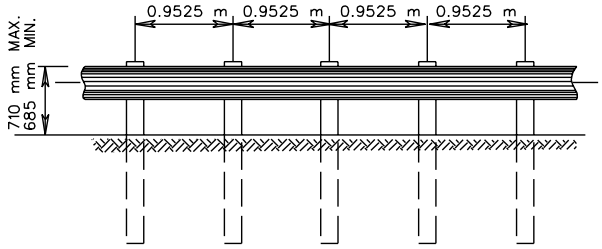
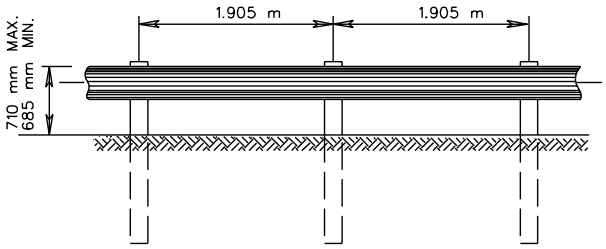
GR-2,2A



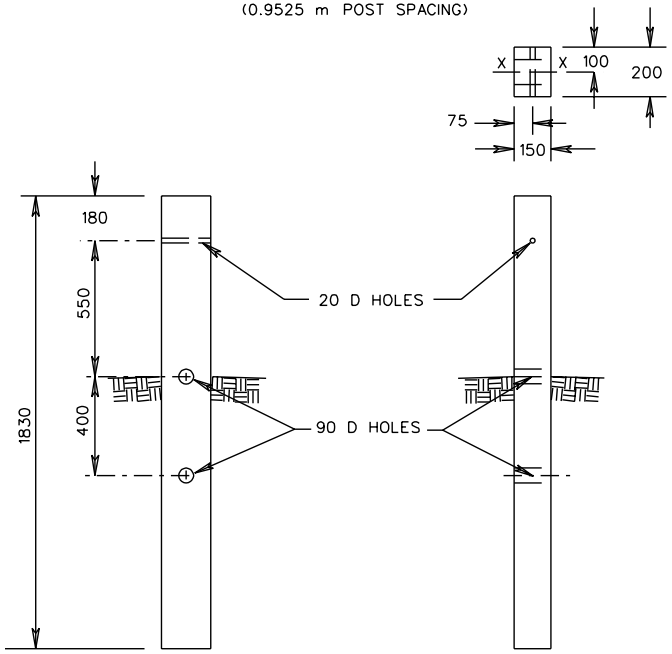
GR-2A

(0.9525 m POST SPACING)



GR-2

(1.905 m POST SPACING)



CRT POST

NOTES:

GUARDRAIL LOCATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY AND CAN BE ADJUSTED DURING CONSTRUCTION IF AND AS DIRECTED BY THE ENGINEER.

FOR DETAILS OF POST AND BLOCKOUTS SEE SHEET NO. 501.05.

FOR DETAILS OF RAIL ELEMENT, RAIL SPLICE JOINT, W BEAM BACK-UP PLATE, AND ASSOCIATED HARDWARE SEE SHEET NOS. 501.01 AND 501.02.

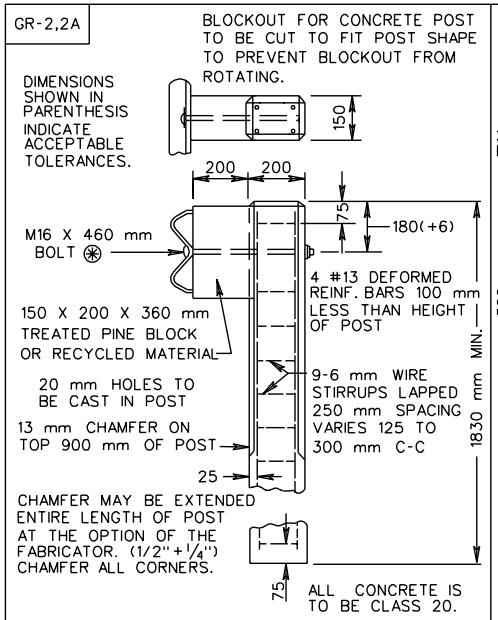
THE MAXIMUM DYNAMIC DEFLECTION FOR STANDARD GR-2 IS 600 mm, FOR GR-2A DEFLECTION IS LESS THAN 600 mm SINCE NO TEST DATA IS AVAILABLE.

RAIL ELEMENTS ARE FURNISHED SHOP CURVED FOR RADII BETWEEN 1.5 m AND 46.0 m.

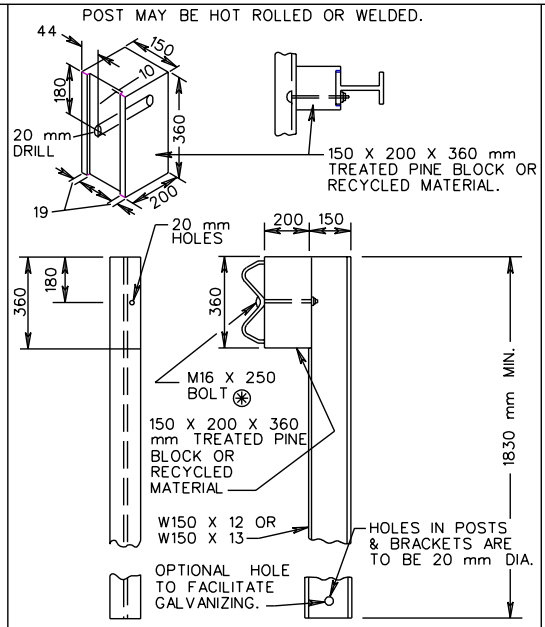
SPECIFICATION REFERENCE	STANDARD BLOCKED-OUT W BEAM GUARDRAIL (STRONG POST SYSTEM)	REV. 7/98
221 505	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS — 501.04

REVISED ON 2/01 **REVISED ON 7/01**

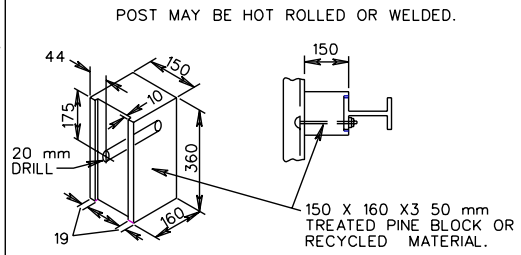
GR-2,2A



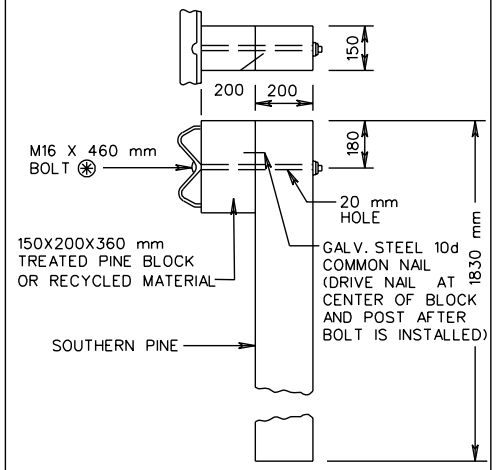
CONCRETE POST



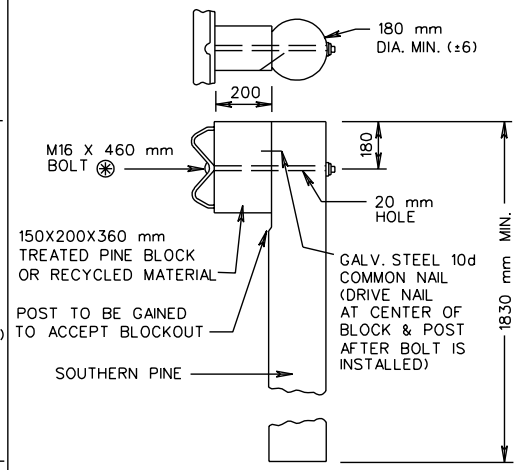
STEEL POST



BLOCKOUT FOR mmAINTENANCE REPAIR ONLY



150X200 mm WOOD POST



ROUND WOOD POST

ALL BOLTS, NUTS, WASHERS, AND OTHER STEEL ITEMS ARE TO BE GALVANIZED.

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

FOR DETAILS OF GUARDRAIL ELEMENT SPLICE JOINT, HARDWARE, ETC. SEE SHEET NO'S. 501.01 AND 501.02

THE GUARDRAIL AND MEDIAN BARRIER COMPONENTS DEPICTED IN AASHTO - AGC - ARTBA "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.

⊛ STANDARD WASHER TO BE USED ON LAST 15 mm OF RUN OFF END.

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

REV. 7/98

501.05

UNLESS AND OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

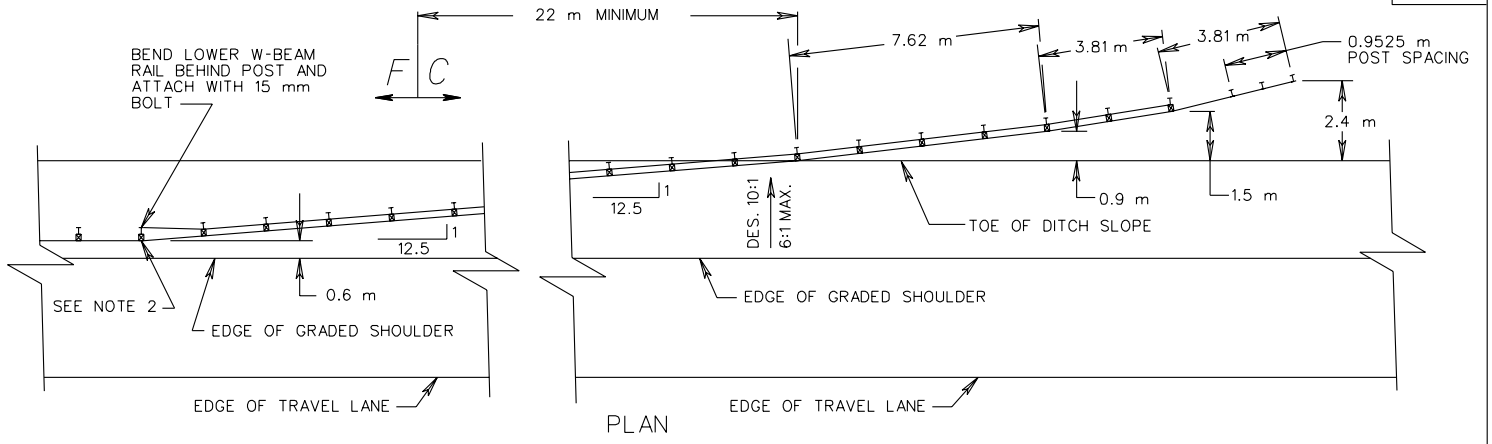
VIRGINIA DEPARTmmENT OF TRANSPORTATION

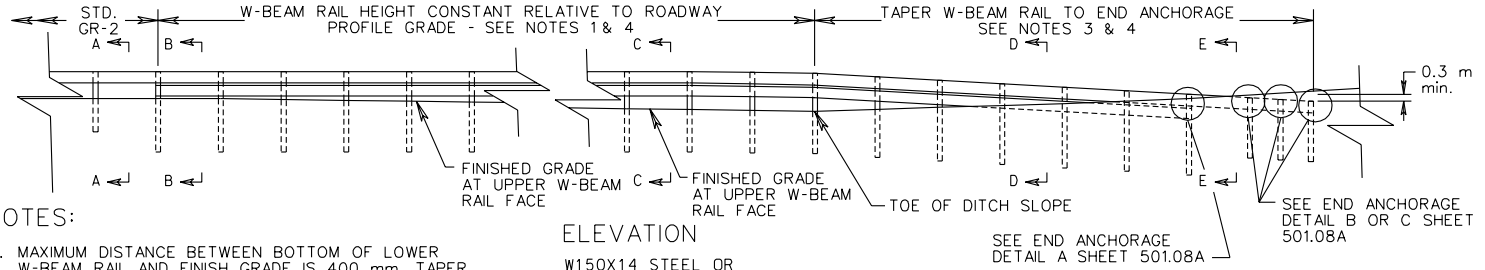
SPECIFICATION REFERENCE

221
236
505

REVISED ON 12/99 REVISED ON 2/01 REVISED ON 7/01 REVISED ON 7/02

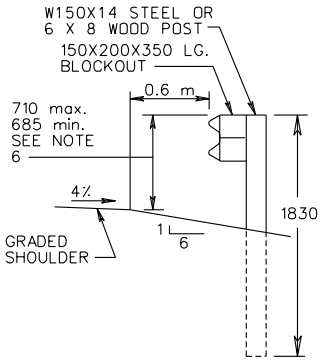
GR-6

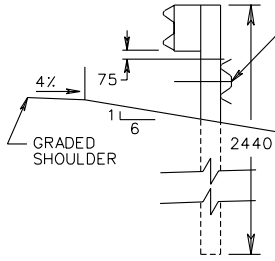


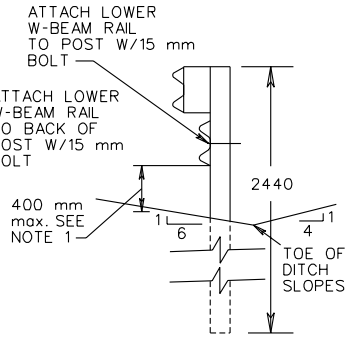


NOTES:

1. MAXIMUM DISTANCE BETWEEN BOTTOM OF LOWER W-BEAM RAIL AND FINISH GRADE IS 400 mm. TAPER BOTH W-BEAM RAILS TO MAINTAIN 400 mm DISTANCE.
2. BEGIN LOWER W-BEAM AT BEGINNING OF FLARE.
3. TAPER BOTH W-BEAM RAILS FROM HEIGHT AT TOE OF DITCH SLOPES TO 300 mm BELOW FINISHED GRADE AT LAST POST (2.4 m OFFSET).
4. A 2440 mm LONG POST MUST BE USED WHEN UPPER AND LOWER W-BEAM RAILS ARE ATTACHED.
5. STANDARD GR-6 TERMINAL TREATMENT MAY BE USED AT THE RUN-ON END OF DIVIDED HIGHWAYS (LEFT AND RIGHT OF TRAFFIC) AND AT THE RUN-ON AND RUN-OFF ENDS ON UNDIVIDED HIGHWAYS.
6. HEIGHT OF UPPER W-BEAM RAIL TO BE MAINTAINED AT 685mm MINIMUM TO 710 mm MAXIMUM FROM THE EDGE OF GRADED SHOULDER TO THE TOP OF THE RAIL FOR THE ENTIRE LENGTH TO THE TOE OF THE DITCH.
7. ALL POST SPACING 1.905 m C-C UNLESS OTHERWISE NOTED. THE POST MAY BE W150X14 SEEL OR 150X14 WOOD EXCEPT FOR THE LAST 4 TERMINAL POST.
8. FOR SECTIONS D-D & E-E, AND END ANCHORAGE DETAILS SEE SHEET 501.08A.





