September 17, 2010

MEMORANDUM

To: All Holders of the Virginia Department of Transportation’s 2008 Road and Bridge Standards

The following is a list of sheets contained in the 2008 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An interim standard sheet will not be required in plan assemblies for the following sheets only. Changes to these sheets will not affect the basis of payment or estimates.

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<td>Changed note 5 from “shall be“ to “may be“</td>
</tr>
<tr>
<td>603.02</td>
<td>Clarified exit taper ratios</td>
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The following is a list of revised standards to the 2008 Road and Bridge Standards that require an interim standard 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. The respective interim standard sheet number has been placed with the revised standard. An interim standard sheet is available for each of these revised standards. The interim standard sheets are available on VDOT’s web site, on the FTP server, and in Falcon DMS for VDOT personnel. These interim standard sheets will be required in plan assemblies for projects advertised May 10, 2011 and later.
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<th>INTERIM</th>
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<tr>
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</tbody>
</table>

If you have any questions or comments regarding this revision to the publication, please contact Chuck Patterson, at (804) 786-1805, of the Standards and Special Design Section.

Sincerely,

[Signature on file: September 17, 2010]

Mohammad Mirshahi, P.E.
State Location and Design Engineer
CAST IN PLACE STORMWATER MANAGEMENT DRAINAGE STRUCTURE

Virginia Department of Transportation

NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE BID PRICE FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.

2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 2 OF 3 FOR DETAILS ON PRECAST STRUCTURE.

3. WEEP HOLES SHALL NOT BE PROVIDED.

4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.

5. FOR DETAILS ON METAL PLATE, TRASH RACK AND TRASH RACK SEE STANDARD SWM-DR.

6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 7 INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).

7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5, FOR TEMPORARY MODIFICATION DETAILS.

8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>12&quot;</th>
<th>15&quot;</th>
<th>18&quot;</th>
<th>24&quot;</th>
<th>30&quot;</th>
<th>36&quot;</th>
<th>42&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM DEPTH H</td>
<td>5'-0&quot;</td>
<td>5'-3/4&quot;</td>
<td>5'-6/2&quot;</td>
<td>6'-1&quot;</td>
<td>6'-7/2&quot;</td>
<td>7'-2&quot;</td>
<td>7'-8/2&quot;</td>
</tr>
<tr>
<td>CU. YDS. CONCRETE</td>
<td>2.665</td>
<td>2.773</td>
<td>2.878</td>
<td>3.078</td>
<td>3.624</td>
<td>3.437</td>
<td>3.598</td>
</tr>
</tbody>
</table>

INCREMENT PER FOOT OF ADDITIONAL DEPTH "H" • 0.461 CU. YDS.
NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE PRICE BID FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.

2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 1 OF 3 FOR DETAILS ON CAST IN PLACE STRUCTURE.

3. WEEP HOLES SHALL NOT BE PROVIDED. ANY LIFT HOLES SHALL BE PLUGGED.

4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.

5. SEE STANDARD SWM-DR FOR DETAILS ON PLATE, DEBRIS RACK AND TRASH RACK.

6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).

7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5 FOR TEMPORARY MODIFICATION DETAILS.

8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.
MEDIAN WITH CUT-THROUGH
TYPE M2

SECTION C-C
SEE NOTE 5

MEDIAN WITH RAMP
TYPE M1

SECTION B-B
SEE NOTE 5

SECTION D-D
SEE NOTE 5

REFUGE ISLAND WITH RAMPS
TYPE RI1

REFUGE ISLAND CUT-THROUGH
TYPE RI2

NOTES:
1. FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.
2. CURB SHALL BE SHAPED TO MATCH THE FACE OF ROADWAY CURB.
3. SEE ROADWAY PLANS FOR MEDIAN AND REFUGE ISLAND DIMENSIONS
4. RAMPS AND CUT THROUGH’S SHALL BE ALIGNED WITH CROSSWALKS.
5. THE RAMPS AND CUT THROUGH’S SHALL BE INSTALLED AND PAID FOR AS 4” HYDRAULIC CEMENT CONCRETE SIDEWALK IN ACCORDANCE WITH SECTION 504 OF THE ROAD & BRIDGE SPECIFICATIONS. EXCAVATION OF MATERIAL FOR THE INSTALLATION OF THE SIDEWALK SHALL BE INCLUDED IN THE PRICE BID FOR 4” HYDRAULIC CEMENT CONCRETE SIDEWALK.
1. Rumble stripes shall be placed continuously as directed by the engineer.

