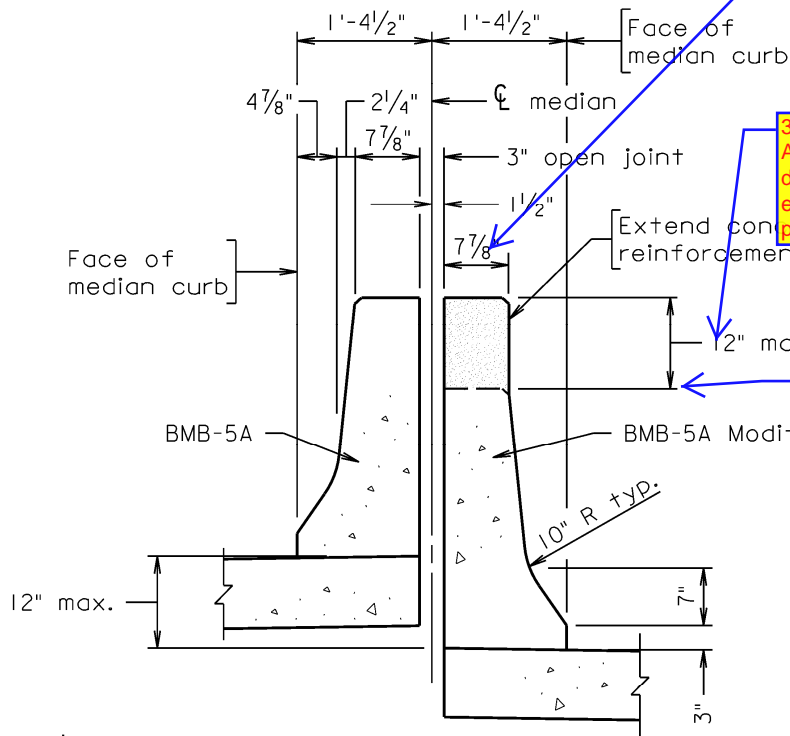


CONCRETE (SPLIT) MEDIAN BARRIER - BMB-5A



*When the elevation difference is greater than 12", use BMB-5A.

**CONCRETE (SPLIT/DIFFERENT DECK EVELATIONS)
MEDIAN BARRIER BMB-5A MODIFIED**

Note: Contact the Engineering Services Program Area for the detail of BMB-5A Modified.

**PARAPETS / RAILS / MEDIANS / SIDEWALKS
VDOT STANDARD PARAPETS AND RAILS
STANDARD TYPES**

PART 2
DATE: 28Dec2016
SHEET 7 of 14
FILE NO. 25.01-7

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—				

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Low Shrinkage Class A4 Modified.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

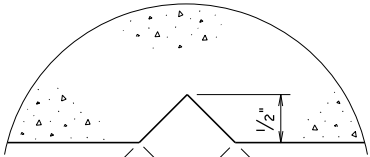
All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...

Use groove and deflection joint over pier.

Spacing of grooves shall be approximately 8'-0". If lighting standard is used (see Bridge Conduit System), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

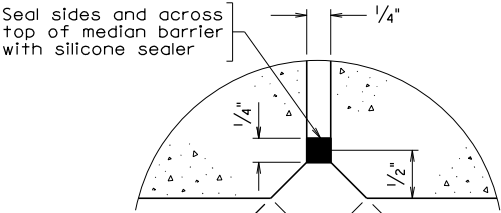
Barrier Delineator size, color, and spacing shall be in accordance with the Specifications.

Bid items for median barrier shall include barrier delineators, grounding, materials and other associated metal parts as shown on plans. Also included are concrete noted in the plans and reinforcing steel indicated in the Reinforcing Steel Schedule.



SECTION B-B
Full Scale

Groove detail for both sides of median barrier



SECTION C-C
Full scale

ALTERNATE REINFORCING STEEL SCHEDULE					
MV0403	Mark	No.	Size	Pin ø	Length
MV0403			#4	3"	4'-0"
ML04			#4		

Dimensions in bending diagram are out-to-out of bars.

