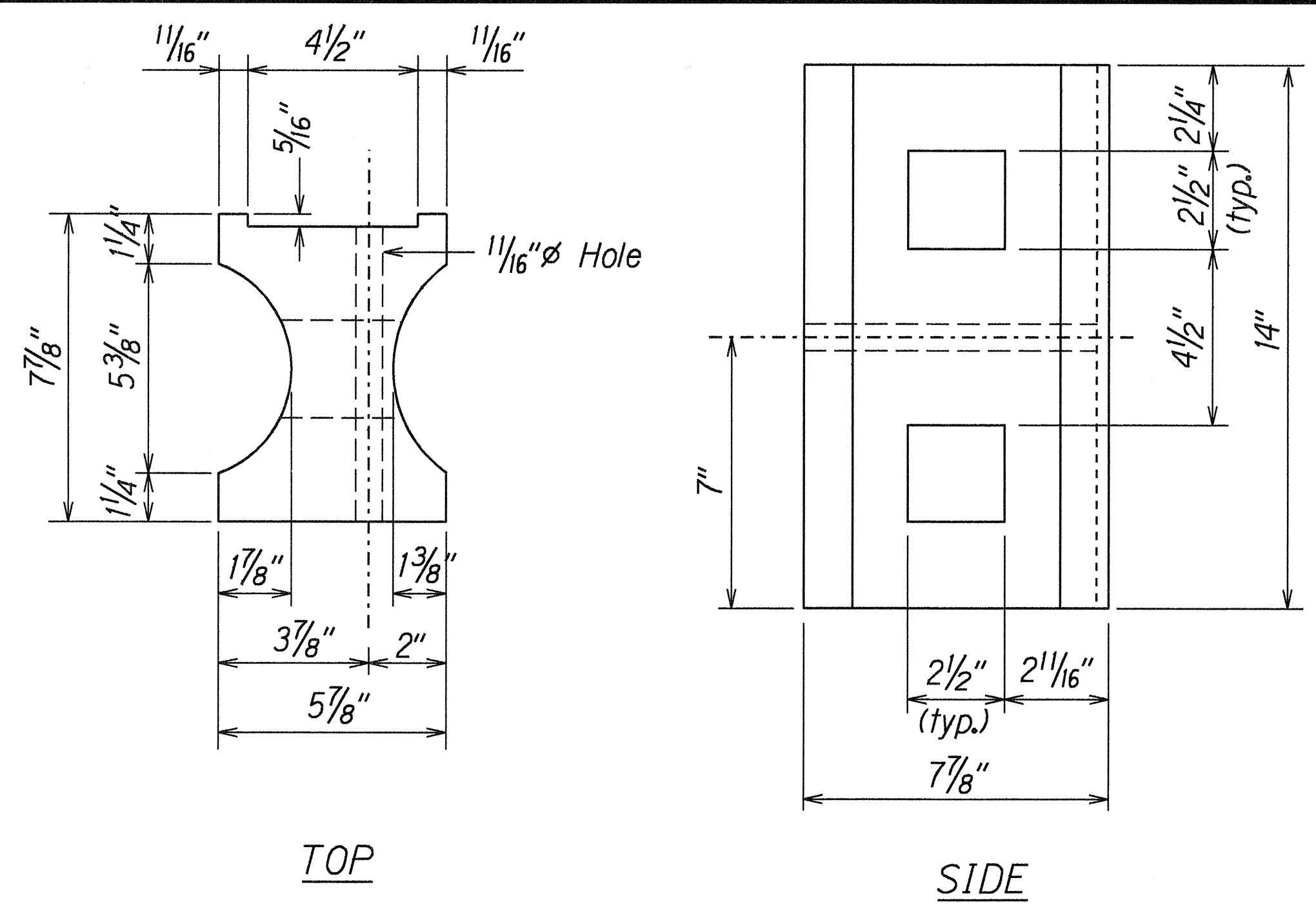
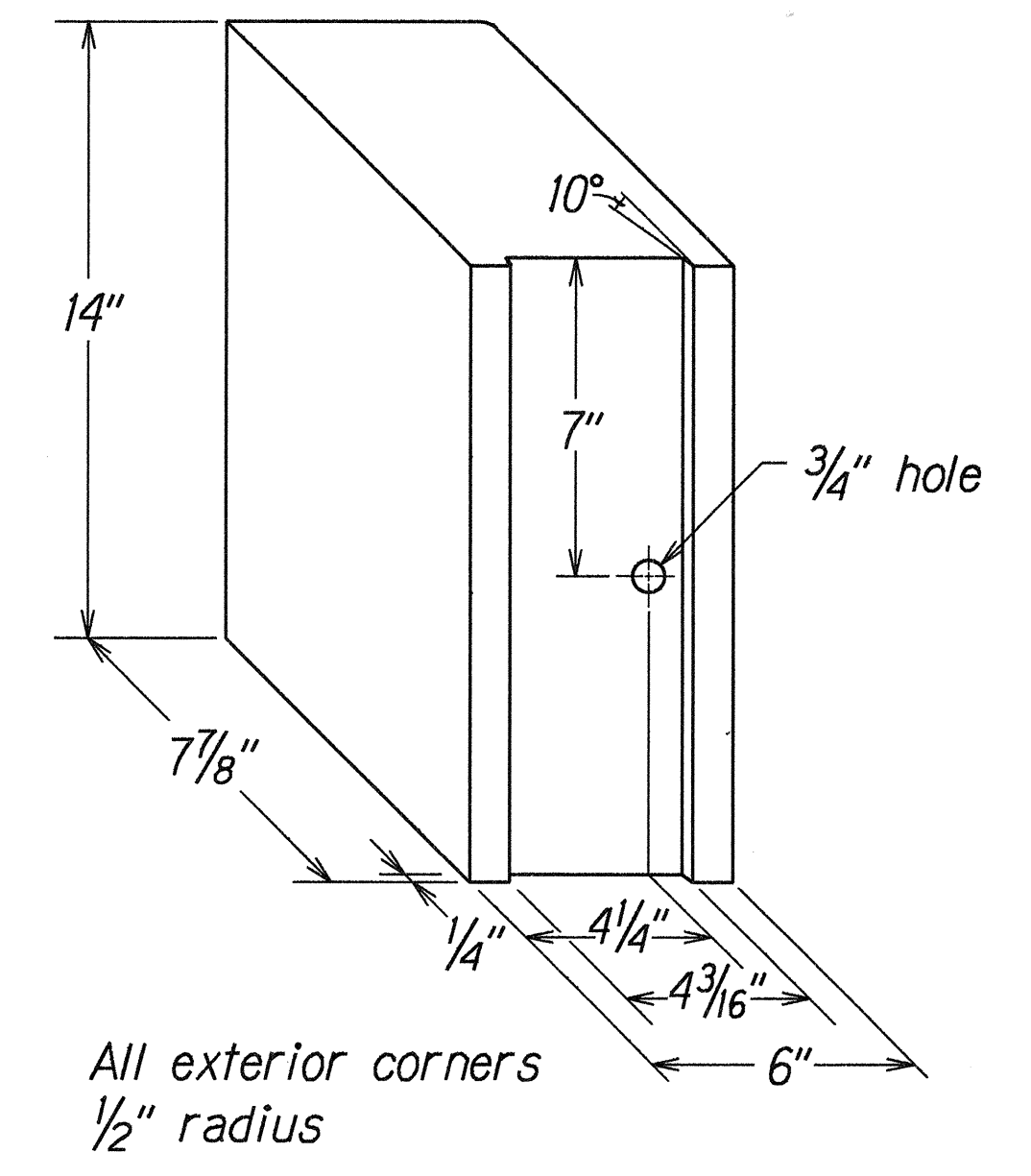


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	35	55

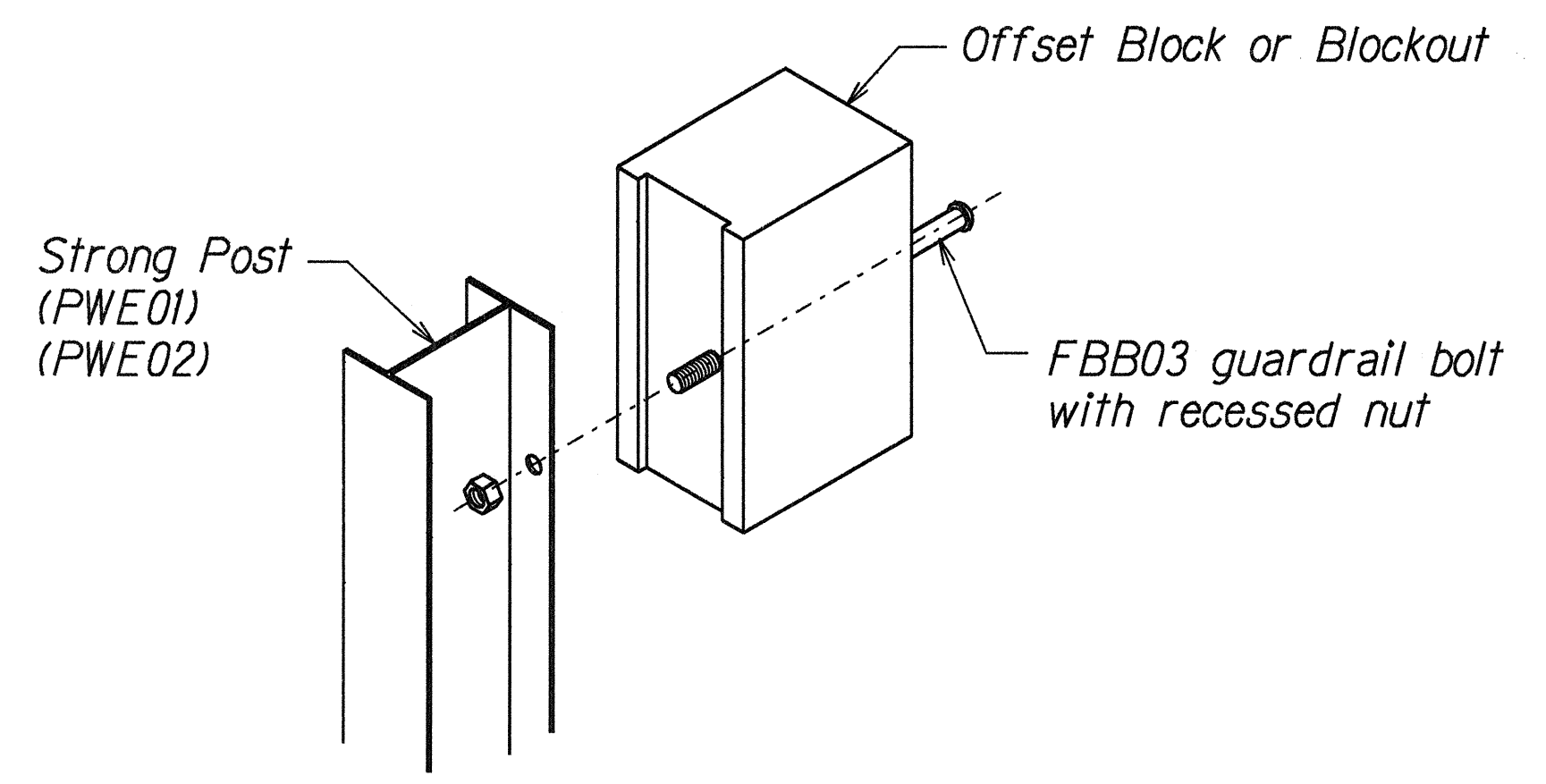


TOP
SIDE
RECYCLED PLASTIC BLOCKOUT (TYPE I)

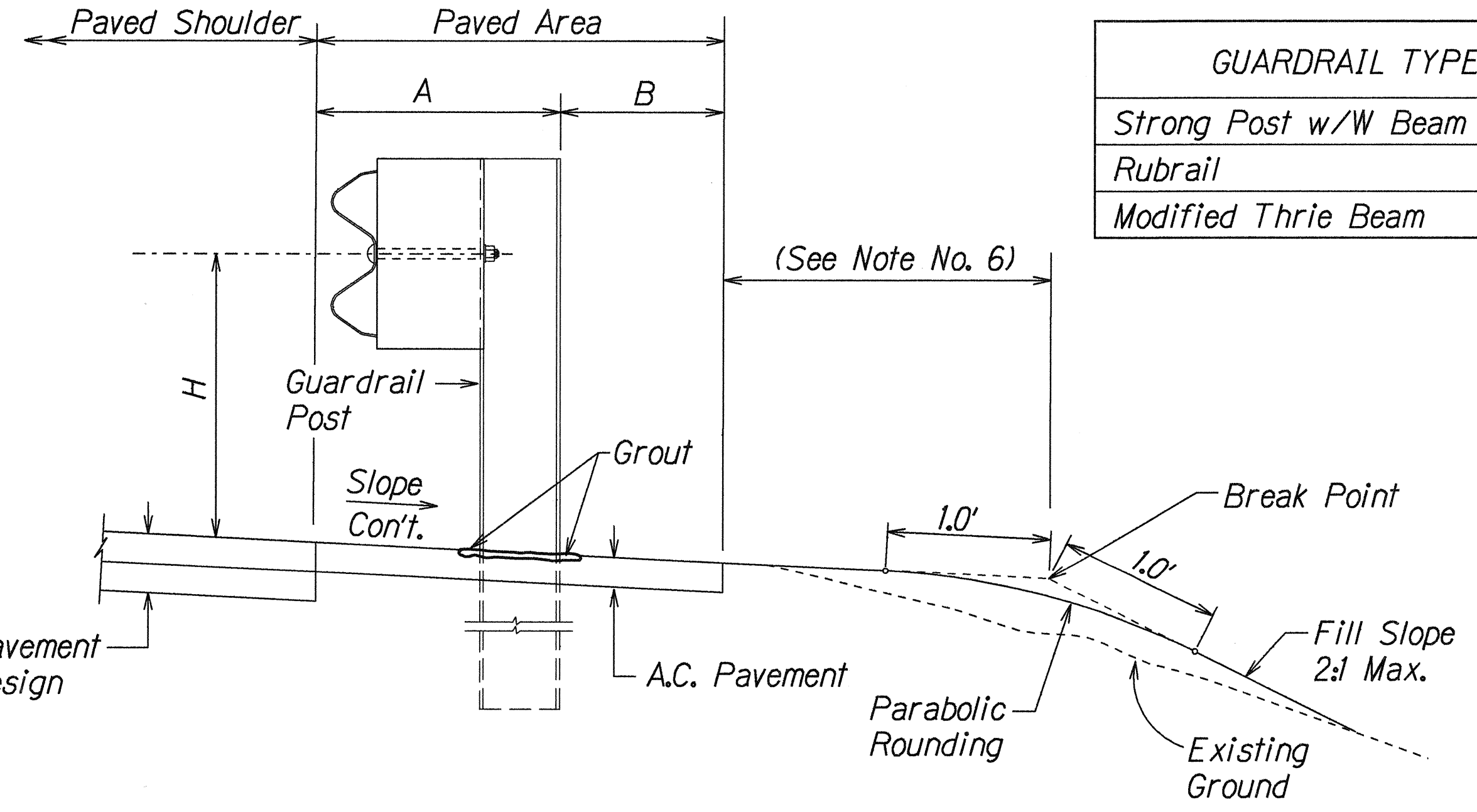
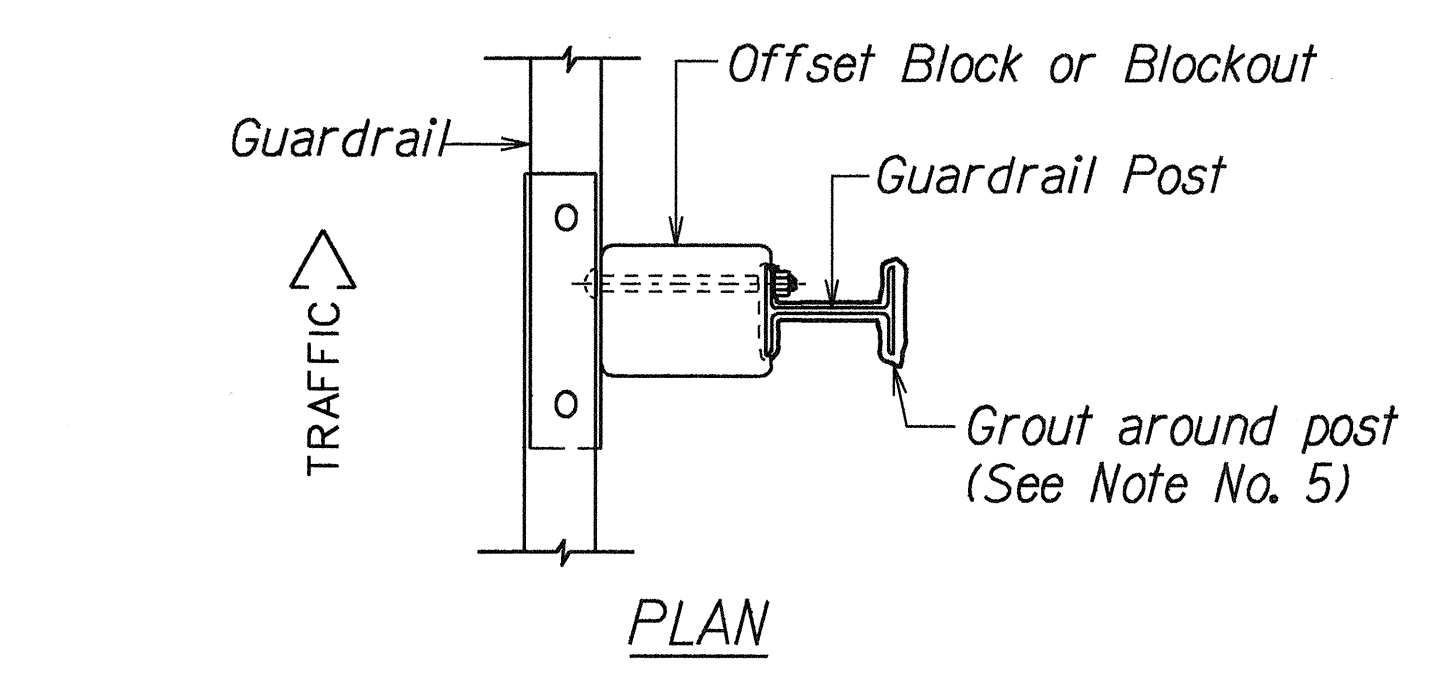


RECYCLED POLYETHYLENE
OFFSET BLOCK (TYPE II)

- 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. Refer to Sheet #47 for details for paving under guardrails.



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



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"

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS AND NOTES

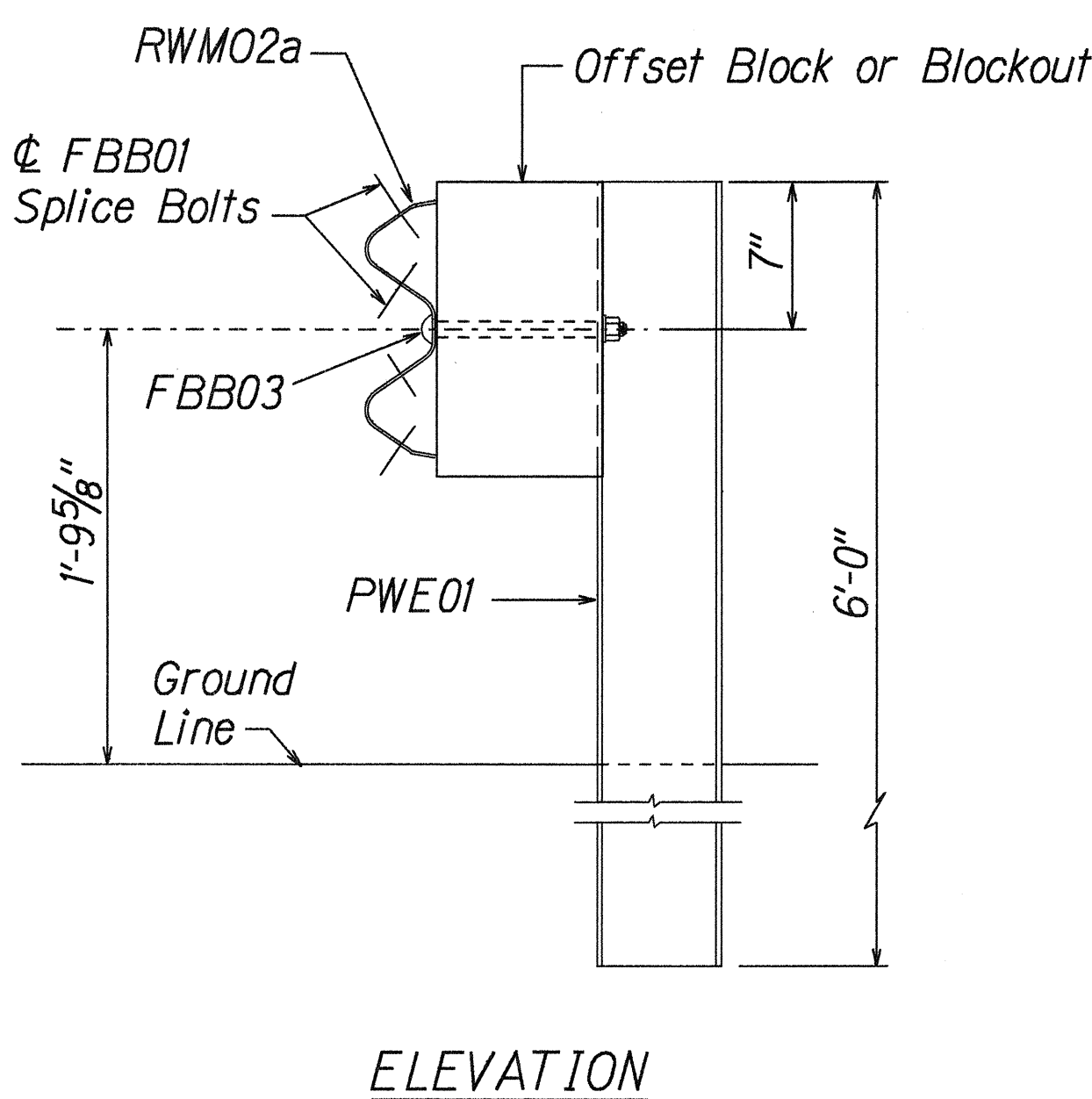
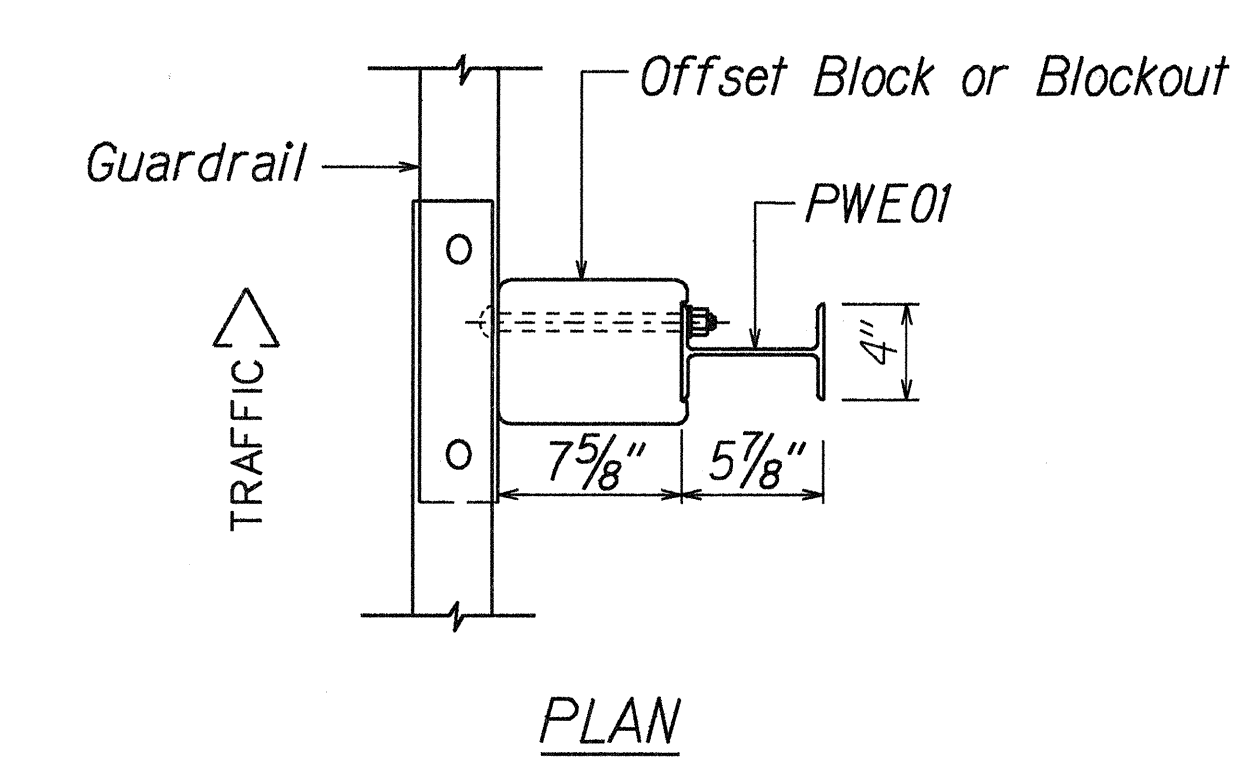
KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)

