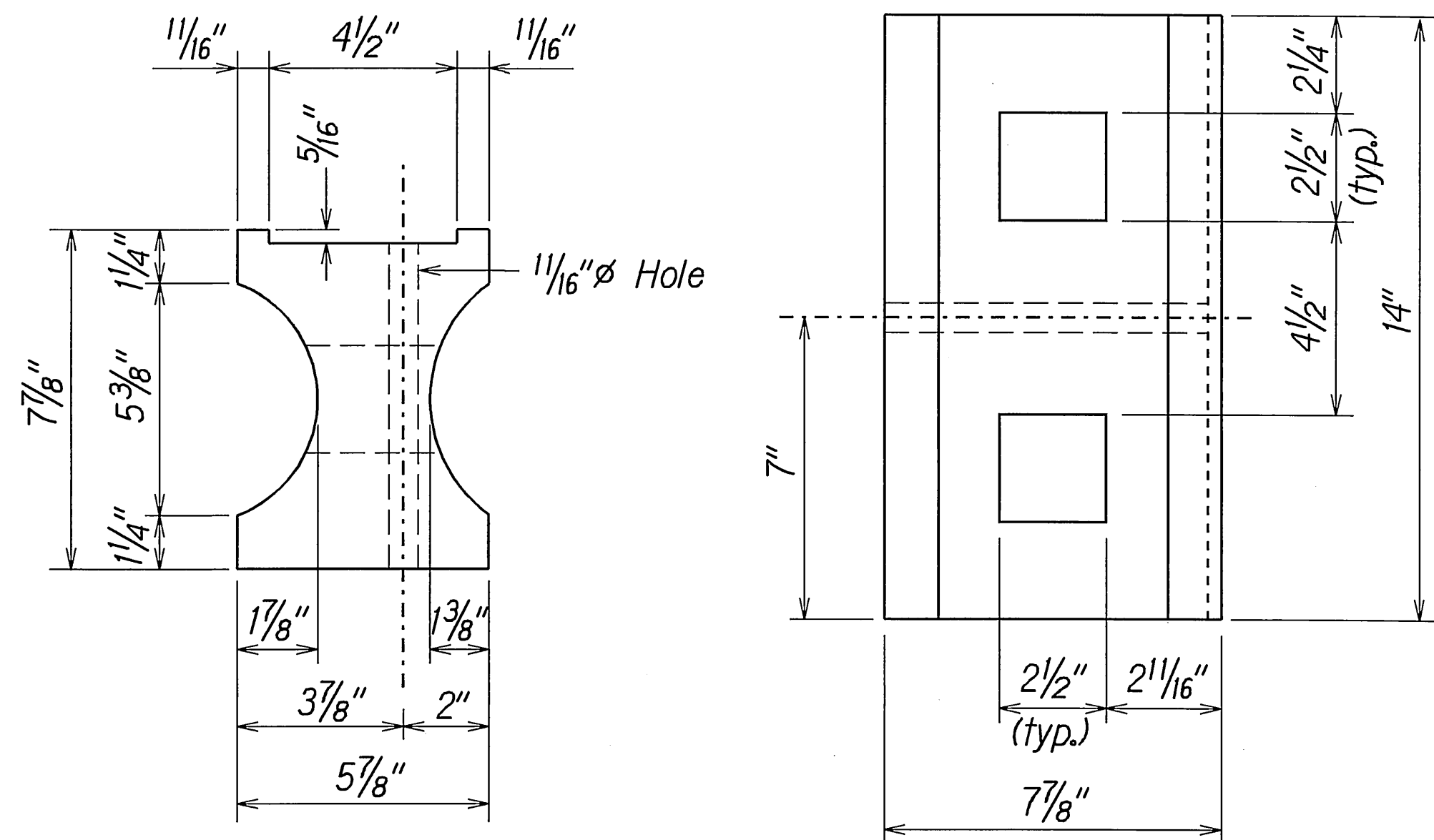
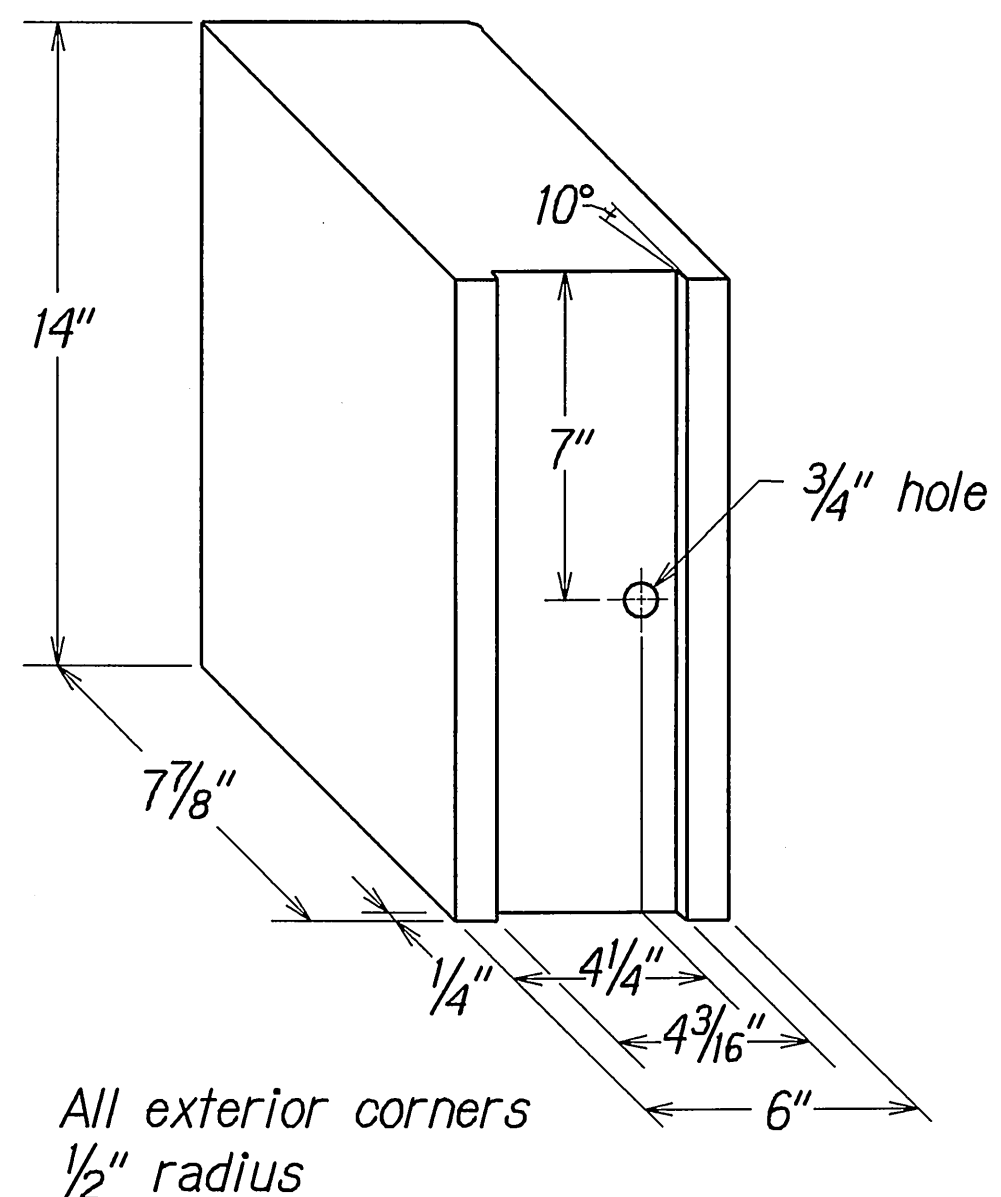


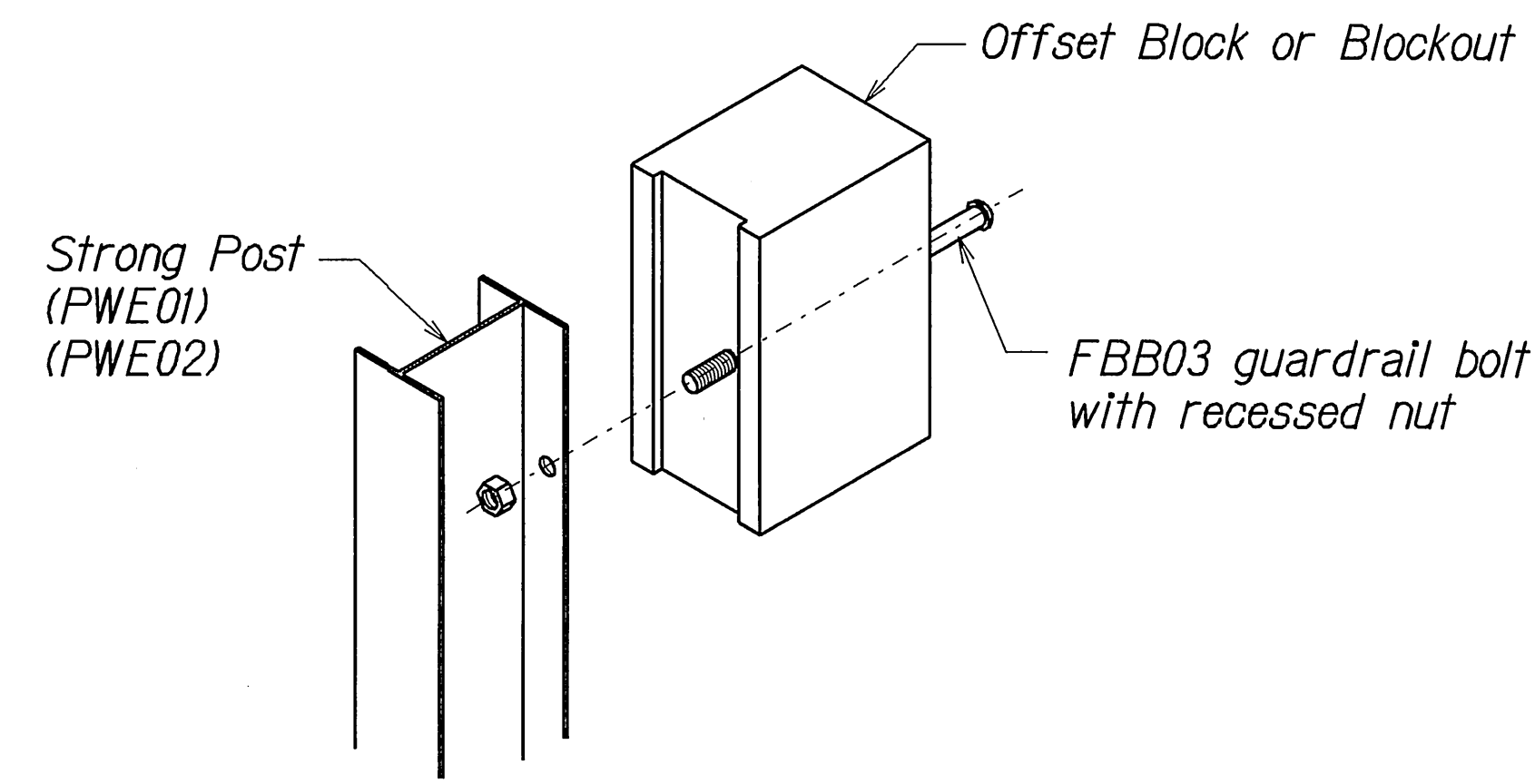
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	130B-01-07	2007	20	29



