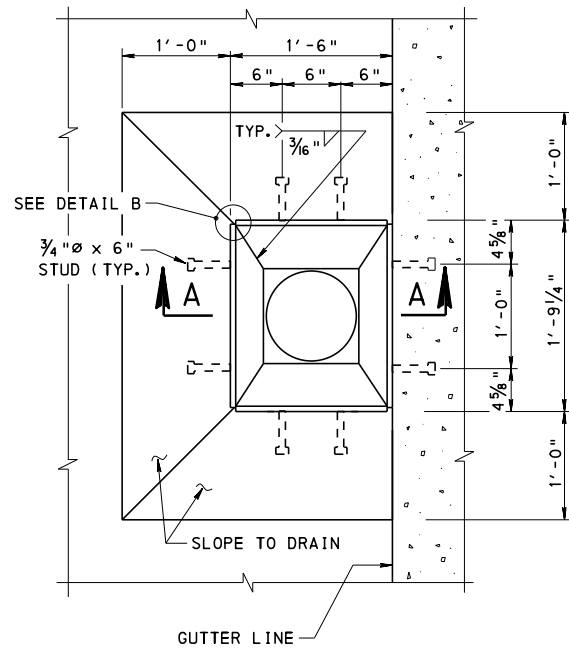
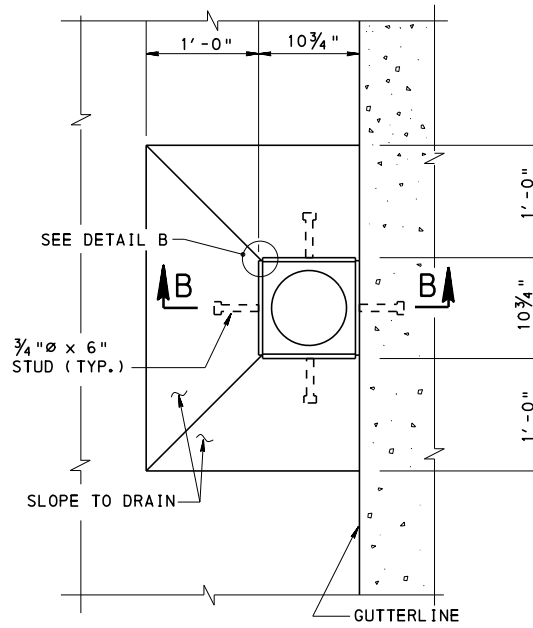


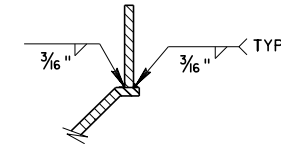
- CHANGE 1
- CHANGE 2
- CHANGE 3



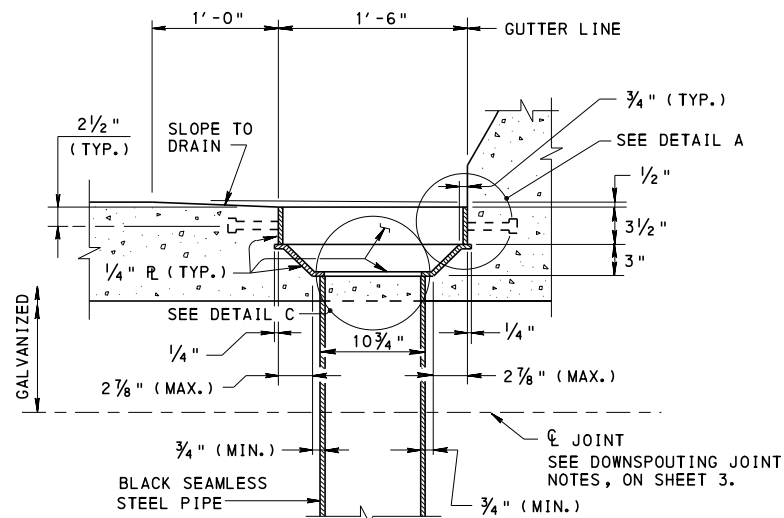
PLAN



PLAN



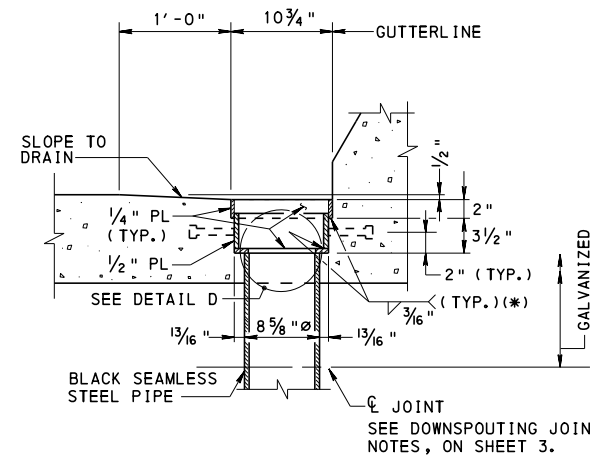
DETAIL A



SECTION A-A

TYPE 1 SCUPPER

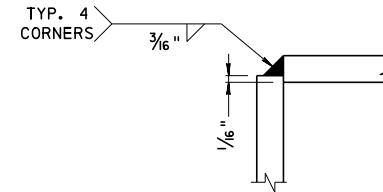
SHOWN WITHOUT GRATE, SEE TYPE 1 GRATE DETAIL THIS SHT.



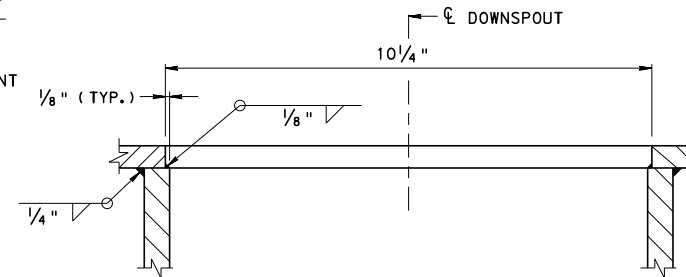
SECTION B-B

TYPE 2 SCUPPER

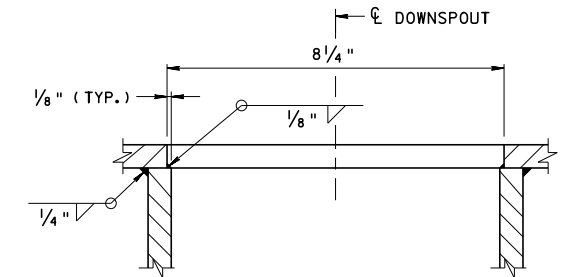
SHOWN WITHOUT GRATE, SEE TYPE 2 GRATE DETAIL THIS SHT.



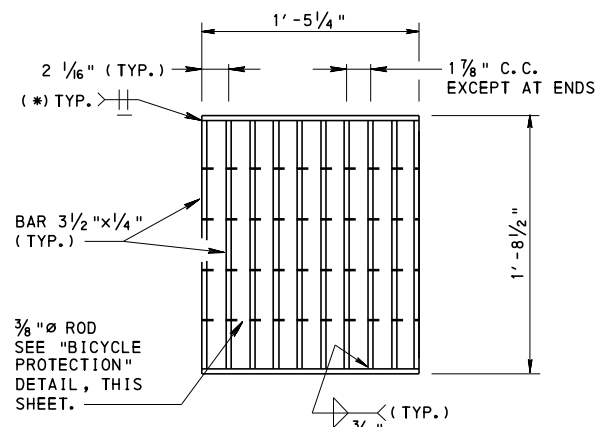
DETAIL B



DETAIL C

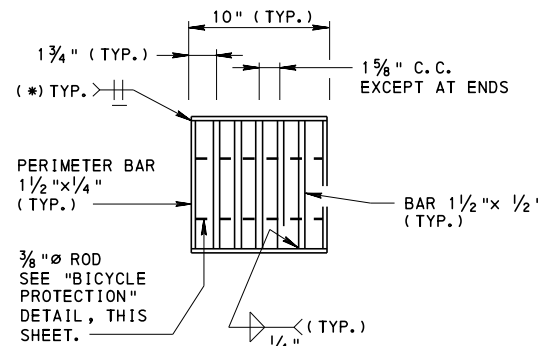


DETAIL D



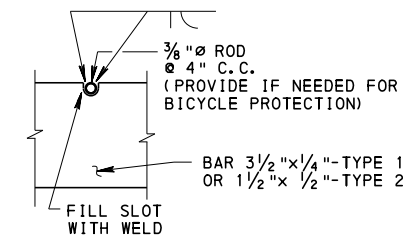
PLAN

TYPE 1 GRATE



PLAN

TYPE 2 GRATE



BICYCLE PROTECTION

(UNLESS DELETED BY CONTRACT DRAWINGS)

(*) = OR EQUIVALENT FULL PENETRATION WELD.

