

IMPERIAL ROAD DESIGN MANUAL
REVISIONS July, 2012

CHAPTER 1B

- Page 1B-12 – Added the following language in “DEFINITIONS”; “*PEDESTRIAN – A Person of foot or by wheelchair.*”

CHAPTER 2A

- Page 2A-11 – Deleted the following language under “PROJECT SCOPING”;

DESIGN WAIVERS

This Design Waiver Policy is applicable to VDOT owned and maintained roadways only.

Design Waivers are required when deviations from VDOT’s design criteria occur. When design criteria meets or exceeds AASHTO minimal design requirements but falls short of VDOT’s minimal design standards, a Design Waiver shall be required. Design Waivers will be applicable to all projects regardless of functional classification and funding and shall be documented and approved in accordance with the Design Waiver Request Form LD-448. Please refer to IIM-LD-227 for specific guidelines on obtaining a design waiver.

DESIGN EXCEPTIONS

If there are geometric values that are below AASHTO minimum guidelines, the Project Manager/ Design Engineer shall seek to obtain approval of these design exceptions from the State Location and Design Engineer (all projects) and FHWA (if applicable) no later than Public Hearing Stage. Please refer to IIM-LD-227 for specific guideline on obtaining design exceptions.

CHAPTER 2C

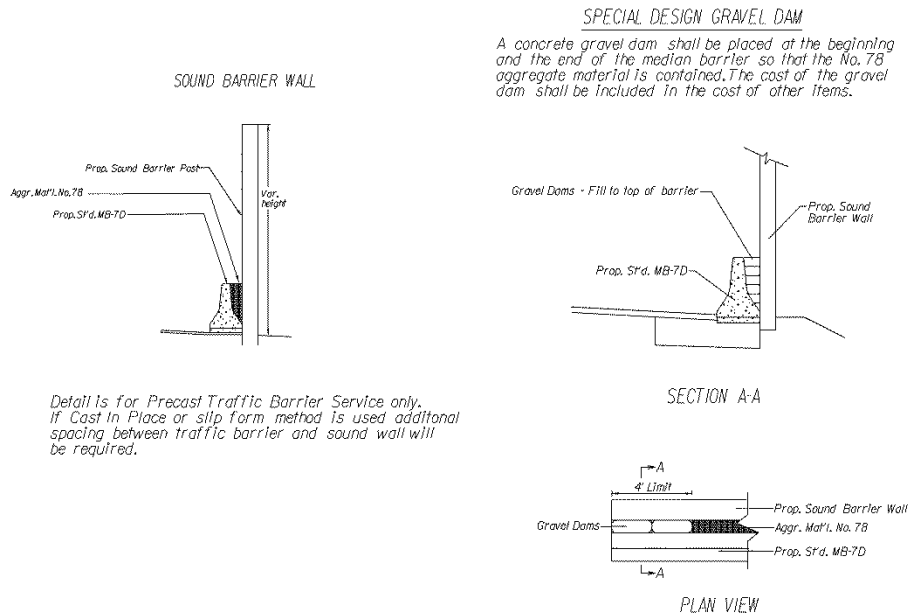
- Page 2C-5 – Revised the following language in the first sentence under “DRAFTING” from; “*All drafting will be accomplished in accordance with the CADD Users Guide.*”
To; All drafting will be accomplished in accordance with the CADD Manual.

CHAPTER 2D

- Page 2D-8 – Revised the following language; replace “THE ENGINEER” with “THE PROJECT MANAGER”.
- Page 2D-13 – Added the following language to the eighth paragraph under “REFINING VERTICAL ALIGNMENT”; “*Proposed grades for roadside ditches and/or special design ditches are to be shown on corresponding profile sheet. See Chapter 7 of VDOT Drainage Manual.*”
- Page 2D-21 – Revised the following language in the second sentence in the third paragraph under “PLOTTING ENTRANCES AND CROSSOVERS” from; “*Grades for entrances are to be depicted as shown in Figure 2D-4.*” To; Grades for entrances are to be depicted as shown in Figure 2D-3.

CHAPTER 2E

- Page 2E-27 – Added the following language and detail; “*If Sound Wall is adjacent to the roadway shoulder then a Concrete Traffic Barrier Service Standard MB-7D is to be used, see detail below.*”



- Page 2E-36 – Revised the following language in the third paragraph under “DETERMINING PROPOSED RIGHT OF WAY ENCOMPASSING SLOPE LIMITS from; “*Minimum right of way widths are to be set in accordance with the "CS" standards in VDOT's Road and Bridge Standards.*” To; Minimum right of way widths *shall* be set in accordance with the "CS" standards in VDOT's Road and Bridge Standards.

- Page 2E-44 – Added the following language;

LIMITED ACCESS ESTABLISHMENT AND CHANGE GUIDELINES

Background

24VAC30-72-10 provide the following definition: "Limited access highway" means a highway especially designed for through traffic over which abutting properties have no easement or right of light, air, or access by reason of the fact that their property abuts upon the limited access highway.

Section 33.1-58 provides the Commonwealth Transportation Board (CTB) with the power and authority to designate and regulate the use of limited access (L/A) highways.

By resolution, the CTB designates a section or all of a proposed or existing highway or street as a limited access facility within the limits described in the resolution, less any access breaks that may be excepted in the resolution.

The actual width of the limited access portion of the right of way is established by the Chief Engineer as a part of the design approval process. The Right of Way Division is responsible for the actual acquisition of the right of way and limited access rights and the disposal of same when authorized by the CTB.

Virginia Administrative Code (VAC) Section 24VAC30-401-10 requires CTB action on any limited access control changes that “occur” after a project is completed, finalized and serving in its intended capacity.”

Establishing New Limited Access Control

Proposed limited access lines and limits shall be shown on the proposed project plans for public hearing and throughout the plan development process. Evaluation of the effect of the L/A control and proposed refinements should be considered through field inspection stage and after the public hearing should L/A concerns be raised as a comment.

