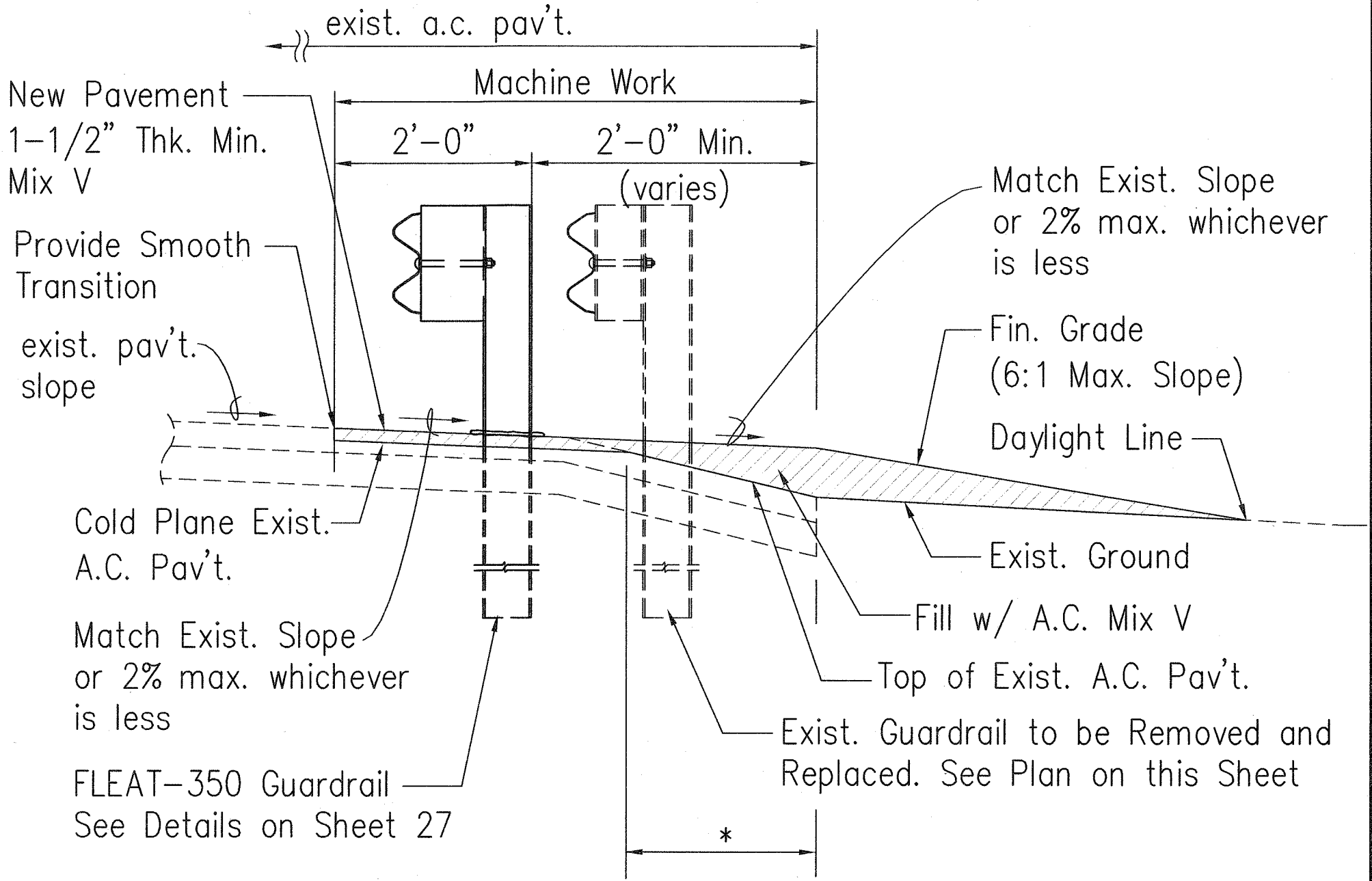


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(50)	2006	26	43

### NOTES

- Guardrail Plans and Details presented herein are intended to assist the Contractor in the event construction operations require removal of existing guardrails to facilitate work.
- Removal of existing guardrail and installation of new guardrails and appurtenances shall be paid on a force account basis according to Subsection 109.04 – Payment for Additional and Force Account Work.
- Connection between new and existing guardrail shall be located at the closest existing strong post.
- The exact locations and limits or areas to be filled with leveling course, reconstructed and cold planed shall be determined in the field by the Engineer.
- All holes, depressions and wheel ruts shall be filled and compacted with Asphalt Concrete Pavement, Mix No. V prior to resurfacing. This work shall be incidental to the various contract items.



\* Scarify Surface of Exist. A.C. Pav't. in Areas Where New Pav't. Thickness is Greater than 1-1/2". Compaction of A.C. Mix V for New Pav't. shall be in Accordance with the Standard Specifications or as Directed by the Engineer.

**TYP. PAVING UNDER NEW GUARDRAIL**  
Not To Scale

NEIL S. FUKUNOTO  
LICENSED PROFESSIONAL ENGINEER  
No. 6186-C  
HAWAII, U.S.A.

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*Wesley R. Segawa*  
Wesley R. Segawa & Associates, Inc.

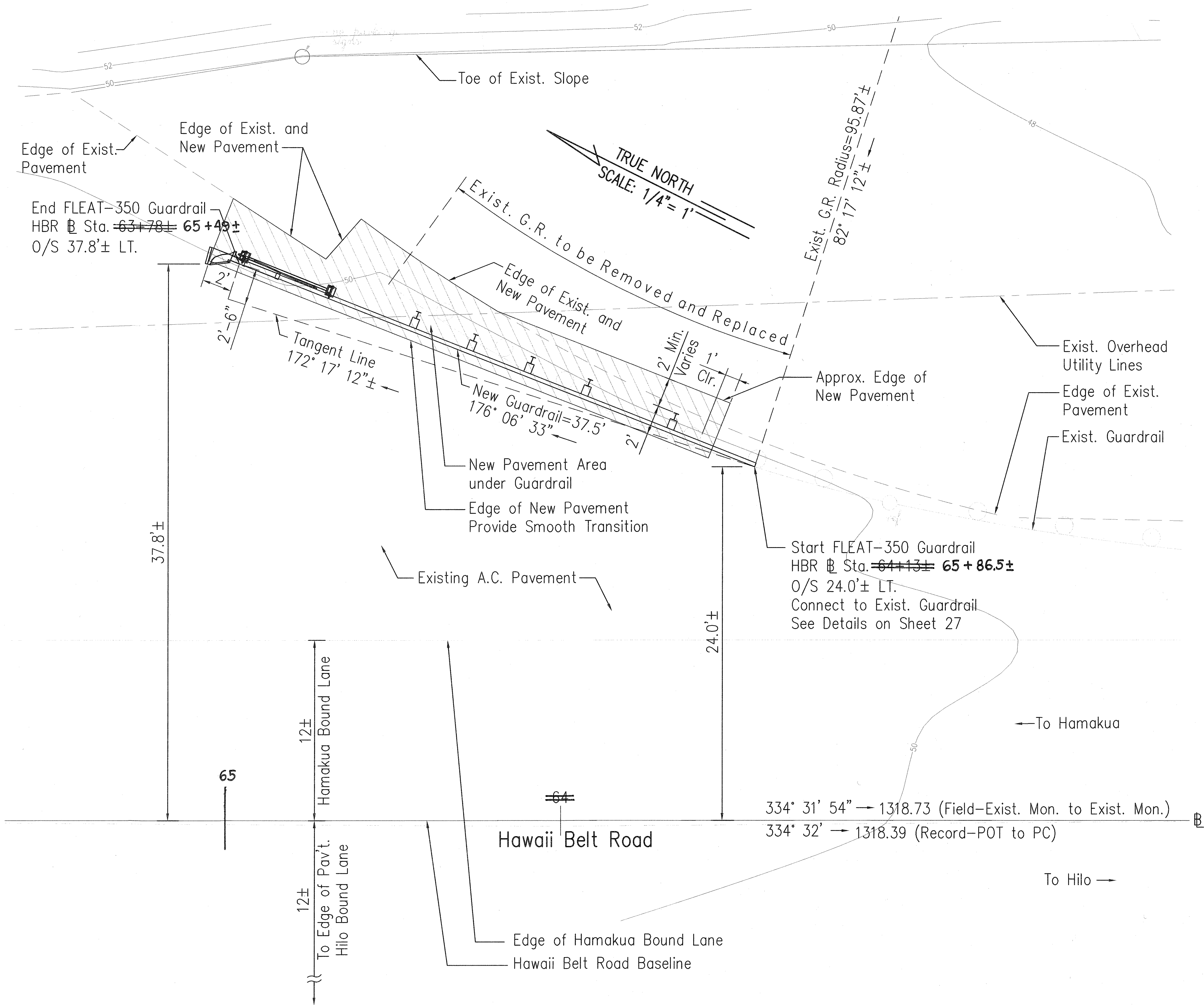
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**FLEAT-350 GUARDRAIL PLAN**  
**DETAIL & NOTES**

REMOVAL OF HALAULANI BRIDGE  
Hawaii Belt Road  
Federal Aid Project No. BR-019-2(50)

Scale: AS NOTED      Date: July, 2006

SHEET NO. **G1** OF **4** SHEETS



**FLEAT-350 GUARDRAIL PLAN**  
Scale: 1/4"=1'

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	

PM: OPER: REVISD: - - -

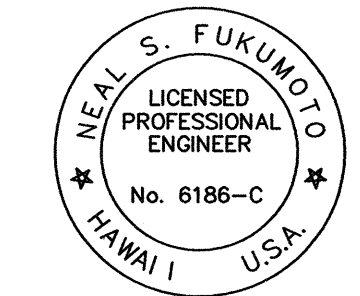
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(50)	2006	27	43