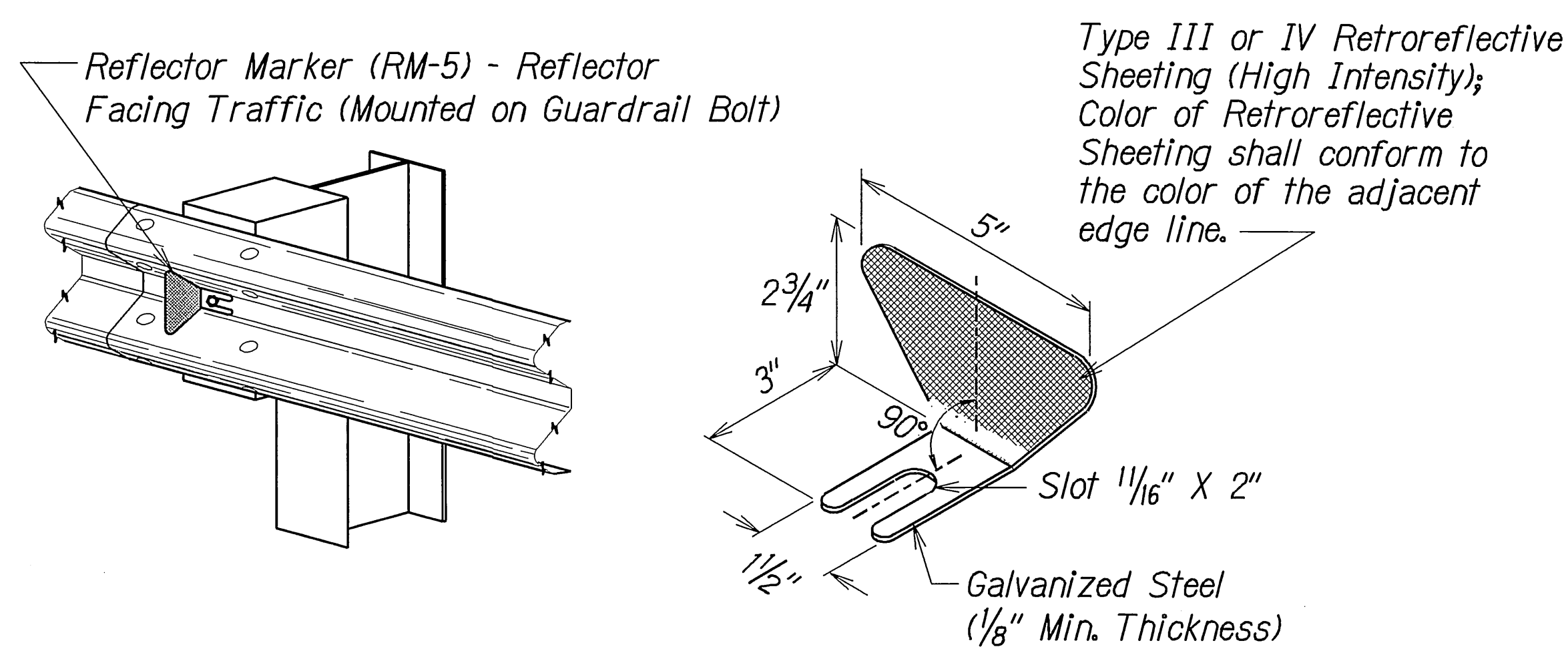
TOP
SIDE
RECYCLED PLASTIC BLOCKOUT (TYPE I)



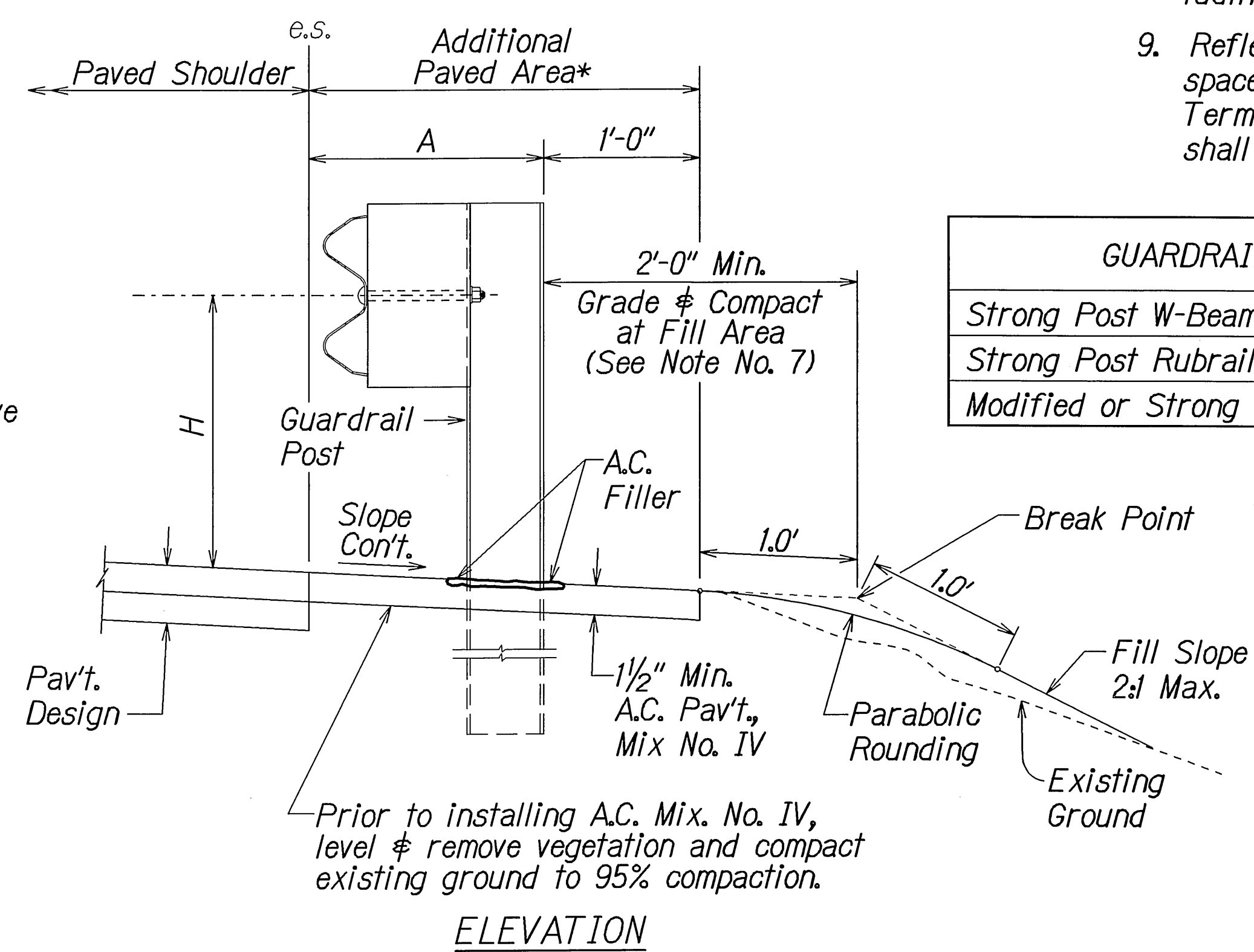
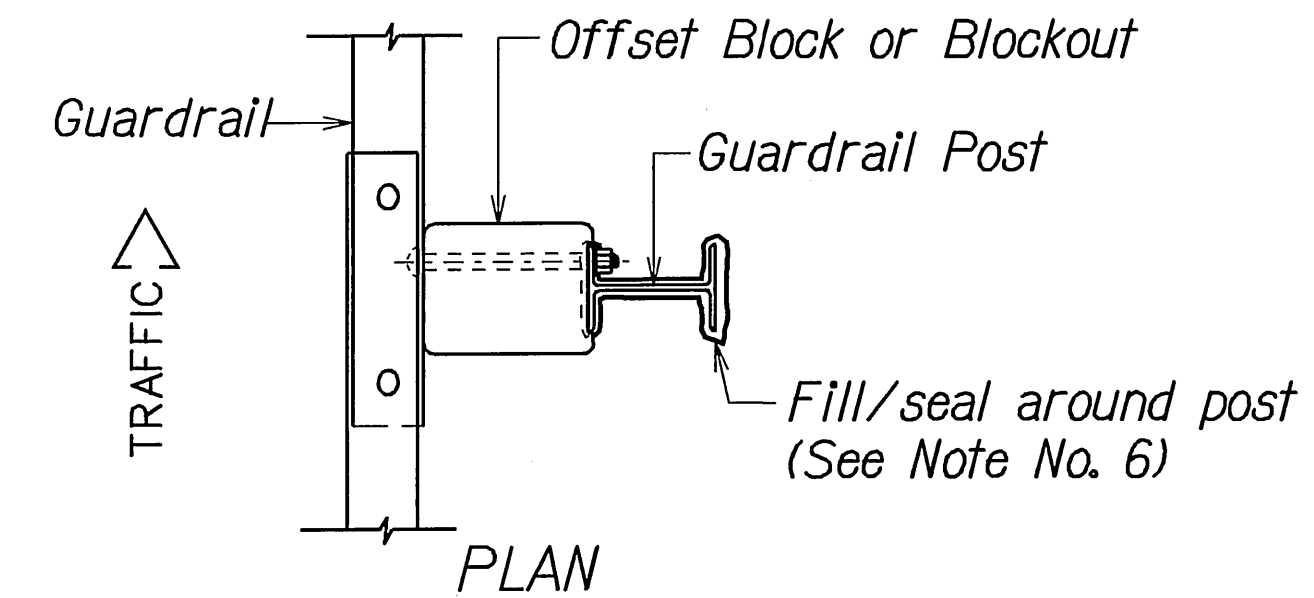
RECYCLED POLYETHYLENE
OFFSET BLOCK (TYPE II)



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



REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION



TYPICAL GUARDRAIL INSTALLATION

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 fastners, 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. All new guardrail systems (system consists of total length of guardrail including both end treatments) shall include the Additional Paved Area.
6. After the guardrail posts are installed in the paved area, the Contractor shall fill/seal around each guardrail post and all cracks in the paved area 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 filling/sealing. All costs associated with this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
7. When standards for the fill slope area cannot be met, a site specific, engineer approved design may be used.
8. New A.C. pavement at guardrails shall extend 6 feet longitudinally beyond terminal ends.
9. Reflector Markers (RM-5) mounted on guardrails shall be spaced every 25 feet. RM-5's shall not be installed on Terminal Sections. Furnishing and installing of each RM-5 shall be considered incidental to the adjacent guardrail system.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS & NOTES

KEA'AU PĀHOA ROAD
HIGHWAY ACCESS IMPROVEMENTS
Vicinity of Ka Ōhūwalu Street
Project No. 130B-01-07
Scale: NTS Date: March 2007
SHEET No. 1 OF 5 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
TELEPHONE	
ADDRESS	

Guardrail

Offset Block or Blockout

PWE01

TRAFFIC

7 7/8"

