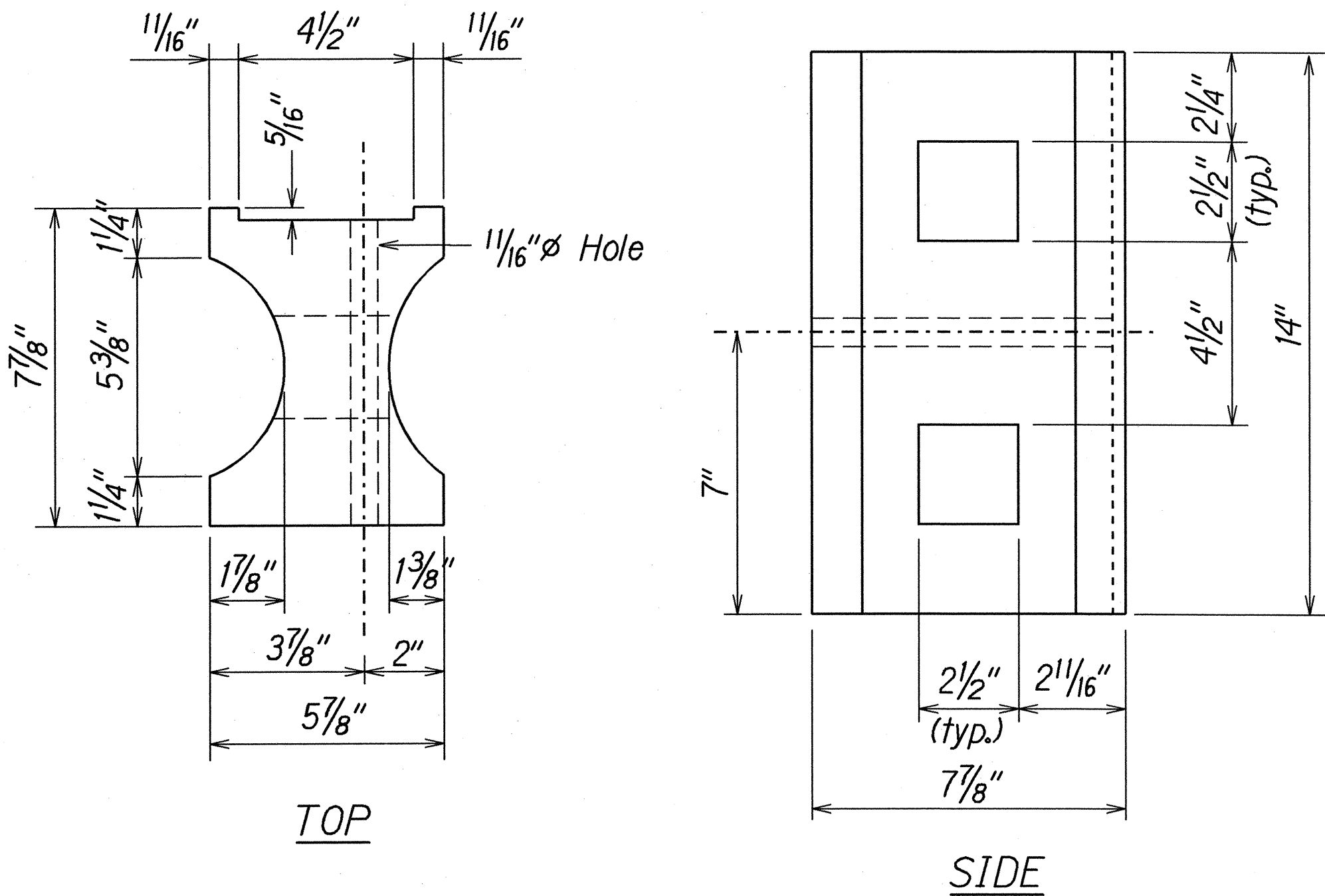


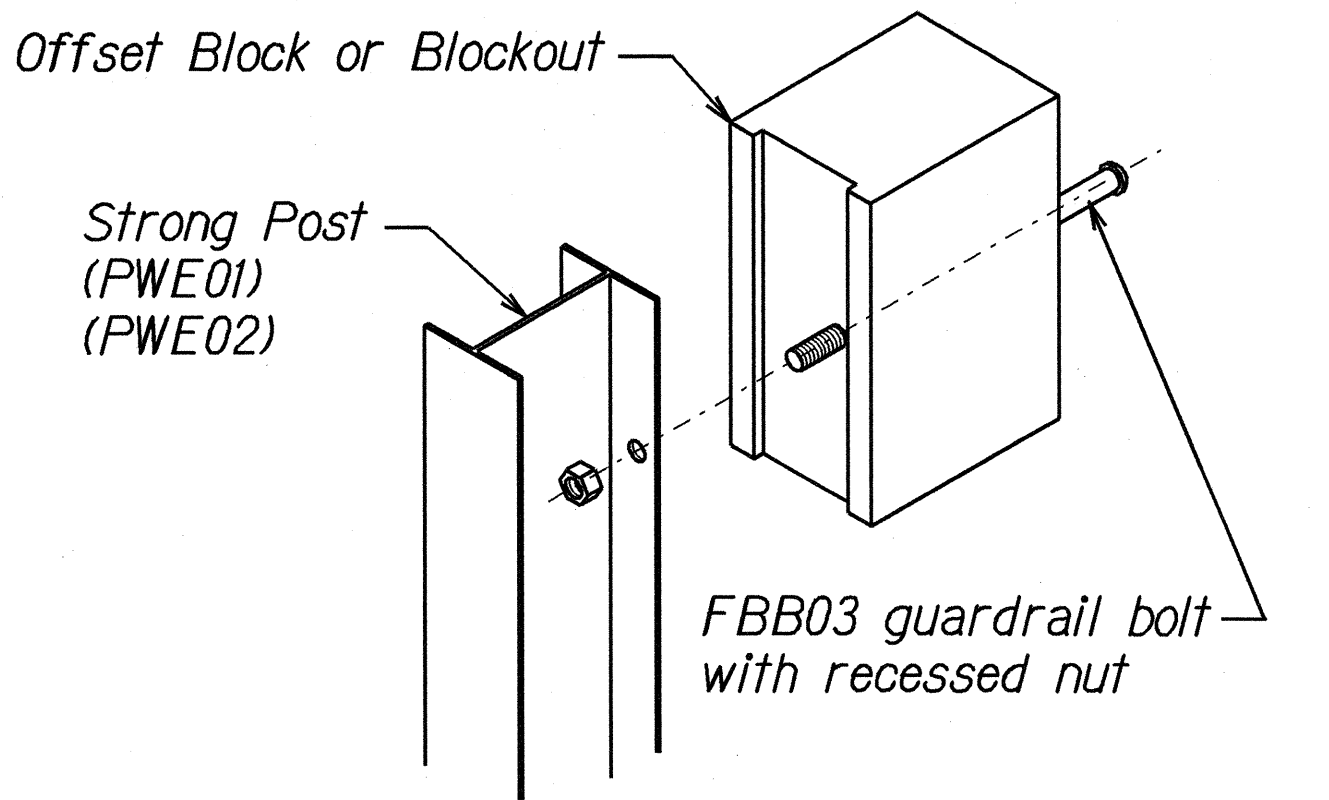
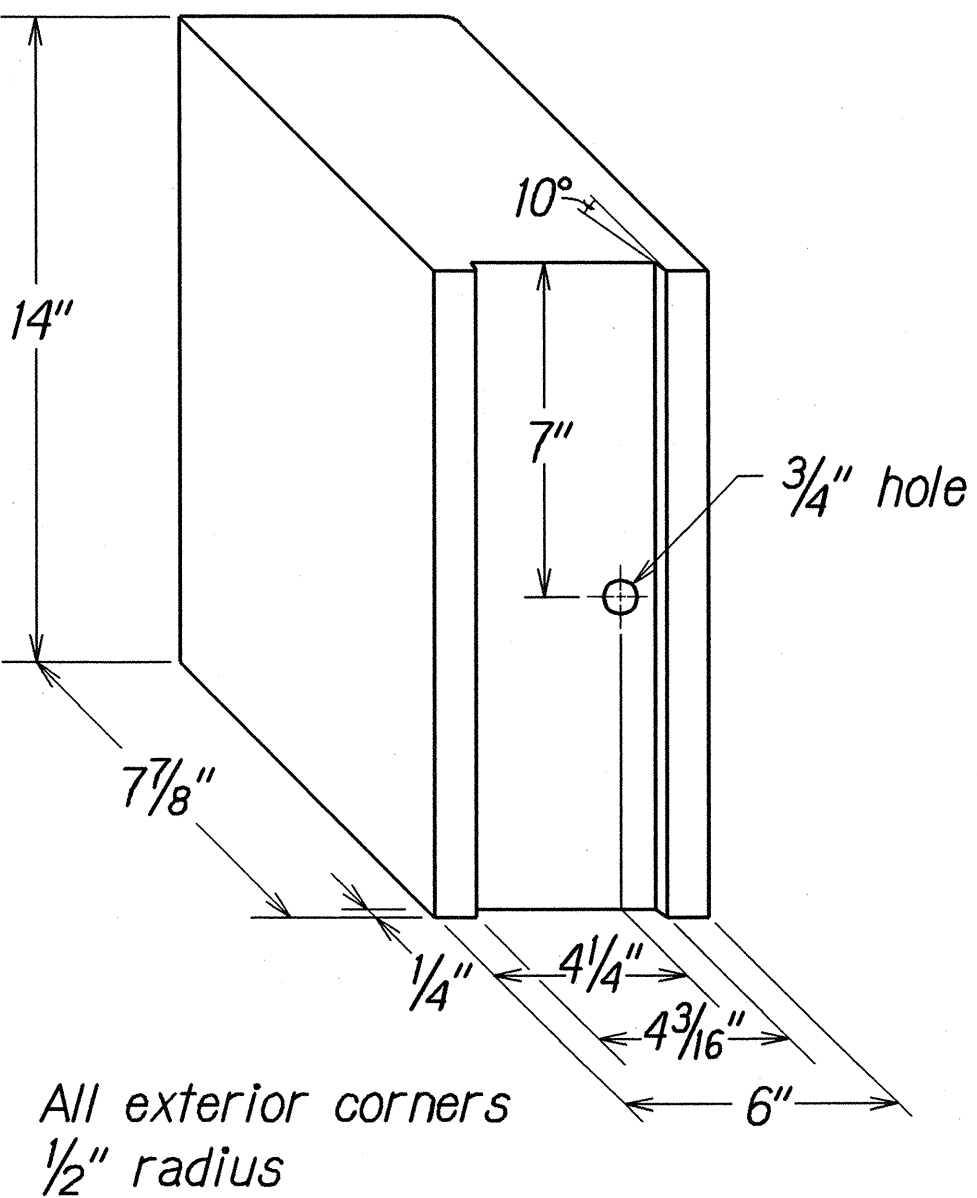
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	9	33

