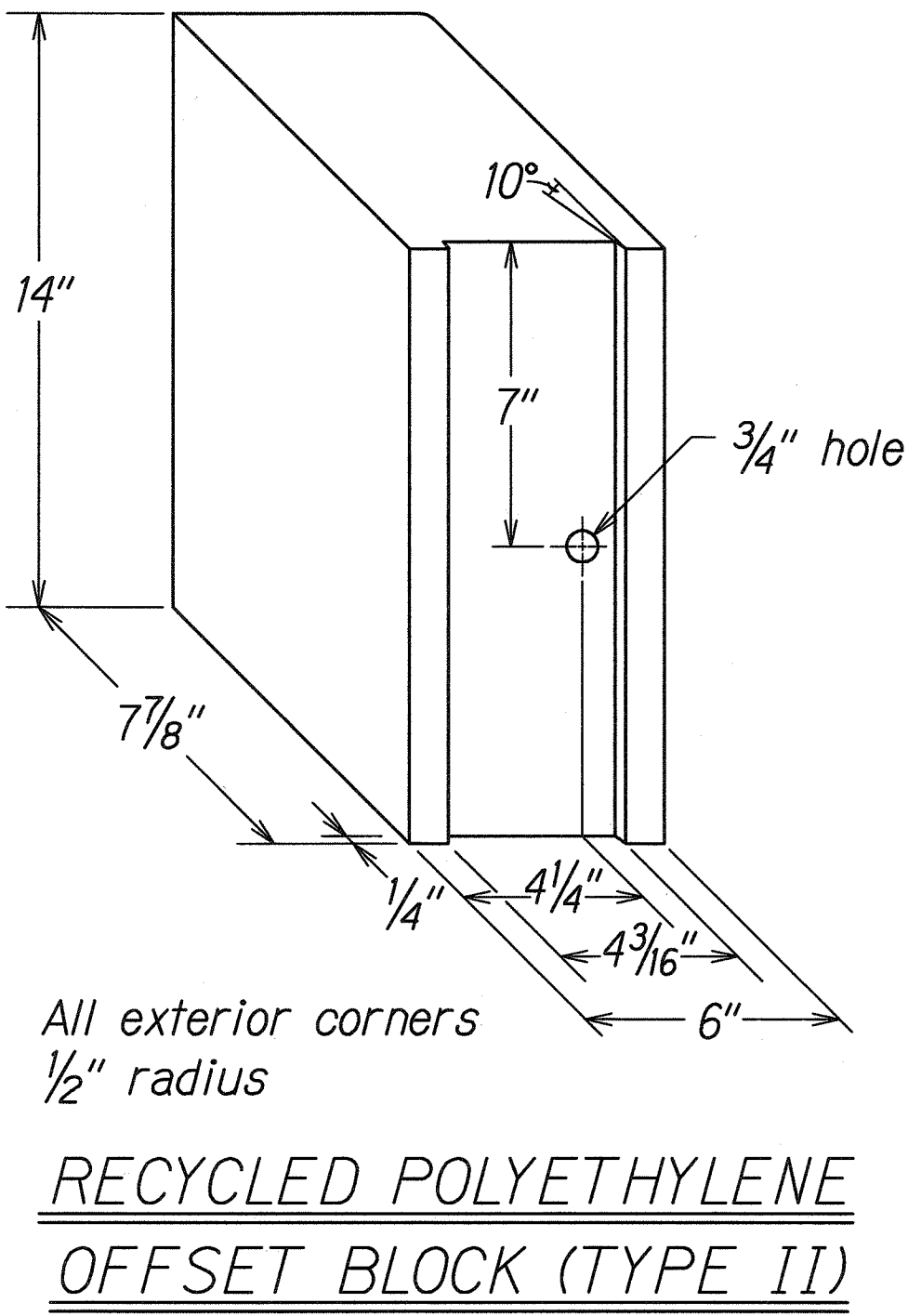
