

NOTES

POSTS: Post may be round (single rail only) or 6"x8" square-sawed pressure-treated wood or W6x9 galvanized steel. The same type post shall be used throughout the length of project unless otherwise required by the plans or permitted by the Engineer. Round posts shall be 8" plus or minus 1" in diameter at the top and not more than 3" larger at the butt with a uniform taper. Post may be set in drilled holes or may be driven to grade. Wood posts shall be fabricated with square ends. Posts and spacer blocks shall be pressure-treated as per 710.14. Bolt holes shall be bored and tops of posts trimmed as shown, if required, after posts are set.

SPACER BLOCKS: When wood spacer blocks are used with the steel post, a 10d nail shall be driven through the hole in the adjacent flange to prevent blocks from turning.

WASHERS: All washers indicated are standard galvanized steel of the appropriate size.

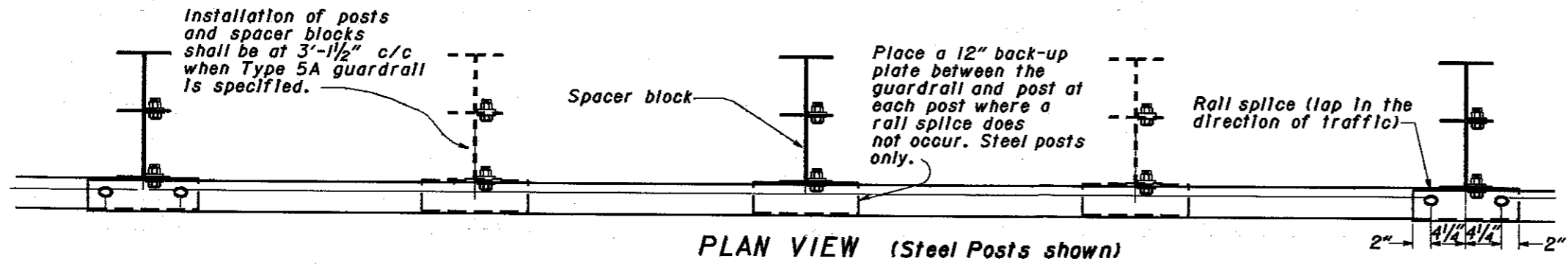
WELDED BEAMS: Welded beam guardrail posts and spacer blocks may be used for Item 606, Guardrail, provided the web and flange sizes are as shown hereon. Welding of the web to the flanges shall conform to ASTM A769, Class 1 using Grade 36 steel with the following exceptions:

- 7.2 Test reports of tensile properties for each lot shall accompany each shipment.
12. Beams which have imperfections repaired by welding shall not be accepted for use in Item 606.
13. Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

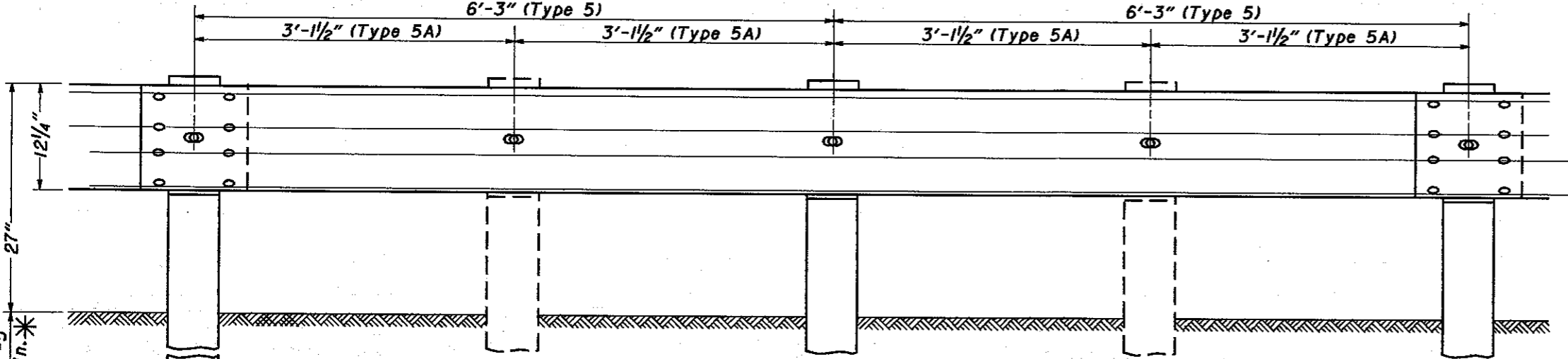
* **FOR SPECIFIC POST** embedment depth requirements see Std. Const. Dwg. GR-1.2.

| STEEL BEAM POSTS & BLOCKS | | | | |
|---------------------------|------------|--------------|------------------|---------------|
| Size | Beam depth | Flange width | Flange thickness | Web thickness |
| Rolled W 6x8.5 | 5.83" | 3.94" | .194" | .170" |
| Rolled W 6x9 | 5.90" | 3.94" | .215" | .170" |
| Rolled W 8x10 | 7.89" | 3.94" | .205" | .170" |
| Welded 6x8.5 | 6.0" | 3.94" | .194" | .170" |
| Welded 6x9 | 6.0" | 3.94" | .215" | .170" |
| Welded 8x10 | 8.0" | 3.94" | .205" | .170" |

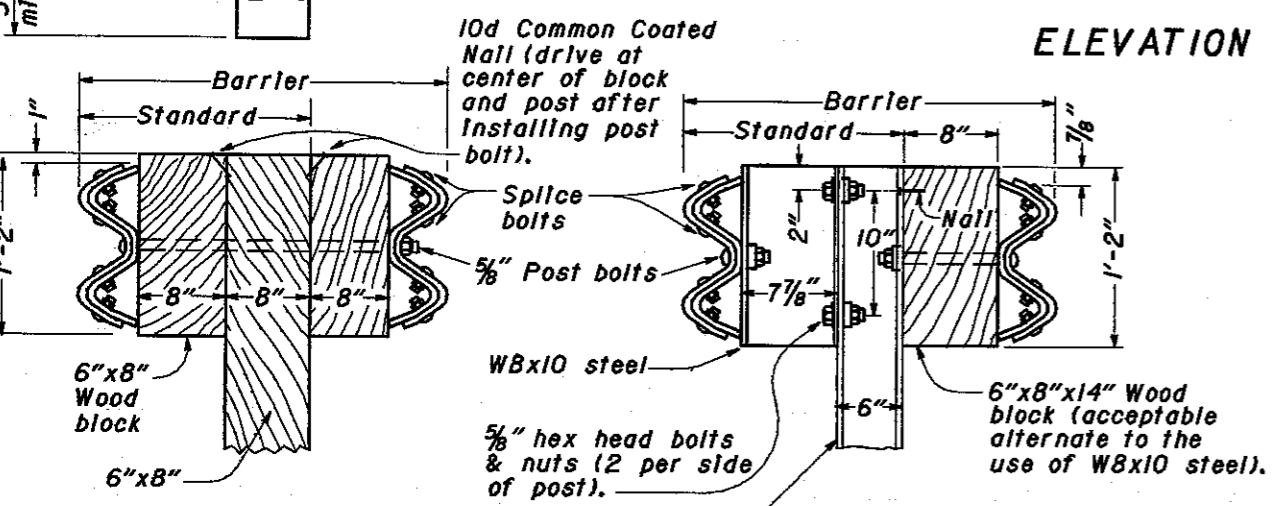
MISCELLANEOUS: For details not shown see Standard Construction Drawings GR-1.1 and GR-1.2.