Scale: Noted Date: May, 2000

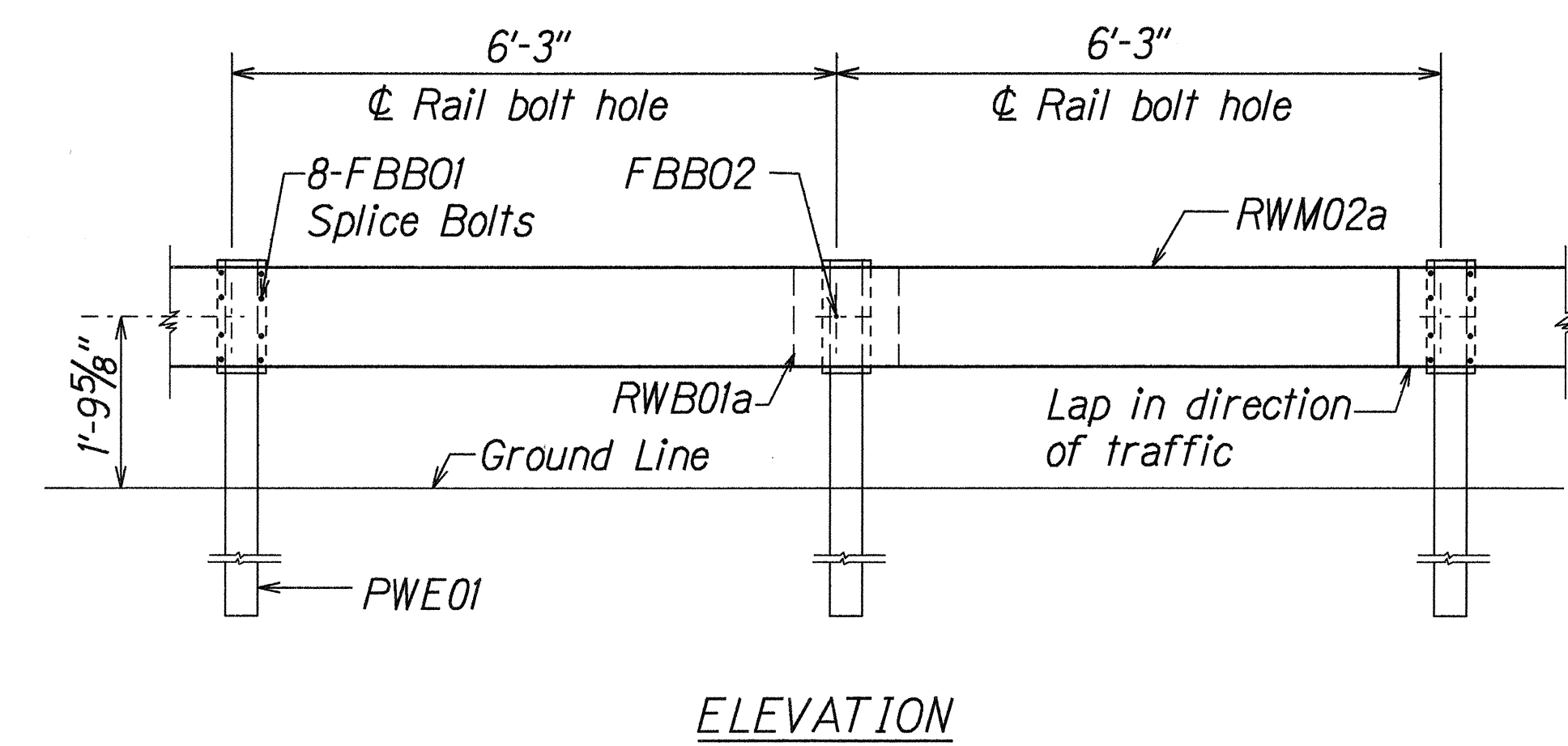
SHEET No. 1 OF 1 SHEETS

ELEVATION
TYPICAL GUARDRAIL INSTALLATION

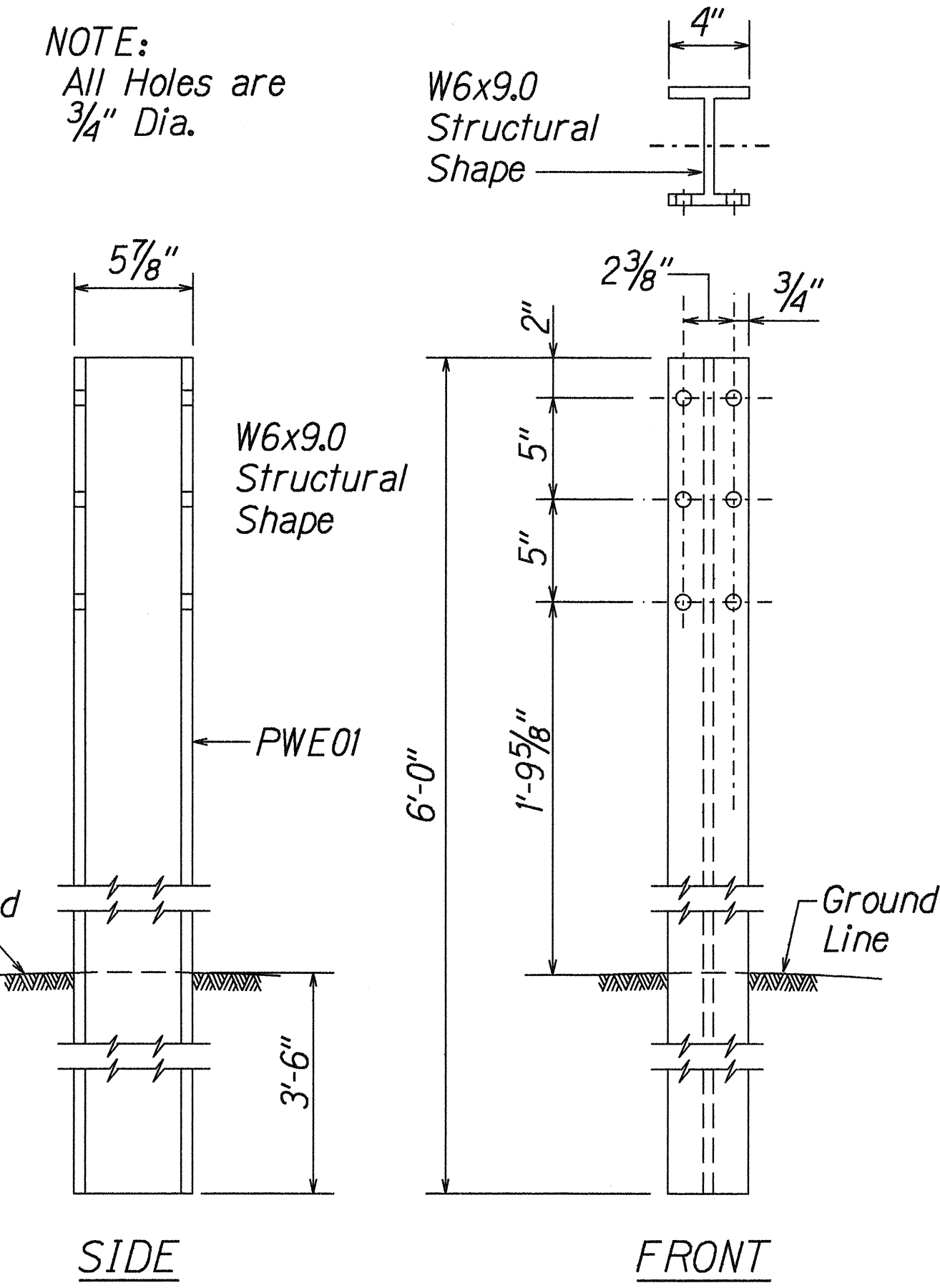
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	36	55



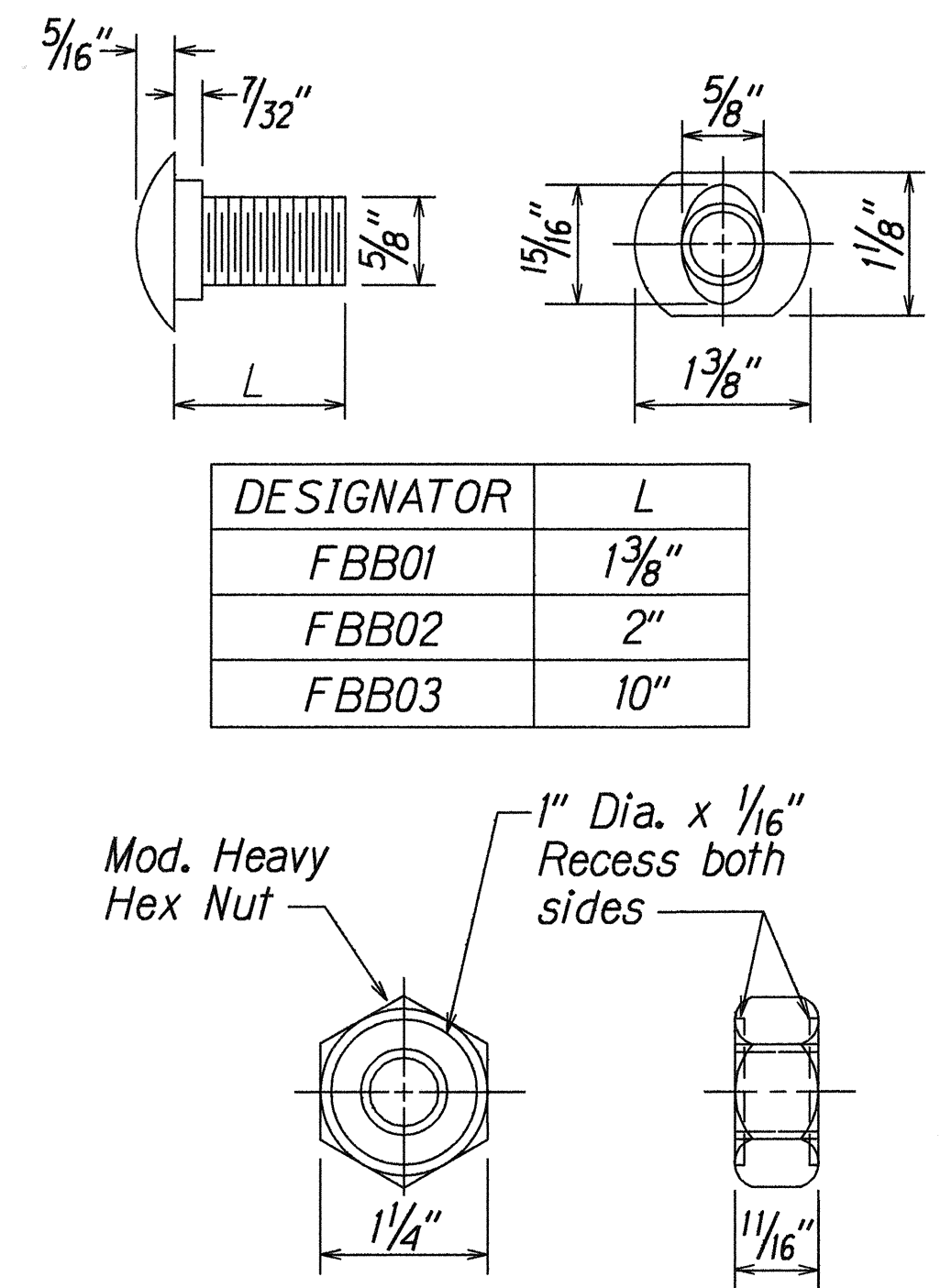
STRONG POST W-BEAM GUARDRAIL
(SGR04a)



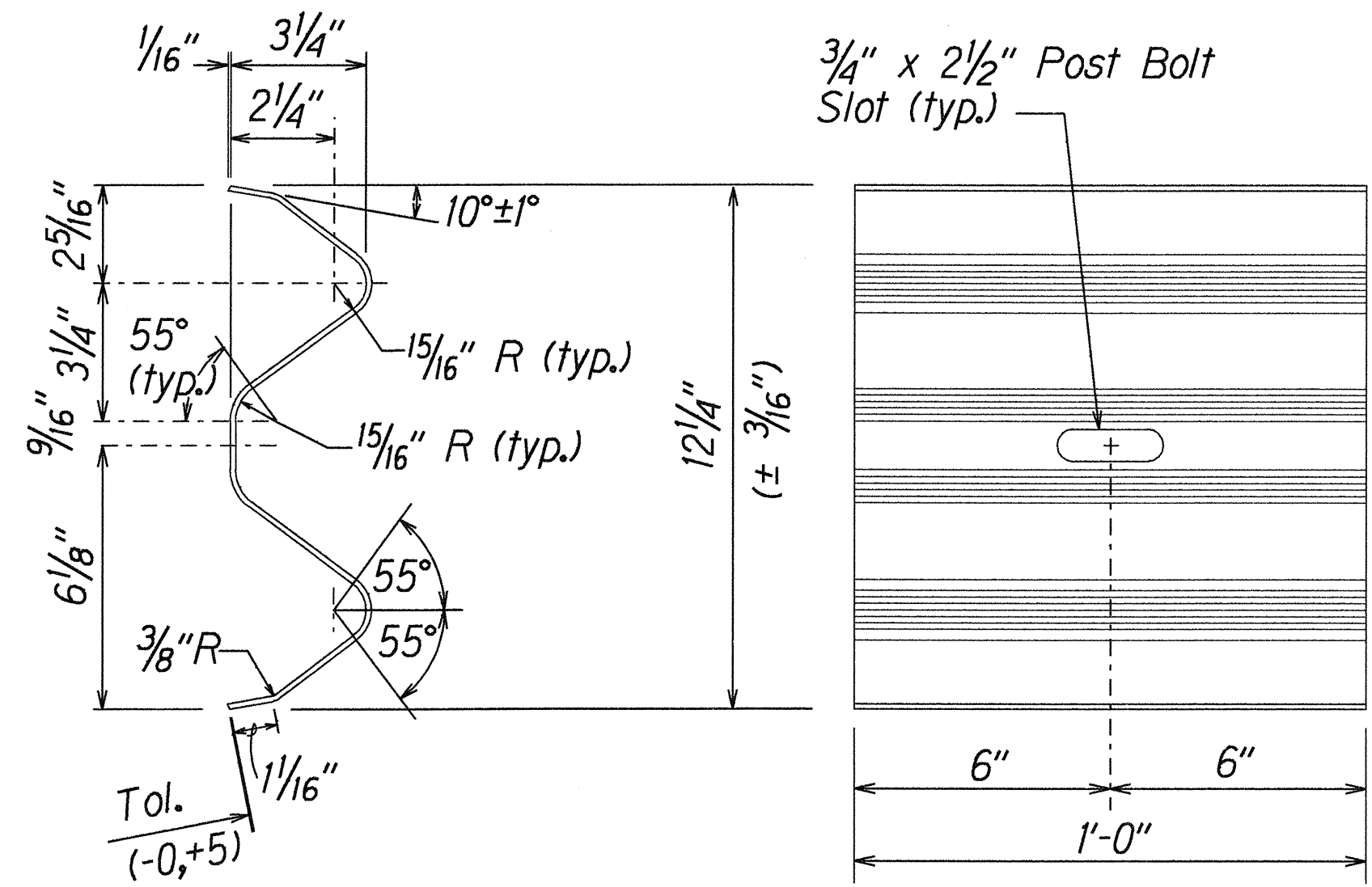
STRONG POST W-BEAM GUARDRAIL WITH
RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT



W-BEAM STRONG POST (PWE01)

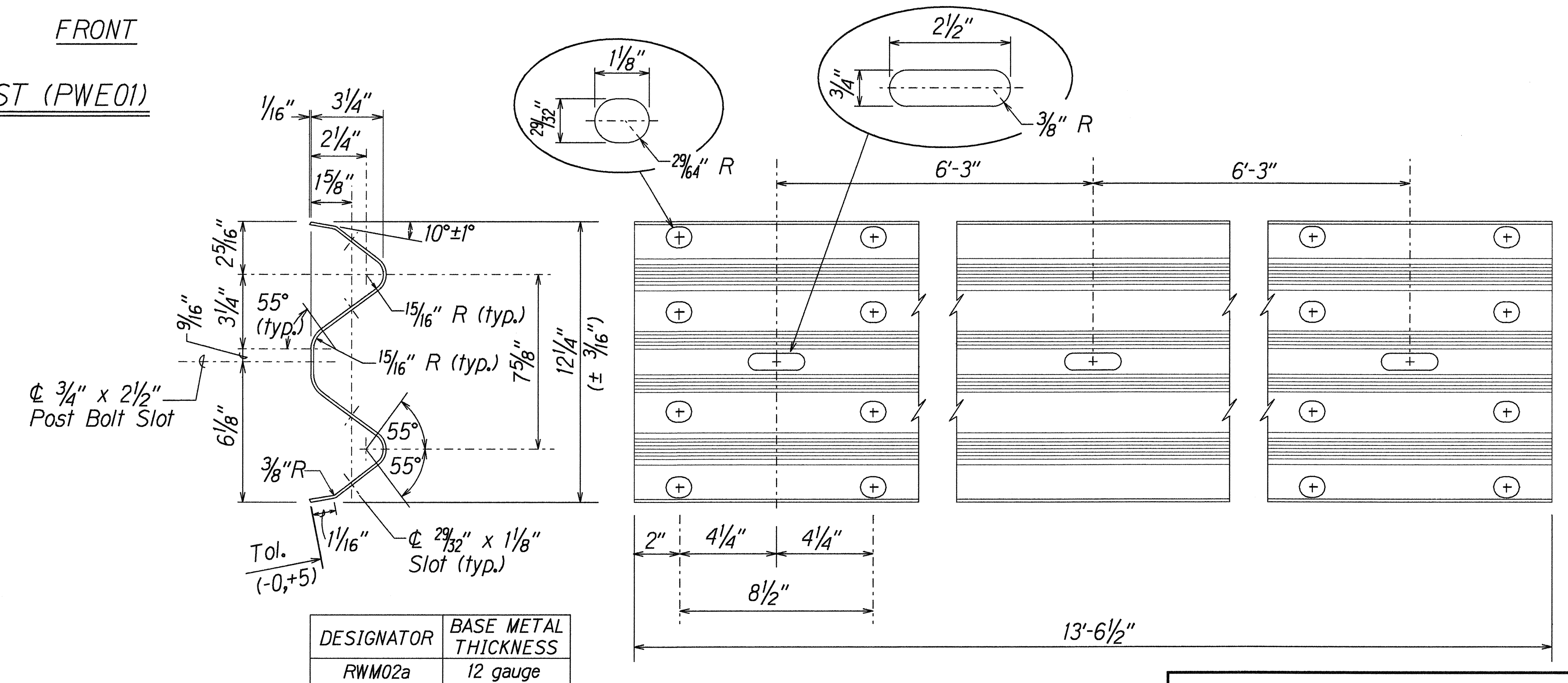


GUARDRAIL BOLTS AND
RECESSED NUT



DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 gauge

W-BEAM BACK-UP-PLATE (RWB01a)



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 gauge

2 SPACE W-BEAM GUARDRAIL (RWM02a)

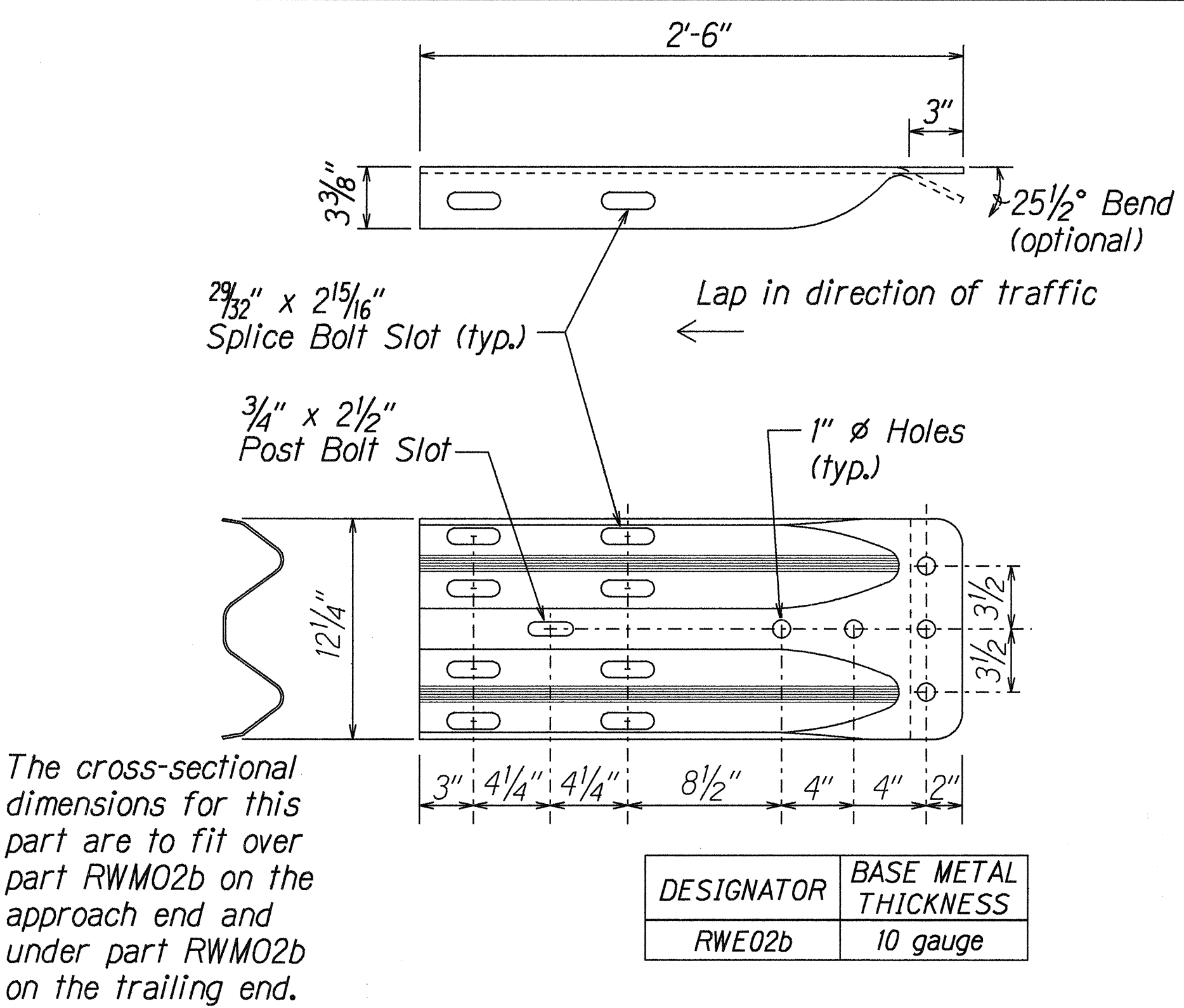
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST W-BEAM GUARDRAIL

