR REVIEW BY THE COUNTY. AN INDIVIDUAL THAT HAS SUCCESSFULLY COMPLETED THE COUNTY'S EROSION CONTROL CERTIFICATION COURSE SHALL PERFORM INSPECTIONS AND MAINTAIN THE LOG.
18. ALL TEMPORARY BMP'S SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED. TRAPPED SEDIMENT SHALL BE DEPOSITED AND STABILIZED ON SITE. AREAS DISTURBED RESULTING FROM REMOVAL SHALL BE PERMANENTLY STABILIZED.
19. CONSTRUCTION SHALL NOT BE CONSIDERED COMPLETE AND ACCEPTABLE UNTIL ALL DISTURBED SOIL SURFACES HAVE BEEN PROTECTED FROM EROSION WITH PERMANENT LANDSCAPING, COVERING WITH IMPERVIOUS SURFACES, RESTORED TO ORIGINAL UNDISTURBED CONDITION OR PERMANENTLY STABILIZED.
20. VEGETATED STABILIZATION AND LANDSCAPING SHALL BE FERTILIZED, WATERED AND MAINTAINED TO INSURE THAT GROWTH OF VEGETATION IS ESTABLISHED AND SUSTAINED.
21. DURING DRY WEATHER CONSTRUCTION PERIODS THE CONTRACTOR SHALL PROVIDE PROJECT-SPECIFIC DUST CONTROL MEASURES THAT MAY INCLUDE: SEEDING, MULCHING, MATTING, WATER, TACKIFIER, OR CHEMICAL SOIL STABILIZERS. THE CONTRACTOR SHALL MAINTAIN THE DUST CONTROL MEASURES THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. IMMEDIATELY RE-STABILIZE AREAS DISTURBED BY CONTRACTOR'S OPERATIONS OR OTHER ACTIVITIES (WIND, WATER, VANDALISM, ETC.).
22. ENTRY ONTO THE CONSTRUCTION SITE SHALL BE RESTRICTED TO A SINGLE APPROVED ENTRANCE AS SHOWN ON THE PLAN.
23. MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES WHICH INVOLVE POTENTIAL CONTAMINANTS (OIL, SOLVENTS, HYDRAULIC FLUID, ETC.) MUST BE CONDUCTED IN A MANNER WHICH PREVENTS CONTAMINATION OF SOILS, SURFACE WATER AND GROUND WATER. TARPS, DRIP PANS, OR OTHER APPROPRIATE MEASURES SHALL BE USED AS NECESSARY.
24. STRIPPING, TOPSOIL, AND UNSUITABLE MATERIAL STOCKPILES SHALL BE HYDROSEEDED WITH "REGREEN WHEAT X WHEAT GRASS HYBRID" BY HOBBS AND HOBKINS (OR APPROVED EQUAL). MAINTENANCE OF STOCKPILE AREAS AND REAPPLICATION OF HYDROSEED COVERING SHALL BE REQUIRED IF BARE SOIL IS PRESENT. DURING WINTER AND WET WEATHER CONDITIONS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING PER DETAIL E-16.
25. SIGNIFICANT VARIATION AND DEGREE OF EROSION CONTROL EFFORT WILL BE DICTATED BY WEATHER CONDITIONS. THE DEVELOPER AND CONTRACTOR SHOULD BE PREPARED TO PROVIDE EXTRA EROSION CONTROL PROVISIONS AND EFFORT DURING WINTER AND WET WEATHER CONDITIONS BEYOND THAT NORMALLY REQUIRED DURING SUMMER AND DRY WEATHER CONDITIONS. FINE GRAINED AND UNCONSOLIDATED SOILS ON SLOPING SITES MAY BECOME UNSTABLE WHEN SUBJECT TO EXCESSIVE MOISTURE.

NO.	REVISIONS	DATE	BY

DWG: ECN.DWG

SHEET 2 OF 2

 <p align="center"> Department of Public Works CLARK COUNTY WASHINGTON proud past, promising future </p>	STANDARD NOTES FOR EROSION CONTROL PLAN (CONTINUED)	STANDARD ECN2
	APPROVED  COUNTY ENGINEER	5/23/08 DATE



1. EXCAVATE MINIMUM OF 12" OF EXISTING SOILS.
2. PLACE MINIMUM OF 12" OF 2"-6" QUARRY SPALLS.
3. CONSTRUCT ROCK BERM ALONG TRANSITION POINT TO FINISH ROAD SURFACES, DIVERT RUNOFF TO ONSITE AREA (OPTIONAL).

NOTES:

1. FOR DEVELOPMENT PROJECTS REVIEWED BY ENGINEERING SERVICES. NOT FOR USE WITH SINGLE FAMILY OR DUPLEX RESIDENTIAL BUILDING PERMITS. SEE BUILDING DEPT. FOR GRAVEL CONSTRUCTION ENTRANCE PLAN.
2. INSTALL WOVEN GEOTEXTILE FABRIC TO PREVENT SUB-SOIL PUMPING.
3. VEHICLE WASHDOWN AREA, IF REQUIRED, IS TO BE INSTALLED AND USED TO REMOVE SEDIMENT FROM VEHICLES THAT ARE ABOUT TO ENTER AN ESTABLISHED ROAD.
4. WASHDOWN AREA TO BE MADE UP OF CLEAN 2"- 6" QUARRY SPALLS, 12" DEEP (MIN) OVER WOVEN GEOTEXTILE FABRIC. WASHDOWN AREA TO BE FULL WIDTH OF ENTRANCE AND 50' LENGTH (MIN.), AND 100' IF EXPOSED SOIL IS OVER 5 ACRES.
5. AT TIME OF PRECONSTRUCTION MEETING, THE COUNTY INSPECTOR MAY REQUIRE THE ENTRANCE TO BE PAVED TO THE EDGE OF THE RIGHT-OF-WAY PRIOR TO THE INSTALLATION OF A WASHDOWN ENTRANCE TO AVOID DAMAGE TO THE EXISTING ROADWAY.
6. THE RESPONSIBLE EROSION CONTROL INDIVIDUAL IS TO ENSURE THAT ALL VEHICLES USE THIS ENTRANCE AND ARE TO BE INSPECTED AND CLEANED OF SOILS BEFORE LEAVING PROJECT, AND THAT THE ENTRANCE IS TO BE KEPT CLEAN AT ALL TIMES.
7. THE 100' MINIMUM LENGTH OF ENTRANCE SHALL BE REDUCED TO THE MAXIMUM PRATICABLE SIZE WHEN THE SIZE OR CONFIGURATION OF THE SITE DOES NOT ALLOW THE FULL LENGTH (100').

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: E1.DWG



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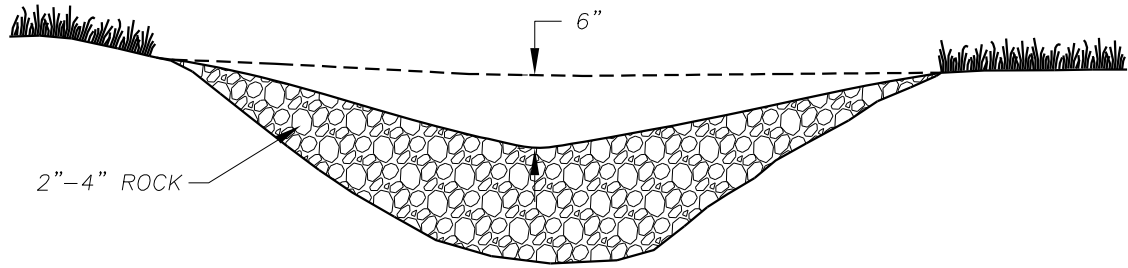
STABILIZED CONSTRUCTION ENTRANCE

Peter Capen
 COUNTY ENGINEER

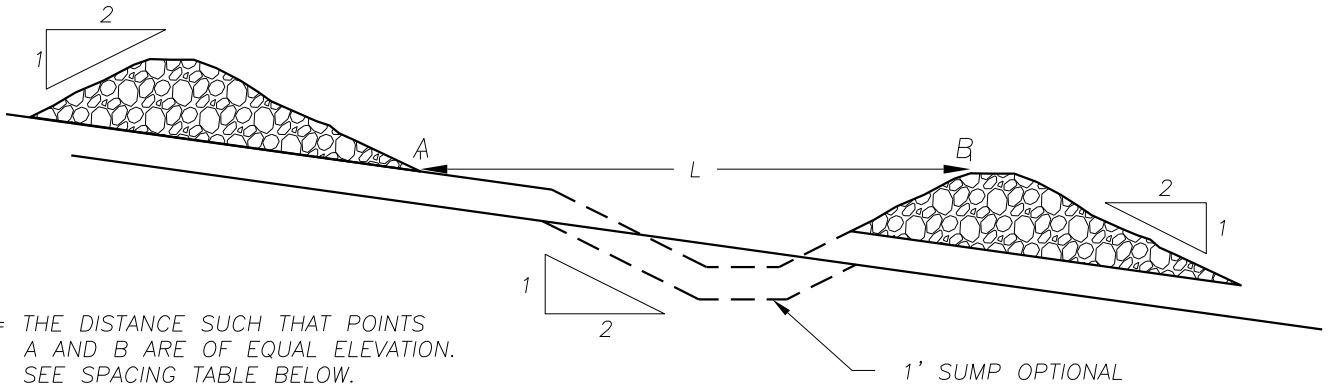
APPROVED

5/23/08
 DATE

STANDARD
E1
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



ROCK CHECK DAM



L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION. SEE SPACING TABLE BELOW.

SPACING BETWEEN CHECK DAMS

CHECK DAM NOTES:

1. CHECK DAMS ARE CONSTRUCTED ACROSS A SWALE OR DITCH TO REDUCE VELOCITIES OF CONCENTRATED FLOWS, THEREBY REDUCING EROSION AND ALLOWING A SIGNIFICANT AMOUNT OF SUSPENDED SEDIMENT TO SETTLE OUT.
2. CHECK DAMS SHALL BE USED IN TEMPORARY OR PERMANENT CHANNELS THAT DRAIN 10 ACRES OR LESS, ARE NOT YET VEGETATED, AND WHEN INSTALLING CHANNEL LINING IS NOT FEASIBLE.
3. USE TYPICAL ROCK SIZE OF 2-4 INCH. PLACE ROCK BY HAND OR BY MECHANICAL MEANS RATHER THAN DUMPING THE ROCK. BRIDGE ENTIRE DITCH OR SWALE WIDTH AND ENSURE THE CENTER OF THE DAM IS 6" LOWER THAN THE OUTER ENDS. FOR HIGHER VELOCITY FLOWS: ±5 FPS USE 6"-12" RIPRAP, AND HAND PLACE LARGER ROCK ON UPSTREAM SIDE OF DAM.
4. REMOVE CHECK DAMS FROM GRASS-LINED DITCHES AND SWALES ONCE THE GRASS IS ESTABLISHED. SEED, MULCH OR MAT THE AREA WHERE THE CHECK DAMS WERE, IMMEDIATELY FOLLOWING REMOVAL.
5. INSPECT ONCE PER WEEK ON ACTIVE SITES, ONCE EVERY TWO WEEKS ON INACTIVE SITES, AND WITHIN 24 HOURS FOLLOWING A 0.5 INCH RAIN EVENT. REMOVE SEDIMENT ONCE IT REACHES ONE-THIRD THE DEPTH OF THE ROCK WEIR. REPLACE ROCK WEIR WHEN FILTERING CAPACITY IS REDUCED BY ONE-HALF.

6. SPACING TABLE FOR CHECK DAMS:

DITCH GRADE	MINIMUM WEIR DEPTH		
	6 INCH	12 INCH	18 INCH
6%	**	L= 16 ft O.C.	L=26 ft O.C.
5%	**	L= 20 ft	L= 30 ft
4%	**	L= 26 ft	L= 40 ft
3%	15 ft	L= 33 ft	L= 50 ft
2%	25 ft	L= 50 ft	L= 80 ft

**NOT ALLOWED

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DWG: E2.DWG



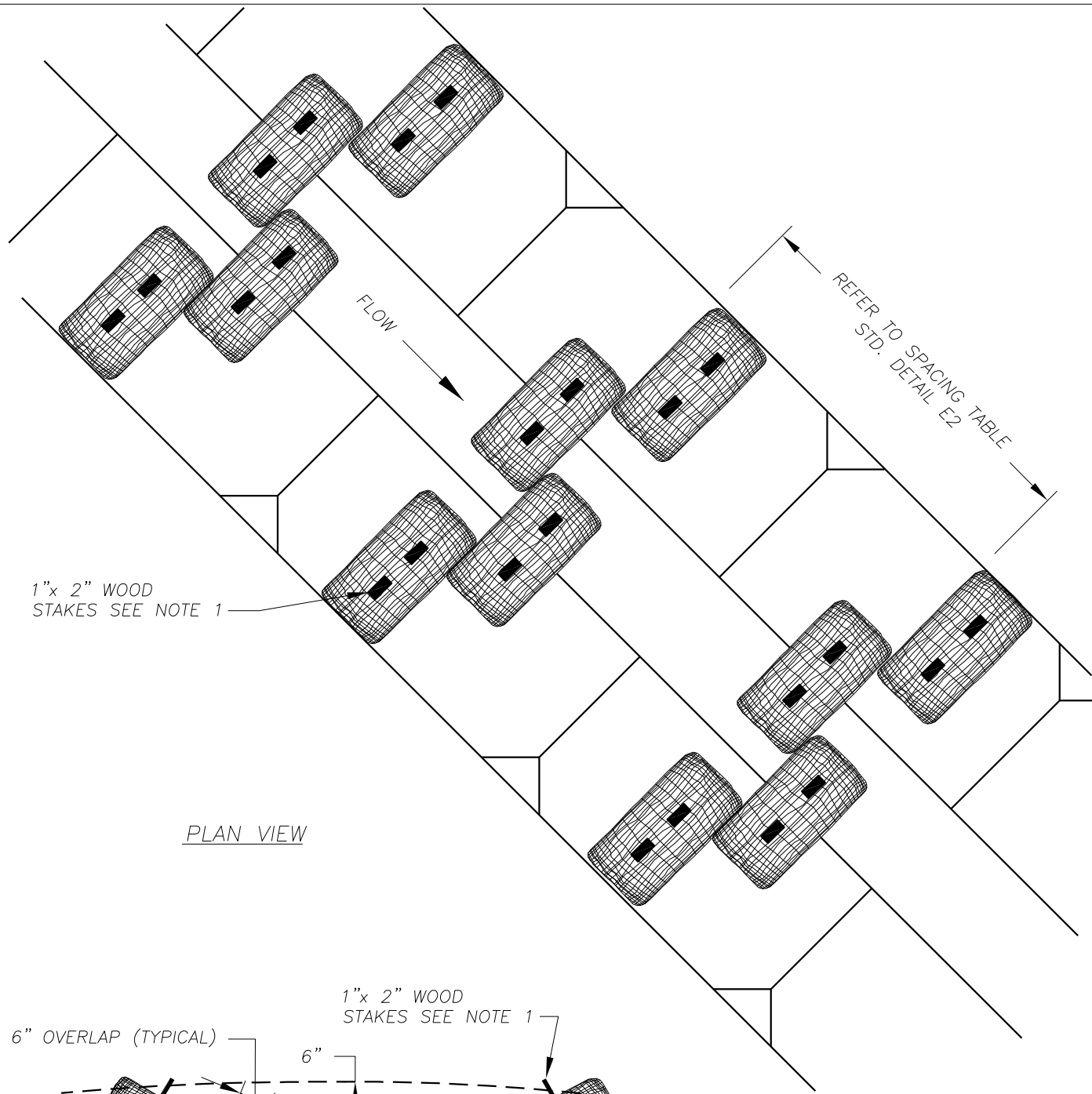
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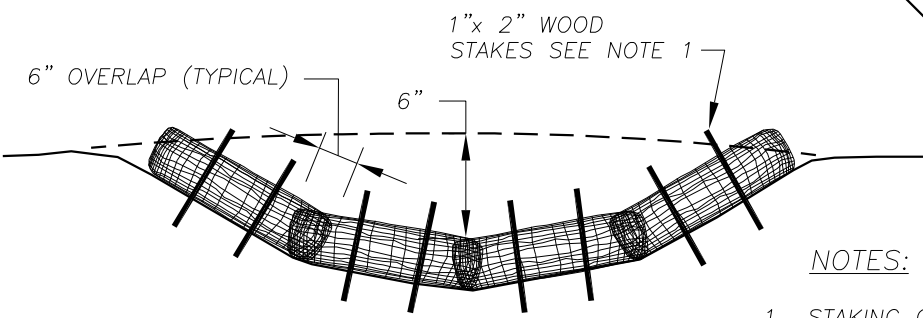
ROCK
CHECK DAM
APPROVED

5/23/08
DATE

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E2
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



PLAN VIEW



PROFILE

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. SEE CHECK DAM NOTES STD. DETAIL E2.

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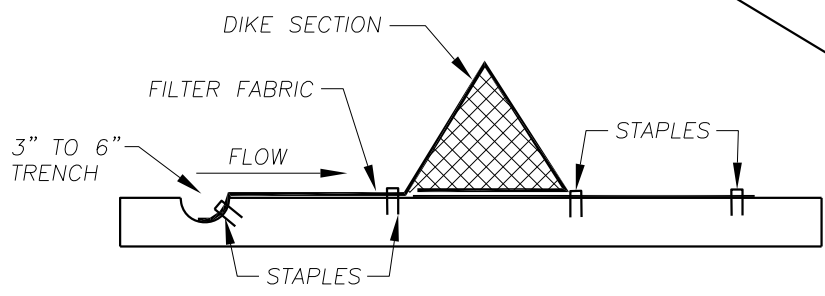
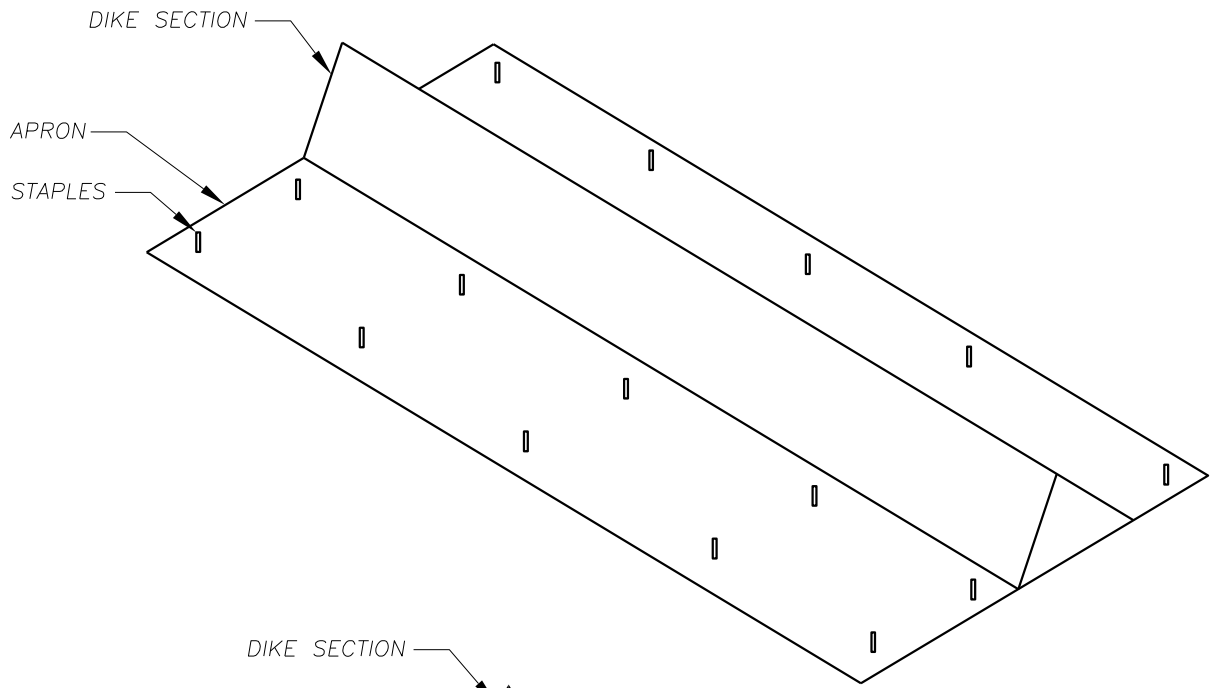
DWG: E2a.DWG



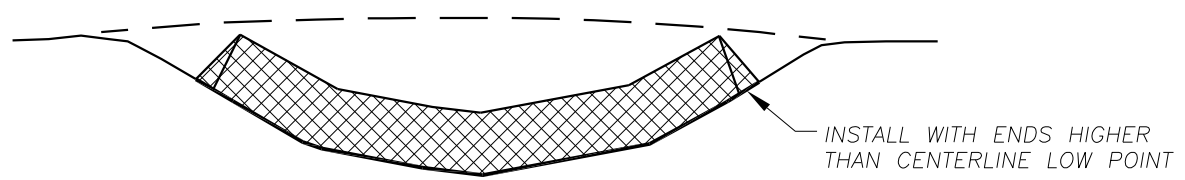
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BIO-FILTER BAGS
CHECK DAM
APPROVED
Peter Capen
COUNTY ENGINEER
5/23/08
DATE

STANDARD
E2a
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



SECTION



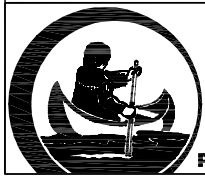
PROFILE

NOTES:

1. TO BE INSTALLED PER MANUFACTURER'S SPECIFICATION. SEE WSDOT SPECIFICATION 8-01.3(6)A.
2. CAN BE USED FOR DITCH CHECK DAMS, DIVERSION DIKES, DROP INLET PROTECTION, TEMPORARY DITCH LINER, AND CAN REPLACE SILT FENCE IN SOME APPLICATION.
3. PRODUCT IS MANUFACTURED BY TRIANGULAR SILT DIKE.TM
4. SEE SPACING TABLE AND CHECK DAM NOTES ON STD. DETAIL E2.

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DWG: E2b.DWG



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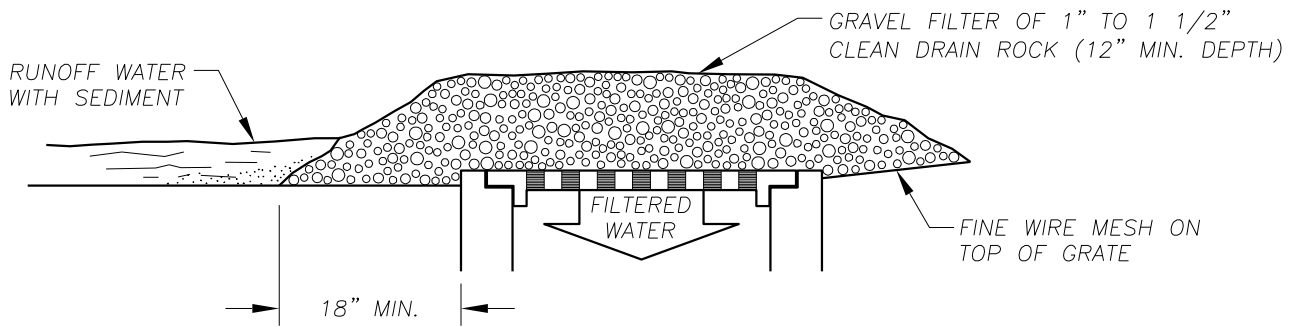
*GEOTEXTILE-ENCASED
CHECK DAM*

APPROVED

Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
E2b
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



GRAVEL & WIRE MESH

NOT TO BE USED IN TRAVELED WAY IF IT MAY RESULT IN A TRAFFIC HAZARD

INLET PROTECTION NOTES:

1. INLET PROTECTION IS INTENDED TO PREVENT COARSE SEDIMENT FROM ENTERING STORM DRAINAGE SYSTEMS BY FILTERING RUNOFF AND RETAINING SEDIMENT BEFORE IT REACHES A DRAINAGE OR STORM SEWER SYSTEM.
2. PLACE INLET PROTECTION IN AREAS WHERE WATER CAN POND, AND WHERE PONDING WILL NOT HAVE ADVERSE IMPACTS.
3. INLET PROTECTION MUST ALLOW FOR OVERFLOW IN A SEVERE STORM EVENT.
4. INLET PROTECTION TYPES INCLUDE:
 - TYPE 1 – GRAVEL AND WIRE MESH
 - TYPE 2 – MASONRY AND ROCK
 - TYPE 3 – SILT FENCE
 - TYPE 4 – BIO-FILTER BAGS
 - TYPE 5 – SILT SACK INSERT
5. INSPECT ONCE PER WEEK ON ACTIVE SITES, ONCE EVERY TWO WEEKS ON INACTIVE SITES, AND WITHIN 24 HOURS FOLLOWING A 0.5 INCH RAIN EVENT.
6. CLEAN INLET PROTECTION DURING AND AFTER EACH SIGNIFICANT STORM AND REMOVE SEDIMENT FROM BEHIND STRUCTURE AFTER EVERY STORM.
7. IF ROCK BECOMES CLOGGED WITH SEDIMENT, IT MUST BE CAREFULLY REMOVED FROM THE INLET AND EITHER CLEANED OR REPLACED.
8. ASSESS THE IMPACT OF ALLOWING WATER TO POND AT THE INLET AND PROVIDE AN OVERFLOW WEIR OR SOME OTHER TYPE OF RELIEF AS NEEDED.
9. CONSIDER THE EFFECT PLACING OBSTRUCTIONS AT INLETS ON GRADE MAY HAVE ON THEIR EFFICIENCY.
10. USE MECHANICAL MEANS TO REMOVE SEDIMENT DEPOSITS (SHOVEL, BROOM, SWEEPER/VACTOR UNIT).
11. REMOVE SEDIMENT ACCUMULATED ON OR AROUND THE PROTECTION AS NEEDED TO MAINTAIN INTENDED FUNCTION.
12. REPAIR OR REPLACE MATERIALS AS NEEDED TO ENSURE PROPER FUNCTION.

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INLET PROTECTION TYPE 1
GRAVEL AND WIRE MESH

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COUNTY ENGINEER

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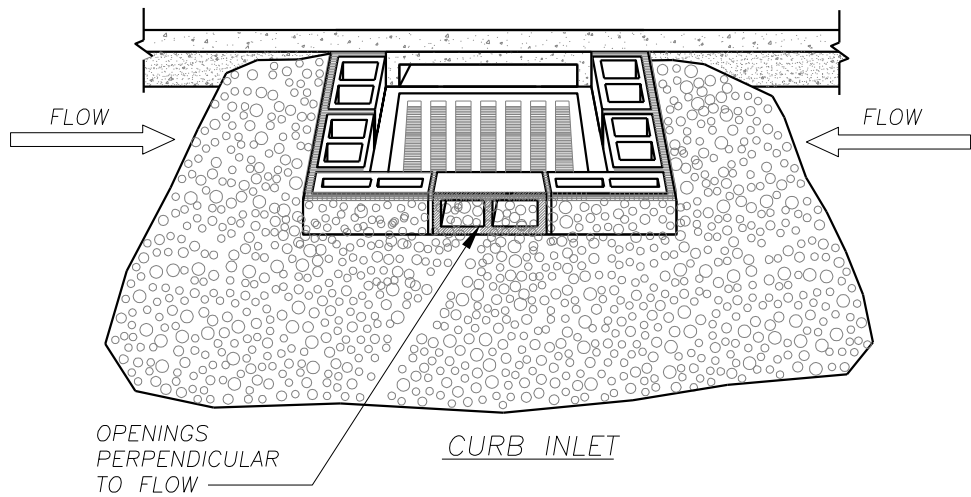
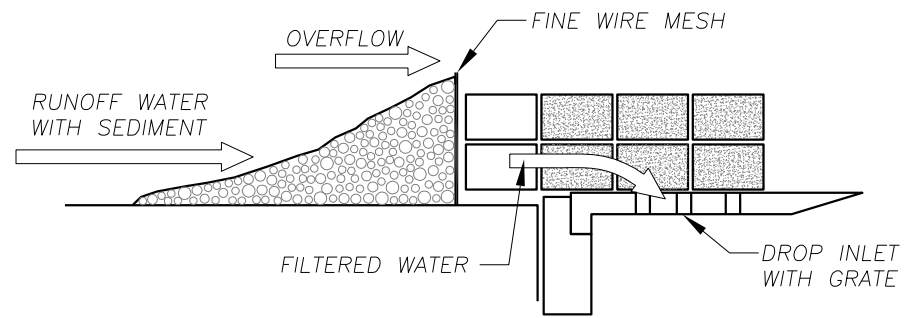
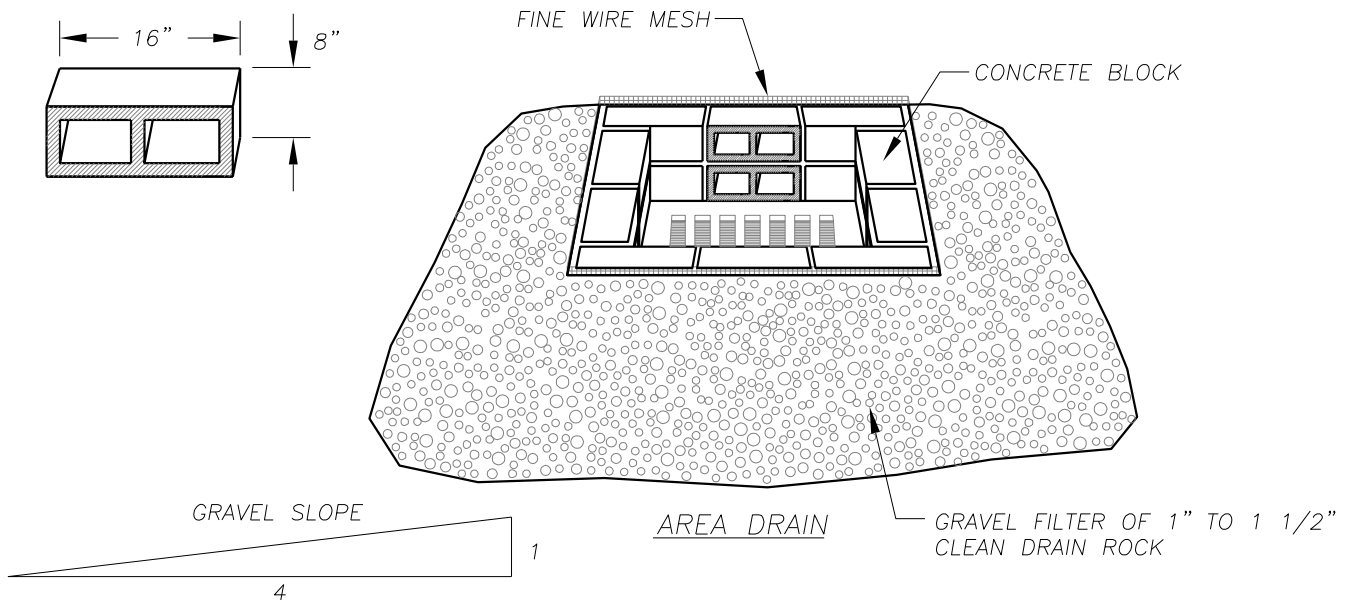
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DATE 05/23/08



BLOCK AND GRAVEL INLET BARRIERS

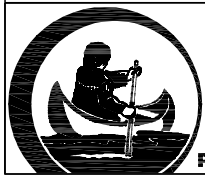
NOT TO BE USED IN TRAVELED WAY IF IT MAY RESULT IN A TRAFFIC HAZARD

NOTES:

1. BLOCKS SHALL BE STACKED WITH THE OPENINGS ON THE TOP AND BOTTOM EXCEPT FOR THE CENTER BLOCKS. CENTER BLOCKS WILL HAVE OPENINGS PERPENDICULAR TO FLOW.
2. SEE INLET PROTECTION NOTES STD. DETAIL E3.

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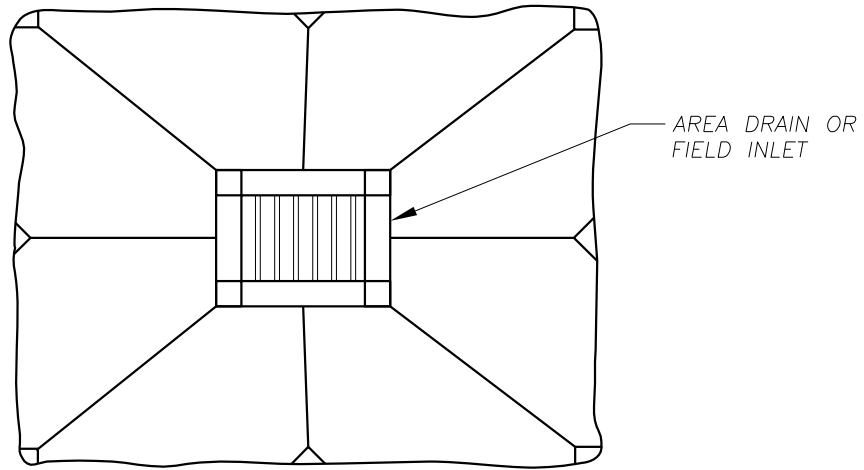
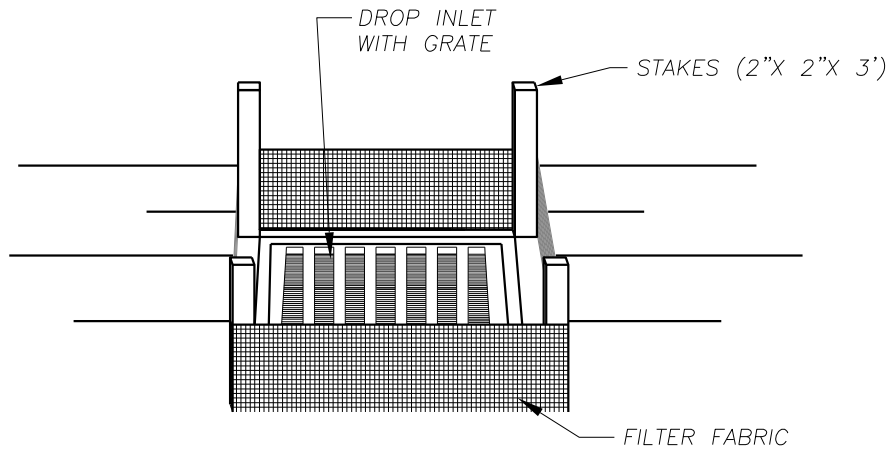
INLET PROTECTION TYPE 2
 MASONRY AND ROCK

Peter Capen
 COUNTY ENGINEER

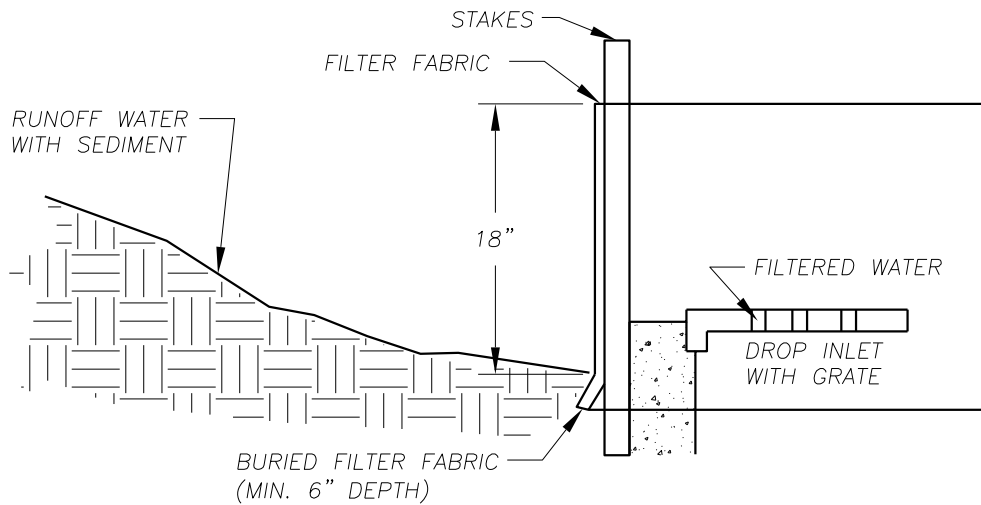
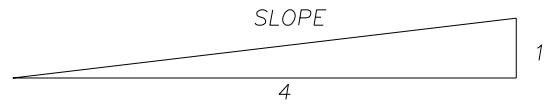
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5/23/08
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E3a
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PLAN VIEW
SLOPE 4:1



PROFILE

NOTE:

1. SEE INLET PROTECTION NOTES STD. DETAIL E3.

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INLET PROTECTION TYPE 3
SILT FENCE

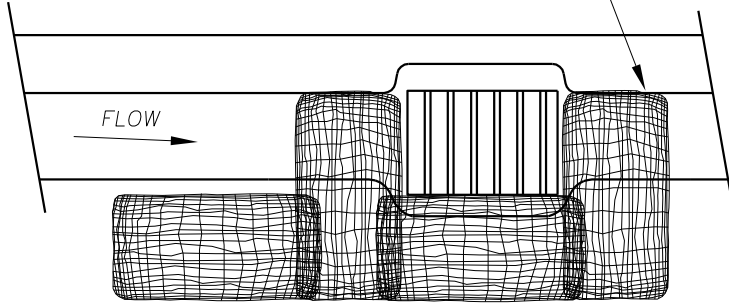
Peter Capen
COUNTY ENGINEER

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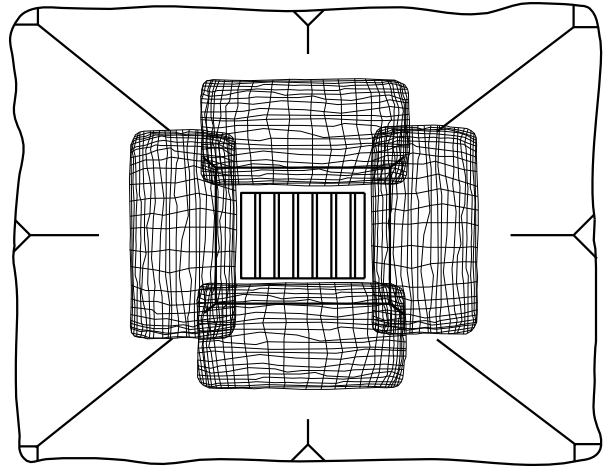
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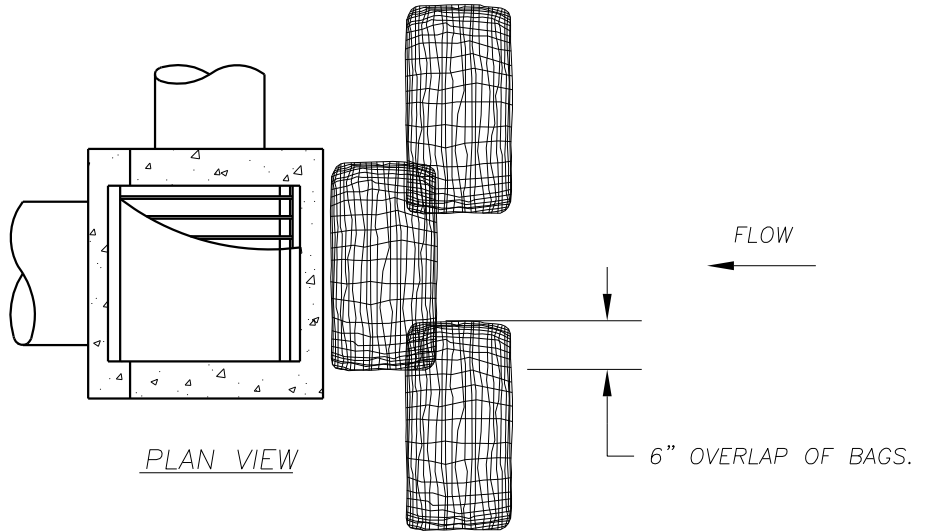
BIO-FILTER BAGS OR STRAW WATTLES MAY BE USED SHORT TERM W/ UTILITY WORK AND W/ PHASING OF DEVELOPMENT



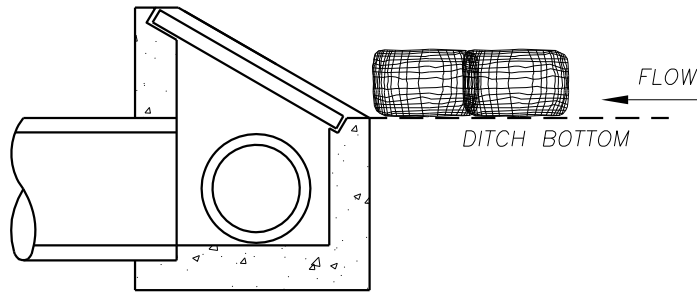
CATCH BASIN



AREA DRAIN



PLAN VIEW



DITCH INLET

NOTES:

1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPE.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.
3. STRAW WATTLES MUST BE STABILIZED BY ATTACHING WIRE CLIPS TO THE CATCH BASIN PER MANUFACTURERS SPECIFICATIONS.
4. INLET PROTECTION MUST BE REGULARLY INSPECTED BY THE EROSION CONTROL INDIVIDUAL TO INSURE PROPER PLACEMENT/FUNCTION AND MAINTENANCE.
5. SEE INLET PROTECTION NOTES STD. DETAIL E3.

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DWG: E3c.DWG



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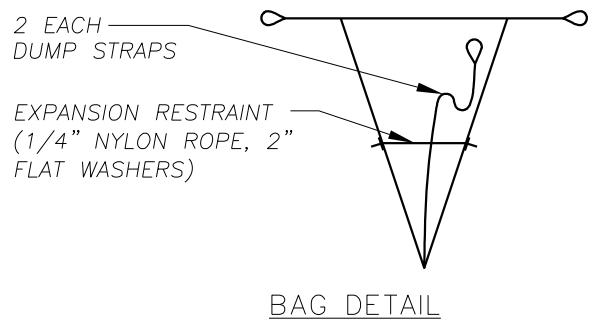
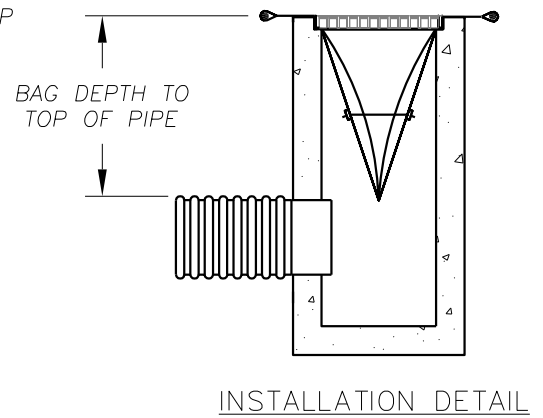
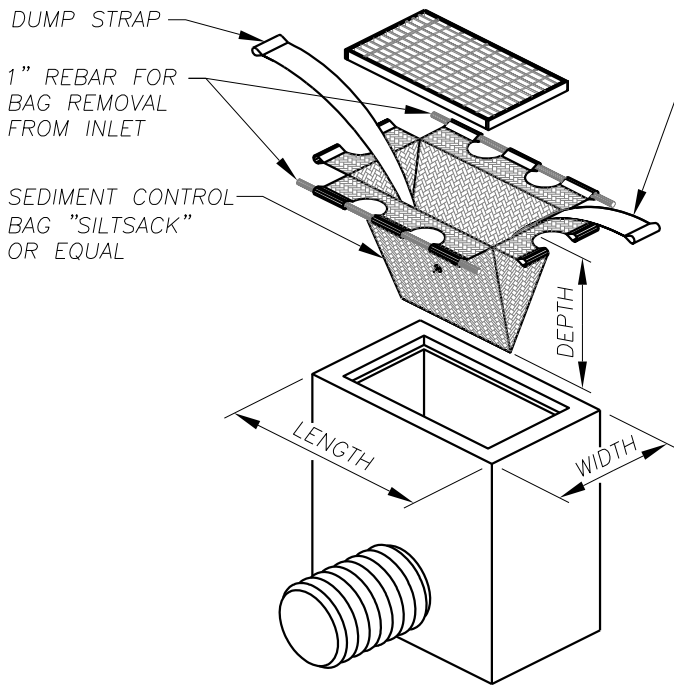
INLET PROTECTION TYPE 4
BIO-FILTER BAGS

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

STANDARD
E3c
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



CB STYLE	LENGTH	WIDTH	DEPTH
TYPE 1 CB	24"	20"	VARIES
TYPE 1 CCI	29.5"	24"	VARIES
USA G2	32.5"	27.5"	VARIES

INLET SEDIMENT CONTROL DEVICE – SILT SACK

NOTES:

1. THE DIMENSION CHART ABOVE IS FOR STANDARD CATCH BASINS AND INLETS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE CORRECT SIZE DEVICE FOR EACH INLET.
2. FOR NON-STANDARD CATCH BASINS AND INLETS, THE CONTRACTOR SHALL MEASURE DIMENSIONS IN THE FIELD AND ORDER THE APPROPRIATE SIZE(S).
3. THE INLET SEDIMENT CONTROL DEVICE SHALL BE OF HIGH FLOW DESIGN (200 GAL/MIN/FT), AS PER THE MANUFACTURER'S SPECS.
4. THE SEDIMENT CONTROL DEVICE SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED A MINIMUM ONCE PER MONTH OR WITHIN THE 48 HOURS FOLLOWING A STORM EVENT. FILTER SHALL BE CLEANED IN A MANNER WHICH ENSURES THAT ALL SEDIMENT REMAINS ON SITE.
5. SUBSTITUTION OF A SHEET OF FILTER FABRIC PLACED OVER THE OPENING OF THE INLET IS NOT APPROVED.
6. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS, SIZE OF FILTER INLET SACK TO BE DETERMINED BY MANUFACTURER.
7. THE FILTER SHALL BE REPLACED OR CLEANED WHEN THE BAG BECOMES HALF FULL.
8. SEE INLET PROTECTION NOTES STD. DETAIL E3.

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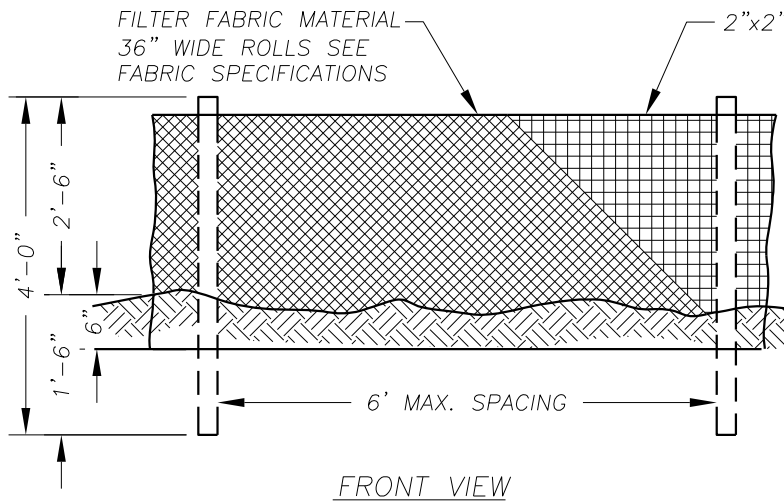
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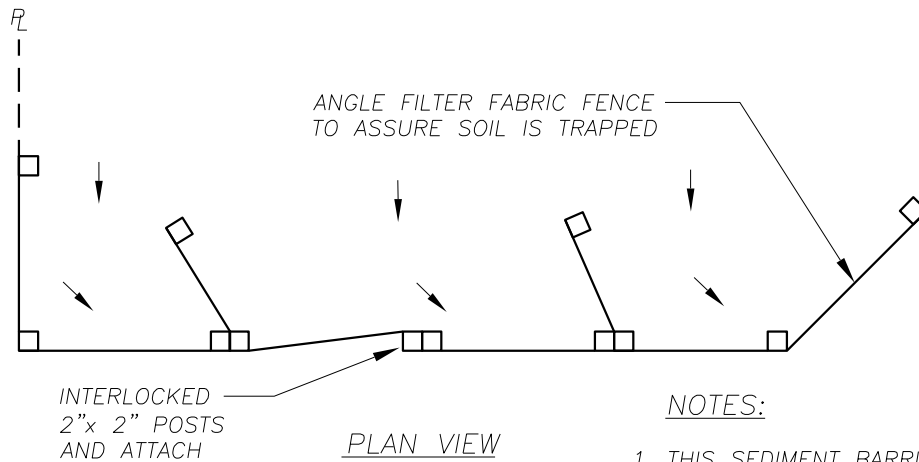
INLET PROTECTION TYPE 5
 SILT SACK
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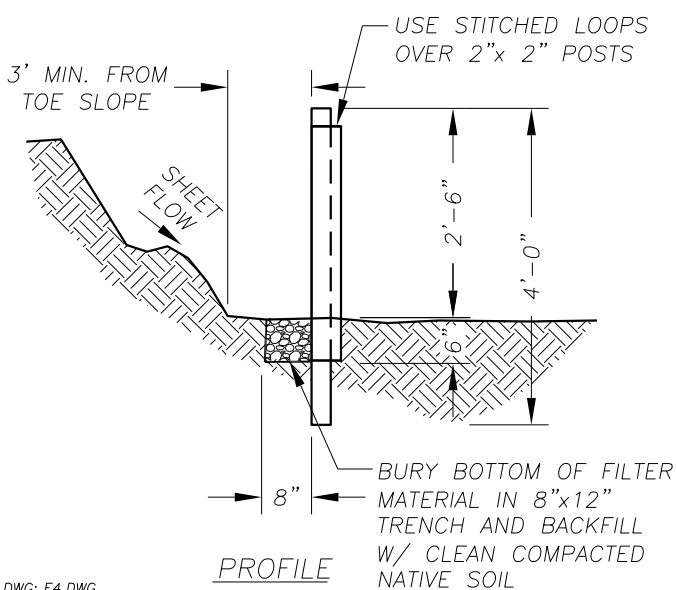
SILT FENCE FABRIC SPECIFICATIONS
(WOVEN POLYPROYLENE SILT FENCE FABRIC)

PROPERTY	TEST PROCEDURE	MIN. FABRIC VALUE
GRAB TENSILE STRENGTH	ASTM D-4632	180 LBS.
GRAB ELONGATION	ASTM D-4632	30%
TRAPEZOID TEAR	ASTM D-4533	70 LBS.
MULLEN BURST	ASTM D-3786	300 PSI.
PUNCTURE	ASTM D-4833	80 LBS.
PERMITTIVITY	ASTM D-4491	0.07 SEC-1 MIN.
PERMEABILITY	ASTM D-4491	.005 CM/SEC
A.O.S.	ASTM D-4751	50 U.S. SIEVE
UV RESISTANCE(500 HRS)	ASTM D-4355	70%



NOTES:

1. THIS SEDIMENT BARRIER UTILIZES STANDARD STRENGTH OR EXTRA STRENGTH SYNTHETIC FILTER FABRICS, IT IS DESIGNED FOR SITUATIONS IN WHICH ONLY SHEET OR OVERLAND FLOWS ARE EXPECTED. (SEE FABRIC SPECIFICATIONS ABOVE).
2. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
3. POST ARE TO BE 2"x2" FIR, PINE OR STEEL FENCE POSTS.
4. POST TO BE INSTALLED ON UPHILL SIDE OF SLOPE FOR FENCING WITH STITCHED LOOP. FOR STAPLED FENCING, POST TO BE INSTALLED ON DOWNHILL SLOPE.
5. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
6. SEDIMENT FENCE TO BE SPACED ON SLOPES PER TABLE BELOW.



INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS		
% SLOPE	SLOPE	MAX. SPACING ON SLOPE
10% FLATTER	10:1 OR FLATTER	300 ft.
10>%<15	10:1>x<7.5:1	150 ft.
15>%<20	7.5:1>x<5:1	100 ft.
20>%<30	5:1>x<3.5:1	50 ft.
30>%<50	3.5:1>x<2:1	25 ft.

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SILT FENCE

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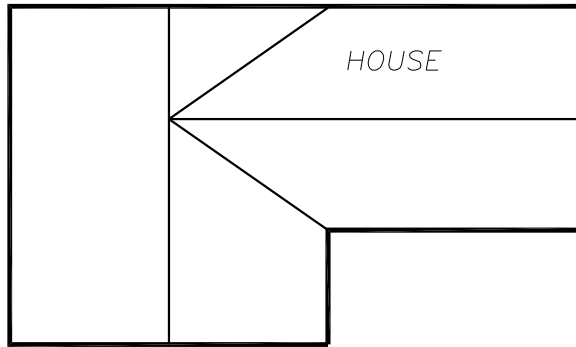
5/23/08
DATE

STANDARD

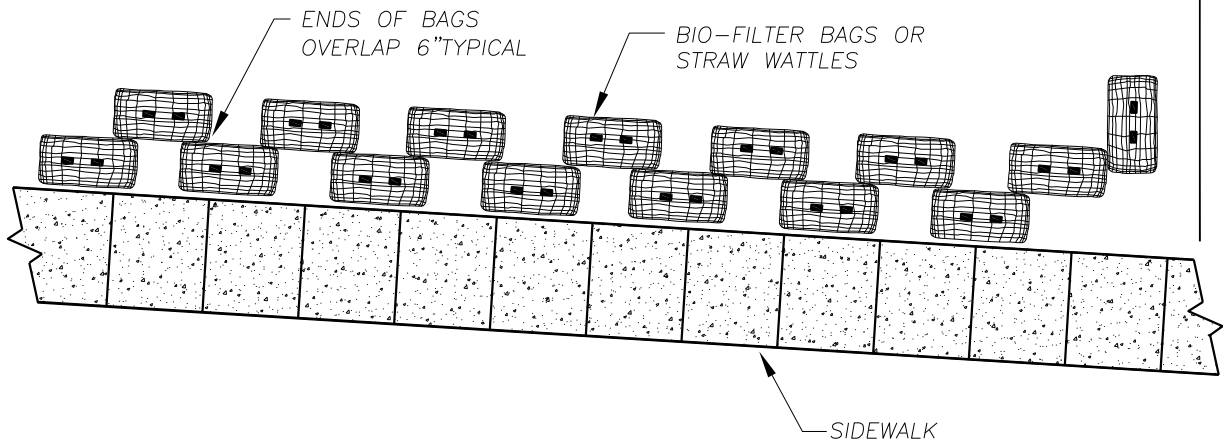
E4

DETAIL

DESIGNED
DRAWN
DATE 05/23/08



PROPERTY LINE



PLAN VIEW

NOTES:

1. STAKING OF BAGS REQUIRED USING (2) 1"x2" WOOD STAKES OR APPROVED EQUAL PER BAG.
2. BAGS OR WATTLES MAY BE USED AS ALTERNATE FOR SEDIMENT FENCE FOLLOWING INSTALLATION OF SIDEWALK ON SINGLE FAMILY CONSTRUCTION ONLY.

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BIO-FILTER BAGS
SEDIMENT BARRIER

APPROVED

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COUNTY ENGINEER

5/23/08
DATE

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E5
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

CONSTRUCTION SPECIFICATIONS:

PREPARE THE SLOPE BEFORE THE WATTLING PROCEDURE IS STARTED.

SHALLOW GULLIES SHOULD BE SMOOTHED AS WORK PROGRESSES.

DIG SMALL TRENCHES ACROSS THE SLOPE ON CONTOUR, TO PLACE ROLLS IN. THE TRENCH SHOULD BE DEEP ENOUGH TO ACCOMMODATE HALF THE THICKNESS OF THE ROLL. WHEN THE SOIL IS LOOSE AND UNCOMPACTED, THE TRENCH SHOULD BE DEEP ENOUGH TO BURY THE ROLL 2/3 OF ITS THICKNESS BECAUSE THE GROUND WILL SETTLE.