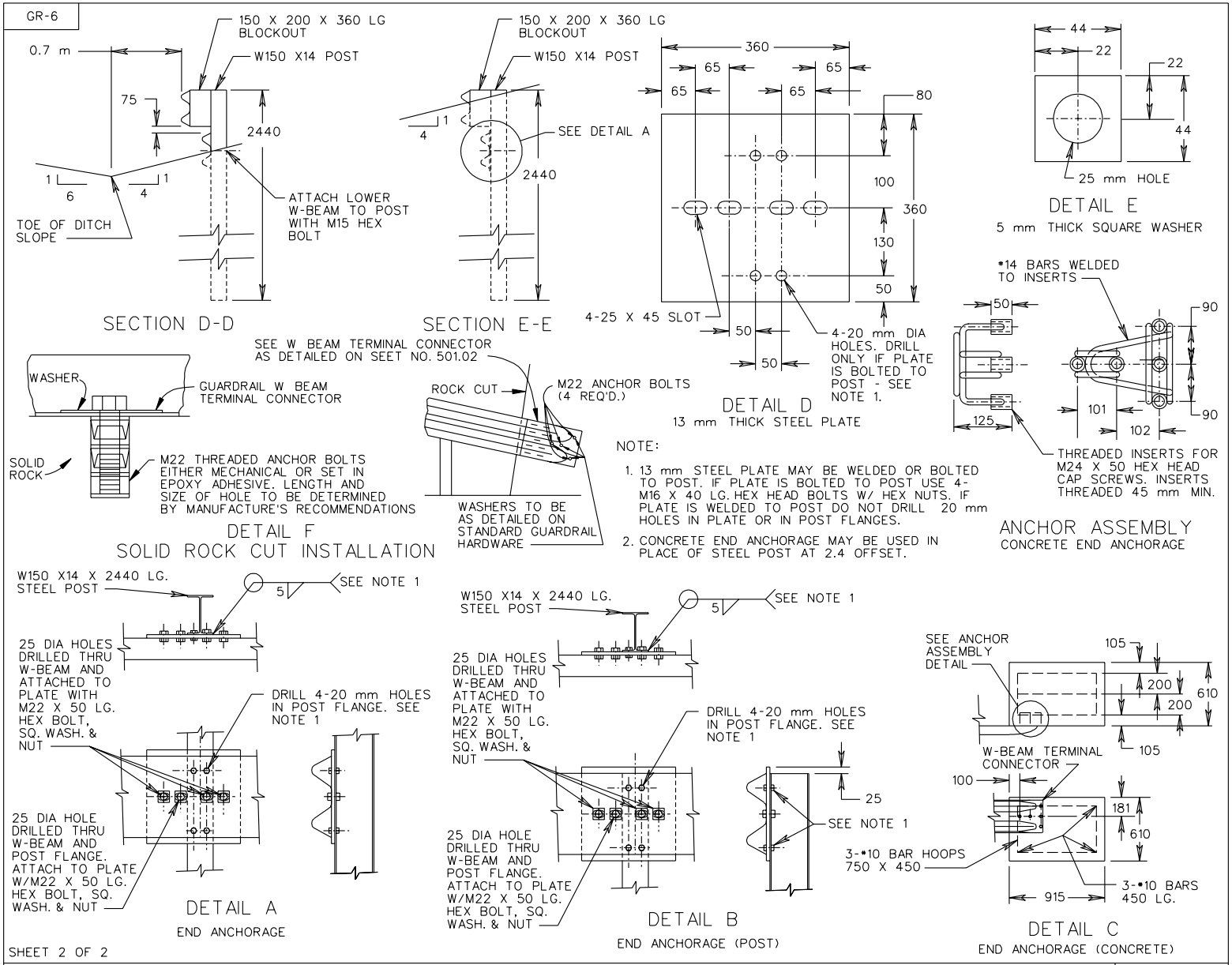


SHEET 1 OF 2

SPECIFICATION REFERENCE	TERMINAL TREATMENT FOR W BEAM GUARDRAIL	
505 221	VIRGINIA DEPARTMENT OF TRANSPORTATION	Rev. 7/98
	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS	501.08

REVISED ON 12/99 REVISED ON 2/01 REVISED ON 11/02

GR-6



SHEET 2 OF 2

TERMINAL TREATMENT FOR W BEAM GUARDRAIL

SPECIFICATION REFERENCE

505
221

NEW 7/98

501.08A

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

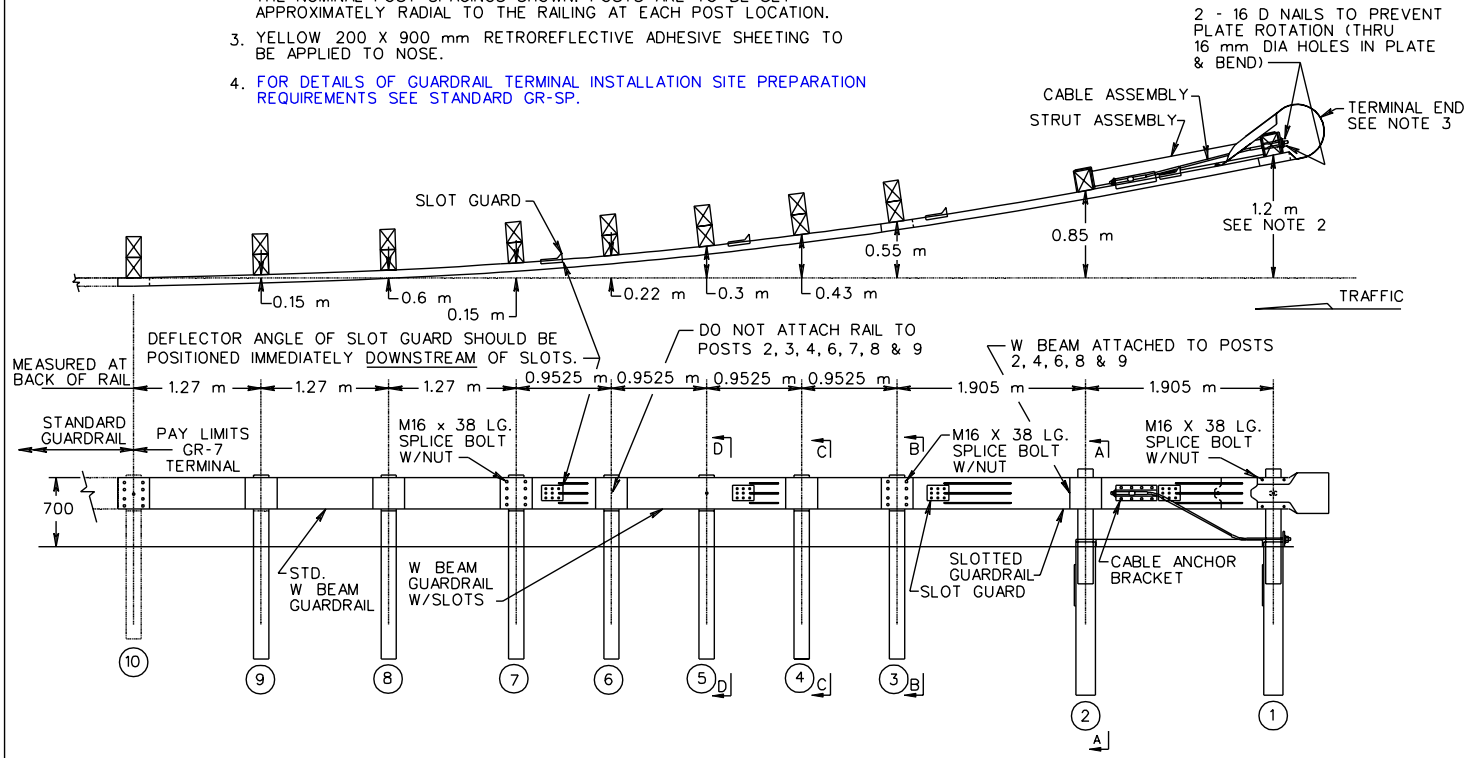
VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED ON 2/01 **REVISED ON 7/02**

GR-7

NOTE:

1. GUARDRAIL TERMINAL - STD. GR-7, IS TO BE SRT 350 (AS SHOWN) MANUFACTURED BY SYRO STEEL COMPANY, THE FLEAT 350 MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.
2. THE POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS. EXCEPT AT THE FIRST TWO POSTS, WHERE THE DIMENSION IS TO THE CENTER OF THE TRAFFIC FACE OF THE POST. OFFSET POINTS ARE TO BE LOCATED BY CHORD MEASUREMENTS AT THE BACK OF THE RAIL EQUAL TO THE NOMINAL POST SPACINGS SHOWN. POSTS ARE TO BE SET APPROXIMATELY RADIAL TO THE RAILING AT EACH POST LOCATION.
3. YELLOW 200 X 900 mm RETROREFLECTIVE ADHESIVE SHEETING TO BE APPLIED TO NOSE.
4. FOR DETAILS OF GUARDRAIL TERMINAL INSTALLATION SITE PREPARATION REQUIREMENTS SEE STANDARD GR-SP.



SHEET 1 OF 3

BREAKAWAY CABLE TERMINAL
1.2 m FLARE
VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 7/98

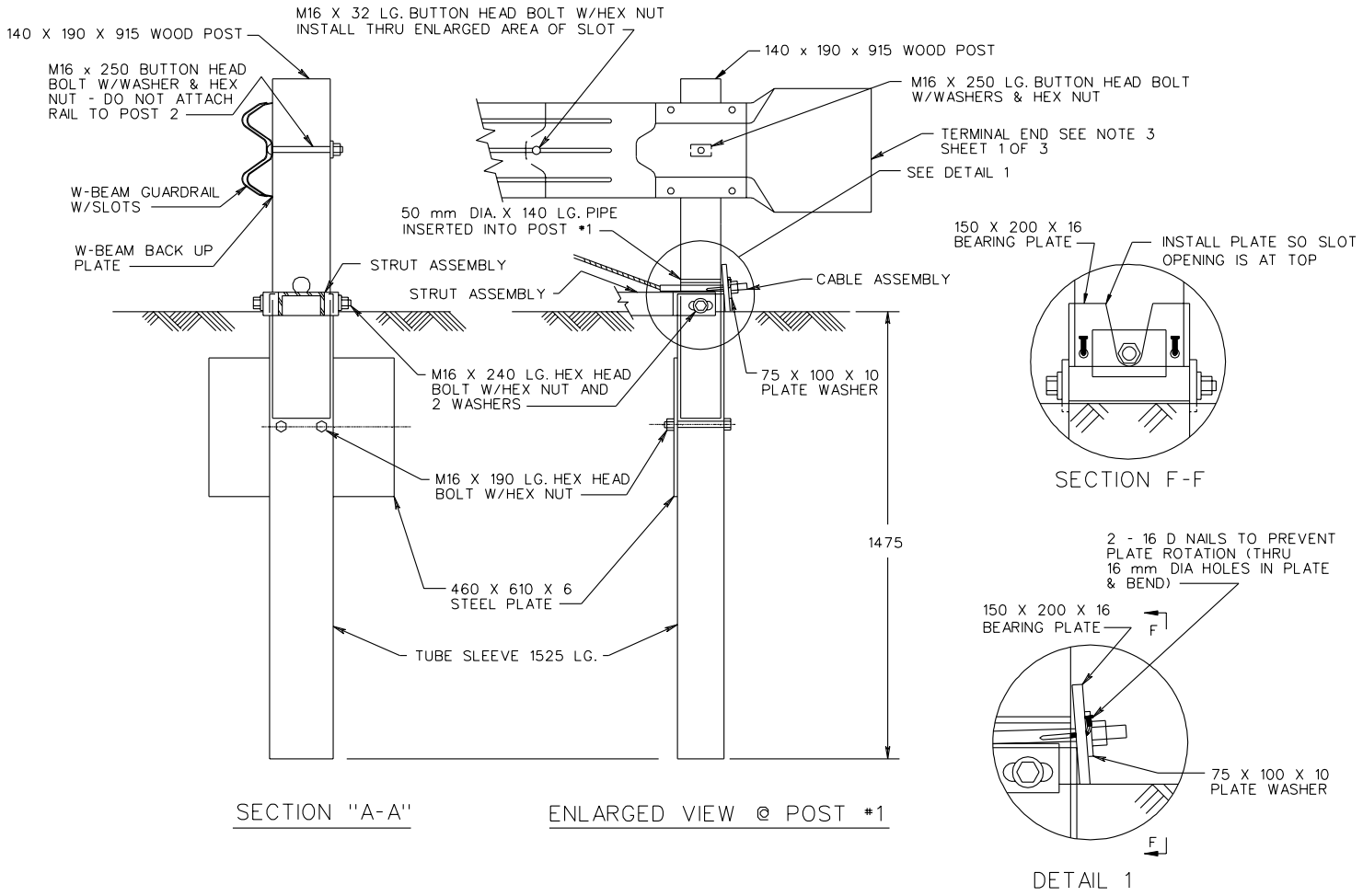
501.09 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SPECIFICATION REFERENCE

221
505

REVISED ON 5/99 **REVISED ON 2/01** **REVISED ON 7/02**

GR-7



Sheet 2 of 3

SPECIFICATION REFERENCE
221 505

BREAKAWAY CABLE TERMINAL
1.2 m FLARE

VIRGINIA DEPARTMENT OF TRANSPORTATION

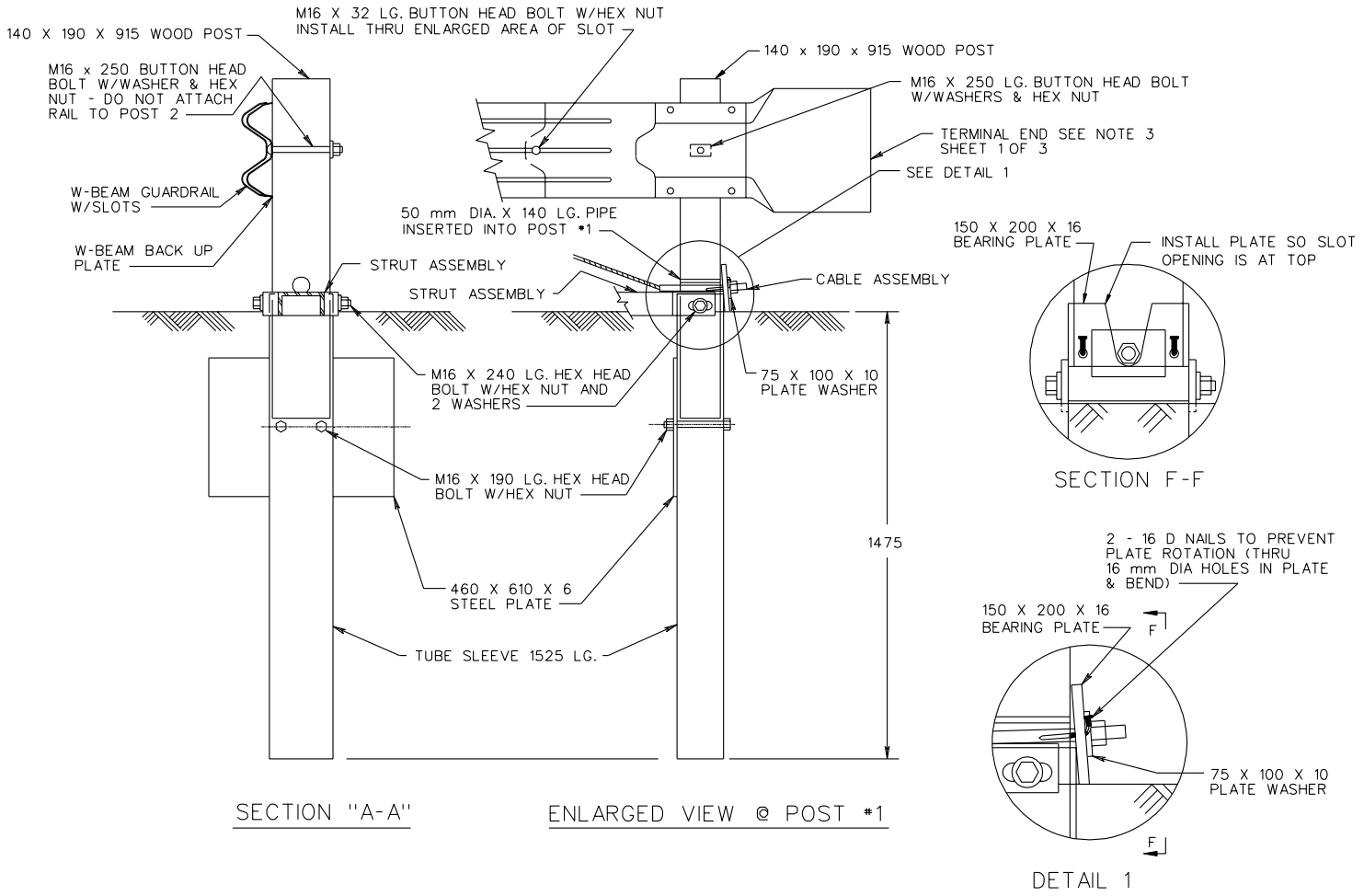
REV. 7/98

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.10

REVISED ON 2/01 **REVISED ON 7/02**

GR-7

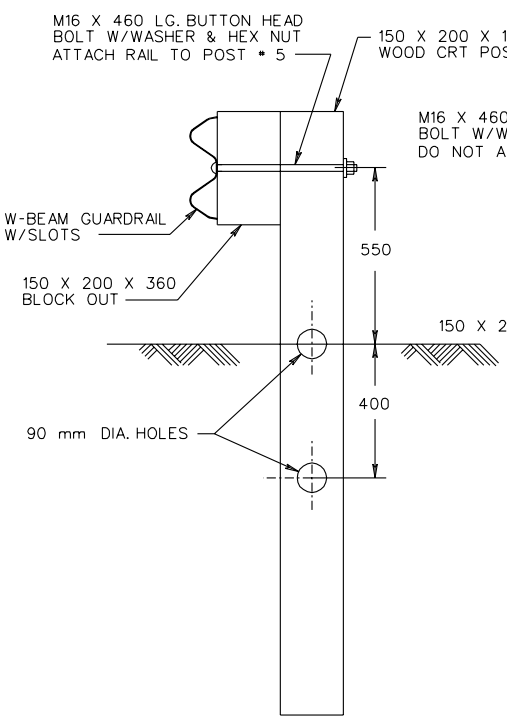


Sheet 2 of 3

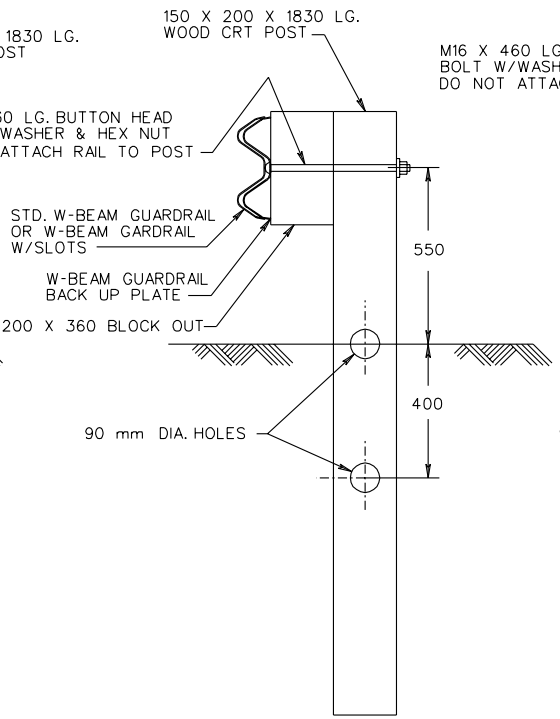
SPECIFICATION REFERENCE	BREAKAWAY CABLE TERMINAL 1.2 m FLARE	REV. 7/98
221 505	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS — 501.10