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS BRIDGE WELDING CODE **D1.5**, AND CONTRACT SPECIAL PROVISIONS. USE AWS **D1.1** FOR WELDING NOT COVERED IN AASHTO/AWS **D1.5**.
2. DO NOT USE TYPE 2 SCUPPER UNLESS TYPE 1 SCUPPER CANNOT BE ACCOMMODATED.
3. WELDED CONSTRUCTION: USE STRUCTURAL STEEL M 270, GR. 36, (ASTM A 709, GR. 36).
4. PROVIDE WELDED STUDS CONFORMING TO PUB. 408, SECTION 1105.02(e).
5. GALVANIZE ALL MATERIALS IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s) 1, AFTER FABRICATION.
6. REPAIR ALL DAMAGED GALVANIZED SURFACES IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s) 2.
7. CAST GRATES: CONSTRUCT GRATES OF MALLEABLE IRON CONFORMING TO ASTM A47, GRADE 32510, CAST STEEL CONFORMING TO ASTM A27, GRADE 65-35, OR DUCTILE IRON CONFORMING TO ASTM A536, GRADE 60-40-18.
8. DO NOT WELD CAST MATERIAL.
9. PROVIDE EITHER STANDARD 8"Ø OR 10"Ø NPS STEEL PIPE (ASTM A 53) AS INDICATED. PROVIDE PIPE JOINTS OF SCREWED MALLEABLE IRON (ASTM A 338) OR STEEL WELDING FITTINGS (ASTM A 234) FOR USE WITH STEEL PIPE. PROVIDE EQUIVALENT SIZE FIBERGLASS OR PVC PIPE BELOW JOINT WHEN SPECIFIED BY THE DISTRICT BRIDGE ENGINEER.
10. TACK WELD ALL FOUR CORNERS OF GRATES.
11. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615 OR A 706.
12. ALL DIAMETERS SPECIFIED ARE NOMINAL.
13. MANUFACTURE METAL CURB DRAIN PER PUB. 408, SECTION 1052.
14. METAL CURB DRAINS DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THIS STANDARD DRAWING DO NOT REQUIRE SHOP DRAWINGS.
15. PROVIDE FLOOR DRAINS OF EITHER GALVANIZED STEEL OR ALUMINUM PIPE AS INDICATED UNLESS FIBERGLASS OR PVC PIPE IS SPECIFIED BY THE DISTRICT BRIDGE ENGINEER.
16. ALUMINUM CURB OR FLOOR DRAINS IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALKALINE-RESISTANT BITUMINOUS PAINT.

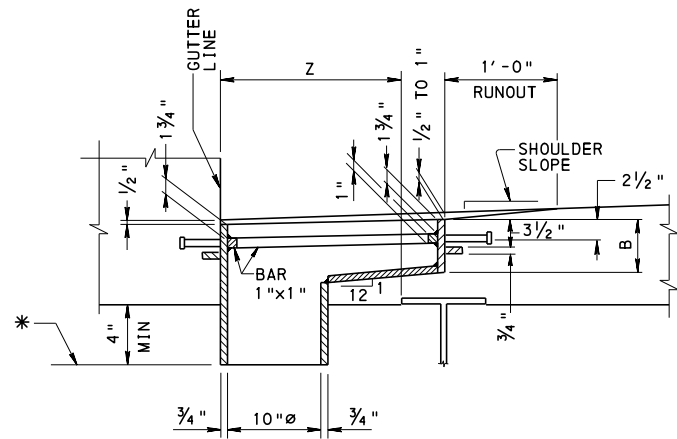
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
SCUPPER DETAILS
TYPE 1 & TYPE 2

RECOMMENDED NOV. 21, 2014
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

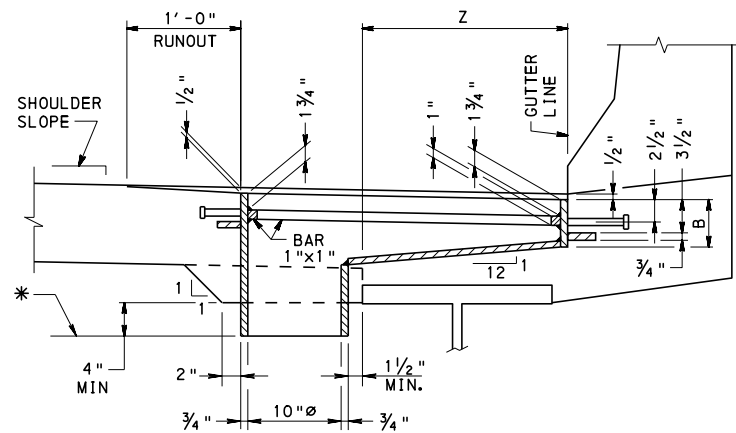
RECOMMENDED NOV. 21, 2014
Brenda S. Thompson
ACTING DIR., BUR. OF PROJECT DELIVERY

SHEET 1 OF 7
BC-751M



- NOTES:
 1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. 1/4" MIN. SIZE.
 2. GRATING NOT SHOWN

SECTION C-C
 (TYPE A OR B SCUPPER)

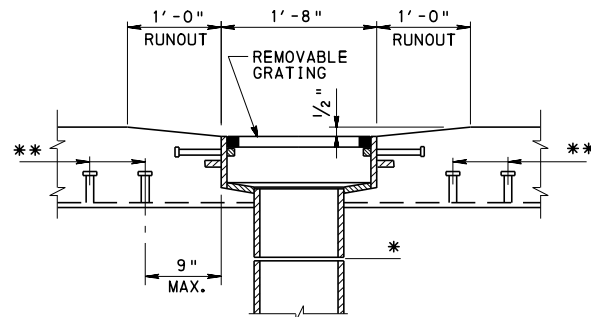


- NOTES:
 1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. 1/4" MIN. SIZE.
 2. GRATING NOT SHOWN

SECTION C-C
 (TYPE C OR D SCUPPER)

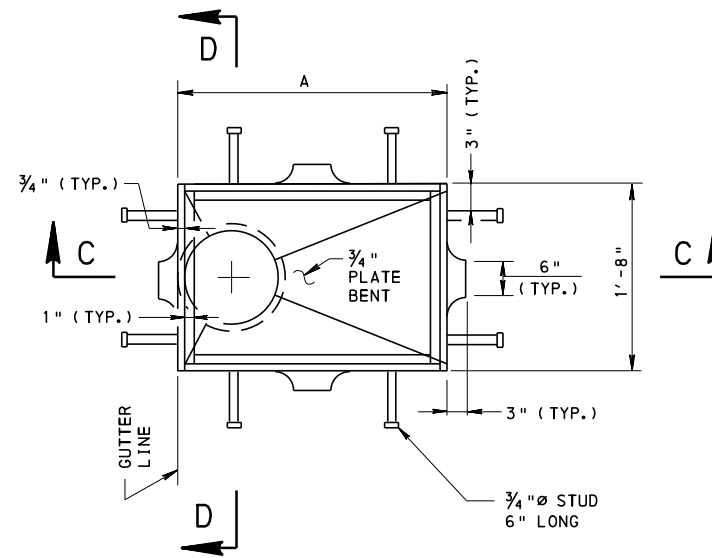
* SEE DOWNSPOUTING JOINT NOTES ON SHEET 3.

** RESPACE SHEAR CONNECTORS ON COMPOSITE CONSTRUCTION TO CLEAR SCUPPERS.

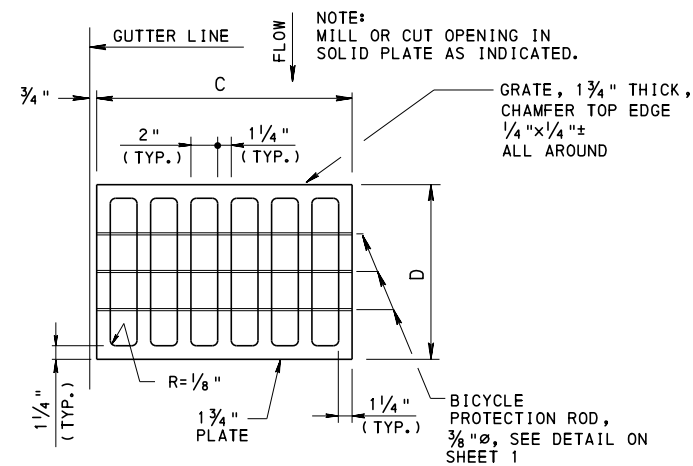


SECTION D-D

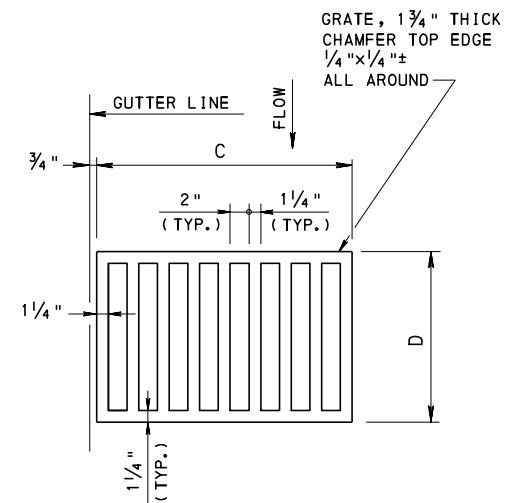
WELDED SCUPPER DETAILS



PLAN



ALTERNATE
 STRUCTURAL STEEL SCUPPER GRATE



CAST GRATING PLAN

NOTE:
 PROVIDE ALTERNATE STRUCTURAL STEEL GRATE WHEN BICYCLE PROTECTION IS REQUIRED, SEE DETAIL THIS SHEET.