PLAN VIEW (Steel Posts shown)

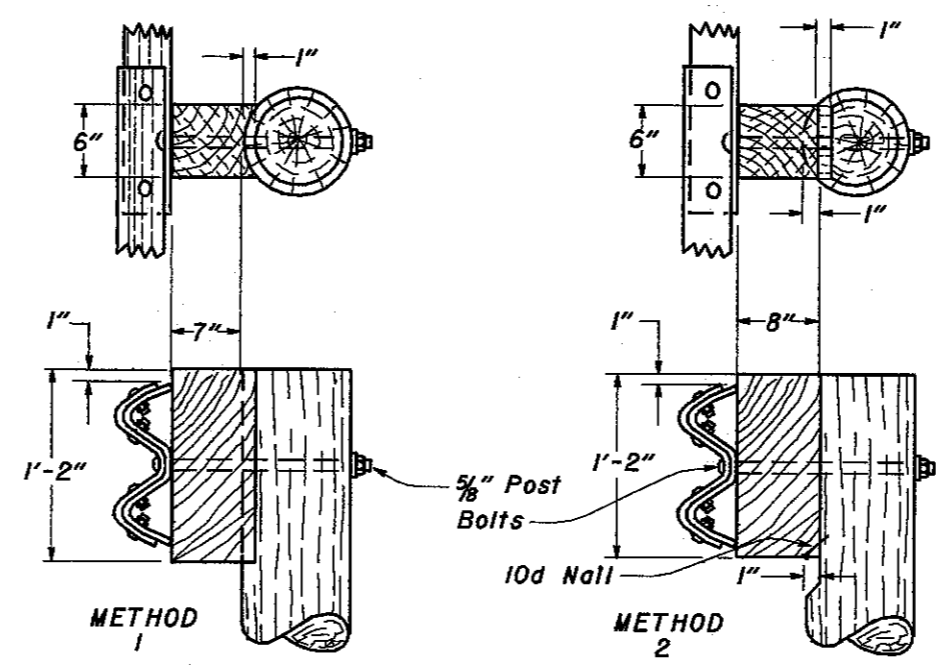


ELEVATION (Wood Posts shown)



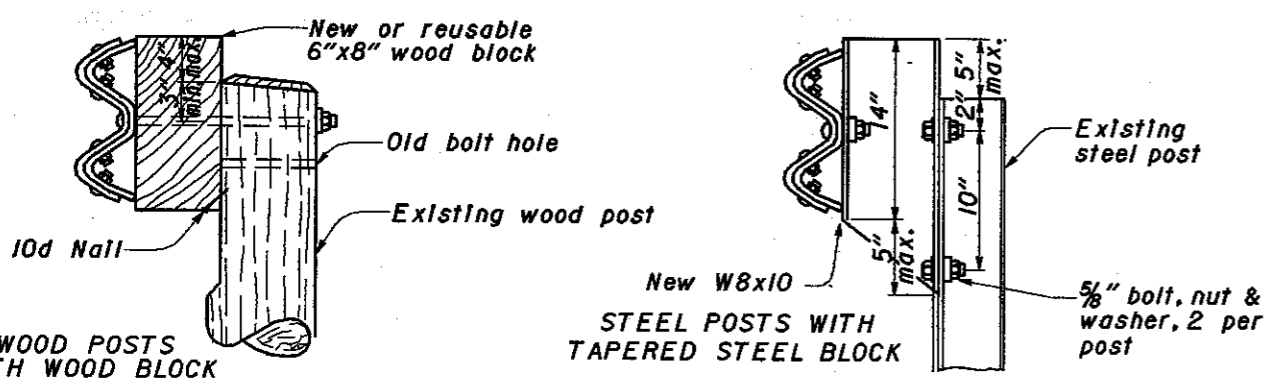
SQUARE WOOD POST

STEEL POST



Alternate methods of placing the spacer blocks on round posts may be submitted for consideration and approval by the Engineer.

ROUND WOOD POSTS



When the guardrail height is to be raised, wood blocks shall not be used on existing steel post.

RAISING EXISTING GUARDRAIL HEIGHT

1990

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

**GUARDRAIL
TYPE 5 & 5A**

STANDARD CONSTRUCTION DRAWING
GR-2.1

APPROVED ENGR., L. & D.

DATE
2-15-68
1-1-71
11-9-71
12-6-76
2-5-82
9-10-90

NOTES

POSTS: Post may be round (single rail only) or 6"x8" square-sawn pressure-treated wood or W6x9 galvanized steel. The same type post shall be used throughout the length of project unless otherwise required by the plans or permitted by the Engineer. Round posts shall be 8" plus or minus 1" in diameter at the top and not more than 3" larger at the butt with a uniform taper.

Post may be set in drilled holes or may be driven to grade.

Wood posts shall be fabricated with square ends. Posts and spacer blocks shall be pressure-treated as per 710.14. Bolt holes shall be bored and tops of posts trimmed as shown, if required, after posts are set.

SPACER BLOCKS: When wood spacer blocks are used with the steel post, a 10d nail shall be driven through the hole in the adjacent flange to prevent blocks from turning.

WASHERS: All washers indicated are standard galvanized steel of the appropriate size.

WELDED BEAMS: Welded beam guardrail posts and spacer blocks may be used for Item 606, Guardrail, provided the web and flange sizes are as shown hereon. Welding of the web to the flanges shall conform to ASTM A769, Class I using Grade 36 steel with the following exceptions:

7.2 Test reports of tensile properties for each lot shall accompany each shipment.

12. Beams which have imperfections repaired by welding shall not be accepted for use in Item 606.

13. Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

* **FOR SPECIFIC POST** embedment depth requirements see Std. Const. Dwg. GR-1.2.

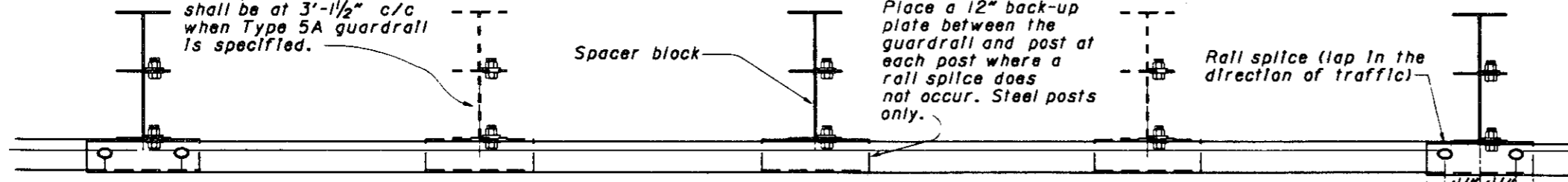
| STEEL BEAM POSTS & BLOCKS | | | | |
|---------------------------|------------|--------------|------------------|---------------|
| Size | Beam depth | Flange width | Flange thickness | Web thickness |
| Rolled W 6x8.5 | 5.83" | 3.94" | .194" | .170" |
| Rolled W 6x9 | 5.90" | 3.94" | .215" | .170" |
| Rolled W 8x10 | 7.89" | 3.94" | .205" | .170" |
| Welded 6x8.5 | 6.0" | 3.94" | .194" | .170" |
| Welded 6x9 | 6.0" | 3.94" | .215" | .170" |
| Welded 8x10 | 8.0" | 3.94" | .205" | .170" |

MISCELLANEOUS: For details not shown see Standard Construction Drawings GR-1.1 and GR-1.2.

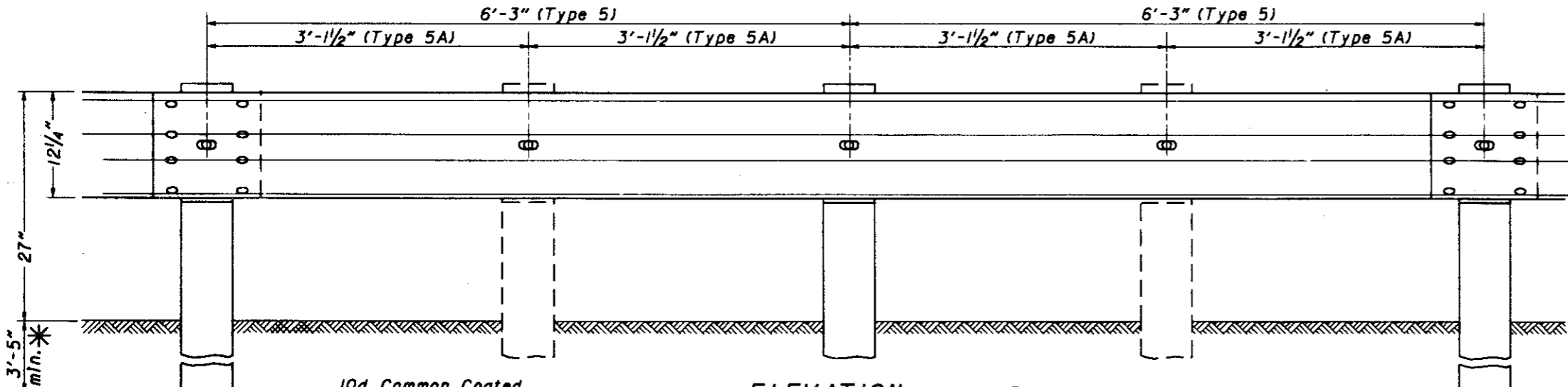
Installation of posts and spacer blocks shall be at 3'-1/2" c/c when Type 5A guardrail is specified.