REVISED ON 2/01

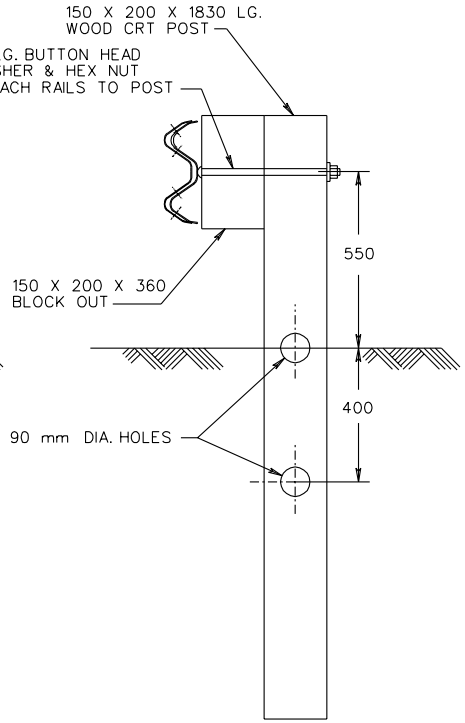
GR-7



SECTION "D-D"
(@ POST *5)



SECTION "C-C"
(@ POSTS *4, *6, *8 & *9)



SECTION "B-B"
(@ POSTS *3 & *7)

Sheet 3 of 3

BREAKAWAY CABLE TERMINAL
1.2 m FLARE

VIRGINIA DEPARTMENT OF TRANSPORTATION

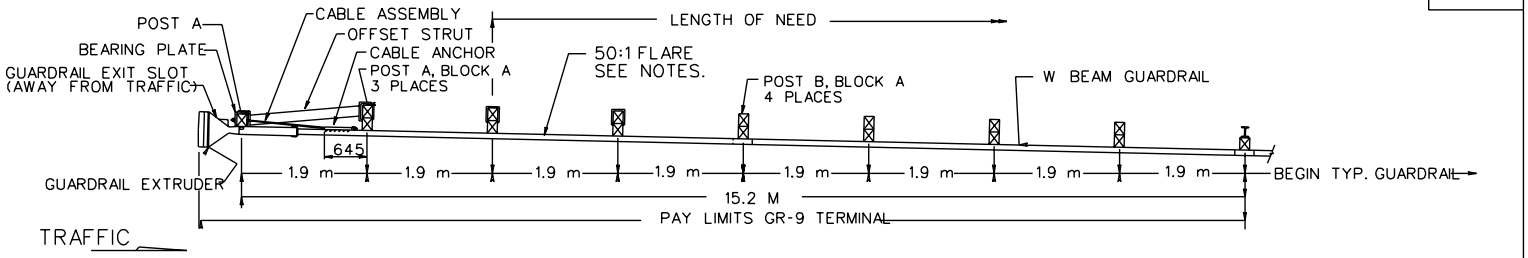
REV. 7/98

501.11 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

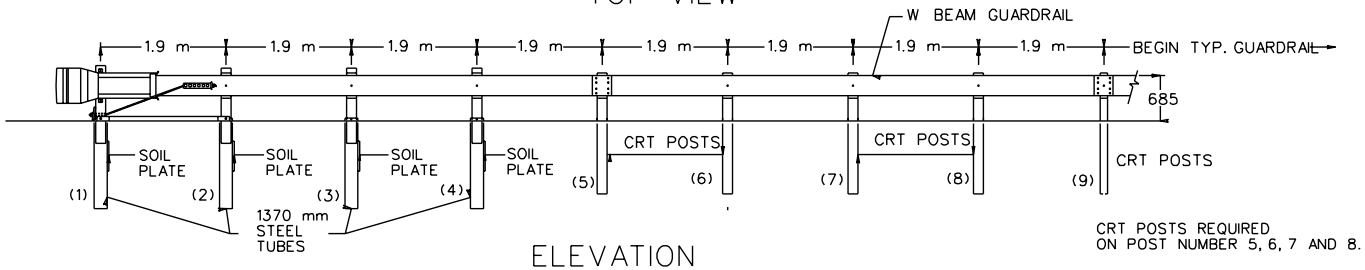
SPECIFICATION REFERENCE

221
505

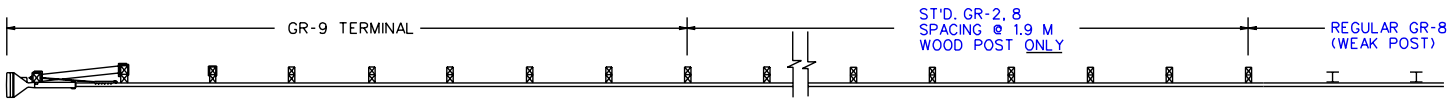
REVISED ON 2/01 REVISED ON 7/02



TOP VIEW



ELEVATION



TRANSITION FROM GR-9 TERMINAL TO WEAK POST GUARDRAIL

NOTES:

THIS DESIGN SHALL ONLY BE USED AFTER AN ANALYSIS INDICATES IT IS MORE COST EFFECTIVE THAN PROVIDING THE FLARE FOR A ST'D. GR-7 OR EXTENDING THE GUARDRAIL TO PROVIDE A ST'D. GR-6 TERMINAL.

ALTERNATE BREAKAWAY CABLE TERMINAL (GR-9) IS TO BE ET-2000 (AS SHOWN) MANUFACTURED BY SYRO STEEL COMPANY, BRAKEMASTER AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., THE BEST SYSTEM AS MANUFACTURED BY INTERSTATE STEEL CORPORATION, THE SKT-350 AS MANUFACTURED BY ROAD SYSTEMS INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

FOR DETAILS, DIMENSIONS, QUANTITIES AND OTHER INFORMATION NOT SHOWN HEREON, SEE INDIVIDUAL MANUFACTURER'S PLANS.

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

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

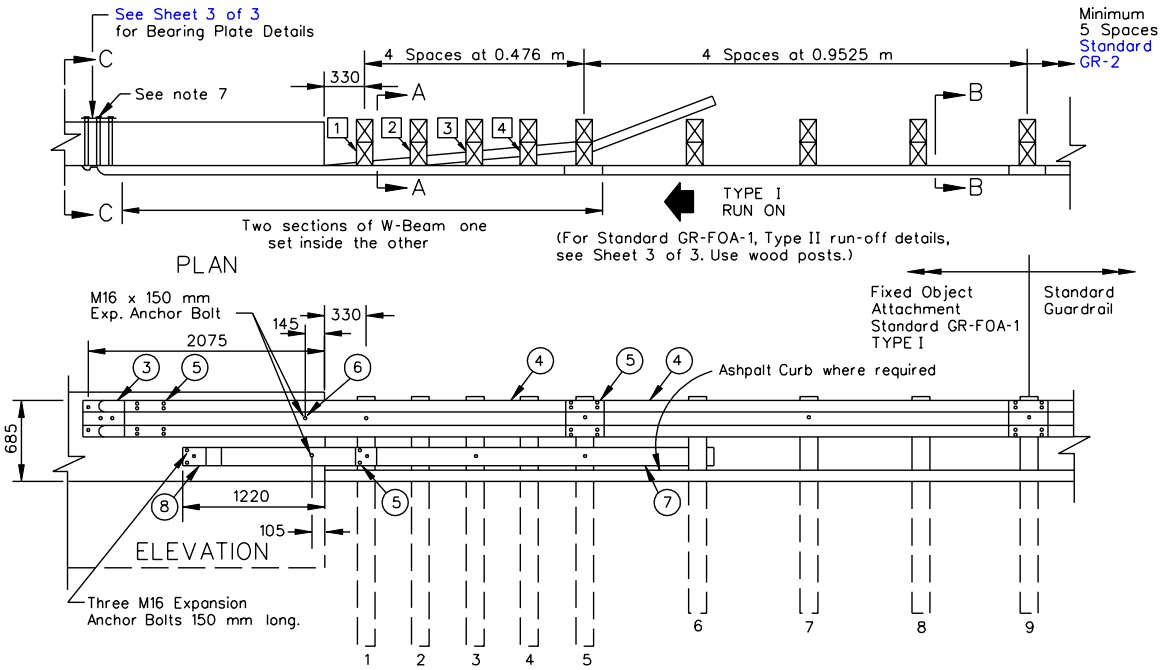
CRT POSTS REQUIRED ON POST NUMBER 5, 6, 7 AND 8.

ALL STANDARD GR-9 TERMINALS WILL BE INSTALLED WITH A MINIMUM FLARE RATE OF 50:1. PLEASE REFER TO THIS MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR SPECIFIC INFORMATION ON THEIR TERMINAL SYSTEM'S RECOMMENDED STRAIGHT LINE FLARE RATE.

SPECIFICATION REFERENCE	ALTERNATE BREAKAWAY CABLE TERMINAL NO FLARE	REV. 4-98
505.01	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS — 501.16

REVISED ON 2/01 **REVISED ON 7/01**

GR-FOA-1



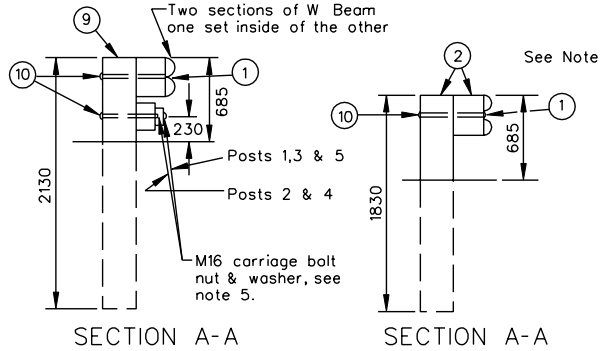
Notes:

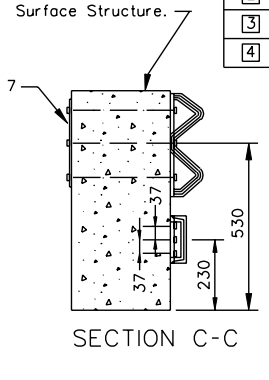
1. Fixed objects may consis of bridge rails, abutments, piers, retaining walls, or other flat surfaced structures with a vertical face.
2. Bridge rail ends and bridge parapets must be of adequate strength to accept full impact loading.
3. Guardrail components to be in accordance with VDOT Road and Bridge Standards.
4. Posts 1,2,3,4 and 5 require an additional hole to attach lower blocks and/or rubrail. Rubrail is not bolted to post 2 and 4.
5. Bottom wood blocks located on posts 1 through 4 are center drilled and secured with M16 carriage bolts. (Length as required.)
6. W-beam is no bolted to posts 2,3,4,6 and 8: Bolt balock diretly to post.
7. Appropriate length M22 diameter ASTM A325 hex bolts must be used with hru drilled holes with a 16 mm bearing plate on the back side of the bridge parapet or Terminal wall.

New Bridges - Attachments
One Way Traffic - Run-on, 2-GR-FOA-1, Type I
- Run-off, 2-GR-FOA-1, Type II
Two Way Traffic - Run On, 4-GR-FOA-1, Type I
Existing bridge attachments as shown on plans.

RUBRAIL WOOD BLOCKS
180 mm x 150 mm x THICKNESS

Post	Thickness
1	170
2	130
3	90
4	50





Item	Material/Specifications/Notes
1	M16 x 460 mm Guardrail bolt & Recessed nut
2	Standard 150 x 200 mm Wood post & Block
3	Standard W-beam terminal connector
4	Standard W-beam rail
5	M16 x 50 mm Guardrail bolt & Recessed nut (See Standard GR-HDW)
6	Rectangular Plate Washer (See Standard GR-HDW)
7	Bent plate rubrail (See sheet 3 of 3)
8	C150 x 12 rubrail (See sheet 3 of 3)
9	Mod. 150 x 200 mm Wood post & Standard block (2130 mm length post)
10	Washer for M16 bolt

Sheet 1 of 3

SPECIFICATION REFERENCE

505

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

Rev. 7/98

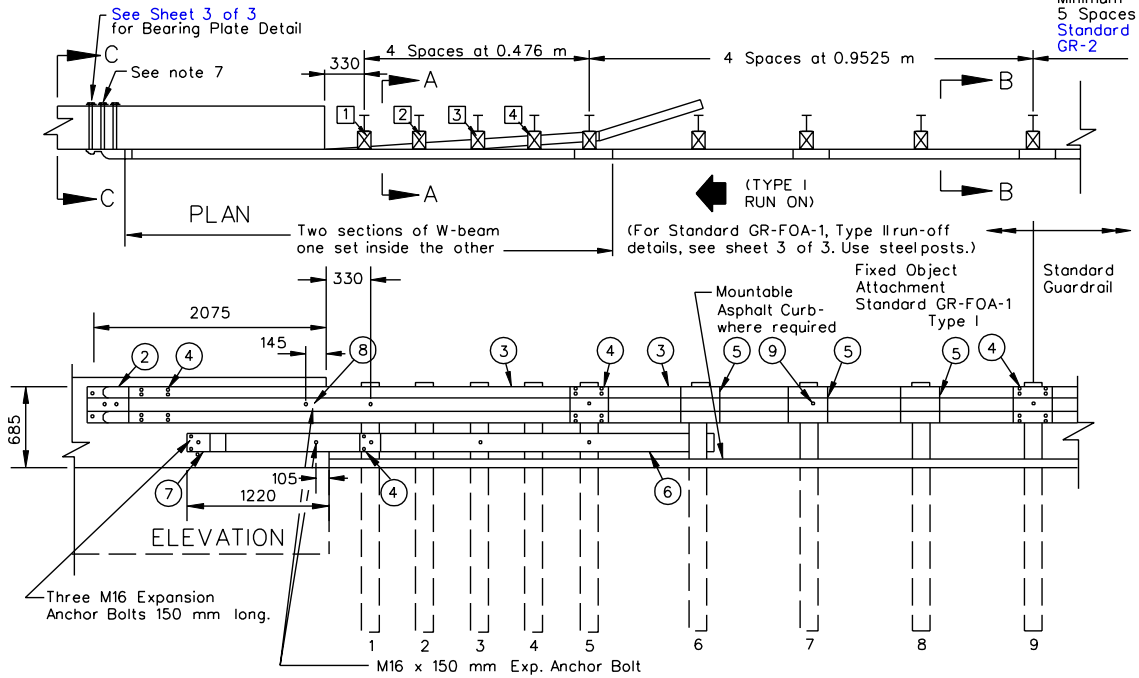
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.22

REVISED ON 2/01 **REVISED ON 7/01**

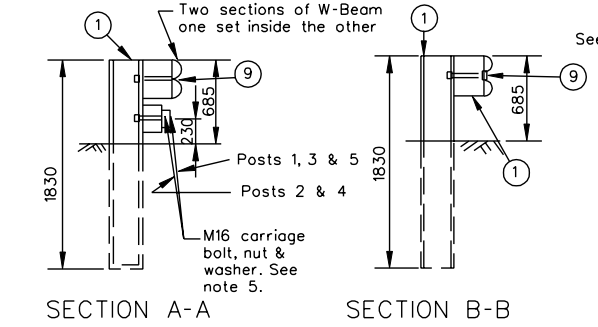
GR-FOA-1

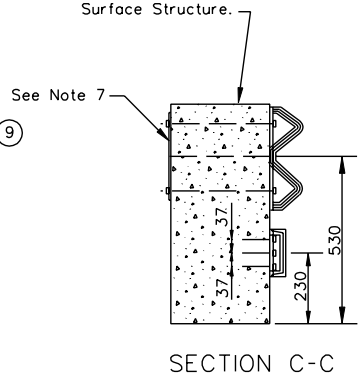


Notes:

1. Fixed objects may consis of bridge rails, abutments, piers, retaining walls, or other flat surfaced structures with a vertical face.
2. Bridge rail ends and bridge parapets must be of adequate strength to accept full impact loading.
3. Guardrail components to be in accordance with VDOT Road and Bridge Standards.
4. Posts 1,2,3,4 and 5 require an additional hole to attach lower blocks and/or rubrail. Rubrail is not bolted to post 2 and 4.
5. Bottom wood blocks located on posts 1 through 4 are center drilled and secured with M16 carriage bolts. (Length as required.)
6. W-beam is no bolted to posts 2,3,4,6 and 8; Bolt balock diretly to post.
7. Appropriate length M22 diameter ASTM A325 hex bolts must be used with hru drilled holes with a 16 mm bearing plate on the back side of the bridge parapet or Terminal wall.