ITEM NO.	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
F1304	1	W-BEAM GUARDRAIL CENTER SECTION, 12 GA.
G1203	1	W-BEAM GUARDRAIL, 12 GA.
S730	2	*FOUNDATION SOIL TUBE, 6" x 8" x 72"
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
E780	1	GROUND STRUT
PB620	2	STEEL BREAKAWAY END POST
PB621	5	STEEL BREAKAWAY LINE POST
	5	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
HARDWARE		
B580122	25	5/8" Dia. x 1 1/4" SPLICE BOLT, POST #2
B580754	2	5/8" Dia. x 7 1/2" HEX BOLT
B341004	2	3/4" Dia. x 10" HEX BOLT
B581002	5	5/8" Dia. x 10" H.G.R. BOLT (POST 3 THRU 7)
N050	32	5/8" Dia. H.G.R. NUT (SPlice 24, SOIL TUBES 2, POST 2 THRU 7, 6)
N030	2	3/4" Dia. HEX NUT
W050	6	H.G.R. WASHER
W030	4	3/4" ID WASHER
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B140404	2	1/4" x 4" HEX BOLT
N014	2	1/4" HEX NUT
W014	4	1/4" WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2" A325 STRUCTURAL NUT
W050A	16	1 1/16" OD x 9/16" ID A325 STR. WASHER

Foundation Tube Options For Posts 1 & 2

- \*6'-0" Split Foundation Tubes S730
- \*6'-0" Solid Foundation Tubes E731
- \*5'-0" Foundation Tubes S735 W/Soil Plates SP600
- \*4'-6" Foundation Tubes E735 W/Soil Plates SP600



NEAL S. FUKUMOTO  
LICENSED PROFESSIONAL ENGINEER  
No. 6186-C  
HAWAII U.S.A.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**FLEAT - 350 FLARED  
ENERGY ABSORBING TERMINAL**

REMOVAL OF HALAULANI BRIDGE  
Hawaii Belt Road  
Federal Aid Project No. BR-019-2(50)

Scale: AS NOTED      Date: July, 2006

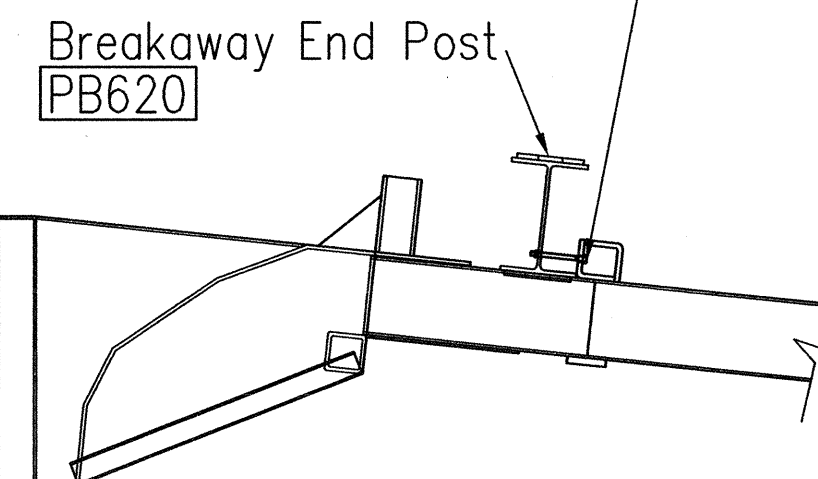
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Wesley R. Segawa & Associates, Inc.

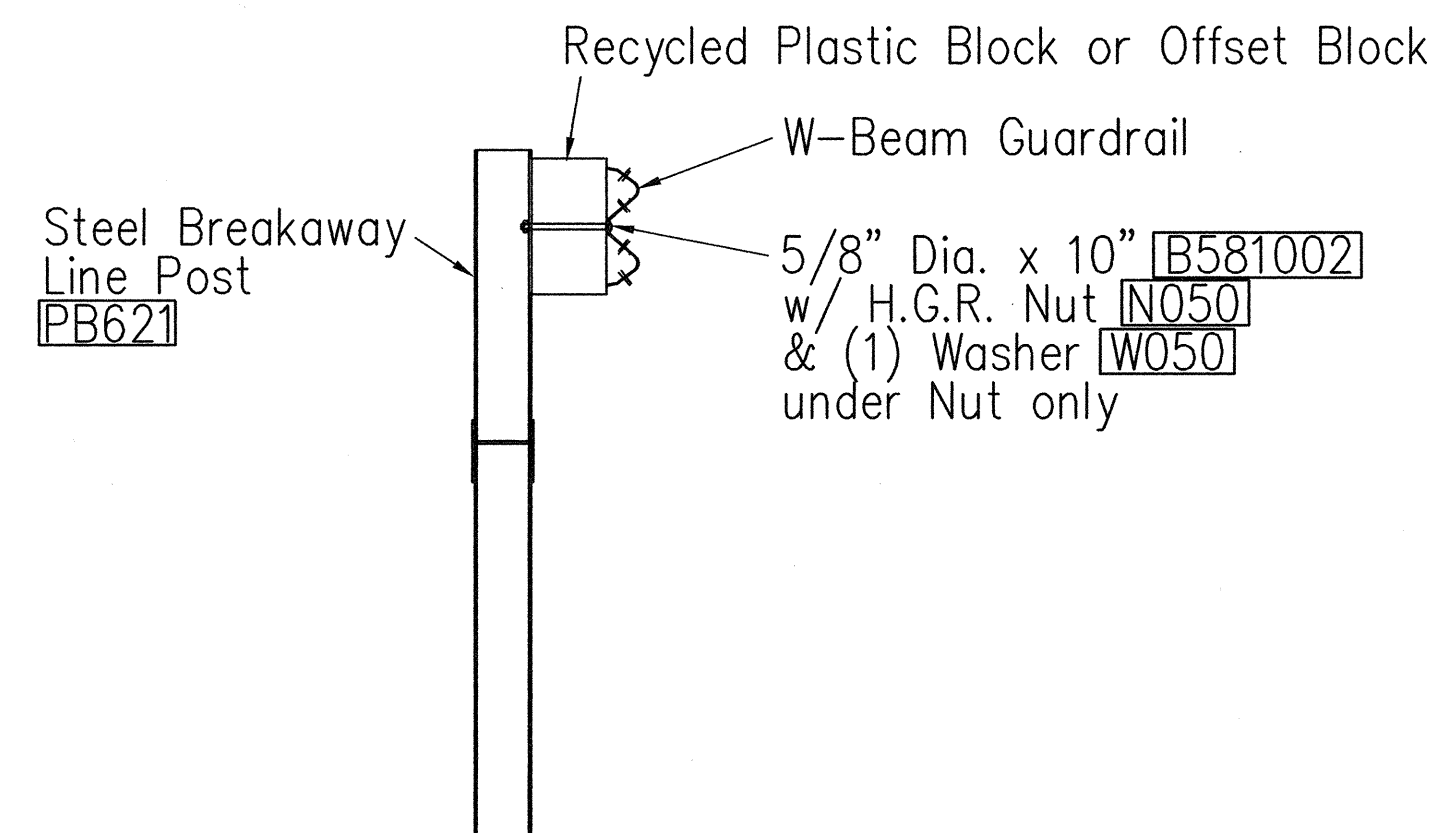
## GENERAL NOTES

- Breakaway posts are required with the FLEAT Terminal.
- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The soil tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- The soil tubes may be driven with an approved driving head. Soil tubes should not be driven with the post in the tube. If the tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent settlement.
- When rock is encountered during excavation, a 12" Dia. post hole, 20" deep may be used if approved by the engineer. Granular material will be placed in the bottom of the hole approximately 2-1/2" deep to provide drainage. The soil tubes will be field cut to length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.

1/4" Dia. x 4" Bolt [B140404]  
w/ Nut [N014]  
& (2) Washers [W014]