IT IS CRITICAL THAT ROLLS ARE INSTALLED PERPENDICULAR TO WATER MOVEMENT, PARALLEL TO THE SLOPE CONTOUR.

START BUILDING TRENCHES AND INSTALL ROLLS FROM THE BOTTOM OF THE SLOPE AND WORK UP.

CONSTRUCT TRENCHES AT CONTOUR INTERVALS OF 3-12 FEET APART DEPENDING ON STEEPNESS OF SLOPE. THE STEEPER THE SLOPE, THE CLOSER TOGETHER THE TRENCHES.
 1:1=10' 3:1=30'
 2:1=20' 4:1=40'

LAY THE ROLL ALONG THE TRENCHES FITTING IT SNUGLY AGAINST THE SOIL. MAKE SURE NO GAPS EXIST BETWEEN THE SOIL AND THE STRAW WATTLE.

USE A STRAIGHT BAR TO DRIVE HOLES THROUGH THE WATTLE AND INTO THE SOIL FOR THE WILLOW OR WOODEN STAKES.

DRIVE THE STAKE THROUGH PREPARED HOLE INTO SOIL. LEAVE ONLY 1 OR 2 INCHES OF STAKE EXPOSED ABOVE ROLL.

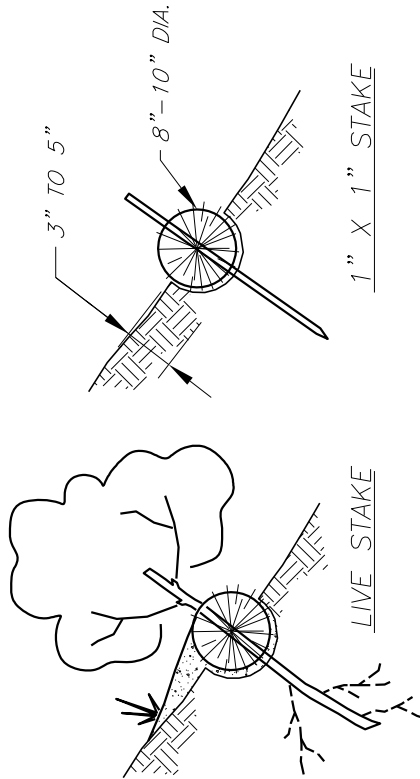
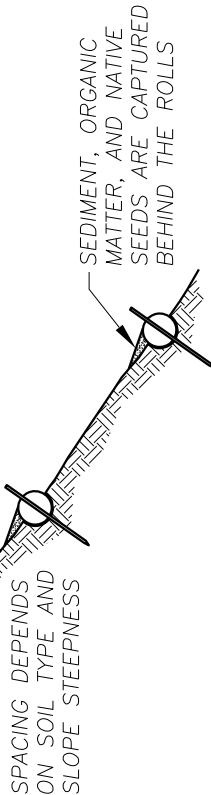
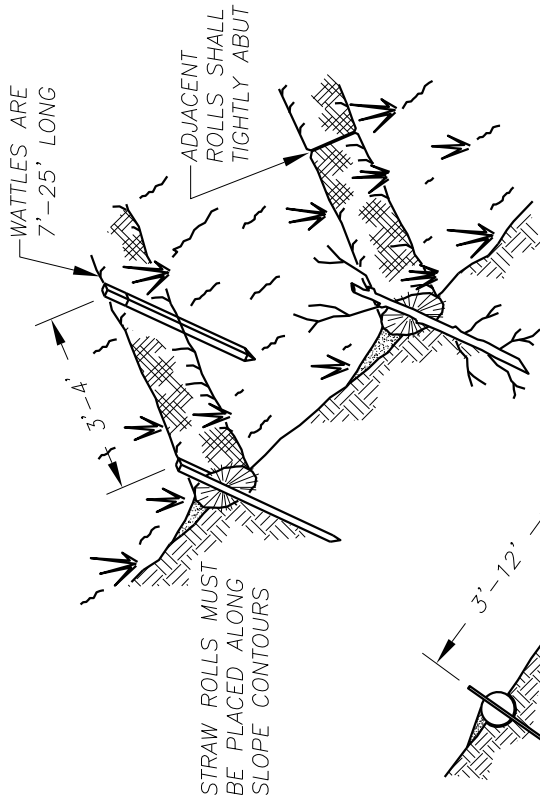
IF USING WILLOW STAKES REFER TO LIVE STAKING BMP.

INSTALL STAKES AT LEAST EVERY 4 FEET APART THROUGH THE WATTLE. ADDITIONAL STAKES MAY BE DRIVEN ON THE DOWNSLOPE SIDE OF THE TRENCHES ON HIGHLY EROSION OR VERY STEEP SLOPES. INSPECTION AND MAINTENANCE:

INSPECT THE STRAW ROLLS AND THE SLOPES AFTER SIGNIFICANT STORMS. MAKE SURE THE ROLLS ARE IN CONTACT WITH THE SOIL.

REPAIR ANY RILLS OR GULLYS PROMPTLY.

RESEED OR REPLANT VEGETATION IF NECESSARY UNTIL THE SLOPE IS STABILIZED.



WATTLE DETAIL

WATTLES STAKED ALONG THE CONTOUR OF NEWLY CONSTRUCTED OR DISTURBED SLOPES. CAN OFTEN BE USED TO REPLACE SEDIMENT FENCES ON STEEP SLOPES.

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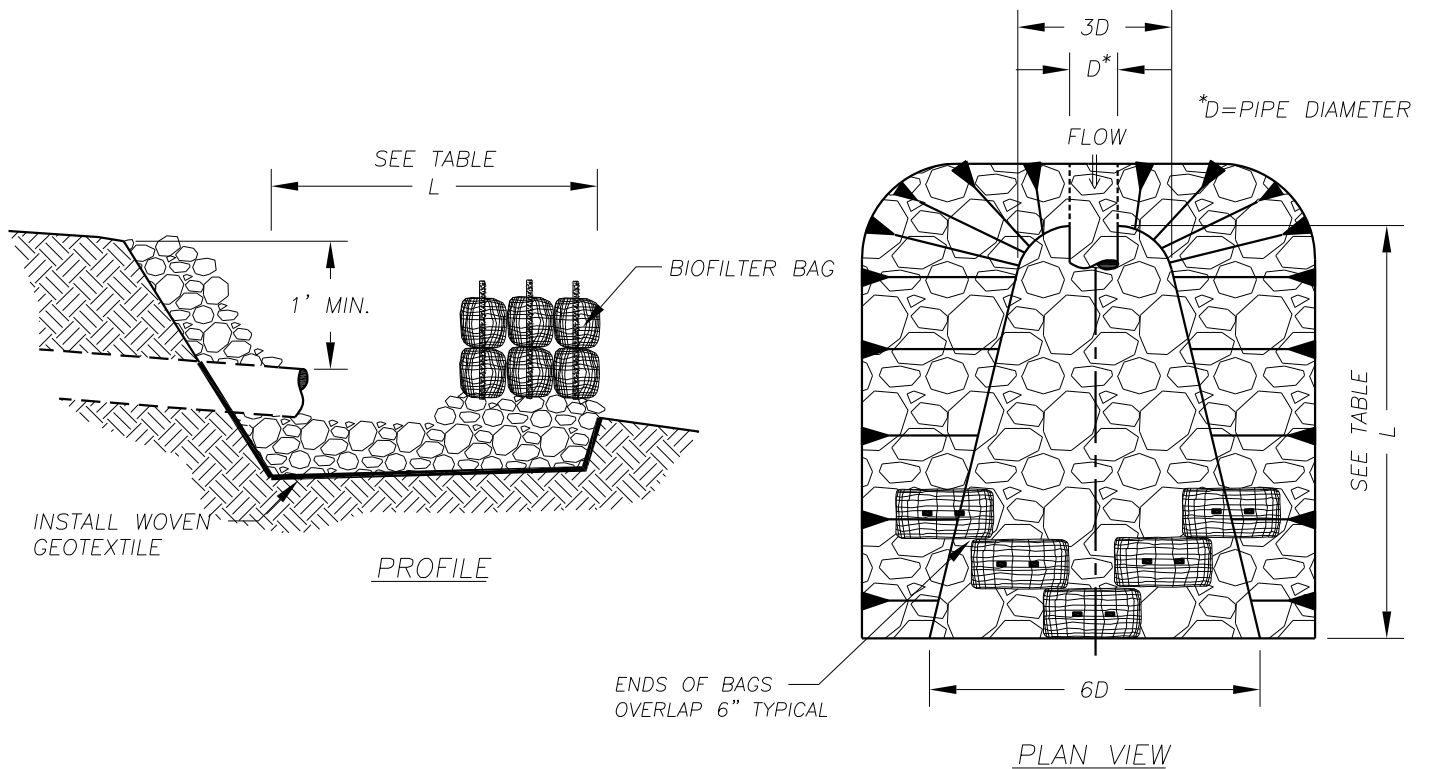
Peter Capen
 COUNTY ENGINEER

WATTLE

APPROVED

5/23/08
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STANDARD
E6
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



NOTES:

1. BIO-BAGS ONLY REQUIRED WHEN DISCHARGING SEDIMENT LADEN WATER. STAKING OF BAGS REQUIRED WITH EITHER METHOD USING (2) 1"x2" WOOD STAKES OR APPROVED EQUAL PER BAG.
2. RIP-RAP SIZING GOVERNED BY THE SIDE SLOPES ON THE OUTLET CHANNEL, ASSUMED TO BE 3:1.
3. PLACE WOVEN GEOTEXTILE ALONG BOTTOM AND SIDE SLOPES TO CROWN OF PIPE, AND INSTALL ROCK TO 1' ABOVE PIPE CROWN ALONG BOTH SIDES OF CHANNEL.
4. RIP-RAP SHALL BE IN ACCORDANCE WITH SECTION 9-13.1 OF THE WSDOT STANDARD SPECIFICATIONS. RIP-RAP ROCK SIZE SHALL BE AS SHOWN IN THE TABLE BELOW.
5. RIP-RAP SHALL BE HAND LAID AND REASONABLY GRADED.
6. INSPECT ONCE PER WEEK ON ACTIVE SITES, ONCE EVERY TWO WEEKS ON INACTIVE SITES, AND WITHIN 24 HOURS FOLLOWING A 0.5 INCH RAIN EVENT.
7. IF THERE IS SCOURING AT THE OUTLET, PROTECT THE ERODED AREA BY INCREASING THE SIZE OF THE ENERGY DISSIPATOR FACILITY.
8. REMOVE ACCUMULATED SEDIMENT FREQUENTLY.
9. USE THIS DETAIL FOR OUTLET PROTECTION AS A MINIMUM. CONSIDER SITE CONDITIONS TO DETERMINE IF A MORE COMPLEX ENERGY DISSIPATOR MAY BE REQUIRED.

DISCHARGE VELOCITY AT DESIGN FLOW (FPS)	REQUIRED PROTECTION MINIMUM DIMENSIONS	
	TYPE	LENGTH (L)
0 TO <5	RIP-RAP*	8' OR 3D (WHICHEVER IS GREATER)
6 TO <10	RIP-RAP**	12' OR 4D (WHICHEVER IS GREATER)
11 TO <20	GABION	AS REQUIRED
>20	ENGINEERED ENERGY DISSIPATER REQUIRED	

* 8" MAXIMUM, 6" MEDIAN, 2" MINIMUM
 ** 24" MAXIMUM, 16" MEDIAN, 4" MINIMUM

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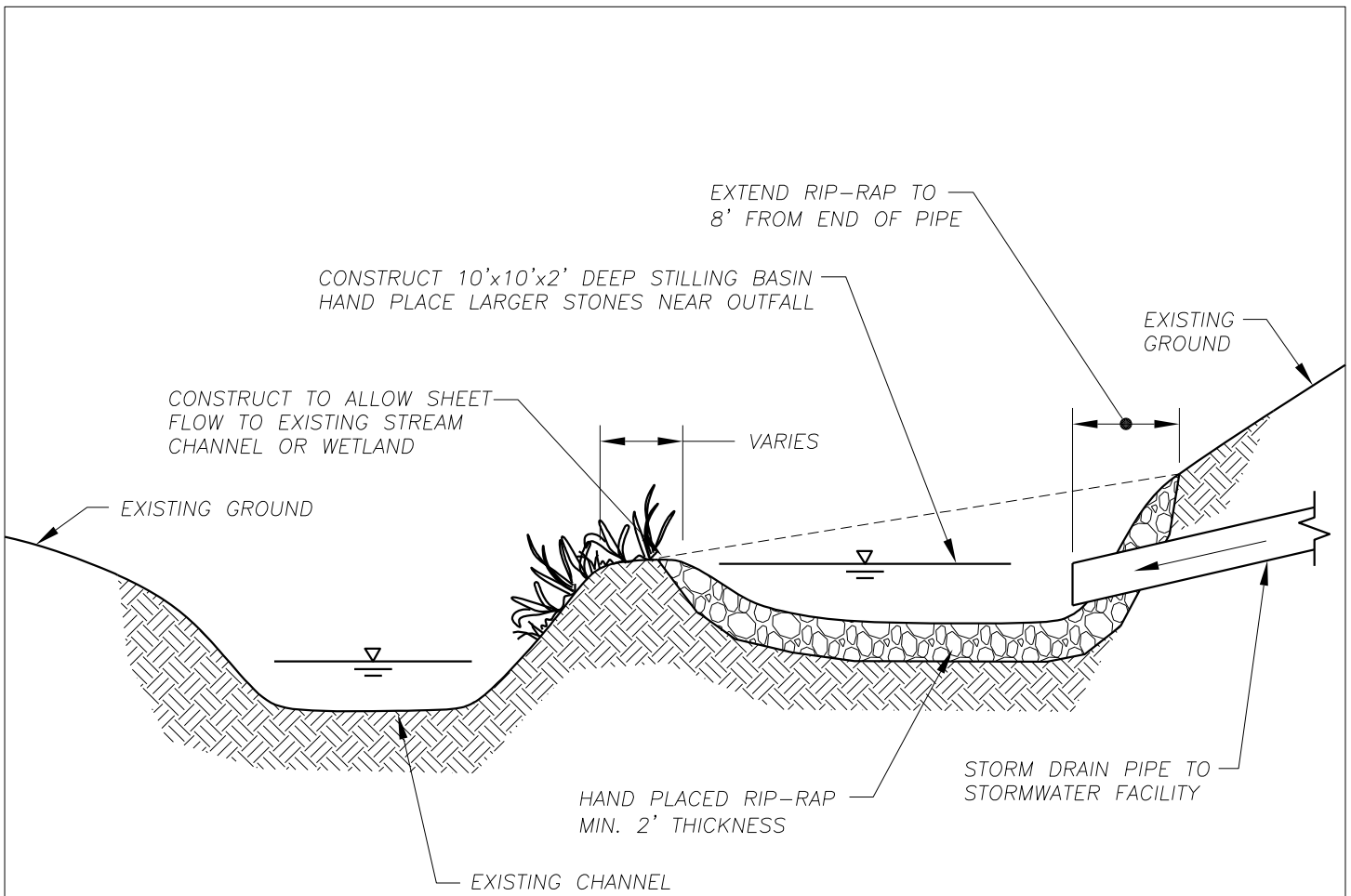
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OUTLET PROTECTION
 RIP-RAP
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NOTES:

1. HAND PLACED RIPRAP PER WSDOT STD. SPECIFICATION 9-13.2.
2. USE STD. DETAIL E7 FOR OUTLET PROTECTION AS A MINIMUM. CONSIDER SITE CONDITIONS TO DETERMINE IF A MORE COMPLEX ENERGY DISSIPATOR MAY BE REQUIRED.
3. CONTRACTOR TO COMPLY WITH CONDITIONS AND REQUIREMENTS OF COUNTY FLOODPLAIN, SHORELINE, HABITAT AND WETLANDS REVIEWS, HYDRAULIC PERMIT (HPA), AND CORPS PERMITS WHEN APPLICABLE.

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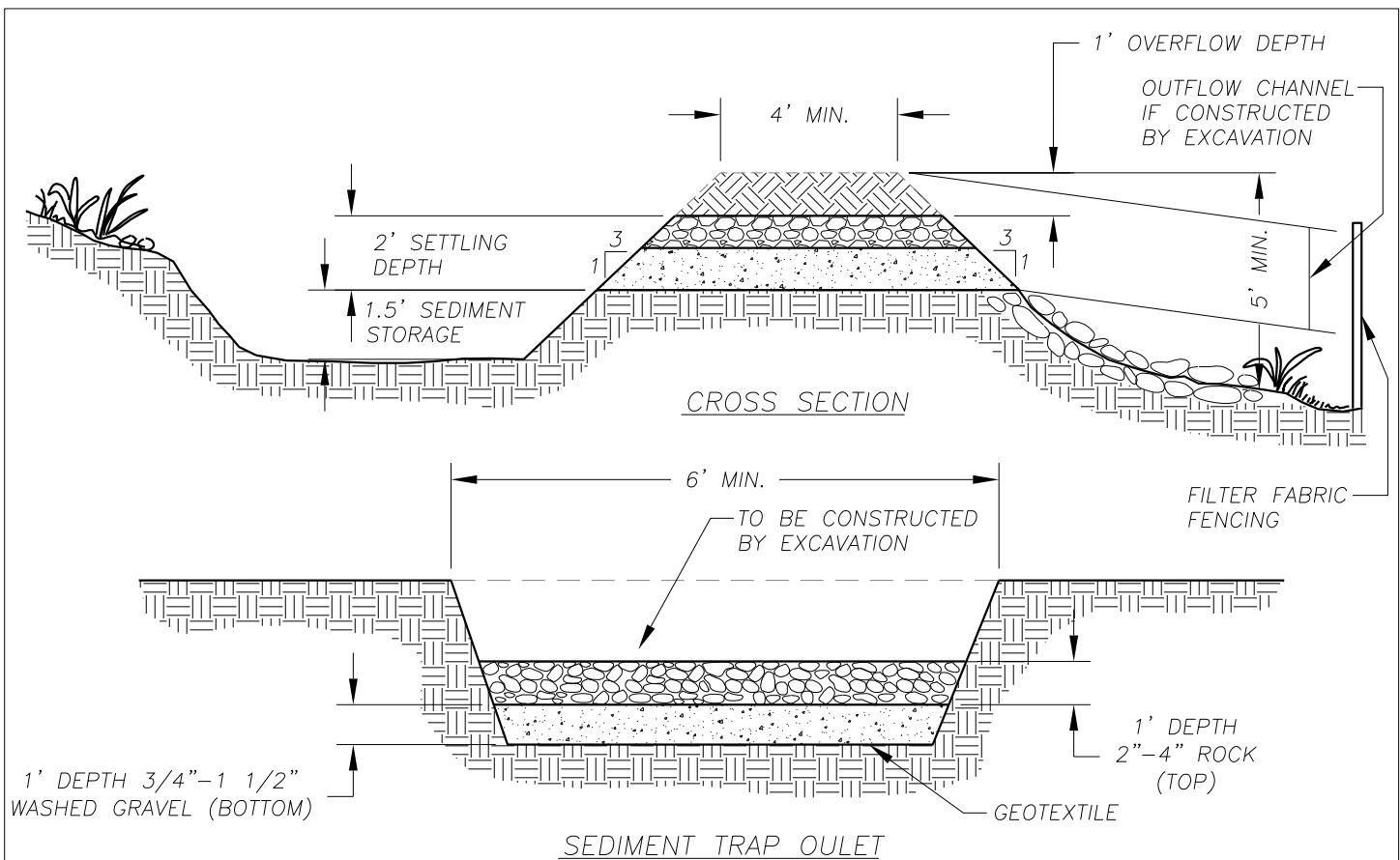
OUTLET PROTECTION
STILLING BASIN

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DATE

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E7a
DETAIL
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NOTES:

1. THE SEDIMENT TRAP MAY BE FORMED COMPLETELY BY EXCAVATION OR BY CONSTRUCTION OF A COMPACTED EMBANKMENT, AND IS TO BE CONSTRUCTED PRIOR TO ANY UPSLOPE CLEARING AND GRADING.
2. TRAP IS TO BE LOCATED IN A LOW AREA WHERE THE TRAP WILL INTERCEPT ALL OR MOST OF THE RUNOFF FROM THE DISTURBED AREA. MUST BE ACCESSIBLE FOR MAINTENANCE.
3. PROVIDE DIVERSION DIKES AND DITCHES, AS NEEDED TO COLLECT AND DIVERT WATER SEDIMENT LADEN FLOWS TO TRAPS AND PONDS.
4. SEDIMENT TRAPS SHALL BE LIMITED TO A TRIBUTARY AREA OF LESS THAN 3 ACRES. SEE THE BMP MANUAL SECTION II-5.8.6 DESIGN CRITERIA, FOR SEDIMENT STORAGE VOLUME.
5. SEDIMENT TRAPS AND PONDS ARE TO HAVE A LEVEL BOTTOM, 3:1 OR FLATTER SIDE SLOPES AND A L:W RATIO OF 3.
6. WATER TEMPERATURE IN TRAPS AND PONDS MAY BE TOO HIGH FOR DIRECT RELEASE. ALWAYS MODERATE THE WATER TEMPERATURE BEFORE IT DRAINS INTO A LAKE, STREAM, WETLAND OR WATERWAY. WHENEVER POSSIBLE, RELEASE THE DISCHARGE ONSITE ONTO A RELATIVELY LEVEL, DENSELY GRASSED AREA AT LEAST 50 FEET FROM A WATERWAY OR WETLAND.
7. INSPECT ONCE PER WEEK ON ACTIVE SITES, ONCE EVERY TWO WEEKS ON INACTIVE SITES, AND WITHIN 24 HOURS FOLLOWING A 0.5 INCH RAIN EVENT.
8. CONSTANT MAINTENANCE IS ESSENTIAL FOR PROPER FUNCTIONING.
9. REMOVE SEDIMENT FROM THE TRAP WHEN IT REACHES ONE FOOT IN DEPTH, AND REPAIR ANY DAMAGE TO THE TRAP, THE EMBANKMENT OR THE SLOPES.
10. CARE MUST BE GIVEN TO CONSIDERING LOCATION OF TRAPS FOR SAFETY IN CASE THE STRUCTURE FAILS. FENCING MUST ALSO BE CONSIDERED FOR SAFETY.

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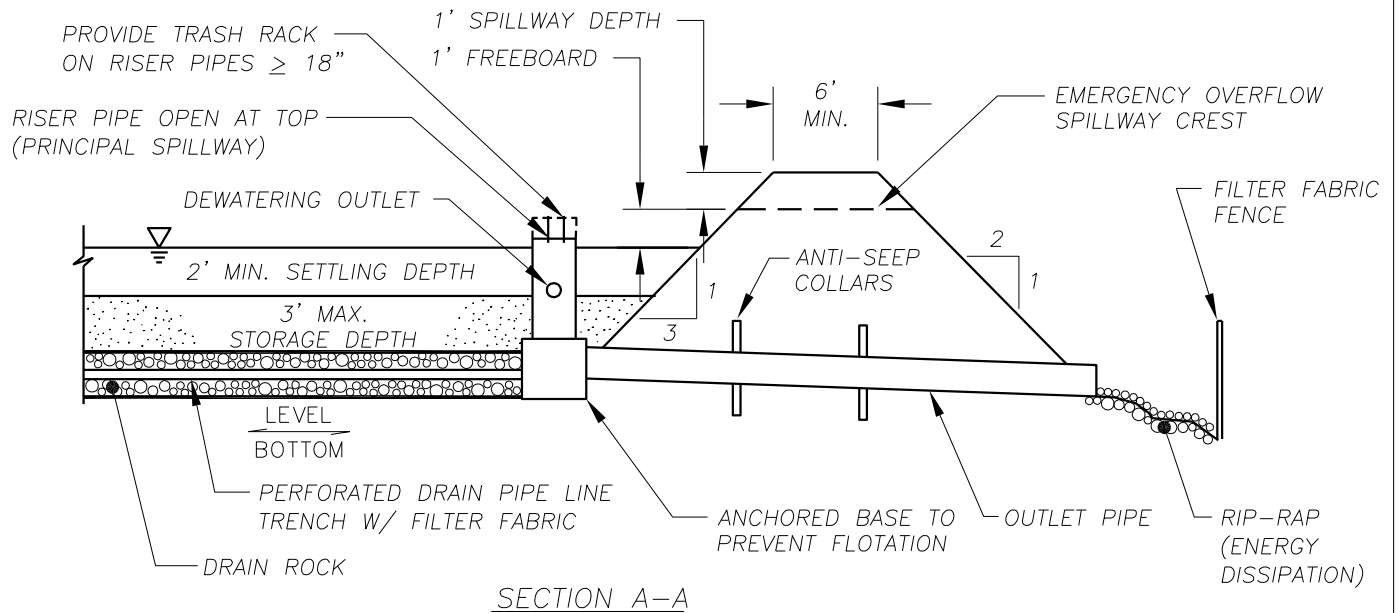
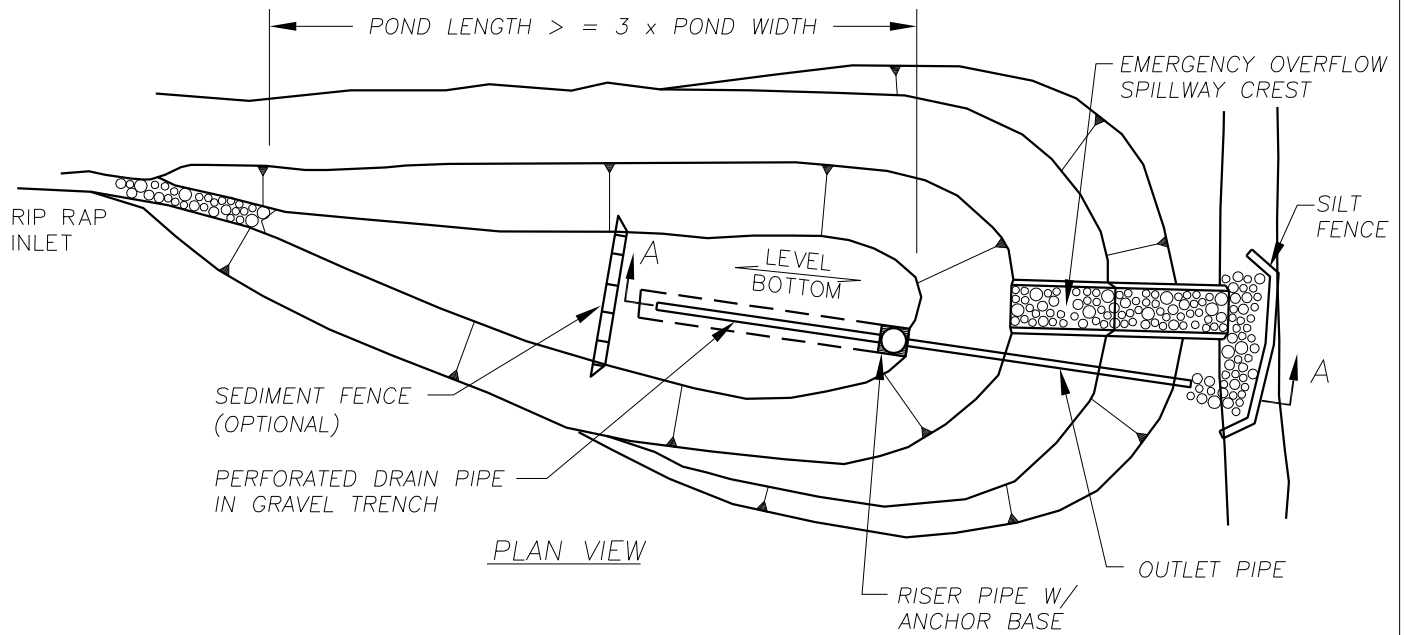
STANDARD SEDIMENT TRAP

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DATE

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NOTES:

1. FOR USE WITH TRIBUTARY DRAINAGE AREA OF LESS THAN 10 ACRES. IF DRAINAGE AREA EXCEEDS 10 ACRES, CONSULT THE DAM SAFETY SECTION OF THE WASHINGTON DEPARTMENT OF ECOLOGY MANUAL.
2. PROVIDE BAFFLES TO PREVENT SHORT-CIRCUITING.
3. SPILLWAY SHALL BE LINED WITH 2"-4" ROCKS.
4. ALL INLETS AND OUTLETS SHALL BE PROTECTED WITH RIP-RAP.
5. IF POND POSES A SAFETY HAZARD, IT SHALL BE FENCED.
6. REMOVE SEDIMENT BEFORE 1.5" ACCUMULATES.
7. PERFORATED PIPE TRENCH SHALL BE COMPLETELY LINED WITH FILTER FABRIC.
8. SEE APPLICABLE NOTES ON STD. DETAIL E8.

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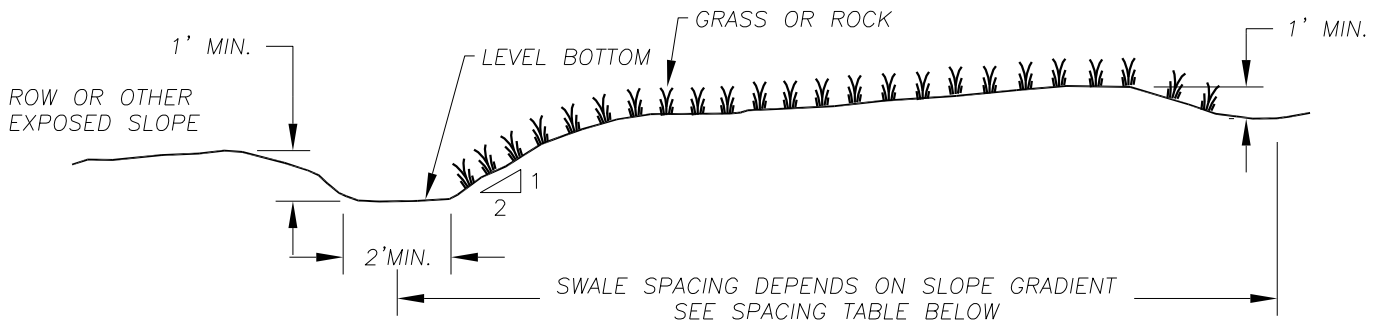
TEMPORARY SEDIMENT POND

Peter Capen
 COUNTY ENGINEER

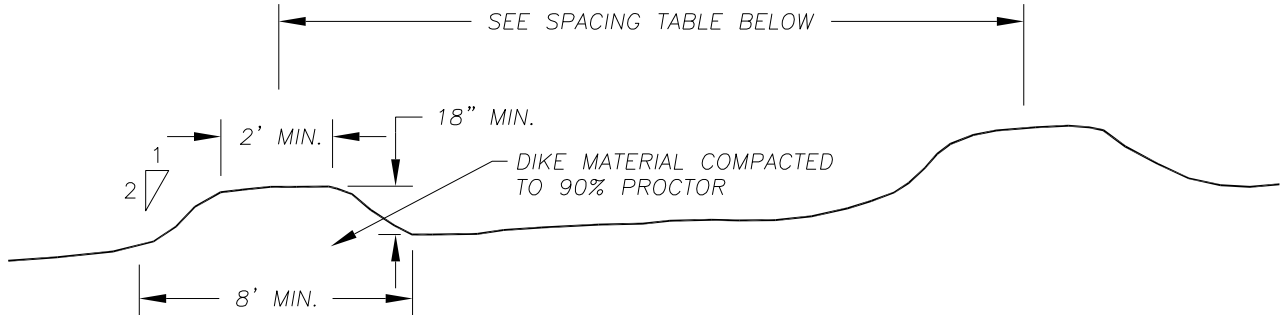
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DIVERSION SWALE



TEMPORARY DIVERSION DIKE

NOTES:

1. DIKE OR SWALES ARE INSTALLED TO INTERCEPT AND CONVEY SMALLER FLOWS ALONG LOW-GRADIENT DRAINAGE WAYS TO LARGER CONVEYANCES SUCH AS DITCHES OR PIPE SLOPE DRAINS OR TO A STABILIZED OUTLET, AND CAN BE USE SINGULARLY OR IN COMBINATION WITH EACH OTHER.
2. REFER TO TABLES BELOW FOR DESIGN CRITERIA FOR DIVERSION DIKES AND SWALES. INSTALL THE DIKES AND/OR SWALES HORIZONTALLY AT INTERVALS ACROSS A DISTURBED SLOPE AT SPACING ACCORDING TO TABLES.
3. FOR SLOPES OF ERODIBLE SOILS STEEPER THAN 2:1 WITH MORE THAN 10 FT. OF VERTICAL RELIEF, CONSTRUCT BENCHES OR SHORTEN DISTANCE BETWEEN DIKES AND SWALES.
4. DISCHARGE THE RUNOFF TO A STABLE CONVEYANCE THAT ROUTES THE SEDIMENT LADEN RUNOFF TO A SEDIMENT TRAP OR POND.
5. MAY NEED MATTING TO PROTECT SEED BED AND CHANNEL FROM EROSION.

DIVERSION DIKE DESIGN CRITERIA

TOP WIDTH	24" MIN.	
HEIGHT	20" MIN (90% COMPACTION)	
SIDE SLOPES	2:1 OR FLATTER	
DIKE GRADE	BETWEEN 0.5-1%	
SLOPE OF DISTURBED AREA VS. HORZ. SPACING	<5%	300 ft
	5-10%	200 ft
	10-25%	100 ft
	25-50%	50 ft
SLOPE STABILIZATION	<5% SEED AND MULCH WITHIN 5 DAYS FOLLOWING DIKE CONSTRUCTION	
OUTLET	UPSLOPE SIDE OF DIKE PROVIDES POSITIVE DRAINAGE TO OUTLET, PROVIDE RIPRAP AS NECESSARY TO PREVENT EROSION RELEASE TO SEDIMENT TRAPPING FACILITY.	

DIVERSION SWALE DESIGN CRITERIA

BOTTOM WIDTH	24" MIN. LEVEL BOTTOM ACROSS SWALE	
DEPTH	12"	
SIDE SLOPES	2:1 OR FLATTER	
GRADE	MAX. 5% POSITIVE DRAINAGE TO OUTLET	
SLOPE OF DISTURBED AREA VS. HORZ. SPACING	<5%	300 ft
	5-10%	200 ft
	10-25%	100 ft
	25-50%	50 ft
SLOPE STABILIZATION	TEMPORARILY SEED OR LINE WITH RIPRAP 12" THICK AND PRESS INTO BANK ± 3-4"	
OUTLET	LEVEL SPREADER OR RIPRAP TO STABILIZED OUTLET/SEDIMENTATION POND	

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DIVERSION DIKE/SWALE

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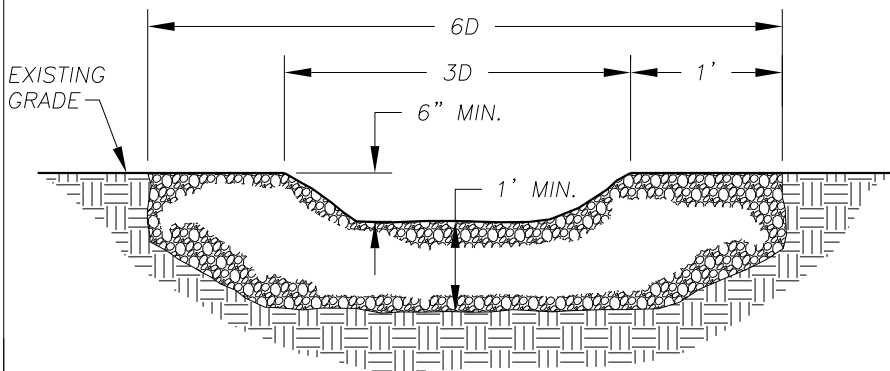
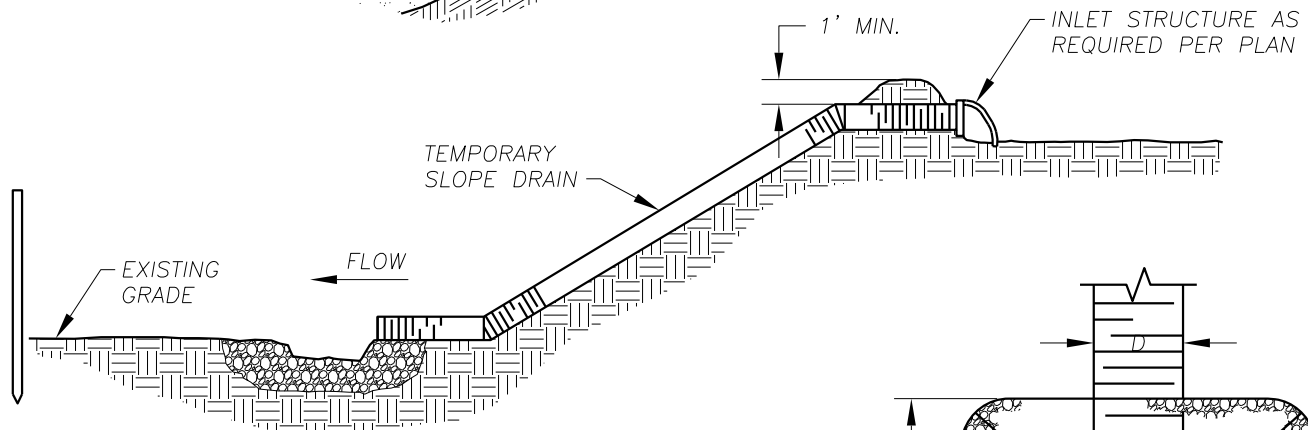
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SEE OUTLET PROTECTION STD.
DETAIL E-7 FOR REQUIRED
PROTECTION VS. DISCHARGE
VELOCITY AT DESIGN FLOW

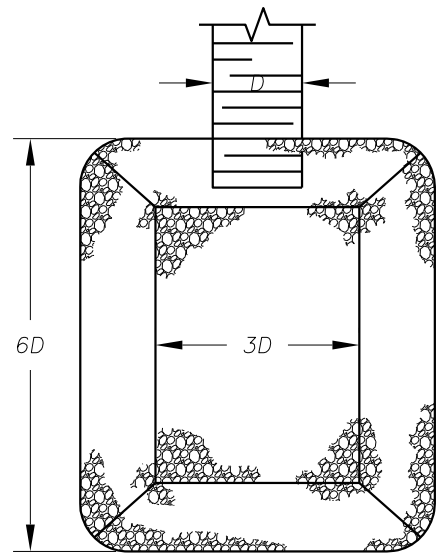
SCOUR HOLE

INTERCEPTOR DIKE

1' MIN.



SCOUR HOLE DETAIL - FRONT VIEW



SCOUR HOLE DETAIL - TOP VIEW

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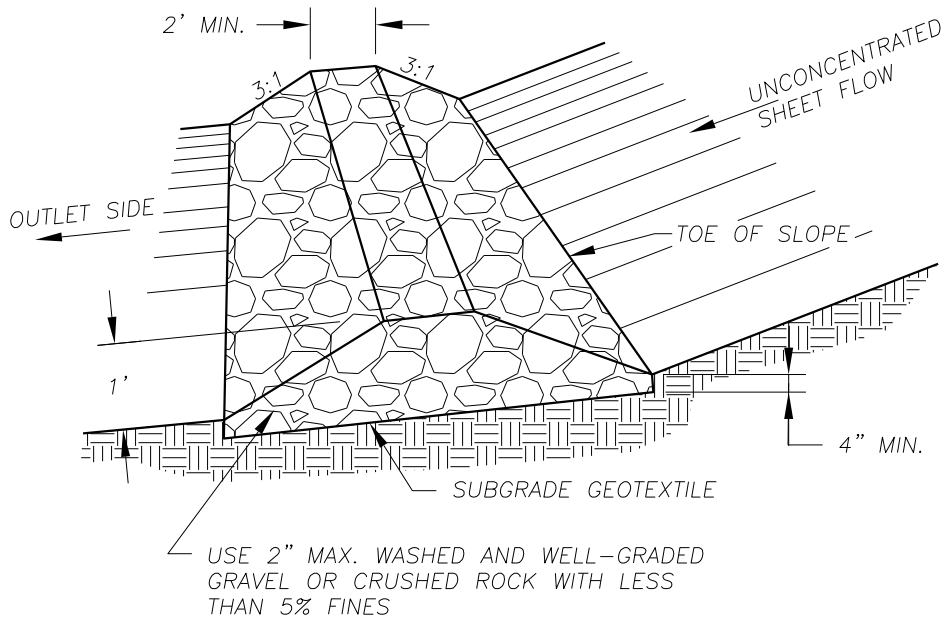
PIPE SLOPE DRAIN

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COUNTY ENGINEER

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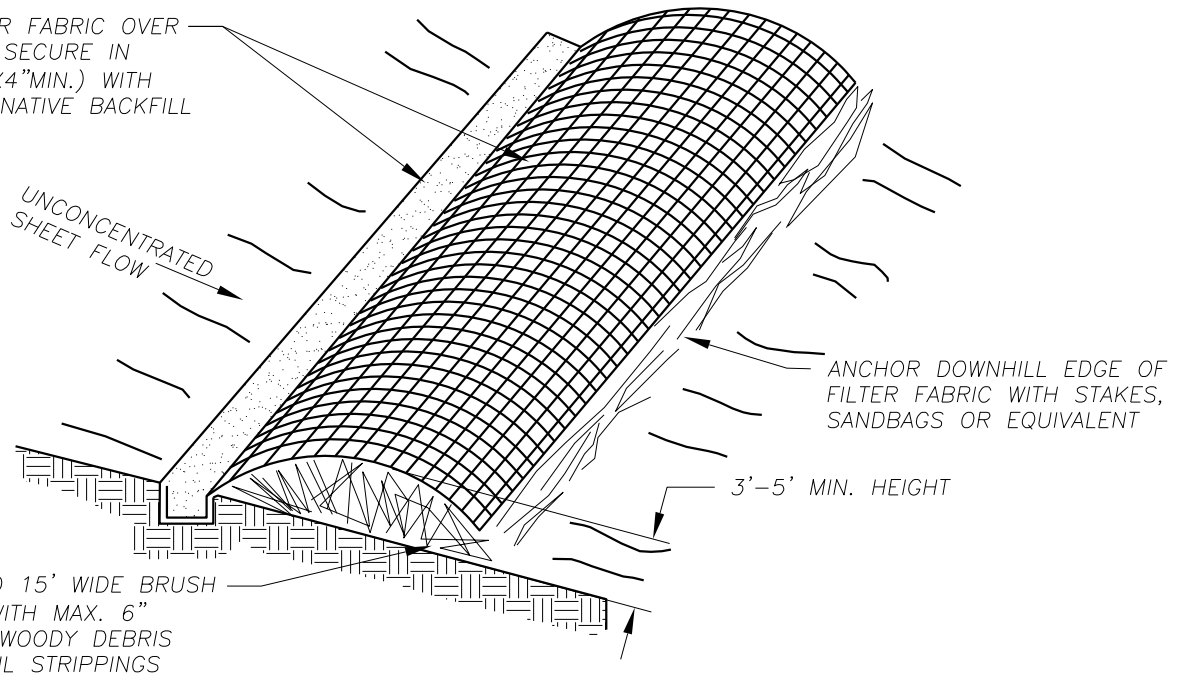
5/23/08
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FILTER BERM

DRAPE FILTER FABRIC OVER BRUSH AND SECURE IN TRENCH (4"X4"MIN.) WITH COMPACTED NATIVE BACKFILL



BRUSH BARRIER

NOTES:

1. DIRECT THE OUTLET SIDE OF THE ROCK FILTER BERM/DAMS ONTO A STABILIZED AREA, SUCH AS VEGETATION AND OR ROCK.
2. EMBED A MIN. OF 4" INTO THE EXISTING GROUND/EMBANKMENT.
3. USE 3:1 OR FLATTER SIDE SLOPES.
4. USED PRIMARILY AS A BASE MEASURE AT TOE OF SLOPE.

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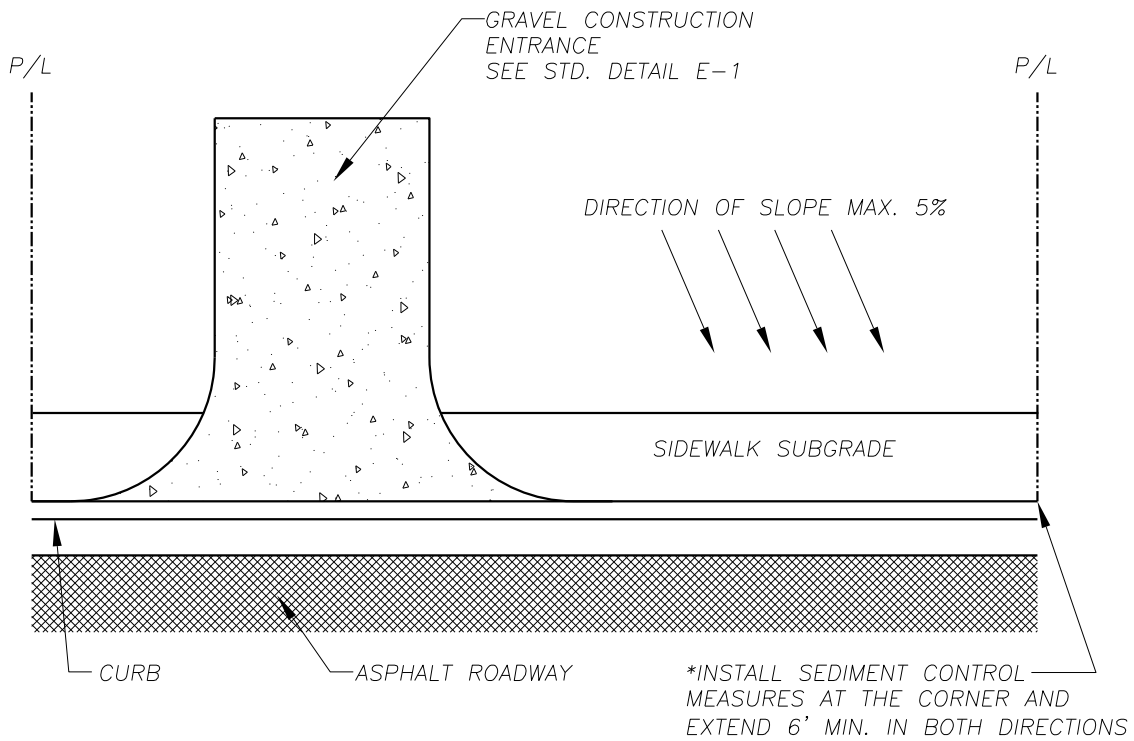
Peter Capen
COUNTY ENGINEER

FILTER BERM
ROCK/BRUSH

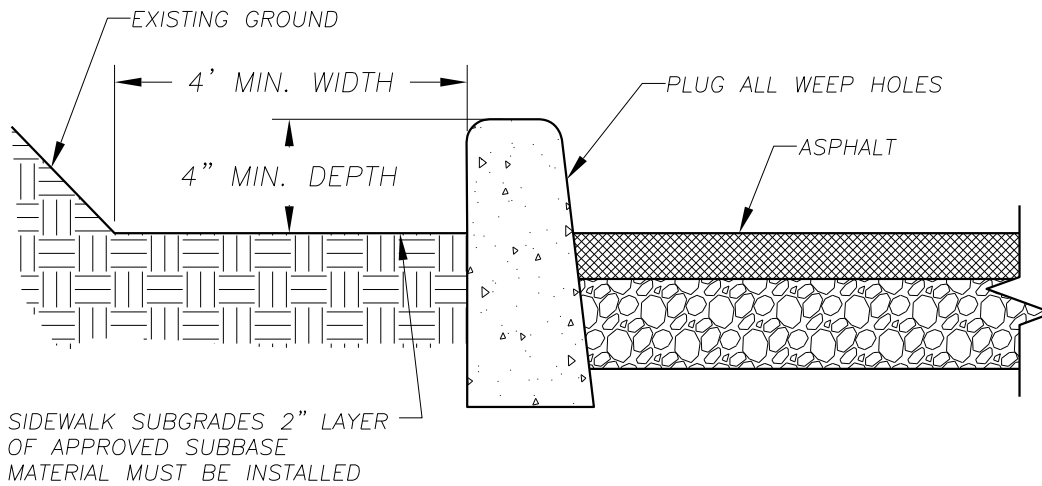
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PLAN VIEW



PROFILE

NOTE: SIDEWALK SUBGRADE CAN BE USED FOR ALL CONSTRUCTION ACTIVITIES.

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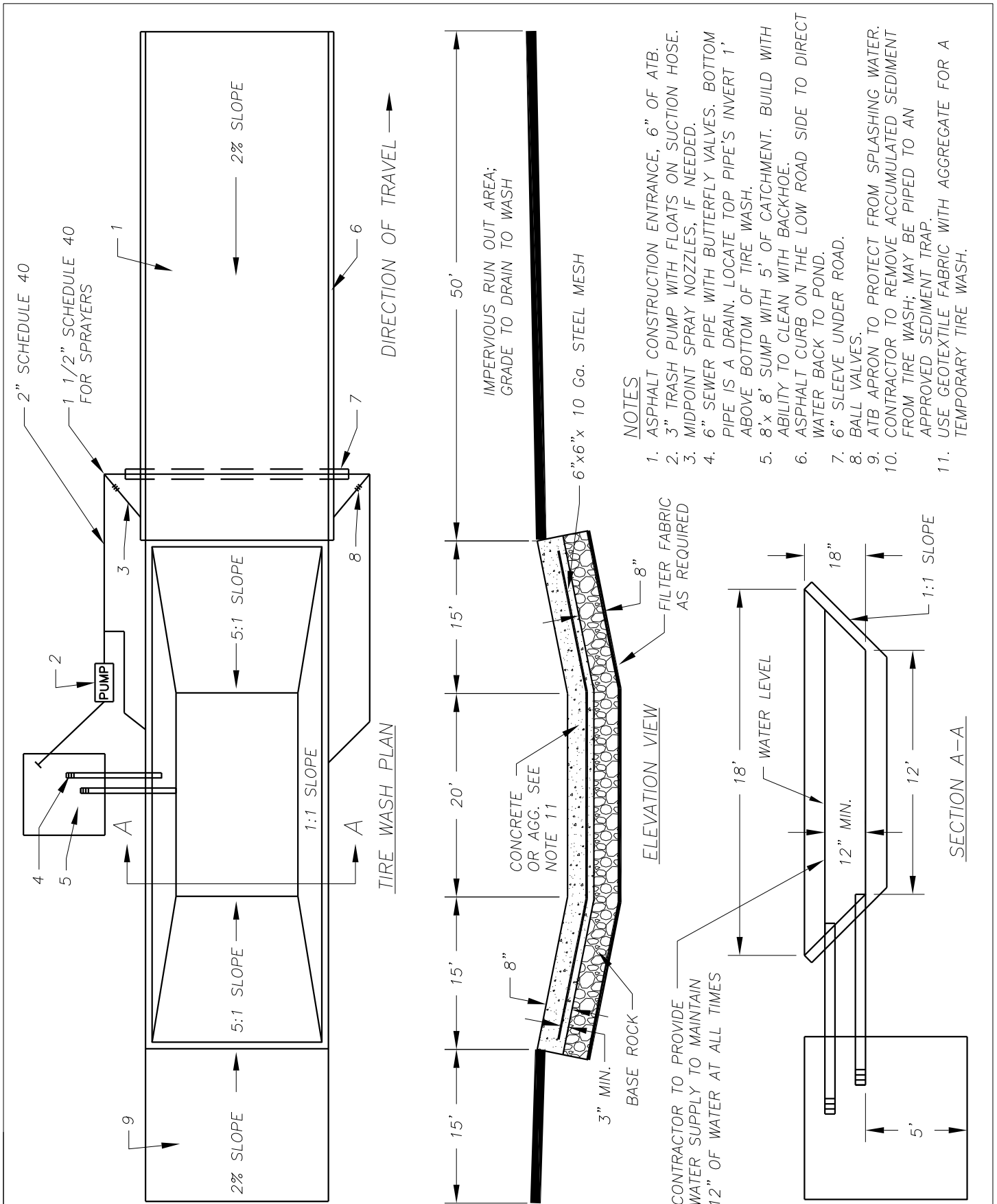
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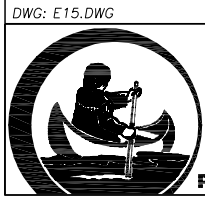
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SIDEWALK SUBGRADE
CURB BARRIER
APPROVED
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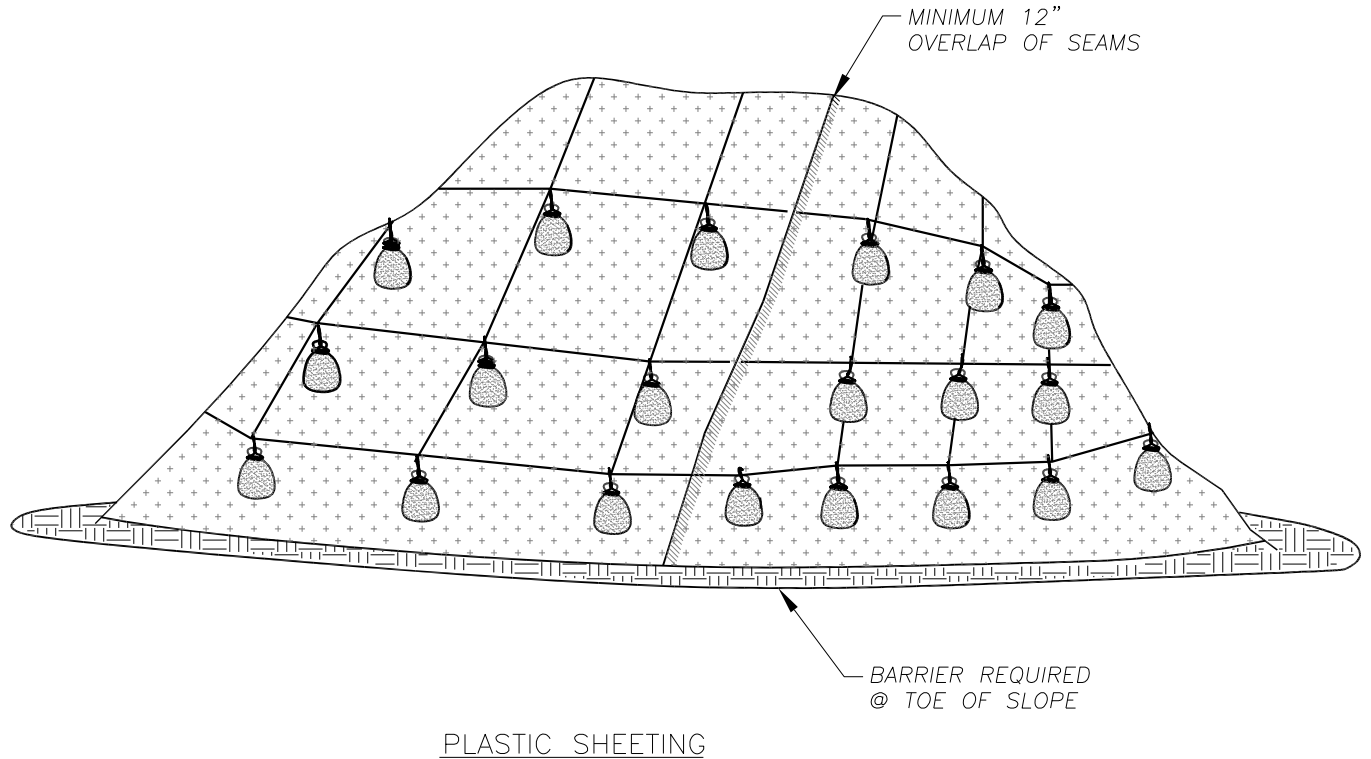
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 DATE 05/23/08



NOTES:

1. PLASTIC SHEETING IS USED TO PROVIDE IMMEDIATE PROTECTION TO SLOPES AND STOCKPILES.
2. DO NOT USE PLASTIC COVERING UPSLOPE OF AREAS SUCH AS STEEP AND/OR UNSTABLE SLOPES THAT MIGHT BE ADVERSELY AFFECTED BY CONCENTRATED RUNOFF.
3. WHEN POSSIBLE, INSTALL AN INTERCEPTER DIKE AT THE TOP OF THE PLASTIC TO DIVERT FLOWS AWAY FROM THE PLASTIC.
4. TOE-IN THE TOP OF THE SHEETING IN A 6"x6" TRENCH BACKFILLED WITH COMPACTED NATIVE MATERIAL.
5. INSTALL A GRAVEL BERM, RIPRAP, OR OTHER SUITABLE PROTECTION AT THE TOP OF THE SLOPE IN ORDER TO DISSIPATE RUNOFF VELOCITY.
6. ANCHOR THE PLASTIC USING SANDBAGS OR OTHER SUITABLE TETHERED ANCHOR SYSTEM SPACED ON A 10' GRID SPACING IN ALL DIRECTIONS.
7. OVERLAP SEAMS 1-2', TAPE, ROLL AND STAKE THE SEAMS AND THEN WEIGH DOWN THE ENTIRE LENGTH.
8. BARRIER IS REQUIRED @ TOE OF STOCK PILE.
9. REPLACE TORN SHEETS AND REPAIR OPEN SEAMS. COMPLETELY REMOVE AND REPLACE PLASTIC WHEN IT BEGINS TO DETERIORATE.