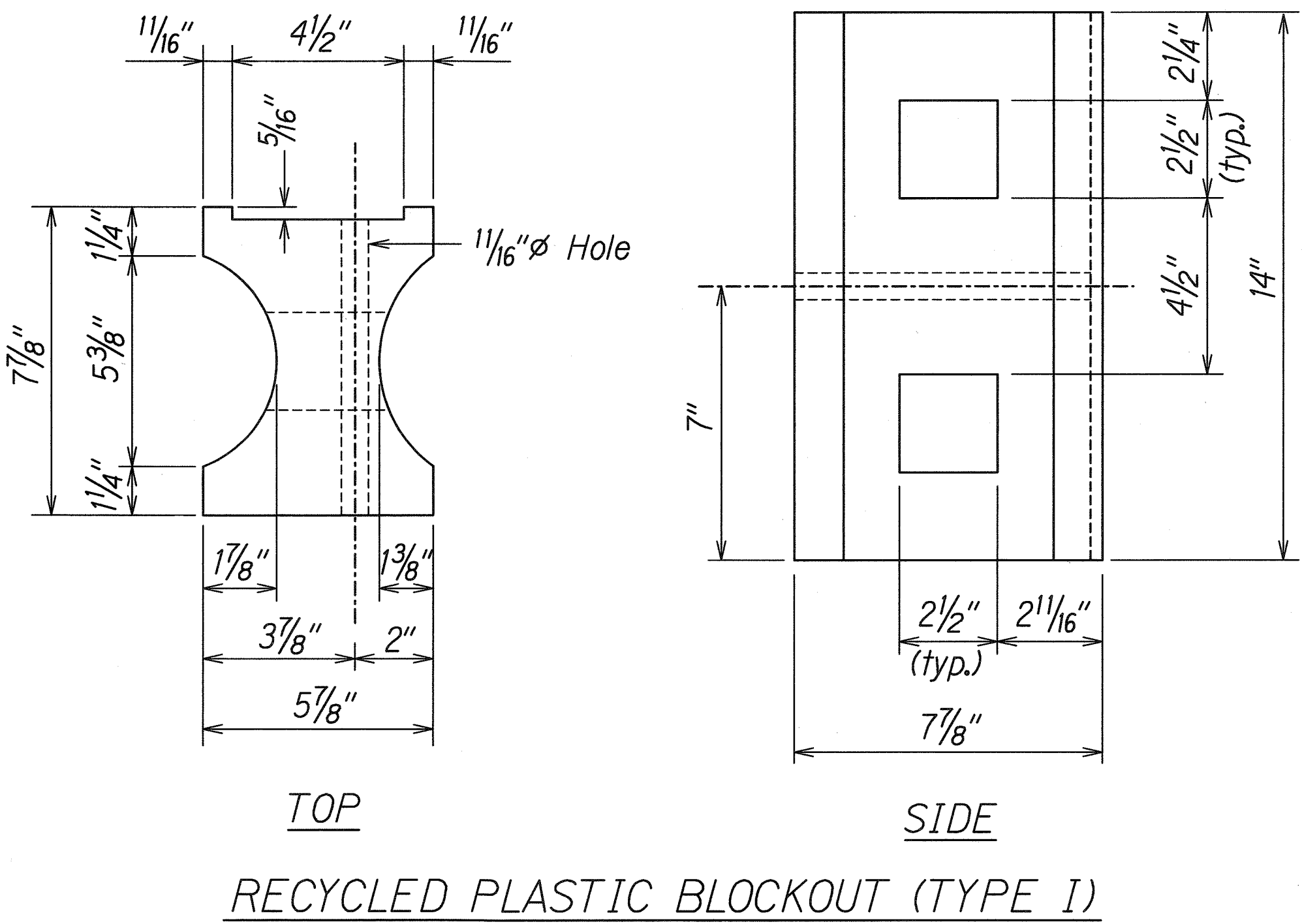