New Bridges - Attachments
One-Way Traffic - Run-On, 2-GR-FOA-1, Type I
- Run-Off, 2-GR-FOA-1, Type II
Two-Way Traffic - Run-On, 4-GR-FOA-1, Type I
Existing bridge attachments as shown on plans.





RUBRAIL WOOD BLOCKS
180 mm x 150 mm x Thickness

Post	Thickness
1	125
2	100
3	70
4	35

Item	Material/Specifications/Notes
1	Standard W150x13.5 Steel Post and Standard 150x200xa360 mm Treated Pine Block or Recycled Material
2	Standard W-beam terminal connector
3	Standard W-beam rail
4	M16x50 Guardrail bolt & Recessed nut
5	Standard W-beam back-up plate
6	Bent plate rubrail (See sheet 3 of 3)
7	C150x12 rubrail (See sheet 3 of 3)
8	Rectangular plate washer (See Standard GR-HDW)
9	M16x250 Guardrail bolt and Rrecessed nut

Sheet 2 of 3

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

SPECIFICATION REFERENCE

505

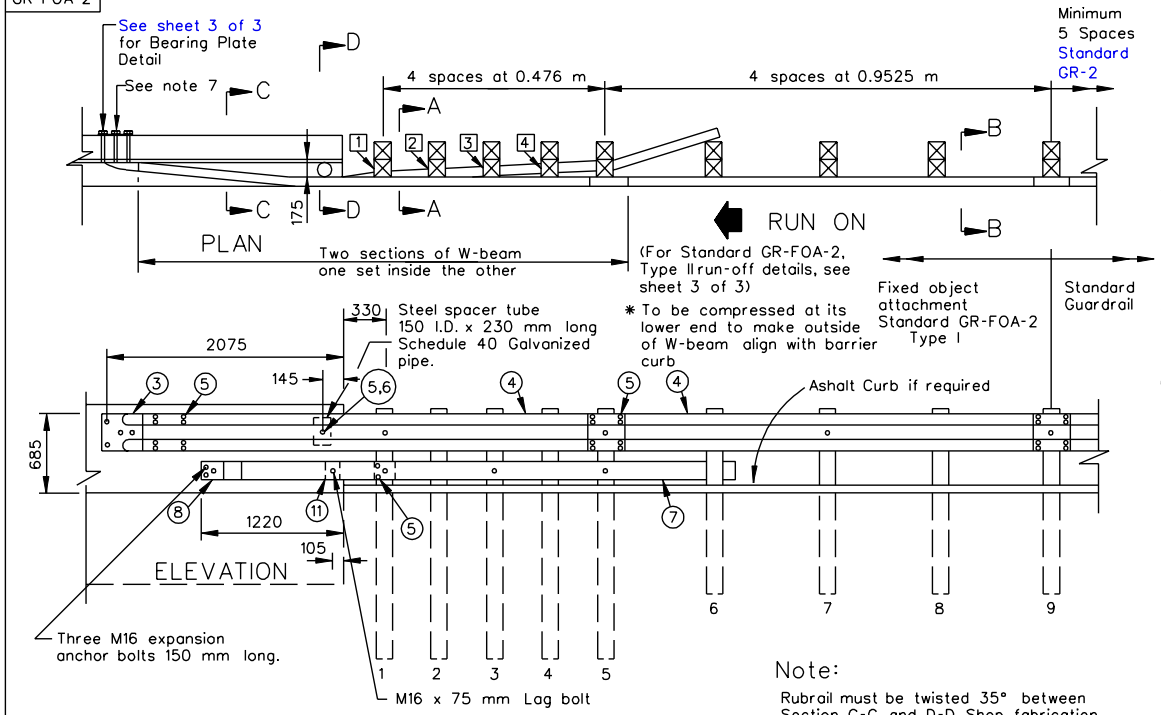
Rev. 7/98

501.23 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED ON 2/01 **REVISED ON 7/01**

GR-FOA-2



Notes:

1. Fixed objects may consist of safety shaped bridge parapets or concrete barriers.
2. Bridge rail ends and bridge parapets must be of adequate strength to accept full impact loading.
3. Guardrail components to be in accordance with VDOT Road and Bridge Standards.
4. Posts 1,2,3,4 and 5 require an additional hole to attach lower blocks and/or rubrail. Rubrail is not bolted to posts 2 and 4.
5. Bottom wood blocks located on posts 1 through 4 are center drilled and secured with M16 carriage bolts. (Length as required)
6. W-beam is not bolted to posts at posts 2,3,4,6 and 8, Bolt block directly to post.
7. Appropriate length M22 ASTM A325M hex bolts must be used with thru drilled holes with a 16 mm bearing plate on the back side of the bridge parapet or concrete barrier.

RUBRAIL WOOD BLOCKS
180 mm x 150 mm

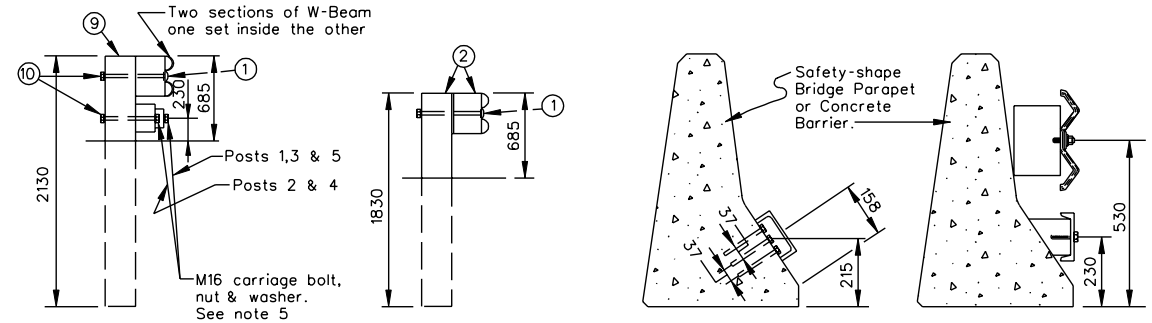
Post	Thickness
1	158
2	117
3	79
4	38

Note:

Rubrail must be twisted 35° between Section C-C and D-D. Shop fabrication may be required. Right hand and left hand twists will be necessary.

New Bridges - Attachments
One - Way Traffic-Run-on, 2-GR-FOA-2,Type I
-Run-off, 2-GR-FOA-2, Type II
Two - Way Traffic-Run-on, 4-GR-FOA-2, Type I

Existing bridge attachments as shown on plans.



SECTION A-A SECTION B-B SECTION C-C (W Beam Omitted) SECTION D-D

Item	Material/Specifications/Notes
1	M16 x 450 Guardrail bolt & Recessed nut
2	Standard 150 x 200 Wood post & Block
3	Standard W-beam terminal connector
4	Standard W-beam rail
5	M16 x 50 Guardrail bolt & Recessed nut (See Standard GR-HDW)
6	Rectangular Plate Washer (See Standard GR-HDW)
7	Bent plate rubrail (see sheet 3 of 3)
8	C150 x 12 rubrail (See sheet 3 of 3)
9	Mod. 150 x 200 Wood post & Standard block (2.1 m length post)
10	Washer for M16 bolt
11	Wood blockout for rubrail (see sheet 3 of 3)

Sheet 1 of 3

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

SPECIFICATION REFERENCE

506

Rev. 7/98

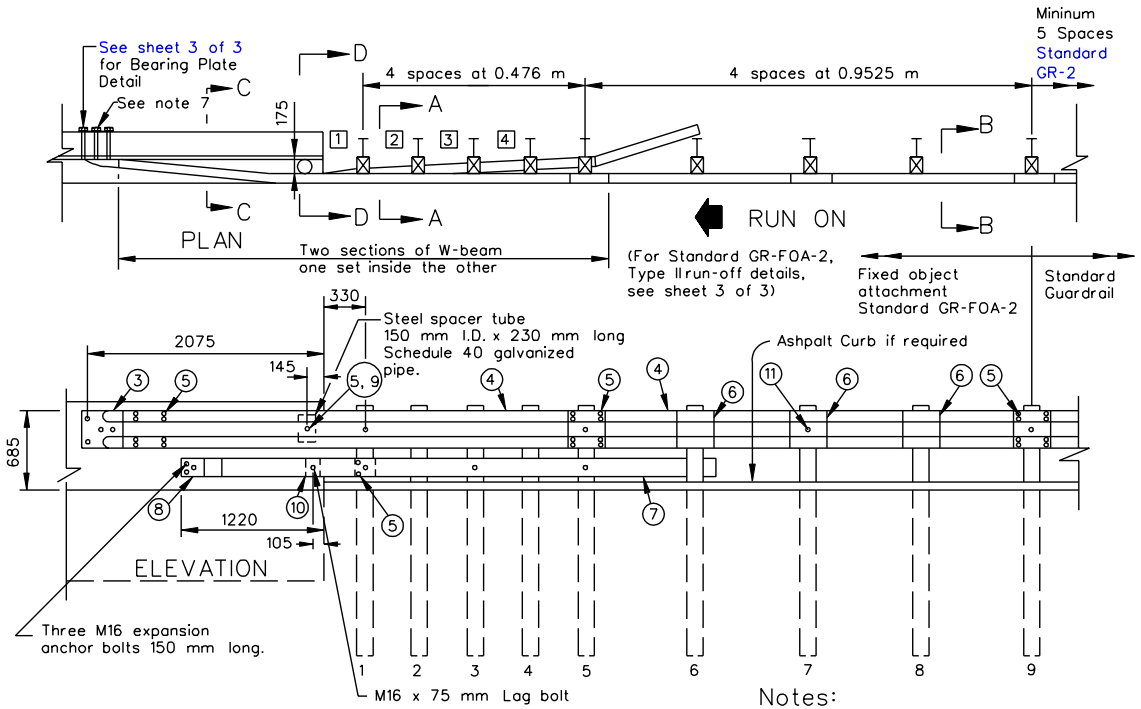
501.25

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED ON 2/01 **REVISED ON 7/01**

GR-FOA-2



Notes:

1. Fixed objects may consist of safety shaped bridge parapets or concrete barriers.
2. Bridge rail ends and bridge parapets must be of adequate strength to accept full impact loading.
3. Guardrail components to be in accordance with VDOT Road and Bridge Standards.
4. Posts 1,2,3,4 and 5 require an additional hole to attach lower blocks and/or rubrail. Rubrail is not bolted to posts 2 and 4.
5. Bottom wood blocks located on posts 1 through 4 are center drilled and secured with M16 carriage bolts. (Length as required)
6. W-beam is not bolted to posts at posts 2,3,4,6 and 8, Bolt block directly to post.
7. Appropriate length M22 ASTM A325M hex bolts must be used with thru drilled holes with a M16 bearing plate on the back side of the bridge parapet or concrete barrier.

RUBRAIL WOOD BLOCKS 180 x 100

Post	Thickness
1	108
2	82
3	50
4	25

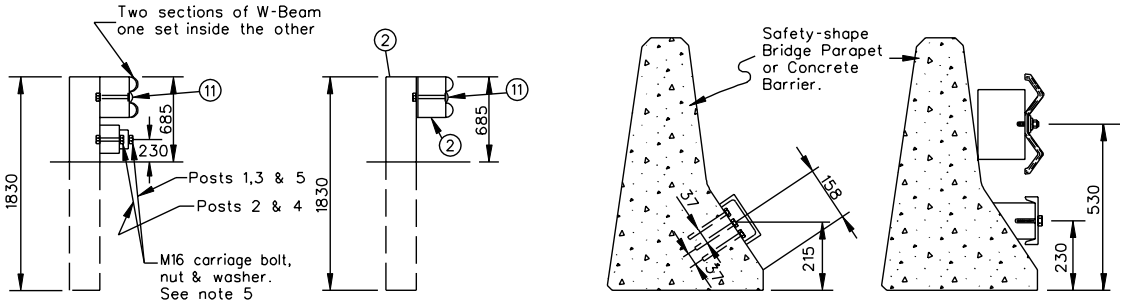
New Bridges - Attachments
One - Way Traffic-Run-on, 2-GR-FOA-2, Type I
-Run-off, 2-GR-FOA-2, Type II
Two - Way Traffic-Run-on, 4-GR-FOA-2, Type I

Existing bridge attachments as shown on plans.

Notes:

Rubrail must be twisted 35° between Section C-C and D-D. Shop fabrication may be required. Right hand and left hand twists will be necessary.