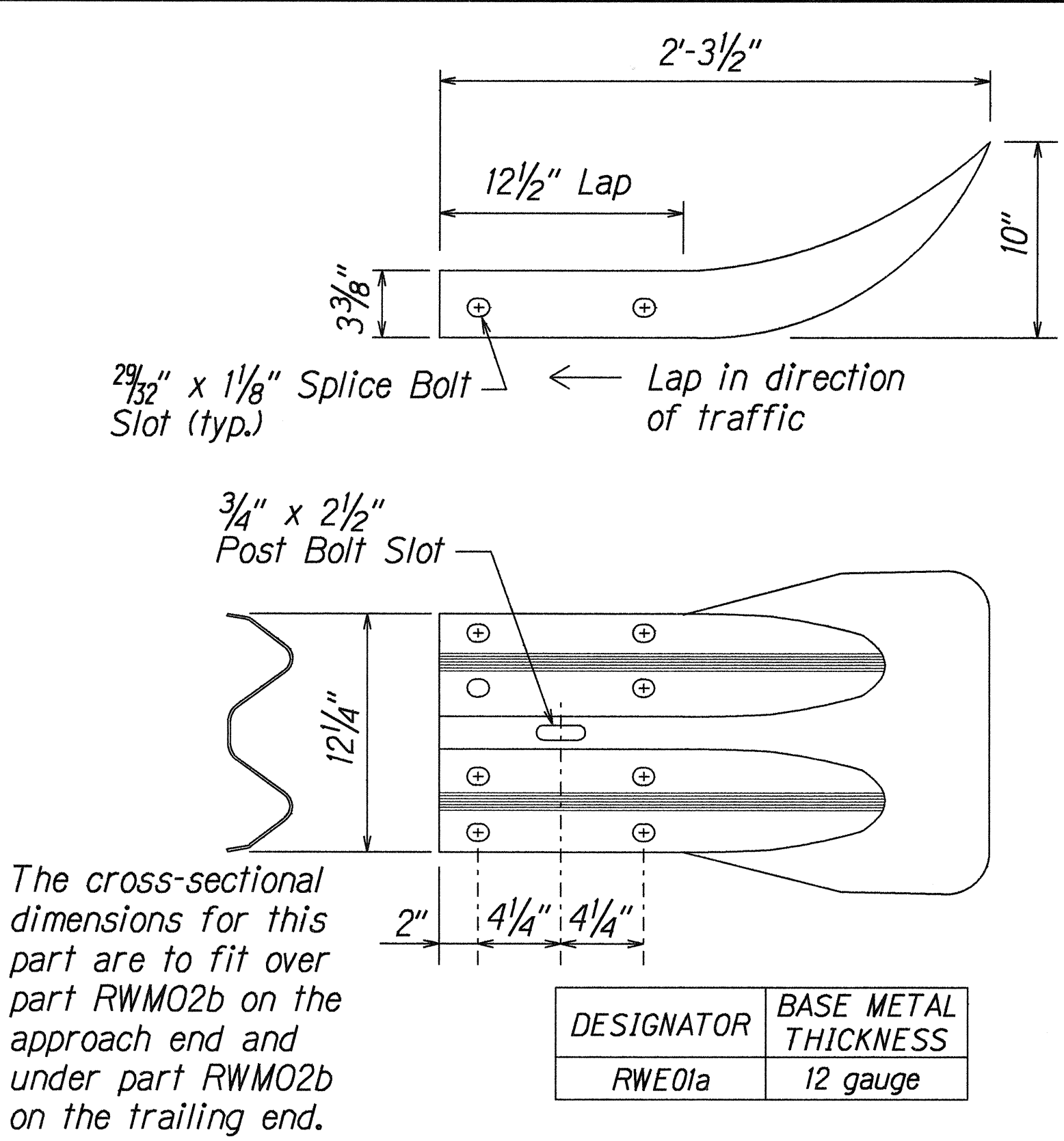
KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 1 OF 3 SHEETS

ORIGINAL PLAN	DATE
DESIGNED BY	
DRAWN BY	
CHECKED BY	
NOTED BY	
APPROVED BY	
DATE	

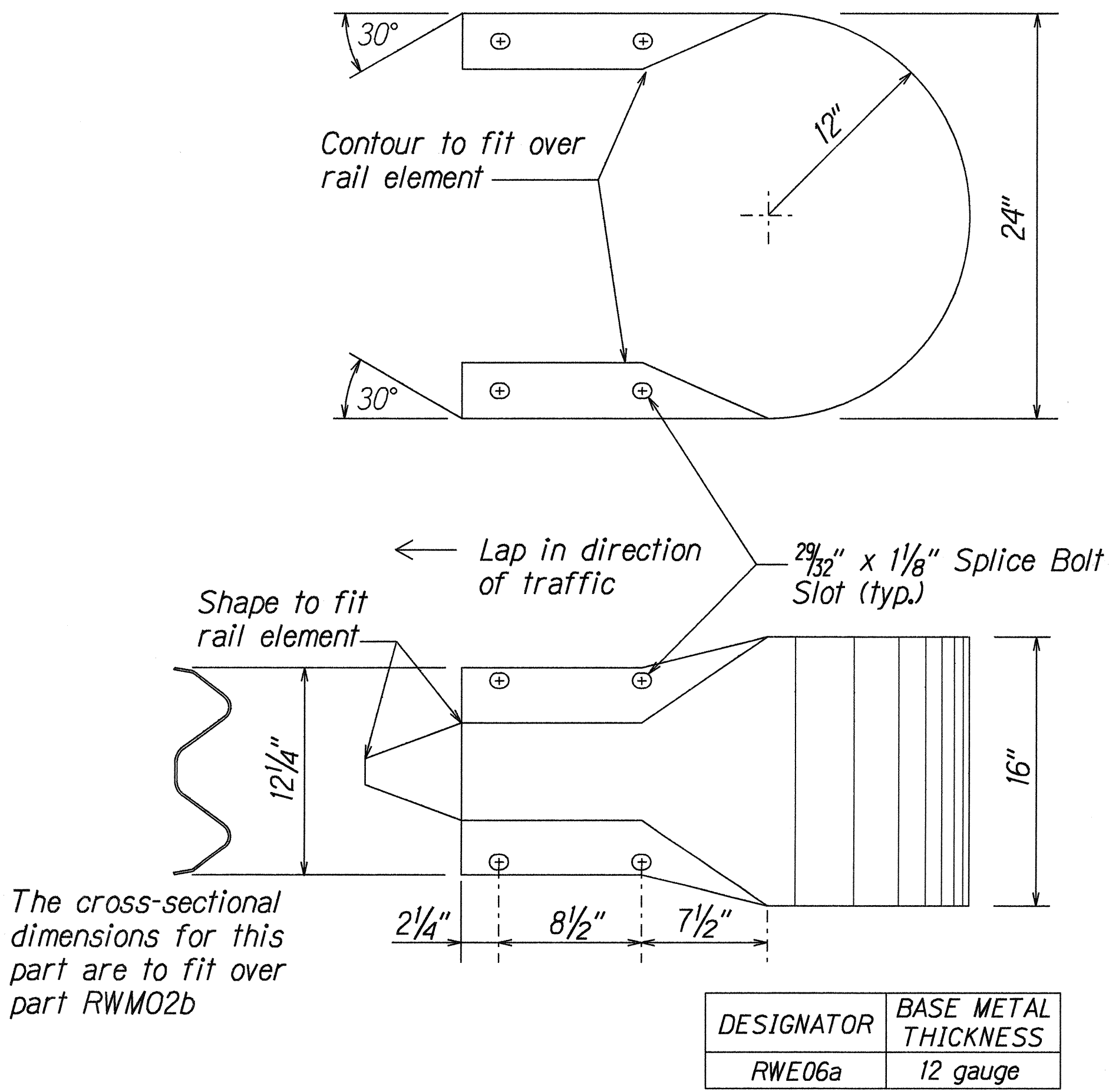
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	37	55



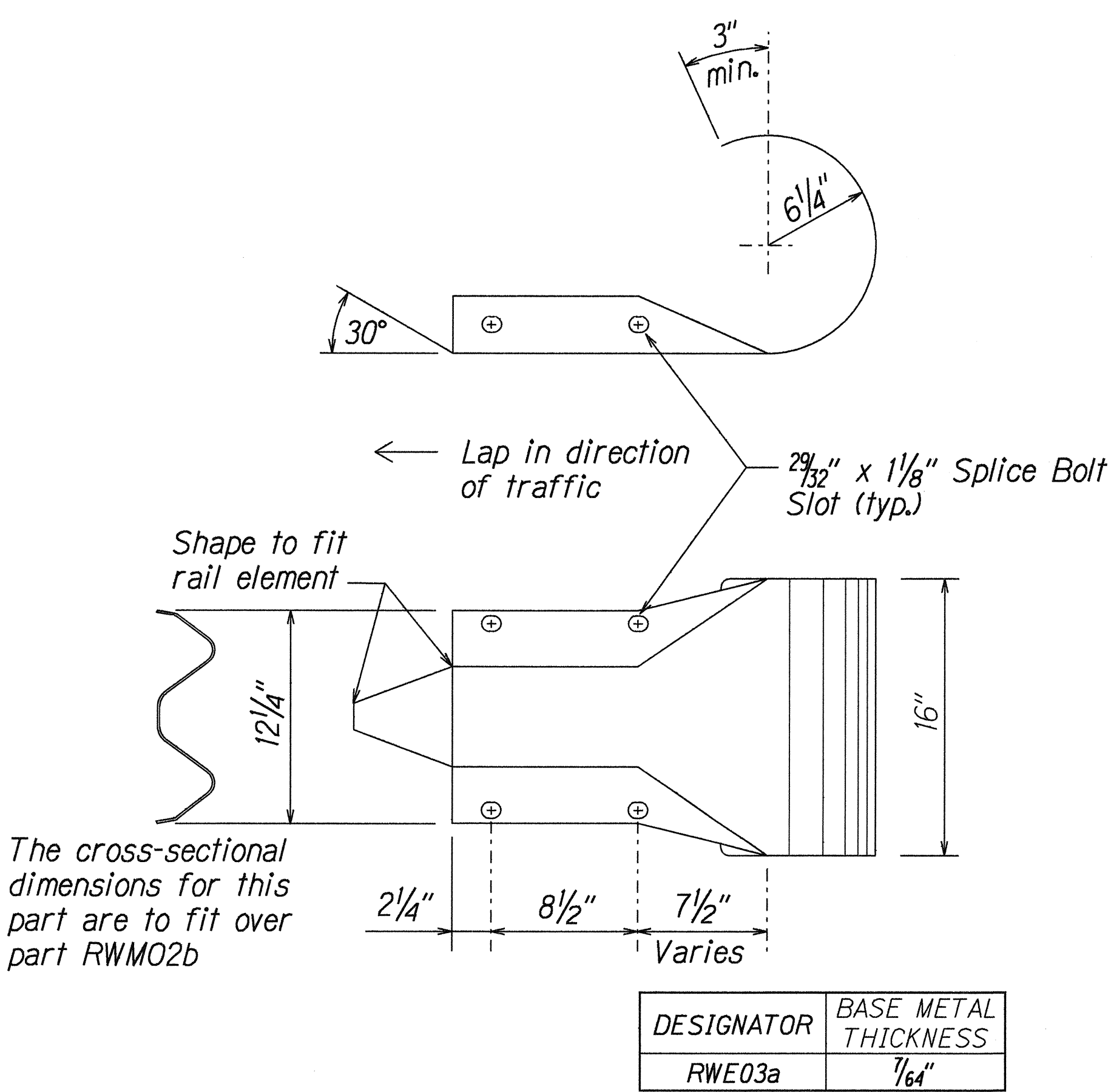
W-BEAM TERMINAL CONNECTOR (RWE02b)



W-BEAM END SECTION (FLARED RWE01a)



W-BEAM END SECTION (BUFFER RWE06a)



W-BEAM END SECTION (ROUNDED RWE03a)

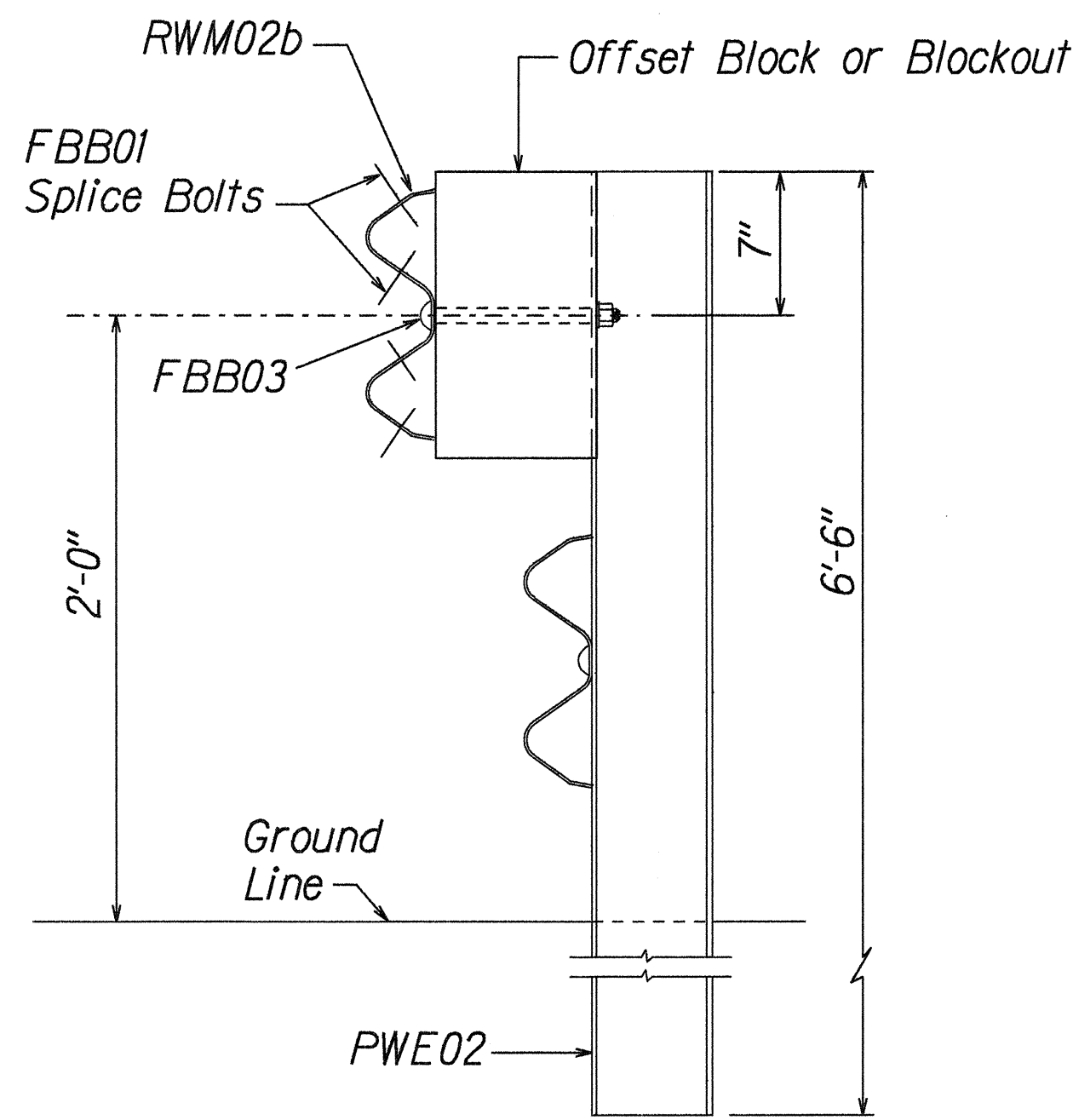
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTED BY	DRAWN BY	
DESIGNED BY	CHECKED BY	
APPROVED BY		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

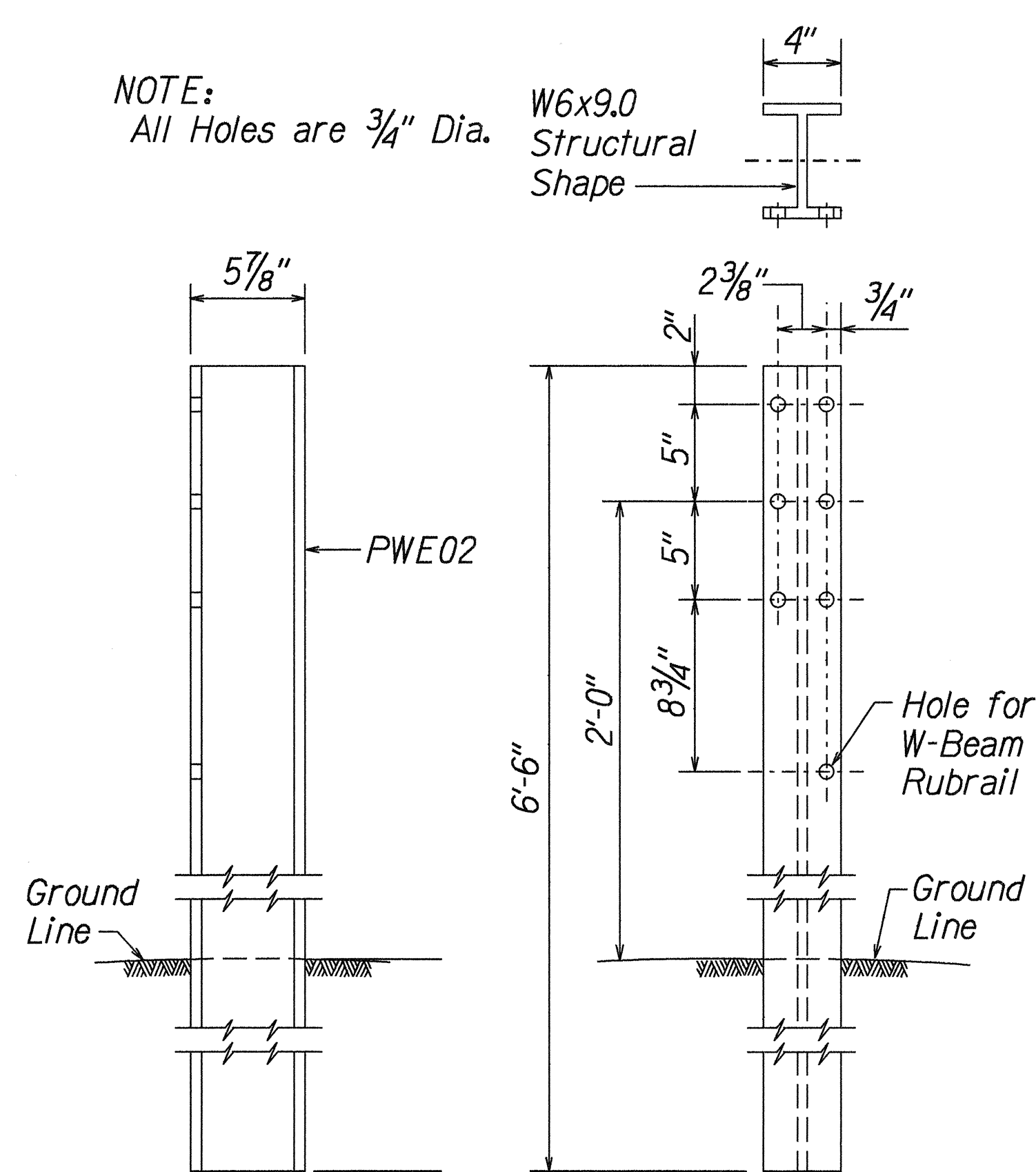
STRONG POST W-BEAM GUARDRAIL

KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 2 OF 3 SHEETS

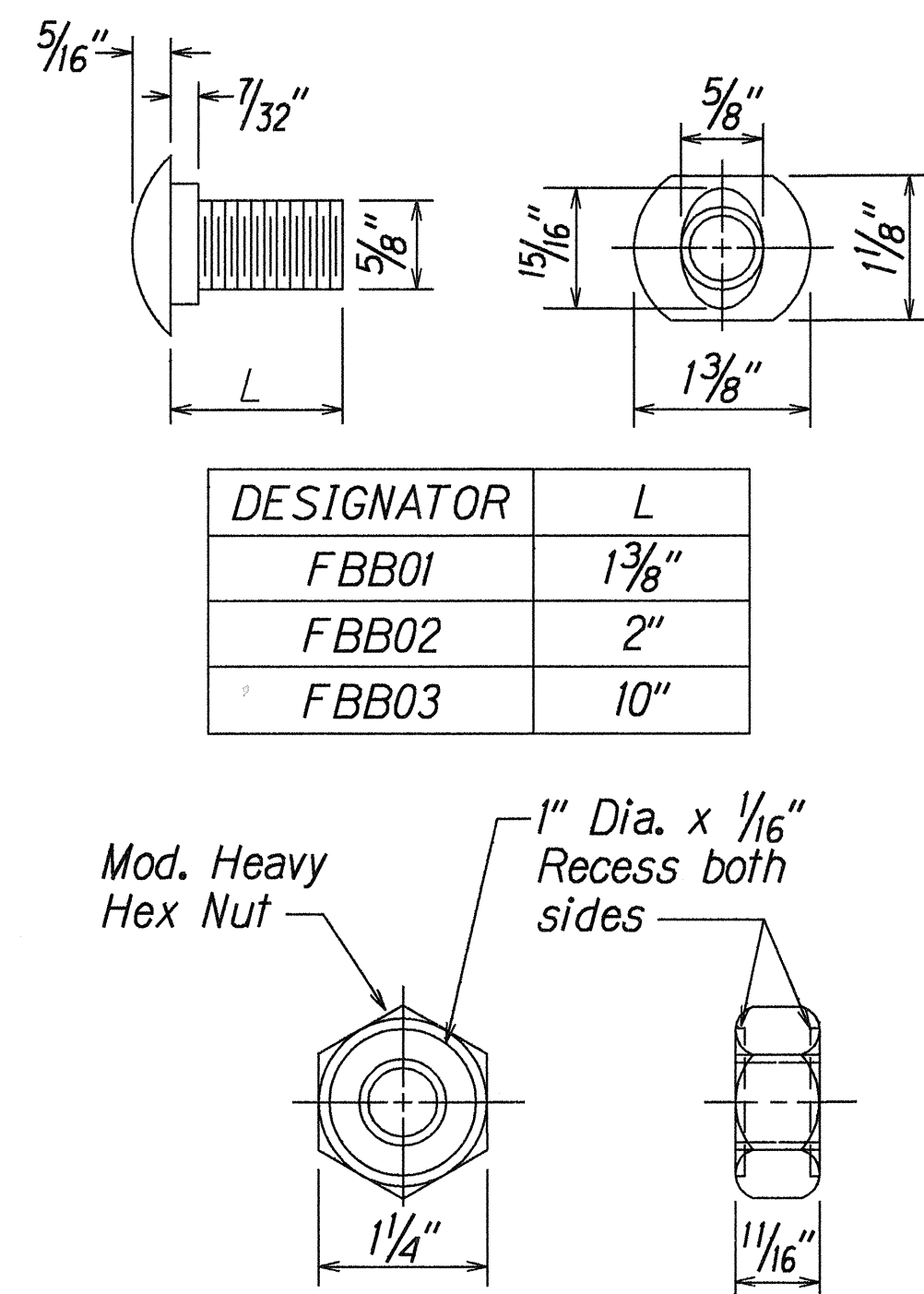
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	38	55