Place a 12" back-up plate between the guardrail and post at each post where a rail splice does not occur. Steel posts only.

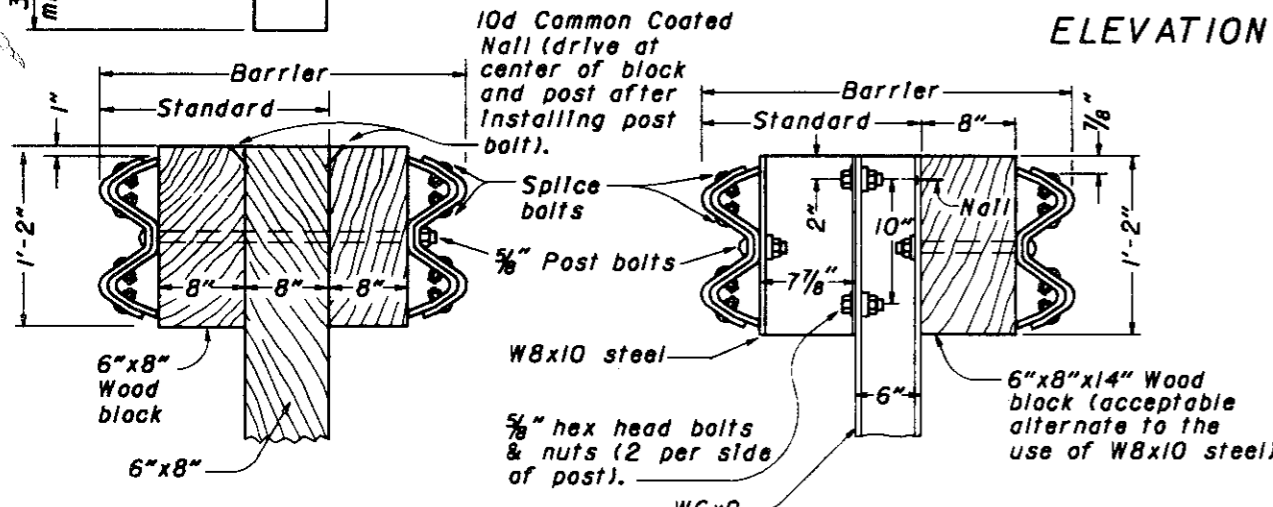
Rail splice (lap in the direction of traffic)



PLAN VIEW (Steel Posts shown)

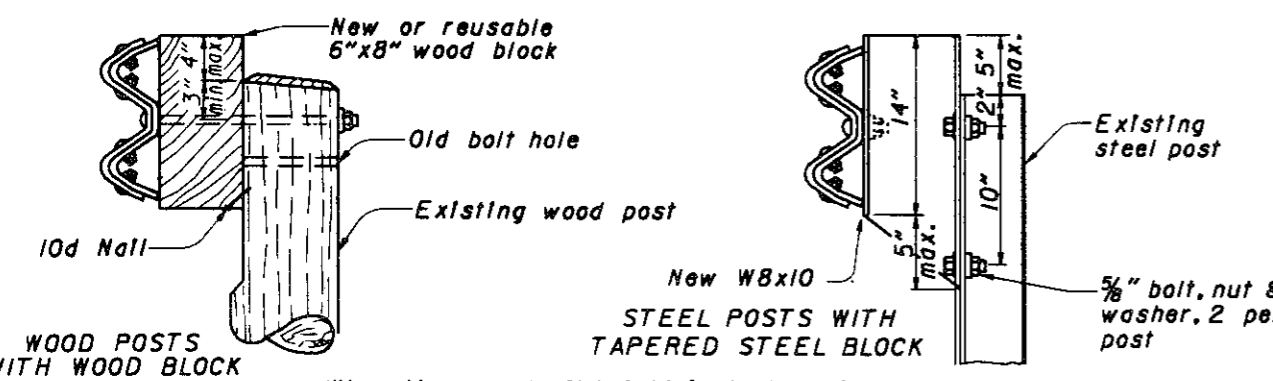


ELEVATION (Wood Posts shown)



SQUARE WOOD POST

STEEL POST

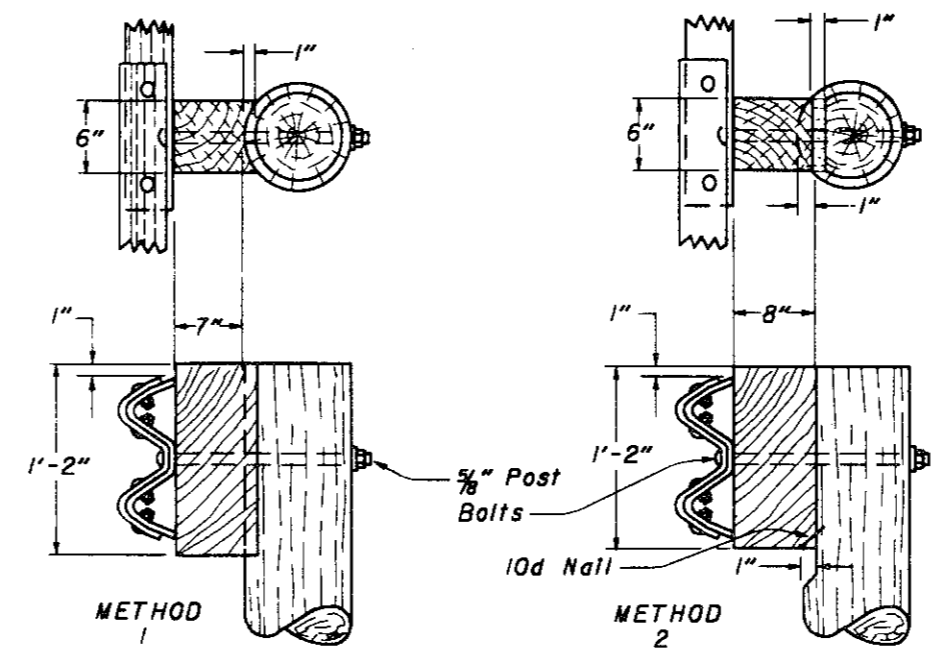


WOOD POSTS WITH WOOD BLOCK

STEEL POSTS WITH TAPERED STEEL BLOCK

When the guardrail height is to be raised, wood blocks shall not be used on existing steel post.

RAISING EXISTING GUARDRAIL HEIGHT



Alternate methods of placing the spacer blocks on round posts may be submitted for consideration and approval by the Engineer.

ROUND WOOD POSTS

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

**GUARDRAIL
TYPE 5 & 5A**

DATE 5-6-91

STANDARD CONSTRUCTION DRAWING **GR-2.1**

APPROVED *R.K. Hulman* ENGR., L. & D.

NOTES

RAIL: Use W-Beam rail meeting AASHTO M 180 Type II Class A, as specified in CMS 606.

POSTS: Posts may be constructed of wood or steel. Wood posts may be round or 6"x8" [150x200] square-sawed.

Use round wood posts on runs of single-sided rail. The round posts shall be 8"±1 [200±25] in diameter at the top and not more than 3" [75] larger at the butt with a uniform taper.

Fabricate wood posts with square ends. Posts shall be pressure-treated as per CMS 710.14. Bore bolt holes and, if required, trim the tops of posts after the posts are set.

Steel posts are to be W6x9 [W150x13.5] or W6x8.5 [W150x12.8] galvanized steel. Use the same type of post throughout the length of the project unless otherwise specified in the plans or permitted by the Engineer.