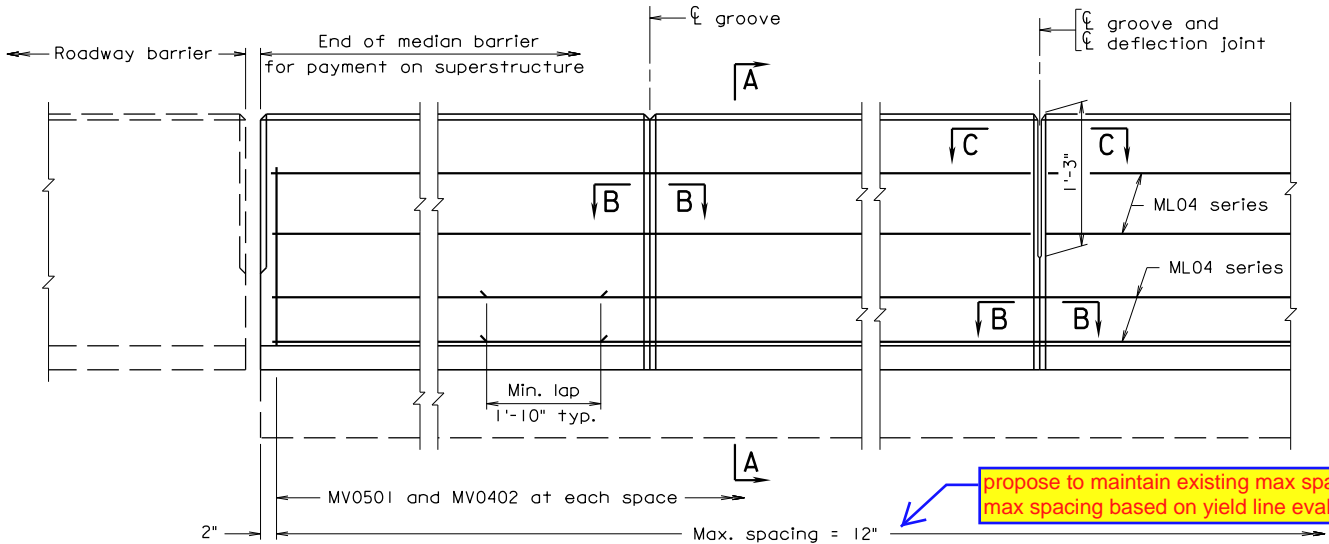
REINFORCING STEEL SCHEDULE					
MV0501	Mark	No.	Size	Pin ø	Length
MV0501			#5	*4 1/4"	6'-11"
MV0402			#4	2"	2'-10"
ML04			#4		

* Pin ø 2 1/2" for hooks at ends

Dimensions in bending diagram are out-to-out of bars, except as shown.

Gross concrete quantities (C.Y.) = Lin. ft. x 0.170 for all concrete above roadway slab.

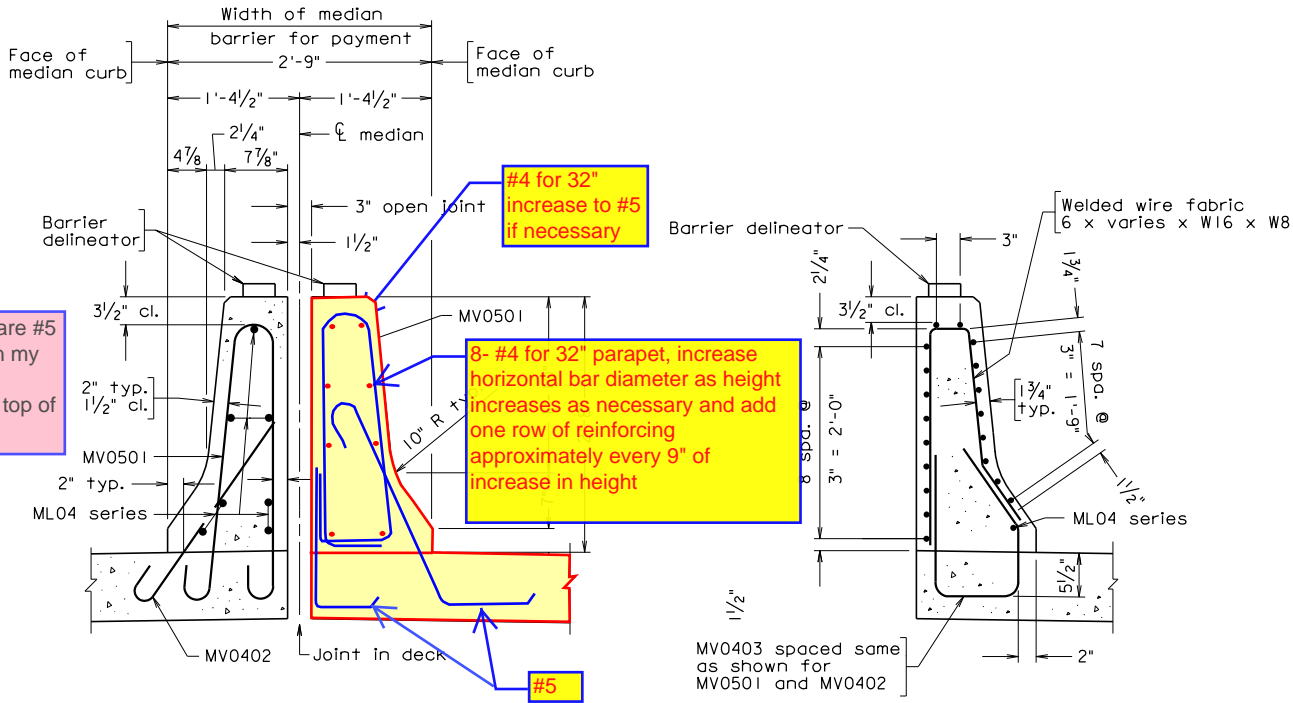
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE MEDIAN BARRIER (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: ...S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BMB-5A		



