

ROAD DESIGN MANUAL REVISIONS
July, 2019

CHAPTER 2E

- Page 2E-24 – Revised the following language in the first sentence in the second paragraph from: “*The contractor is responsible for the design and construction of the sound wall based on the Special Provision and applicable...*” To: The contractor is responsible for the design and construction of the sound barrier wall based on “*Section 519 of the VDOT Road and Bridge Specifications*” and applicable...

Revised the following language in the first sentence in the third paragraph from: “*Special Provisions for the sound barrier wall designed by VDOT engineers are prepared by the Construction Division.*” To: “*If*” Special Provisions are required for the sound barrier wall “*they will be*” prepared by the “*Central Office*” Construction Division.

Deleted the following language: “*For sound barrier walls designed by consultants, Engineering Development and Project Management Section shall advise the consultants to contact Standards/Special Design Section for input and direction prior to initiating the development of special provisions. When Standards/Special Design Section is made aware of a need for special provisions, it will coordinate with the Construction Division and provide Engineering Development and Project Management Sections a suggested draft of the provisions.*”

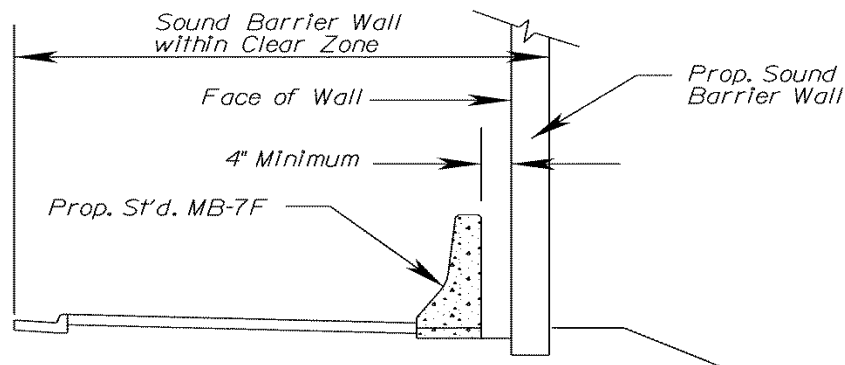
If Sound Wall is adjacent to the roadway shoulder then a Concrete Barrier Standard MB-7D shall be used, see detail below.”

Added the following language and detail: “*All sound barrier wall designs shall be submitted to the Central Office Location and Design Standards and Special Design (Engineering Services) Section.*”

If a sound barrier wall is located within the clear zone, sound barrier wall shall be shielded (protected) by concrete barrier. For RDM Clear Zone (Lateral Offset) Cases, See Appendix A, Table A-2-1.

When sound barrier wall is adjacent to a curb and/or curb and gutter section the wall shall be shielded (protected) with (MB-7F). For roadway shoulder section, sound barrier wall shall be shielded (protected) by median barrier (MB-7D).

Below are details depicting when shielding is required.



Curb and/or Curb and Gutter Section Detail”

- Page 2E-25 – Added the following label to the Sound Barrier Wall detail: *“Shoulder Section Detail”*.
- Page 2E-48 – Added the following language at the end of the first paragraph under “Establishing New Limited Access Control”: *“The CTB shall take action on all Limited Access Changes (LACC’s) prior to granting Design Approval.”*

Deleted the following language at the beginning of the second paragraph under “Establishing New Limited Access Control”: *“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.”*

- Page 2E-50 – Added the following language (bullet) under “Items needed for Commonwealth Transportation Board (CTB) Approval” list: *“Draft decision brief and resolution (Provided by the District)”*.
- Page 2E-61 – Revised the following language in the “Project Length Tabulation Block” to add the existing bridge structure number in the “Description” block.

APPENDIX A

- Page A-28 – Revised the following language in the first sentence in the second paragraph under “Roadways With Curb” from: *“When providing clear zone in accordance with the Roadside Design Guide in an urban area is not practical, consideration should be given to establishing as much lateral offset as practical, or incorporating...”* To: *When providing clear zone in accordance with the Roadside Design Guide in an urban area is not practical, consideration should be given to incorporating...*

Revised the following language in the third sentence in the third paragraph under “Roadways With Curb” from: *“Note that this minimum lateral offset does not meet clear zone criteria but simply enables normal facility operations by providing clearance for turning trucks, etc.”*
To: Lateral offset does not meet clear zone criteria but simply enables normal facility operations by providing clearance for turning trucks, etc.