NOTE:
 THE SCUPPERS DETAILED ON THIS SHEET ARE FOR GUIDANCE ONLY IN REHABILITATION PROJECTS. DO NOT USE IN NEW CONSTRUCTION UNLESS SPECIFICALLY APPROVED BY THE DISTRICT BRIDGE ENGINEER.

TABLE I

SPECIFY TYPE A SCUPPER FOR Z UP TO 1'-6"
SPECIFY TYPE B SCUPPER FOR Z OVER 1'-6" TO 3'-0"
SPECIFY TYPE C SCUPPER FOR Z UP TO 1'-10 1/2"
SPECIFY TYPE D SCUPPER FOR Z OVER 1'-10 1/2" TO 2'-8 1/4"

TABLE II - U.S. CUSTOMARY UNITS

	DIMENSIONS				APPROXIMATE WEIGHT	
	A	B	C	D	SCUPPER	W/ GRATE
TYPE A SCUPPER	1'-10 1/2"	6"	1'-8 3/4"	1'-6 1/4"	295 LB	395 LB
TYPE B SCUPPER	2'-8 1/4"	5"	2'-6 1/2"	1'-6 1/4"	380 LB	525 LB
TYPE C SCUPPER	2'-11 1/2"	5"	2'-9 3/4"	1'-6 1/4"	400 LB	545 LB
TYPE D SCUPPER	3'-9 1/4"	5"	3'-7 1/2"	1'-6 1/4"	465 LB	655 LB

SCUPPER WEIGHTS LISTED ARE FOR A SCUPPER ASSEMBLY DEPTH OF 1'-3".

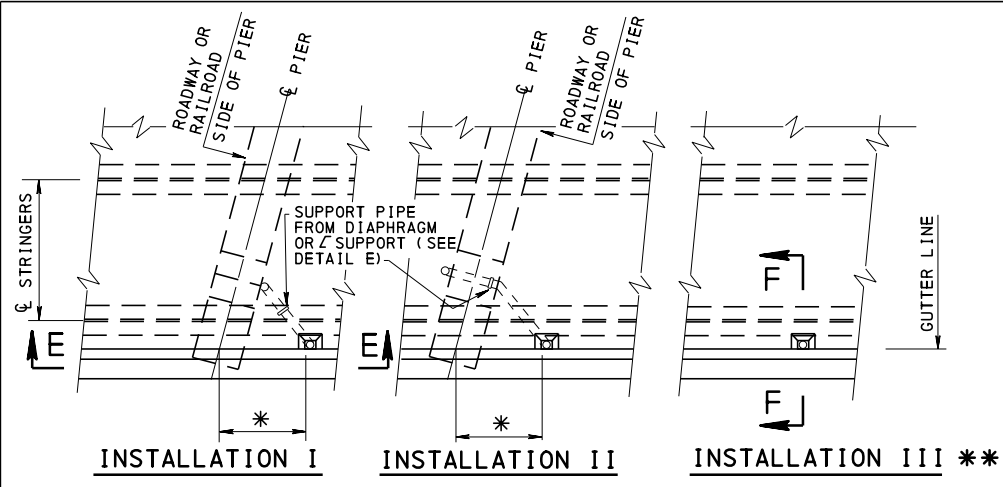
COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 BRIDGE DRAINAGE
 SCUPPER DETAILS
 TYPE A, B, C & D

RECOMMENDED NOV. 21, 2014
 Thomas P. Maiore
 CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 21, 2014
 Bruce S. Thompson
 ACTING DIR, BUR. OF PROJECT DELIVERY

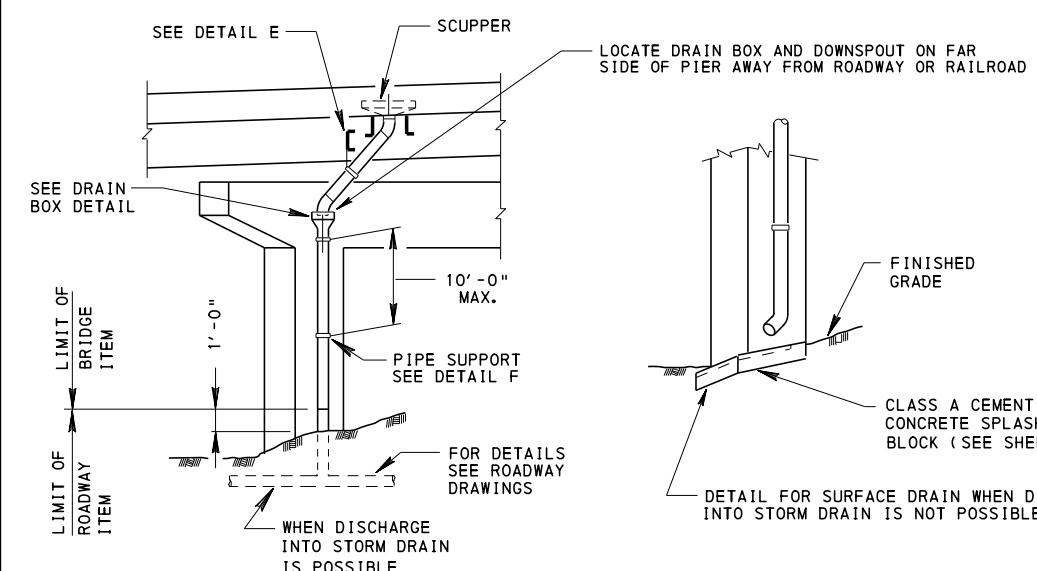
SHEET 2 OF 7
 BC-751M



INSTALLATION I INSTALLATION II INSTALLATION III **

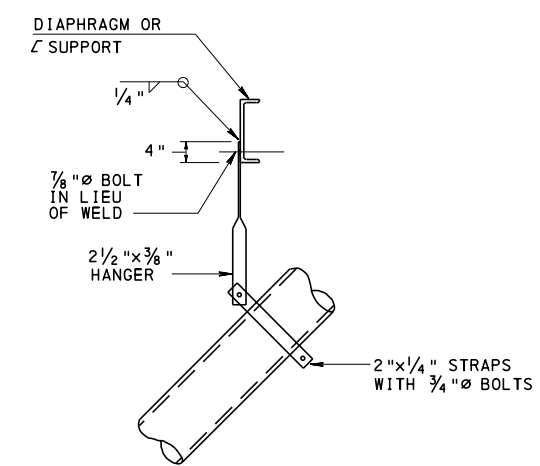
PLAN SHOWING TYPICAL INSTALLATION OF SCUPPERS

- * AS REQUIRED FOR A MIN. 45° DRAIN PIPE SLOPE
- ** USE INSTALLATION III IN SPANS OVER STREAMS AND OVER GROUND WHERE DISCHARGE IS NOT OBJECTIONABLE.



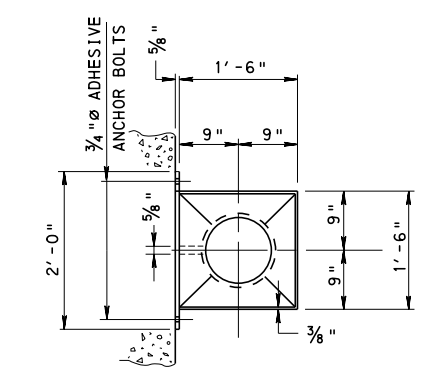
ELEVATION E-E

FOR INSTALLATIONS I AND II, CONNECT DOWNSPOUT TO STORM DRAIN, IF PRACTICAL, AND INCLUDE DETAILS OF THE CONNECTION ON ROADWAY DRAWINGS. IF CONNECTION TO STORM DRAIN IS IMPRACTICAL, HAVE DOWNSPOUT DISCHARGE ONTO SPLASH BLOCK.