2. Rumble stripes shall not be placed within limits of bridge drainage aprons or special design shoulder slot inlets.

3. Rumble stripes shall be placed on mainline shoulders only.

4. Following cutting and cleaning depressions of waste material in asphalt, concrete pavement that is been in place more than one year, the entire rumble strip area shall be coated with liquid asphalt coating (emulsion) using a pressure distributor at an approximate rate of 0.05 gallons per square yard. Overspray shall not extend more than 2 inches beyond the width of cut and/or shall not come in contact with pavement markings.

5. Rumble stripes shall not be placed within 50 feet of any intersection, turn lane, acceleration/deceleration lane or gore area.

6. Pavement markings shall be placed as directed by the engineer.
**NOTES**

1. Rumble strips shall be placed with an intermittent pattern as shown in the plan view and shall be installed in the locations shown on the plans, or as directed by the engineer.

2. Rumble strips shall not be placed within limits of bridge drainage aprons or special design shoulder slot inlets.

3. Rumble strips shall be placed on mainline shoulders only.

4. Intermittent rumble strips shall be placed on outside shoulders only.

5. Following cutting and cleaning depressions of waste material, the entire rumble strip area shall be coated with liquid asphalt coating emulsion using a pressure distributor at an approximate rate of 0.1 gallon per square yard. Overspray shall not extend more than 2 inches beyond the width of cut and/or shall not come in contact with pavement markings.

6. Rumble strips shall not be placed within 50 feet of any intersection, turn lane, acceleration/deceleration lane or gore area.

7. Pavement markings shall be placed as directed by the engineer.
NOTES
1. ASPHALT OVERLAY TRANSITION SHALL BE USED TO PROVIDE A SMOOTH TRANSITION BETWEEN ASPHALT CONCRETE OVERLAY AND EXISTING PAVEMENT SURFACE, BRIDGE DECKS, AND BRIDGE OVERPASSES WITH AT LEAST 1\(^\circ\) OF GRADE CHANGE, AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
2. TOP COURSE SHALL BE NOTCHED, SUBLAYERS SHALL BE FEATHERED WHEN OVERLAYING CONCRETE PAVEMENTS. SUBLAYERS MAY BE NOTCHED WHEN OVERLAYING ASPHALT PAVEMENTS.
3. ASPHALT CONCRETE OVERLAY TRANSITION SHALL END/BEGIN A MINIMUM OF 75 FEET FROM THE VERTICAL PROJECTION OF THE NEAREST OUTER FACE OF THE BRIDGE STRUCTURE OF THE OVERPASS.
4. THE ASPHALT CONCRETE OVERLAY TRANSITION SHALL CONFORM TO THE REQUIREMENTS OF THE ASPHALT FINISHING SECTIONS OF THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.
5. NO OVERLAY SHALL BE PERMITTED ON THE BRIDGE DECK (OVERLAY OR MILL/REPLACE) WITHOUT THE PRIOR WRITTEN APPEARAL FROM THE DISTRICT BRIDGE ENGINEER.

TRANSITION RATE

<table>
<thead>
<tr>
<th>POSTED SPEED MPH</th>
<th>RATE (FT/INCH)</th>
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<tr>
<td>35</td>
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</tr>
<tr>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>70</td>
<td>50</td>
</tr>
</tbody>
</table>

PLANED SURFACE

EXISTING PAVEMENT OR BRIDGE DECK

TEMP. PAVEMENT WEDGE

EXISTING PAVEMENT

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.

