

# STATE OF OHIO DEPARTMENT OF TRANSPORTATION

## MED-42-6.10 MED-252-5.51

HARRISVILLE TOWNSHIP  
LIVERPOOL TOWNSHIP  
  
MEDINA COUNTY

**FEDERAL PROJECT NUMBER**

E201215

**RAILROAD INVOLVEMENT**

NONE

**PROJECT DESCRIPTION**

THIS PROJECT INCLUDES THE REPAIR OF AN EXISTING 66" DIAMETER CULVERT UNDER US ROUTE 42 AND THE REPLACEMENT OF TWIN 48" DIAMETER CULVERTS UNDER STATE ROUTE 252 USING OPEN CUT METHODS.

**EARTH DISTURBED AREAS**

PROJECT EARTH DISTURBED AREA: N/A ACRES  
(MAINTENANCE PROJECT)  
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: N/A ACRES  
(MAINTENANCE PROJECT)  
NOTICE OF INTENT EARTH DISTURBED AREA: N/A ACRES  
(MAINTENANCE PROJECT)

**LIMITED ACCESS (MED-42)**

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

**2019 SPECIFICATIONS**

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.



**LOCATION MAP**

**DESIGN DESIGNATION**

	MED-42	MED-252
CURRENT ADT (2022)	6,500	4,800
DESIGN YEAR ADT (2042)	7,600	7,300
DESIGN HOURLY VOLUME (2042)	700	750
DIRECTIONAL DISTRIBUTION	55%	57%
TRUCKS (24 HOUR B&C)	15%	7%
DESIGN SPEED	60 MPH	45 MPH
LEGAL SPEED	60 MPH	45 MPH
DESIGN FUNCTIONAL CLASSIFICATION:		
RURAL OTHER PRINCIPAL ARTERIAL (MED-42); RURAL MINOR ARTERIAL (MED-252)		
NHS PROJECT	YES	NO

**DESIGN EXCEPTIONS**

NONE REQUIRED

**ADA DESIGN WAIVERS**

NONE REQUIRED

**INDEX OF SHEETS:**

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GR-1.1	36A-36C
GR-2.1	36D-36E

TITLE SHEET

**UNDERGROUND UTILITIES**

**Contact Two Working Days  
Before You Dig**

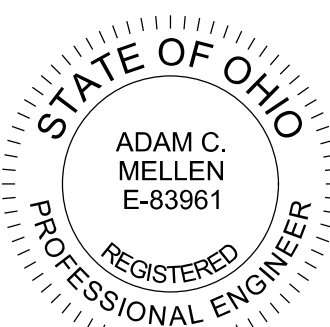


**OHIO811, 8-1-1, or 1-800-362-2764**  
(Non-members must be called directly)

PLANS PREPARED BY:

OHIO DEPARTMENT OF  
TRANSPORTATION  
DISTRICT THREE ENGINEERING

**ENGINEER'S SEAL:**



SIGNED: *Adam C. Mellen*  
DATE: 11/8/2021

**STANDARD CONSTRUCTION DRAWINGS**

STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS		SPECIAL PROVISIONS		
BP-3.1	1/17/20	CB-2-3,2-4	7/16/21	MT-95.30	7/19/19	TC-41.20	10/18/13	800	10/15/21	WATERWAY
BP-4.1	7/19/13			MT-95.40	1/17/20	TC-42.10	10/18/13	821	4/20/12	PERMIT
		DM-1.1	7/17/20	MT-95.45	1/17/20	TC-42.20	10/18/13	832	10/19/18	CONDITIONS
RM-1.1	1/15/21	DM-4.3	1/15/16	MT-95.50	7/21/17	TC-52.10	10/18/13	902	7/19/19	DATED 9/16/21
		DM-4.4	1/15/16	MT-97.10	4/19/19	TC-52.20	1/15/21	921	4/20/12	
				MT-97.12	1/20/17					
		HW-1.1	7/20/18	MT-99.20	4/19/19					
		HW-2.1	7/20/18	MT-101.60	1/17/20					
		HW-2.2	7/20/18	MT-101.70	1/17/20					
		PCB-91	7/17/20	MT-101.75	1/17/20					
				MT-101.90	7/17/20					
				MT-105.10	1/17/20					

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT DETOURS WILL BE PROVIDED AS INDICATED ON SHEET 9.

APPROVED: *Adam C. Mellen*  
DATE: 11/8/21 DISTRICT DEPUTY DIRECTOR

APPROVED: \_\_\_\_\_  
DATE: \_\_\_\_\_ DIRECTOR, DEPARTMENT OF TRANSPORTATION

DESIGN AGENCY

DISTRICT 3



ENGINEERING TEAM TWO

DESIGNER  
ACM

REVIEWER  
KRB 09-03-20

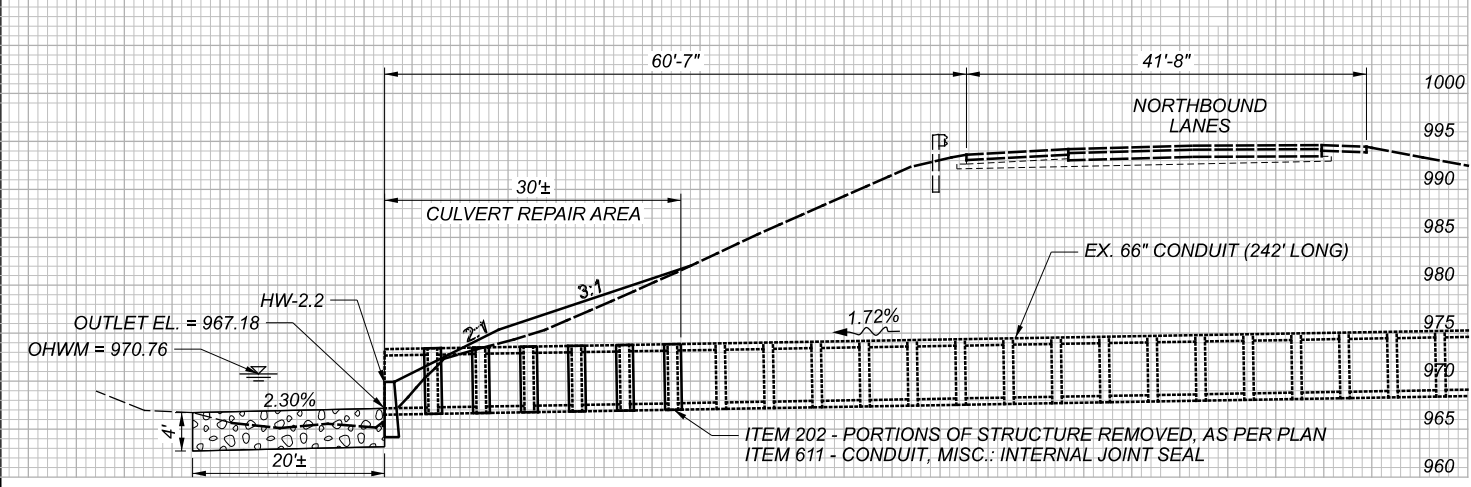
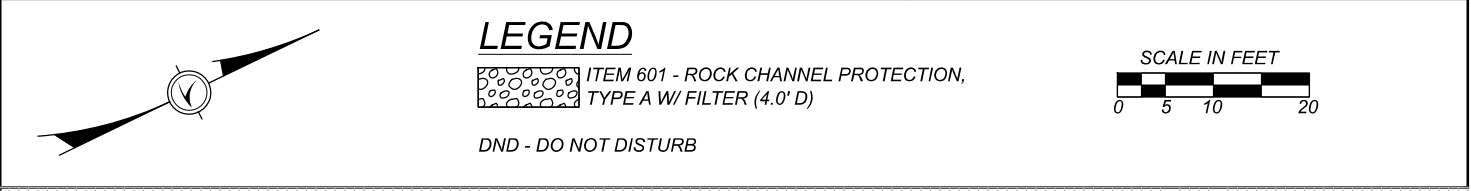
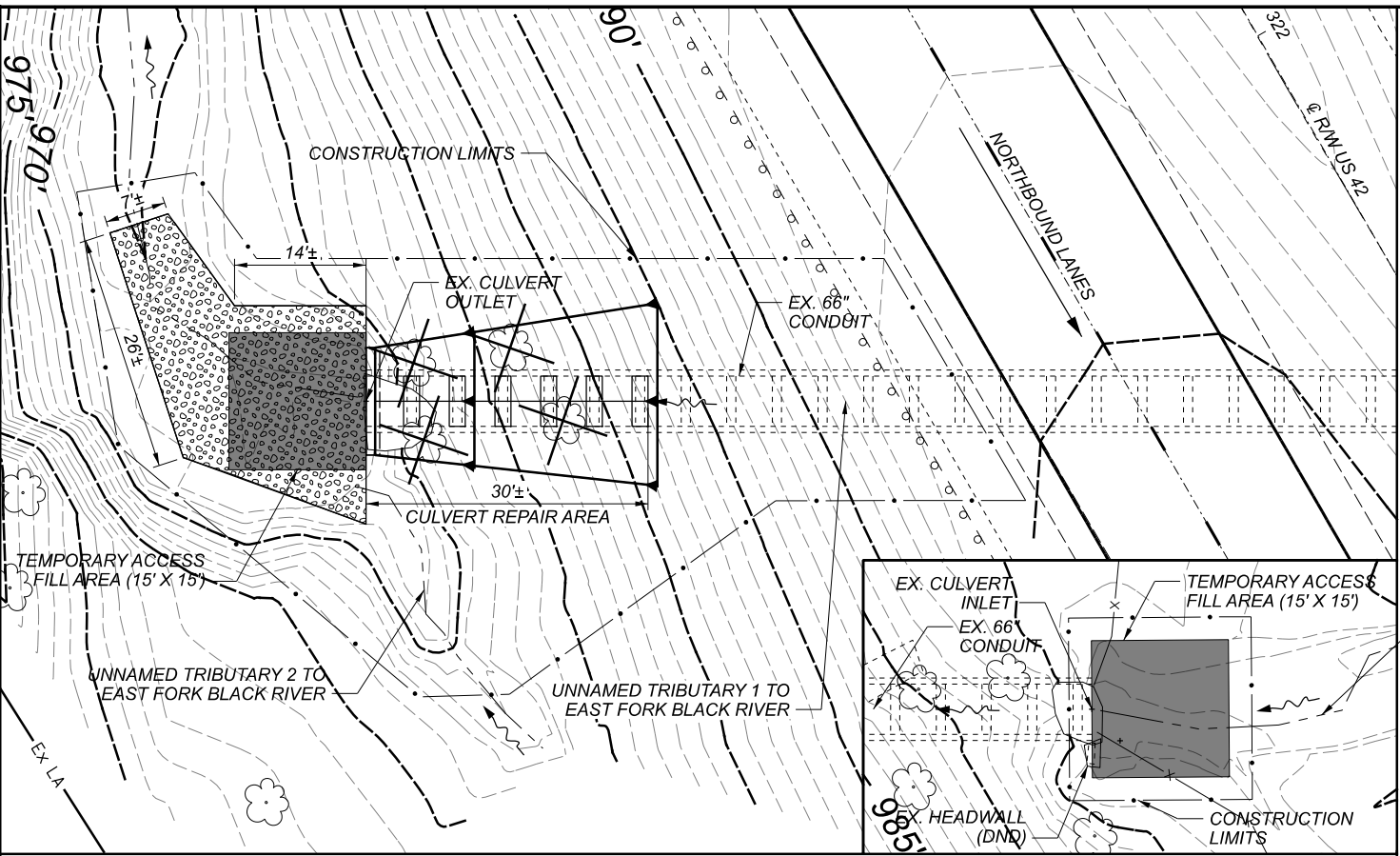
PROJECT ID  
102624