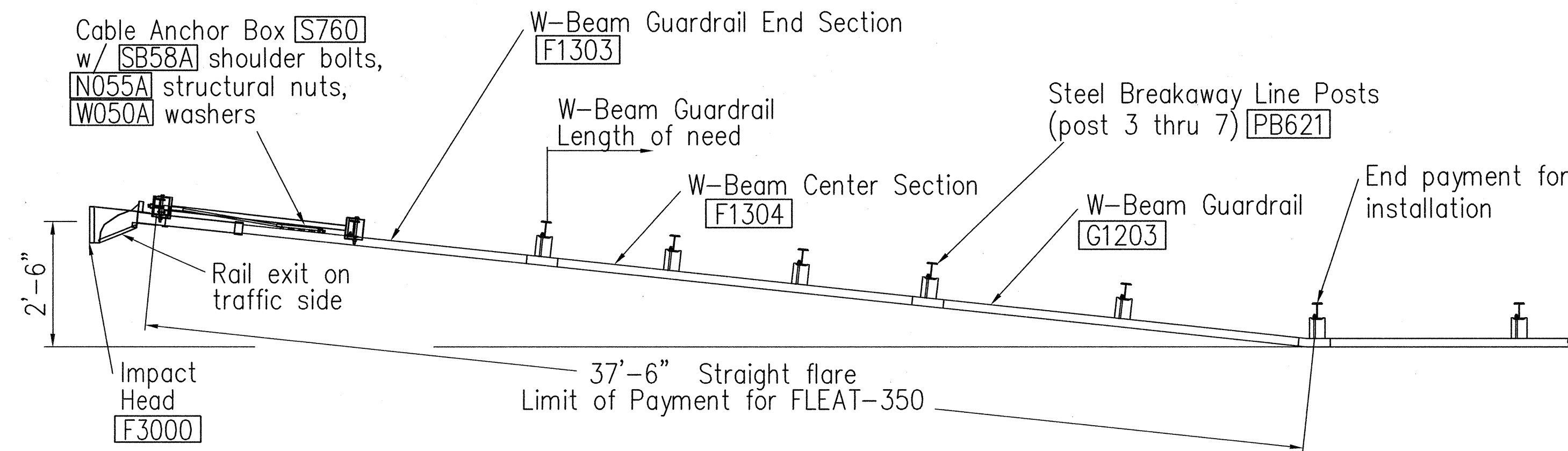
## IMPACT HEAD CONNECTING DETAIL



## SECTION B-B

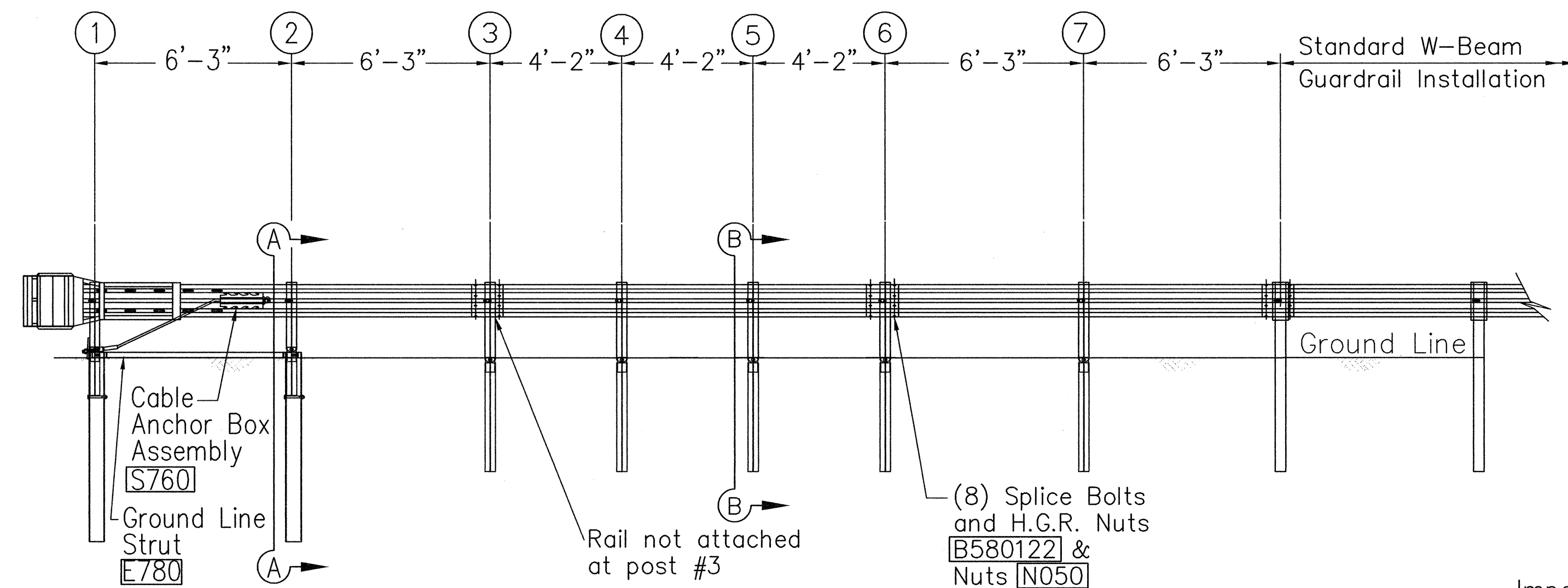
(Typical @ Post 3 - 7)