WEDGE DETAIL

SINGLE COURSE OVERLAY TRANSITION GEOMETRY

TOTAL TRANSITION LENGTH

TWO COURSE OVERLAY TRANSITION GEOMETRY

TOTAL TRANSITION LENGTH

THREE COURSE OVERLAY TRANSITION GEOMETRY

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.
ASPHALT CONCRETE OVERLAY TRANSITION

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
210
315
515

ROAD AND BRIDGE STANDARDS
REVISION DATE 08/10
SHEET 1 OF 1
305.01
**DETAIL A**
**END ANCHORAGE**

- 1" DIA HOLES DRILLED THRU W-BEAM AND ATTACHED TO PLATE WITH 1/4" X 2" LG. HEX BOLT SO, WASH & NUT
- 1/2" PLATE SEE DETAIL D

**DETAIL B**
**END ANCHORAGE (POST)**

- 1/2" PLATE SEE DETAIL D
- DRILL 9/16" HOLES IN POST FLANGE SEE NOTE 1
- 1" DIA HOLES DRILLED THRU W-BEAM AND ATTACHED TO PLATE WITH 1/2" X 2" LG. HEX BOLT, SO, WASH & NUT
- 3-#3 BAR HOOPS 30" X 18"

**DETAIL C**
**END ANCHORAGE (CONCRETE)**

- 3-#3 BAR HOOPS 30" X 18"
- W-BEAM TERMINAL CONNECTOR

**DETAIL D**
**1/2" THICK STEEL PLATE**

- 1/2" THICK SQUARE WASHER
- 4-1/4" X 2" SLOT
- 4-1/8" DIA HOLES DRILL ONLY IF PLATE IS BOLTED TO POST. SEE NOTE 1

**NOTE:**
1. 1/2" STEEL PLATE MAY BE WELDED OR BOLTED TO POST. IF PLATE IS BOLTED TO POST USE 4-1/8" X 1/4" LG. HEX HEAD BOLTS W/ HEX NUTS. IF PLATE IS WELDED TO POST DO NOT DRILL 1/8" HOLES IN PLATE OR IN POST FLANGES.
2. CONCRETE END ANCHORAGE MAY BE USED IN PLACE OF STEEL POST AT 8'-0" OFFSET.

**DETAIL E**
**1/8" THICK SQUARE WASHER**

- 1" Ø HOLE

**DETAIL F**
**SOLID ROCK CUT INSTALLATION**

- GUARDRAIL W BEAM TERMINAL CONNECTOR
- 1/4" ANCHOR BOLTS (4 RED'D)
- WASHERS TO BE AS DETAILED ON STANDARD GUARDRAIL HARDWARE
- ROCK CUT

**SECTION D-D**

- STANDARD 6 X 8 X 14" LONG BLOCKOUT
- W6 X 8.5 STEEL POST OR 6 X 8 WOOD POST
- ATTACH LOWER W-BEAM TO POST WITH 1/4" HEX BOLT
- TOE OF DITCH SLOPE
- 3'-0"

**SECTION E-E**

- 2'-4"
- SEE DETAIL A
- SEE NOTE 1

**TERMINAL TREATMENT FOR W-BEAM GUARDRAIL**
NOTES:

1. GUARDRAIL TERMINAL, STD. GR-7 IS TO BE SRT 350 (SIMILAR TO AS SHOWN) MANUFACTURED BY TRINITY INDUSTRIES, THE FLEET 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 SHOWN BELOW REGARDLESS OF ADJACENT TRAFFIC DIRECTION.

3. IF YOU CANNOT GET THE NECESSARY CLEAR RUNOUT AREA FOR THE GR-7 TERMINAL, CONSIDER ALTERNATIVE TERMINAL OPTIONS.

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.

BREAKAWAY CABLE TERMINAL
(4' FLARE)

VIRGINIA DEPARTMENT OF TRANSPORTATION
TRANSLATION 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 (STD. MB-3 TERMINAL OPTION) AS MANUFACTURED BY SYRO STEEL COMPANY, BRAKEMASTER (STD. 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 MANUFACTURER’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 501 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 SHOWN ABOVE REGARDLESS OF ADJACENT TRAFFIC DIRECTION.