SHEET TOTAL  
P.1 36

MED-42/252-6.10/5.51

MODEL: Sheet PAPER: 11x17 (in.) DATE: 10/28/2021 TIME: 10:49:16 AM USER: amellen  
p:\ohiodot-pw\benley\comohiodot-pw-02\Documents\01Active Projects\District 03\03\102624\400-Engineering\Roadway\Sheets\102624-GT001.dgn





**EXISTING STRUCTURE**

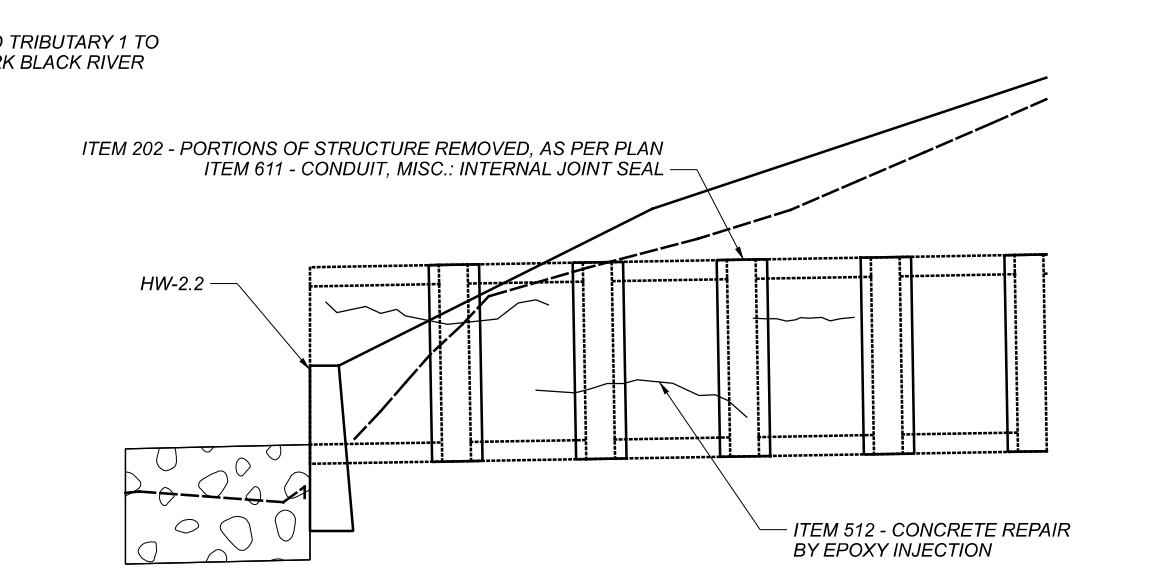
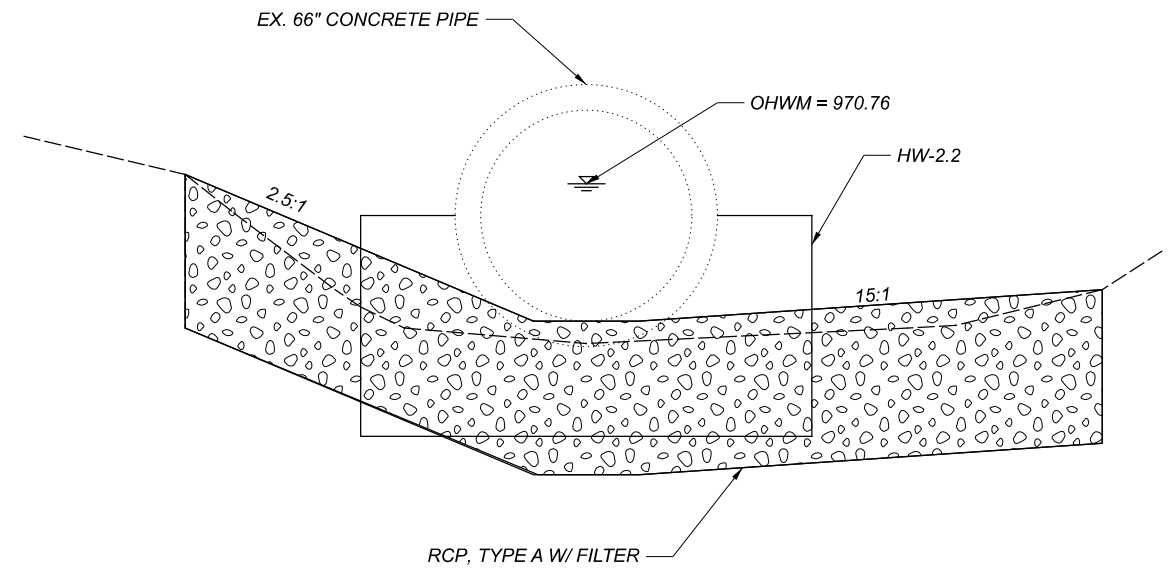
TYPE: REINFORCED CONCRETE PIPE  
 DIAMETER: 66"  
 SKEW: 30° 4' 8" R.F.  
 ALIGNMENT: TANGENT  
 DATE BUILT: 1958  
 DISPOSITION: POOR

**HYDRAULIC DATA**

DRAINAGE AREA = 0.69 SQ. MILES  
 Q(50) = 351 CFS      Q(100) = 421 CFS  
 V(50) = 19.51 FT/S      V(100) = 20.59 FT/S

**NOTES**

- HOLES AND VOIDS BEHIND EXISTING PIPE  
 PRIOR TO INSTALLING THE INTERNAL JOINT SEALS, FILL THE VOID SPACES WHERE THE JOINTS HAVE SEPARATED WITH GROUT. TAKE SPECIAL CARE TO PREVENT AIR POCKETS FROM FORMING WHEN INJECTING THE GROUT. THE GROUT SHOULD CONFORM TO ALL REQUIREMENTS OF ITEM 837. ALLOW SUFFICIENT TIME FOR THE GROUT TO CURE PRIOR TO APPLYING THE INTERNAL JOINT SEALER. ALL MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS NEEDED TO COMPLETE THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 611 - CONDUIT, MISC.: INTERNAL JOINT SEAL.
- ITEM 202 - GUARDRAIL REMOVED FOR REUSE, AS PER PLAN  
 THIS ITEM SHALL BE USED TO REMOVE THE EXISTING GUARDRAIL TO PROVIDE ACCESS FROM THE ROADWAY TO THE PROJECT AREAS AS SHOWN. GUARDRAIL REMOVED FOR PROJECT ACCESS IS TO BE REMOVED AND REINSTALLED IN ACCORDANCE WITH C&MS 202.09 AND 606.05. DO NOT REMOVE ANY SEGMENTS OF GUARDRAIL PRIOR TO FULL ESTABLISHMENT OF TEMPORARY WORK ZONE PROTECTION WHERE WORK IS TAKING PLACE. ALL REMOVED GUARDRAIL SHALL BE FULLY REINSTALLED PRIOR TO REMOVAL OF TEMPORARY WORK ZONE PROTECTIONS. THE COST OF REBUILDING THE GUARDRAIL RUN SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM.