ABUTMENTS

ELEVATION

existing barrier rebar on Left
proposed rebar on right



SECTION A-A

PART SECTION A-A
ALTERNATE REINFORCING STEEL

Front row is #4, 2nd and 3rd rows are #5 (raises strain compatibility issues in my mind)
7-#4 bars including only one at the top of the railing.

bmb5a.dgn

05-18-2016

BMB-5A

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
May 18, 2016

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise shown.

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CAST-IN-PLACE CONCRETE (SPLIT) MEDIAN BARRIER

F-SHAPE

NOTES TO DESIGNER:

Standard is used when there is longitudinal joint in median barrier and is used for **Adjusted Test Level TL-3 for MASH criteria**. Although the joint opening of 3" should be satisfactory for most situations, it is up to the designer to adjust the opening if required, e.g., long spans, curved girders with small radii.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of roadway surface. Therefore, for example if a 1" overlay at the median barrier curb is set, the 3" curb dimension and the 2'-8" barrier height would need to be adjusted to 4" and 2'-9" respectively (Section A-A).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule and Alternate Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Modify vertical dimensions (3" curb and 2'-8" barrier height) as noted above if an initial overlay is used on bridge.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

ALTERNATE REINFORCING STEEL SCHEDULE:

Modify bar MV0403 if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

"Adjusted Test Level 3 for MASH" means that this is the reinforcing we were using for NCHRP 350 Test level 4, but we know it doesn't meet MASH. We have assumed, lacking any evidence to the contrary that it will meet MASH TL-3. We are waiting for the equivalence research to be completed.

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and is used for **Adjusted Test Level TL-3 for MASH criteria**. It is to be used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-3A-AT.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

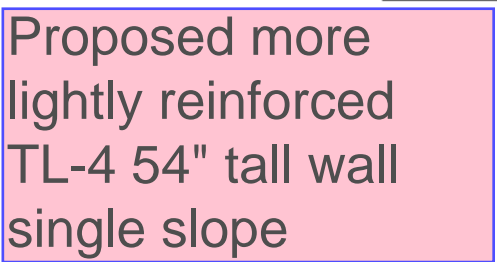
NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

TITLE BLOCK:

Replace standard designation with plan number.

"Adjusted Test Level 3 for MASH" means that this is the reinforcing we were using for NCHRP 350 Test level 4, but we know it doesn't meet MASH. We have assumed, lacking any evidence to the contrary that it will meet MASH TL-3. We are waiting for the equivalence research to be completed.



STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—				

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Low Shrinkage Class A4 Modified.

All bevels for concrete shall be $\frac{3}{4}$ ".

The reinforcing steel shown has been detailed based on a standard $\frac{1}{4}$ " per foot cross slope and for an $\frac{8}{2}$ " slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Use groove and deflection joint over pier.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications.

Each terminal wall shall be cast as one piece.