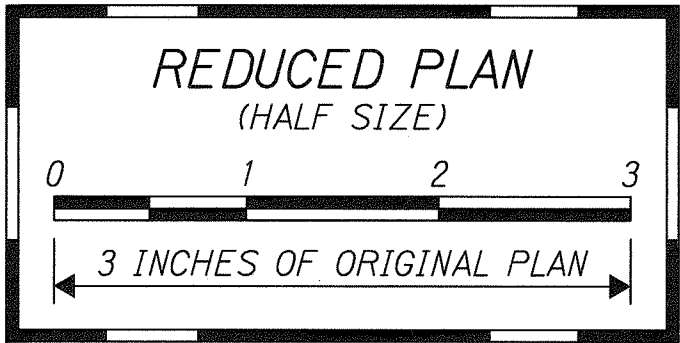
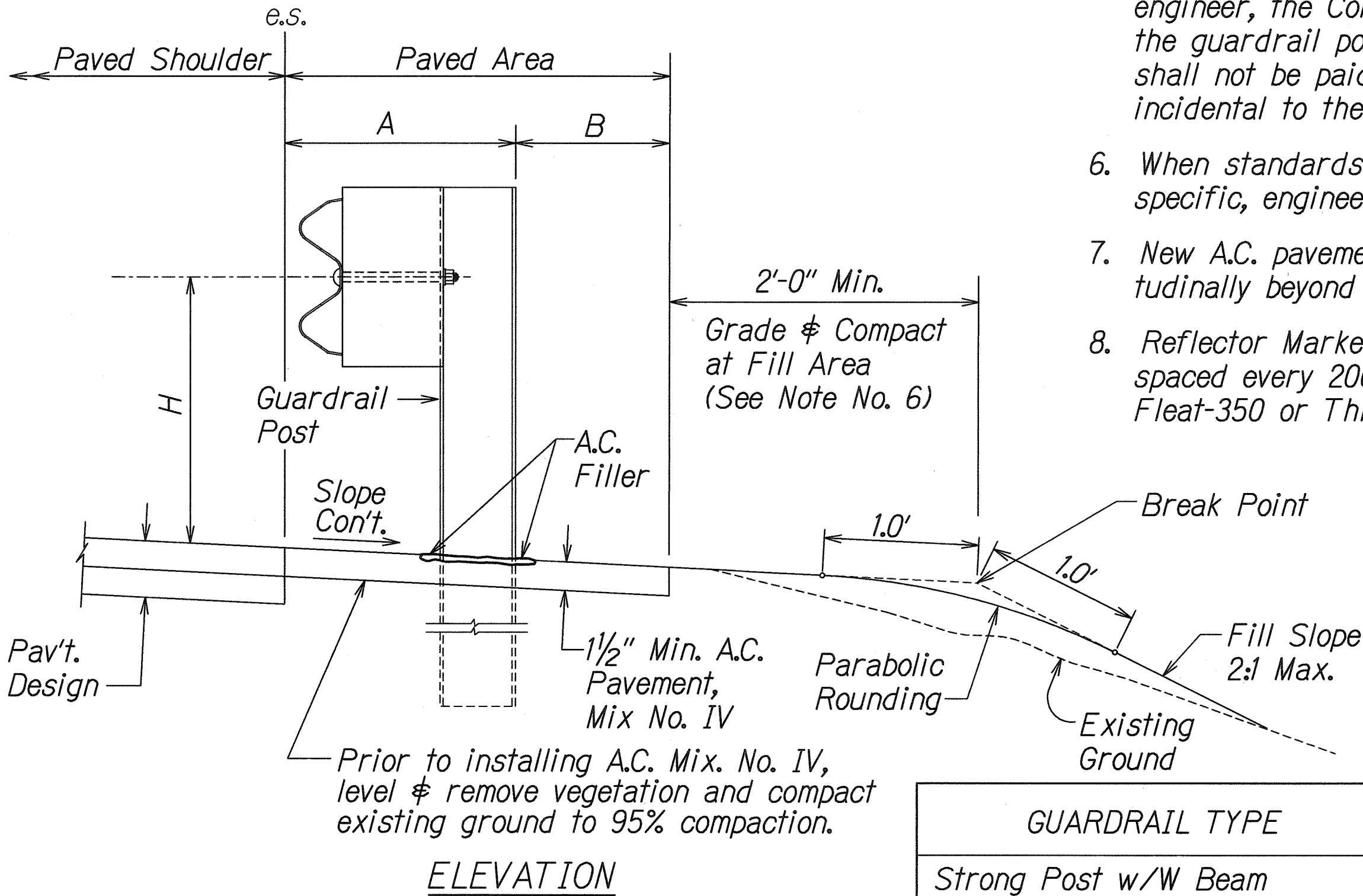