**NOTES (CONTINUED)**

- ITEM 512 - CONCRETE REPAIR BY EPOXY INJECTION  
 A QUANTITY OF 50 FT HAS BEEN USED FOR ESTIMATING PURPOSES ONLY. LOCATIONS OF CRACKS SHOWN ON PLAN SHEET ARE NOT ACCURATE AND ARE FOR REPRESENTATION ONLY. EXACT DIMENSIONS AND LOCATIONS OF CRACKS SHALL BE DETERMINED BY THE ENGINEER.
- PIPE INTERSECTS @ U.S. 42 AT STA. 322+46.26.

**ESTIMATED QUANTITIES**

ITEM	QUANTITY	UNIT	DESCRIPTION
201	LS		CLEARING AND GRUBBING
202	6	EACH	PORTIONS OF STRUCTURE REMOVED, AS PER PLAN
202	1	EACH	HEADWALL REMOVED
202	25	FT	GUARDRAIL REMOVED FOR REUSE, AS PER PLAN
203	20	CY	EMBANKMENT
503	LS		COFFERDAMS AND EXCAVATION BRACING
512	50	FT	CONCRETE REPAIR BY EPOXY INJECTION
601	79	CY	ROCK CHANNEL PROTECTION, TYPE A W/ FILTER
602	2.4	CY	CONCRETE MASONRY
611	6	EACH	CONDUIT, MISC.: INTERNAL JOINT SEAL

ALL QUANTITIES CARRIED TO THE GENERAL SUMMARY

## NOTES

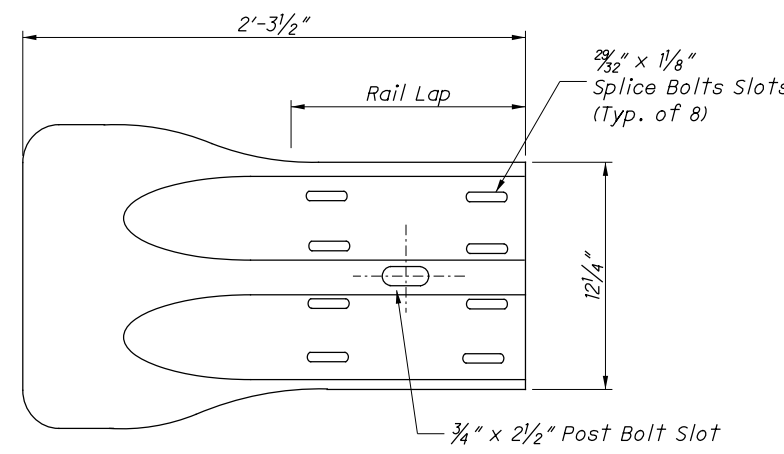
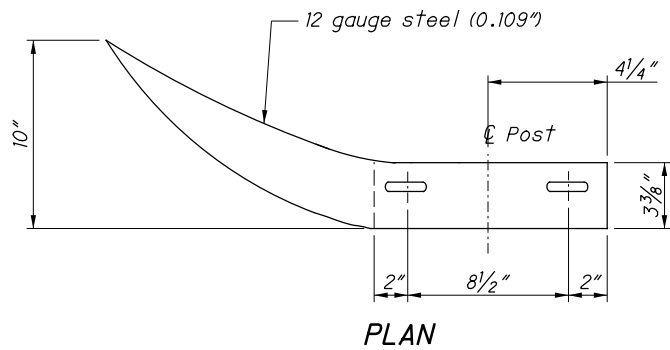
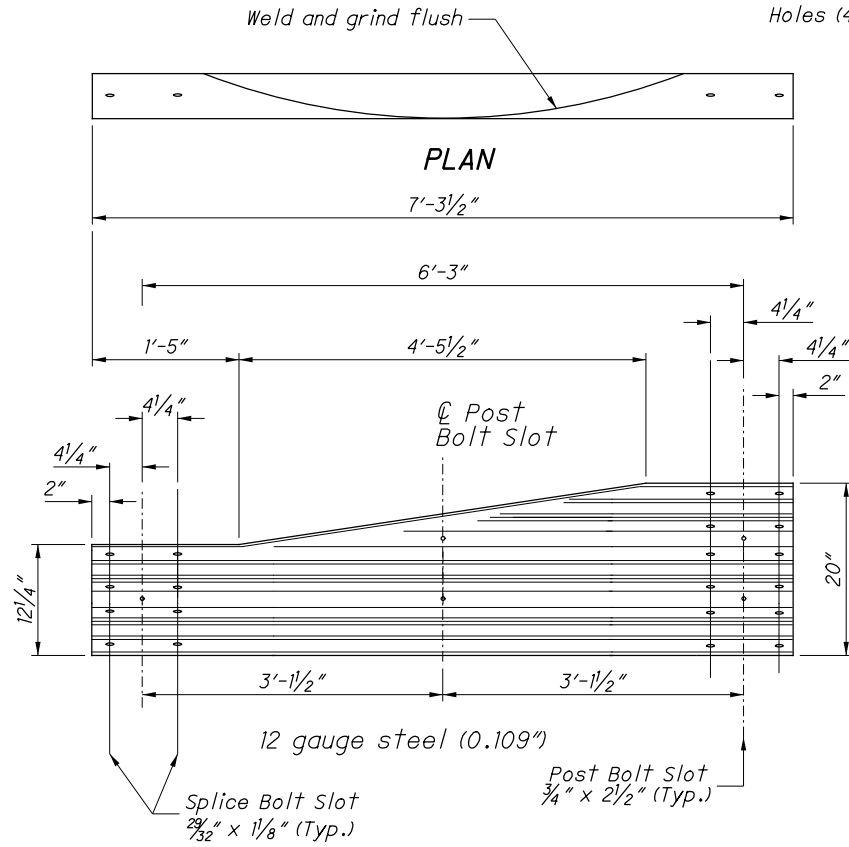
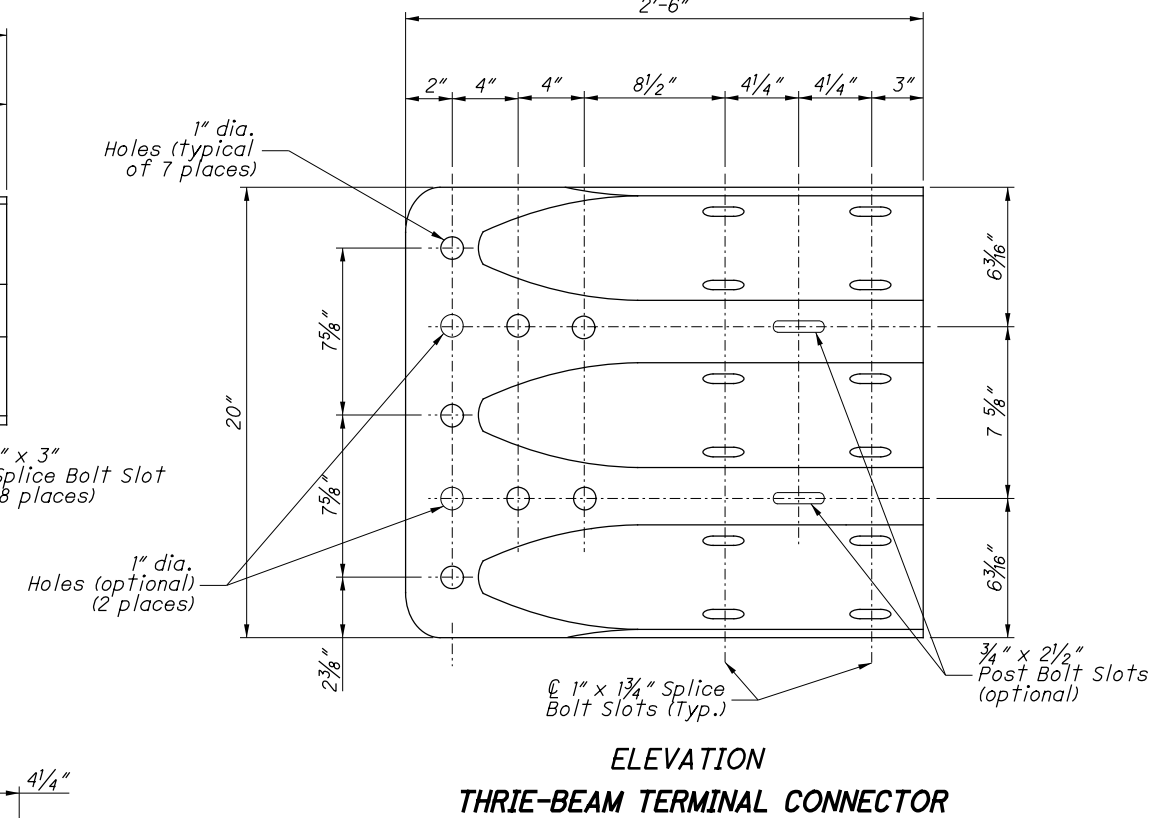
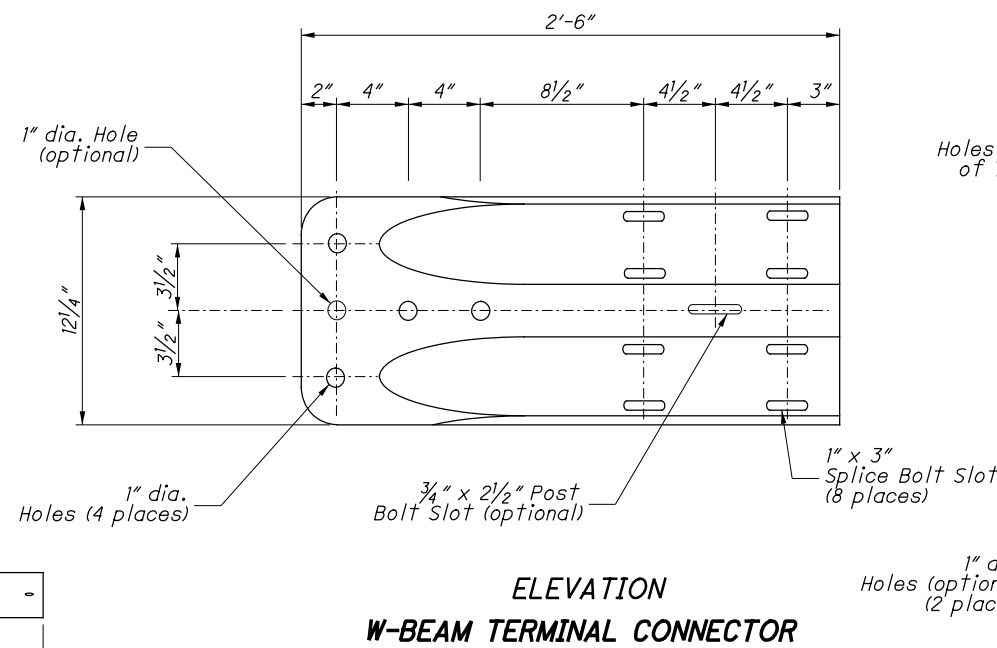
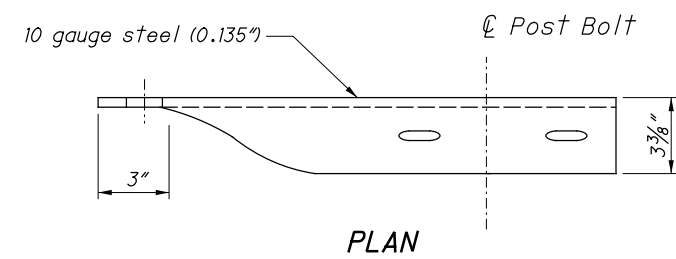
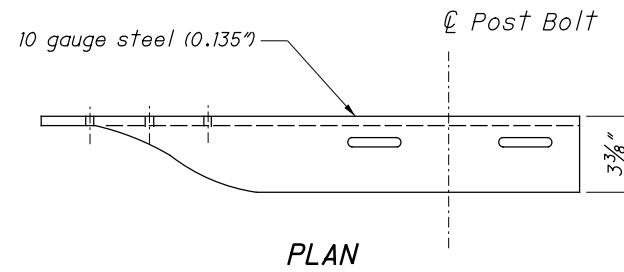
**GENERAL:** Components shown on this drawing are used in a variety of guardrail systems. See individual guardrail drawing for specific applications.