GENERAL NOTES

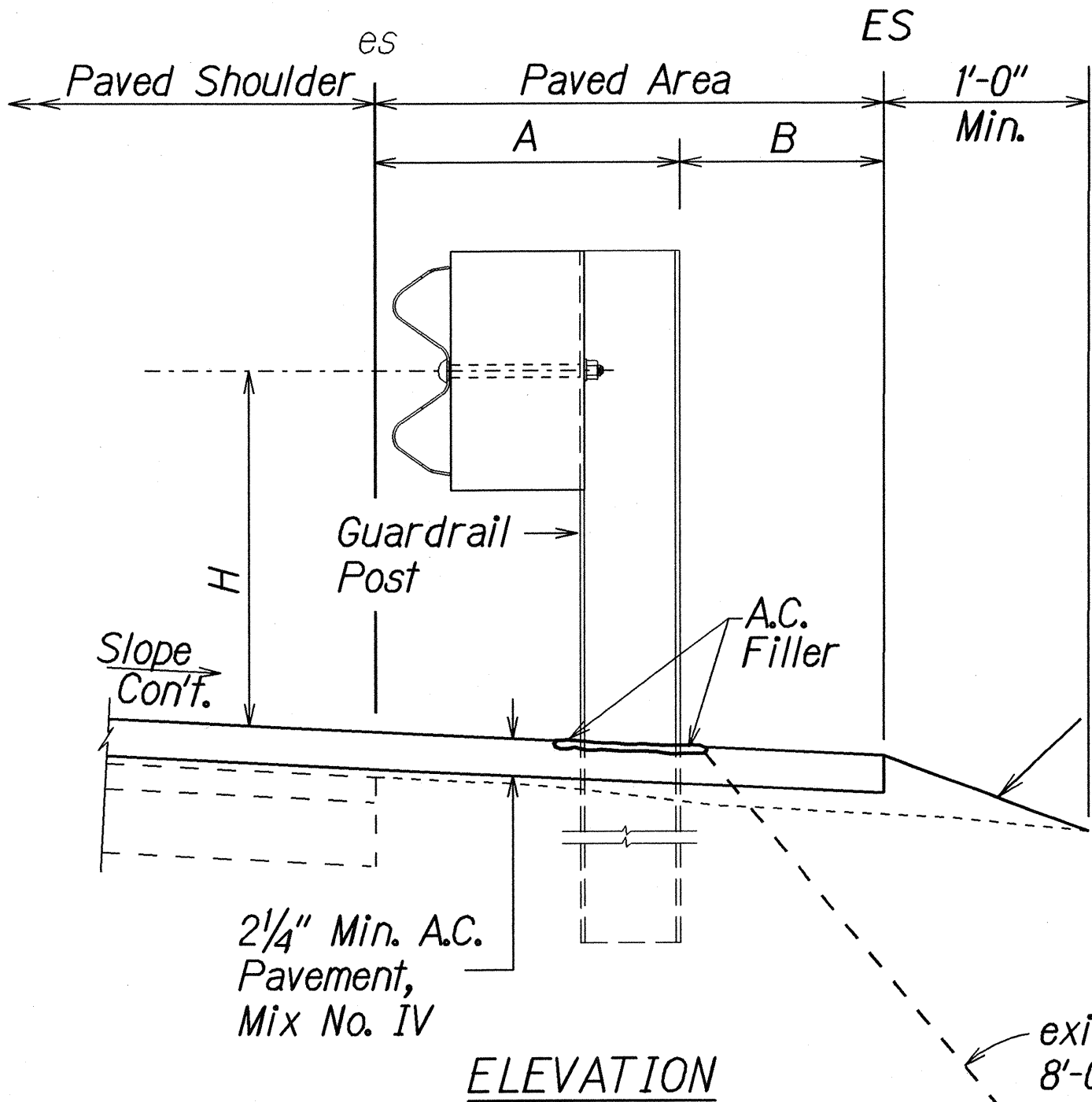
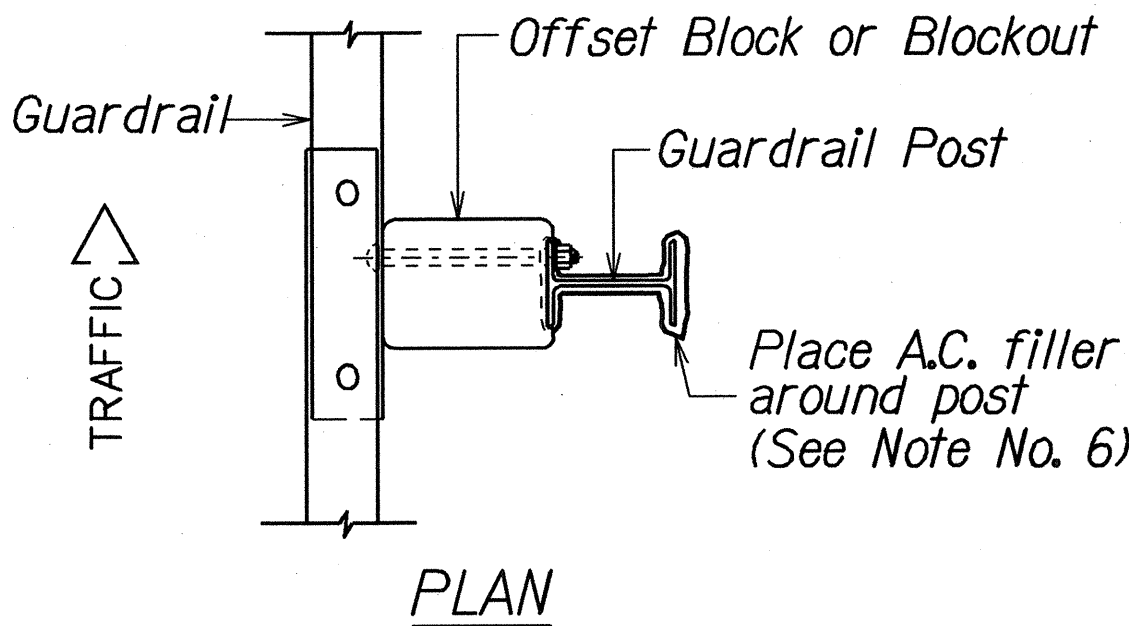
- All hardware, posts and fasteners shall be hot-dip zinc coated galvanized after fabrication. No punching, drilling or cutting will be permitted after galvanizing.
- Where conditions require, special post lengths in increments of 6 inches may be specified.
- All fasteners, posts, and rail elements (i.e. 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 fastners, posts and rail elements have been converted from metric units into their present form.
- The Recycled Plastic Block or Offset Block shall be approved by the State.
- Prior to installing A. C. Mix. No. IV, level & remove vegetation and compact existing ground to 95% compaction. New A.C. pavement at guardrails shall extend 6' longitudinally beyond terminal ends.
- After the guardrail posts are installed in the paved area, the Contractor shall place A.C. filler 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 placing A.C. filler. The cost for this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
- Reflector Markers (RM-5) mounted on guardrails shall be spaced every 50'-0". Spacing of RM-5's on Horizontal Curves shall comply with Table 3D-1 of the MUTCD 2000. RM-5's shall not be installed on Terminal Sections.



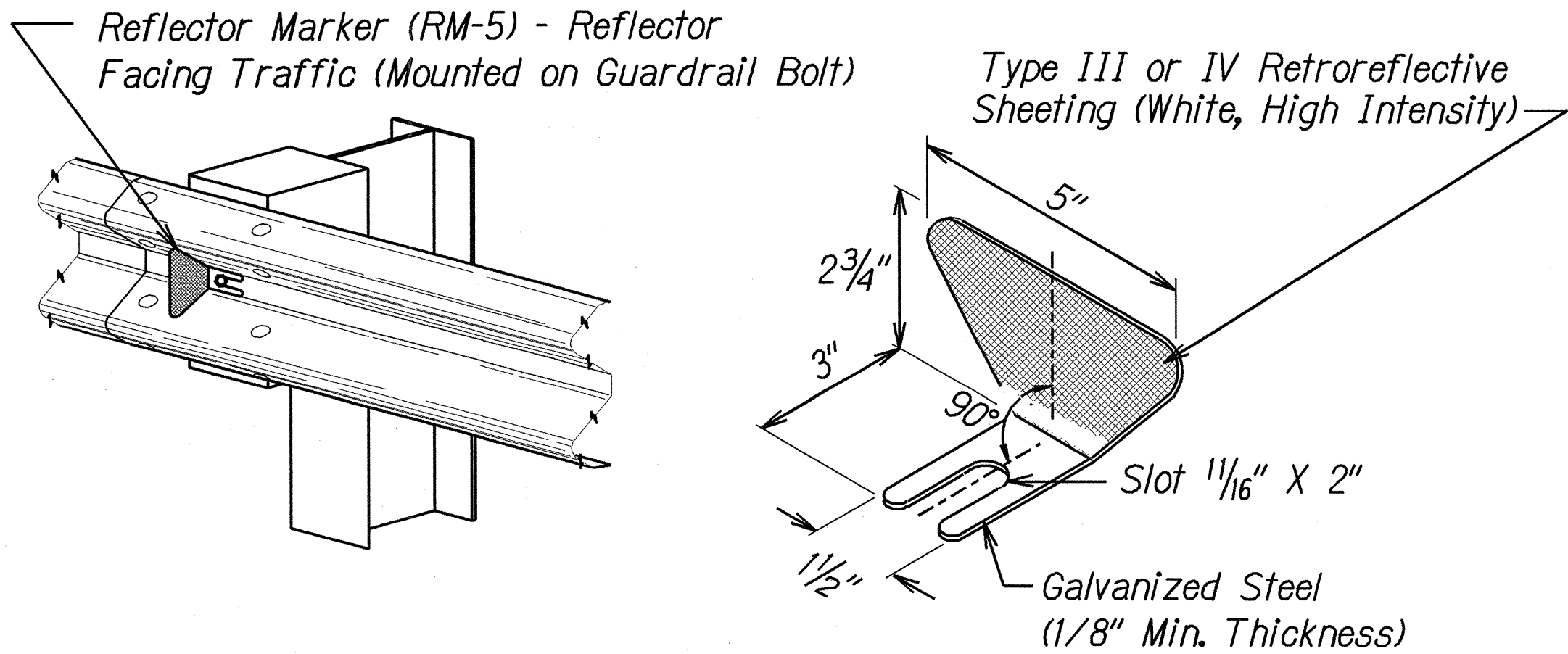
RECYCLED PLASTIC BLOCKOUT (TYPE I)



EXPLODED VIEW
(Rail, washer and reflector not shown)
STEEL POST AND BLOCK DETAIL



TYPICAL GUARDRAIL INSTALLATION



REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION

GUARDRAIL TYPE	DIMENSION		
	H	A	B
Strong Post w/W Beam	1'-9 5/8"	1'-6"	1'-0"
Rubrail	2'-0"	1'-6"	2'-0"
Modified Thrie Beam	2'-0"	2'-0"	1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