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PLASTIC SHEETING

APPROVED

Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
E16
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

MATTING NOTES:

1. THERE ARE A WIDE RANGE OF MATERIALS AND COMBINATION OF MATERIALS USED TO PRODUCE MATTING INCLUDING, BUT NOT LIMITED TO: STRAW, JUTE, WOOD FIBER, COIR (COCONUT FIBER), PLASTIC NETTING, AND BONDED FIBER MATRIX. THE SELECTION OF MATTING MATERIAL FOR A SITE CAN MAKE A SIGNIFICANT DIFFERENCE IN THE EFFECTIVENESS OF THE BMP.
2. GENERALLY, MATTING IS USED ON SLOPES 2:1 AND STEEPER.
3. SURFACE MUST BE GRADED SMOOTH TO REMOVE ALL DEBRIS AND UNDULATIONS LARGER THAN 2" IN ANY DIRECTION.
4. APPLY SEED AND FERTILIZER PRIOR TO MATTING. INSTALL SO THAT MATTING IS IN COMPLETE CONTACT WITH SOIL SURFACE.
5. STAPLES ARE TO BE INSTALLED PER MANUFACTURES SPECIFICATIONS.
6. ORGANIC MATTING MATERIALS (EXCELSIOR, JUTE, AND COIR) BIODEGRADE AND ARE USEFUL FOR APPLICATIONS REQUIRING STABILIZATION FOR UP TO THREE MONTHS. USE ORGANIC BLANKETS, WHICH RETAIN MOISTURE AND PROVIDE ORGANIC MATTER TO THE SOIL, FOR SLOPE PROTECTION AND SHORT-TERM WATERWAY PROTECTION AND TO IMPROVE THE SPEED AND SUCCESS OF REVEGETATION.
 - EXCELSIOR BRAND (ASPEN WOOD FIBER), WOVEN STRAW, AND COIR BLANKETS MAY BE INSTALLED WITHOUT MULCH BECAUSE THEY PROVIDE COMPLETE SURFACE PROTECTION.
7. SYNTHETIC MATS ARE MADE FROM NON-BIODEGRADABLE MATERIALS AND WILL REMAIN IN PLACE FOR YEARS (SOME PHOTODEGRADATION DOES OCCUR). USE PURELY SYNTHETIC BLANKETS FOR LONG-TERM STABILIZATION OF WATERWAYS.
 - TURF REINFORCEMENT MATS (TRM) ARE MADE FROM POLYMER NETTING OR MONOFILAMENTS FORMED INTO A SYNTHETIC 3-D MAT. TRMs PROTECT SEED AND INCREASE GERMINATION AND ALSO ACTS AS PART OF THE ROOT STRUCTURE; GIVING THE TURF HIGHER STRENGTH.
 - EROSION CONTROL AND REVEGETATION MATS (ECRM), COMPOSED OF HEAT-FUSED MONOFILAMENTS AND MONOFILAMENTS STITCHED BETWEEN NETTING ACT AS PERMANENT MULCH. ECRM ALLOW GROWTH THROUGH THE MAT.
8. CHANNEL OR SWALE APPLICATIONS: LENGTHWISE OVERLAP MATTING A MINIMUM OF 12"; CROSSWISE OVERLAP A MINIMUM OF 6", AND AVOID JOINING MATERIAL IN CENTER OF DITCH OR SWALE.
9. SLOPE APPLICATION: LENGTHWISE OVERLAP MATTING A MINIMUM OF 6"; CROSSWISE OVERLAP A MINIMUM OF 6"; AT TOP OF SLOPE, ENTRENCH MATERIAL IN A 6"x6" TRENCH AND STAPLE AT 12" INTERVAL; AT BOTTOM OF SLOPE, EXTEND MAT 2 FEET BEYOND THE TOE OF THE SLOPE, TURN MATERIAL UNDER 4" AND STAPLE AT 12" INTERVAL; ON 4:1 SLOPES, ROLLS CAN BE PLACED IN HORIZONTAL STRIPS; MATS MUST BE STAPLED IN PLACE AS THEY ARE INSTALLED DOWN THE SLOPE FACE EVERY 4' UNTIL YOU REACH THE BOTTOM. THIS KEEPS BLANKET IN A RELAXED POSITION, ELIMINATING THE POTENTIAL FOR UNDER-RILLING.
10. INSPECT ONCE PER WEEK ON ACTIVE SITES, ONCE EVERY TWO WEEKS ON INACTIVE SITES, AND WITHIN 24 HOURS FOLLOWING A 0.5 INCH RAIN EVENT.
11. REPAIR ANY DAMAGED AREAS OF THE NET OR BLANKET AND STAPLE INTO THE GROUND ANY AREAS NOT IN CLOSE CONTACT WITH THE GROUND SURFACE.
12. IF EROSION OCCURS, REPAIR AND PROTECT THE ERODED AREA.

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Peter Capen
COUNTY ENGINEER

MATTING
GENERAL NOTES

APPROVED

5/23/08
DATE

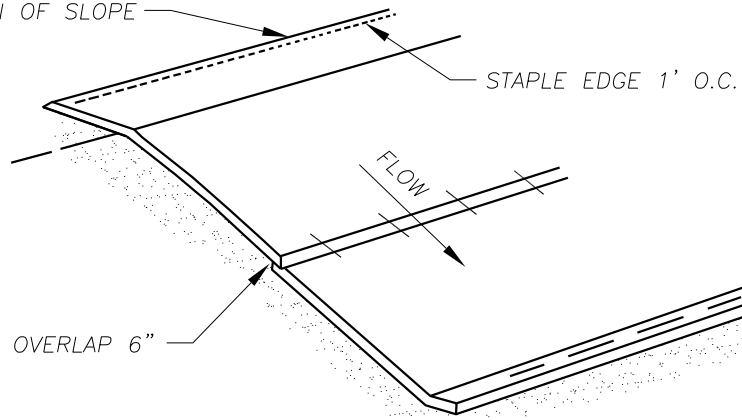
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E17

DETAIL

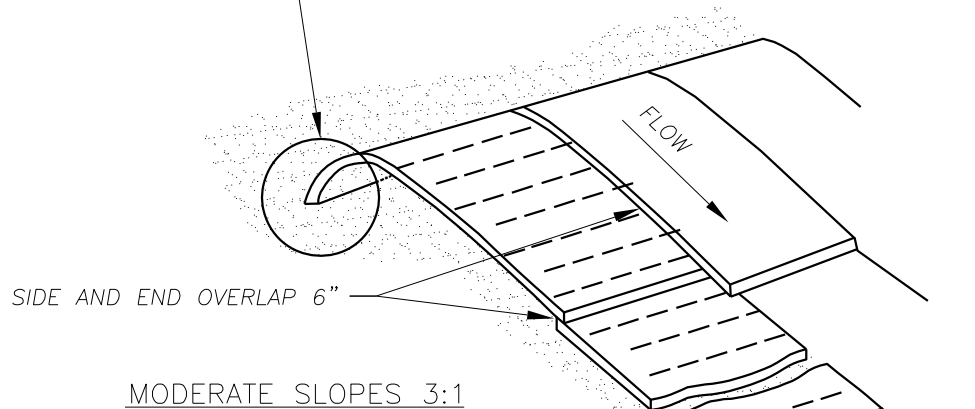
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EXTEND BLANKET A MINIMUM OF 3' ABOVE CROWN OF SLOPE



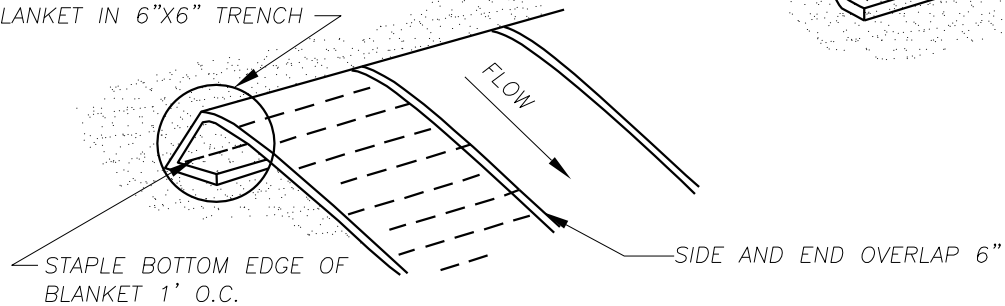
SHALLOW SLOPES 4:1 OR LESS

BURY TOP 4 INCHES OF BLANKET AND STAPLE EDGE 1' O.C.



MODERATE SLOPES 3:1

BURY TOP 12 INCHES OF BLANKET IN 6"X6" TRENCH



STEEP SLOPES 2:1 OR GREATER

NOTES:

1. ON 4:1 OR LESS SLOPES BLANKETS MAY BE APPLIED ACROSS THE SLOPE.
2. ALL BLANKET INSTALLED AND STAPLED PER MANUFACTURERS SPECIFICATIONS.
3. SEE MATTING NOTES STD. DETAIL E17.

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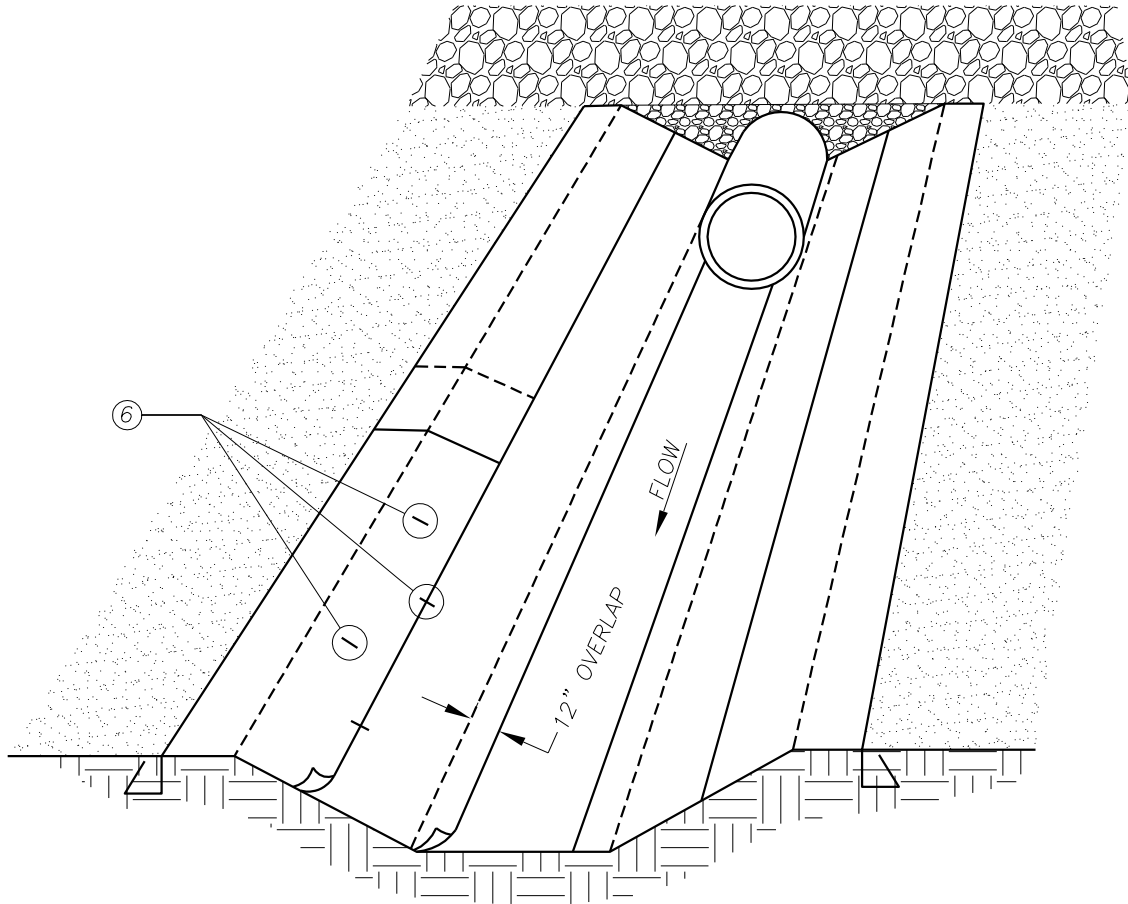
Peter Capen
COUNTY ENGINEER

MATTING
SLOPE INSTALLATION

APPROVED

5/23/08
DATE

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E17a
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DATE 05/23/08



CHANNEL INSTALLATION

NOTES:

1. INFORMATION PROVIDED IS MINIMUM REQUIREMENTS. MANUFACTURERS REQUIREMENTS WHICH ARE MORE STRINGENT SHALL BE USED.
2. INSTALL MAT PARALLEL IN CENTER OF CHANNEL IN THE DIRECTION OF FLOW. FOR CULVERT OUTFALLS, PLACE MAT UNDER CULVERT OR RIP RAP A MIN. OF 12".
3. IN CHANNEL BOTTOM, OVERLAP LENGTH ENDS A MINIMUM OF 12 INCHES.
4. REFER TO STD. DETAIL E-17 FOR MATTING NOTES.
5. STAPLE PER MANUFACTURERS SPECIFICATIONS.
6. LENGTH OF STAPLES SHALL BE DETERMINED BY SOIL TYPE- COHESIVE SOIL USE 6 INCH, NON-COHESIVE SOILS 8-12 INCH.

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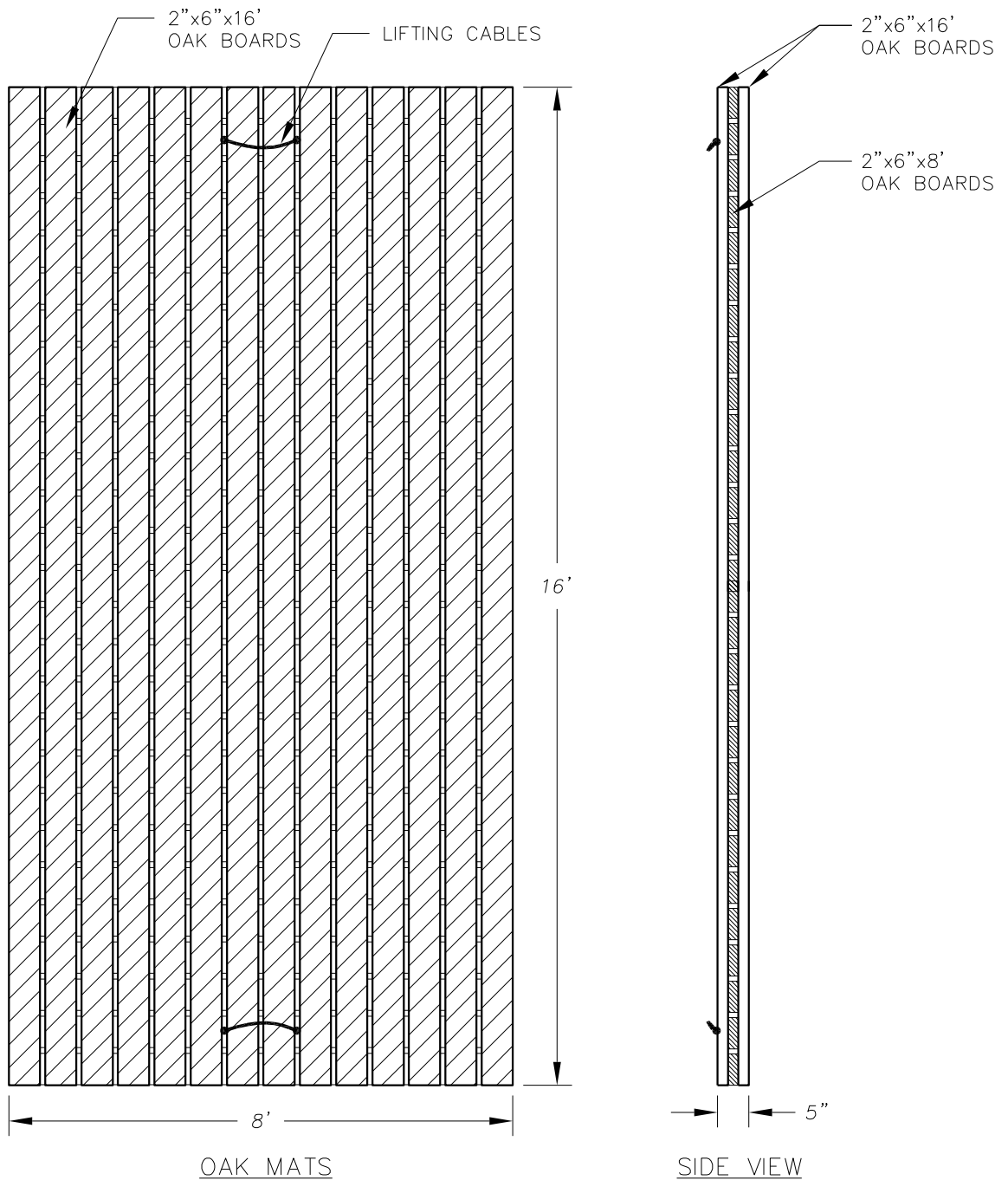
MATTING
CHANNEL INSTALLATION

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

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OAK MATS

SIDE VIEW

NOTES:

1. TO BE USED AS A STABILIZED PLATFORM LOCATED AT SPECIFIED POINTS OF CONSTRUCTION FOR THE PURPOSE OF TEMPORARY OR PERMANENT ACCESS. OAK MATS HAVE TWO BENEFITS: REDUCE OVERALL TRACKING FROM CONSTRUCTION SITES, AND CREATES A STABLE PAD FOR HEAVY EQUIPMENT, ESPECIALLY WHEN WORKING AROUND SENSITIVE AREAS SUCH AS WETLANDS AND STREAMS.
2. DIMENSIONS: 8'x16'x4-1/2" (3 PLY LAMINATED OAK).
3. BUILT TO WITHSTAND HEAVY EQUIPMENT SUCH AS CRANES, DUMP TRUCKS, AND BACK HOES.
4. ON LINEAR PROJECTS THAT PARALLEL STREAMS OR WETLANDS INSTALL AS A CONTINUOUS WORKING PAD TO REDUCE SOIL "PUMPING".
5. MINOR EXCAVATION OF SURFACE AREA MAY BE REQUIRED PRIOR TO INSTALLATION OF MATS.

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OAK MATS

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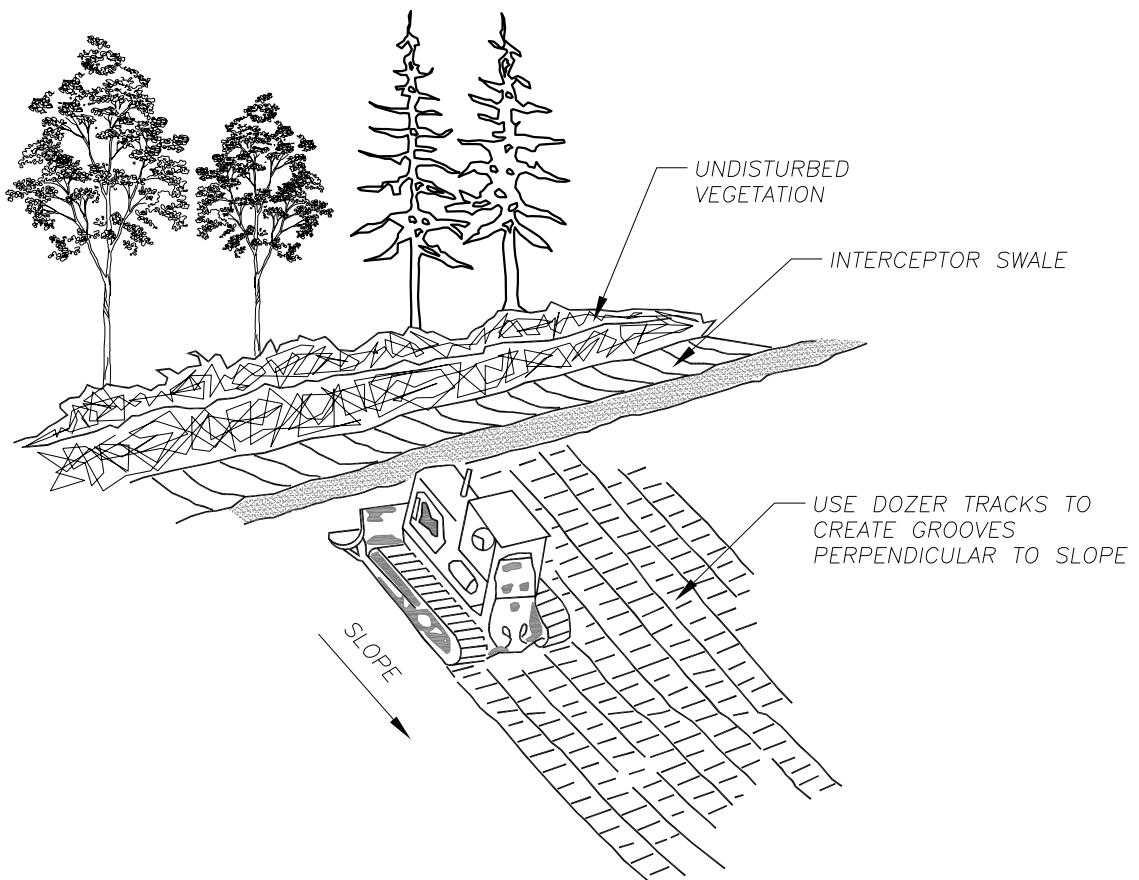
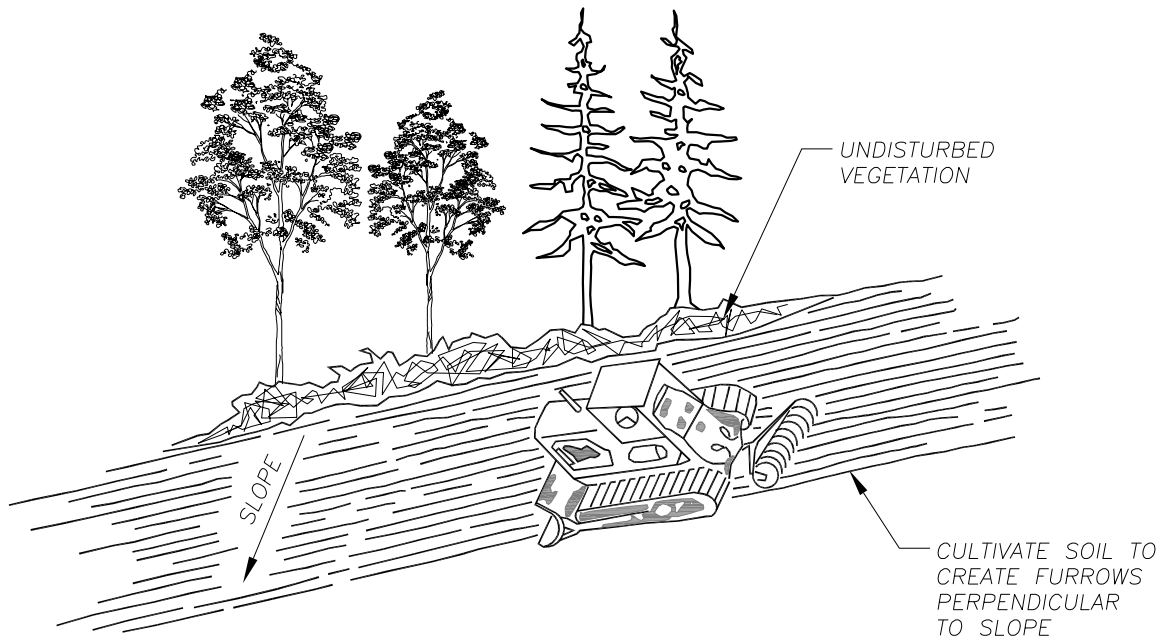
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*SURFACE ROUGHENING
CAT TRACKING*

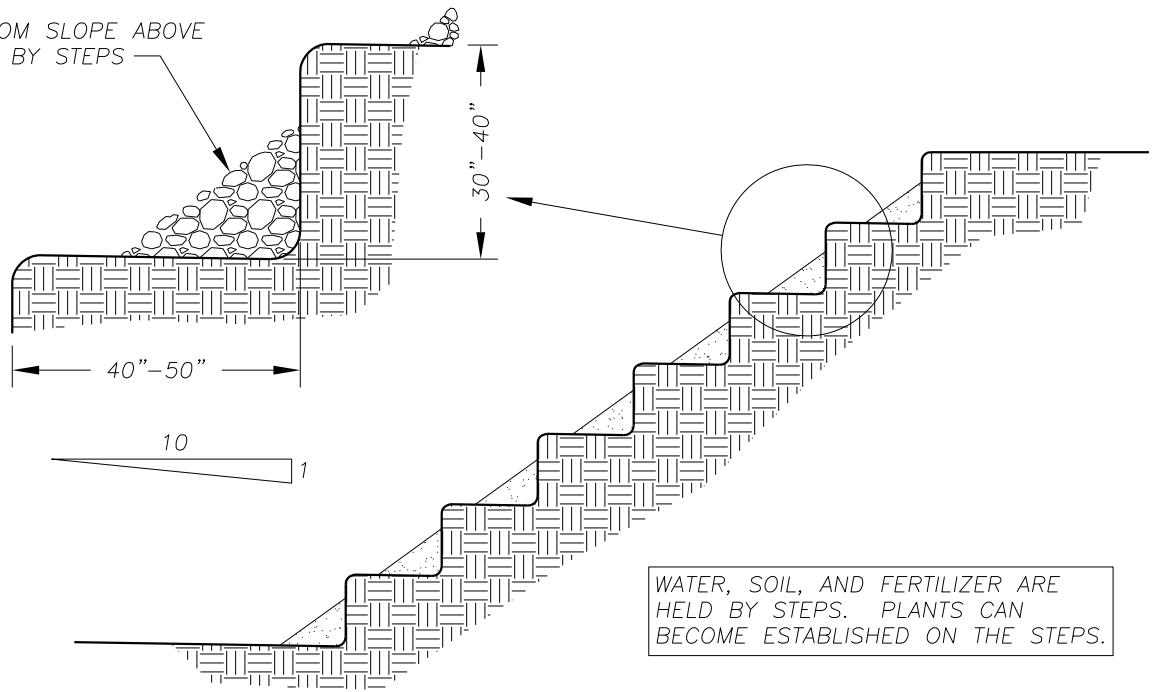
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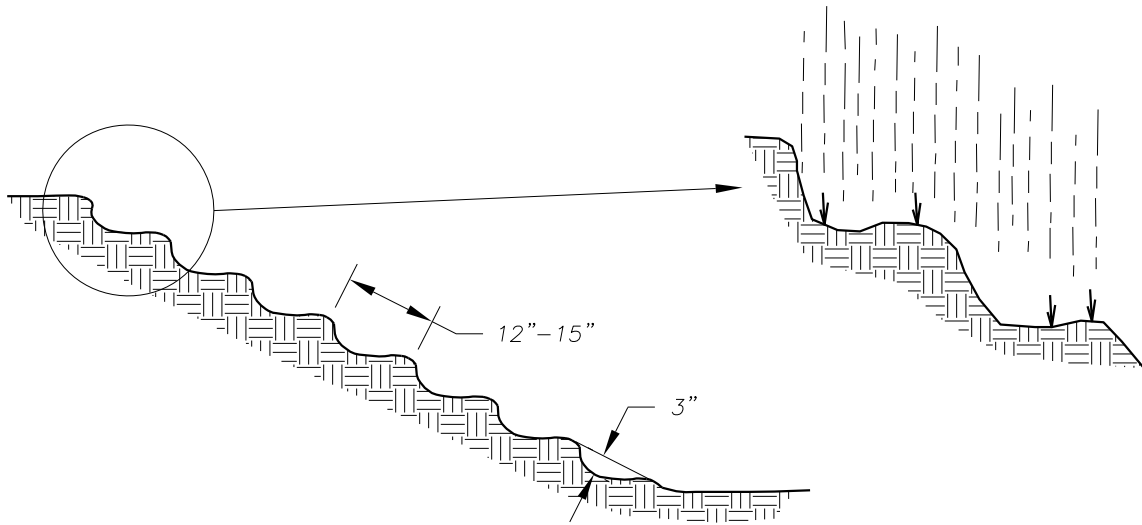
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DEBRIS FROM SLOPE ABOVE IS CAUGHT BY STEPS



WATER, SOIL, AND FERTILIZER ARE HELD BY STEPS. PLANTS CAN BECOME ESTABLISHED ON THE STEPS.

STAIR STEPPING CUT SLOPES



GROOVING IS CUTTING FURROWS ALONG THE CONTOUR OF A SLOPE. IRREGULARITIES IN THE SOIL SURFACE REDUCE RUNOFF VELOCITY, PROMOTE INFILTRATION, AND RETAIN LIME, FERTILIZER, AND SEED.

GROOVING SLOPES

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SURFACE ROUGHENING
STAIR STEPPING/GROOVING
APPROVED
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DATE 05/23/08

STORM DRAIN GENERAL NOTES:

1. MATERIALS AND WORKMANSHIP FOR STREET AND DRAINAGE WORK SHALL CONFORM TO THE 2008 EDITION OF THE WSDOT "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION" (CCC 40.385), AND STANDARD DETAIL SHEETS ATTACHED HEREWITH.
2. PROOF OF LIABILITY INSURANCE IN THE AMOUNT OF FIVE HUNDRED THOUSAND DOLLARS (\$500,000) SHALL BE SUBMITTED TO CLARK COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT, DIVISION OF ENGINEERING SERVICES PRIOR TO THE PRE-CONSTRUCTION MEETING (CCC 40.385).
3. PRECAST DRAINAGE STRUCTURES PREVIOUSLY APPROVED BY WASHINGTON DEPARTMENT OF TRANSPORTATION AND THE CLARK COUNTY PUBLIC WORKS DEPARTMENT MAY BE SUBSTITUTED FOR ANY NEW STANDARD CAST-IN-PLACE UNIT. HOWEVER, IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASSURE THAT THE PRECAST DRAINAGE STRUCTURES COMPLY WITH THE DESIGN INVERTS AND RIM ELEVATIONS.
4. THE CONTRACTOR IS TO VERIFY ALL INVERT AND TOP ELEVATIONS OF EXISTING STORM DRAINS, AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
5. CONTRACTOR TO VERIFY CENTERLINE AND TOP OF THE CURB ELEVATIONS PRIOR TO CONSTRUCTION TO ENSURE COMPLIANCE WITH THE CONSTRUCTION DRAWINGS AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO THE START OF CONSTRUCTION AND TO NOTIFY THE ENGINEER OF ANY POTENTIAL CONFLICTS. THE CONTRACTOR SHALL DIG TEST HOLES OVER ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE THEIR EXACT LOCATION. CALL 1-800-553-4344 FOR UTILITIES LOCATE, A MINIMUM OF 48 HOURS PRIOR TO START OF CONSTRUCTION.
7. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER AND/OR CONTRACTOR TO PROCURE ALL APPLICABLE PERMITS, LICENSES AND CERTIFICATES RELATIVE TO THE TRADES TO COMPLETE THE PROJECT AND FOR THE USE OF SUCH WORK WHEN COMPLETED. COMPLIANCE SHALL BE AT ALL LEVELS: FEDERAL, STATE AND COUNTY RELATING TO THE PERFORMANCE OF THIS WORK.
8. ALL EROSION CONTROL DEVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN AND EROSION CONTROL DETAILS, PRIOR TO START OF CONSTRUCTION (CCC 40.385).
9. THE DEVELOPER SHALL OBTAIN ALL OFFSITE CONSTRUCTION EASEMENTS PRIOR TO THE START OF CONSTRUCTION. THE APPLICANT SHALL VERIFY THAT ALL OFFSITE UTILITIES EASEMENTS HAVE BEEN OBTAINED BY THE OWNER PRIOR TO PLAN APPROVAL FOR OFFSITE CONSTRUCTION.
10. ALL CATCH BASINS AND MANHOLES CAPABLE OF ACCEPTING STORMWATER SHALL BE STENCILED AS FOLLOW PER CCC 40.385.

INFILTRATION SYSTEMS – "PLEASE PROTECT – DRAINS TO DRINKING WATER"
 ALL OTHER SYSTEMS – "PLEASE PROTECT – DRAINS TO (STREAM, LAKE OR RIVER)"

11. PER CCC 40.385) SIGNS SHALL BE INSTALLED AS FOLLOWS:

ALONG WATER QUALITY BIOFILTRATION SYSTEMS TO READ "WATER QUALITY FILTER – PLEASE LEAVE VEGETATED"	STENCILING COLORS SHALL BE BLUE BACKGROUND W/ WHITE LETTERING CONTACT COUNTY INSPECTION AT 397-2375 EXT. 4995 FOR STENCILING STANDARDS
FENCED RETENTION AND DETENTION BASINS TO READ "[PUBLIC/PRIVATE] STORMWATER CONTROL FACILITY"	


PRIVATE SYSTEMS NOT MAINTAINED BY CLARK COUNTY SHALL INCLUDE ADDRESS AND CONTACT INFORMATION OF RESPONSIBLE PARTY.

12. VEGETATION IN BIOFILTRATION SYSTEMS SHALL BECOME FULLY ESTABLISHED PRIOR TO COMMENCING WITH INSTALLATION OF PAVEMENT FOR ALL AREAS DRAINING INTO THE WATER QUALITY SYSTEM. WATER QUALITY SWALES SHOULD BE GENERALLY VEGETATED WITH RECOMMENDED GRASSES IN THE SWALE BOTTOM; GRASSES, GROUND COVER, AND SHRUBS ON THE SIDE SLOPES; AND GROUND COVERS, SHRUBS, AND TREES ON THE ADJACENT DRY AREAS. PLANTING PLANS MUST BE INDIVIDUALLY TAILORED TO UNIQUE CONDITIONS AT EACH SITE.

DWG: D1.0.DWG

SHEET 1 OF 2

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/05/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC

 <p>Department of Public Works CLARK COUNTY WASHINGTON proud past, promising future</p>	<p>STORM DRAIN GENERAL NOTES</p> <p style="text-align: right;">APPROVED</p> <p style="text-align: center;"><i>Peter Capen</i> COUNTY ENGINEER</p>	<p>STANDARD D1.0 DETAIL</p>
	<p><u>5/23/08</u> DATE</p>	<p>DESIGNED DRAWN DATE 05/23/08</p>

STORM DRAIN GENERAL NOTES –CONTINUED–:

13. PER CCC 40.385, ALL LOTS WITHIN THE URBAN GROWTH AREA MUST BE DESIGNED TO PROVIDE POSITIVE DRAINAGE FROM BOTTOM OF FOOTINGS TO AN APPROVED STORMWATER SYSTEM. POSITIVE DRAINAGE MAY BE ACCOMPLISHED BY THE USE OF SWALES, DRYWELLS, FRENCH DRAINS, LATERAL TO THE STREET, LATERALS BEHIND THE CURB OR WITHIN A PUBLIC UTILITY EASEMENT, AN APPROVED BACKYARD OR SIDE YARD SYSTEM, OR SOME OTHER METHOD ACCEPTABLE TO THE BUILDING OFFICIAL AND/OR DIRECTOR. STUB-OUTS (LATERALS) SHALL CONFORM TO THE FOLLOWING:

- a) EACH OUTLET SHALL BE SUITABLY LOCATED AT THE LOWEST ELEVATION ON THE LOT, SO AS TO SERVICE ALL FUTURE ROOF DOWN SPOUTS AND FOOTING DRAINS, DRIVEWAYS, YARD DRAINS, AND ANY OTHER SUBSURFACE DRAINS NECESSARY TO RENDER THE LOTS SUITABLE FOR THEIR INTENDED USE. EACH OUTLET SHALL HAVE FREE-FLOWING, POSITIVE DRAINAGE TO AN APPROVED STORMWATER CONVEYANCE SYSTEM OR TO AN APPROVED OUTFALL LOCATION.
- b) THE STUB-OUT I.E. ON EACH LOT SHALL BE LOCATED WITH A FIVE-FOOT-HIGH, 2"x 4" STAKE MARKED "DRAIN", WITH PIPE AND STAKE ADEQUATELY WRAPPED WITH COPPER LOCATOR WIRE.
- c) STUB-OUT TO BE 6" MINIMUM DIAMETER, CORRUGATED POLYETHYLENE STORM SEWER PIPE (N-12), AT 2% MINIMUM SLOPE. PIPE SHALL CONTAIN WIRE OR OTHER ACCEPTABLE DETECTION.
- d) DRAINAGE EASEMENTS ARE REQUIRED FOR DRAINAGE SYSTEMS DESIGNED TO CONVEY FLOWS THROUGH INDIVIDUAL LOTS.
- e) THE APPLICANT/CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE PROPER LOCATION OF ALL STUB-OUT CONVEYANCE LINES WITH RESPECT TO UTILITIES (E.G., POWER, GAS, TELEPHONE, TELEVISION, ETC.), AND FOR AS-BUILT PLANS.
- f) ALL INDIVIDUAL STUB-OUTS SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE LOT OWNER, TO IT'S CONNECTION WITH THE MAIN.

14. PRIVATE SYSTEMS MUST MEET PLUMBING CODE, HAVE AN OPERATIONS AND MAINTENANCE MANUAL, MAINTENANCE COVENANT OVER THE REQUIRED EASEMENT, AND COVENANT TO CLARK COUNTY FOR INSPECTION AND REVIEW.

DWG: D1.0.DWG

SHEET 2 OF 2

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC



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STORM DRAIN GENERAL NOTES
(CONTINUED)

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
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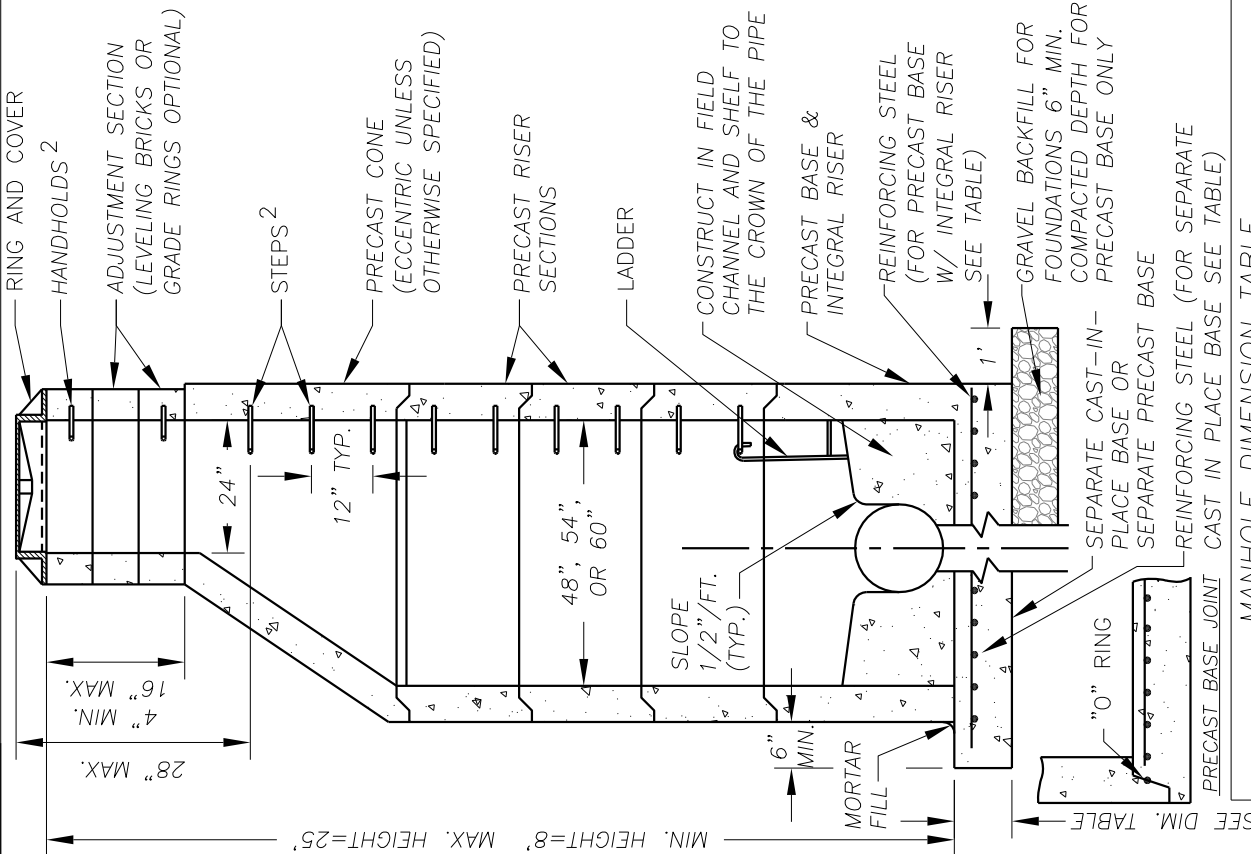
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DETAIL

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DRAWN
DATE 05/23/08

NOTES:

- MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT STANDARD SPECIFICATIONS.
- HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD. DETAIL D1.5, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HAND HOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. SEE MANHOLE DIMENSION TABLE BELOW.
- MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS SEC. 7-05 AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
- FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
- FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5, "MANHOLE DETAILS."
- INSIDE DROP MAXIMUM TO BE 4' VERTICAL DISTANCE I.E. TO I.E.
- KNOCKOUTS TO BE USED WHEN STUB OUT PIPE IS 3' OR LESS.
- MINIMUM 0.20' FALL BETWEEN INLET AND OUTLET, ANY REDUCTION IN THIS DESIGN REQUIREMENT MUST BE APPROVED BY REVIEWING AUTHORITY.
- SEE THE WSDOT STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.



MANHOLE DIMENSION TABLE					
DIA.	THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS	BASE REINFORCING STEEL SQ IN/FT EACH DIRECTION	
				INTEGRAL BASE	SEPARATE BASE
48"	4"	36"	8"	0.15	0.23
54"	4.5"	42"	8"	0.19	0.19
60"	5"	48"	8"	0.25	0.25

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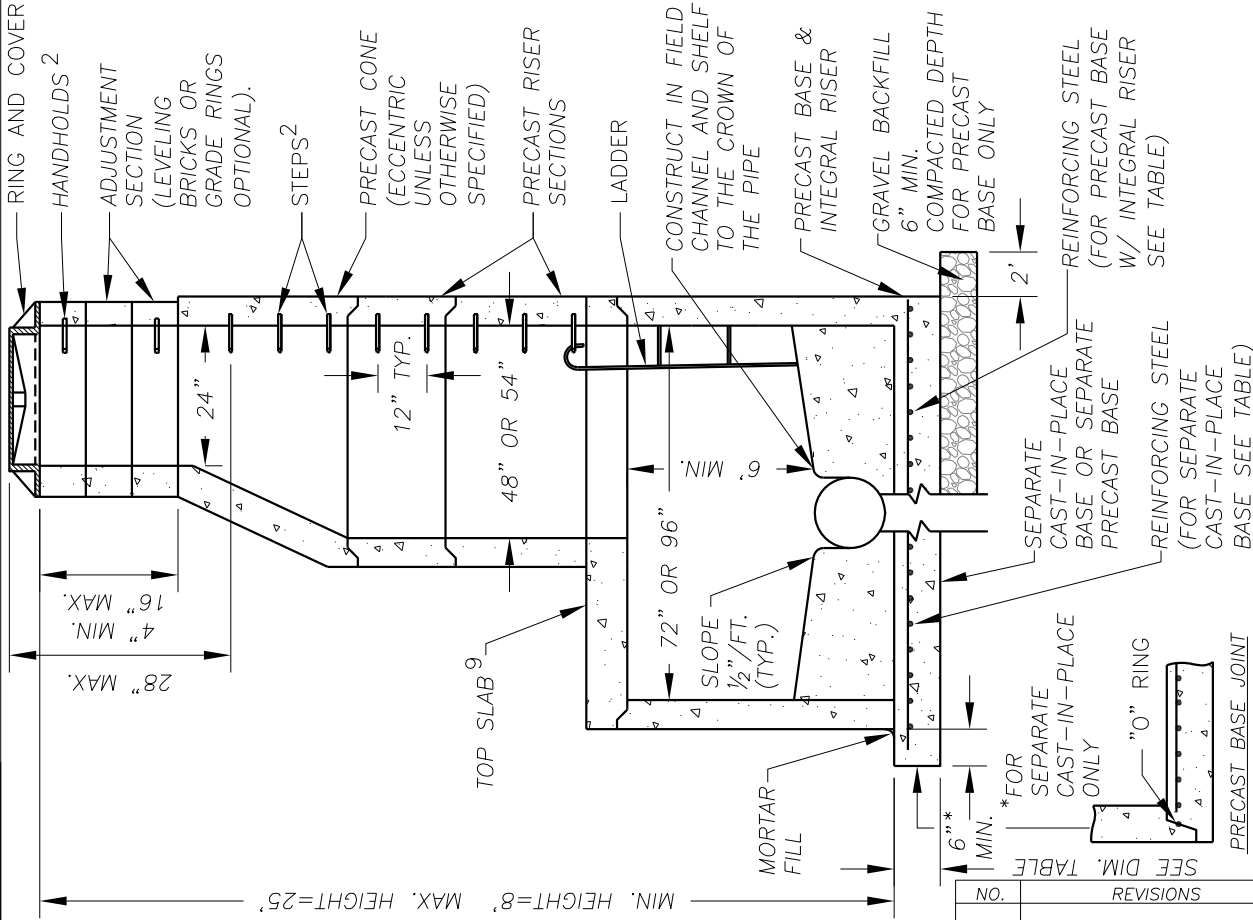
MANHOLE TYPE 1
48", 54", & 60"

Peter Capen
COUNTY ENGINEER

APPROVED

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MANHOLE TYPE 2
 72" & 96"
 APPROVED
Peter Capen
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 5/23/08
 DATE

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D1.2
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 DATE 05/23/08

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD. DETAIL D1.5, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HAND HOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. SEE MANHOLE DIMENSION TABLE BELOW.
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS SEC. 7-05 AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
7. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
8. FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5, "MANHOLE DETAILS."
10. INSIDE DROP MAXIMUM TO BE 4' VERTICAL DISTANCE I.E. TO I.E.
11. KNOCKOUTS TO BE USED WHEN STUB OUT PIPE IS 3' OR LESS.
12. MINIMUM 0.20' FALL BETWEEN INLET AND OUTLET, ANY REDUCTION IN THIS DESIGN REQUIREMENT MUST BE APPROVED BY REVIEWING AUTHORITY.
13. SEE THE WSDOT STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.

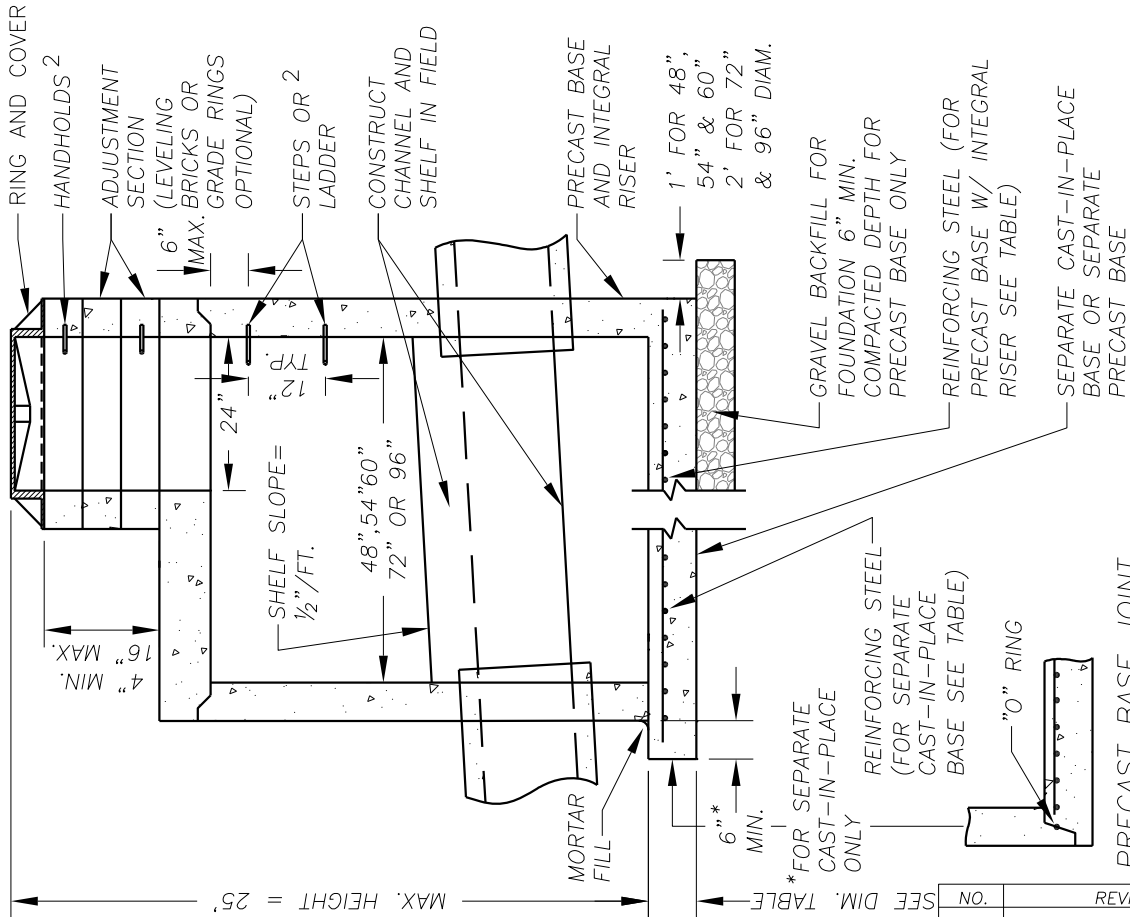
MANHOLE DIMENSION TABLE

DIA.	THICKNESS	MAXIMUM KNOCKOUT SIZE	BASE REINFORCING STEEL SQ IN/FT EACH DIRECTION	
			MINIMUM DISTANCE BETWEEN KNOCKOUTS	INTEGRAL BASE SEPARATE BASE
72"	6"	60"	0.24	0.35
96"	8"	84"	0.29	0.39

NO.	REVISIONS	DATE	BY

NOTES:

- MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT STANDARD SPECIFICATIONS.
- HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD. DETAIL D1.5, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. SEE MANHOLE DIMENSION TABLE BELOW.
- MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS SEC. 7-05 AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
- FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
- FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5, "MANHOLE DETAILS."
- INSIDE DROP MAXIMUM TO BE 4' VERTICAL DISTANCE I.E. TO I.E.
- KNOCKOUTS TO BE USED WHEN STUB OUT PIPE IS 3' OR LESS.
- MINIMUM 0.20' FALL BETWEEN INLET AND OUTLET, ANY REDUCTION IN THIS DESIGN REQUIREMENT MUST BE APPROVED BY REVIEWING AUTHORITY.
- SEE THE WSDOT STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.



MANHOLE DIMENSION TABLE					
DIA.	THICKNESS WALL BASE	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS	BASE REINFORCING STEEL SQ IN/FT EACH DIRECTION	
				INTEGRAL BASE	SEPARATE BASE
48"	4"	36"	8"	0.15	0.23
54"	4.5"	42"	8"	0.19	0.19
60"	5"	48"	8"	0.25	0.25
72"	6"	60"	12"	0.24	0.35
96"	8"	84"	12"	0.29	0.39

NO.	REVISIONS	DATE	BY

DWG: D1.3.DWG



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CLARK COUNTY
 WASHINGTON
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MANHOLE TYPE 3
 48", 54", 60", 72", & 96"
 APPROVED
Peter Capen
 COUNTY ENGINEER
 5/23/08
 DATE

STANDARD
D1.3
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD. DETAIL D1.5, "MANHOLE DETAILS."
3. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS SEC. 7-05 AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
4. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
5. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5, "MANHOLE DETAILS".
6. NOT FOR USE IN TRAFFIC BEARING AREAS.