All posts are 6'-0" [1830] long unless specified otherwise in the Contract Document. Posts may be set in drilled holes or may be driven to grade.

WELDED BEAM POSTS: Welded beam guardrail posts may be used for Item 606, Guardrail, provided the web and flange sizes are as shown here. Welding of the web to the flanges must comply with ASTM A 769, Class 1, using Grade 36 steel [250 MPa yield point] with the following exceptions:

- Sec. 7.2 Test reports of tensile properties for each lot shall accompany each shipment.
- Sec. 12 Beams that have imperfections repaired by welding shall not be accepted for use in Item 606.
- Sec. 13 Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

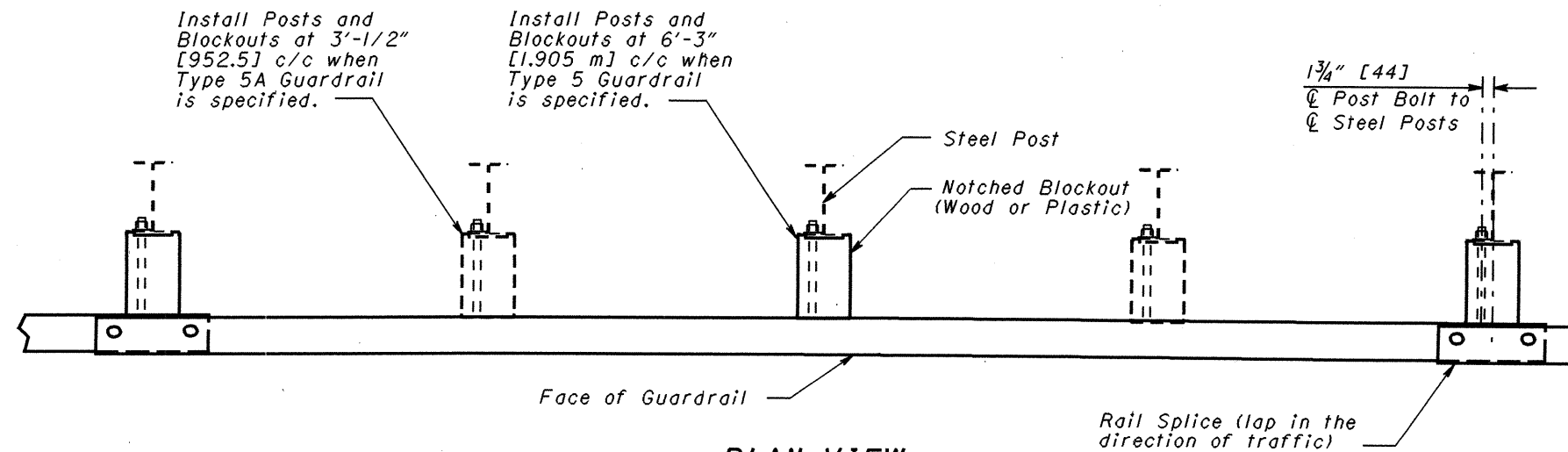
ALTERNATE POSTS: Engineered guardrail posts having met NCHRP 350 criteria, and listed on the **Office of Materials Management's** Approved List are permitted as an equal alternate when installed according to the Manufacturer's instructions and within the limitations shown on the Approved List.

BLOCKOUTS: Blockout dimensions are dependent on post used. Wood Blockouts are to be pressure treated as specified in CMS 710.14. Bore bolt holes. Approved plastic blockouts may be used in lieu of the wood blockouts shown. The approved list is maintained by the **Office of Materials Management**.

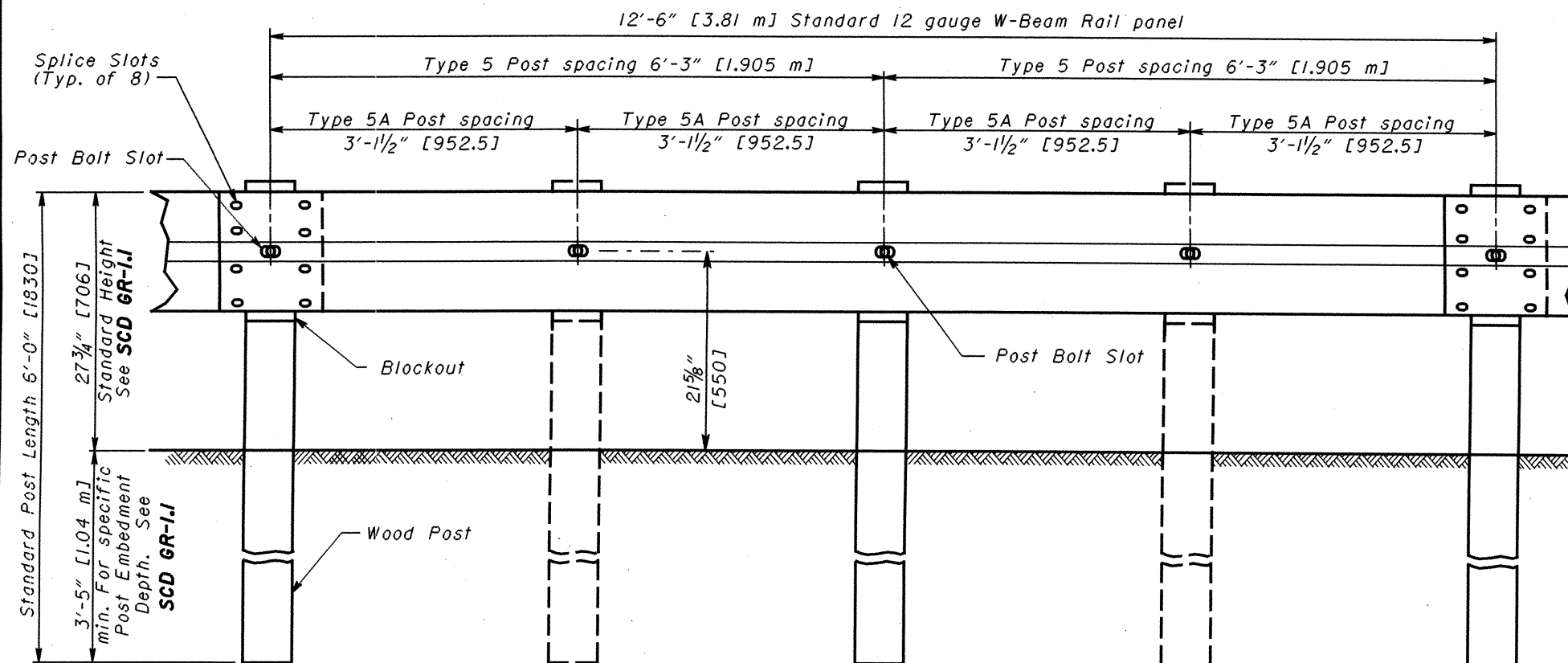
WASHERS: Install appropriate sized standard galvanized steel washers on the nut side of bolts installed on wood posts.

DELINEATION: For barrier reflectors, see CMS 626.

MISCELLANEOUS: For other guardrail details, see **SCD GR-1.1**.



