



**STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION**

**ROADWAY DESIGN DIVISION**  
SUITE 1300 JAMES K. POLK BUILDING  
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**JOHN C. SCHROER**  
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**BILL HASLAM**  
GOVERNOR

**INSTRUCTIONAL BULLETIN NO. 15-08**

**Regarding Revised and New Standard Drawings**

**Effective for the December 4, 2015 letting (September 23, 2015 turn-in)**, the following Standard Drawings are new and revised. Section V of the Design Guidelines is revised to incorporate these changes and to correct miscellaneous revision dates to agree with the current Standard Drawings.

**PURPOSE:** This Instructional Bulletin revises standard drawings D-PE-4, S-GRA-3, and S-GRT-4 and adds standard drawings S-GRA-4 and S-GRS-4.

DRAWING NUMBER	CURRENT REVISION DATE	DESCRIPTION
D-PE-4	04-23-15	STRAIGHT TYPE CONCRETE ENDWALL
S-GRA-3	05-01-15	GUARDRAIL ANCHOR FOR TYPE 21, 13 AND IN-LINE TERMINALS
S-GRA-4		IN-LINE GUARDRAIL ANCHOR
S-GRS-4		SPECIAL CASE: GUARDRAIL HEIGHT TRANSITION DETAIL
S-GRT-4	04-23-15	TYPE 13 GUARDRAIL TERMINAL (TRAILING END)

IB 15-08

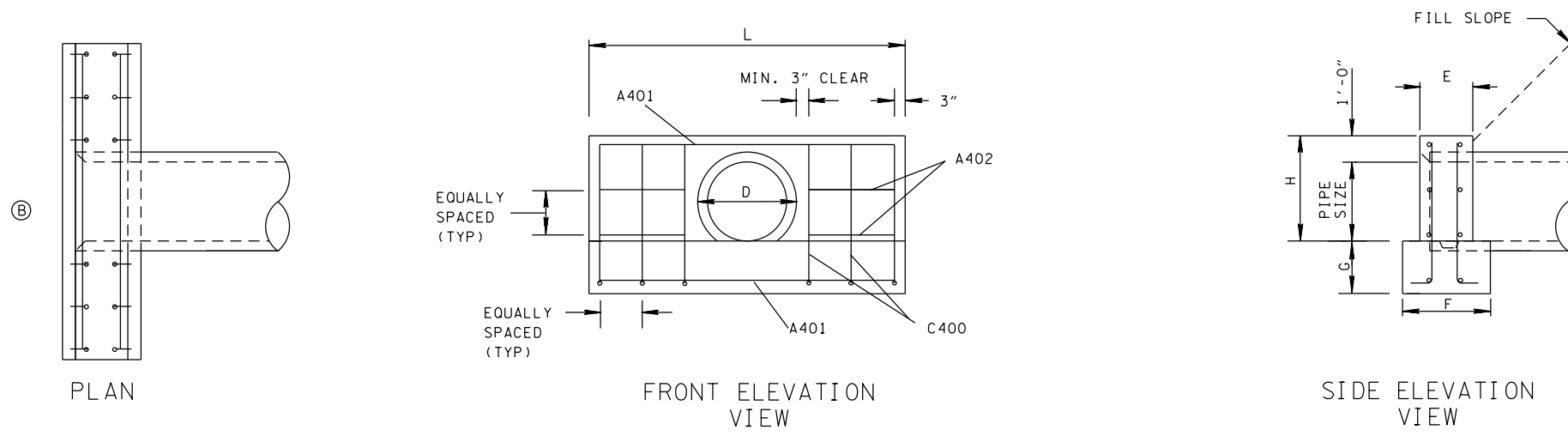
A copy of the revised standard drawings is attached.

Original Signed by the Director  
Jennifer Lloyd, PE  
Civil Engineering Director  
Roadway Design Division

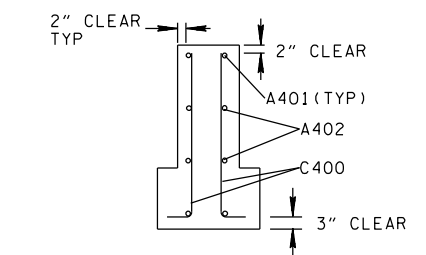
JKL:ARH  
07/01/2015

Attachments

# STRAIGHT TYPE CONCRETE ENDWALL



DIMENSIONS AND ESTIMATED QUANTITIES FOR STRAIGHT CONCRETE ENDWALL								
PIPE SIZE	HOLE SIZE	WALL			FOOTING		CONC. C.Y.	REINF. STEEL LB
		L	H	E	F	G		
18"	26"	6'-0"	2'-6"	1'-3"	2'-1"	1'-3"	1.16	40
24"	33"	8'-0"	3'-0"	1'-4"	2'-2"	1'-4"	1.86	68
30"	40"	10'-0"	3'-6"	1'-6"	2'-4"	1'-6"	2.98	90



