COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219-2000

David S. Ekern, P.E.
COMMISSIONER

October 2, 2006

MEMORANDUM

To: All Holders of the Virginia Department of Transportation's 2001 Road and Bridge Standards

The following is a list of standards contained in the 2001 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An insertable sheet will not be required in plan assemblies for the following two (2) sheets only.

PAGE	STANDARD	REVISION
602.02	PE-1	Updated dimension lines.
702.00	GS-10	Revised sheet title.

The following is a list of revised standards to the 2001 Road and Bridge Standards that do require an insertable sheet to be included in your plan assembly until the next edition of the imperial standards is published. Please add these pages to your copy of the standards. They are available electronically in PDF format on the VDOT web site. The respective insertable sheet number has been placed with the revised standard. An insertable sheet is available for each of these revised standards in Falcon DMS for VDOT personnel and on the FTP server for consultants working on VDOT projects. These insertable sheets will be required in plan assemblies for projects utilizing the standard items listed below effective with the March 2007 advertisement.

PAGE	INSERT	STANDARD	REVISION
106.15	a186	DSB-1	New standard for the bedding of drainage structures.
107.20	a166_8	PC-1	Revised notes.
107.20A	a166_9	PC-1	Revised notes.

PAGE	INSERT	STANDARD	REVISION
107.21	a166_9	PC-1	Revised notes.
114.01	a69	EC-1	Added dimension tables for length and thickness of erosion control stone.
114.06	isd414_1	EC-5	Replaced silt fence at culvert inlet with a check dam.
201.01	a179	CG-2	Revised notes for use of 4” and 6” curb.
201.02	a180	CG-3	Revised notes for use of 4” and 6” curb.
201.03	a179	CG-6	Revised notes for use of 4” and 6” curb.
201.04	a180	CG-7	Revised notes for use of 4” and 6” curb.
201.05	a181	MC-3, 3A	Revised notes for use of 4” and 6” curb.
201.06	a181	MC-3B, 3C	Revised notes for use of 4” and 6” curb.
202.01	a182	MC-1	Revised notes for use of 4” and 6” curb.
202.02	a159	MS-1	Revised notes for use of 4” and 6” curb.
202.03	a159	MS-1A	Revised notes for use of 4” and 6” curb.
202.04	a183	MS-2	Revised notes for use of 4” and 6” curb.
202.05	a183	MS-4	Revised notes for use of 4” and 6” curb.
303.02	a187	WP-2	New standard for asphalt pavement widening.
304.03	a188	RS-3	New standard for centerline rumble strips.
305.01	a189	TPT-1	New standard for pavement planing tie-ins.
401.02	a161	RW-3	Clarified porous backfill location.
501.05	a87	GR-2, 2A	Added note for GR-11 option in place of 50’ of rail with washers

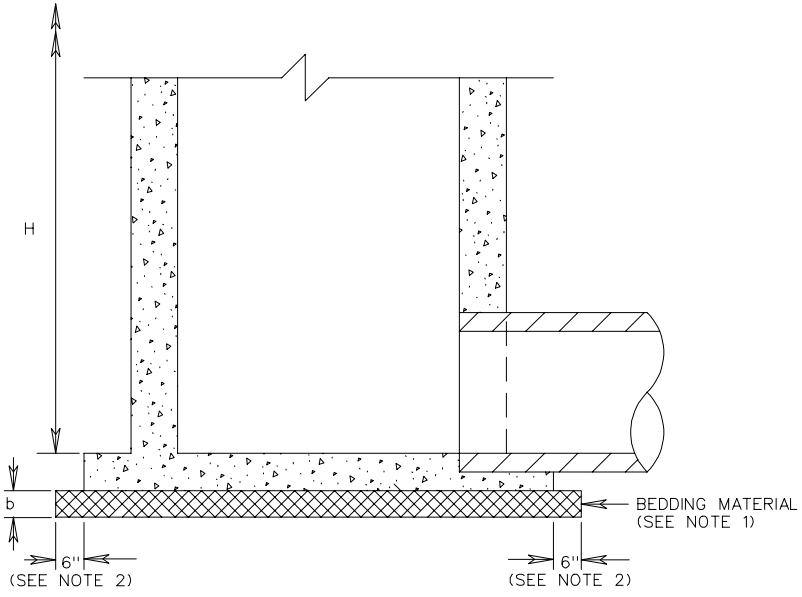
PAGE	INSERT	STANDARD	REVISION
501.11	a89	GR-7	Revised to show only typical dimensions.
501.18	isd2390	GR-9	Revised to show only typical dimensions.
501.19	a88	GR-10	Revised depth of fill above culvert to 4’-0”.
501.20	a88	GR-10	Revised depth of fill above culvert to 4’-0” and added a note about 9” min. distance between post and culvert.
501.25	a65_1	FOA-1	Revised guardrail height to 27 ¾” ± ¾” to match GR-2.
501.26	a65_1	FOA-1	Revised guardrail height to 27 ¾” ± ¾” to match GR-2.
501.27	a65_2	FOA-1	Revised dimension of guardrail on parapet.
501.28	a66_1	FOA-2	Revised guardrail height to 27 ¾” ± ¾” to match GR-2.
501.29	a66_1	FOA-2	Revised guardrail height to 27 ¾” ± ¾” to match GR-2.
501.30	a66_2	FOA-2	Revised dimension of guardrail on parapet.
501.31	a67	FOA-4	Revised guardrail height to 27 ¾” ± ¾” to match MB-3.
501.38	a92	GR-INS	Revised tables to reflect Road Design Manual revision.
501.39	a93	GR-INS	Revised transition length for rail height adjustment.
501.40	a93	GR-INS	Revised transition length for rail height adjustment.

PAGE	INSERT	STANDARD	REVISION
501.41	a94	MB-3	Revised guardrail height to 27 ¾" ± ¾" to match GR-2.
501.53	isd1165A	MB-11A	Revised to be sheet 1 of 3.
501.54	isd1165A	MB-11A	Revised to be sheet 2 of 3.
501.54A	isd1165B	MB-11A	New staking detail for pavement locations.
1301.10	a128	LF-1	Corrected mislabeled dimensions.
1301.25	a184	WD-4	Revised notes.
1301.48	a127	JB-1A,2A,3A,4A,5A	Corrected mislabeled dimensions
1301.84	a185	ED-1, 2	Revised notes.

If you have any questions or comments regarding the listed revisions to this publication, please contact Steve Van Cleef of the Standards and Special Design Section at (804) 786-2532.

Sincerely,

Mohammad Mirshahi, P.E.
State Location and Design Engineer



SECTIONAL ELEVATION

NOTES

1. BEDDING MATERIAL IS TO BE AGGREGATE SIZE 25 OR 26. IF FOUNDATION HAS STANDING OR RUNNING WATER PRESENT, THEN AGGREGATE NO. 57 SHALL BE USED FOR THE DEPTH SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER, CAPPED WITH 4 INCHES OF AGGREGATE NO. 25 OR 26.
2. WIDTH OF BEDDING MATERIAL SHALL EXTEND A MINIMUM OF 6" BEYOND THE BASE OF THE STRUCTURE ON ALL SIDES.
3. HEIGHT OF STRUCTURE (H) IS MEASURED FROM THE INVERT OF THE STRUCTURE TO THE TOP OF THE FRAME AND COVER OR CONCRETE DEPENDING ON STRUCTURE TYPE. SEE APPLICABLE DRAINAGE STRUCTURE STANDARD FOR DETAIL.

BEDDING THICKNESS TABLE

FOUNDATION TYPE	BEDDING THICKNESS (b)
NORMAL EARTH	4" FOR H < 10'
	6" FOR H > 10'
ROCK	1" PER FOOT OF H, MAX. 8"
SOFT & YIELDING	AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER

SPECIFICATION REFERENCE
302

DRAINAGE STRUCTURE BEDDING FOR DROP INLET, MANHOLE, AND JUNCTION BOX

VIRGINIA DEPARTMENT OF TRANSPORTATION

NEW 9/06

106.15

PC-1

POLYETHYLENE CORRUGATED PIPE (PE) (SEE NOTE 6)		
DIAMETER INCHES	AREA SQ. FT.	MAXIMUM HEIGHT OF COVER FEET
12	0.8	21
15	1.2	21
18	1.8	20
24	3.1	20
30	4.9	19
36	7.1	18
42	7.1	18
48	7.1	17

POLYVINYLCHLORIDE RIBBED PIPE (PVC)		
DIAMETER INCHES	AREA SQ. FT.	MAXIMUM HEIGHT OF COVER FEET
18	1.7	20
21	2.3	19
24	3.0	19
30	4.7	18
36	6.9	18
48	12.3	18

NOTES:

1. COVER HEIGHTS INDICATED IN TABLES ARE FOR FINISHED CONSTRUCTION.
2. TO PROTECT PIPE DURING CONSTRUCTION, MINIMUM HEIGHT OF COVER TO BE IN ACCORDANCE WITH TABLE A PRIOR TO ALLOWING CONSTRUCTION TRAFFIC TO CROSS INSTALLATION. THE COVER SHALL EXTEND THE FULL LENGTH OF THE PIPE. THE APPROACH FILL IS TO EXTEND A MINIMUM OF 10(DIAMETER + ½ DIAMETER) ON EACH SIDE OF THE PIPE OR TO THE INTERSECTION WITH A CUT.
3. STANDARD MINIMUM FINISHED HEIGHT OF COVER FOR ALL PIPES, EXCEPT THOSE UNDER ENTRANCES, SHALL BE 2.0' OR ½ DIAMETER WHICHEVER IS GREATER. IN CASES IN WHICH THESE COVER HEIGHTS CANNOT BE ACHIEVED, AN ABSOLUTE MINIMUM FINISHED COVER HEIGHT OF 1.0' OR ⅛ DIAMETER WHICHEVER IS GREATER WILL BE ALLOWED ONLY IF ALL POSSIBLE MEANS TO OBTAIN THE STANDARD VALUE HAVE BEEN EXHAUSTED. THE MINIMUM FINISHED HEIGHT OF COVER FOR PIPES UNDER ENTRANCES IS 9" FOR PIPE DIAMETERS LESS THAN OR EQUAL TO 24" AND 12" OR ⅛ DIAMETER, WHICHEVER IS GREATER, FOR PIPE DIAMETERS GREATER THAN 24". WHERE THE SURFACE OVER THE TOP OF THE PIPE WILL BE ASPHALT, A MINIMUM OF 6" OF CLASS I BACKFILL MATERIAL IS TO BE PLACED BETWEEN THE TOP OF THE PIPE AND THE BOTTOM OF THE ASPHALT.
4. SEE STANDARD PB-1 FOR PIPE BEDDING AND BACKFILL REQUIREMENTS.
5. THE MAXIMUM HEIGHT OF COVER SHOWN IN THE TABLES IS BASED ON A SOIL MODULUS OF 700 PSI. ALL OTHER DESIGN CRITERIA ARE IN ACCORDANCE WITH THE AASHTO SPECIFICATIONS AND VDOT MODIFICATIONS FOR SOIL THERMOPLASTIC PIPE INTERACTION SYSTEMS.
6. HEIGHT OF COVER VALUES FOR 12" TO 36" DIAMETER APPLY TO TYPE C OR S. HEIGHT OF COVER VALUES FOR 42" AND 48" APPLY TO TYPE S ONLY.

TABLE A	
PIPE DIAMETER	MINIMUM COVER HEIGHT DURING CONSTRUCTION (SEE NOTE 4)
12" TO 30"	18"
36" AND ABOVE	½ DIAMETER

PLASTIC PIPE

EXTRA STRENGTH CLAY PIPE		
DIAMETER INCHES	AREA SQ. FT.	MAXIMUM HEIGHT OF COVER FEET
12	0.8	19
15	1.2	15
18	1.8	15
21	2.4	15
24	3.1	15
30	4.9	13
36	7.1	13

NOTES:

1. ALL VITRIFIED CLAY PIPE IS TO BE EXTRA STRENGTH.
2. MAXIMUM HEIGHTS OF COVER SHOWN IN TABLE ARE FOR FINISHED CONSTRUCTION.
3. TO PROTECT PIPE DURING CONSTRUCTION, MINIMUM HEIGHT OF COVER PRIOR TO ALLOWING CONSTRUCTION TRAFFIC TO CROSS INSTALLATION IS TO BE 36". THIS COVER IS TO EXTEND THE FULL LENGTH OF THE PIPE. THE APPROACH FILL RAMP IS TO EXTEND A MINIMUM OF [10(DIAMETER + 36")] ON EACH SIDE OF THE PIPE, OR TO THE INTERSECTION WITH A CUT.
4. MINIMUM FINISHED HEIGHT OF COVER TO BE 24", EXCEPT PIPE UNDER ENTRANCES WHERE A 9" MINIMUM WILL BE PERMITTED.
5. SEE STANDARD PB-1 FOR PIPE BEDDING AND BACKFILL REQUIRMENTS.

VITRIFIED CLAY

VITRIFIED CLAY AND PLASTIC PIPE
HEIGHT OF COVER TABLES FOR H-20 LIVE LOAD

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

232
302

REV. 9/06

107.20

TABLE A - ALLOWABLE TYPE OF PIPE CULVERT

FOR ROADWAYS THAT ARE CONSTRUCTED, FUNDED OR WILL ULTIMATELY BE MAINTAINED BY VDOT

FUNCTIONAL CLASSIFICATION OF ROADS SYSTEM UNDER WHICH PIPE IS TO BE INSTALLED					
	HIGHER FUNCTIONAL CLASS - HFC RURAL PRINCIPAL ARTERIAL, URBAN PRINCIPAL ARTERIAL, RURAL MINOR ARTERIAL, URBAN MINOR ARTERIAL, RURAL COLLECTOR ROADS, URBAN COLLECTOR STREETS, SUBDIVISION STREETS WITH AN ADT GREATER THAN 4000		LOWER FUNCTIONAL CLASS - LFC RURAL LOCAL ROADS, URBAN LOCAL STREETS, SUBDIVISION STREETS WITH AN ADT LESS THAN OR EQUAL TO 4000		ENTRANCE PIPE
ALLOWABLE PIPE CULVERTS NOTES 1 & 2	STATEWIDE EXCEPT LOCATIONS SHOWN IN TABLE B	LOCATION SHOWN IN TABLE B	STATEWIDE EXCEPT LOCATIONS SHOWN IN TABLE B	LOCATION SHOWN IN TABLE B	STATEWIDE
CONCRETE	✓	✓	✓	✓	✓
ALUMINUM COATED TYPE 2 CORRUGATED STEEL NOTE 3	✓		✓		✓
POLYMER COATED (10/10) CORRUGATED STEEL NOTE 3	✓	✓	✓	✓	✓
UNCOATED GALVANIZED CORRUGATED STEEL NOTES 3 & 4					✓
GALVANIZED STEEL STRUCTURAL PLATE NOTE 3			✓		✓
GALVANIZED STEEL STRUCTURAL PLATE WITH CONCRETE INVERT NOTE 3	✓		✓	✓	✓
CORRUGATED ALUMINUM ALLOY NOTE 3	✓	✓	✓	✓	✓
CORRUGATED ALUMINUM ALLOY STRUCTUAL PLATE NOTE 3	✓	✓	✓	✓	✓
POLYVINYLCHLORIDE (PVC) RIBBED PIPE (SMOOTH INTERIOR)	✓	✓	✓	✓	✓
POLYETHYLENE (PE) CORRUGATED TYPE C	✓	✓	✓	✓	
POLYETHYLENE (PE) CORRUGATED TYPE S	✓	✓	✓	✓	✓

NOTES:

1. ALLOWABLE TYPES OF PIPES FOR A SPECIFIC AREA ARE TO CONFORM TO THE CRITERIA SHOWN IN TABLES A, A1, B, AND C. ANY DEVIATION MUST BE APPROVED BY THE STATE LOCATION AND DESIGN ENGINEER AND THE DISTRICT MATERIALS ENGINEER.
2. SEE HEIGHT OF COVER TABLES FOR MINIMUM AND MAXIMUM COVER LIMITATIONS FOR EACH TYPE OF PIPE.
3. SEE TABLE C FOR MINIMUM AND MAXIMUM pH, RESISTIVITY, AND VELOCITY LIMITATIONS FOR METAL PIPES.
4. USE ONLY UNDER ENTRANCES WHERE THE PIPE SIZE IS LESS THAN OR EQUAL TO 30" DIAMETER (OR EQUIVALENT) AND THE HEIGHT OF COVER IS LESS THAN OR EQUAL TO 15' AND AS AN OUTLET PIPE FOR STANDARD DI-13 SHOULDER SLOT INLETS.

SPECIFICATION REFERENCE

302
232

ALLOWABLE PIPE CRITERIA FOR CULVERTS AND STORM SEWERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

PC-1

TABLE A1 - ALLOWABLE TYPE OF STORM SEWER PIPE

FOR ROADWAYS THAT ARE CONSTRUCTED, FUNDED OR WILL ULTIMATELY BE MAINTAINED BY VDOT

FUNCTIONAL CLASSIFICATION OF ROADS SYSTEM UNDER WHICH PIPE IS TO BE INSTALLED

	HIGHER FUNCTIONAL CLASS - HFC RURAL PRINCIPAL ARTERIAL, URBAN PRINCIPAL ARTERIAL, RURAL MINOR ARTERIAL, URBAN MINOR ARTERIAL, RURAL COLLECTOR ROADS, URBAN COLLECTOR STREETS, SUBDIVISION STREETS WITH AN ADT GREATER THAN 4000	LOWER FUNCTIONAL CLASS - LFC RURAL LOCAL ROADS, URBAN LOCAL STREETS, SUBDIVISION STREETS WITH AN ADT LESS THAN OR EQUAL TO 4000	
ALLOWABLE PIPE CULVERTS NOTES 1 & 2	STATEWIDE	STATEWIDE EXCEPT LOCATIONS SHOWN IN TABLE B	LOCATION SHOWN IN TABLE B
CONCRETE	✓	✓	✓
CORRUGATED STEEL ALUMINUM COATED TYPE 2 FULLY CONCRETE LINED NOTE 3		✓	
ALUMINUM COATED TYPE 2 STEEL SPIRAL RIB NOTE 3		✓	
POLYMER COATED (10/10) CORRUGATED STEEL SPIRAL RIB NOTE 3		✓	✓
POLYMER COATED (10/10) CORRUGATED STEEL DOUBLE WALL (SMOOTH INTERIOR) NOTE 3		✓	✓
ALUMINUM SPIRAL RIB NOTE 3		✓	✓
POLYVINYLCHLORIDE (PVC) RIBBED PIPE (SMOOTH INTERIOR)		✓	✓
POLYETHYLENE (PE) CORRUGATED TYPE S		✓	✓

TABLE B

EXCEPTIONS TO STATEWIDE APPLICATIONS

COUNTIES (INCLUDING TOWNS)				CITIES	
ARLINGTON - EAST OF AND INCLUDING RTES. 95 & 395		SURRY - EAST OF AND INCLUDING RTE. 10		SUFFOLK - EAST OF AND INCLUDING RTE. 32	
FAIRFAX - EAST OF AND INCLUDING RTES. 95 & 395		ISLE OF WIGHT - EAST OF AND INCLUDING RTE. 10		CHESAPEAKE	WILLIAMSBURG
PRINCE WILLIAM - EAST OF AND INCLUDING RTES. 95 & 395				VIRGINIA BEACH	POQUOSON
WESTMORELAND	JAMES CITY	ESSEX	NORTHAMPTON	HAMPTON	PORTSMOUTH
LANCASTER	ACCOMACK	MIDDLESEX	STAFFORD	NEWPORT NEWS	
MATTHEWS	SPOTSYLVANIA	YORK	KING GEORGE	NORFOLK	
GLOUCESTER	NORTHUMBERLAND	RICHMOND		ALEXANDRIA	
				FREDERICKSBURG	

TABLE C

PIPE TYPE	ALLOWABLE pH RANGE (SEE NOTE 6)		ALLOWABLE RESISTIVITY RANGE		ALLOWABLE VELOCITY (FPS) (SEE NOTE 5)
	MIN.	MAX.	MIN.	MAX.	MAXIMUM
ALUMINUM COATED TYPE 2 CORRUGATED STEEL	5.0	9.0	1500	-	5
GALVANIZED STEEL STRUCTURAL PLATE WITH CONCRETE INVERT	6.0	9.0	2000	10000	15
GALVANIZED STEEL STRUCTURAL PLATE	6.0	9.0	2000	7000	5
POLYMER COATED (10/10) CORRUGATED STEEL	4.0	9.0	750	-	15
UNCOATED GALVANIZED CORRUGATED STEEL	6.0	10.0	2000	7000	5
CORRUGATED ALUMINUM ALLOY	4.0	9.0	500	-	5
CORRUGATED ALUMINUM ALLOY STRUCTURAL PLATE	4.0	9.0	500	-	5
ALUMINUM SPIRAL RIB	4.0	9.0	500	-	5
ALUMINUM COATED TYPE 2 SPIRAL RIB	5.0	9.0	1500	-	5
CORRUGATED STEEL ALUMINUM COATED TYPE 2 FULLY CONCRETE LINED	5.0	9.0	1500	-	15
POLYMER COATED CORRUGATED STEEL SPIRAL RIB	4.0	9.0	750	-	15
POLYMER COATED CORRUGATED STEEL DOUBLE WALL	4.0	9.0	750	-	15

NOTES:

1. ALLOWABLE TYPES OF PIPES FOR A SPECIFIC AREA ARE TO CONFORM TO THE CRITERIA SHOWN IN TABLES A, A1, B, AND C. ANY DEVIATION MUST BE APPROVED BY THE STATE LOCATION AND DESIGN ENGINEER AND THE DISTRICT MATERIALS ENGINEER.
2. SEE HEIGHT OF COVER TABLES FOR MINIMUM AND MAXIMUM COVER LIMITATIONS FOR EACH TYPE OF PIPE.
3. SEE TABLE C FOR MINIMUM AND MAXIMUM pH, RESISTIVITY, AND VELOCITY LIMITATIONS FOR METAL PIPES.
4. USE ONLY UNDER ENTRANCES WHERE THE PIPE SIZE IS LESS THAN OR EQUAL TO 30" DIAMETER (OR EQUIVALENT) AND THE HEIGHT OF COVER IS LESS THAN OR EQUAL TO 15' AND AS AN OUTLET PIPE FOR STANDARD DI-13 SHOULDER SLOT INLETS.
5. ALLOWABLE VELOCITY WHERE ABRASIVE BEDLOAD IS PRESENT OR ANTICIPATED. MAXIMUM VELOCITY BASED ON 10 YEAR DESIGN DISCHARGE (Q).
6. pH VALUES APPLY TO BOTH THE SOIL AND WATER.

SPECIFICATION REFERENCE

302
232

ALLOWABLE PIPE CRITERIA FOR CULVERTS AND STORM SEWERS

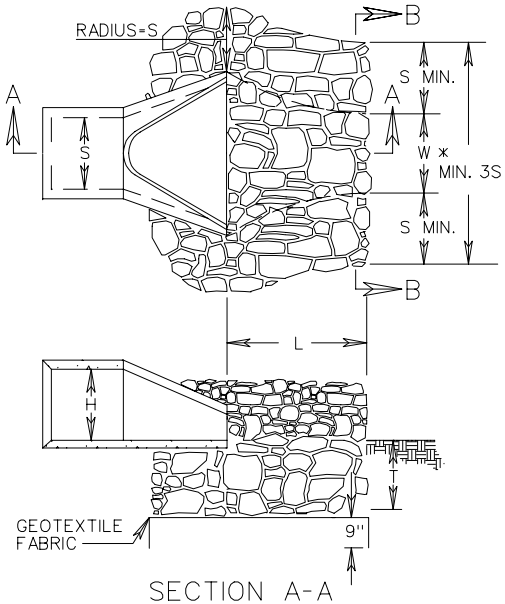
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

107.21

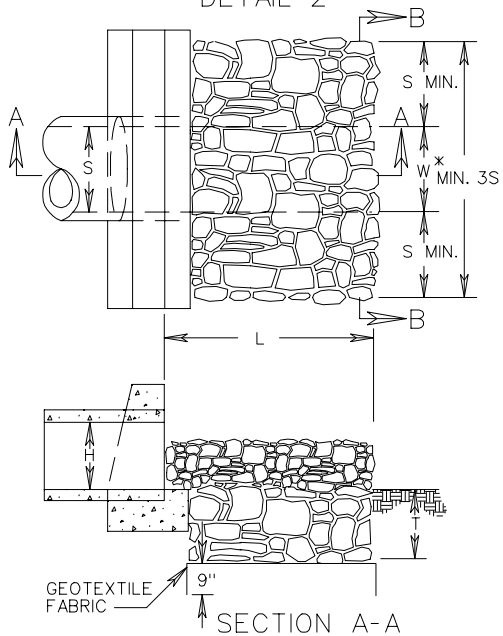
EC-1

DETAIL 1



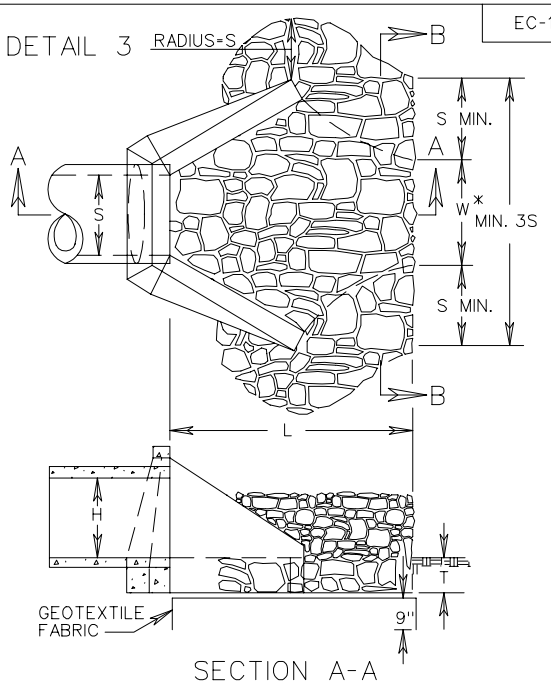
SECTION A-A

DETAIL 2

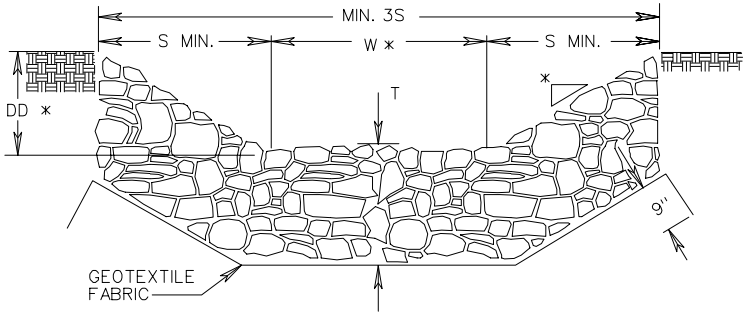


SECTION A-A

DETAIL 3



SECTION A-A



SECTION B-B

TYPE OF OUTLET PROTECTION MATERIAL		MAXIMUM OUTLET VELOCITY (FOR DESIGN STORM)	MINIMUM "T"
CLASS 1	EC-3 TYPE B	6 fps	NA
CLASS 2	CLASS A1 DRY RIPRAP	8 fps	20"
CLASS 3	CLASS I DRY RIPRAP	14 fps	26"
CLASS 4	CLASS II DRY RIPRAP	19 fps	38"

NOTES:

1. FOR MULTIPLE LINE INSTALLATIONS, DIMENSION S IS TO GOVERN THE PROTECTION OUTSIDE THE CHANNEL WIDTH (W).
2. ON ANY INSTALLATION REQUIRING CULVERT OUTLET PROTECTION WHERE NO ENDWALL OR ENDSECTION IS SPECIFIED ON THE PLANS, CONSTRUCTION IS TO BE IN ACCORDANCE WITH DETAIL 2 SHOWN ABOVE.
3. GEOTEXTILE FABRIC TO BE INSTALLED UNDER CLASS 2, 3, AND 4 MATERIALS IN ACCORDANCE WITH THE SPECIFICATIONS.
4. S = DIAMETER OF CIRCULAR CULVERT OR SPAN FOR BOX, ELLIPTICAL OR ARCH CULVERT. H = DIAMETER OF CIRCULAR CULVERT OR RISE/HEIGHT FOR BOX, ELLIPTICAL OR ARCH CULVERT.
5. PLAN AND SECTION DETAILS DEPICT CLASS 2, 3, AND 4 MATERIALS. FOR CLASS 1 INSTALLATION DETAILS SEE EC-3 TYPE B STANDARD DRAWING.

* USE TYPICAL SECTION SHOWN ON PLANS FOR SIDE SLOPE, BOTTOM WIDTH AND DEPTH OF CHANNEL OR MATCH EXISTING DITCH OR NATURAL GROUND.