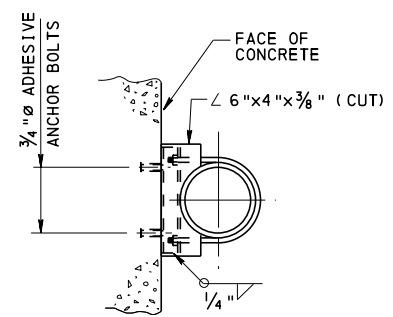


DETAIL E

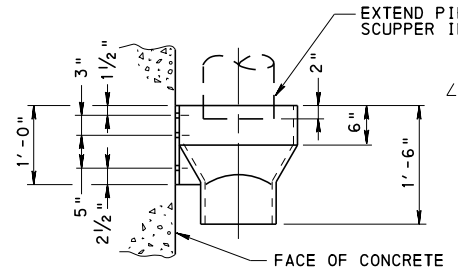
SPACING OF HANGER SUPPORTS TO BE BASED ON FULL PIPE (SELF WEIGHT, WATER, ICE AND ANTI-SKID DEBRIS)



PLAN



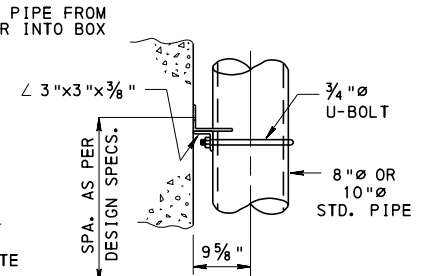
PLAN



ELEVATION DRAIN BOX DETAIL

DRAIN BOX DETAIL

DETAILS SHOWN ARE SUITABLE FOR PLANE CONCRETE SURFACES. MODIFY THE DETAILS AS REQUIRED FOR ROUND CONCRETE SURFACES.

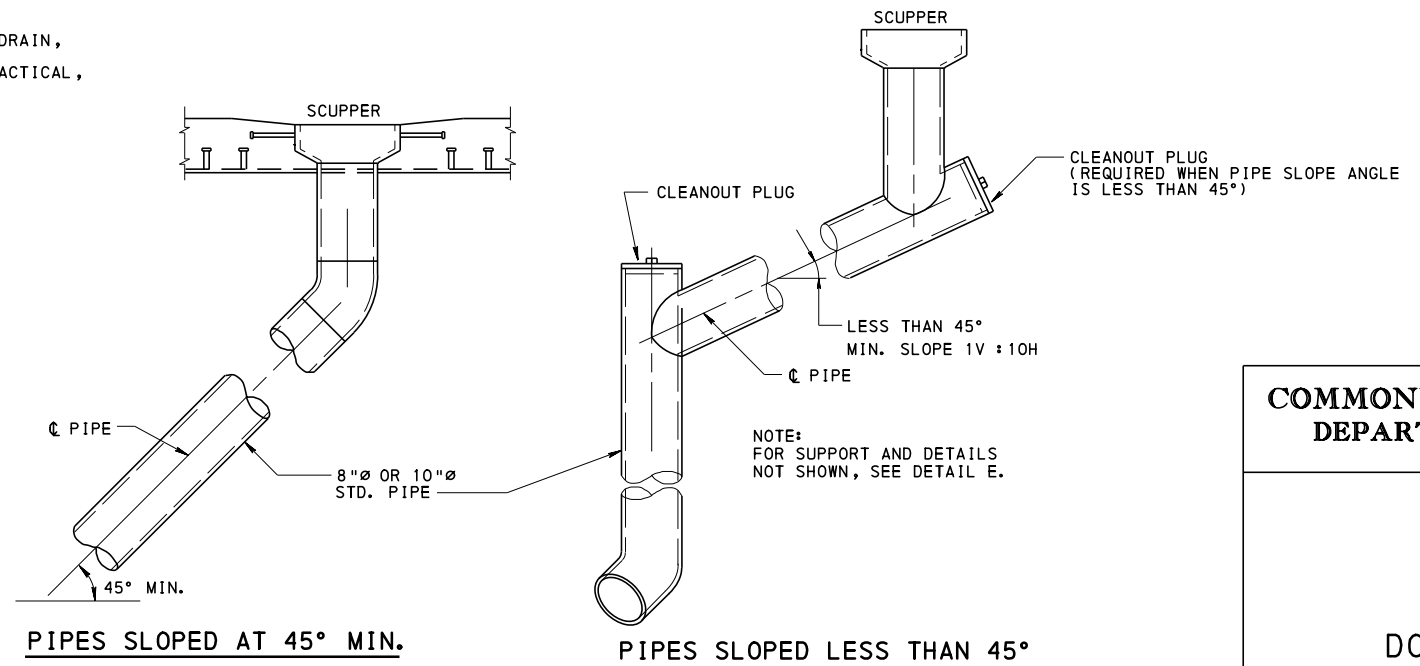


ELEVATION DETAIL F

DETAIL F

DOWNSPOUTING JOINT NOTES:

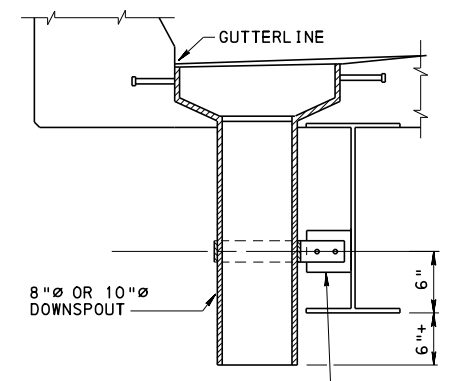
- FOR STEEL PIPE: PROVIDE MECHANICAL COUPLINGS.
- FOR PVC OR FIBERGLASS PIPE: PROVIDE MECHANICAL COUPLINGS.
- AT THE DISCRETION OF THE ENGINEER, DELETE JOINT FROM INSTALLATION III.
- FOR ALL MECHANICAL COUPLINGS, PROVIDE COUPLING AS PER PIPE MANUFACTURERS RECOMMENDATIONS.



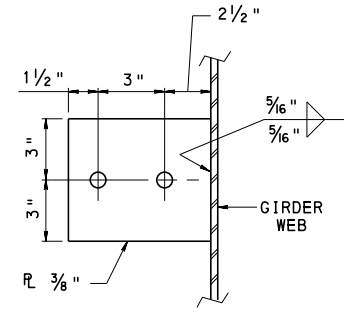
PIPES SLOPED AT 45° MIN.

PIPES SLOPED LESS THAN 45°

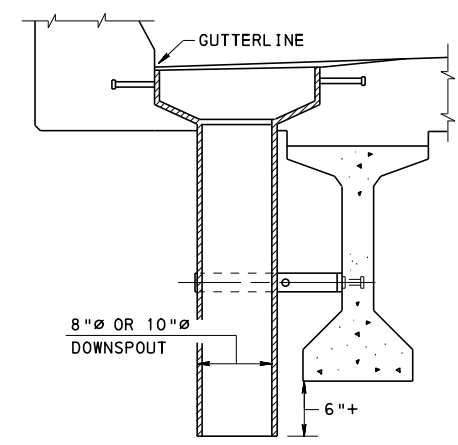
INSTALLATIONS I & II



SECTION F-F STEEL GIRDER



DETAIL G



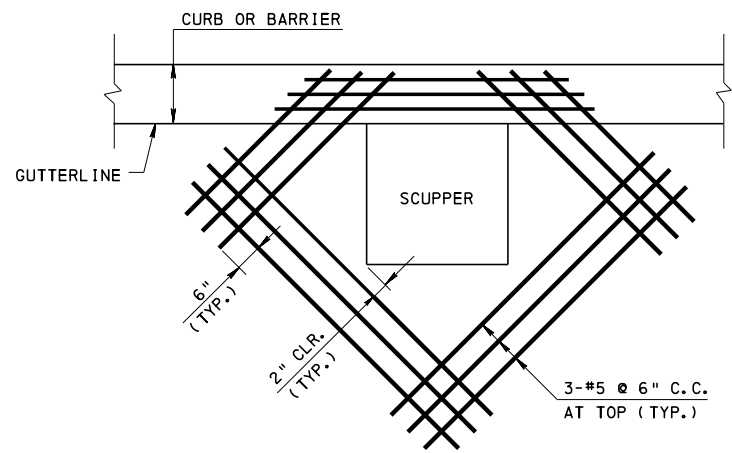
SECTION F-F PRESTRESSED I-BEAM

INSTALLATION III

FOR ADDITIONAL INFORMATION SEE DOWNSPOUTING DETAILS ON SHEET 4

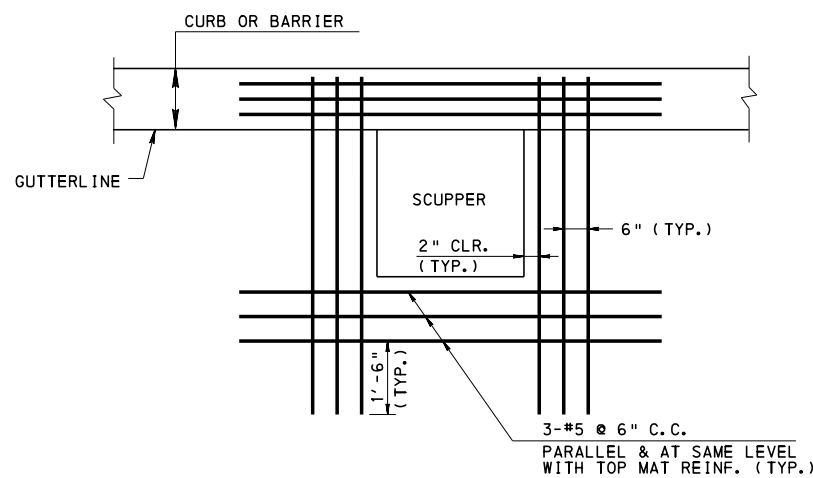
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
BRIDGE DRAINAGE
DOWNSPOUTING DETAILS**