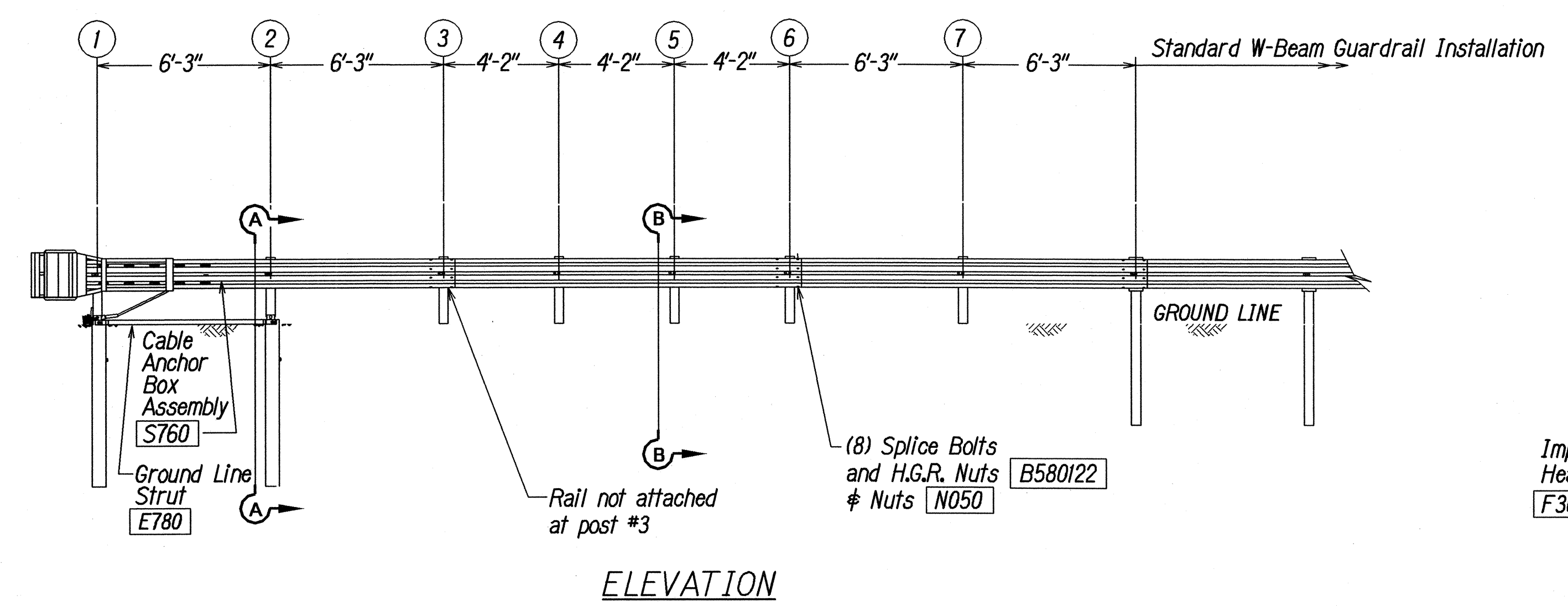
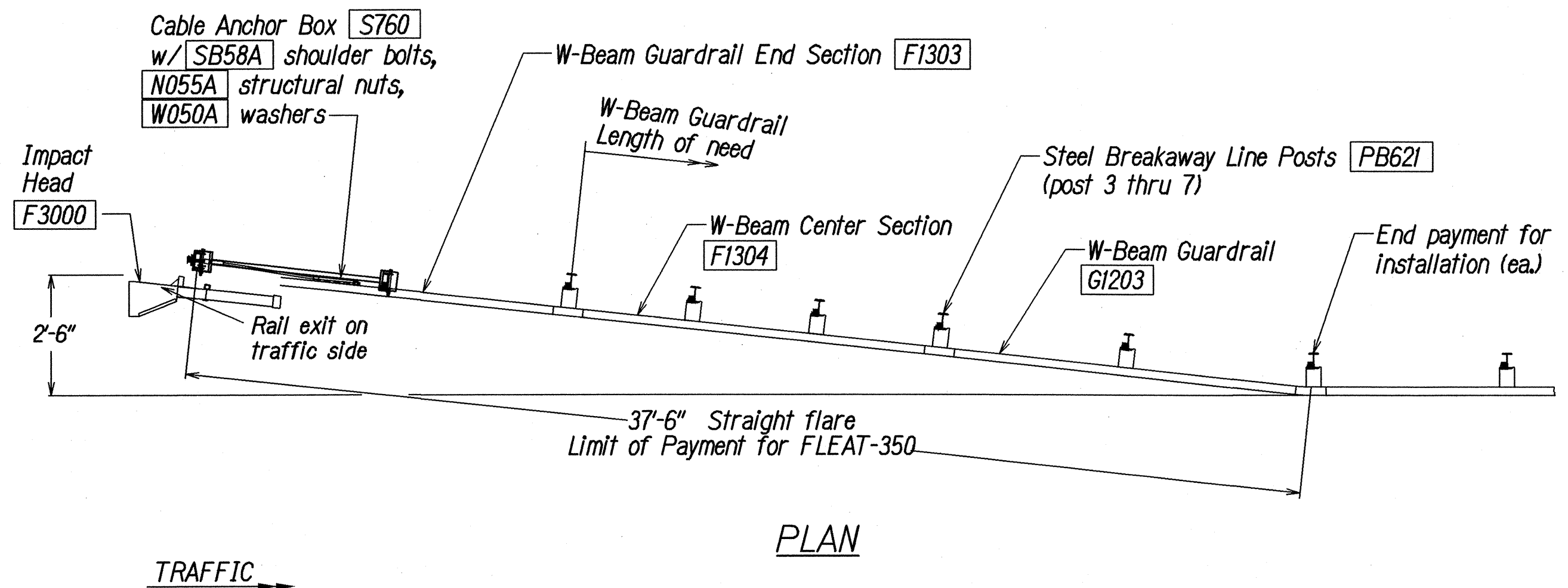
GUARDRAIL DETAILS & NOTES

MAALO ROAD RESURFACING
Vicinity of Wailua Falls
Project No. 583A-01-01M
Scale: NTS

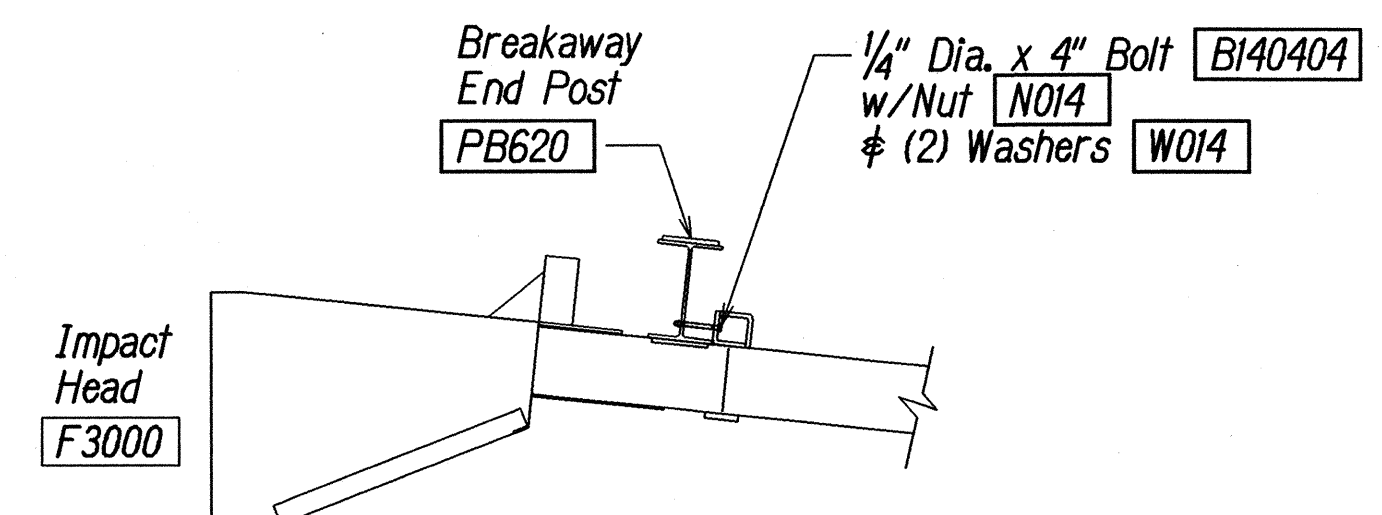
Date: Aug. 2003
SHEET No. 1 OF 7 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NOTED BY	
APPROVED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	11	33



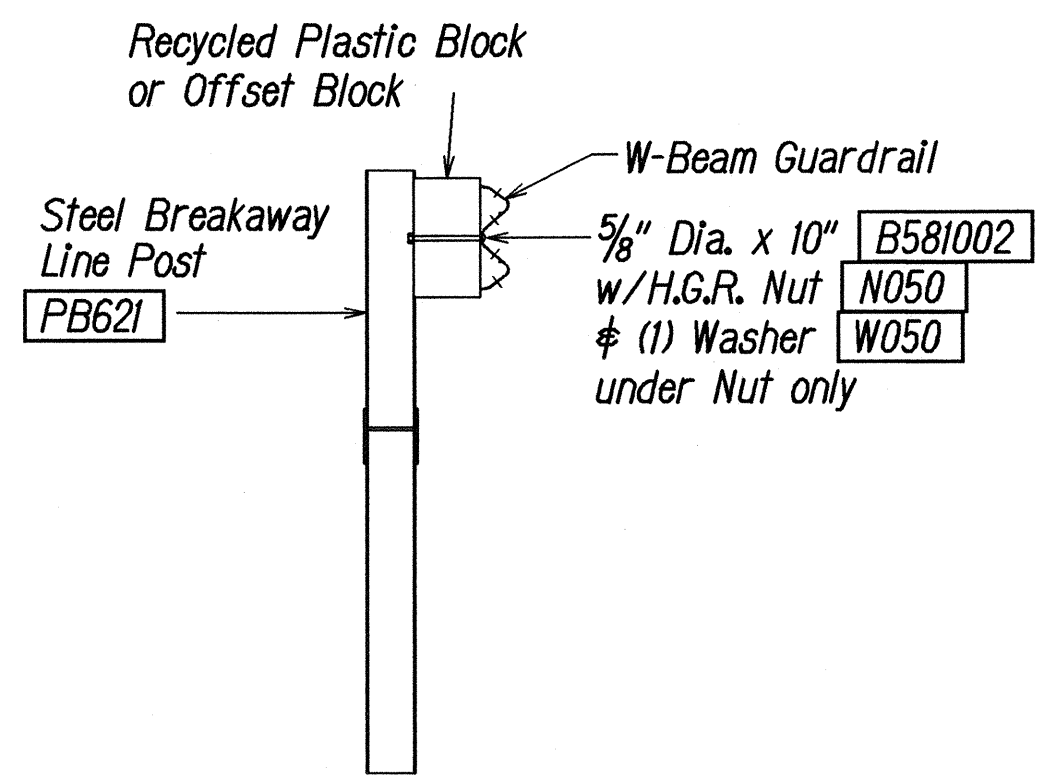
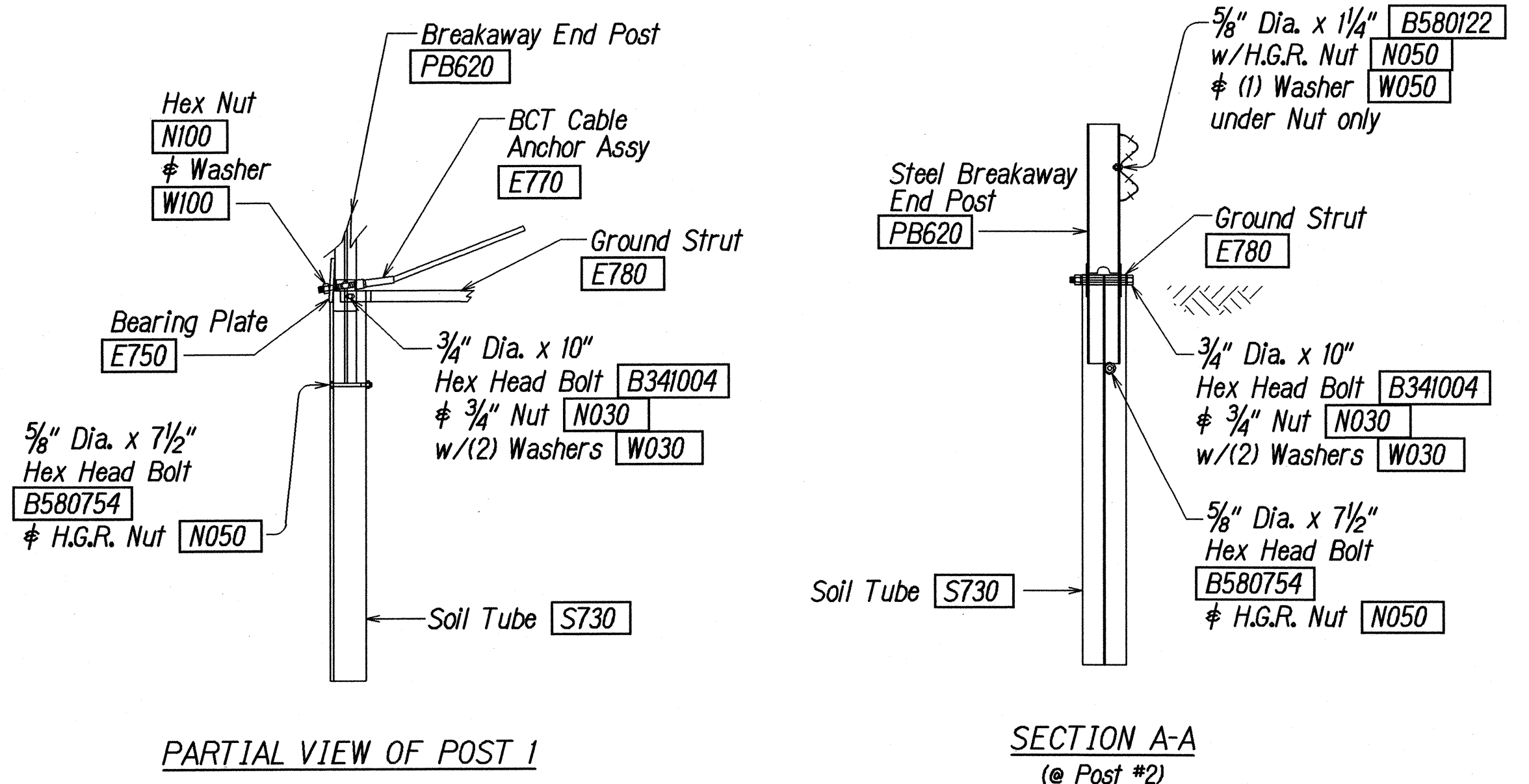
- GENERAL NOTES**
- Breakaway posts are required with the FLEAT Terminal.
 - All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
 - The soil tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
 - The soil tubes may be driven with an approved driving head. Soil tubes shall 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 approx. 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.
 - (R) or (L) indicates right or left Impact Head Reflector Marker (IHRM).
 - The stripes for IHRM shall slope downward at an angle of 45° towards the side of the end treatment that traffic is to pass.