OUTLET PROTECTION MINUMUM LENGTH (L)	
TYPE A INSTALLATION	3H
TYPE B INSTALLATION	5H

SPECIFICATION REFERENCE
204 245 303 414

CULVERT OUTLET PROTECTION

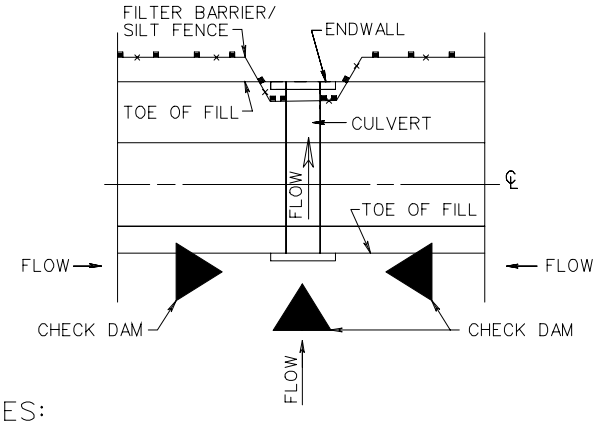
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

114.01

EC-5

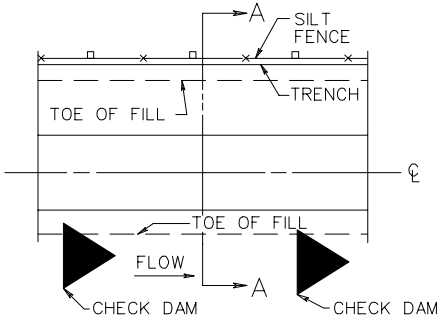
TYPICAL DETAIL FOR TEMPORARY FILTER BARRIER/SILT FENCE/CHECK DAM AT CULVERT



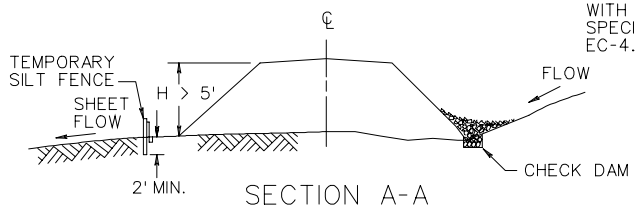
NOTES:

1. IF ANY PORTION OF FILL IS GREATER THAN 5', SILT FENCE IS REQUIRED. IF FILL HEIGHT IS LESS THAN 5', FILTER BARRIER IS REQUIRED.
2. ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

TYPICAL DETAIL FOR TEMPORARY SILT FENCE/CHECK DAM AT TOE OF FILL

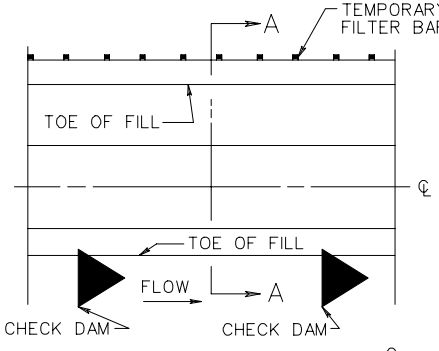


NOTE:
ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.



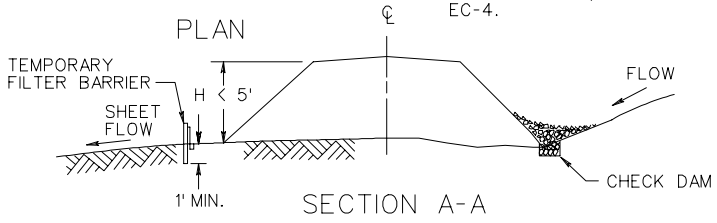
SECTION A-A

TYPICAL DETAIL FOR TEMPORARY FILTER BARRIER/CHECK DAM AT TOE OF FILL



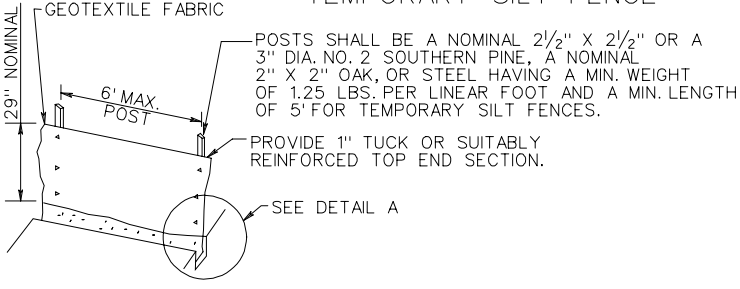
PLAN

NOTE:
ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

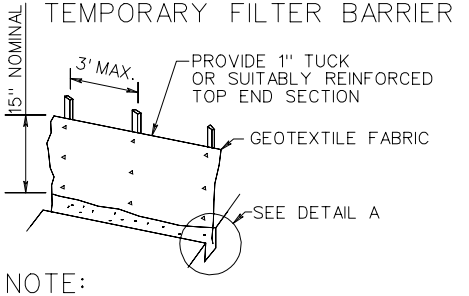


SECTION A-A

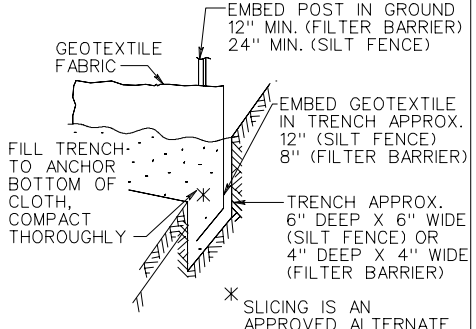
TEMPORARY SILT FENCE



TEMPORARY FILTER BARRIER



NOTE:
SUPPORTS FOR TEMPORARY FILTER BARRIERS SHALL BE A NOMINAL 1" X 2" OR A 1½" DIA. NO. 2 SOUTHERN PINE OR OAK, OR STEEL HAVING A MIN. WEIGHT OF 1.00 LBS. PER LINEAR FOOT.



DETAIL A

TEMPORARY SILT FENCE AND FILTER BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION

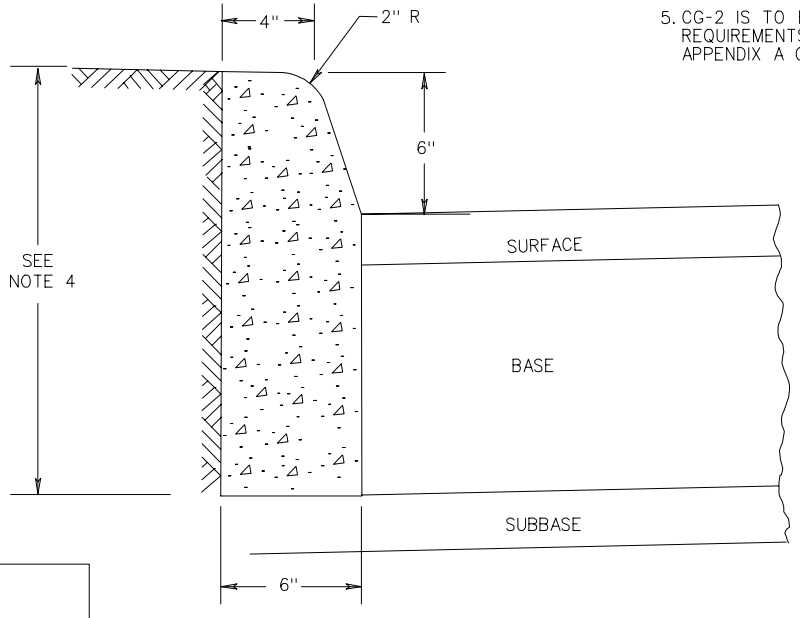
SPECIFICATION REFERENCE
107
242
303

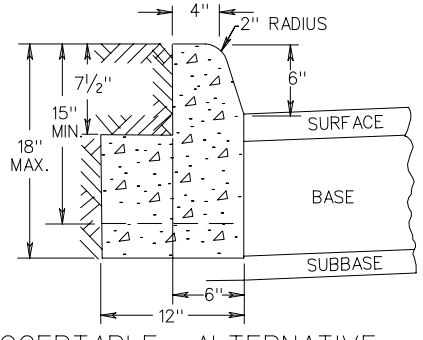
REV. 9/06
114.06

CG-2

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. CURB HAVING A RADIUS OF 300 FEET. OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.
4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (15" DEPTH) OR INCREASED AS MUCH AS 3" (21" DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.
5. CG-2 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.





ACCEPTABLE ALTERNATIVE IF CURB IS EXTRUDED

SPECIFICATION REFERENCE
105 502

STANDARD 6" CURB

VIRGINIA DEPARTMENT OF TRANSPORTATION

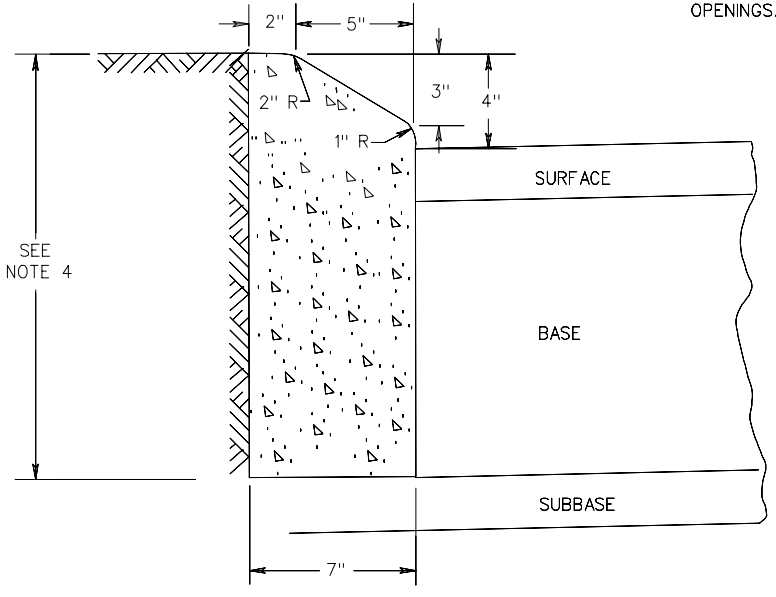
REV. 9/06

201.01

CG-3

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. CURB HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.
4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (13" DEPTH) OR INCREASED AS MUCH AS 3" (19" DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE THE DEPTH IS TO BE 16" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.
5. CG-3 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-7 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.
6. WHEN THIS STANDARD IS TO BE TIED INTO EXISTING BARRIER CURB, THE TRANSITION IS TO BE MADE WITHIN 10' OR THE CHANGE IN STANDARDS MADE AT REGULAR OPENINGS.



STANDARD 4" CURB

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

105
502

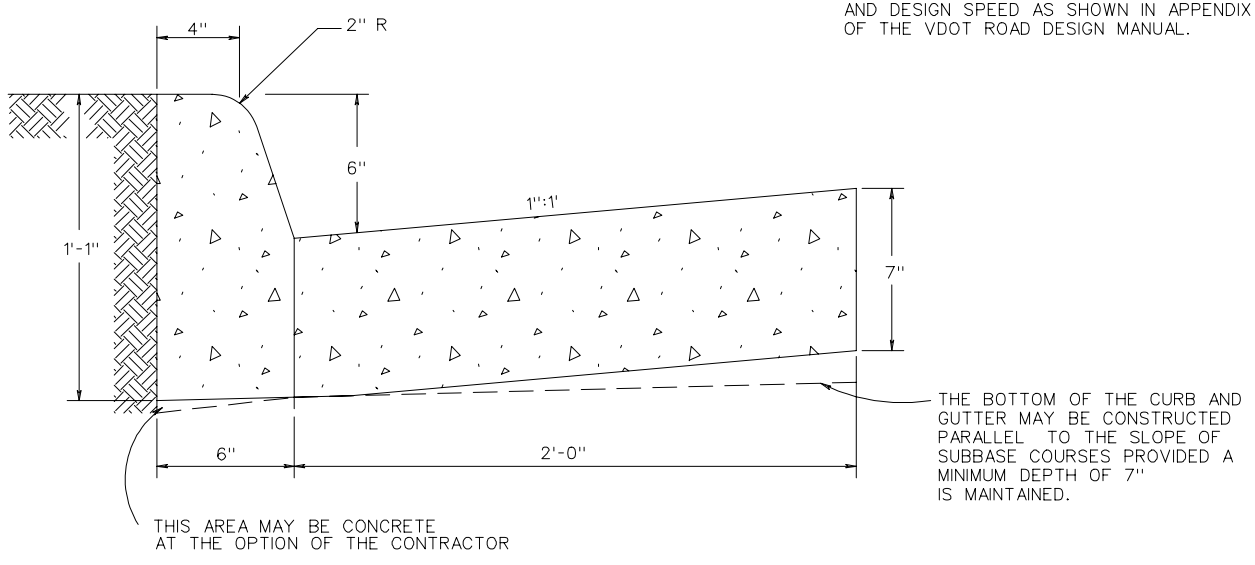
REV. 9/06

201.02

CG-6

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURB & GUTTER.
4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT.
5. ALLOWABLE CRITERIA FOR THE USE OF CG-6 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.



SPECIFICATION REFERENCE

105
502

COMBINATION 6" CURB & GUTTER

VIRGINIA DEPARTMENT OF TRANSPORTATION

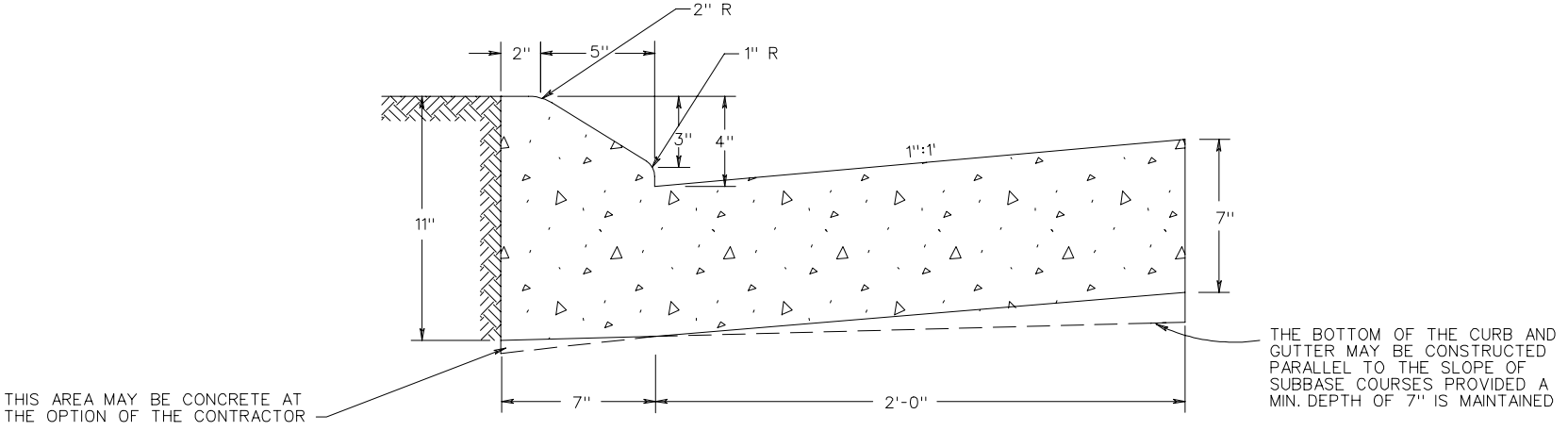
REV. 9/06

201.03

CG-7

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURB & GUTTER.
4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT.
5. ALLOWABLE CRITERIA FOR THE USE OF CG-7 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.
6. WHEN THIS STANDARD IS TO BE TIED INTO EXISTING BARRIER CURB, THE TRANSITION IS TO BE MADE WITHIN 10' OR THE CHANGE IN STANDARDS MADE AT REGULAR OPENINGS.
7. WHEN COMBINATION MOUNTABLE CURB AND GUTTER IS USED, THE STANDARD ENTRANCE GUTTERS OR STANDARD CONNECTION FOR STREET INTERSECTIONS ARE TO HAVE THE MOUNTABLE CURB CONFIGURATION INCORPORATED.



COMBINATION 4" CURB & GUTTER

VIRGINIA DEQARTMENT OF TRANSQORTATION

SQECIFICATION REFERENCE

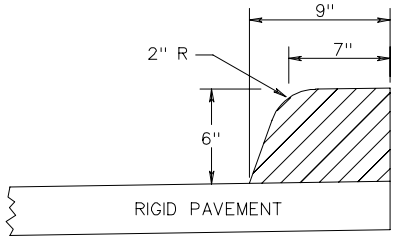
105
502

REV. 9/06

201.04

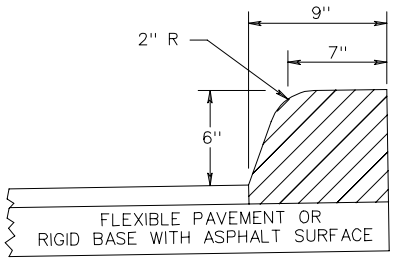
INSERTABLE SHEET A181

MC-3



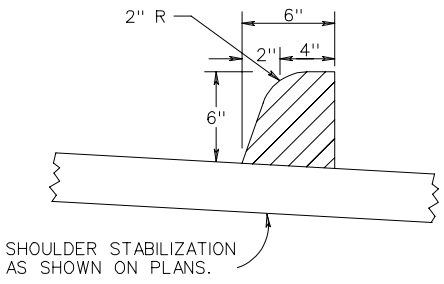
ASPHALT CURB

MC-3

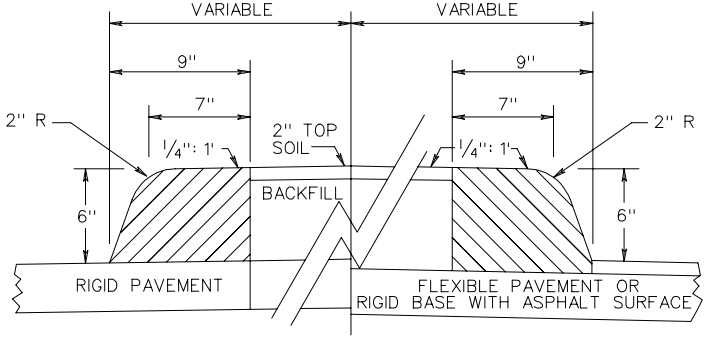


ASPHALT CURB

MC-3A

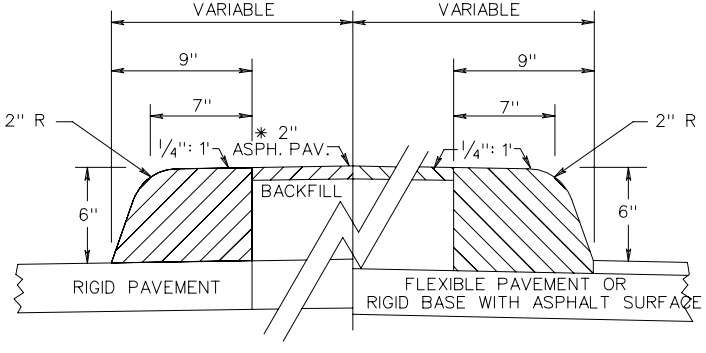


ASPHALT CURB
FOR SLOPE EROSION CONTROL ONLY



ASPHALT MEDIAN

MC-3 AND MC-3A IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.



ASPHALT MEDIAN

* ASPHALT TOP FOR MEDIAN TO BE SAME MIX AS CURB.

SPECIFICATION REFERENCE
502

ASPHALT CONCRETE CURB AND MEDIAN FOR TEMPORARY OR PERMANENT INSTALLATION

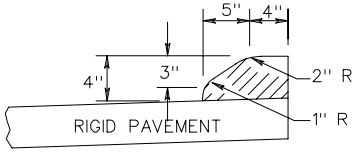
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

201.05

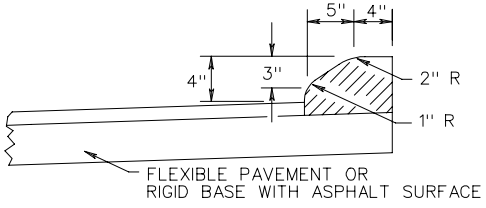
INSERTABLE SHEET A181

MC-3B



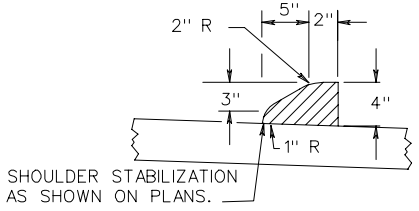
ASPHALT CURB

MC-3B



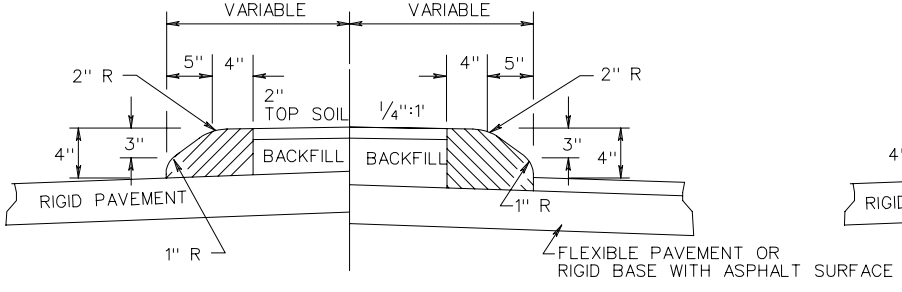
ASPHALT CURB

MC-3C

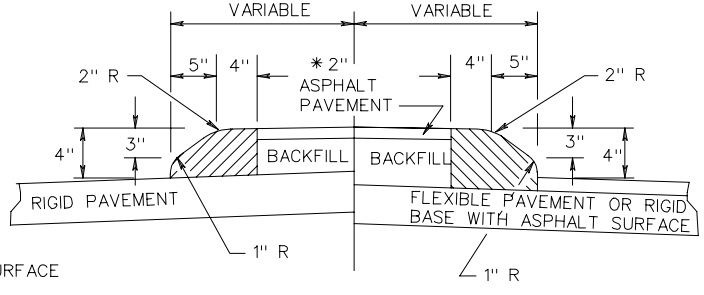


ASPHALT CURB
FOR SLOPE EROSION CONTROL ONLY

MC-3B



ASPHALT MEDIAN



ASPHALT MEDIAN

MC-3B AND MC-3C IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-7 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.

* ASPHALT TOP FOR MEDIAN TO BE SAME MIX AS CURB.

ASPHALT CONCRETE CURB AND MEDIAN FOR TEMPORARY OR PERMANENT INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

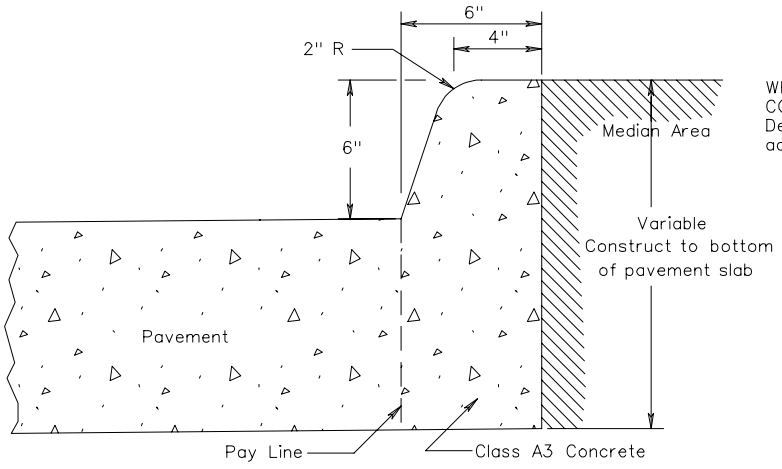
SPECIFICATION REFERENCE

502

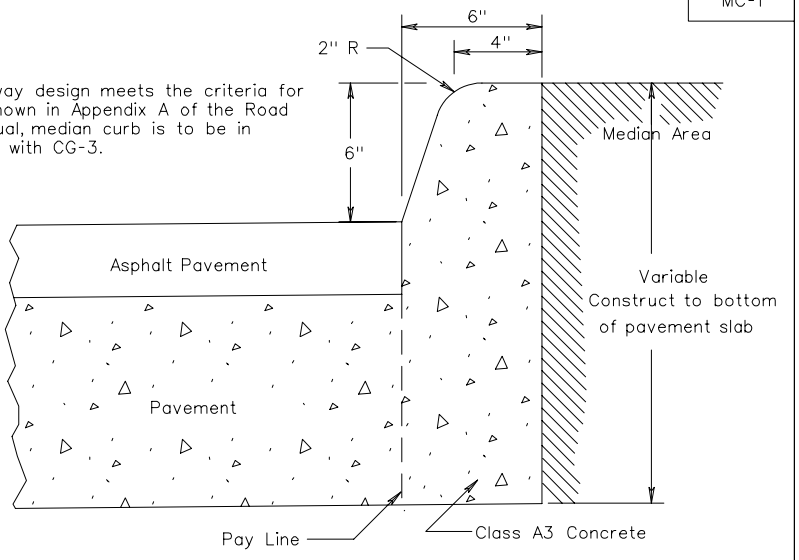
REV. 9/06

201.06

MC-1



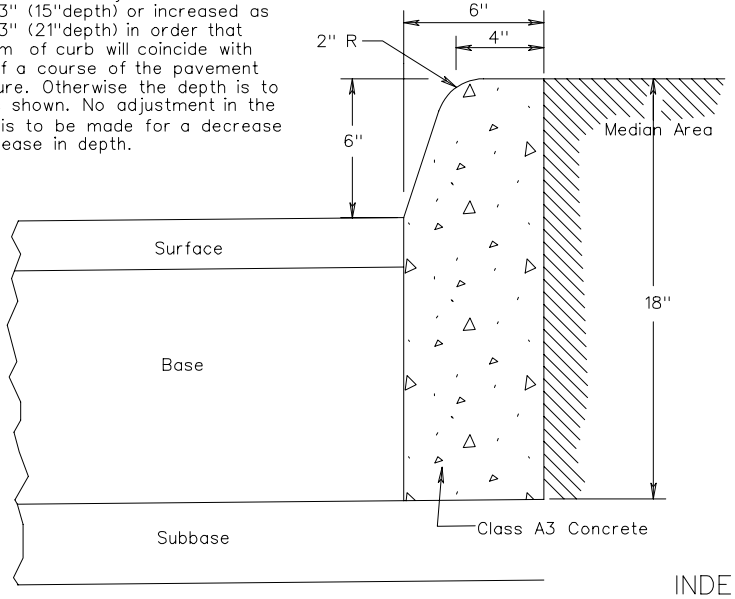
When roadway design meets the criteria for CG-7 as shown in Appendix A of the Road Design Manual, median curb is to be in accordance with CG-3.



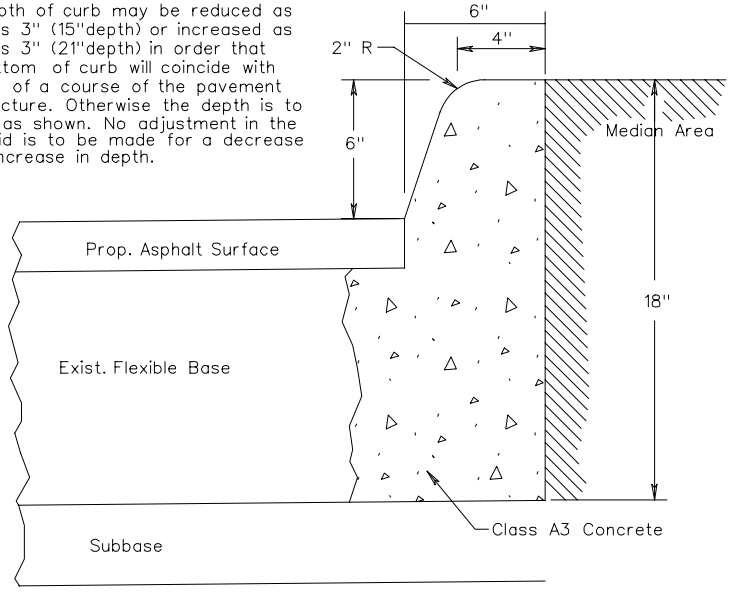
FOR USE WITH CONCRETE PAVEMENT INTEGRAL

FOR USE WITH CONCRETE WITH ASPHALT TOP COURSE

The depth of curb may be reduced as much as 3" (15"depth) or increased as much as 3" (21"depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise the depth is to be 18" as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.



The depth of curb may be reduced as much as 3" (15"depth) or increased as much as 3" (21"depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise the depth is to be 18" as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.



INDEPENDENT

SPECIFICATION REFERENCE
502

CONCRETE MEDIAN CURB

VIRGINIA DEPARTMENT OF TRANSPORTATION

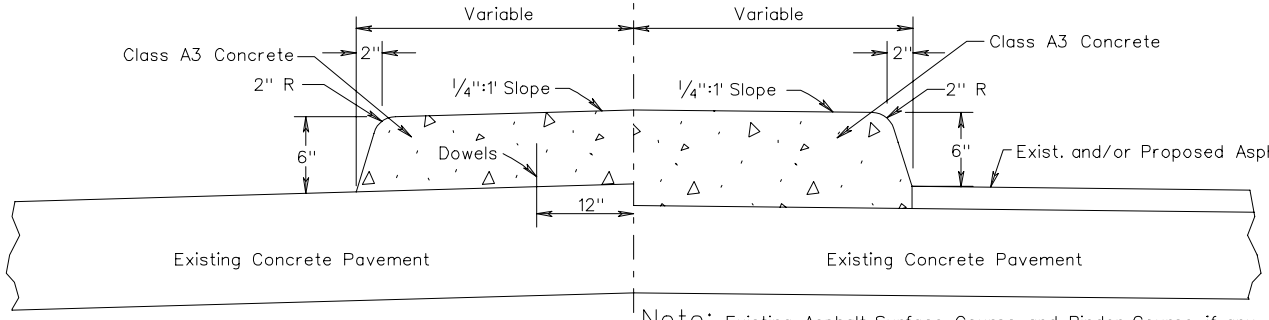
REV. 9/06

202.01

INSERTABLE SHEET A159

MS-1

HALF SECTION ON EXISTING CONCRETE PAVEMENT

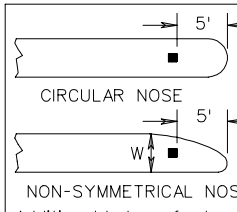


Dowel spacing Longitudinally at 2'-0" c-c from nose to first joint.

When roadway design meets the criteria for CG-7 as shown in Appendix A of the Roadway Design Manual, median curb is to be in accordance with CG-3.

HALF SECTION ON EXISTING CONCRETE PAVEMENT WITH PROPOSED OR EXISTING ASPHALT PAVEMENT

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.