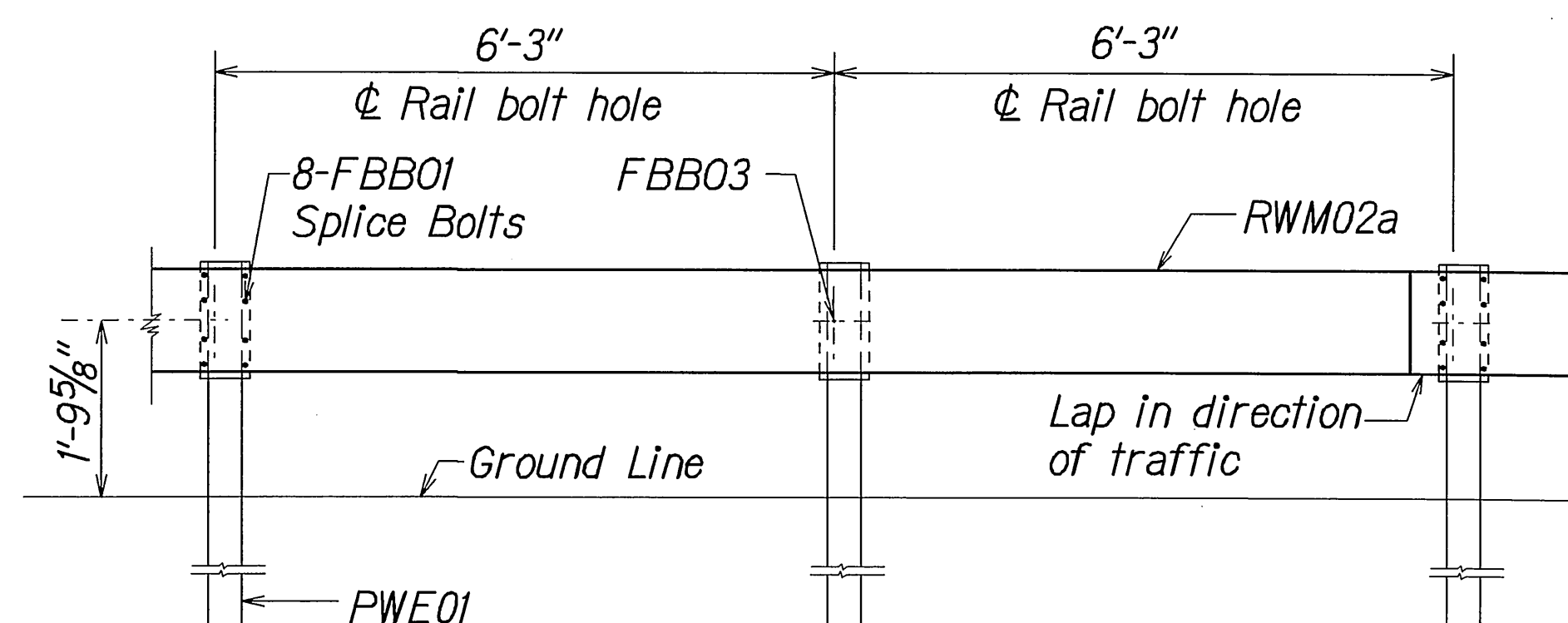
5 7/8"

4"

PLAN

Diagram illustrating the offset block or breakout for a splice. The diagram shows a vertical structure with a splice at a height of 1'-9 5/8" from the ground line. The splice is labeled FBB03 and Splice Bolts. An offset block or breakout is shown above the splice, labeled RWM02a. The total height of the structure is 6'-0". A dimension of 7" is shown for the offset block height. The label PWE01 points to the vertical structure. A ground line is indicated at the bottom.

STRONG POST W-BEAM GUARDRAIL
(SGR04a)



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

W6x8.5
Structural
Shape

4"

2 3/8"

3/4"

2"

5"

5"

6'-0"

1'-9 5/8"

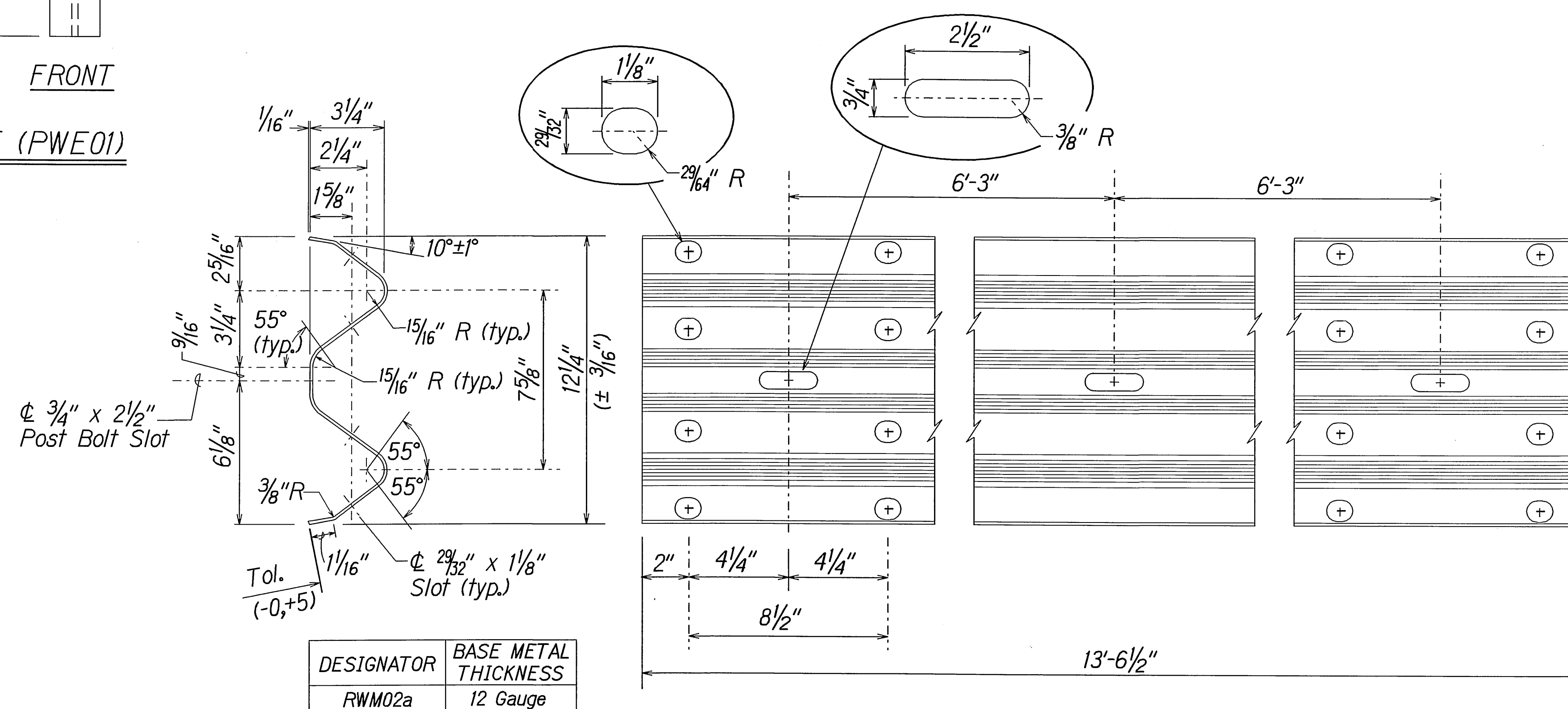
2'-4 5/8"

Ground Line

FRONT

W-BEAM STRONG POST (PWE01)

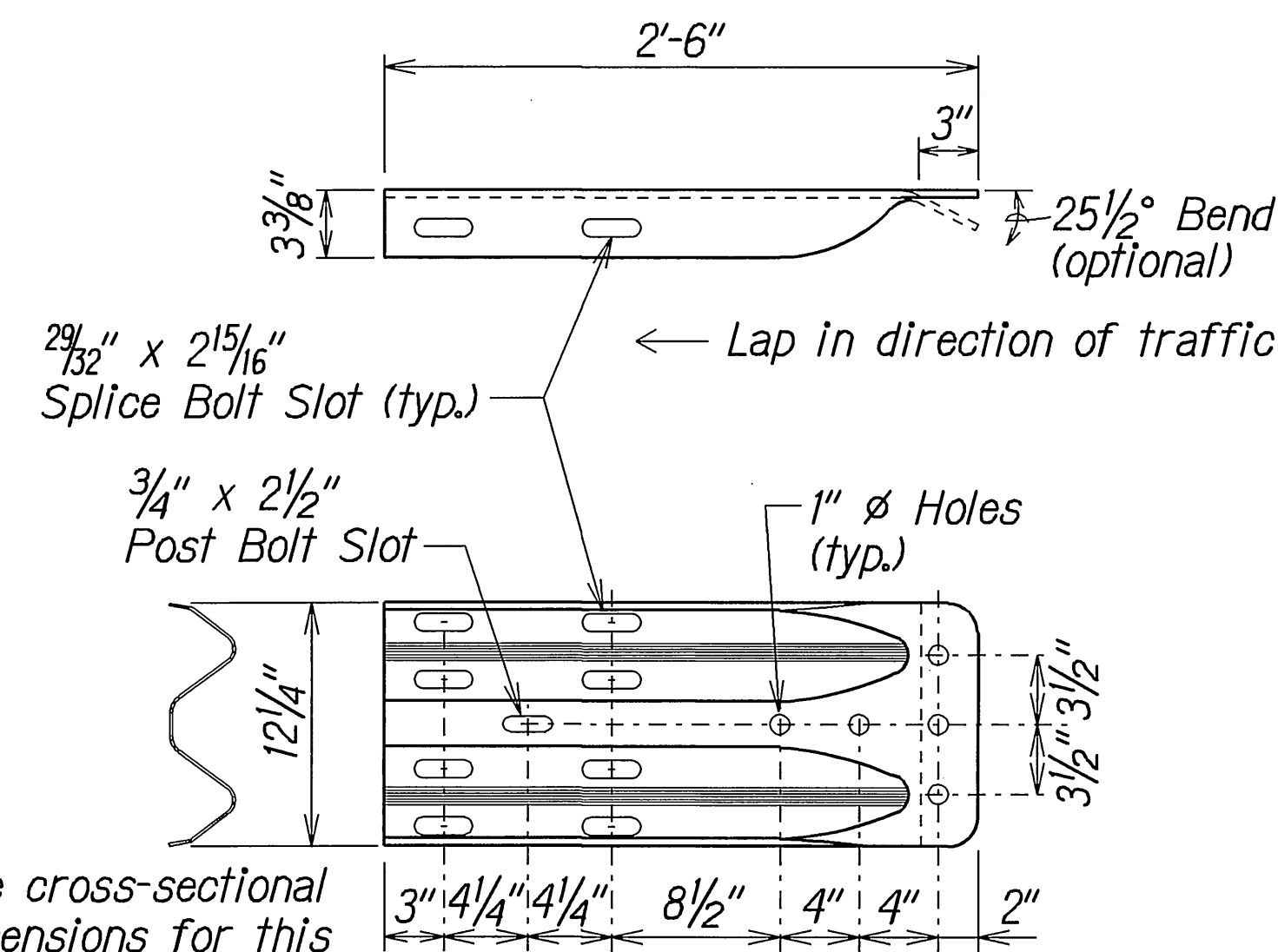
1" Dia. x $\frac{1}{16}$ "
Recess both
sides



2 SPACE W-BEAM GUARDRAIL (RWM02a)

ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____
	DRAWN BY <u>X</u> _____
	TRACED BY _____
NOTE BOOK	DESIGNED BY <u>X</u> _____
<i>tel.yme</i>	QUANTITIES BY _____
<i>staple</i>	CHECKED BY _____