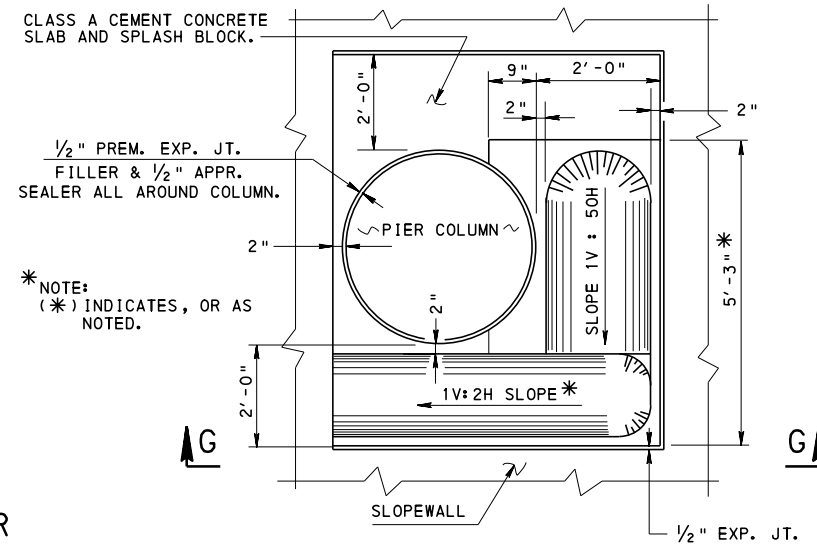
ADDITIONAL DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS

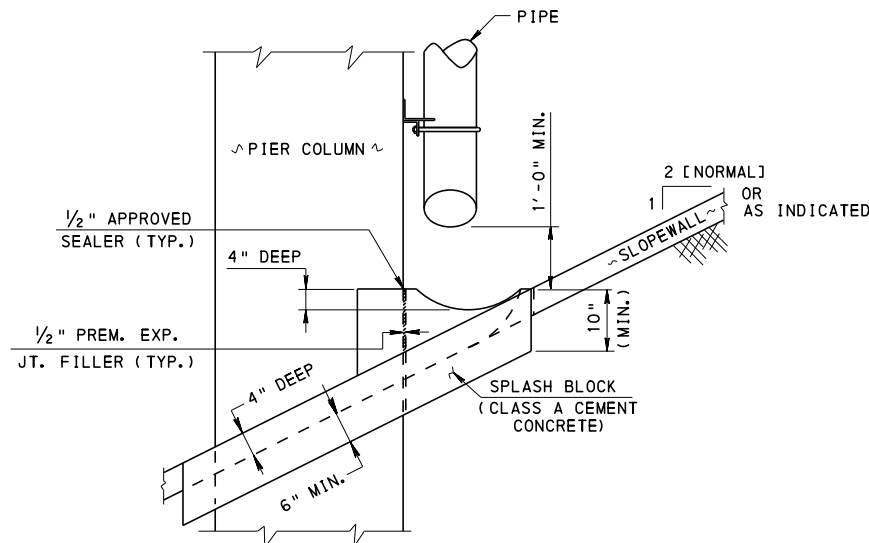


ALTERNATE DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS (ALTERNATE TO DETAIL ABOVE)

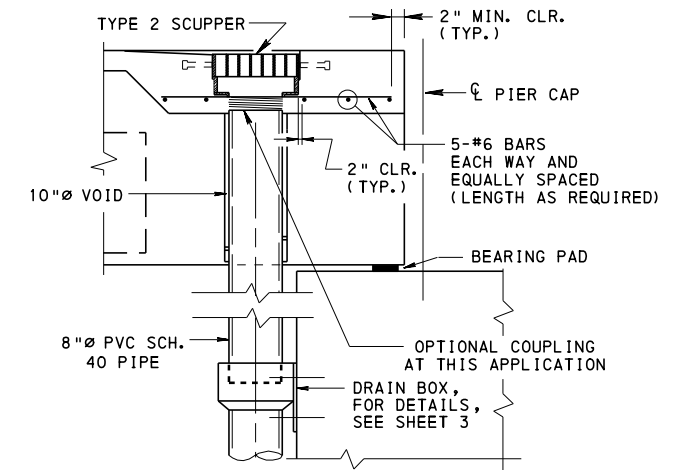


PLAN

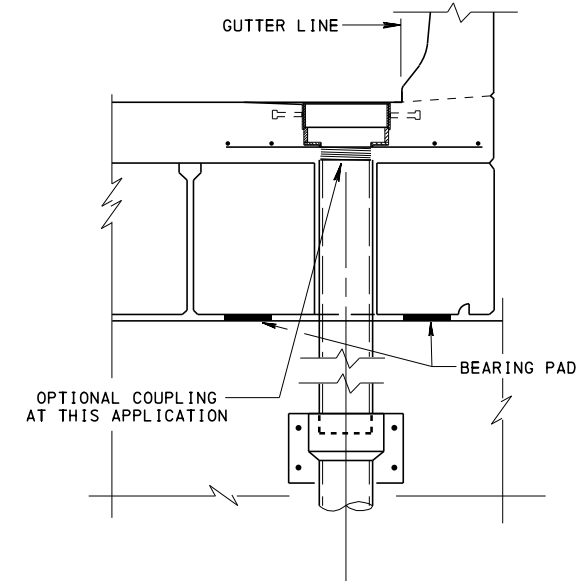


VIEW G-G

SPLASH BLOCK DETAIL



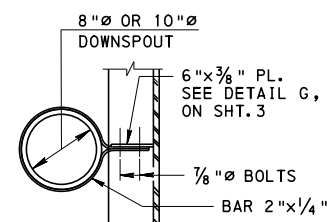
SECTION ALONG C BEAM



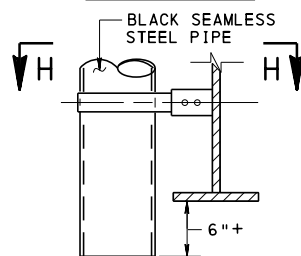
SECTION THRU BEAM

THRU ADJACENT BOX BEAM DETAILS

- LOCATE DRAINS IN BEAM END BLOCKS ONLY.
- FORM VOID IN BOX BEAM USING 10" P.V.C. PIPE OR APPROVED EQUAL.
- CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS.
- ONLY 48" WIDE BOX BEAMS CAN BE USED.

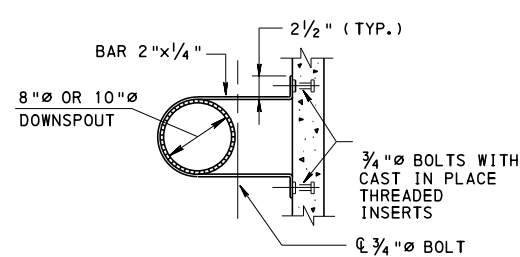


SECTION H-H

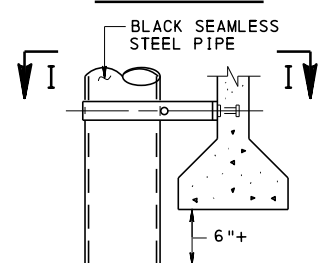


ELEVATION

STEEL GIRDER

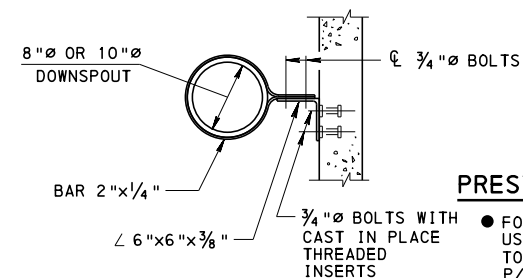


SECTION I-I

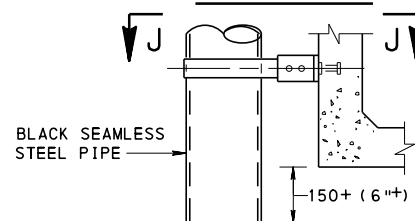


ELEVATION

PRESTRESSED I-BEAM



SECTION J-J



ELEVATION

PRESTRESSED BOX BEAM

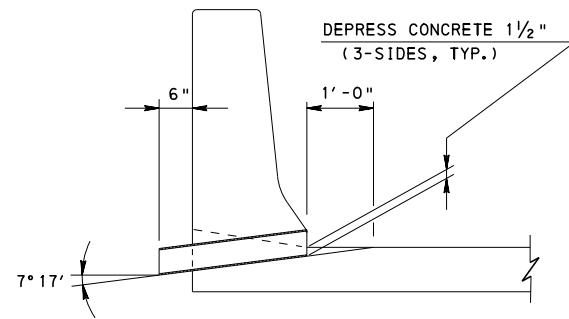
PRESTRESSED DRILLING NOTES:

- FOR REHABILITATION PROJECTS ONLY: USE A PACHOMETER (OR EQUIVALENT) TO LOCATE ALL REINFORCEMENT AND P/S STRANDS IN PRESTRESSED I-BEAMS BEFORE DRILLING HOLES THROUGH WEB. NO DRILLING OF PRESTRESSED BOX BEAMS IS PERMITTED.
- ANY DRILLING OF A PRESTRESSED I-BEAM REQUIRES THE PRIOR APPROVAL OF THE DISTRICT BRIDGE ENGINEER.
- CAST IN PLACE THREADED INSERTS ARE TO BE USED IN NEW P/S BEAMS.

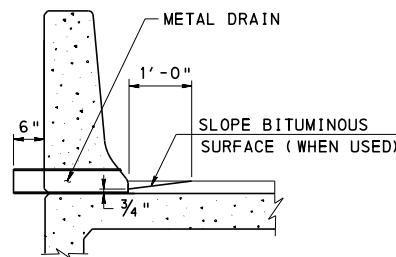
DOWNSPOUTING CONNECTION DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

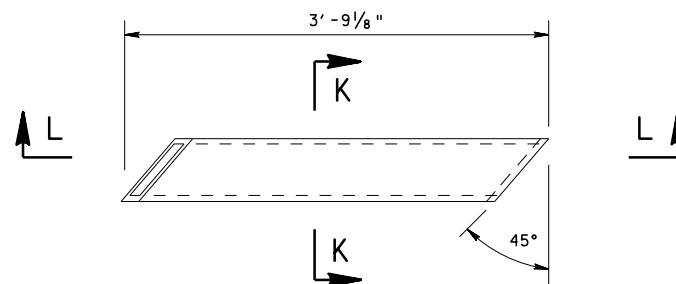
STANDARD
 BRIDGE DRAINAGE
 MISCELLANEOUS DETAILS



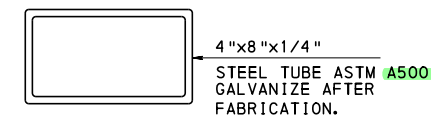
ELEVATION - CONCRETE DECK



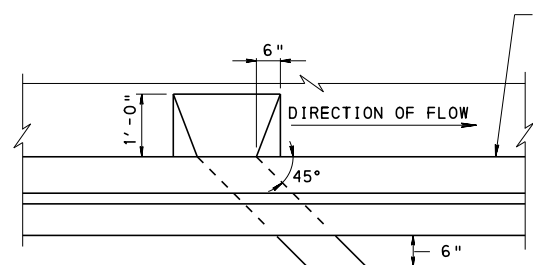
ELEVATION - BITUMINOUS DECK ONLY



PLAN



SECTION K-K

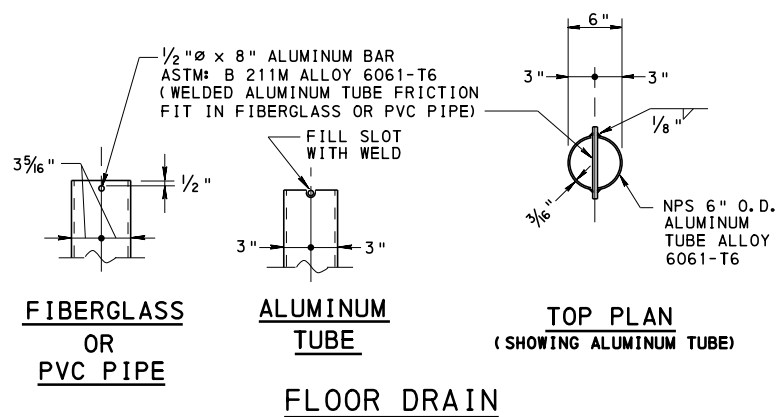


PLAN



VIEW L-L

TYPICAL METAL CURB DRAIN DETAILS

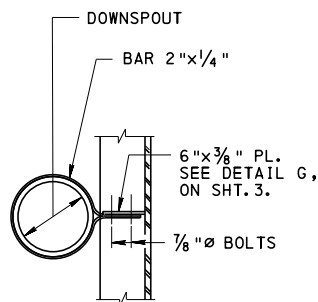


FIBERGLASS OR PVC PIPE

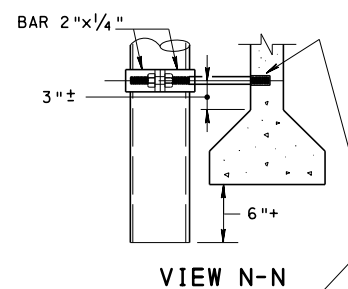
ALUMINUM TUBE

TOP PLAN (SHOWING ALUMINUM TUBE)

FLOOR DRAIN



STEEL GIRDER

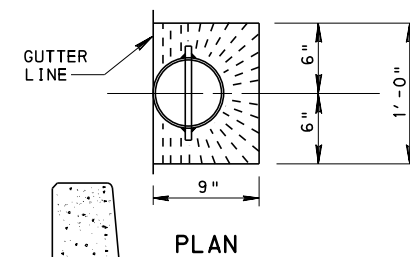


VIEW N-N

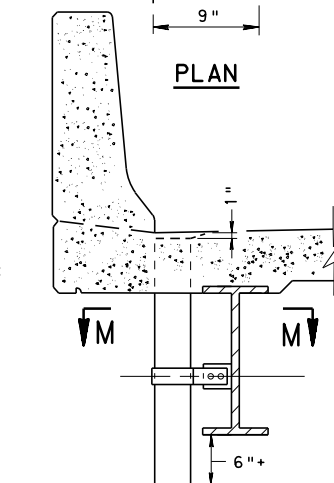
PRESTRESSED GIRDER

PRESTRESSED DRILLING NOTES:

- FOR REHABILITATION PROJECTS: USE A PACHOMETER (OR EQUIVALENT) TO LOCATE ALL REINFORCEMENT AND P/S STRANDS BEFORE DRILLING HOLES FOR THREADED INSERTS.
- ANY DRILLING OF A PRESTRESSED GIRDER REQUIRES THE PRIOR APPROVAL OF THE DISTRICT BRIDGE ENGINEER

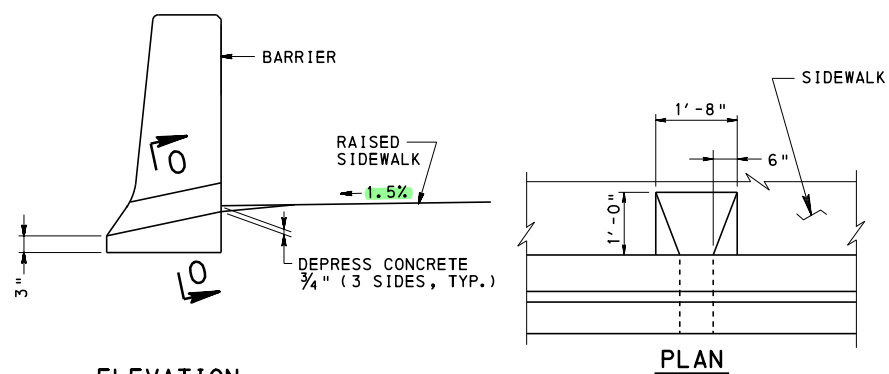


PLAN



SECTION AT BARRIER (FLOOR DRAIN)