See CMS 606 for guardrail specifications not covered on these drawings.

Refer to AASHTO M 180 for dimensional details of W-Beam and Thrie-Beam rail elements, related buffer and end sections, beam splices, post and splice bolts, nuts, and Type 1 W-Beam to Thrie-Beam Transition sections.

**RAIL ELEMENTS:** W-Beam Rail has an effective length of 12'-6" unless otherwise specified, with  $\frac{3}{4}$ " x  $2\frac{1}{2}$ " post bolt slots on 6'-3" centers regardless of post spacing. Field punch or drill bolt holes or slots for irregularly spaced posts as specified in CMS 606.04.

**RAIL SPLICES:** Lap splices between two rail elements or between a rail and terminal connector in the direction of traffic. Lap the buffer or flared end sections in the direction of traffic.



**ELEVATION  
TYPE 2 TRANSITION SECTION**  
(Asymmetric W to Thrie-Beam)

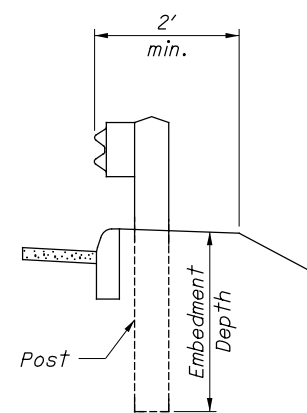
For details of Type 1 Transition Section (Symmetric), refer to AASHTO M 180, Figure 4.

**ELEVATION  
W-BEAM FLARED END SECTION**

GUARDRAIL BOLT (For Post and Splice Bolts)		
L	T min.	Bolt Use
18" (Standard Rail)	4"	Type 5: WP/WB, PB
26" (Barrier Rail)		
10"	4"	Type 5: SP/WB, PB
1 1/4"	1 1/8"	Splice Bolt

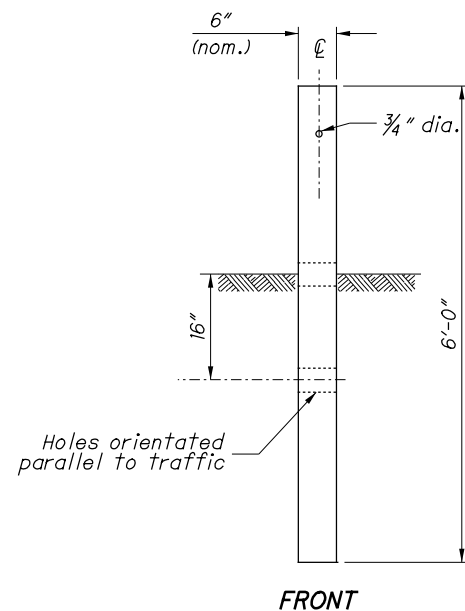
WP = Wood Post      WB = Wood Blockout  
SP = Steel Post      PB = Plastic Blockout

Longer Bolt may be needed for round Wood Post larger than 8" dia.



**DETAIL A**

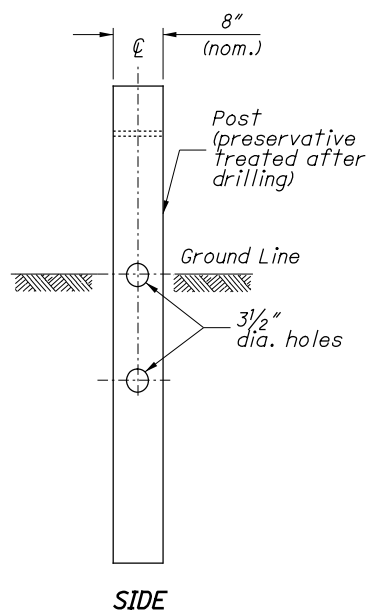
See POST EMBEDMENT DEPTH Note



**FRONT**

**SIDE**

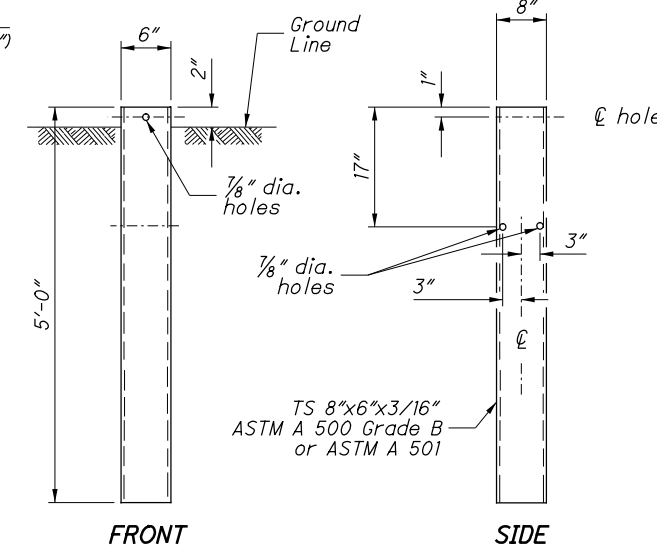
**TYPE 1 BREAKAWAY CRT POST**



**FRONT**

**SIDE**

**TYPE 2 BREAKAWAY CRT POST**



**FRONT**

**SIDE**

**STEEL GROUND TUBE**

**NOTES**

**GUARDRAIL HEIGHT:** For initial installation, construct the guardrail within  $\pm 1"$  of the standard height,  $h$ , or **29"** to the top of W-Beam rail. (See MEASURING GUARDRAIL HEIGHT Detail.)

When subsequent projects, such as resurfacings, affect the height of existing guardrail, the finished height is to be within  $\pm 2.5"$  of the standard height.