REINFORCING STEEL LEGEND	
— a —	A400
— b —	C400

## REINFORCEMENT DETAILS

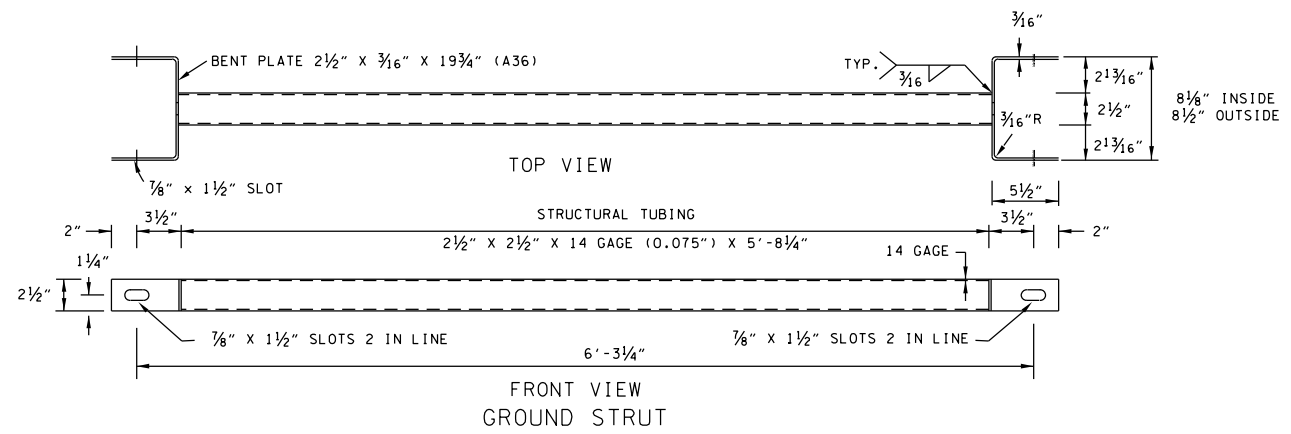
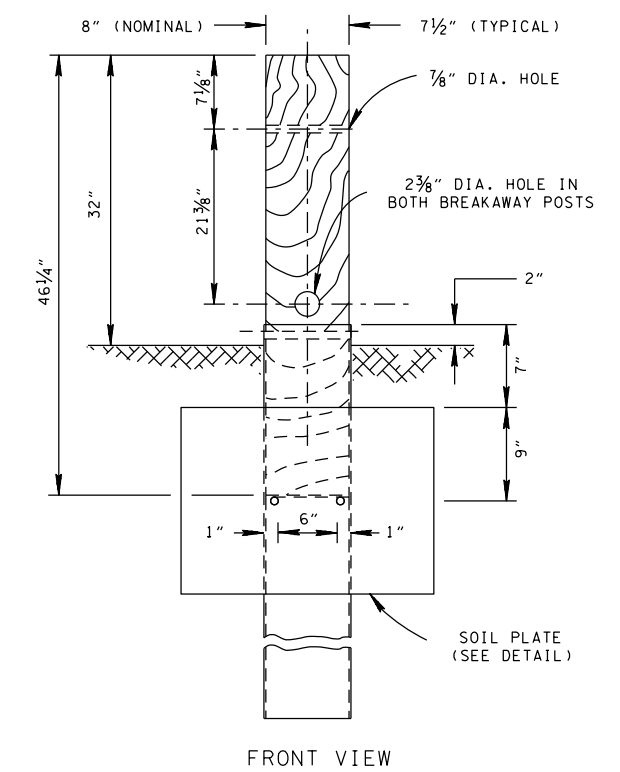
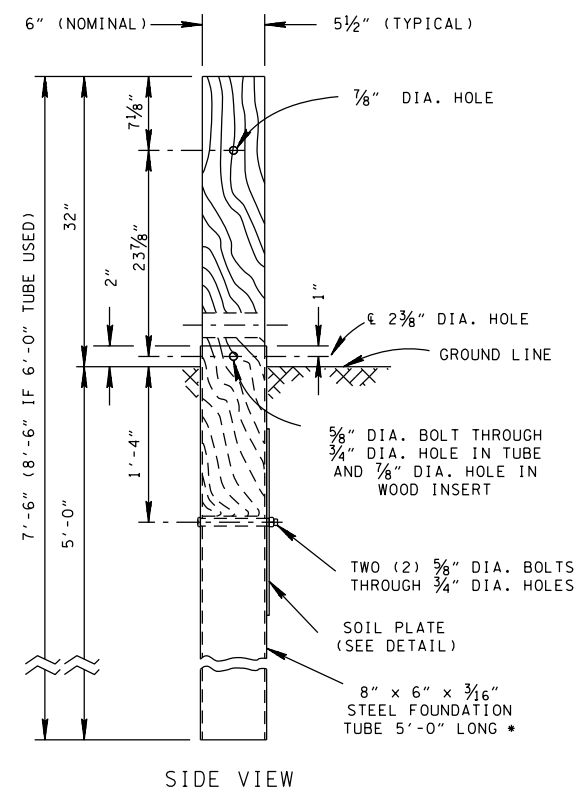
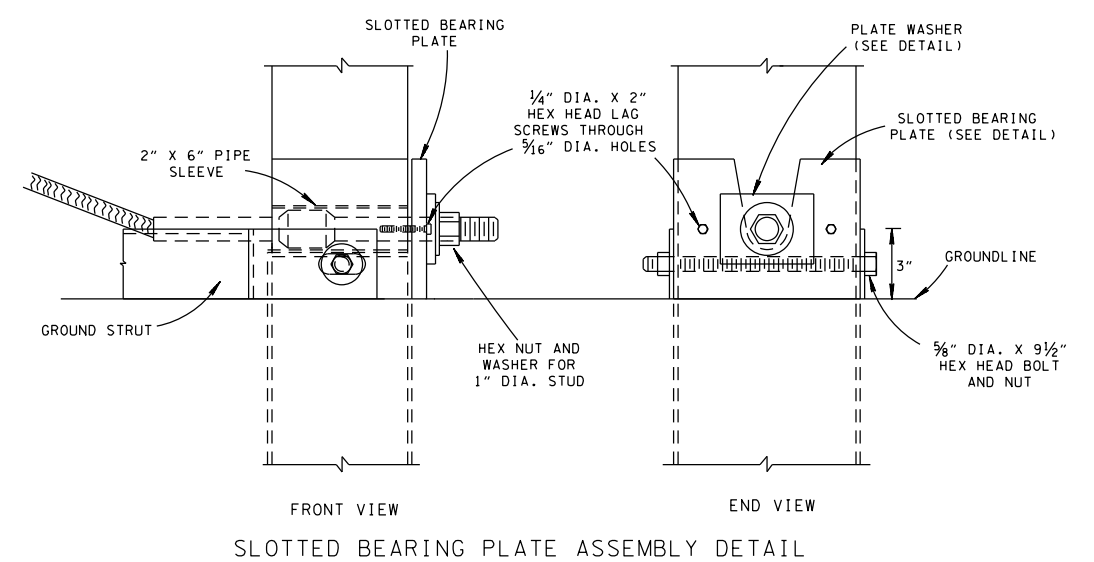
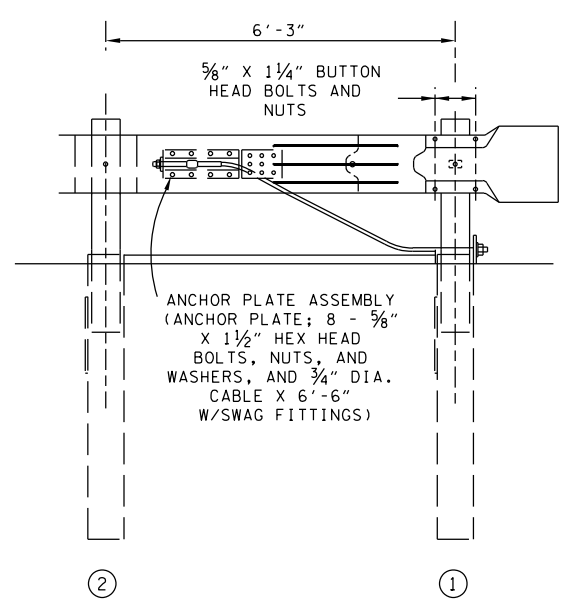
BILL OF STEEL													
BAR	18" PIPE				24" PIPE				30" PIPE				
	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER	
A401	66	0	66	4	90	0	90	4	114	0	114	4	
C400	40	6	46	8	47	6	53	12	55	6	61	12	
A402	18.5	0	18.5	8	27	0	27	8	35.5	0	35.5	12	
TOTAL			706 in		TOTAL			1212 in		TOTAL			1614 in
LB			40		LB			68		LB			90