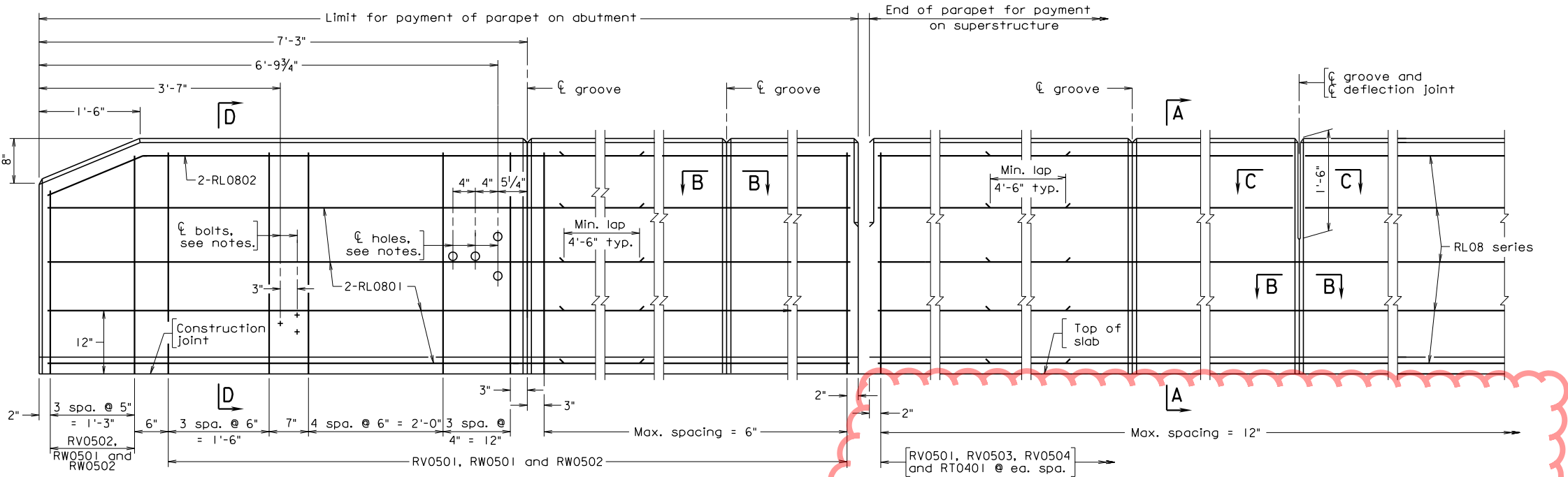
Terminal walls are detailed to take guardrail attachment GR-F0A-2.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of $\frac{1}{2}$ " diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be $\frac{5}{8}$ " diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