PLAN VIEW
(Steel Posts shown)



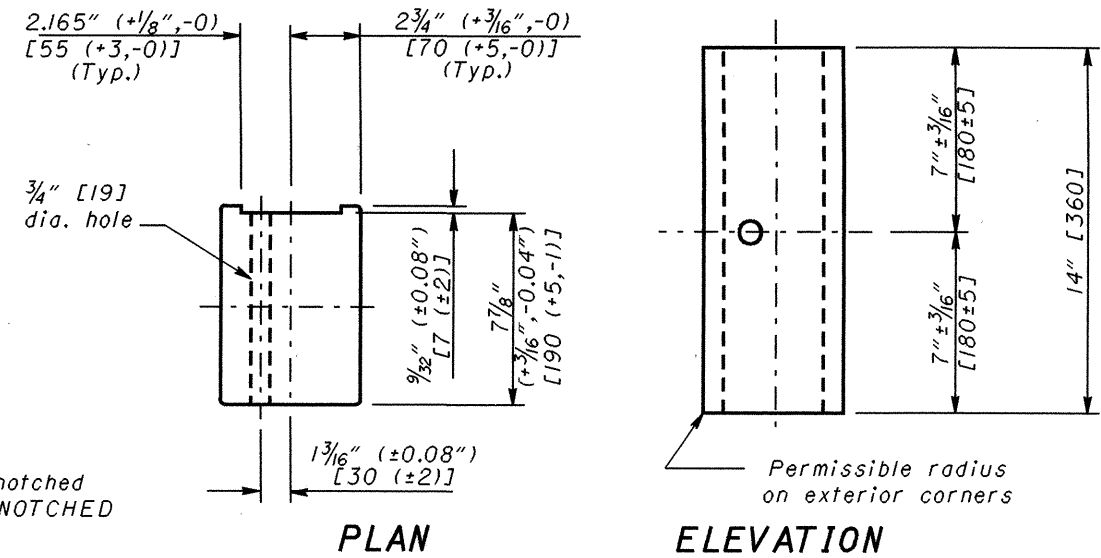
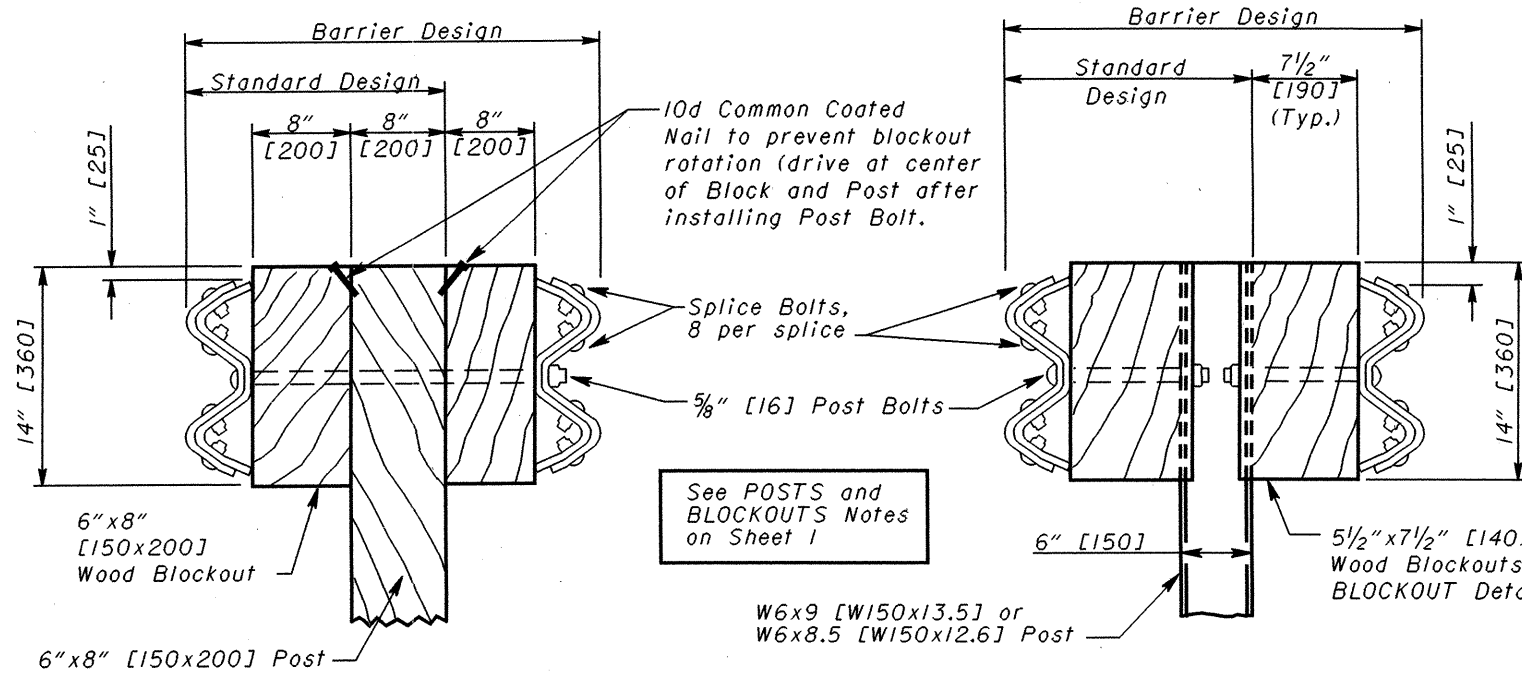
ELEVATION
(Wood Posts shown)

| STEEL BEAM POSTS (English) | | | | |
|----------------------------|------------|--------------|------------------|---------------|
| Size | Beam depth | Flange width | Flange thickness | Web thickness |
| Rolled W6x8.5 | 5.8" | 3.94" | 0.193" | 0.170" |
| Rolled W6x9 | 5.9" | 3.94" | 0.215" | 0.170" |
| Welded 6x8.5 | 6.0" | 3.94" | 0.193" | 0.170" |
| Welded 6x9 | 6.0" | 3.94" | 0.215" | 0.170" |

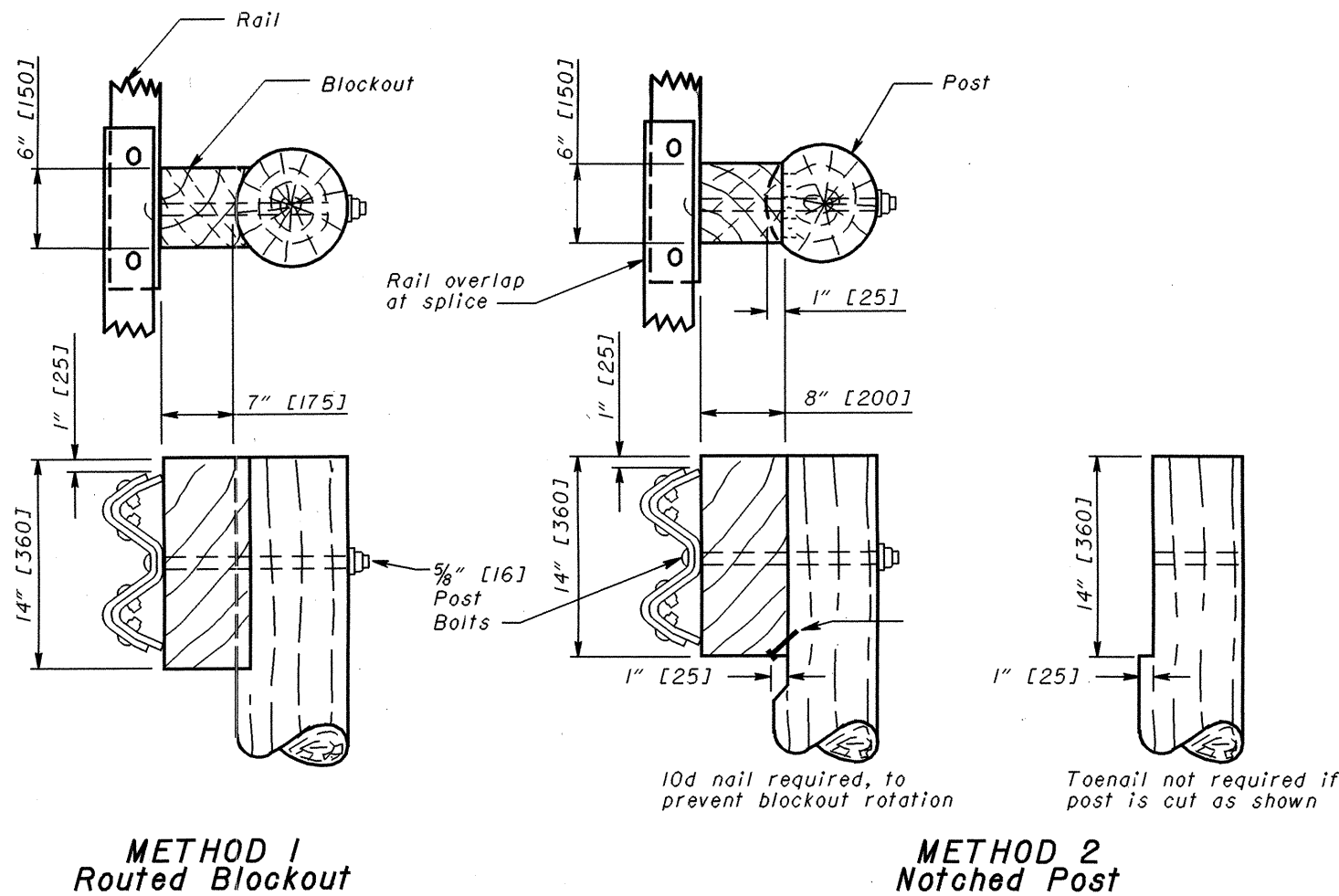
| STEEL BEAM POSTS (Metric) | | | | |
|---------------------------|------------|--------------|------------------|---------------|
| Size | Beam depth | Flange width | Flange thickness | Web thickness |
| Rolled W150x12.6 | 148 mm | 100 mm | 4.9 mm | 4.3 mm |
| Rolled W150x13.5 | 150 mm | 100 mm | 5.5 mm | 4.3 mm |
| Welded 150x12.6 | 152 mm | 100 mm | 4.9 mm | 4.3 mm |
| Welded 150x13.5 | 152 mm | 100 mm | 5.5 mm | 4.3 mm |