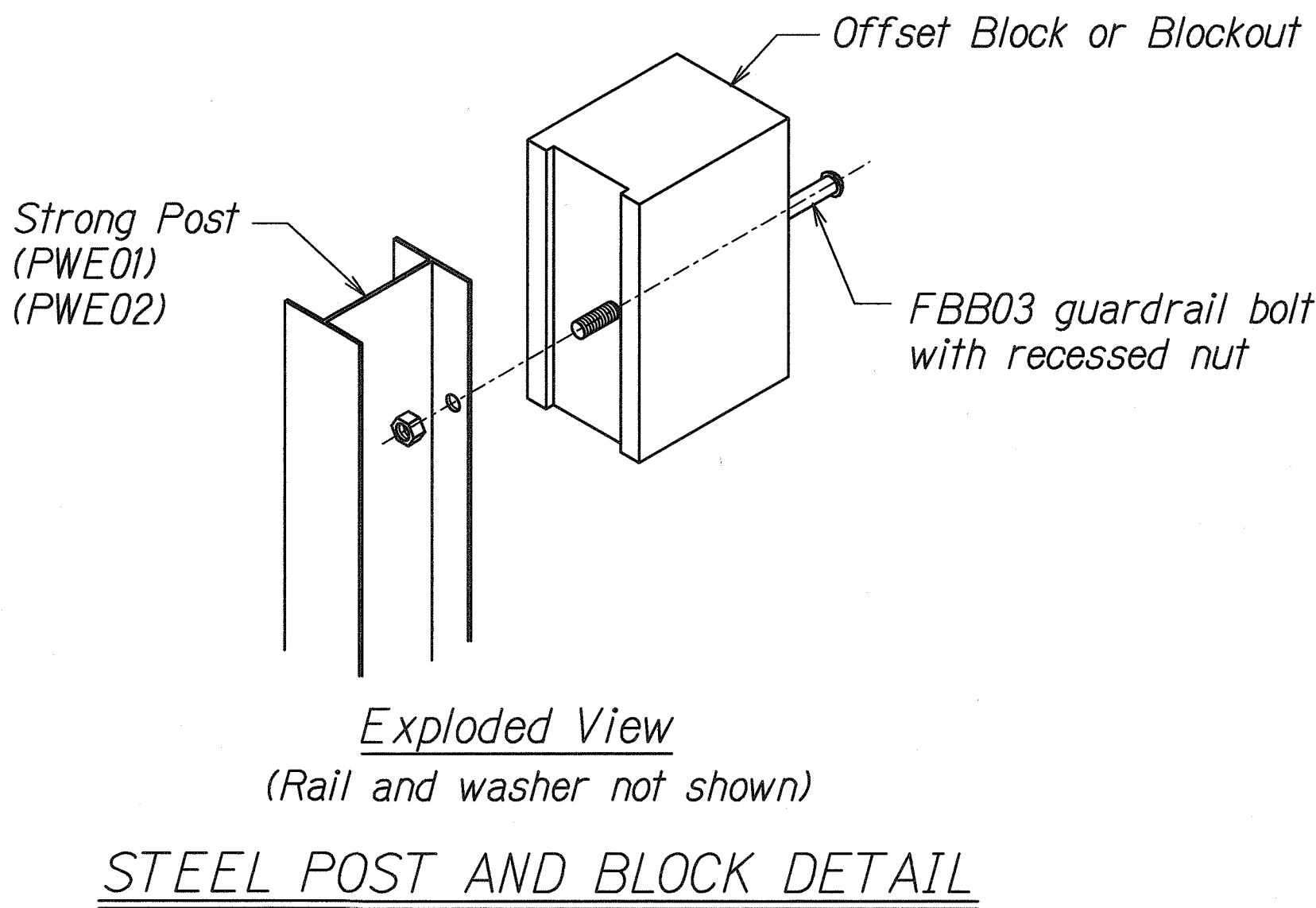