Revised the following language in the fourth sentence in the third paragraph under “Roadways With Curb” from: *“Consideration should be given to providing more than the minimum lateral offset to obstructions by placing fixed objects behind the sidewalk or sidewalk space.”*
To: Consideration should be given to providing more than the minimum lateral offset to obstructions by placing “frangible” objects behind the sidewalk or sidewalk space.

Added the following Language after the third paragraph:
“A common misconception is that a curb with a 1.5 ft. lateral offset behind it satisfies the clear roadside concept. Curbs have limited re-directional capabilities and these occur only at low speeds, approximately 25 mph or lower. Fixed objects located adjacent to the travel lane, even in the presence of curbs, pose a potential hazard. Achieving the clear zone distances suggested in Chapter 3 may be unlikely in an urban setting. As a result, a secondary goal for roadside design in an urban setting is to identify critical urban roadside locations, such as (bridge terminal walls, retaining walls, soundwalls, and sloped or vertical drop offs in the clear zone), and give these locations priority attention for roadside safety improvements.”

Added the following Language at the end of the fifth paragraph: *“Curbed roadways with design speeds > 45 mph shall provide the required clear-zone or shield non-breakaway objects in accordance with Appendix J.”*

- Page A-29 – Added the following language at the beginning of the page: *“A barrier may be required on the back side of a sidewalk or shared use path based on the fill slope and vertical elevation drop-off. Note pedestrian railings are not breakaway devices and shall be located outside of the clear-zone. See Figure A(1)-1-6 and A(1)-1-24.”*

Revised the following language in the second paragraph from: *“When a vertical drop-off or other hazard (see Appendix J, Section J-3, Guardrail Warrants) is located within 6 feet of the face of curb, guardrail should be considered. For instructions on the placement of guardrail adjacent to curb, see Appendix J, Section J-3, Guardrail Installation in Urban Settings.”*
To: *“When a vertical drop-off or other hazard is located within the clear zone, barrier should be considered, see Appendix J, Section J-3, Barrier Warrants. For instructions on the placement of guardrail adjacent to curb, see Appendix J, Section J-3, Guardrail Installation Adjacent to Curb.”*

Revised the following language in the fourth Paragraph from: *“Source: AASHTO Green Book, Chapter 4, Section 4.7.1, page 4-16 / Roadside Design Guide, Chapter 10.”* To: Source: AASHTO Green Book, Chapter 4, Section 4.7.1, page 4-16 *“and ASSHTO”* Roadside Design Guide, *“Chapter 3 and”* Chapter 10.

APPENDIX A(1)

- Page A(1)-4 – Added the following resource: *On April 21, 2016, NACTO released the NACTO Bike Share Station Siting Guide https://nacto.org/wp-content/uploads/2016/04/NACTO-Bike-Share-Siting-Guide_FINAL.pdf, which highlights best practices in station placement and design. This Guide is a highly useful resource for bike share planners and operators, providing clear standards for how and where to install bike share stations. This Guide is also a complement to NACTO's successful Urban Bikeway Design Guide and Urban Street Design Guide.*
- Page A(1)-7 – Added the following resources: *In February 2019, FHWA released the Bikeway Selection Guide to help transportation practitioners consider and make informed trade-off decisions relating to the selection of bikeway types. It is intended to supplement planning and engineering judgement. It incorporates and builds upon the FHWA support for design flexibility to assist transportation agencies in the development of connected, safe, and comfortable bicycle networks that meet the needs of people of all ages and abilities. The FHWA Bikeway Selection Guide can be accessed at [safety.fhwa.dot.gov/ped_bike/tools_solve/docs/...](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/)*

On May 20, 2019, NACTO released Don't Give Up at the Intersection, which includes best practices for next-generation intersection designs that save lives and make walking and biking more comfortable for people of all ages and abilities. The new guidance expands the groundbreaking NACTO Urban Bikeway Design Guide with new diagrams detailing intersection design treatments and signal strategies that reduce vehicle-bike and vehicle-pedestrian conflicts.