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.
ONE POST OMITTED
TOP VIEW
FOR DETAILS OF GUARDRAIL POSTS, AND BLOCKOUTS, SEE STANDARD GR-2, 2A.

TABLE OF MAXIMUM ALLOWABLE STRUCTURE WIDTHS FOR THIS DESIGN
* "A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.

<table>
<thead>
<tr>
<th>TYPE I - ONE POST OMITTED</th>
<th>TYPE II - TWO POST OMITTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKEW</td>
<td>MAX. PERPENDICULAR WIDTH (FEET)</td>
</tr>
<tr>
<td>0°</td>
<td>9&quot;</td>
</tr>
<tr>
<td>5°</td>
<td>10.5</td>
</tr>
<tr>
<td>10°</td>
<td>10.4</td>
</tr>
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<td>7.6</td>
</tr>
<tr>
<td>45°</td>
<td>7.0</td>
</tr>
</tbody>
</table>

NOTES:
1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVERT 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.

GUARDRAIL AT LOW-FILL CULVERTS

Virginia Department of Transportation
**GUARDRAIL AT LOW-FILL CULVERTS**

**TYPE III THREE POSTS OMITTED**

<table>
<thead>
<tr>
<th>SKEW</th>
<th>A*</th>
<th>MAX. PERPENDICULAR WIDTH (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>9&quot;</td>
<td>23.00</td>
</tr>
<tr>
<td>5°</td>
<td>9&quot;</td>
<td>22.90</td>
</tr>
<tr>
<td>10°</td>
<td>9&quot;</td>
<td>22.60</td>
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<td>15°</td>
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</tr>
<tr>
<td>45°</td>
<td>9&quot;</td>
<td>15.60</td>
</tr>
</tbody>
</table>

* "A" is 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 culvert 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.
MEASURING GUARDRAIL HEIGHT ON FRONT SLOPE RELATIVE TO SHOULDER HINGE POINT

GR-2A INSTALLATION WITH CG-3 OR CG-7 CURB

FOR GUARDRAIL DESIGN POLICIES USING CG-2 AND CG-6 OR URBAN DESIGNS WITH SIDEWALK OR SIDEWALK SPACE SEE APPENDIX A OF THE ROAD DESIGN MANUAL

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

<table>
<thead>
<tr>
<th>TOTAL SHOULDER WIDTH (S)</th>
<th>PAVED SHOULDER WIDTH (PS)</th>
<th>OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>17'</td>
<td>12'</td>
<td>14'</td>
</tr>
<tr>
<td>15'</td>
<td>3', 4', OR 10'</td>
<td>12'</td>
</tr>
<tr>
<td>13'</td>
<td>3'</td>
<td>10'</td>
</tr>
<tr>
<td>11'</td>
<td>3'</td>
<td>8'</td>
</tr>
<tr>
<td>8' (MED.)</td>
<td>3' or 4'</td>
<td>5'</td>
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TABLE II
NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES RIGHT OF TRAFFIC

<table>
<thead>
<tr>
<th>TOTAL SHOULDER WIDTH (S)</th>
<th>PAVED SHOULDER WIDTH (PS)</th>
<th>OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17'</td>
<td>12'</td>
<td>14'</td>
</tr>
<tr>
<td>15'</td>
<td>6' or 10'</td>
<td>12'</td>
</tr>
<tr>
<td>13'</td>
<td>8'</td>
<td>10'</td>
</tr>
<tr>
<td>11'</td>
<td>0, 3', 4', OR 6'</td>
<td>8'</td>
</tr>
<tr>
<td>9'</td>
<td>0, 3', 4'</td>
<td>6'</td>
</tr>
<tr>
<td>8'</td>
<td>3'</td>
<td>5'</td>
</tr>
<tr>
<td>7'</td>
<td>2'</td>
<td>4'</td>
</tr>
<tr>
<td>5'</td>
<td>0</td>
<td>2'</td>
</tr>
</tbody>
</table>
NOTES:
1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT THE AGE OF 28 DAYS SHALL BE 4000 PSI.
2. ALL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
3. STANDARD BARRIER SECTIONS SHALL BE 12'-0" AS SHOWN OR 18'-0". SHORTER SECTIONS SHALL BE CAST IN REQUIRED LENGTHS AS ONE UNIT. LONGER SECTIONS SHALL BE CAST TO REQUIRED DIMENSIONS IN TWO UNITS.
4. ALL EXPOSED METAL IS TO BE GALVANIZED FOR PERMANENT LOCATIONS.
5. ALL EXPOSED METAL MAY BE GALVANIZED FOR TEMPORARY LOCATIONS.
6. T-LOK AS MANUFACTURED BY ROCKINGHAM PRECAST
7. BEGINNING WITH JANUARY 2000, ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NOHRP 350 TEST REQUIREMENTS.
8. REFER TO MANUFACTURER FOR TEMPORARY INSTALLATION DETAILS.