- ### GENERAL NOTES
- (A) CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD CONSTRUCTION SPECIFICATIONS, SECTION 611, AND/OR SPECIAL PROVISIONS.
  - (B) ALL STRAIGHT CONCRETE ENDWALLS ON THE INLET END OF PIPE, AND AT 90° SKEW SHALL BE BEVELED AT 3" AT AN 45° ANGLE. BEVEL WILL NOT BE REQUIRED WHEN ENDWALL IS CONSTRUCTED ON THE "BELLED" END OF CONCRETE PIPE.
  - (C) ENDWALL MAY BE MODIFIED TO ACCOMMODATE MULTIPLE PIPES WHEN MORE THAN ONE PIPE IS PROPOSED, THE DISTANCE FROM CENTER TO CENTER OF PIPE SHALL BE D + 1'-0".
  - (D) PAYMENT FOR ENDWALLS WILL BE MADE AS FOLLOWS:  
ITEM 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.  
ITEM 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.
  - (E) SEE SECTION 6.04.3.3 IN THE TDOT DESIGN MANUAL FOR RIPRAP APRON REQUIREMENT.
  - (F) PRECASTING IS ALLOWED.
  - (G) PIPE OPENING TO BE BASED ON TYPE "B" WALL THICKNESS (AASHTO M170).
  - (H) PIPE ENDWALLS FOR SLOPES STEEPER THAN 3:1 (PREVIOUSLY TYPE "U") WILL NOW USE TYPE "B" SEE D-PE-9.

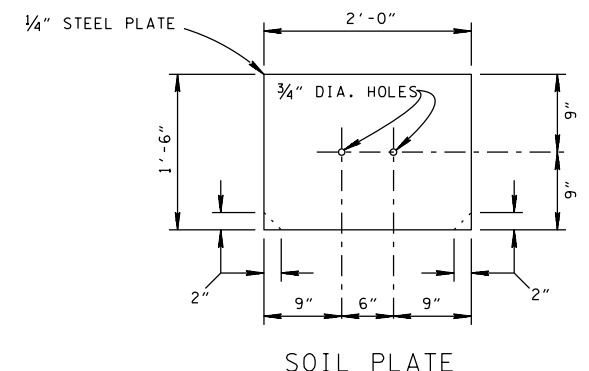
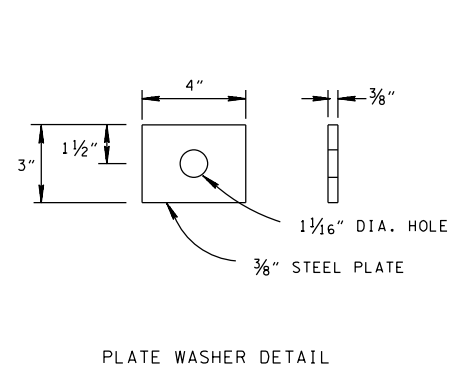
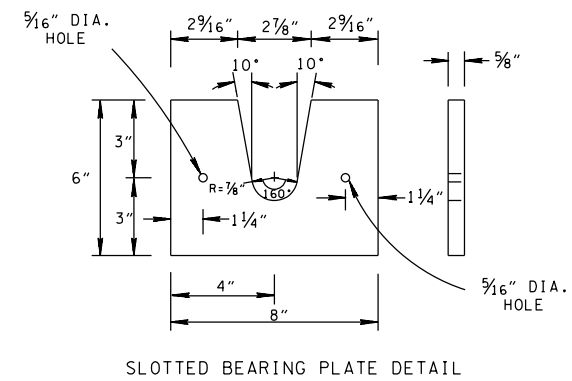
- REV. 9-28-83: REDREW AND ADDED TABLE FOR STRAIGHT ENDWALL WHEN PIPE IS SKEWED.
- REV. 2-19-88: ADDED SAFETY ADJUSTMENTS "U" TYPE ENDWALL.
- REV. 1-19-94: REDREW AND REORGANIZED DRAWING. ELIMINATED TYPE "U" ENDWALL FOR 3:1 SLOPE.
- REV. 1-19-97: ADDED UNITS TO HEADING FOR TABLE FOR SKEWED PIPE.
- REV. 6-1-09: ADDED GENERAL NOTE (D).
- REV. 7-19-10: REMOVED GENERAL NOTE (D).
- REV. 1-15-13: ADDED REINFORCEMENT AND CHANGED NOTES. ADDED BILL OF STEEL, REMOVED "U" AND "L" TYPE ENDWALL.
- REV. 12-1-14: REVISED BAR DESIGNATION MINOR EDITING.
- REV. 4-23-15: REVISED DIMENSIONS AND ESTIMATED QUANTITIES FOR STRAIGHT CONCRETE ENDWALL.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

REV. 5-1-15: REVISED NO.1 & 2 BREAKAWAY POSTS WITH 5'-0" TUBE SLEEVE.