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	67	77



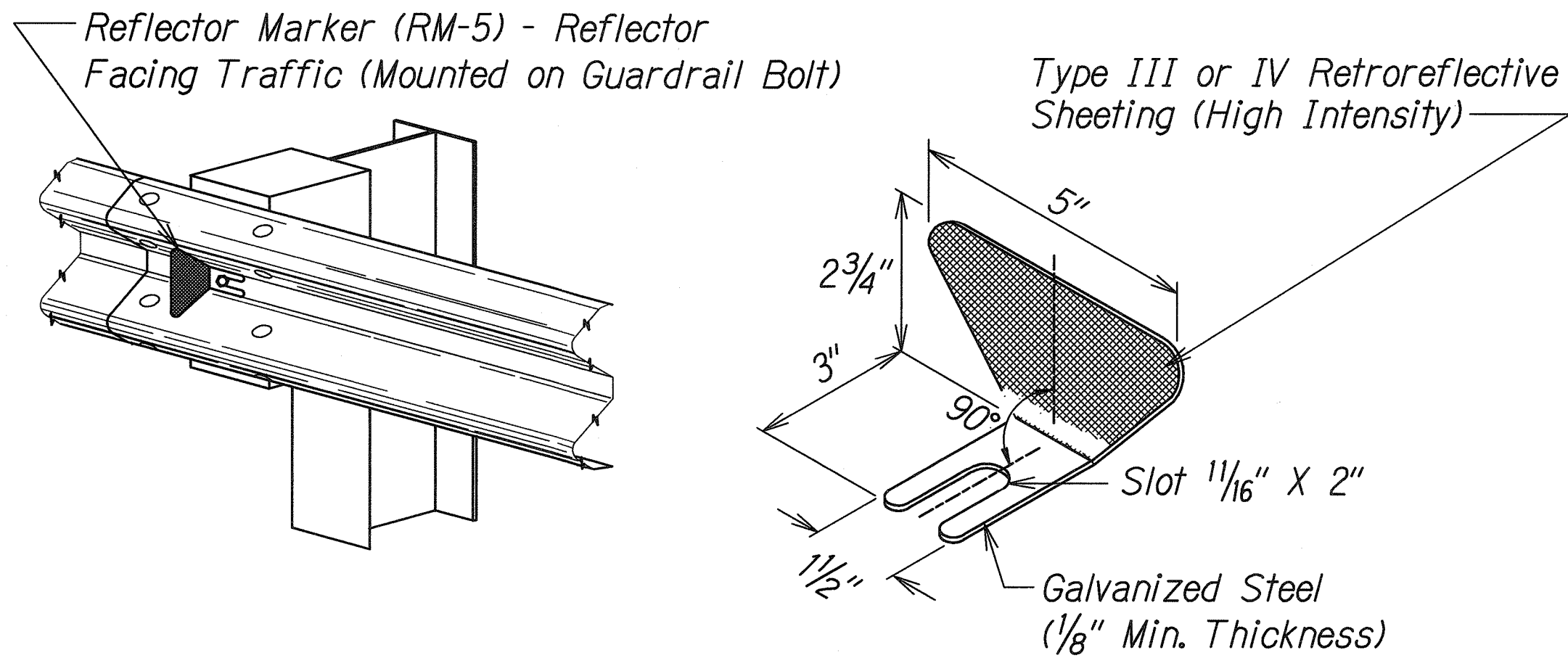
GENERAL NOTES

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. 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. RM-5's shall not be installed on Fleet-350 or Thrie Beam guardrail.

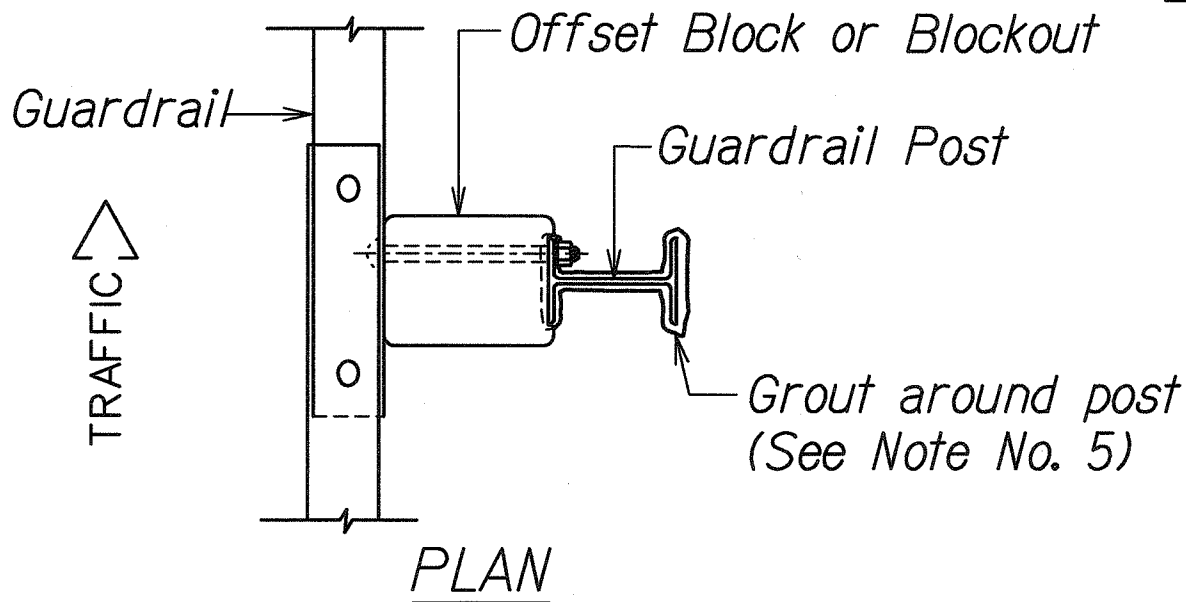


[1] \* Or As Directed By Engineer

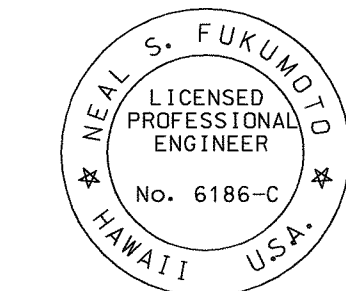
GUARDRAIL TYPE	DIMENSION		
	H*	A	B
Strong Post w/W Beam	1'-9 5/8"	1'-6"	1'-0"
Modified Thrie Beam	1'-10"	2'-0"	1'-0"



REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION



TYPICAL GUARDRAIL INSTALLATION



This work was prepared by me or under my supervision.