The proposed right of way plans incorporating the public hearing changes should show the limited access lines and limits and be used to request CTB approval. The date of the CTB approval as well as any previous CTB L/A approval shall be shown on the appropriate plan sheets prior to approval for Right of Way.

- Page 2E-45 – added the following language;

Guide to Changes to Existing Limited Access Control

1. *New project requiring a modification to the existing Limited Access Control:*

- a. Any changes in the Limited Access termini OR the modification of the existing Limited Access lines to widen or narrow the existing width of Limited Access control requires VDOT's evaluation and CTB approval.*
- b. Once the modified Limited Access lines have been approved (by the CTB) for the proposed project and the proposed project is still under construction / design, changes to the Limited Access termini, including breaks in the limited access, still need to be approved by the CTB. However, changes in the width (to widen or narrow) any and all lines of the Limited Access within the established termini can be approved by the Chief Engineer. Once the project has opened and begins serving its intended purpose, then any changes in the termini OR width of the Limited Access control shall to be approved by the CTB.*
- c. If a structure is to be constructed over a limited access highway the proposed break in limit access shall be approved by the CTB.*

2. **Changes on Completed VDOT Projects**

Section 24VAC30-401-10 is effective after a project is completed, finalized and serving in its intended capacity. Any proposed limited access changes as defined by the VAC requires CTB approval and shall be processed in accordance with the remaining Sections of 24VAC30-401.

Should you have questions or concerns regarding these guidelines or any other types of work such as the installation of utilities on limited access highways, please visit the Right of Way and Utilities Division website at <http://www.virginiadot.org/business/row-default.asp>

The VDOT Utility Manual of Instructions – Utility Relocation Policies & Procedures can be accessed at

http://www.virginiadot.org/business/resources/Right_of_way/Utility_Manual02132012_TechRev.pdf

- Page 2E-46 – Added the following language;

LIMITED ACCESS FENCING

Fencing along a controlled access highway is required as a means of preventing unwanted and likely intrusion of animals, people, vehicles, machines, etc., from outside the right of way line or access control line into the vicinity of moving traffic or onto the operating right of way. This applies to both full and partial controlled facilities.

- Page 2E-68 – Added the following paragraph at the beginning of the page; “*The sheet following the last profile sheet is assigned to Drainage Descriptions and Storm Sewer Profile Sheets (If needed. All sheets are assigned one number with the total number of sheets afterwards in parentheses, such as: Sheet No. 7 (1 thru 10).*”

Revised the following language in the first sentence of the second paragraph from; “*The sheet no. following the last profile sheet...*” To; “*The sheet no. following the last “Storm Sewer” profile sheet...*”

APPENDIX “A”

- Page A-1 – Added the following language to the first sentence in the first paragraph under “INTRODUCTION”; VDOT has formally adopted the 2011 AASHTO A Policy on Geometric Design of Highways and Streets,

Deleted the following language under GEOMETRIC DESIGN STANDARDS, INTRODUCTION; “*The 2004 AASHTO Green Book shall only be used for Urban Low Speed (ULS) superelevation design criteria and the 2001 AASHTO Green Book shall be used for all Urban (U) and Rural (R) superelevation design criteria.*”

- Page A-4 – Revised the following language in the second sentence in the first paragraph under “FUNCTIONAL CLASSIFICATION” from; referred to as The AASHTO Book, To; referred to as the AASHTO “Green Book”.

- Page A-6 – Revised the following language under **LANE/PAVEMENT TRANSITIONS** from; “*Pavement transitions typically occur where new or reconstructed roadways tie-in to existing roadways. This transition of pavement width shall meet the minimum length provided by the following equations:*”

To; “**LANE/TRANSITIONS, MERGING TAPERS AND SPEED CHANGE LENGTHS**” “*Lane/transitions typically occur where new or reconstructed roadways tie-in to existing roadways. “Lane transitions, merging tapers and speed change lengths” shall meet the minimum length provided by the following equations:*”

- Page A-7 – Revised “Minimum Radius” under GS-1 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the fourth paragraph under “General Notes” from; “*Standard TC-5.01R (2001 AASTHO Green Book) superelevation...*” To; “*Standard TC-5.11 R superelevation...*”

Replaced the following language in the seventh paragraph under “General Notes” from; “*see AASHTO Green Book, Chapter 7, Figure 7-2 and 7-3...*” To; “*see AASHTO Green Book, Chapter 7, “Tables” 7-2 and 7-3...*”

Revised language under “FOOTNOTE” No. 1 as follows; “*Graded Shoulders (including the paved portion);*” Shoulder widths shown are for right shoulders and independently graded median shoulders. No additional width “*is*” necessary for guardrail situations.

“*For 4-lane*” non-Interstate “*(2 lanes in each direction) with independently graded median shoulders,*” an 8' graded median shoulder will be provided. For 6 or more lanes, the “*graded*” median shoulder “*shall*” be the same as “*right graded shoulder. For*” Freeways with truck < 250 DDHV, the “*graded shoulder*” width shall be “*a minimum of*” 15' for fills and 12' for cuts.

Added the following language at the beginning of “FOOTNOTE” No. 2; “*Paved Shoulders*”

Revised the following language under “FOOTNOTE” No. 6 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO Green Book.

- Page A-8 – Revised “Minimum Radius” under GS-2 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the third paragraph under “General Notes” from; *Standard TC-5.01R (2001 AASTHO Green Book) superelevation...* To; Standard TC-5.11 R superelevation...

Replaced the following language in the seventh paragraph under “General Notes” from; “*see AASHTO Green Book, Chapter 7, Figure 7-2*” To; see AASHTO Green Book, Chapter 7, “*Tables*” 7-2.

Added the following language at the beginning of “FOOTNOTE” No. 3; “*When the mainline is 4 lanes (2 lanes in each direction) and a...*”

Revised the following language under “FOOTNOTE” No. 8 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO Green Book.