**POST EMBEDMENT DEPTH:** Standard embedment is 3'-5" min. Where less than 2' of graded shoulder width (10:1 or flatter) exists, measured from the face of the guardrail (see DETAIL "A"), use longer posts so that a minimum of 5'-5" embedment depth is provided. Payment for the longer posts will be made at the unit price bid for **ITEM 606 - GUARDRAIL POST, 9', Each.**

**SPECIAL POST MOUNTINGS:** Install posts located over a drainage inlet or structure as shown in the FOOTING ANCHOR Detail, or anchor per the details shown on **SCD GR-2.2.**

Install posts located over a footing with a cover of less than 2'-6" with a footing anchor as detailed here. (A plate, as detailed on SECTION B-B of **SCD GR-2.2**, may be used as an alternative attachment method.) Where the cover is between 2'-6" and 3'-5", the footing anchor may be omitted and the post encased instead with 4" (min.) of concrete.

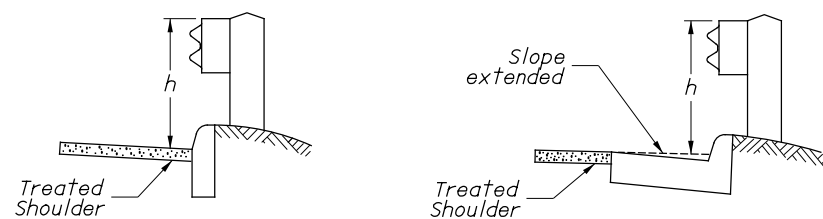
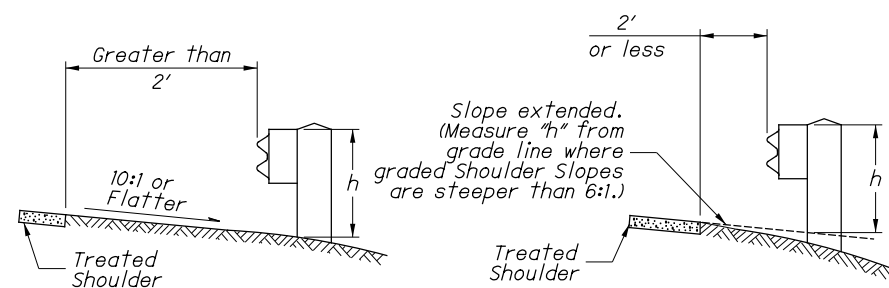
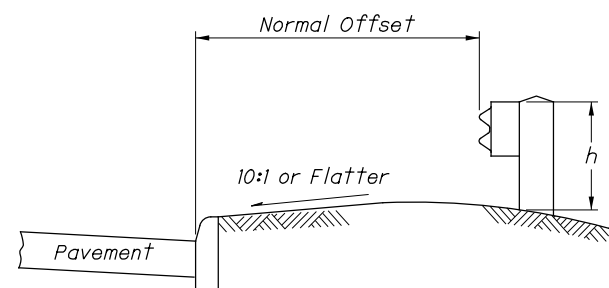
Do not drive posts located over a culvert with less than 4'-3" of cover; instead set in drilled or dug holes. Where the available post embedment depth is less than 3'-5", encase the post with a minimum of 4" concrete.

All costs associated with special post mountings are included in the unit price bid of Item 606 Guardrail of the type specified in the plans.

**ANCHORS:** Holes and grouting shall comply with CMS 510. Use either cement or non-shrink, nonmetallic grout.

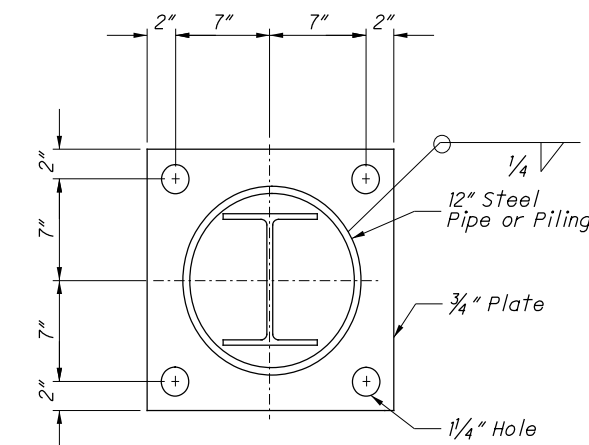
Expansion shield anchors as specified in CMS 712.01 may be substituted except where concrete deterioration has occurred, as determined by the Engineer. Where self-drilling anchors are used, drill the holes with the expansion shield (not by a drill bit) and install the shield flush with the concrete surface.

**PROTECTIVE COATING:** In lieu of the complying with CMS 710.06, coat expansion shields, anchors and concrete insert anchor assemblies embedded in concrete in accordance with ASTM A 153 or be of stainless steel. Any bolts screwed into these devices shall meet CMS 710.06. (See sheet 3 for Concrete Insert Anchor Assembly Detail.)



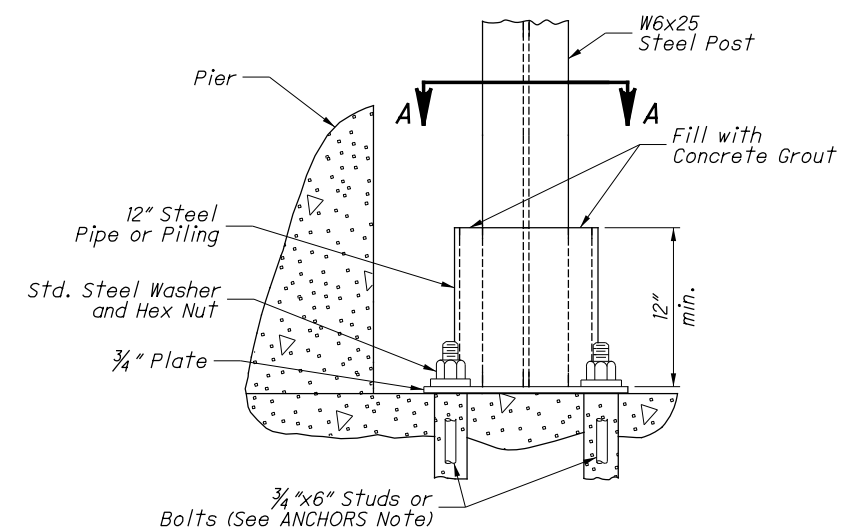
$h$  = Standard Height (See GUARDRAIL HEIGHT Note)

**MEASURING GUARDRAIL HEIGHT**



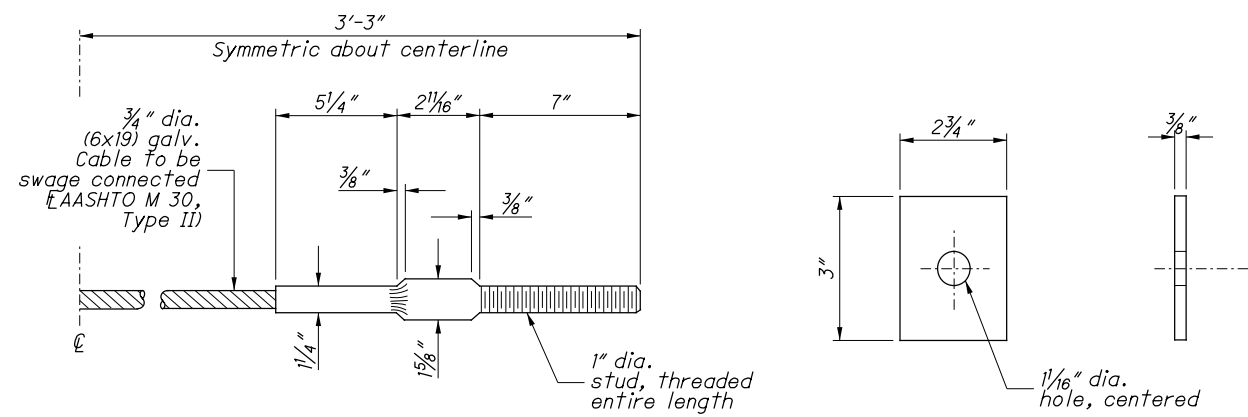
Footing Anchor and hardware need not be galvanized

**SECTION A-A**



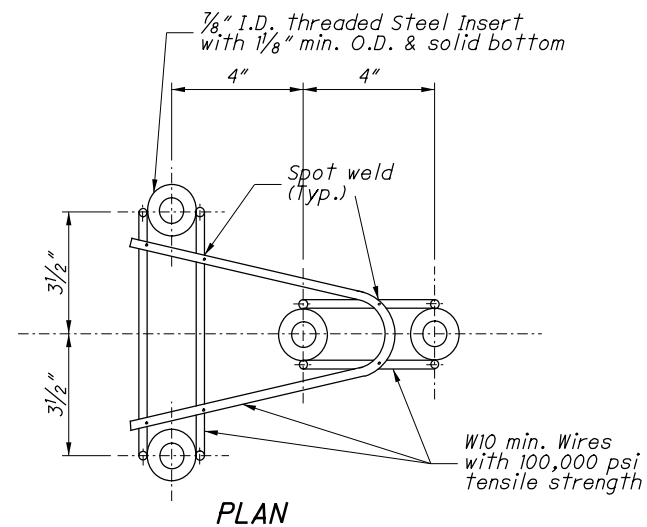
**ELEVATION FOOTING ANCHOR**

See SPECIAL POST MOUNTINGS Note.