*Neal S. Fukunaga*

Wesley R. Segawa & Associates, Inc.

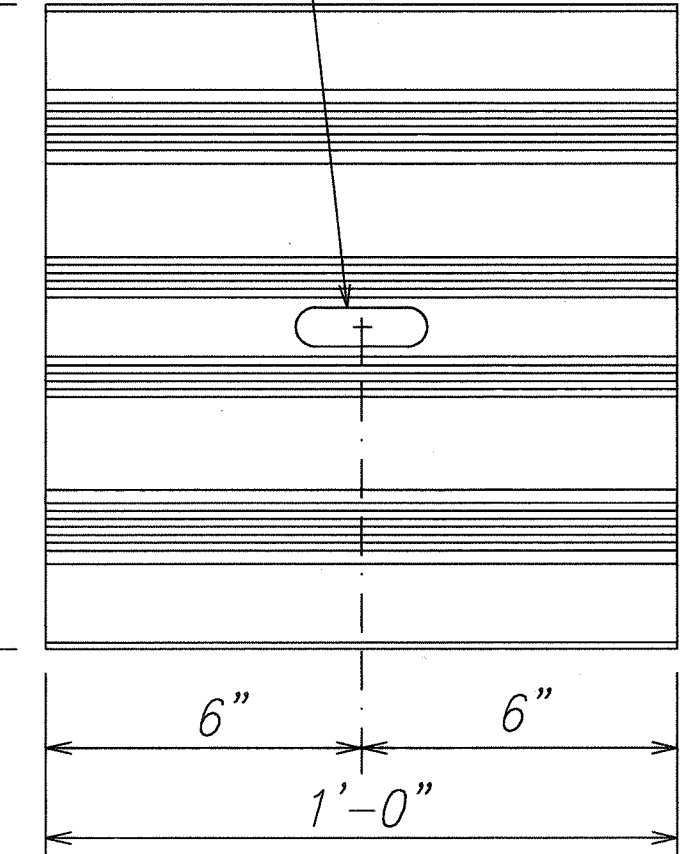
01-30-01	[1] Note Added
DATE	DESCRIPTION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>GUARDRAIL DETAILS &amp; NOTES</b>	
MAMALAHOA HIGHWAY EMERGENCY REPLACEMENT OF KEAIIWA STREAM BRIDGE Federal Aid Project No. ER-12(1)R	
Scale: NTS	Date: January 2001
SHEET No. 1 OF 1 SHEETS	

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
DATE	



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	68	77

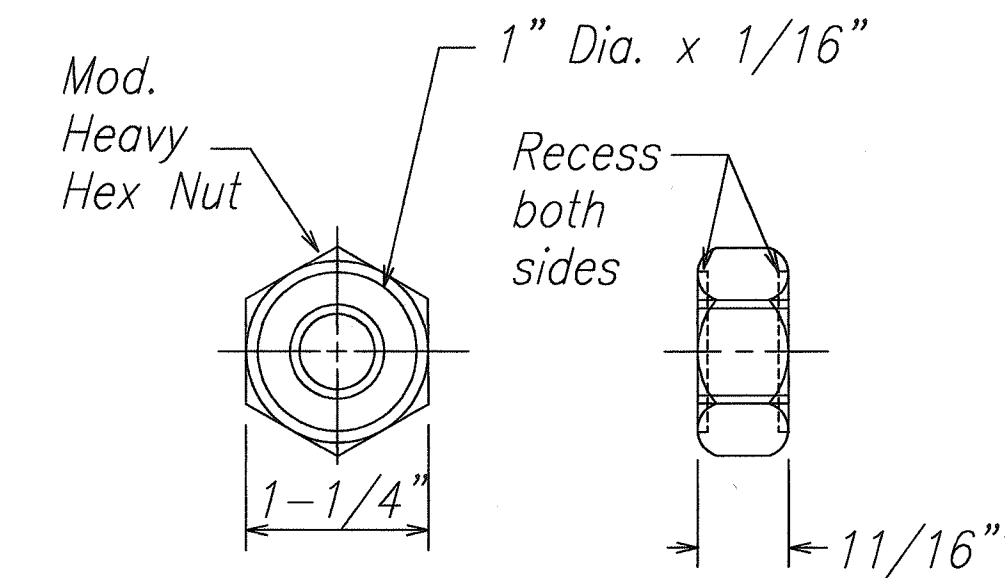
3/4" x 2-1/2" Post Bolt Slot (typ.)