- Page A-9 – Revised “Minimum Radius” under GS-3 table to agree with the 2011 AASTHO Green Book.

Revised language in the second paragraph under “GENERAL NOTES” from; “*Low design speeds (40 MPH and below)...*” To; “*Low design speeds (45 MPH and below)...*”

Revised language in the third paragraph under “GENERAL NOTES” from; “*High speed design (45 MPH and above)...*” To; “*High speed design (50 MPH and above)...*”

Replaced the following language in the seventh paragraph under “General Notes” from;
Standard TC-5.01R (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11 R superelevation...

Replaced the following language in the last paragraph under “General Notes” from;
“*see AASTHO Green Book, Chapter 6, Exhibit 6-2*” To;
see AASTHO Green Book, Chapter 6, “*Tables 6-2*”.

Revised the following language under “FOOTNOTE” No. 8 from; “*see Exhibit 3-2 of the
2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO
Green Book.

Replaced the following language under “FOOTNOTE” No. 9 from; “*see AASTHO Green
Book, Exhibit 6-5*” To; see AASTHO Green Book, “*Tables*” 6-5.

- Page A-10 – Revised “Minimum Radius” under GS-4 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the fourth paragraph under “General Notes” from;
“*see AASTHO Green Book, Chapter 5, Exhibit 5-1*” To;
see AASTHO Green Book, Chapter 5, “*Tables 5-1*”.

Replaced the following language in the fifth paragraph under “General Notes” from;
Standard TC-5.01R (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11 R superelevation...

Replaced the following language in the last paragraph under “General Notes” from;
“*see AASTHO Green Book, Chapter 5, Exhibit 5-4*” To;
see AASTHO Green Book, Chapter 5, “*Tables 5-2*”.

Revised the following language under “FOOTNOTE” No. 9 from; “*see Exhibit 3-2 of the
2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO
Green Book.

- Page A-11 – Revised “Minimum Radius” under GS-5 table to agree with the 2011 AASTHO Green Book.

Added “FILL” column under “MINIMUM WIDTH OF TOTAL SHOULDERS” to help clarify language under footnote #1.

Replaced the following language in the fourth paragraph under “General Notes” from;
Standard TC-5.01R (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11 R (*Rural*) superelevation...

Replaced the following language in the fifth paragraph under “General Notes” from;
Standard TC-5.01U (Urban) (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11 U (Urban) superelevation...

Replaced the following language in the sixth paragraph under “General Notes” from;
Standard TC-5.04ULS (Urban Low Speed) (2004 AASTHO Green Book) superelevation...
To; Standard TC-5.11ULS (Urban Low Speed) superelevation...

Replaced the following language in the last paragraph under “General Notes” from; “*see AASHTO Green Book, Chapter 7, Exhibit 7-10, for Freeways, see Chapter 8, Exhibit 8-1.*”
To; see AASHTO Green Book, Chapter 7, “*Tables 7-4*” for Freeways, see Chapter 8, “*Table*” 8-1.

Revised the following language under “FOOTNOTE” No. 13 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO Green Book.

- Page A-12 – Revised “Minimum Radius” under GS-6 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the second paragraph under “General Notes” from;
Standard TC-5.01R (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11 R (*Rural*) superelevation...

Replaced the following language in the third paragraph under “General Notes” from;
Standard TC-5.01U (Urban) (2001 AASTHO Green Book) superelevation... To;
Standard TC-5.11U (Urban) superelevation...

Replaced the following language in the fourth paragraph under “General Notes” from;
Standard TC-5.04ULS (Urban Low Speed) (2004 AASTHO Green Book) superelevation...
To; Standard TC-5.11 ULS (Urban Low Speed) superelevation...

Replaced the following language in the last paragraph under “General Notes” from;
“*see AASHTO Green Book, Chapter 7, Exhibit 7-10*” To;
see AASHTO Green Book, Chapter 7, “*Tables 7-4*”.

Revised the following language under “FOOTNOTE” No. 12 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO Green Book.

Revised the following language under “FOOTNOTE” No. 13 from; “*see Exhibit 7-3 of the 2004 AASTHO Green Book.*” To; see “*Table*” 7-3 of the AASTHO Green Book.

- Page A-13 – Revised “Minimum Radius” under GS-7 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the third paragraph under “General Notes” from; *Standard TC-5.01U (Urban) (2001 AASTHO Green Book) superelevation...* To; *Standard TC-5.11U (Urban) superelevation...*

Replaced the following language in the fourth paragraph under “General Notes” from; *Standard TC-5.04ULS (Urban Low Speed) (2004 AASTHO Green Book) superelevation...* To; *Standard TC-5.11 ULS (Urban Low Speed) superelevation...*

Replaced the following language in the last paragraph under “General Notes” from; “*see AASHTO Green Book, Chapter 6, Exhibit 6-8*” To; *see AASHTO Green Book, Chapter 6, “Tables” 6-8.*

Revised the following language under “FOOTNOTE” No. 1 from; “*(see AASTHO Green Book, Exhibit 6-5)...*” To; (see AASTHO Green Book, “Table” 6-5)...

Revised the following language under “FOOTNOTE” No. 10 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “Table” 3-2 of the AASTHO Green Book.

Revised the following language under “FOOTNOTE” No. 11 from; “*see Exhibit 6-5 of the 2004 AASTHO Green Book.*” To; see “Table” 6-5 of the AASTHO Green Book.

- Page A-14 – Revised “Minimum Radius” under GS-8 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the fourth paragraph under “General Notes” from; *Standard TC-5.01U (Urban) (2001 AASTHO Green Book) superelevation...* To; *Standard TC-5.11U (Urban) superelevation...*

Replaced the following language in the fifth paragraph under “General Notes” from; *Standard TC-5.04ULS (Urban Low Speed) (2004 AASTHO Green Book) superelevation...* To; *Standard TC-5.11 ULS (Urban Low Speed) superelevation...*

Revised the following language under “FOOTNOTE” No. 1 from; “*see AASHTO Green Book, Chapter 5, Exhibit 5-4*” To; *see AASHTO Green Book, Chapter 5, “Tables 5-4”.*

Revised the following language under “FOOTNOTE” No. 10 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “Table” 3-2 of the AASTHO Green Book.