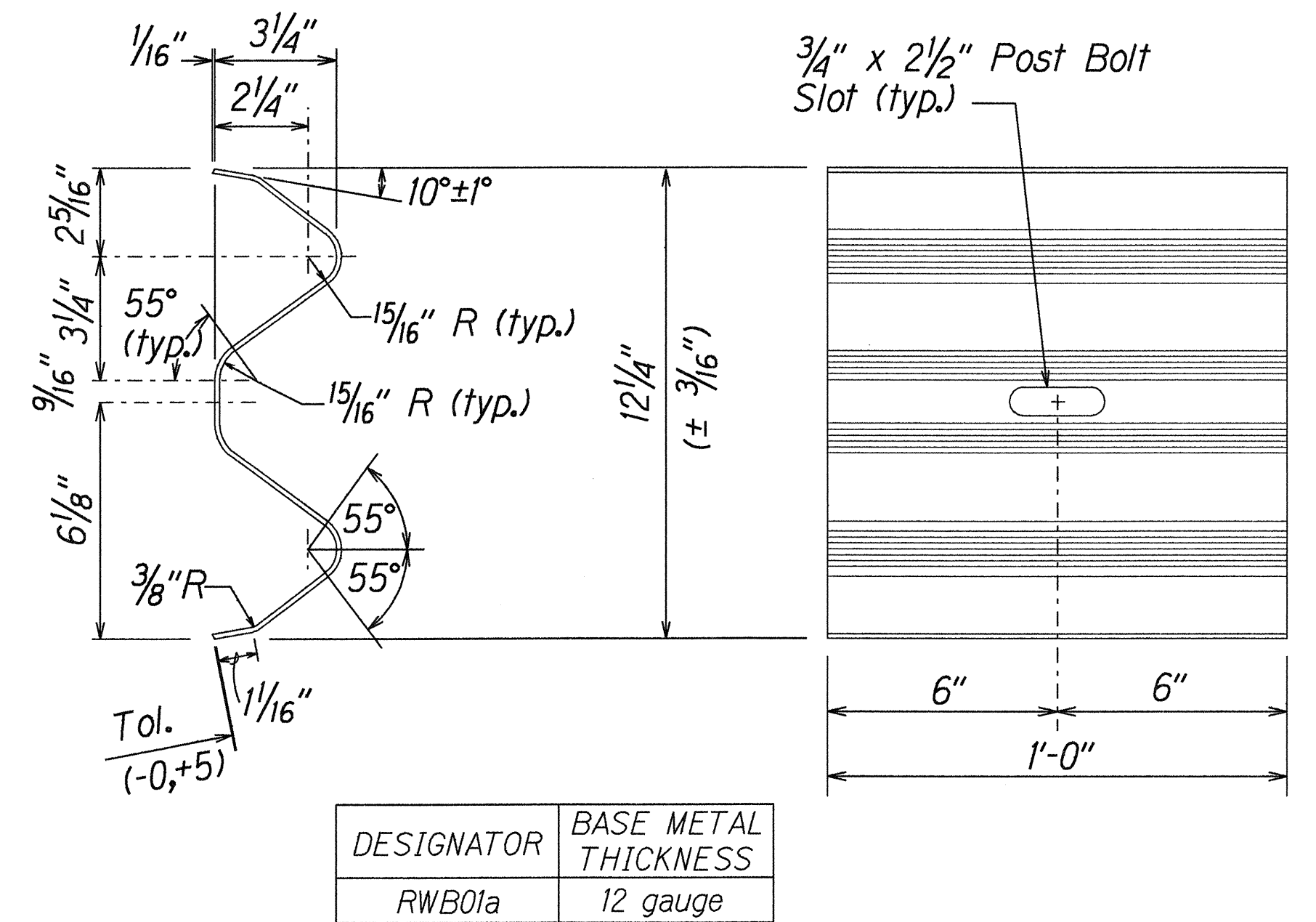
ELEVATION
STRONG POST RUBRAIL
(W-BEAM) GUARDRAIL



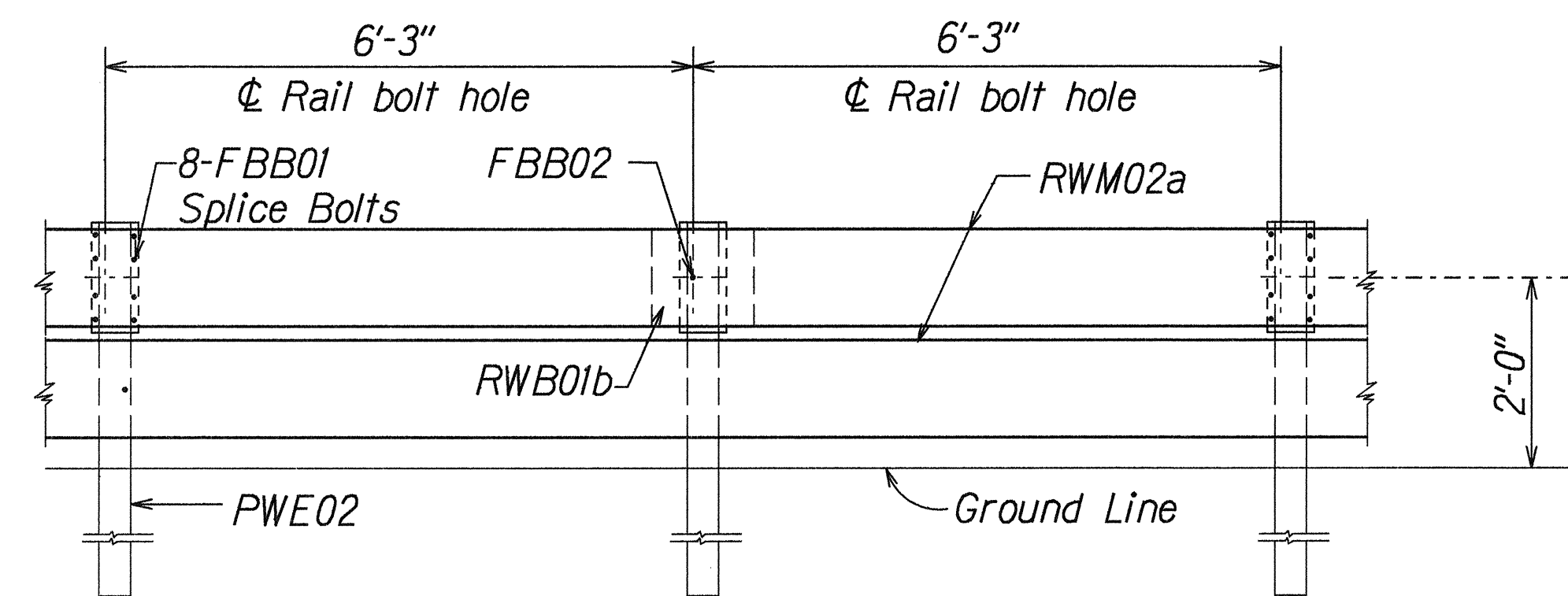
SIDE
FRONT
W-BEAM STRONG POST (PWE02)



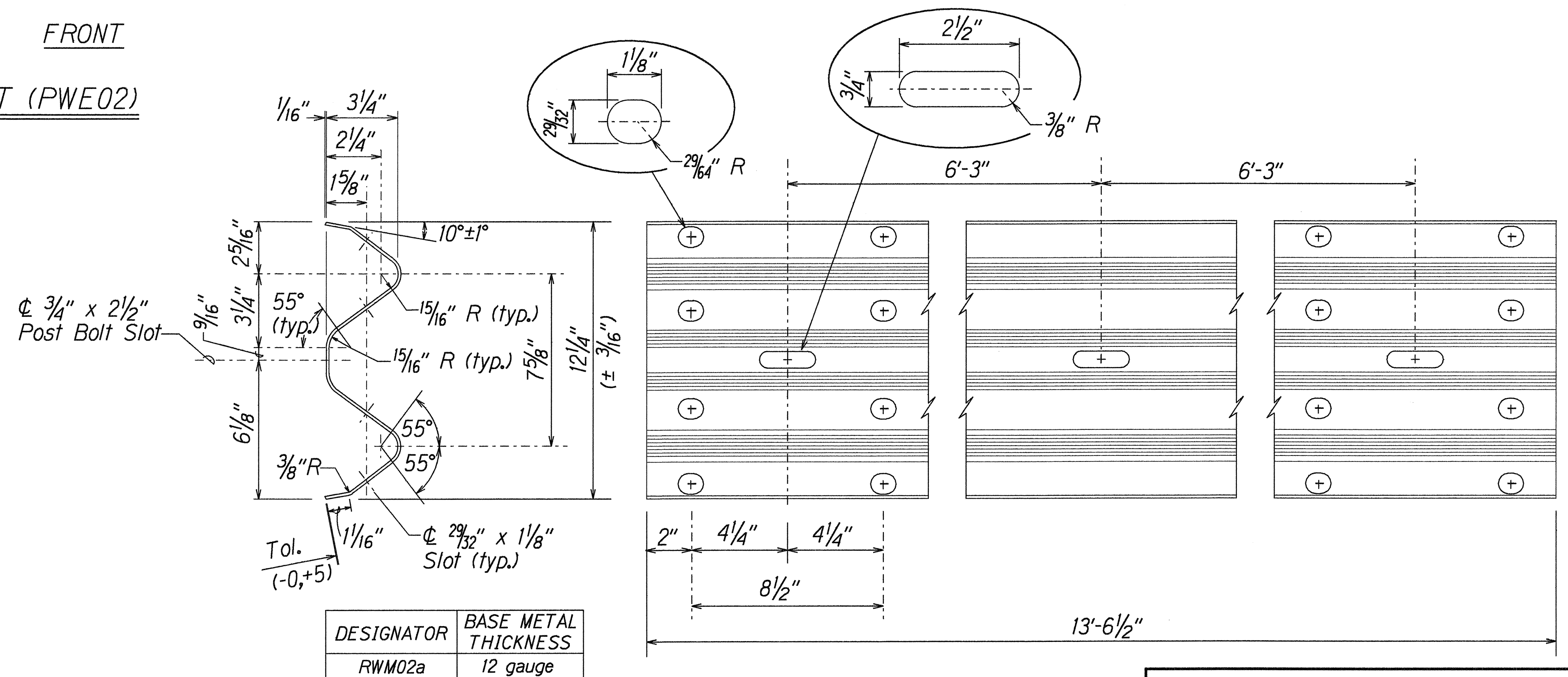
GUARDRAIL BOLTS AND
RECESSED NUT



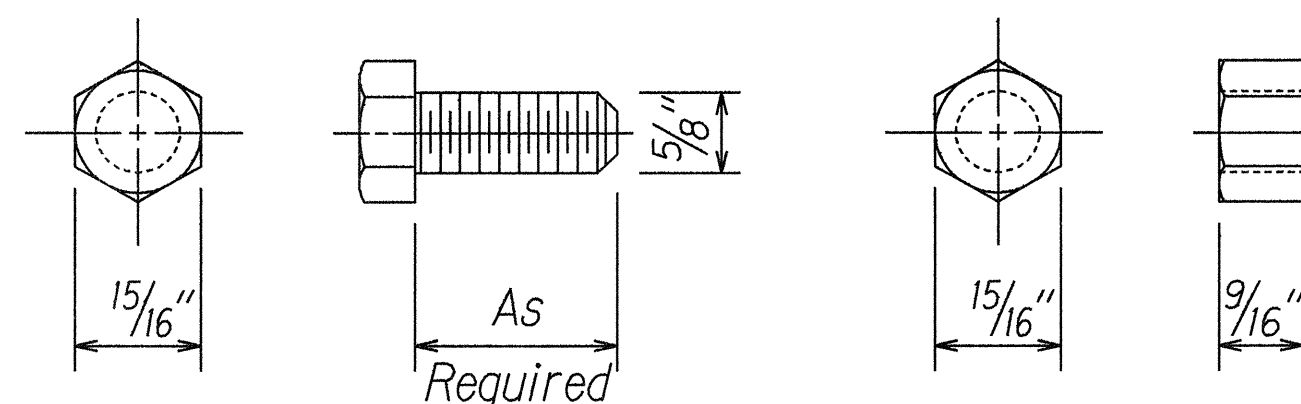
W-BEAM BACK-UP-PLATE (RWB01a)



ELEVATION
STRONG POST RUBRAIL (W-BEAM) GUARDRAIL WITH
RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT



2 SPACE W-BEAM GUARDRAIL (RWM02a)

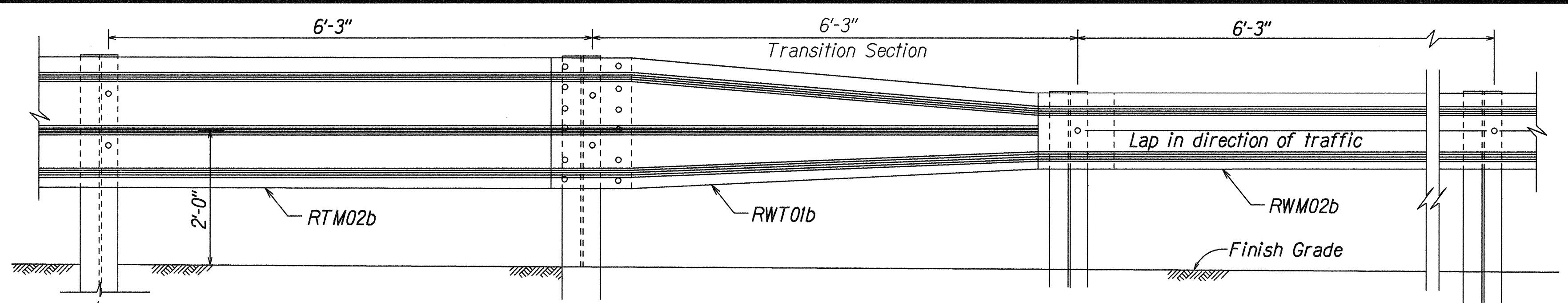


HEX BOLT & NUT (FBX16a)

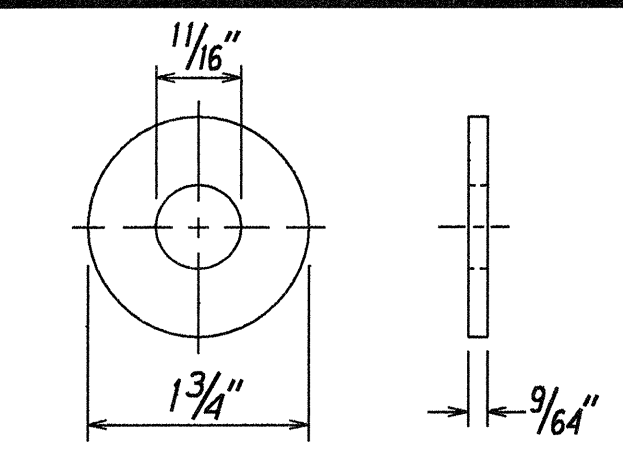
ORIGINAL PLAN	DATE	BY
SURVEY PLOTTED BY		
DRAWN BY		
NOTES BOOK		
DESIGNED BY		
CHECKED BY		
BY		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRONG POST RUBRAIL
(W-BEAM) GUARDRAIL
KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 3 OF 3 SHEETS

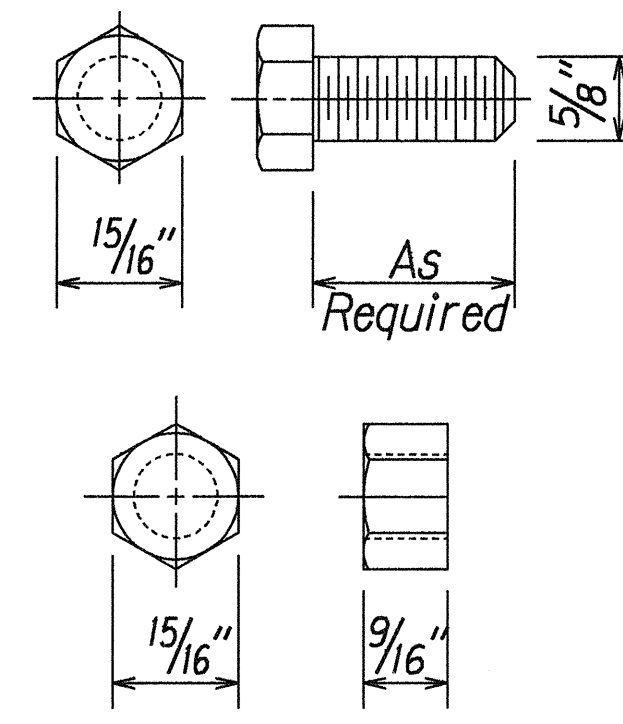
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	39	55



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



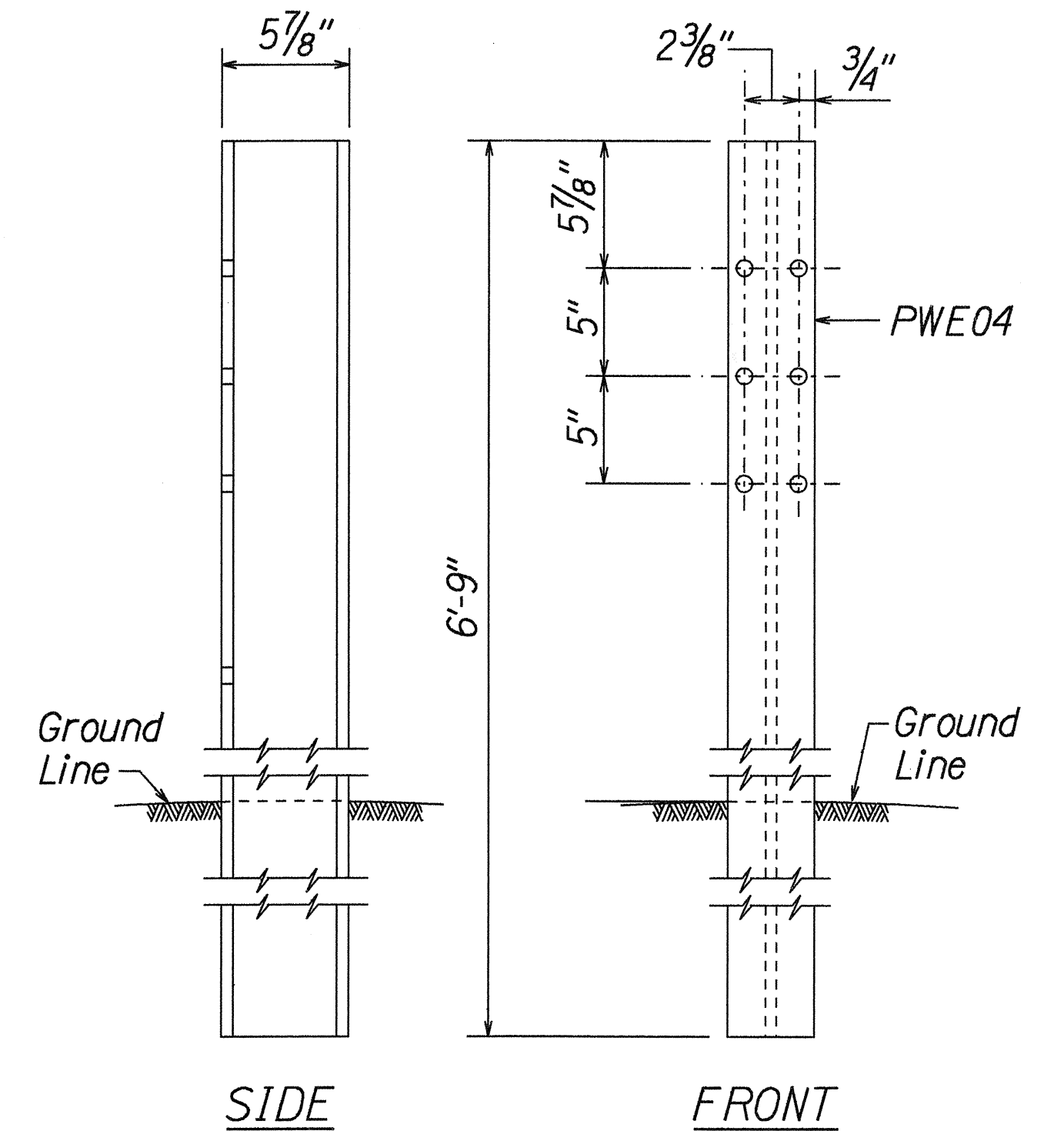
STEEL WASHER
FOR 5/8" BOLT



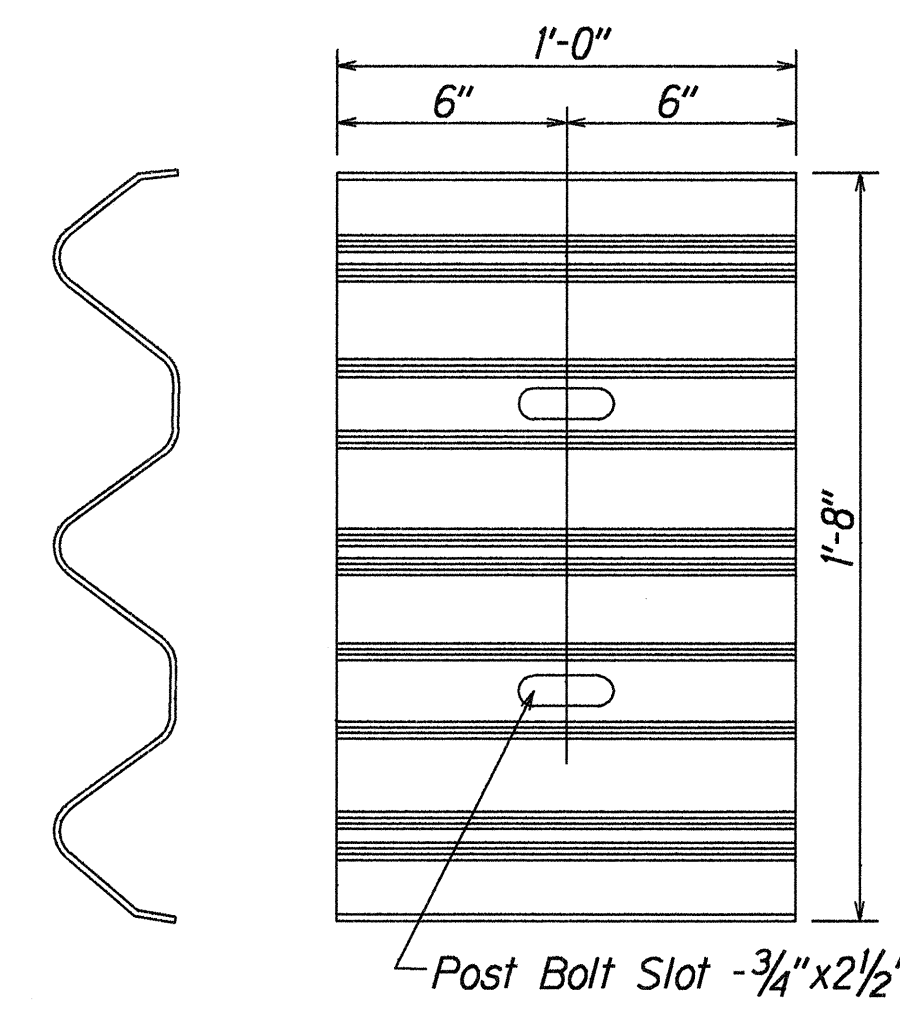
HEX BOLT & NUT
(FBX16a)

NOTE:
All Holes are
3/4" Dia.