The guidance, funded by Knight Foundation, uses three principles to enhance safety at the intersection, where conflicts between street users are most frequent: Reduce turning speeds, Make bikes and pedestrians visible and Give bikes the right of way.

Don't Give Up at the Intersection can be accessed at <https://nacto.org/publication/urban-bikeway-design-guide/dont-give-up-at-the-intersection/>

- Page A(1)-36 – Revised “Figure A(1)-1-8 Detectable Warning Surface For shared-Use Path With Shoulder” to depict that the area between the edge of pavement and edge of shoulder shall be paved.
- Page A(1)-40 – Revised “FIGURE A(1)-1-11 SHARED USE PATH TRANSITION FROM ROADWAY ONTO BRIDGE FOR DESIGN SPEEDS >45 MPH” to replace “GR-MGS Height” with “GR-MGS4” in section DD.
- Page A(1)-54 – Revised the following language in the sixth sentence under “PARALLEL CURB RAMP 9CG-12, TYPE B) from: “*In recognition of this, an exception limits the required length of a parallel ramp to 15 feet, regardless of the slope.*” To: In recognition of this, the required length of a parallel ramp “*is limited*” to 15 feet, regardless of the slope.

- Page A(1)-63 – Revised the following language after the second bullet from: “A slope steeper than 8:1 (12.5%) is not allowed.” To: “Note: The required length of a parallel or perpendicular ramp is limited to 15 feet, regardless of the slope.”
- Page A(1)-76 – Revised “FIGURE A(1)-1-25 SIDEWALK TRANSITION FROM ROADWAY ONTO BRIDGE FOR DESIGN SPEEDS >45 MPH” to replace “GR-MGS Height” with “GR-MGS4” in section DD.
- Page A(1)-77 – Added the following language at the end of “Parallel Parking” under ON-STREET PARKING: “Note: No parking within 20 feet of any intersection measured from the curb return of the intersection.”
- Page A(1)-79 – Added detail for “On-street parking – number of accessible spaces is based on total marked or metered spaces on a block perimeter.” under “Advisory R214 On-Street Parking Spaces”.

Added the following language: “R309 On-Street Parking Spaces”

- Page A(1)-80 – Revised “Figure A(1)-2-2 Design For Accessible Parallel Parking Space Exception” in increase the length of the corner clearance from 10 feet to 20 feet.

Revised the following language in the first sentence under the “Note” at the bottom of the page from: “Corner clearance (i.e., the distance from the end of the intersection curb return to the nearest edge of on-street parking) should be at least 10 feet.” To: Corner clearance (i.e., the distance from the end of the intersection curb return to the nearest edge of on-street parking) “shall” be “20” feet.

- Page A(1)-96 – Revised “Figure A(1)-2-13 Parking Space Design And Arrangement For Parking Lots And Park & Ride Lots” to add an additional column for “90° Parking Without Wheel Stops” and revised the first “90° Parking” column to add “With Wheel Stops” with the following note: “*Wheel stops are required when parking spaces are located perpendicular to the sidewalk, See Note under Figure A(1)-2-3”.
- Page A(1)-103 – Revised “Figure A(1)-3-2 Bus Turnout on Far-Side (Open)” to include the following language: “See AASHTO Guide for Geometric Design of Transit Facilities on Highways and Streets, Chapter 5, Page 5-24, Note 3.”

Revised “Bus Turnout Dimensions” note 1 from: “The bus stop boarding area sis to be 50 feet (min.) for each standard bus and 70 feet (min.) for each articulated bus expected to be at the stop at the same time.” To: 1. The bus stop boarding area “shall” be 50 feet (min.) for each standard bus and 70 feet (min.) for each articulated bus expected to be at the stop at the same time.

Revised “Bus Turnout Dimensions” note 2 from: “The bus boarding area lane width is to be 12 feet (min.), excluding the gutter pan.” To: The bus boarding area lane width “shall” be 12 feet (min.), excluding the gutter pan.

Deleted the following notes: 3. The entrance taper lengths is to be 60 feet minimum.
4. Re-entry taper lengths is to be 40 feet minimum.