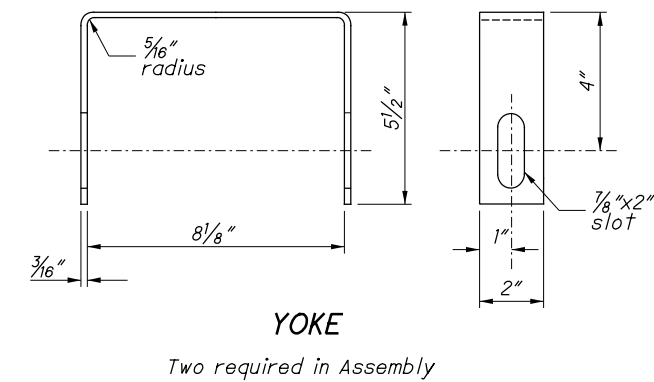


STANDARD SWAGED FITTING AND STUD  
**CABLE ANCHOR**

**END PLATE**

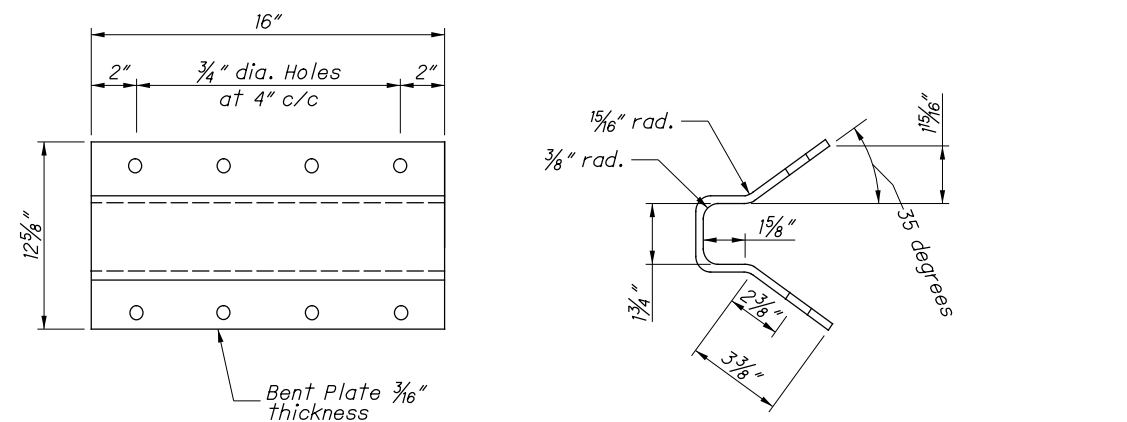


**PLAN**

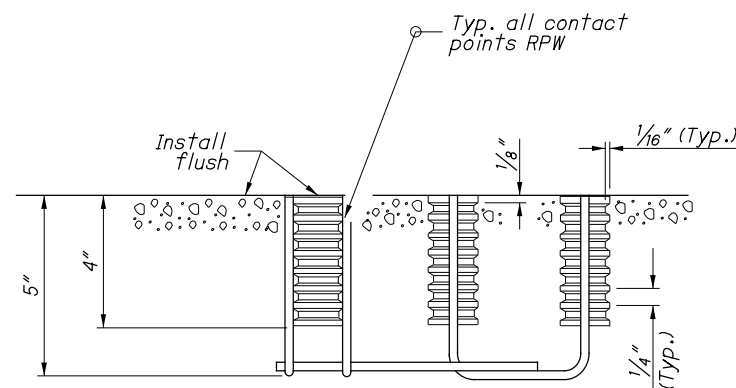


**YOKE**

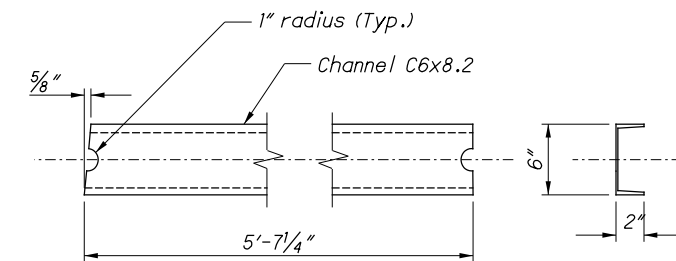
Two required in Assembly



**ANCHOR BRACKET**



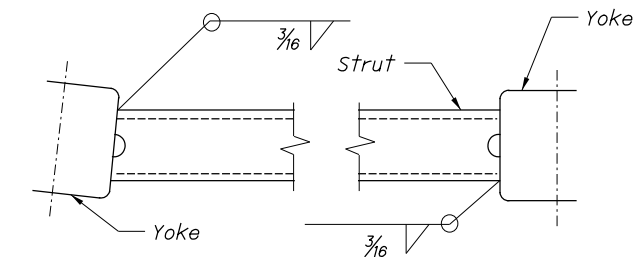
Four 7/8" Bolts required  
**ELEVATION**



**STRUT**

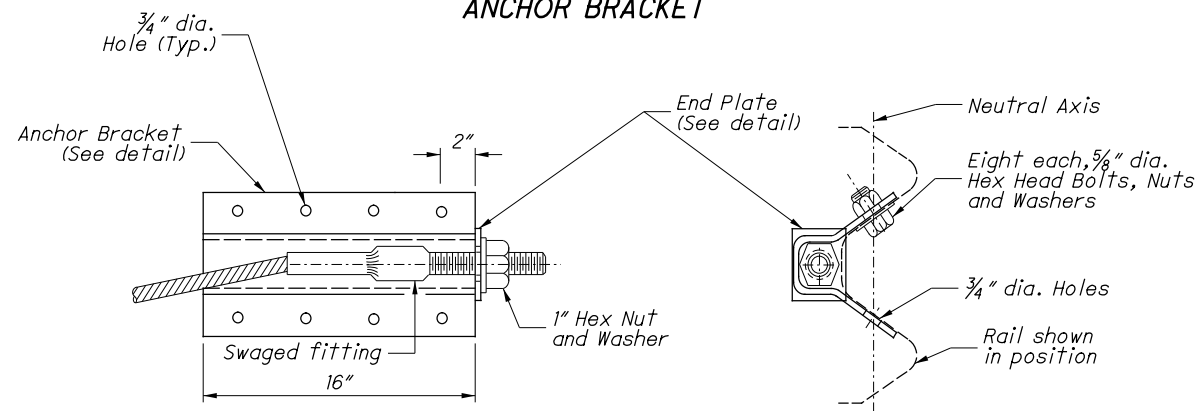
**CONCRETE INSERT ANCHOR ASSEMBLY (W-BEAM ONLY)**

See ANCHORS and PROTECTIVE COATINGS Notes on Sheet 2

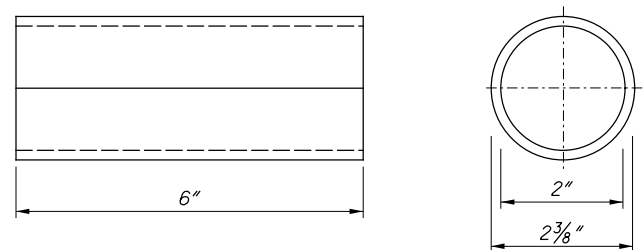


Channel legs shown down. For opposite hand, install Channel legs up.

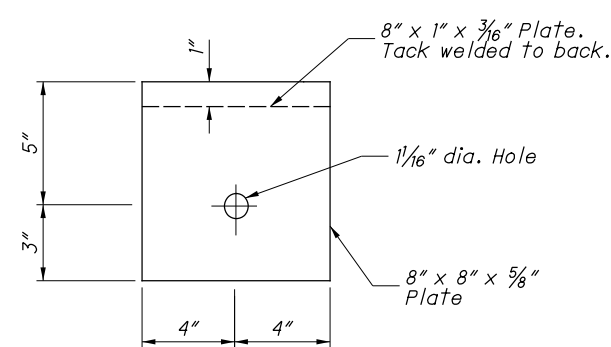
**STRUT AND YOKE ASSEMBLY**



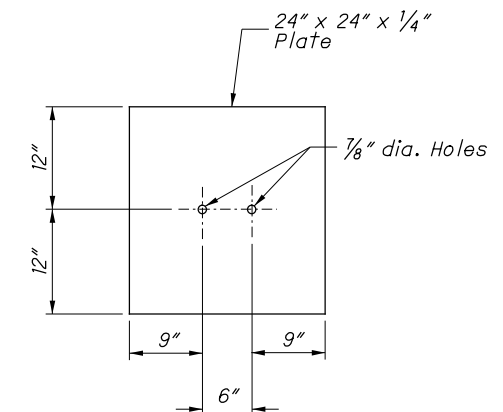
**ANCHOR BRACKET ASSEMBLY DETAILS**



**POST SLEEVE**



**BEARING PLATE**



**SOIL PLATE**

**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" square-sawed.

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

Fabricated 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 or W6x8.5 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" 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.