NOTE: RAIL NOT BOLTED @ POST #3

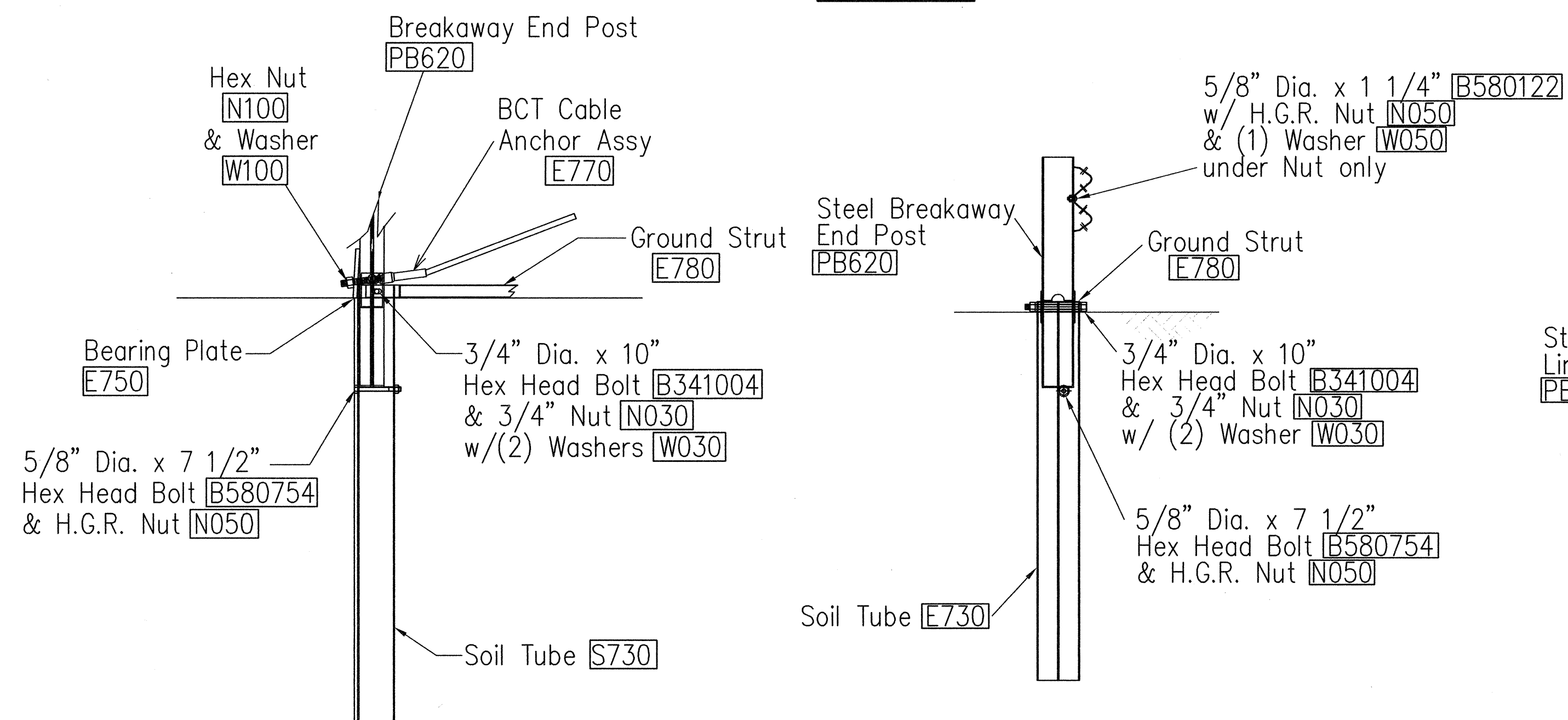


## PLAN

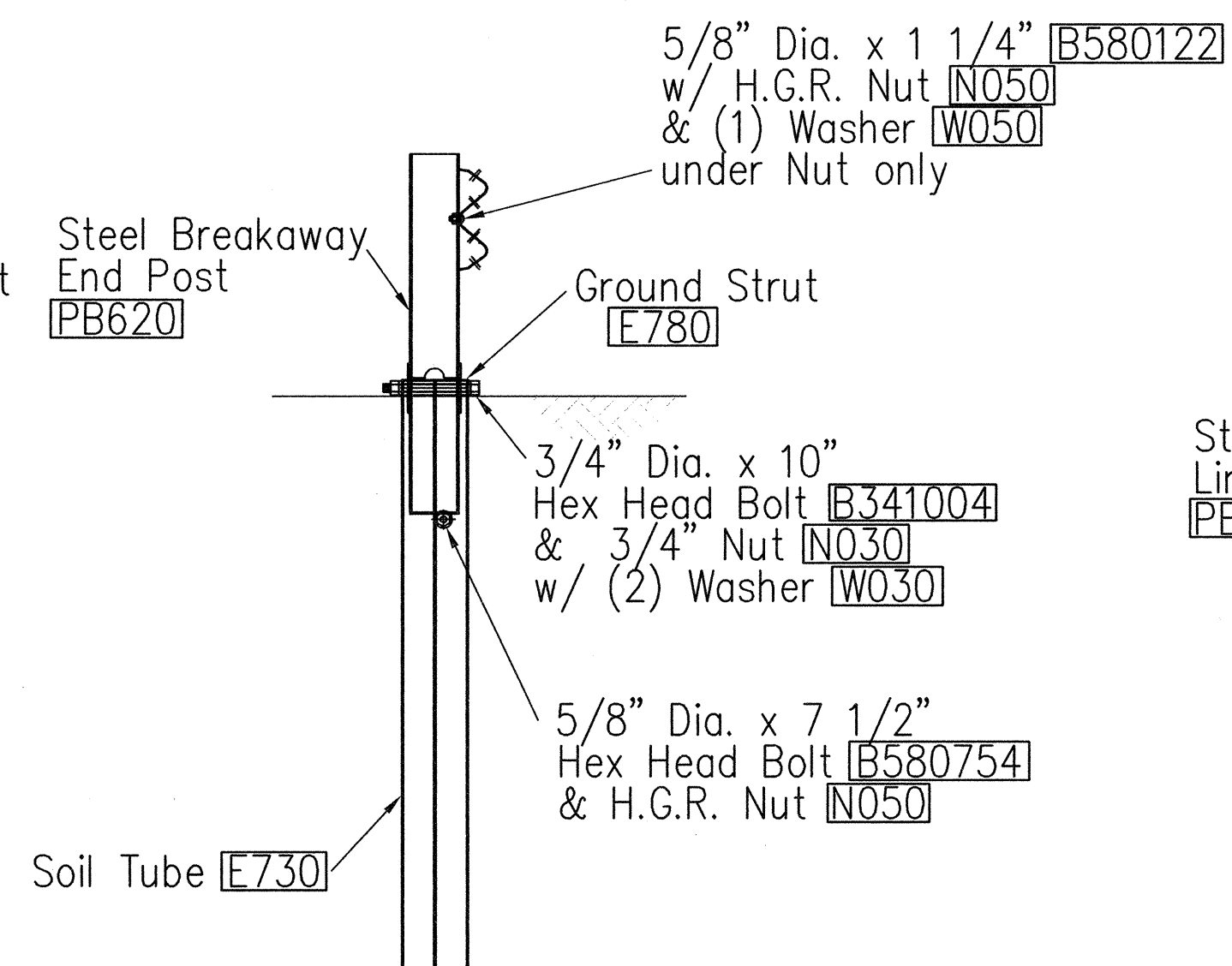
OPPOSING  
TRAFFIC



## ELEVATION



## PARTIAL VIEW OF POST 1



## SECTION A-A (@ Post #2)

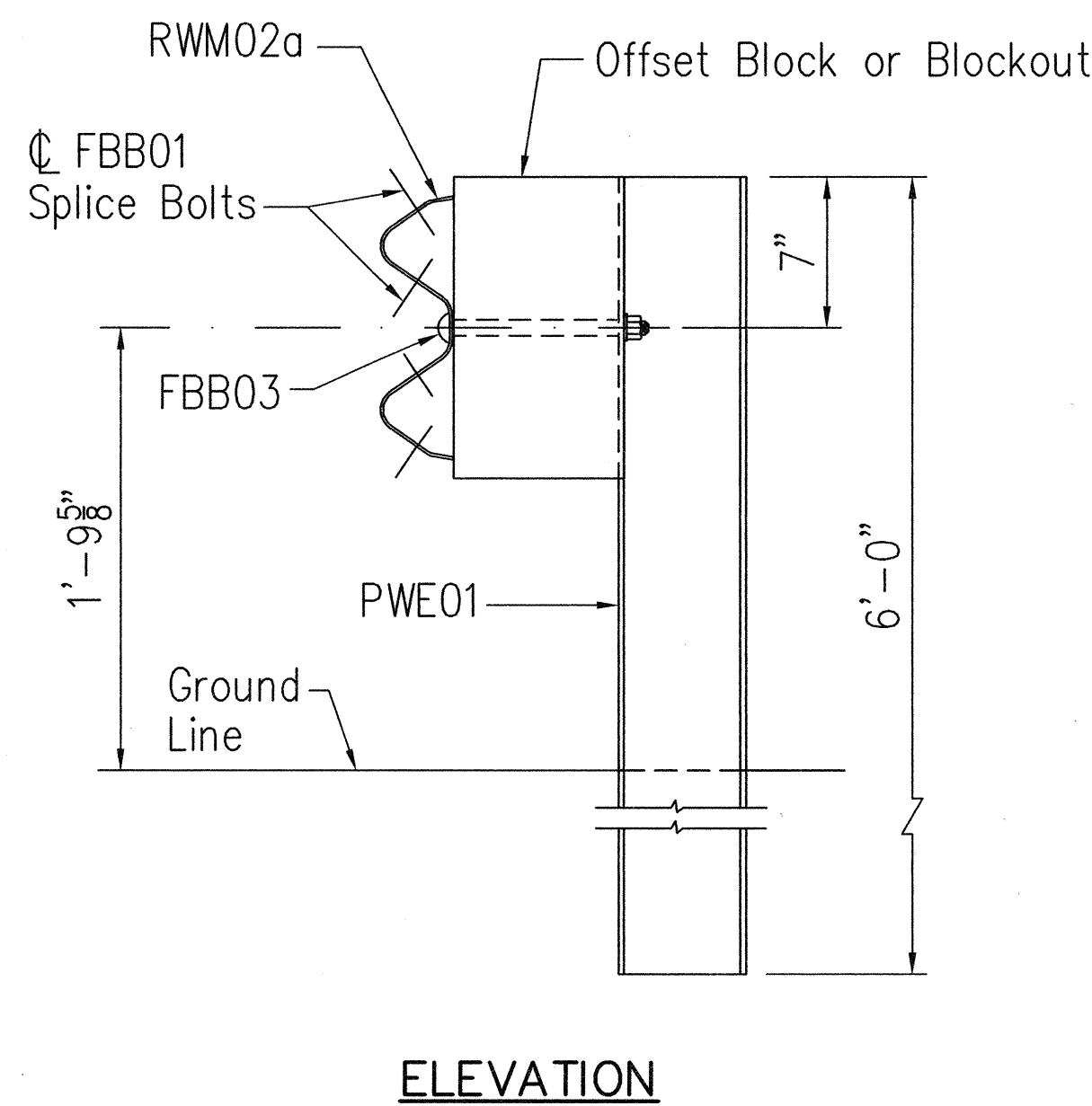
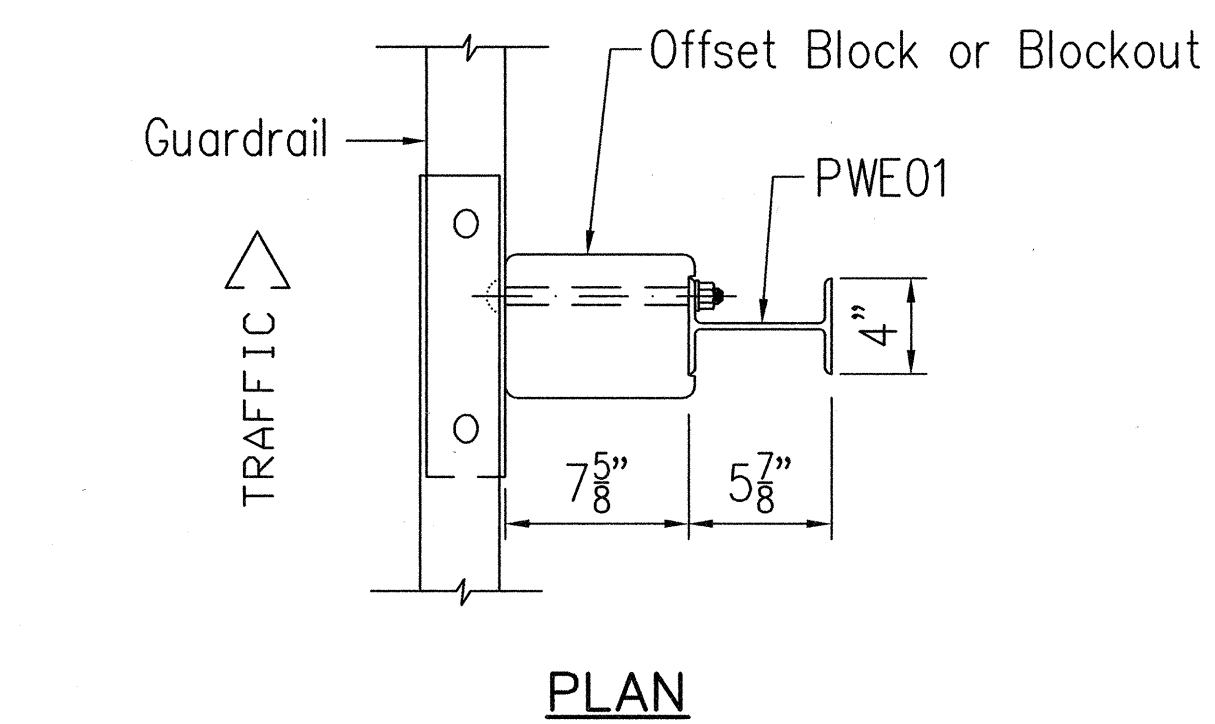
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DATE: SCALE: FILE:

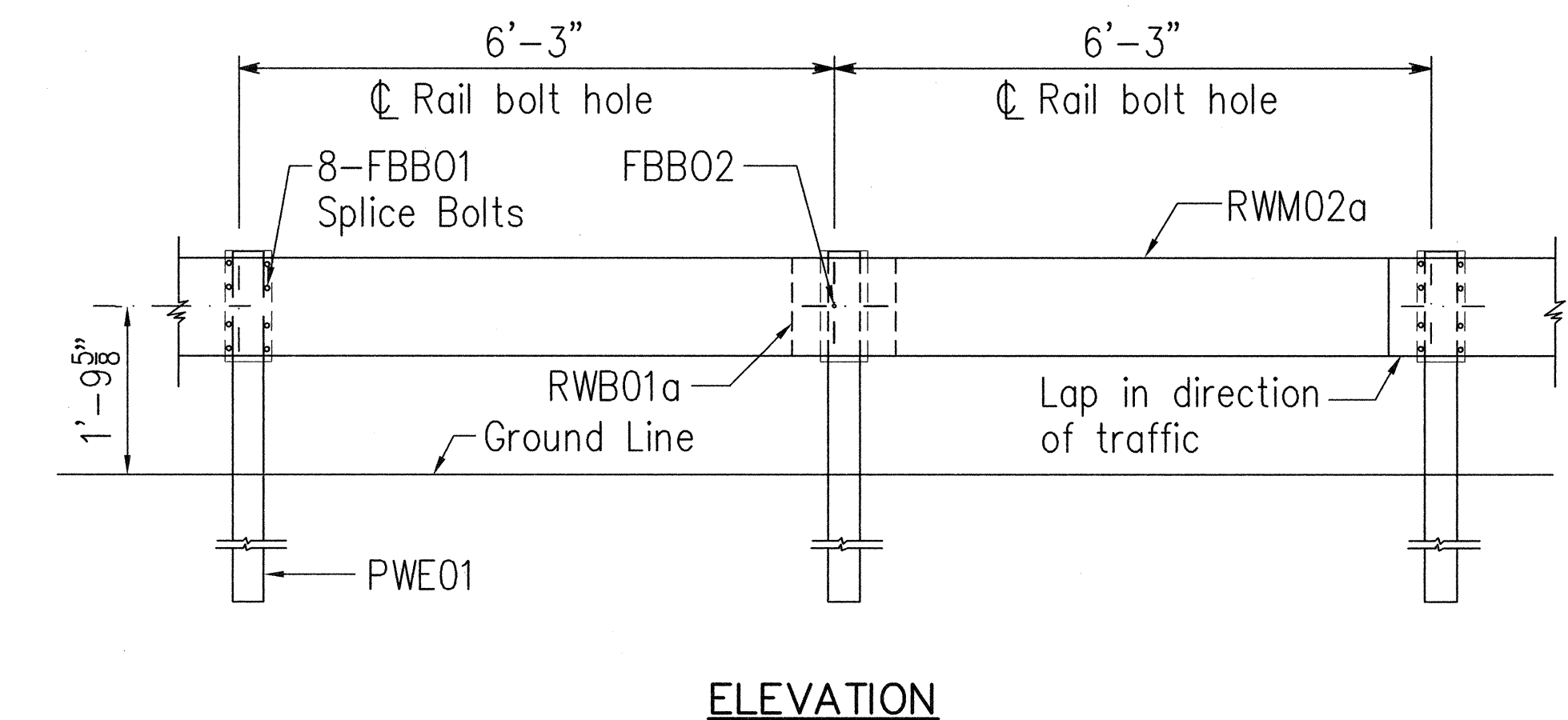
DATE	BY	DATE	BY
SURVEY PLOTTED BY		DATE	BY
DRAWN BY		DATE	BY
TRACED BY		DATE	BY
DESIGNED BY		DATE	BY
QUANTITIES BY		DATE	BY
CHECKED BY		DATE	BY
ORIGINAL PLAN		DATE	BY
NO.		DATE	BY