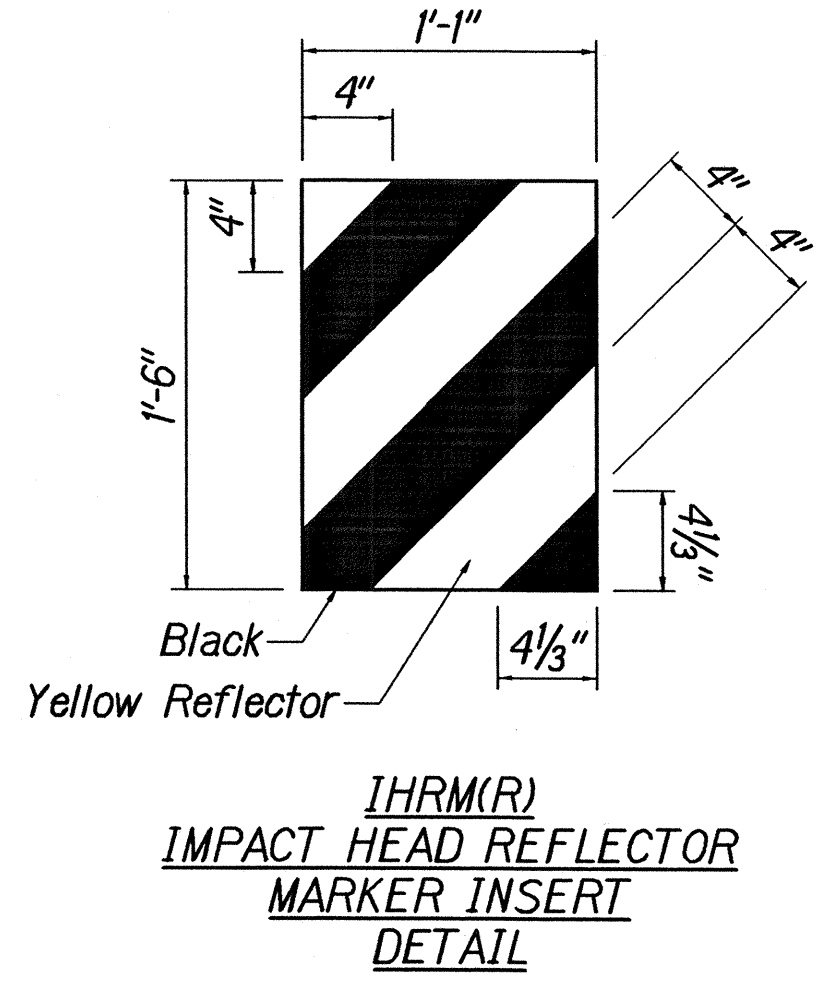
IMPACT HEAD CONNECTING DETAIL

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
	1	IMPACT HEAD REFLECTOR MARKER - IHRM(R) OR (L)
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



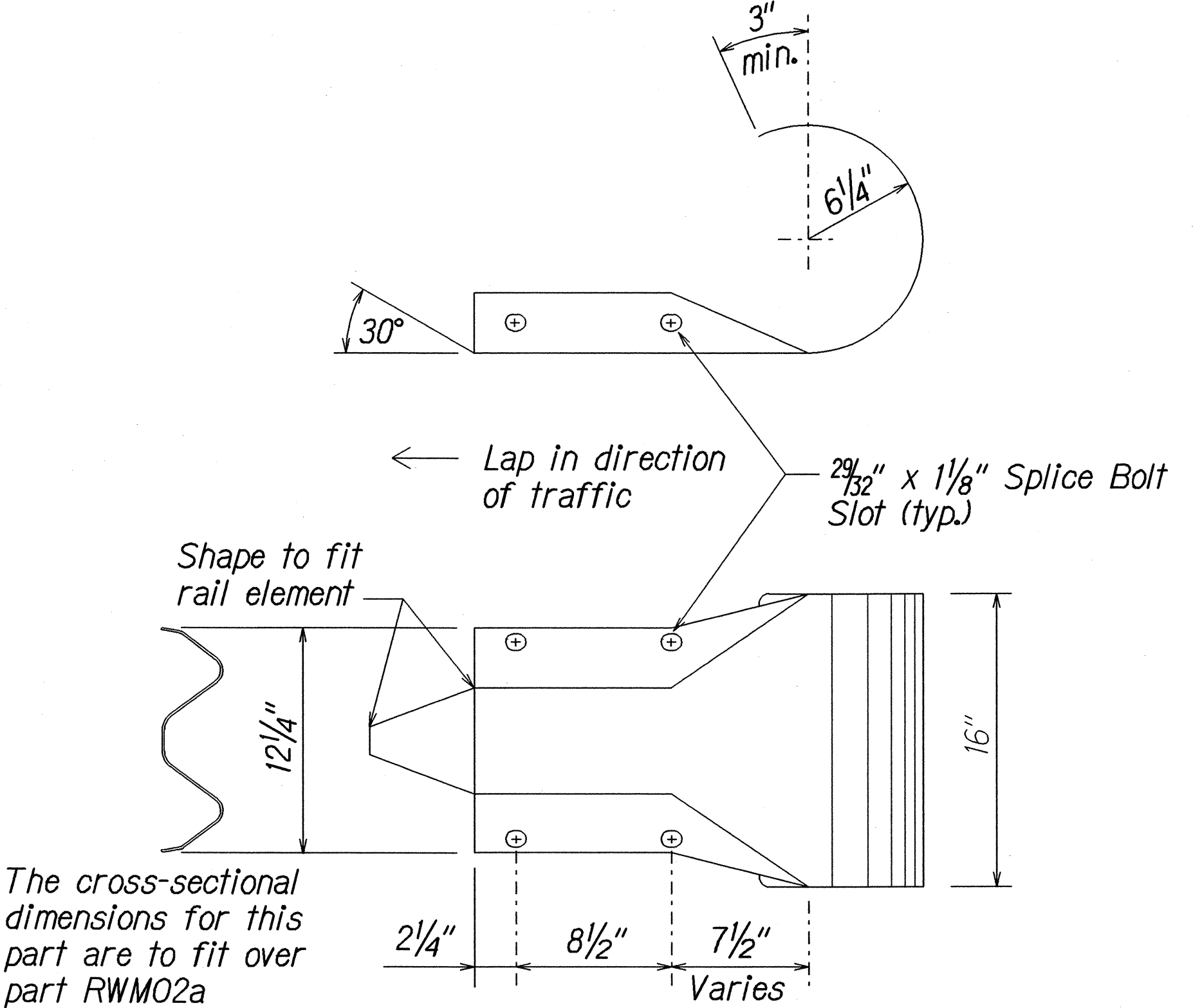
SECTION B-B
 (Typical @ Post 3 - 7)
 NOTE: RAIL NOT BOLTED @ POST #3



SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
FLEAT-350
FLARED ENERGY ABSORBING TERMINAL
MAALO ROAD RESURFACING
 Vicinity of Wailua Falls
 Project No. 583A-01-01M
 Not to Scale Date: Aug. 2003
 SHEET No. 3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	12	33



DESIGNATOR	BASE METAL THICKNESS
RWE03a	12 Gauge

W-BEAM END SECTION (ROUNDED RWE03a)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	Dec. 2003
Relief	DESIGNED BY	
Speckle/Don	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL END SECTION

MAALO ROAD RESURFACING

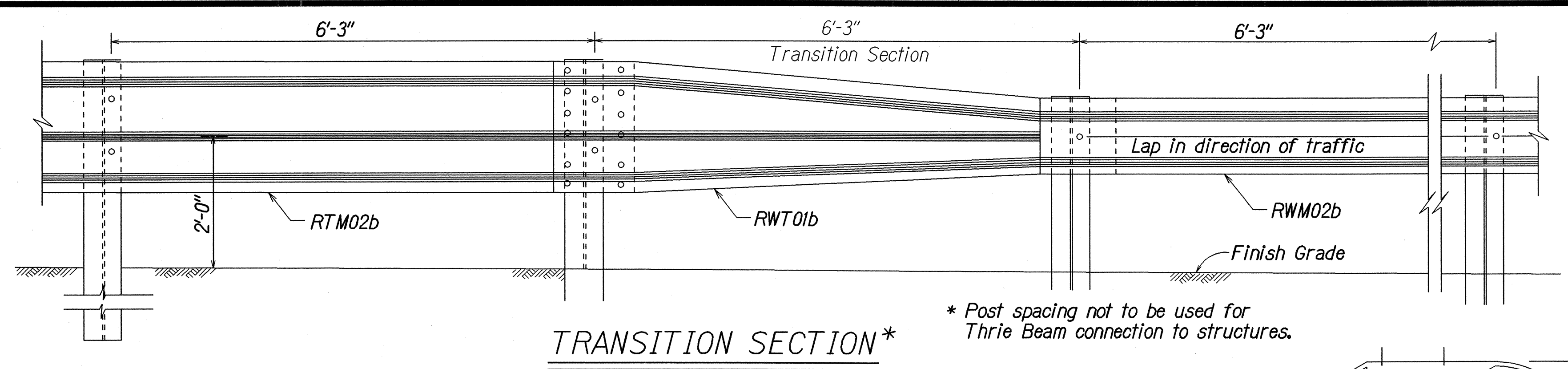
Vicinity of Wailua Falls

Project No. 583A-01-01M

Scale: NTS
Date: Aug. 2003

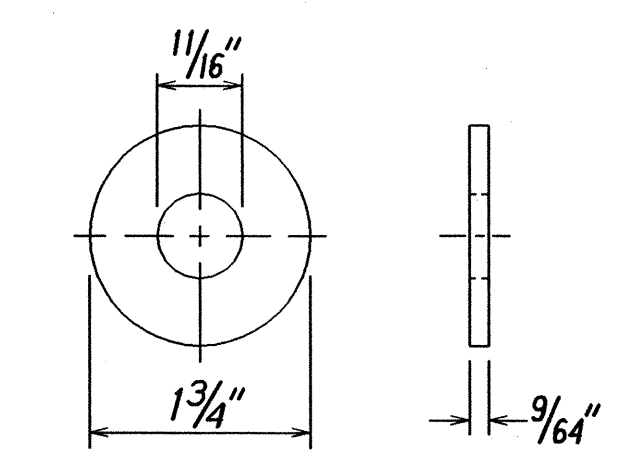
SHEET No. 4 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	13	33

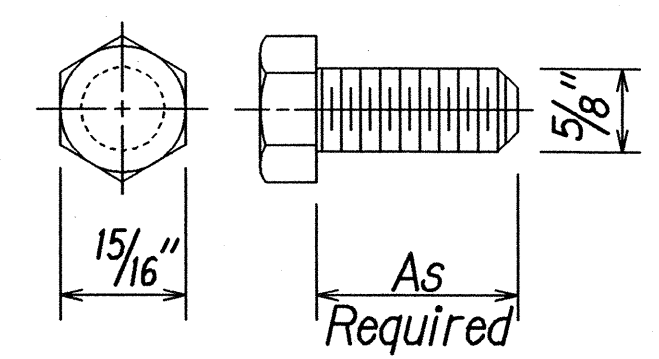


TRANSITION SECTION*

* Post spacing not to be used for Thrie Beam connection to structures.