THIS DRAWING REPLACES GR-2.1M DATED 4-18-98.

STANDARD ROADWAY CONSTRUCTION DRAWING
GUARDRAIL TYPE 5 & 5A
 NUMBER **GR-2.1**
 ROADWAY ENGINEERING SERVICES
 OHIO DEPARTMENT OF TRANSPORTATION
 D. Focke
 ROADWAY DESIGN ENGINEER
 4-18-03
 DATE

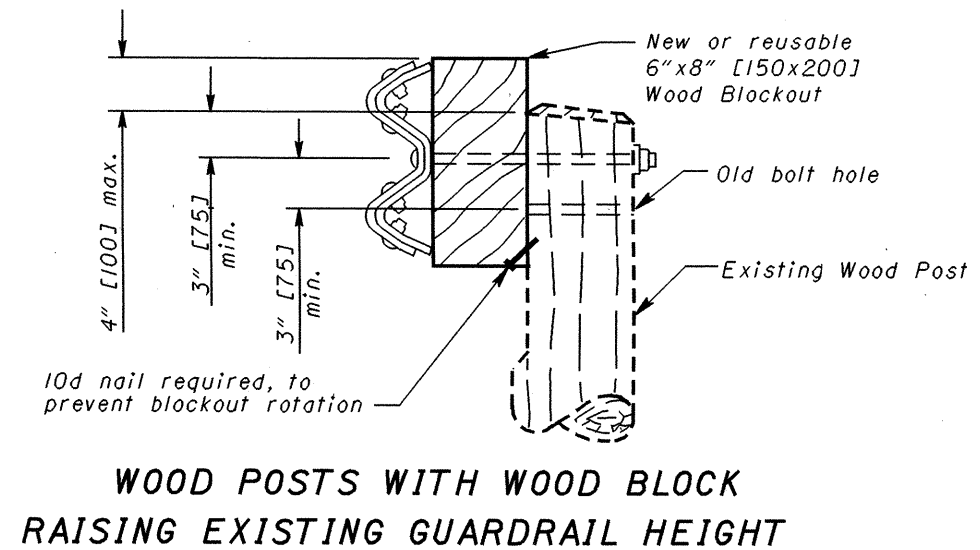


NOTCHED BLOCKOUTS FOR STEEL POSTS
See BLOCKOUTS Note on Sheet 1



Alternate methods of placing the Blockouts on round Posts may be submitted for consideration and approved by the Engineer.

ROUND WOOD POSTS
Single Sided runs only (Standard Design)



THIS DRAWING REPLACES GR-2-IM DATED 4-18-98.

NOTES

RAIL: Use W-Beam rail meeting AASHTO M 180 Type II Class A, as specified in CMS 606.

POSTS: Posts may be constructed of wood or steel. Wood posts may be round or 6"x8" [150x200] square-sawed.

Use round wood posts on runs of single-sided rail. The round posts shall be 8"±1 [200±25] in diameter at the top and not more than 3" [75] larger at the butt with a uniform taper.

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Steel posts are to be W6x9 [W150X13.5] or W6x8.5 [W150X12.8] galvanized steel. Use the same type of post throughout the length of the project unless otherwise specified in the plans or permitted by the Engineer.

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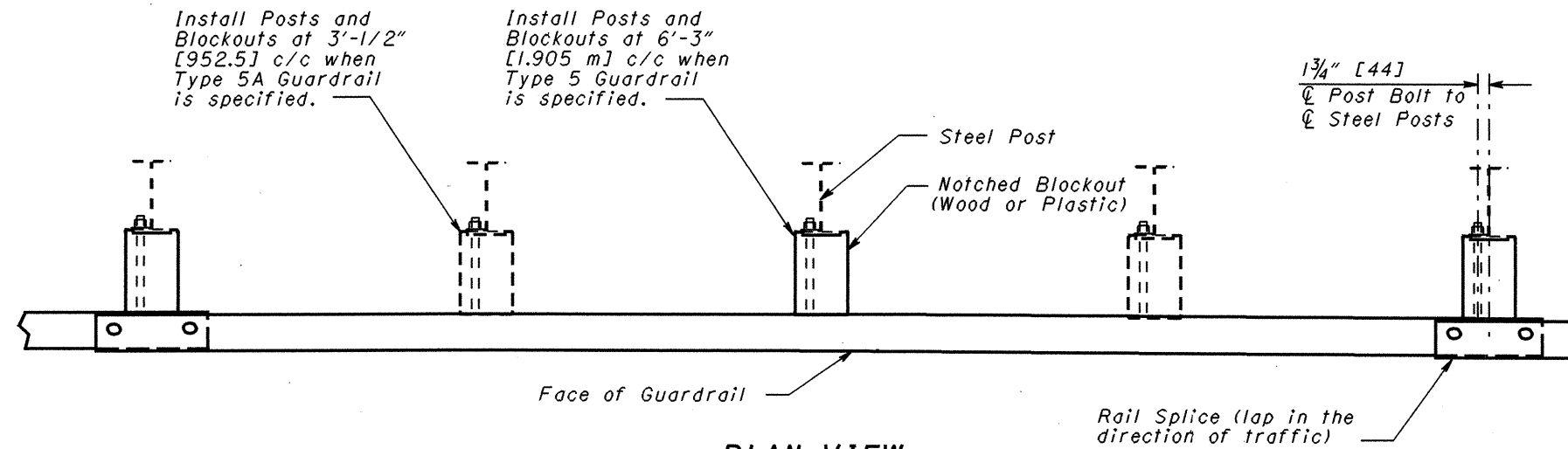
ALTERNATE POSTS: Engineered guardrail posts having met NCHRP 350 criteria, and listed on the **Office of Materials Management's** Approved List are permitted as an equal alternate when installed according to the Manufacturer's instructions and within the limitations shown on the Approved List.