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(50)	2006	28	43

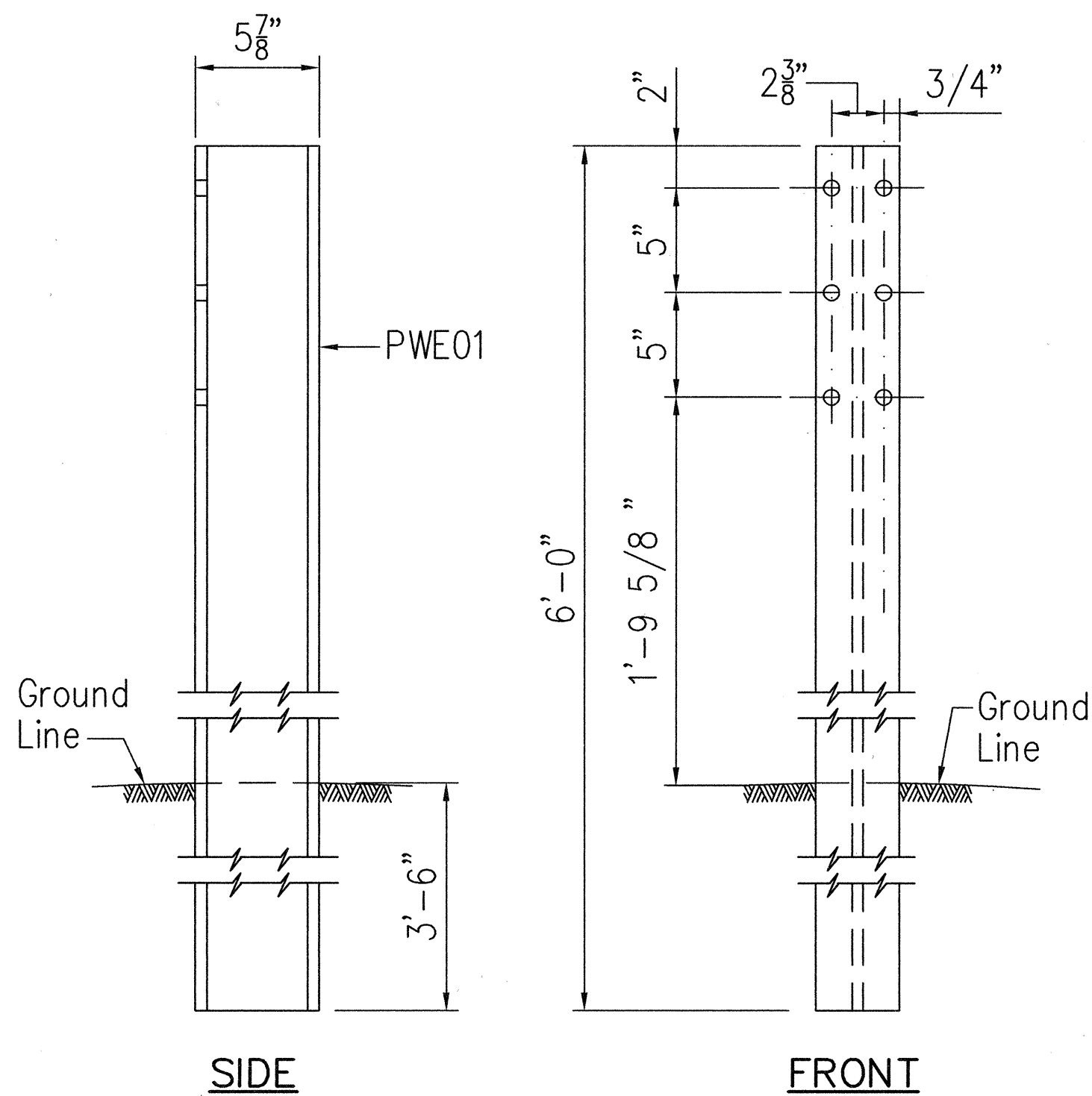


**STRONG POST W-BEAM GUARDRAIL (SGR04a)**

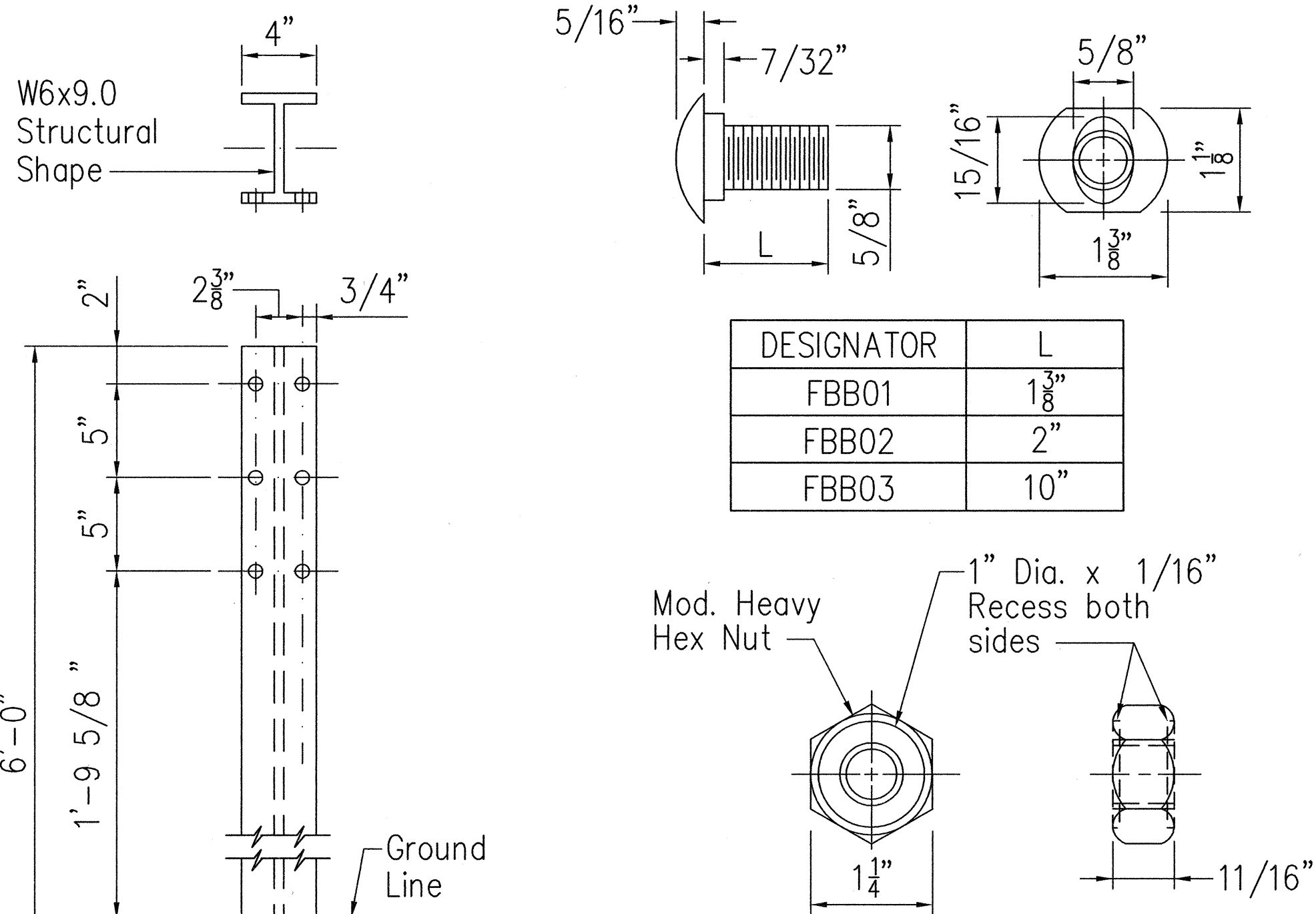


**STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT**

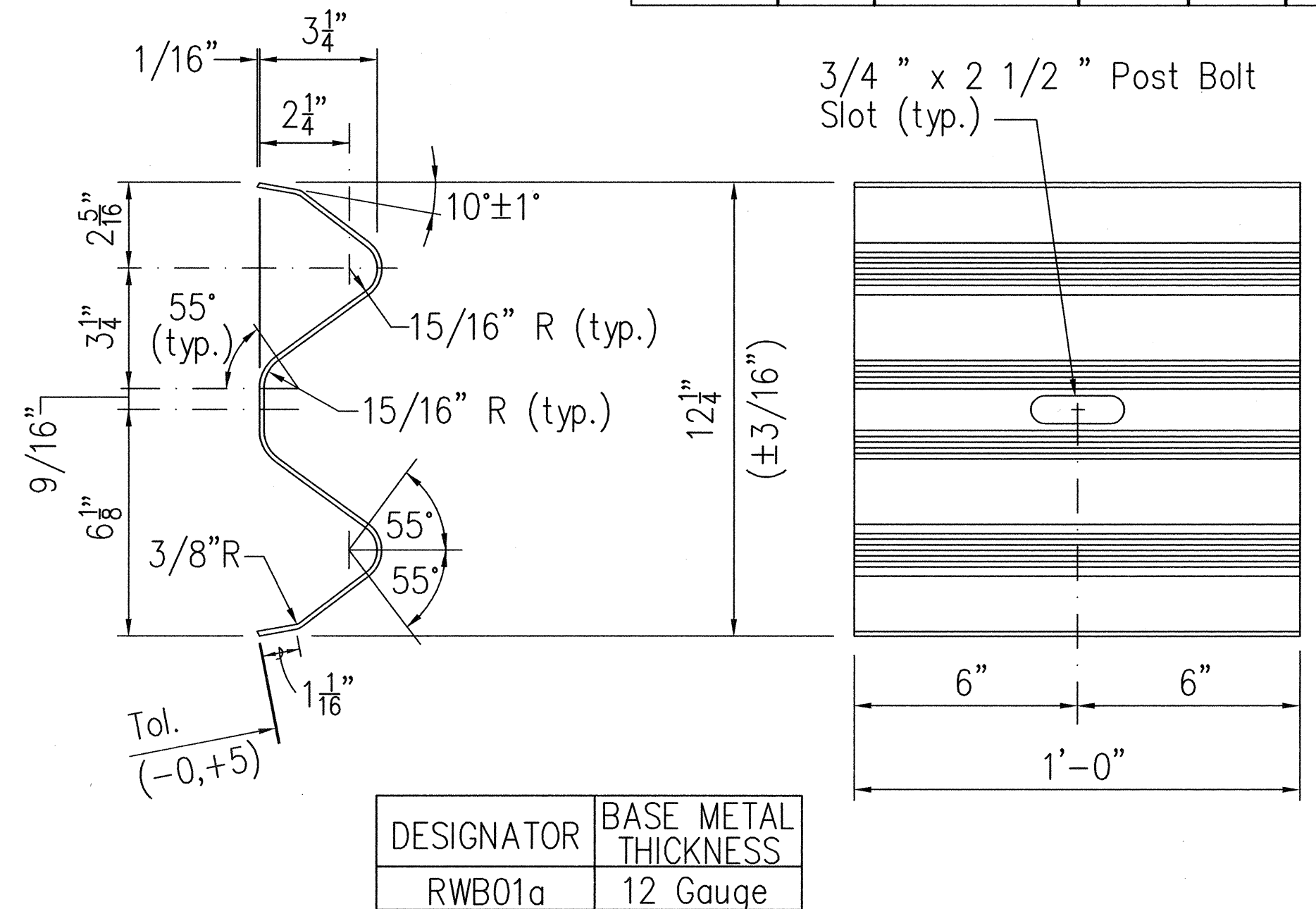
**NOTE:**  
All Holes are 3/4" Dia.



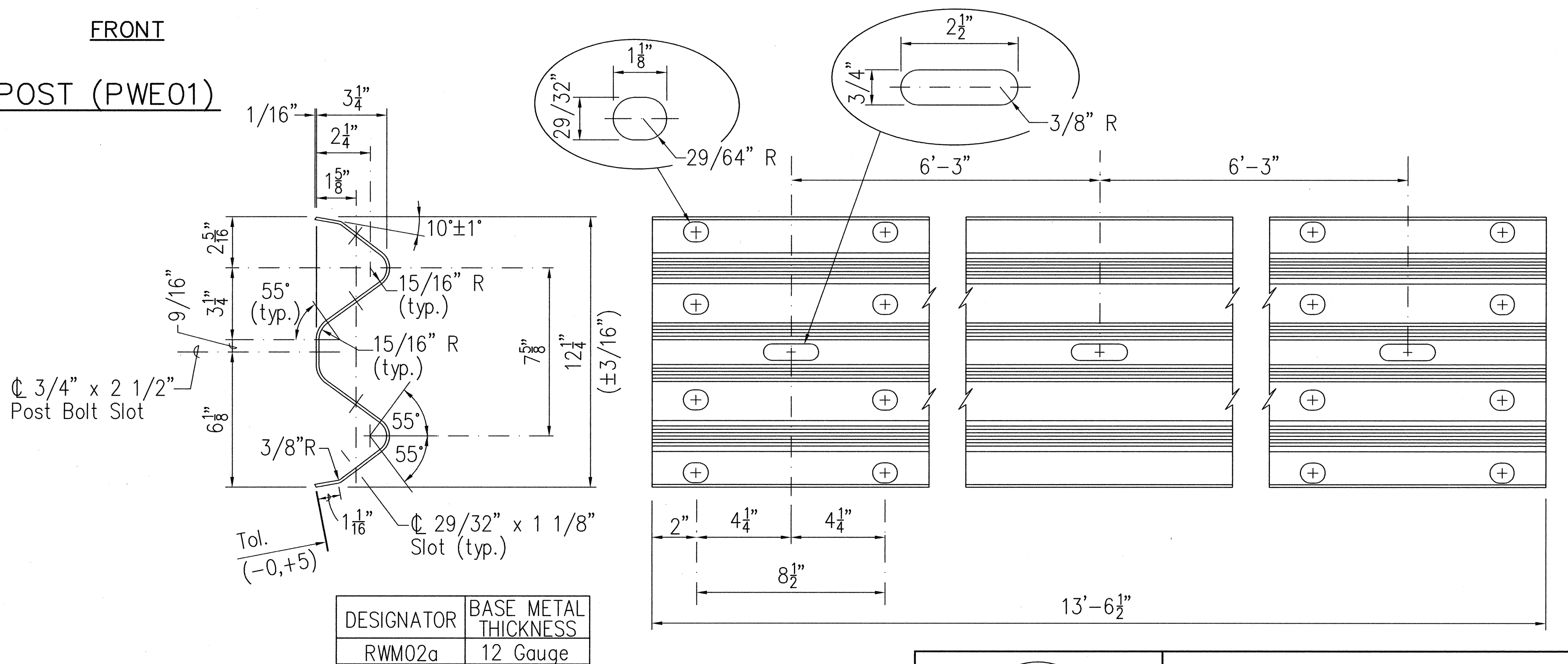
**W-BEAM STRONG POST (PWE01)**



**GUARDRAIL BOLTS AND RECESSED NUT**



**W-BEAM BACK-UP-PLATE (RWB01a)**



**2 SPACE W-BEAM GUARDRAIL (RWM02a)**

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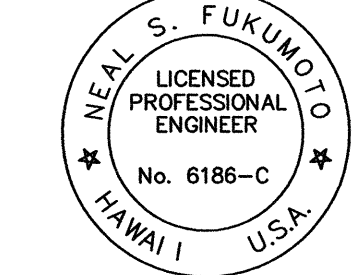
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRONG POST W-BEAM GUARDRAIL**  
**REMOVAL OF HALAULANI BRIDGE**  
Hawaii Belt Road  
Federal Aid Project No. BR-019-2(50)  
Scale: AS NOTED Date: July, 2006

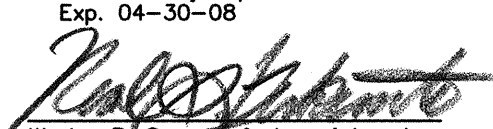
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(50)	2006	29	43

### GENERAL NOTES

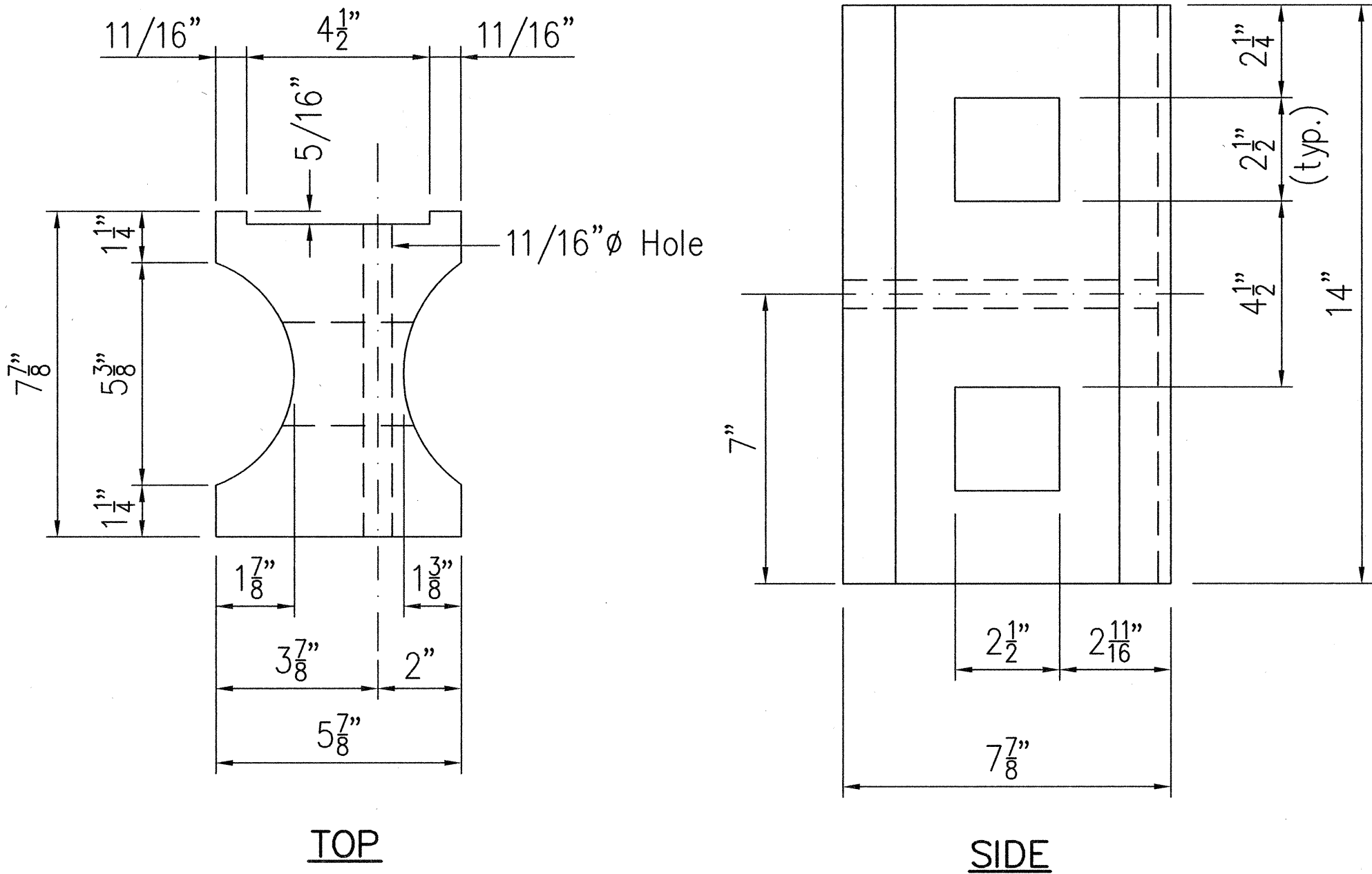
1. All hardware, posts and fasteners shall be hot-dip zinc coated galvanized after fabrication. No punching, drilling or cutting will be permitted after galvanizing.
2. Where conditions require, special post lengths in increments of 6 inches may be specified.
3. All fasteners, posts, and rail elements (i.e. FBB03, PWE01, RWM02b, etc.) shall conform to the latest edition and amendments of "A Guide to Standardized Highway Barrier Rail Hardware", a report prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee, Subcommittee On New Highway Materials, Task Force 13 Report. Dimensions of fasteners, posts and rail elements have been converted from metric units into their present form.
4. The Recycled Plastic Block or Offset Block shall be approved by the State.
5. After the guardrail posts are installed in the paved area, the Contractor shall grout around the guardrail post and seal all cracks in the paved area that was caused during the guardrail post installation. If required by the inspector/engineer, the Contractor shall tamper the paved area around the guardrail post prior to grouting. The cost for this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
6. When standards for the fill slope area cannot be met, a site specific, engineer approved design may be used.
7. New A.C. pavement at guardrails shall extend 6 feet longitudinally beyond terminal ends.
8. Reflector Markers (RM-5) mounted on guardrails shall be spaced every 200 feet. Spacing of RM-5's on Horizontal Curves shall comply with Table III-1 of the MUTCD. RM-5's shall not be installed on Terminal Sections.