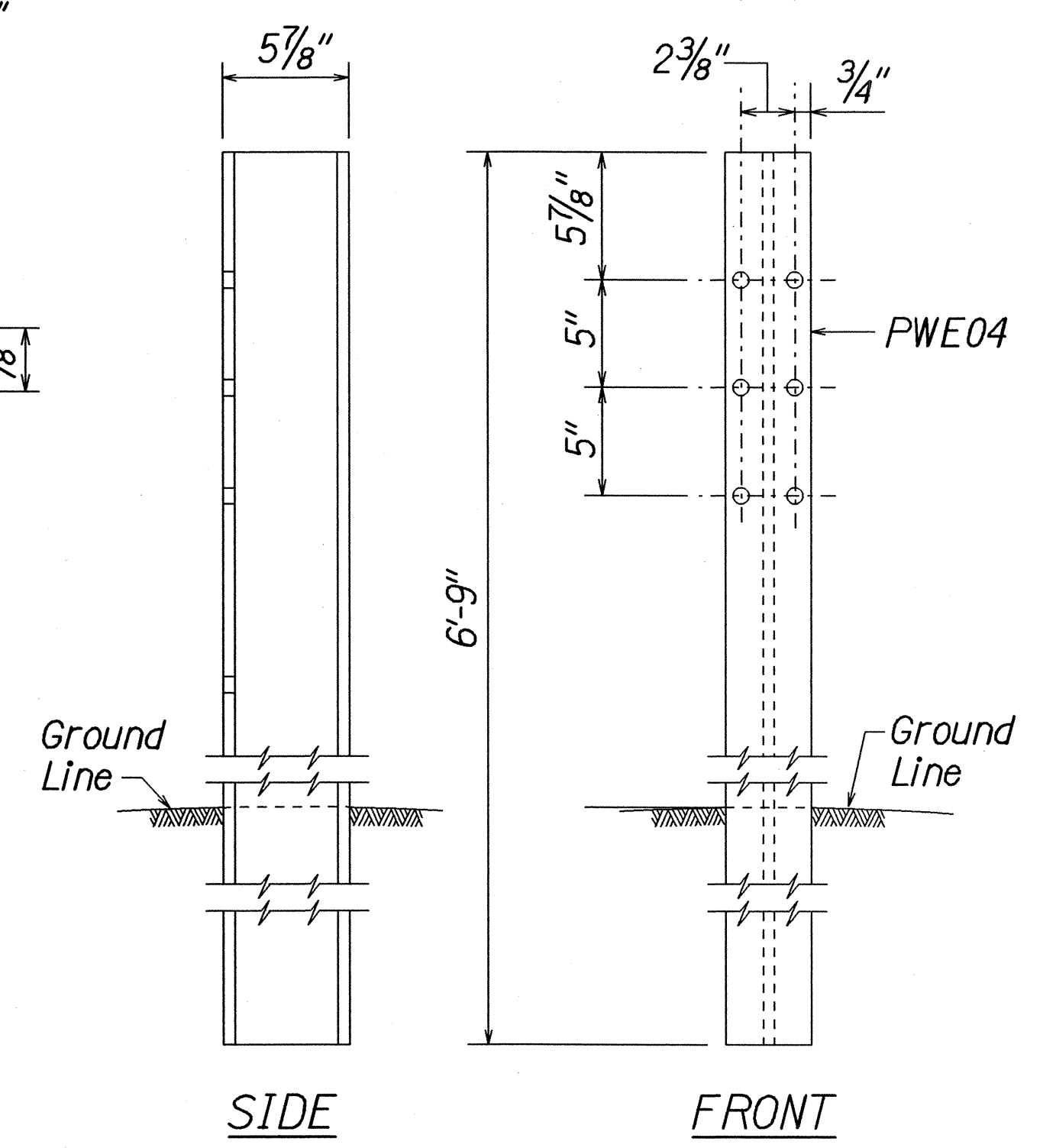
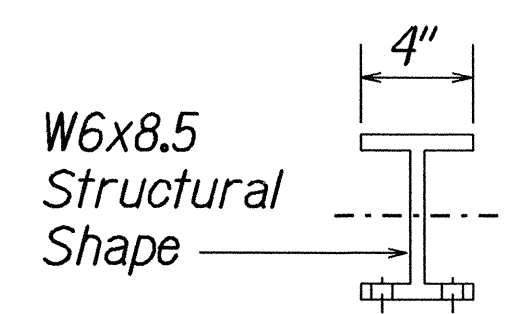


**STEEL WASHER
FOR 5/8" BOLT**

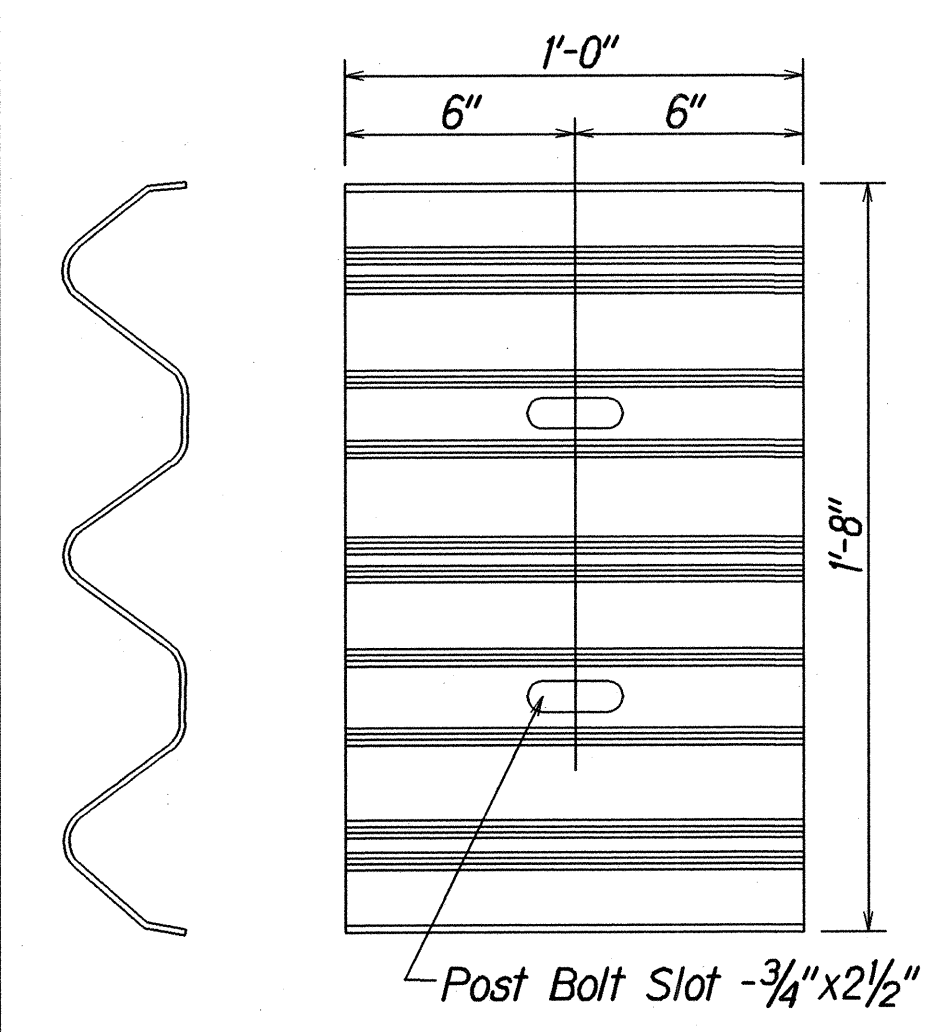


**HEX BOLT & NUT
(FBX16a)**

NOTE:
All Holes are
3/4" Dia.

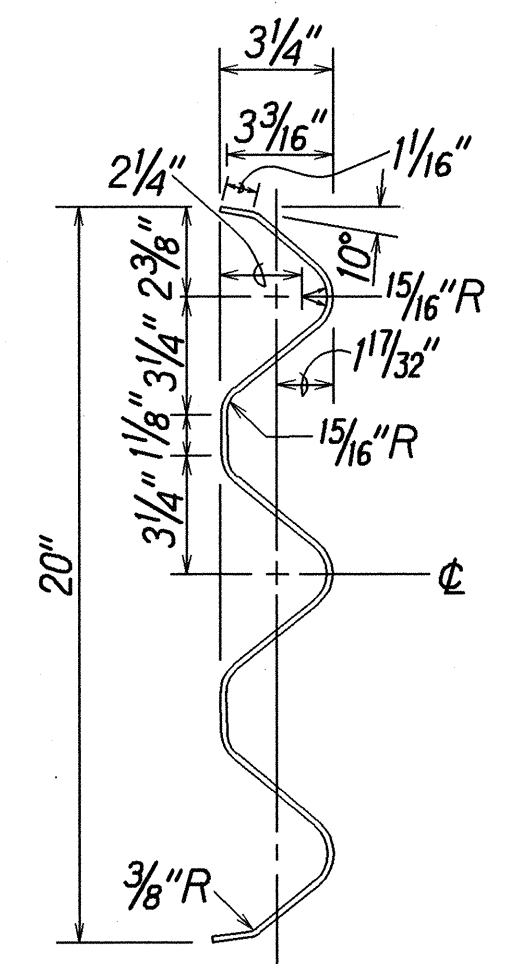


W-BEAM STRONG POST (PWE04)