DWG: D1.4.DWG



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MANHOLE TYPE 4

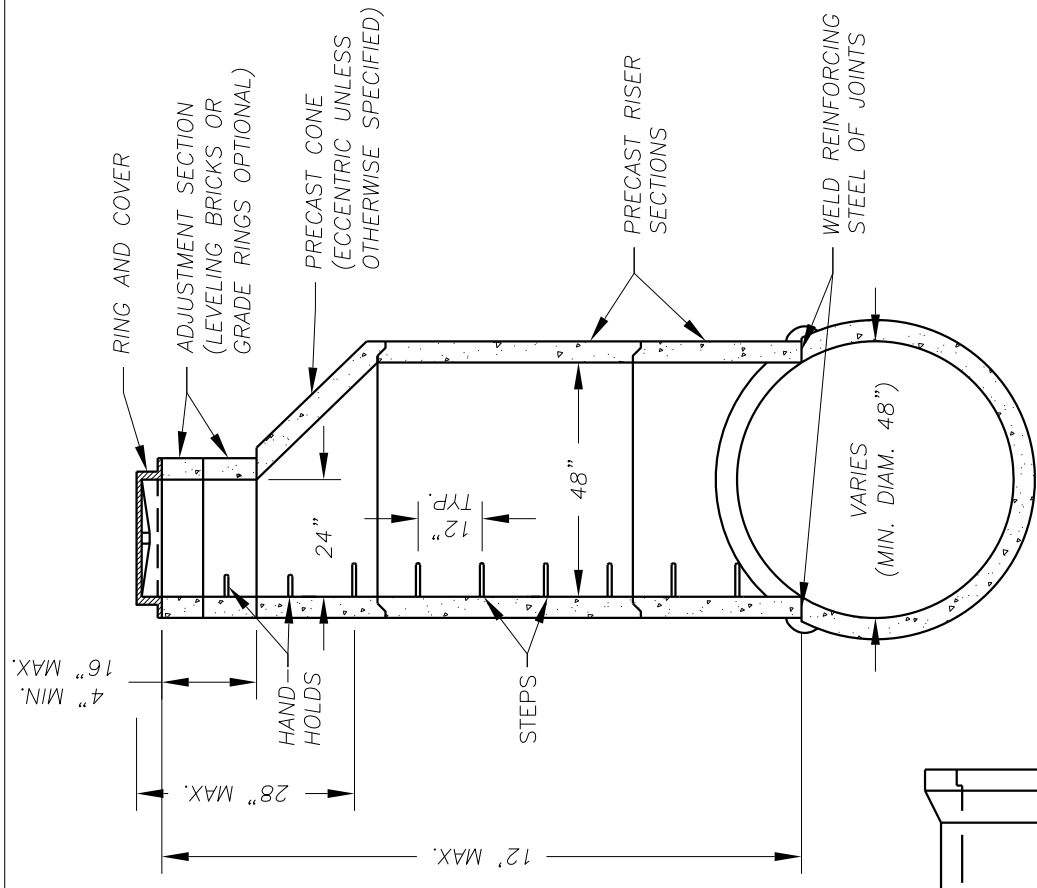
Peter Capen
 COUNTY ENGINEER

APPROVED

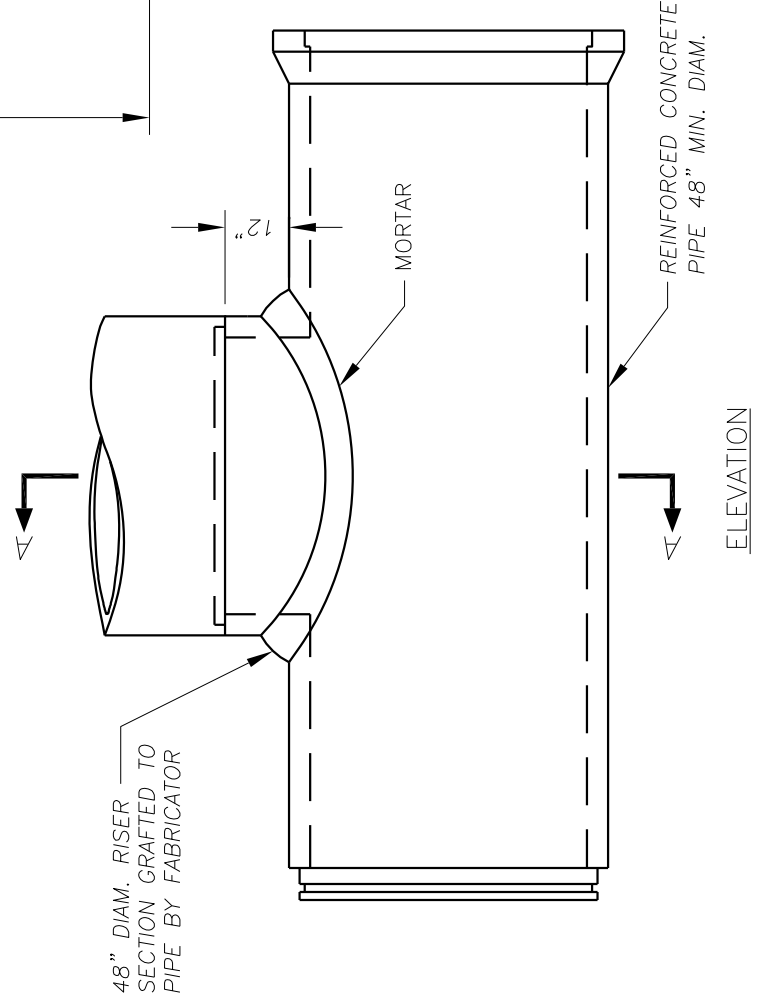
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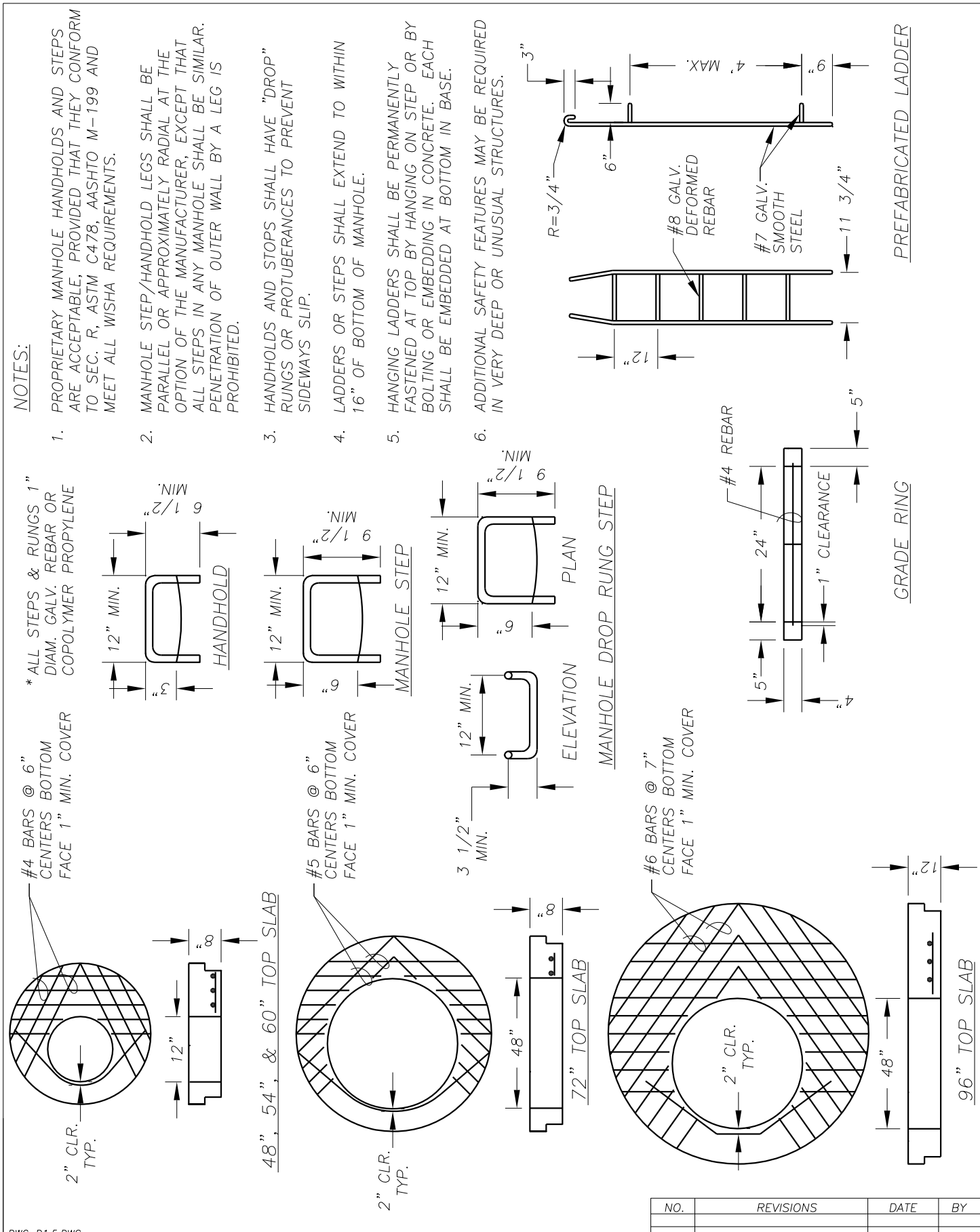
STANDARD
D1.4
 DETAIL
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 DRAWN
 DATE 05/23/08



SECTION A-A



ELEVATION



NOTES:

1. PROPRIETARY MANHOLE HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R, ASTM C478, AASHTO M-199 AND MEET ALL WISHA REQUIREMENTS.
2. MANHOLE STEP/HANDHOLD LEGS SHALL BE PARALLEL OR APPROXIMATELY RADIAL AT THE OPTION OF THE MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY MANHOLE SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. HANDHOLDS AND STEPS SHALL HAVE "DROP" RUNGS OR PROTUBERANCES TO PREVENT SIDEWAYS SLIP.
4. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16" OF BOTTOM OF MANHOLE.
5. HANGING LADDERS SHALL BE PERMANENTLY FASTENED AT TOP BY HANGING ON STEP OR BY BOLTING OR EMBEDDING IN CONCRETE. EACH SHALL BE EMBEDDED AT BOTTOM IN BASE.
6. ADDITIONAL SAFETY FEATURES MAY BE REQUIRED IN VERY DEEP OR UNUSUAL STRUCTURES.

* ALL STEPS & RUNGS 1" DIAM. GALV. REBAR OR COPOLYMER PROPYLENE

#4 BARS @ 6" CENTERS BOTTOM FACE 1" MIN. COVER

#5 BARS @ 6" CENTERS BOTTOM FACE 1" MIN. COVER

#6 BARS @ 7" CENTERS BOTTOM FACE 1" MIN. COVER

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 COUNTY ENGINEER

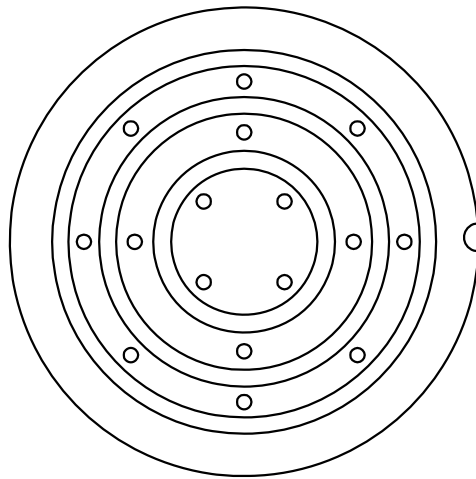
MANHOLE DETAILS

APPROVED

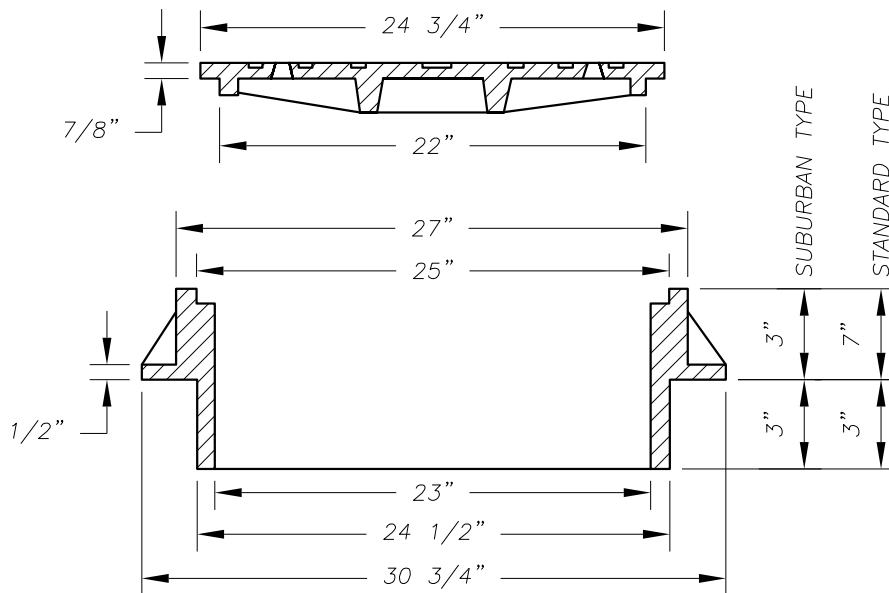
5/23/08
 DATE

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D1.5
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



COVER



NOTES:

1. USE SUBURBAN TYPE ONLY IN NON-TRAFFIC AREAS, AND ONLY WITH APPROVAL BY COUNTY.
2. COVER MATERIAL TO BE DUCTILE IRON ASTM A536 GRADE 80-55-06.
3. RING MATERIAL TO BE GRAY CAST IRON ASTM A-48 CLASS 30.
4. SEE WSDOT STANDARD SPECIFICATIONS SEC. 7-05.
5. RING AND COVER TO BE MACHINED TO A TRUE BEARING ALL AROUND.
6. NOTCH LID FOR LIFTING HOOK.

NO.	REVISIONS	DATE	BY

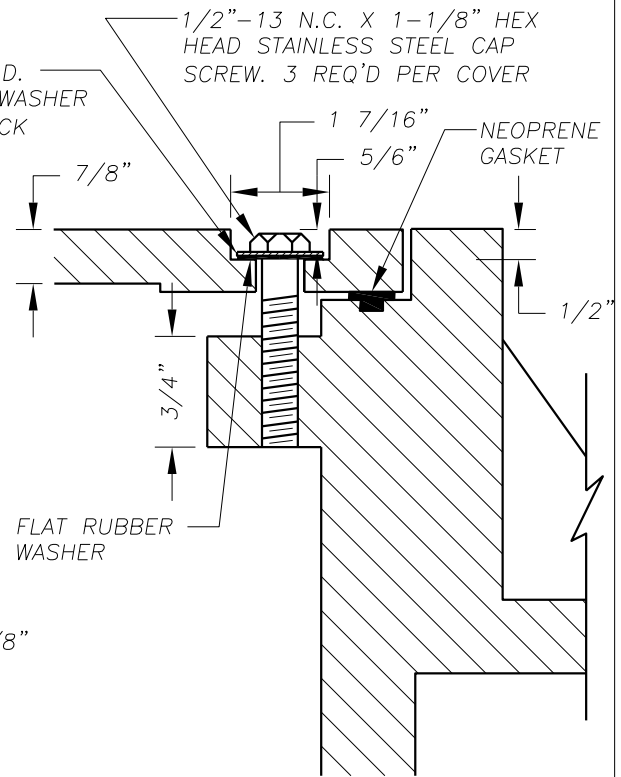
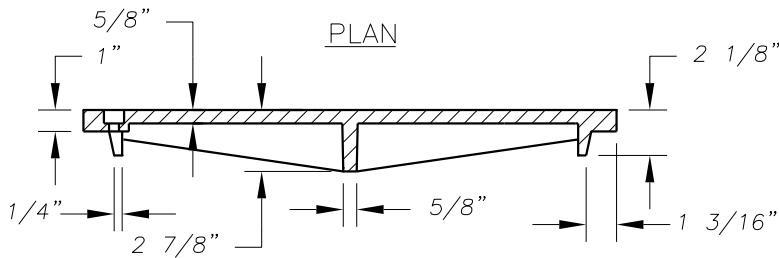
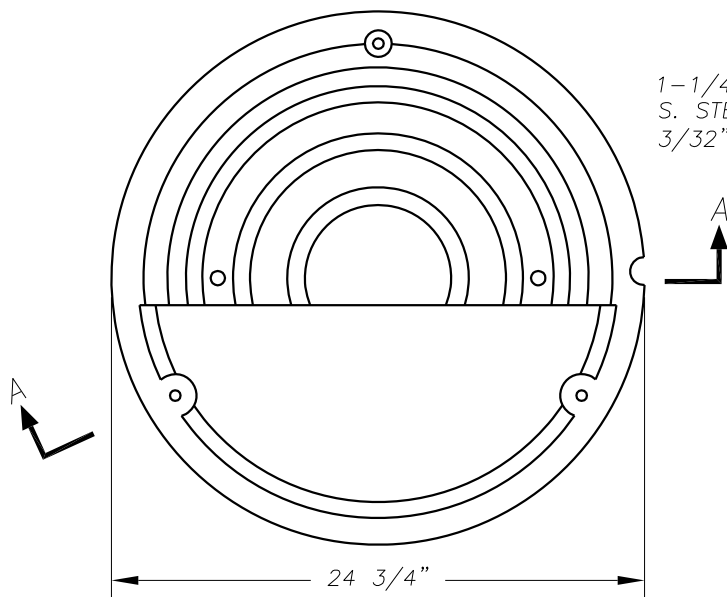
DWG: D1.6.DWG



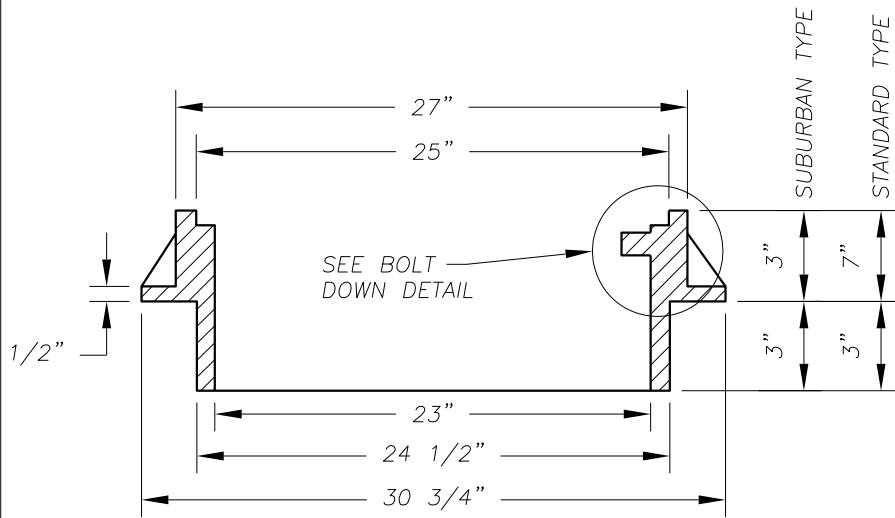
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<p>MANHOLE RING AND COVER</p> <p><i>Peter Capen</i> COUNTY ENGINEER</p>	<p>APPROVED</p> <p>5/23/08 DATE</p>	<p>STANDARD D1.6 DETAIL DESIGNED DRAWN DATE 05/23/08</p>
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BOLT DOWN COVER



BOLT DOWN DETAIL



SECTION A-A

NOTES:

1. USE SUBURBAN TYPE ONLY IN NON-TRAFFIC AREAS, AND ONLY WITH APPROVAL BY COUNTY.
2. COVER MATERIAL TO BE DUCTILE IRON ASTM A536 GRADE 80-55-06.
3. RING MATERIAL TO BE GRAY CAST IRON ASTM A-48 CLASS 30.
4. SEE WSDOT STANDARD SPECIFICATIONS SEC. 7-05.
5. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.
6. NOTCH LID FOR LIFTING HOOK.
7. FOR TAMPER PROOF COVER REMOVE GASKET.

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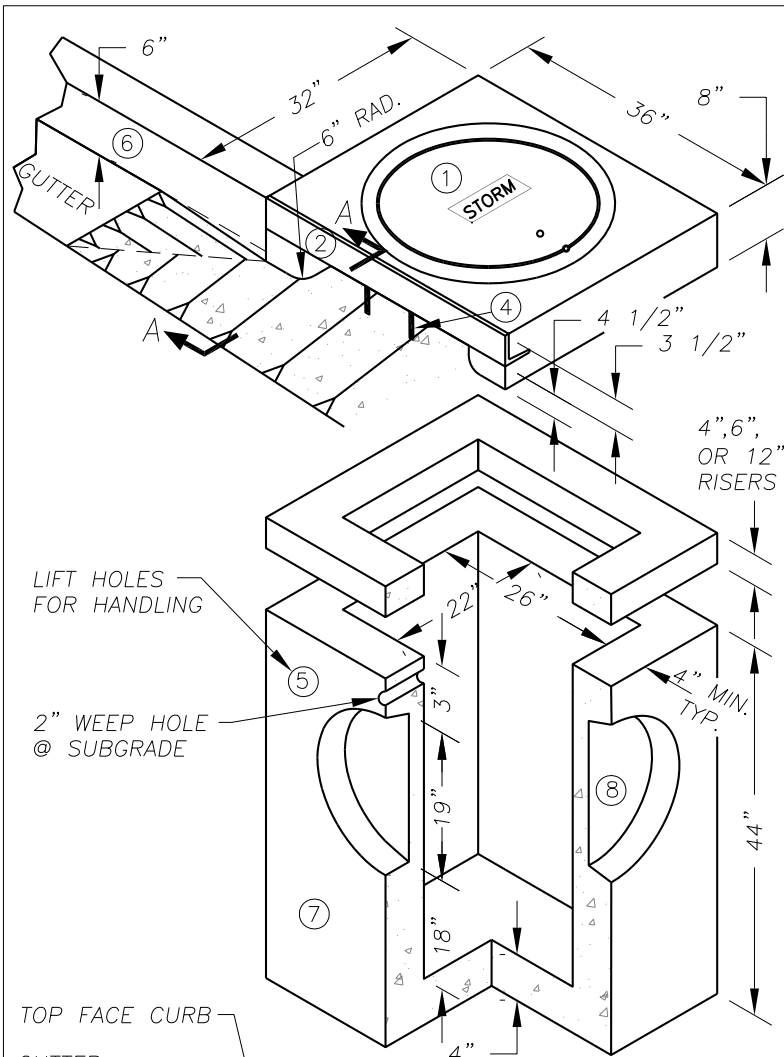
MANHOLE
 BOLT DOWN RING AND COVER

APPROVED

Peter Capen
 COUNTY ENGINEER

5/23/08
 DATE

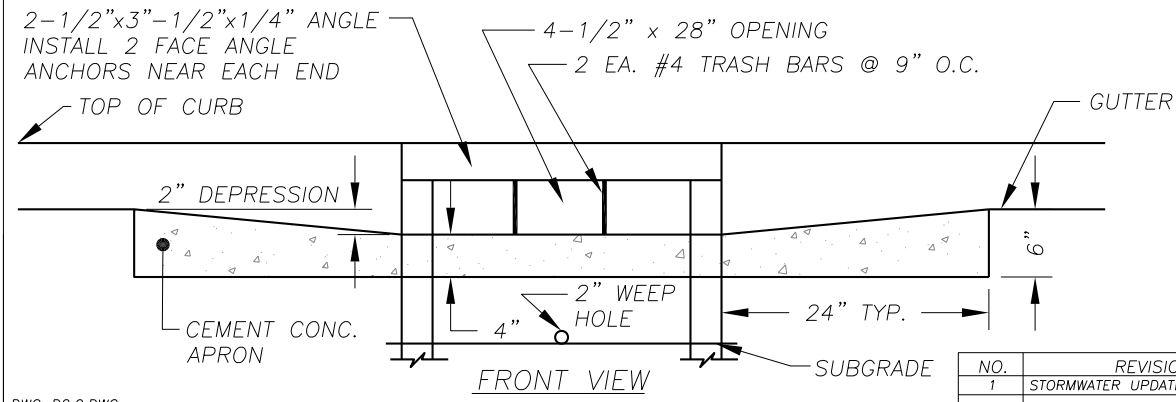
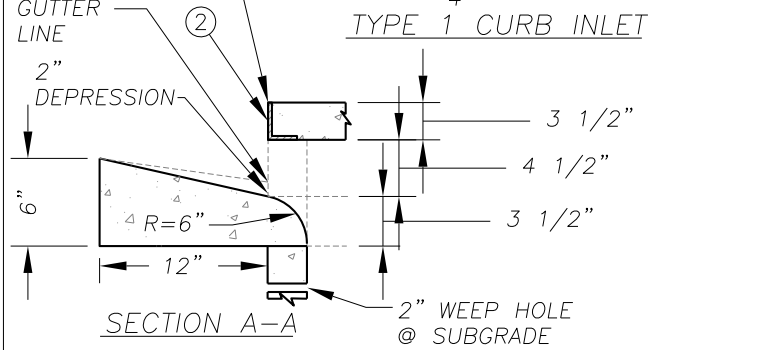
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D1.7
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 DESIGNED
 DRAWN
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- ① 24" CAST IRON LOCKING FRAME & COVER
- ② 2 1/2"x3 1/2"x1/4"x 35 7/8" GALVANIZED ANGLE IRON
- ③ NOT USED
- ④ 2 EA. #4 TRASH BARS @ 9" O.C.
- ⑤ 2 EA. BASE UNIT LIFT HOLES
- ⑥ 6" CURB AND 12" GUTTERS
- ⑦ STANDARD TYPE 1 BASE UNIT
- ⑧ PIPE KNOCKOUTS ALL FOUR SIDES.

NOTES:

1. CURB INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 & C890 UNLESS SHOWN ON PLANS OR NOTED IN WSDOT STANDARD SPECIFICATIONS.
2. REINFORCING FOR INLET UNIT, 3 EA. #4 HORIZONTAL BARS.
3. REINFORCING FOR TOP UNIT, 2 EA. #3 HORIZONTAL BARS.
4. ALL REBAR TO MEET ASTM A615 GRADE 60.
5. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497. WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
6. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.
7. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
8. KNOCKOUTS OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS INLET WALL THICKNESS.
9. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 17".
10. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
11. ANY PROTRUDING ENDS OF PIPES SHALL BE TRIMMED FLUSH WITH THE INSIDE WALLS AND GROUTED TO THE SATISFACTION OF ENGINEER.
12. GUTTER IS TAPERED DOWN TO INLET.
13. INSTALL REMOVABLE OUTLET PIPE TRAP OR EQUAL, SEE STD. DETAIL D2.1.
14. CONTRACTOR SHALL HAVE THE OPTION OF FURNISHING PRECAST OR CAST-IN-PLACE INLET STRUCTURES, UNLESS SPECIFIED.



DWG: D2.0.DWG

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

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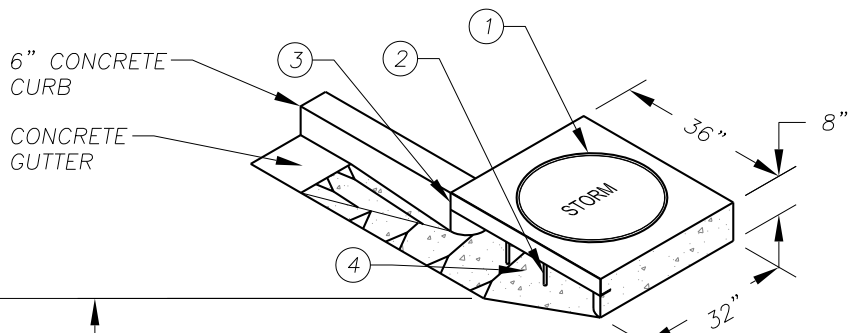
CONCRETE CURB INLET

APPROVED

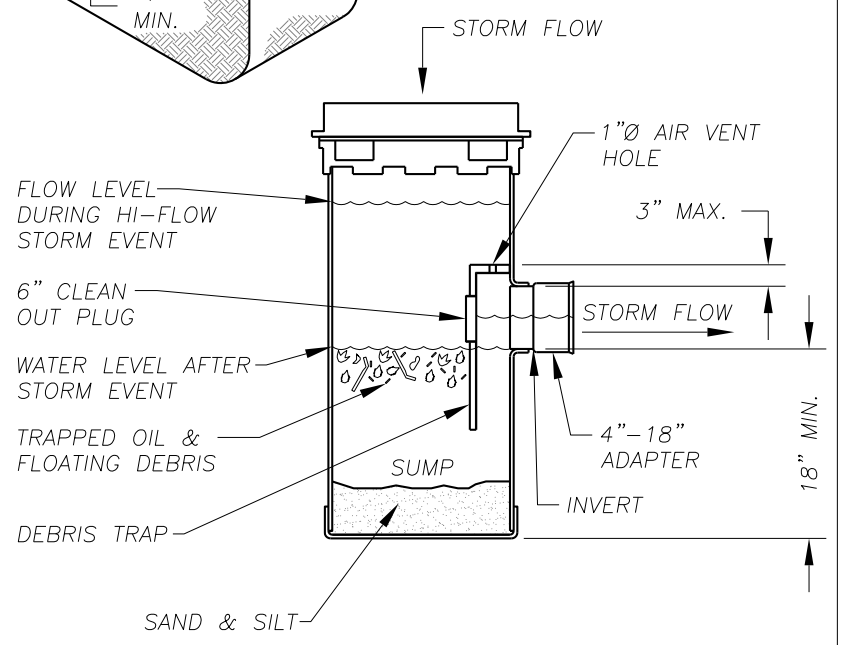
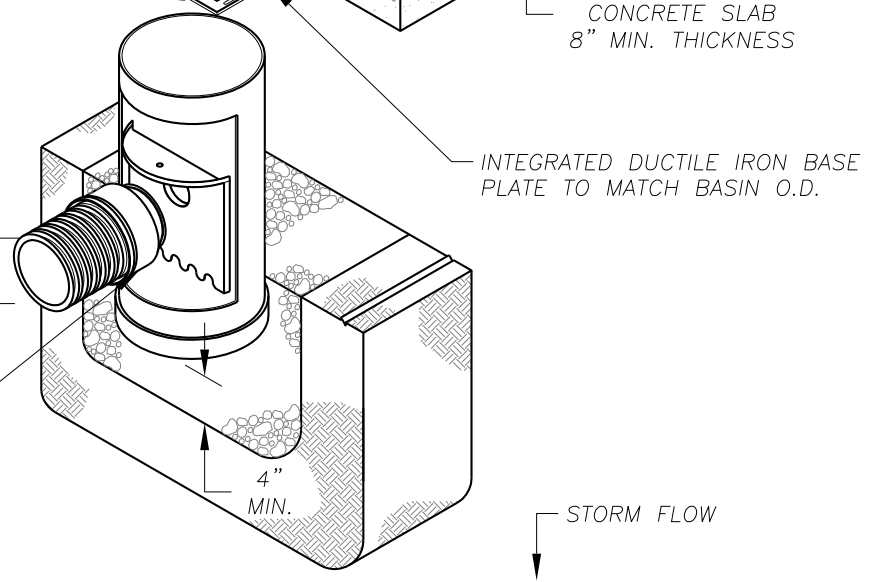
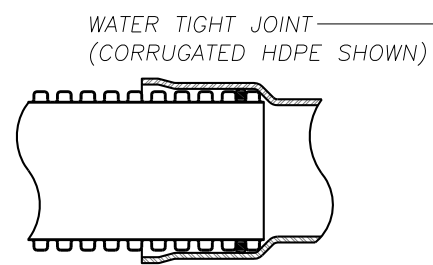
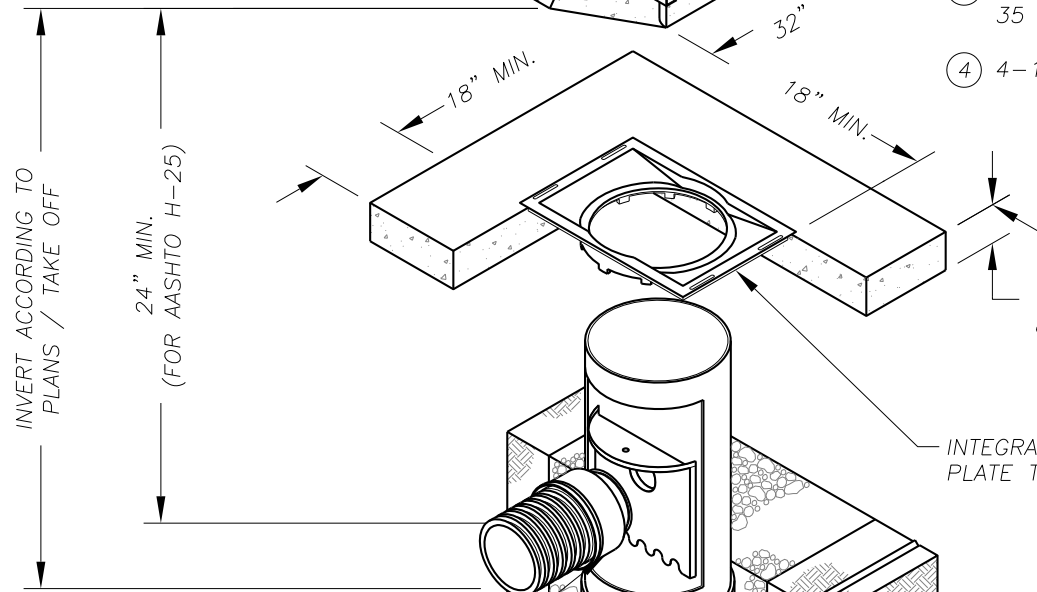
Peter Capen
 COUNTY ENGINEER

5/23/08
 DATE

STANDARD
D2.0
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



- ① 24" CAST IRON LOCKING FRAME & COVER
- ② 2 EA. #4 TRASH BARS @ 9" O.C.
- ③ 2 1/2" X 3 1/2" X 1/4" X 35 7/8" GALVANIZED ANGLE IRON
- ④ 4-1/2" X 28" OPENING



- NOTES:**
1. DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
 2. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
 3. VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 18" FOR CORRUGATED HDPE (ADS N-12, ADS SINGLE WALL, HANCOR DUAL WALL), SDR 35, SCH 40 DWV, CORRUGATED & RIBBED PVC.
 4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
 5. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
 6. BACKFILL MATERIAL BELOW & TO SIDE OF STRUCTURE SHALL BE ASTM D2321 CLASS I OR II CRUSHED STONE OR GRAVEL, PLACED UNIFORMLY. BACKFILL TO MEET WSDOT M41-10 & AASHTO T-99 95% COMPACTION.
 7. BASE PLATE SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
 8. GUTTER IS TAPERED DOWN TO INLET.
 9. ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: D2.0a.DWG



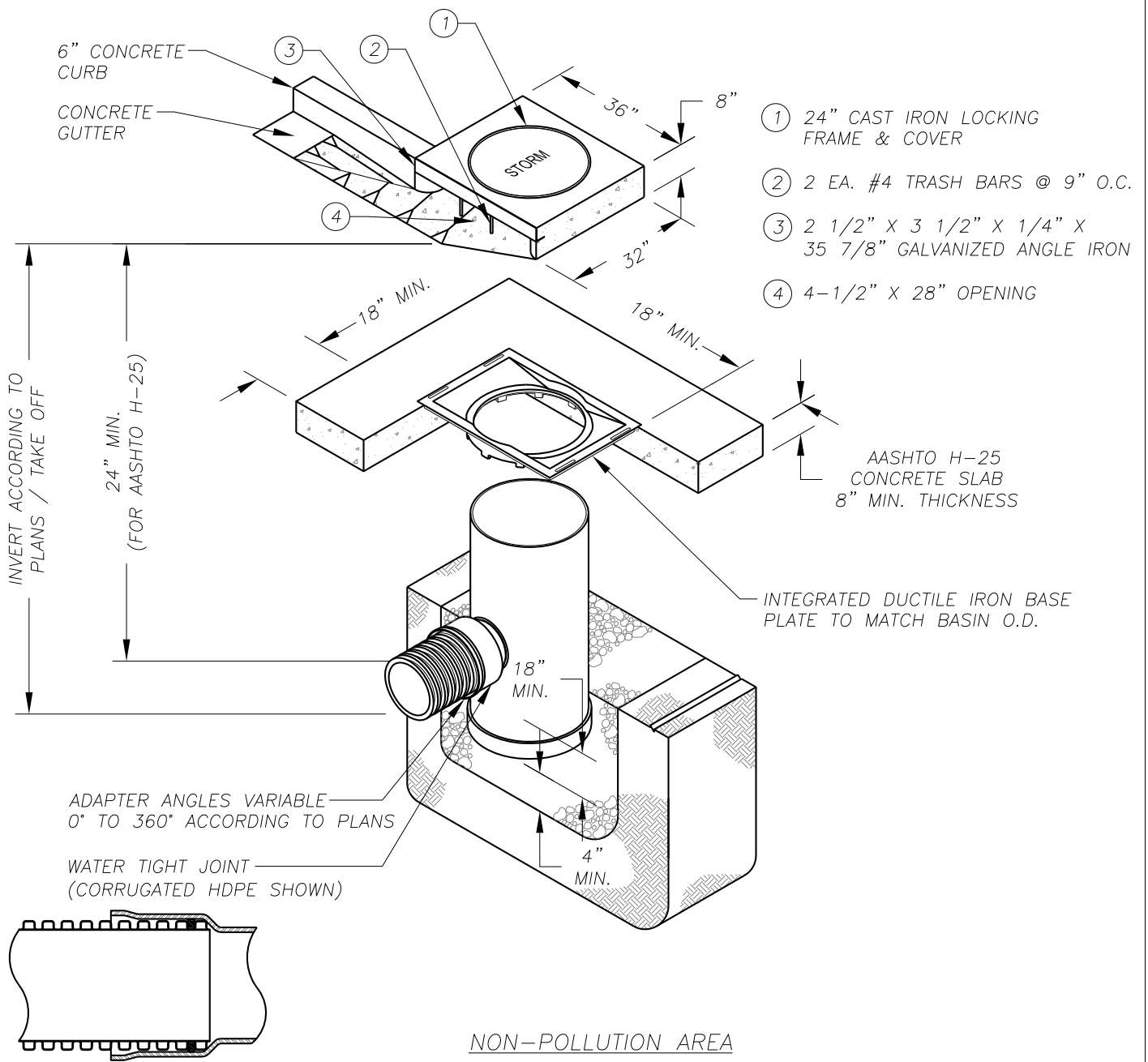
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DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL
WITH DEBRIS TRAP AND CURB INLET

APPROVED
Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
D2.0a
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTES:

1. DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
2. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
3. VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 24" FOR CORRUGATED HDPE (ADS N-12, ADS SINGLE WALL, HANCOR DUAL WALL), SDR 35, SCH 40 DWV, CORRUGATED & RIBBED PVC.
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
5. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
6. BACKFILL MATERIAL BELOW & TO SIDE OF STRUCTURE SHALL BE ASTM D2321 CLASS I OR II CRUSHED STONE OR GRAVEL, PLACED UNIFORMLY. BACKFILL TO MEET WSDOT M41-10 & AASHTO T-99 95% COMPACTION.
7. BASE PLATE SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
8. GUTTER IS TAPERED DOWN TO INLET.
9. ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

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DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL
WITH CURB INLET

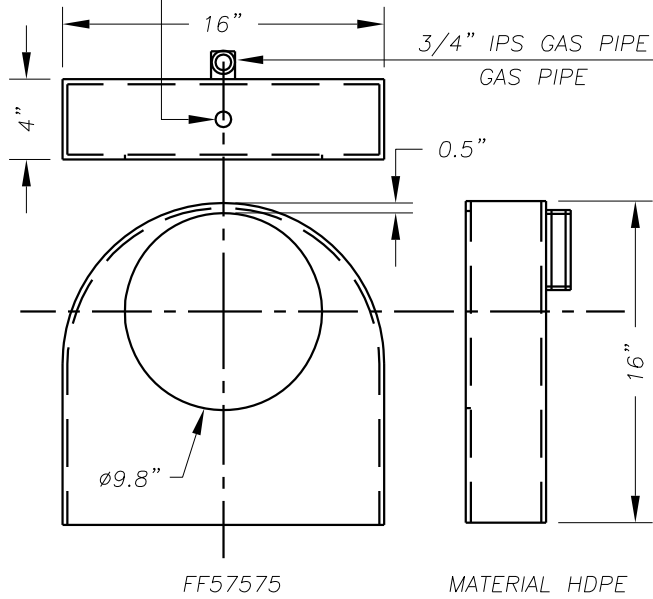
Peter Capen
COUNTY ENGINEER

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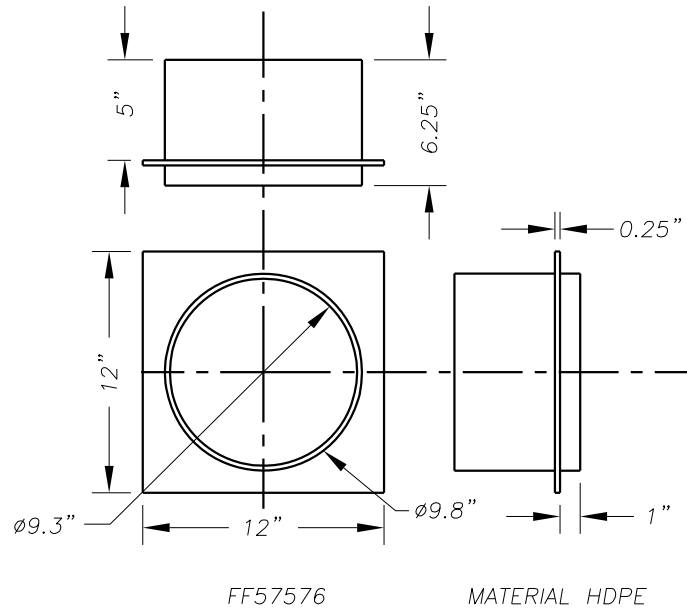
5/23/08
DATE

STANDARD
D2.0b
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

DRILL 3/4"
VENT HOLE AT
TOP OF TRAP

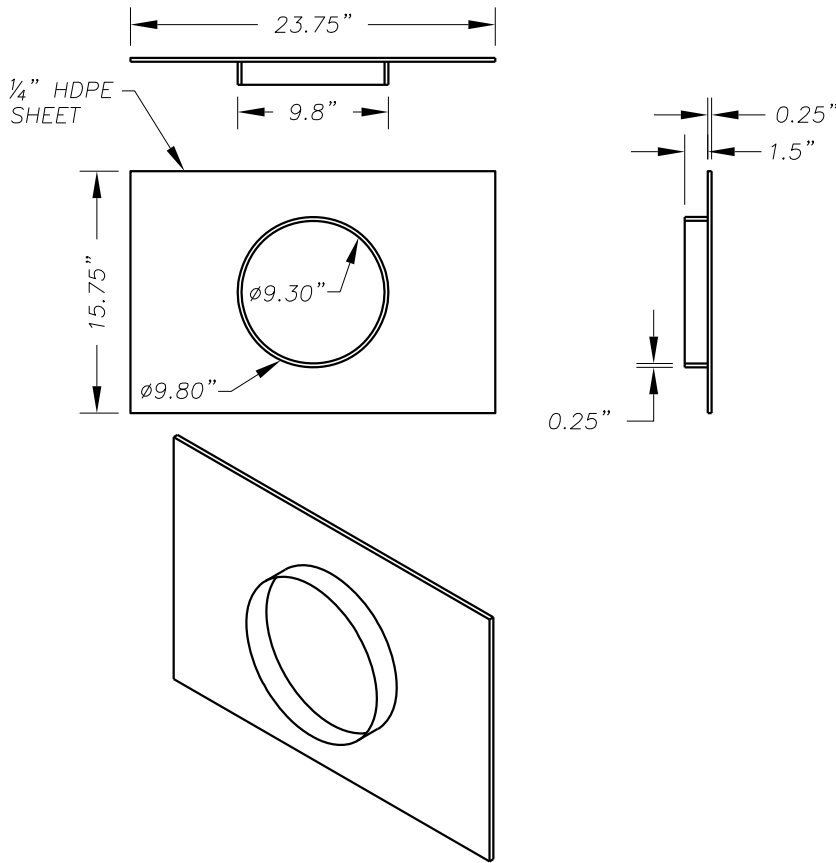


LOW PROFILE ELBOW

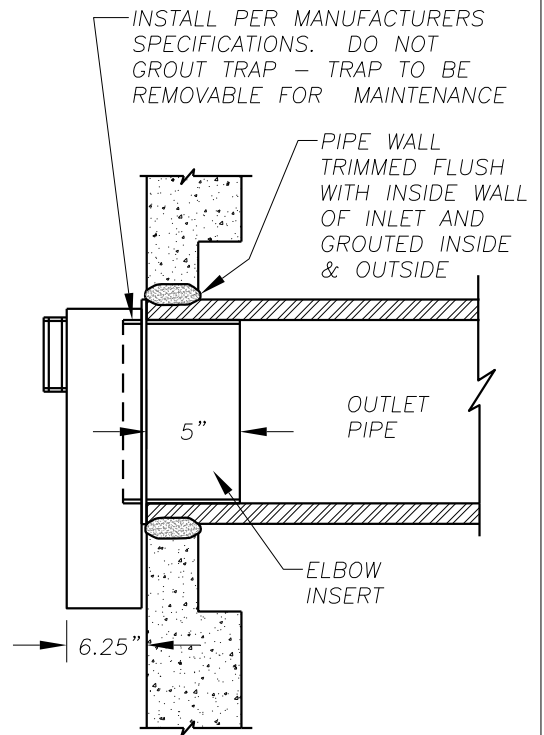


ELBOW INSERT

ZYMARK, ULTRATECH, BONAIR BRANDS OR EQUIVALENT



10" HDPE FLAT FACE ADAPTOR
FORD FABRICATIONS OR EQUIVALENT



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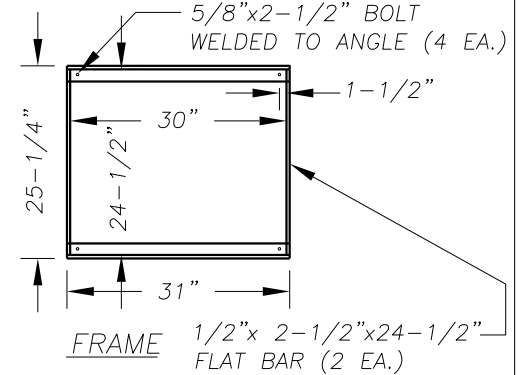
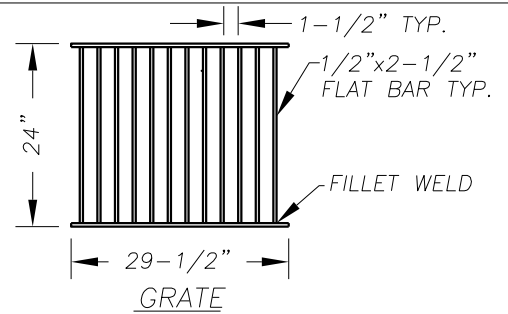
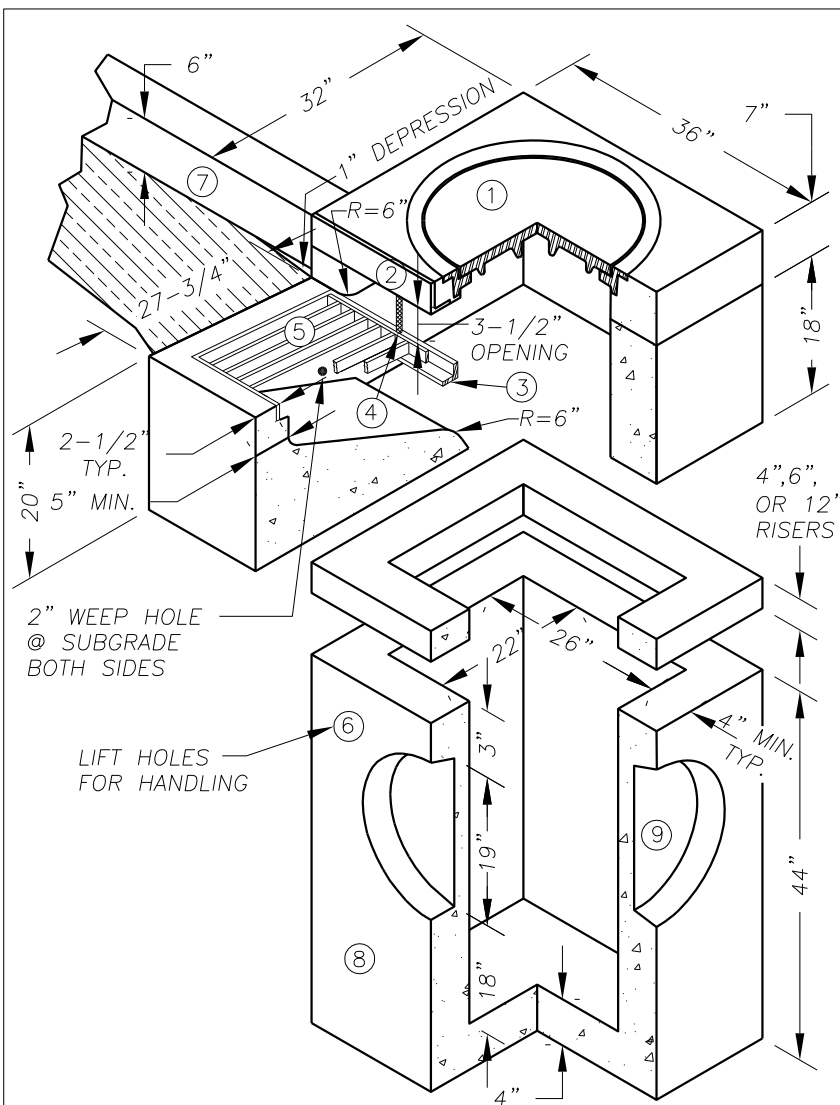
DEBRIS TRAP

APPROVED

Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
D2.1
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



- ① 24" x 3-1/2" CAST IRON LOCKING FRAME & COVER
- ② 2-1/2"x3-1/2"x1/4"x 35 7/8" GALVANIZED ANGLE IRON
- ③ 2-1/2"x2-1/2"x3/8" FRAME GALVANIZED ANGLE IRON
- ④ 2 EA. #4 TRASH BARS @ 8" O.C.
- ⑤ 1/2"x2-1/2" FLAT BAR GALVANIZED GRATE
- ⑥ 2 EA. BASE UNIT LIFT HOLES
- ⑦ 6" CURB AND 12" GUTTERS
- ⑧ STANDARD TYPE 1 BASE UNIT
- ⑨ PIPE KNOCKOUTS ALL FOUR SIDES

NOTES:

1. COMBINATION CURB INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 & C890 UNLESS SHOWN ON PLANS OR NOTED IN WSDOT STANDARD SPECIFICATIONS.
2. REINFORCING FOR INLET UNIT, 3 EA. #4 HORIZONTAL BARS; REINFORCING FOR TOP UNIT, 2 EA. #3 HORIZONTAL BARS; REINFORCING FOR INLET SLOPED BASE, 4x4 MESH.
3. ALL REBAR TO MEET ASTM A615 GRADE 60.
4. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497. WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
5. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.
6. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
7. KNOCKOUTS OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS INLET WALL THICKNESS.
8. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 20".
9. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
10. ANY PROTRUDING ENDS OF PIPES SHALL BE TRIMMED FLUSH WITH THE INSIDE WALLS AND GROUTED TO THE SATISFACTION OF ENGINEER.
11. GRATE TO HAVE 1" DEPRESSION AT GUTTER INLET WITH GUTTER TO BE TAPERED DOWN TO INLET.
12. INSTALL REMOVABLE OUTLET PIPE TRAP OR EQUAL, SEE STD. DETAIL D2.1.
13. CONTRACTOR SHALL HAVE THE OPTION OF FURNISHING PRECAST OR CAST-IN-PLACE INLET STRUCTURES, UNLESS SPECIFIED.
14. SEE STD. DETAIL 4.1 FOR BASIN GUTTER PAN DETAIL.

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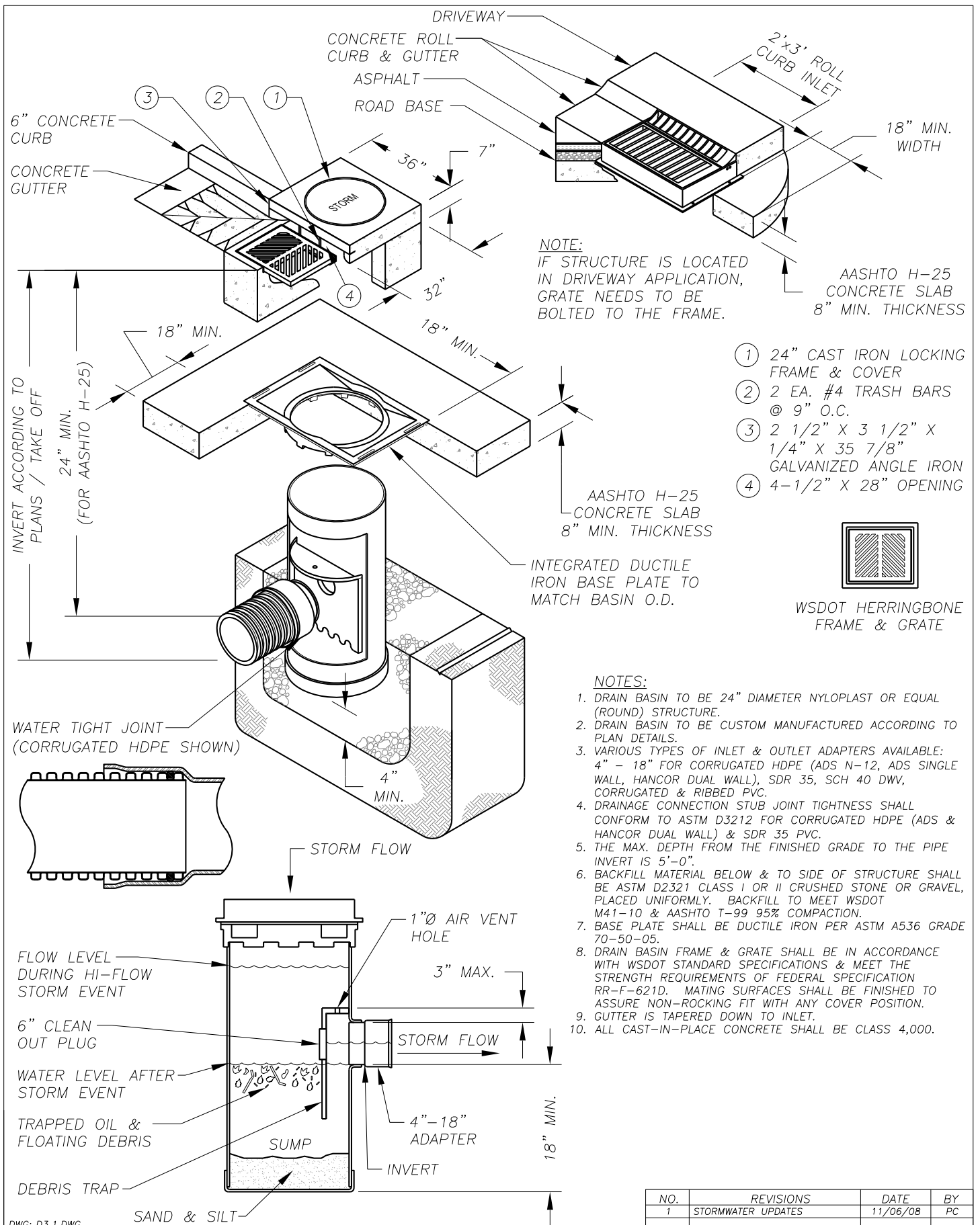
CONCRETE COMBINATION CURB INLET

Peter Capen
COUNTY ENGINEER

APPROVED

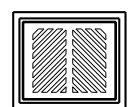
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NOTE:
IF STRUCTURE IS LOCATED IN DRIVEWAY APPLICATION, GRATE NEEDS TO BE BOLTED TO THE FRAME.