- Page A(1)-104 – Revised “Figure A(1)-3-3 Bus Turnout on Near-Side” to include the following language: “*See AASHTO Guide for Geometric Design of Transit Facilities on Highways and Streets, Chapter 5, Page 5-24, Note 3.*”

Revised “Figure A(1)-3-4 Bus Turnout on Mid-Block” to include the following language: “*See AASHTO Guide for Geometric Design of Transit Facilities on Highways and Streets, Chapter 5, Page 5-24, Note 3.*”

- Page A(1)-105 – Revised “Bus Turnout Dimensions” note 1 from: “*The bus stop boarding area is to be 50 feet (min.) for each standard bus and 70 feet (min.) for each articulated bus expected to be at the stop at the same time.*” To: 1. The bus stop boarding area “*shall*” be 50 feet (min.) for each standard bus and 70 feet (min.) for each articulated bus expected to be at the stop at the same time.

Revised “Bus Turnout Dimensions” note 2 from: “*The bus boarding area lane width is to be 12 feet (min.), excluding the gutter pan.*” To: The bus boarding area lane width “*shall*” be 12 feet (min.), excluding the gutter pan.

Deleted the following notes: 3. *The entrance taper lengths is to be 60 feet minimum.*
4. *Re-entry taper lengths is to be 40 feet minimum.*

APPENDIX B(1)

- Page B(1)-51 – Added the following language at the end of the of the sixth paragraph under “TRAFFIC CALMING”: “*For additional information, see ITE Traffic Calming Measures Fact Sheets, May 2018.*”

APPENDIX B(2)

- Page B(2)-13 – Added the following language after the first paragraph under “Parallel On-Street Parking Lane Widths”: “*No Parking within 20 feet of intersection measured from the curb return at intersection.*”

APPENDIX F

- Page F-33 – Revised the following language to add the following: “Certain roads within Virginia are designated as “*part of the Arterial Preservation Network (APN)*” – major roadways outside of municipal corporate limits that serve a critical function for mobility. “*Because of the potential impact on through travel, traffic signal installation on APN highways requires additional approval than other highways.*”

Revised the following language in the second sentence under “Removal of a Traffic Signal” from: “...data confirms the signal is no longer warranted.” To: ...data confirms the signal is no longer “*justified.*”

Deleted the third sentence under “Removal of a Traffic Signal”: *“There is no official appeal process for the removal of a traffic signal.”*

- Page F-34 – Revised the following language in the first sentence under “Installation of a Traffic Signal” from: *“The selection and use of traffic control signals should be based on an engineering study of roadway, traffic, and other conditions, analyzing traffic, pedestrian and bicycle operations and needs and the series of signal warrants included in the MUTCD, including peak hour, 4-hour and 8-hour vehicular volumes, pedestrian volumes, school or grade crossings, roadway network and coordinated signal systems and crash experience and application of the Access Management Spacing Standards.”* To: The selection and use of traffic control signals “shall” be based on “a Signal Justification Report (SJR) engineering study that evaluates whether the signal is both warranted (as based on the signal warrants of the MUTCD) and justified, as per the latest effective revision to IIM-TE-387. The SJR shall consider the impacts of the proposed signal on” traffic, pedestrian, bicycle operations and “safety, and whether spacing to adjacent intersections and entrances will be in accordance with” the Access Management Spacing Standards.

Revised the following language in the first sentence of the second paragraph under “Installation of a Traffic Signal” from: *“The proposed installation of any new traffic signals on Mobility Preservation Segments” (MPS’s) shall be approved by the State Traffic Engineer, as proposed in TE I&IM 387.”* To: The proposed installation of any new traffic signals on “the APN” shall be approved by the “District Engineer and” the State Traffic Engineer, as “per” TE I&IM 387.