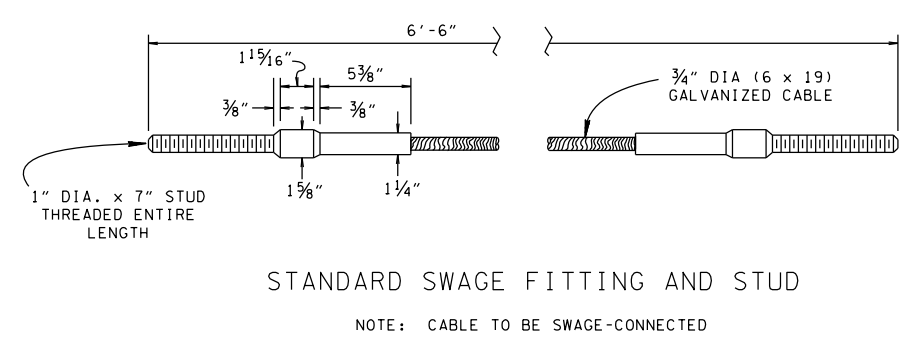
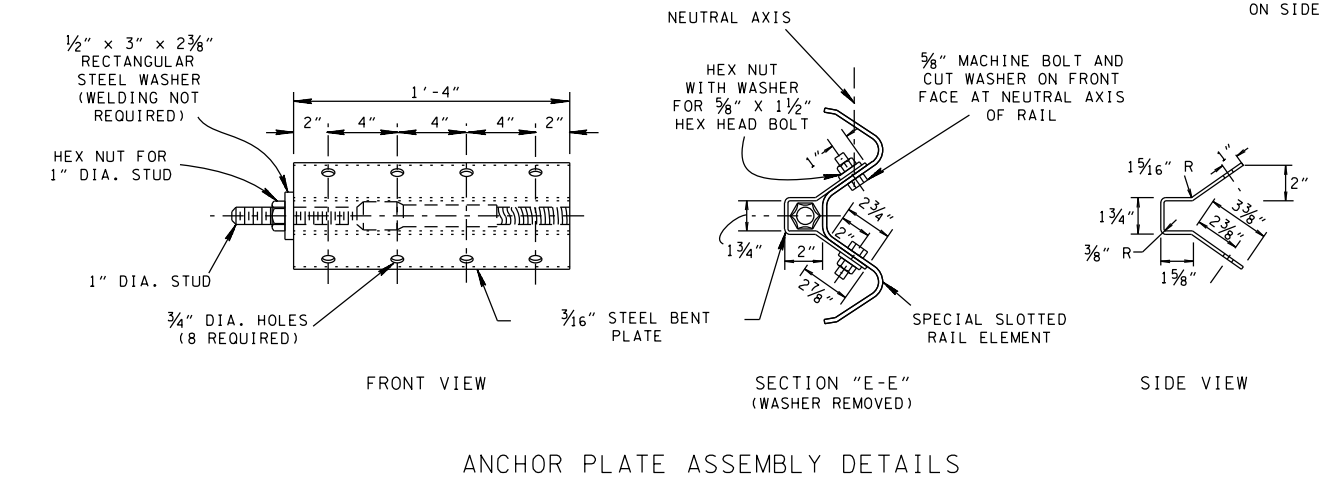


NO. 1 & 2 BREAKAWAY POSTS WITH 5'-0" TUBE SLEEVE  
ALTERNATE 6'-0" TUBE SLEEVE WITHOUT SOIL PLATE MAY BE USED



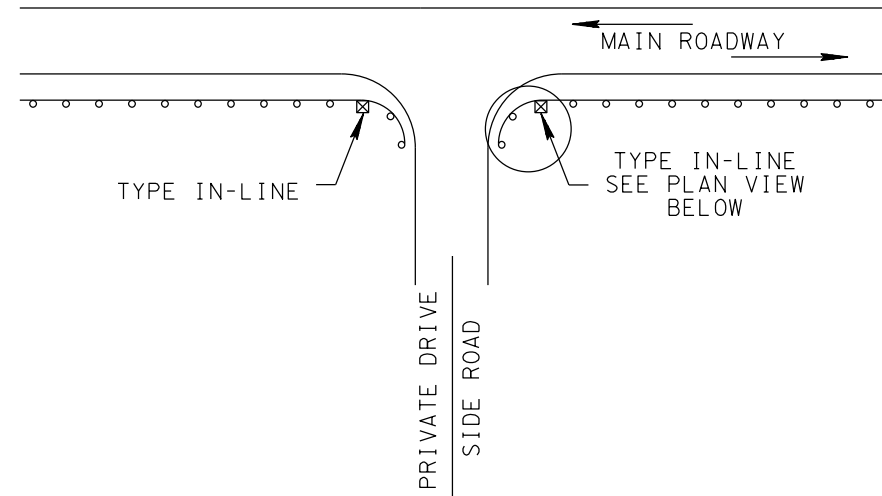
NOTE: THE CONTRACTOR HAS THE OPTION OF CLIPPING 2" x 2" TRIANGLES OFF BOTTOM CORNERS TO AID IN DRIVING. (TO BE ATTACHED TO BREAKAWAY POST NOS. 1 & 2 ON SIDE OPPOSITE TO END TERMINAL SECTION)