Revised the following language under “FOOTNOTE” No. 11 from; “*see Exhibit 5-5 of the AASTHO Green Book.*” To; see “*Table*” 5-5 of the AASTHO Green Book.

- Page A-15 – Revised “Minimum Radius” under GS-9 table to agree with the 2011 AASTHO Green Book.

Replaced the following language in the second paragraph under “General Notes” from; *Standard TC-5.01R superelevation based on 8% maximum to be used (See 2001 AASHTO “Green Book”).* To; “Standard TC-5.11R superelevation is based on 8% maximum.”

Revised the following language under “FOOTNOTE” No. 2 from; “*see page 411, 2004 AASHTO “Green Book.”*” To; see page “5-29”, AASHTO Green Book

- Page A-16 – Revised “Minimum Radius” under GS-R table to agree with the 2011 AASTHO Green Book.

Revised the Graded Shoulder Width Right of Traffic from 11’ to 10’ and added “FOOTNOTE” No. 7 “*Shoulder width to be increased additional 3’ when guardrail is required.*”

Revised the following language at the end of the first paragraph under “GENERAL NOTES” from; “*Exhibit 10-56 of the 2004 AASHTO “Green Book.”*” To; “*Table 10-1*” of the AASHTO Green Book.

Revised the following language at the end of the second paragraph under “GENERAL NOTES” from; “*Standard TC-5.01R is to be used. Maximum ramp superelevation to be 8% (See 2001 AASHTO “Green Book”).*” To; Standard TC-5.11R is to be used. Maximum ramp superelevation is to be 8%.

Revised the following language at the end of the fourth paragraph under “GENERAL NOTES” from; “*See page 829 of the 2004 AASHTO Green Book.*” To; See page “10-92” of the AASHTO Green Book.

Revised the following language under “FOOTNOTE” No. 1 from; “*see Exhibit 10-67 in the 2004 AASHTO “Green Book.”*” To; see “*Table 3-28b*” in the AASHTO Green Book.

Revised the following language under “FOOTNOTE” No. 2 from; “*See 2004 AASHTO “Green Book”, page 838.*” To; See AASHTO “Green Book”, page “10-102”.

Revised the following language under “FOOTNOTE” No. 6 from; “*see Exhibit 3-2 of the 2004 AASTHO Green Book.*” To; see “*Table*” 3-2 of the AASTHO Green Book.

- Page A-21 – Revised the following language in the second paragraph under “INTRODUCTION” from; “(See 2004 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 5).” To; “(See 2011 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 5).”

Revised the following language in the second paragraph under “ROADWAYS WITH SHOULDERS” from; “(See 2004 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 4 and 5).” To; “(See 2011 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 4 and 5).”

- Page A-22 – Revised the following language in the first paragraph from; “(See 2004 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 7).” To; “(See 2011 AASHTO A Policy on Geometric Design of Highways and Streets, Chapter 7).”
- Page A-39 – Revised “TABLE A-3-3 DESIGN PARAMETERS FOR ROADSIDE BARRIERS LAYOUT” to agree with The 2011 AASTHO’s Roadside Design Guide, 4th edition.
- Page A-53 – Relocated the following language from the second paragraph under “PROJECT DEVELOPMENT” to the first paragraph under “ROADWAY AND TRAVELWAY”; “*The minimum roadway and travelway widths are shown under GEOMETRIC DESIGN CRITERIA, TABLE A-4-1. Lane and shoulder width requirements are provided for roadways with 10% or more trucks and for roadways with less than 10% trucks.*”
- Page A-55 – Revised the following language from the second sentence in the first paragraph under “TERRAIN” from; “*High design speeds (50 MPH and greater) can generally be achieved on flat terrain, and lower design speeds (40MPH and lower)...*” To; High design speeds (50 MPH and greater) can generally be achieved on flat terrain, and lower design speeds (45 MPH and lower)
- Page A-56 – Deleted the following language that was the third paragraph; “*If the calculated design speed for a particular horizontal or vertical curve is within 15 MPH of the design speed of the adjacent sections and the location is not an identified high accident location, (facilities with ADT< 750 vehicles per day), proper signs and markings informing drivers of the condition may be used in lieu of reconstruction to meet standards for the assumed design speed. When the difference is over 15 MPH or the design speed of the horizontal or vertical curve is less than 20 MPH, (facilities with ADT> 750 vehicles per day), corrective action must be considered and should be undertaken unless cost or other factors make the improvement impractical. If improvement is not possible, appropriate signs, markings and other provisions should be used to provide for proper speed transition.*”

Deleted the following language that was the fifth paragraph; “*Grades generally do not need to be flattened on RRR projects. Steep grades and restricted horizontal or vertical curvature in combination, however, may warrant corrective action.*”

Revised the following language in the first sentence in the sixth paragraph from; “A completed roadside hazard review is required.” To; “A completed Roadside Safety Assessment is required to be performed by the Regional Traffic Engineer.”

- Page A-88 – Revised language in the second sentence under “Paved Shoulders” as follows; “Paved shoulders should be at least 4 feet wide to accommodate bicycle travel. However, where 4 foot “*minimum*” widths cannot be provided...

Revised language in the third sentence under “Paved Shoulders” from; A shoulder width of 5 feet is recommended from the face of guardrail... To; A shoulder width of 5 feet is “*required*” from the face of guardrail...

Revised language in the second paragraph under “Paved Shoulders” from; On rural and urban collector and local roads and streets, provide minimum 4 foot wide paved shoulders when: To; On rural and urban collector and local roads and streets, provide minimum “5” foot wide paved shoulders when:

Revised language in the second paragraph item b) under “Paved Shoulders” from; The route is an AASHTO Approved Interstate Bicycle Route... To; The route is an AASHTO Approved “U.S.” Bicycle Route...