GUARDRAIL TYPE	DIMENSION		
	H	A	B
Strong Post w/ W Beam	1'-9 <sup>5</sup> / <sub>8</sub> "	1'-6"	2'-0" min.

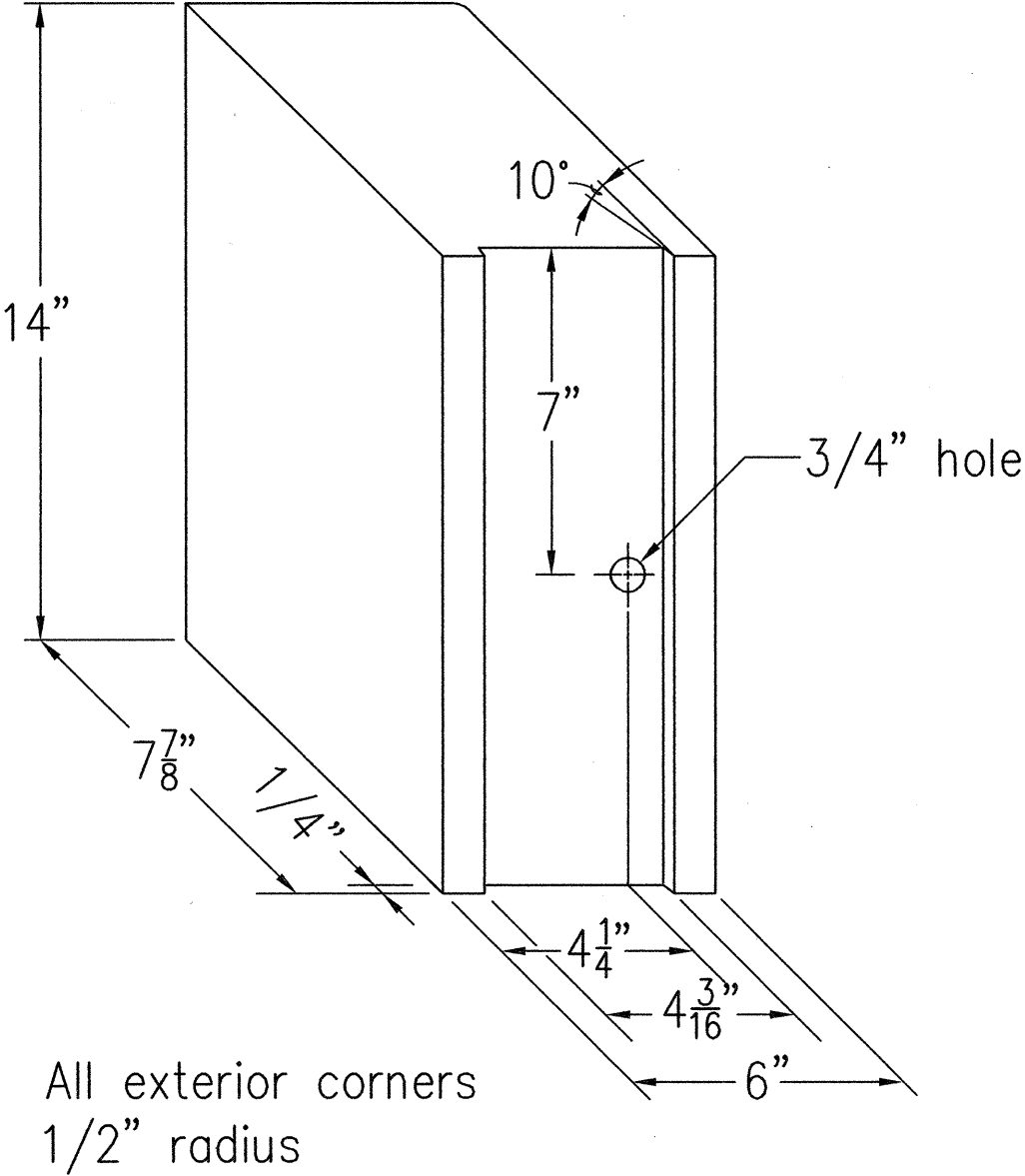


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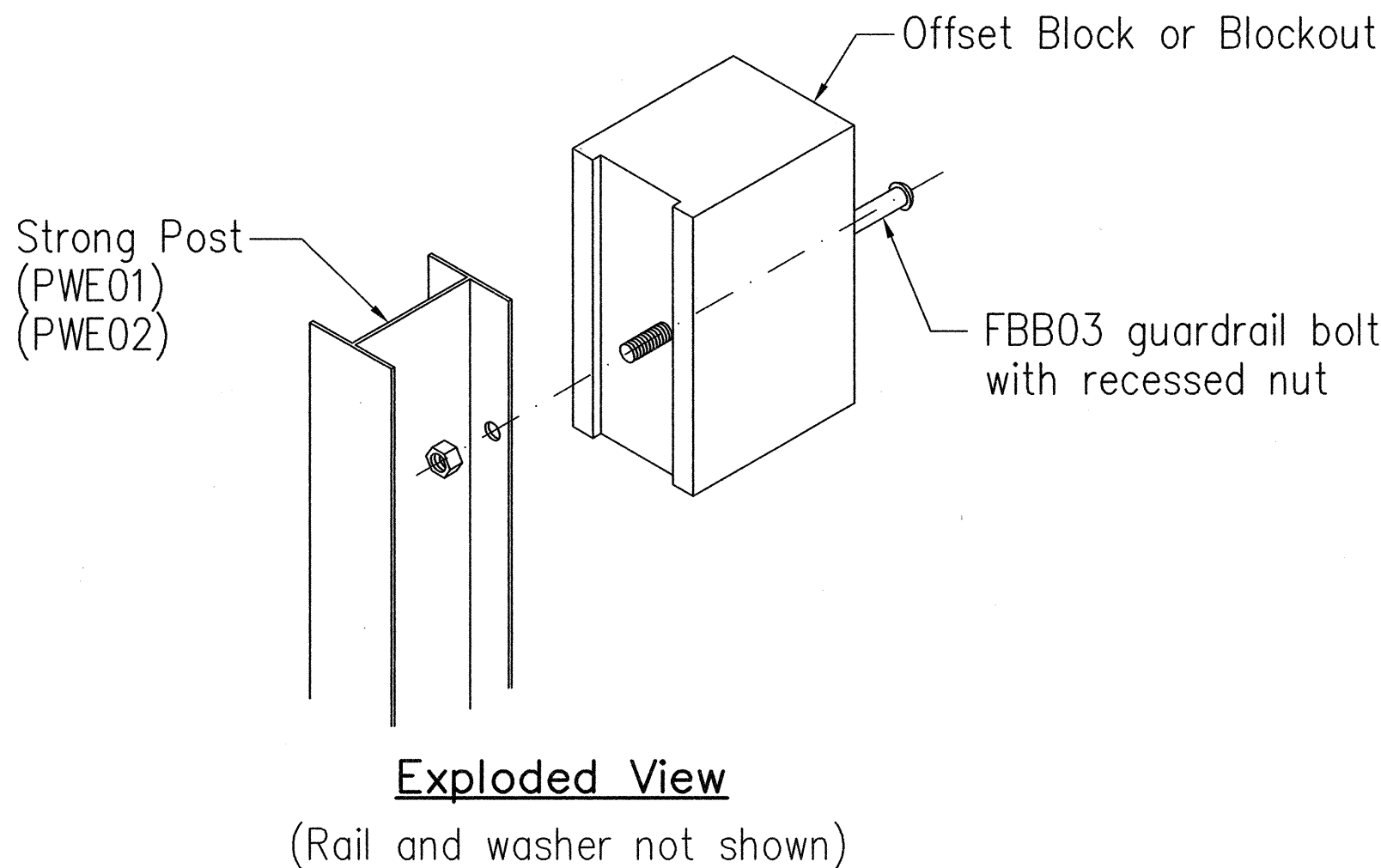
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GUARDRAIL DETAILS  
AND NOTES**  
**REMOVAL OF HALAULANI BRIDGE**  
Hawaii Belt Road  
**Federal Aid Project No. BR-019-2(50)**  
Scale: AS NOTED      Date: July, 2006