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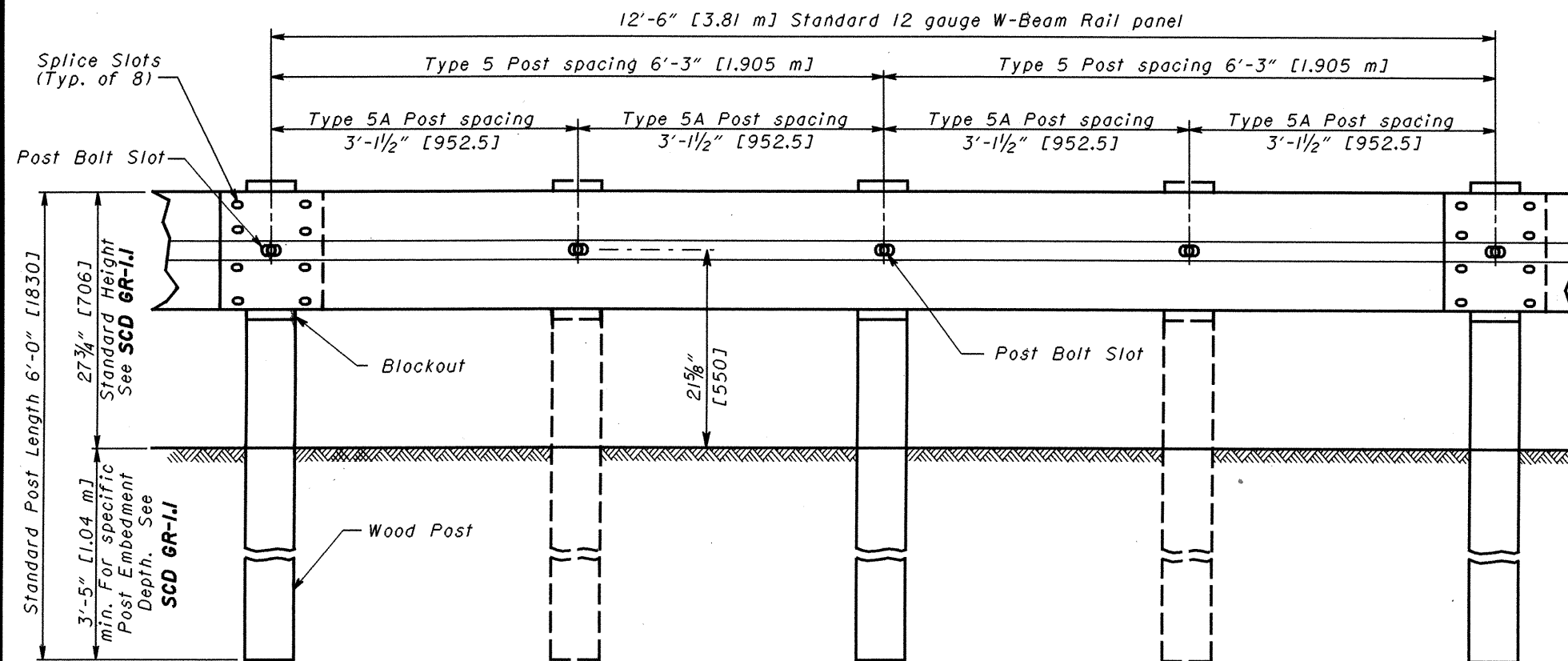
WASHERS: Install appropriate sized standard galvanized steel washers on the nut side of bolts installed on wood posts.

DELINEATION: For barrier reflectors, see CMS 626.

MISCELLANEOUS: For other guardrail details, see **SCD GR-1.1.**



PLAN VIEW
(Steel Posts shown)



ELEVATION
(Wood Posts shown)

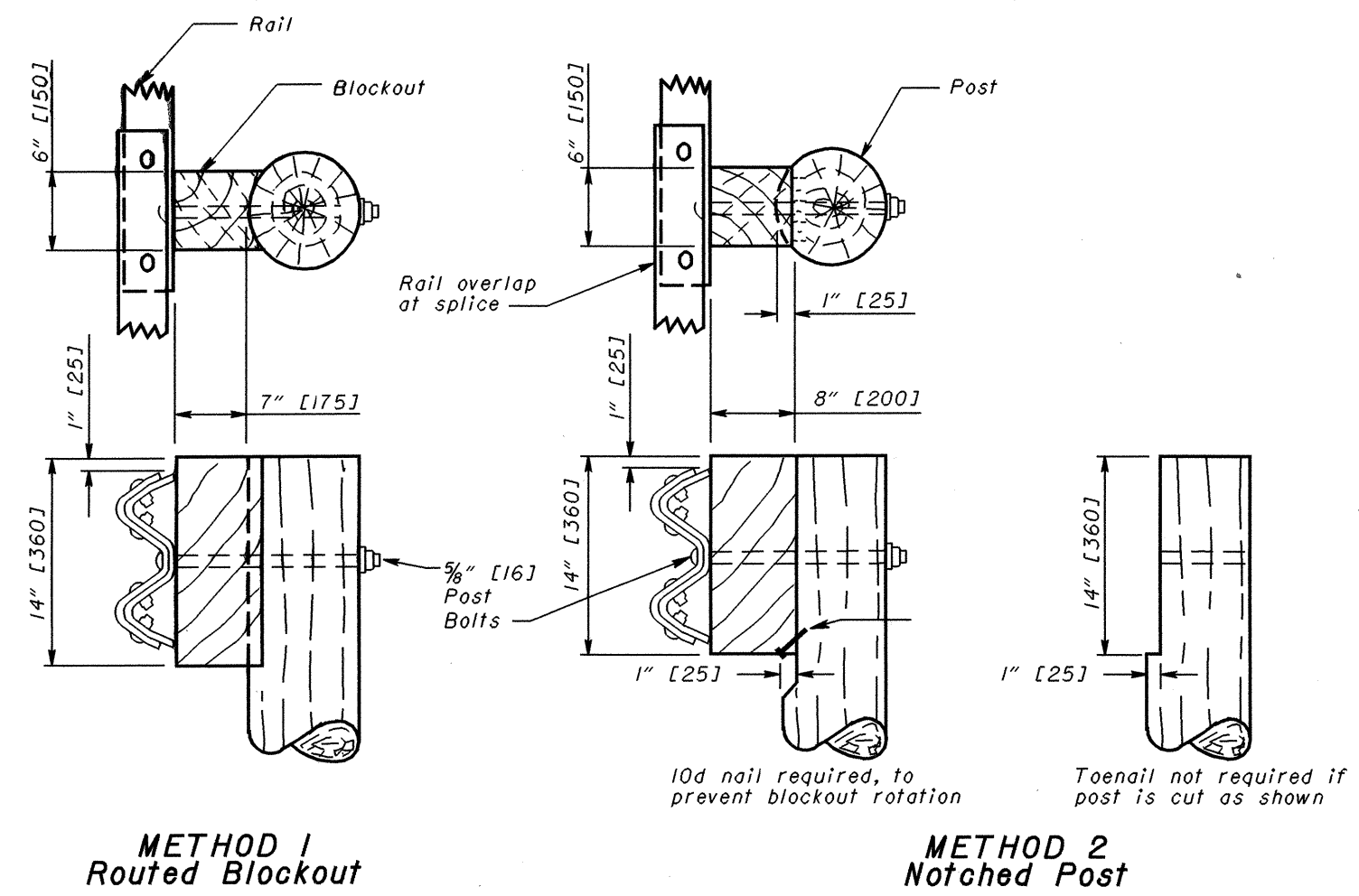
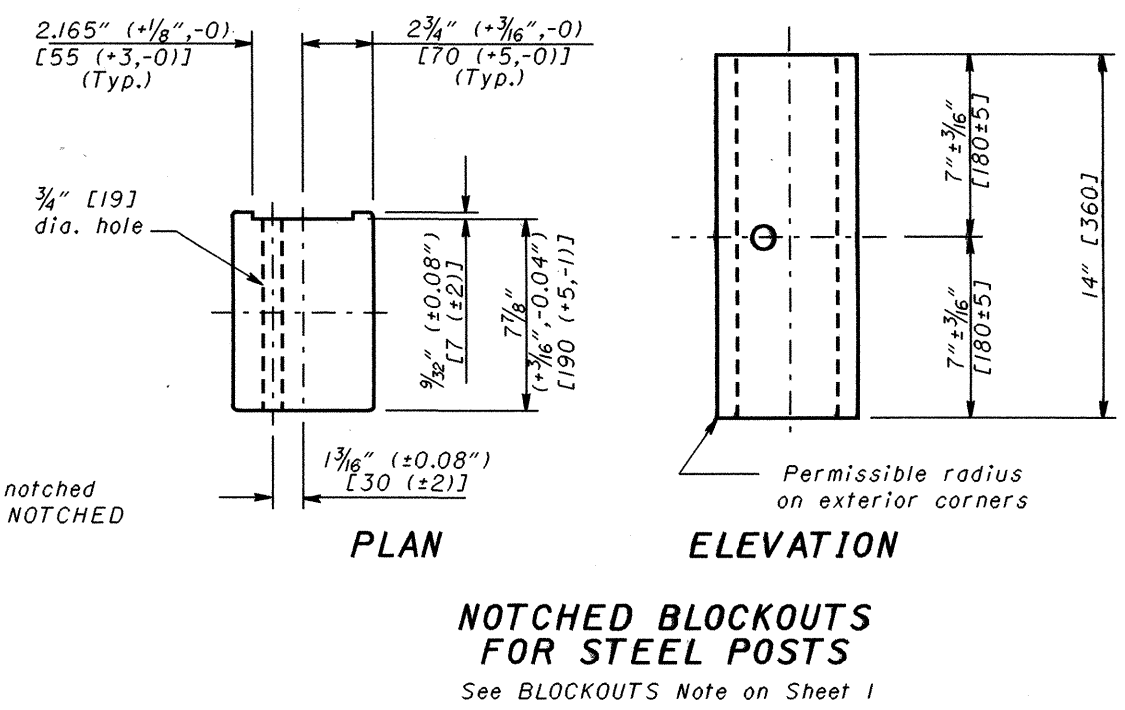
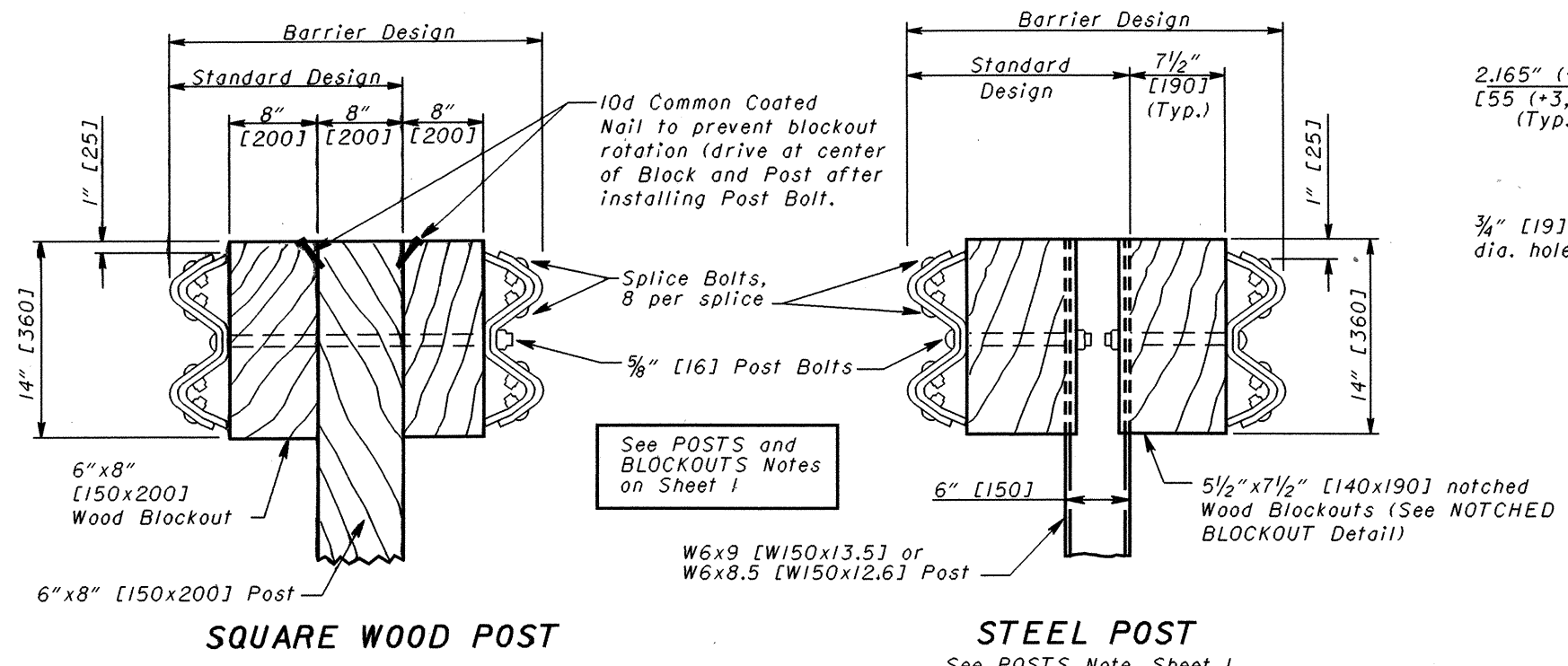
STEEL BEAM POSTS (English)