- GENERAL NOTES
- (A) THE NO. 1 AND NO. 2 BREAKAWAY POSTS WILL HAVE A 6" x 8" (NOMINAL) CROSS-SECTION AREA AND WILL HAVE A 2 3/8" DIAMETER HOLE CENTERED 2'-0" BELOW THE TOP OF THE POST ON THE 8" SIDE AS SHOWN. ALL POSTS SHALL BE ERRECTED SO THAT THE GUARDRAIL WILL HAVE A TOP-OF-RAIL HEIGHT OF 2'-7".
  - (B) ALL HOLES IN WOOD POSTS ARE TO BE DRILLED BEFORE PRESERVATIVE TREATMENT.
  - (C) ALL CUTTING, DRILLING, AND WELDING OF STEEL COMPONENTS SHALL BE DONE BEFORE GALVANIZING.
  - (D) THE FINISHED CABLE ASSEMBLY WILL NOT BE ACCEPTABLE UNLESS IT IS IN TENSION WITH NO SAG.
  - (E) OTHER ANCHOR CABLE ASSEMBLIES PROVIDING A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS PER SQUARE INCHES WILL BE ACCEPTABLE.
  - (F) COST OF ANCHOR TO BE INCLUDED IN THE COST OF END TERMINAL EXCEPT AS STATED IN NOTE (G).
  - (G) IF USED WITHOUT END TERMINAL TO BE PAID UNDER ITEM NO. 705-04.05 GUARDRAIL TERMINAL (TYPE IN LINE) PER EACH. (SEE S-PL-2)