Item	Material/Specifications/Notes
1	M16 washer
2	Standard W150x13.5 Steel Post and Standard 150x200x360 mm Treated Pine Block or Recycled Material
3	St'd W-beam terminal connector
4	Standard W-beam rail
5	M16 x 50 Guardrail bolt and Recessed nut
6	Standard W-beam back-up plate
7	Bent plate rubrail (see sheet 3 of 3)
8	C150 x 12 rubrail (See sheet 3 of 3)
9	Rectangular plate washer (see Standard GR-HDW)
10	Wood blockout for rubrail (see sheet 3 of 3)
11	M16 x 250 Guardrail bolt and Recessed nut



SECTION A-A SECTION B-B SECTION C-C (W Beam Omitted) SECTION D-D

SPECIFICATION REFERENCE

506

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

Rev. 7/98

VIRGINIA DEPARTMENT OF TRANSPORTATION

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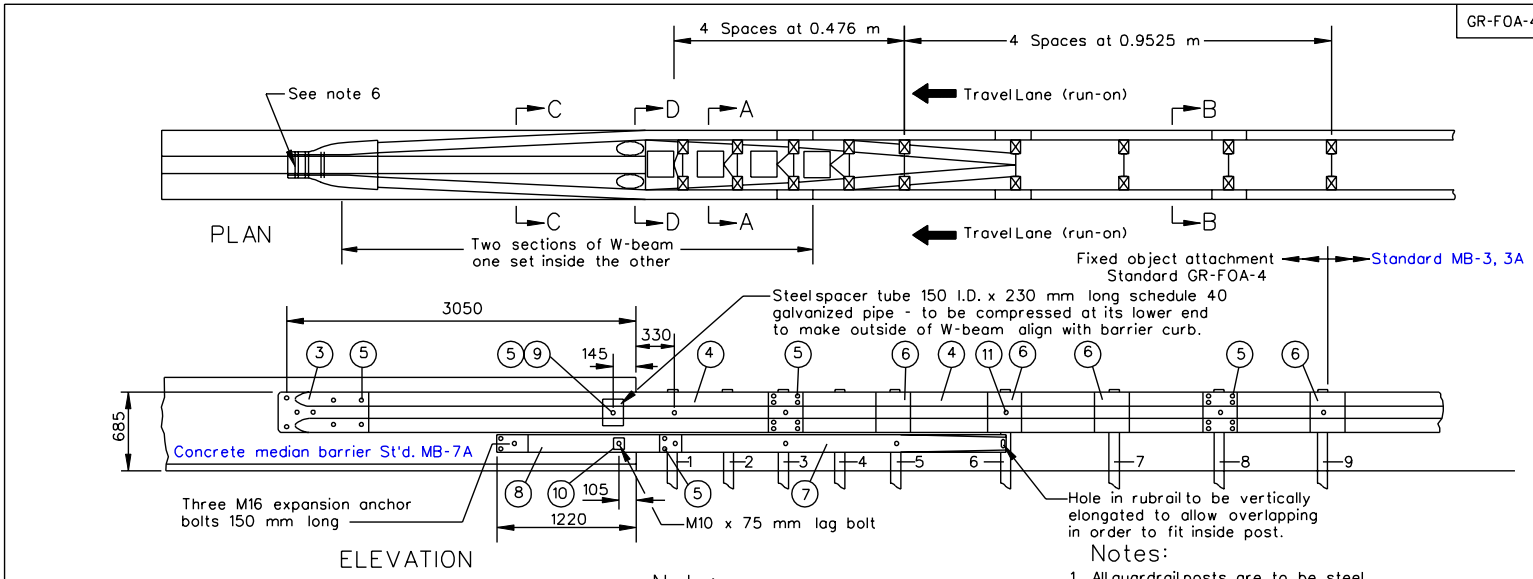
501.26

REVISED ON 2/01

GR-FOA-4

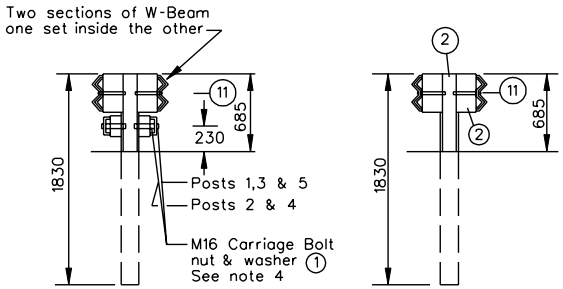


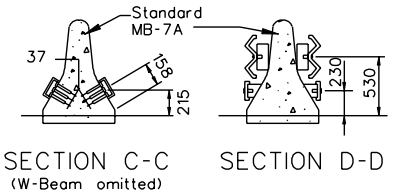
Notes:

1. All guardrail posts are to be steel.
2. All guardrail components are to be in accordance with VDOT Road and Bridge Standards.
3. Posts 1,2,3,4 and 5 require an additional hole to attach lower blocks and/or rubrail. Rubrail is not bolted to posts 2 and 4.
4. Bottom wood blocks located on posts 1 through 4 are to be drilled and secured with M16 carriage bolts (length as required).
5. W-beam is not bolted to posts 2,4,5 and 7. These blocks are to be bolted directly to posts.
6. Appropriate length M22 ASTM A325M hex bolts are to be used with holes drilled through the concrete median barrier, attaching the W-beam terminal connectors on each side.

Note:

Rubrail must be twisted 35° between Sections C-C and D-D. Shop fabrication may be required. Right and left hand twists will be required.





Rubrail Wood Blocks 175 x 100	
Post	Thickness
1	108
2	83
3	51
4	25

TYPE I Two run-on sections (with two rubrails as shown)

TYPE II One run-on section (with one rubrail retained) One run-off section (with one rubrail removed)

TYPE III Two run-off sections (with both rubrails removed)

Item	Material / Specifications / Notes
(1)	M16 washer
(2)	Standard W150x13.5 Steel Post and Standard 150x200x360 mm Treated Pine Block or Recycled Material
(3)	St'd. W-Beam terminal connector (Mod.)
(4)	Standard W-Beam rail
(5)	M16x50 guardrail bolt & recessed nut
(6)	Standard W-Beam backup plate

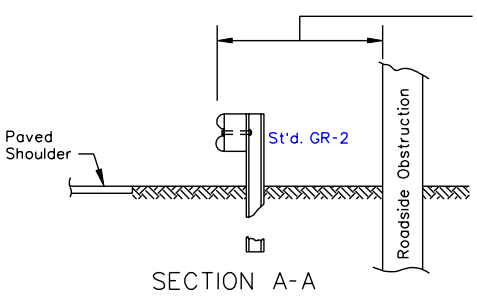
Item	Material / Specifications / Notes
(7)	Bent plate rubrail (See sheet 2 of 2)
(8)	C150x12 rubrail (See sheet 2 of 2)
(9)	Rectangular plate washer (See Standard GR-HDW)
(10)	Wood blockout for rubrail (See sheet 2 of 2)
(11)	M16x250 guardrail bolt & recessed nut

Sheet 1 of 2

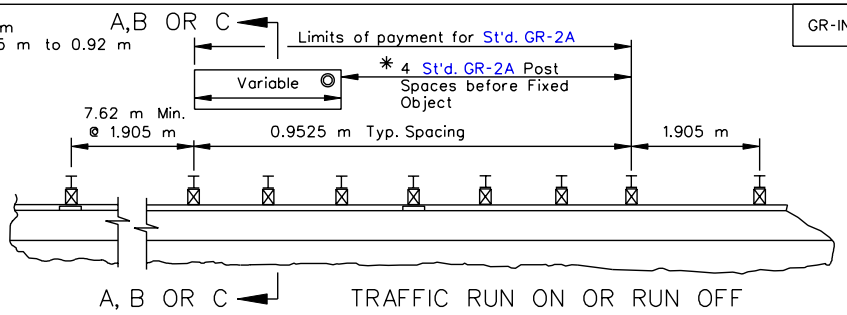
SPECIFICATION REFERENCE	BLOCKED-OUT W-BEAM MEDIAN BARRIER-FIXED OBJECT ATTACHMENT FOR USE BETWEEN STANDARD MB-7A AND STANDARD MB-3	Rev. 7/98
505	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS — 501.28

REVISED ON 2/01

GR-INS



SECTION A-A

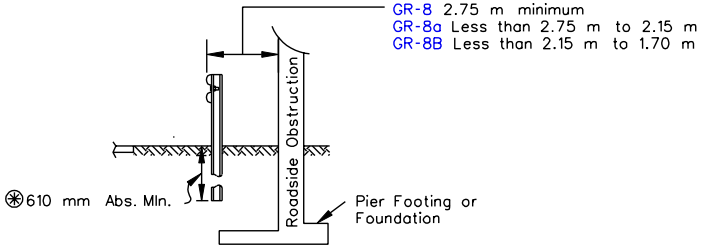


TRAFFIC RUN ON OR RUN OFF

*For Two Way Traffic, use 4 Post Spacing Design from each end of fixed object.

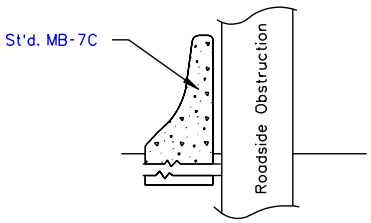
◎ Roadside Obstruction

⊛ If 610 mm dimension cannot be obtained use St'd. MB-7C treatment shown Section C-C.

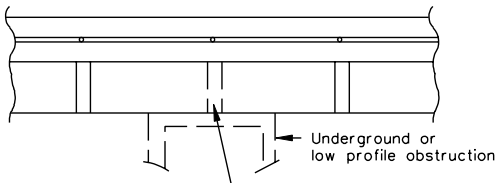


SECTION B-B

For use where distance face of rail to fixed object is less than 0.92 m.



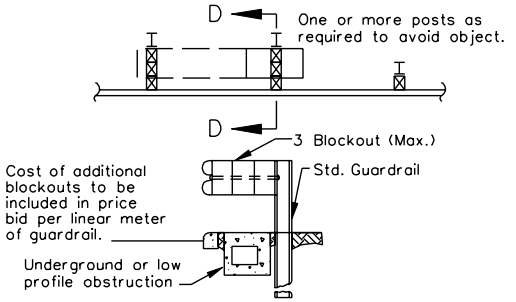
SECTION C-C



Note:

If ground level or underground fixed object necessitates the elimination of one or more posts, a SPECIAL DESIGN will be required.

DETAIL OF SPECIAL DESIGN SITUATION



SECTION D-D

DETAIL OF MULTIPLE BLOCK-OUT TO AVOID UNDERGROUND OR LOW PROFILE OBSTRUCTION

Sheet 3 of 8

SPECIFICATION REFERENCE
221 505

W BEAM GUARDRAIL INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 6/98

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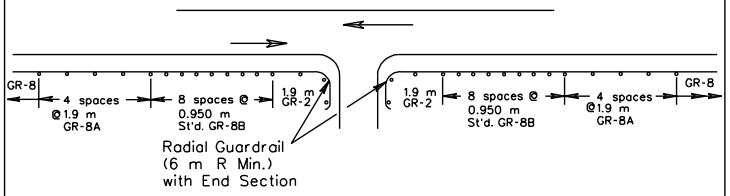
501.32

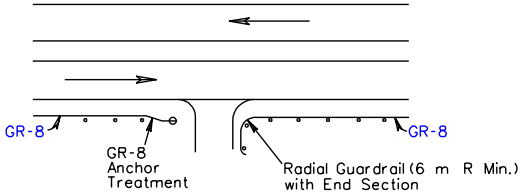
REVISED ON 2/01

GR-INS

WEAK POST INSTALLATION

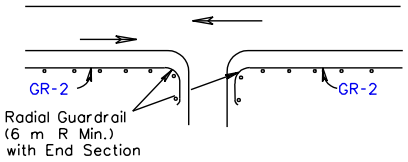


ADJACENT TO UNDIVIDED HIGHWAY

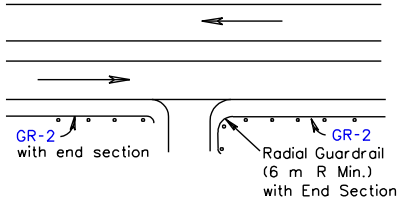


ADJACENT TO DIVIDED HIGHWAY

STRONG POST INSTALLATION

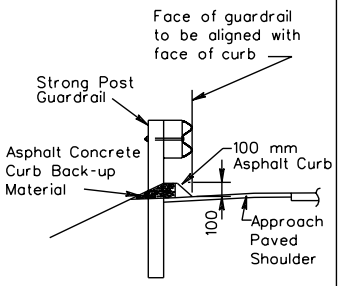


ADJACENT TO UNDIVIDED HIGHWAY



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

INSTALLATION AT ENTRANCE OR OTHER REQUIRED OPENING



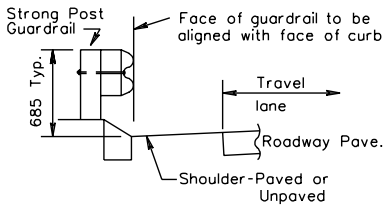
ASPHALT CURB SECTION

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

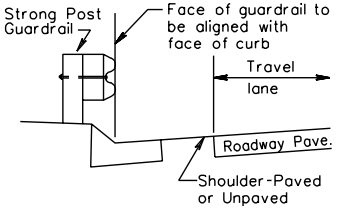
SHOULDER WIDTH (S)	PAVED SHOULDER WIDTH (P_S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
4.5 m	0.9, 1.2, 3.0 or 3.6 m	3.6 m
3.9 m	0.9 m	3.0 m
3.6 m (Med. 6 lane)	3.0 m	3.0 m
3.3 m	0.9 m	2.4 m
2.4 m (Med.)	0.9 m or 1.2 m	1.5 m

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

SHOULDER WIDTH (S)	PAVED SHOULDER WIDTH (P_S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
4.5 m	1.8, 3.0 or 3.6 m	3.6 m
3.9 m	2.4 m	3.0 m
3.3 m	0, 0.9, 1.2 or 1.8 m	2.4 m
2.7 m	0, 0.9 or 1.2 m	1.8 m
2.1 m	0 or .09 m	1.2 m
1.5 m	0 or .09 m	0.6 m

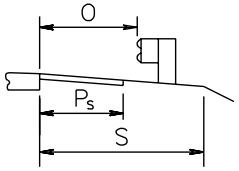


CURB SECTION

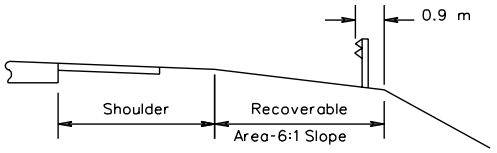


CURB & GUTTER SECTION

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



GUARDRAIL LOCATION-ON RECOVERABLE SLOPE



Sheet 6 of 8

SPECIFICATION REFERENCE
221 505

W BEAM GUARDRAIL INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/98

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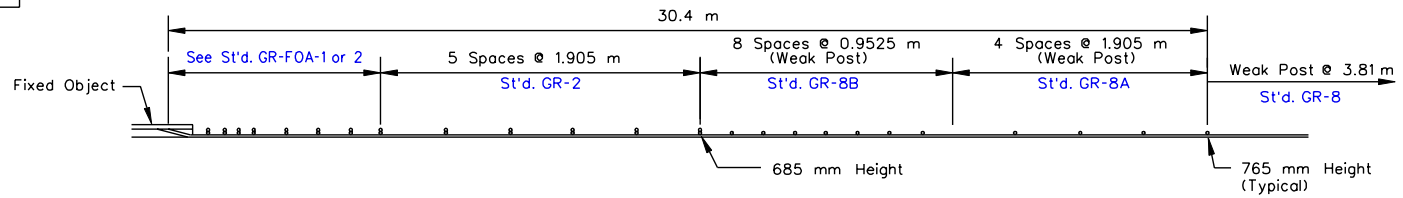
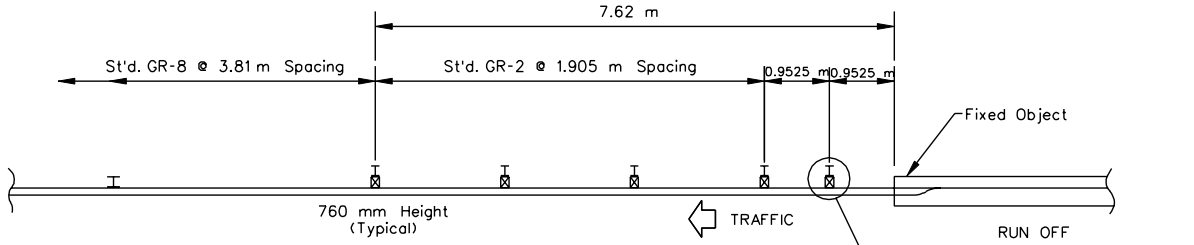
501.35

REVISED ON 2/01 REVISED ON 7/01

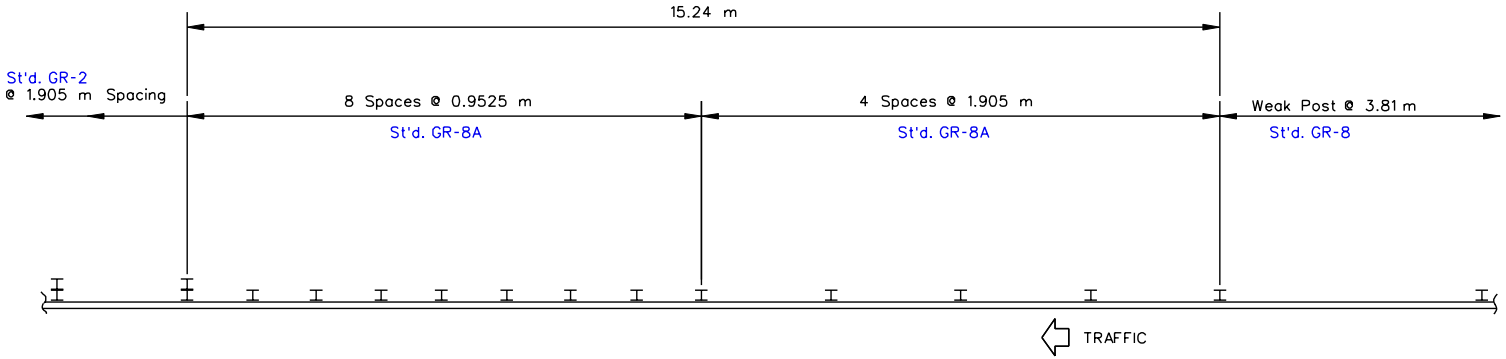
GR-INS



TRANSITION FROM WEAK POST GUARDRAIL TO FIXED OBJECT



TRANSITION FROM FIXED OBJECT TO WEAK POST GUARDRAIL



TRANSITION FROM WEAK POST TO STRONG POST GUARDRAIL

Sheet 7 of 8

W BEAM GUARDRAIL INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 7/98

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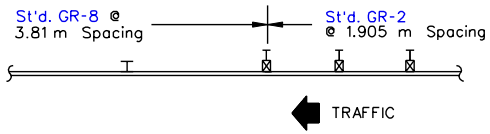
SPECIFICATION REFERENCE