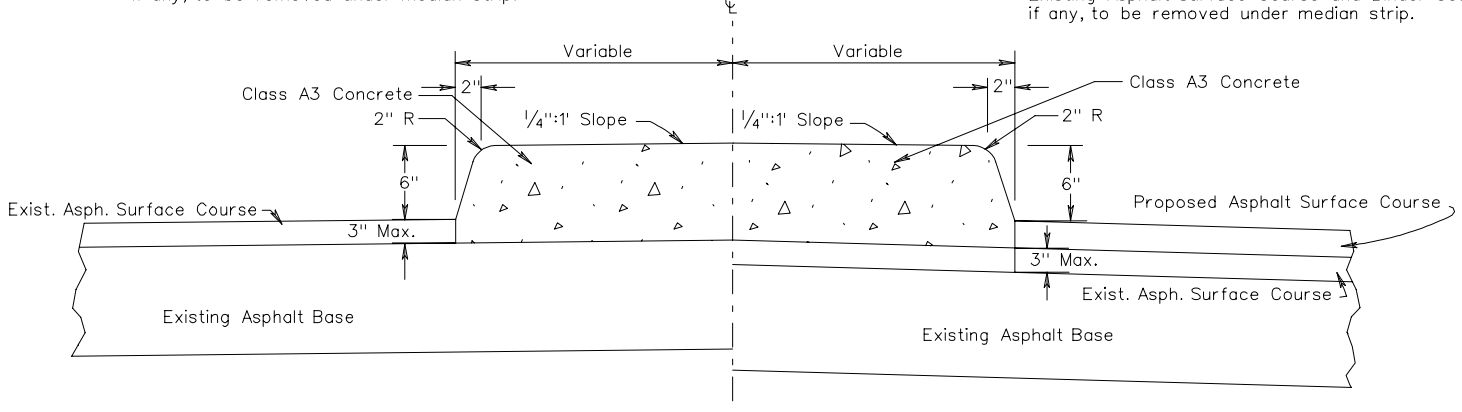
12" square hole for sign post to be formed into introduced median noses a minimum of 5' from the nose.

W = 4' Min.

When median is installed over existing pavement, hole for sign post is to extended to the subbase.

Additional holes of adequate size to be provided for sign posts, delineator posts, etc. as shown on the plans or directed by the Engineer.

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.



Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

HALF SECTION ON EXISTING FLEXIBLE PAVEMENT

HALF SECTION ON EXISTING FLEXIBLE PAVEMENT TO BE RESURFACED

STANDARD SOLID CONCRETE RAISED MEDIAN STRIP

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

502

REV. 9/06

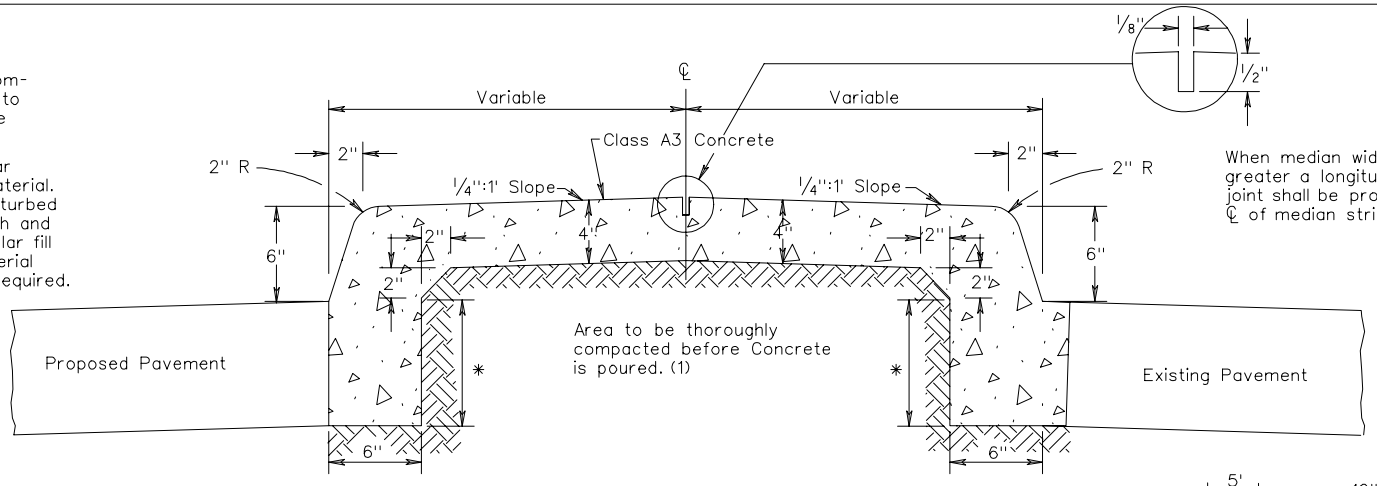
202.02

INSERTABLE SHEET A159

MS-1A

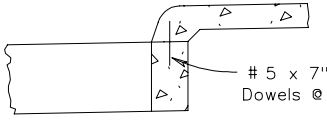
(1) Thoroughly compacted area to consist of the following:

In Fills-Regular fill material.
In Cuts-Undisturbed earth and regular fill material as required.

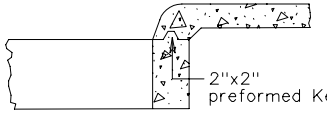


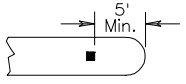
When median width is 3 feet or greater a longitudinal contraction joint shall be provided along ℄ of median strip.

SUGGESTED CONSTRUCTION METHOD IF TOP SLAB IS POURED SEPARATELY

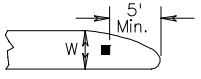


ALTERNATE CONSTRUCTION METHOD IF TOP SLAB IS POURED SEPARATELY





CIRCULAR NOSE



NON-SYMMETRICAL NOSE

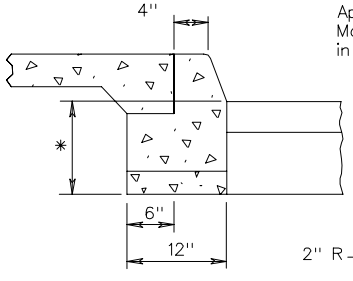
12" square hole for sign post to be formed into introduced median noses a minimum of 5' from the nose.

W = 4' Min.

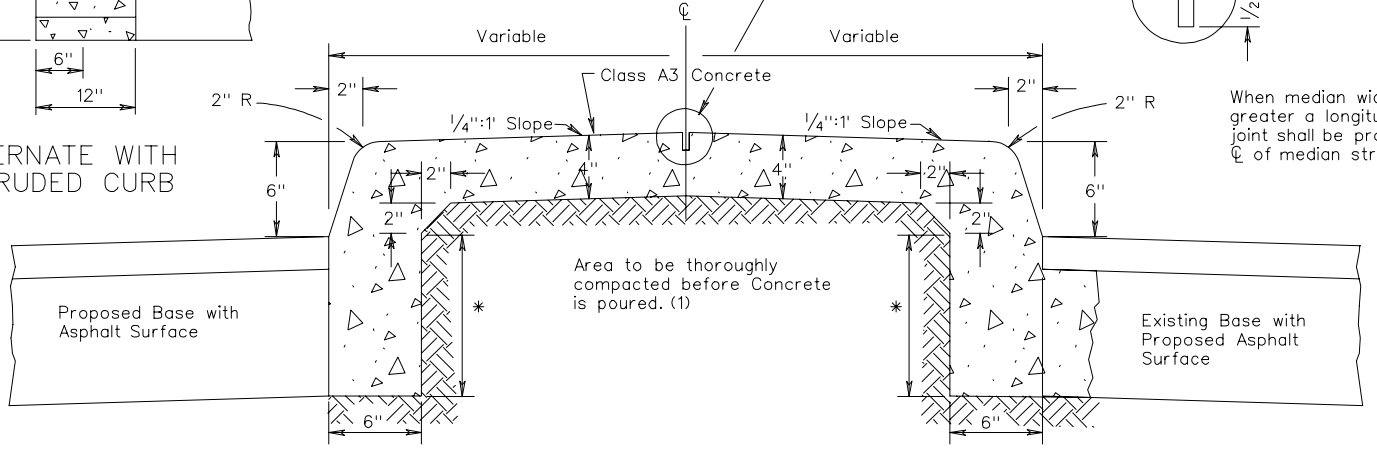
When roadway design meets the criteria for CG-7 as shown in Appendix A of the Road Design Manual, median curb is to be in accordance with Standard CG-3.

* The depth of curb may be reduced as much as 3" (9" depth) or increased as much as 3" (15" depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise the depth is to be 12" as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.

Additional holes of adequate size to be provided for sign posts, delineator posts, etc. as shown on the plans or directed by the Engineer.



ALTERNATE WITH EXTRUDED CURB



When median width is 3 feet or greater a longitudinal contraction joint shall be provided along ℄ of median strip.

SPECIFICATION REFERENCE

502

STANDARD SOLID CONCRETE RAISED MEDIAN STRIP

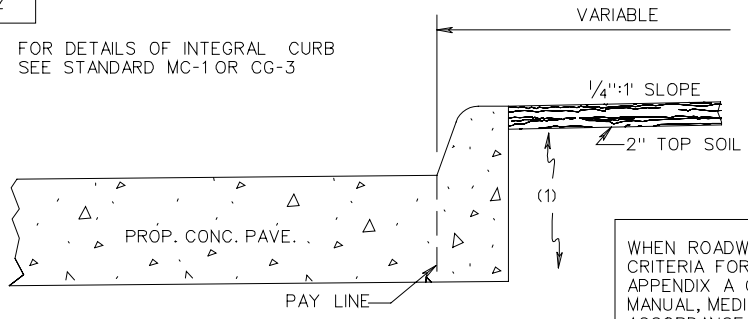
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

202.03

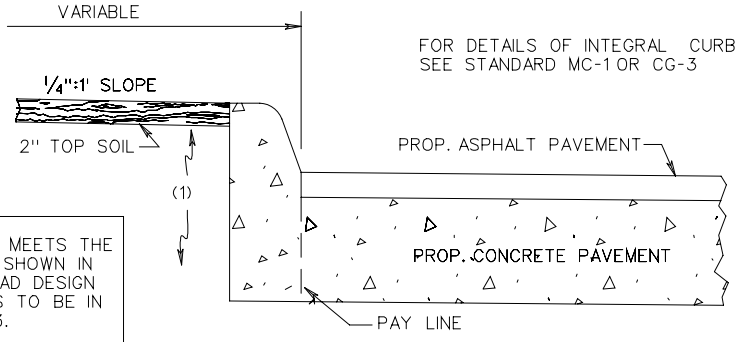
INSERTABLE SHEET A183

MS-2

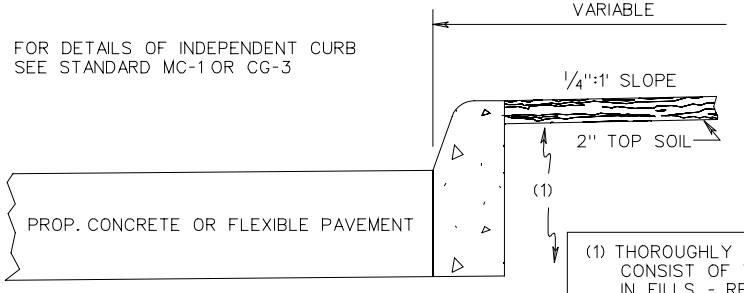


HALF SECTION WITH PROP. CONCRETE PAVEMENT

WHEN ROADWAY DESIGN MEETS THE CRITERIA FOR CG-7 AS SHOWN IN APPENDIX A OF THE ROAD DESIGN MANUAL, MEDIAN CURB IS TO BE IN ACCORDANCE WITH CG-3.

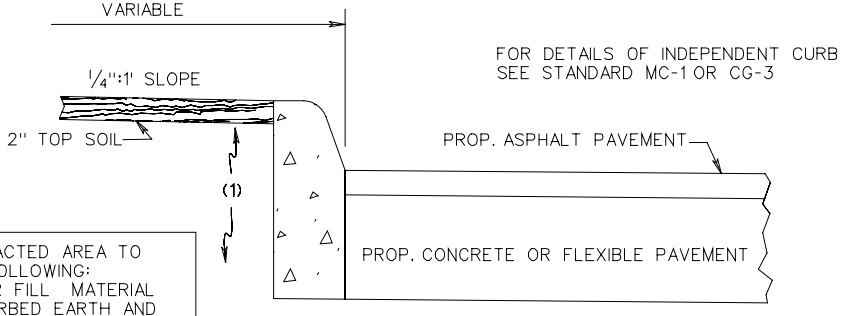


HALF SECTION WITH PROP. CONCRETE BASE WITH ASPHALT TOP

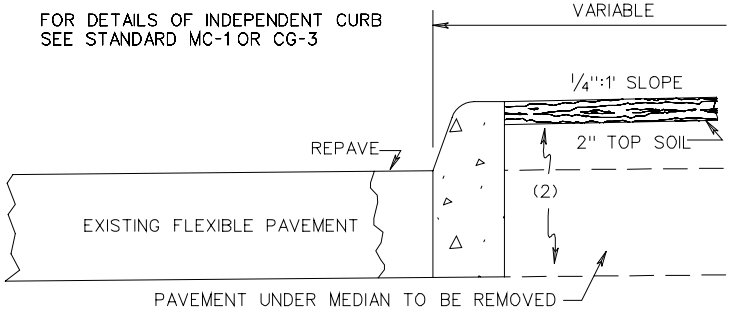


HALF SECTION WITH PROP. CONCRETE OR FLEXIBLE PAVEMENT

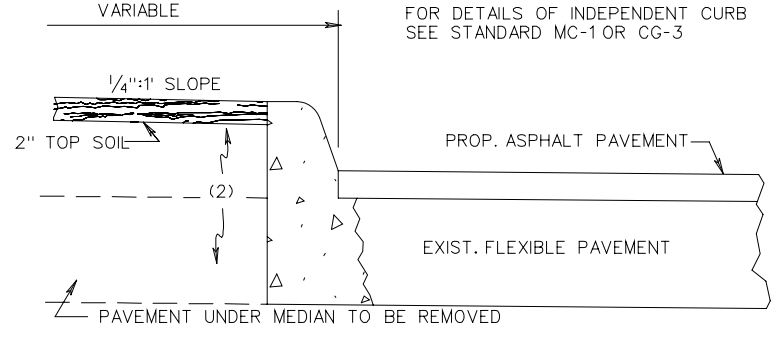
(1) THOROUGHLY COMPACTED AREA TO CONSIST OF THE FOLLOWING:
IN FILLS - REGULAR FILL MATERIAL
IN CUTS - UNDISTURBED EARTH AND REGULAR FILL MATERIAL, AS REQUIRED.
(2) THOROUGHLY COMPACTED AREA TO CONSIST OF REGULAR FILL MATERIAL.



HALF SECTION WITH PROP. CONCRETE OR FLEXIBLE BASE WITH ASPHALT TOP



HALF SECTION WITH EXISTING FLEXIBLE PAVEMENT



HALF SECTION WITH EXIST. FLEXIBLE BASE WITH ASPHALT TOP

STANDARD RAISED GRASS MEDIAN STRIPS

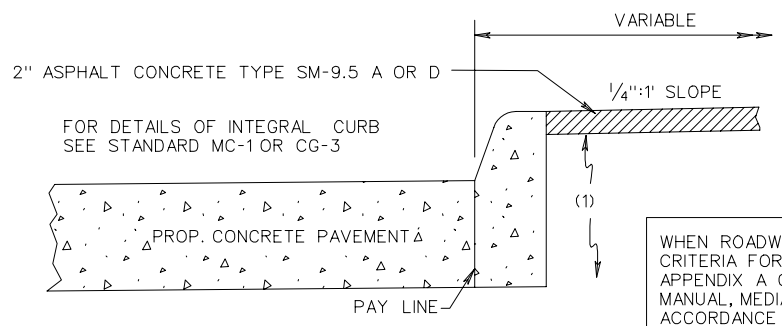
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

502

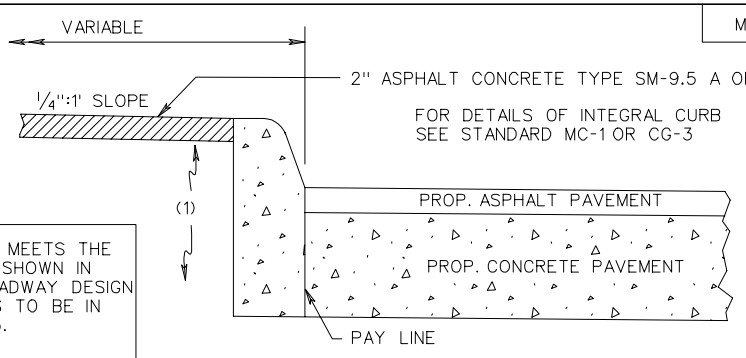
REV. 9/06

202.04

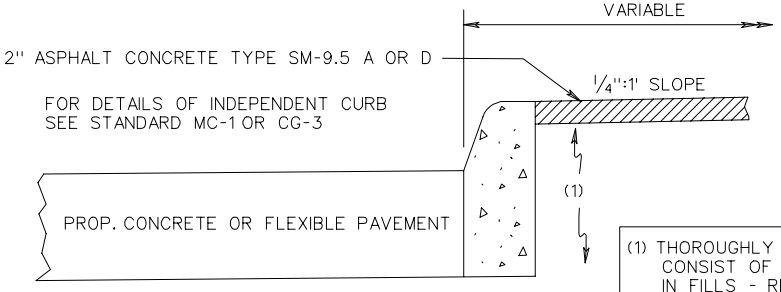


HALF SECTION WITH PROPOSED CONCRETE PAVEMENT

WHEN ROADWAY DESIGN MEETS THE CRITERIA FOR CG-7 AS SHOWN IN APPENDIX A OF THE ROADWAY DESIGN MANUAL, MEDIAN CURB IS TO BE IN ACCORDANCE WITH CG-3.

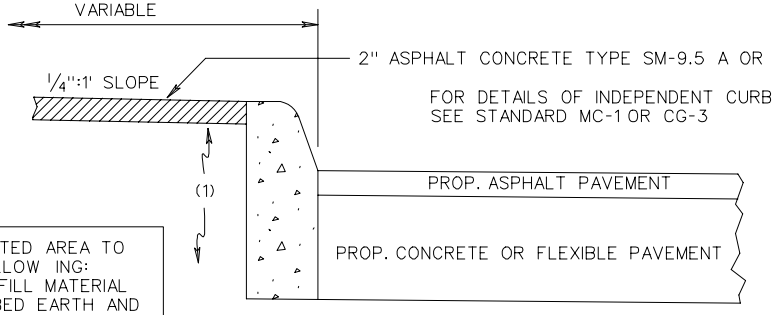


HALF SECTION WITH PROPOSED CONCRETE BASE WITH ASPHALT TOP

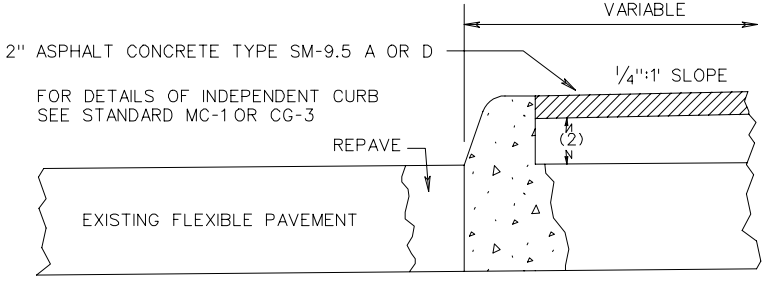


HALF SECTION WITH PROP. CONCRETE OR FLEXIBLE PAVEMENT

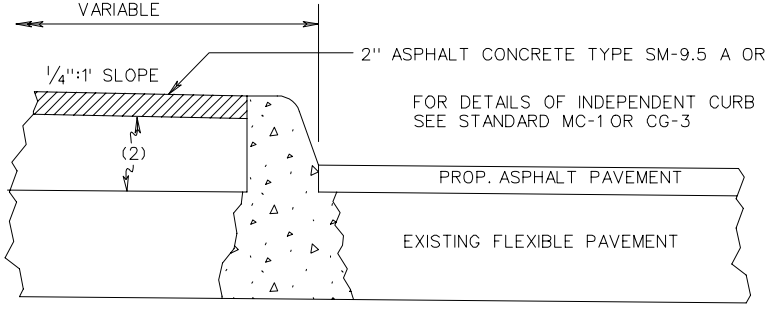
(1) THOROUGHLY COMPACTED AREA TO CONSIST OF THE FOLLOW ING:
IN FILLS - REGULAR FILL MATERIAL
IN CUTS - UNDISTURBED EARTH AND REGULAR FILL MATERIAL, AS REQUIRED.
(2) THOROUGHLY COMPACTED AREA TO CONSIST OF REGULAR FILL MATERIAL.



HALF SECTION WITH PROP. CONCRETE OR FLEXIBLE BASE WITH ASPHALT TOP



HALF SECTION WITH EXISTING FLEXIBLE PAVEMENT

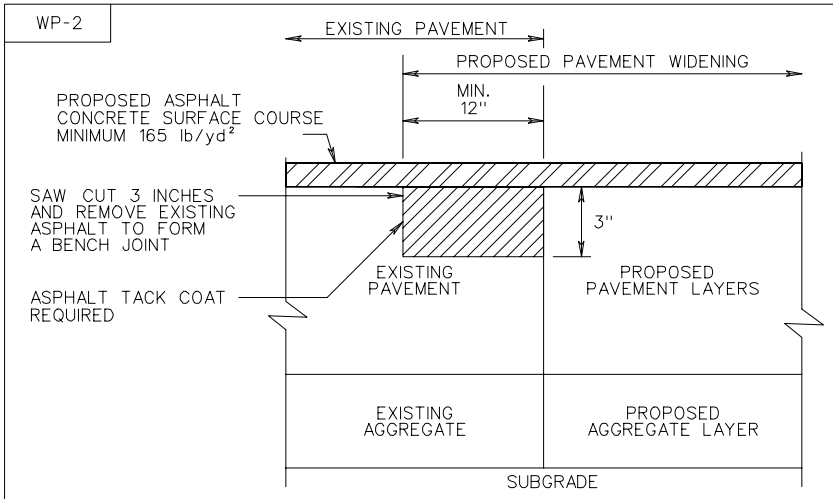


HALF SECTION WITH EXISTING FLEXIBLE BASE WITH ASPHALT TOP

NOTE: THE ASPHALT CONCRETE SURFACE SLAB IS TO CONFORM TO THE CURRENT ROAD & BRIDGE SPECIFICATIONS FOR SM-9.5 A OR D MATERIAL EXCEPT THAT THE MINIMUM BITUMEN CONTENT IS TO BE 6.5%.

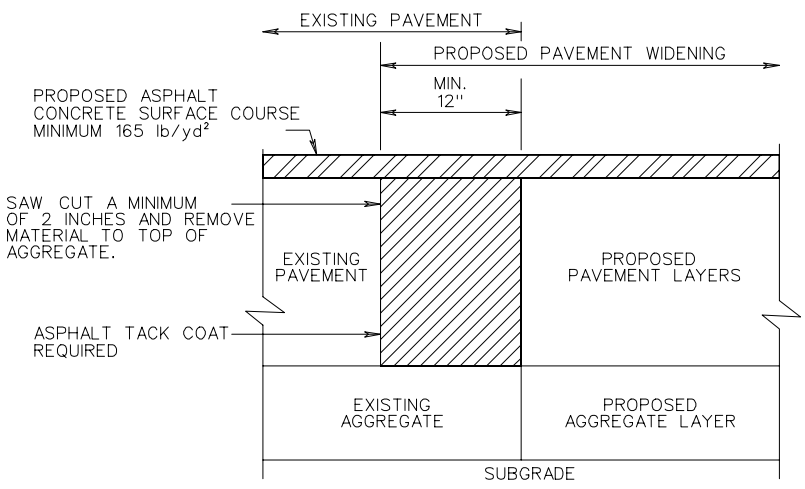
SPECIFICATION REFERENCE	STANDARD RAISED ASPHALT MEDIAN WITH P.C. CONCRETE CURB	REV. 9/06
502	VIRGINIA DEPARTMENT OF TRANSPORTATION	202.05

WP-2



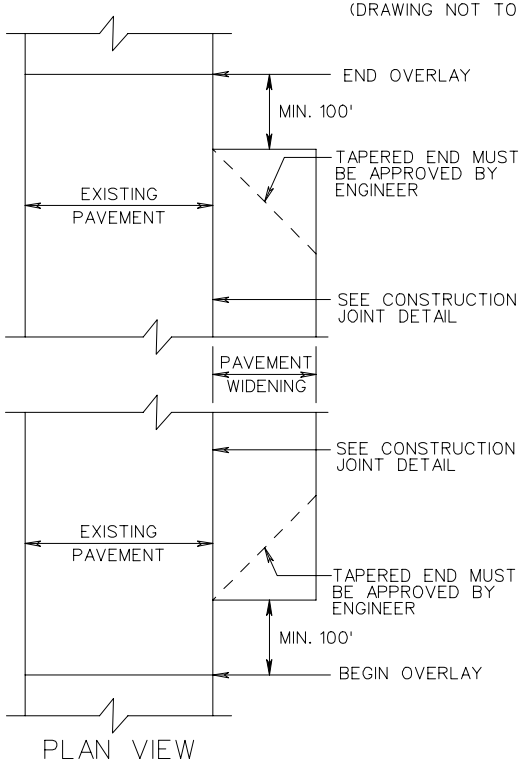
PAVEMENT CONSTRUCTION JOINT DETAIL
(EXISTING PAVEMENT OVER 6" IN DEPTH)

(DRAWING NOT TO SCALE)



PAVEMENT CONSTRUCTION JOINT DETAIL
(EXISTING PAVEMENT LESS THAN 6" IN DEPTH)

(DRAWING NOT TO SCALE)



PLAN VIEW

(DRAWING NOT TO SCALE)

NOTES:

1. WHEN THE PAVEMENT DESIGN IS GREATER IN DEPTH THAN THE DEPTH OF THE EXISTING PAVEMENT, SUBSURFACE DRAINAGE MAY BE REQUIRED BY THE ENGINEER.
2. OVERLAP THE EXISTING PAVEMENT AS SHOWN IN THE CONSTRUCTION JOINT DETAILS.
3. A PERPENDICULAR CONSTRUCTION JOINT SHALL BE PROVIDED AT ALL LOCATIONS WHERE NEW PAVEMENT ABUTS EXISTING PAVEMENT.
4. THE AREA OF PAVEMENT WIDENING SHALL BE TRENCHED TO THE SUBGRADE AND COMPACTED PER VDOT SPECIFICATIONS.
5. SURFACE OF WIDENING AREA SHALL BE FLUSH WITH THE SURFACE OF EXISTING PAVEMENT PRIOR TO OVERLAY.
6. MILLING OF NEW AND EXISTING PAVEMENT MAY BE REQUIRED TO ACHIEVE ACCEPTABLE PAVEMENT CROSS-SLOPE AND PAVEMENT DRAINAGE.
7. OVERLAY THE ENTIRE SURFACE AREA OF THE NEW AND EXISTING PAVEMENT WITH A MINIMUM OF 165 LBS/SQ YD OF ASPHALT CONCRETE TO A POINT AT LEAST 100 FEET BEFORE AND AFTER THE LIMITS OF WIDENING.
8. ERADICATE EXISTING PAVEMENT MARKINGS AND RESTRIPE THE WORK ZONE AS REQUIRED TO ACHIEVE A UNIFORM APPEARANCE AS DIRECTED BY THE ENGINEER.
9. FINAL TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FEET STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(a) OF THE SPECIFICATIONS. THE VARIATION FROM THE TESTING EDGE OF THE STRAIGHTEDGE BETWEEN ANY TWO CONTACT POINTS WITH THE PAVEMENT SURFACE SHALL NOT EXCEED 1/4".
10. PAVEMENT WIDENING PERFORMED UNDER A VDOT LAND USE PERMIT SHALL HAVE A PAVEMENT DESIGN PROVIDED BY THE PERMITTEE AND APPROVED BY THE MATERIALS ENGINEER.

PAVEMENT WIDENING

VIRGINIA DEPARTMENT OF TRANSPORTATION

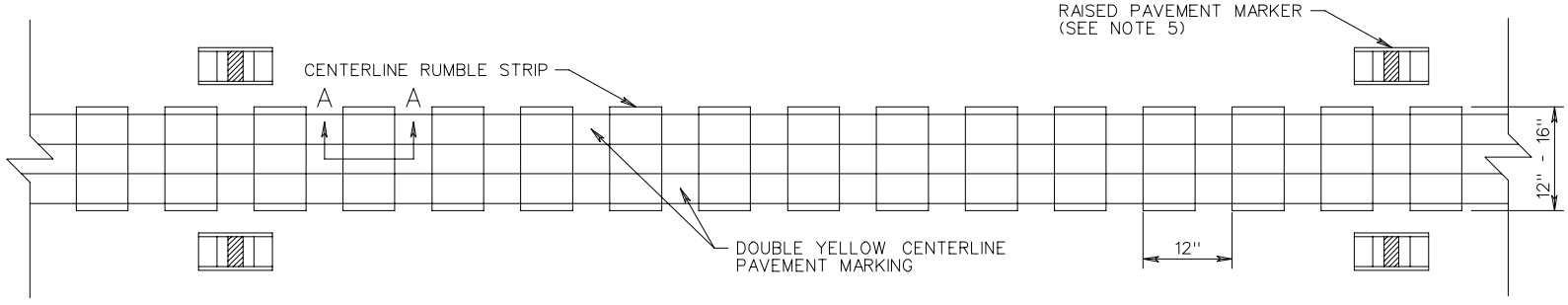
SPECIFICATION REFERENCE

315

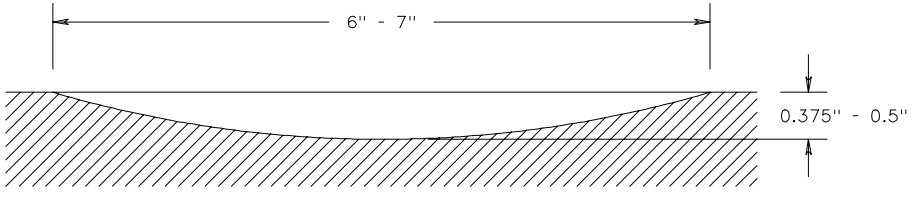
NEW 9/06

303.02

RS-3



PLAN VIEW



SECTION A-A

NOTES

1. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF BRIDGES.
2. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED ON SUBDIVISION STREETS OR IN NARROW UNMARKED ROAD SECTIONS WITHOUT PAVEMENT MARKINGS.
3. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF CENTER TWO-WAY TURN LANES.
4. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED IN PASSING ZONES EXCEPT AS DIRECTED BY THE TRAFFIC ENGINEER. THE DEPTH OF CENTERLINE RUMBLE STRIPS IN PASSING ZONES SHALL BE $\frac{3}{8}$".
5. USE OF RAISED PAVEMENT MARKERS IS OPTIONAL. SEE STANDARD PM-9 FOR DETAILS ON RAISED PAVEMENT MARKER PLACEMENT.