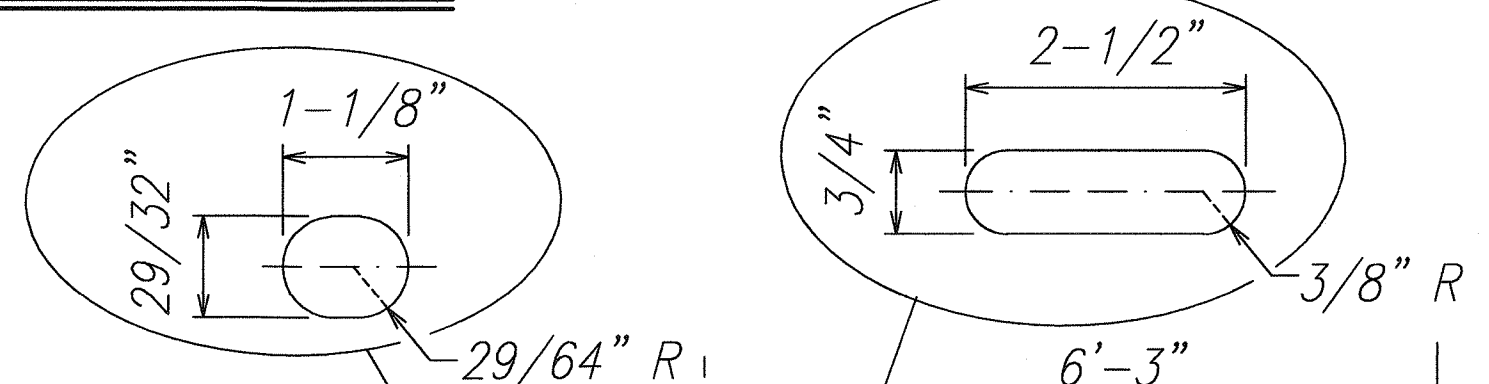
DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 Ga.

W-BEAM BACK-UP-PLATE (RWB01a)

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

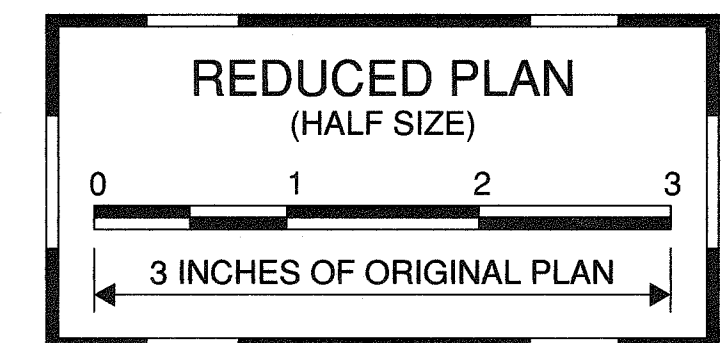


GUARDRAIL BOLTS AND RECESSED NUT



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Ga.