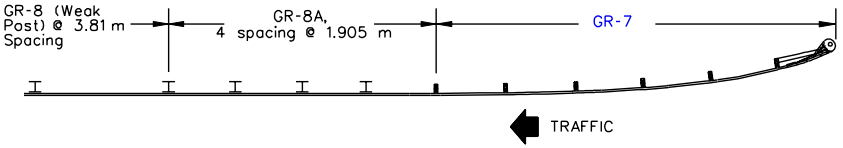
221
505

REVISED ON 2/01 REVISED ON 7/01

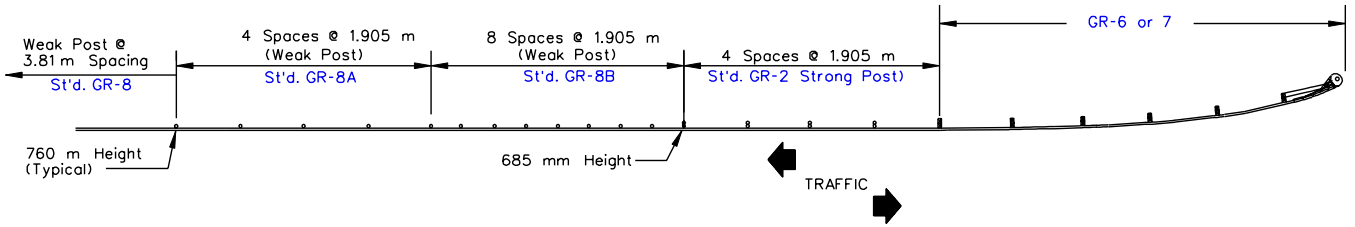
GR-INS



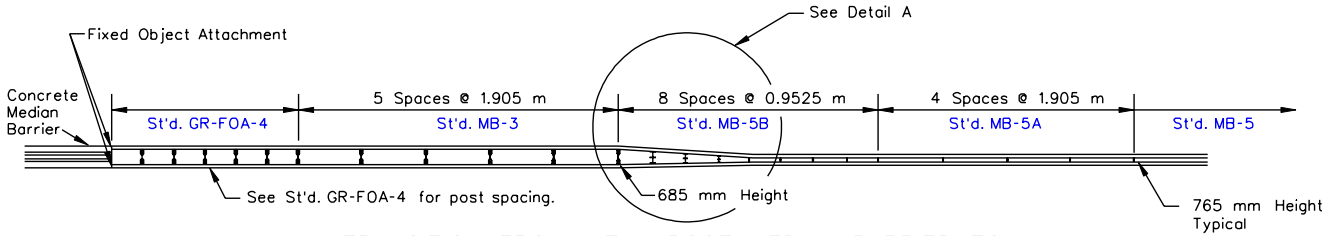
TRANSITION FROM STRONG POST TO WEAK POST GUARDRAIL



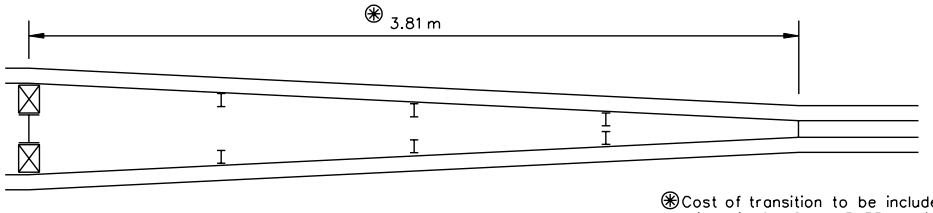
TRANSITION FROM GR-7 TERMINAL TO WEAK POST GUARDRAIL



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



TRANSITION FROM WEAK POST MEDIAN BARRIER TO CONCRETE MEDIAN BARRIER



DETAIL A

*Cost of transition to be included in price bid for St'd. MB-5B Median Barrier.

Sheet 8 of 8

SPECIFICATION REFERENCE
221 505

W BEAM GUARDRAIL AND MEDIAN BARRIER INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 7/98

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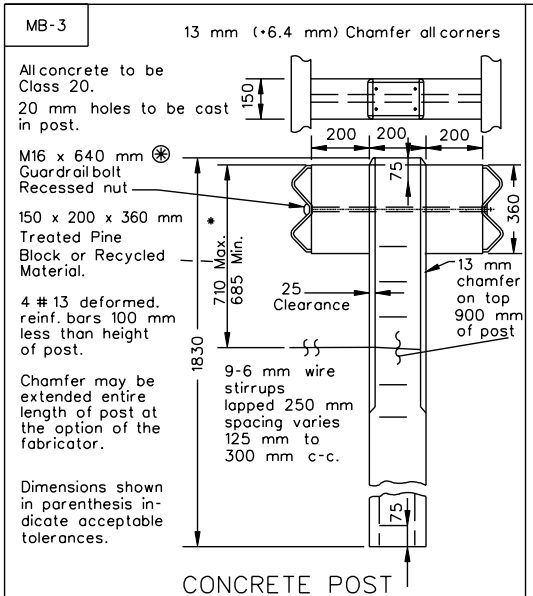
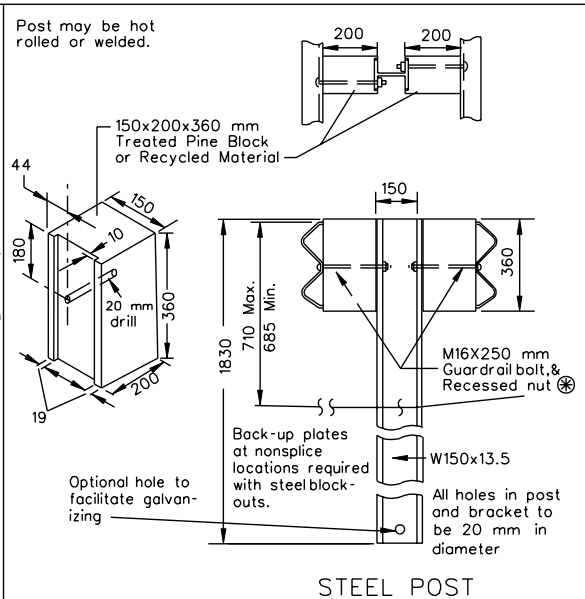
501.37

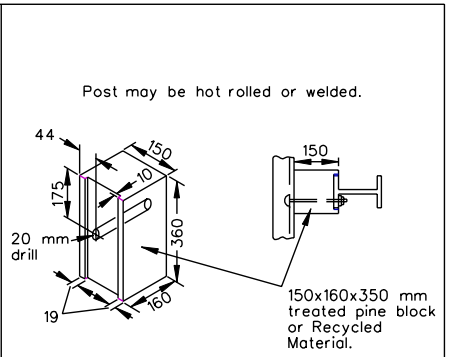
MB-3



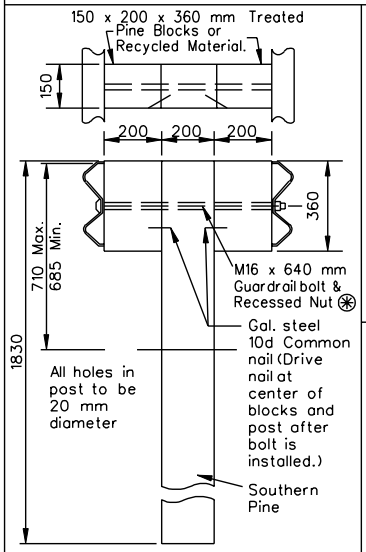
CONCRETE POST



STEEL POST



BLOCKOUT FOR MAINTENANCE REPAIR ONLY



WOOD POST

Notes:

Standard MB-3 post spacing is 1.905 m.

For details of Rail Element, Rail Splice Joint, W Beam Back up Plate, and associated hardware see Sheet no. 501.01.

Alternate type posts and blockouts may be interchanged on any one project with the restriction that the same type of post and blockout must be used in any single run of median barrier.

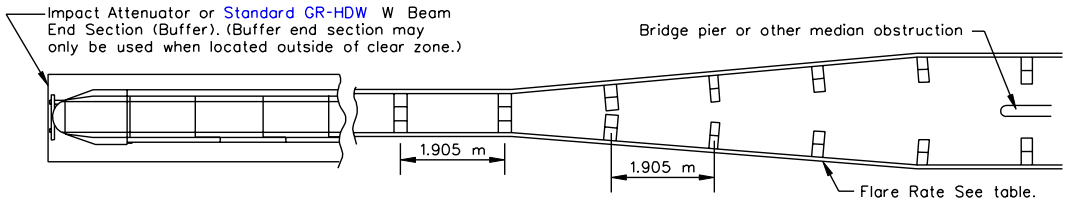
All bolts, nuts, washers, steel posts, bent plate post, and blockouts are to be galvanized.

The guardrail and median barrier components depicted in AASHTO - AGC - ARTBA "A Guide to Standardize Highway Barrier Hardware" may be substituted if interchangeable with the Standards for guardrail (GR) or median barrier (MB) and approved by the Engineer.

⊛ Standard washers are to be used on last 15.24 meters of Run off end.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/H	SHY LINE (m)	FLARE RATE	FLARE RATE
110	2.8	30:1	15:1 *
100	2.4	26:1	14:1 *
80	2.0	21:1	11:1 *
60	1.4	16:1	8:1 *
50	1.1	13:1	7:1 *

* Suggested maximum flare rate for semi-rigid barrier systems.



METHOD OF TREATMENT AT BRIDGE PIER OR MEDIAN OBSTRUCTION

BLOCKED-OUT W BEAM MEDIAN BARRIER

Rev. 7/98

501.38

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

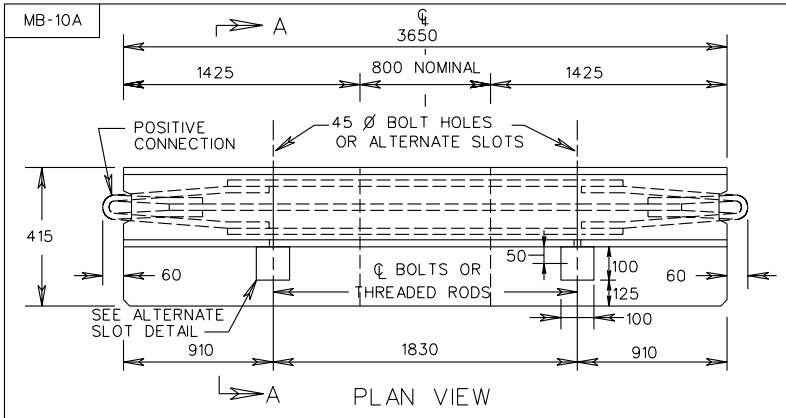
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

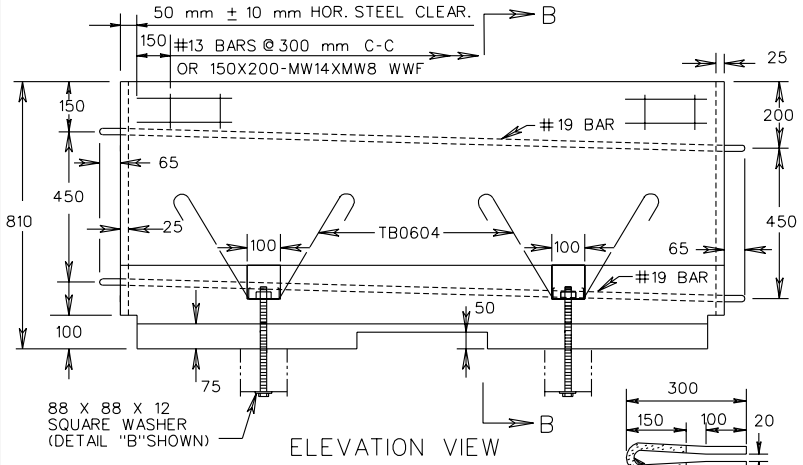
221
505

REVISED ON 7/02

MB-10A

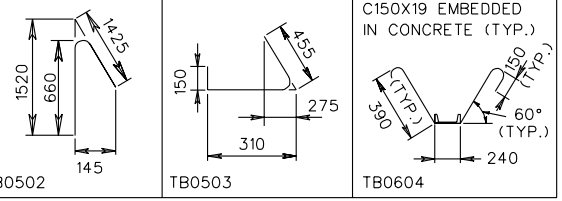


PLAN VIEW



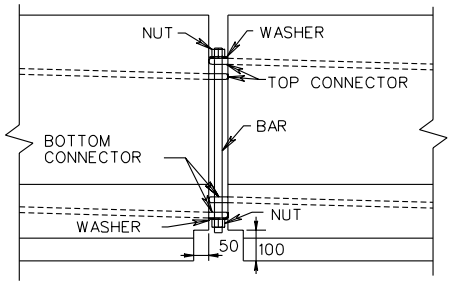
ELEVATION VIEW

REINFORCING STEEL SCHEDULE					
FOR ONE (1) SECTION					
MARK	NO.	SIZE	LENGTH	PIN Ø	LOCATION
TB0401	8	13	3480	———	TEMP. PARAPET
TB0502	12	16	1295	63	"
TB0503	12	16	810	63	"
TB0604	4	19	1420	115	"
BENDING DIAGRAM					

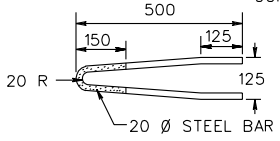


DIMENSIONS IN BENDING DIAGRAMS ARE OUT-TO-OUT OF BARS, EXCEPT AS SHOWN.
KILOGRAMS OF REINFORCING STEEL = 80 KG.
REINFORCING SCHEDULE BASED ON 3650 UNIT LENGTH.

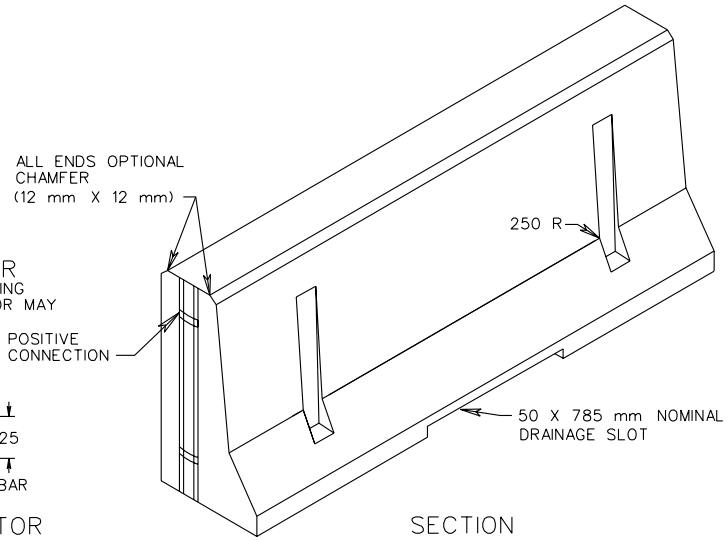
TOP CONNECTOR
GALVANIZE AFTER FORMING
NOTE: ENTIRE CONNECTOR MAY BE GALVANIZED.