| Size | Beam depth | Flange width | Flange thickness | Web thickness |
|---------------|------------|--------------|------------------|---------------|
| Rolled W6x8.5 | 5.8" | 3.94" | 0.193" | 0.170" |
| Rolled W6x9 | 5.9" | 3.94" | 0.215" | 0.170" |
| Welded 6x8.5 | 6.0" | 3.94" | 0.193" | 0.170" |
| Welded 6x9 | 6.0" | 3.94" | 0.215" | 0.170" |

STEEL BEAM POSTS (Metric)

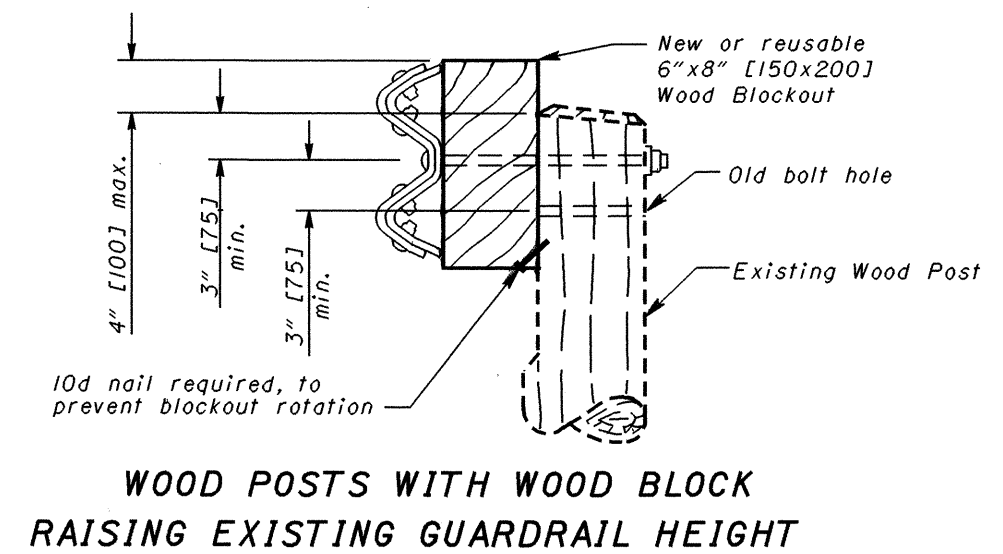
| Size | Beam depth | Flange width | Flange thickness | Web thickness |
|------------------|------------|--------------|------------------|---------------|
| Rolled W150x12.6 | 148 mm | 100 mm | 4.9 mm | 4.3 mm |
| Rolled W150x13.5 | 150 mm | 100 mm | 5.5 mm | 4.3 mm |
| Welded 150x12.6 | 152 mm | 100 mm | 4.9 mm | 4.3 mm |
| Welded 150x13.5 | 152 mm | 100 mm | 5.5 mm | 4.3 mm |

THIS DRAWING REPLACES GR-2.1 DATED 4-18-03.
 STANDARD ROADWAY CONSTRUCTION DRAWING
GUARDRAIL TYPE 5 & 5A
 NUMBER **GR-2.1**
 DATE **1-16-04**
 ROADWAY DESIGN ENGINEER
 STOS. ENGR. **D. Focke**
 OHIO DEPARTMENT OF TRANSPORTATION



Alternate methods of placing the Blockouts on round Posts may be submitted for consideration and approved by the Engineer.

ROUND WOOD POSTS
Single Sided runs only (Standard Design)



THIS DRAWING REPLACES GR-2.1 DATED 4-18-03.

OHIO DEPARTMENT OF TRANSPORTATION
1-16-04 DATE

STDS. ENGR. D. Focke
ROADWAY DESIGN ENGINEER

ROADWAY ENGINEERING SERVICES

GUARDRAIL TYPE 5 & 5A

STANDARD ROADWAY CONSTRUCTION DRAWING

NUMBER GR-2.1

2/2