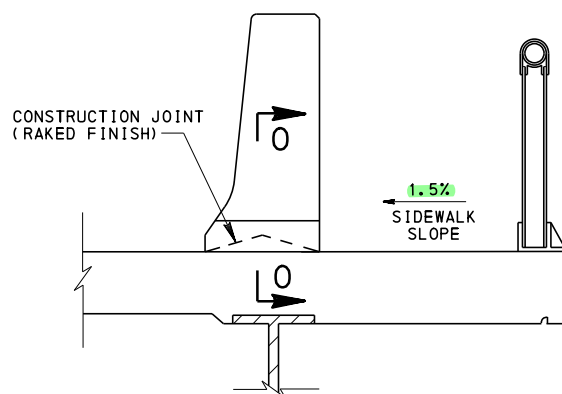
TYPICAL FLOOR DRAIN DETAILS



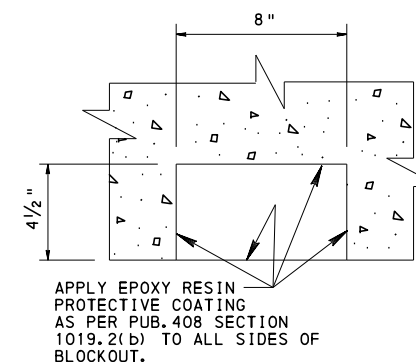
ELEVATION

PLAN

RAISED SIDEWALK DRAINAGE DETAIL



TYPICAL SIDEWALK & BARRIER DRAIN



SECTION 0-0

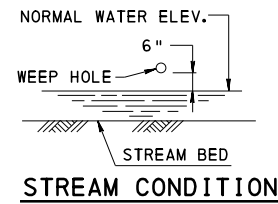
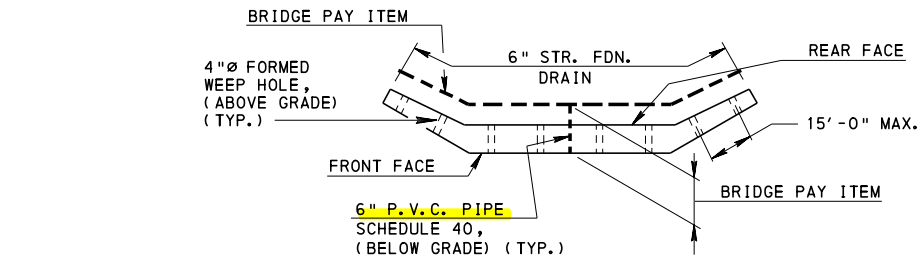
BARRIER DRAIN BLOCKOUTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

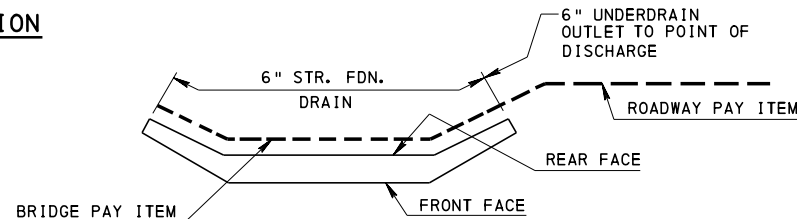
STANDARD
BRIDGE DRAINAGE
METAL CURB AND FLOOR DRAINS

DRAINAGE NOTES:

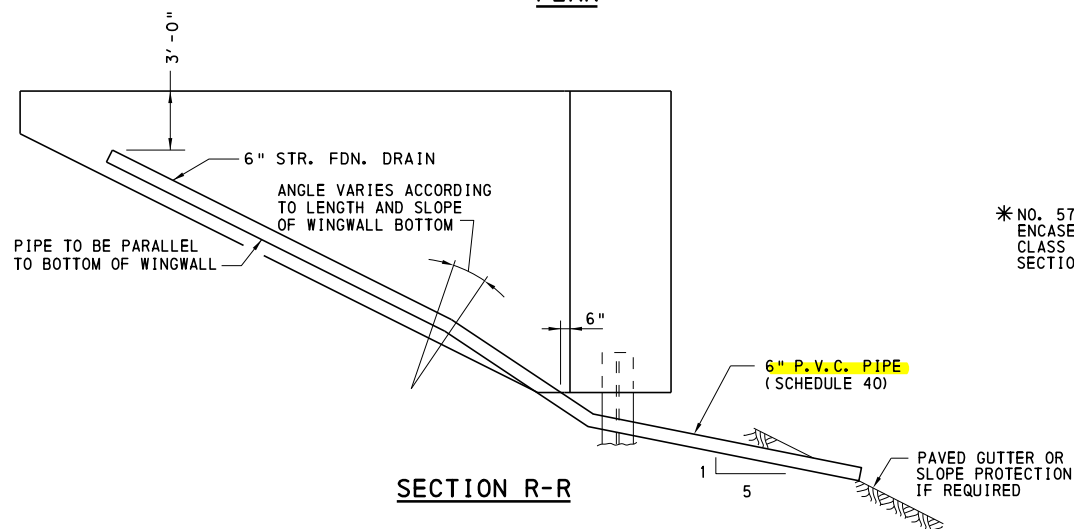
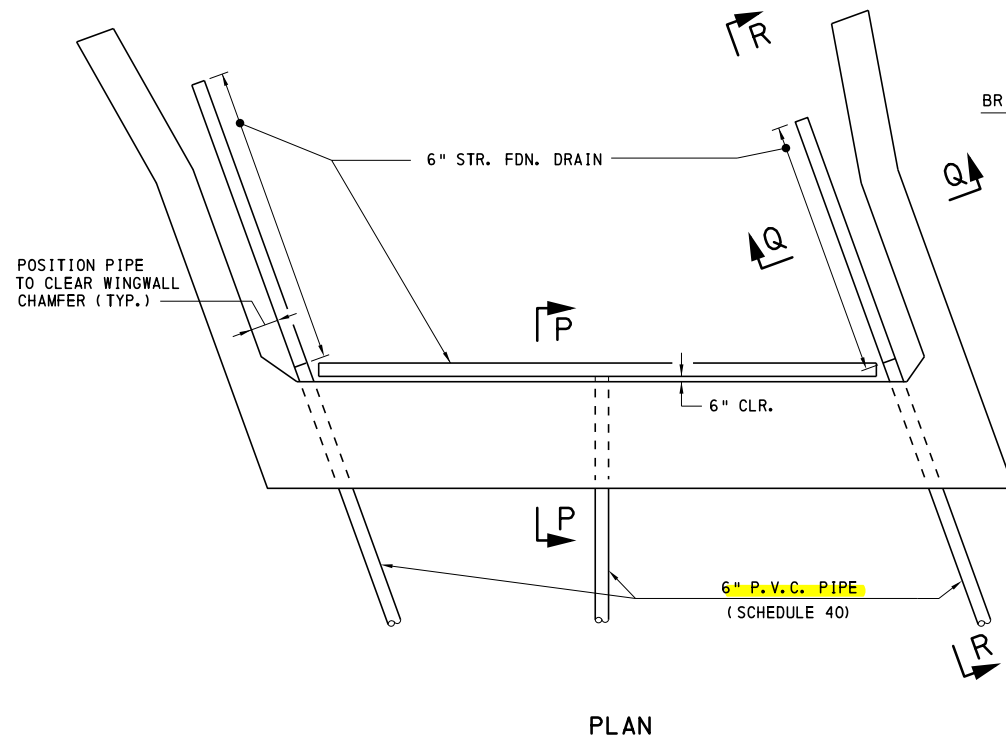
1. USE SCHEME A IF DISCHARGE AT FRONT OF WALL IS NOT OBJECTIONABLE, OTHERWISE USE SCHEME B.
2. SPACE WEEP HOLES SO AS TO NOT EXCEED 15'.
3. SLOPE 6" STRUCTURE FOUNDATION DRAIN A MINIMUM OF 1/8"/FT.
4. SHOW PIPES IF USED TO COLLECT WATER AT THE REAR OF ABUTMENTS, WINGWALLS AND RETAINING WALLS ON A PLAN VIEW OF THE BRIDGE DRAWINGS, AND INCLUDE THE QUANTITY IN THE BRIDGE QUANTITIES AS 6" STRUCTURE FOUNDATION DRAIN AND 6" P.V.C. PIPE (SCHEDULE 40).
5. SHOW PIPE UNDERDRAIN OUTLETS CARRYING DRAINAGE COLLECTED FROM THE REAR OF ABUTMENTS, WINGWALLS, AND RETAINING WALLS TO A HIGHWAY DRAINAGE SYSTEM ON A PLAN VIEW OF THE BRIDGE DRAWINGS AND ALSO ON THE ROADWAY PLANS. INDICATE THESE PIPES ON THE BRIDGE DRAWING AS A ROADWAY PAY ITEM. FOR DETAILS SEE DRAINAGE SCHEMES. HOWEVER, INCLUDE PIPES ENCASED IN CONCRETE WALLS OR EXTENDING BEYOND THE FRONT FACE OF STUB ABUTMENTS, AND DISCHARGING INTO A DITCH OR ONTO A PAVED SLOPE IN THE BRIDGE QUANTITIES AS 6" P.V.C. PIPE (SCHEDULE 40).
6. SEE SHEET 7 FOR ADDITIONAL DRAINAGE REQUIREMENTS FOR ABUTMENTS WITHOUT BACKWALLS.