ELEVATION OF CONNECTION



BOTTOM CONNECTOR



SECTION

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

REV. 4/98

501.57 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

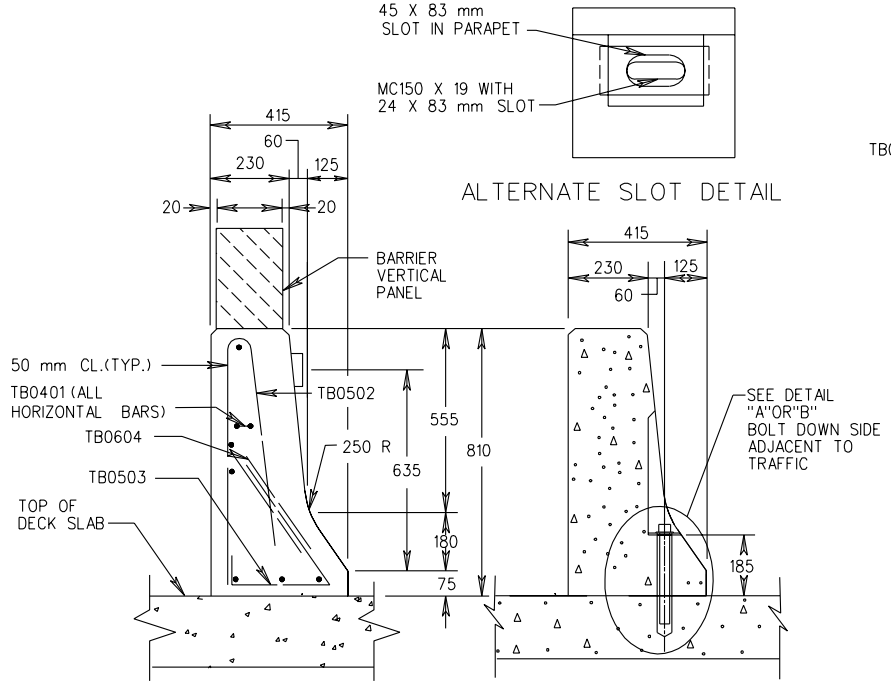
VIRGINIA DEPARTMENT OF TRANSPORTATION

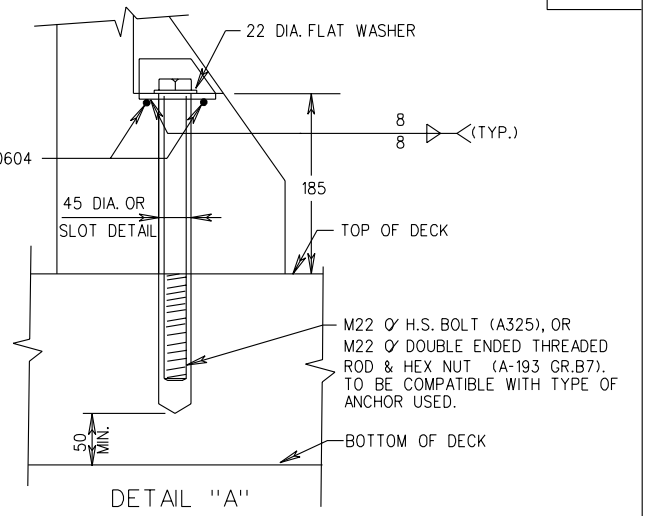
SPECIFICATION REFERENCE

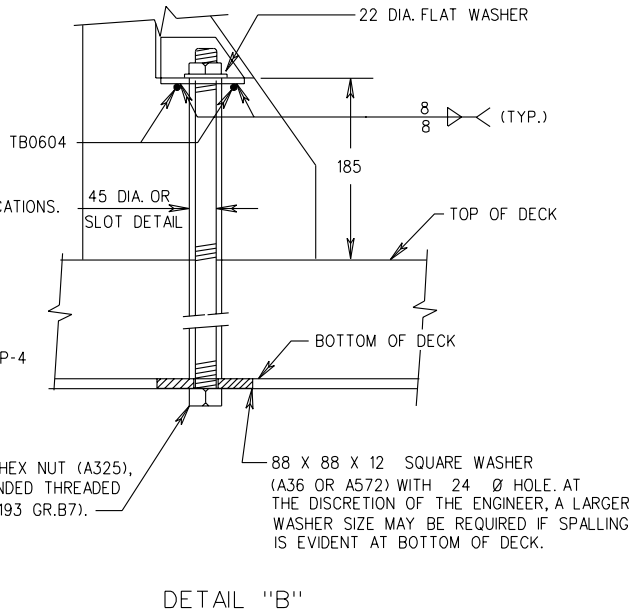
105
502

REVISED ON 7/02

MB-10A







NOTES:

BARRIER DELINEATOR TO BE SPACED IN ACCORDANCE WITH SECTION 702, OF THE ROAD AND BRIDGE SPECIFICATIONS.

Δ BARRIER VERTICAL PANELS TO BE SPACED IN ACCORDANCE WITH VIRGINIA WORK AREA PROTECTION MANUAL.

REFLECTIVE SURFACE, IN ALL INSTANCES, TO BE FACING ONCOMING TRAFFIC.

CONCRETE 30 MPA (MIN.) REINFORCING STEEL, GRADE 400.

AFTER REMOVING TEMPORARY BARRIER, CUT M22 BOLT OR THREADED ROD AS LOW AS PRACTICAL BELOW ROADWAY SURFACE AND FILL RECESS WITH EPOXY BONDING COMPOUND EP-4 (DETAIL "A") OR REMOVE M22 BOLTS OR THREADED RODS AND FILL HOLES WITH GROUT BONDED WITH EPOXY BONDING COMPOUND EP-4 (DETAIL "B").

ANCHOR SYSTEM SHOWN IN DETAIL "A" SHALL BE TESTED TO PROVIDED A MINIMUM PULLOUT OF 142.4 kN. AND INSTALLED ACCORDING TO MANUFACTURER'S RECOmmENDATIONS.

COST OF BARRIER DELINEATOR AND BARRIER VERTICAL PANELS TO BE INCLUDED IN PRICE BID PER METER OF BARRIER SERVICE.

WHEN BARRIER IS LOCATED ON VERTICAL AND/OR HORIZONTAL CURVES, THE OPENINIG AT JOINTS IS NOT TO EXCEED 25 mm.

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT.

FOR POSITIVE CONNECTION DETAILS AND DIMENSIONS SEE SPECIAL DESIGN DRAWING NO. A-105.

SHEET 2 OF 2

SPECIFICATION REFERENCE
105 502

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

REV. 4/98

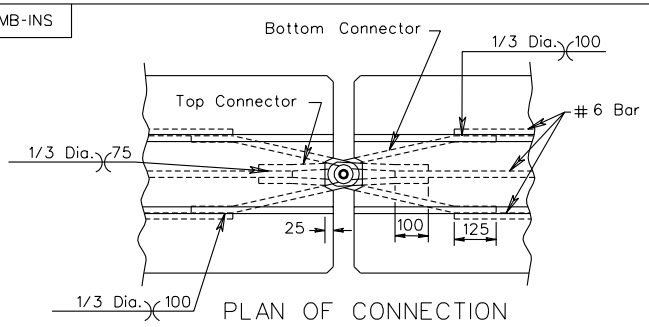
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

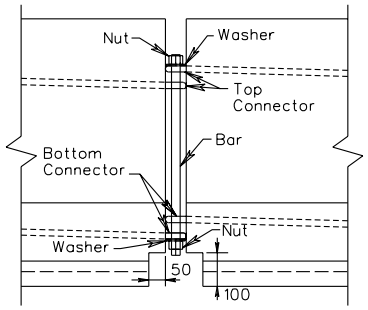
501.58

REVISED ON 12/99

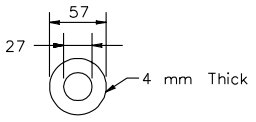
MB-INS



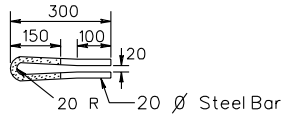
PLAN OF CONNECTION



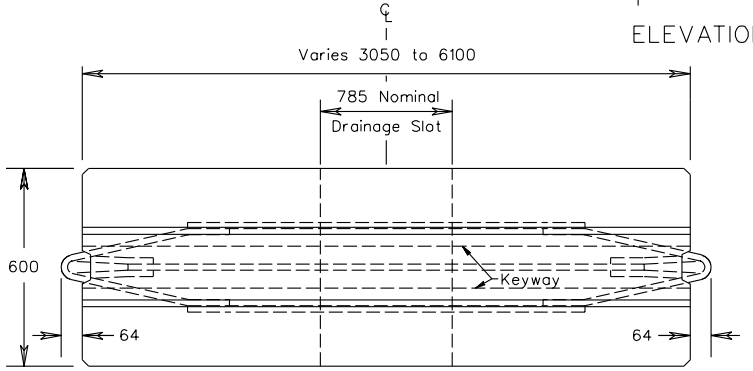
ELEVATION OF CONNECTION



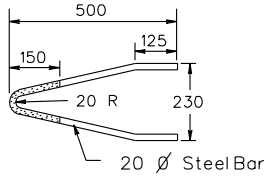
PLAIN GALVANIZED STEEL WASHER FOR 25 mm PIN



TOP CONNECTOR



PLAN VIEW



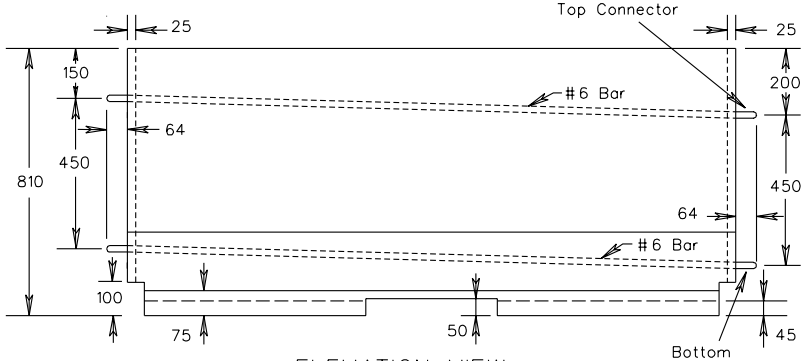
BOTTOM CONNECTOR

Galvanize After Forming
Note: Entire Connector May Be Galvanized.

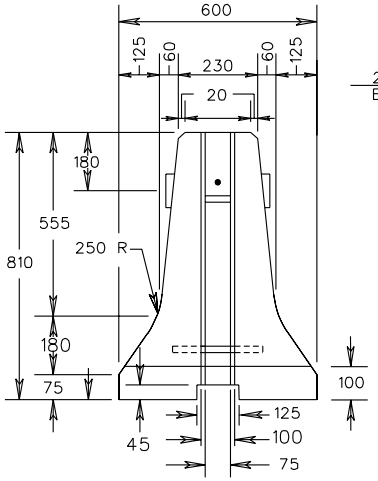
Notes:

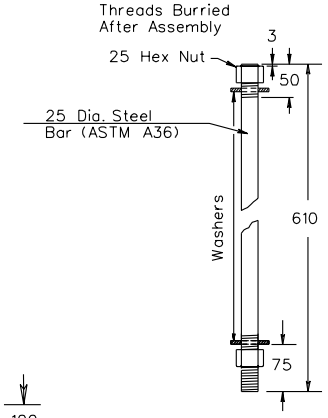
Pin and Connectors to be ASTM A-36 Reinforcing steelbars to be ASTM A 615, Grade 60 One Connector Pin Assembly with each Barrier section.

Beginning with the January 2000 Advertisement all positive connections must be approved by the FHWA in accordance with NCHRP 350 test requirements.



ELEVATION VIEW





CONNECTOR PIN ASSEMBLY

Galvanized after fabrication.

Sheet 1 Of 4

PIN & LOOP DETAILS

PRECAST CONCRETE MEDIAN BARRIER
POSITIVE CONNECTION OPTIONS

Rev. 3/98

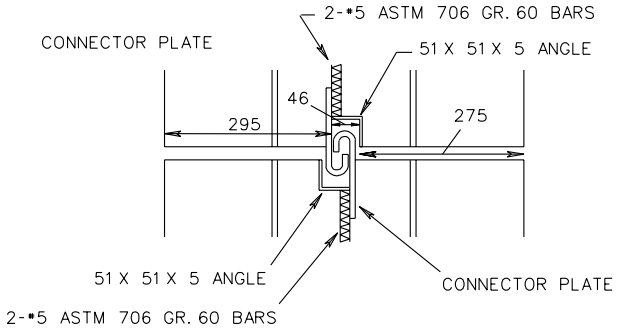
VIRGINIA DEPARTMENT OF TRANSPORTATION

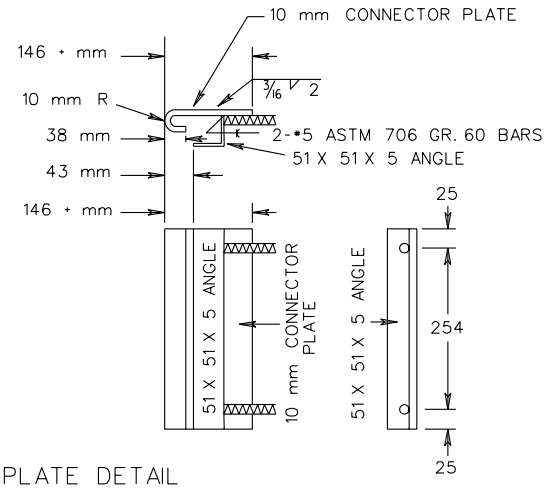
501.68 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SPECIFICATION REFERENCE

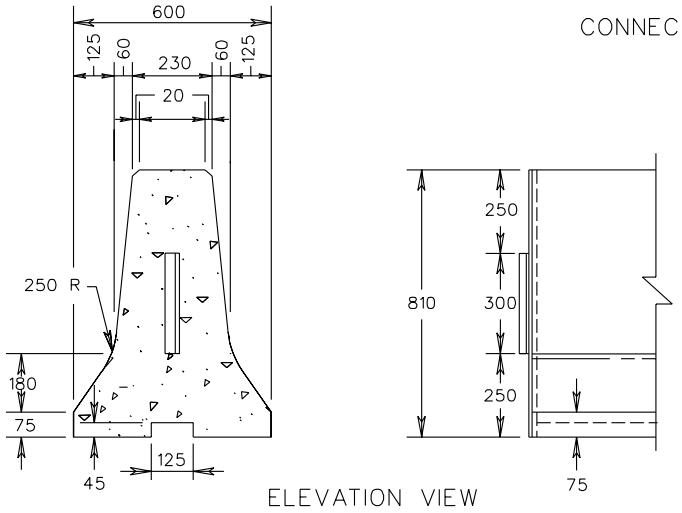
REVISED ON 12/99

MB-INS

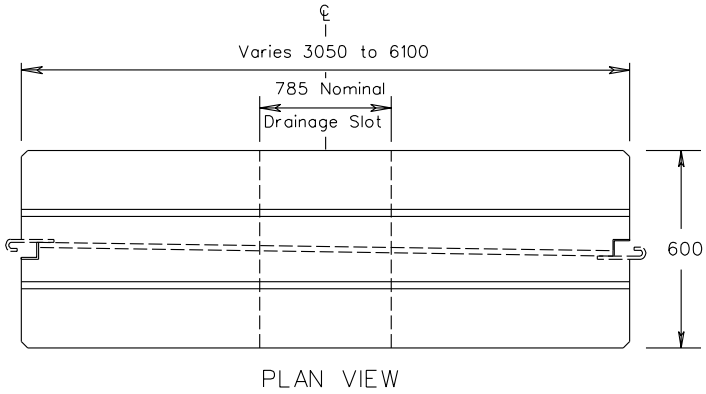




CONNECTOR PLATE DETAIL



ELEVATION VIEW



PLAN VIEW

Notes:

All exposed metal to be galvanized.
J-J Hook as manufactured by Smith Midland.

Beginning with the January 2000 Advertisement all positive connections must be approved by the FHWA in accordance with NCHRP 350 test requirements.

J-J HOOK DETAILS

Sheet 2 of 4

SPECIFICATION REFERENCE

PRECAST CONCRETE MEDIAN BARRIER POSITIVE CONNECTION OPTIONS

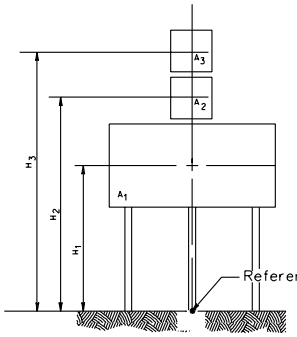
VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 3/98

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.69

CSI-1



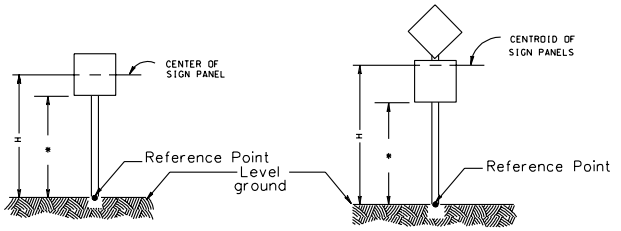
A_1 = Area of Sign Panel 1
A_2 = Area of Sign Panel 2
A_3 = Area of Sign Panel 3
H_1 = Centroidal Distance From Sign Panel 1 to Ground Line
H_2 = Centroidal Distance From Sign Panel 2 to Ground Line
H_3 = Centroidal Distance from Sign Panel 3 to Ground Line.
H = Centroidal Distance for Sign Group.

$$H = \frac{(A_1 X H_1) + (A_2 X H_2) + (A_3 X H_3)}{(A_1 + A_2 + A_3)}$$

NOTE:
Measure "H" distances from Reference point which is located half-way between outer posts (for 2 or 3 posts) and intersection with ground line.