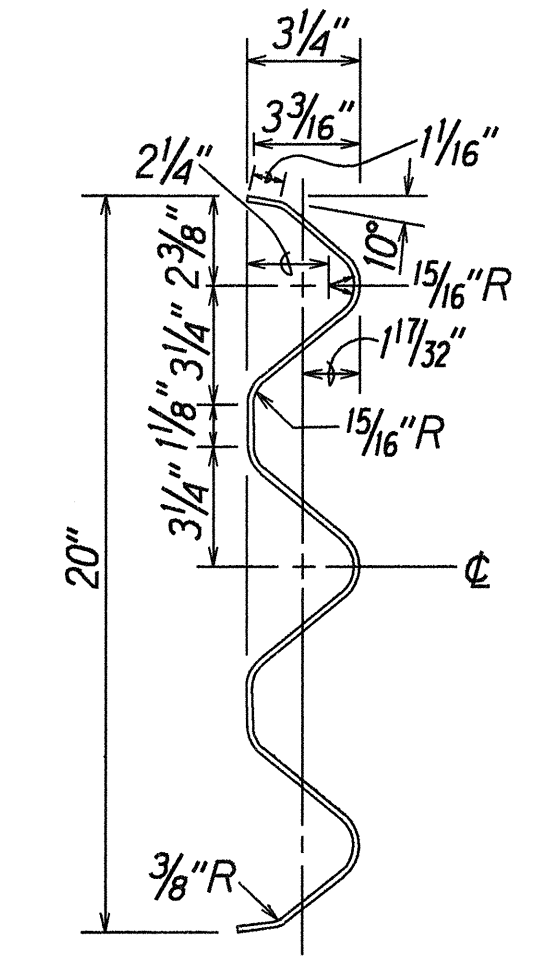
W6x9.0
Structural
Shape



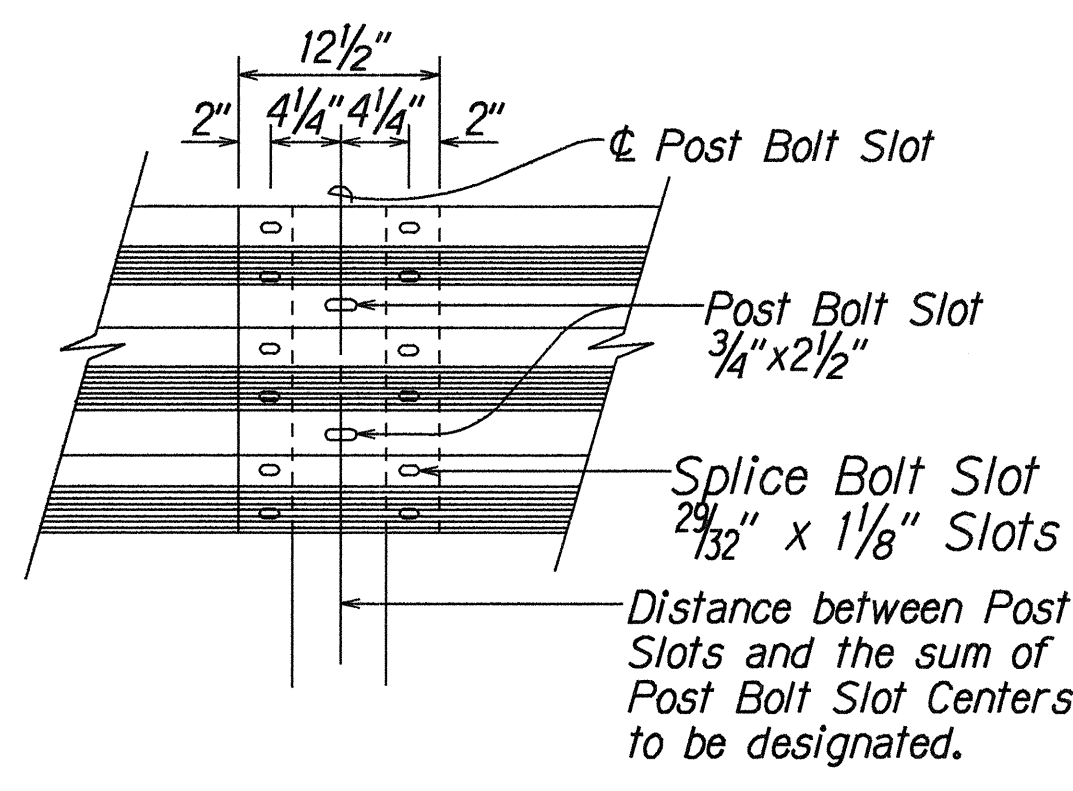
W-BEAM STRONG POST (PWE04)



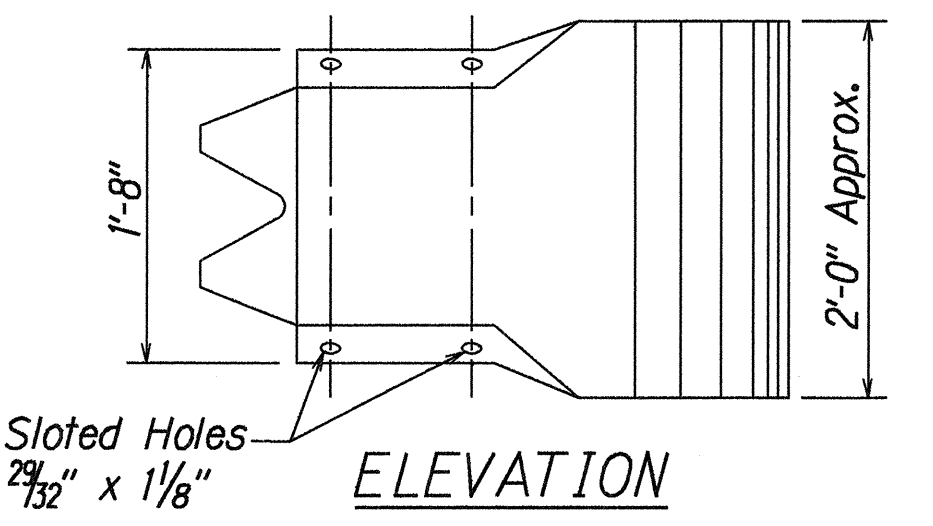
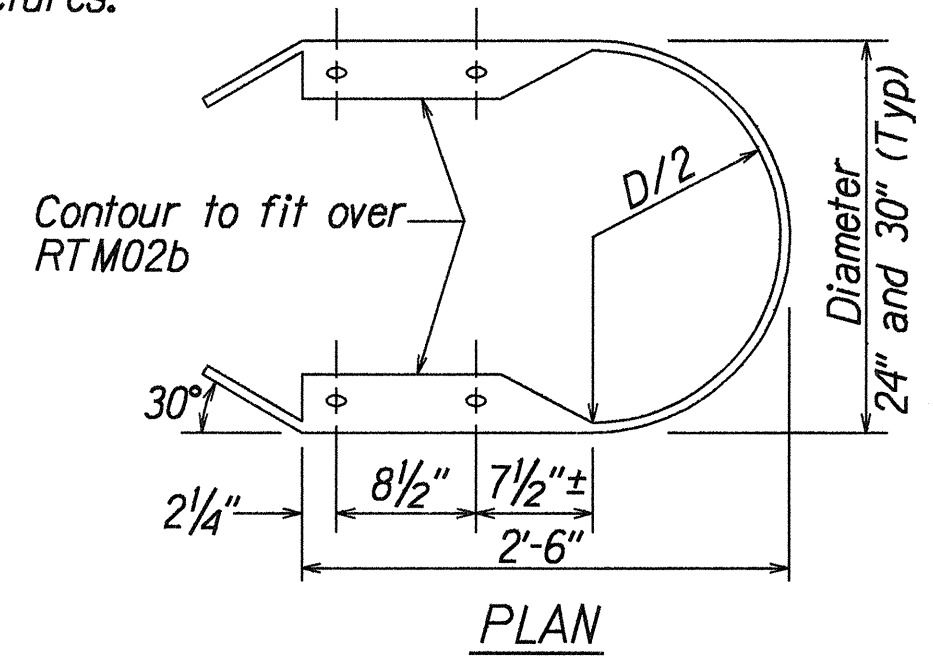
BACKUP PLATE
(RTB01b)
(Use at Posts where
Splices do not occur)



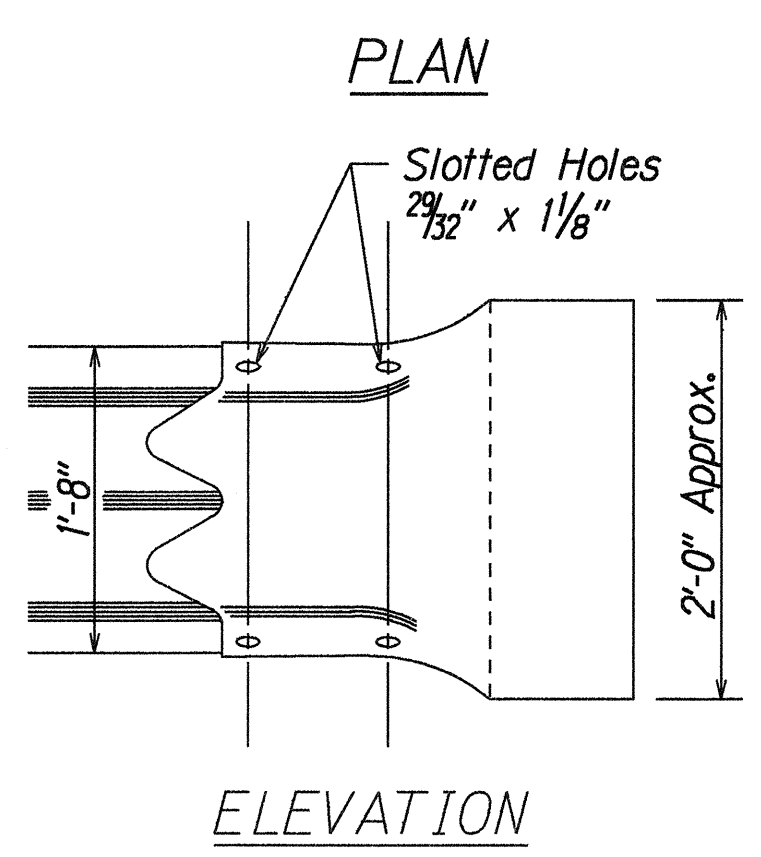
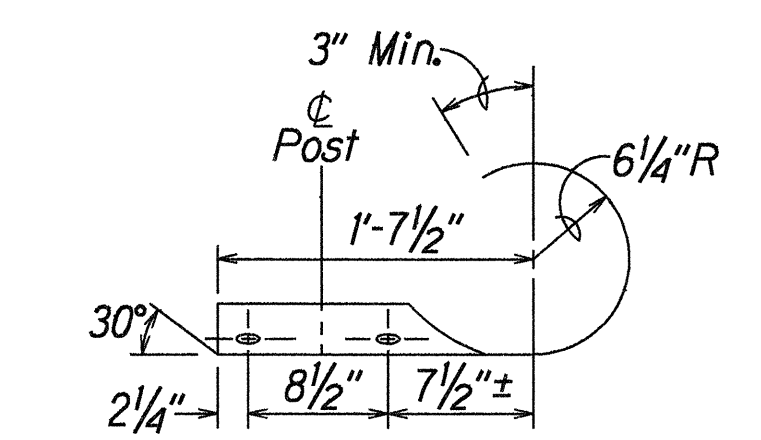
SECTION THRU
RAIL ELEMENT
(RTM02b)



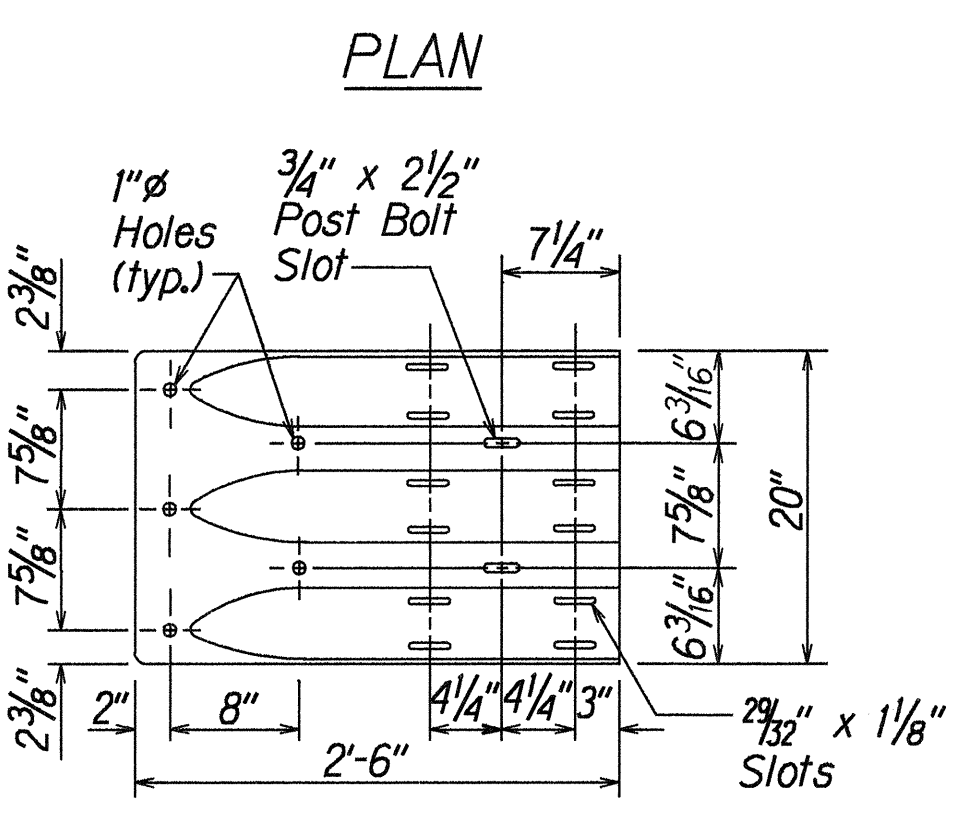
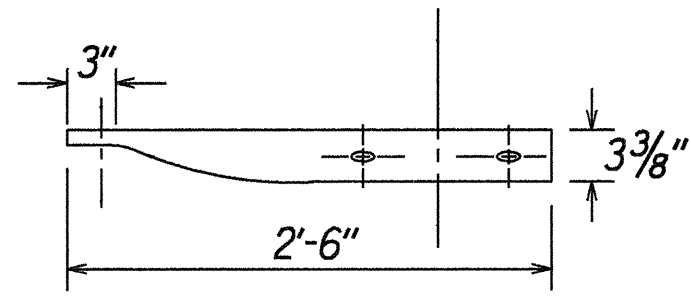
RAIL SPLICE



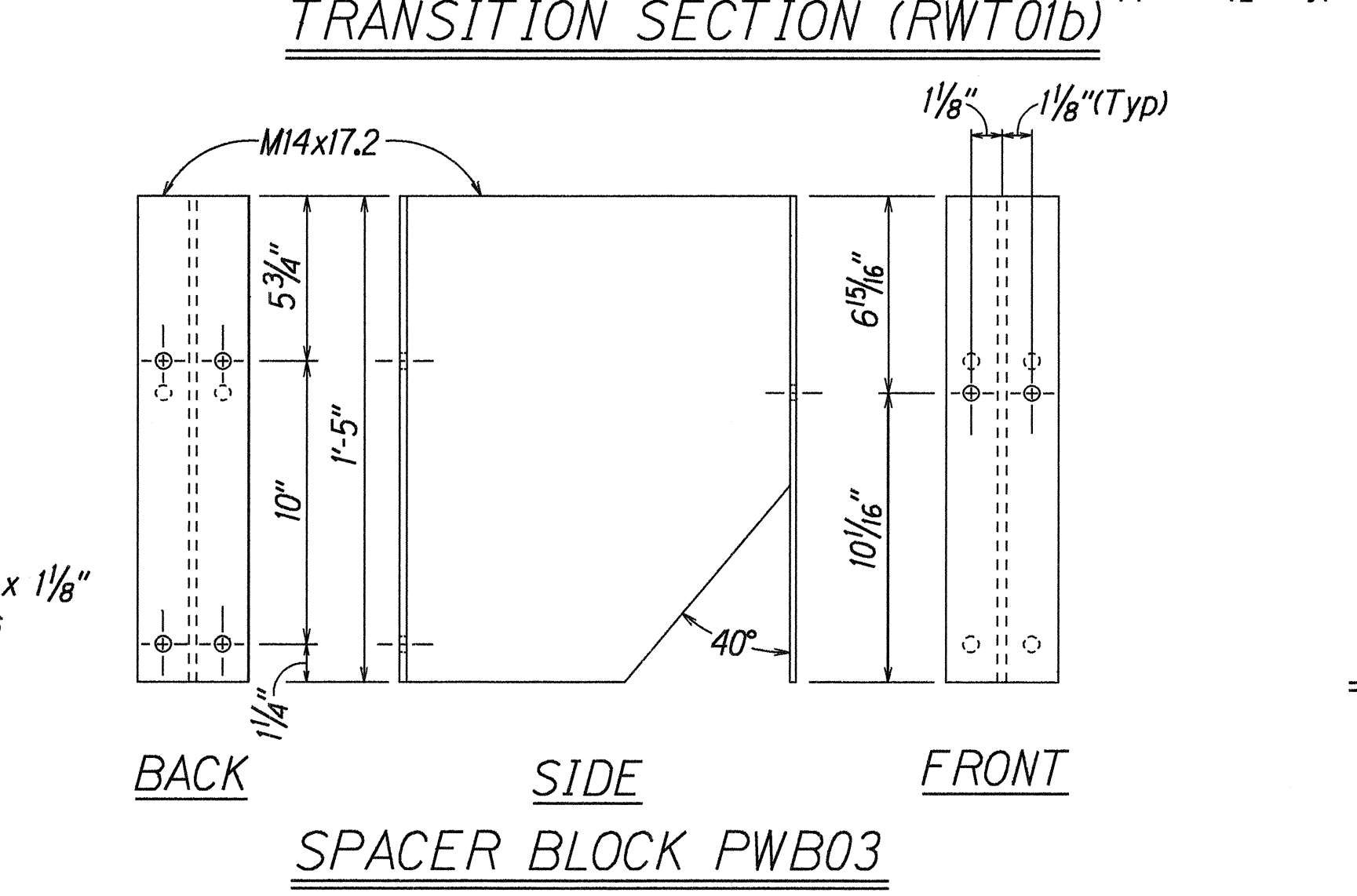
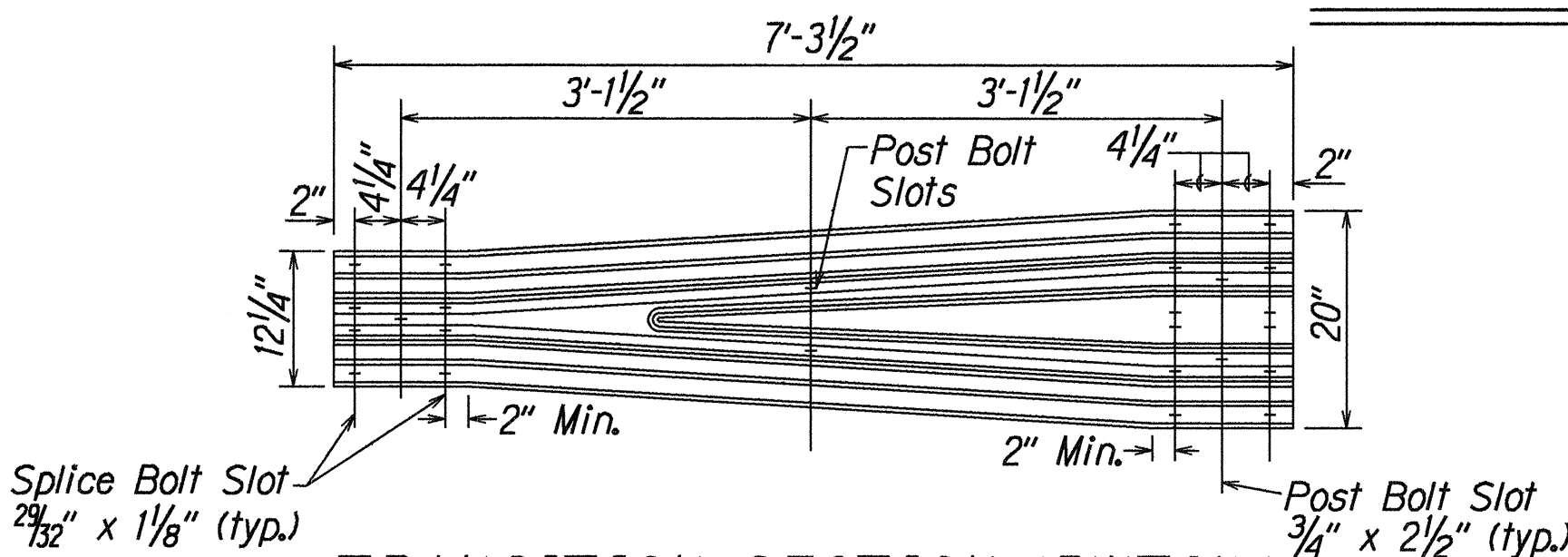
END SECTION (BUFFER RTE03b
or RTE04b)



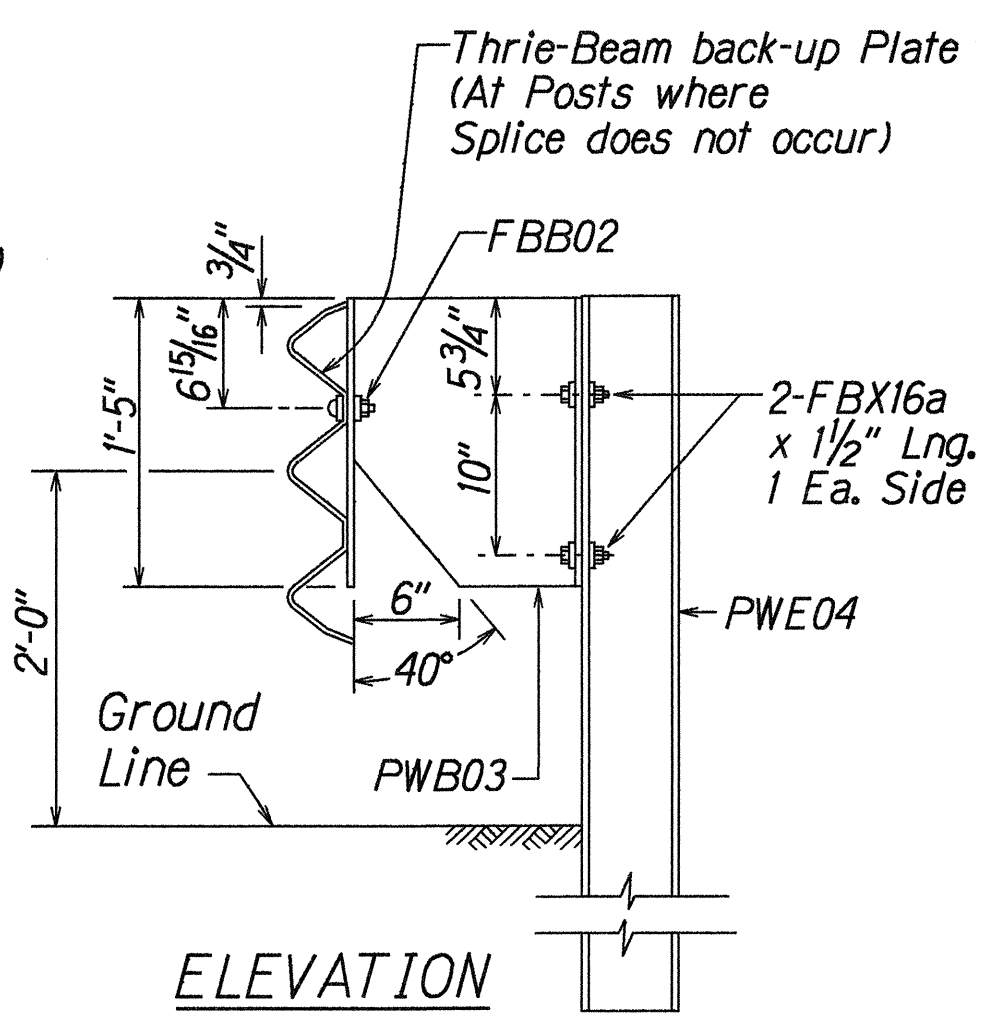
SECTION (ROUNDED)
(RTE02b)



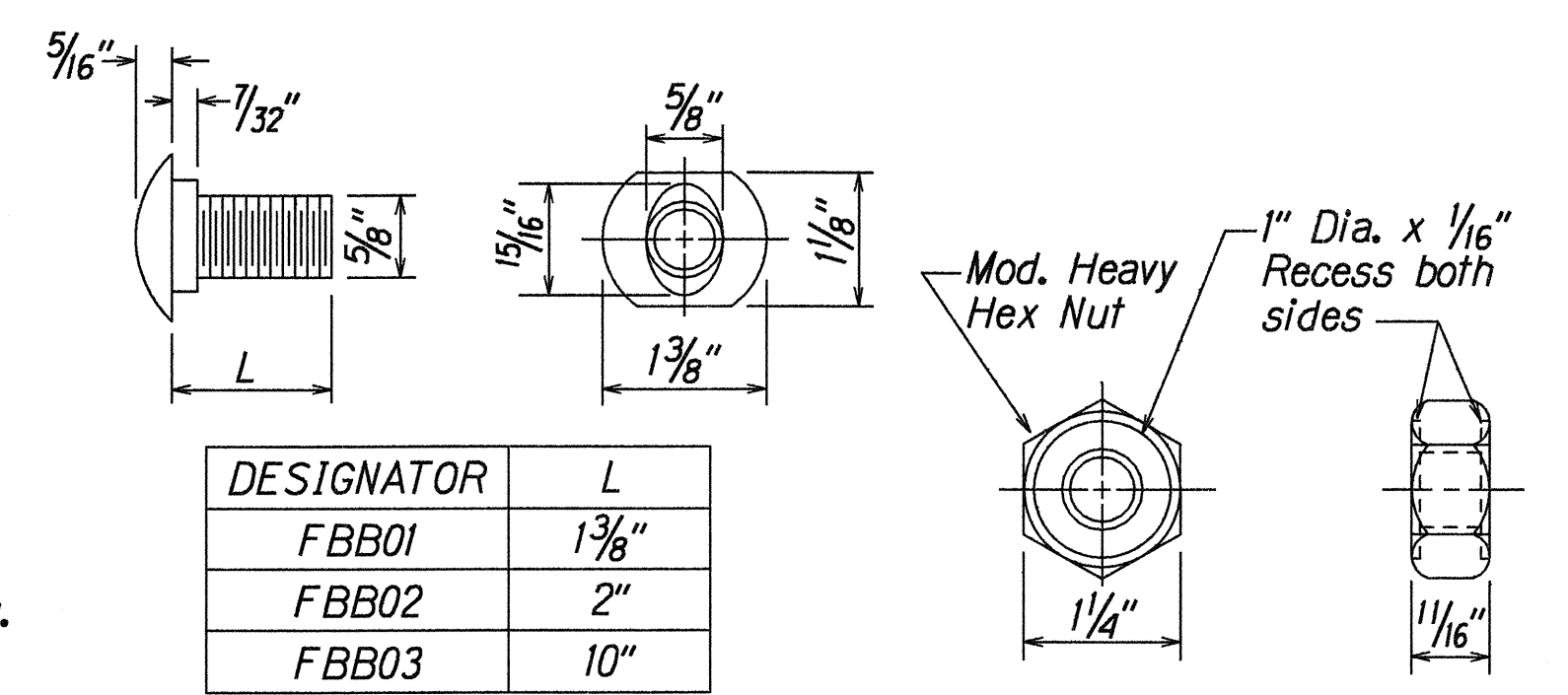
TERMINAL CONNECTOR
(RTE01b)