SPECIFICATION REFERENCE
310 315

CENTERLINE RUMBLE STRIPS

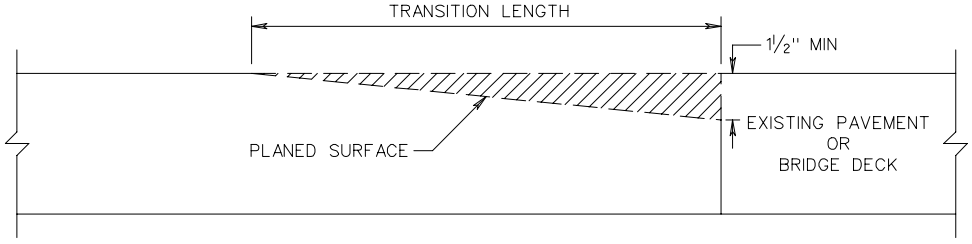
VIRGINIA DEPARTMENT OF TRANSPORTATION

NEW 9/06

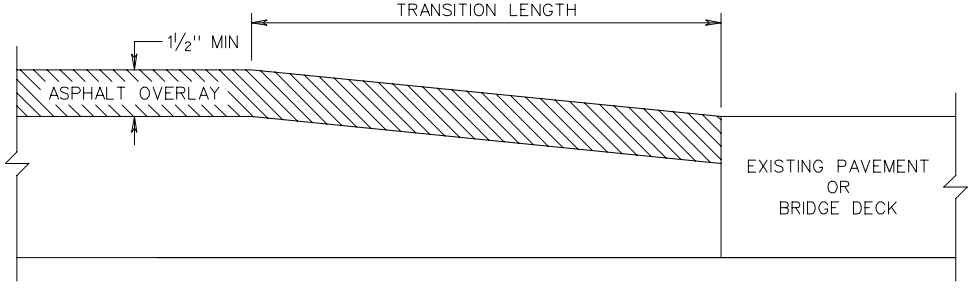
304.03

TPT-1

TRANSVERSE PAVEMENT TIE-IN



PLANING TRANSITION PAVEMENT DETAIL

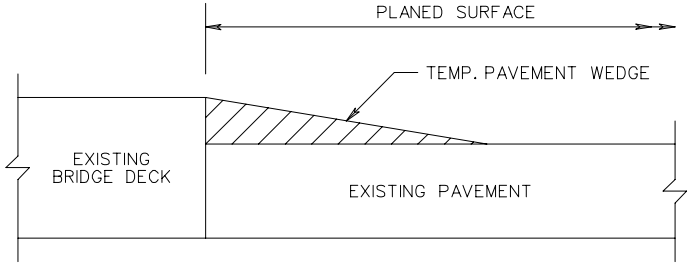


OVERLAYING TRANSITION PAVEMENT DETAIL

NOTES

1. TRANSVERSE PAVEMENT TIE-IN SHALL BE USED TO PROVIDE A SMOOTH TRANSITION BETWEEN NEW PAVEMENT AND EITHER EXISTING PAVEMENT OR AN EXISTING BRIDGE DECK AS SHOWN ON THE PLANS AND DIRECTED BY THE ENGINEER.
2. THE EXISTING PAVEMENT SHALL BE PLANED A MINIMUM DEPTH OF 1½". THE FULL DEPTH OF PLANING SHALL EQUAL THE DEPTH OF THE ASPHALT OVERLAY.
3. TRANSVERSE PAVEMENT TIE-INS SHALL BE CONSTRUCTED A MINIMUM OF 10 FEET IN LENGTH FOR EVERY INCH OF DEPTH OF PAVEMENT PLANING PERFORMED.
4. TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHT EDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(a) OF THE SPECIFICATIONS. THE VARIATION FROM THE TESTING EDGE OF THE STRAIGHT EDGE BETWEEN ANY TWO CONTACT POINTS WITH THE PAVEMENT SURFACE SHALL NOT EXCEED ¼".

TEMPORARY PAVEMENT WEDGE



WEDGE DETAIL

NOTES

1. TEMPORARY PAVEMENT WEDGE SHALL BE CONSTRUCTED OF SURFACE MIX ASPHALT A MINIMUM OF 3 FEET IN LENGTH FOR EVERY INCH OF DEPTH OF PAVEMENT MILLING.

SPECIFICATION REFERENCE
210
315
515

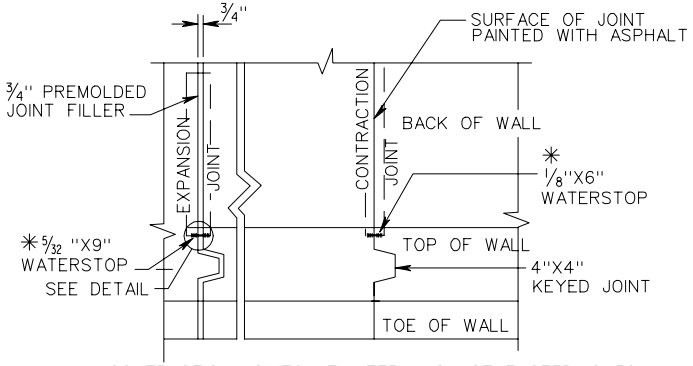
TRANSVERSE PAVEMENT TIE-IN

VIRGINIA DEPARTMENT OF TRANSPORTATION

NEW 9/06

305.01

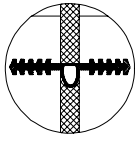
RW-3



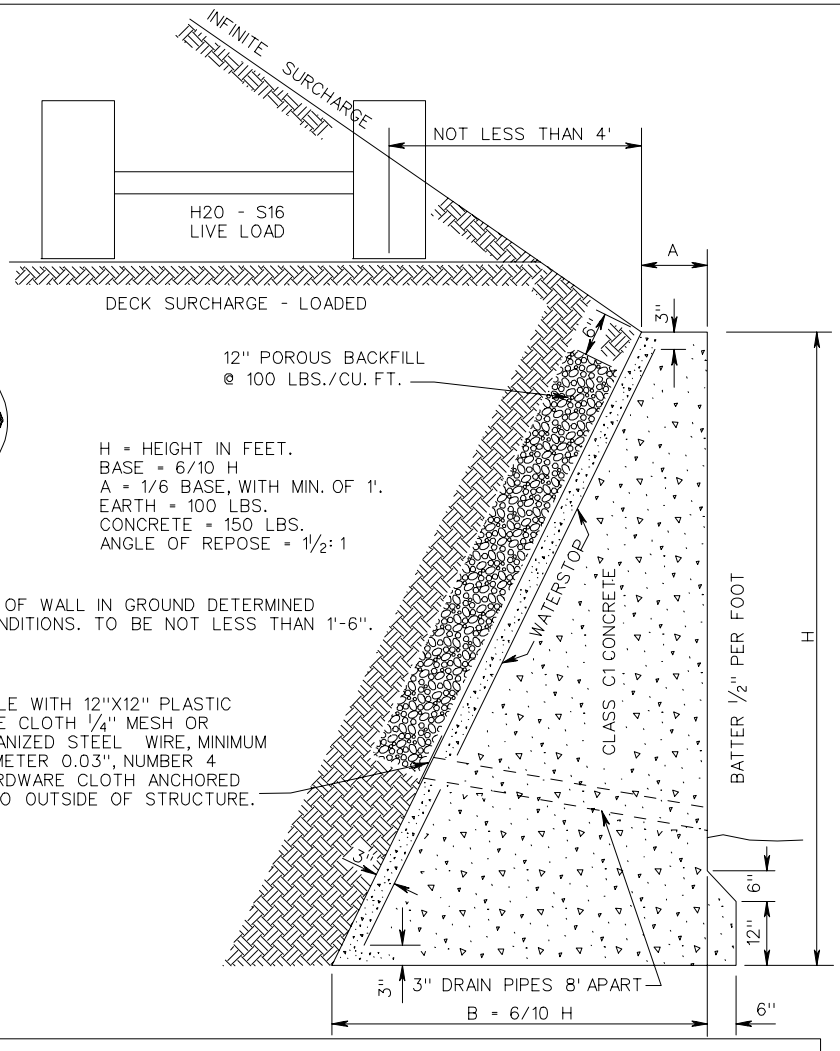
CONTRACTION JOINTS AT INTERVALS NOT EXCEEDING 30'.

EXPANSION JOINTS AT INTERVALS NOT EXCEEDING 90'.

* WATER STOPS TO BE ELASTOMERIC OR OTHER APPROVED MATERIAL. DIMENSIONS SHOWN ARE ABSOLUTE MINIMUM.



WATERSTOP DETAIL



HEIGHT OF WALL "H" IN FEET	THICKNESS AT TOP "A" IN FEET	THICKNESS AT BASE B=.6H	COMPRESSION AT TOE LBS. SQ. FT.	AREA OF SECTION SQ. FT.
3	1'-0"	1'-9 5/8"	856	4.83
4	1'-0"	2'-4 3/4"	1141	7.43
5	1'-0"	3'-0"	1427	10.63
6	1'-0"	3'-7 1/4"	1712	14.43
7	1'-0"	4'-2 3/8"	1997	18.83
8	1'-0"	4'-9 5/8"	2283	23.83
9	1'-0"	5'-4 3/4"	2568	29.43
10	1'-0"	6'-0"	2853	35.63
11	1'-1 1/4 "	6'-7 1/4"	3139	42.98
12	1'-2 3/8 "	7'-2 3/8"	3424	51.03
13	1'-3 5/8 "	7'-9 5/8"	3709	59.78
14	1'-4 3/4 "	8'-4 3/4"	3995	69.23
15	1'-6"	9'-0"	4280	79.38

SAFE BEARING CAPACITY OF SOIL	
ROCK MINIMUM	10,000 - 20,000 LBS. SQ. FT.
GRAVEL AND COARSE SAND, WELL CEMENTED	16,000 - 20,000 LBS. SQ. FT.
CLAY IN THICK BEDS, ALWAYS DRY	12,000 - 16,000 LBS. SQ. FT.
CLAY IN THICK BEDS, MODERATELY DRY	8,000 - 12,000 LBS. SQ. FT.
CLAY, SOFT	2,000 - 4,000 LBS. SQ. FT.
SAND, DRY, COMPACT, AND WELL CEMENTED	8,000 - 12,000 LBS. SQ. FT.
SAND, CLEAN, DRY	4,000 - 8,000 LBS. SQ. FT.
ALLUVIAL SOILS, ETC	1,000 - 2,000 LBS. SQ. FT.

NOTE: IF COMPRESSION AT TOE EXCEEDS SAFE BEARING CAPACITY OF SOIL, A SPECIAL FOOTING IS TO BE USED.

CONCRETE GRAVITY RETAINING WALLS
INFINITE SURCHARGE AND DECK SURCHARGE - LOADED

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

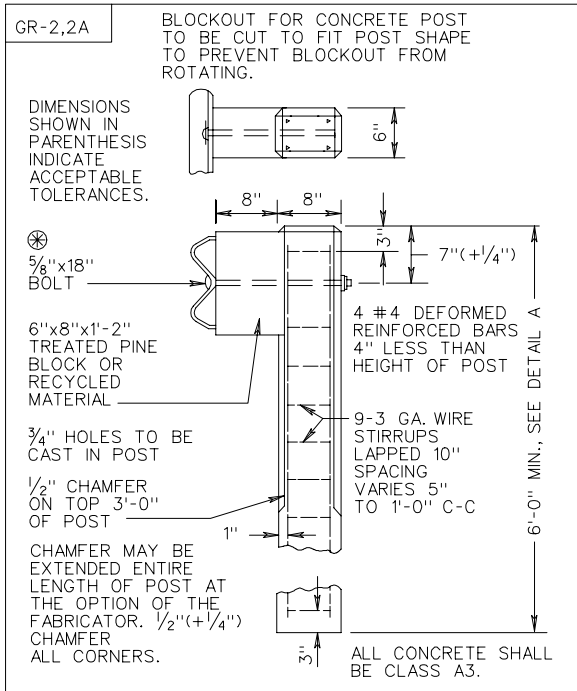
506

REV. 9/06

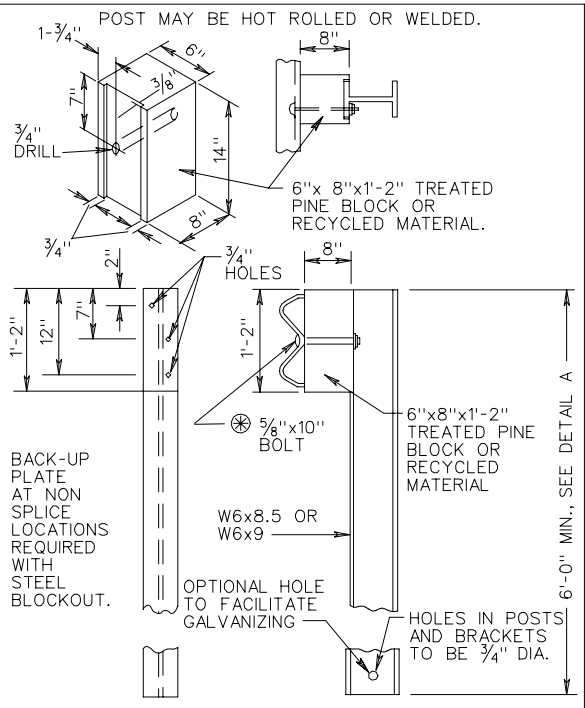
401.02

INSERTABLE SHEET A87

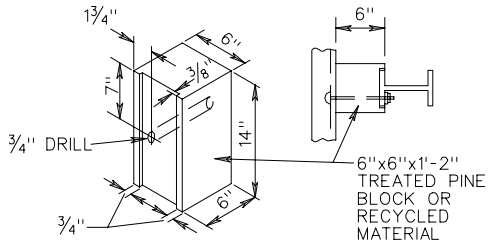
GR-2,2A



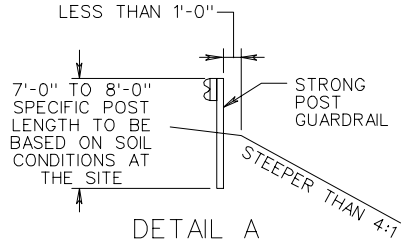
CONCRETE POST



STEEL POST

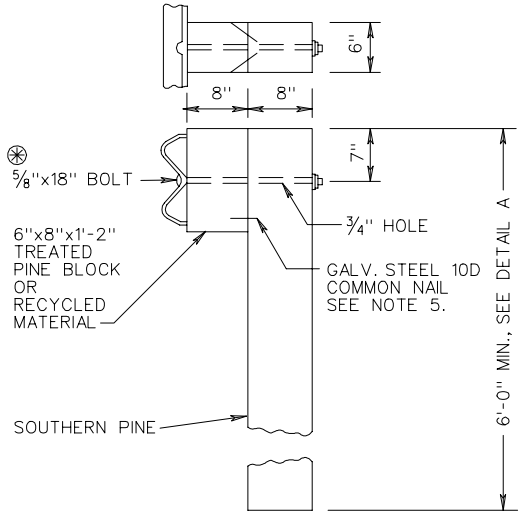


BLOCKOUT FOR MAINTENANCE REPAIR ONLY

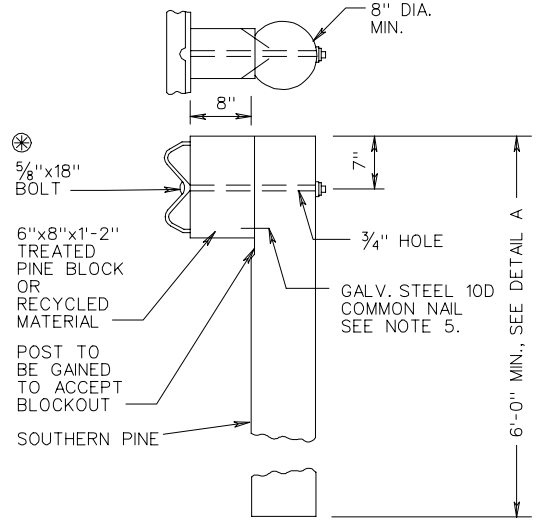


DETAIL A

GUARDRAIL INSTALLATION SITES REQUIRING LONGER GUARDRAIL POSTS



6x8 WOOD POST



ROUND WOOD POST

NOTES:

1. ALL BOLTS, NUTS, WASHERS, AND OTHER STEEL ITEMS ARE TO BE GALVANIZED.
2. ALTERNATE TYPE POSTS AND BLOCKOUT MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF POST AND BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF GUARDRAIL.
3. FOR DETAILS OF GUARDRAIL ELEMENT SPLICE JOINT, HARDWARE, ETC. SEE SHEET NOS. 501.01 AND 501.02.
4. THE GUARDRAIL AND MEDIAN BARRIER COMPONENTS DEPICTED IN A.R.T.B.A. TECHNICAL BULLETIN NUMBER 268B MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.
5. DRIVE NAIL ON BOTH SIDES WITHIN 2" OF THE TOP OR BOTTOM OF BLOCKOUT AFTER 5/8" x 18 BOLT IS INSTALLED.

⊛ STANDARD WASHER TO BE USED ON LAST 50' OF RUN-OFF END ONLY UNLESS A STANDARD GR-11 RUN-OFF TERMINAL TREATMENT IS USED.

STANDARD BLOCKED-OUT W BEAM GUARDRAIL (STRONG POST SYSTEM)
POST AND BLOCKOUT DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06
501.05

SPECIFICATION REFERENCE
221
236
505

GR-7

NOTES:

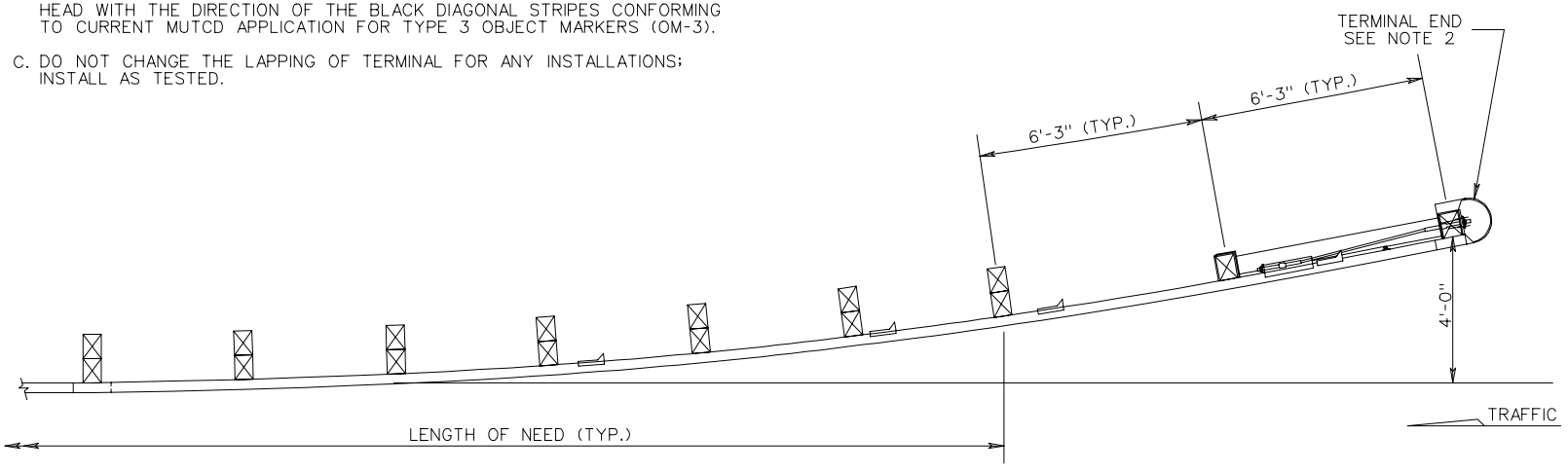
1. GUARDRAIL TERMINAL, STD. GR-7 IS TO BE SRT 350 (SIMILAR TO AS SHOWN) MANUFACTURED BY TRINITY INDUSTRIES, THE FLEAT 350 MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.
2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:

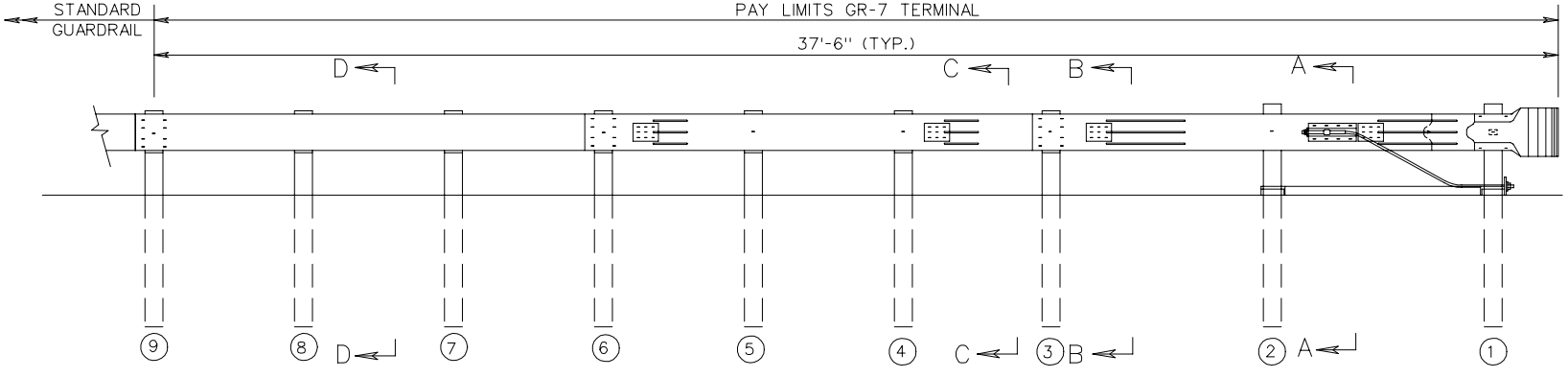
   A. ALL STANDARD GR-7 TERMINALS SHALL BE INSTALLED WITH A 4 FT. OFFSET.

   B. YELLOW 8" X 36" REFLECTIVE SHEETING, IN ACCORDANCE WITH VDOT SPECIFICATIONS, SHOULD BE APPLIED IN TERMINALS EMPLOYING W-BEAM END SECTIONS. FOR TERMINALS EMPLOYING IMPACT (EXTRUDER) HEADS, AMBER (YELLOW) REFLECTIVE SHEETING WITH BLACK DIAGONAL STRIPES SHOULD BE APPLIED TO THE FULL AREA INSIDE THE IMPACT HEAD WITH THE DIRECTION OF THE BLACK DIAGONAL STRIPES CONFORMING TO CURRENT MUTCD APPLICATION FOR TYPE 3 OBJECT MARKERS (OM-3).

   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS; INSTALL AS TESTED.

3. IF YOU CANNOT GET THE NECESSARY CLEAR RUNOUT AREA FOR THE GR-7 TERMINAL, CONSIDER ALTERNATIVE TERMINAL OPTIONS.
4. FOR DETAILS OF GUARDRAIL TERMINAL INSTALLATION SITE PREPARATION REQUIREMENTS, SEE STANDARD GR-SP.
5. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.





SHEET 1 OF 2

BREAKAWAY CABLE TERMINAL
4' FLARE

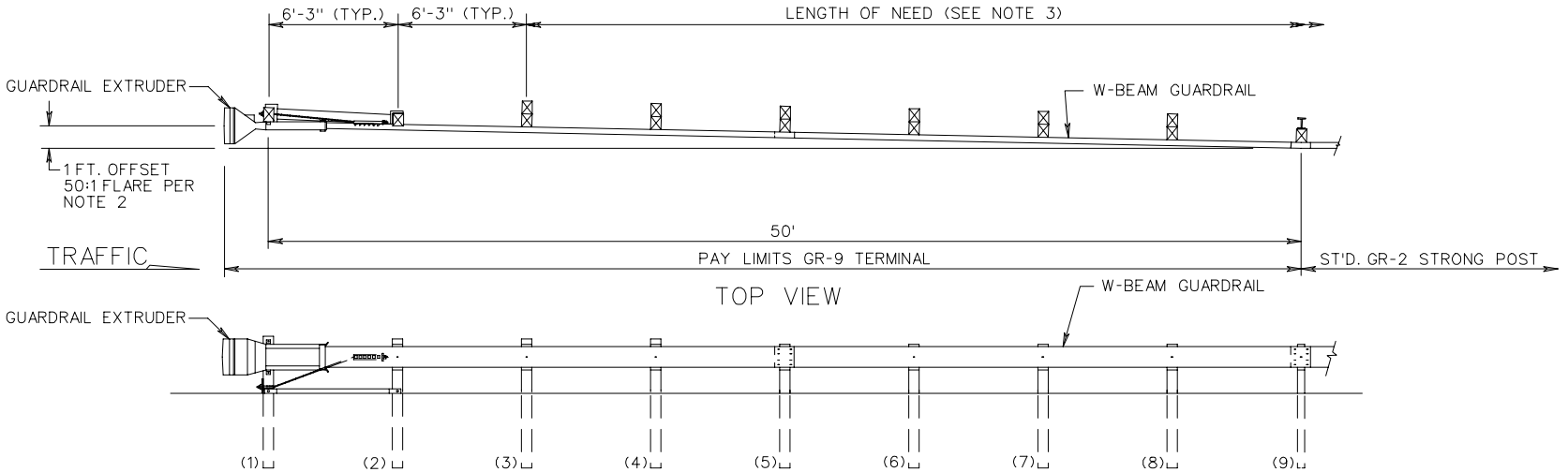
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

501.11

SPECIFICATION REFERENCE

221
505



TRANSITION FROM GR-9 TERMINAL TO WEAK POST (STANDARD GR-8) GUARDRAIL

NOTES:

1. ALTERNATE BREAKAWAY CABLE TERMINAL (GR-9) IS TO BE ET-2000 (SIMILAR TO AS SHOWN), OR CAT (ST'D. MB-3 TERMINAL OPTION) AS MANUFACTURED BY SYRO STEEL COMPANY, BRAKEMASTER (ST'D. MB-3 TERMINAL OPTION) AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., THE SKT-350 AS MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.

2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURE'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:

   A. ALL STANDARD GR-9 TERMINALS (SIMILAR TO AS SHOWN ABOVE) SHALL BE INSTALLED WITH A 1 FT. OFFSET ACCOMPLISHED WITH A 50:1 FLARE TO PREVENT THE GUARDRAIL EXTRUDER FROM ENCROACHING ON THE SHOULDER FOR 3R WORK WHERE RIGHT OF WAY IS LIMITED, THE OFFSET CAN BE DECREASED AS DIRECTED BY THE ENGINEER.

   B. DIRECTION OF THE REFLECTIVE TAPE ON THE EXTRUDER SHALL CONFORM TO MUTCD APPLICATION FOR DIAGONAL STRIPES ON OBJECT MARKERS AND BRIDGE END PANELS. COLOR OF TAPE SHALL BE AMBER (YELLOW).

   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS; INSTALL AS TESTED.

3. IF THE CALCULATED LENGTH OF NEED CANNOT BE MET FOR THE SITES OF RETROFIT, MAINTENANCE, OR UPGRADE OF TERMINALS, PROVIDE AS MUCH DISTANCE AS POSSIBLE TO THE HAZARD.

4. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.

SPECIFICATION REFERENCE
505

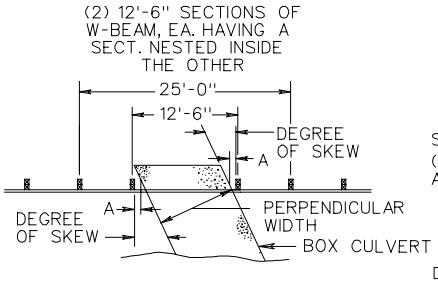
ALTERNATE BREAKAWAY CABLE TERMINAL NO FLARE

VIRGINIA DEPARTMENT OF TRANSPORTATION

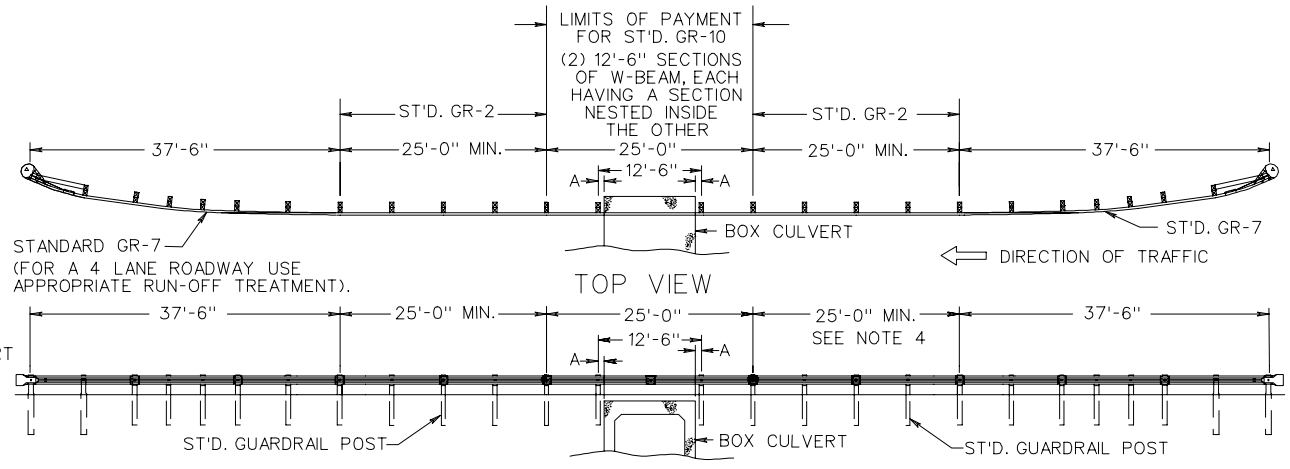
REV. 9/06

501.18

GR-10



ONE POST OMITTED
TOP VIEW



TOP VIEW

ELEVATION
TYPE I-ONE POST OMITTED

FOR DETAILS OF GUARDRAIL POSTS AND BLOCKOUTS, SEE STANDARD GR-2, 2A.