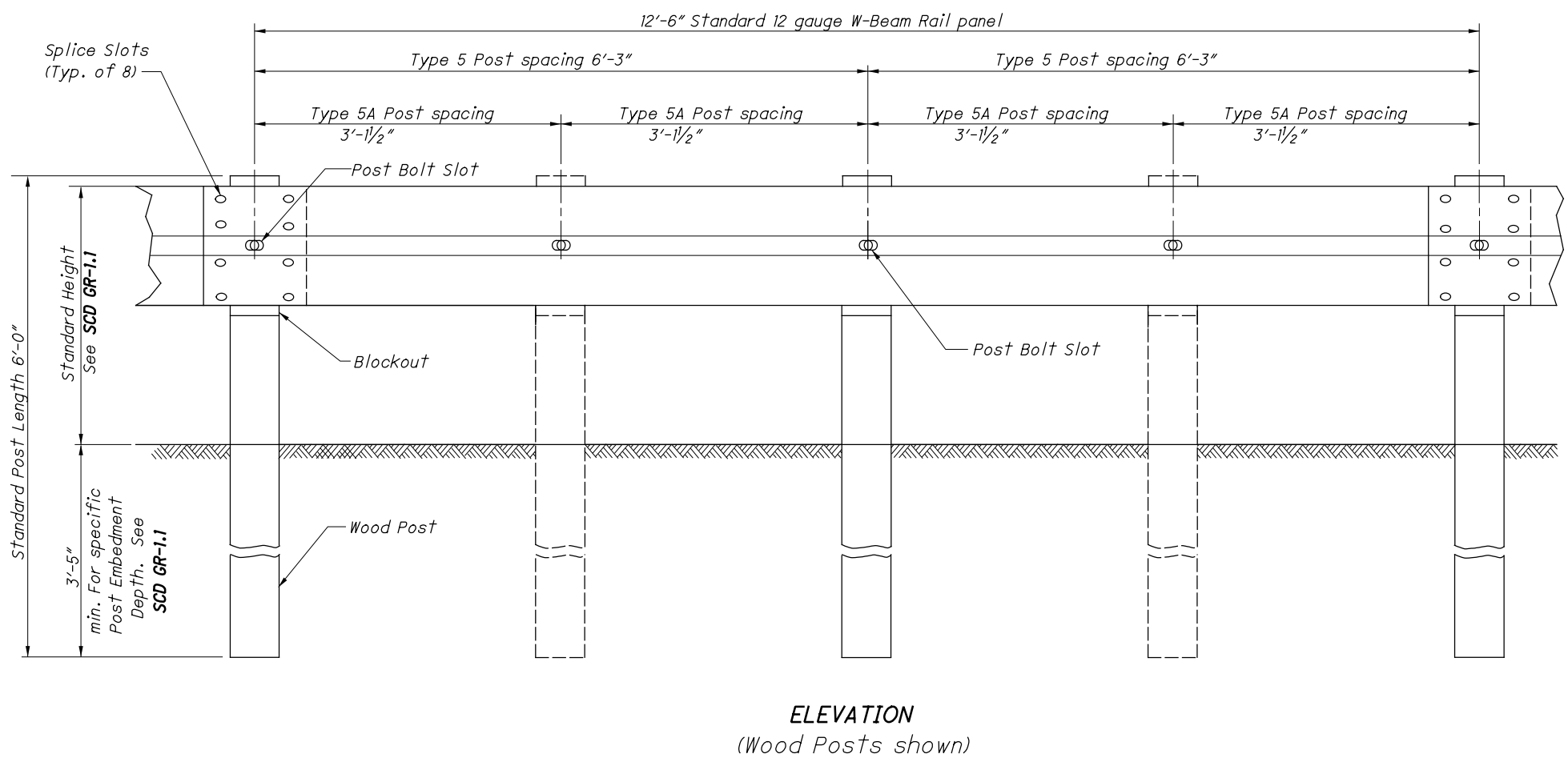
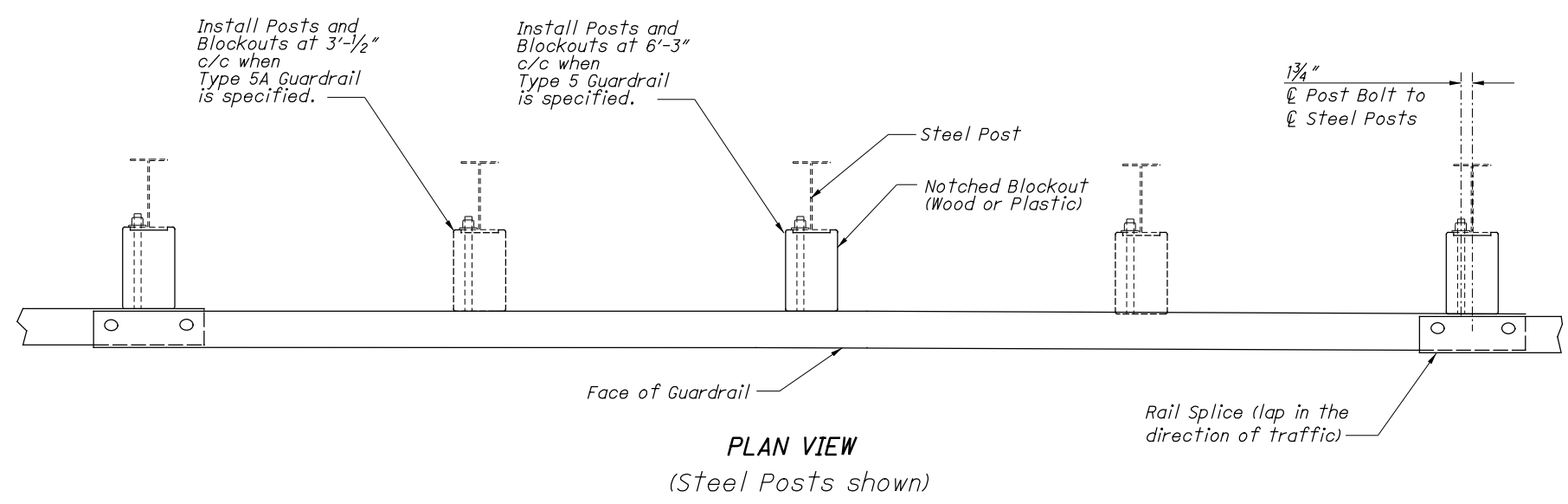
**BLOCKOUTS:** Blockout dimensions are dependent on post used. Wood Blockouts are to be pressure treated as specified in CMS 710.14. Bore bolt holes. Approved alternate blockouts may be used in lieu of the wood blockouts shown. The approved list is maintained by the **Office of Roadway Engineering**.

**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**.

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"



Install Posts and Blockouts at 3'-1/2" c/c when Type 5A Guardrail is specified.

Install Posts and Blockouts at 6'-3" c/c when Type 5 Guardrail is specified.