- Page A-106 – Relocated the following language from page A-110;

AASHTO APPROVED INTERSTATE BICYCLE ROUTES

VDOT provides signing along the designated AASHTO approved Interstate Bicycle Routes. Figure A-5-10 shows the corridors for Interstate Bicycle Routes 1 and 76 and the counties the routes pass through. The individual county maps provide detailed location information. County maps are to be checked by the plan designer to determine if their project is on a designated Interstate Bicycle Route. All proposed projects involving major construction or redevelopment along designated Interstate Bicycle Routes are to provide the necessary design features to facilitate bicycle travel in accordance with the parameters established in these guidelines.

RESOURCES

It should be understood that this Guide is not all inclusive. The publications listed below will provide additional information to be used in the design of bicycle facilities.

“Guide for the Development of Bicycle Facilities.” AASHTO

“Manual on Uniform Traffic Control Devices.” Federal Highway Administration

“Selecting Roadway Design Treatments to Accommodate Bicycles.” Federal Highway Administration

“A Virginia Guide for Bicycle Facility Planning.” Virginia Department of Transportation

- Pages A-110 – Relocated the language above to page A-106.
- Page A-118 – Revised the following language in the first paragraph under “Widths” from; *Buffer strip shall be 48” (1220 mm) wide to provide the lateral offset for the placement of conventional signs in accordance with the MUTCD, Part 2 (See detail below). Buffer strip less than 48” (1220 mm) wide may be utilized; however...* To;

Buffer strips shall be 48” (1220 mm) wide to provide the lateral offset for the placement of conventional signs “((36”x36” (914 mm) wide)) for Posted Speeds 25 mph and greater)” in accordance with the MUTCD, Part 2 (See details below). Buffer strips less than 48” (1220 mm) wide may be utilized. “*Buffer strips 36” (914 mm) wide may be utilized to provide the lateral offset for the placement of smaller signs ((24”x24” (609 mm) wide)) for Posted Speeds 25 mph and less.*” However, a Design Waiver will be required “*for buffer strips less than 48” (1220 mm) for Posted Speeds 25 mph and greater and for buffer strips less than 36” (914 mm) for Posted Speeds 25 mph and less...*”

- Page A-126 – Revised the following language to the second bullet under “Detectable warnings surface shall be provided only at the following locations:” from:
*“Where a rail system crosses pedestrian facilities that are not shared with vehicular ways. (See 1108.2 of the Access Board Draft Guidelines for Accessible Public Rights-of-Way for information)
Guidelines concerning detectible warning locations at rail systems are contained in Section 1108.2.2 of the Access Board Draft Guidelines for Accessible Public Rights-of-Way (See References).”* To:
“At pedestrian at-grade rail crossings, boarding platforms and boarding and alighting areas see R305.2.5 thru R305.2.7 of current reference dated July 26, 2011.”

Added the following language to the forth bullet under “Detectable warnings surface shall be provided only at the following locations:” from:
“Pedestrian access routes that cross medians and refuge islands. See Roads and Bridge Standards.” To;
Pedestrian access routes that cross medians and refuge islands. A cut through less than 6 feet in width shall not have Detectable Warning Surfaces installed. See Roads and Bridge Standards.

- Page A-139 – Added the following paragraph to the beginning of “MINIMUM PLAN PROJECTS”; *A “Minimum Plan” project requires survey and topo to provide sufficient right of way plans necessary for the acquisition of right of way by the Right of Way Division and plan, profile and cross section sheets are to be provided. In the establishment of such projects, attention should be given to determine that the project location and selection is in an area where disruption due to construction can be tolerated by the users of that particular roadway for a reasonable period of time.*

APPENDIX “B(1)”

- Page B(1)-5 – Revised the following language in second sentence in item No. 1 under “LOCAL ROADWAYS” from; “*Dimensions for this vehicle are depicted in Exhibit 2-4 of the AASHTO Geometric Design of Highways and Streets 2004, shown as Figure 1.*” To; Dimensions for this vehicle are depicted in “*Figure 2-2*” of the AASHTO Geometric Design of Highways and Streets “2011”, shown as Figure 1.

Revised the following language to FIGURE 1 from; “*FIGURE 1 – “EXHIBIT 2-2” SCANNED FROM “A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS,” AASHTO, 2004.*” To; FIGURE 2 – “*FIGURE 2-2” SCANNED FROM “A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS,” AASHTO, 2011.*”

- Page B(1)-7 – Revised the following language in “FOOTNOTE No. 2 from; “*2004 AASHTO Green Book Chapter 5 (Page 399).*” To; “*2011*” AASHTO Green Book Chapter 5 “(Page 5-20)”.

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Revised the following language in “FOOTNOTE No. 3 from; “*2004 AASHTO Green Book Chapter 3 (Page 112, Exhibit 3-1)*” To; “*2011*” AASHTO Green Book Chapter 3 (Page 3-4, Table 3-1).

Revised the following language in “FOOTNOTE No. 4 from; “*2004 AASHTO Green Book Chapter 9 (Page 661, Exhibit 9-55).*” To; “*2011*” AASHTO Green Book Chapter 9 (Page 9-38, Table 9-6).

Revised the following language in “FOOTNOTE No. 5 from; “*2004 AASHTO Green Book Chapter 3 (Page 151, Exhibit 3-16)*” To; “*2011*” AASHTO Green Book Chapter 3 (Page 3-55, Table 3-13b).

Revised the following language in “FOOTNOTE No. 6 from; “*2004 AASHTO Green Book Chapter 5 (Page 399).*” To; “*2011*” AASHTO Green Book Chapter 5 “(Page 5-20)”.