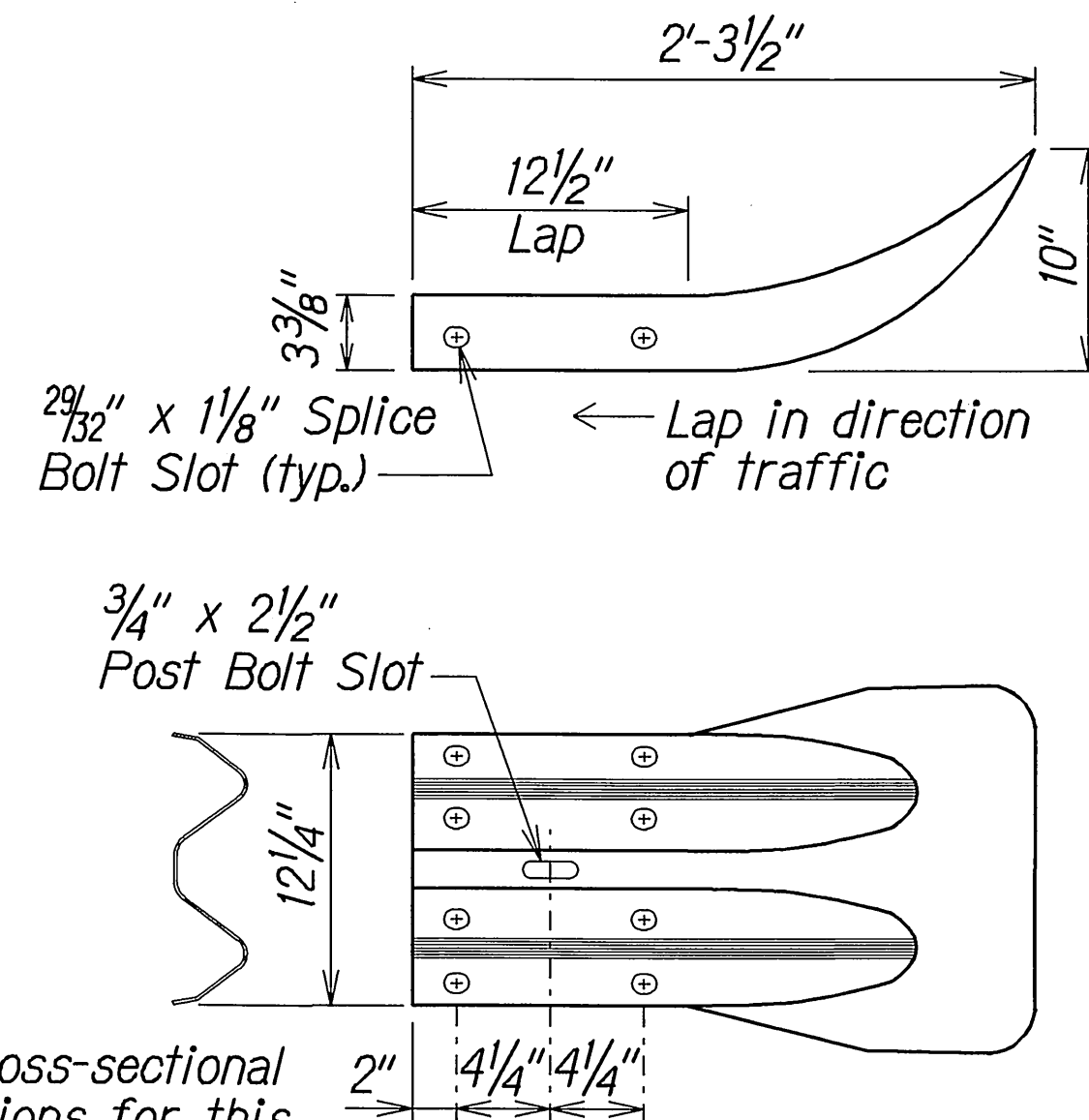
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	130B-01-07	2007	22	29



The cross-sectional dimensions for this part are to fit over part RWM02a on the approach end and under part RWM02a on the trailing end.

DESIGNATOR	BASE METAL THICKNESS
RWE02b	10 Gauge

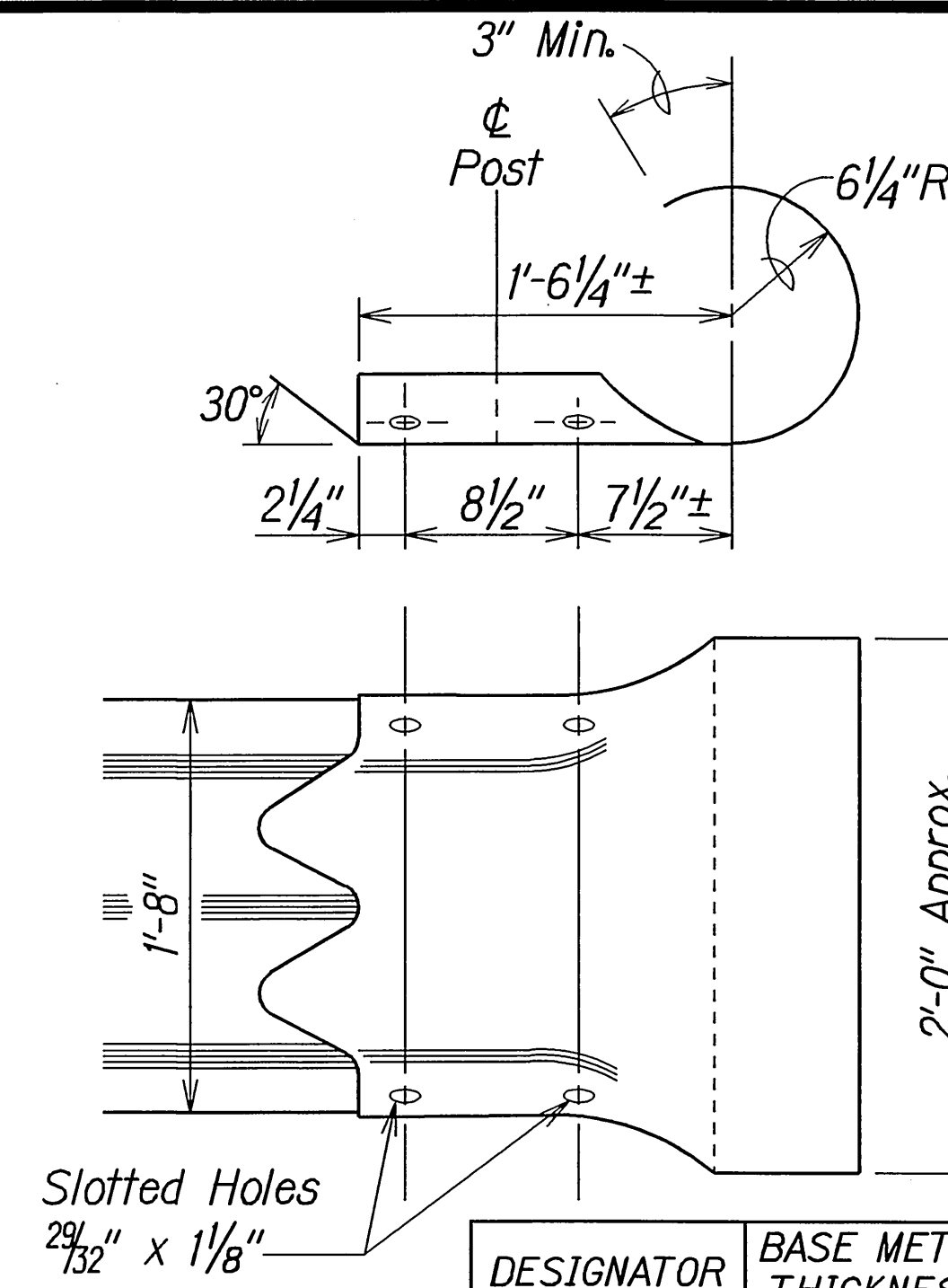
W-BEAM TERMINAL CONNECTOR (RWE02b)



The cross-sectional dimensions for this part are to fit over part RWM02a on the approach end and under part RWM02a on the trailing end.

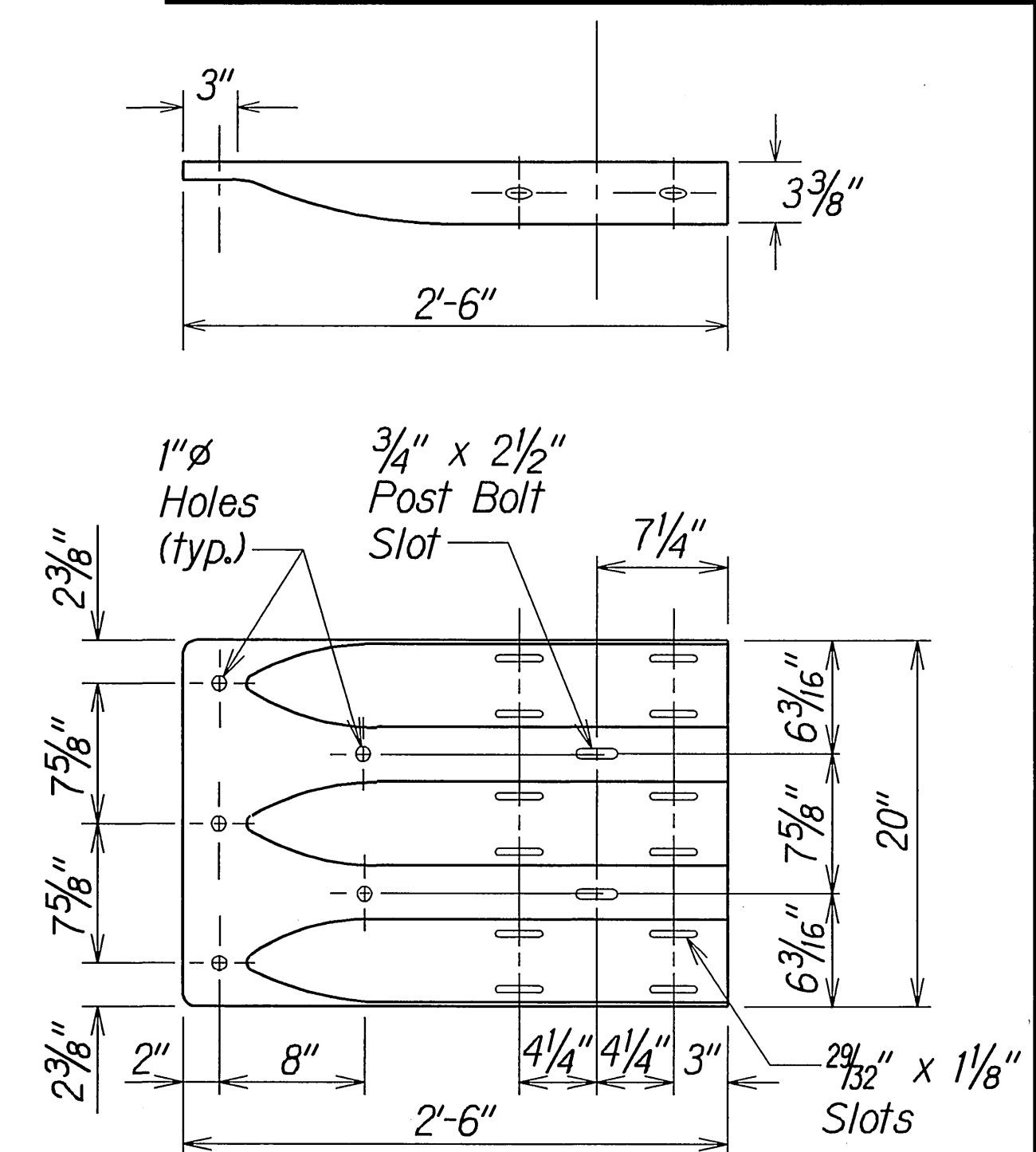
DESIGNATOR	BASE METAL THICKNESS
RWE01a	12 Gauge