1/4" Post Bolt to Steel Posts

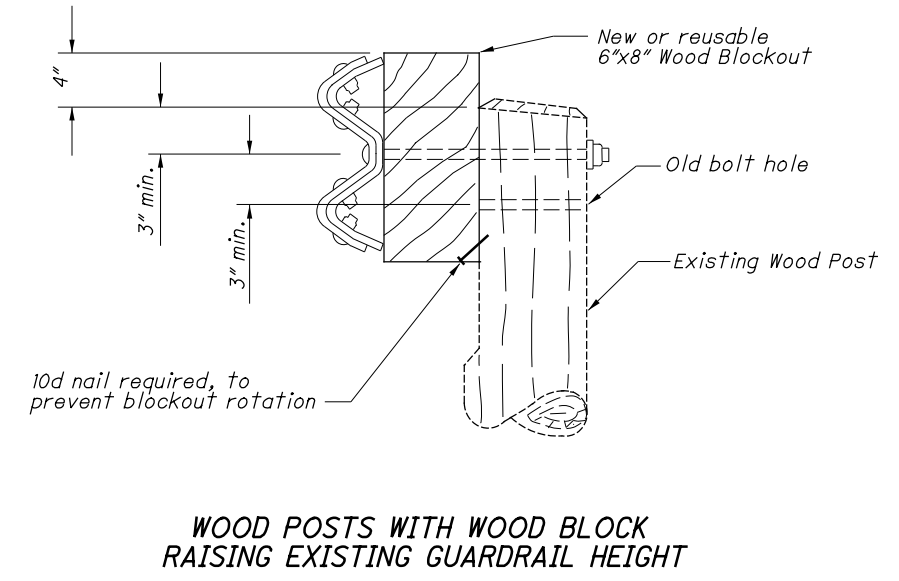
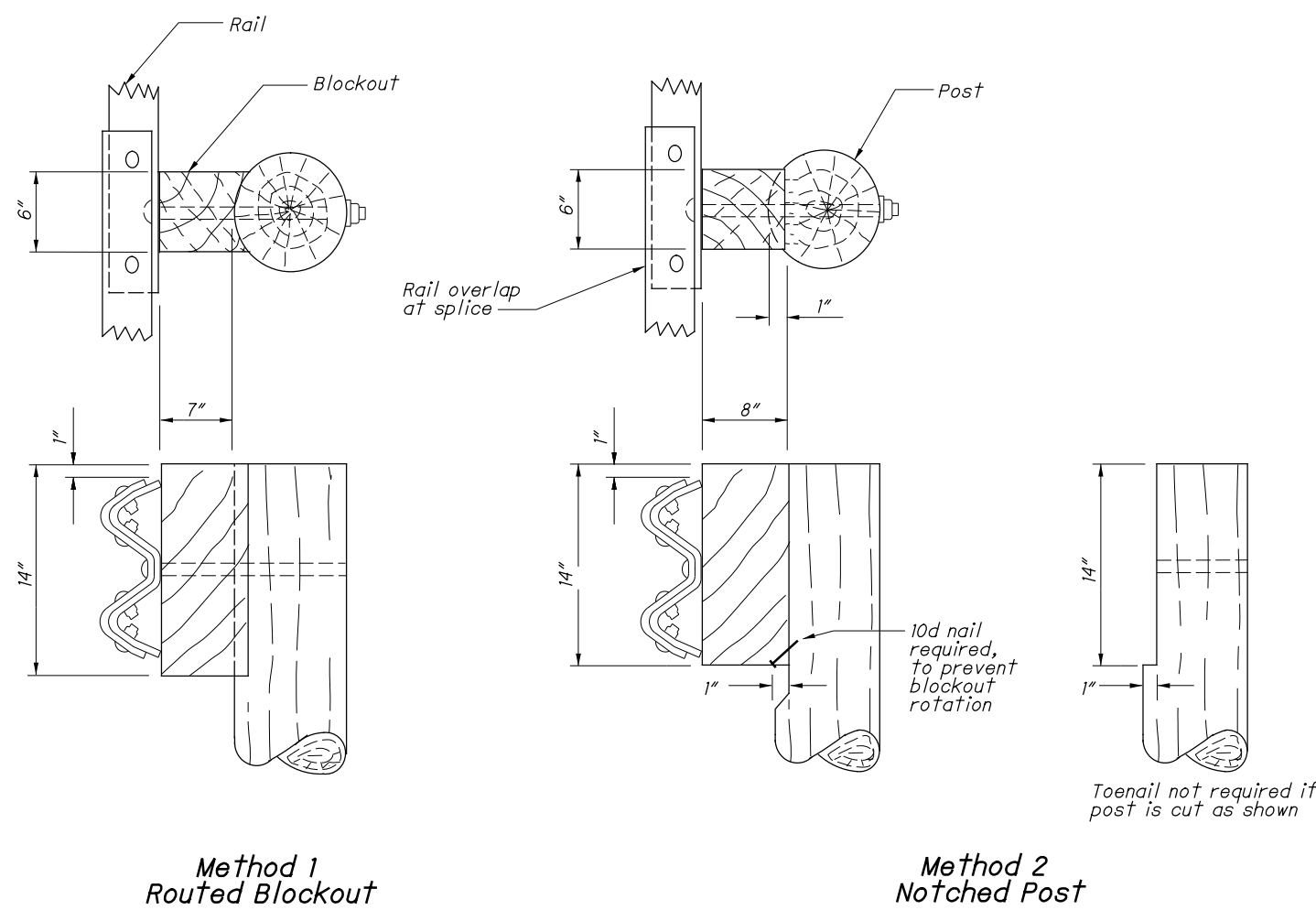
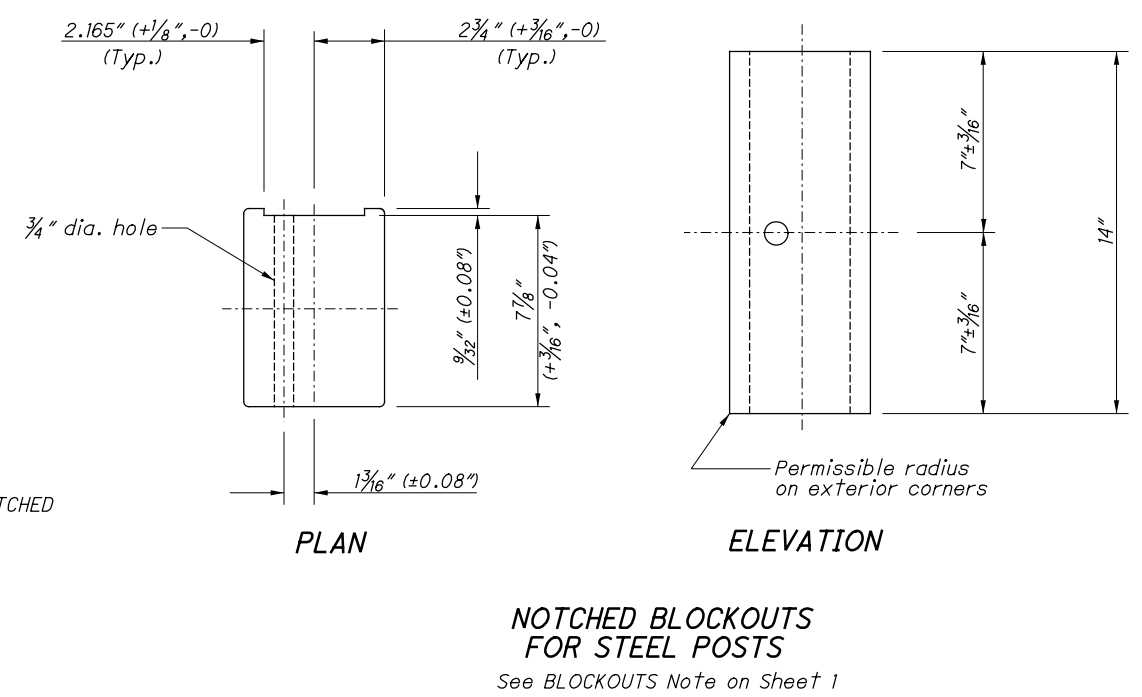
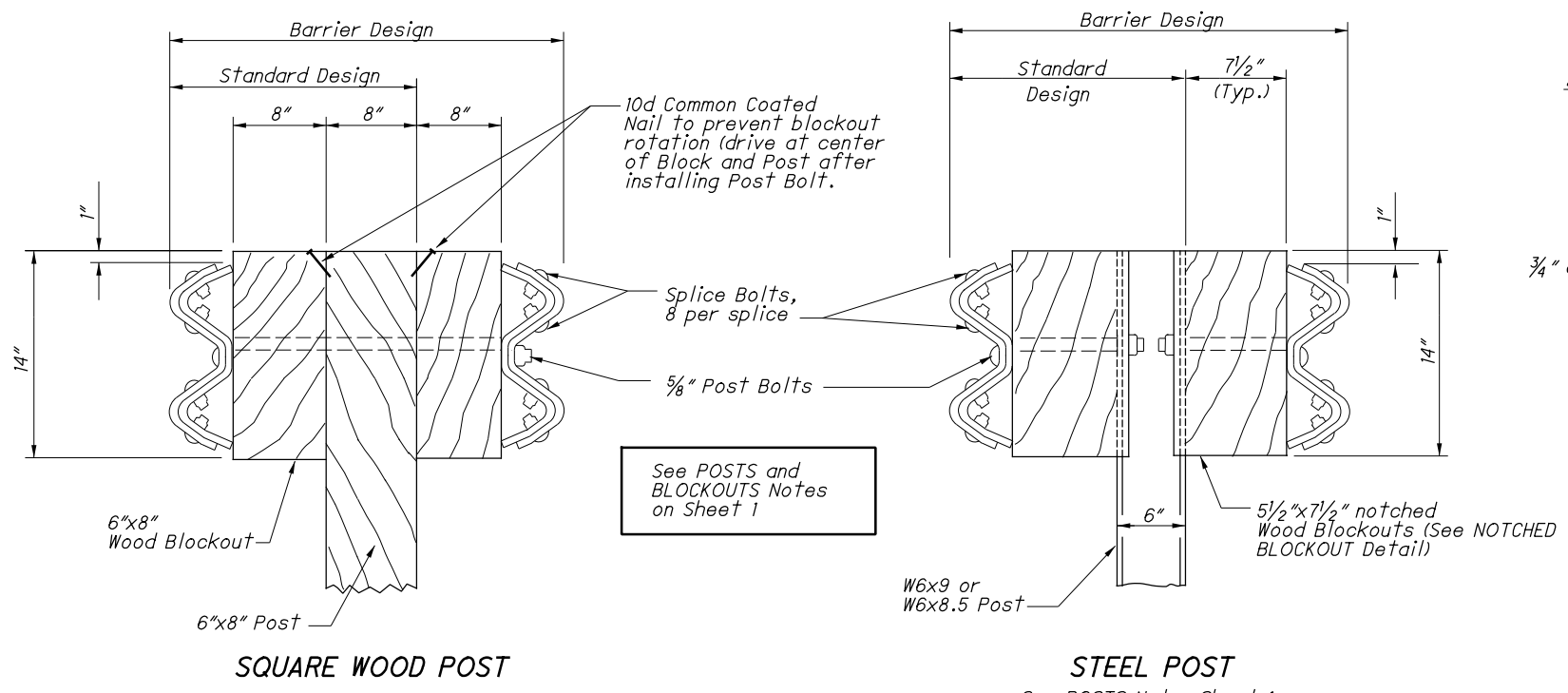
**PLAN VIEW**

(Steel Posts shown)

**ELEVATION**

(Wood Posts shown)

DESIGNED	XXX
REVISION DATE	01-18-2013
CHECKED	XXX
REVIEWED	XXX



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)