- ① 24" CAST IRON LOCKING FRAME & COVER
- ② 2 EA. #4 TRASH BARS @ 9" O.C.
- ③ 2 1/2" X 3 1/2" X 1/4" X 35 7/8" GALVANIZED ANGLE IRON
- ④ 4-1/2" X 28" OPENING



WSDOT HERRINGBONE FRAME & GRATE

- NOTES:**
- DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
 - VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 18" FOR CORRUGATED HDPE (ADS N-12, ADS SINGLE WALL, HANCOR DUAL WALL), SDR 35, SCH 40 DWV, CORRUGATED & RIBBED PVC.
 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
 - THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
 - BACKFILL MATERIAL BELOW & TO SIDE OF STRUCTURE SHALL BE ASTM D2321 CLASS I OR II CRUSHED STONE OR GRAVEL, PLACED UNIFORMLY. BACKFILL TO MEET WSDOT M41-10 & AASHTO T-99 95% COMPACTION.
 - BASE PLATE SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
 - DRAIN BASIN FRAME & GRATE SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS & MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
 - GUTTER IS TAPERED DOWN TO INLET.
 - ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

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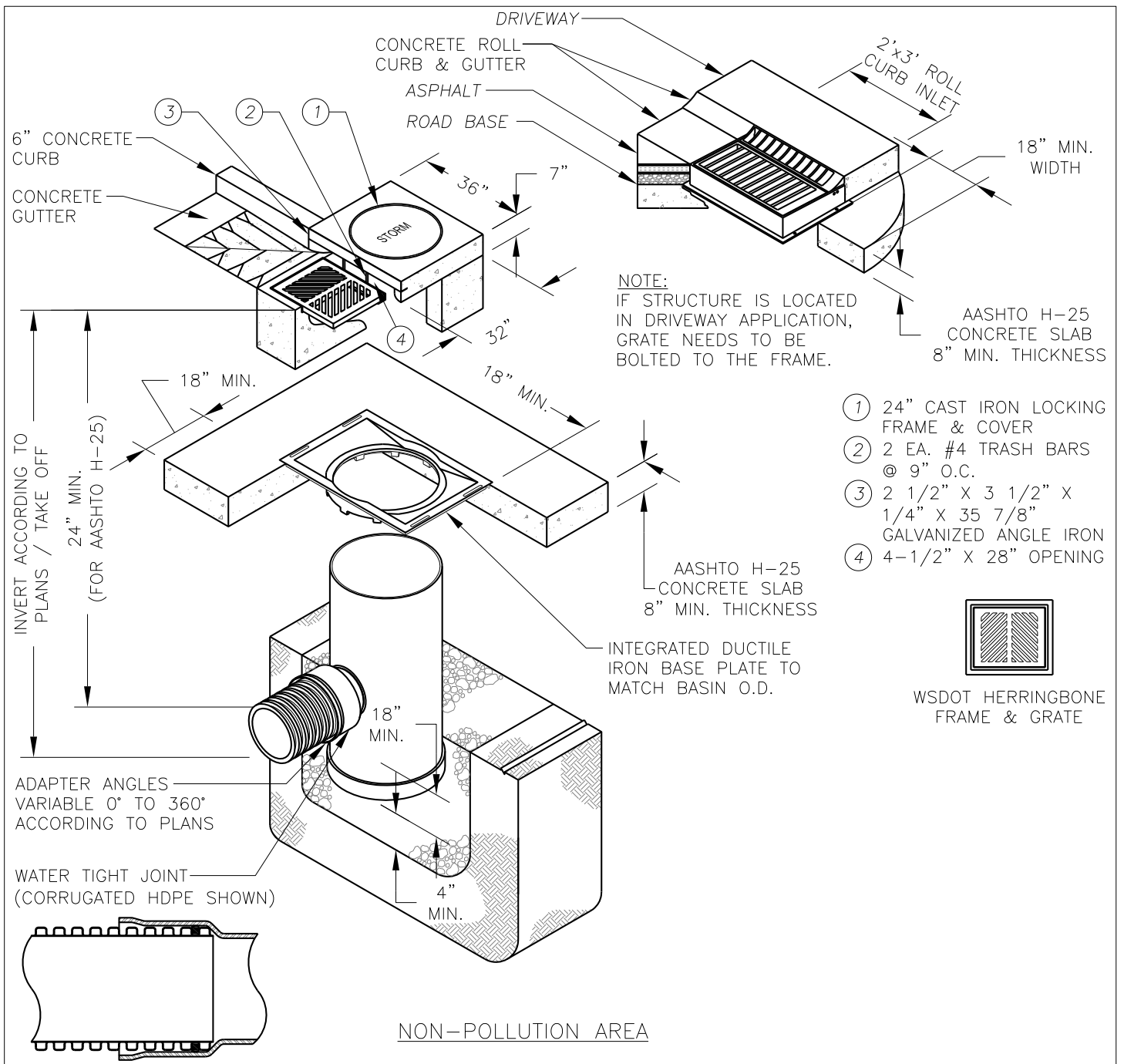
DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL WITH DEBRIS TRAP AND COMBINATION CURB INLET

APPROVED

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COUNTY ENGINEER

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NOTES:

1. DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
2. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
3. VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 24" FOR CORRUGATED HDPE (ADS N-12, ADS SINGLE WALL, HANCOR DUAL WALL), SDR 35, SCH 40 DW, CORRUGATED & RIBBED PVC.
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
5. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
6. BACKFILL MATERIAL BELOW & TO SIDE OF STRUCTURE SHALL BE ASTM D2321 CLASS I OR II CRUSHED STONE OR GRAVEL, PLACED UNIFORMLY. BACKFILL TO MEET WSDOT M41-10 & AASHTO T-99 95% COMPACTION.
7. BASE PLATE SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
8. DRAIN BASIN FRAME & GRATE SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS & MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
9. GUTTER IS TAPERED DOWN TO INLET.
10. ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.

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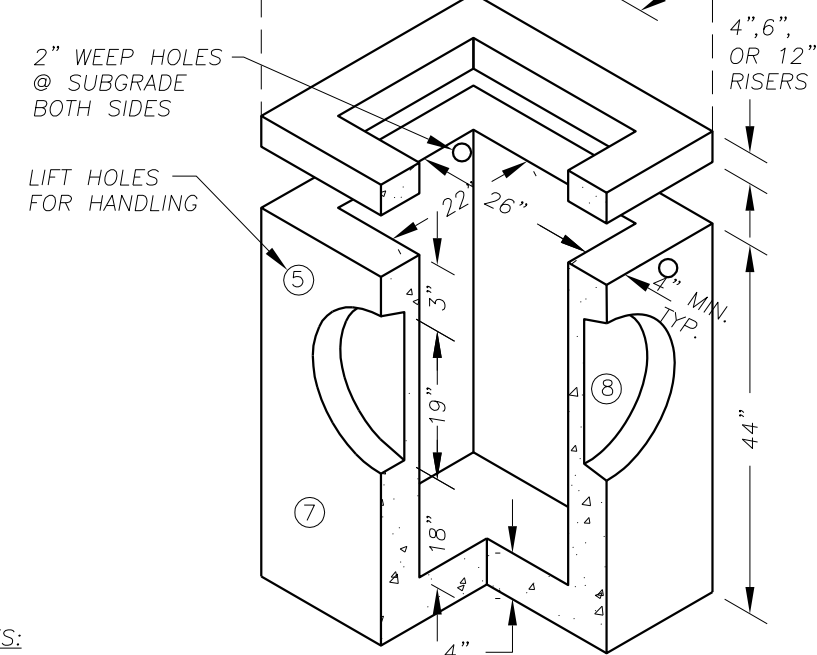
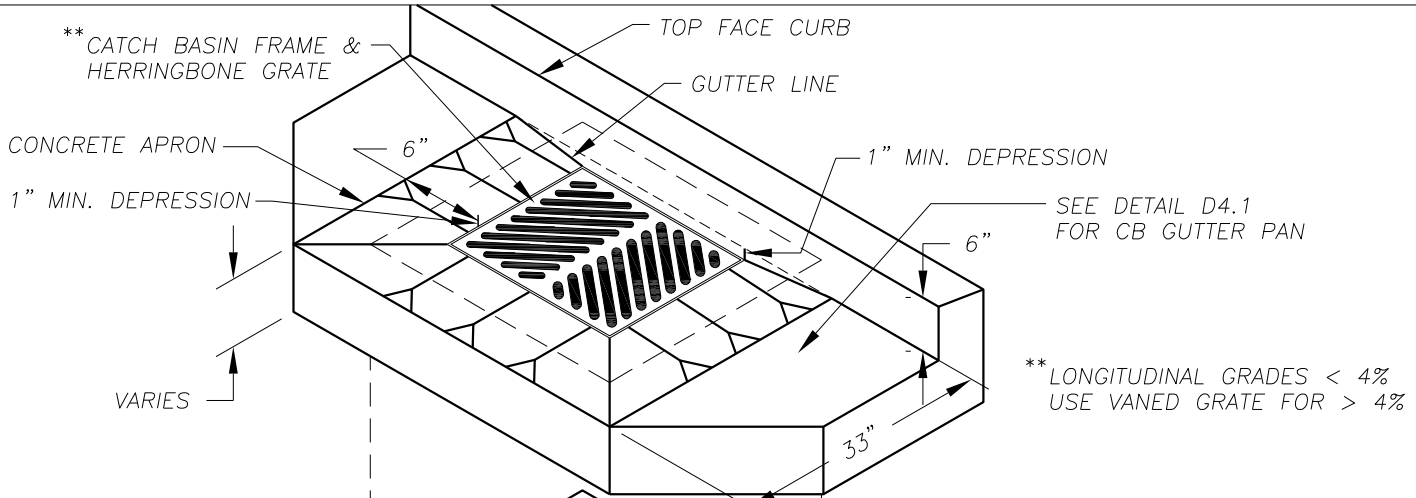
DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL WITH COMBINATION CURB INLET

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PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP* (STD. SPEC. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. 9-05.12(2))	15"

*CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES:

- CURB INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO) M 199 & C890 UNLESS SHOWN ON PLANS OR NOTED IN STANDARD SPECIFICATIONS.
- REINFORCING FOR INLET UNIT, 3 EA. #4 HORIZONTAL BARS.
- REINFORCING FOR TOP UNIT, 2 EA. #3 HORIZONTAL BARS.
- ALL REBAR TO MEET ASTM A615 GRADE 60.
- AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497. WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
- KNOCKOUTS OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS INLET WALL THICKNESS.
- ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 20".
- THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
- ANY PROTRUDING ENDS OF PIPES SHALL BE TRIMMED FLUSH WITH THE INSIDE WALLS AND GROUTED TO THE SATISFACTION OF ENGINEER.
- CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- FRAME MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
- INSTALL REMOVABLE OUTLET PIPE TRAP OR EQUAL, SEE STD. DETAIL D2.1.
- CONTRACTOR SHALL HAVE THE OPTION OF FURNISHING PRECAST OR CAST-IN-PLACE INLET STRUCTURES, UNLESS SPECIFIED.

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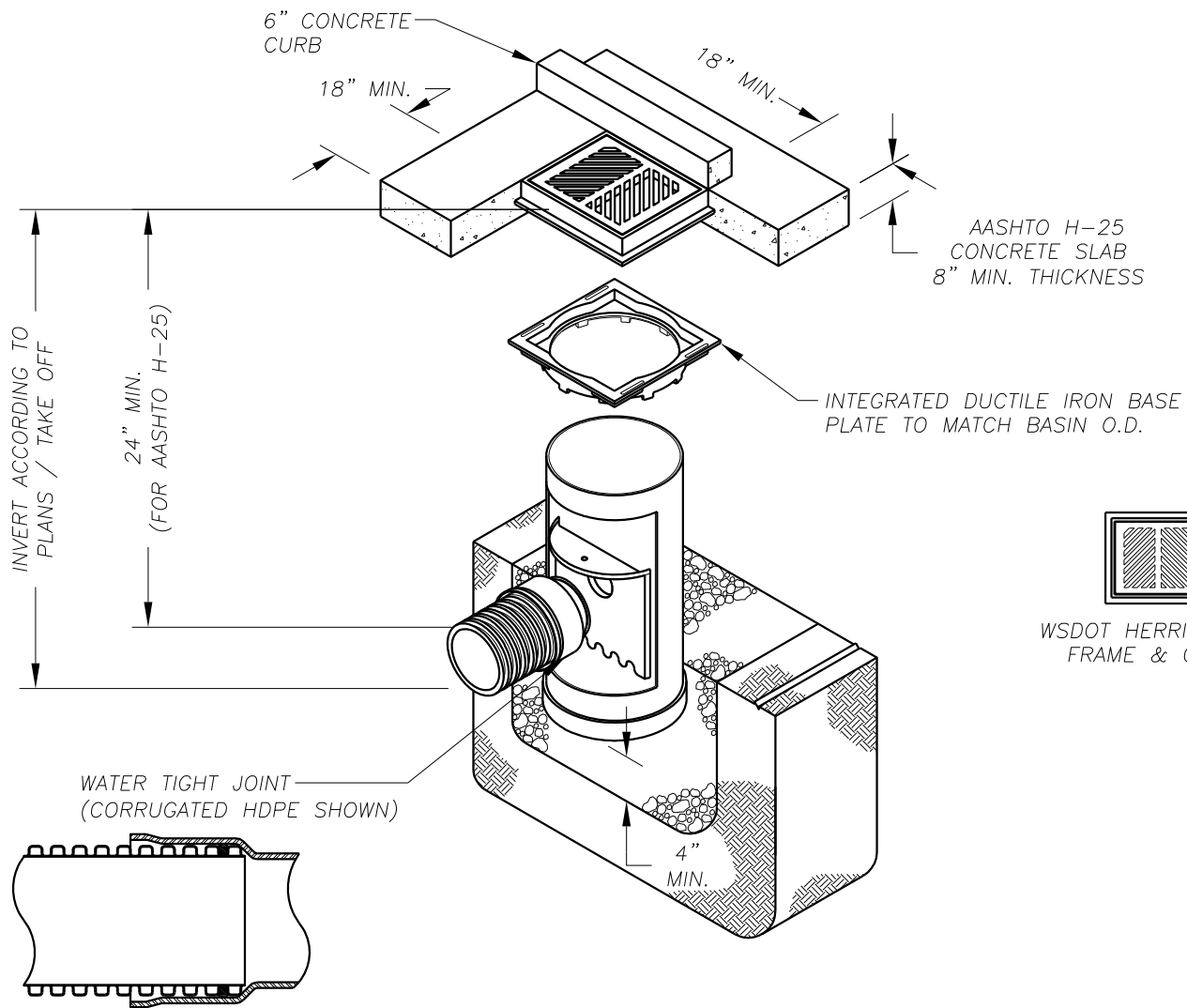
CATCH BASIN
TYPE 1

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COUNTY ENGINEER

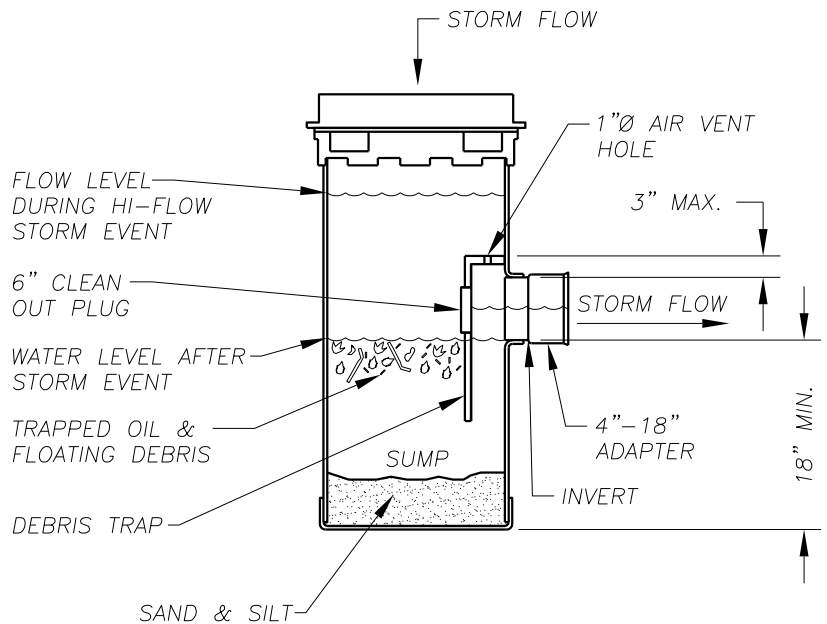
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DATE	05/23/08



NOTES:

1. DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
2. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
3. VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 18" FOR CORRUGATED HDPE (ADS N-12, ADS SINGLE WALL, HANCOR DUAL WALL), SDR 35, SCH 40 DWV, CORRUGATED & RIBBED PVC.
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7. DRAIN BASIN FRAME & GRATE SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS & MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
8. FRAME MUST BE INSTALLED WITH FLANGE DOWN.
9. BASE PLATE SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
10. ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS 4,000.



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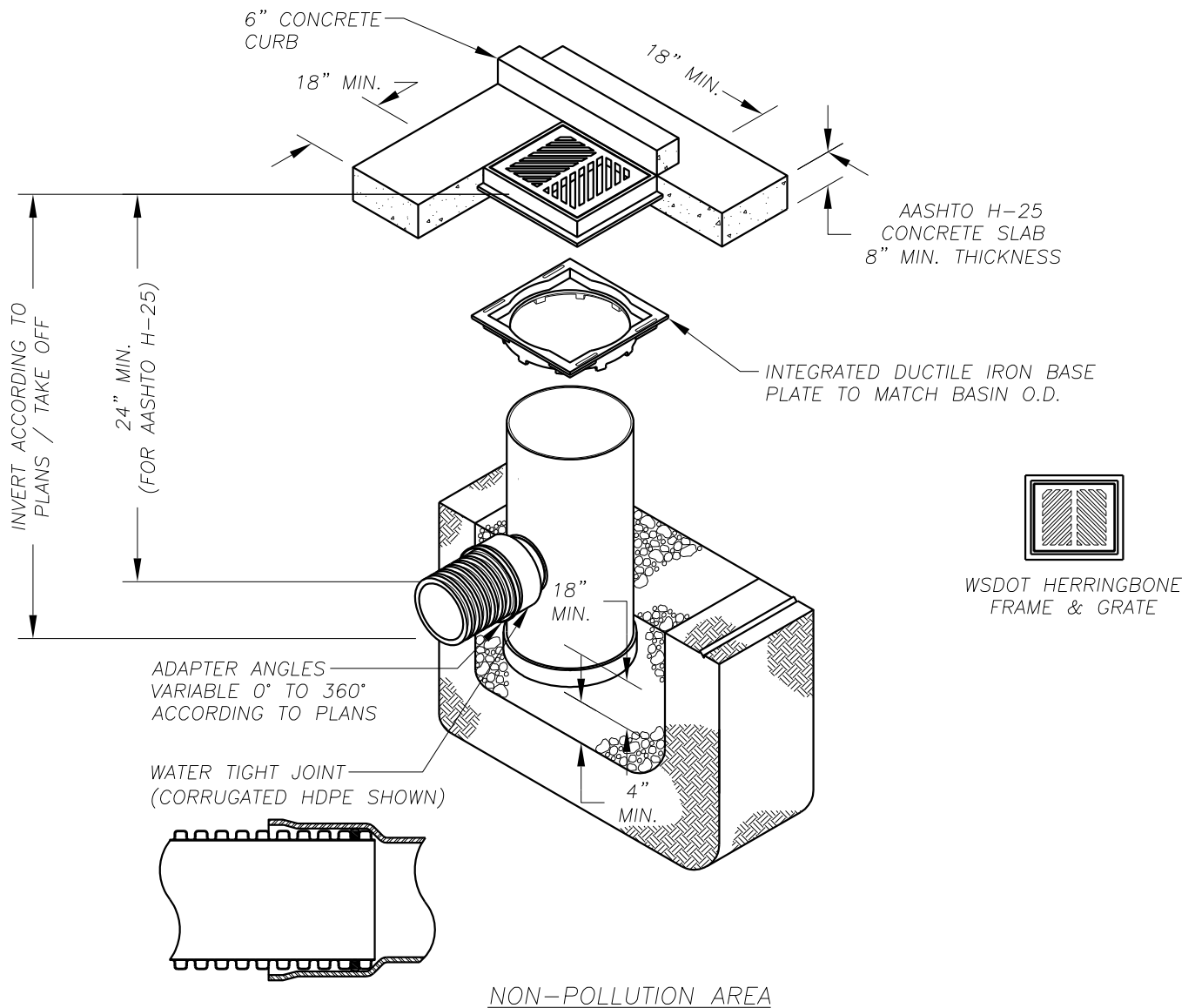
DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL
WITH DEBRIS TRAP AND HERRINGBONE GRATE

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COUNTY ENGINEER

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NOTES:

1. DRAIN BASIN TO BE 24" DIAMETER NYLOPLAST OR EQUAL (ROUND) STRUCTURE.
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8. FRAME MUST BE INSTALLED WITH FLANGE DOWN.
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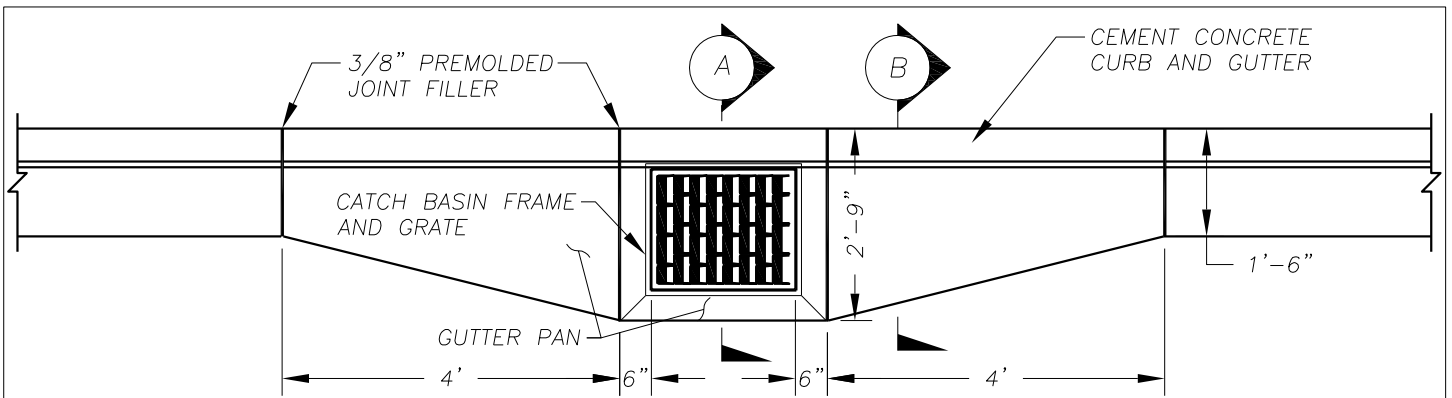
DRAIN BASIN H-25 24 IN. NYLOPLAST OR EQUAL
WITH HERRINGBONE GRATE

Peter Capen
COUNTY ENGINEER

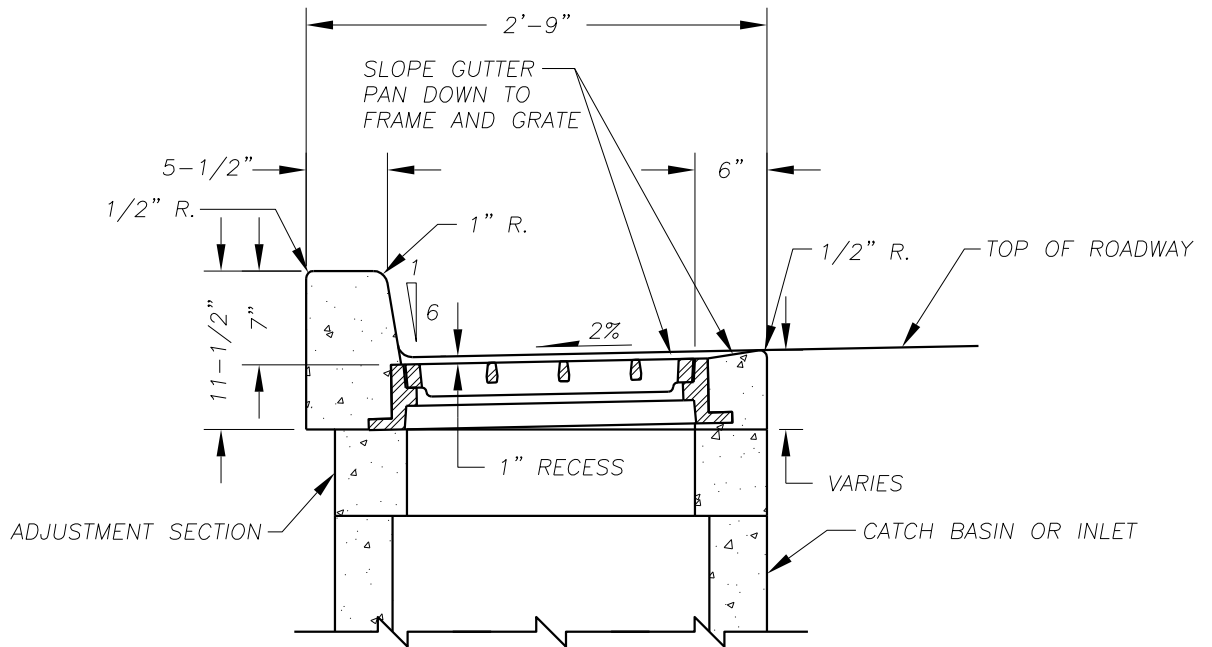
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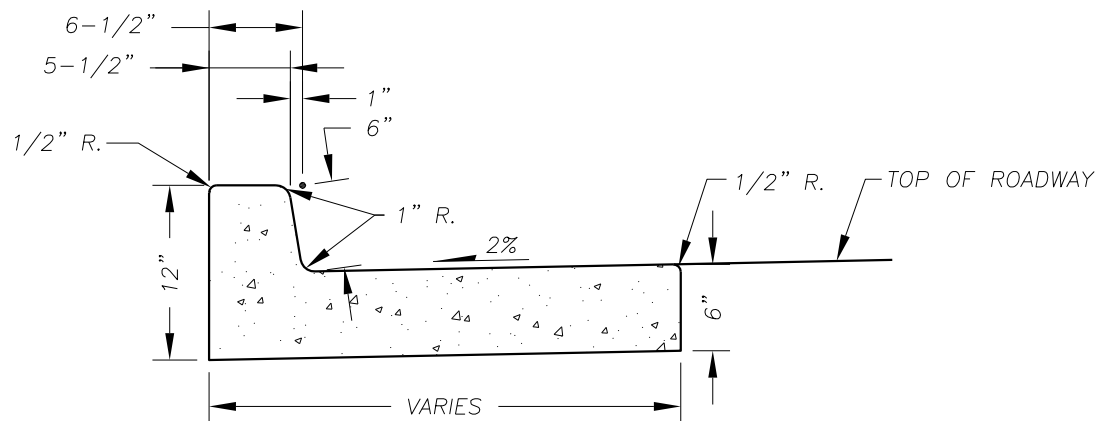
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CATCH BASIN GUTTER PAN
PLAN VIEW



SECTION A



SECTION B

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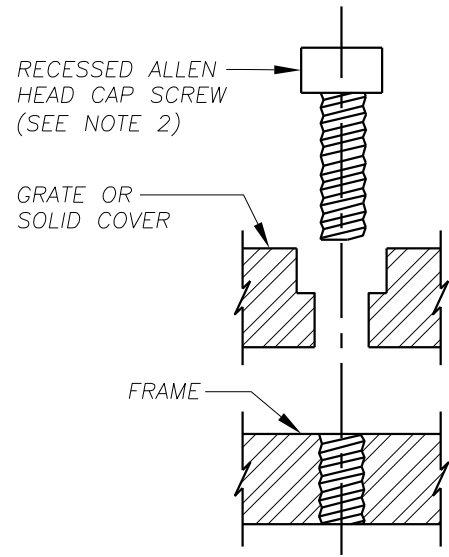
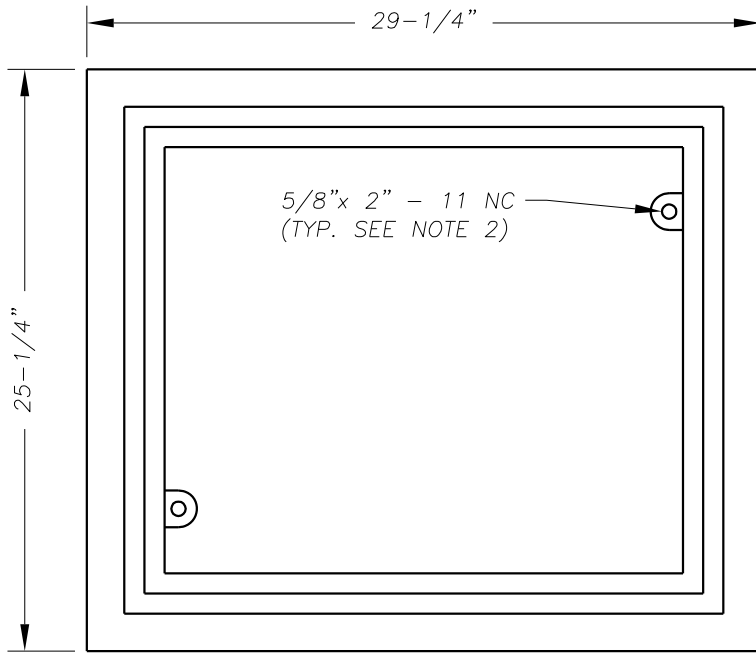
CATCH BASIN GUTTER PAN

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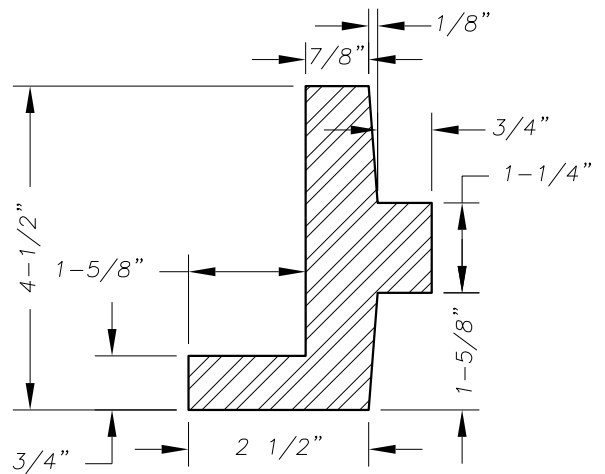
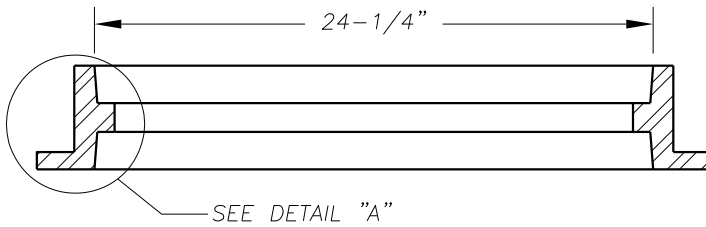
Peter Capon
COUNTY ENGINEER

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DATE

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DRAWN
DATE 05/23/08



BOLT DOWN DETAIL



DETAIL "A"

NOTES:

1. THIS FRAME IS DESIGNED TO ACCOMMODATE 20"x 24" GRATES OR COVERS AS SHOWN ON STD. DETAILS D4.3 AND D4.4.
2. WHEN BOLT DOWN GRATES OR COVERS ARE SPECIFIED, PROVIDE TWO HOLES IN THE FRAME THAT ARE VERTICALLY ALIGNED WITH THE GRATE OR COVER SLOTS. TAP EACH HOLE TO ACCEPT A 5/8"x 2" - 11 NC ALLEN HEAD CAP SCREW. LOCATION OF BOLT DOWN HOLES VARIES AMONG DIFFERENT MANUFACTURERS.
3. REFER TO WSDOT STANDARD SPECIFICATIONS 9-05.15(2) FOR ADDITIONAL REQUIREMENTS.
4. SEE WSDOT STANDARD SPECIFICATIONS SECTION 7-05.

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REVERSIBLE FRAME
FOR CATCH BASIN

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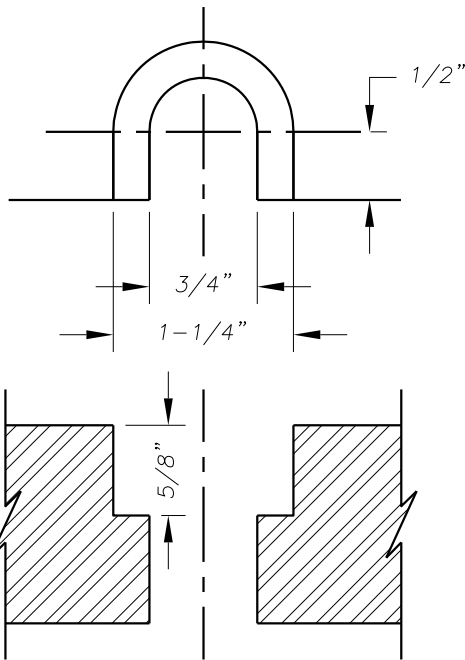
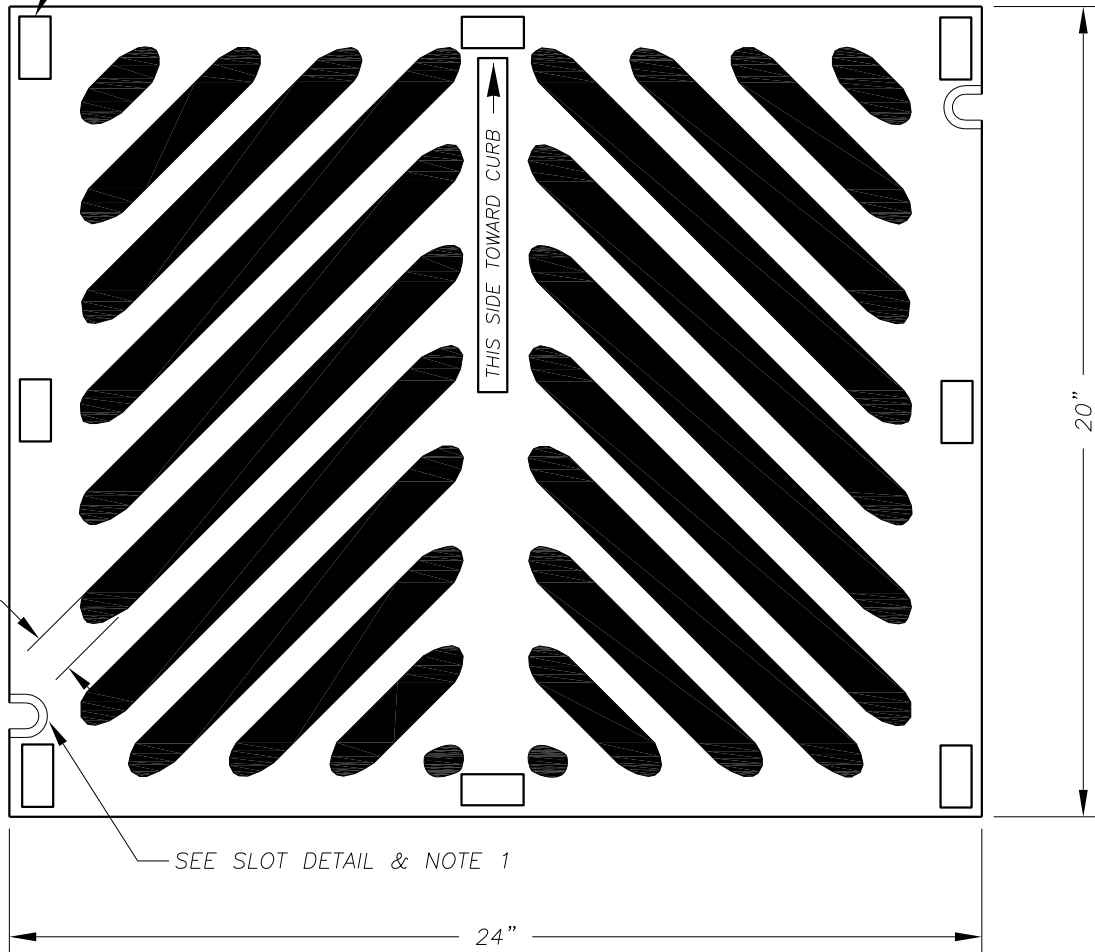
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8 LEVELING PADS
2"x 1-1/8" x 1/8"

1" OPENING
(TYP.)

SEE SLOT DETAIL & NOTE 1

THIS SIDE TOWARD CURB



SLOT DETAIL

NOTES:

1. WELDING NOT PERMITTED.
2. USE VANED GRATE PER STD. DETAIL D4.4 WHERE LONGITUDINAL SLOPE EXCEEDS 4%.
3. WHEN BOLT DOWN GRATES ARE SPECIFIED, PROVIDE TWO SLOTS IN THE GRATE THAT ARE VERTICALLY ALIGNED WITH THE HOLES IN THE FRAME. LOCATION OF BOLT DOWN SLOTS VARIES AMONG DIFFERENT MANUFACTURERS.
4. REFER TO WSDOT STANDARD SPECIFICATIONS 9-05.15(2) FOR ADDITIONAL REQUIREMENTS.
5. FOR FRAME DETAIL, SEE STD. DETAIL D4.2.
6. THE THICKNESS OF THE GRATE SHALL NOT EXCEED 1-5/8".

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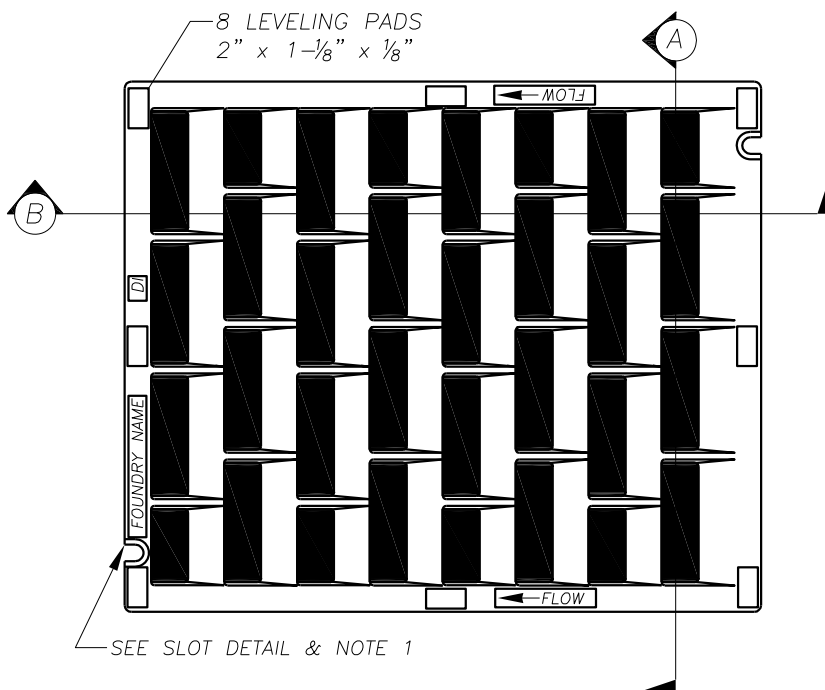
HERRINGBONE GRATE
FOR CATCH BASIN

Peter Capen
COUNTY ENGINEER

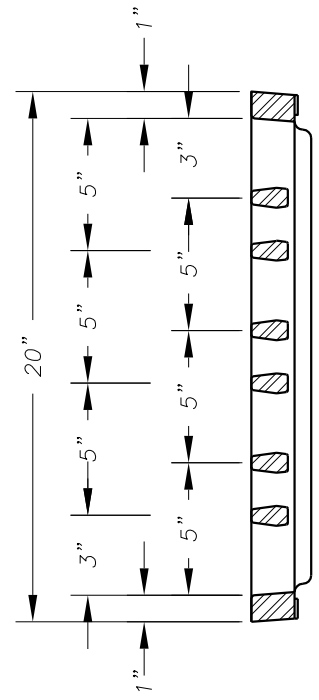
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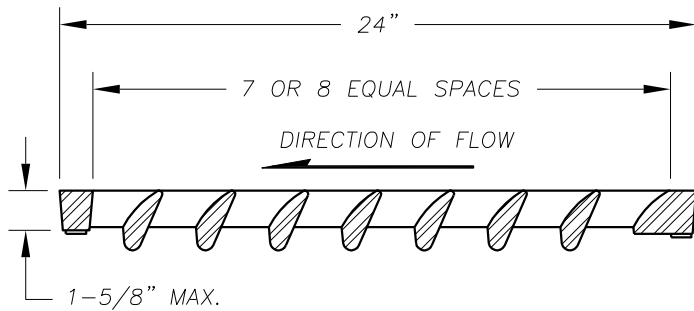
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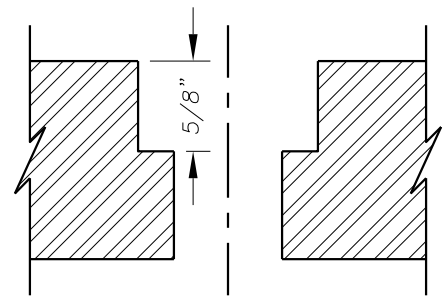
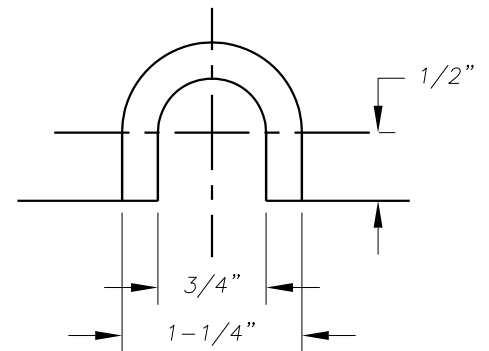
PLAN VIEW



SECTION A



SECTION B



SLOT DETAIL

NOTES:

1. WELDING NOT PERMITTED.
2. USE HERRINGBONE GRATE PER STD. DETAIL D4.3 WHERE LONGITUDINAL SLOPE IS LESS THAN 4%.
3. WHEN BOLT DOWN GRATES ARE SPECIFIED, PROVIDE TWO SLOTS IN THE GRATE THAT ARE VERTICALLY ALIGNED WITH THE HOLES IN THE FRAME. LOCATION OF BOLT DOWN SLOTS VARIES AMONG DIFFERENT MANUFACTURERS.
4. REFER TO WSDOT STANDARD SPECIFICATIONS 9-05.15(2) FOR ADDITIONAL REQUIREMENTS.
5. FOR FRAME DETAIL, SEE STD. DETAIL D4.2.

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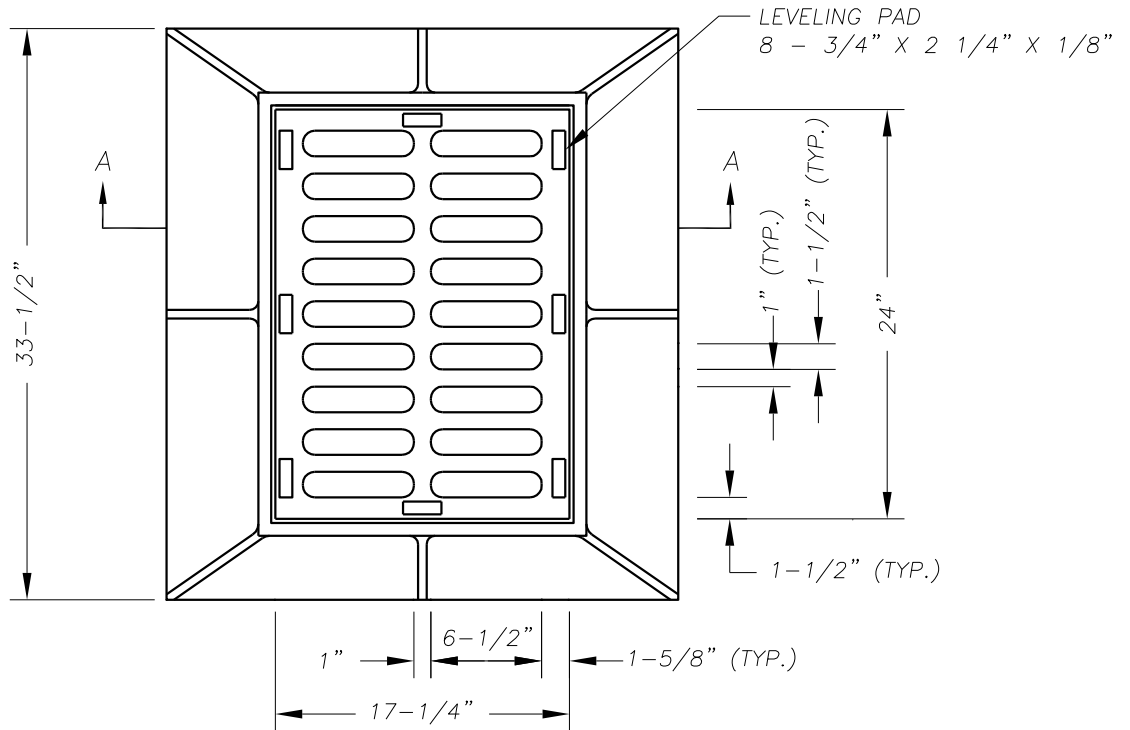
VANED GRATE
FOR CATCH BASIN

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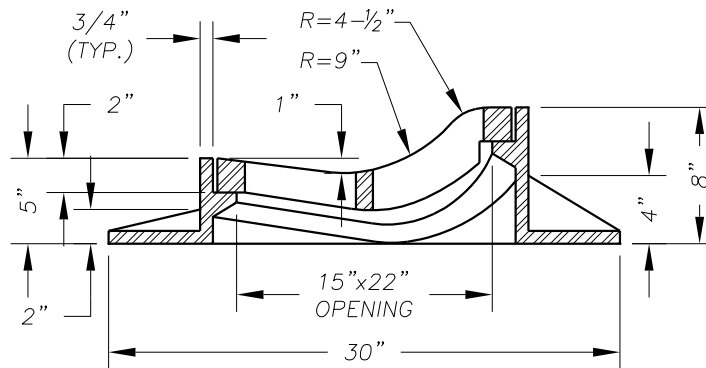
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COUNTY ENGINEER

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PLAN



SECTION A-A

NOTES:

1. WELDING NOT PERMITTED
2. USE ROLLED CURB VANE GRATE PER STD. DETAIL D4.7 WHERE LONGITUDINAL SLOPE IS GREATER THAN 4%.
3. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
4. SEE WSDOT STANDARD SPECIFICATIONS SECTION 7-05.

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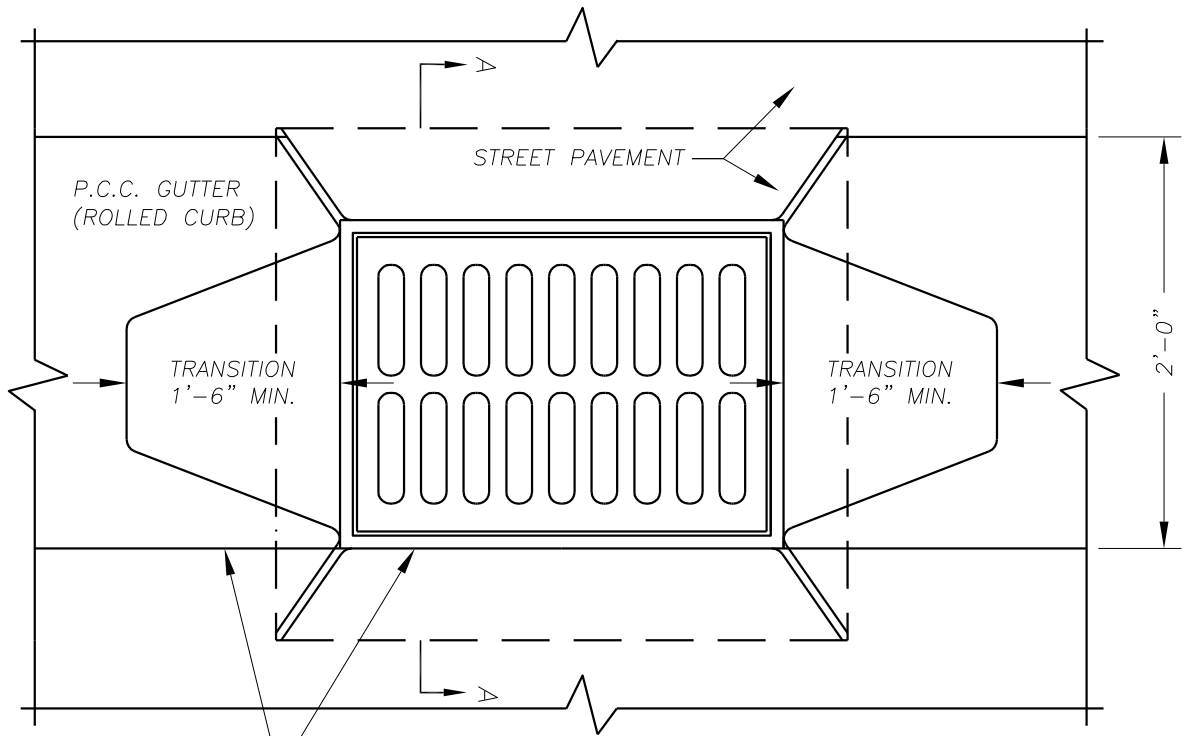
Peter Capen
COUNTY ENGINEER

ROLLED CURB
FRAME AND GRATE

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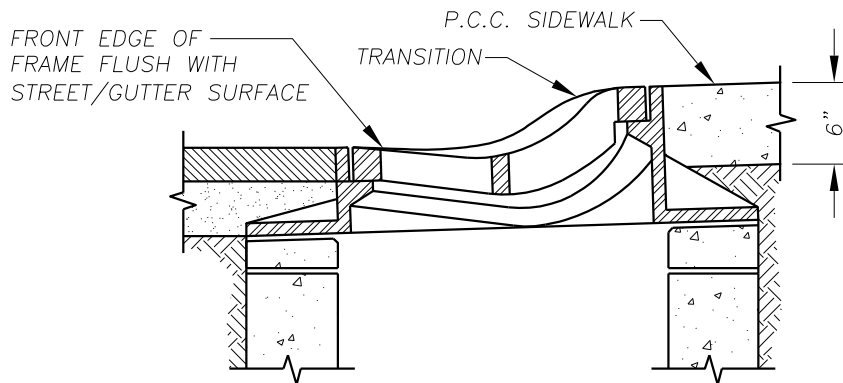
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BACK EDGE OF FRAME EVEN WITH BACK FACE OF CURB

PLAN



SECTION A-A

NOTES:

1. WELDING NOT PERMITTED.
2. USE ROLLED CURB VANE GRATE PER STD. DETAIL D4.7 WHERE LONGITUDINAL SLOPE IS GREATER THAN 4%.
3. SET FRAME TO GRADE AND CONSTRUCT ROAD AND CURB TO BE FLUSH AT FRONT AND BACK OF FRAME.
4. SEE WSDOT STANDARD SPECIFICATIONS SECTION 7-05.

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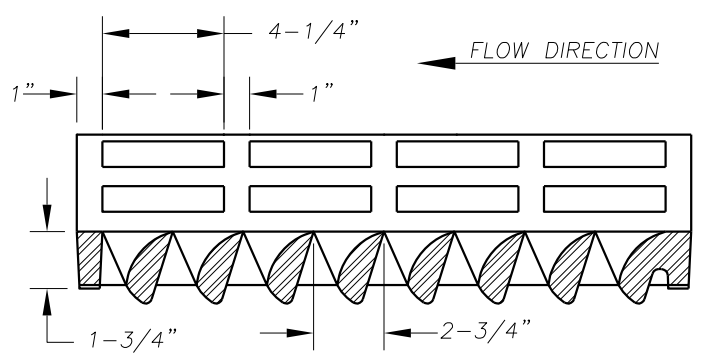
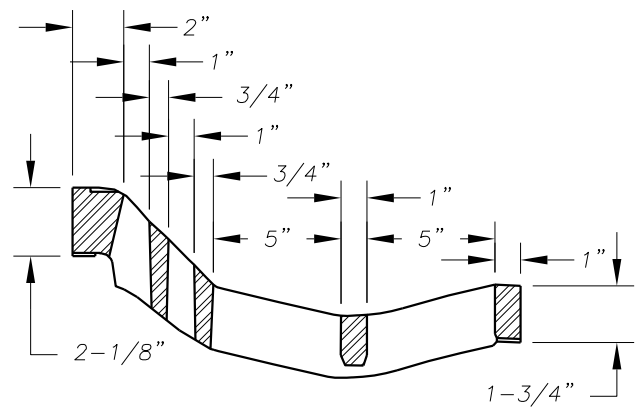
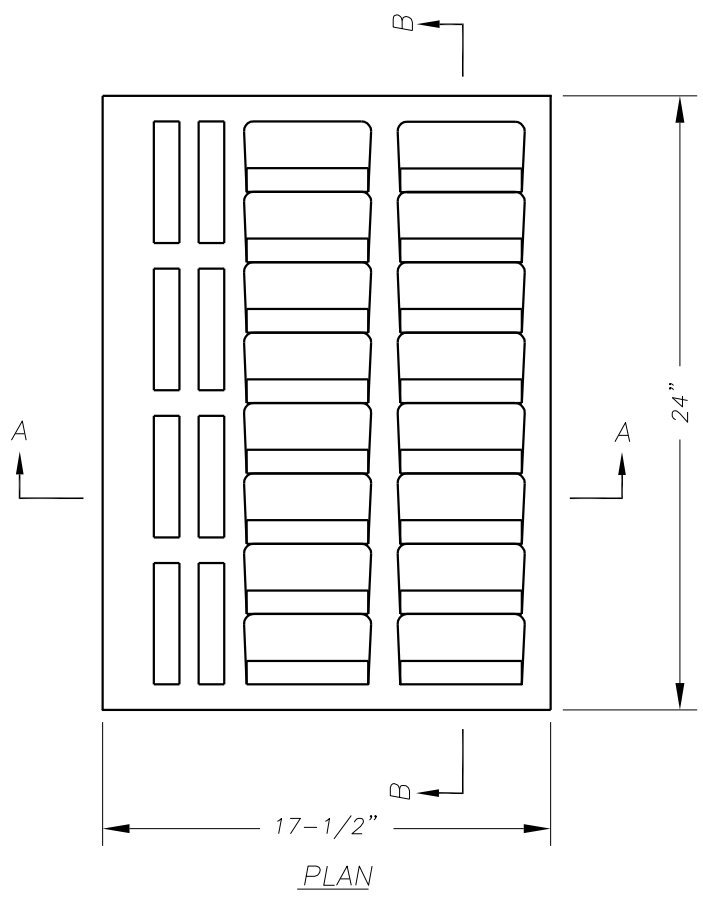
ROLLED CURB
FRAME AND GRATE INSTALLATION

Peter Capen
COUNTY ENGINEER

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DATE

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DATE 05/23/08

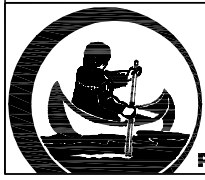


NOTES:

1. WELDING NOT PERMITTED.
2. USE ROLLED CURB VANE GRATE WHERE LONGITUDINAL SLOPE IS GREATER THAN 4%.
3. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
4. SEE WSDOT STANDARD SPECIFICATIONS SECTION 7-05.