SPACER BLOCK PWB03



STRONG POST MODIFIED
THRIE-BEAM GUARDRAIL
(SGR09b)



DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

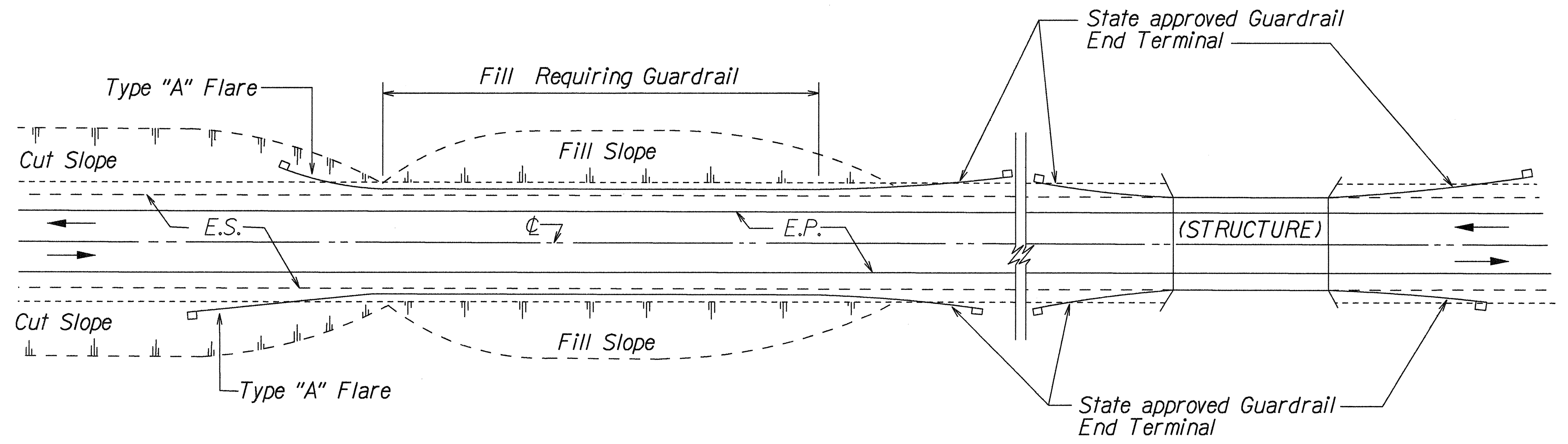
GUARDRAIL BOLTS AND RECESSED NUT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST MODIFIED
THRIE-BEAM GUARDRAIL
KEA'AU-PAHOA ROAD
PARADISE PARK SECTION-PHASE II # III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 1 OF 1 SHEETS

ORIGINAL PLAN	DATE	BY
DRAWN BY		
NOTED BY		
CHECKED BY		
QUANTITIES BY		
4/20/05		
No. 1		

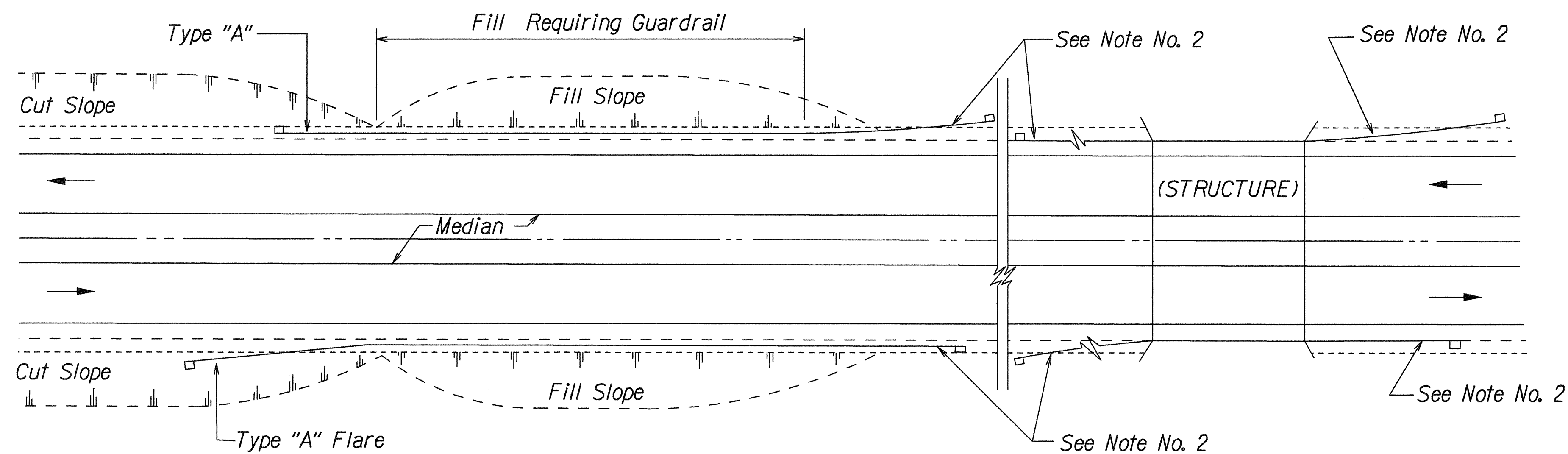
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	40	55



PLAN
TWO WAY ROADWAY

NOTES:

1. Metal Guardrail connection to concrete structures requires End Post Connection. See Structure Plans.
2. Depending on the existing field conditions, the Engineer shall determine which guardrail end terminal should be installed.
3. Refer to State's most current approved Product List for NCHRP 350 approved Guardrail End Terminals.



PLAN
ONE WAY ROADWAY (DIVIDED HIGHWAY)

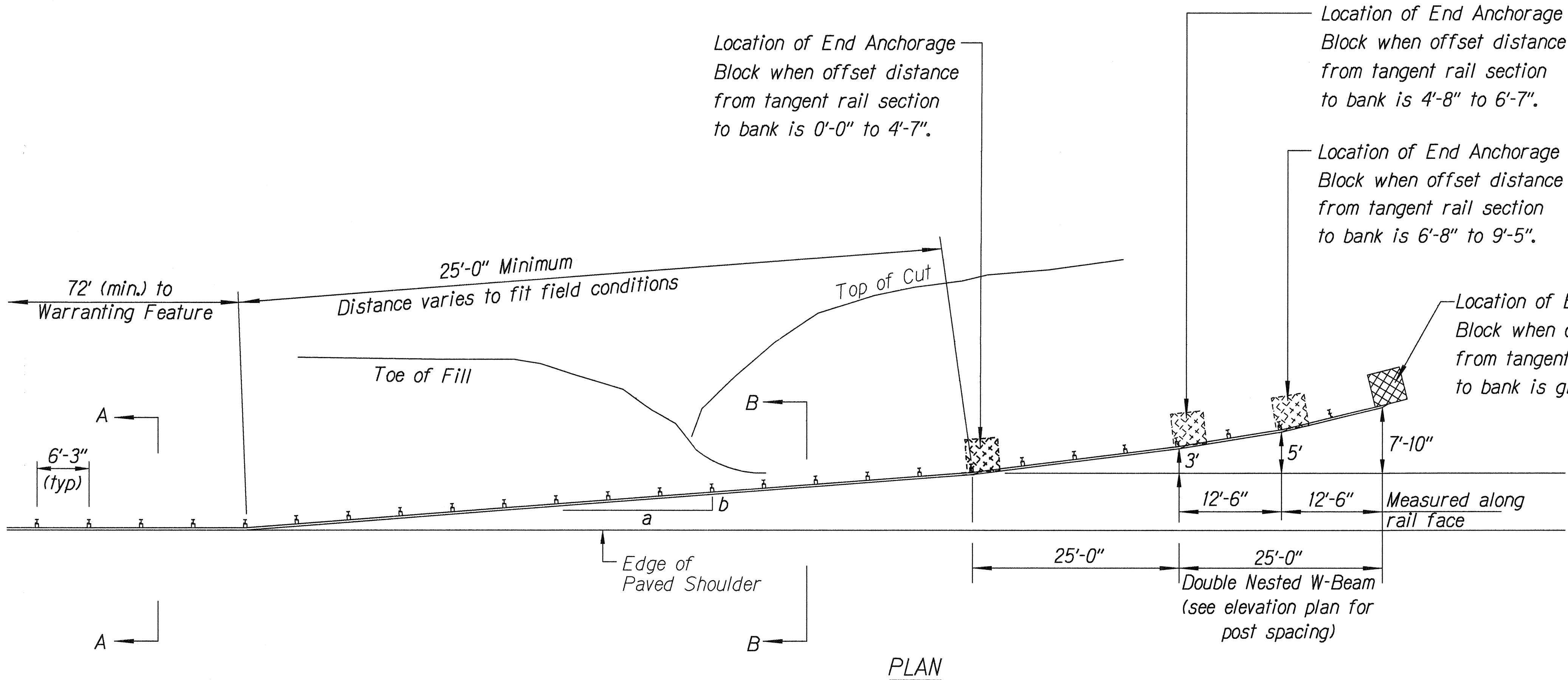
ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NOTED BY	
DATE	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
GUARDRAIL DETAILS
APPROACH END FLARE
KEA'AU-PAHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 1 OF 1 SHEETS

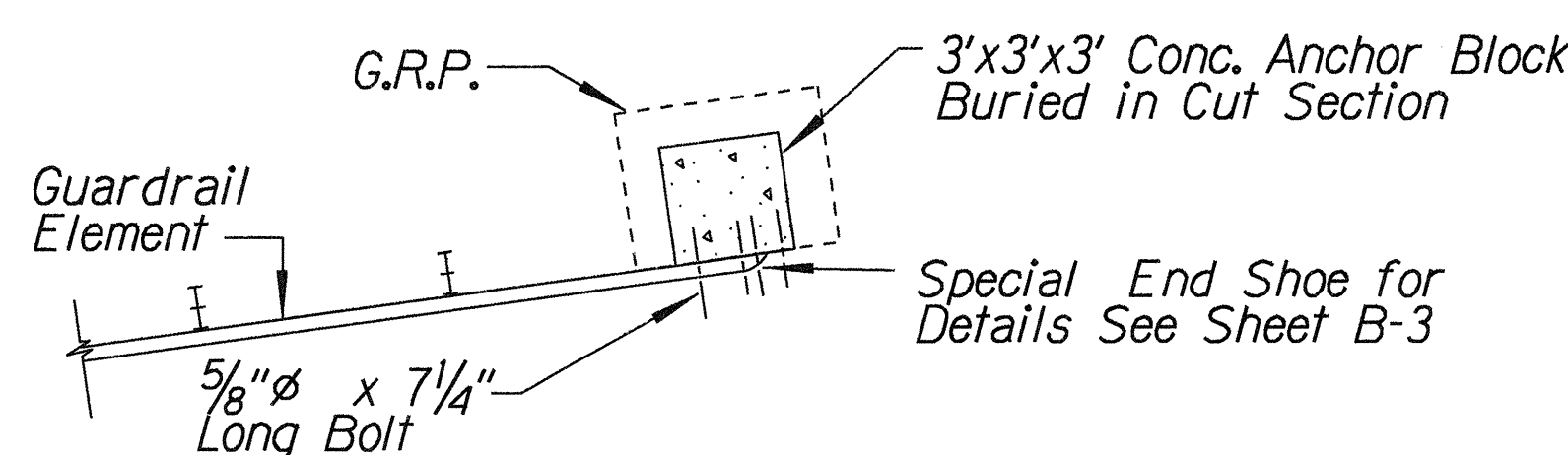
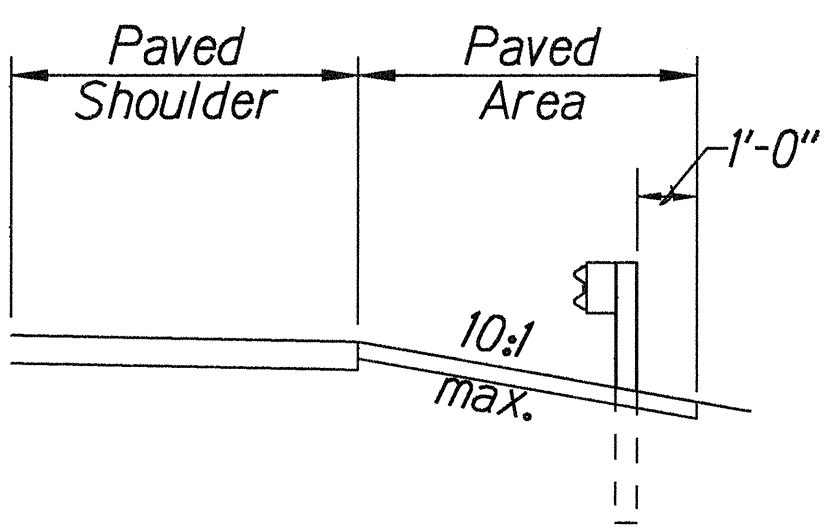
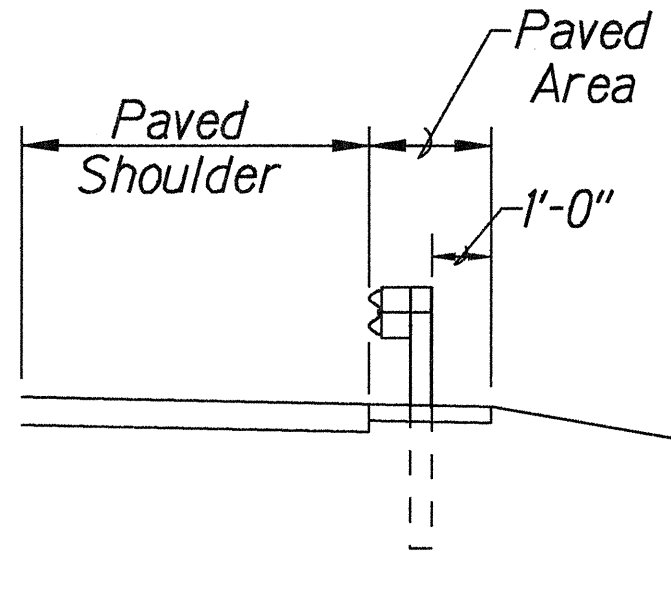
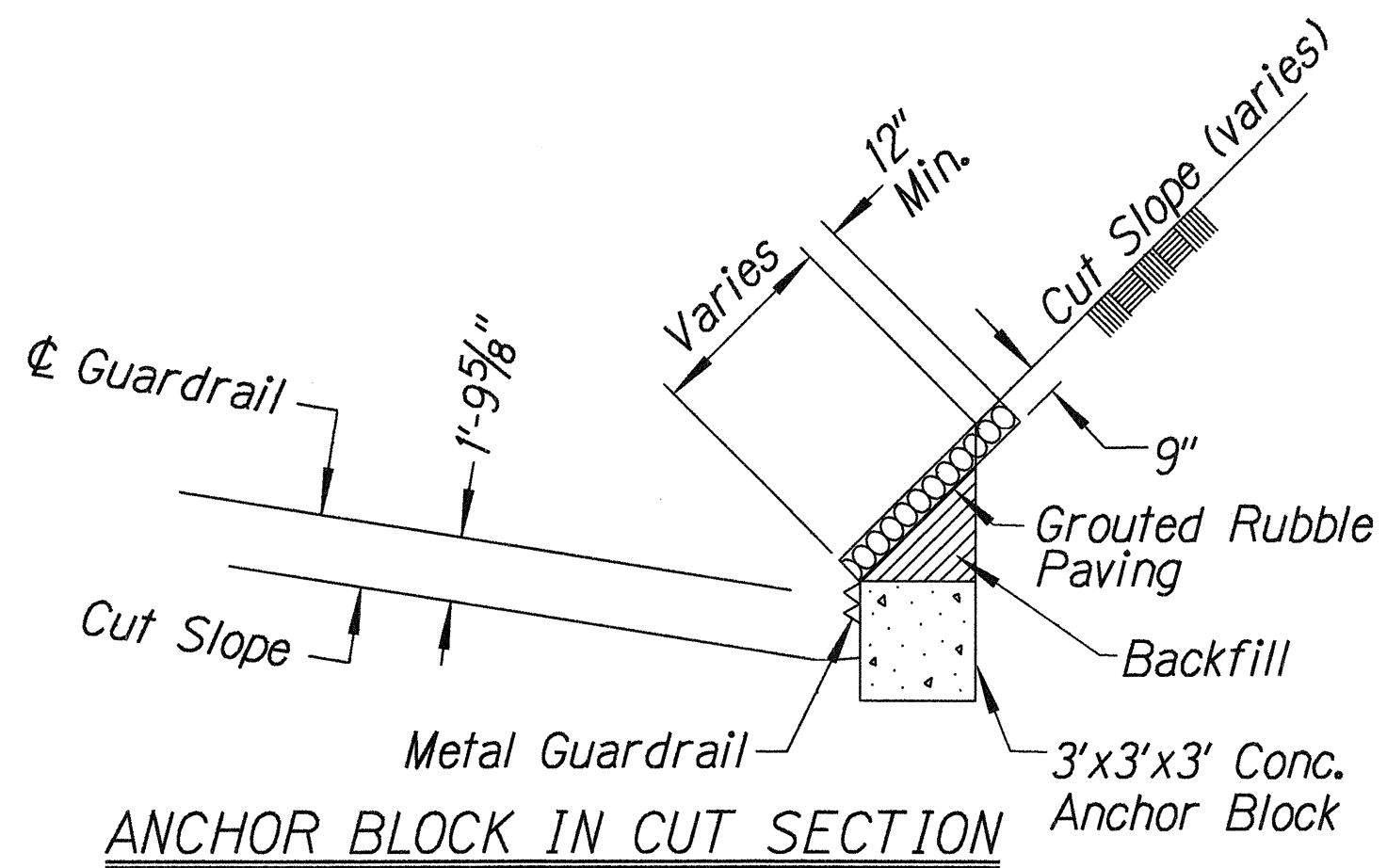
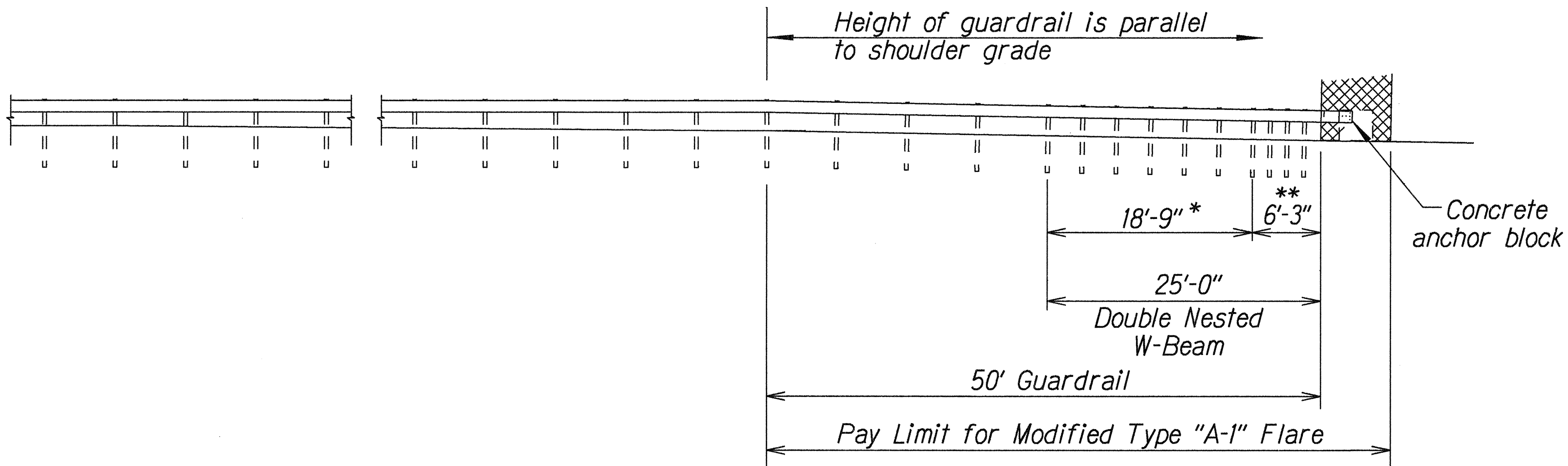
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	42	55

General Notes

1. All posts are 8'-0" in length within the 50'-0" pay limit for the Modified Type "A-1" Flare.
2. All fasteners, posts, blocks and rail elements 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-AGCARTBA Joint Cooperative Committee.
3. Limit of payment for Modified Type "A-1" Flare shall be 50'-0" from End Shoe including Anchor Block and GRP work.
4. Excavation, Anchor Block, Backfill and GRP work shall be considered incidental to the Modified Type "A-1" Flare.