WHEN USING T-LOK BARRIER, ALLOW FOR A 3'-10" DYNAMIC DEFLECTION. PROVIDE MINIMUM 60'-0" BARRIER UPSTREAM AND DOWNSTREAM OF WORK ZONE FOR ANCHORAGE.
NOTES:

1. MINIMUM COMpressive STRENGTH OF CONCRETE AT THE AGE OF 28 DAYS SHALL BE 4000 PSI.
2. ALL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
3. ALL EXPOSED METAL TO BE GALVANIZED FOR PERMANENT LOCATIONS.
4. ALL EXPOSED METAL MAY BE GALVANIZED FOR TEMPORARY LOCATIONS.
5. J-J HOOK AS MANUFACTURED BY SMITH-MIDLAND.

6. BEGINNING WITH JANUARY 2000, ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NCHRP 350 TEST REQUIREMENTS.
7. REFER TO MANUFACTURER FOR TEMPORARY INSTALLATION DETAILS.

WHEN USING J-J HOOK BARRIER, ALLOW FOR A 4'-4" DYNAMIC DEFLECTION. PROVIDE A MIN. 2'-7" OF BARRIER UPSTREAM AND DOWNSTREAM OF WORK ZONE FOR ANCHORAGE.

J-J HOOK DETAILS

PRECAST CONCRETE MEDIAN BARRIER

POSITIVE CONNECTION OPTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION
HR-1 TYPE II PEDESTRIAN RAILING
(FOR USE ALONG SIDEWALKS AND RAMPS)

SEE ROADWAY PLANS OR TYPICAL SECTIONS FOR DISTANCE TO SIDEWALK OR SHARED USE PATH.

CONCRETE FOOTING TO BE DESIGNED BASED ON SOIL CONDITIONS.

EARTH FOUNDATION DETAIL
(FOR USE WITH TYPE III BICYCLE RAILINGS)

HR-1 TYPE III BICYCLE RAILING
(FOR USE ALONG SHARED USE PATHS)

MAX. 6'-0"  MAX. 6'-0"
4 1/2" O.C.
2"  3" MAX.
1'-3"

HR-1 TYPE I HANDRAIL
(FOR USE ALONG STEPS)

1/2" DIA. SOLID STEEL SMOOTH ROUND ROD (TYP.) OR 1" STANDARD PIPE.