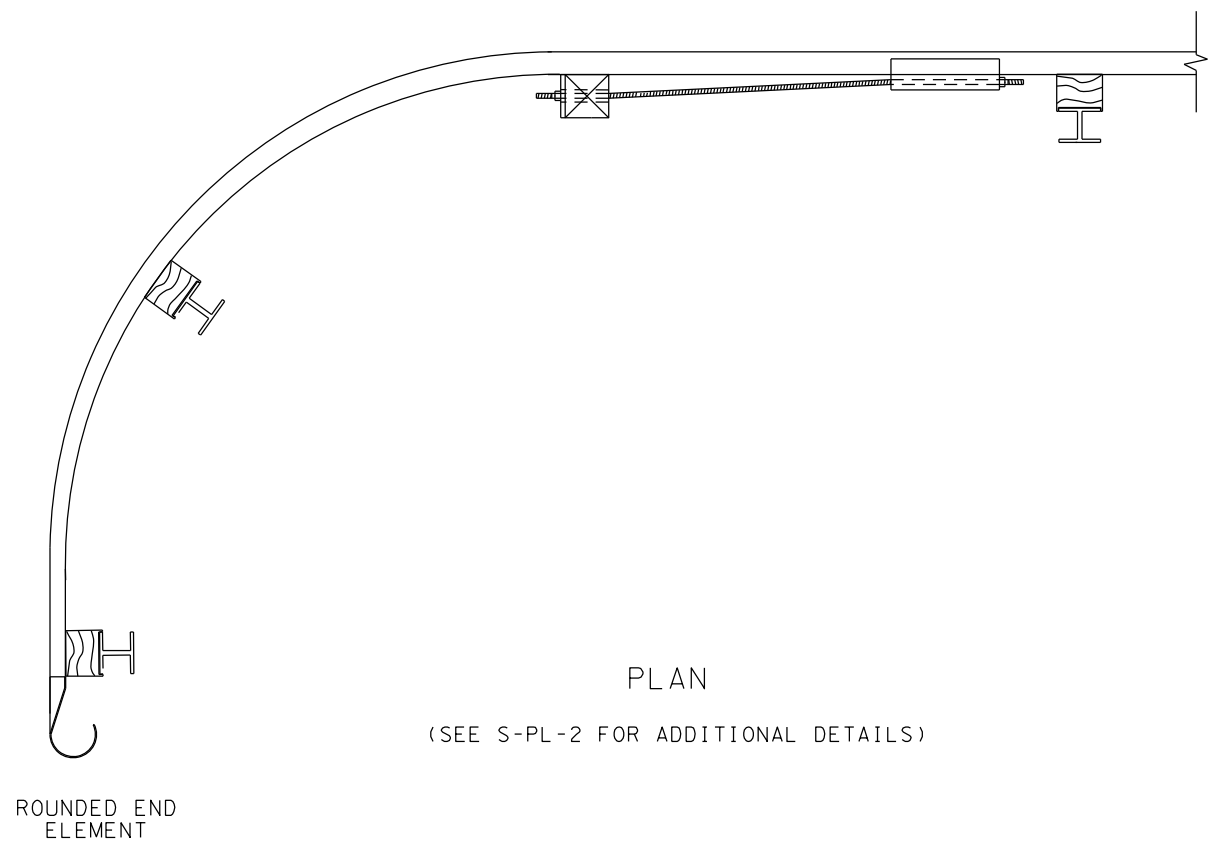


NOTE: CABLE TO BE SWAGE-CONNECTED

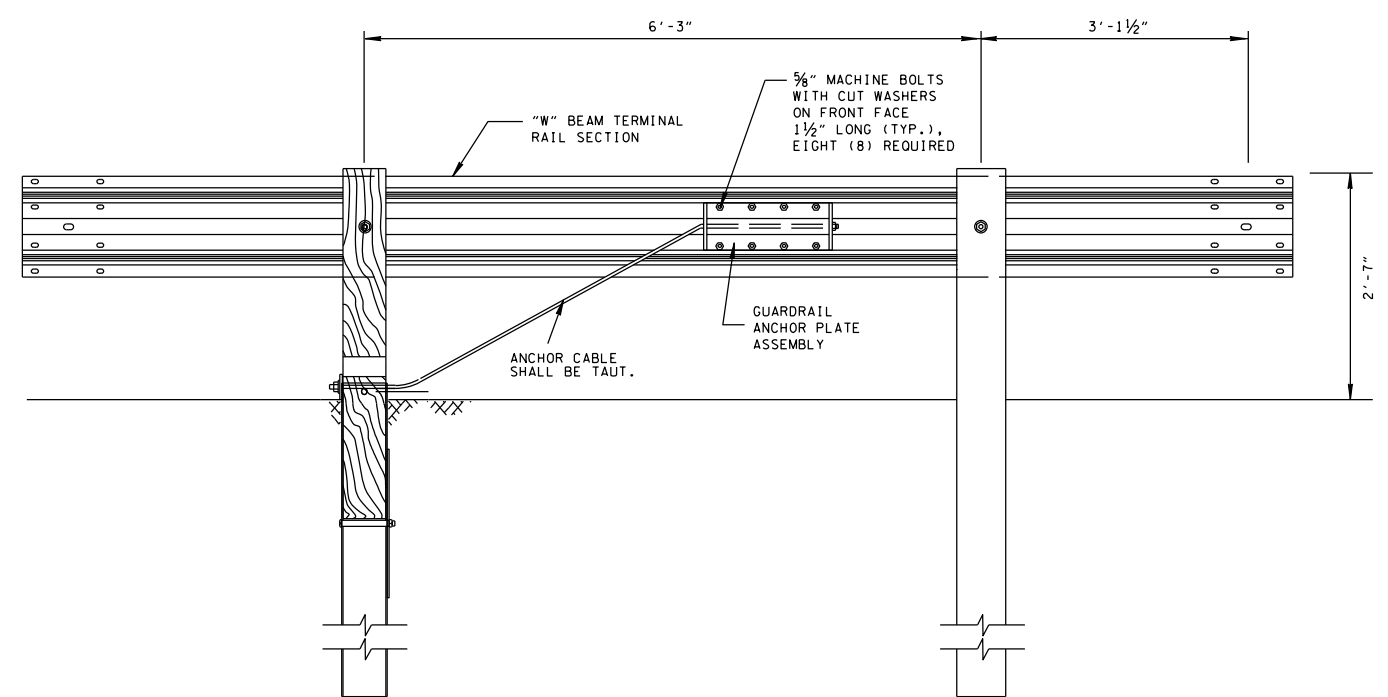
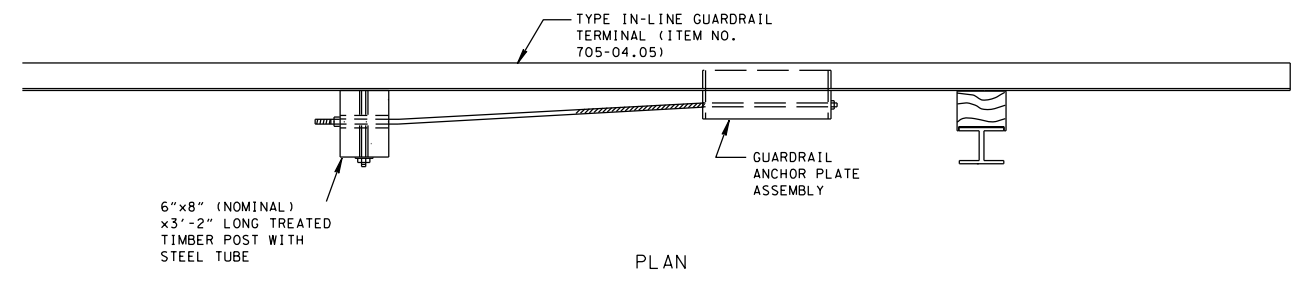
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.



GUARDRAIL TERMINAL ANCHOR (TYPE IN-LINE) APPLICATION  
DO NOT USE ON NATIONAL HIGHWAY SYSTEM (NHS)



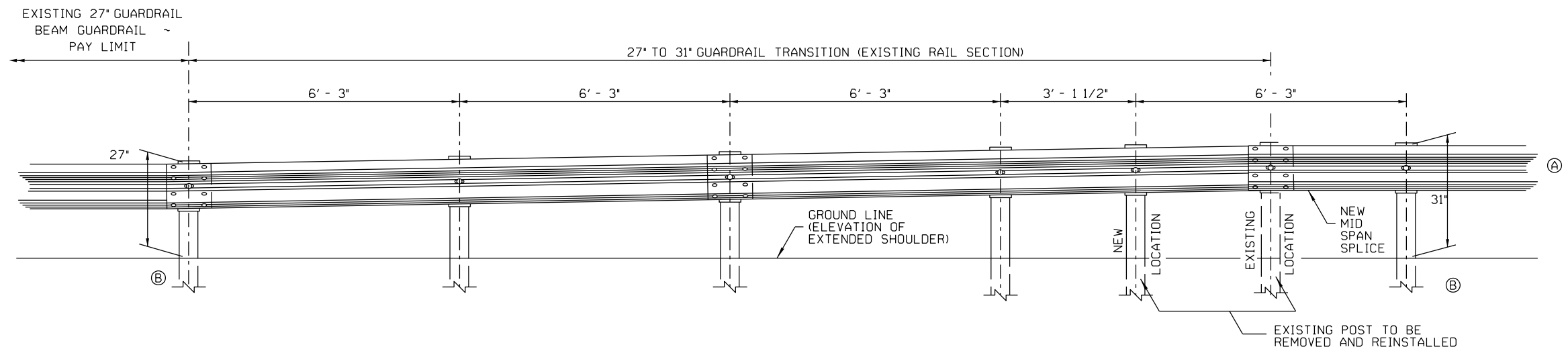
PLAN  
(SEE S-PL-2 FOR ADDITIONAL DETAILS)



ELEVATION FROM BEHIND GUARDRAIL  
SEE S-GRA-3 FOR ADDITIONAL DETAILS

DO NOT USE WITHOUT ALSO REFERENCING S-GRA-3

- GENERAL NOTES
- (A) THIS ANCHORAGE MAY ONLY BE USED ON THE TRAILING END OF A BARRIER WHICH IS NOT EXPOSED TO DIRECT VEHICULAR IMPACT OR OUTSIDE THE CLEAR ZONE (ONLY DIVIDED HIGHWAYS OR ROADS WITH ONE WAY TRAFFIC) USE S-PL-1 TO DETERMINE LENGTH OF NEED.
  - (B) PAY ITEM NO. 705-04.05 GUARDRAIL TERMINAL (TYPE IN-LINE)



### ELEVATION VIEW ~ PROFILE TAPER

MAXIMUM HEIGHT ADJUSTMENT SHOULD BE LIMITED TO 1" PER 6'-3" GUARDRAIL SECTION.  
 MINIMUM HEIGHT TRANSITION SECTION SHOWN.