Revised the following language in the third paragraph under “Installation of a Traffic Signal” from: *“Innovative Intersections/interchanges, including grade separated interchanges and roundabouts, as detailed in Appendix A-3, are to be considered and analyzed when constructing or reconstructing new signalized or unsignalized intersections. Roundabouts are the preferred alternative if a study shows that they are feasible. On any roadway corridor designated by the CTB as a Mobility Preservation Segment (MPS), intersections or new access points which meet warrants for traffic shall not have a new traffic signal installed until these alternatives have been evaluated and determined to be not appropriate for the location.”* To: Innovative Intersections and Interchanges as detailed in Appendix A, “Section A-3 of this Manual”, are to be considered and analyzed when constructing or reconstructing new signalized or unsignalized intersections. “Unsignalized Innovative Intersections, including but not limited to Roundabouts”, are the Department’s preferred alternative if the analysis shows that they are feasible. On any roadway corridor designated “as APN”, intersections or new access points shall **not** have a new traffic signal installed until these alternatives have been evaluated and determined to be **not** “feasible or” appropriate for the location.

Revised the following language in the bullet after the third paragraph from: *“•Responsible Person: State Traffic Engineer for MPS and District Traffic Engineer for all other roadways.”* To: • Responsible Person: “District Engineer and the” State Traffic Engineer for “new signal(s) on the APN”; District Traffic Engineer for “new signal(s) on” all other roadways.

- Page F-35 – Revised language in the following heading from: “*Median Crossovers Requested by the Private Sector (MPS)*” To: Median Crossovers Requested by the Private Sector “(APN)”.

Revised the following language under “Median Crossovers Requested by the Private Sector (APN)” from: “*Any new median crossover designated MPS are to be approved by the State Location & Design Engineer. The basic process is the same as for non-MPS roadways (see below).*” To: Any new median crossover designated “*on the APN shall not be installed unless*” approved by the State Location & Design Engineer. The basic process is the same as for “*non-APN*” roadways (see below).

Revised language in the following heading from: “*Median Crossovers Requested by the Private Sector (Non-MPS)*” To: Median Crossovers Requested by the Private Sector “(Non-APN)”

- Page F-36 – Revised language in the following heading from: “*Median Crossovers on a Highway Construction Project (MPS)*” To: Median Crossovers on a Highway Construction Project “(APN)”

Revised the following language under “Median Crossovers on a Highway Construction Project (APN)” from: “*Any new median crossover on MPS is to be approved by the State Location & Design Engineer. The basic process for non-MPS roadways is the same (See below). The closing of a median crossover is to be approved by the District Engineer/Administrator and the responsible District Traffic Engineer.*” To: Any new median crossover “*designated*” on “*the APN shall*” be approved by the State Location & Design Engineer. The basic process “*is the same for non-APN*” roadways (see below). The closing of a median crossover “*shall*” be approved by the District Engineer and the responsible District Traffic Engineer.

Revised language in the following heading from: “*Median Crossovers on a Highway Construction Project (Non-MPS)*” To: Median Crossovers on a Highway Construction Project “(Non-APN)”

- Page F-48 – Revised the following language in the first paragraph under “Roundabout Policy” from: “*VDOT recognizes that roundabouts are frequently able to address safety and operational objectives better than other types of intersections in both urban and rural environments and on high-speed and low-speed highways.*” To: VDOT recognizes that Roundabouts are frequently able to address safety and operational objectives better than other types of intersections “*(signalized and unsignalized)*” in both urban and rural environments and on high-speed and low-speed highways.

Revised the following language in the second paragraph under “Roundabout Policy” from: “*Therefore, it is VDOT policy that roundabouts be considered when a project includes reconstructing or constructing new intersection(s), signalized or unsignalized (HJR 594, 2003). As a minimum, the roundabout alternative shall be reviewed to determine conceptual project impacts including safety, land impacts and construction. If the roundabout appears to be a feasible alternative, then a traffic analysis and preliminary layout should be developed and analyzed in more detail. In such case the Engineer shall provide an analysis of each intersection to determine if a roundabout is a feasible alternative based on site constraints,*

including right-of-way, environmental factors and other design constraints. The advantages and disadvantages of constructing a roundabout shall be documented for each intersection.”
To: Therefore, it is VDOT policy that Roundabouts “*or other Innovative Intersections / Interchanges shall*” be considered when a project includes reconstructing or constructing new intersection(s), signalized or unsignalized (“*Roundabout*” HJR 594, 2003). “*Roundabouts and other Innovative Intersections / Interchanges shall be screened using the Department’s Virginia Junction Screening Tool (VJuST). When the VJuST shows that a Roundabout or other Innovative Intersection / Interchange configuration is a feasible alternative, it is considered the Department’s preferred alternative due to the proven substantial safety and operational benefits as well as the reduction in the Department’s long-term maintenance costs for traffic signals.*”