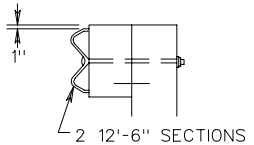
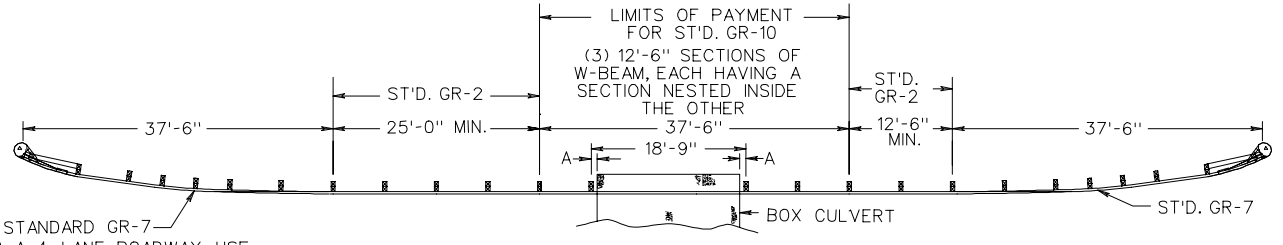
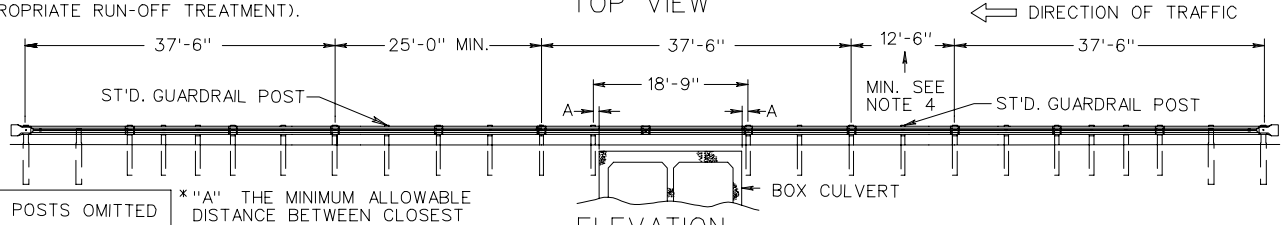


TABLE OF MAXIMUM ALLOWABLE STRUCTURE WIDTHS FOR THIS DESIGN



TOP VIEW



ELEVATION
TYPE II-TWO POSTS OMITTED

TYPE I-ONE POST OMITTED			TYPE II-TWO POSTS OMITTED		
SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)	SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)
0°	9"	10.5	0°	9"	16.75
5°	9"	10.4	5°	9"	16.6
10°	9"	10.2	10°	9"	16.4
15°	9"	10.0	15°	9"	16.0
20°	9"	9.6	20°	9"	15.5
25°	9"	9.2	25°	9"	14.9
30°	9"	8.8	30°	9"	14.2
35°	9"	8.2	35°	9"	13.2
40°	9"	7.6	40°	9"	12.4
45°	9"	7.0	45°	9"	11.4

*"A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.

NOTES:
1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVET IS LESS THAN 4'-0".
2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
4. THIS DISTANCE SHALL BE IN ACCORDANCE WITH VDOT POLICY ON DETERMINING THE LENGTH OF NEED FOR GUARDRAIL WITH A MINIMUM DISTANCE AS SHOWN.
5. ALL SPLICES IN NESTED W-BEAM SECTIONS MUST COINCIDE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.

SHEET 1 OF 2

GUARDRAIL AT LOW-FILL CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV 9/06

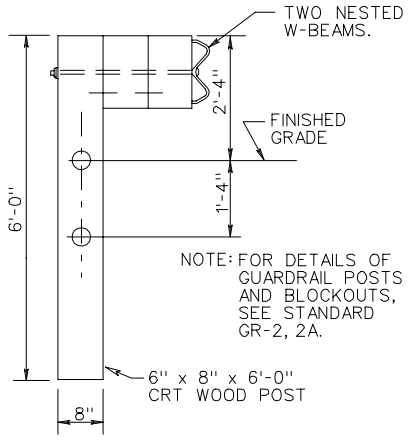
501.19

SPECIFICATION REFERENCE

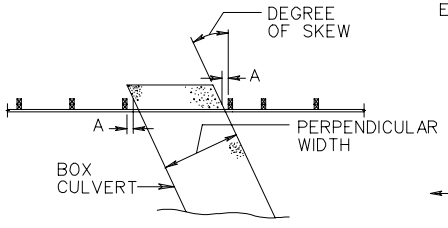
221
505

INSERTABE SHEET A88

GR-10



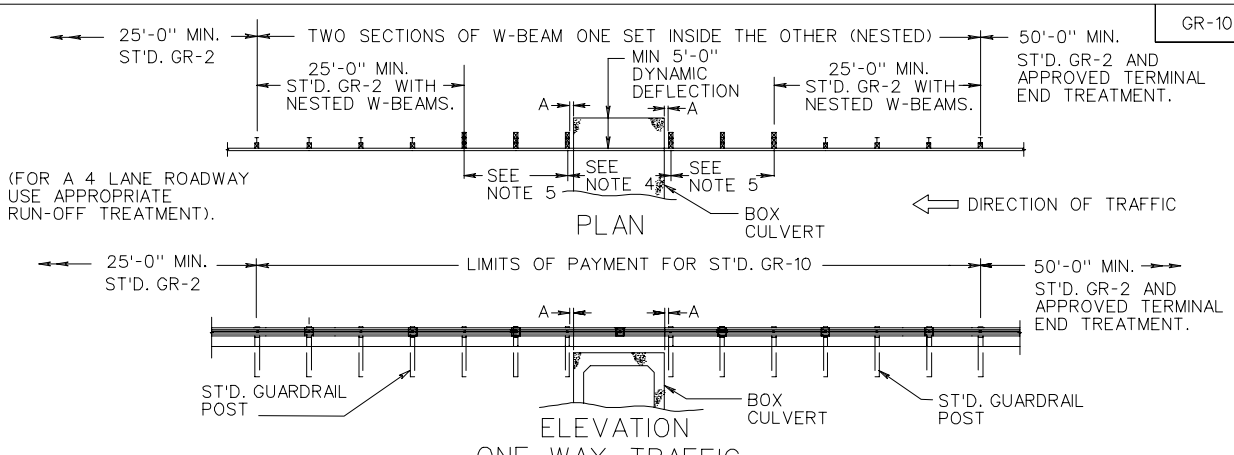
CRT POST
WITH DOUBLE BLOCKOUTS



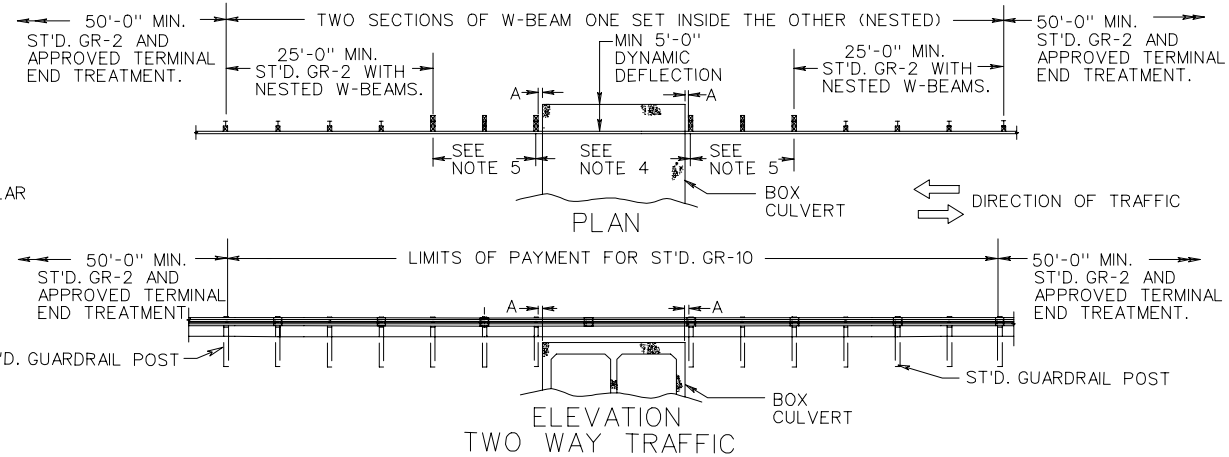
THREE POSTS
OMITTED TOP VIEW

TYPE III-THREE POSTS OMITTED		
SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)
0°	9"	23.00
5°	9"	22.90
10°	9"	22.60
15°	9"	22.10
20°	9"	21.40
25°	9"	20.60
30°	9"	19.60
35°	9"	18.40
40°	9"	17.10
45°	9"	15.60

* "A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.



ONE WAY TRAFFIC
TYPE III THREE POSTS OMITTED



TWO WAY TRAFFIC
TYPE III THREE POSTS OMITTED

NOTES:

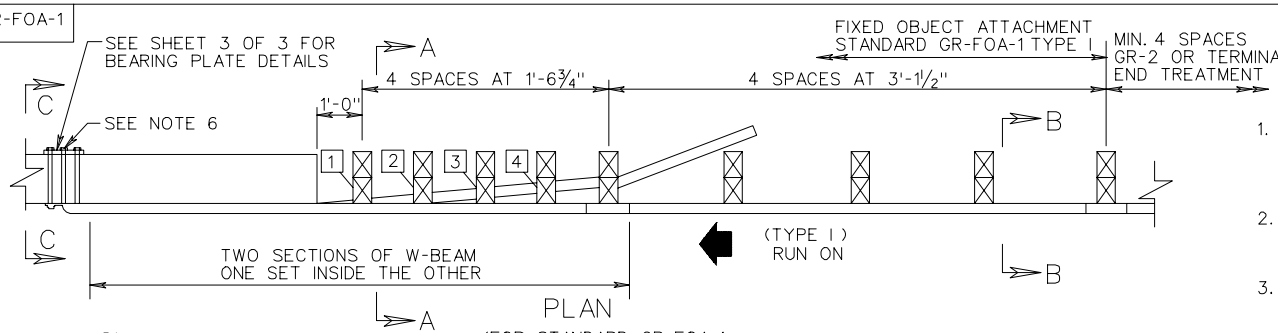
1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVET IS LESS THAN 4'-0".
2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
4. TWO NESTED W-BEAM GUARDRAILS, SEE TABLE FOR ALLOWABLE WIDTHS (25'-0" MAXIMUM).
5. TWO NESTED W-BEAM GUARDRAILS, CRT WOODPOST, 6'-3" SPACING, WITH TWO 6"x8"x14" WOOD OR RECYCLED MATERIAL BLOCKOUTS.
6. ALL SPLICES IN NESTED W-BEAM SECTIONS MUST COINCIDE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.

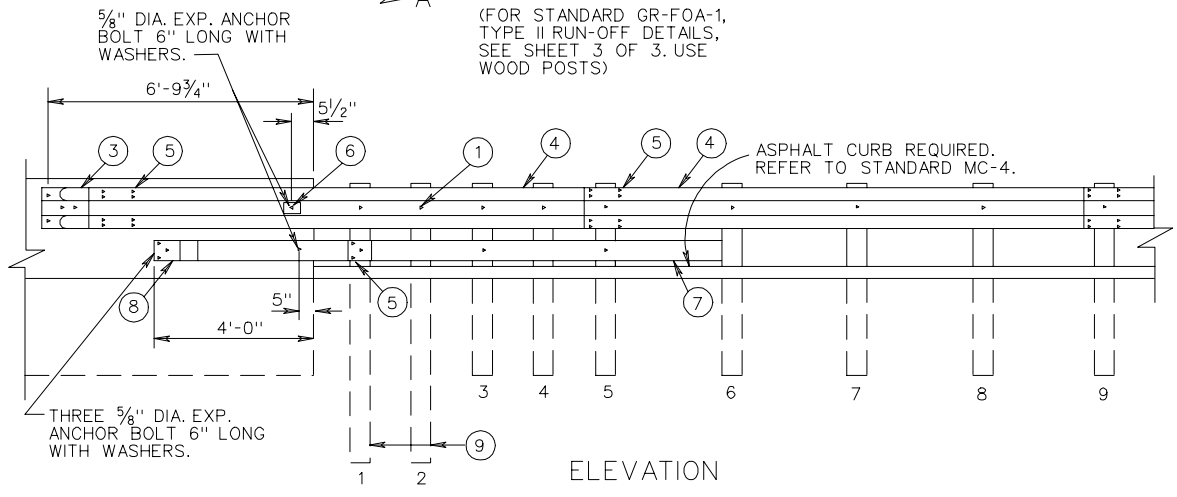
SPECIFICATION REFERENCE
221 505

GUARDRAIL AT LOW-FILL CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

GR-FOA-1

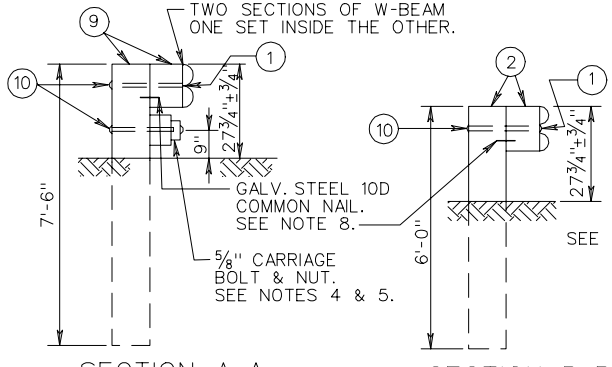


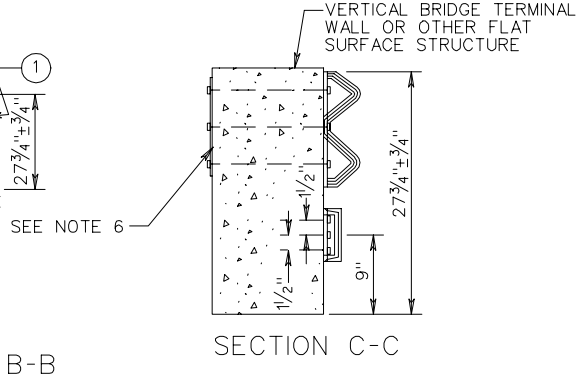


NOTES:

1. FIXED OBJECTS MAY CONSIST OF BRIDGE RAILS, ABUTMENTS, PIERS, RETAINING WALLS, OR OTHER FLAT SURFACED STRUCTURES WITH VERTICAL FACE.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGHT TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH BLOCKS AND/OR RUBRAIL RUBRAIL IS NOT BOLTED TO POSTS 2 ANS 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH ⅝" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
6. APPROPRIATE LENGTH ⅞" DIAMETER ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A ⅝" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR TERMINAL WALL.
7. DRIVE NAIL WITHIN 2" OF THE TOP OR BOTTOM OF THE BLOCKOUT AFTER ⅝" X 18 BOLT IS INSTALLED.
8. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

NEW BRIDGES - ATTACHMENTS
ONE WAY TRAFFIC - RUN-ON, 2-GR-FOA-1, TYPE I
- RUN-OFF, 2-GR-FOA-1, TYPE II
TWO WAY TRAFFIC - RUN-ON, 4-GR-FOA-1, TYPE I
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.





ITEM	MATERIAL/SPECIFICATIONS/NOTES
1	⅝" X 18" LONG. GUARDRAIL BOLT AND RECESSED NUT
2	STANDARD 6" x 8" WOOD POST AND BLOCK
3	STANDARD W-BEAM TERMINAL CONNECTOR
4	STANDARD W-BEAM RAIL
5	⅝" X 2" LONG GUARDRAIL BOLT & RECESSED NUT (SEE ST'D. GR-HDW)
6	RECTANGULAR PLATE WASHER (SEE ST'D. GR-HDW)
7	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
8	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
9	8" X 8" X 7'-6" LONG WOOD POST & 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
10	WASHER FOR ⅝" BOLT

SHEET 1 OF 3

REV. 9/06

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE BETWEEN VERTICAL FIXED OBJECTS AND GUARDRAIL (WOOD POSTS)

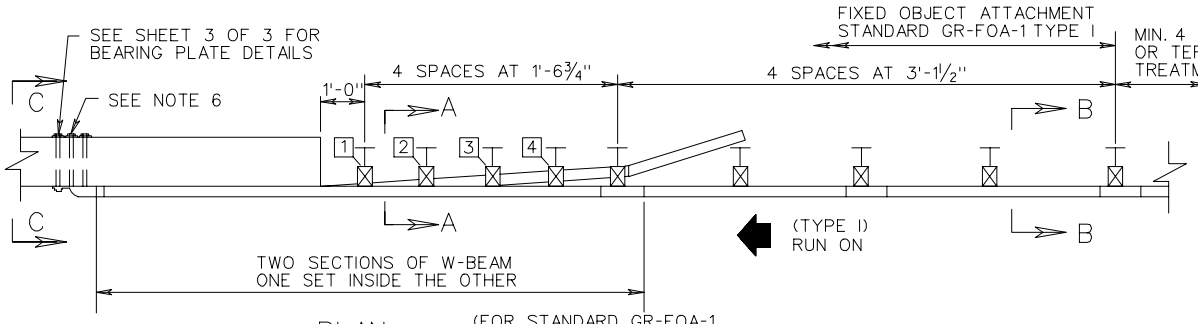
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

505

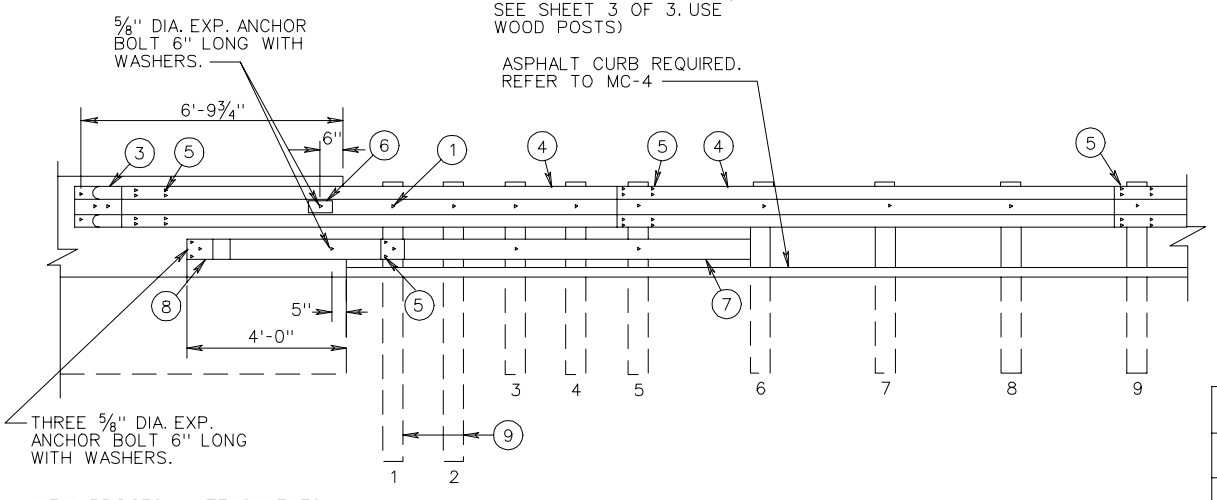
501.25

GR-FOA-1



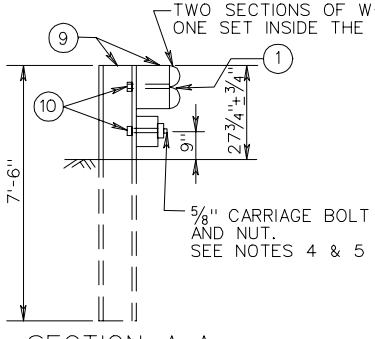
PLAN

(FOR STANDARD GR-FOA-1, TYPE II RUN-OFF DETAILS, SEE SHEET 3 OF 3. USE WOOD POSTS)

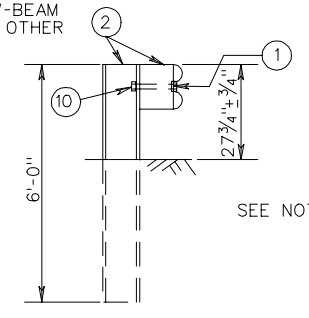


ELEVATION

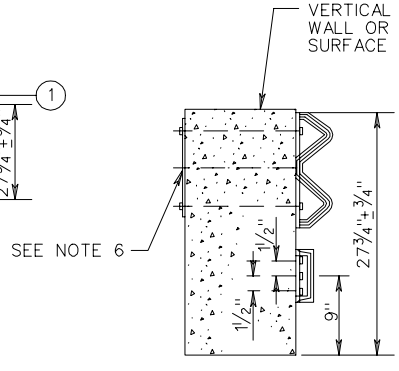
NEW BRIDGES - ATTACHMENTS
ONE WAY TRAFFIC - RUN-ON, 2-GR-FOA-1, TYPE I
- RUN-OFF, 2-GR-FOA-1, TYPE II
TWO WAY TRAFFIC - RUN-ON, 4-GR-FOA-1, TYPE I



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:

1. FIXED OBJECTS MAY CONSIST OF BRIDGE RAILS, ABUTMENTS, PIERS, RETAINING WALLS, OR OTHER FLAT SURFACED STRUCTURES WITH VERTICAL FACE.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGHT TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH BLOCKS AND/OR RUBRAIL RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH ⅝" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
6. APROPRIATE LENGTH ⅞" DIAMETER ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A ⅝" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR TERMINAL WALL.
7. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

ITEM	MATERIAL/SPECIFICATIONS/NOTES
1	⅝" X 10" LONG HEX BOLT WITH NUT
2	ST'D. W6X8.5 OR W6X9 STEEL POST ST'D. 6X8X14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL
3	STANDARD W-BEAM TERMINAL CONNECTOR
4	STANDARD W-BEAM RAIL
5	⅝" X 2" LONG GUARDRAIL BOLT & RECESSED NUT (SEE STANDARD GR-HDW)
6	RECTANGULAR PLATE WASHER (SEE ST'D. GR-HDW)
7	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
8	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
9	W8 X 13 X 7'-6" LONG STEEL POST WITH STANDARD 6" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
10	WASHER FOR ⅝" BOLT

SPECIFICATION REFERENCE

505

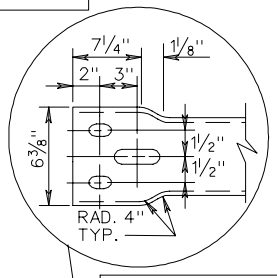
W-BEAM GUARDRAIL-FIXED OBJECT ATTACHMENT FOR USE BETWEEN VERTICAL FIXED OBJECTS AND GUARDRAIL (STEEL POSTS)

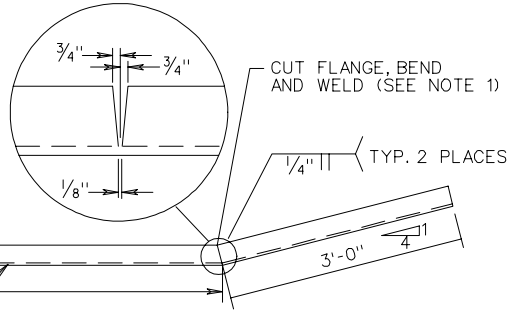
VIRGINIA DEPARTMENT OF TRANSPORTATION

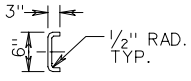
REV. 9/06

501.26

GR-FOA-1



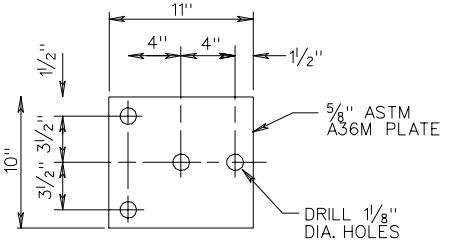




NOTE:

CAN BE FIELD CUT AND BENT USING HEAT. IF SHOP CUT AND BENT, RIGHT HAND OR LEFT HAND MUST BE SPECIFIED DEPENDING ON WHICH SIDE OF THE ROADWAY THE TRANSITION IS USED.

ITEM (7) DETAIL



BEARING PLATE
GALVANIZED

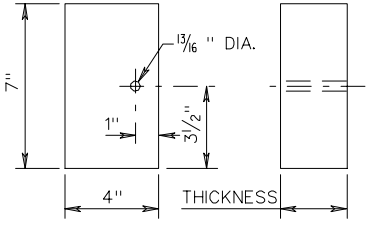
☆ CAN BE FIELD CUT AND BENT USING HEAT.

WOOD POSTS
RUBRAIL BLOCKOUTS
7" X 4" X THICKNESS

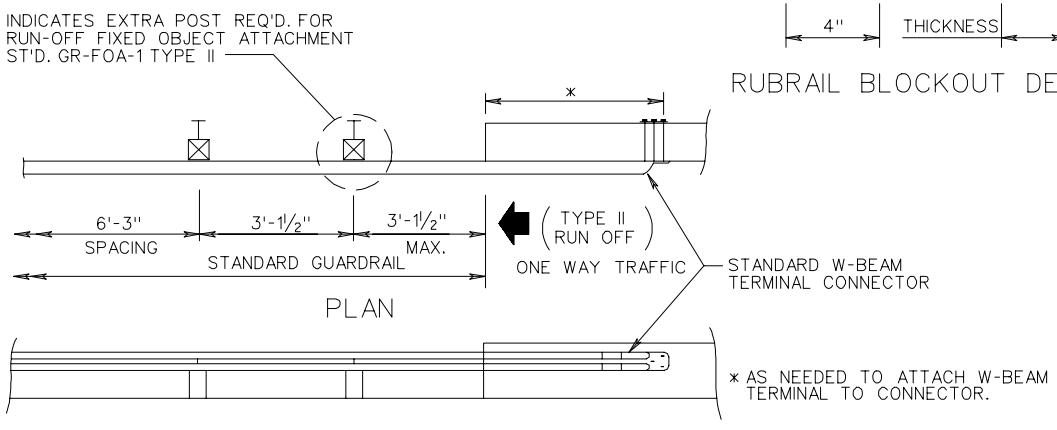
POST	THICKNESS
1	6⅝"
2	5 1/16"
3	3⅜"
4	2"

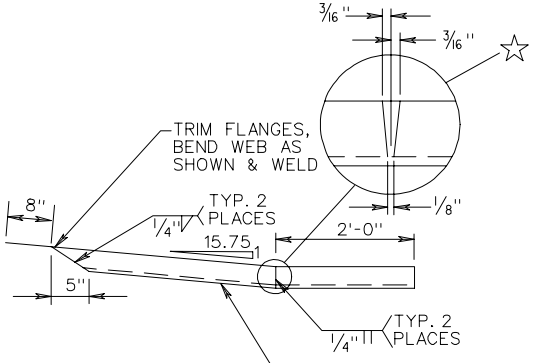
STEEL POSTS
RUBRAIL BLOCKOUTS
7" X 4" X THICKNESS

POST	THICKNESS
1	5"
2	3 13/16"
3	2⅝"
4	1 7/16"



RUBRAIL BLOCKOUT DETAIL





ITEM (8) DETAIL

W BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
RUBRAIL AND HARDWARE DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

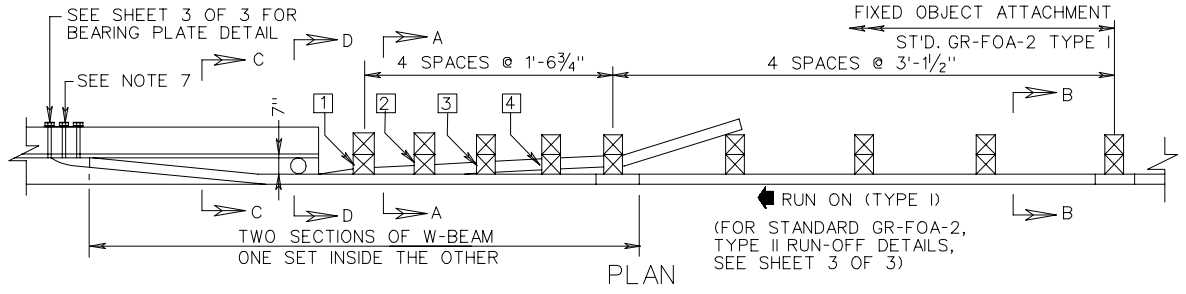
SPECIFICATION REFERENCE

505

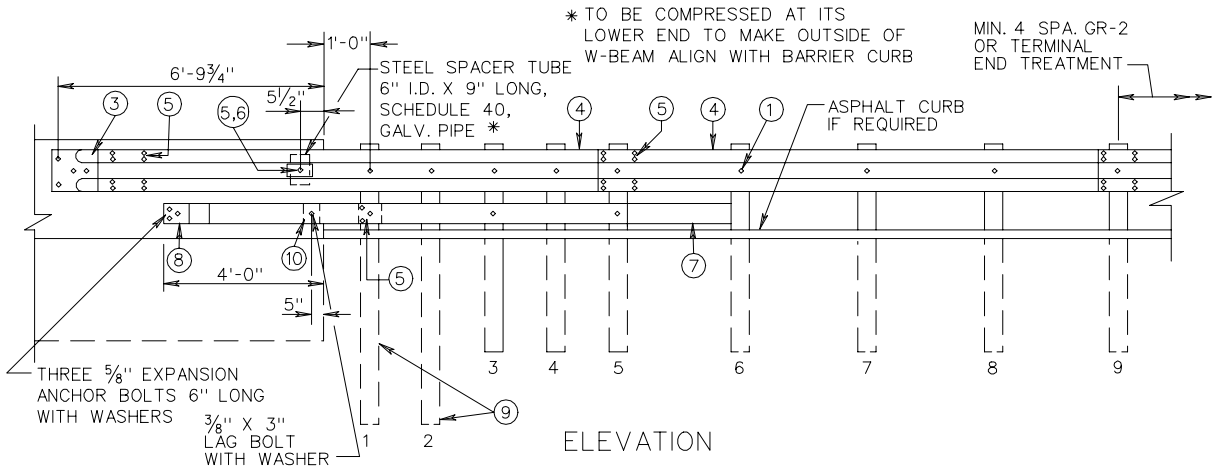
REV. 9/06

501.27

GR-FOA-2



PLAN



ELEVATION

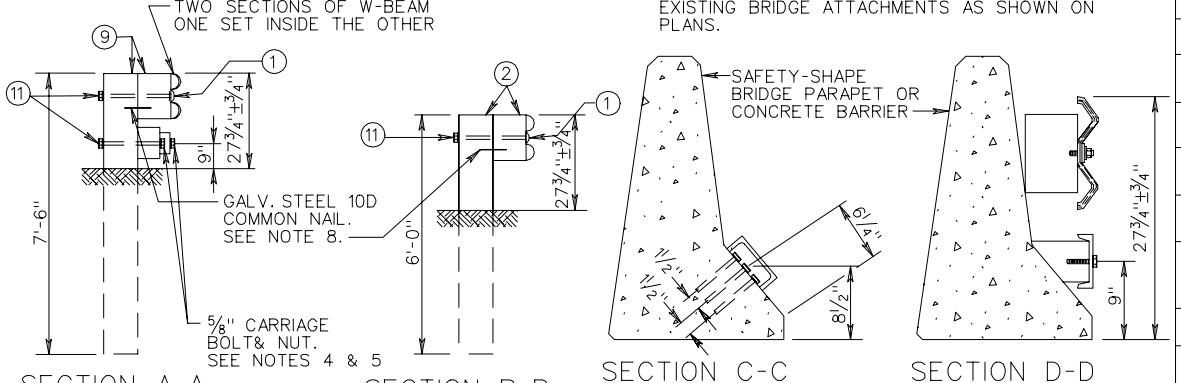
NOTES:

1. FIXED OBJECTS MAY CONSIST OF SAFETY SHAPED BRIDGE PARAPETS OR CONCRETE BARRIERS.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH ⅝" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
6. RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.
7. APPROPRIATE LENGTH ⅞" ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A ⅝" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR CONCRETE BARRIER.
8. DRIVE NAIL WITHIN 2" OF THE TOP OR BOTTOM OF BLOCKOUT AFTER ⅝" X 18 BOLT IS INSTALLED.
9. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.