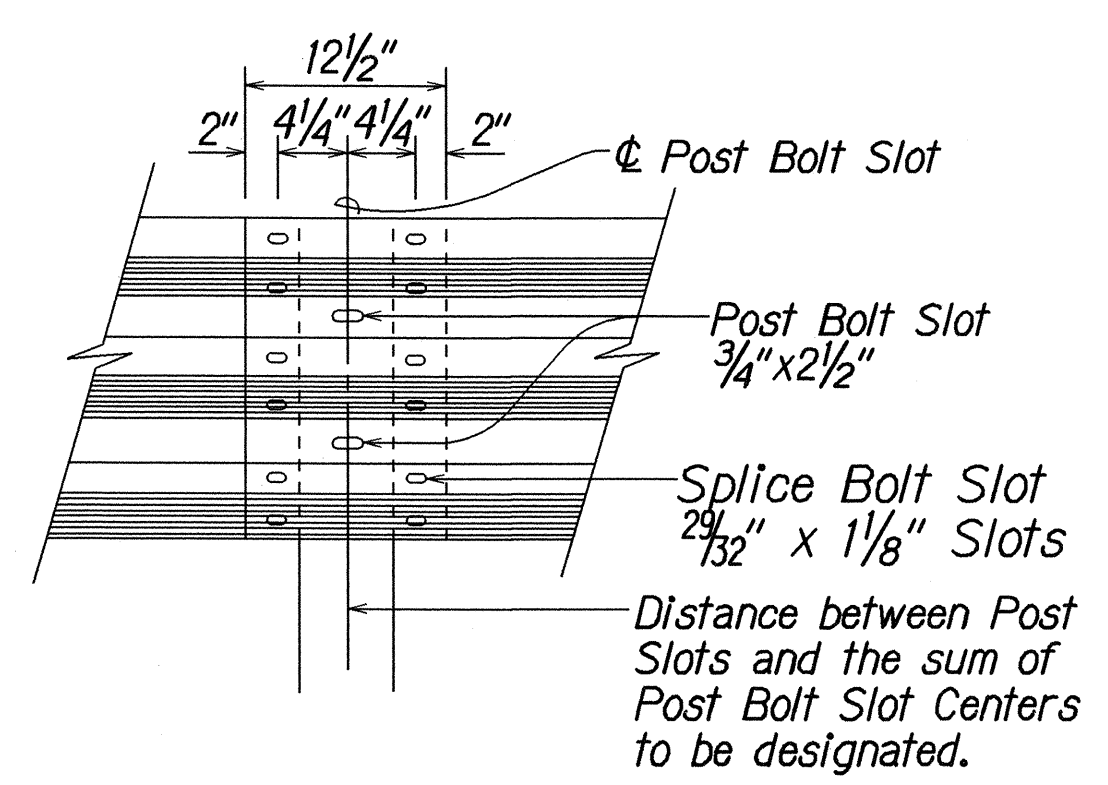


**BACKUP PLATE
(RTB01b)**

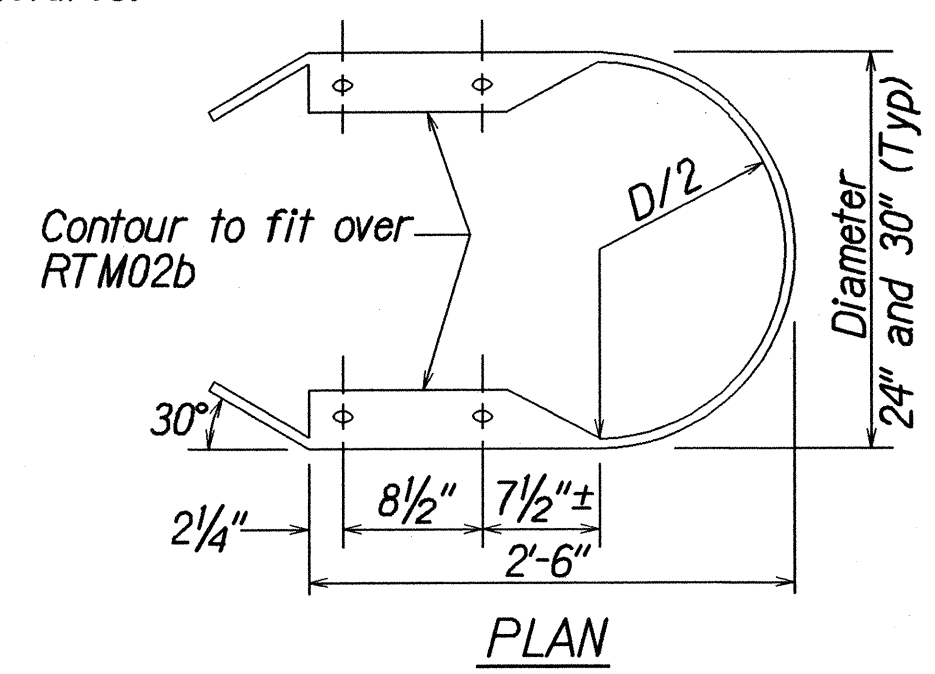
(Use at Posts where
Splices do not occur)



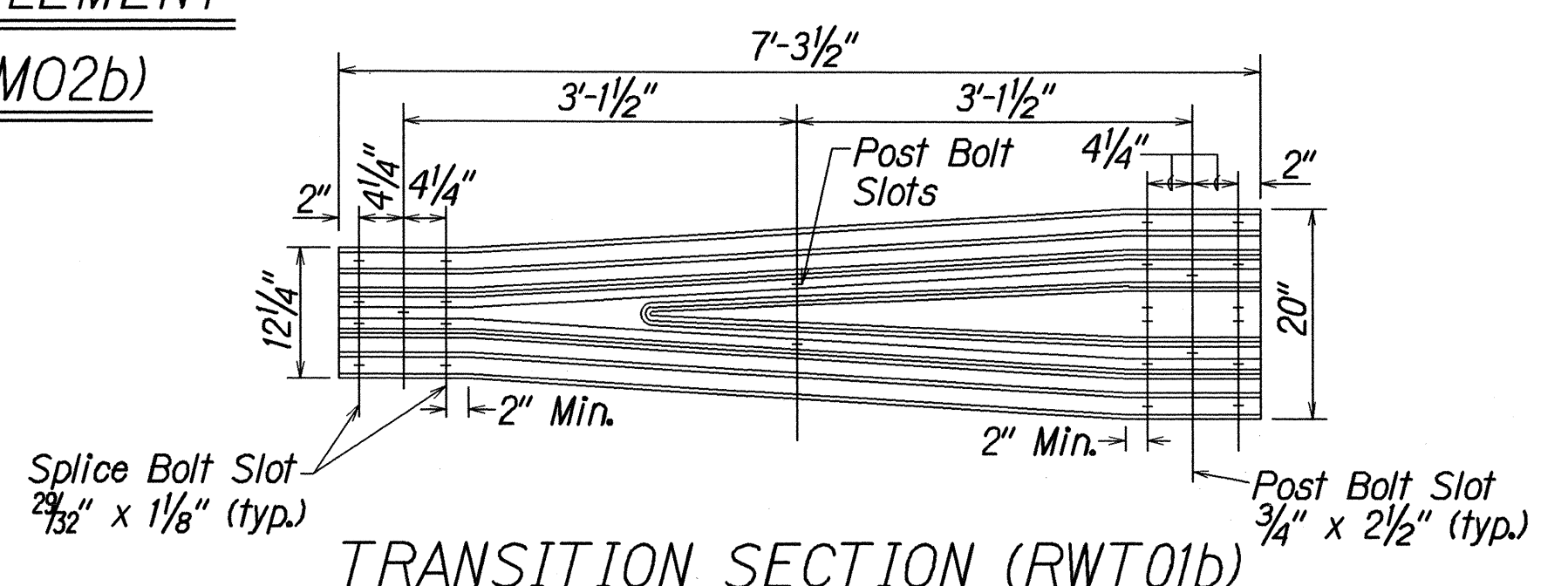
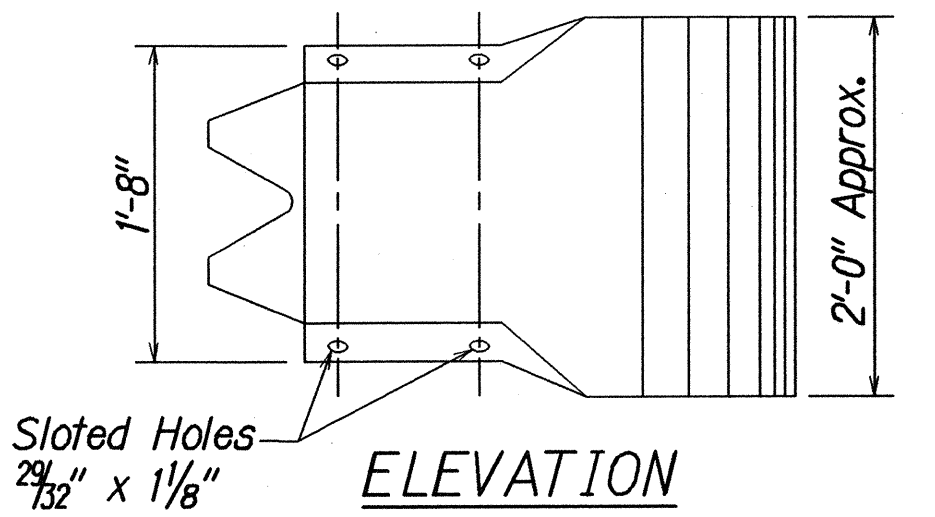
**SECTION THRU
RAIL ELEMENT
(RTM02b)**



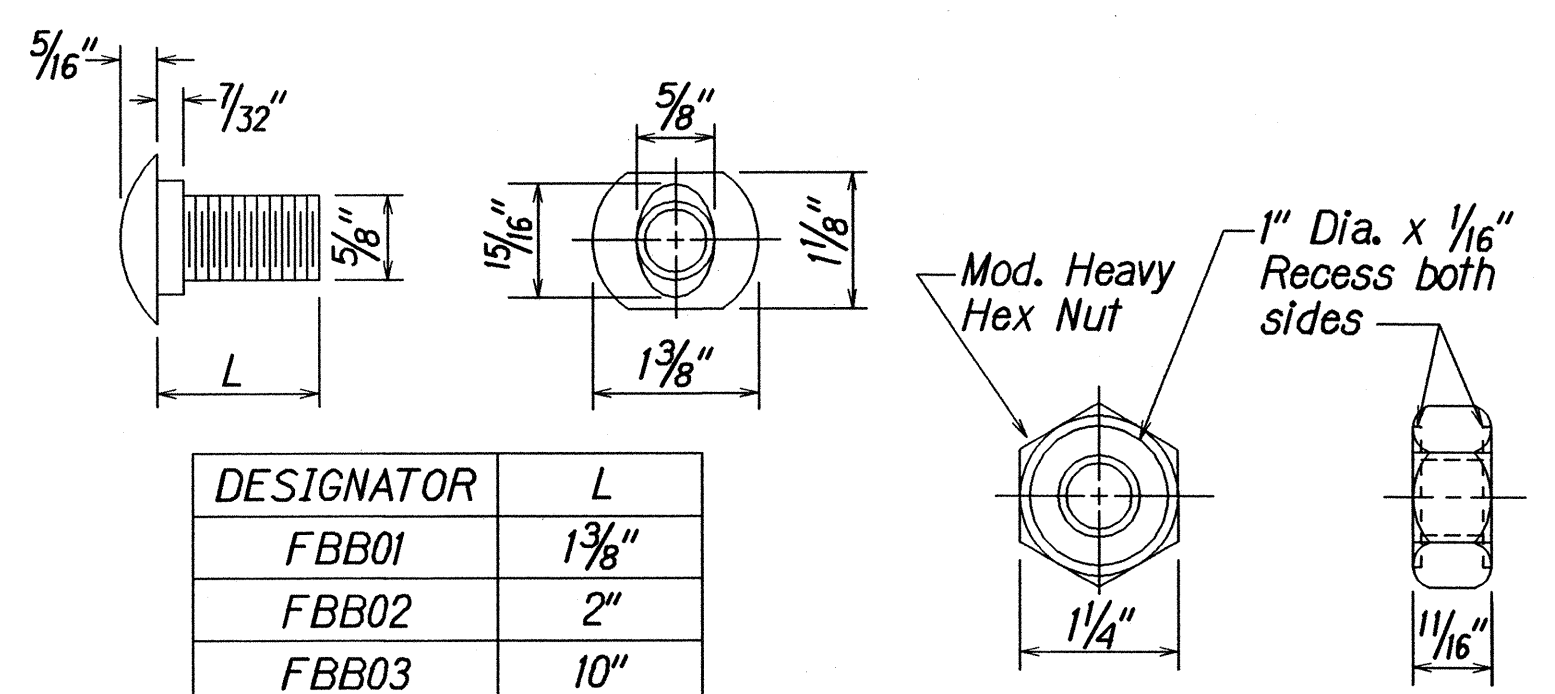
RAIL SPLICE



**END SECTION (BUFFER RTE03b
or RTE04b)**

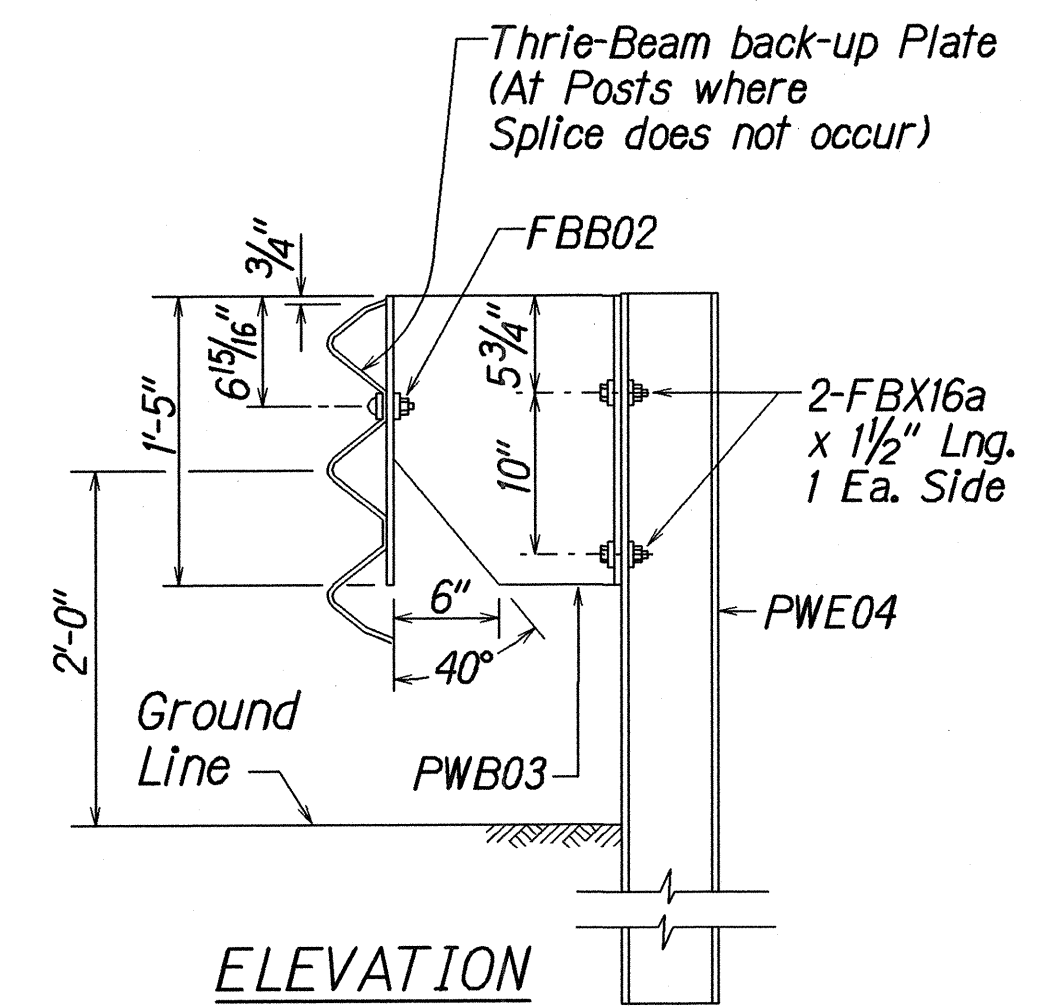


TRANSITION SECTION (RWT01b)