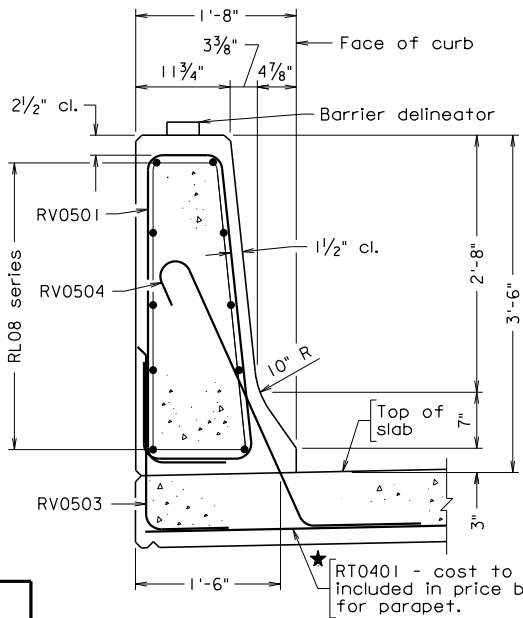


TERMINAL WALL

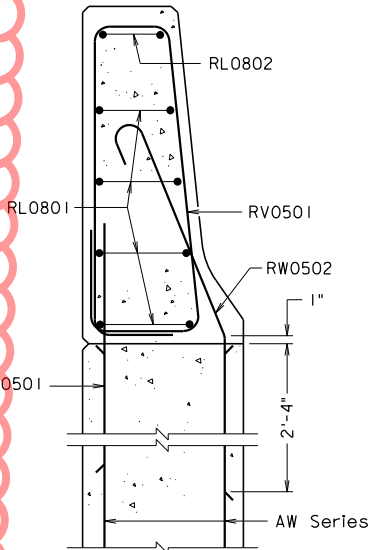
U-BACK WING

ABUTMENTS

ELEVATION

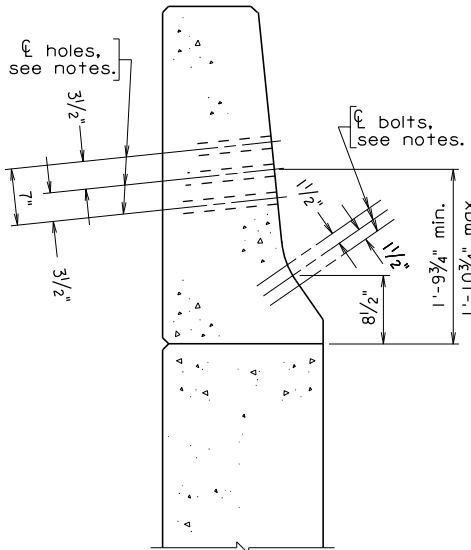


SECTION A-A



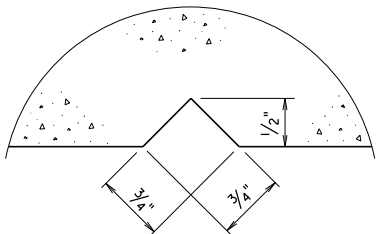
SECTION D-D

For dimensions and details not shown, see Section A-A.



SECTION D-D

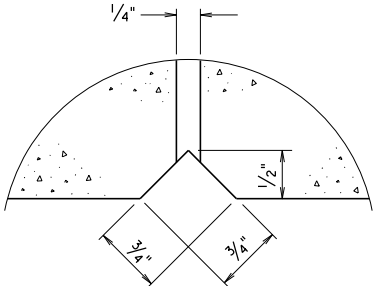
Reinforcing steel not shown.



SECTION B-B

Full scale

Groove detail for both sides of parapet

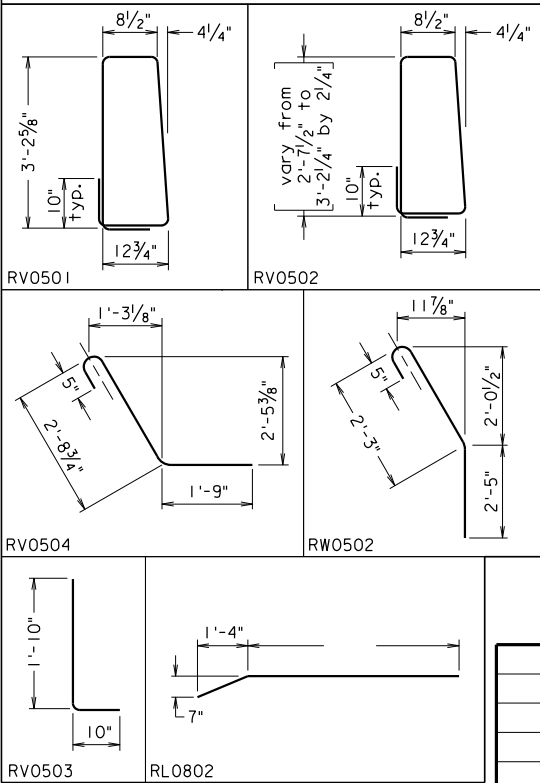


SECTION C-C

Full scale

Deflection joint detail for both sides of parapet

REINFORCING STEEL SCHEDULE



Mark	No.	Size	Pin \varnothing	Length	Location
★RT0401	-	#4	—	3'-0"	Slab
RV0501	-	#5	$3\frac{3}{4}$ "	9'-3"	Parapet and terminal wall
RV0502	-	#5	$3\frac{3}{4}$ "	from 8'-1 to 9'-2'	Terminal wall (4 per terminal wall)
RV0503	-	#5	$3\frac{3}{4}$ "	2'-6 1/2"	Parapet
RV0504	-	#5	$3\frac{3}{4}$ "	5'-0"	Parapet
RW0501	-	#5	—	3'-0"	Terminal wall and wingwall
RW0502	-	#5	$3\frac{3}{4}$ "	5'-3"	Terminal wall and wingwall
RL0801	-	#8	—	-	Terminal wall and U-back wing
RL0802	-	#8	6"	-	Terminal wall
RL08	-	#8	—	-	Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin Ft. \times 0.158

All concrete above roadway slab.