W-BEAM END SECTION (FLARED RWE01a)



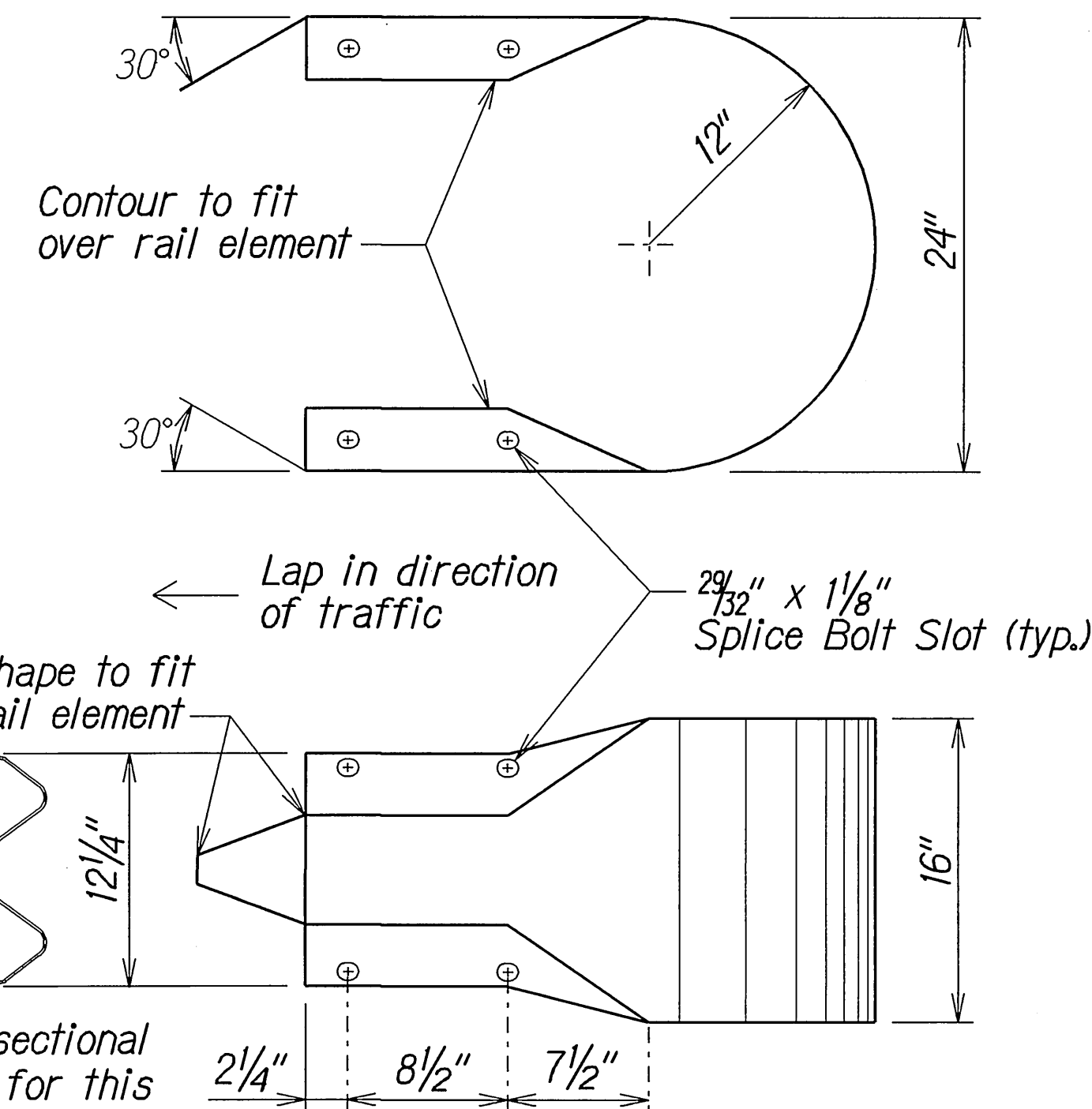
DESIGNATOR	BASE METAL THICKNESS
RTE02b	10 Gauge

THRIE-BEAM SECTION (ROUNDED) (RTE02b)



DESIGNATOR	BASE METAL THICKNESS
RTE01b	10 Gauge

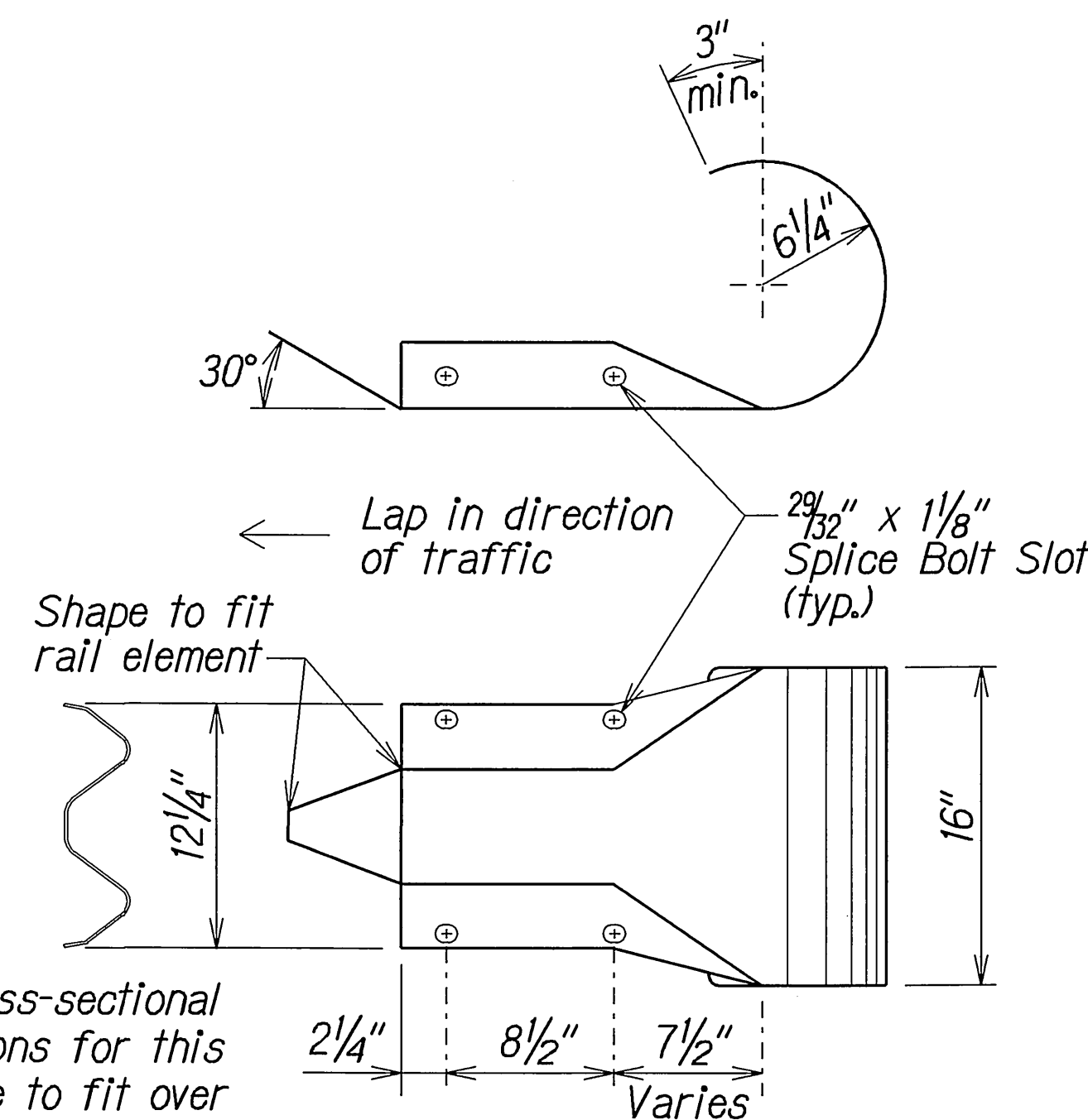
THRIE-BEAM TERMINAL CONNECTOR (RTE01b)



The cross-sectional dimensions for this part are to fit over part RWM02a

DESIGNATOR	BASE METAL THICKNESS
RWE06a	12 Gauge

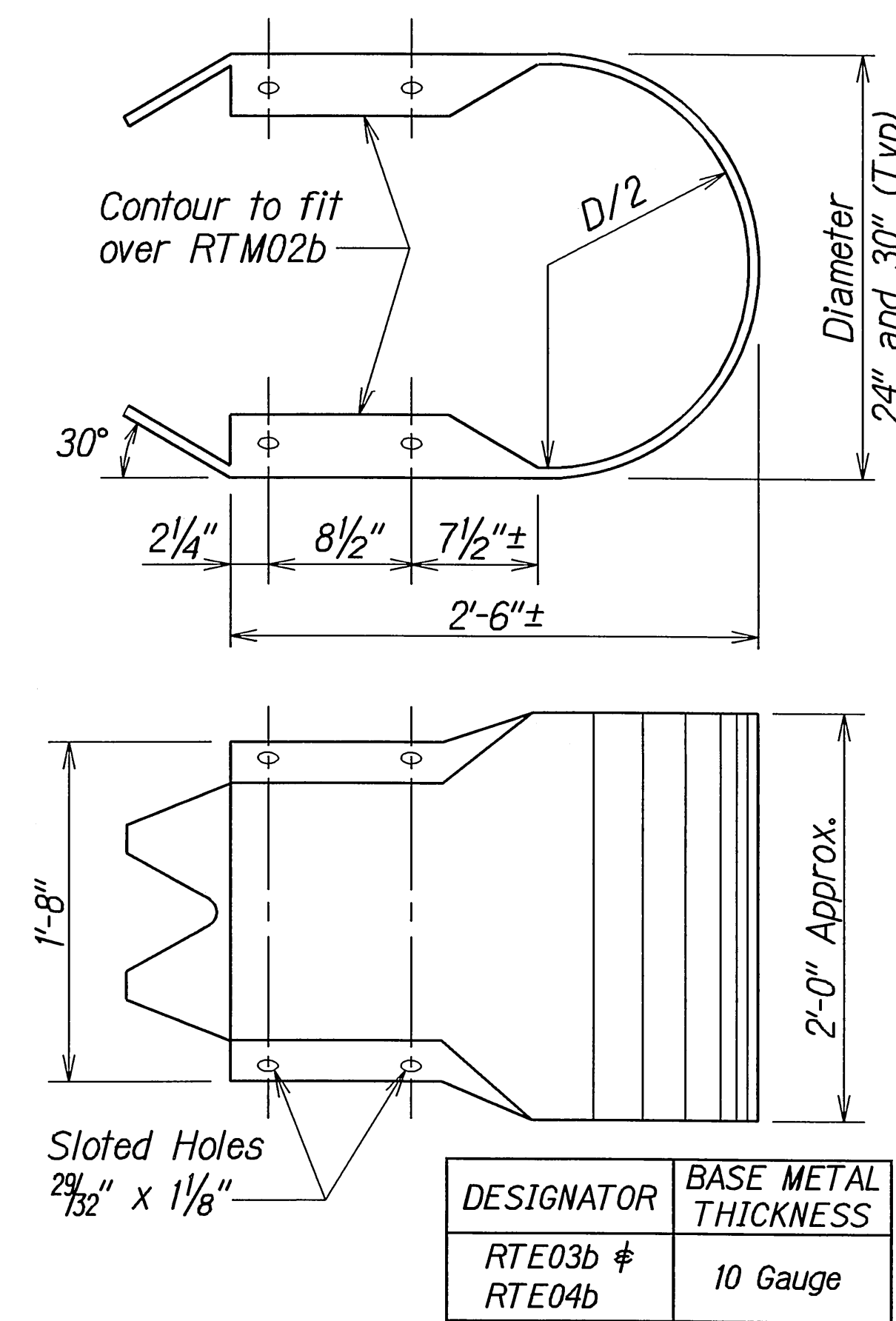
W-BEAM END SECTION (BUFFER RWE06a)