Revised the following language in “FOOTNOTE No. 7 from; “*2004 AASHTO Green Book Chapter 5 (Page 391).*” To; “*2011*” AASHTO Green Book Chapter 5 “(Page 5-12)”.

Revised the following language in “FOOTNOTE No. 8 from; “*2004 AASHTO Green Book Chapter 6 (Page 432).*” To; “*2011*” AASHTO Green Book Chapter 6 “(Page 6-12)”.

- Page B(1)-8 – Revised the following language in “FOOTNOTE No. 2 from; “*2004 AASHTO Green Book Chapter 3 (Page 112, Exhibit 3-1)*” To; “*2011*” AASHTO Green Book Chapter 3 (Page 3-4, Table 3-1).

Revised the following language in “FOOTNOTE No. 3 from; “2004 AASHTO Green Book Chapter 9 (Page 661, Exhibit 9-55).” To; “2011” AASHTO Green Book Chapter 9 (Page 9-38, Table 9-6).

Revised the following language in “FOOTNOTE No. 4 from; “2004 AASHTO Green Book Chapter 3 (Page 151, Exhibit 3-16)” To; “2011” AASHTO Green Book Chapter 3 (Page 3-55, Table 3-13b).

Revised the following language in “FOOTNOTE No. 6 from; “2004 AASHTO Green Book Chapter 5 (Page 391).” To; “2011” AASHTO Green Book Chapter 5 “(Page 5-12)”.

Revised the following language in “FOOTNOTE No. 7 from; “2004 AASHTO Green Book Chapter 6 (Page 432).” To; “2011” AASHTO Green Book Chapter 6 “(Page 6-12)”.

Revised the following language in “FOOTNOTE No. 8 from; “2004 AASHTO Green Book Chapter 5 (Page 384, Exhibit 5-5)” To; “2011” AASHTO Green Book Chapter 5 (Page 5-6, Table 5-5).

- Page B(1)-9 – Revised the following language in “FOOTNOTE No. 1 from; “2004 AASHTO Green Book Chapter 5 (Page 384, Exhibit 5-5)” To; “2011” AASHTO Green Book Chapter 5 (Page 5-6, Table 5-5).

Revised the following language in “FOOTNOTE No. 2 from; “2004 AASHTO Green Book Chapter 5 (Page 391).” To; “2011” AASHTO Green Book Chapter 5 “(Page 5-3)”.

Revised the following language in “FOOTNOTE No. 4 from; “2004 AASHTO Green Book Chapter 3 (Page 151, Exhibit 3-16)” To; “2011” AASHTO Green Book Chapter 3 (Page 3-55, Table 3-13b).

- Page B(1)-19 – Revised the following language in the last sentence in the third paragraph under “Sight Distance Triangles” from; “For reference purposes, AASHTO defines this point as 14.4 to 17.8 feet from the...”
To; For reference purposes, AASHTO defines this point as “14.5 to 18.0” feet from the...

Added the following language to the end of the third paragraph under “Sight Distance Triangles”; “*Note: Decision point A shall be the distance from the edge of the travel lane of the major roadway to the drivers eye, which is determined by the location of the stop bar and/or stop sign.*”

- Page B(1)-20 – Revised “FIGURE 2 – SIGHT DISTANCE TRIANGLES” to add “Decision Points A, B and C” and also added language at the end of the following note; Distance to middle of nearest through travel lane varies by roadway width. “(4 feet min. from the centerline or left edge of pavement).”
- Page B(1)-22 – Revised the following language at the end of the first sentence in the second paragraph under item “3. Minimum Radii” from; “(See 2004 AASHTO Green Book, Exhibit 5-10).” To; (See “2011” AASHTO Green Book, “Figure 5-3”).
- Page B(1)-51 – Revised language in the last bullet under “The submittal should contain and depict the following criteria” from; “Are their accommodations made to bicyclists?” To; Are there accommodations made for bicyclists?

APPENDIX “C”

- Page C-3 – Revised language in the first sentence in the first paragraph to add the following; “which shall be accomplished by the installation of wheel stops as shown in Figure C-1-3.”
- Page C-4 – Revised language in “FIGURE C-1-3 ACCESSIBLE PARKING AND LOADING ZONES” to add “Wheel Stop” label to detail.
- Page C-69 – Revised language to incorporate new section; SECTION C-7- HORIZONTAL AND VERTICAL CURVE FORMULAS.
- Page C-70 – Revised language from; “FIGURE C-6-4 TRANSITION (SPIRAL) CURVES” To; FIGURE C-7-1 TRANSITION (SPIRAL) CURVES.
- Page C-71 – Revised language from; “FIGURE C-6-5 COORDINATE POINTS ON THE SPIRAL” To; FIGURE C-7-2 COORDINATE POINTS ON THE SPIRAL.
- Page C-72 – Revised language from; “FIGURE C-6-6 HORIZONTAL CURVES EXAMPLE” To; FIGURE C-7-3 HORIZONTAL CURVES EXAMPLE.
- Page C-73 – Revised language from; “FIGURE C-6-7 SIMPLE CURVE COMPUTATIONS” To; FIGURE C-7-4 SIMPLE CURVE COMPUTATIONS.
- Page C-74 – Revised language from; “FIGURE C-6-8 COMPOUND CURVE COMPUTATIONS” To; FIGURE C-7-5 COMPOUND CURVE COMPUTATIONS.
- Page C-75 – Revised language from; “FIGURE C-6-9 PARABOLIC VERTICAL CURVE COMPUTATIONS” To; FIGURE C-7-6 PARABOLIC VERTICAL CURVE COMPUTATIONS.