★ Used only when deck transverse to skew of bridge.

TL-5 42" barrier

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		
			STRUCTURE AND BRIDGE DIVISION		
			42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)		
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-4A		

Scale: 1" = 1'-0" unless otherwise shown.

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bbp4a.dgn

05-18-2016

BPB-4A

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
May 18, 2016

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and is used for Adjusted Test Level TL-5 for MASH criteria. It is used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-4A-AT.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

Complete dimension and length of rebar RL0802.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

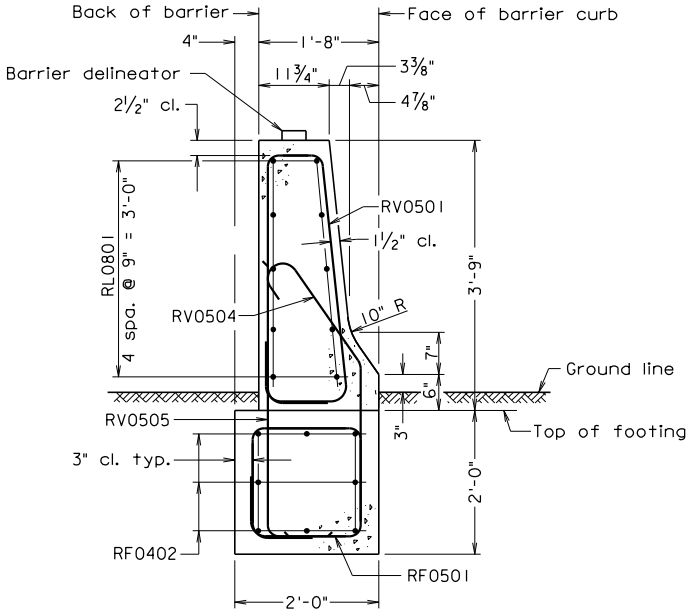
TITLE BLOCK:

Replace standard designation with plan number.