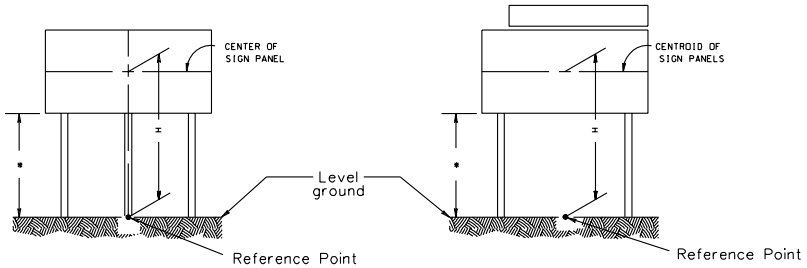
PROCEDURE FOR DETERMINING CENTROID WITH MULTIPLE SIGN PANELS

SINGLE POST



SINGLE SIGN PANEL MULTIPLE SIGN PANELS

TWO OR THREE POSTS



SINGLE SIGN PANEL MULTIPLE SIGN PANEL

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
100x100	2300	0.66	1.32	1.98
	2400	0.63	1.27	1.90
	2500	0.61	1.21	1.82
	2600	0.58	1.17	1.75
	2700	0.56	1.12	1.69
	2800	0.54	1.08	1.63
	2900	0.52	1.05	1.57
	3000	0.51	1.01	1.52
	3100	0.49	0.98	1.47
	3200	0.47	0.95	1.42
	3300	0.46	0.92	1.38
	3400	0.45	0.89	1.34
	3500	0.43	0.87	---
	3600	0.42	0.84	---
	3700	0.41	0.82	---

Dimension "H" is defined as follows (for level ground):

Single sign panel: Vertical distance from center of sign panel to the ground line.

Multiple sign panels: Vertical distance from centroid of sign panel group to the ground line.

Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

* Wood post sign structures shall be installed in accordance with WSP-1 except that notes under installation details are replaced with the following:

Single post sign structures shall have a minimum distance between top of sign panel and groundline of 2700 mm.

Single and multipost sign structures shall have a minimum distance between top of pavement (at edge of pavement) and bottom of sign panel, and between groundline and bottom of sign panel of 2100 mm.

If a secondary sign panel is mounted below primary sign panel the above distances (between bottom of sign panel and either groundline or top of pavement) may be reduced to 1800 mm.

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS LEVEL GROUND

SPECIFICATION REFERENCE

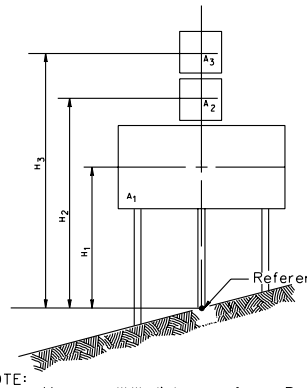
Rev. 12/97

1301.93

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

CSI-1



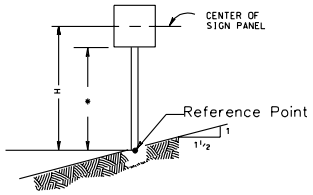
A_1 = Area of Sign Panel 1
A_2 = Area of Sign Panel 2
A_3 = Area of Sign Panel 3
H_1 = Centroidal Distance From Sign Panel 1 to Ground Line
H_2 = Centroidal Distance From Sign Panel 2 to Ground Line
H_3 = Centroidal Distance from Sign Panel 3 to Ground Line.
H = Centroidal Distance for Sign Group.

$$H = \frac{(A_1 X\ H_1) + (A_2\ X\ H_2) + (A_3 X\ H_3)}{(A_1 + A_2 + A_3)}$$

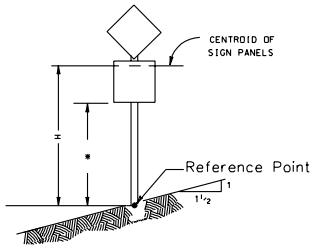
NOTE:
Measure "H" distances from Reference point which is located half-way between outer posts (for 2 or 3 posts) and intersection with ground line.

PROCEDURE FOR DETERMINING CENTROID WITH MULTIPLE SIGN PANELS

SINGLE POST

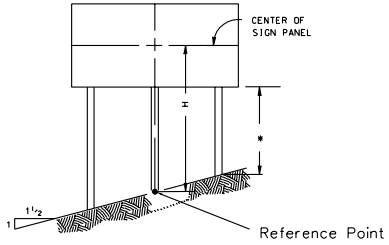


SINGLE SIGN PANEL

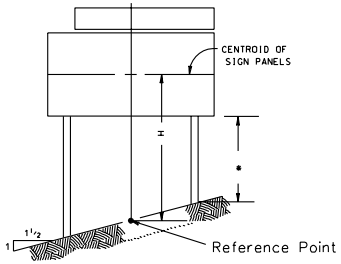


MULTIPLE SIGN PANELS

TWO OR THREE POSTS



SINGLE SIGN PANEL



MULTIPLE SIGN PANEL

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
100x100	2300	0.66	---	---
	2400	0.63	---	---
	2500	0.61	---	---
	2600	0.58	---	---
	2700	0.56	---	---
	2800	0.54	---	---
	2900	0.52	---	---
	3000	0.51	---	---
	3100	0.49	---	---
	3200	0.47	---	---
	3300	0.46	---	---
	3400	0.45	---	---
	3500	0.43	---	---
	3600	0.42	---	---
	3700	0.41	---	---

Dimension "H" is defined as follows (for 1 1/2: 1 Slope):

Single sign panel: Vertical distance from center of sign panel to the ground line.

Multiple sign panels: Vertical distance from centroid of sign panel group to the ground line.

Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

* Wood post sign structures shall be installed in accordance with WSP-1 except that notes under installation details are replaced with the following:

Single post sign structures shall have a minimum distance between top of sign panel and groundline of 2700 mm.

Single and multipost sign structures shall have a minimum distance between top of pavement (at edge of pavement) and bottom of sign panel, and between groundline and bottom of sign panel of 2100 mm.

If a secondary sign panel is mounted below primary sign panel the above distances (between bottom of sign panel and either groundline or top of pavement) may be reduced to 1800 mm.

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS 1 1/2 : 1 SLOPE

SPECIFICATION REFERENCE

Rev. 12/97

1301.95 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

CSI-1

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
125x125	2300	1.51	---	---
	2400	1.44	---	---
	2500	1.39	---	---
	2600	1.33	---	---
	2700	1.28	---	---
	2800	1.24	---	---
	2900	1.19	---	---
	3000	1.16	---	---
	3100	1.12	---	---
	3200	1.08	---	---
	3300	1.05	---	---
	3400	1.02	---	---
	3500	0.99	---	---
	3600	0.96	---	---
	3700	0.94	---	---
	3800	---	---	---
	3900	---	---	---
	4000	---	---	---
	4100	---	---	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---
	5000	---	---	---
	5100	---	---	---
	5200	---	---	---

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
100x150 (*)	2300	1.81	---	---
	2400	1.74	---	---
	2500	1.67	---	---
	2600	1.60	---	---
	2700	1.54	---	---
	2800	1.49	---	---
	2900	1.44	---	---
	3000	1.39	2.60	---
	3100	1.34	2.52	---
	3200	1.30	---	---
	3300	1.26	---	---
	3400	1.23	---	---
	3500	1.19	---	---
	3600	1.16	---	---
	3700	1.13	---	---
	3800	---	---	---
	3900	---	---	---
	4000	---	---	---
	4100	---	---	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4500	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---
	5000	---	---	---
	5100	---	---	---
	5200	---	---	---

(*) Larger dimension in direction of (parallel to) traffic.

Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

SPECIFICATION REFERENCE

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS $1\frac{1}{2}$: 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 12/97

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.96

CSI-1

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
150x150	2300	2.85	---	---
	2400	2.73	---	---
	2500	2.62	---	---
	2600	2.52	---	---
	2700	2.43	---	---
	2800	2.34	---	---
	2900	2.26	---	---
	3000	2.18	4.09	---
	3100	2.11	3.96	---
	3200	2.05	3.84	---
	3300	1.98	3.72	---
	3400	1.93	3.61	---
	3500	1.87	3.51	---
	3600	1.82	3.41	---
	3700	1.77	3.32	---
	3800	---	3.23	---
	3900	---	3.15	---
	4000	---	3.07	---
	4100	---	2.99	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---
	5000	---	---	---
	5100	---	---	---
	5200	---	---	---

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
150x200 (*)	2300	5.09	---	---
	2400	4.88	---	---
	2500	4.68	---	---
	2600	4.50	---	---
	2700	4.34	---	---
	2800	4.18	---	---
	2900	4.04	---	---
	3000	3.90	7.53	---
	3100	3.78	7.29	---
	3200	3.66	7.06	---
	3300	3.55	6.85	---
	3400	3.44	6.65	---
	3500	3.35	6.46	---
	3600	3.25	6.28	---
	3700	3.16	6.11	---
	3800	---	5.95	8.49
	3900	---	5.79	8.28
	4000	---	5.65	8.07
	4100	---	5.51	7.87
	4200	---	3.93	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---
	5000	---	---	---
	5100	---	---	---
	5200	---	---	---

(*) Larger dimension in direction of (parallel to) traffic.
Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS $1\frac{1}{2}$: 1 SLOPE

SPECIFICATION REFERENCE

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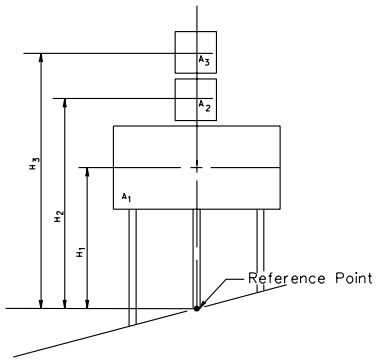
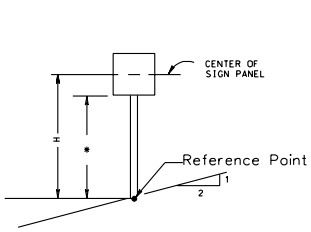


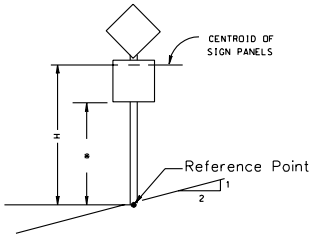
A_1 = Area of Sign Panel 1
A_2 = Area of Sign Panel 2
A_3 = Area of Sign Panel 3
H_1 = Centroidal Distance From Sign Panel 1 to Ground Line
H_2 = Centroidal Distance From Sign Panel 2 to Ground Line
H_3 = Centroidal Distance from Sign Panel 3 to Ground Line.
H = Centroidal Distance for Sign Group.

$$H = \frac{(A_1 X\ H_1) + (A_2\ X\ H_2) + (A_3 X\ H_3)}{(A_1 + A_2 + A_3)}$$

SINGLE POST



SINGLE SIGN PANEL



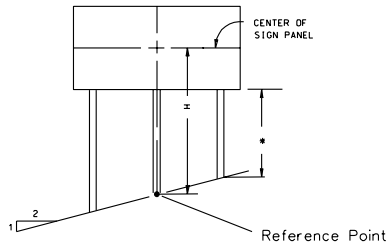
MULTIPLE SIGN PANELS

NOTE:
Measure "H" distances from Reference point which is located half-way between outer posts (for 2 or 3 posts) and intersection with ground line.

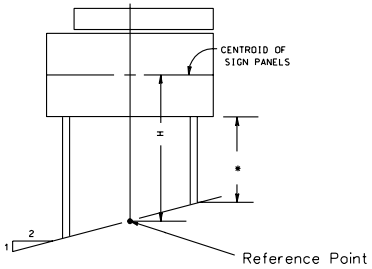
PROCEDURE FOR DETERMINING CENTROID WITH MULTIPLE SIGN PANELS

TWO OR THREE POSTS

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
100x100	2300	0.66	---	---
	2400	0.63	---	---
	2500	0.61	---	---
	2600	0.58	---	---
	2700	0.56	1.06	---
	2800	0.54	1.02	---
	2900	0.52	0.99	---
	3000	0.51	0.95	1.33
	3100	0.49	0.92	---
	3200	0.47	0.90	---
	3300	0.46	0.87	---
	3400	0.45	0.84	---
	3500	0.43	0.82	---
	3600	0.42	0.80	---
	3700	0.41	0.77	---



SINGLE SIGN PANEL



MULTIPLE SIGN PANEL

Dimension "H" is defined as follows (for 2:1 Slope):

Single sign panel: Vertical distance from center of sign panel to the ground line.

Multiple sign panels: Vertical distance from centroid of sign panel group to the ground line.

Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

* Wood post sign structures shall be installed in accordance with WSP-1 except that notes under installation details are replaced with the following:

Single post sign structures shall have a minimum distance between top of sign panel and groundline of 2700 mm.

Single and multipost sign structures shall have a minimum distance between top of pavement (at edge of pavement) and bottom of sign panel, and between groundlineand bottom of sign panel of 2100 mm.

If a secondary sign panel is mounted below primary sign panel the above distances (between bottom of sign panel and either groundline or top of pavement) may be reduced to 1800 mm.

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS 2 : 1 SLOPE

SPECIFICATION REFERENCE

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DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
125x125	2300	1.51	---	---
	2400	1.44	---	---
	2500	1.39	---	---
	2600	1.33	---	---
	2700	1.28	---	---
	2800	1.24	---	---
	2900	1.19	---	---
	3000	1.16	---	---
	3100	1.12	---	---
	3200	1.08	---	---
	3300	1.05	---	---
	3400	1.02	---	---
	3500	0.99	---	---
	3600	0.96	---	---
	3700	0.94	---	---
	3800	---	---	---
	3900	---	---	---
	4000	---	---	---
	4100	---	---	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
100x150 (*)	2300	1.81	---	---
	2400	1.74	---	---
	2500	1.67	---	---
	2600	1.60	---	---
	2700	1.54	---	---
	2800	1.49	---	---
	2900	1.44	---	---
	3000	1.39	2.65	---
	3100	1.34	2.57	---
	3200	1.30	---	---
	3300	1.26	---	---
	3400	1.23	---	---
	3500	1.19	---	---
	3600	1.16	---	---
	3700	1.13	---	---
	3800	---	---	---
	3900	---	---	---
	4000	---	---	---
	4100	---	---	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---

(*) Larger dimension in direction of (parallel to) traffic.
Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

SPECIFICATION REFERENCE

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS
FOR CONSTRUCTION SIGN INSTALLATIONS 2 : 1 SLOPE

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CSI-1

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
150x150	2300	2.85	---	---
	2400	2.73	---	---
	2500	2.62	---	---
	2600	2.52	---	---
	2700	2.43	---	---
	2800	2.34	---	---
	2900	2.26	---	---
	3000	2.18	4.17	---
	3100	2.11	4.03	---
	3200	2.05	3.91	---
	3300	1.98	3.79	---
	3400	1.93	3.68	---
	3500	1.87	3.57	---
	3600	1.82	3.47	---
	3700	1.77	3.38	---
	3800	---	3.29	---
	3900	---	3.21	---
	4000	---	3.13	---
	4100	---	3.05	---
	4200	---	---	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (mm)	Maximum area (Total of sign panels) (m^2)		
		Single-post	Two-posts	Three-posts
150x200 (*)	2300	5.09	---	---
	2400	4.88	---	---
	2500	4.68	---	---
	2600	4.50	---	---
	2700	4.34	---	---
	2800	4.18	---	---
	2900	4.04	---	---
	3000	3.90	7.61	---
	3100	3.78	7.36	---
	3200	3.66	7.13	---
	3300	3.55	6.92	---
	3400	3.44	6.71	---
	3500	3.35	6.52	---
	3600	3.25	6.34	9.20
	3700	3.16	6.17	8.96
	3800	---	6.01	8.72
	3900	---	5.85	8.50
	4000	---	5.71	8.28
	4100	---	5.57	8.08
	4200	---	3.99	---
	4300	---	---	---
	4400	---	---	---
	4500	---	---	---
	4600	---	---	---
	4700	---	---	---
	4800	---	---	---
	4900	---	---	---

(*) Larger dimension in directionof (parallel to) traffic.
Minimum spacing between posts:

100 X 100 posts: 900mm
All other posts: 2400mm

DETAILS FOR CALCULATING NUMBER AND SIZE OF WOOD POSTS FOR CONSTRUCTION SIGN INSTALLATIONS 2 : 1 SLOPE

SPECIFICATION REFERENCE

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