- Page F-49 – Revised the following language at the top of the page from: “*The Department’s Roundabout Analysis Selection Tools listed below shall be used to determine if a roundabout is a feasible alternative.*” To: The Department’s Roundabout Analysis Selection Tools listed below shall be used “*for a more detailed screening and to develop a planning-level cost comparison between a Roundabout and a traditional signalized intersection.*”

Deleted the second paragraph on this page: “*When the analysis shows that a roundabout is a feasible alternative, it is considered the Department’s preferred alternative due to the proven substantial safety and operational benefits.*”

Revised the following language in the first paragraph under “*Innovative Intersection and Interchange Policy*” from: “*VDOT recognizes that Conventional intersections are not always the most effective traffic control and Innovative Intersections/interchanges, including but not limited to roundabouts, can provide innovative solutions to address safety and operational objectives better in both urban and rural environments and on both high-speed and low-speed highways. Innovative Intersections are defined as non-traditional intersection designs that improve operations and safety by reducing the overall number of conflicting movements and/or signal phases.*” To: Conventional intersections are not always the most effective traffic control. Innovative Intersections/”*Interchanges*”, including but not limited to Roundabouts, can provide innovative solutions to address safety and operational objectives better in both urban and rural environments and on both high-speed and low-speed highways. Innovative Intersections/Interchanges are defined as non-traditional intersection designs that improve operations and safety by reducing the overall number of conflicting movements and/or signal phases.

Revised the following language in the first bullet under “*Innovative Intersection and Interchange Policy*” from: “*•On Mobility Preservation Segments (MPS) and Mobility Enhancement Segments (MES) [Mapping of which can be found at this hyperlink: <http://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=8cf10ec607844f75be916e27b15f43eb>], Innovative Intersections, including roundabouts, shall be considered when a project involves constructing or reconstructing any new intersection. Reconstruction includes signalization of an unsignalized intersection.*” To: On “*the Arterial Preservation Network (APN)*” [Mapping of which can be found at this hyperlink: Innovative Intersections “*/ Interchanges*”, including “*but not limited to*” Roundabouts, **shall** be considered when a project “*includes*” constructing or reconstructing any new intersection. “*For the purposes of this requirement, “reconstruction” includes signalization of an unsignalized intersection.*”

Deleted the following Language after the second bullet: “• On both MPS and MES portions of the Corridors of Statewide Significance (CoSS) and the National Highway System that are not part of the CoSS, roundabouts shall be considered and other Innovative Intersection designs should be considered when a project involves constructing or reconstructing any new intersection.”

Deleted the following language at the bottom of the page: “This is reinforced by The Virginia Supplement to the MUTCD, which has specific restrictions requiring the necessary engineering evaluations that shall be performed prior to installation of new traffic signals on the CoSS. Also note that all new traffic signals on MPHSs shall be approved by the VDOT State Traffic Engineer as per IIM-TE-387.0”

Page F-50 – Revised the following language in the first paragraph from: “The Department’s VDOT Junction Screening Tool (VJuST will be used to determine which Innovative Intersection/interchange control configurations are most deserving of further investigation at a particular location. Those configurations deserving further investigation will then be analyzed more comprehensively in accordance with TOSAM. A Preliminary layout and construction cost for each feasible alternative shall be developed and the advantages and disadvantages of constructing each of the feasible alternatives shall be documented for each alternative analyzed.”

To: VDOT Junction Screening Tool (VJuST “shall” be used to determine which Innovative Intersection/interchange control configurations “including but not limited to Roundabouts”, are most deserving of further investigation at a particular location. Those configurations deserving further investigation will then be analyzed more comprehensively in accordance with “VDOT’s Traffic Operation Safety Analysis Manual” (TOSAM). A Preliminary layout and “right of way and” construction cost for each feasible alternative shall be developed and the advantages and disadvantages of constructing each of the feasible alternatives shall be documented for each alternative analyzed.