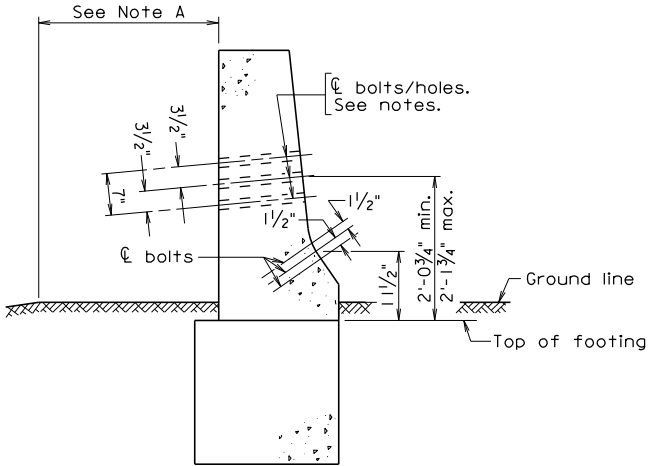
STANDARD BPB-4A: NOTES TO DESIGNER

PART 3
DATE: 28Dec2016
SHEET 2 of 2
FILE NO. BPB-4A-2

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—				

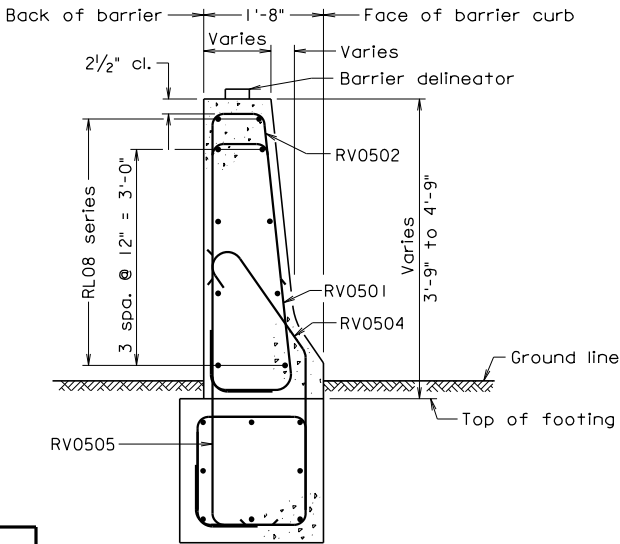


SECTION A-A



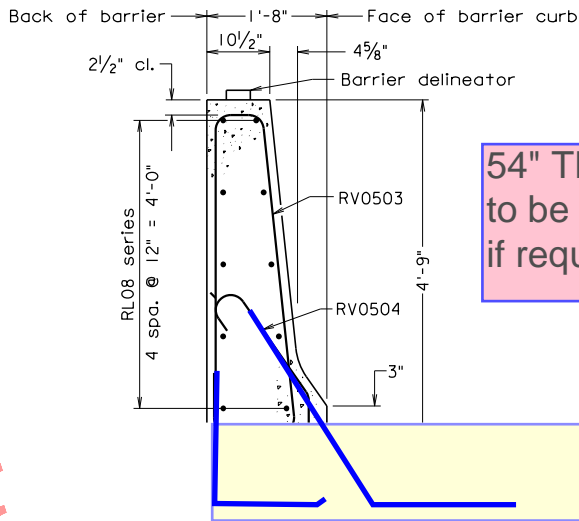
SECTION A-A

Showing location of bolts and holes in Terminal Section.



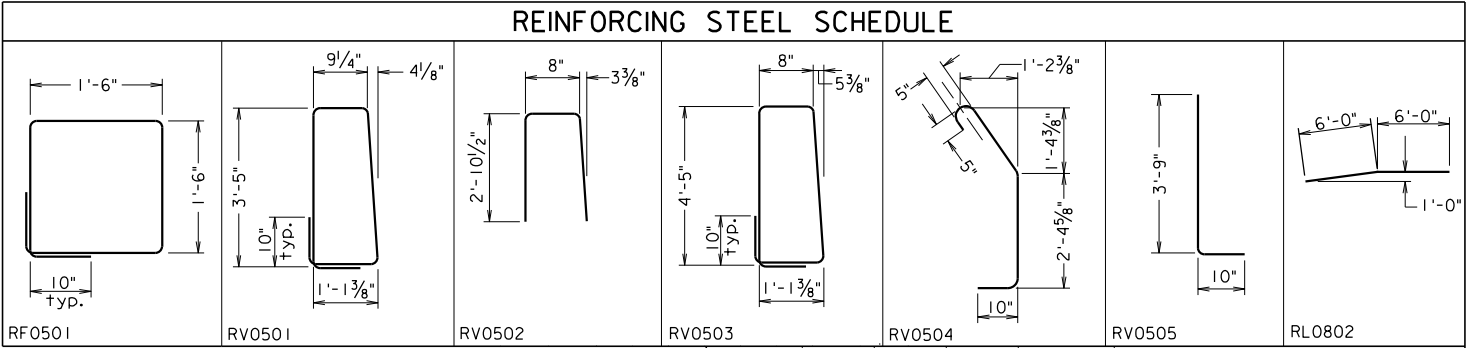
SECTION B-B

For dimensions and details not shown, see Section A-A.



SECTION C-C

For dimensions and details not shown, see Section A-A.



Mark	No.	Size	Pin ø	Length	Location
RV0501		#5	3 3/4"	9'-8 3/4"	Barrier
RV0502		#5	3 3/4"	6'-2 1/4"	Barrier
RV0503		#5	3 3/4"	11'-7 5/8"	Barrier
RV0504		#5	3 3/4"	5'-5 3/8"	Barrier
RV0505		#5	3 3/4"	4'-5 3/8"	Barrier/footing
RL0801		#8	—	—	Barrier
RL0802		#8	Var.	12'-0"	Barrier
RL0803		#8	—	6'-0"	Barrier
RL08		#8	—	—	Barrier
RF0501		#5	3 3/4"	7'-0 1/4"	Footing
RF0402		#4	—	—	Footing

Dimensions in bending diagram are out-to-out of bars, except as shown.
Cost of all bars listed in schedule to be included in price bid for Pier Protection System.

Note A:
2'-6" min. from the break line of embankment unless footing adjacent to a permanent structure.

54" TL-5 reinforcing pattern to be modified for the deck if required.

Scale: 3/4" = 1'-0" unless otherwise shown

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bpps2.dgn

05-18-2016

BPPS-2

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
May 18, 2016

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PIER PROTECTION SYSTEM					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BPPS-2		

PIER PROTECTION SYSTEM

NOTES TO DESIGNER:

Include this standard in the plans when using standard BPPS-1.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARDS:

None.