The cross-sectional dimensions for this part are to fit over part RWM02a

DESIGNATOR	BASE METAL THICKNESS
RWE03a	12 Gauge

W-BEAM END SECTION (ROUNDED RWE03a)



DESIGNATOR	BASE METAL THICKNESS
RTE03b & RTE04b	10 Gauge

THRIE-BEAM END SECTION (BUFFER RTE03b or RTE04b)

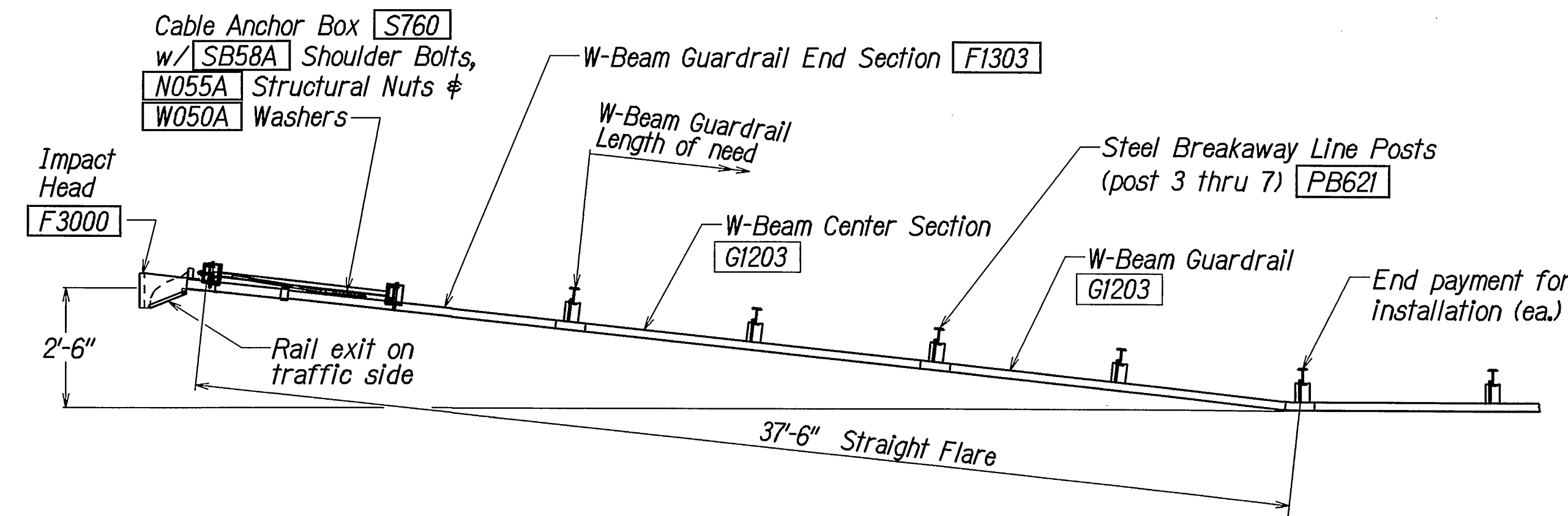
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL TERMINAL CONNECTOR AND END SECTIONS

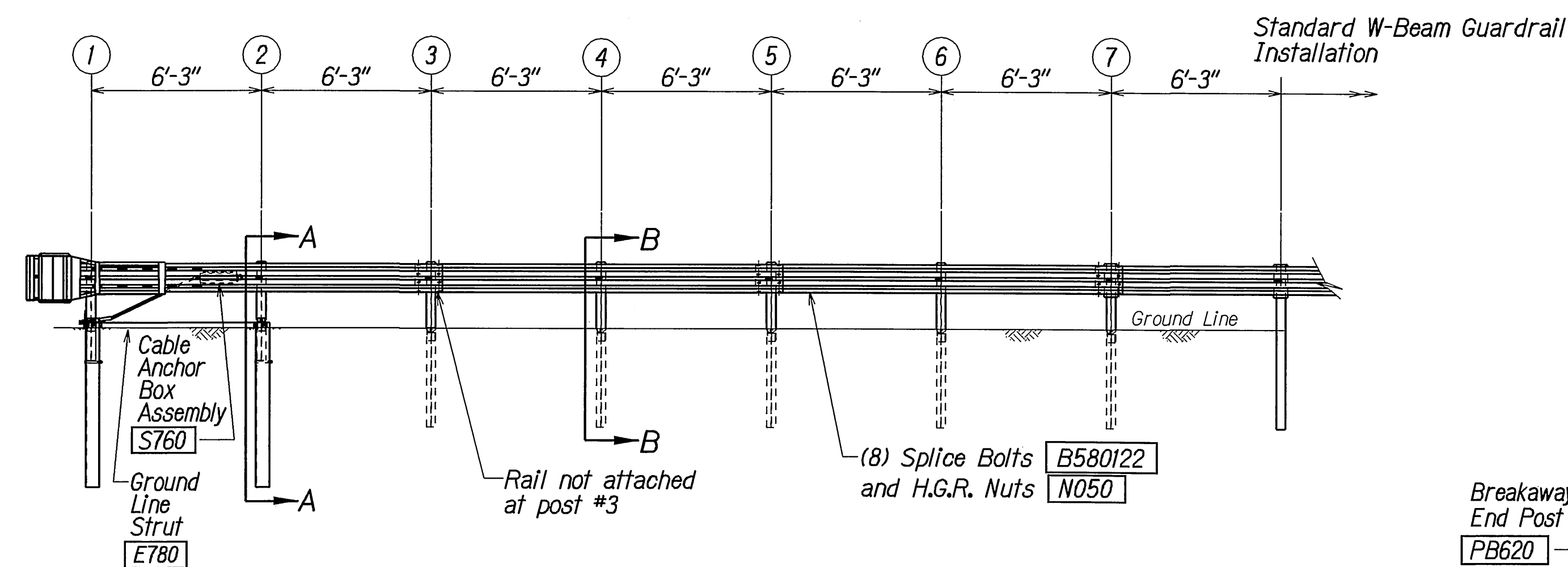
KEA'AU PĀHOA ROAD
HIGHWAY ACCESS IMPROVEMENTS
Vicinity of Ka Ohūwalu Street
Project No. 130B-01-07