Revised the following language in the second paragraph from: “The District Traffic Engineer shall then provide a recommendation to the Innovative Intersection Review Committee as to the preferred Innovative Intersection/interchange for the location, based on safety, operational, environmental, right of way and/or Common Sense Engineering benefits, for their concurrence.”

To: “For new signals or Innovative Intersections/Interchanges on the APN,” the District Traffic Engineer shall then provide a recommendation to the Innovative Intersection Review Committee as to the preferred Innovative Intersection/interchange “alternative” for the location, based on safety, operational, environmental, right of way and/or Common Sense Engineering benefits, for their concurrence.

APPENDIX J

- Page J-12 – Revised the following language in the first sentence of this page from: “For paving under GR-MGS1 and GR-MGS2, Standard MC-4 is applicable. If pavement depth under guardrail is greater than 2”, then the Special Provision for Guardrail Post Leave-out shall be used.”
To: For paving under GR-MGS1 and GR-MGS2, Standard MC-4 is applicable. If pavement depth under guardrail is greater than 2”, “then refer to GR-MGS-INS (LEAVE-OUT FOR STANDARD GAURDRAIL POST INSTALLATION).”

Added the following language between “ASPHALT CURBS” and “GUARDRAIL INSTALLATION ADJACENT TO CURB”: “*GUARDRAIL INSTALLATION IN ROCK*
When rock interferes with guardrail post installation, DO NOT CUT POSTS. Refer to Standard GR-MGS-INS (LEAVE-OUT FOR STANDARD GAURDRAIL POST INSTALLATION).”

- Page J-14 – Revised “FIGURE J-3-3 TYPICAL CURB OFFSET LAYOUT FOR A TANGENT MGS GUARDRAIL TERMINAL AT A BRIDGE WITH A SIDEWALK” to replace “*GR-MGS Height*” with “*GR-MGS4*” in section DD.
- Page J-15 – Revised “FIGURE J-3-4 TYPICAL CURB OFFSET LAYOUT FOR A TANGENT MGS GUARDRAIL TERMINAL AT A BRIDGE WITH A SHARED USE PATH” to replace “*GR-MGS Height*” with “*GR-MGS4*” in section DD.
- Page J-18 – Replaced the following language under “FOA” from: “*GR-FOA’s are designed to help prevent potential vehicular snagging at the immediate upstream end of a rigid fixed object such as a vertical or safety-shaped bridge railing. These Standards use tighter post spacing and nested rail to achieve this. A rubrail is also provided to aid in the prevention of wheel snag.*

There are currently no VDOT approved MASH FOA’s. The MGS system will have to be transitioned to the current FOA Standards using the GR-MGS4 transition standard.” To: “*GR-FOA’s are designed to help prevent potential vehicular snagging at the immediate upstream, or run-on, end of a bridge parapet or terminal wall which are fixed objects. FOA’s can also provide anchorage on run-off ends for downstream guardrail.*

GR-FOA’s 1, 2, 3, and 4 use nested w-beam, reduced post spacing, and a rubrail. A GR-MGS-4 transition to MGS guardrail is required for GR-FOA’s 1, 2, and 3. A design waiver is required if these FOA’s are to be used with NCHRP 350 guardrail systems.

The GR-FOA-1 is used with a vertical bridge parapet or terminal wall.

The GR-FOA-2 is used with a safety-shaped bridge parapet or terminal wall.

The GR-FOA-3 design is available as in insertable sheet and is used as a retrofit on existing flared bridge rail terminal walls.

The GR-FOA-4 is used to attach MB-3 2-sided median guardrail to both sides of a safety-shaped concrete barrier. A design waiver is not required since there is not an MGS version of 2-sided median guardrail at this time.

The thrie-beam GR-FOA-5 is the only FOA currently acceptable for use directly with MGS guardrail without using the GR-MGS-4 transition. It consists of nested thrie-beam and reduced post spacing. Since thrie-beam is used, a rubrail is not needed. However, it is only allowed to be used with the CPSR, SSCP, and Kansas Corral vertical face terminal walls.”