- Page C-76 – Revised language from; “*TABLE C-6-1 INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT*” To; TABLE C-7-1 INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT.
- Page C-77 – Revised language from; “*FIGURE C-6-10 REFERENCE FORMULAS - 90 DEGREES TRIANGLE*” To; FIGURE C-7-7 REFERENCE FORMULAS - 90 DEGREES TRIANGLE.
- Page C-78 – Revised language from; “*FIGURE C-6-11 REFERENCE FORMULAS OBLIQUE TRIANGLE*” To; FIGURE C-7-8 REFERENCE FORMULAS OBLIQUE TRIANGLE

APPENDIX “F”

- PREFACE – Revised the following language to the first sentence in the fourth paragraph to from; “*Legislation was enacted during the 2008 General Assembly session (Chapter 274) to require that the regulations...*” To; Legislation was enacted during the 2008 General Assembly session to require that the regulations...
- Page F-1 – Revised the following language in the definition of “Crossover” from; “*An opening in a nontraversable median that provides for crossing movements and left and right turning movements.*” To; An opening in a nontraversable median that provides for crossing, left *turns* and *U-turns*.
- Page F-4 – Revised the following language in the definition from; “**Median Opening, Directional**; *An opening in a restrictive median that physically restricts movements to specific turns such as left turns and U turns.*” To; **Median Opening (Directional)**; *An opening in a restrictive median that “provides for specific movements and physically restricts other movements.”*

Revised the following language in the definition of “Private Subdivision Road or Street Entrance” from; “*A commercial entrance for a road or street that serves more than two individual properties and is privately owned and maintained.*” To; “A commercial entrance for a road or street that serves more than five individual properties and is privately owned and maintained.”

- Page F-10 – Revised language in the “source” of the detail “Relationship of Functionally Classified Systems in Serving Traffic Mobility and Land Access” from; “*A Policy on Geometric Design of Highways and Streets, AASHTO, 2004 AASHTO Green Book.*” To; *A Policy on Geometric Design of Highways and Streets, AASHTO, 2011 AASHTO Green Book.*

- Page F-23 – Revised language in “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” to add the following language from; “Centerline to Centerline Spacing” To; “*Minimum*” Centerline to Centerline “(*Distance*)” Spacing.

Revised language to the first column label in “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” under “Minimum Centerline to Centerline (Distance) Spacing” From; “*Signalized Intersection/Crossovers*” To; “*Spacing from Signalized Intersections to Other Signalized Intersections*”.

Revised language to the second column label in “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” under “Minimum Centerline to Centerline (Distance) Spacing” From; “*Unsignalized Intersection/Crossovers*” To; “*Spacing from Unsignalized Intersections/Crossover to Signalized or Unsignalized Intersections/Crossovers*”.

Revised language to the third column label in “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” under “Minimum Centerline to Centerline (Distance) Spacing” From; “*Full Access Entrances*” To; “*Spacing from Full Access Entrances to Other Full Access Entrances and Any Intersection on Highways Without Restrictive Medians*”.

Revised language to the fourth column label in “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” under “Minimum Centerline to Centerline (Distance) Spacing” From; “*Partial Access One or Two Way Entrances*” To; “*Spacing from Partial Access One or Two Way Entrances to Any Type of Entrance, Intersection or Crossover*”.

Revised the following language to the “Notes” for “TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND CROSSOVERS” from;

A. *Divided/undivided highway* - *Spacing distances apply to both divided and undivided highways.*

B. *Crossovers* - *A proposed intersection that will require a new or closing an existing crossover on a divided highway must also be approved in accordance with the Crossover Location Approval Process Section.*

C. *Relationship between spacing standards* - *Signalized intersection spacing applies to other signals. The unsignalized intersection spacing is the minimum distance between such intersections and between unsignalized and signalized intersections. The partial entrance spacing separates such entrances from each other and from intersections.*

D. Roundabouts - Roundabouts are separated from other intersections by the unsignalized intersection spacing standard; from other roundabouts by the partial access entrance spacing.

E. Spacing standards exceptions - See “exceptions to the spacing standards” presented later in this section.

F. Right Turn Lanes - When a right turn lane will be installed at an entrance, the length of the turn lane needs to be considered when locating the entrance.

To;

A. Entrances and restrictive medians – Entrances opposite such medians have no left turn ingress/egress movements: the Partial Access Entrance spacing applies. Entrances on highways without such medians are full access entrances. Entrances directly opposite each other on a highway create an intersection.

B. Roundabouts –

- Are separated from signalized intersections and unsignalized intersections/crossovers by the Unsignalized Intersection spacing standard.
- Are separated from other roundabouts by the Partial Access Entrance spacing standard.
- Are measured from the outer edge of the nearest inscribed diameter, not the centerline.

C. Spacing standard exceptions – See the “Exceptions to Spacing Standards” section.

D. Right turn lanes - When a right turn lane will be installed at an entrance, the length of the turn lane needs to be considered when locating the entrance.

- Page F-24 – Revised Footnotes 2, 3, 4 and 5 to include diagrams to help clarify descriptions of intersections and entrances.
- Page F-26 – Revised language in “FIGURE 2-8.1 ILLUSTRATION OF THE RELATIONSHIP BETWEEN SPACING STANDARDS” to help clarify detail.
- Page F-29 – Revised the following language in the first paragraph under “Exceptions/Waivers to the Design Standards” from;

*“For both land development and highway construction projects **on VDOT owned and maintained roadways only**, the appropriate intersection sight distance from Table 2-7 and stopping sight distance from Table 2-6 must be met for all commercial entrances, intersections, and crossovers. Intersection sight distance determinations apply both horizontally and vertically, measured in each direction, and are to be based on a height of driver’s eye of 3.5’ and a height of object 3.5’.”*

To;

For both land development and highway construction projects **on VDOT owned and maintained roadways only**, the appropriate intersection sight distance from Table 2-7 *must be met for all commercial entrances, intersections, and crossovers. If intersection sight distance cannot be met and a design waiver is granted (see below), then the minimum stopping sight distance from Table 2-6 must be met.*

- Page F-35 – Revised figures in “TABLE 2-7 INTERSECTION SIGHT DISTANCE” to agree with the 2011 AASTHO Green Book.
- Page F-36 – Added the following language to the end of the first paragraph; “*Intersection sight distance determinations apply both horizontally and vertically, measured in each direction, and are to be based on a height of driver’s eye of 3.5’ and a height of object 3.5’.*”

Revised the following language in the fourth sentence in the seventh paragraph from; “*See 2004 AASTHO Green Book, Chapter 9...*”

To; See “2011” AASTHO Green Book, Chapter 9...