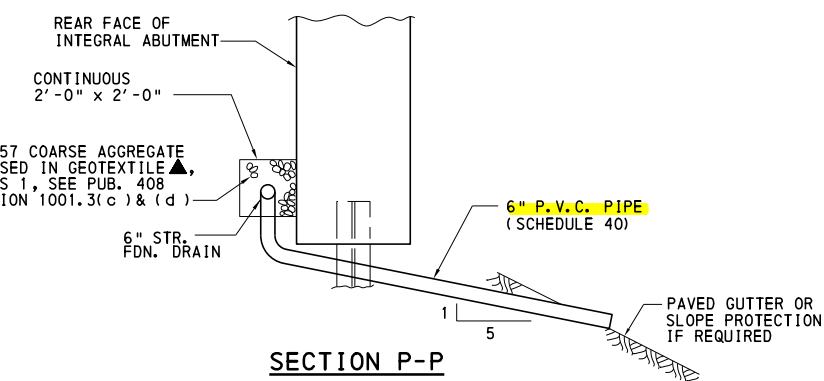
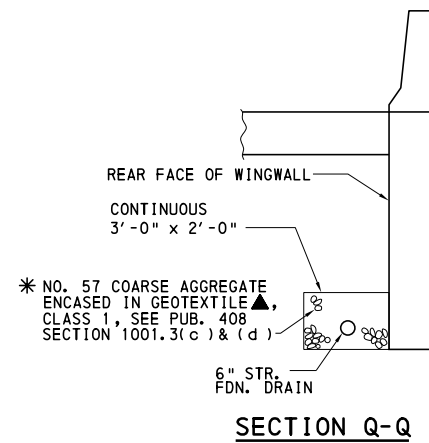
SCHEME A
PROVIDE DRAINAGE BY USE OF EITHER WEEP HOLES OR STRUCTURE FOUNDATION DRAIN, DISCHARGED AT FRONT OF WALL, BASED UPON FIELD CONDITIONS.



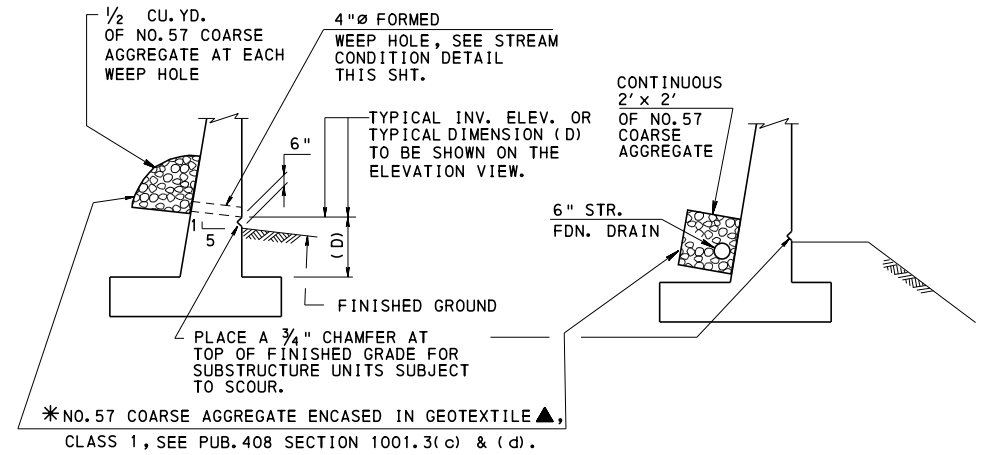
SCHEME B
DRAINAGE SCHEMES



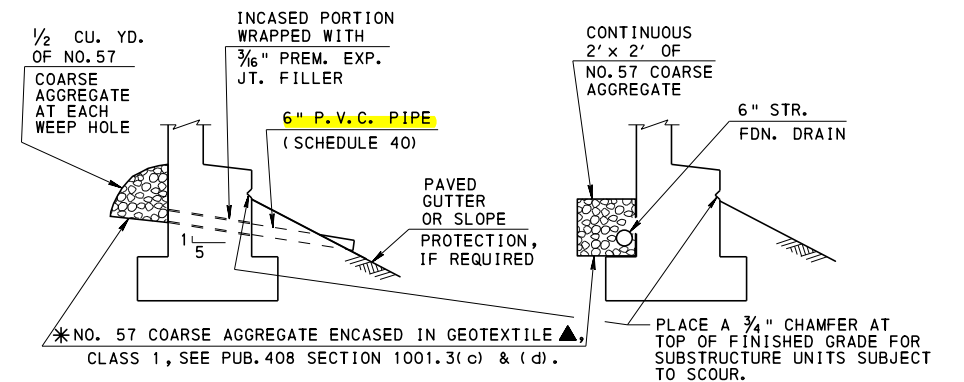
INTEGRAL ABUTMENT SUBSTRUCTURE DRAINAGE



LEGEND:
STR. FDN. DRAIN = STRUCTURE FOUNDATION DRAIN
P. V. C. = POLYVINYL CHLORIDE (SCHEDULE 40)



SCHEME A
ABOVE GRADE CONDITION



SCHEME B
BELOW GRADE CONDITION

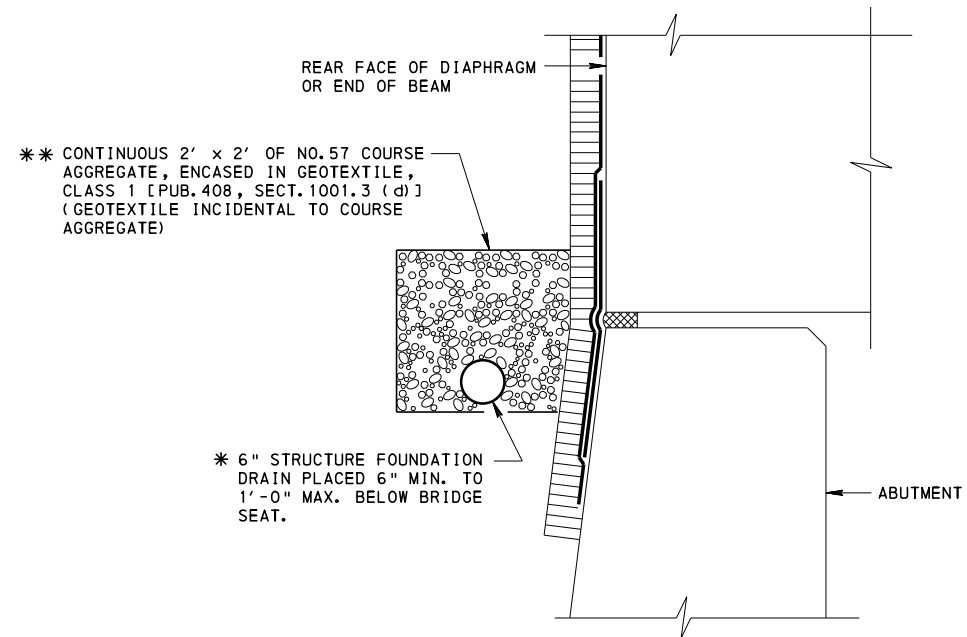
ABUTMENT, WING & RETAINING WALL
DRAINAGE DETAILS

- * NO. 57 COARSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57 COARSE AGGREGATE BACKFILL IS USED.
- ▲ COST OF GEOTEXTILE IS INCIDENTAL TO THE COST OF THE NO. 57 COARSE AGGREGATE.

SEE SHEET 7 FOR ADDITIONAL DRAINAGE AT ABUTMENT WITHOUT BACKWALL DETAIL.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS



**ADDITIONAL DRAINAGE DETAIL
AT ABUTMENT WITHOUT BACKWALL**

- * SLOPE FOUNDATION DRAIN A MINIMUM OF 1/4" PER FOOT. CONNECT TO LOWER STRUCTURE FOUNDATION DRAIN OR OUTLET TO GRADE SIMILAR TO SECTION P-P ON SHEET 6.
- ** NO. 57 COURSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57 COURSE AGGREGATE BACKFILL IS USED.

Detail
previously
on
BD-656M

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION <small>BUREAU OF PROJECT DELIVERY</small>		
STANDARD BRIDGE DRAINAGE MISCELLANEOUS DETAILS		
<small>RECOMMENDED</small> NOV. 21, 2014 <i>Thomas P. Maiore</i> <small>CHIEF BRIDGE ENGINEER</small>	<small>RECOMMENDED</small> NOV. 21, 2014 <i>Brenda S. Thompson</i> <small>ACTING DIR., BUR. OF PROJECT DELIVERY</small>	SHEET 7 OF 7 BC-751M