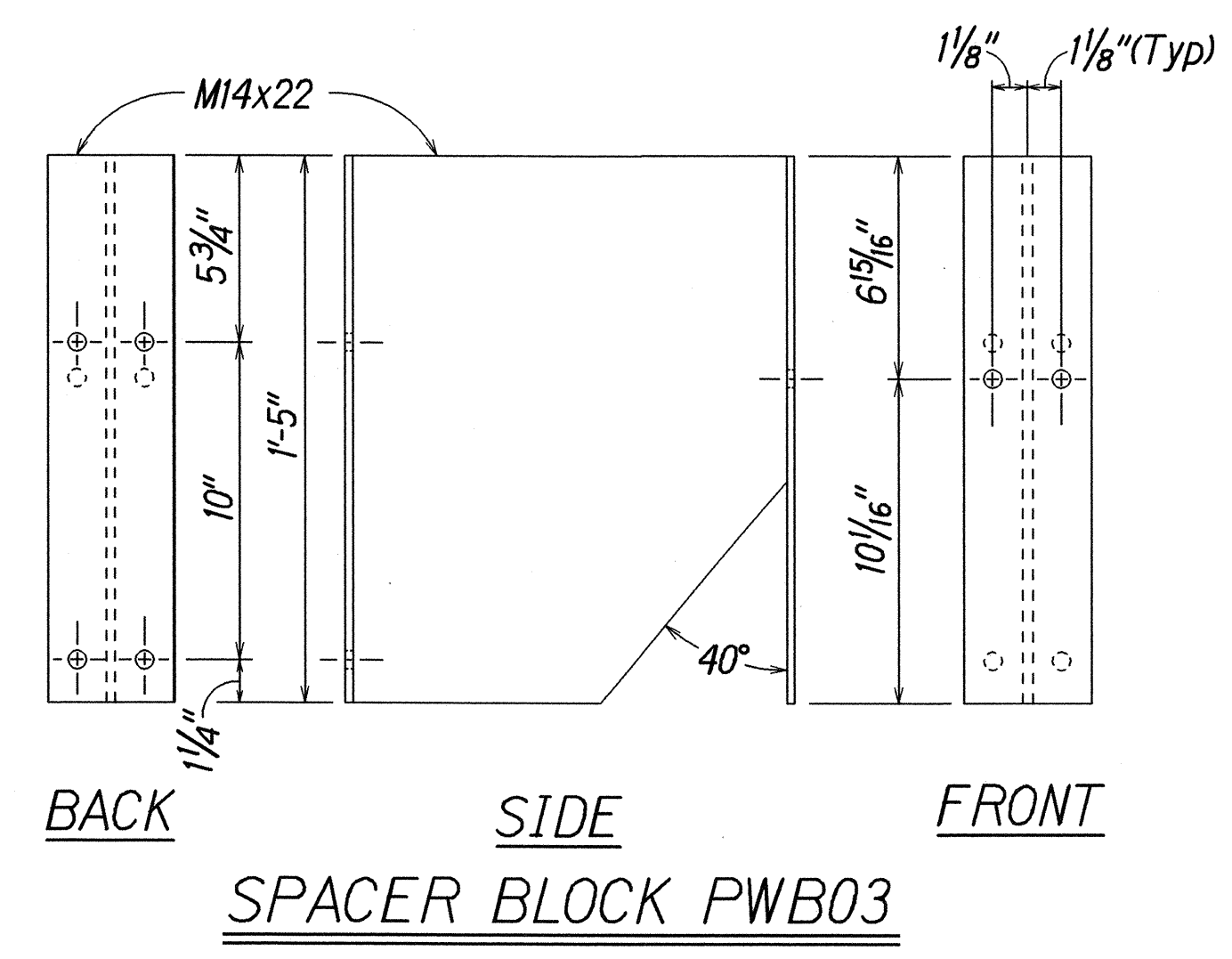


DESIGNATOR	L
FBF01	1 3/8"
FBF02	2"
FBF03	10"

GUARDRAIL BOLTS AND RECESSED NUT



**STRONG POST MODIFIED
THRIE-BEAM GUARDRAIL
(SGR09b)**



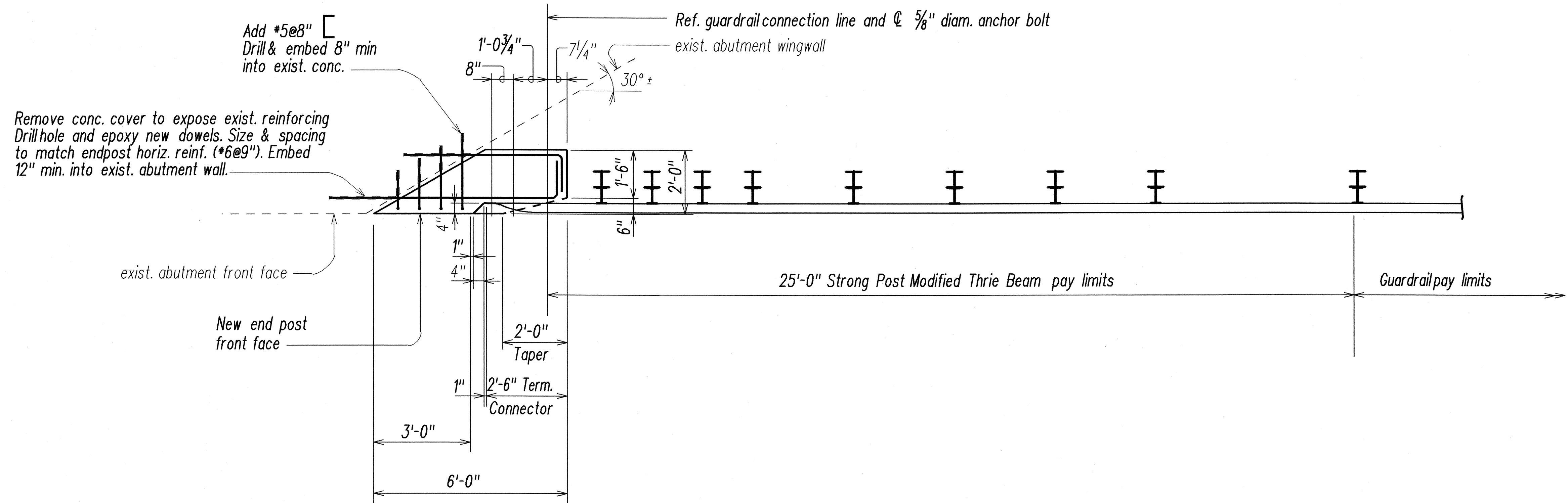
SPACER BLOCK PWB03

ORIGINAL PLAN	DATE	Dec. 2003
SURVEY PLOTTED BY		
DRAWN BY		
DESIGNED BY		
CHECKED BY		

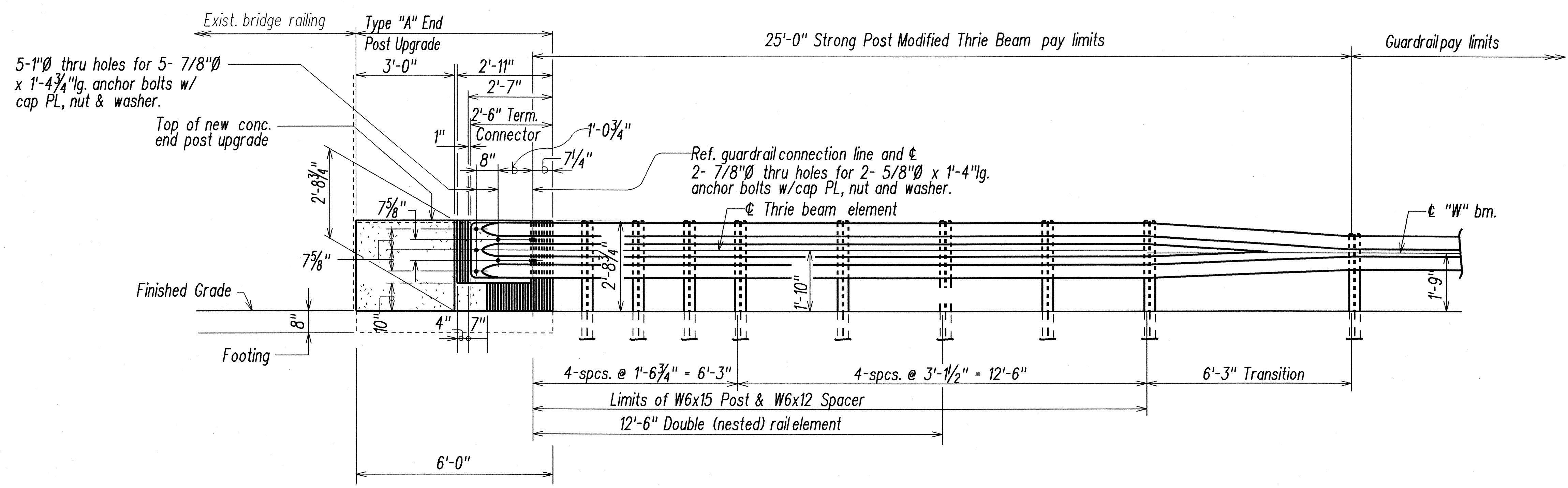
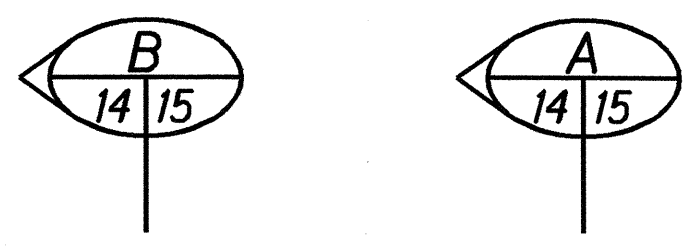
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**STRONG POST MODIFIED
THRIE-BEAM GUARDRAIL**
MAALO ROAD RESURFACING
Vicinity of Wailua Falls
Project No. 583A-01-01M
Scale: As Noted Date: Aug. 2003
SHEET No. 5 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	14	33