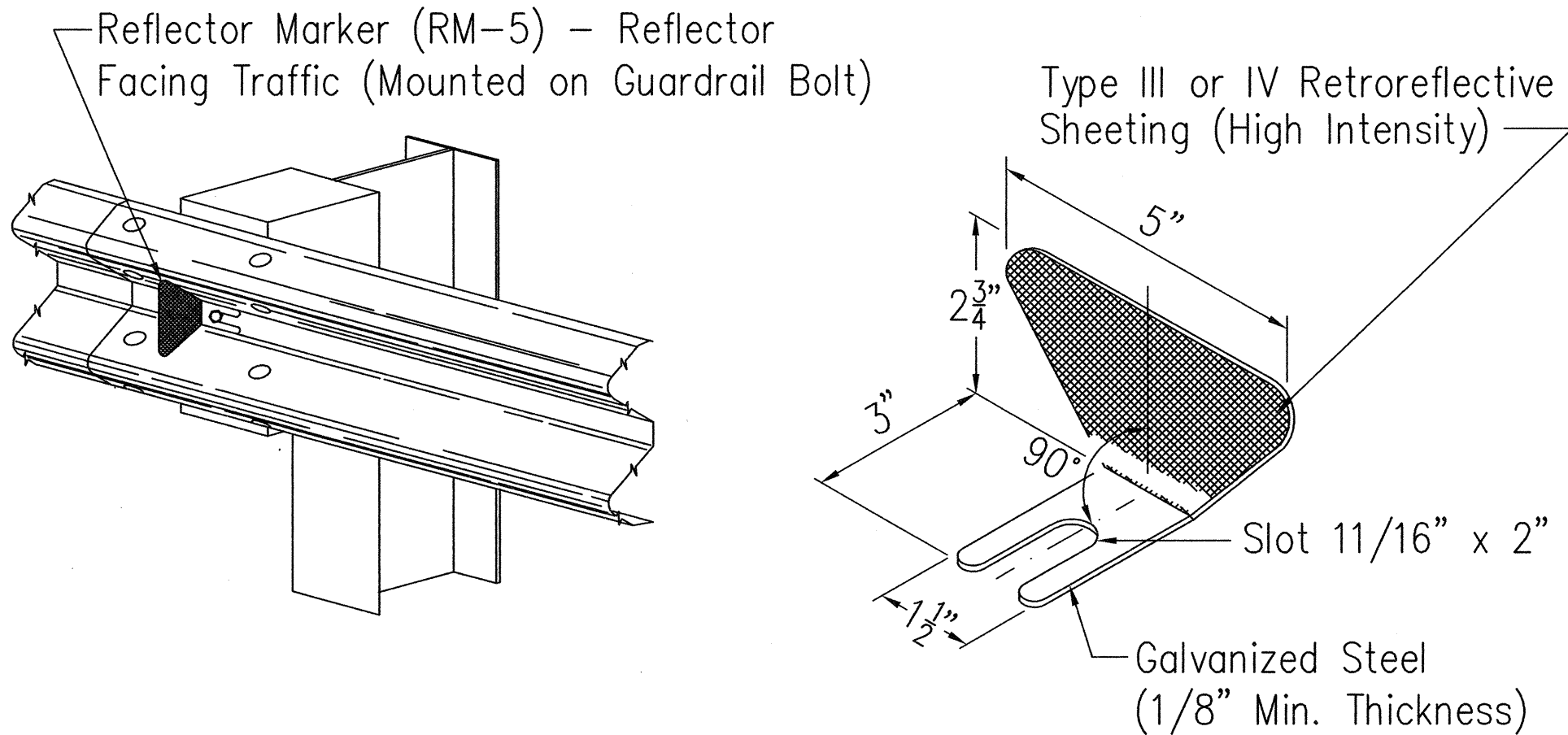
TOP  
SIDE  
RECYCLED PLASTIC BLOCKOUT (TYPE I)



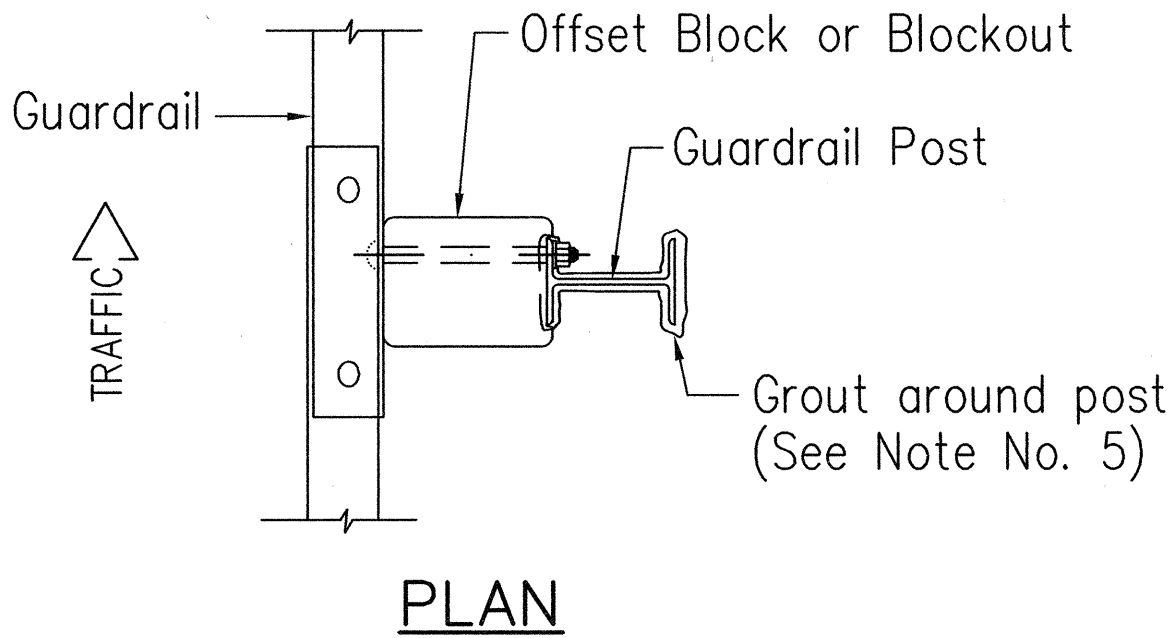
RECYCLED POLYETHYLENE  
OFFSET BLOCK (TYPE II)



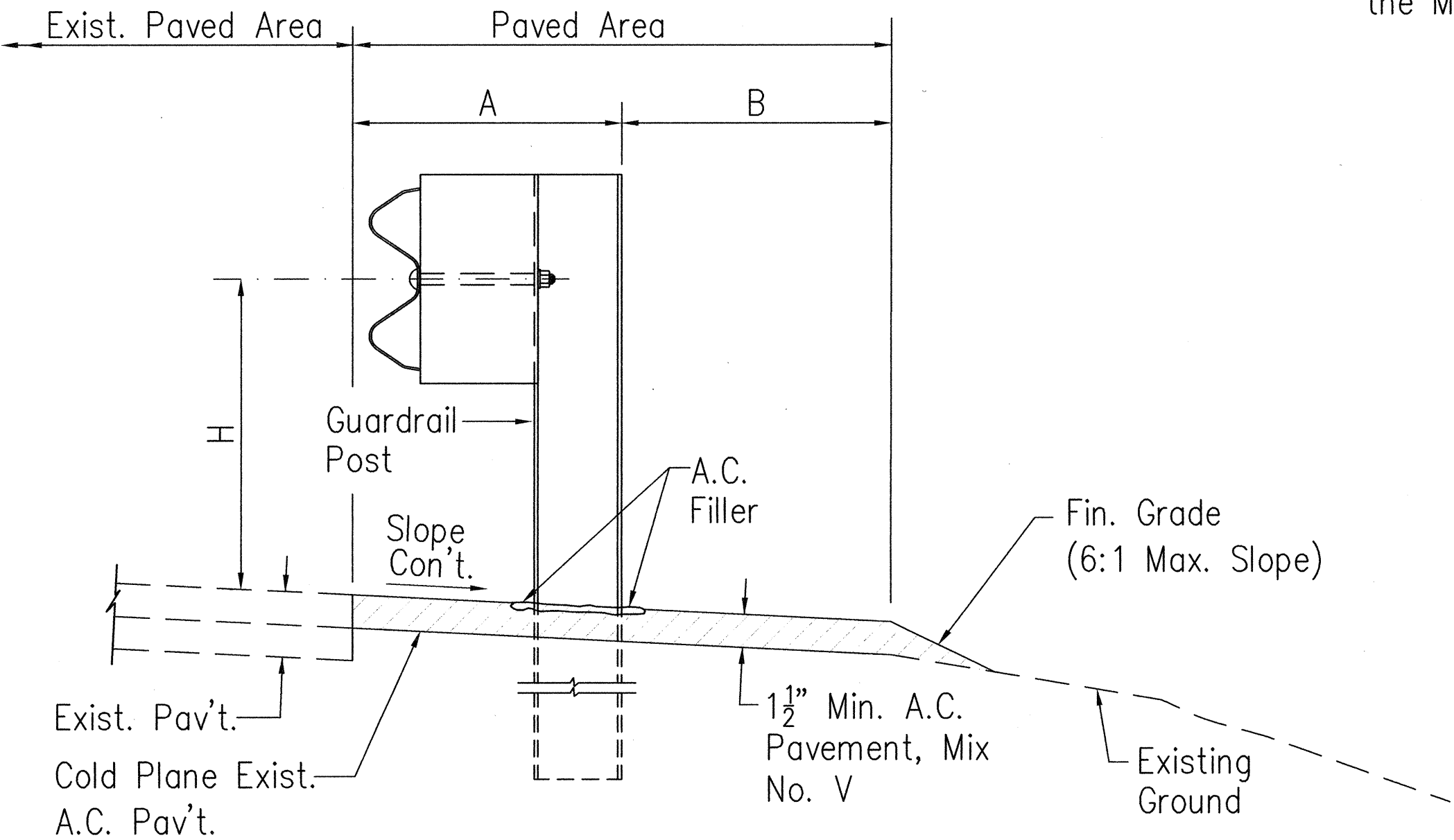
Exploded View  
(Rail and washer not shown)  
STEEL POST AND BLOCK DETAIL



REFLECTOR MARKER (RM-5) DETAIL & TYP. INSTALLATION



PLAN



ELEVATION

TYPICAL GUARDRAIL INSTALLATION

PM: OPER. REVISD:

DATE: SCALE: FILE:

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
GRAND PLAN	
NOTEBOOK	
No.	