NEW BRIDGE - ATTACHMENTS
ONE-WAY TRAFFIC-RUN-ON, 2-GR-FOA-2, TYPE I
-RUN-OFF, 2-GR-FOA-2, TYPE II
TWO-WAY TRAFFIC-RUN-ON, 4-GR-FOA-2, TYPE I

EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.



SECTION A-A

SECTION B-B

SECTION C-C
(W BEAM OMITTED)

SECTION D-D

ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	⅝" X 18" LG. GUARDRAIL BOLT AND RECESSED NUT.
②	STANDARD 6" X 8" WOOD POST AND BLOCK.
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	⅝"X 2" LONG GUARDRAIL BOLT AND RECESSED NUT (SEE STANDARD GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	8" X 8" X 7'-6" LONG WOOD POST AND 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
⑩	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
⑪	WASHER FOR ⅝" BOLT

SPECIFICATION REFERENCE

506

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT FOR USE BETWEEN SAFETY SHAPE AND GUARDRAIL (WOOD POSTS)

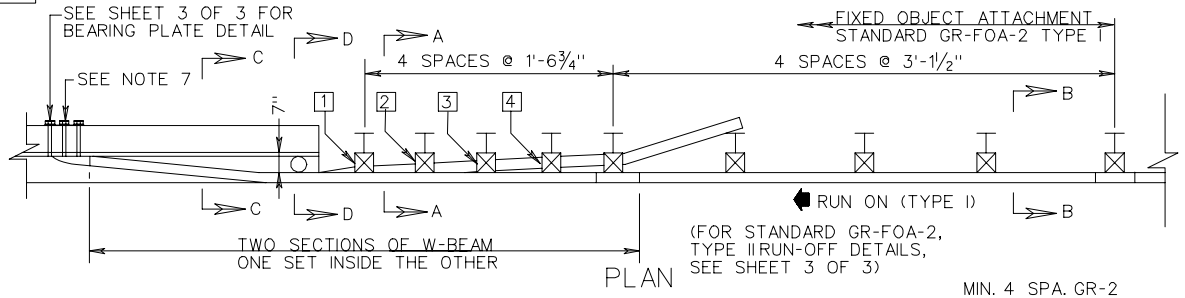
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

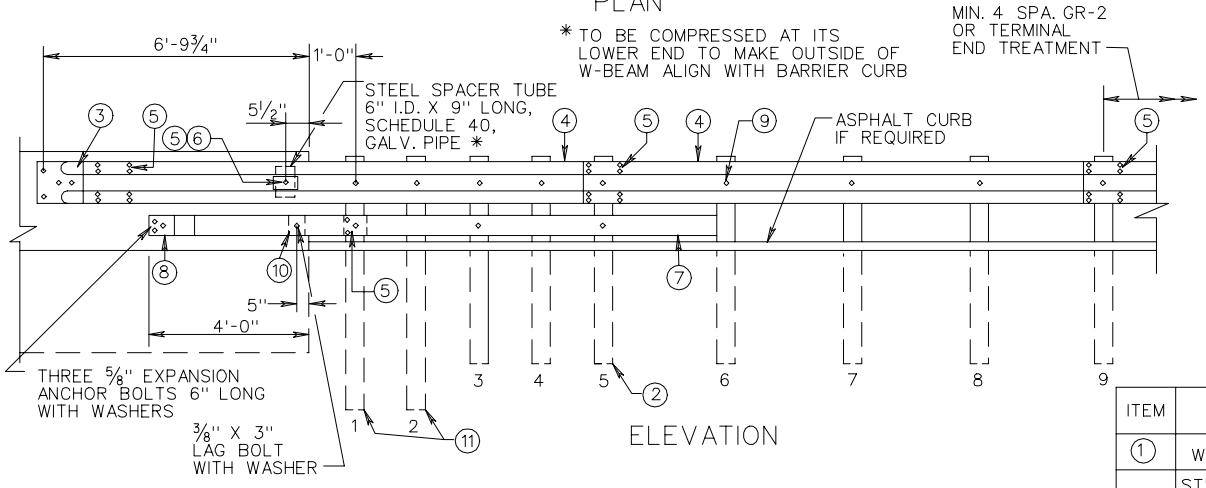
501.28

INSERTABLE SHEET A66-1

GR-FOA-2



PLAN



ELEVATION

NOTES:

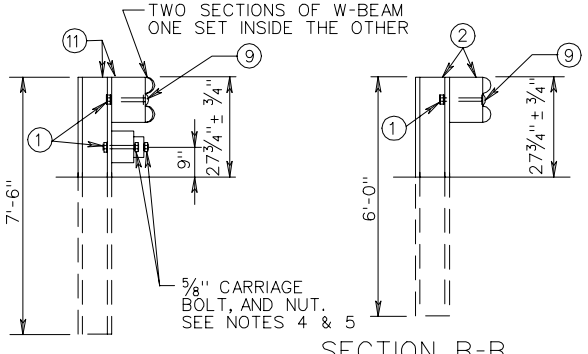
1. FIXED OBJECTS MAY CONSIST OF SAFETY SHAPED BRIDGE PARAPETS OR CONCRETE BARRIERS.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH ⅝" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
6. RUBRAIL MUST BE TWISTED 35° BETWEEN SECTIONS C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.
7. APPROPRIATE LENGTH ⅞" ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A ⅝" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR CONCRETE BARRIER.
8. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.

NEW BRIDGE - ATTACHMENTS
ONE-WAY TRAFFIC-RUN-ON, 2-GR-FOA-2, TYPE I
-RUN-OFF, 2-GR-FOA-2, TYPE II
TWO-WAY TRAFFIC-RUN-ON, 4-GR-FOA-2, TYPE I

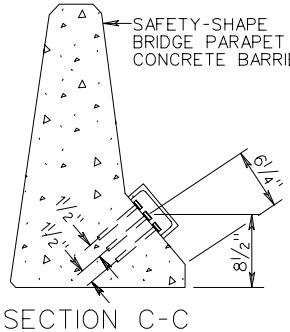
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	WASHER FOR ⅝" BOLT
②	ST'D. W6 X 8.5 OR W6 X 9 STEEL POST W/ ST'D. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	⅝"X 2" LONG GUARDRAIL BOLT AND RECESSED NUT (SEE STANDARD GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	⅝" X 10" LG. HEX BOLT, NUT AND WASHER
⑩	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
⑪	W8 X 13 X 7'-6" LG. STEEL POST WITH STD. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL.

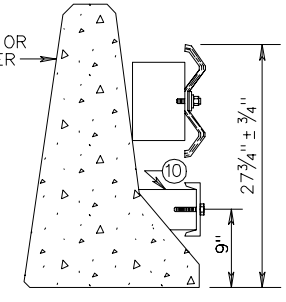


SECTION A-A

SECTION B-B



SECTION C-C
(W BEAM OMITTED)



SECTION D-D

SHEET 2 OF 3

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT FOR USE WITH SAFETY SHAPE - STEEL POSTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

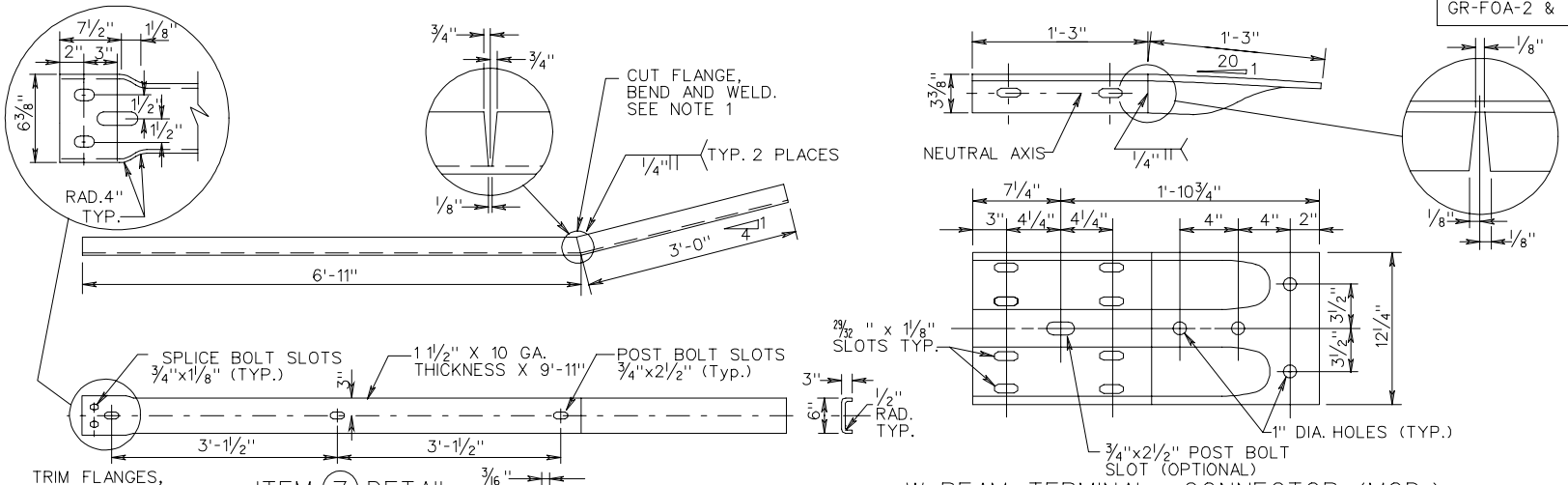
REV. 9/06

501.29

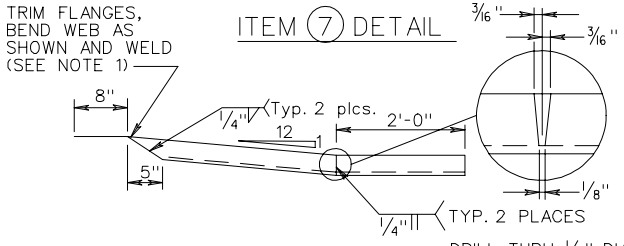
SPECIFICATION REFERENCE

506

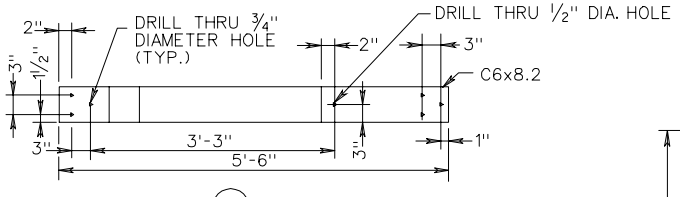
GR-FOA-2 & 4



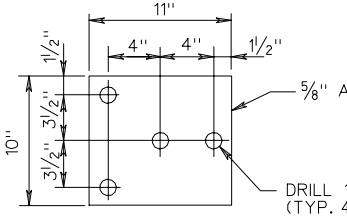
W-BEAM TERMINAL CONNECTOR (MOD.)



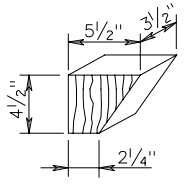
ITEM (7) DETAIL



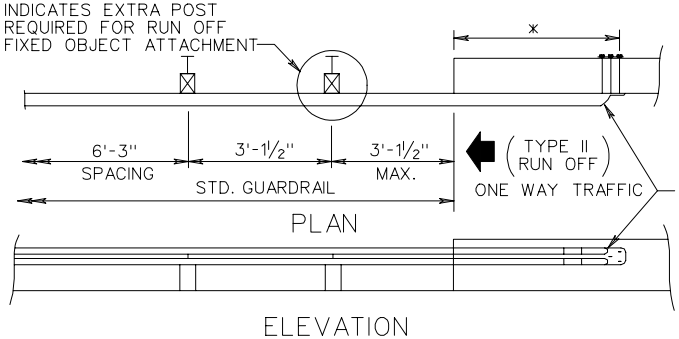
ITEM (8) DETAIL



BEARING PLATE



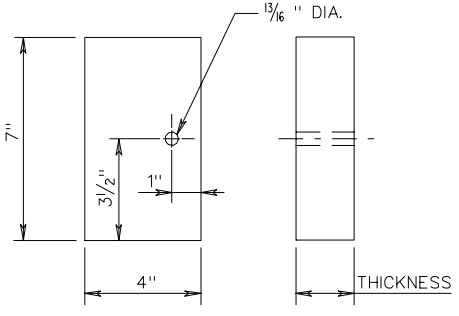
ITEM (10) DETAIL



PLAN

ELEVATION

* AS NEEDED TO ATTACH W-BEAM TERMINAL CONNECTOR.



RUBRAIL BLOCKOUT DETAIL

STEEL POSTS
RUBRAIL BLOCKOUTS
7" X 4" X THICKNESS

POST	THICKNESS
1	4¼"
2	3¼"
3	2"
4	1"

WOOD POSTS
RUBRAIL BLOCKOUTS
7" X 4" X THICKNESS

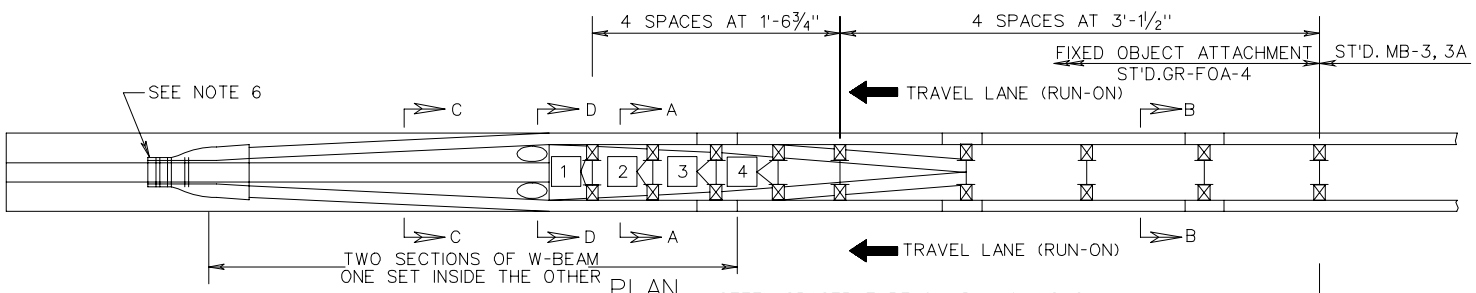
POST	THICKNESS
1	6¼"
2	4⅝"
3	3⅛"
4	1½"

NOTES:
1. CAN BE FIELD CUT AND BENT USING HEAT. IF SHOP CUT AND BENT, RIGHT HAND OR LEFT HAND MUST BE SPECIFIED DEPENDING ON WHICH SIDE OF THE ROADWAY THE TRANSITION IS USED.

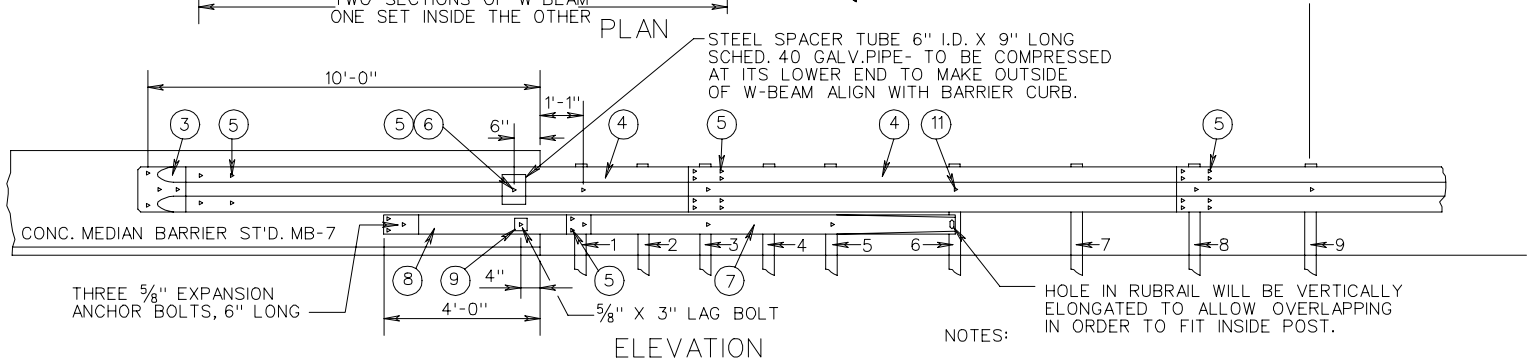
SHEET 3 OF 3

SPECIFICATION REFERENCE	W BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT RUBRAIL AND HARDWARE DETAILS	REV. 9/06
506	VIRGINIA DEPARTMENT OF TRANSPORTATION	501.30

GR-FOA-4

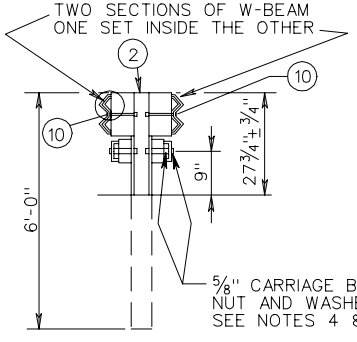


PLAN

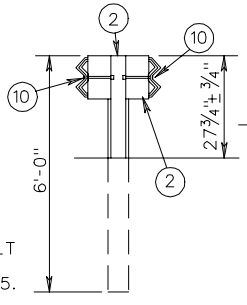


ELEVATION

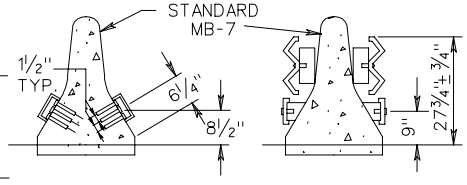
NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTIONS C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT AND LEFT HAND TWISTS WILL BE REQUIRED.



SECTION A-A
(ONE RAIL OMITTED)



SECTION B-B
(ONE RAIL OMITTED)



SECTION C-C
(W-BEAM OMITTED)

SECTION D-D

NOTES:

1. ARE GUARDRAIL POSTS ARE TO BE STEEL.
2. ALL GUARDRAIL COMPONENTS ARE TO BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
3. POSTS 1, 2, 3, 4 AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
4. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE TO BE DRILLED AND SECURED WITH ⅝" CARRIAGE BOLTS (LENGTH AS REQUIRED)
5. W-BEAM IS NOT BOLTED TO POSTS 2, 4, 5 AND 7. THESE BLOCKS ARE TO BE BOLTED DIRECTLY TO POSTS.
6. APPROPRIATE LENGTH ⅞" ASTM A325 HEX BOLTS ARE TO BE USED WITH HOLES DRILLED THROUGH THE CONCRETE MEDIAN BARRIER, ATTACHING THE W-BEAM TERMINAL CONNECTORS ON EACH SIDE.

TYPE I TWO RUN-ON SECTIONS (WITH 2 RUBRAILS SHOWN)

TYPE II ONE RUN-ON SECTION WITH 1 RUBRAIL RETAINED)
ONE RUN-OFF SECTION (WITH 1 RUBRAIL REMOVED)

TYPE III TWO RUN-OFF SECTIONS (WITH 2 RUBRAILS REMOVED)

RUBRAIL WOOD BLOCKS 7" x 4"	
POST	THICKNESS
1	4¼"
2	3¼"
3	2"
4	1"

ITEM	MATERIALS/SPECIFICATIONS/NOTES
1	⅝" WASHER
2	ST'D. W6 X 8.5 OR W6 X 9 STEEL POSTS, ST'D. 6" X 8" X 14" LONG TREATED PINE BLOCK OR RE-CYCLED MATERIAL.
3	ST'D. W-BEAM TERMINAL CONN. (MOD.)
4	STANDARD W-BEAM RAIL
5	⅝" X 2" LG. GUARDRAIL BOLT AND RECESSED NUT

ITEM	MATERIALS/SPECIFICATIONS/NOTES
6	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
7	BENT PLATE (SEE SHEET 2 OF 2)
8	C6 x 8.2 RUBRAIL (SEE SHEET 2 OF 2)
9	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 2 OF 2)
10	⅝" x 10" LONG HEX BOLT WITH NUT

BLOCKED-OUT W-BEAM MEDIAN BARRIER-FIXED OBJECT ATTACHMENT FOR USE BETWEEN STANDARD MB-7 AND STANDARD MB-3

VIRGINIA DEPARTMENT OF TRANSPORTATION

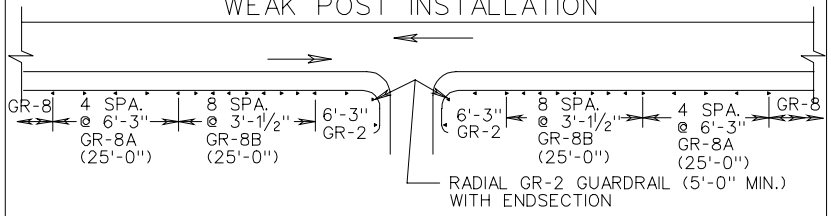
SPECIFICATION REFERENCE
505

REV. 9/06

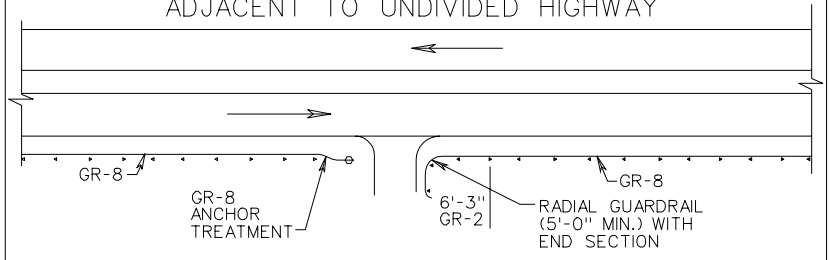
501.31

GR-INS

WEAK POST INSTALLATION

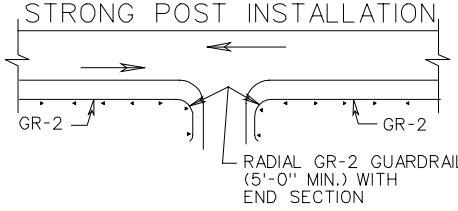


ADJACENT TO UNDIVIDED HIGHWAY

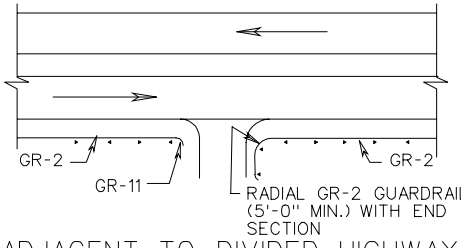


ADJACENT TO DIVIDED HIGHWAY

STRONG POST INSTALLATION

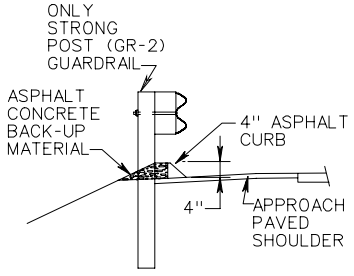


ADJACENT TO UNDIVIDED HIGHWAY



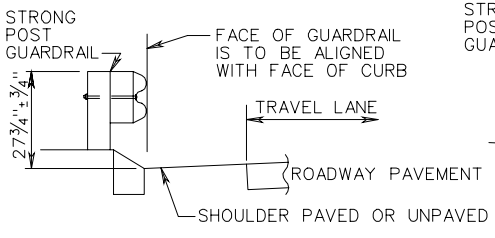
ADJACENT TO DIVIDED HIGHWAY
(ST'D GR-2 ONLY)

FACE OF GUARDRAIL IS TO BE ALIGNED WITH FACE OF CURB.