#### GENERAL NOTES

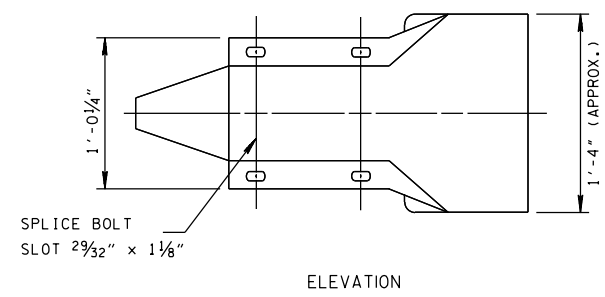
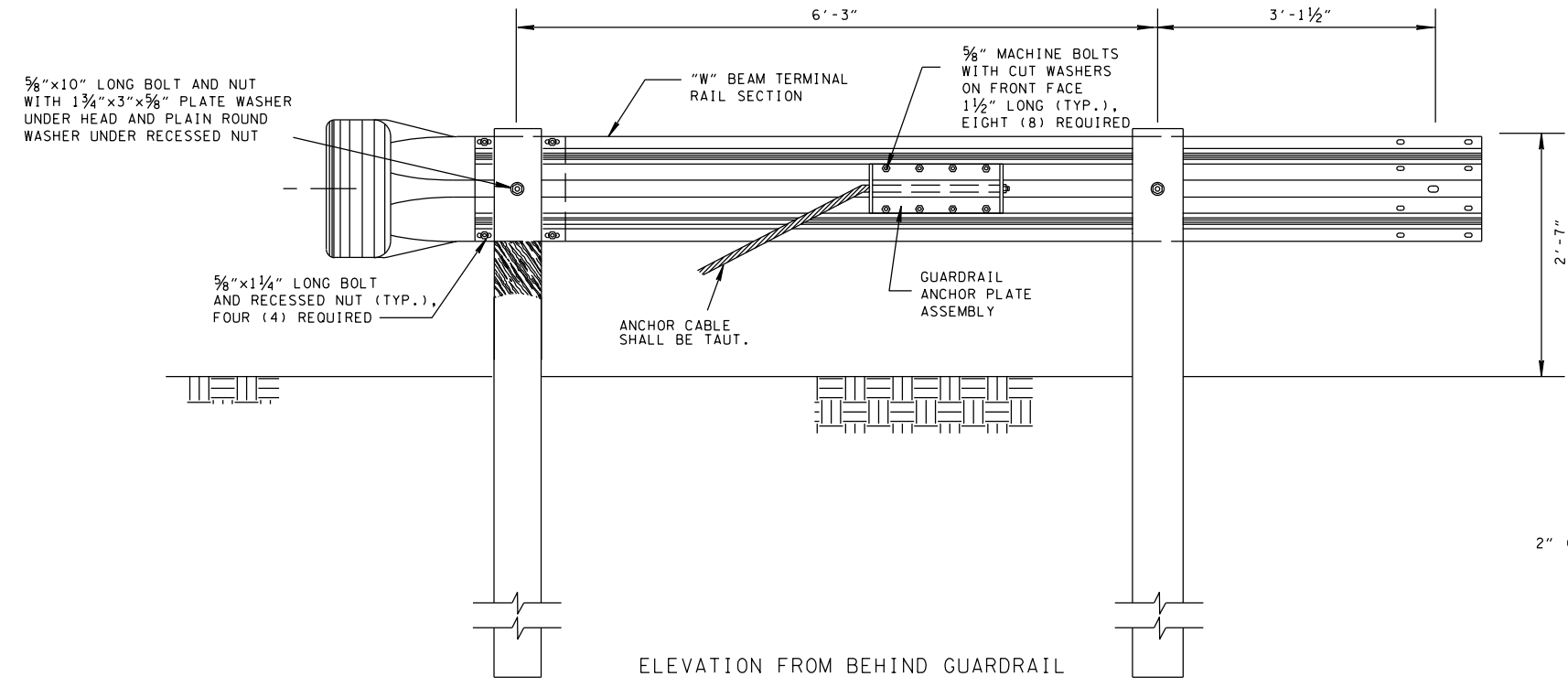
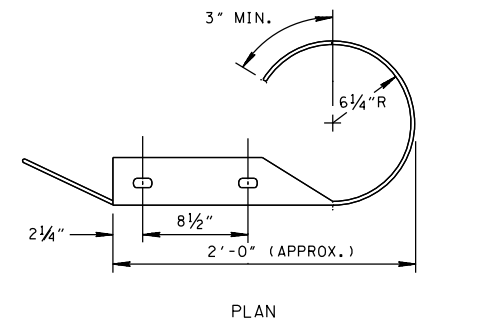
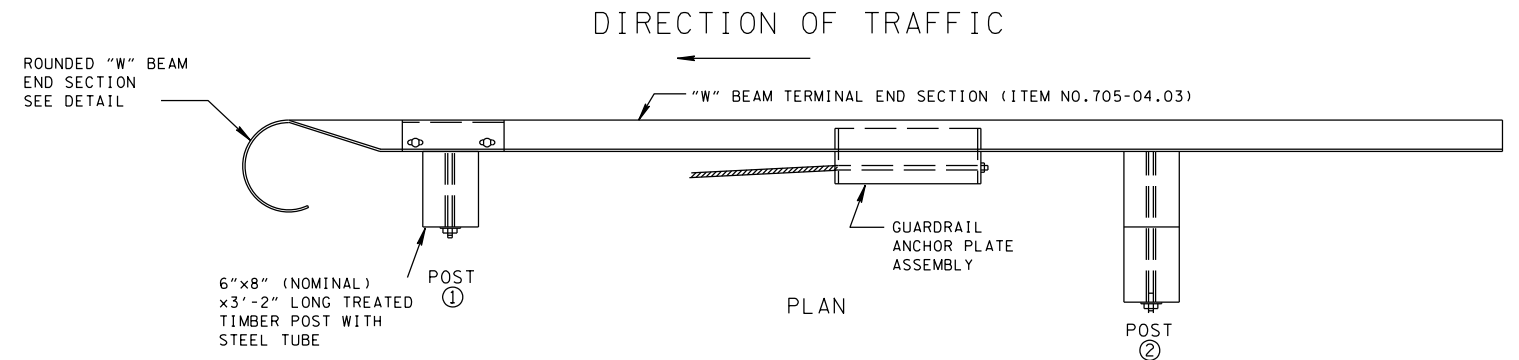
- (A) THIS GUARDRAIL HEIGHT TRANSITION DETAIL MAY BE USED FOR GUARDRAIL REPAIRS, MAINTENANCE, AND BRIDGE REPAIR PROJECTS.
- (B) POST NO. 8 IF USED FOR TRANSITION TO GUARDRAIL END TERMINAL (SEE S-GRT-2).
- (C) WHERE FEASIBLE ADJUST THE EXISTING GUARDRAIL HEIGHT TO 28" MIN.