Design speed mph	a:b
68	15:1
62	13:1
56	12:1
50	11:1
43	10:1
37	9:1
31	7:1



STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE

KEA'AU-PĀHOA ROAD

PARADISE PARK SECTION-PHASE II & III

F.A. PROJECT NO. RS-0130(24)

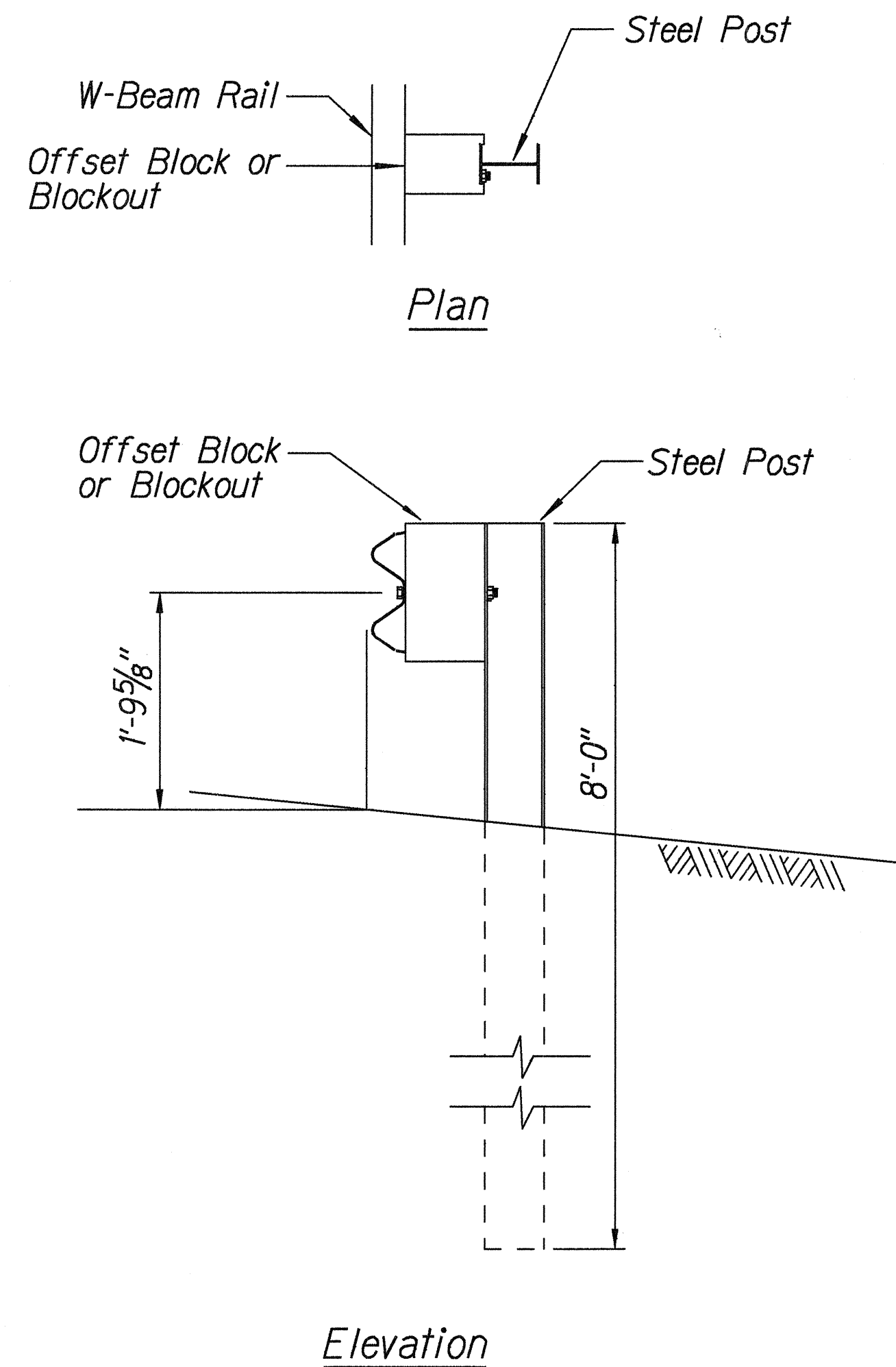
Scale: Noted

Date: May, 2000

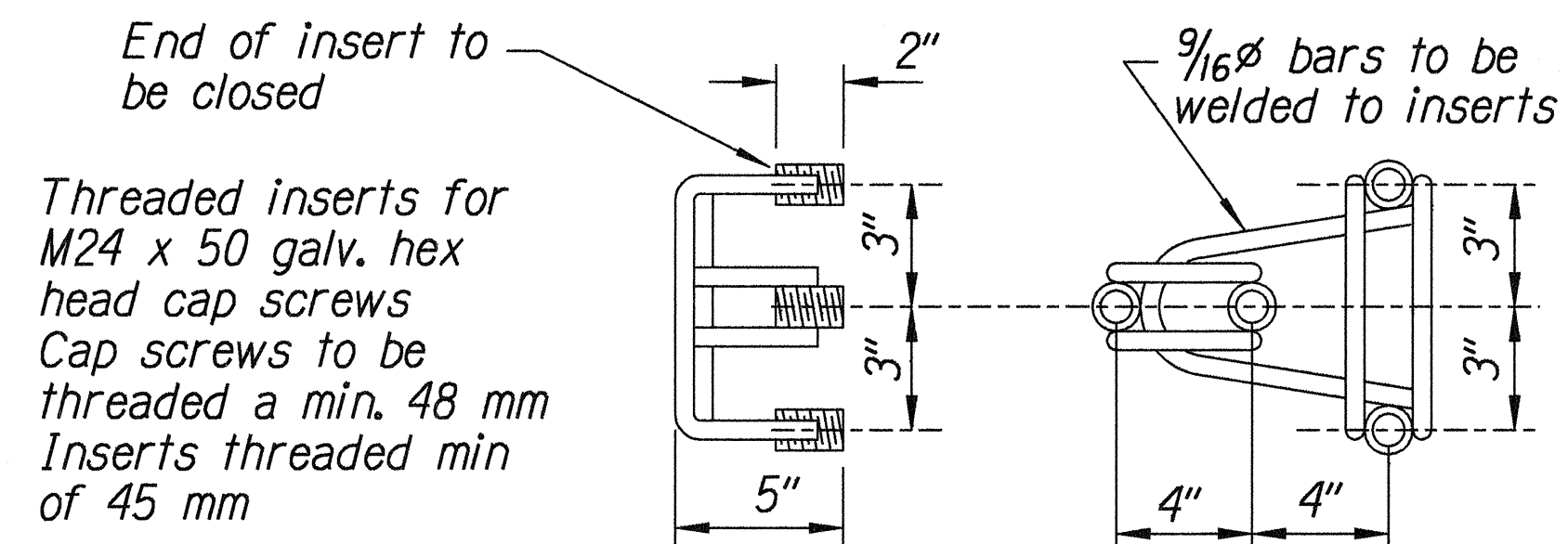
SHEET No. 1 OF 2 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
4/24/00	
N. sign	

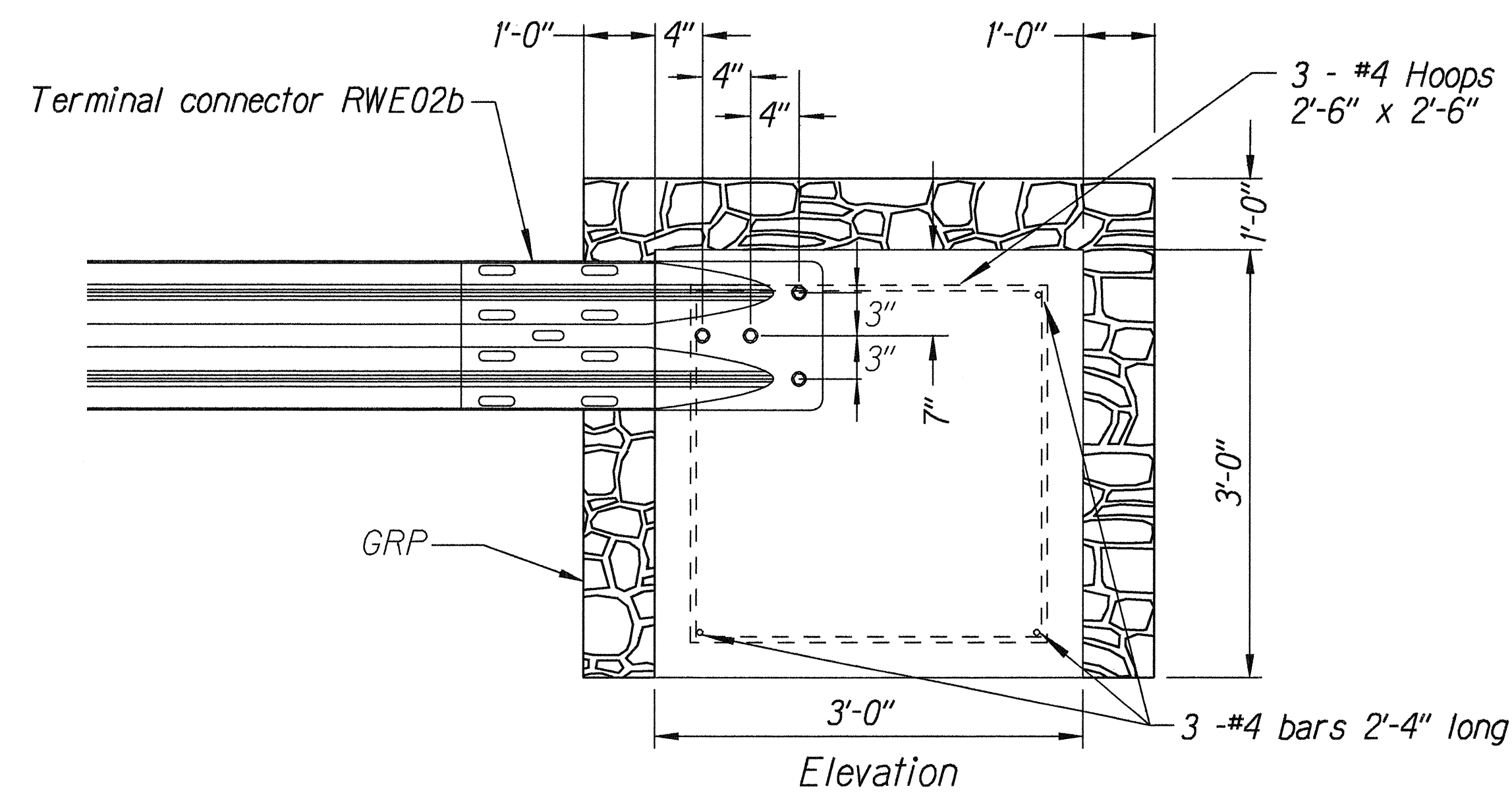
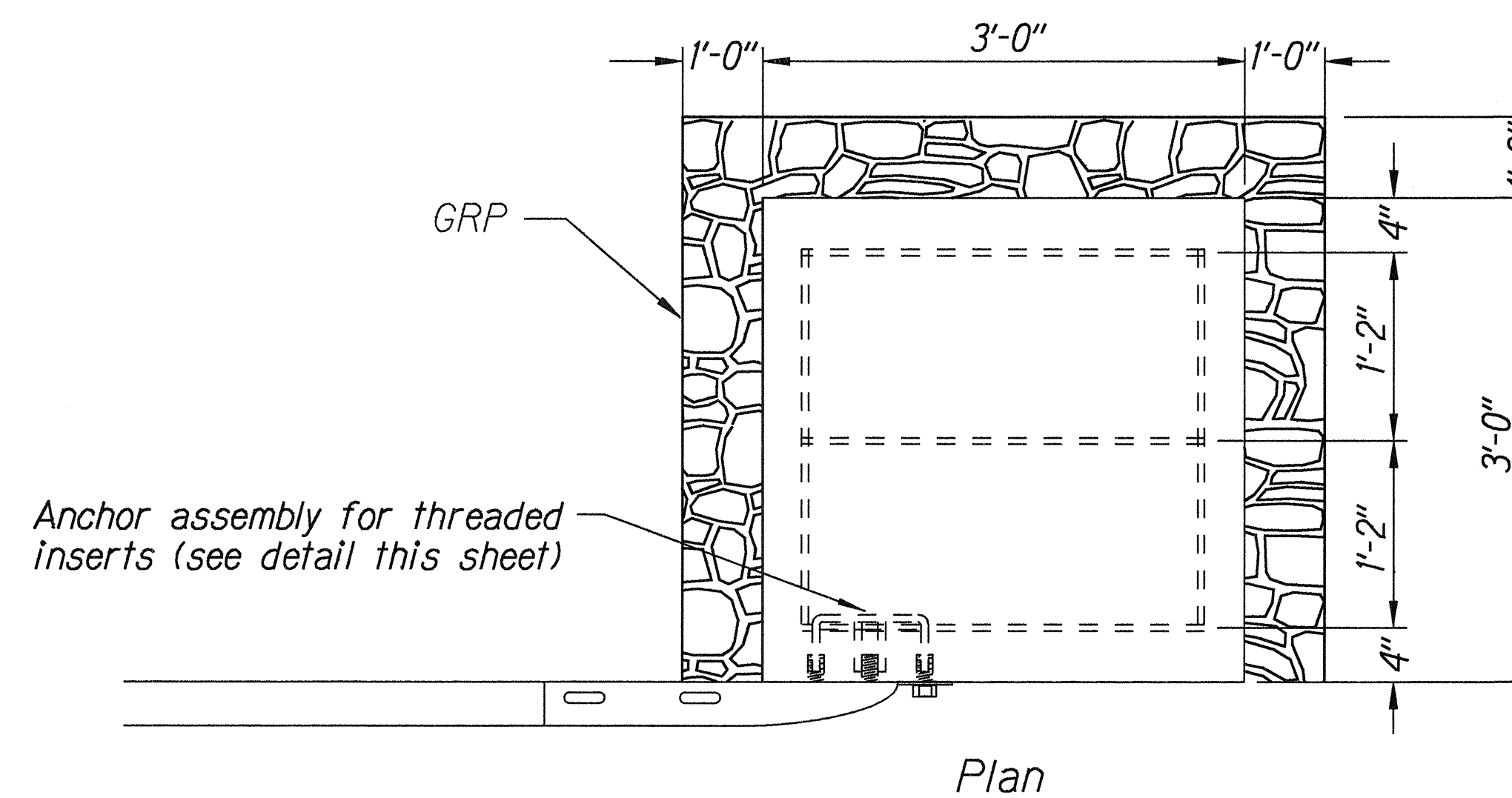
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	43	55



STRONG POST W-BEAM GUARDRAIL



ANCHOR ASSEMBLY CONCRETE BLOCK ANCHOR



CONCRETE BLOCK ANCHOR (3' X 3' X 3')

BACKSLOPE ANCHOR TERMINAL END ANCHORAGE DETAILS MODIFIED TYPE "A-1" FLARE

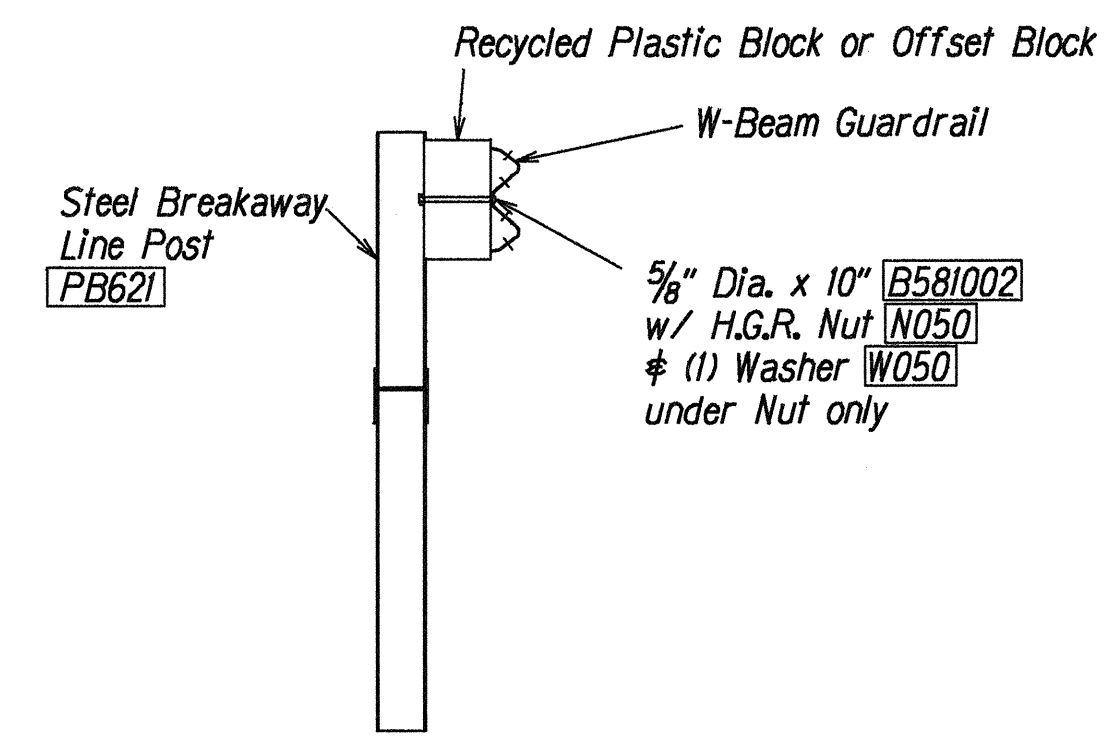
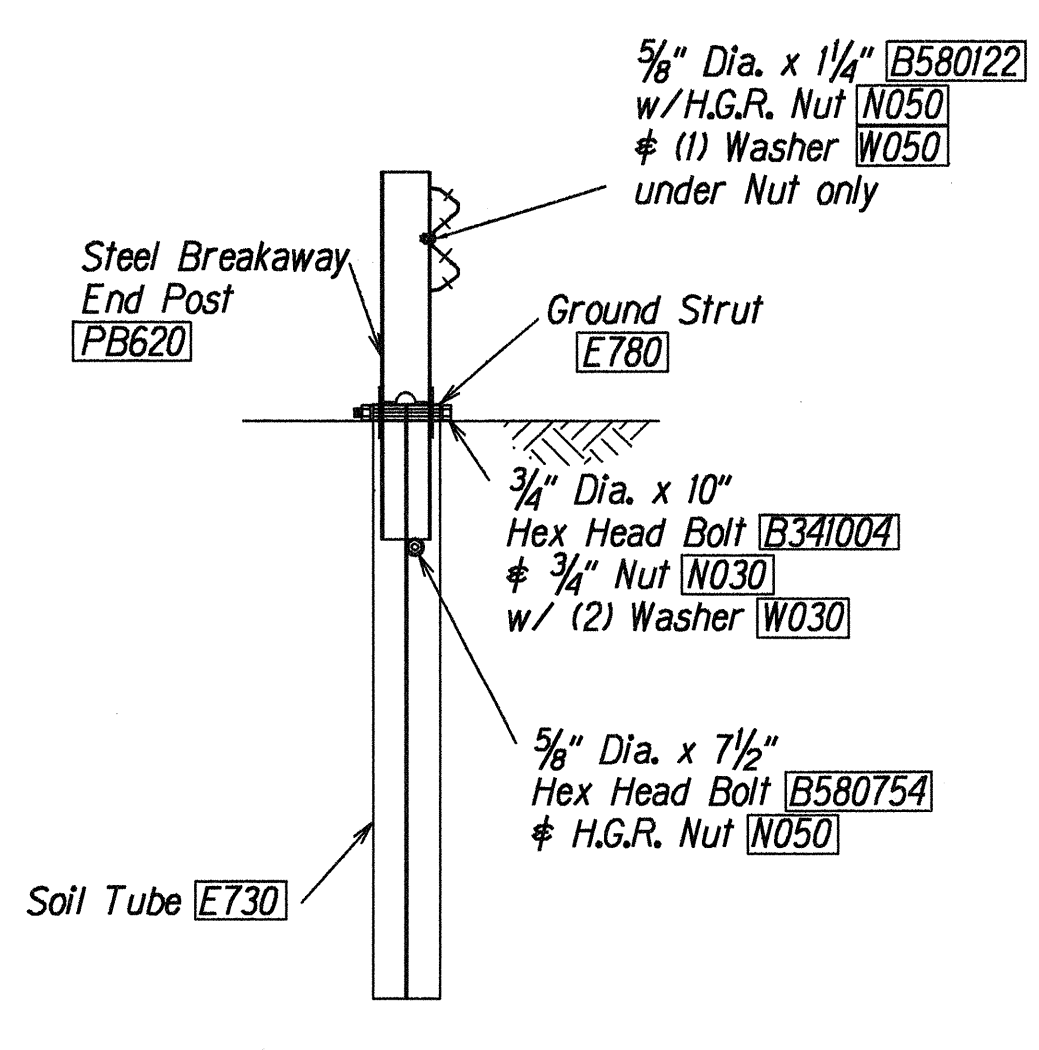
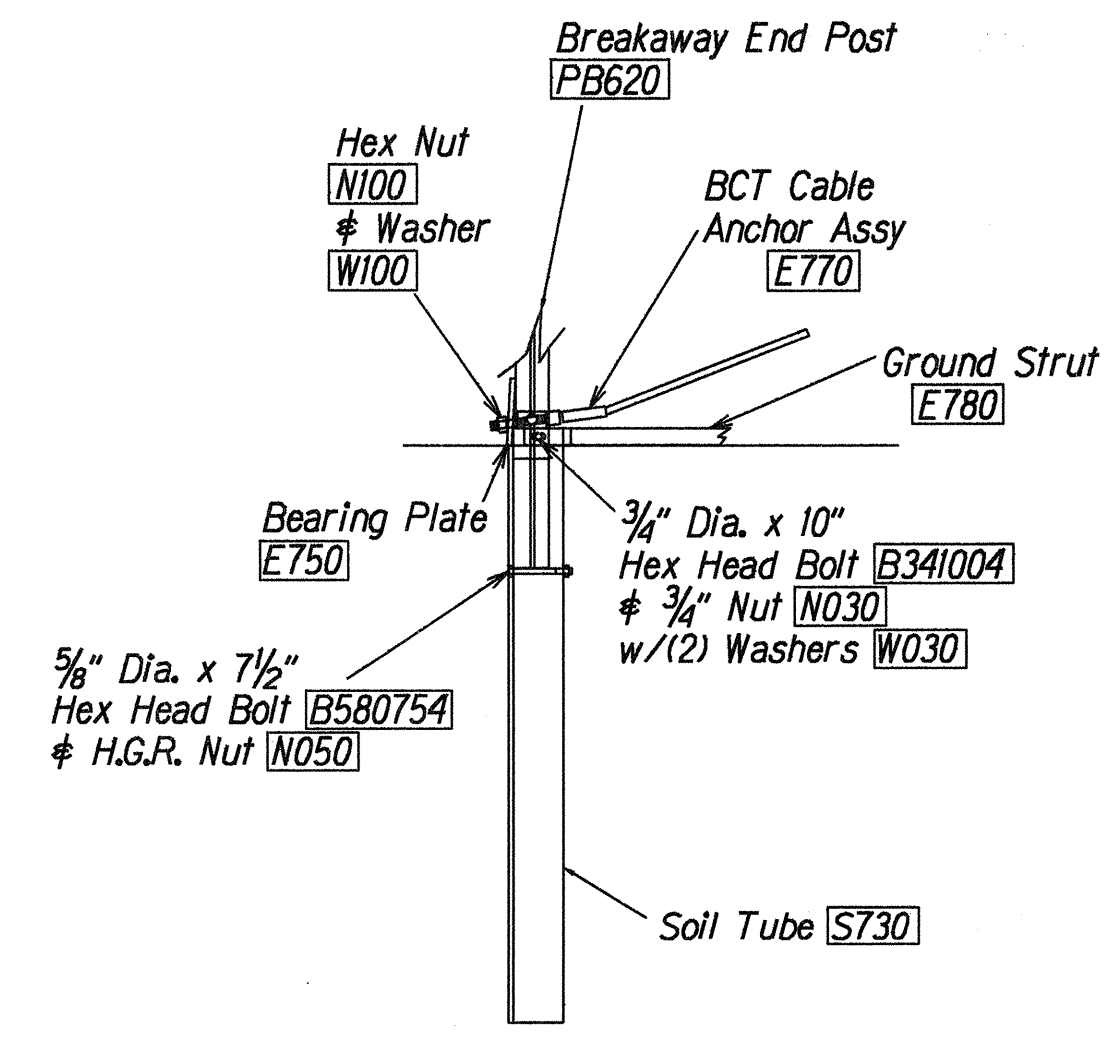
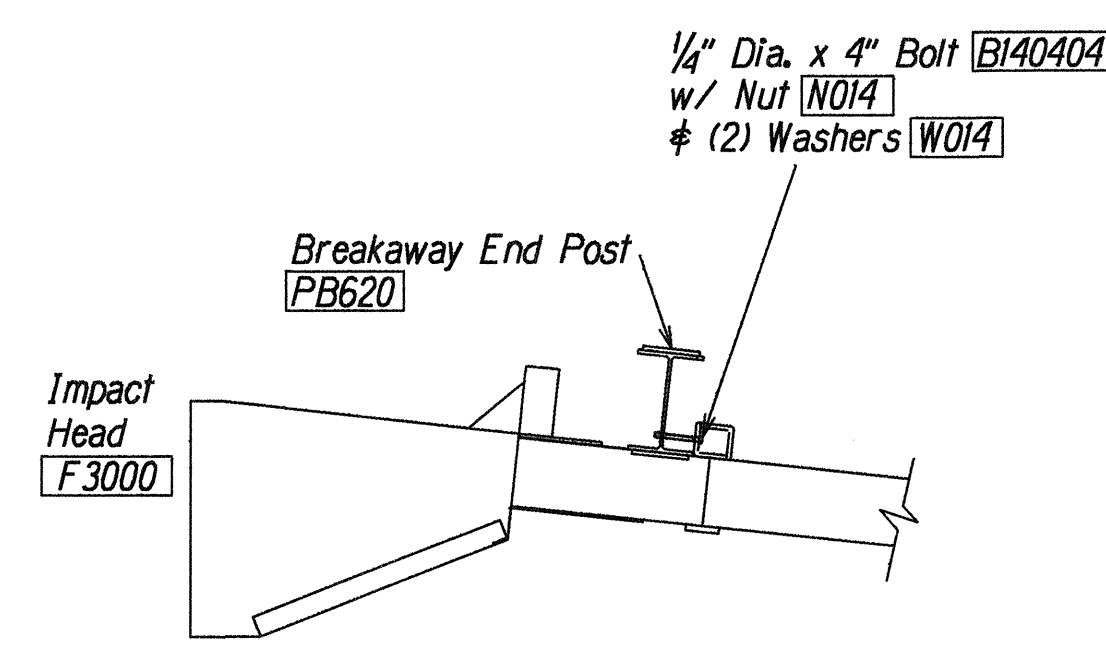
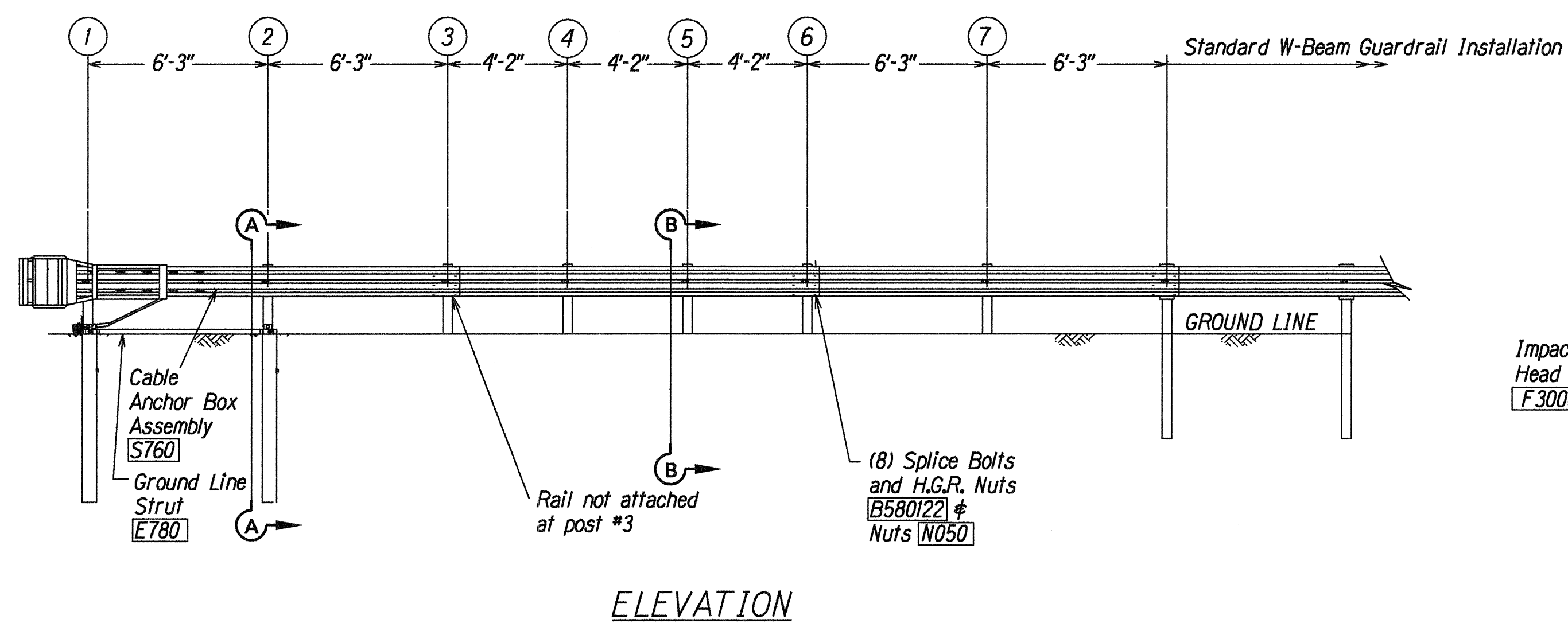
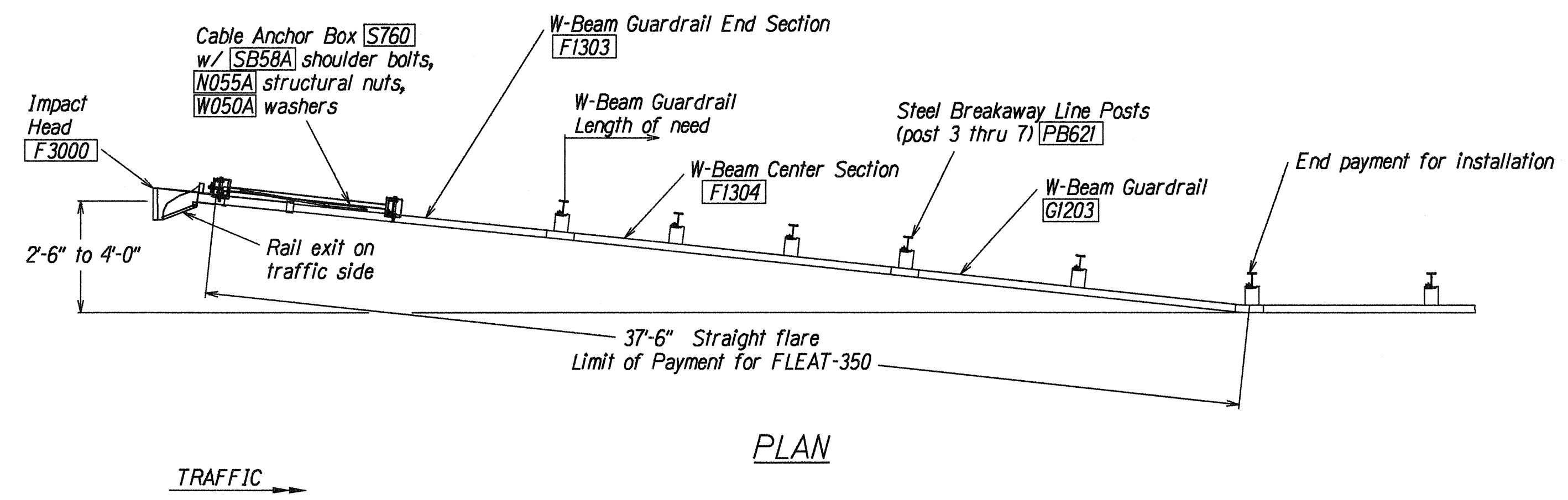
Note:

All fasteners, posts, blocks and rail elements 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-AGCARTBA Joint Cooperative Committee.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTES BOOK	DRAWN BY	
DESIGNED BY	CHECKED BY	
NO. 100		

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
MODIFIED TYPE "A-1" FLARE	
KEA'AU-PĀHOA ROAD PARADISE PARK SECTION-PHASE II & III F.A. PROJECT NO. RS-0130(24)	
Scale: Noted	Date: May, 2000
SHEET No. 2	2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	44	55



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

- GENERAL NOTES**
1. Breakaway posts are required with the FLEAT Terminal.
 2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
 3. 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.
 4. 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.
 5. 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.
 6. 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.

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

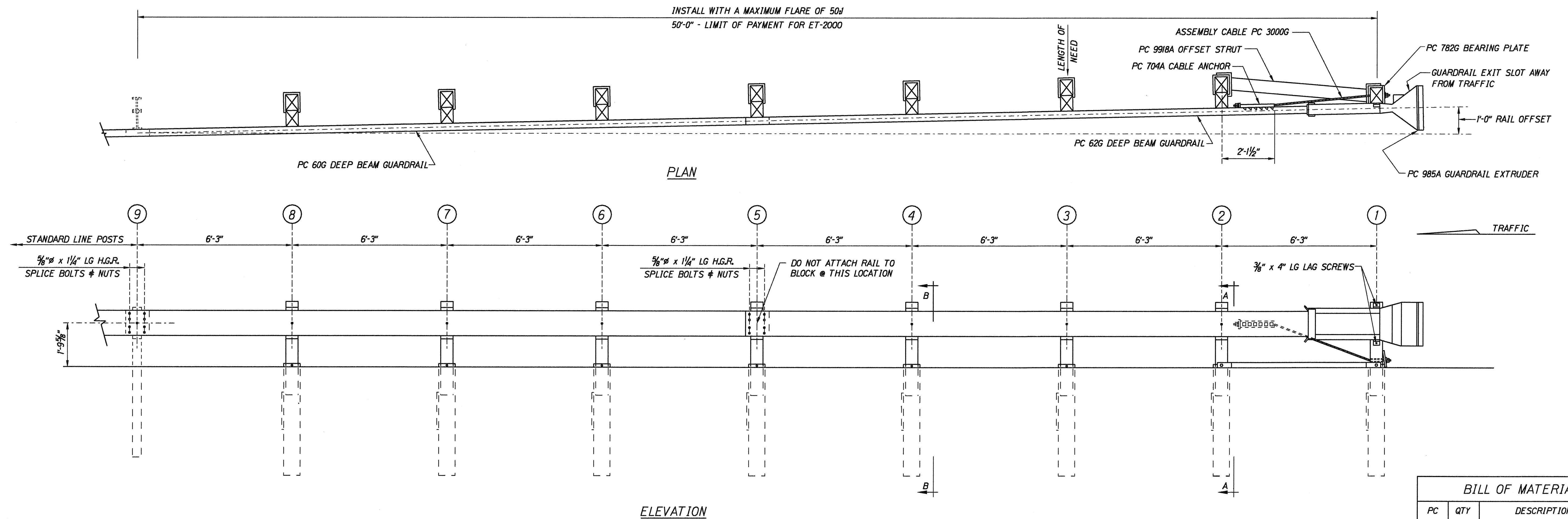
Foundation Tube Options For Posts 1 & 2

- *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

ORIGINAL PLAN	DATE	BY
NOTED		
DESIGNED BY		
CHECKED BY		

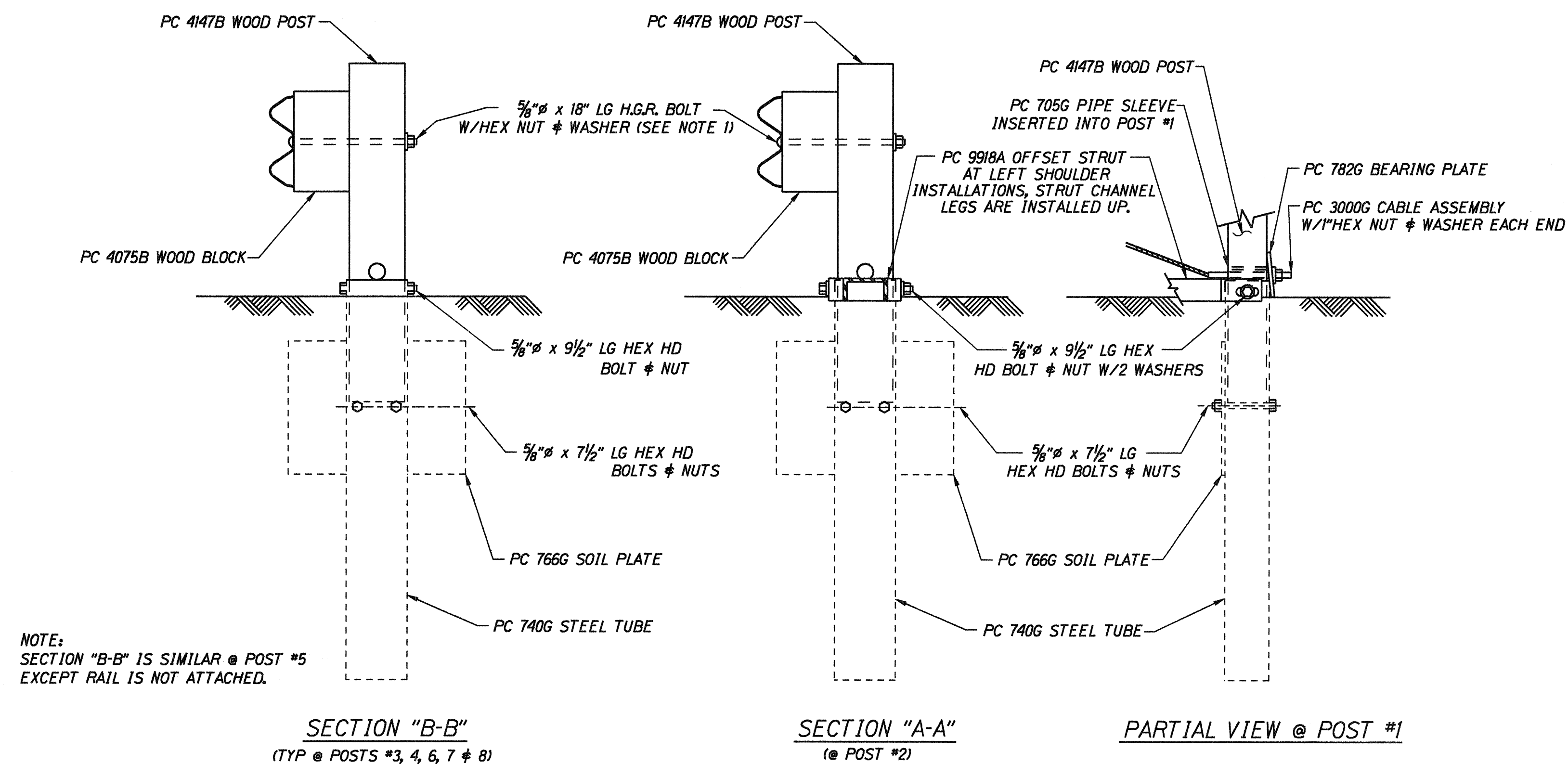
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
FLEAT-350
FLARED ENERGY ABSORBING TERMINAL
KEA'AU-PAHOA ROAD
PARADISE PARK SECTION-PHASE II # III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	45	55



BILL OF MATERIAL

PC	QTY	DESCRIPTION
60G	1	12/25/6'3/S (GUARDRAIL)
62G	1	12/25/6'3/S ANC (GUARDRAIL)
704A	1	CABLE ANCHOR BRACKET
705G	1	2" x 5 1/2" PIPE
740G	8	46 TUBE SLEEVE
766G	8	1/4" x 18" x 24" SOIL PLATE
782G	1	5/8" x 8" x 8" BEARING PLATE
985A	1	ET-2000 EXTRUDER
3000G	1	CABLE 3/4" x 6'
3300G	11	5/8" WASHER
3340G	47	5/8" HEX NUT
3360G	16	5/8" x 1 1/4" SPLICE BOLT
3478G	16	5/8" x 7 1/2" HEX HD BOLT
3497G	8	5/8" x 9 1/2" HEX HD BOLT
3580G	7	5/8" x 18" POST BOLT
3900G	2	1" WASHER
3910G	2	1" HEX NUT
4075B	7	WD BLOCK 1'2 6" x 8" DR
4147B	8	WD 3'9 POST 5 1/2 x 7 1/2
4228G	2	3/8" x 4" LAG SCREW
9918A	1	6'3 STRUT



NOTE: THE 5/8" FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.

NOTE: SECTION "B-B" IS SIMILAR @ POST #5 EXCEPT RAIL IS NOT ATTACHED.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ET-2000 - OPTION "A"

KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)

Scale: Noted

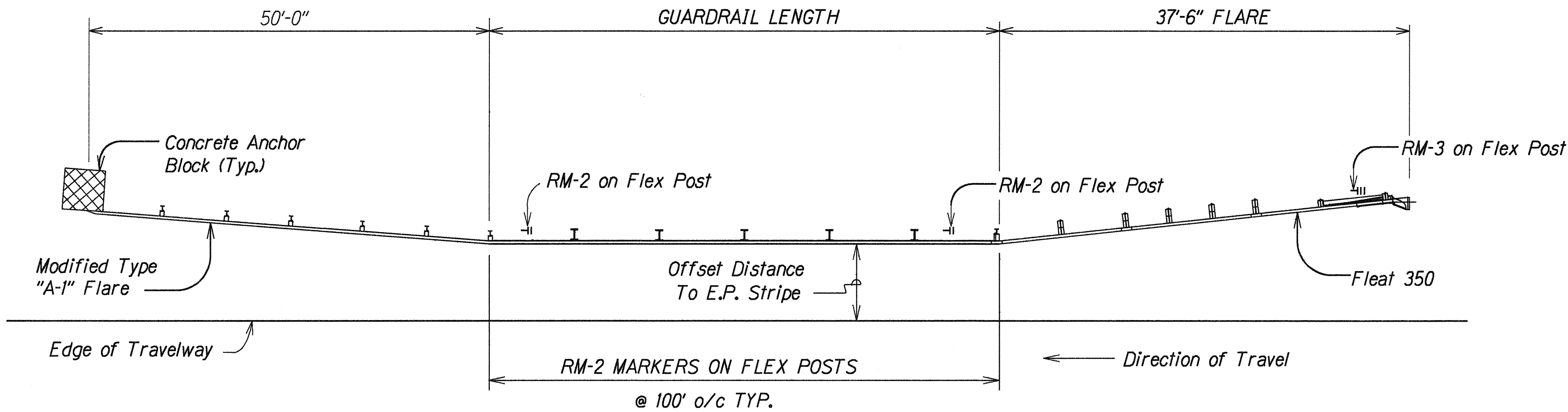
Date: May, 2000

SHEET No. 1 OF 1 SHEETS

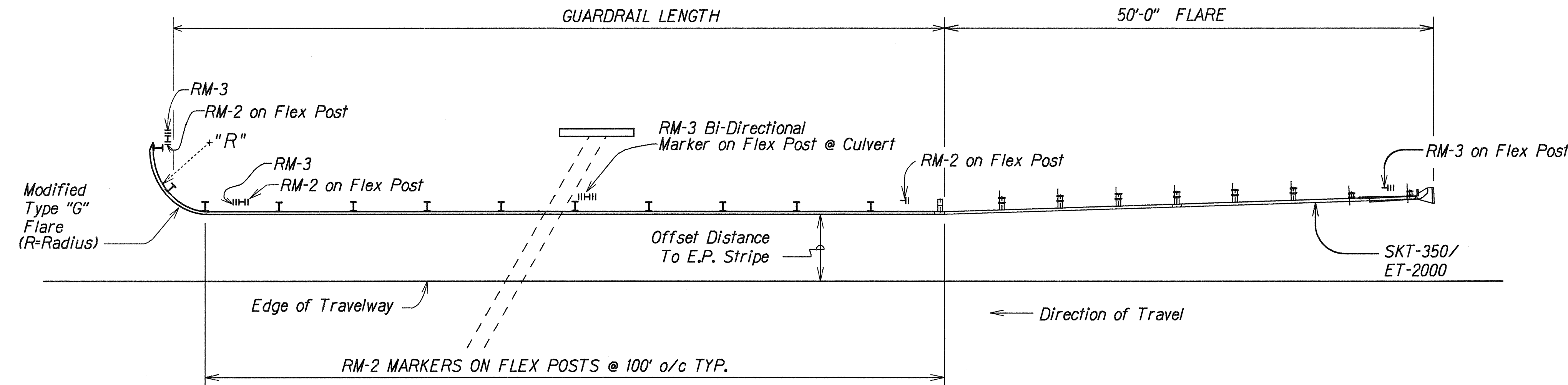
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	46	55

NOTES:

1. All reflector markers located behind guardrail and other locations shall be installed with flexible delineator posts.
2. Exact location of Reflector Markers shall be determined in the field by the Engineer.
3. Color of flexible delineator posts shall be white except for RM-3, RM-3 bidirectional, and RM-3/RM-2 combinations shall be yellow posts.
4. RM-2 shall be white.



TYPICAL @ "MODIFIED A" & "FLEAT 350" END TREATMENT



TYPICAL @ MODIFIED "G" & "SKT-350"/"ET-2000" END TREATMENT

TYPICAL GUARDRAIL REFLECTOR MARKER INSTALLATION

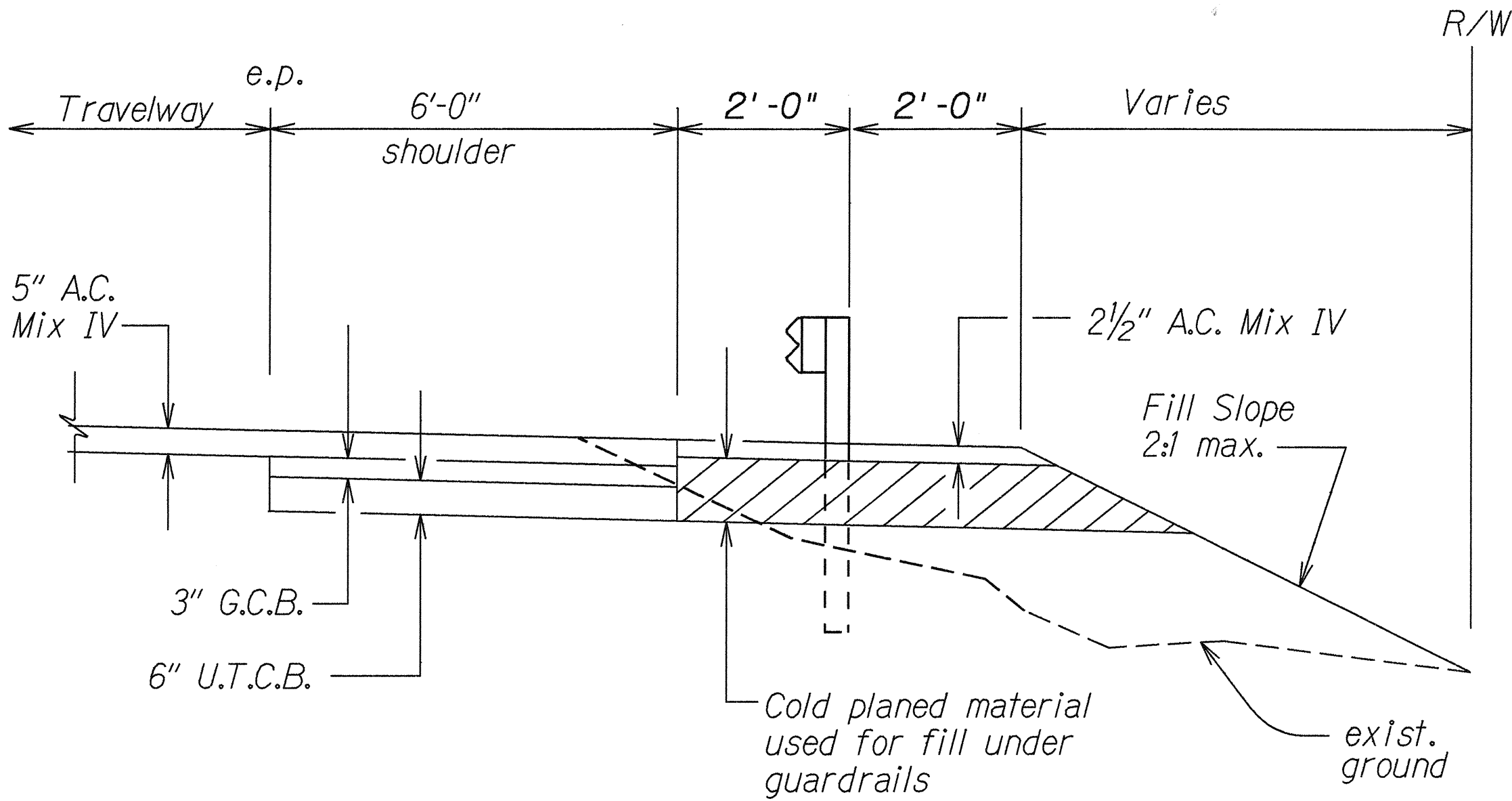
Not To Scale

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**GUARDRAIL REFLECTOR
MARKER DETAIL**
KEA'AU-PĀHOA ROAD
PARADISE PARK SECTION-PHASE II # III
F.A. PROJECT NO. RS-0130(24)
Scale: Noted Date: May, 2000
SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RS-0130(24)	2000	47	55



TYPICAL SECTION - PAVING UNDER GUARDRAIL
Not To Scale

- Notes:
1. Clear, grub, excavate and compact areas as required by contract prior to backfilling or paving.
 2. A.C. Paving under guardrail will be paid for by the ton as provided in the proposal.
 3. If roadway areas are excavated by a cold planing machine, materials so excavated shall be used under guardrails, as shown. Otherwise excavated on site materials or suitable borrow materials shall be used for backfill. Payment for backfilling work shall be as provided under Section 203 - Excavation and Embankment

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	X
DESIGNED BY	DESIGNED BY	
CHECKED BY	CHECKED BY	
No. 1000		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS
PAVING UNDER GUARDRAILS

KEA'AU-PAHOA ROAD
PARADISE PARK SECTION-PHASE II & III
F.A. PROJECT NO. RS-0130(24)

Scale: Noted
Date: May, 2000

SHEET No. 1 OF 1 SHEETS