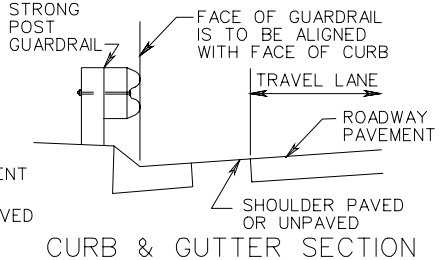


ASPHALT CURB SECTION

INSTALLATION AT PRIVATE ENTRANCE
(NOT TO BE USED IN PLACE OF ST'D GR-6,7, OR 9 NCHRP 350 TERMINAL)

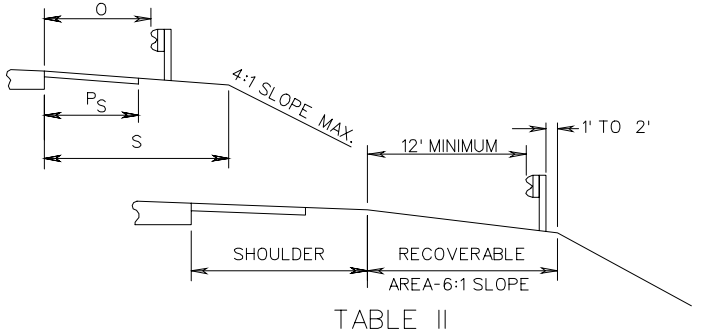


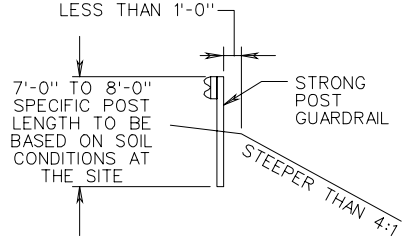
CURB SECTION



CURB & GUTTER SECTION

INSTALLATION ADJACENT TO CURBED SECTIONS
(NOT APPLICABLE TO URBAN DESIGN WITH SIDEWALK OR SIDEWALK SPACE)
ALL CURBS MUST BE MOUNTABLE





GUARDRAIL INSTALLATION SITES REQUIRING LONGER GUARDRAIL POSTS

TABLE I
NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES LEFT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (P_S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	3', 4', OR 10'	12'
13'	3'	10'
11'	3'	8'
8' (MED.)	3' or 4'	5'

TABLE II
NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES RIGHT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (P_S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	6' or 10'	12'
13'	8'	10'
11'	0, 3', 4' or 6'	8'
9'	0, 3' or 4'	6'
8'	3'	5'
5'	0	2'

GUARDRAIL LOCATION ON RECOVERABLE SLOPE

SPECIFICATION REFERENCE

221
505

W BEAM GUARDRAIL INSTALLATION CRITERIA

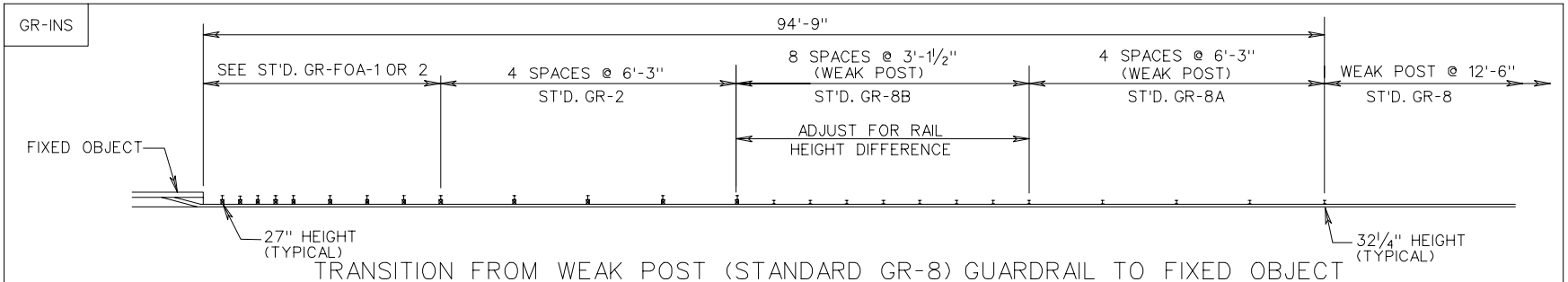
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

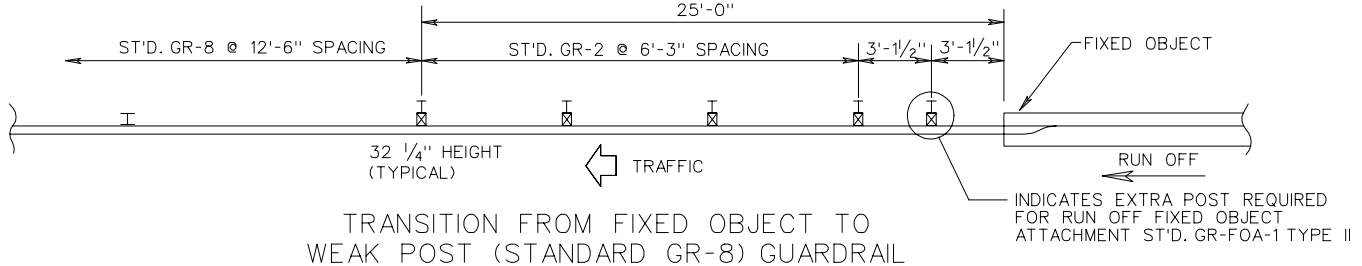
501.38

INSERTABLE SHEET A93

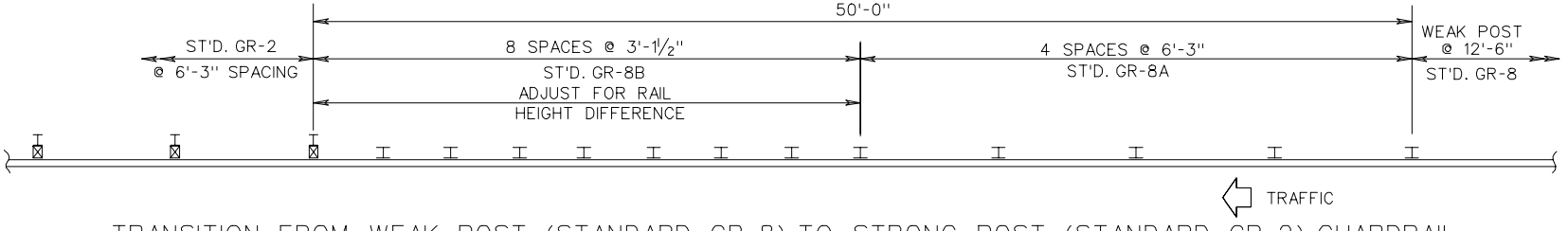
GR-INS



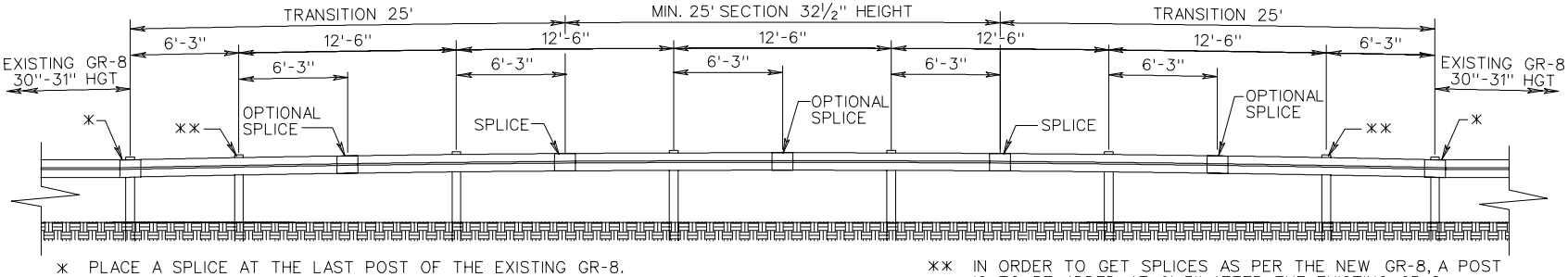
TRANSITION FROM WEAK POST (STANDARD GR-8) GUARDRAIL TO FIXED OBJECT



TRANSITION FROM FIXED OBJECT TO
WEAK POST (STANDARD GR-8) GUARDRAIL



TRANSITION FROM WEAK POST (STANDARD GR-8) TO STRONG POST (STANDARD GR-2) GUARDRAIL



* PLACE A SPLICE AT THE LAST POST OF THE EXISTING GR-8. THEN USE A 25 FT. TRANSITION SECTION OF RAIL TO ANOTHER SPLICE. THIS WILL RAISE THE GUARDRAIL HEIGHT FROM THE OLD GR-8 (30"-31") TO THE NEW GR-8 (32¼").

** IN ORDER TO GET SPLICES AS PER THE NEW GR-8, A POST IS TO BE ADDED AT 6'-3" AFTER THE EXISTING GR-8.

TRANSITION FROM WEAK POST (EXISTING GR-8 30"-31" HEIGHT) TO
CURRENT NCHRP 350 TL-3 WEAK POST (STANDARD GR-8 32¼" HEIGHT)

SHEET 7 OF 8

W BEAM GUARDRAIL INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

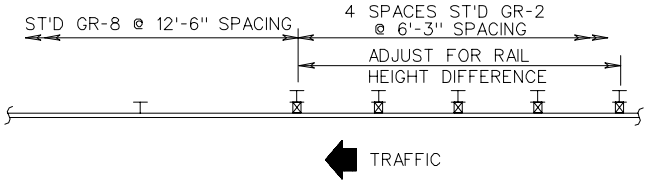
REV. 9/06

501.39

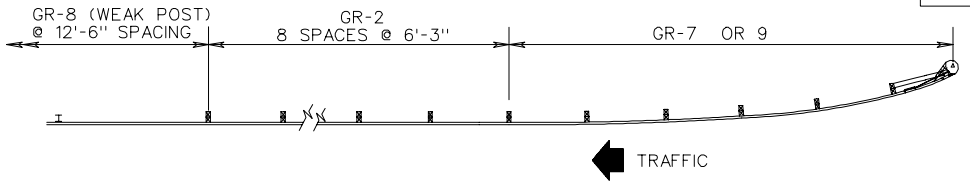
SPECIFICATION REFERENCE

221
505

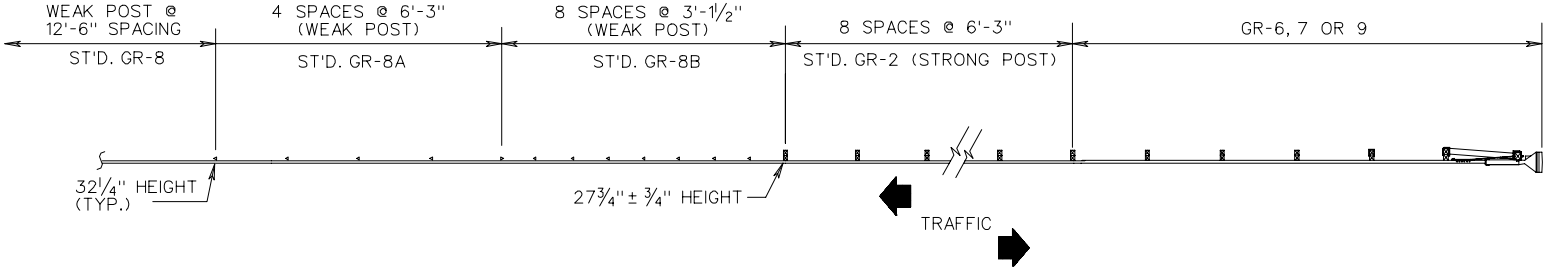
GR-INS



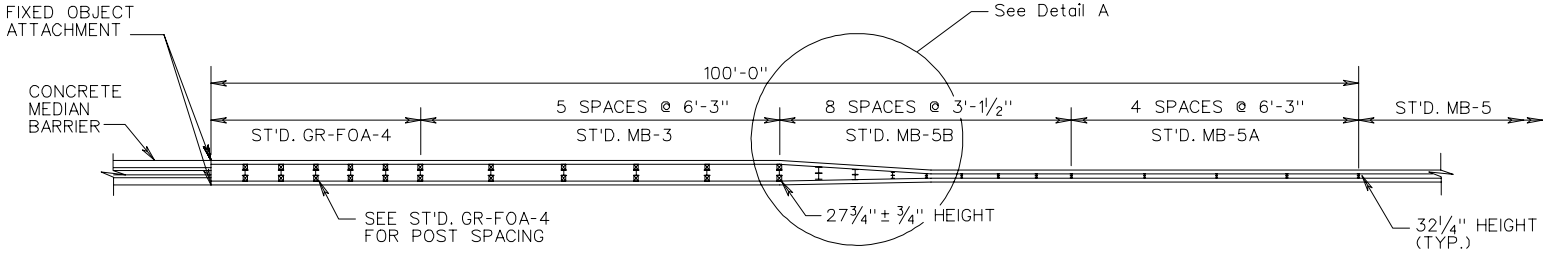
TRANSITION FROM STRONG POST TO WEAK POST GUARDRAIL



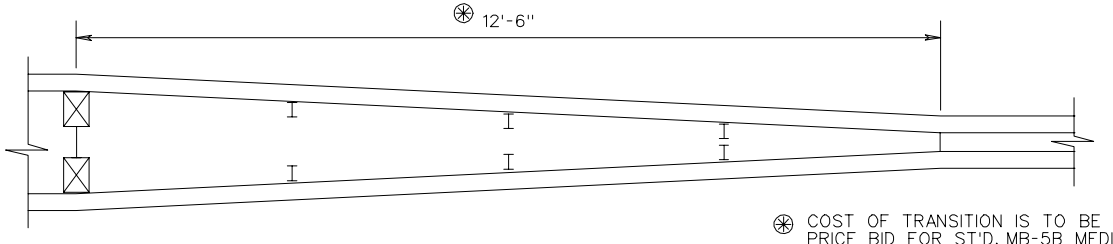
TRANSITION FROM GR-7 & GR-9 TERMINAL TO WEAK POST GUARDRAIL



TRANSITION FROM GR-6, GR-7, OR GR-9 TERMINAL TO WEAK POST GUARDRAIL



TRANSITION FROM WEAK POST MEDIAN BARRIER TO CONCRETE MEDIAN BARRIER



⊛ COST OF TRANSITION IS TO BE INCLUDED IN PRICE BID FOR ST'D. MB-5B MEDIAN BARRIER.

DETAIL A

SPECIFICATION REFERENCE
221
505

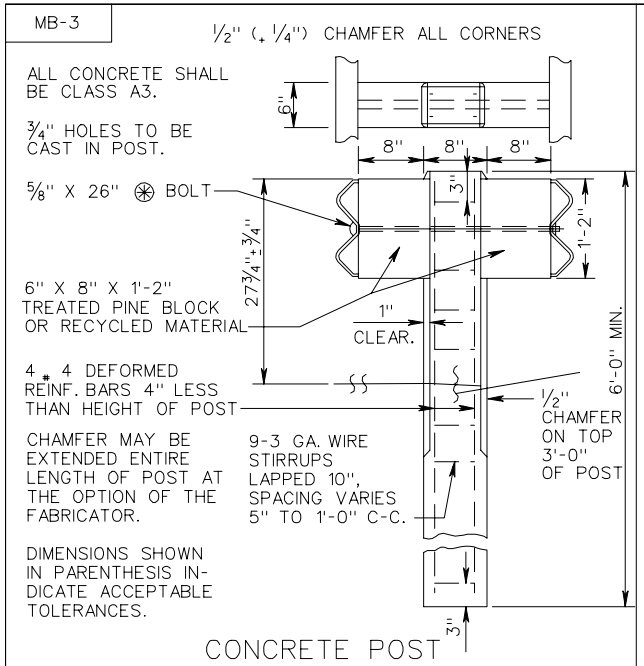
W BEAM GUARDRAIL AND MEDIAN BARRIER INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

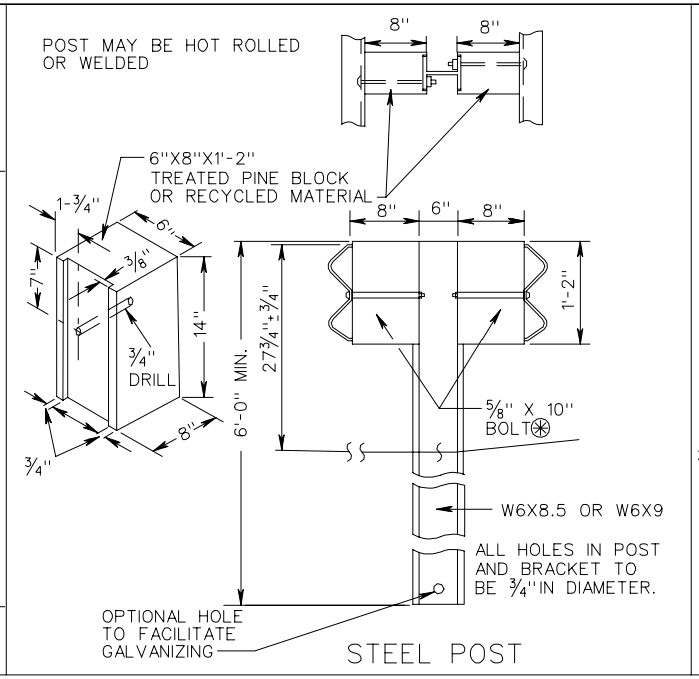
REV. 9/06

501.40

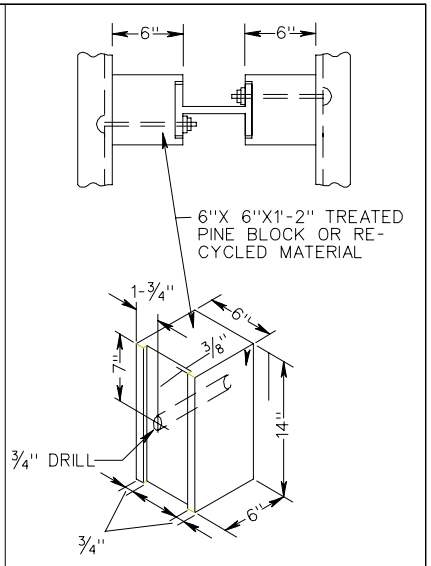
MB-3



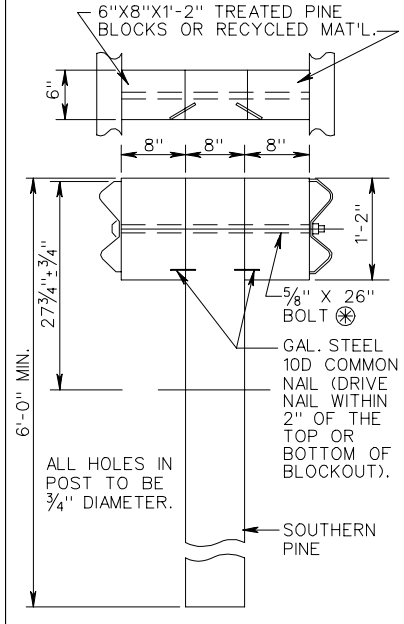
CONCRETE POST



STEEL POST



BLOCKOUT FOR MAINTENANCE REPAIR ONLY



6X8 WOOD POST

NOTES:

STANDARD MB-3 POST SPACING IS 6'-3".

FOR DETAILS OF RAIL ELEMENT, RAIL SPLICE JOINT, W BEAM BACK UP PLATE, AND ASSOCIATED HARDWARE SEE SHEET NO. 501.01.

ALTERNATE TYPE POSTS AND BLOCKOUTS MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF POST AND BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF MEDIAN BARRIER.

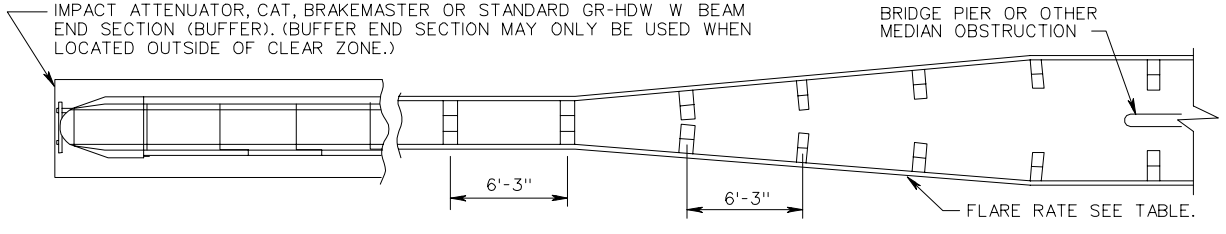
ALL BOLTS, NUTS, WASHERS, STEEL POSTS, BENT PLATE POST, AND BLOCKOUTS ARE TO BE GALVANIZED.

THE GUARDRAIL AND MEDIAN BARRIER COMPONENTS DEPICTED IN A.R.T.B.A. TECHNICAL BULLETIN NUMBER 268B MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.

⊛ STANDARD WASHERS ARE TO BE USED ON LAST 50' OF RUN OFF END ONLY.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
MPH	SHY LINE LS	FLARE RATE	FLARE RATE
70	10'	30:1	15:1 *
60	8'	26:1	14:1 *
50	6.6'	21:1	11:1 *
40	5'	17:1	8:1 *
30	3.6'	13:1	7:1 *

* SUGGESTED MAXIMUM FLARE RATE FOR SEMI-RIGID BARRIER SYSTEMS.



METHOD OF TREATMENT AT BRIDGE PIER OR MEDIAN OBSTRUCTION

BLOCKED-OUT W BEAM MEDIAN BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

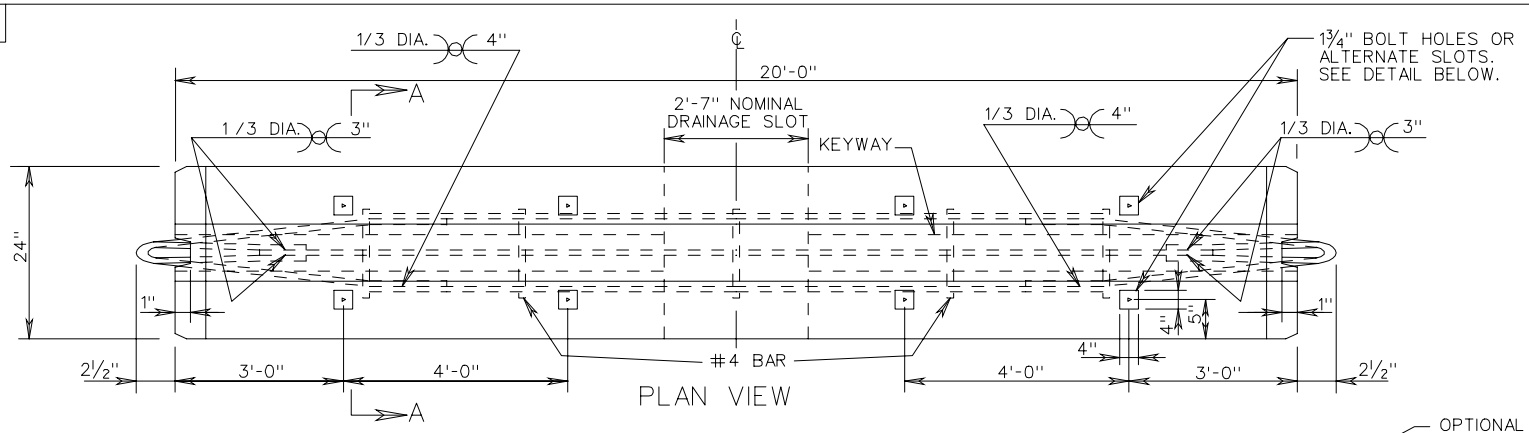
221
505

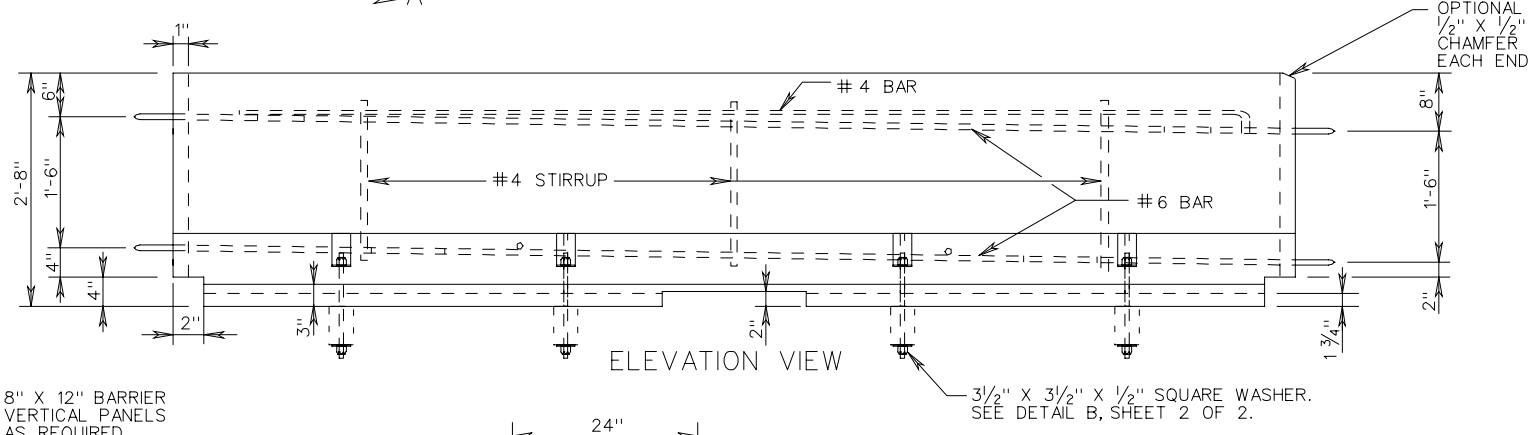
REV. 9/06

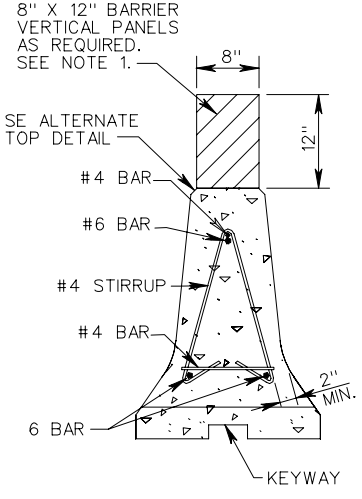
501.41

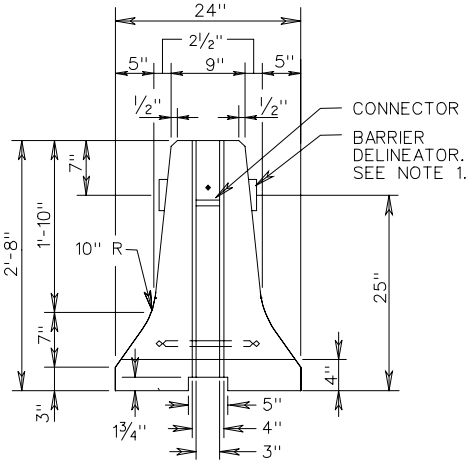
INSERTABLE SHEET ISD1165A

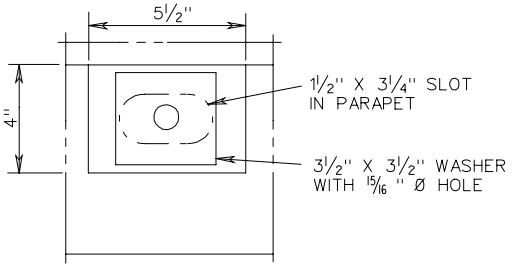
MB-11A

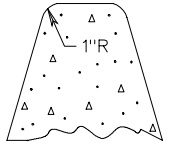












SHEET 1 OF 3

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

501.53

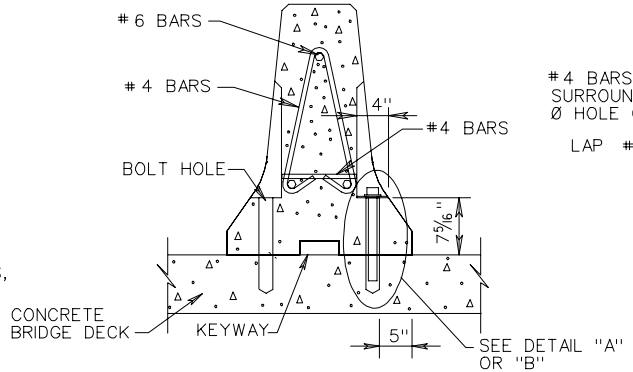
SPECIFICATION REFERENCE

105
512

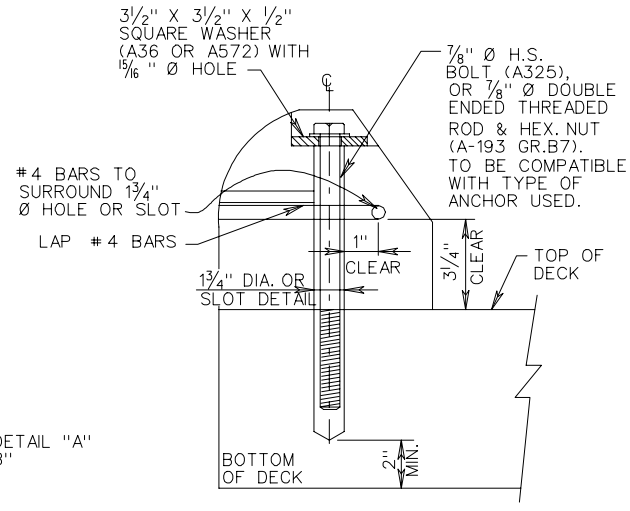
MB-11A

NOTES:

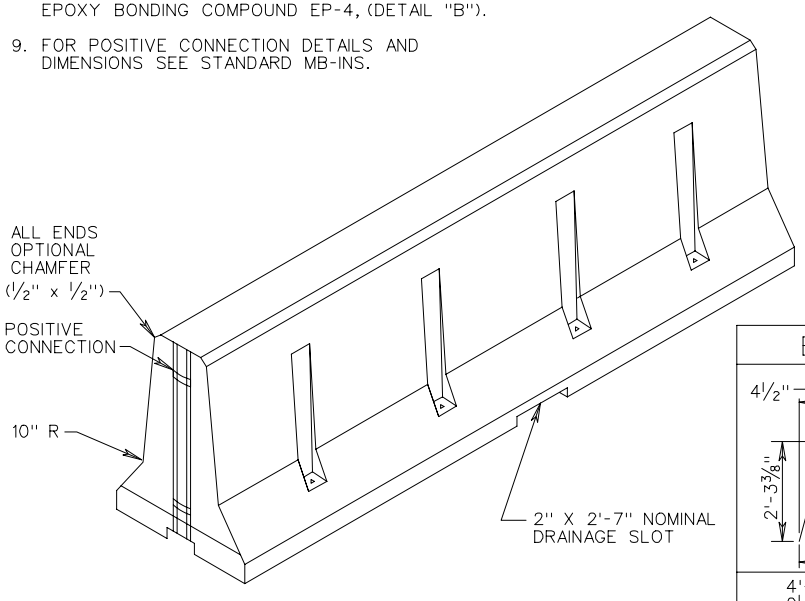
1. BARRIER DELINEATOR IS TO BE SPACED IN ACCORDANCE WITH SECTION 702 OF THE ROAD AND BRIDGE SPECIFICATIONS AND THE BARRIER VERTICAL PANELS ARE TO BE SPACED IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL.
2. REFLECTIVE SURFACE, IN ALL INSTANCES, ARE TO BE FACING ONCOMING TRAFFIC.
3. COST OF BARRIER DELINEATOR AND BARRIER VERTICAL PANELS ARE TO BE INCLUDED IN PRICE BID PER LINEAR FOOT OF BARRIER SERVICE.
4. ANCHOR BOLTS SHALL BE INSTALLED ON TRAFFIC SIDE.
5. CONCRETE 4000 PSI. (MIN.)
6. WELDED WIRE FABRIC MAY BE ONE SHEET BENT TO FIT CONFIGURATION OR TWO SEPARATE SHEETS, ONE ON EACH FACE.
7. ANCHOR SYSTEM SHOWN IN DETAIL "A" SHALL BE TESTED TO PROVIDE A MINIMUM PULLOUT OF 32,000 LBS. AND INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
8. AFTER REMOVING TEMPORARY BARRIER, CUT 7/8" Ø BOLT OR THREADED ROD AS LOW AS PRACTICAL BELOW ROADWAY SURFACE AND FILL RECESS WITH EPOXY BONDING COMPOUND EP-4 (DETAIL "A") OR REMOVE 7/8" Ø BOLT OR THREADED ROD AND FILL HOLE WITH GROUT BONDED WITH EPOXY BONDING COMPOUND EP-4, (DETAIL "B").
9. FOR POSITIVE CONNECTION DETAILS AND DIMENSIONS SEE STANDARD MB-INS.