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ROLLED CURB VANED GRATE

APPROVED

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DATE 05/23/08

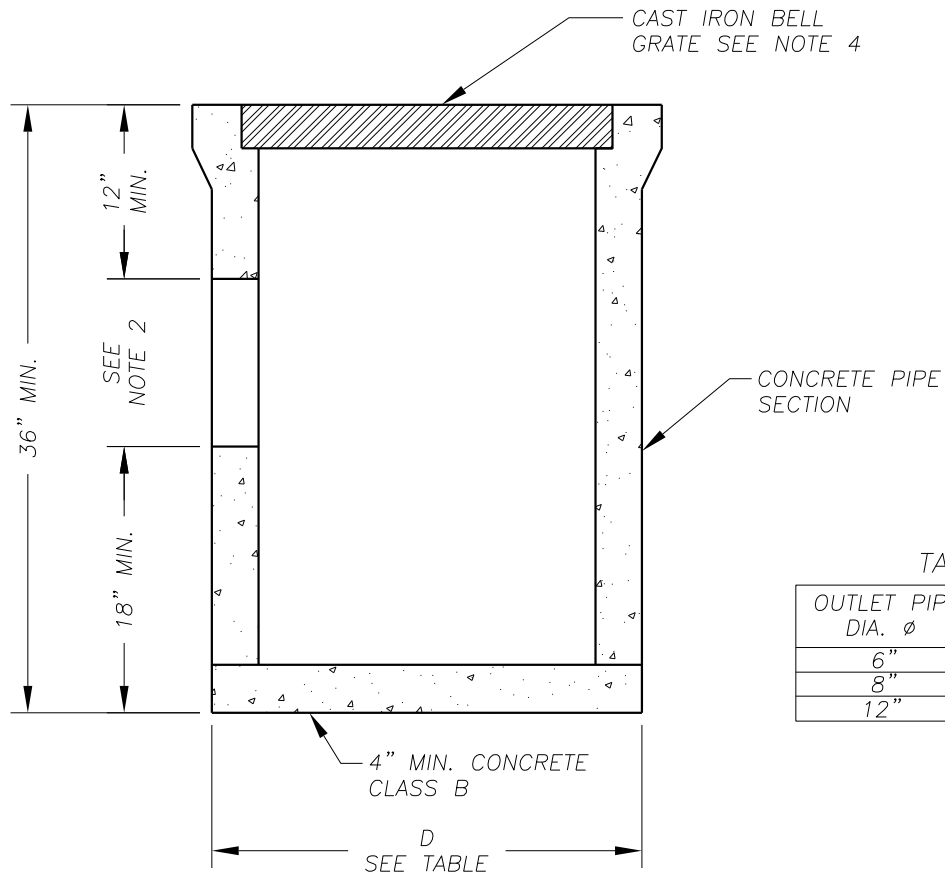


TABLE 1

OUTLET PIPE DIA. ϕ	INLET DIA. ϕ
6"	12"
8"	18"
12"	24"

AREA INLET APPROVED FOR USE IN
PRIVATE STORM DRAIN SYSTEMS ONLY

NOTES:

1. AREA INLETS TO BE CONSTRUCTED FROM CONCRETE PIPE, IN ACCORDANCE WITH ASTM C 14 UNLESS OTHER WISE SHOWN ON THE PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. CUTOUT HOLE SIZE IS EQUAL TO THE OUTLET PIPE OUTSIDE DIAMETER PLUS AREA INLET WALL THICKNESS.
3. CONNECTION TO OUTLET PIPE TO BE MORTARED AND MADE FLUSH WITH INSIDE OF THE AREA INLET WALL.
4. CAST IRON BELL GRATE SHALL MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATIONS RR-F-621D. THE GRATE SHALL HAVE SLOTS (HOLES) THAT CONSTITUTE 50% OPEN AREA FOR DRAINAGE. INLET BELL SURFACE SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
5. AREA INLET TO BE USED FOR PRIVATE STORM SYSTEMS ONLY.

NO.	REVISIONS	DATE	BY

DWG: D5.DWG



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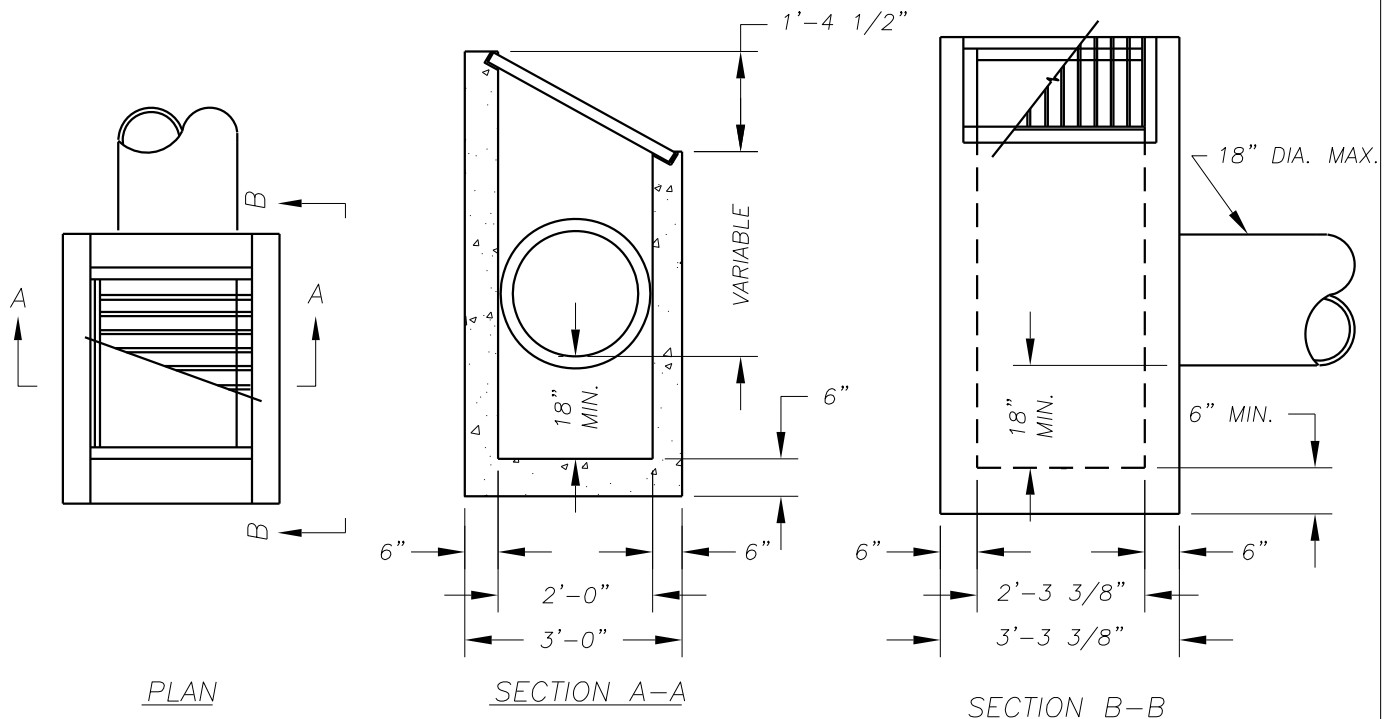
STANDARD AREA INLET
PRIVATE

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

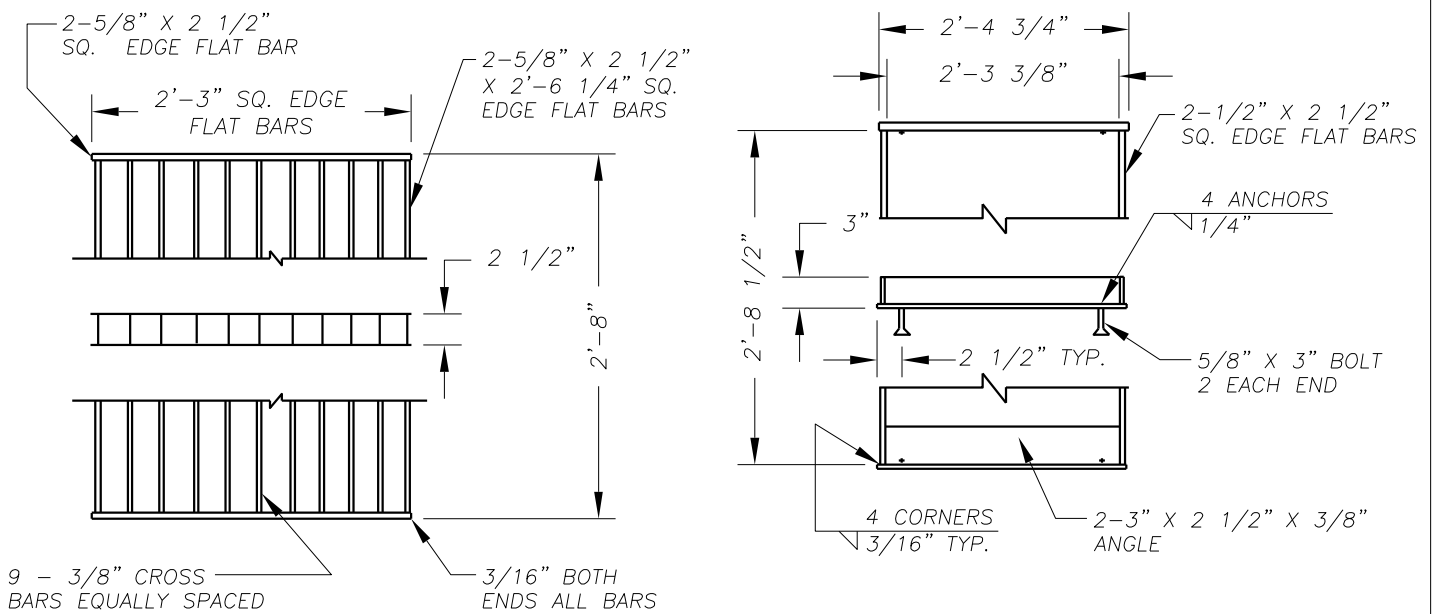
STANDARD
D5
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



PLAN

SECTION A-A

SECTION B-B



NOTES:

1. DITCH INLET CONSTRUCTION IN ACCORDANCE WITH ASTM C-478.
2. CATCH BASIN, FRAME, AND GRATES SHALL BE FLAT BAR STEEL OR APPROVED EQUAL.
3. INSIDE FRAME DIMENSIONS: 2'-3 3/8"x 2'-8 1/2".
4. 3/8" CROSS BARS SHALL BE FLUSH WITH THE GRATE SURFACE AND MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.

NO.	REVISIONS	DATE	BY

DWG: D6.DWG



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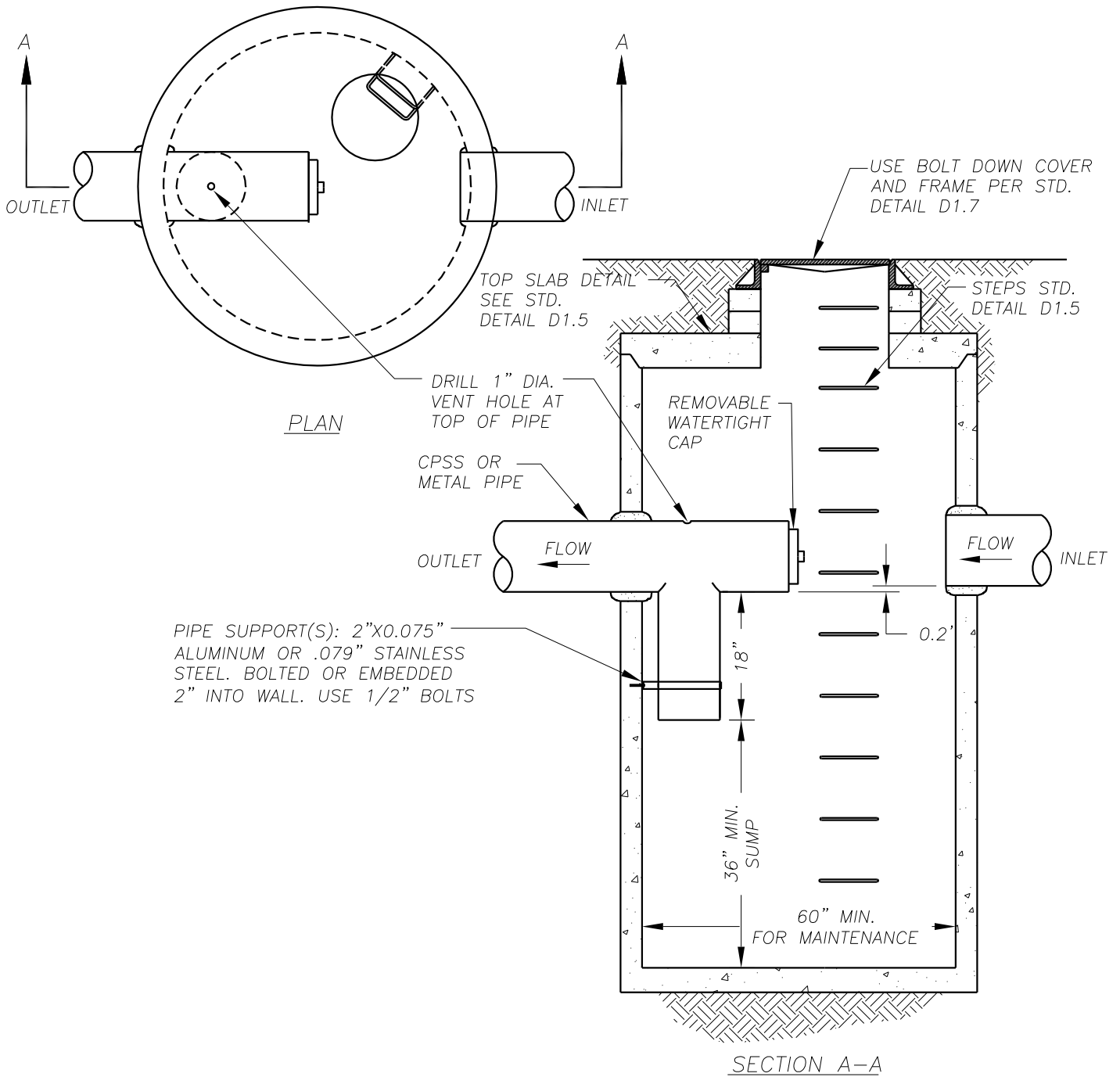
CONCRETE DITCH INLET

Peter Capen
 COUNTY ENGINEER

APPROVED

5/23/08
 DATE

STANDARD
D6
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTES:

1. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR WSDOT CATCH BASIN TYPE 2, 60" MINIMUM DIAMETER. SEE WSDOT STANDARD PLAN B-10.20-00.
2. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5.

NO.	REVISIONS	DATE	BY

DWG: D7.DWG



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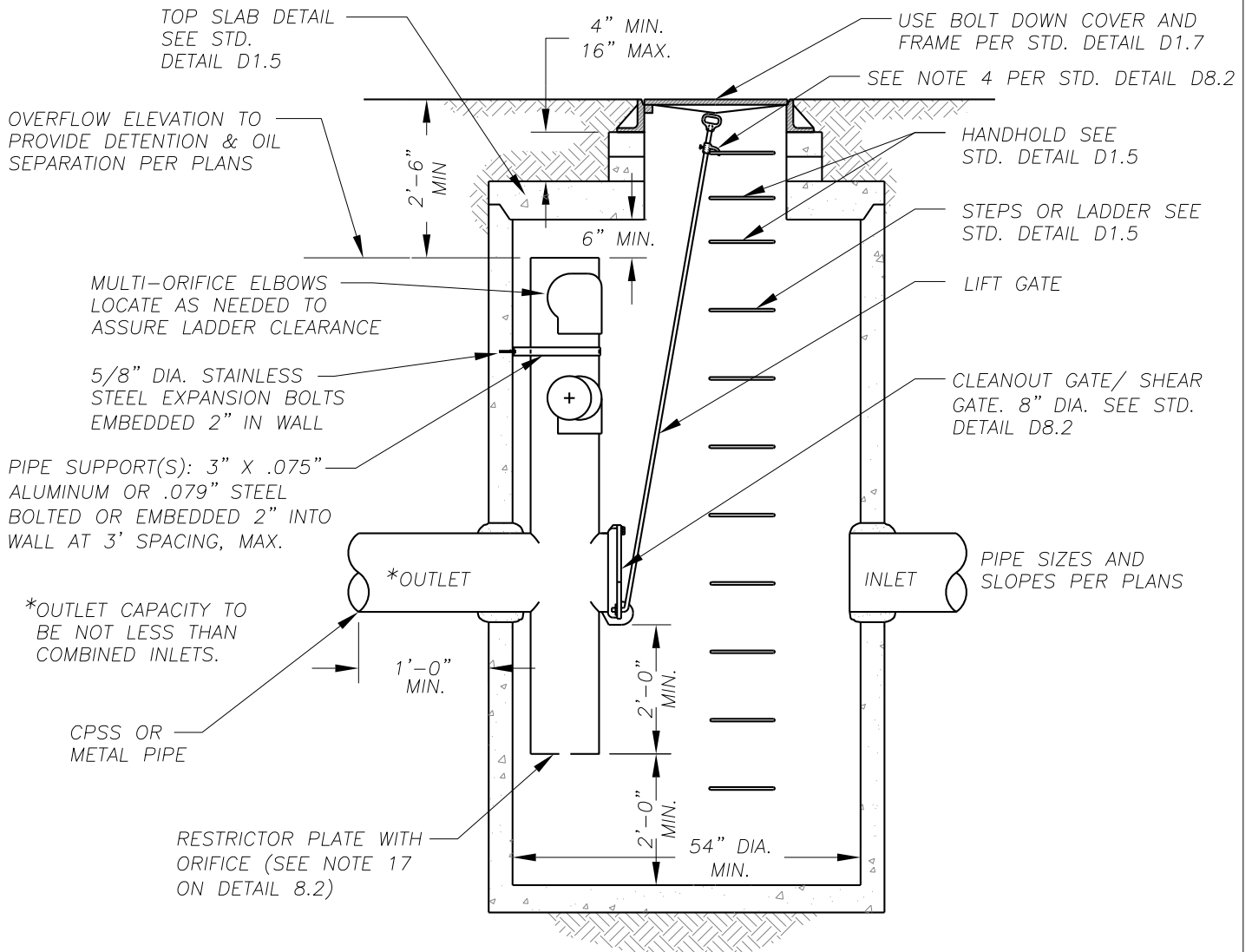
CATCH BASIN TYPE 2
SEDIMENTATION MANHOLE

Peter Capen
COUNTY ENGINEER

APPROVED

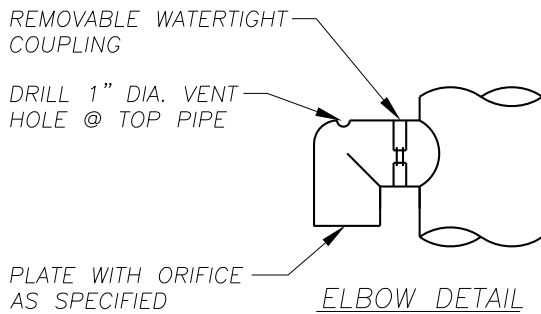
5/23/08
DATE

STANDARD
D7
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

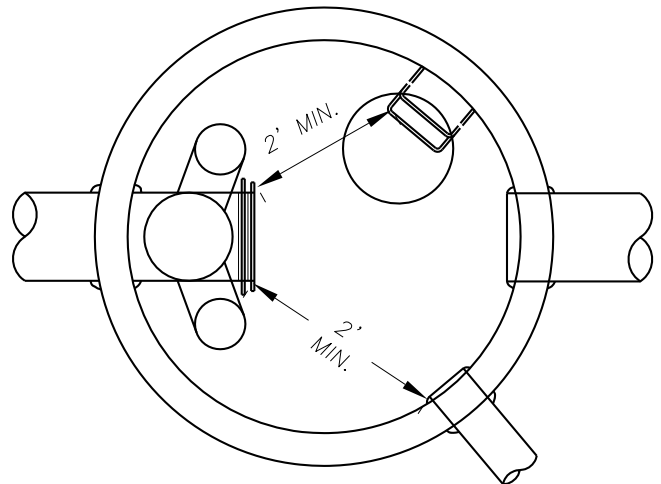


CATCH BASIN TYPE 2

SEE WSDOT STANDARD PLAN B-10.20-00



SEE NOTES STD. DETAIL D8.2



DWG: D8.1.DWG

SHEET 1 OF 2

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC



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CATCH BASIN TYPE 2 - FLOW CONTROL MANHOLE
TEE TYPE (CONTINUED ON D8.2)

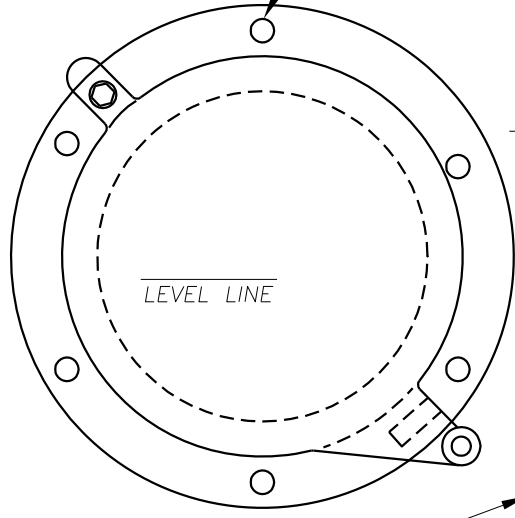
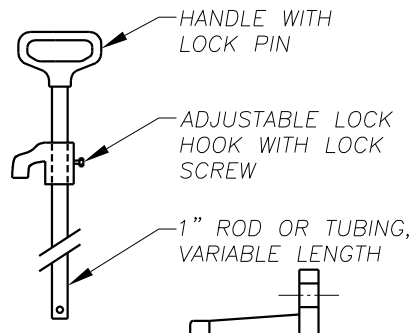
Peter Capen
COUNTY ENGINEER

APPROVED

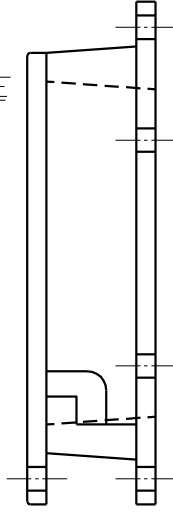
5/23/08
DATE

STANDARD
D8.1
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

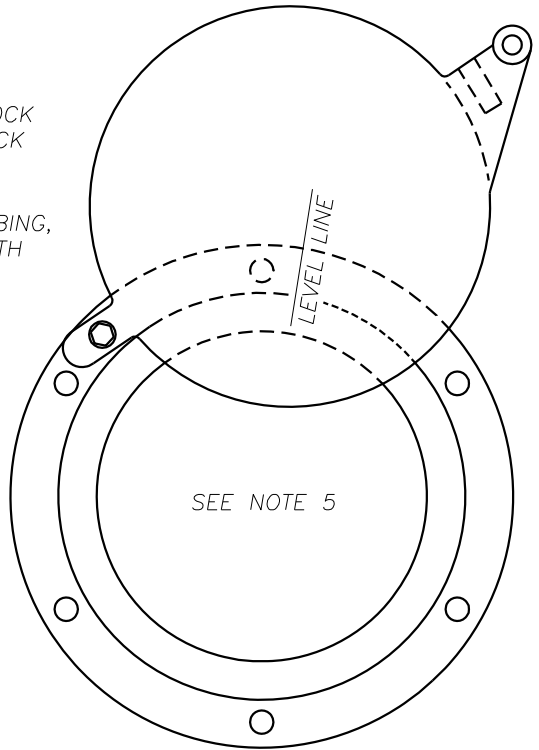
SIX EVENLY SPACED HOLES ON 10 3/8" BOLT CIRCLE FOR BOLTING TO FLANGE CONNECTION



FRONT



SIDE



MAXIMUM OPENING OF GATE

LIFT HANDLE SHALL BE ATTACHED PER MANUFACTURER'S RECOMMENDATIONS

SHEAR GATE NOTES:

1. SHEAR GATE SHALL BE ALUMINUM ALLOY PER ASTM B-26-ZG-32a OR CAST IRON ASTM A48 CLASS 30B AS REQUIRED.
2. GATE SHALL BE 8" DIAM. UNLESS OTHERWISE SPECIFIED.
3. GATE SHALL BE JOINED TO TEE SECTION BY BOLTING (THROUGH FLANGE), WELDING, OR OTHER SECURE MEANS.
4. LIFT ROD: AS SPECIFIED BY MFR. WITH HANDLE EXTENDING TO WITHIN ONE FOOT OF COVER AND ADJUSTABLE HOOK LOCK FASTENED TO FRAME OR UPPER HANDHOLD. **IF ATTACHED TO STEPS, MAKE SURE IT DOES NOT CREATE A TRIP HAZARD OR REDUCE ENTRY SPACE. MUST BE OPERATIONAL WITHOUT ENTERING MANHOLE.**
5. GATE SHALL NOT OPEN BEYOND THE CLEAR OPENING BY LIMITED HINGE MOVEMENT, STOP TAB, OR SOME OTHER DEVICE.
6. NEOPRENE RUBBER GASKET REQUIRED BETWEEN RISER MOUNTING FLANGE AND GATE FLANGE.
7. MATING SURFACES OF LID AND BODY TO BE MACHINED FOR PROPER FIT.
8. FLANGE MOUNTING BOLTS SHALL BE 3/8" DIAM. STAINLESS STEEL.
9. ALTERNATE CLEANOUT/SHEAR GATES TO THE DESIGN SHOWN ARE ACCEPTABLE, PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX BOLTS, 10-3/8" BOLT CIRCLE FOR BOLTING TO THE FLANGE CONNECTION.

FLOW CONTROL DEVICE NOTES:

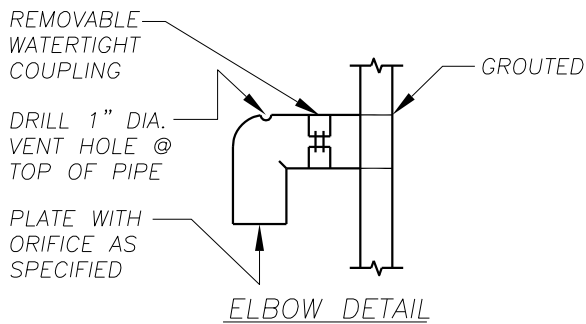
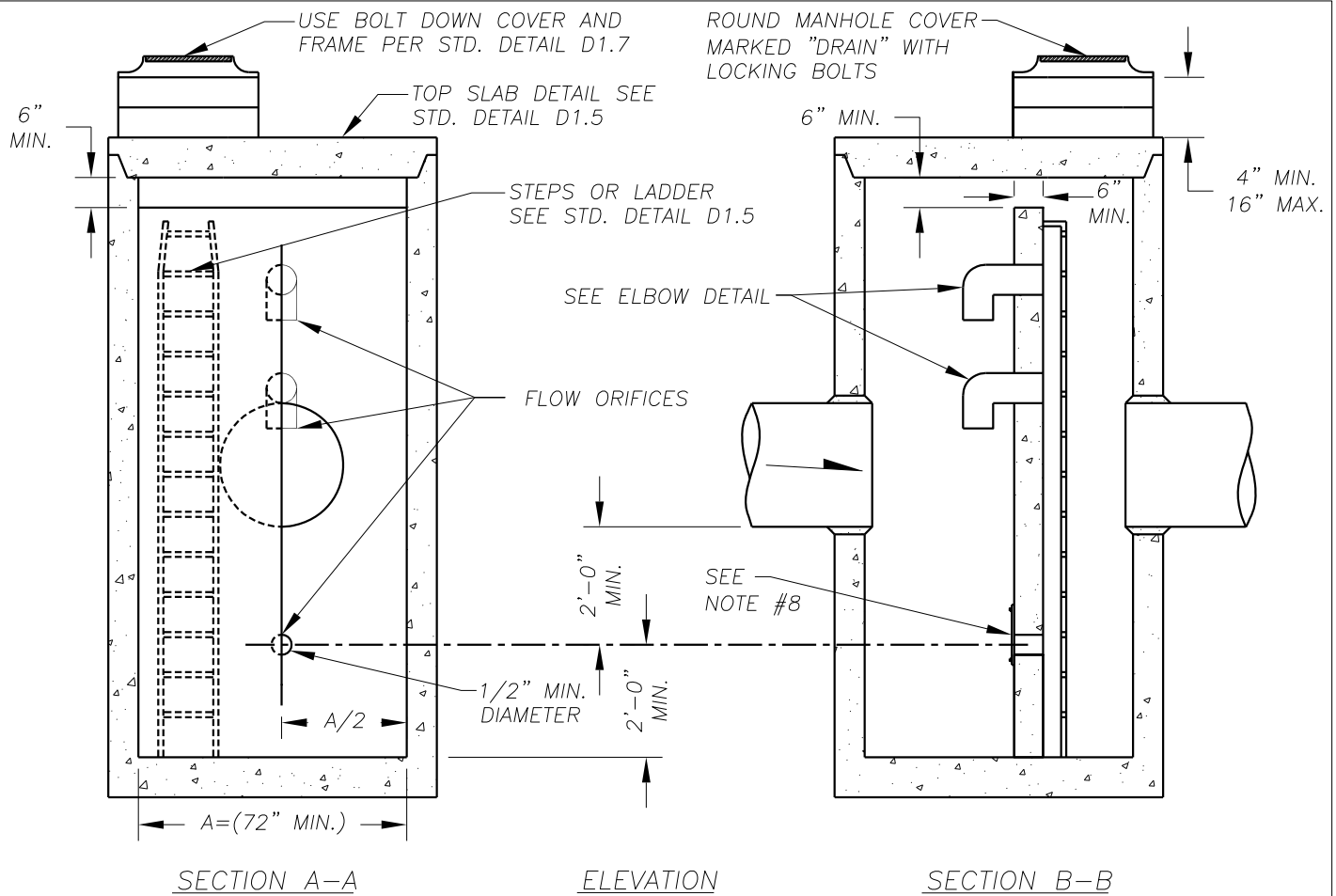
10. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR WSDOT CATCH BASIN TYPE 2, 54" MIN. DIA.
11. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD. DETAIL D1.5.
12. THE RESTRICTOR/SEPARATOR AND PIPE SUPPORTS SHALL BE OF THE SAME MATERIAL AND SHALL BE FABRICATED FROM 0.060" ALUMINUM OR 0.064" ALUMINIZED STEEL OR 0.064" GALVANIZED STEEL PIPE IN ACCORDANCE WITH AASHTO M 36, M 196, M 197 AND M 274. GALVANIZED STEEL SHALL HAVE TREATMENT 1.
13. OUTLET SHALL BE CONNECTED TO CULVERT OR SEWER PIPE WITH A STANDARD COUPLING BAND FOR CORRUGATED METAL PIPE OR GROUTED INTO THE BELL OF CONCRETE PIPE.
14. THE VERTICAL RISER STEM OF THE RESTRICTOR/SEPARATOR SHALL BE THE SAME DIAMETER AS THE HORIZONTAL OUTLET PIPE WITH AN 8" MIN. SIZE.
15. FRAME AND LADDER, OR STEPS TO BE OFFSET SO THAT:
 - A. CLEANOUT GATE IS VISIBLE FROM TOP.
 - B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
 - C. FRAME IS CLEAR OF CURB (IF ANY EXISTS).
16. MULTI-ORIFICE ELBOWS MAY BE LOCATED AS SHOWN OR ALL ON ONE SIDE OF RISER TO ASSURE LADDER CLEARANCE. SIZE OF ELBOWS TO BE DETERMINED BY ENGINEER.
17. RESTRICTOR PLATE WITH ORIFICE AS SPECIFIED IN THE PLANS. OMIT PLATE IF ONLY FOR OIL POLLUTION CONTROL. SPECIFIED OPENING TO BE CUT ROUND AND SMOOTH EDGED.

NO.	REVISIONS	DATE	BY

DWG: D8.2.DWG

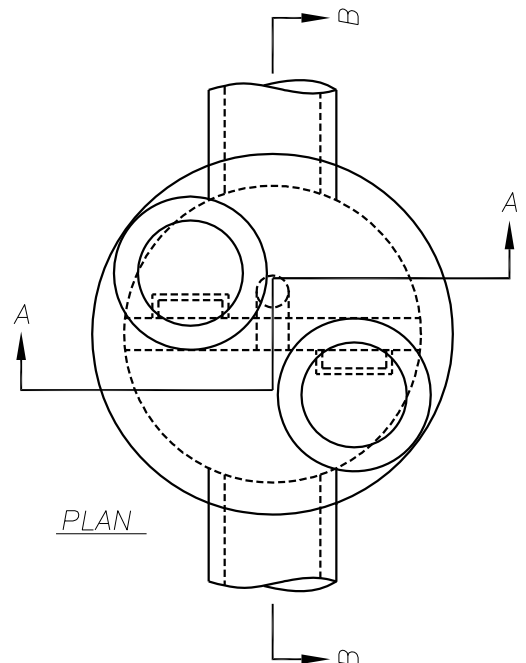
SHEET 2 OF 2

 Department of Public Works CLARK COUNTY WASHINGTON proud past, promising future	CATCH BASIN TYPE 2 - SHEAR GATE DETAIL AND NOTES (CONTINUED FROM D8.1)	STANDARD D8.2 DETAIL	
	 COUNTY ENGINEER	APPROVED 5/23/08 DATE	DESIGNED DRAWN DATE 05/23/08



NOTES:

1. PIPE SIZE, SLOPES AND ALL ELEVATIONS: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. EXCEPT AS SHOWN OR NOTED, UNIT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR WSDOT CATCH BASIN TYPE 2, 72" MIN. DIA.
4. COVERS: ROUND, SOLID MARKED "DRAIN," WITH BOLT DOWN COVER, SEE STD. DETAIL D1.7.
5. ORIFICES: SIZED AND LOCATED AS REQUIRED, WITH LOWEST ORIFICE MIN. 2' FROM BASE.
6. BAFFLE WALL SHALL HAVE #4 BAR AT 12" SPACING EACH WAY.
7. PRECAST BAFFLE WALL SHALL BE KEYED AND GROUTED IN PLACE.
8. BOTTOM ORIFICE PLATE TO BE 1/4" MIN. STAINLESS STEEL OR POLYETHELENE EQUIVALENT AND ATTACHED WITH 1/2" STAINLESS STEEL BOLTS. OMIT ORIFICE PLATE IF ONLY FOR OIL SEPARATION.
9. UPPER FLOW ORIFICE SHALL BE ALUMINUM, ALUMINIZED STEEL OR STAINLESS STEEL. SEE STD. DETAIL D8.1.



NO.	REVISIONS	DATE	BY

DWG: D9.DWG



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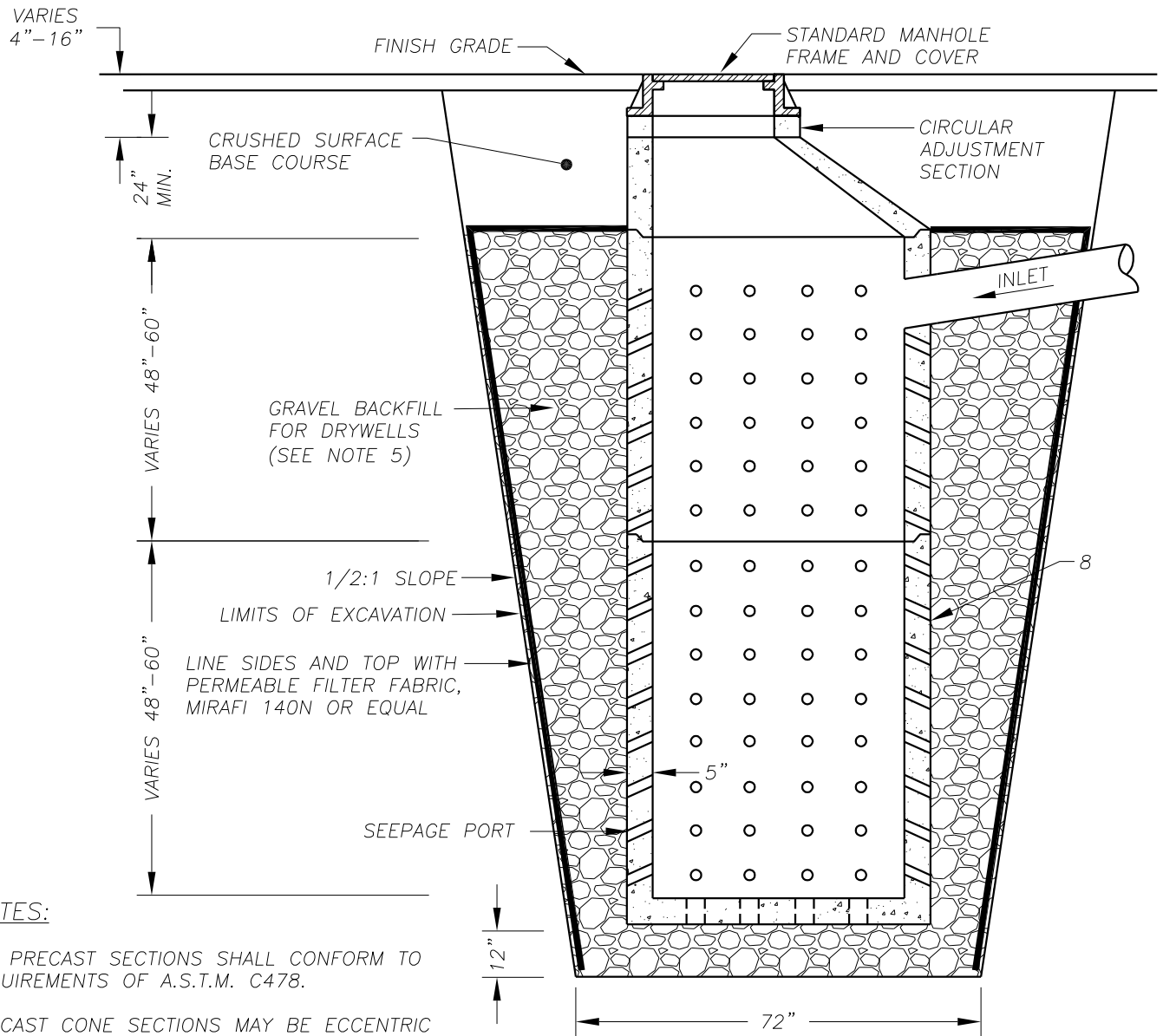
CATCH BASIN TYPE 2 - FLOW CONTROL MANHOLE
 BAFFLE TYPE

Peter Capen
 COUNTY ENGINEER

APPROVED

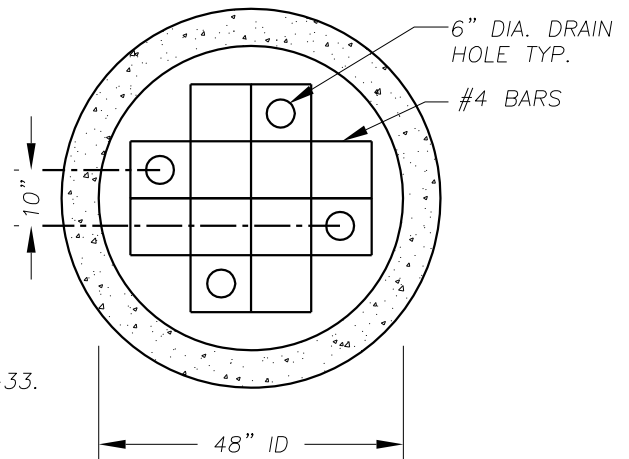
5/23/08
 DATE

STANDARD
D9
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



NOTES:

1. ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF A.S.T.M. C478.
2. PRECAST CONE SECTIONS MAY BE ECCENTRIC OR CONCENTRIC.
3. ALL PIPING TO AND FROM PRECAST DRYWELLS SHALL HAVE AT LEAST 8" OF CRUSHED ROCK COVER CONTINUOUSLY AROUND PIPE WHERE DRAIN ROCK WOULD OTHERWISE BE IN CONTACT WITH PIPE.
4. PERFORATIONS SHALL BE HORIZONTAL ROWS OF (14) 2-1/4" SQUARE OR (14) 2-3/8" ROUND HOLES, EQUALLY SPACED. ROWS SHALL BE SPACED 6-1/2" CENTER TO CENTER.
5. GRAVEL BACKFILL FOR DRYWELLS PER WSDOT STANDARD SPECIFICATIONS 9-03.12(5).
6. UNDERGROUND DRAINAGE GEOTEXTILE, MODERATE SURVIVABILITY, CLASS A. SEE WSDOT SPECIFICATIONS 9-33.
7. TYPICAL DRYWELL DEPTH IS 13'.
8. SEEPAGE PORT ORIENTATION VARIES AMONG MANUFACTURERS.



NO.	REVISIONS	DATE	BY

DWG: D10.DWG



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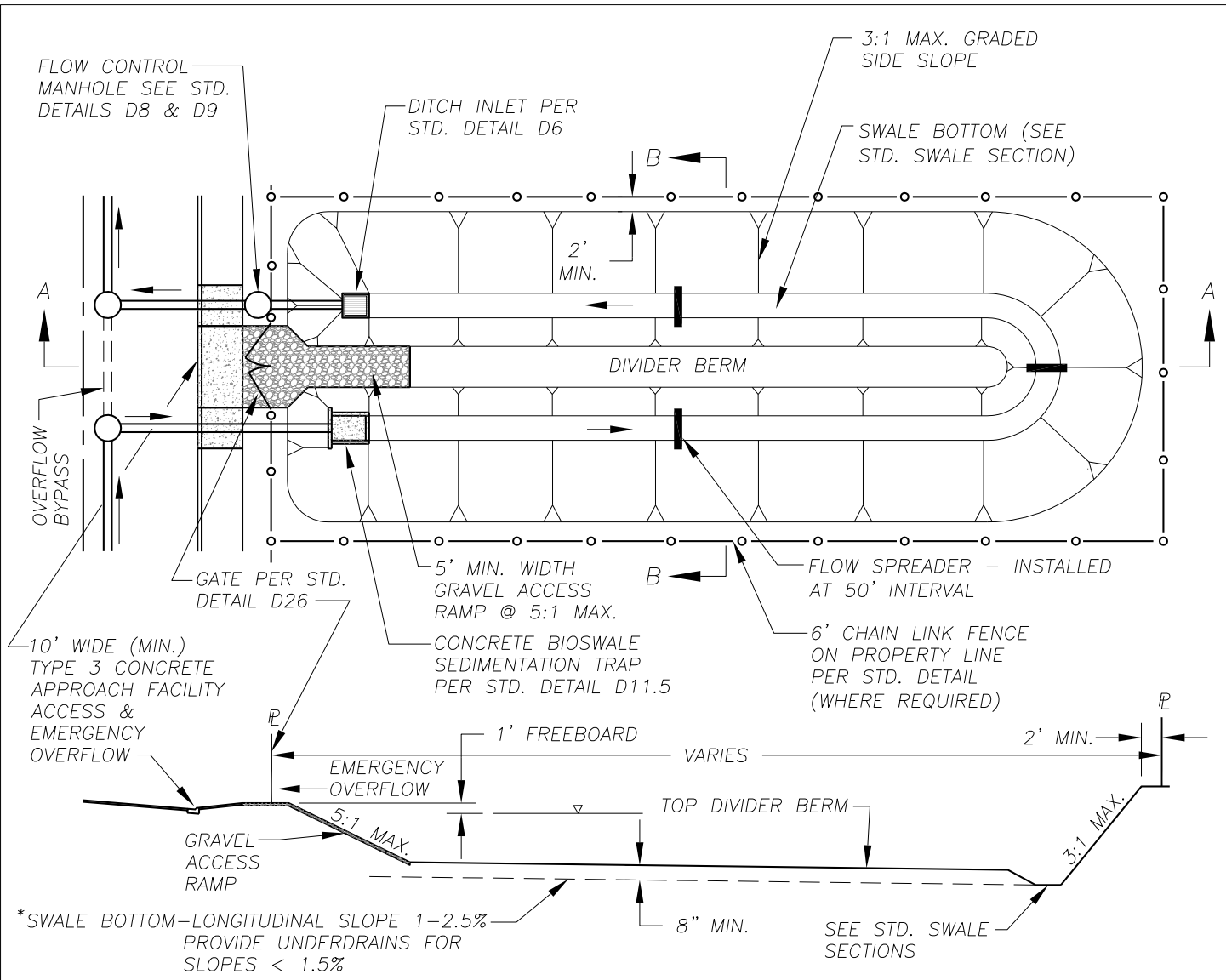
PRECAST CONCRETE DRYWELL

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

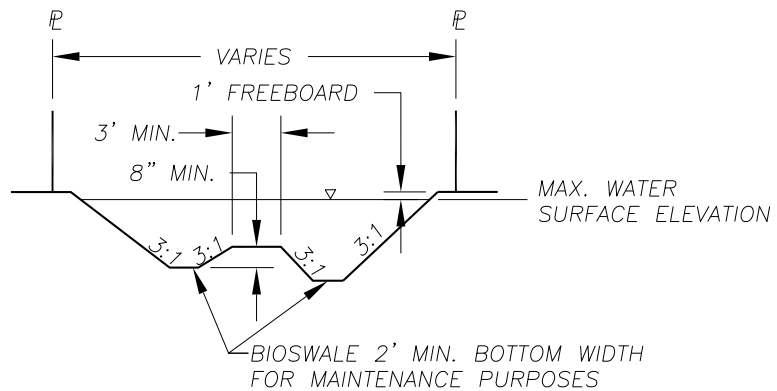
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*SWALE BOTTOM—LONGITUDINAL SLOPE 1–2.5% PROVIDE UNDERDRAINS FOR SLOPES < 1.5%

*NOTE:
SWALE DESIGN REQUIRES A MINIMUM OF 9 MINUTES OF RESIDENCE TIME ($n=0.20$).

SECTION A-A



SECTION B-B

NOTES:

1. THE DESIGN OF THE STORMWATER FACILITIES SHALL MEET THE DESIGN STANDARD AS SET FORTH IN CCC 40.385.
2. THIS DETAIL IS AN EXAMPLE STORMWATER FACILITY FOR URBAN INFILL.
3. SEE STANDARD SWALE SECTIONS, AND FLOW SPREADER DETAILS.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC

DWG: D11.0.DWG

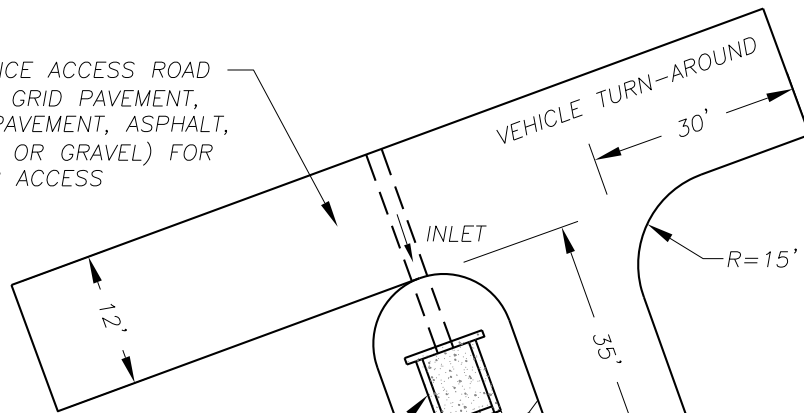


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EXAMPLE STORMWATER FACILITY FOR URBAN INFILL DEVELOPMENT
APPROVED
Peter Capen
COUNTY ENGINEER
5/23/08
DATE

STANDARD
D11.0
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

MAINTENANCE ACCESS ROAD
(MODULAR GRID PAVEMENT,
POROUS PAVEMENT, ASPHALT,
CONCRETE OR GRAVEL) FOR
VEHICULAR ACCESS



CONCRETE BIOSWALE
SEDIMENTATION TRAP
PER STD. DETAIL D11.5

5' WIDE MAINTENANCE ACCESS
RAMP 5:1 MAX. SLOPE

FLOW SPREADER AT
MINIMUM 50' INTERVAL

*SWALE BOTTOM—LONGITUDINAL SLOPE 1–2.5%
PROVIDE UNDERDRAINS FOR
SLOPES < 1.5%

*NOTE:
SWALE DESIGN REQUIRES A MINIMUM OF
9 MINUTES OF RESIDENCE TIME.
MINIMUM LENGTH = 100'

DITCH INLET PER
STD. DETAIL D6

OUTLET

NOTES:

1. THE DESIGN OF WATER QUALITY FACILITIES SHALL MEET THE DESIGN STANDARD AS SET FORTH IN CCC 40.385.
2. THIS DETAIL IS AN EXAMPLE BIOSWALE FOR STORMWATER TREATMENT.
3. SEE STANDARD SWALE SECTIONS, AND FLOW SPREADER DETAILS.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC

DWG: D11.1.DWG



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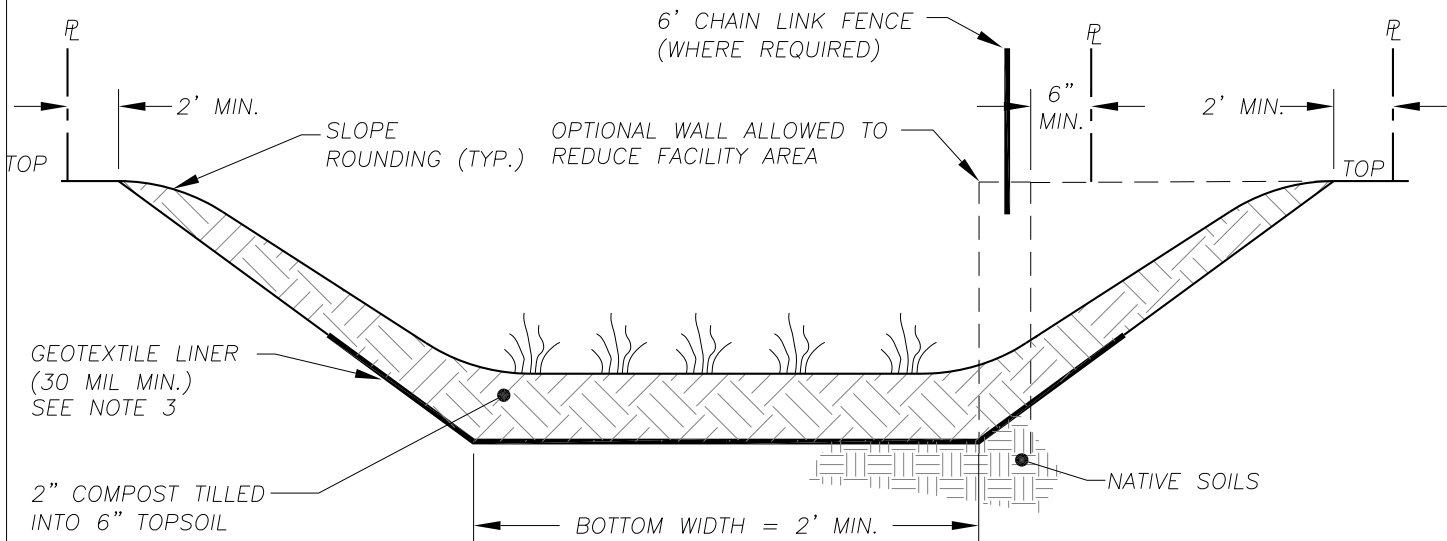
EXAMPLE BIOSWALE SCHEMATIC

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APPROVED

5/23/08
DATE

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DATE 05/23/08



WET/TREATMENT

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>% BY WEIGHT</u>
<i>Elymus glaucus</i>	blue wildrye	50%
<i>Deschampsia cespitosa</i>	tufted hairgrass	5%
<i>Glyceria occidentalis</i>	western mannagrass	10%
<i>Beckmannia syzigachne</i>	slough grass	10%
<i>Festuca rubra</i>	red fescue	15%
<i>Hordeum brachyantherum</i>	meadow barley	10%
TOTAL		100.0%

APPLICATION RATE IS APPROX. 20-40 lbs/ACRE

DRY/UPPER

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>% BY WIEGHT</u>
<i>Elymus glaucus</i>	blue wildrye	60%
<i>Festuca rubra</i>	red fescue	30%
<i>Bromus carinatus</i>	California brome	10%
TOTAL		100.0%

APPLICATION RATE IS APPROX. 40 lbs/ACRE

NOTE:

IF BIOSWALE IS INSTALLED DURING A PERIOD OF WET WEATHER, IT CAN BE ESTABLISHED BY SODDING. SINCE SOD IS NOT AVAILABLE IN RECOMMENDED GRASSES, IT SHOULD BE OVER SOWN WITH A RECOMMENDED MIX AT THE BEGINNING OF THE GROWING SEASON. IT IS RECOMMENDED TO INSTALL A SOD THAT IS A MIX OF CREEPING FESCUE AND HARD & SHEEP FESCUES.

NOTES:

1. THE DESIGN OF WATER QUALITY FACILITIES SHALL MEET THE STANDARD AS SET FORTH IN CCC 40.380.
2. SOD SHALL BE LAID PERPENDICULAR TO SLOPE FROM BOTTOM TO TOP, WITH JOINTS STAGGERED.
3. FOR NATIVE SOILS WITH CLASSIFICATIONS A-1-a, A-1-b, A-3, A-2-4, AND A-2-5 AS DEFINED IN AASHTO SPEC. M145, INSTALL A 30 MIL GOETEXTILE LINER OR EQUIVALENT WITH PERMEABILITY RATE OF (LESS THAN) 2.4 INCHES/HOUR.
4. SWALE LONGITUDINAL SLOPE: 1%-2.5% MAX. UNDERDRAINS REQUIRED FOR SLOPES LESS THAN 1.5%, SEE STD. DETAIL D11.3.
5. SWALE SHALL HAVE A VIABLE STAND OF GRASS APPROVED BY THE COUNTY INSPECTOR PRIOR TO PAVING.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: D11.2.DWG



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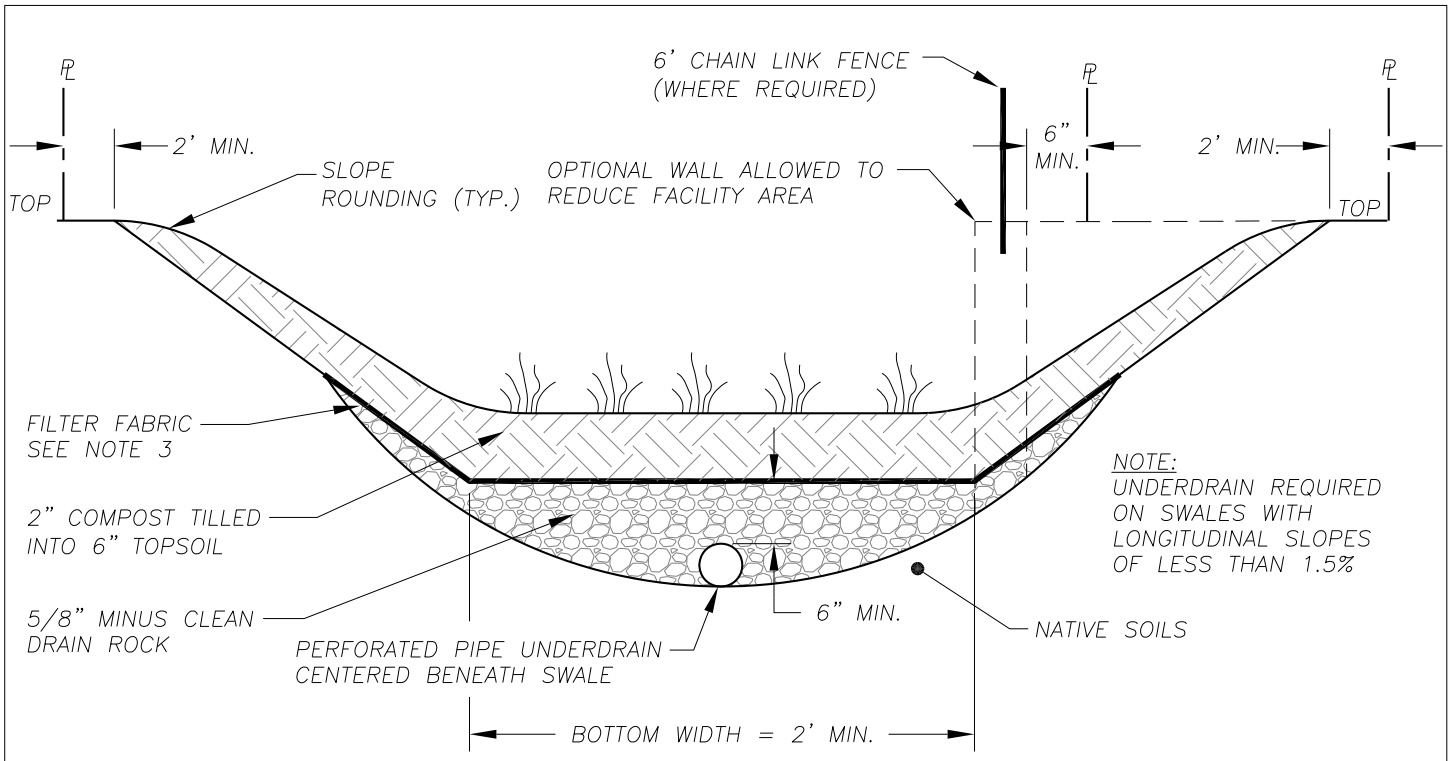
TYPICAL BIOSWALE SECTION

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

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D11.2
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



WET/TREATMENT

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>% BY WEIGHT</u>
<i>Elymus glaucus</i>	blue wildrye	50%
<i>Deschampsia cespitosa</i>	tufted hairgrass	5%
<i>Glyceria occidentalis</i>	western mannagrass	10%
<i>Beckmannia syzigachne</i>	slough grass	10%
<i>Festuca rubra</i>	red fescue	15%
<i>Hordeum brachyantherum</i>	meadow barley	10%
TOTAL		100.0%

APPLICATION RATE IS APPROX. 20-40 lbs/ACRE

DRY/UPPER

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>% BY WIEGHT</u>
<i>Elymus glaucus</i>	blue wildrye	60%
<i>Festuca rubra</i>	red fescue	30%
<i>Bromus carinatus</i>	California brome	10%
TOTAL		100.0%

APPLICATION RATE IS APPROX. 40 lbs/ACRE

NOTE:

IF BIOSWALE IS INSTALLED DURING A PERIOD OF WET WEATHER, IT CAN BE ESTABLISHED BY SODDING. SINCE SOD IS NOT AVAILABLE IN RECOMMENDED GRASSES, IT SHOULD BE OVER SOWN WITH A RECOMMENDED MIX AT THE BEGINNING OF THE GROWING SEASON. IT IS RECOMMENDED TO INSTALL A SOD THAT IS A MIX OF CREEPING FESCUE AND HARD & SHEEP FESCUES.