- Page F-43 – Revised Language in the last bullet under “The submittal should contain and depict the following criteria” from; “*Are their accommodations made to bicyclists?*”
To; *Are there accommodations made for bicyclists?*

- Page F-48 – Revised language in the first sentence of the second paragraph from; “*Left-turn lanes should also be established on two-lane undivided highways...*” To; Left-turn lanes should also be established on two-lane and four lane undivided highways...

Revised the following language in the paragraph at the bottom of the page from; “*See 2004 AASTHO Green Book, Chapter 9.*” To; See “2011” AASTHO Green Book, Chapter 9.

- Page F-51 – Revised the following language in two location on this page from; “*2004 AASTHO Green Book Chapter 9, Page 685, Exhibit 9-75*” To; “*2011*” AASTHO Green Book Chapter 9, Page 9-132, Table 9-23.

- Page F-53 – Revised the following language under *LANE/ TRANSITIONS, MERGING TAPERS AND SPEED CHANGE LENGTHS* from; “*Pavement transitions typically occur where new or reconstructed roadways tie-in to existing roadways. This transition of pavement width shall meet the minimum length provided by the following equations:*” To; “*Lane/*” transitions typically occur where new or reconstructed roadways tie-in to existing roadways. “*Lane transitions, merging tapers and speed change lengths*” shall meet the minimum length provided by the following equations:

- Page F-64 – Revised the following language in the second sentence of the first paragraph under “*Double (Dual) Left-Turn Lanes*” from; “*DLTL’s require a protected (exclusive) signal phase, a 28’ minimum median width...*” To; DLTL’s require a protected (exclusive) signal phase, “*a minimum 4’ raised concrete median separating opposing traffic...*”

- Page F-71 – Revised the following language from; “*Right / Left Turn Lanes may be required beyond these guidelines at the discretion of the District Administrator or designee.*” To; Right / Left Turn Lanes may be required beyond these guidelines at the discretion of the “*District Administrator’s designee.*”

- Page F-80 – Revised language in the third sentence of the first paragraph from; “Entrances should not be situated within the functional area of an intersection...” To; Entrances “shall” not be situated within the functional area of an intersection...

Added the following language at the end of the first paragraph under “Entrance Design Principles”; “, see Figure 4-2A. If however, existing entrances are located within the functional area of the intersection Part A of the Waiver Form AM-3 shall be completed and submitted to the District Location and Design Engineer for approval.”

- Page F-82 – Revised language in “FIGURE 4-1 PRIVATE ENTRANCE AND LOW VOLUME COMMERCIAL ENTRANCE DETAIL” from; “Entrance width may be increased to meet specific site requirements as directed or approved by the Engineer at the District, when based on sound engineering principles.” To; “Entrance details shown on this sheet may be modified to meet specific site requirements as directed or approved by the Engineer when based on sound engineering principles.”
- Page F-87 – Added the following language at the end of the third sentence under “Commercial Entrance Location Criteria”; “If however, existing entrances are located within the functional area of the intersection Part A of the Waiver Form AM-3 shall be completed and submitted to the District Location and Design Engineer for approval.”
- Page F-88 – Revised language in the “source” of the detail “FUNCTIONAL AREA OF INTERSECTION” from; “2004 AASHTO Green Book.” To; “2011” AASHTO Green Book.
- Page F-90 – Revised “FIGURE 4-5 COMMERCIAL ENTRANCE CHANNELIZATION ISLAND OPTIONS” to update diagram.
- Page F-100 – Revised “FIGURE 4- 9 COMMERCIAL ENTRANCE DESIGNS ALONG HIGHWAYS WITH SHOULDERS” to add the following language to “LETTER SYMBOL” U*; “30’ Min. radius required when channelization island is used.”
- Page F-101 – Revised “FIGURE 4-10 COMMERCIAL ENTRANCE DESIGNS ALONG HIGHWAYS WITH CURB AND GUTTER” to add the following language to “LETTER SYMBOL” U*; “30’ Min. radius required when channelization island is used.”
- Page F-102 – Revised “FIGURE 4-11 COMMERCIAL ENTRANCE DESIGNS ALONG LOCAL STREETS” to add the following language to “LETTER SYMBOL” U*; “30’ Min. radius required when channelization island is used.”
- Page F-103 – Revised “FIGURE 4-12 COMMERCIAL ENTRANCE DESIGNS ALONG HIGHWAYS WITH SHOULDERS AT INTERSECTION” to add the following language to “LETTER SYMBOL” U*; “30’ Min. radius required when channelization island is used.”

- Page F-104 – Revised “FIGURE 4-13 COMMERCIAL ENTRANCE DESIGNS ALONG HIGHWAYS WITH CURB & GUTTER AT INTERSECTION” to add the following language to “LETTER SYMBOL” U*; “30’ *Min. radius required when channelization island is used.*”
- Page F-105 – Revised “FIGURE 4-14 COMMERCIAL ENTRANCE DESIGNS TO SERVE DRIVE-IN TYPE BUSINESSES” to add the following language to “LETTER SYMBOL” U*; “30’ *Min. radius required when channelization island is used.*”
- Page F-106 – Revised “FIGURE 4-15 MODERATE VOLUME COMMERCIAL ENTRANCE DESIGN ALONG HIGHWAYS WITH SHOULDERS” to add the following language to “LETTER SYMBOL” U*; “30’ *Min. radius required when channelization island is used.*”
- Page F-107 – Revised language in the first reference under “BIBLIOGRAPHY” from; “2004 AASHTO Green Book.” To; “2011” AASHTO Green Book.