PLAN



ELEVATION

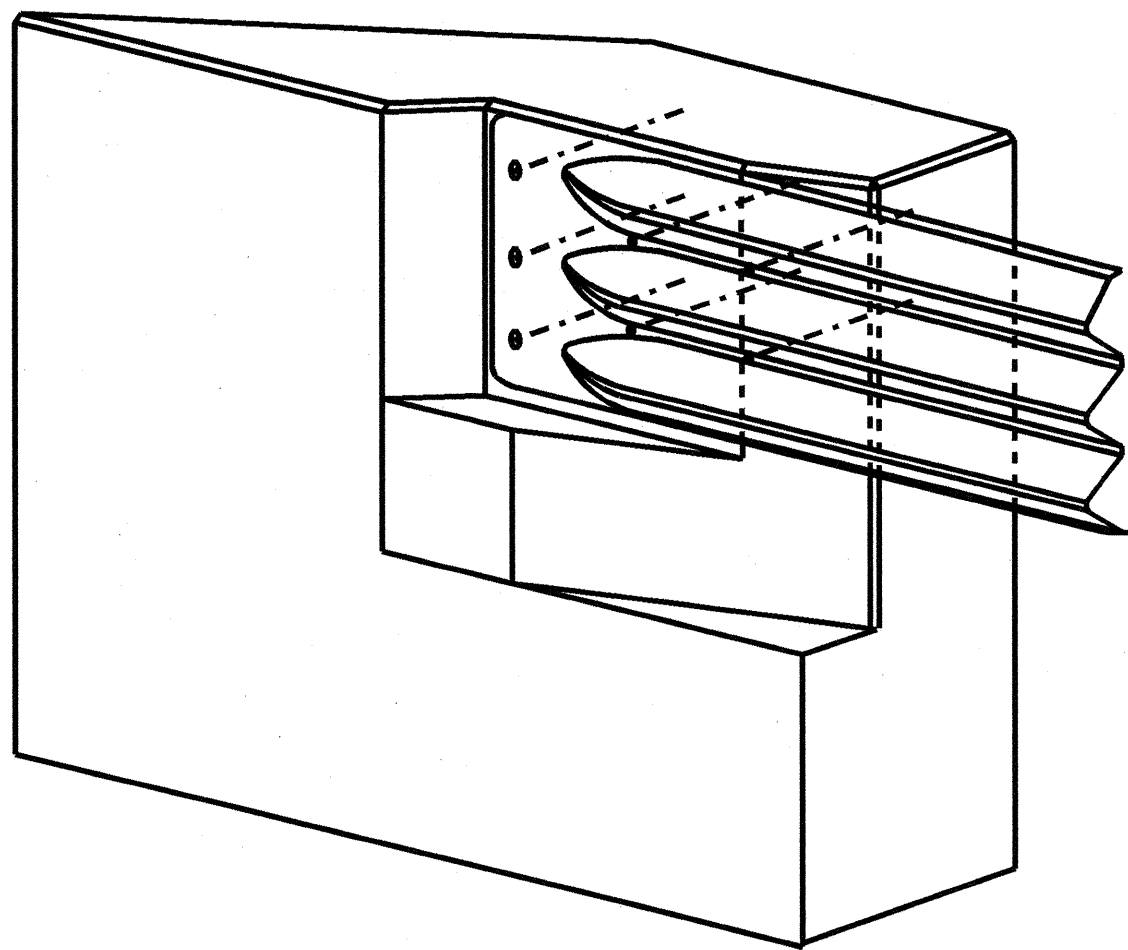
SURVEY PLOTTED BY	DATE	Dec. 2003
DRAWN BY		
TRACED BY		
DESIGNED BY		
CHECKED BY		
NOTE BOOK		
FILED		
STAMPED		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A" ENDPOST UPGRADE
MAALO ROAD RESURFACING
Vicinity of Wailua Falls
Project No. 583A-01-01M

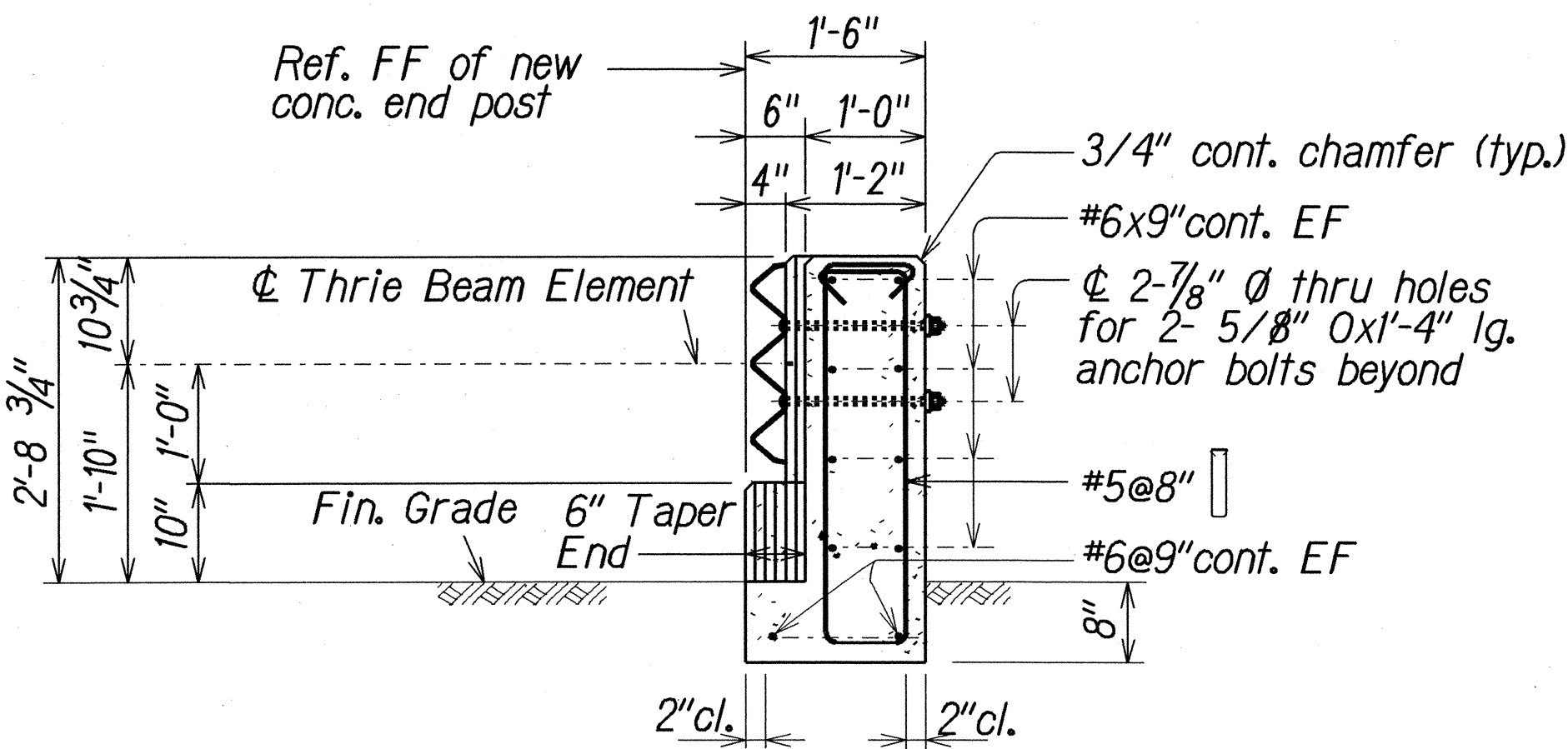
Scale: 1/2"=1'
Date: Aug. 2003
SHEET No. 6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	583A-01-01M	2004	15	33

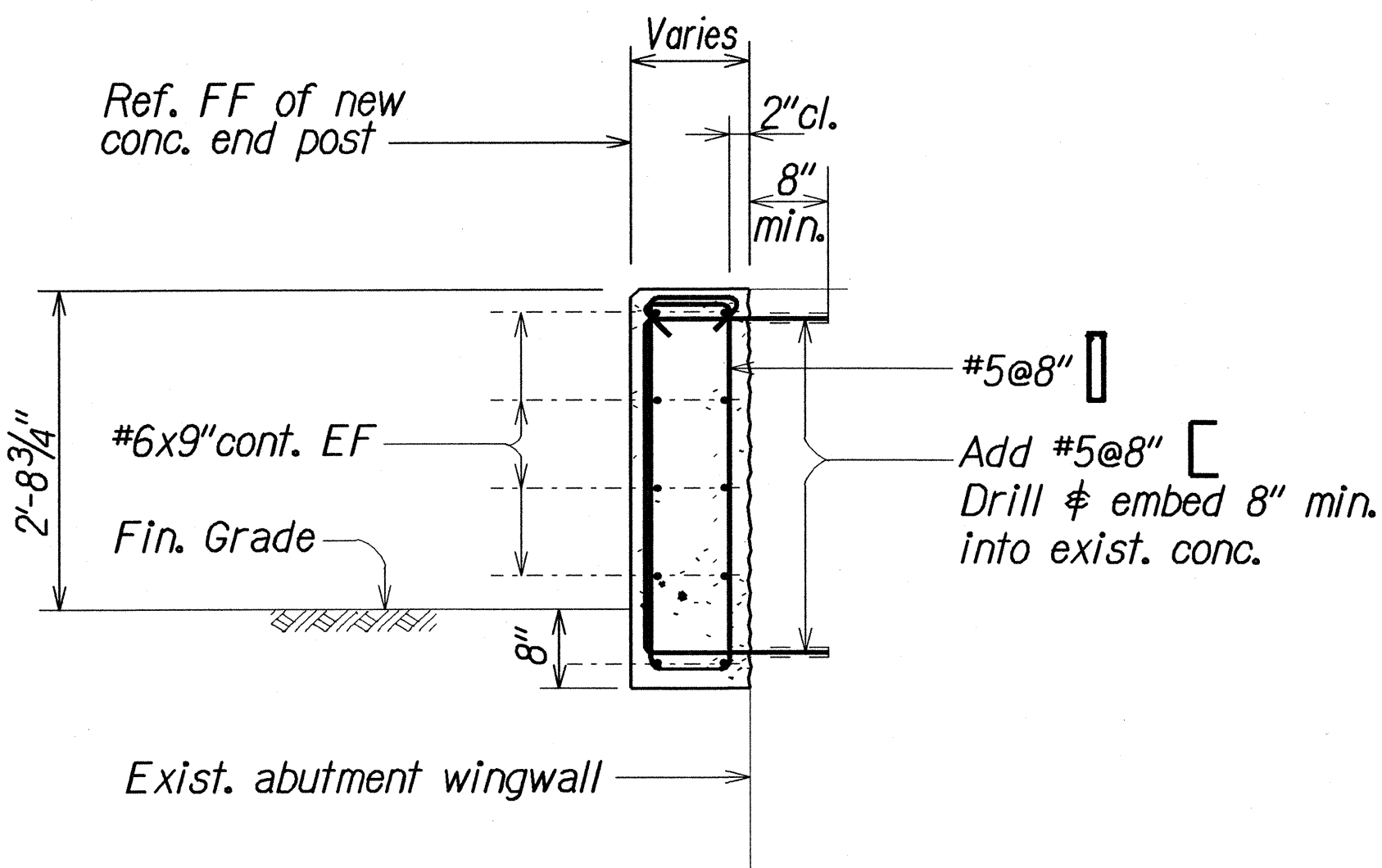


ISOMETRIC VIEW -
TYPE "A" ENDPPOST UPGRADE
Not to Scale

- Notes:
- Excavation work for the New Concrete Endposts and New Guardrail Posts shall be incidental to other items of work.
 - Use injected Sikadur 32 HI-MOD, Sikadur 31 HI-MOD gel, HIT adhesive anchor system by Hilti or other as approved by the Engineer.
 - Threaded Rods shall be #6 (3/4" Diam.), Fy= 60 KSI. Minimum Drill Bit Diameter shall be 7/8" for Hole Depth (U.O.N.) 12". Use concrete f'c 3,000 PSI.
 - Clean holes with motor driven compressed air and nylon brush prior to grouting. Epoxy Grout and Epoxy Bonding Agent shall conform to Section 712. Prior to filling with Epoxy Grout, notify the Engineer to inspect the holes.
 - The Contractor shall be solely responsible for the protection of existing and new structures from damage due to construction. All damages from Contractor's operations shall be repaired at the Contractor's sole expense. All repairs shall conform to current standards of the State Highways Division.



SECTION A
Scale: 3/4"=1'-0"



SECTION B
Scale: 3/4"=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A" ENDPPOST UPGRADE

MAALO ROAD RESURFACING
Vicinity of Wailua Falls
Project No. 583A-01-01M

Scale: As Noted
Date: Aug. 2003

SHEET No. 7 OF 7 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	Dec. 2003
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NOTED BY	
REVIEWED BY	
APPROVED BY	