NOTES:

1. THE DESIGN OF WATER QUALITY FACILITIES SHALL MEET THE STANDARD AS SET FORTH IN CCC 40.385.
2. SOD SHALL BE LAID PERPENDICULAR TO SLOPE FROM BOTTOM TO TOP, WITH JOINTS STAGGERED.
3. INSTALL MIRAFI 140N FILTER FABRIC OR EQUIVALENT ABOVE DRAIN ROCK.
4. UNDERDRAIN MUST INFILTRATE OR DRAIN FREELY TO AN ACCEPTABLE DISCHARGE POINT.
5. SWALE SHALL HAVE A VIABLE STAND OF GRASS APPROVED BY THE COUNTY INSPECTOR PRIOR TO PAVING.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC

DWG: D11.3.DWG



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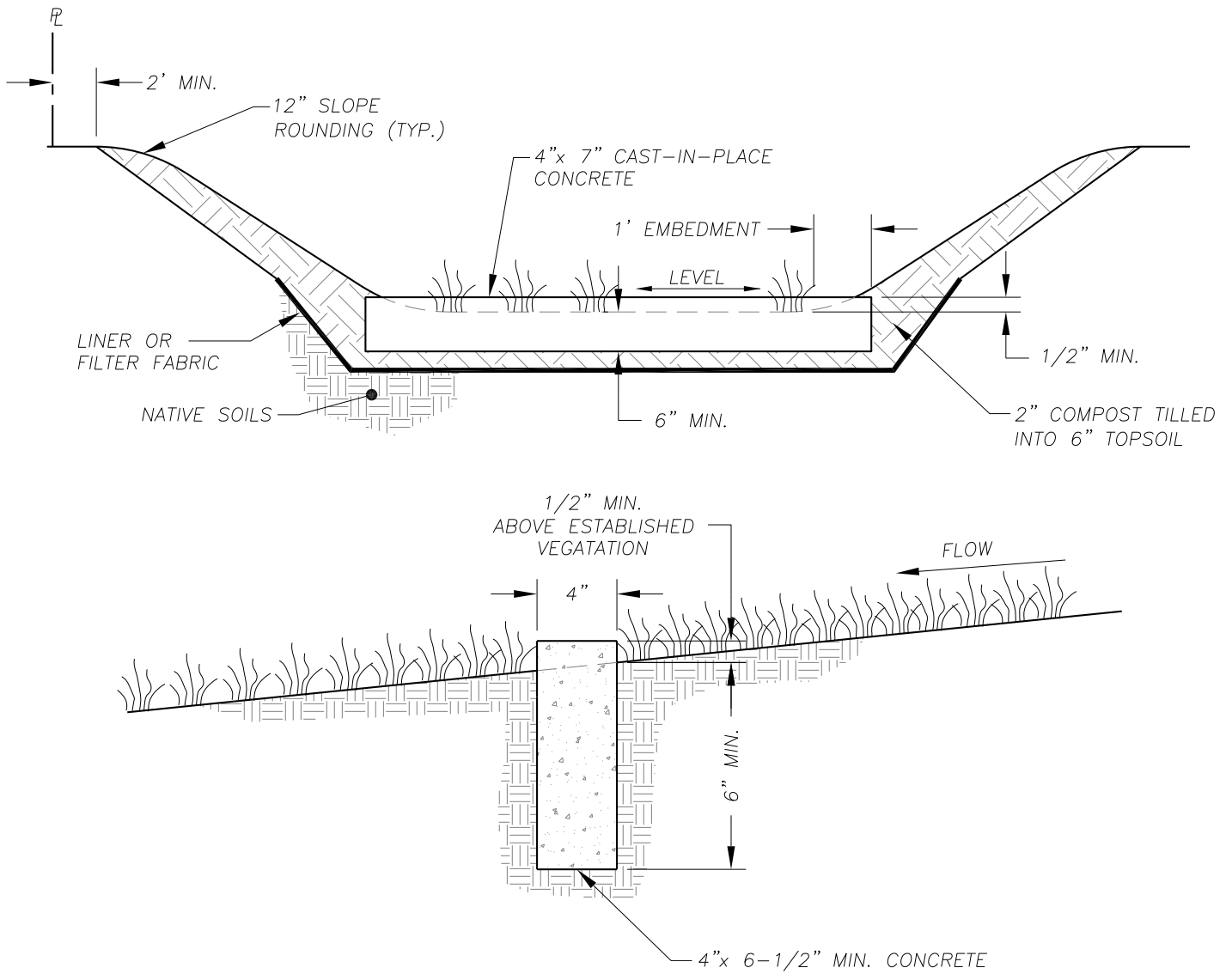
TYPICAL BIOSWALE SECTION WITH UNDERDRAIN

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COUNTY ENGINEER

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5/23/08
DATE

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D11.3
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DATE 05/23/08



NOTES:

1. LEVEL SPREADERS SHALL BE INSTALLED AT A MINIMUM INTERVAL OF 50', TO KEEP THE FLOWS FROM CONCENTRATING. THE SPREADER SHALL BE INSTALLED LEVEL AND ON CONTOUR.
2. CONCRETE SPREADER SHALL BE CAST-IN-PLACE. TOP OF SPREADER SHALL BE BROOM FINISHED IN THE DIRECTION OF FLOW.
3. SEE STD. DETAIL D11.2 FOR SEED MIX.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: D11.4.DWG



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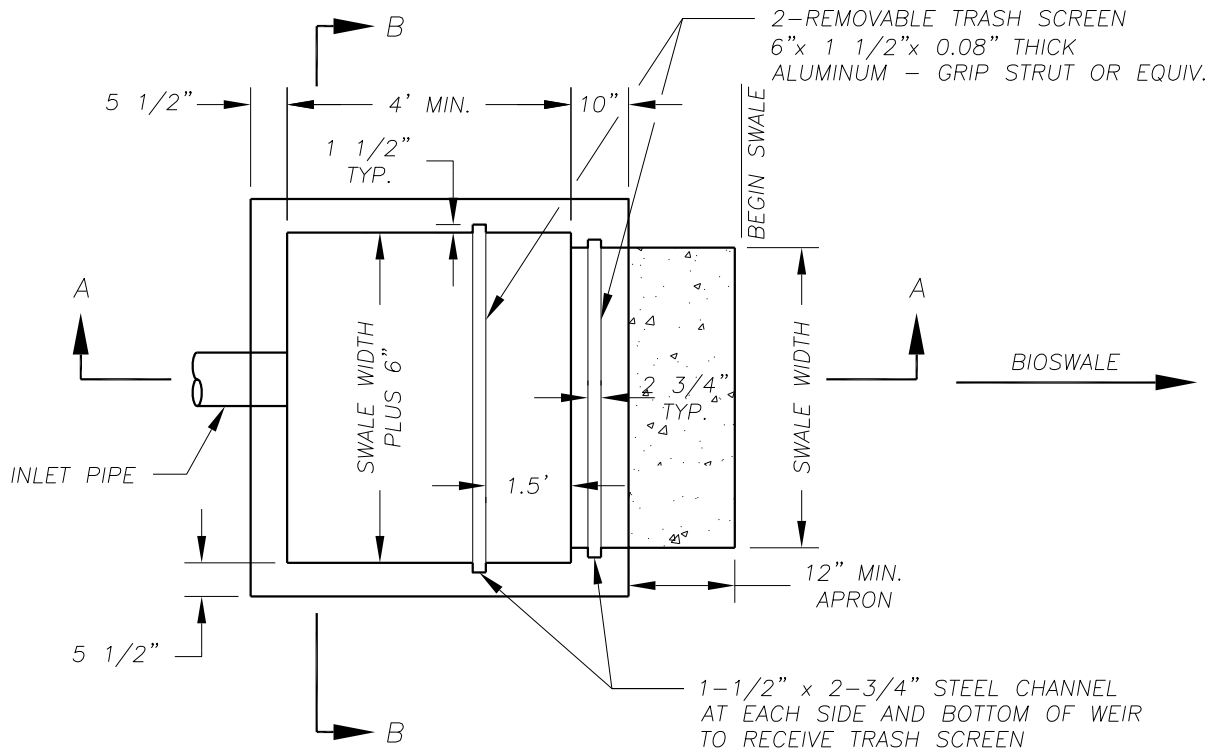
FLOW SPREADER CURB

Peter Capen
COUNTY ENGINEER

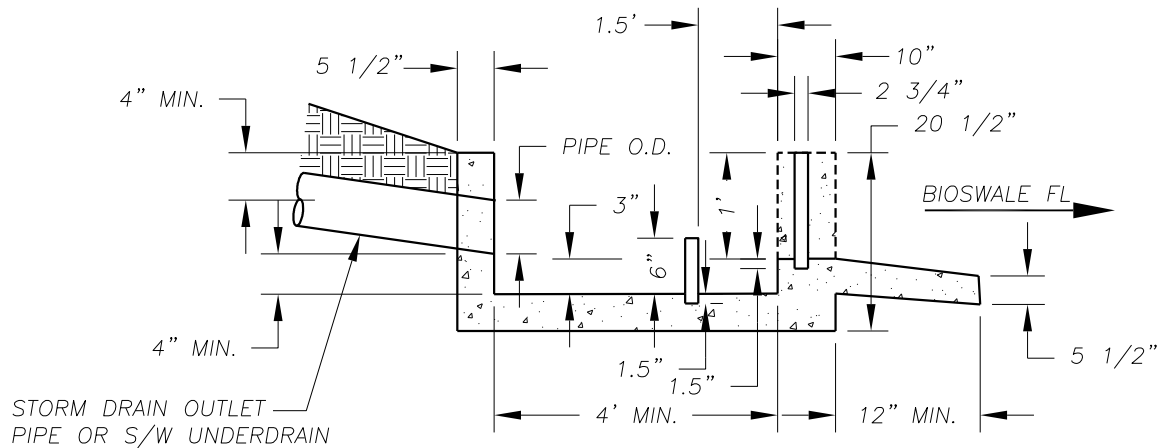
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5/23/08
DATE

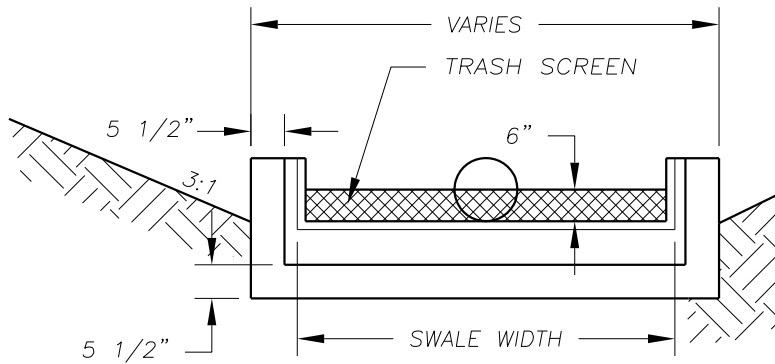
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DETAIL
DESIGNED
DRAWN
DATE 05/23/08



PLAN VIEW



SECTION A-A



SECTION B-B

NOTE:

1. ALL CONCRETE SHALL BE 3000 PSI.
2. STRUCTURE CAN BE USED AS AN AFFECTIVE TEMPORARY EROSION CONTROL SEDIMENTATION TRAP DURING SITE GRADING.
3. TRASH SCREEN CAN BE LINED WITH FILTER FABRIC FOR SEDIMENT REMOVAL.
4. BIOSWALE SEDIMENTATION TRAP IS REQUIRED WITH ALL BIOSWALES, UNLESS OMISSION APPROVED BY REVIEWING AUTHORITY.

NO.	REVISIONS	DATE	BY

DWG: D11.5.DWG



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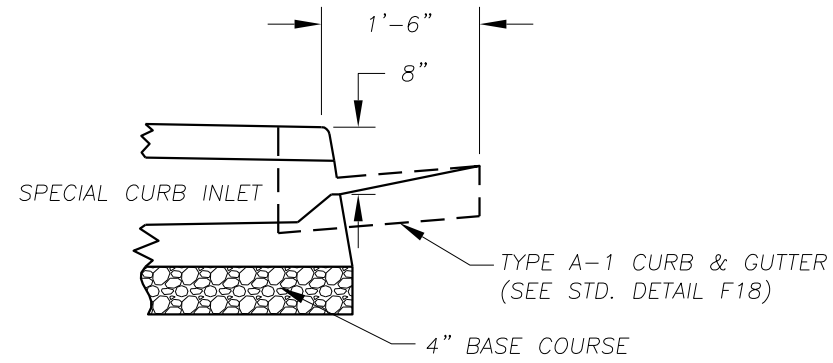
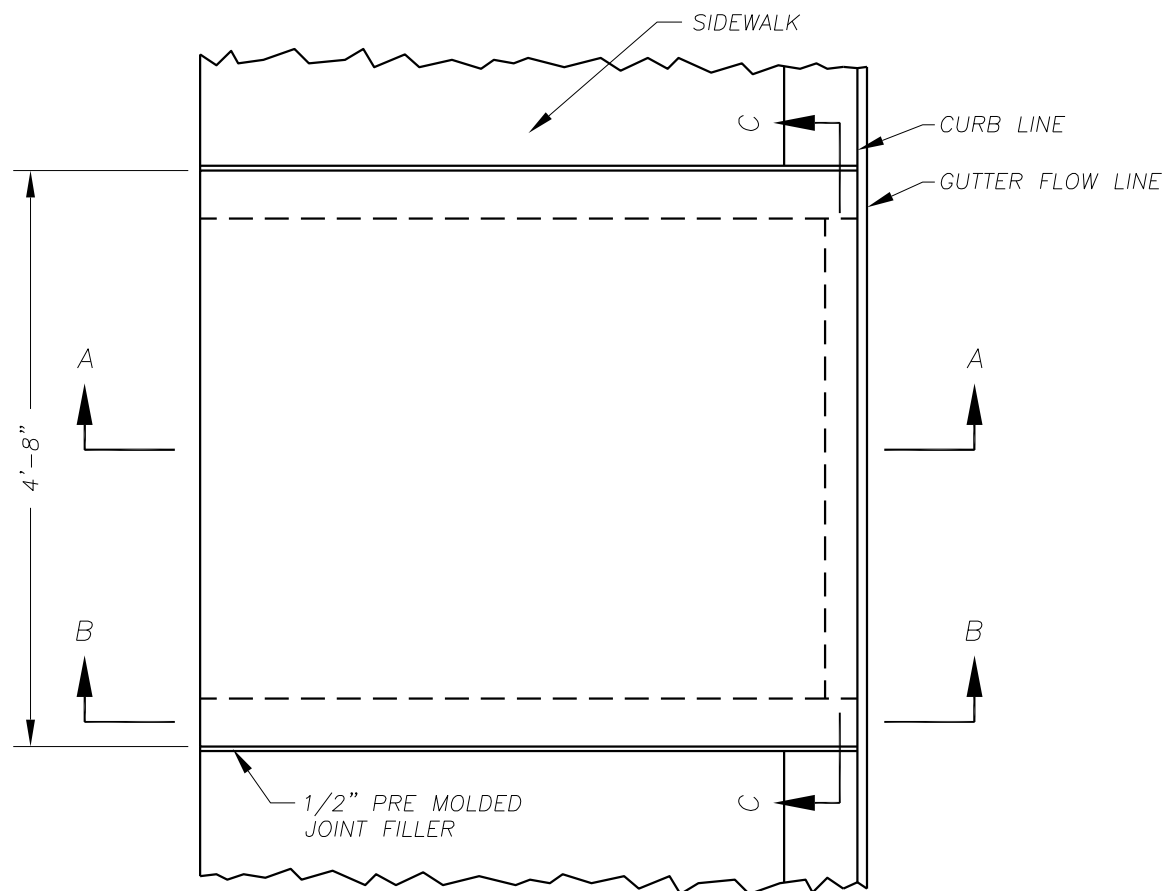
BIOSWALE SEDIMENTATION TRAP

Peter Capen
COUNTY ENGINEER

APPROVED

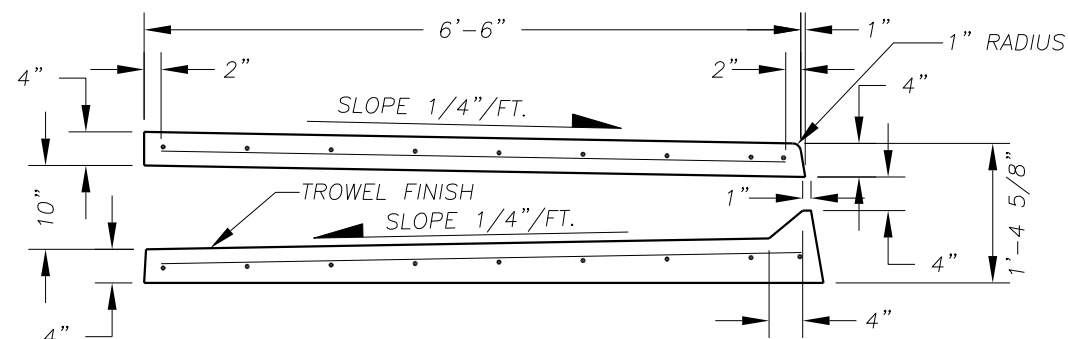
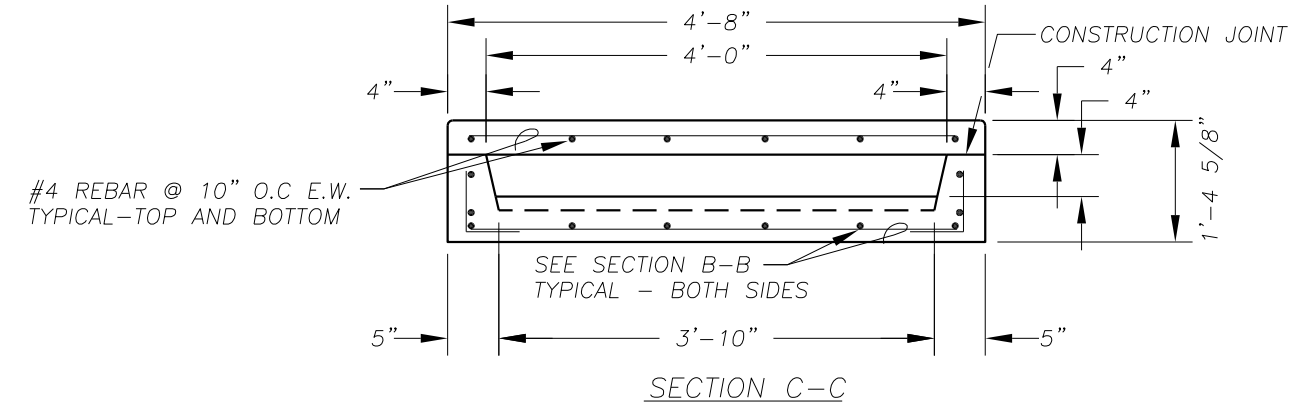
5/23/08
DATE

STANDARD
D11.5
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



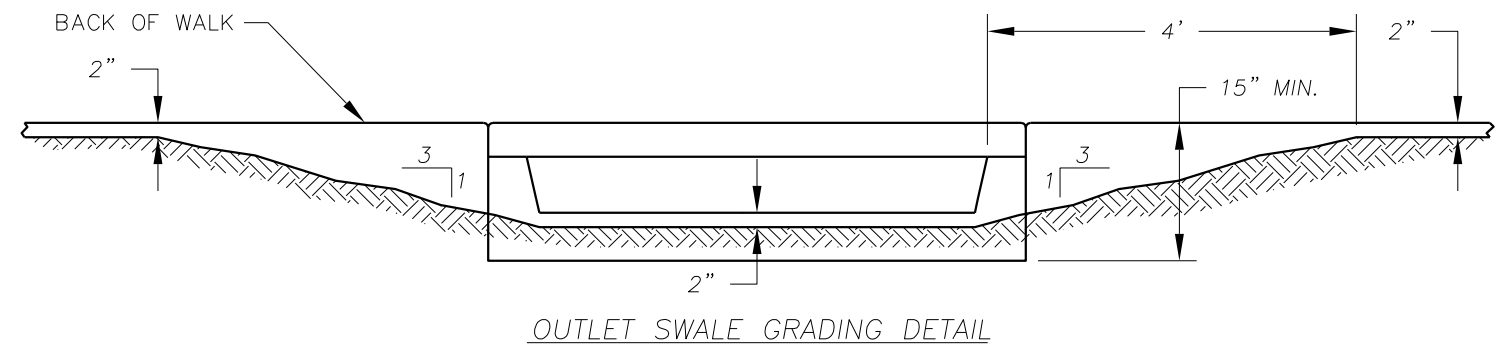
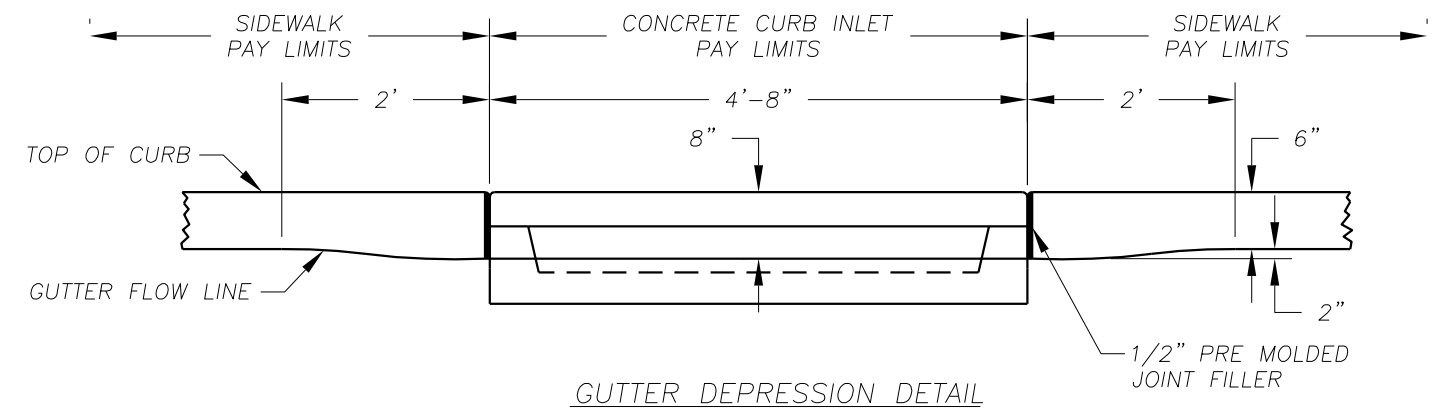
GENERAL NOTES:

1. CURB INLET SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M-199) & ASTM C 890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE PROJECT SPECIAL PROVISIONS.
2. TOP SURFACE TO BE BROOM FINISHED.
3. ALL EXTERNAL EDGES NOT LABELED SHALL BE TROWELLED WITH 1/4" RADIUS EDGER.



3/4" TAPER ALLOWED FOR FORM RELEASE

SECTION B-B (REBAR PLACEMENT)



NO.	REVISIONS	DATE	BY

DWG: D11.6.DWG



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CLARK COUNTY
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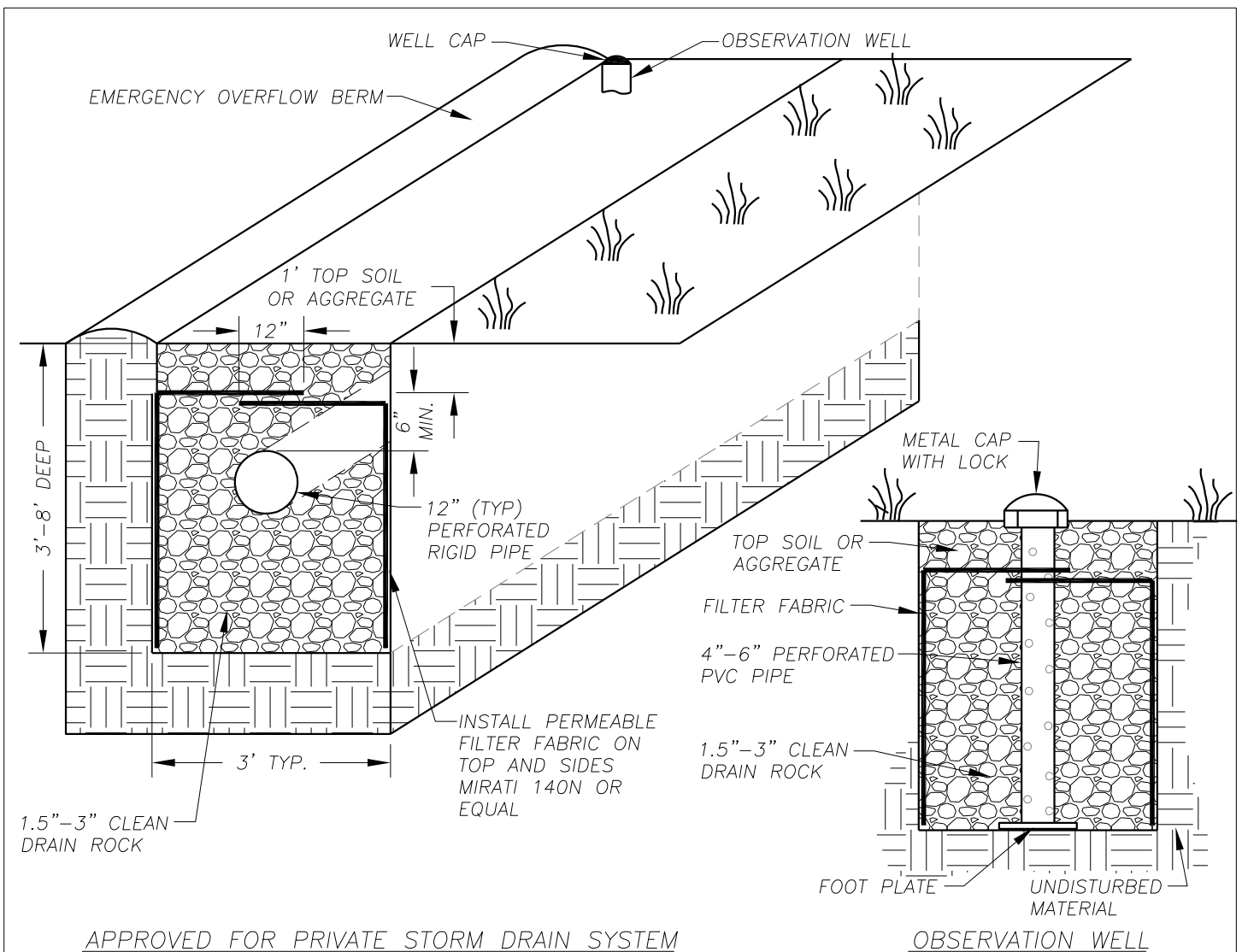
SPECIAL CURB INLET
OUTLET BEHIND WALK TO SWALE

Peter Capon
COUNTY ENGINEER

APPROVED

5/23/08
DATE

STANDARD
D11.6
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



APPROVED FOR PRIVATE STORM DRAIN SYSTEM

OBSERVATION WELL

NOTES:

1. DRAIN ROCK SHALL BE LINED ON BOTH SIDES AND OVER LAPPED ON TOP WITH GEOTEXTILE MATERIAL.
2. THE INFILTRATION TRENCH IS GENERALLY USED FOR SMALL DRAINAGE AREAS, AN EMERGENCY SPILLWAY MAY NOT BE NECESSARY. HOWEVER, AN OVERFLOW OUTLET MAY BE REQUIRED TO BE PROVIDED.
3. AN OBSERVATION WELL SHOULD BE INSTALLED AT THE LOWER END OF THE INFILTRATION TRENCH TO CHECK WATER LEVELS, DRAWDOWN TIME, SEDIMENT ACCUMULATION, AND CONDUCT WATER QUALITY MONITORING. FOR LARGER TRENCHES A 12"-36" WELL CAN BE INSTALLED TO FACILITATE MAINTENANCE OPERATIONS SUCH AS PUMPING OUT OF SEDIMENT. THE TOP OF THE WELL IS TO BE CAPPED TO DISCOURAGE VANDALISM AND TAMPERING. PUBLIC INFILTRATION TRENCH REQUIRES A CLEANOUT TO BE INSTALLED AT END OF PERFORATED PIPE.
4. THE STONE AGGREGATE IS TO BE PLACED IN LIFTS AND COMPACTED USING PLATE COMPACTORS. THE MAXIMUM LOOSE LIFT THICKNESS IS TO BE 12".
5. FOLLOWING THE DRAIN ROCK PLACEMENT, THE GEOTEXTILE MUST BE FOLDED OVER THE TOP TO FORM A 12" MINIMUM LONGITUDINAL OVERLAP. THE UPSTREAM ROLL SHALL OVERLAP A MINIMUM OF 2' OVER THE DOWNSTREAM ROLL (PROVIDE SHINGLE AFFECT).
6. VOIDS BETWEEN THE GEOTEXTILE AND THE EXCAVATION SIDES MUST BE AVOIDED.
7. IF VERTICALLY EXCAVATED WALLS BECOME DIFFICULT TO MAINTAIN, USE TRAPEZOIDAL SECTION.

NO.	REVISIONS	DATE	BY

DWG: D12.DWG



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COUNTY ENGINEER

INFILTRATION TRENCH
PRIVATE

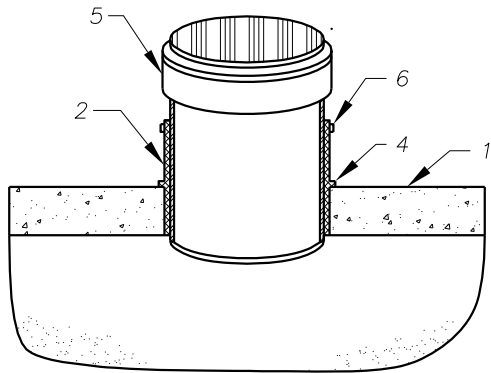
APPROVED

5/23/08
DATE

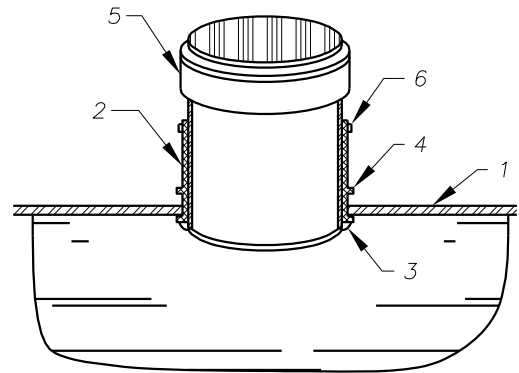
STANDARD
D12
DETAIL
DESIGNED
DRAWN
DATE 05/23/08

NOTE:

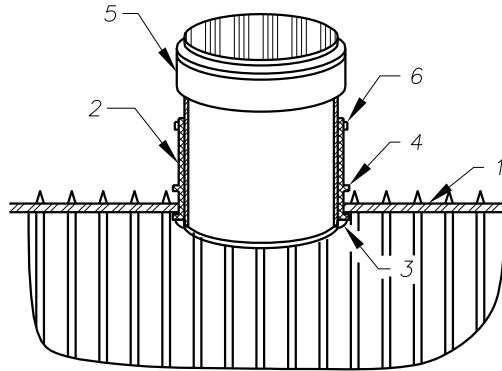
AIR TIGHT SEAL IS ACCOMPLISHED WHEN PVC HUB (NO. 5) IS DRIVEN INTO RUBBER SLEEVE (NO. 2) CAUSING THE RUBBER SLEEVE TO COMPRESS BETWEEN PIPE WALL (NO. 1).



CONCRETE OR CLAY



PVC



PROFILE WALL

NOTES:

1. MAINLINE PIPE WALL WHERE BRANCH LINE IS CONNECTED.
2. COMPLETE RUBBER SLEEVE CONSISTING OF C-443 SPECIFICATIONS.
3. RUBBER SEGMENT WHICH IS MOLDED ONTO THE RUBBER SLEEVE. THIS SEGMENT SNAPS OUT ON THE INSIDE OF THE DRILLED HOLE (PLASTIC PIPE ONLY) AND HELPS HOLD THE FITTING IN PLACE, NOT CREATING THE SEAL.
4. RUBBER SEGMENT WHICH IS MOLDED INTO THE RUBBER SLEEVE. THIS PREVENTS THE RUBBER SLEEVE FROM GOING THROUGH THE DRILLED HOLE WHEN PVC HUB IS BEING DRIVEN INTO THE RUBBER SLEEVE.
5. SDR-35 PVC HUB (ASTM D-3034 SEWER PIPE) WHICH IS DRIVEN INTO THE CENTER OF THE RUBBER SLEEVE AFTER THE RUBBER SLEEVE IS IN THE HOLE.
6. STAINLESS STEEL BAND. PUT ON ABOVE AS AN ADDED PRECAUTION.

NO.	REVISIONS	DATE	BY

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TYPICAL SADDLE TAPS/TEES

Peter Capen
COUNTY ENGINEER

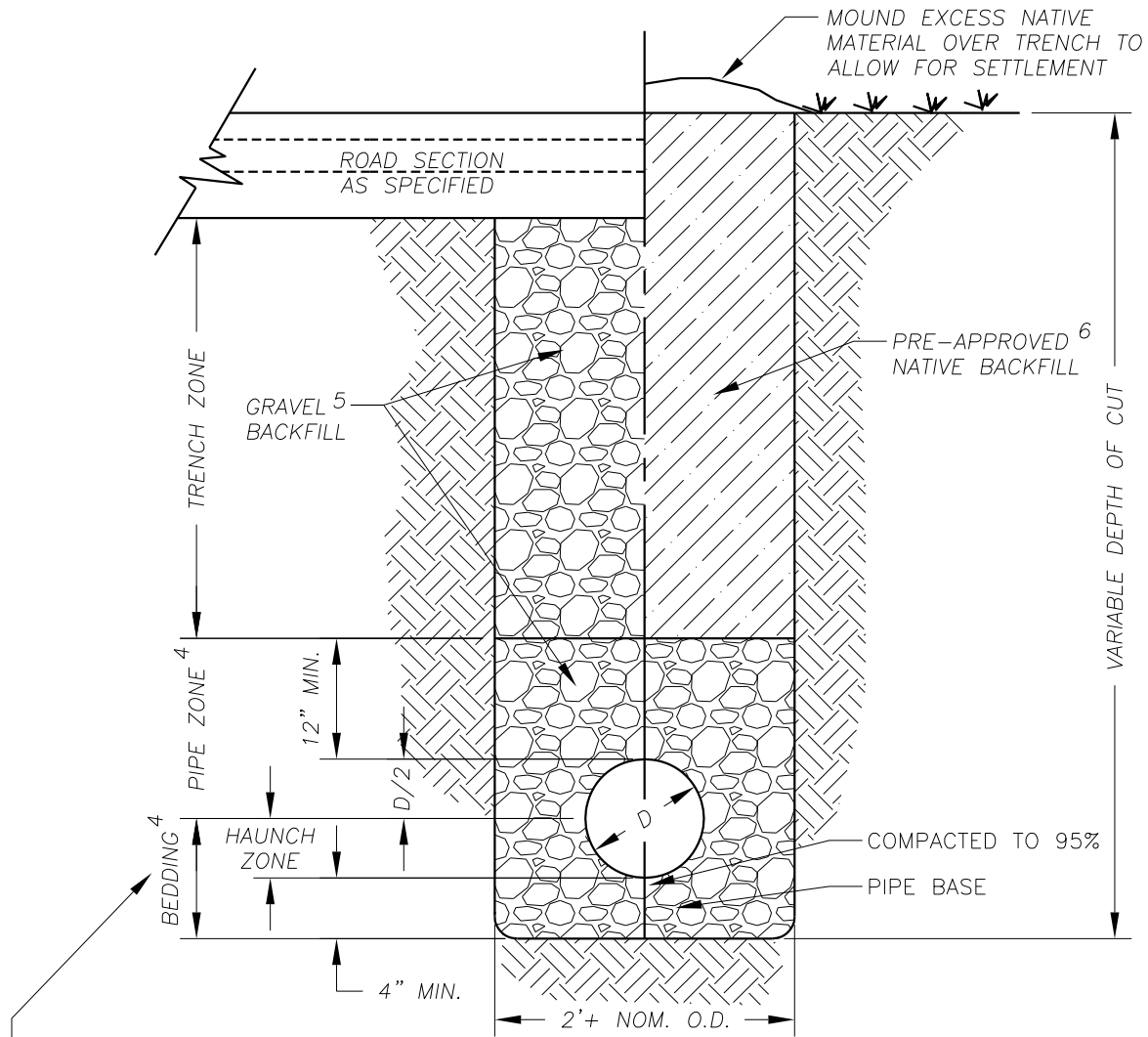
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5/23/08
DATE

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DETAIL
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DRAWN
DATE 05/23/08

TRAFFIC AREAS

NON-TRAFFIC AREAS




1/2 PIPE O.D. PLUS 4" MIN. FOR PIPE SMALLER THAN 12"
 1/2 PIPE O.D. PLUS 6" MIN. FOR PIPE 12" AND LARGER

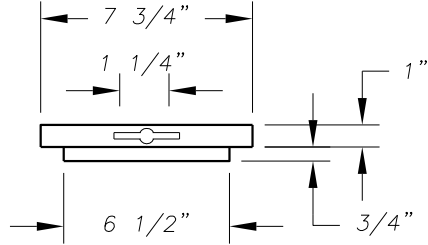
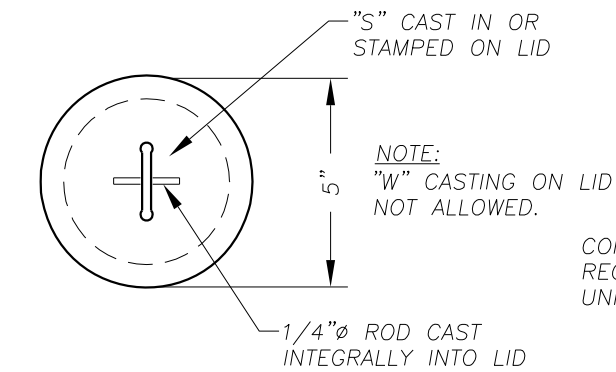
NOTES:

1. FOR INSTALLATION OF DRAINAGE PIPE IN NEW DEVELOPMENT.
2. GENERAL PIPE INSTALLATION REQUIREMENTS SHALL BE PER SECTION 7-08 OF WSDOT STANDARD SPECIFICATIONS.
3. TRENCH BACK FILL SHALL CONFORM TO CCC 40.350.030(C)(4)(e).
4. PIPE ZONE AND BEDDING MATERIAL SHALL CONFORM TO WSDOT STANDARD SPECIFICATIONS 9-03.12(3)
5. GRAVEL BACKFILL PER WSDOT SPECIFICATIONS SECTION 9-03.19, AND COMPACTED TO 95% MAX. DENSITY (AASHTO T-99). NATIVE SOILS MAY BE USED UPON APPROVAL BY REVIEWING AUTHORITY IF TESTING SHOWS MATERIAL IS CLASSIFIED AS A-1 OR A-3 BY AASHTO.
6. OUTSIDE THE ROADWAY PRISM, SUITABLE NATIVE BACKFILL SHALL BE COMPACTED TO 90% MAX. DENSITY (AASHTO T-99).
7. ALL COMPACTION SHALL BE IN ACCORDANCE WITH THE COMPACTION CONTROL TEST OF WSDOT STANDARD SPECIFICATIONS 2-03.3(14)D.

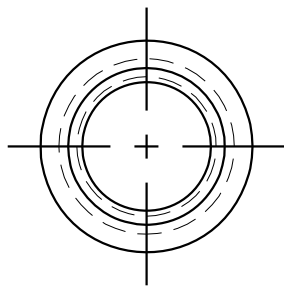
NO.	REVISIONS	DATE	BY

DWG: D14.DWG

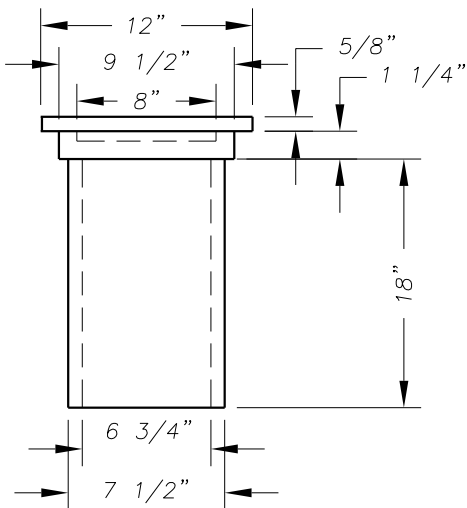
 <p>Department of Public Works CLARK COUNTY WASHINGTON proud past, promising future</p>	<p>PIPE BEDDING AND BACKFILL</p> <p><i>Peter Capen</i> APPROVED COUNTY ENGINEER</p>	<p>STANDARD D14 DETAIL</p> <p>DESIGNED DRAWN DATE 05/23/08</p>
	<p>5/23/08 DATE</p>	



COVER

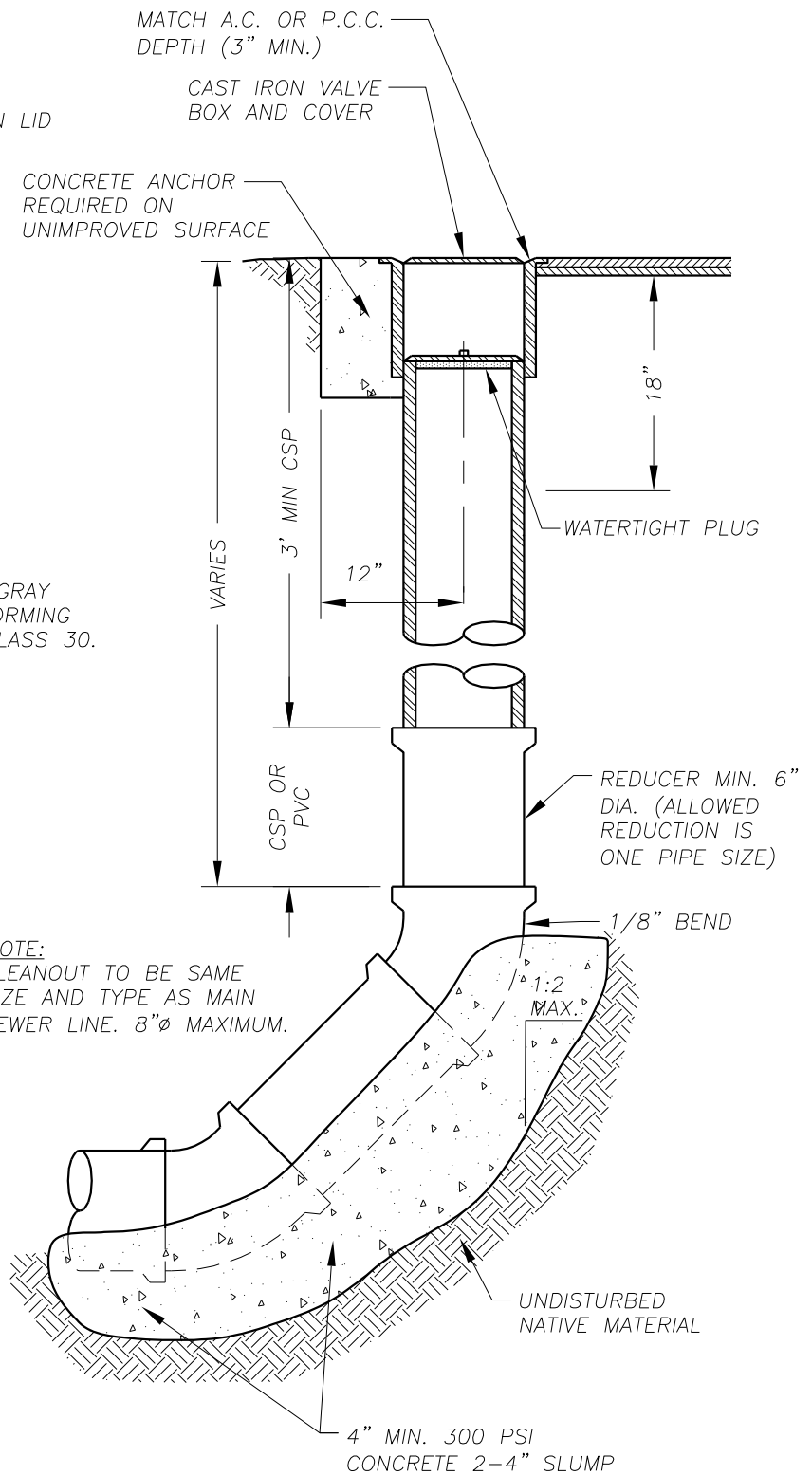


NOTE:
TOLERANCE = 1/8".



CAST IRON VALVE BOX AND COVER NO. 910

VALVE BOX SHALL BE FORT VANCOUVER PATTERN NO. 910 CAST IRON OR APPROVED EQUAL



NO.	REVISIONS	DATE	BY

DWG: D15.DWG



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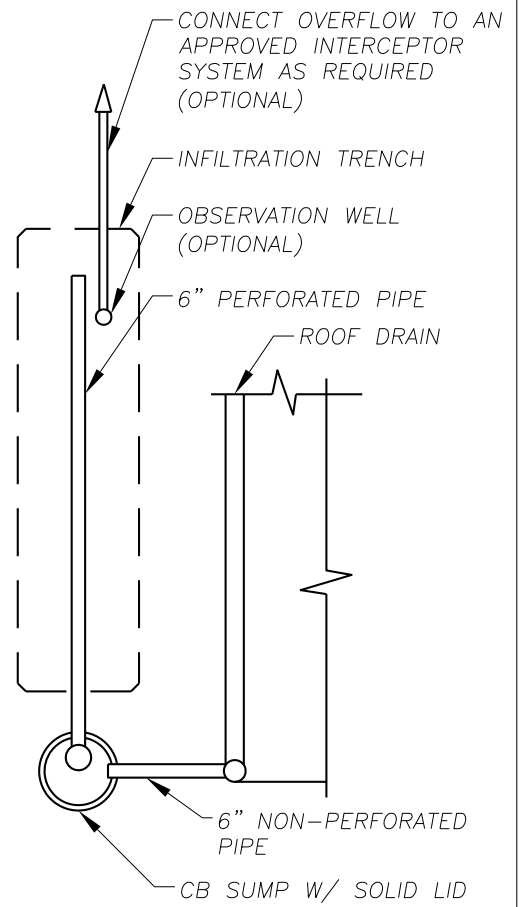
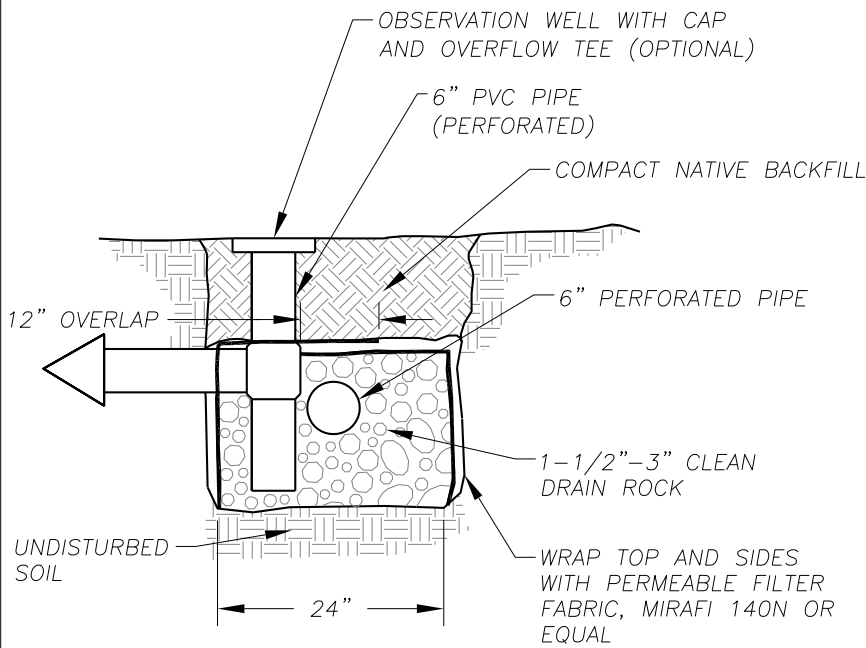
Peter Capen
 COUNTY ENGINEER

SEWER CLEANOUT

APPROVED

5/23/08
 DATE

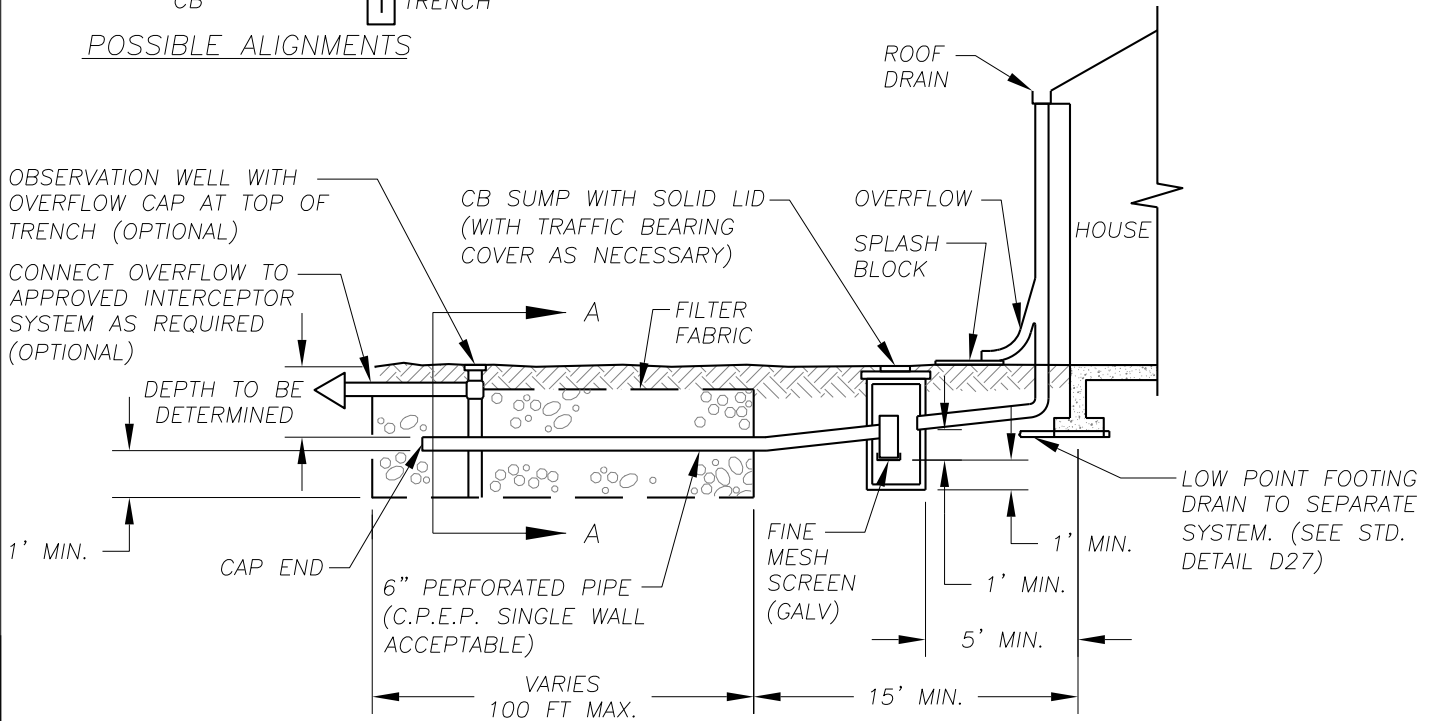
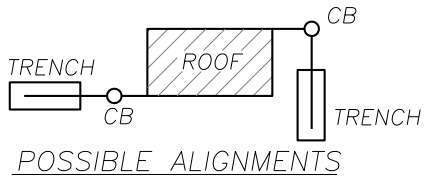
STANDARD
D15
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



SECTION A-A

NOTE:

1. TRENCH TO BE LOCATED 100' MIN. FROM SEPTIC DRAINFIELD (WHERE APPLICABLE).



NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: D16.0.DWG



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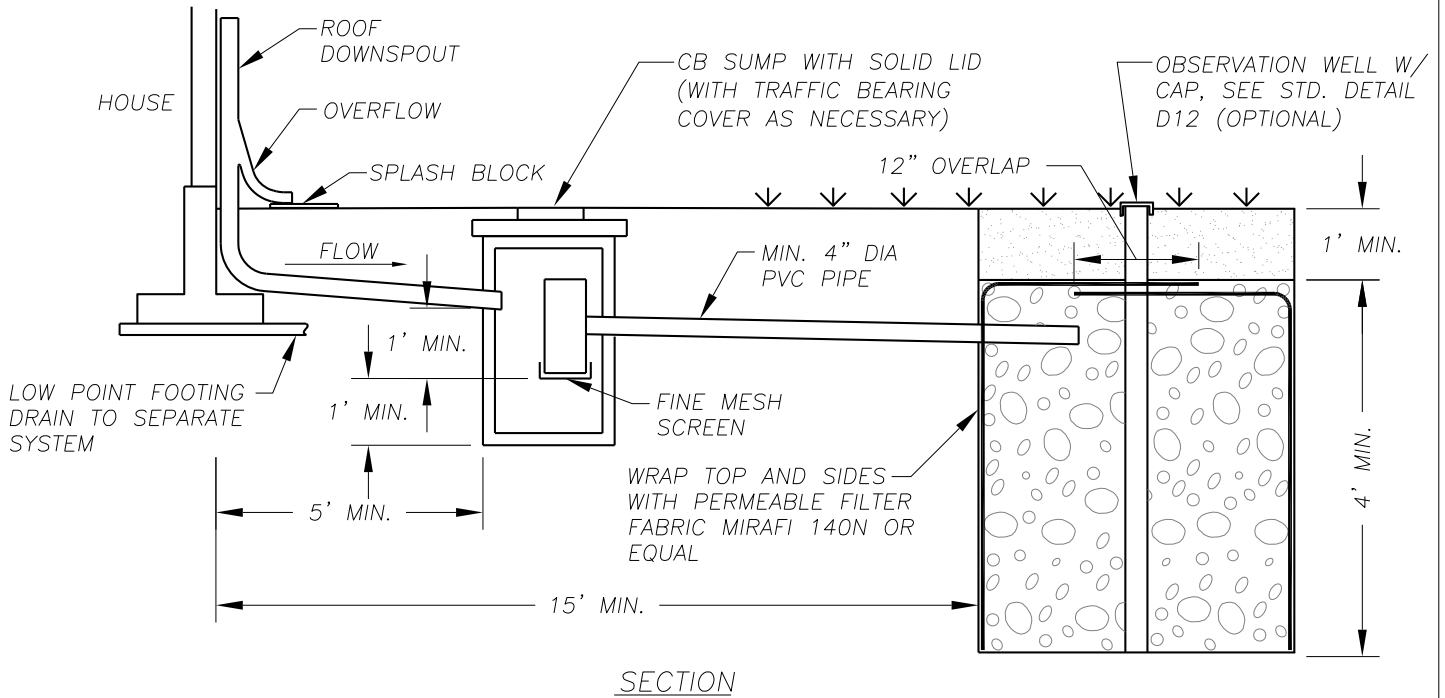
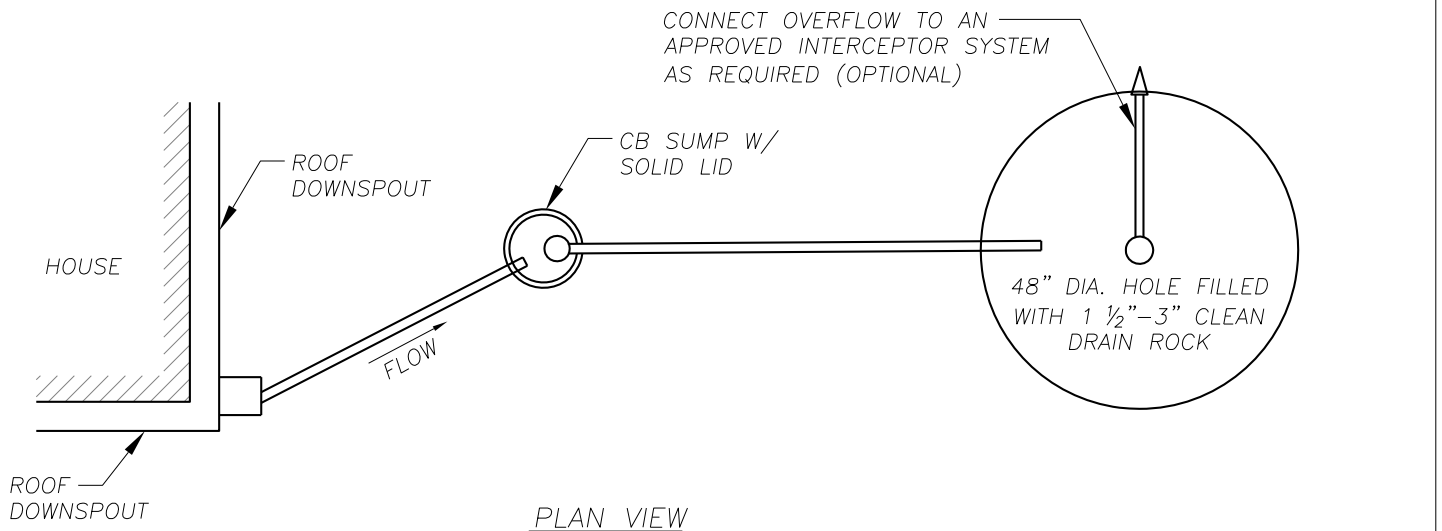
TYPICAL DOWNSPOUT INFILTRATION SYSTEM
INFILTRATION TRENCH (SINGLE-FAMILY HOME)

Peter Capen
COUNTY ENGINEER

APPROVED

5/23/08
DATE

STANDARD
D16.0
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTE:

1. DRYWELL TO BE LOCATED 100' MIN. FROM SEPTIC DRAINFIELD (WHERE APPLICABLE).

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC

DWG: D16.1.DWG



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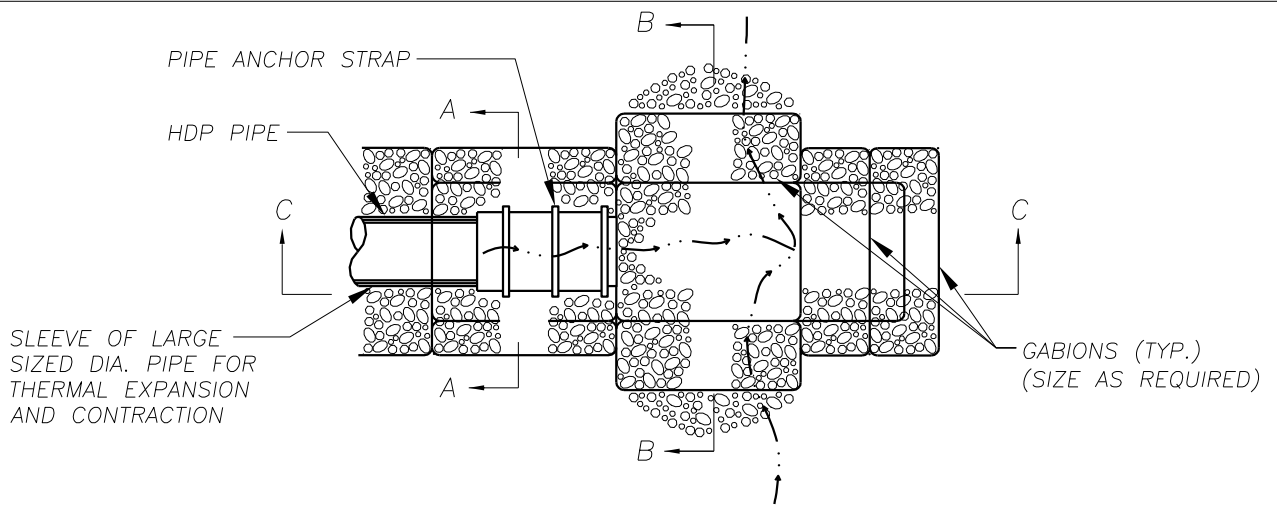
TYPICAL DOWNSPOUT INFILTRATION SYSTEM
DRYWELL (SINGLE-FAMILY HOME)

APPROVED

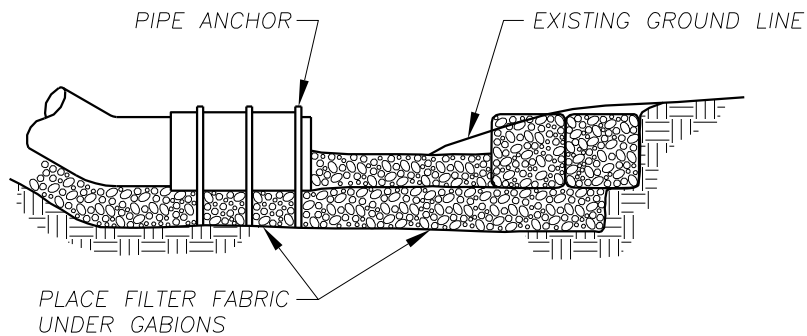
Peter Capen
COUNTY ENGINEER

5/23/08
DATE

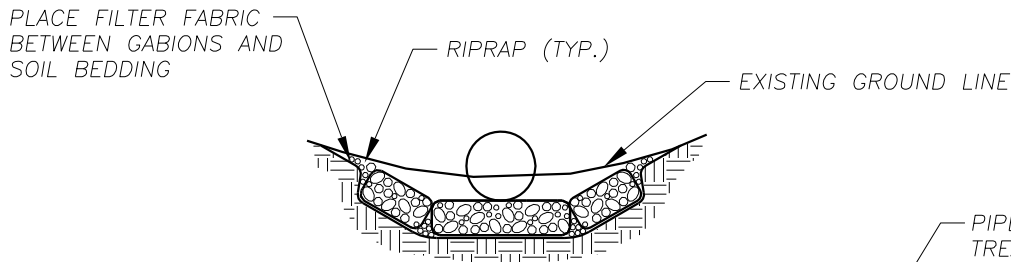
STANDARD
D16.1
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



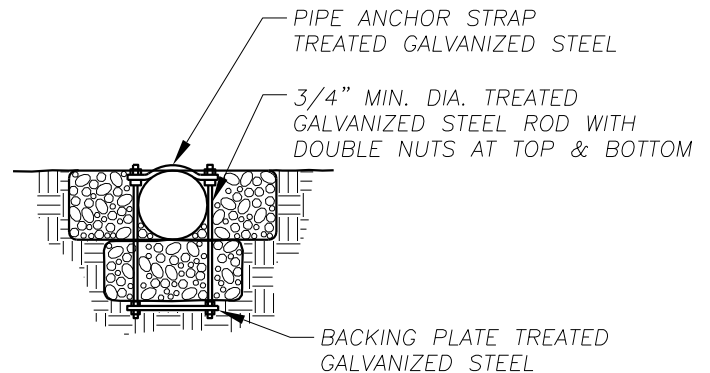
PLAN VIEW



SECTION C-C



SECTION A-A



SECTION B-B

NOTE:

1. GABION CRIBBING TO BE INSTALLED PER WSDOT SPECIFICATIONS 8-24.3(3) AND 9-27.3.
2. STONE FOR FILLING GABIONS SHALL CONFORM TO WSDOT SPECIFICATIONS 9-27.3(6).

NO.	REVISIONS	DATE	BY

DWG: D17.DWG



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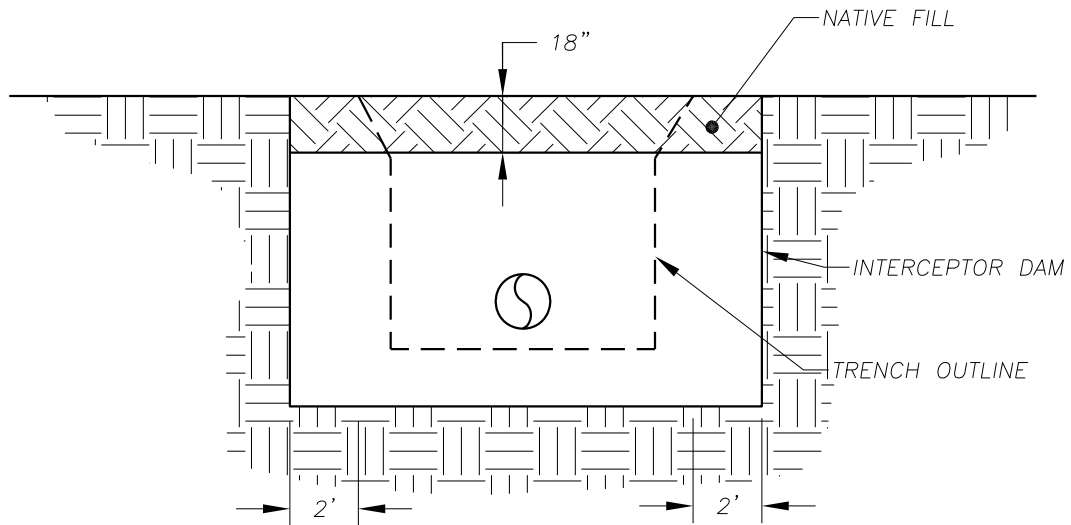
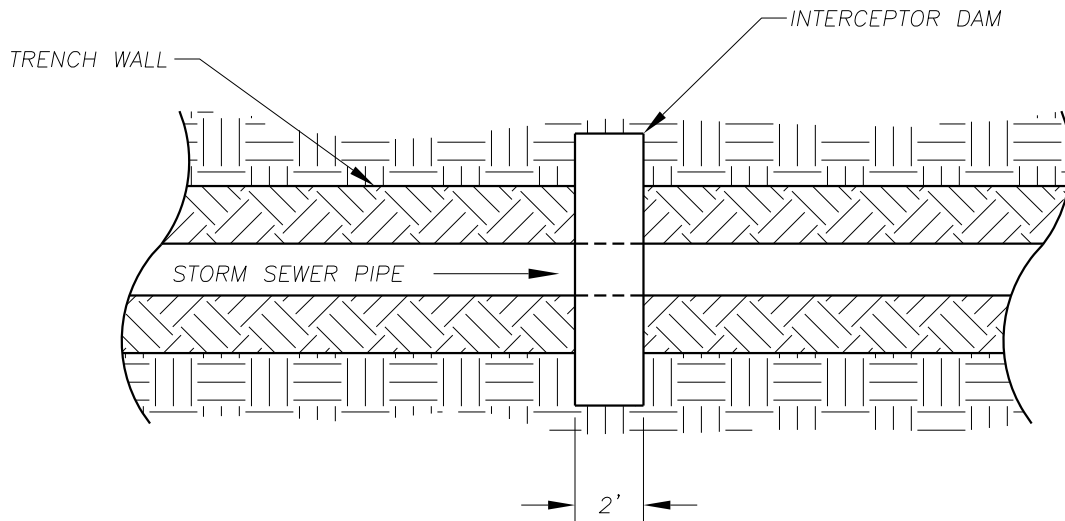
Peter Capen
COUNTY ENGINEER

GABION OUTFALL

APPROVED

5/23/08
DATE

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D17
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTE:

1. CUTOFF WALLS SHALL BE USED AS NEEDED TO PREVENT MIGRATION OF WATER INTO TRENCH BACKFILL.
2. ALTERNATE DESIGNS SHALL BE ALLOWED.
3. CUTOFF WALLS SHALL BE OF A MATERIAL WITH PERMEABILITY OF NO GREATER THAN 1×10^{-6} CM/S.

NO.	REVISIONS	DATE	BY

DWG: D18.DWG



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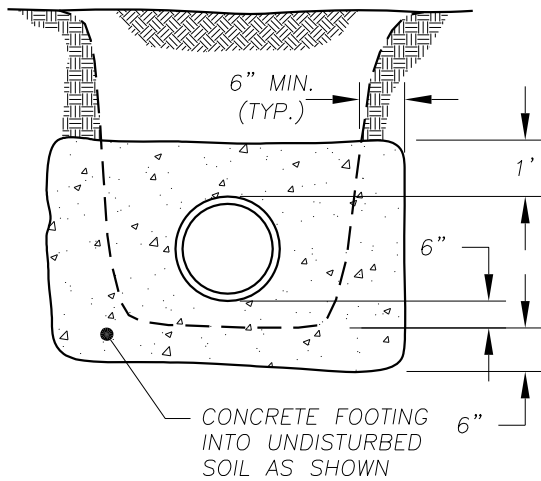
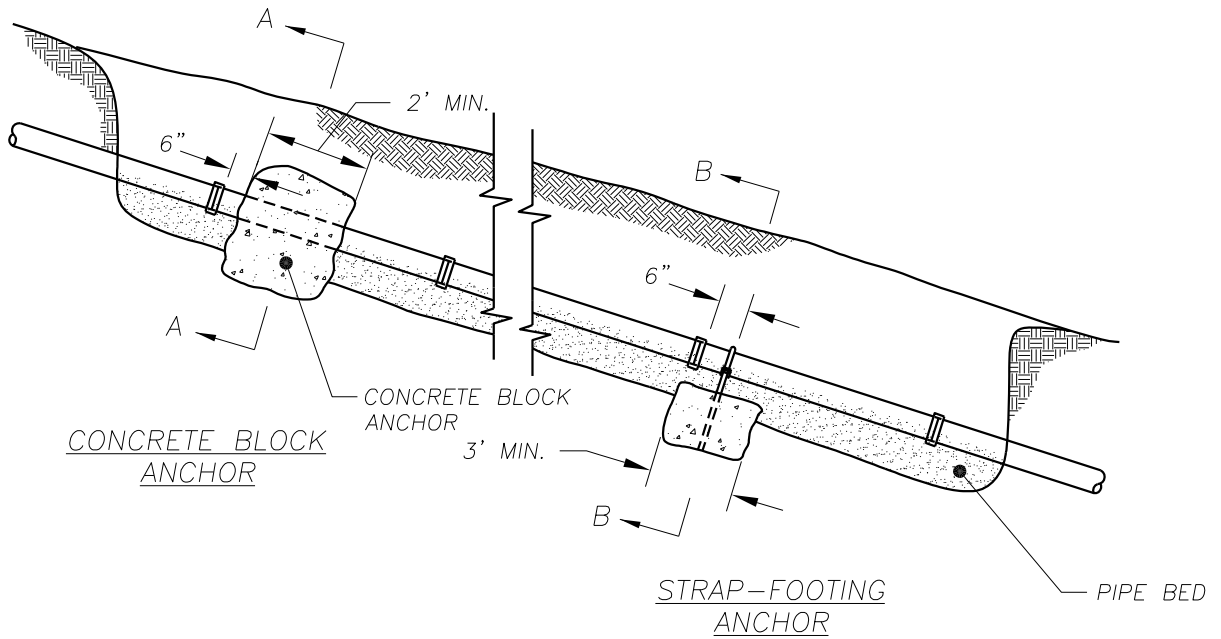
Peter Capen
COUNTY ENGINEER

CUTOFF WALL

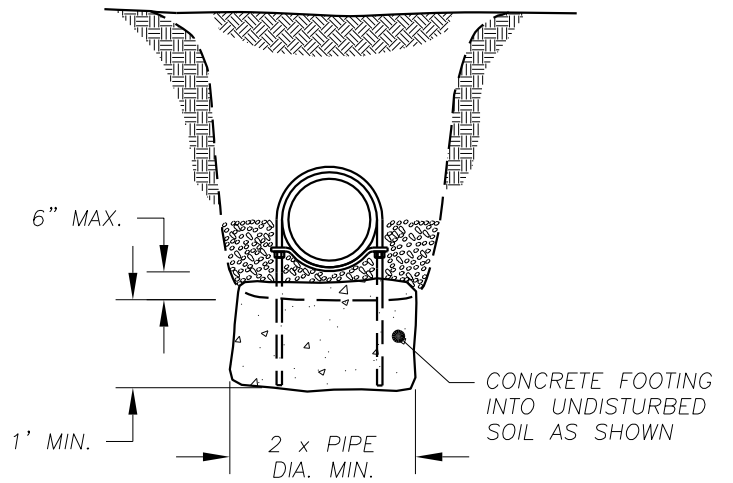
APPROVED

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DETAIL
DESIGNED
DRAWN
DATE 05/23/08



SECTION A-A



SECTION B-B

NOTES:


1. FOR HDPP, PIPE MUST BE FREE TO SLIDE INSIDE A 4' LONG SECTION OF PIPE ONE SIZE DIAMETER LARGER.
2. ON SLOPES OF 15% OR GREATER, PIPE SHALL HAVE WATERTIGHT JOINTS.

NO.	REVISIONS	DATE	BY

DWG: D22.DWG



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PIPE ANCHOR		STANDARD D22
APPROVED		DETAIL
 COUNTY ENGINEER		DESIGNED
5/23/08		DRAWN
DATE		DATE 05/23/08

MATERIAL TO BE ASTM A 36
1/4" PLATE GALVANIZED AFTER
FABRICATION PER ASTM A 123

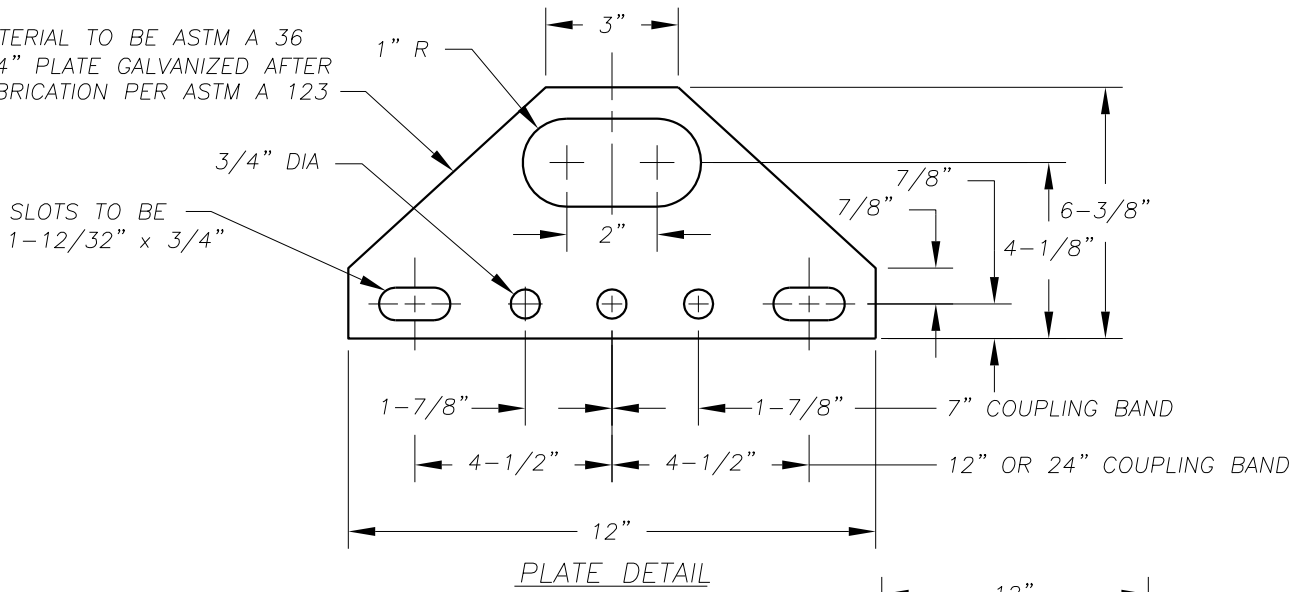
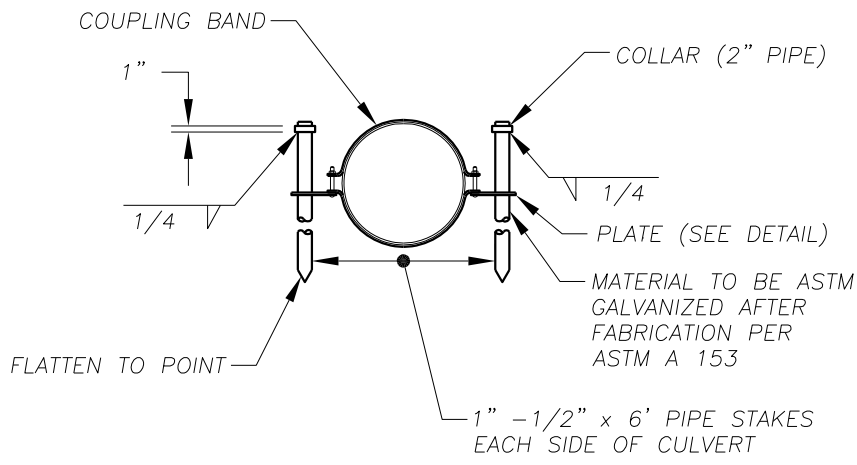
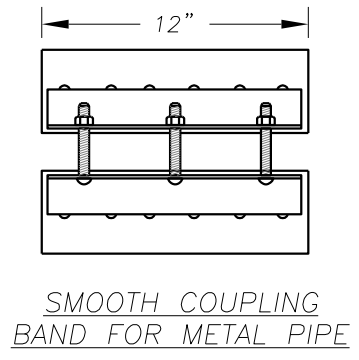


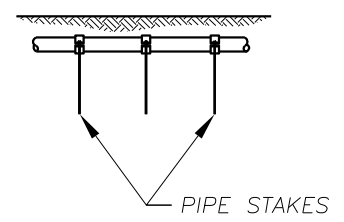
PLATE DETAIL



ANCHOR ASSEMBLY - CORRUGATED
METAL PIPE (OR EQUIVALENT)



SMOOTH COUPLING
BAND FOR METAL PIPE



PIPE STAKES

NOTES:

1. PAYMENT FOR PIPE ANCHORS WHICH SHALL INCLUDE ALL PIPE STOKES AND HARDWARE SHALL BE CONSIDERED AS INCIDENTAL AND SHALL NOT BE INCLUDED IN THE PER LINEAR FOOT COST OF PIPE.
2. THE SMOOTH COUPLING BAND SHALL BE USED IN COMBINATION WITH CONCRETE PIPE.
3. CONCRETE PIPE WITHOUT BELL AND SPIGOT SHALL NOT BE INSTALLED ON GRADES IN EXCESS OF 20%.
4. THE FIRST ANCHOR SHALL BE INSTALLED ON THE FIRST SECTION OF THE LOWER END OF THE PIPE. AND REMAINING ANCHORS EVENLY SPACED THROUGHOUT THE INSTALLATION.
5. IF THE PIPE BEING INSTALLED HAS A MANHOLE OR CATCH BASIN ON THE LOWER END OF THE PIPE, THE FIRST PIPE ANCHOR MAY BE ELIMINATED.
6. WHEN C.M.P. IS USED, THE ANCHORS MAY BE ATTACHED TO THE COUPLING BONDS USED TO JOIN THE PIPE AS LONG AS THE SPECIFIED SPACING IS NOT EXCEEDED.
7. ALL PIPE ANCHORS SHALL BE SECURELY INSTALLED BEFORE BACKFILLING AROUND THE PIPE.

NO.	REVISIONS	DATE	BY

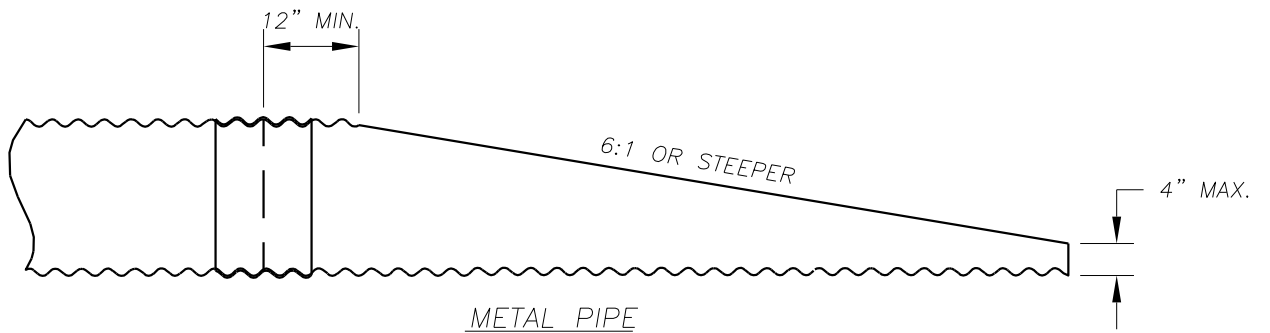
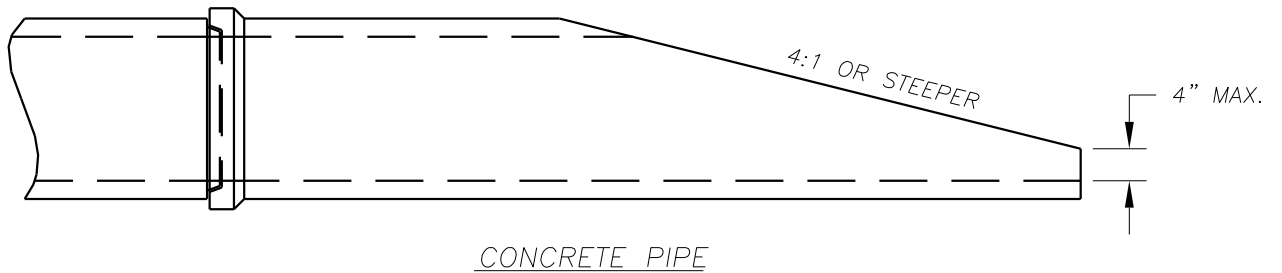
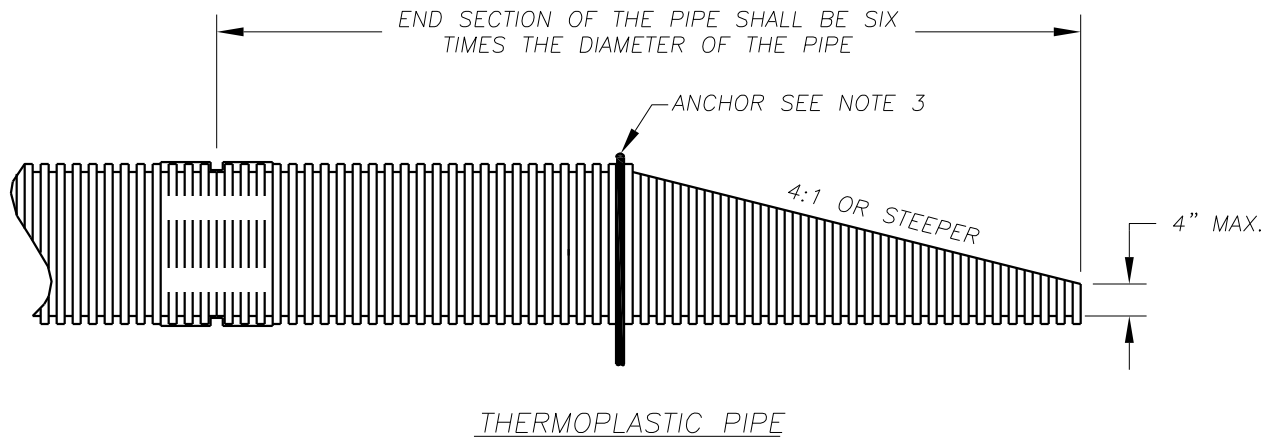
DWG: D23.DWG



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CORRUGATED METAL PIPE
COUPLING/ANCHOR
Peter Capen
APPROVED
5/23/08
DATE

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D23
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DESIGNED
DRAWN
DATE 05/23/08



NOTES:

1. THE CULVERT ENDS SHALL BE BEVELED TO MATCH THE EMBANKMENT OR DITCH SLOPE, WITHOUT EXCEEDING THE LIMITS SHOWN ON THE PLAN.
2. FIELD CUT OF CULVERT ENDS IS PERMITTED, WHEN APPROVED BY THE ENGINEER. ALL FIELD CUT PIPE CULVERTS SHALL BE TREATED WITH TREATMENT SHOWN IN THE STANDARD SPECIFICATION OR GENERAL SPECIAL PROVISIONS.
3. THE END OF THERMOPLASTIC PIPE SHALL BE ANCHORED. SEE STD. DETAIL D22.
4. FOR PIPES 18" OR LARGER, TRASH SCREEN REQUIRED. SEE STD. DETAIL D25.

NO.	REVISIONS	DATE	BY

DWG: D24.DWG



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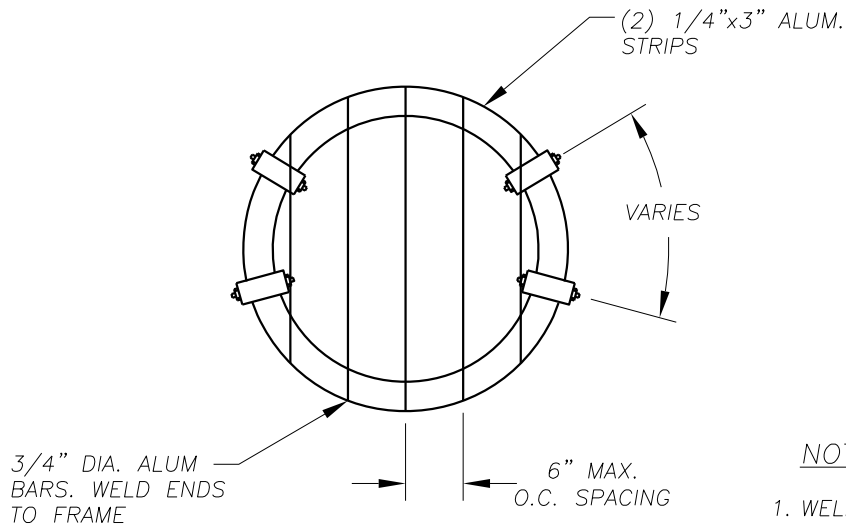
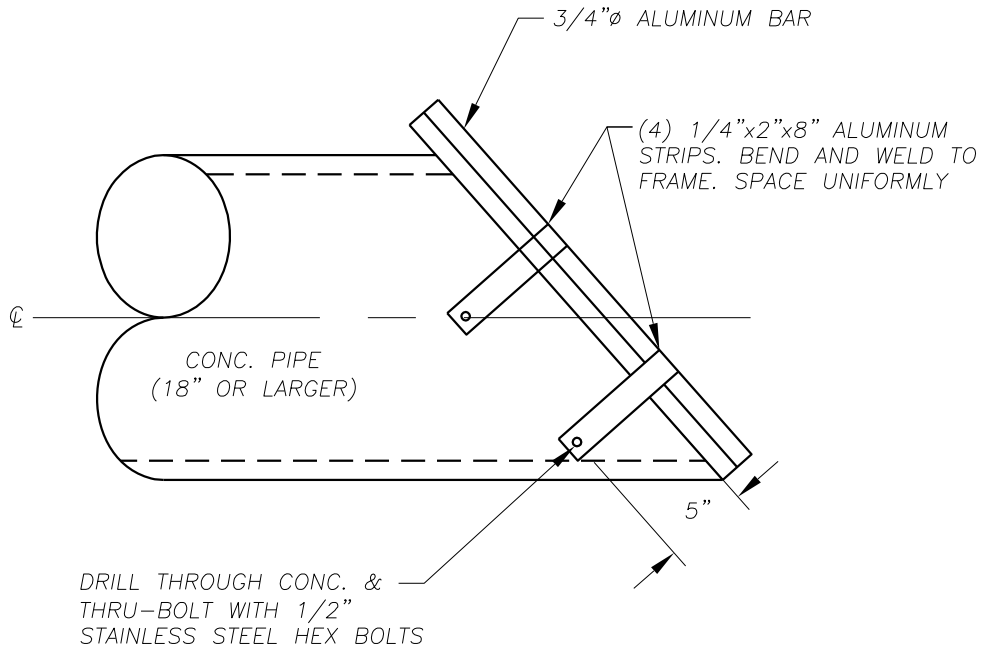
BEVELED END SECTION

Peter Capen
COUNTY ENGINEER

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5/23/08
DATE

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D24
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTES:

1. WELD AT ALL JOINTS.
2. SHOP DRAWING REQUIRED.
3. USE WITH PLASTIC PIPE REQUIRES MODIFICATION TO BE REVIEWED AND APPROVED BY COUNTY ENGINEER.

NO.	REVISIONS	DATE	BY

DWG: D25.DWG



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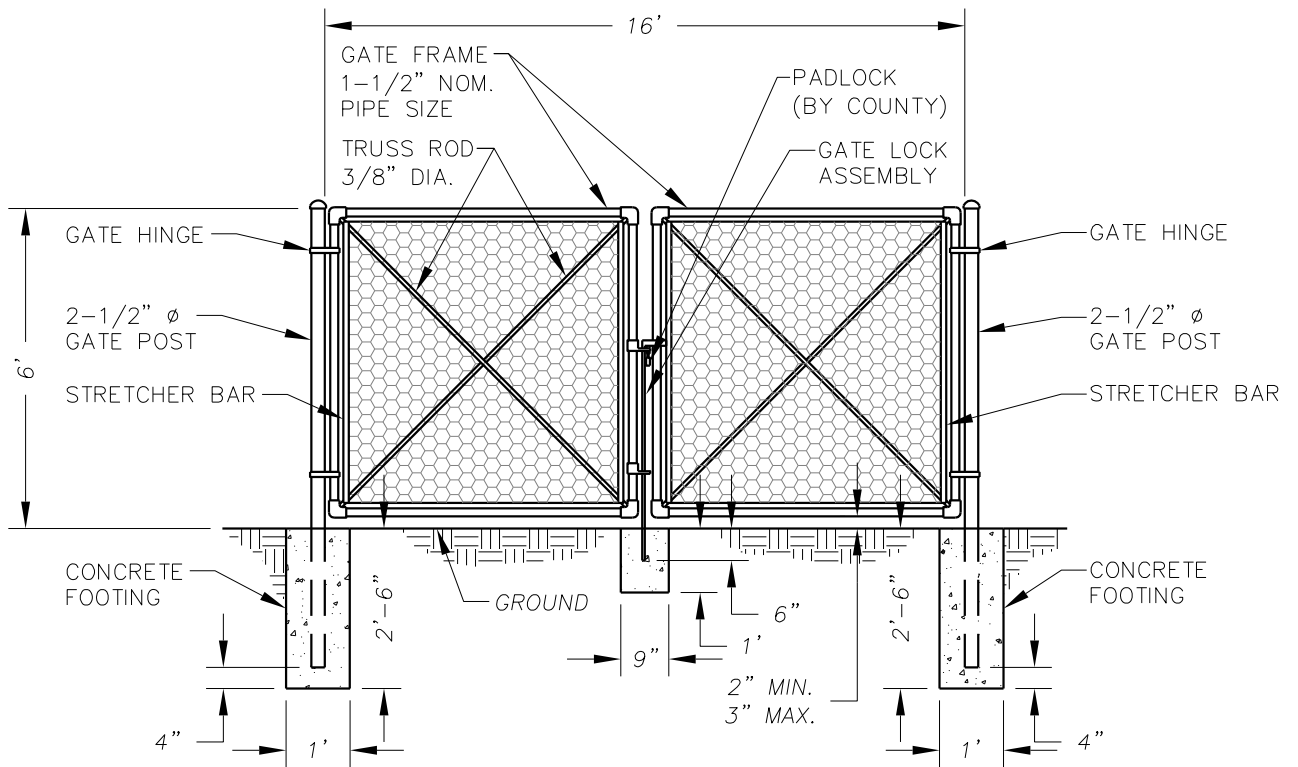
TRASH SCREEN

APPROVED

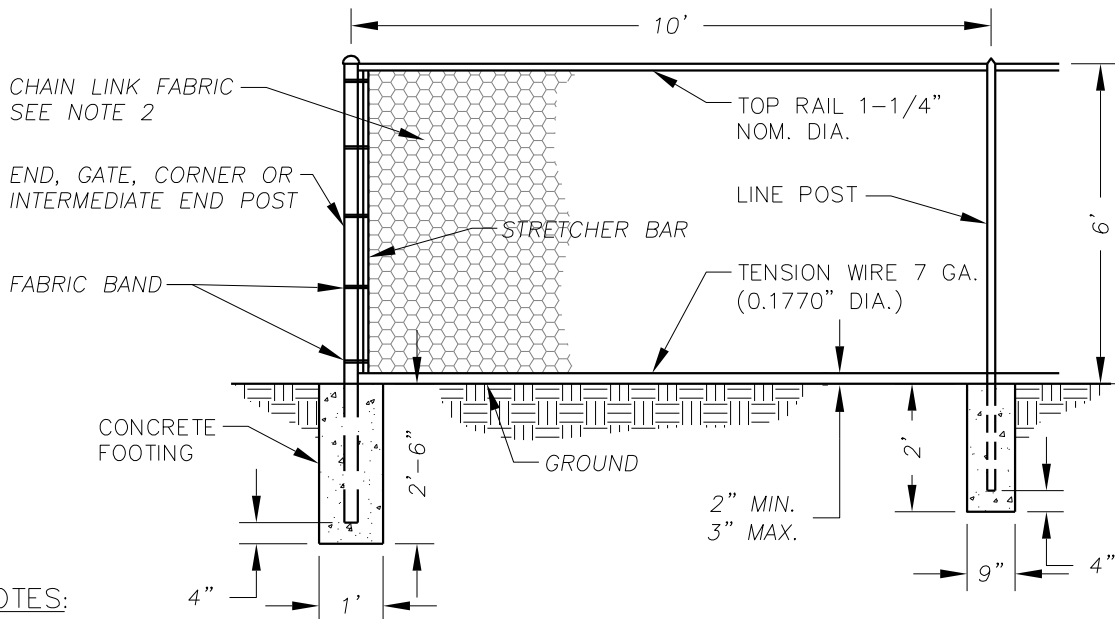
Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
D25
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOT ALLOWED ADJACENT / ALONG ANY STREET, ONLY OFF-SITE FACILITY LOCATION CAN HAVE TOP RAIL.



NOTES:

1. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION.
2. CHAIN LINK FENCE FABRIC TO MEET OR EXCEED REQUIREMENTS OF WSDOT STANDARD SPECIFICATIONS 9-16.1(1)B FOR TYPE 1 FENCE (9 GA) 2" DIAMOND. CHAIN LINK FENCE FABRIC SHALL BE HOT DIP GALVANIZED WITH A MINIMUM OF 0.8 OUNCE PER SQUARE FOOT OF SURFACE AREA. FENCING MATERIALS SHALL BE COATED WITH AN ULTRAVIOLET INSENSITIVE PLASTIC OR OTHER INERT MATERIAL AT LEAST 2 MILS IN THICKNESS. ANY PRETREATED OR COATING SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. THE MANUFACTURER'S WRITTEN SPECIFICATIONS DETAILING THE PRODUCT AND METHOD OF FABRICATION SHALL BE PROVIDED TO CLARK COUNTY PRIOR TO CONSTRUCTION. THE COLOR SHALL BE BLACK.

NO.	REVISIONS	DATE	BY

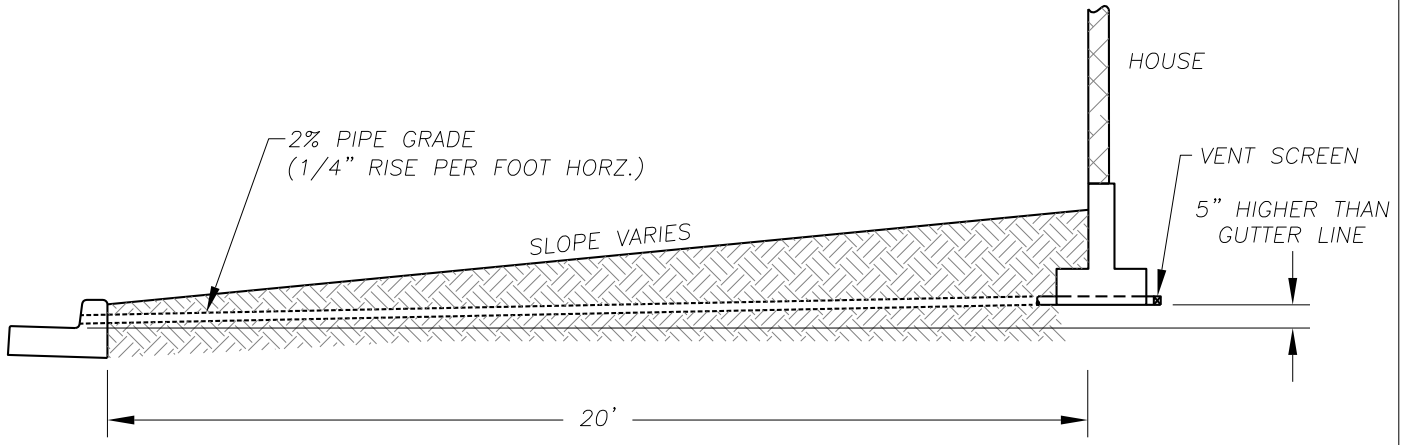
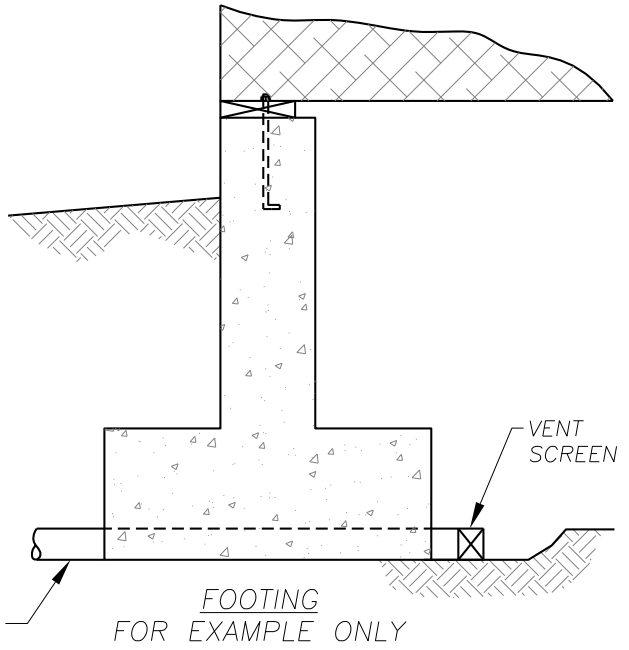
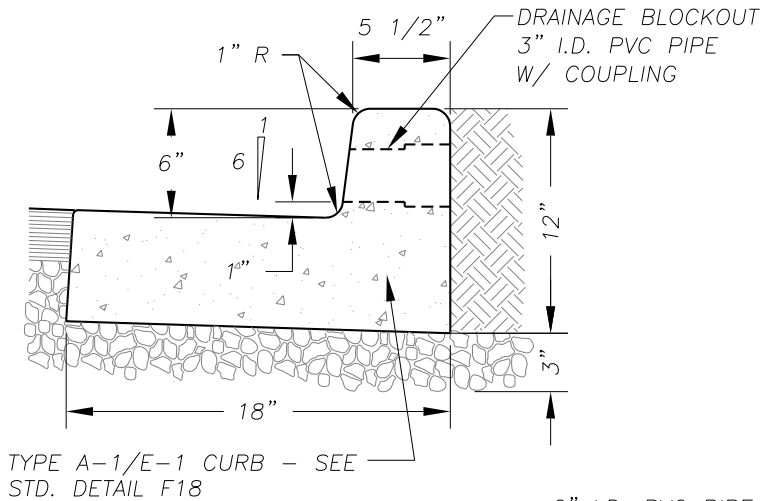
DWG: D26.DWG



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CLARK COUNTY
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CHAIN LINK FENCE FOR STORMWATER FACILITY
 APPROVED
Peter Capen
 COUNTY ENGINEER
 5/23/08
 DATE

STANDARD
D26
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



CCC 40.385:

ALL LOTS WITHIN THE URBAN GROWTH AREA MUST BE DESIGNED TO PROVIDE POSITIVE DRAINAGE FROM BOTTOM OF FOOTINGS TO AN APPROVED STORMWATER SYSTEM. POSITIVE DRAINAGE MAY BE ACCOMPLISHED BY SWALES, DRYWELLS, FRENCH DRAINS, LATERALS TO THE STREET, LATERALS BEHIND THE CURB OR WITHIN A PUBLIC UTILITY EASEMENT, AN APPROVED SYSTEM, IN THE SIDE OR REAR SETBACK, OR SOME OTHER METHOD ACCEPTABLE TO THE RESPONSIBLE OFFICIAL.

NO.	REVISIONS	DATE	BY
1	STORMWATER UPDATES	11/06/08	PC
2	CODE REFERENCE CHANGE	02/06/09	PC

DWG: D27.DWG



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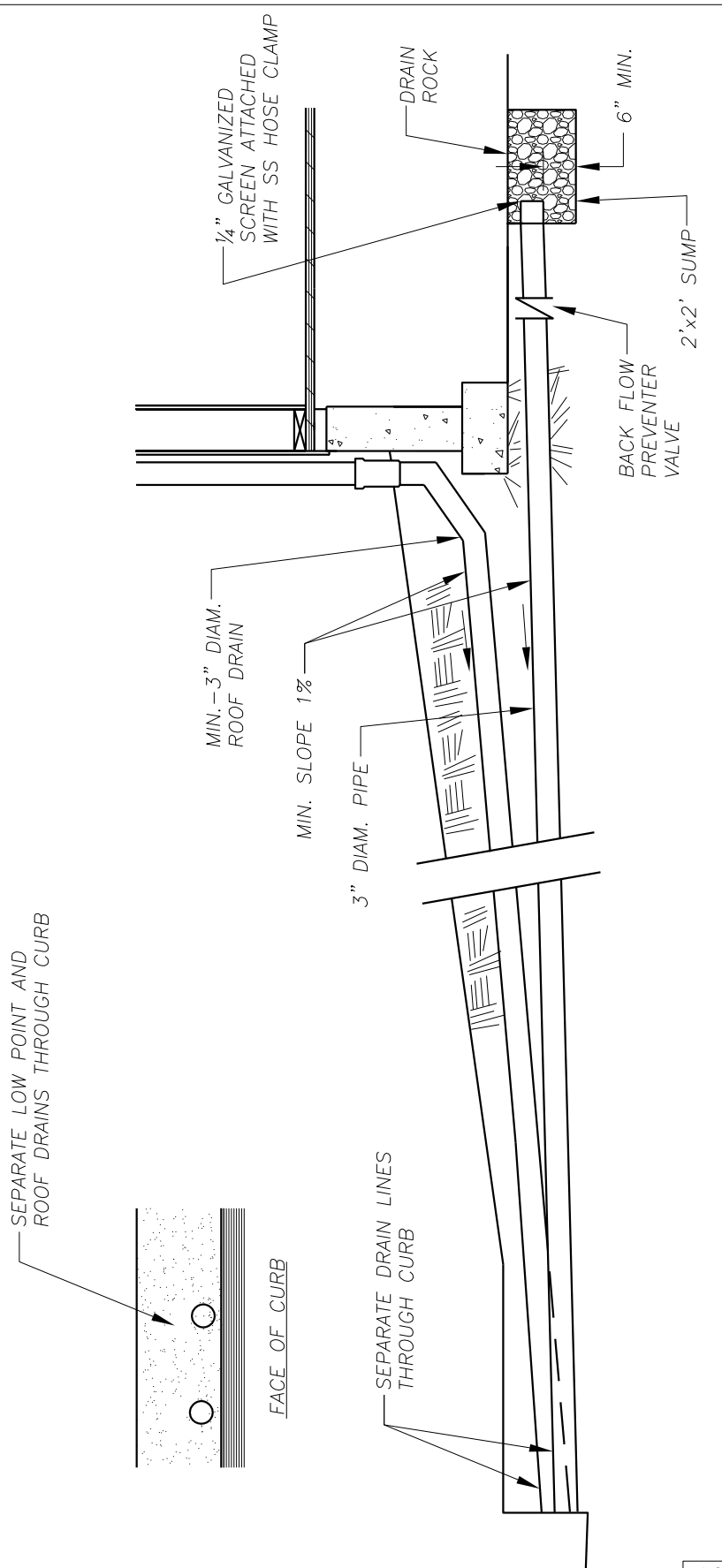
LOW POINT FOOTING DRAIN
(PREFERRED METHOD)

APPROVED

Peter Capen
COUNTY ENGINEER

5/23/08
DATE

STANDARD
D27
DETAIL
DESIGNED
DRAWN
DATE 05/23/08



NOTE:
 ROOF DOWNSPOUT & LOW POINT CRAWL SPACE DRAIN LINE TO CURB
 (ALL OTHER APPLICATIONS TO BE APPROVED BY ENGINEERING DEPARTMENT)

NO.	REVISIONS	DATE	BY

DWG: D27a.DWG



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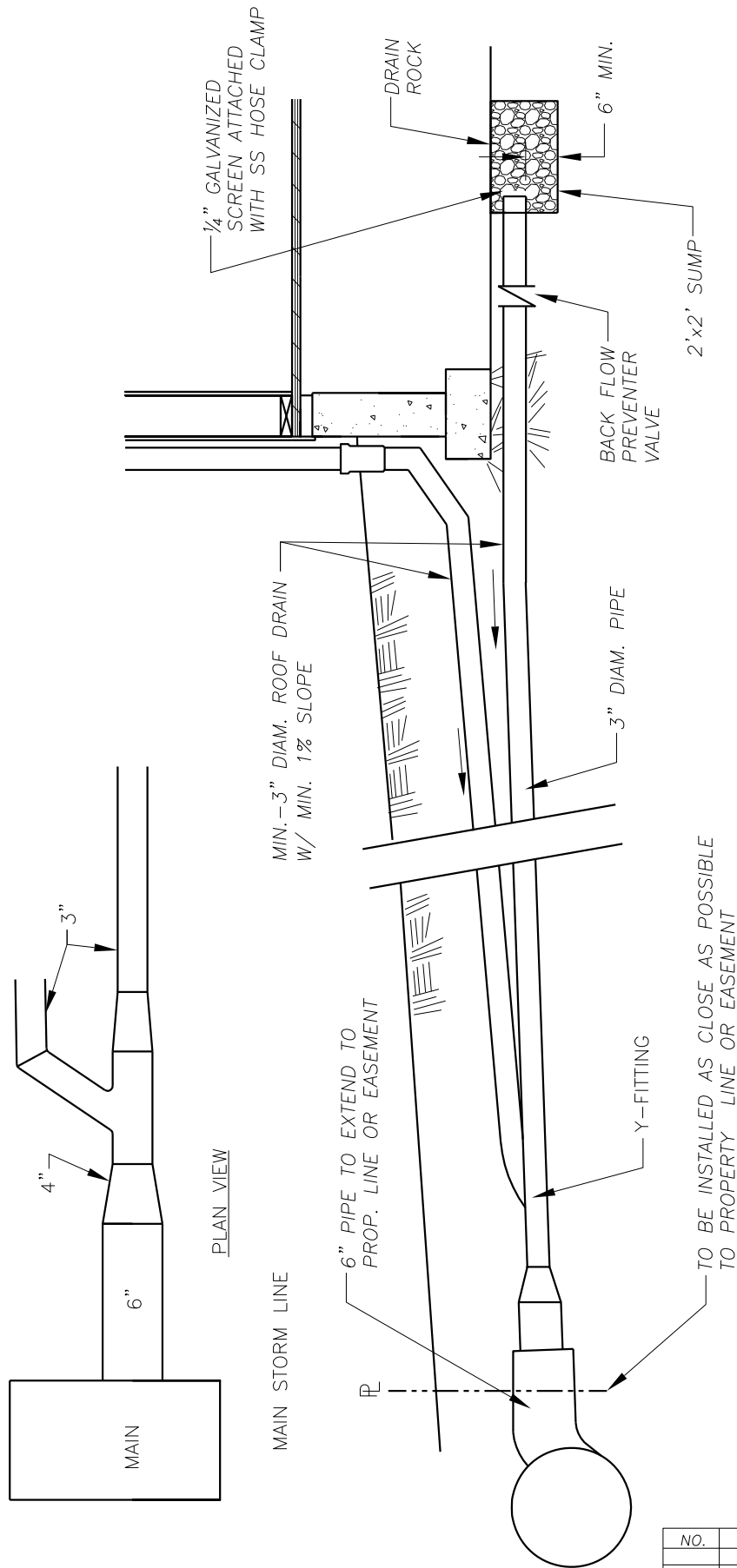
RESIDENTIAL DRAINAGE SYSTEMS
 DRAIN LINE TO CURB

Peter Capen
 COUNTY ENGINEER

APPROVED

5/23/08
 DATE

STANDARD
D27a
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08



NOTE:
 ROOF DOWNSPOUT & LOW POINT CRAWL SPACE DRAIN CONNECTION TO STORM DRAIN
 (ALL OTHER APPLICATIONS TO BE APPROVED BY ENGINEERING DEPARTMENT)

NO.	REVISIONS	DATE	BY

DWG: D27b.DWG



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RESIDENTIAL DRAINAGE SYSTEMS
 DRAIN CONNECTION TO STORM DRAIN

Peter Capen
 COUNTY ENGINEER

APPROVED

5/23/08
 DATE

STANDARD
D27b
 DETAIL
 DESIGNED
 DRAWN
 DATE 05/23/08