SECTION B-B
(ANCHOR BOLT)
BOLT DOWN SIDE ADJACENT TO TRAFFIC

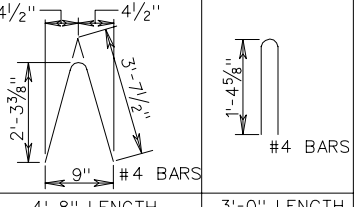


DETAIL "A"



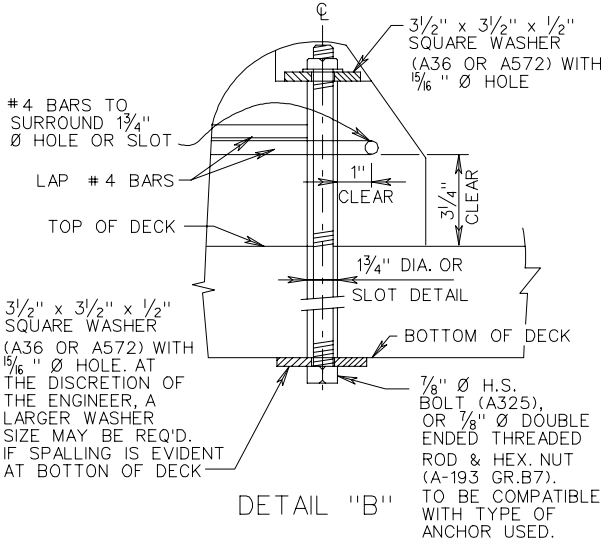
SECTION

BENDING DIAGRAM



4'-8" LENGTH 2 1/2" PIN Ø	3'-0" LENGTH 4 1/2" PIN Ø

DIMENSIONS IN BENDING DIAGRAMS ARE OUT-TO-OUT OF BARS.



DETAIL "B"

SPECIFICATION REFERENCE
105 512

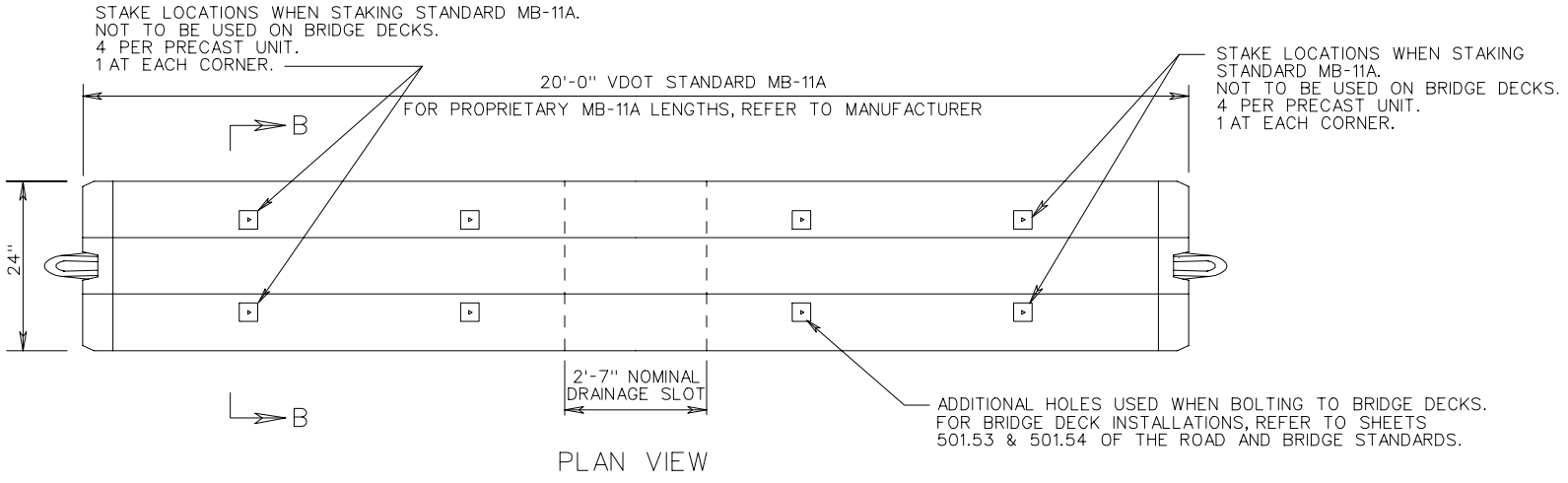
TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

VIRGINIA DEPARTMENT OF TRANSPORTATION

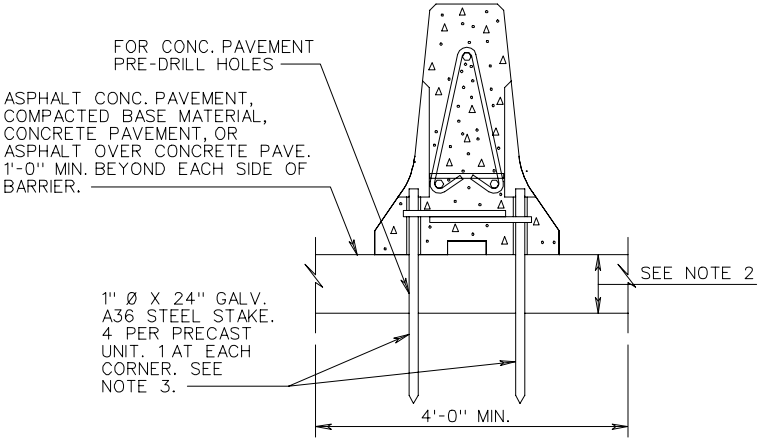
REV. 9/06

501.54

MB-11A



PLAN VIEW



SECTION B-B

TEMPORARY INSTALLATION ON ASPHALT CONCRETE PAVEMENT, COMPACTED BASE MATERIAL, CONCRETE PAVEMENT, OR ASPHALT OVER CONCRETE PAVEMENT (NOT TO BE USED ON BRIDGE DECKS)

NOTES:

1. STAKING OF STANDARD MB-11A TO ASPHALT CONCRETE PAVEMENT, COMPACTED BASE MATERIAL, CONCRETE PAVEMENT, OR ASPHALT OVER CONCRETE PAVEMENT IS REQUIRED WHEN TRAFFIC BARRIER SERVICE CONCRETE IS PLACED WITHIN THE TWO (2) FOOT OFFSET OF A TRENCHING OPERATION (4' OR GREATER IN DEPTH) OR WHEN DETERMINED BY THE ENGINEER.
2. 2" MIN. FOR ASPHALT CONCRETE.
   6" MIN. FOR COMPACTED BASE MATERIAL.
3. DRIVE STAKE HEAD BELOW FACE OF BARRIER TO PREVENT SNAGGING.
4. CONTRACTOR TO VERIFY PAVEMENT STRUCTURE PRIOR TO PLACING STAKES.
5. UPON REMOVAL OF THE STAKES AND BARRIERS, REPAIR THE RESULTING HOLES AS FOLLOWS OR AS DIRECTED BY THE ENGINEER. CLEAN AND FILL WITH TYPE EP-4 OR EP-5 EPOXY MORTAR CONFORMING TO THE REQUIREMENTS OF SECTION 243 FOR HYDRAULIC CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE PAVEMENT. CARE SHALL BE TAKEN NOT TO TRAP AIR WITHIN OR AT THE BOTTOM OF THE EPOXY MORTAR.

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON ROADWAYS)

NEW 9/06

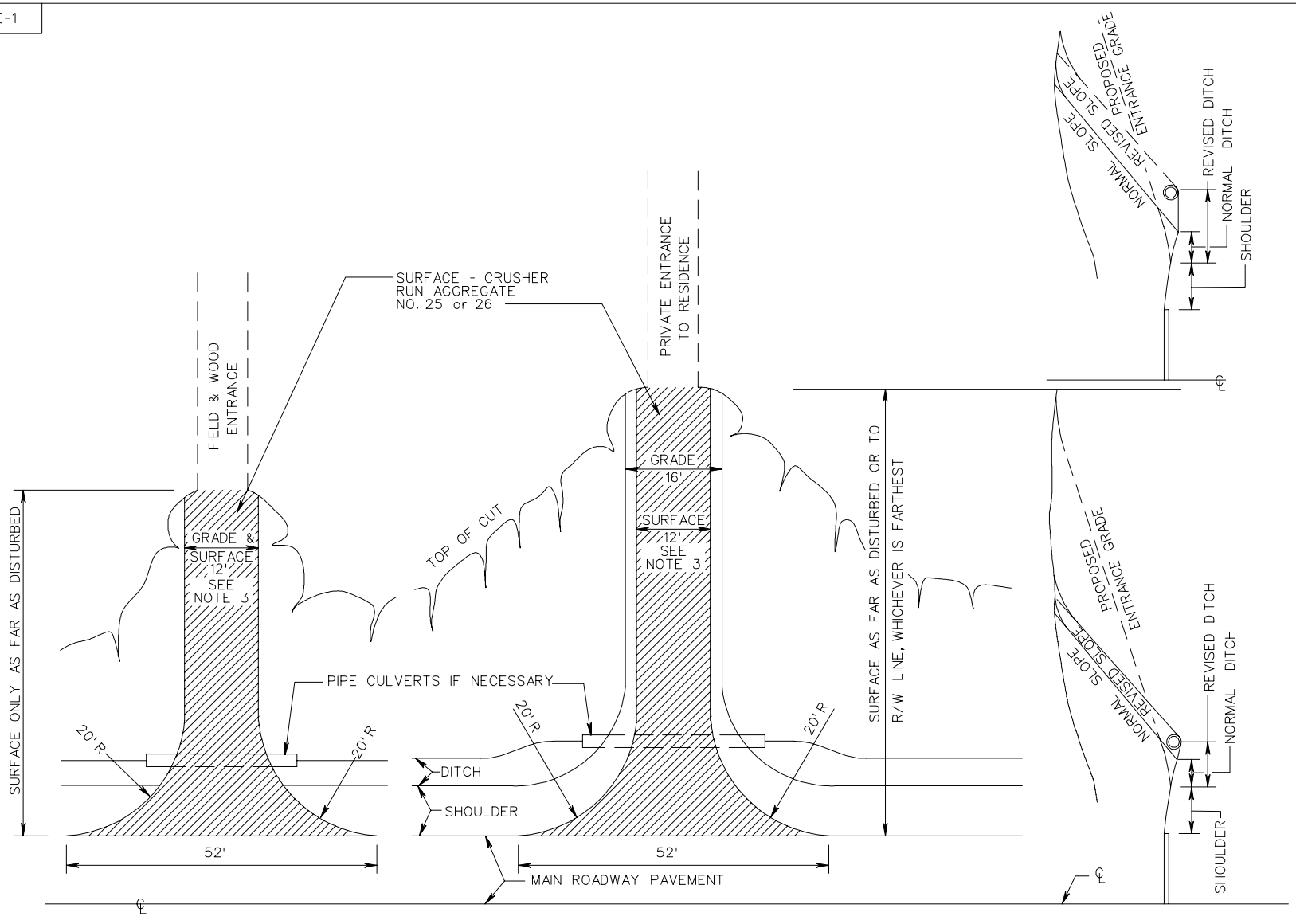
501.54A

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

105
512

PE-1



ALTERNATE METHODS FOR PLACING PIPES UNDER ENTRANCES

NOTES:

1. ALL ENTRANCE GRADES SHALL START BACK OF THE SHOULDER LINE. IF DRAINAGE IS NECESSARY, THE DITCH MAY BE MOVED BACK TO PROVIDE AT LEAST 9" OF COVER OVER PIPE, AS SHOWN IN THE ALTERNATE METHODS FOR PLACING PIPE UNDER ENTRANCES DIAGRAM.
2. ENTRANCE GRADES ARE TO BE SMOOTHLY TIED INTO THE ROADWAY BY ROUNDING AS NECESSARY.
3. 12' OR EXISTING WIDTH WHICHEVER IS GREATER.
4. LENGTHS OF CULVERTS SHOWN ON ROAD PLANS FOR ENTRANCES ARE APPROXIMATE AND SHALL BE ADJUSTED TO OBTAIN ABOVE ROADWAY WIDTHS.
5. ENTRANCES IN FILL TO BE SAME AS ABOVE EXCEPT LOCATION OF CULVERT (WHEN NECESSARY).

STANDARD PRIVATE ENTRANCES

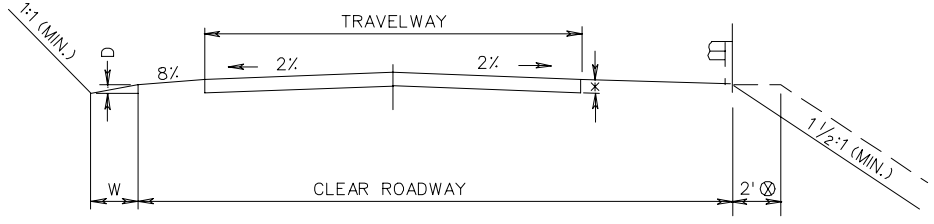
SPECIFICATION REFERENCE

512

REV. 9/06

602.02

VIRGINIA DEPARTMENT OF TRANSPORTATION



✳ SEE PLANS FOR BASE DEPTH AND TYPE AND PAVED SURFACE TREATMENT WHERE REQUIRED.

TYPICAL SECTION

⊗ FOR GUARDRAIL:
ADD 2' TO 4' SHOULDERS
ADD 3' TO ALL OTHER SHOULDERS

BRIDGE WIDTH = APPROACH ROADWAY WIDTH (CLEAR ROADWAY).

WIDTHS FOR TWO WAY TRAFFIC (LESSER WIDTH MAY BE USED FOR ONE-WAY)

TYPE	CURRENT ADT	TRAVELWAY WIDTH ✳	SURFACE		MIN. ROADWAY SHOULDER TO SHOULDER ⊗	DITCH WIDTH (W)	DITCH DEPTH (D)	PAY ITEM
			UNPAVED	PAVED				
A	0-250	18'	✓		22'	4'	16"	LF.
B	251-750	20'	✓		24' ABS. 30' DES.	4'	16"	LF.
C	751-2000	22'		✓	30' ABS. 34' DES.	4'	16"	✳ ✳
D	2001-5500	24'		✓	40'	4'	16"	✳ ✳
E	5501-15,000	24'		✓	40'	4'	16"	✳ ✳
F	15,000-ABOVE	24'		✓	40'	6'	18"	✳ ✳

✳ CURVES TO BE WIDENED IN ACCORDANCE WITH ST'D. TC-5.01R.

✳✳ PAID FOR BY INDIVIDUAL QUANTITIES.

GEOMETRICS

DESIGN SPEED M.P.H.		20	30	40	50	60	70
MIN. RADII		108' R	251' R	465' R	760' R	1204' R	1821' R
MAX. % GRADE	DES.	8%	7%	7%	6%	5%	5%
	ABS.	16%	14%	13%	10%	6%	6%
STOPPING SIGHT DISTANCE	DES.	125'	200'	325'	475'	650'	850'
	MIN.			305'	425'	570'	730'
MAXIMUM SUPERELEVATION		8%	8%	8%	8%	8%	8%

IF GEOMETRICS AND WIDTHS SHOWN IN THESE CHARTS ARE GREATER THAN THE FINISHED CONTRACT DESIGN, APPROVAL MAY BE GRANTED BY THE DEPARTMENT FOR LESSER VALUES.

SPECIFICATION REFERENCE
510

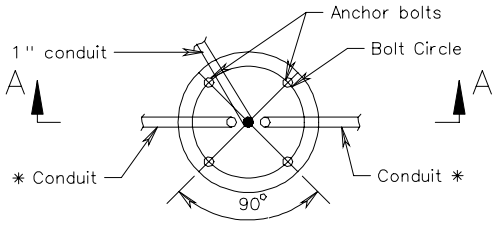
MINIMUM DESIGN CRITERIA FOR TEMPORARY DIVERSION (MAINTENANCE OF TRAFFIC)

VIRGINIA DEPARTMENT OF TRANSPORTATION

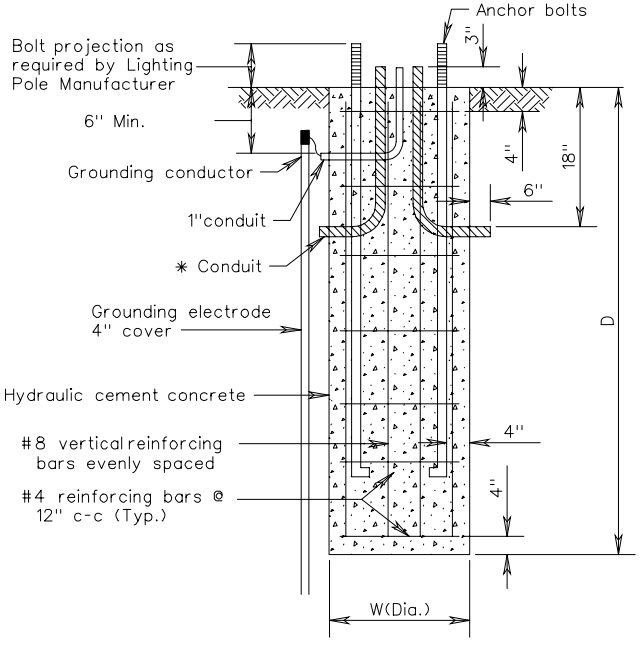
REV. 9/06

702.00

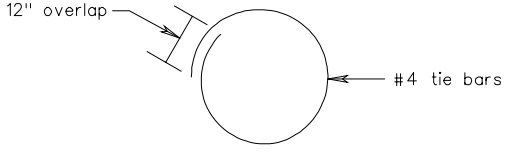
LF-1



PLAN VIEW



SECTION A-A



PLAN VIEW

Type	W	D	Vertical Bars
A	2'6"	8'	8 -#8

Notes:

Conduit elbows shall have a 90° bend. The bend radius shall be in accordance with the N.E.C.

The bolt circle template shall be furnished by the lighting pole manufacturer.

* The number, orientation and size of conduits entering and exiting foundations shall be as shown on plans.

No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

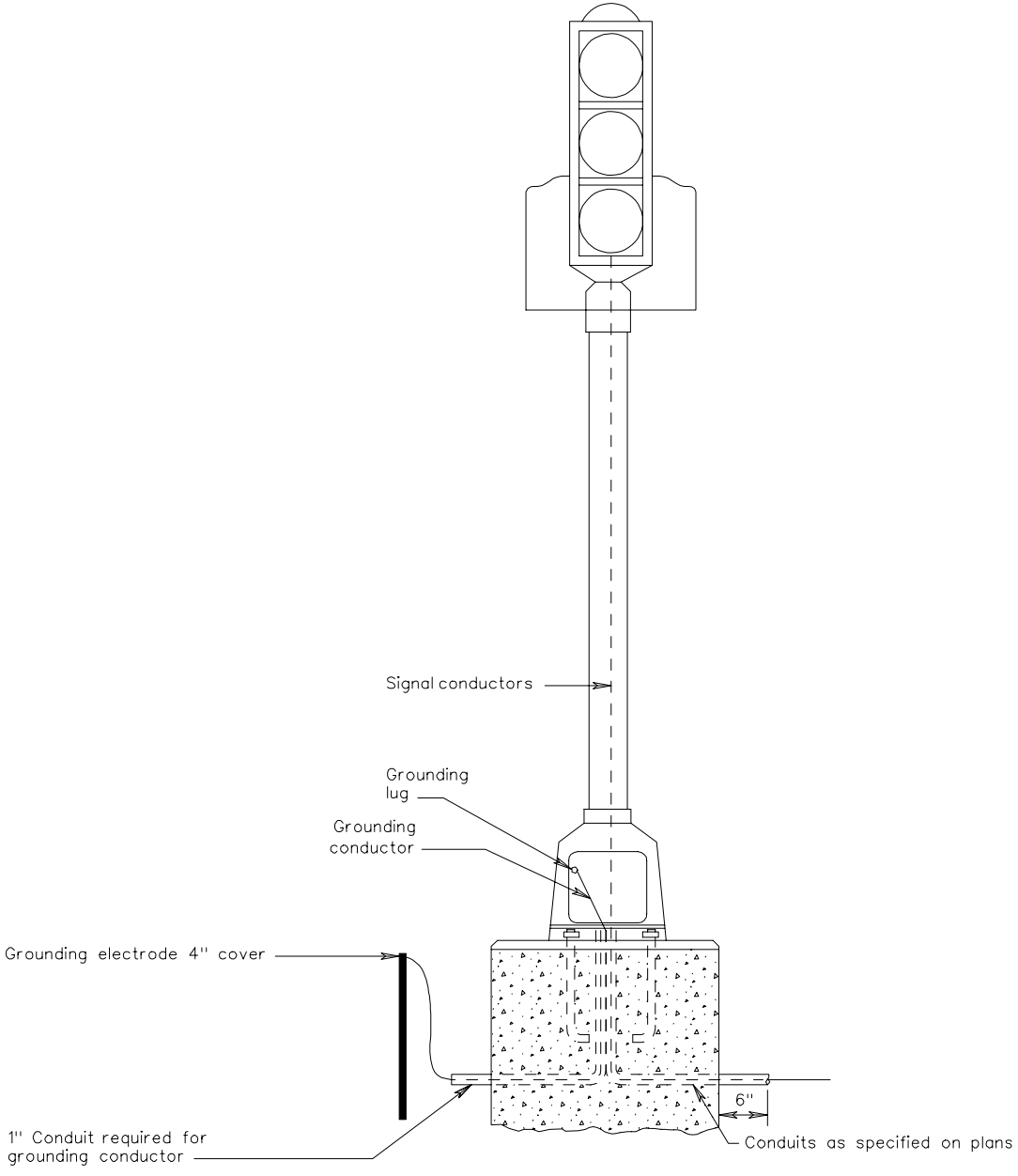
LIGHTING POLE FOUNDATION INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

1301.10

WD-4



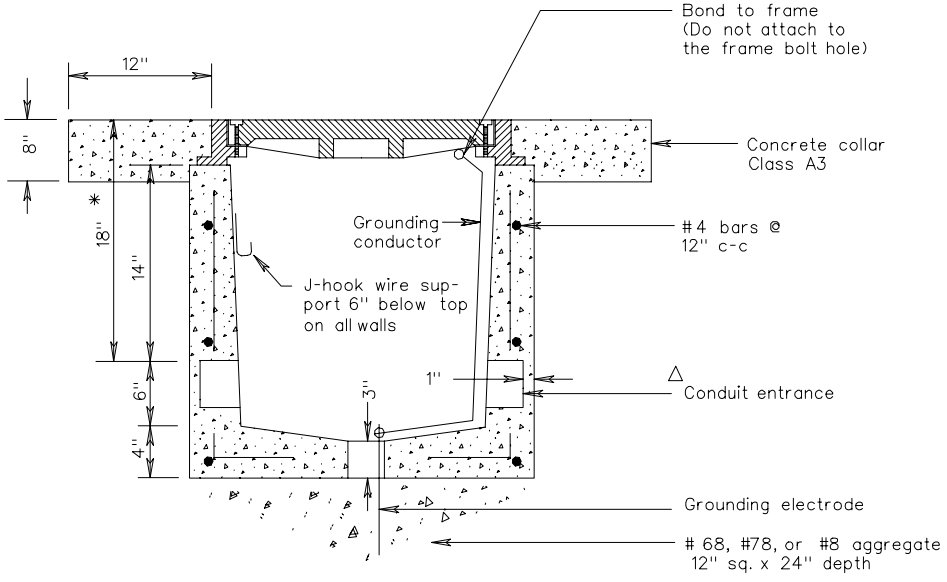
PEDESTAL POLE WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

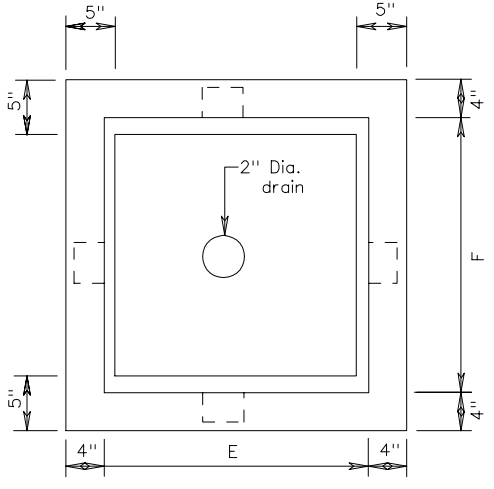
REV. 9/06

1301.25

JB-1A,2A,3A,4A,&5A



STANDARD	DIMENSIONS	
	E	F
JB-1A	14"	14"
JB-2A	14"	20"
JB-3A	20"	20"
JB-4A	20"	27"
JB-5A	27"	27"



PLAN VIEW

(FRAME AND COVER REMOVED)

Notes:

J-Hook wire supports shall be securely attached to the junction box with a bolt and nut with a neoprene washer or an expansion fitting.

Conduit entrances shall be located as shown on the plans. Conduits shall extend 2" min. to 3" max. beyond the inside wall of the junction box.

Bell ends shall be installed on the ends of PVC conduits. Grounding bushings shall be installed on the ends of metal conduits. Bell ends & bushings shall be plugged to prevent moisture & rodent entry.

∗ Depth of conduit entrances for magnetic detectors shall be in accordance with St'd TD-2.

All reinforcing steel shall have a minimum 1 ½" concrete cover. Any reinforcing steel in conflict with conduit shall be cut a minimum of 1 ½" from conduit.

The junction box may be precast or cast in place concrete.

△ A minimum 2" diameter conduit entrance is required unless otherwise specified on plans.

A concrete collar is required only when junction box is installed in earth areas.

High strength grout conforming to the Road & Bridge Specifications shall be used to secure the frame to the junction box.

All junction boxes shall be installed with a grounding electrode unless box houses only communication/interconnect cable.

Voids resulting from entrance of conduits into junction box shall be completely filled with hydraulic cement grout conforming to the Road & Bridge Specifications.

JUNCTION BOX

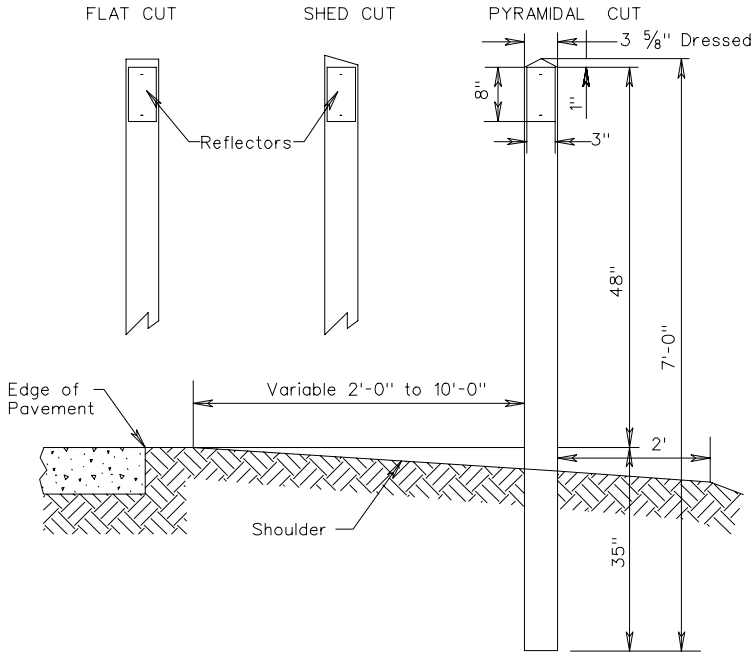
REV. 9/06

1301.48

VIRGINIA DEPARTMENT OF TRANSPORTATION

ED-1

STANDARD ROAD EDGE DELINEATORS



NOTES:

Standard ED-1 delineators consist of reflectorized sheeting, cut to a 3" by 8" vertical rectangle, mounted on a backing of aluminum alloy, not less than 0.063 thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38. The color of the reflective sheeting shall, in all cases, conform to the color of the edgelines.

The reflectors are attached to wood posts with a minimum of two nails or screws produced from alloy 2024-T4 or 6061-T6.

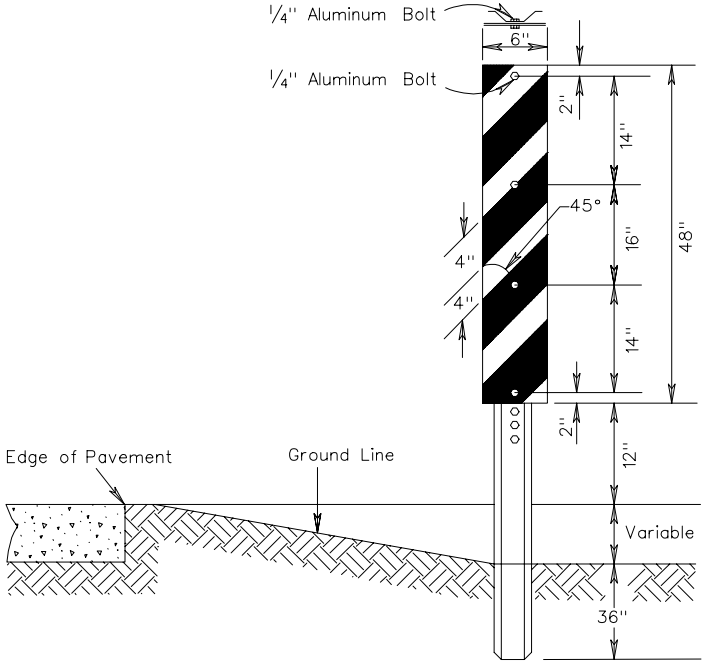
The posts above the ground are painted white with number 11 white paint.

Posts are treated with a water-borne preservative in accordance with Section 236 of the Road and Bridge Specifications.

The top of the posts may have a flat, shed, or pyramidal cut: however, they shall be uniform throughout a project. Cuts shall be in accordance with Standard WSP-1.

ED-2

SPECIAL ROAD EDGE DELINEATORS



NOTES:

Special delineators are made from aluminum alloy, not less than 0.080 thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38.

Delineators extend 1" above the top of the post.

Delineators are reflectorized, and in all cases, the color shall conform to the color of the edgelines, alternating with a black stripe.

The stripes shall slope down toward the center of roadway.

Delineators are mounted on U-Type posts fabricated from rolled-rail steel 1.33 lb./ft. minimum.

The bottom of the delineator panel is 12" above the pavement edge elevation.

TYPICAL DETAILS FOR STANDARD & SPECIAL ROAD EDGE DELINEATORS

REV. 9/06

1301.84

VIRGINIA DEPARTMENT OF TRANSPORTATION