Scale: NTS Date: March 2007

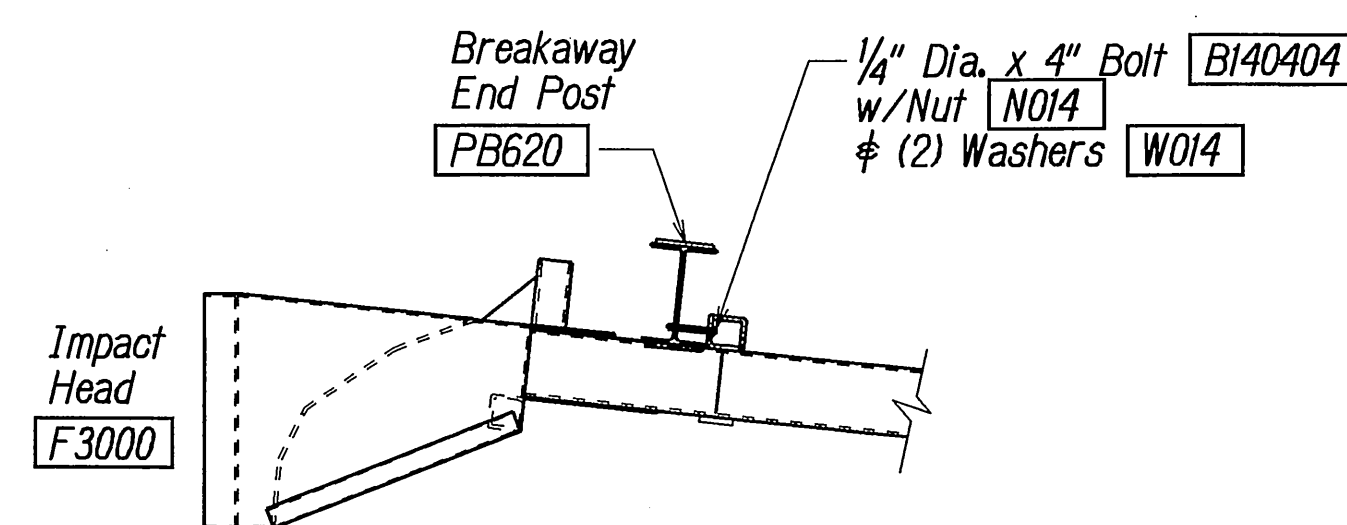
SHEET No. 3 OF 5 SHEETS



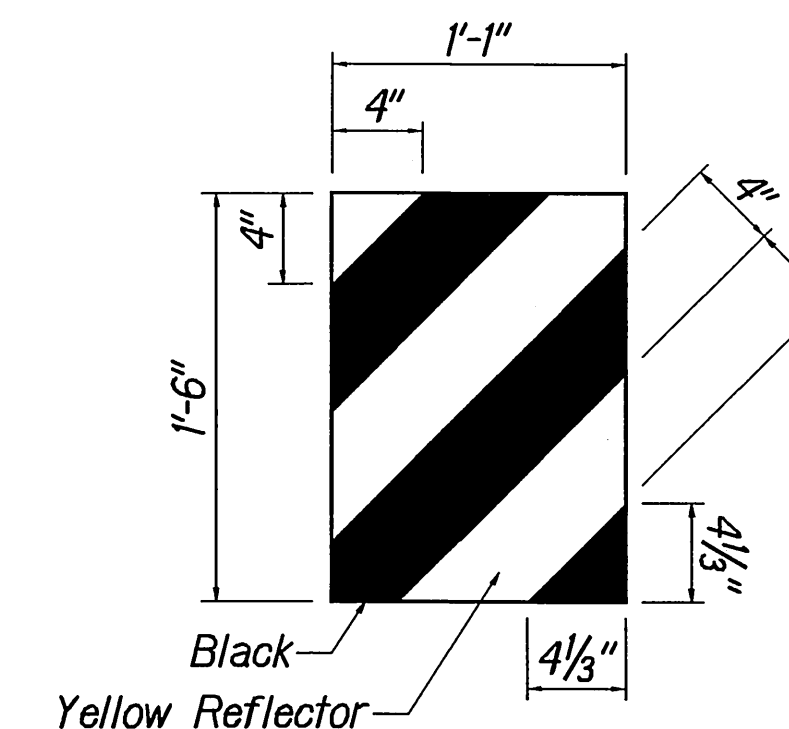
TRAFFIC →
PLAN



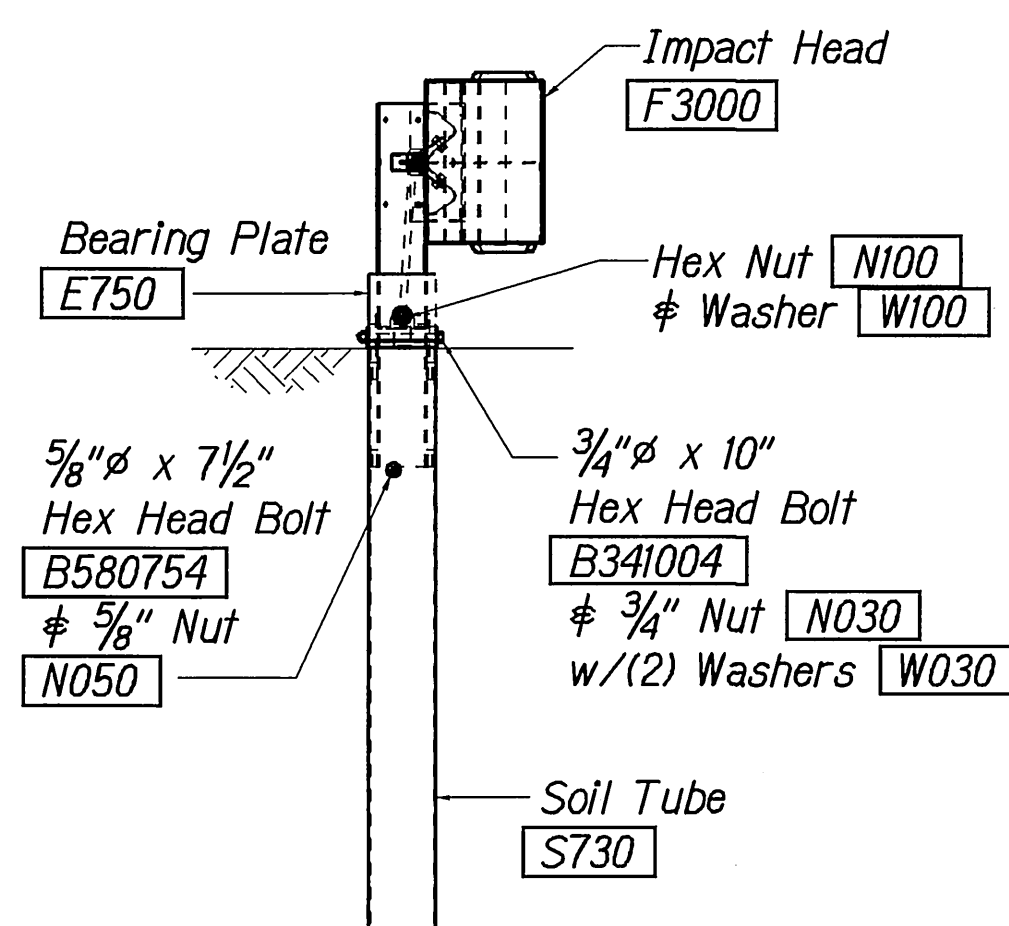
ELEVATION



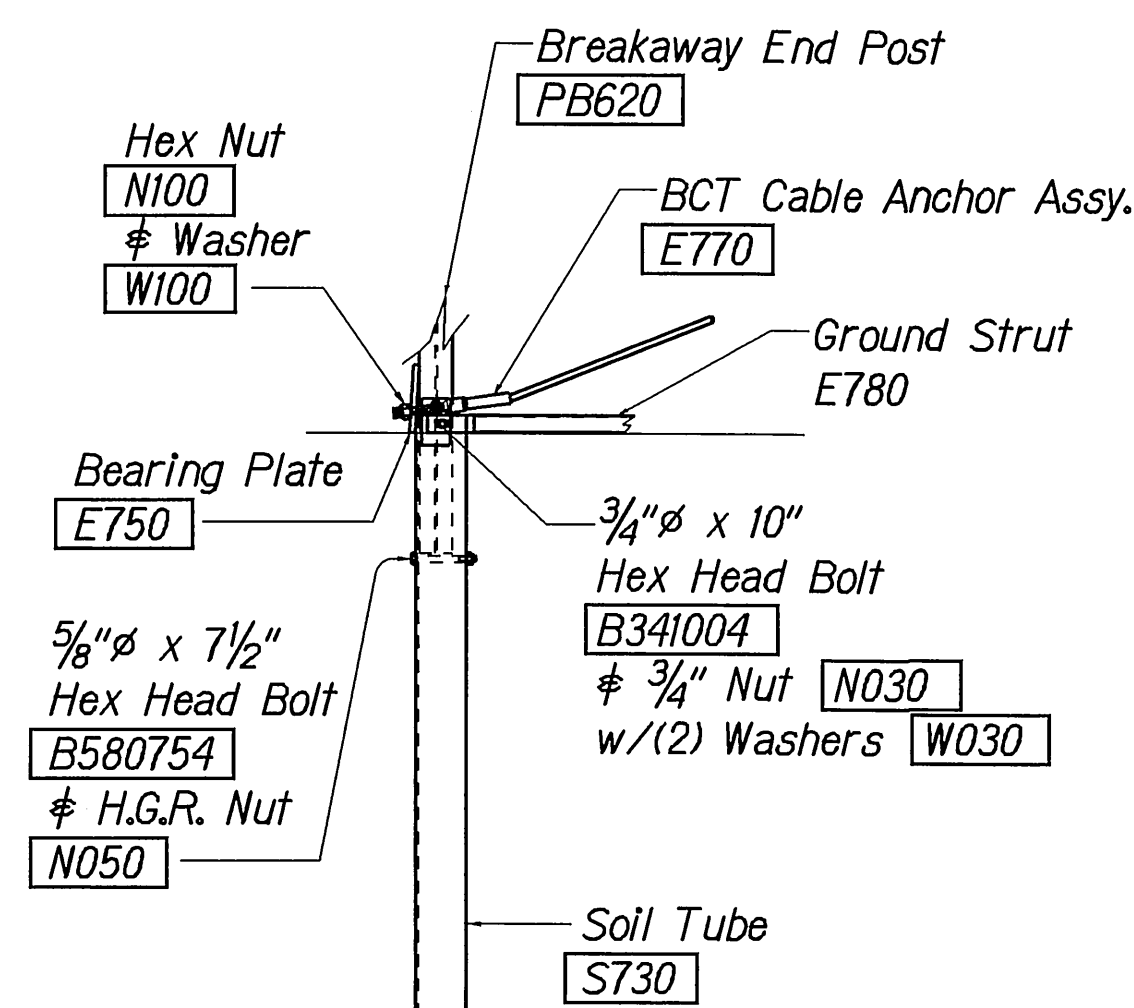
IMPACT HEAD CONNECTING DETAIL



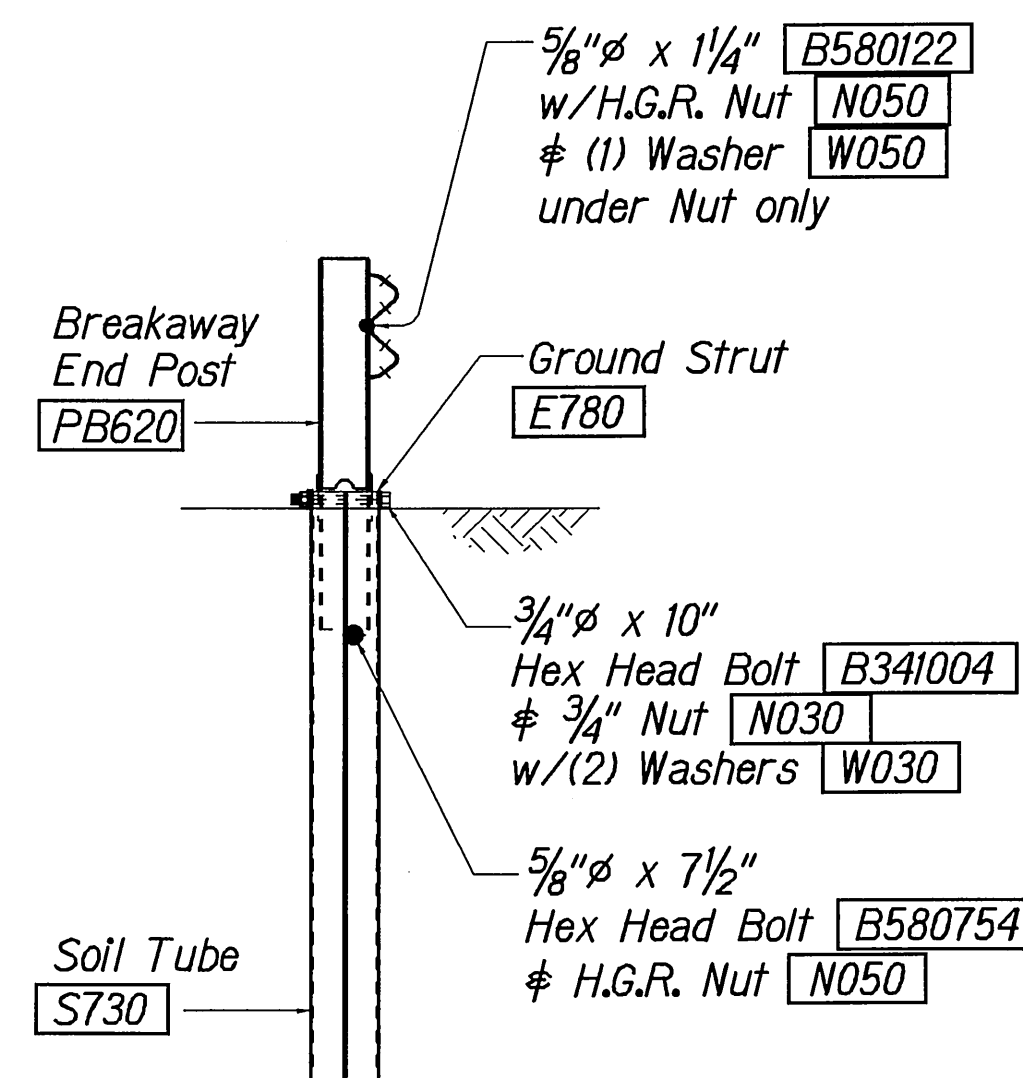
**IHRM(R)
IMPACT HEAD REFLECTOR
MARKER INSERT
DETAIL**



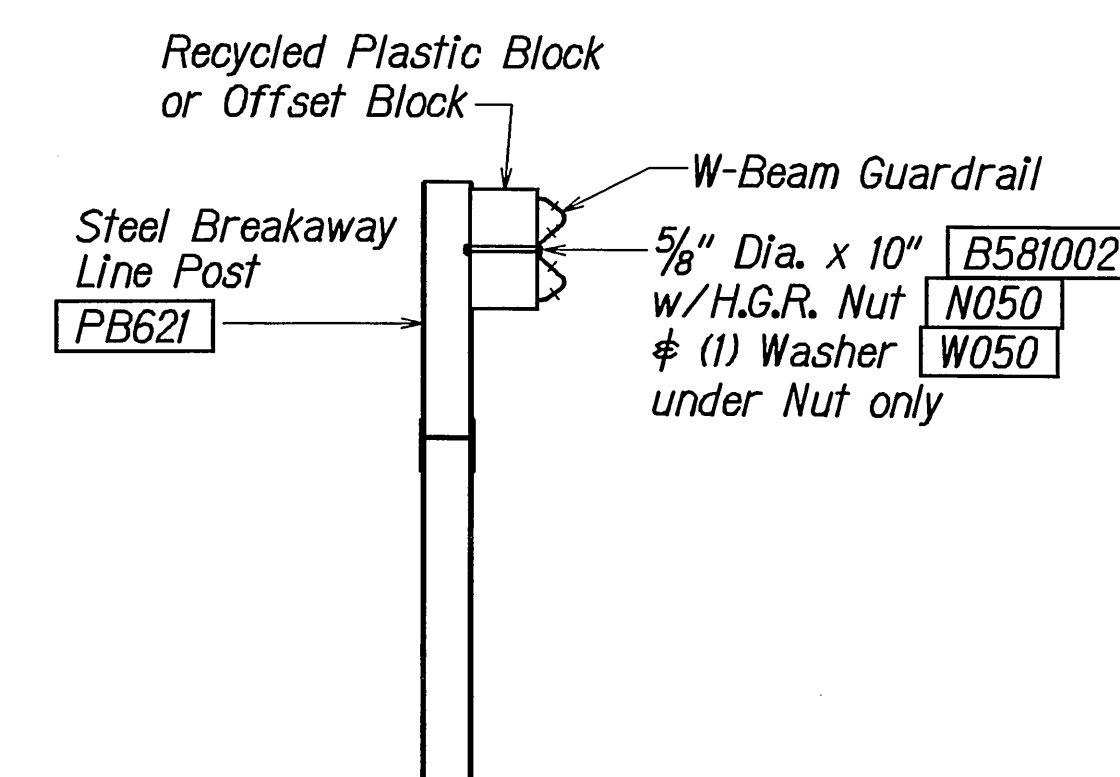
FRONT VIEW OF POST 1



PARTIAL VIEW OF POST 1



**SECTION A-A
at Post #2**



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

GENERAL NOTES

1. Breakaway steel 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 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.
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.
7. (R) or (L) indicates right or left Impact Head Reflector Marker (IHRM). Providing and installing of IHRM shall be considered incidental to end treatment.
8. The stripes for IHRM shall slope downward at an angle of 45° towards the side of the end treatment that traffic is to pass.

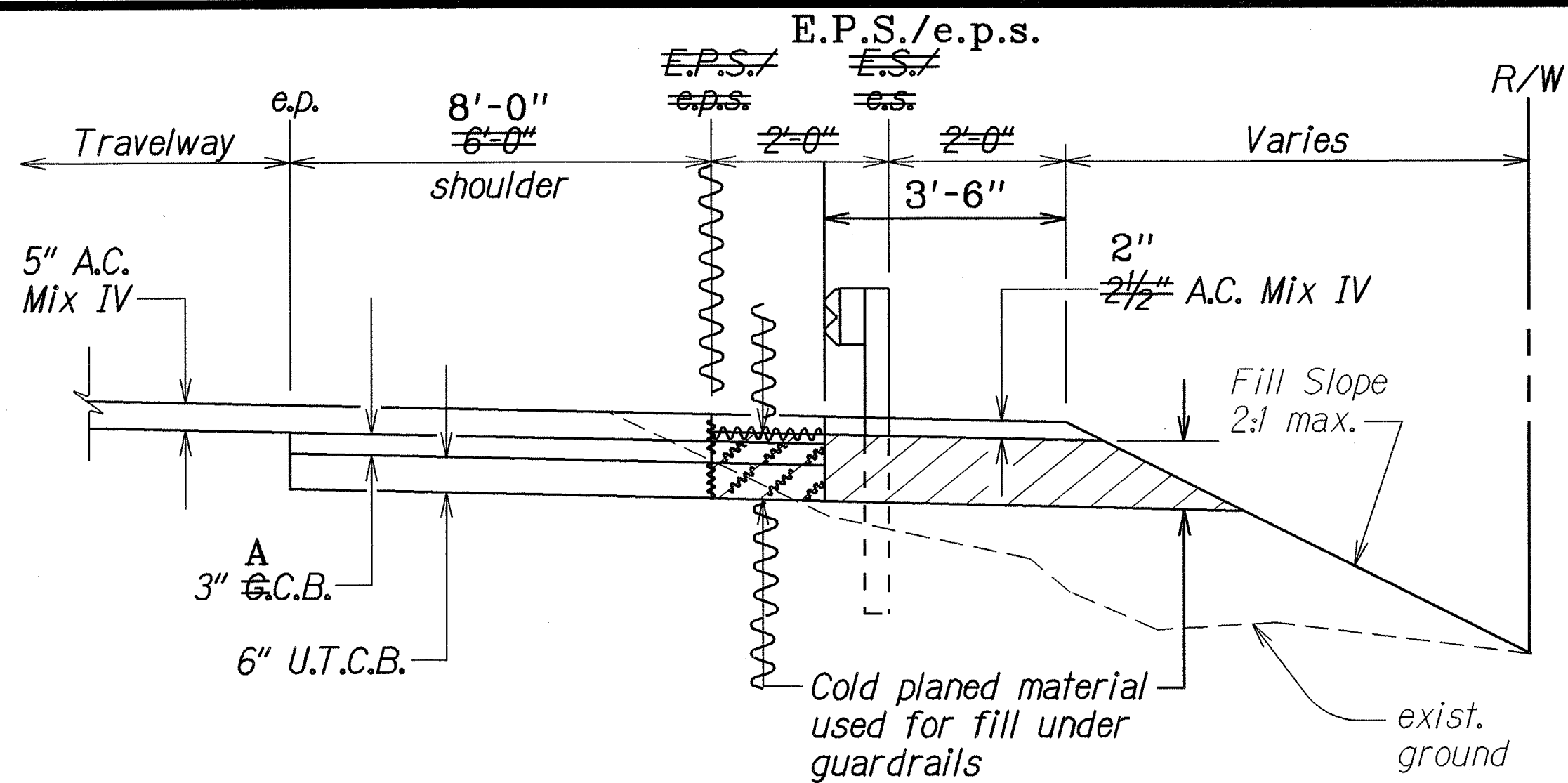
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	130B-01-07	2007	23	29

ITEM NO.	QTY.	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
G1203	2	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 3/16" 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

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
FLEAT - 350
FLARED ENERGY ABSORBING TERMINAL
 KEA'AU PAHOA ROAD
 HIGHWAY ACCESS IMPROVEMENTS
 Vicinity of Ka Ohūwahu Street
 Project No. 130B-01-07
 Scale: NTS Date: March 2007
 SHEET No. 4 OF 5 SHEETS

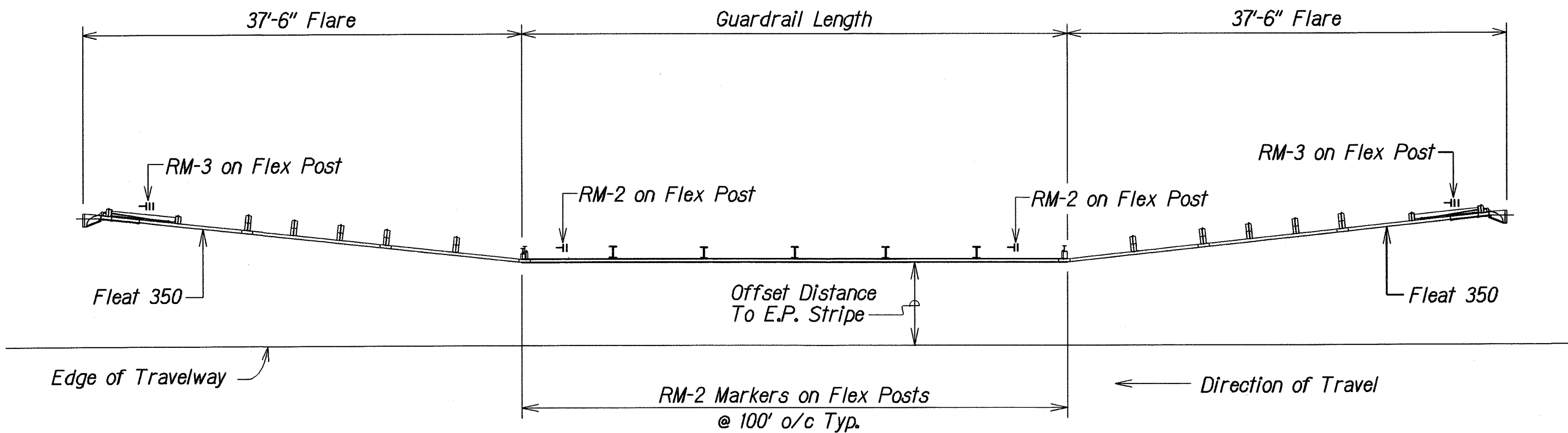
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	130B-01-07	2007	24	29



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 gurardrails, as shown. Otherwise excavated on site materials or suitable borrow materials shall be used for backfill. Payment for backfilling work shall be considered incidental to Borrow Excavated Material and will not be paid for separately.



TYPICAL GUARDRAIL @ "FLEAT 350" END TREATMENT
AND REFLECTOR MARKER INSTALLATION
Not To Scale

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.

GUARDRAIL NOTES:

1. The locations and limits of guardrails shown on the plans are approximate. The Contractor shall stake-out guardrail locations in the field for acceptance by the Engineer.
2. Unless otherwise noted all guardrail elements shall be 12'-6" nominal length.
3. See Plan Sheet No. 12-15 for Paving Under Guardrail detail.
4. All existing posts and guardrails designated for removal shall be disposed of by the Contractor at no cost to the State. This work shall be considered incidental to the various guardrail contract items.
5. The Contractor shall provide new edge of pavement striping (equal or better than existing) and Type 'C' markers at each work site damaged by his operation as determined by the Engineer. The Contractor shall also replace striping or reflector markers damaged by his operations. Payment for this work shall be incidental to various contract items.
6. Removal and reinstallation or relocation of existing signs for the purpose of guardrail removal and installation shall be incidental to the various guardrail contract items. Signs damaged by the Contractor's operations shall be repaired or replaced at no cost to the State.
7. All end treatments (Fleat 350) not completed by day's end shall be properly shielded with approved barriers as directed by the Engineer. Payment for use of the barrier shall be considered incidental to guardrail installation.
8. Replacement of existing guardrails shall be completed within the same day. No unshielded areas shall be permitted at the end of the work day.
9. At new guardrail locations, Contractor shall not leave unshielded posts exposed to public travel. Contractor shall at least install rail elements on posts at the end of each work day.
10. Where full embedment of guardrail post cannot be achieved, the Contractor shall nest the beam(s) in accordance with the latest State DOT, Traffic Design alternate design guidelines. This shall be considered incidental to various guardrail items.
11. References on the plans to Standard Metal Guardrails and Posts shall be considered the same as Strong Post W-Beam Guardrail.

LEGEND FOR AS-BUILT POSTINGS

	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAIL & NOTES

KEEAU-PĀHOA ROAD
HIGHWAY ACCESS IMPROVEMENTS
Vicinity of Ka Ohūwalu Street
Project No. 130B-01-07

Scale: As Noted Date: March 2007
SHEET No. 5 OF 5 SHEETS