NOTES
1. SHOP DRAWINGS DETAILING ALL ASPECTS OF FABRICATION AND INSTALLATION OF RAILING, INCLUDING CONCRETE FOUNDATIONS, SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. SHOP DRAWINGS SHALL BE SIGNED AND SEALED IN ACCORDANCE WITH SECTION 105.10 OF THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.
2. ALL RAILING COMPONENTS AND FASTENERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE CURRENT ROAD AND BRIDGE SPECIFICATIONS. TO ACHIEVE A UNIFORM COATING ON ALL SURFACES, WELDING AND DRAINAGE HOLES FOR GALVANIZING SHALL BE INCLUDED IN THE SHOP DRAWINGS.
4. A CHEMICAL ANCHOR SYSTEM FROM VDOT'S APPROVED MATERIAL LIST MAY BE USED IN LIEU OF CAST IN PLACE ANCHORS AND SHALL BE INCLUDED IN THE SHOP DRAWINGS.
5. POSTS SHALL BE MITERED TO MATCH GRADE OF RAMPS, SIDEWALKS, AND STEPS.
6. HANDRAILS SHALL MATCH GRADE OF RAMPS, SIDEWALKS, AND STEPS.
7. ALL POSTS AND PICKETS SHALL BE SET PLUMB.
8. RAILINGS SHALL BE GROUNDED AND EFFECTIVELY BONDED.
9. COMMERCIAL Y AVAILABLE RAILING SYSTEMS MAY BE USED IN LIEU OF DESIGNING AND FABRICATING THE RAILING. DOCUMENTATION FROM THE MANUFACTURER VERIFYING THAT PROJECT REQUIREMENTS ARE MET WITH THE RAILING SYSTEM SHALL BE SUBMITTED WITH THE INSTALLATION DRAWINGS AND APPROVED BY THE ENGINEER IN ACCORDANCE WITH NOTE 1.
10. HANDRAIL TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE.
11. THIS HANDRAIL IS TO BE USED ONLY AS A PROTECTION FOR PEDESTRIANS AND SHOULD NOT BE PLACED IN ANY LOCATION WHERE IT MIGHT BE SUBJECT TO ANY VEHICULAR IMPACT. FOR VEHICULAR PROTECTION STANDARD GUARDRAIL SHOULD BE USED.
**NOTES:**

1. **IF THERE IS A NEED TO PROVIDE FOR INCREASED ACCESS, THE FOLLOWING MAY BE CONSIDERED IN CONJUNCTION WITH THE LOCAL POSTMASTER**
   A. PROVIDE A LEVEL CLEAR FLOOR SPACE 30" X 48" CENTERED ON THE BOX FOR EITHER SIDE OR FORWARD APPROACH.
   B. PROVIDE AN ACCESSIBLE PASSAGE TO AND FROM THE MAILBOX AND PROJECTION INTO A CIRCULATION ROUTE (NO MORE THAN 4" IF BETWEEN 28" AND 80" AFF) SO THAT THE MAILBOX DOES NOT BECOME A PROTRUDING OBJECT FOR PEDESTRIANS WITH IMPAIRED VISION.
2. **STRIVE FOR A 6 FEET MIN.; HOWEVER, IN SOME SITUATIONS THIS MAY NOT BE PRACTICAL. IN THOSE CASES, PROVIDE AS MUCH AS POSSIBLE.**
3. **IF A TURNDOWN IS PROVIDED, THIS MAY REDUCE TO ZERO.**
4. **BEHIND TRAFFIC-FACE OF CURB.**

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**TURNOUT DETAIL**

<table>
<thead>
<tr>
<th>HIGHWAY TYPE AND ADT, (vpd)</th>
<th>WIDTH (W) OF ALL-WEATHER SURFACE TURNDOWN OR AVAILABLE SHOULDER AT MAILBOX, (FT.) (SEE NOTE 1)</th>
<th>DISTANCE (X) FROM FACE OF MAILBOX IS TO BE OFFSET FROM EDGE OF TURNDOWN OR USEABLE SHOULDER, (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED 12 MINIMUM 8</td>
<td>PREFERRED 8 TO 12MINIMUM 0</td>
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<tr>
<td>OVER 10,000</td>
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<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED 12 MINIMUM 8</td>
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<tr>
<td>OVER 1,500 TO 10,000</td>
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<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED 10 MINIMUM 8</td>
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<tr>
<td>400 TO 1,500</td>
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<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED 8 MINIMUM 6 (SEE NOTE 2)</td>
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<td>UNDER 400</td>
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<tr>
<td>RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER</td>
<td>PREFERRED 6 MINIMUM 0.00 (SEE NOTE 3)</td>
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</tr>
<tr>
<td>CURBED RESIDENTIAL STREET</td>
<td>PREFERRED 8 TO 12 MINIMUM 6 (SEE NOTE 4)</td>
<td></td>
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</tbody>
</table>

ADT=AVerage Daily Traffic

VPD=Vehicles Per Day