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION

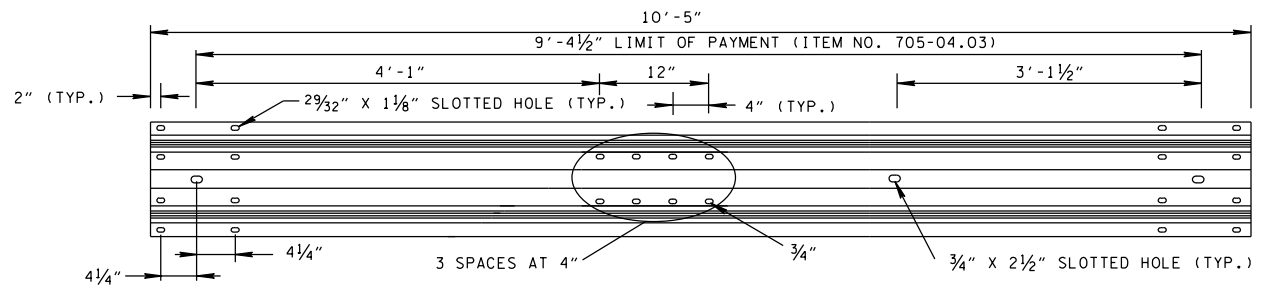
SPECIAL CASE  
 GUARDRAIL HEIGHT  
 TRANSITION  
 DETAIL

5-11-15 S-GRS-4

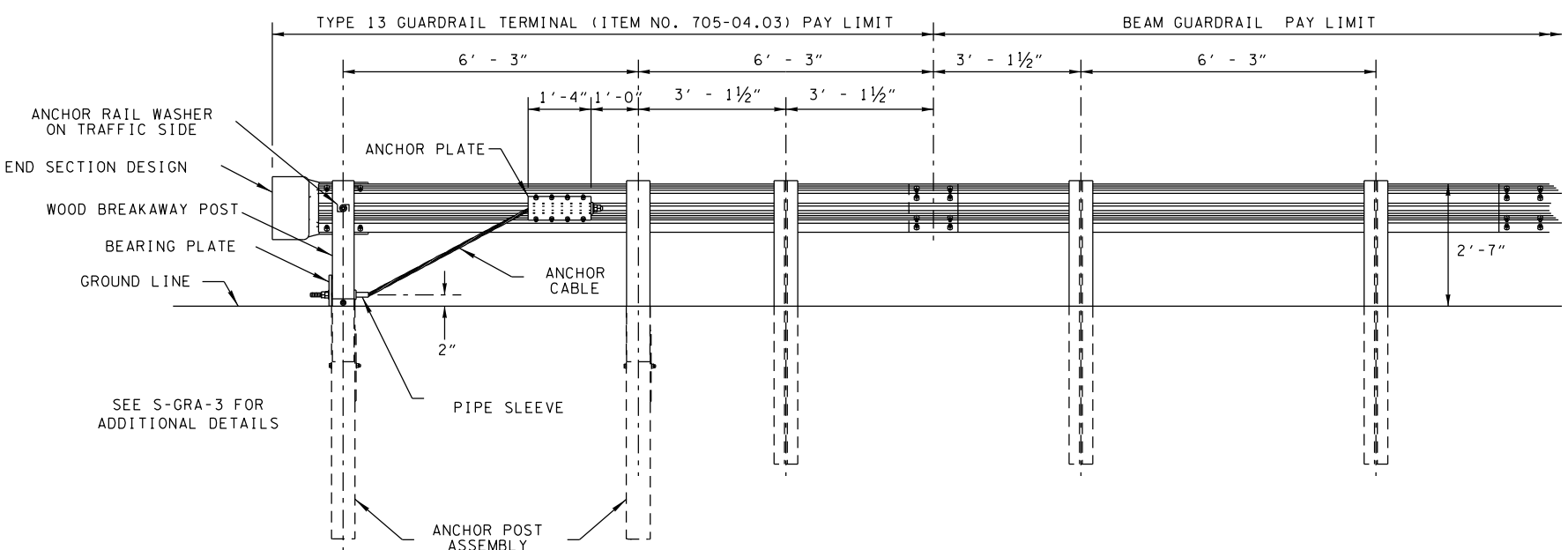
- REV. 11-06-14: EXTENDED GUARDRAIL TERMINAL PAY LIMITS.
- REV. 4-23-15: REVISED TERMINAL RAIL ELEMENT DETAILS. ADDED ALTERNATE DETAIL.



ROUNDED END ELEMENT  
(TO BE PERFORMED BY THE MANUFACTURER)



TERMINAL RAIL ELEMENT DETAILS



ALTERNATE INSTALLATION DETAIL

DO NOT USE WITHOUT ALSO REFERENCING S-GRA-3

- GENERAL NOTES**
- (A) THIS ANCHORAGE MAY ONLY BE USED ON THE TRAILING END OF A BARRIER WHICH IS NOT EXPOSED TO DIRECT VEHICULAR IMPACT OR OUTSIDE THE CLEAR ZONE (ONLY DIVIDED HIGHWAYS OR ROADS WITH ONE WAY TRAFFIC) USE S-PL-1 TO DETERMINE LENGTH OF NEED.
  - (B) GUARDRAIL SHALL MEET THE REQUIREMENTS OF AASHTO M 180, CLASS A, TYPE I UNLESS OTHERWISE DESIGNATED.
  - (C) ALL WOOD POSTS AND BLOCKOUTS SHALL BE TREATED TIMBER IN ACCORDANCE WITH TENNESSEE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
  - (D) PAY ITEM NO. 705-04.03 GUARDRAIL TERMINAL (TYPE13)

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION	
TYPE 13 GUARDRAIL TERMINAL (TRAILING END)	
7-11-13	S-GRT-4