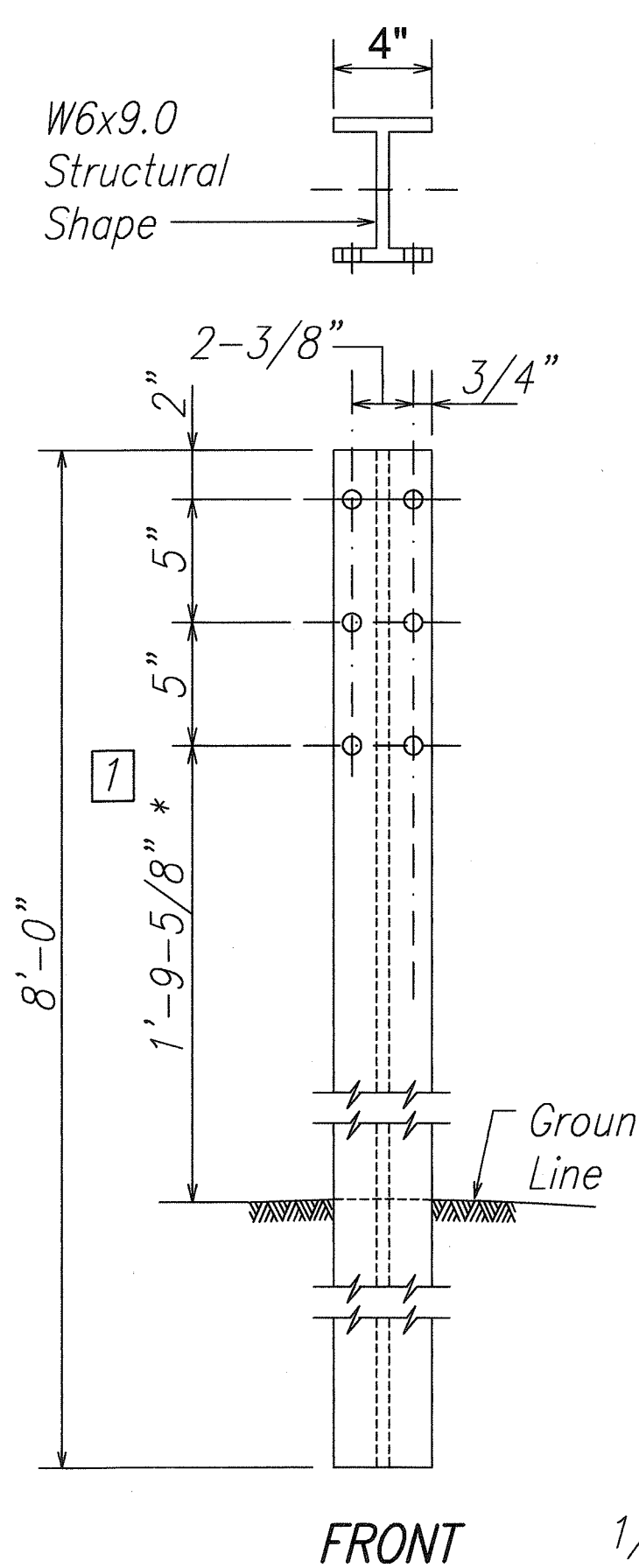
2 SPACE W-BEAM GUARDRAIL (RWM02a)



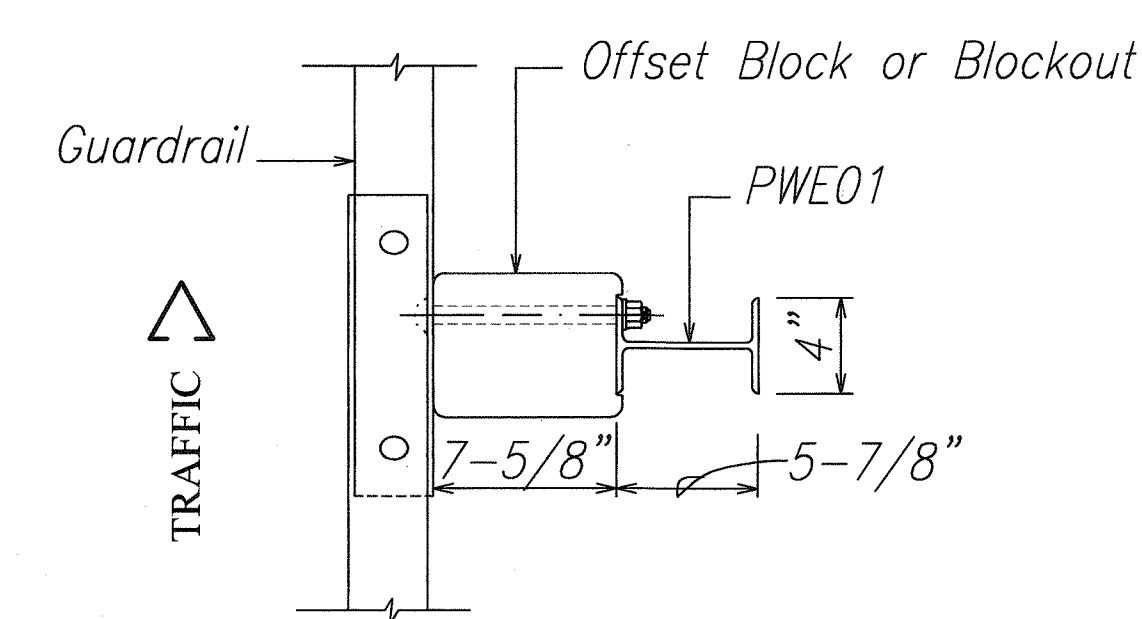
NEAL S. FUKUNAGA  
LICENSED PROFESSIONAL ENGINEER  
No. 6185-C  
HAWAII U.S.A.  
This work was prepared by me or under my supervision.  
Wesley R. Segovia & Associates, Inc.

01-30-01	Note Added.
DATE	DESCRIPTION
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>STRONG POST W-BEAM GUARDRAIL</b> MAMALAHOA HIGHWAY EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE Federal Aid Project No. ER-12(1)R Scale: As Shown Date: January 2001
SHEET No. 1	OF 1 SHEETS

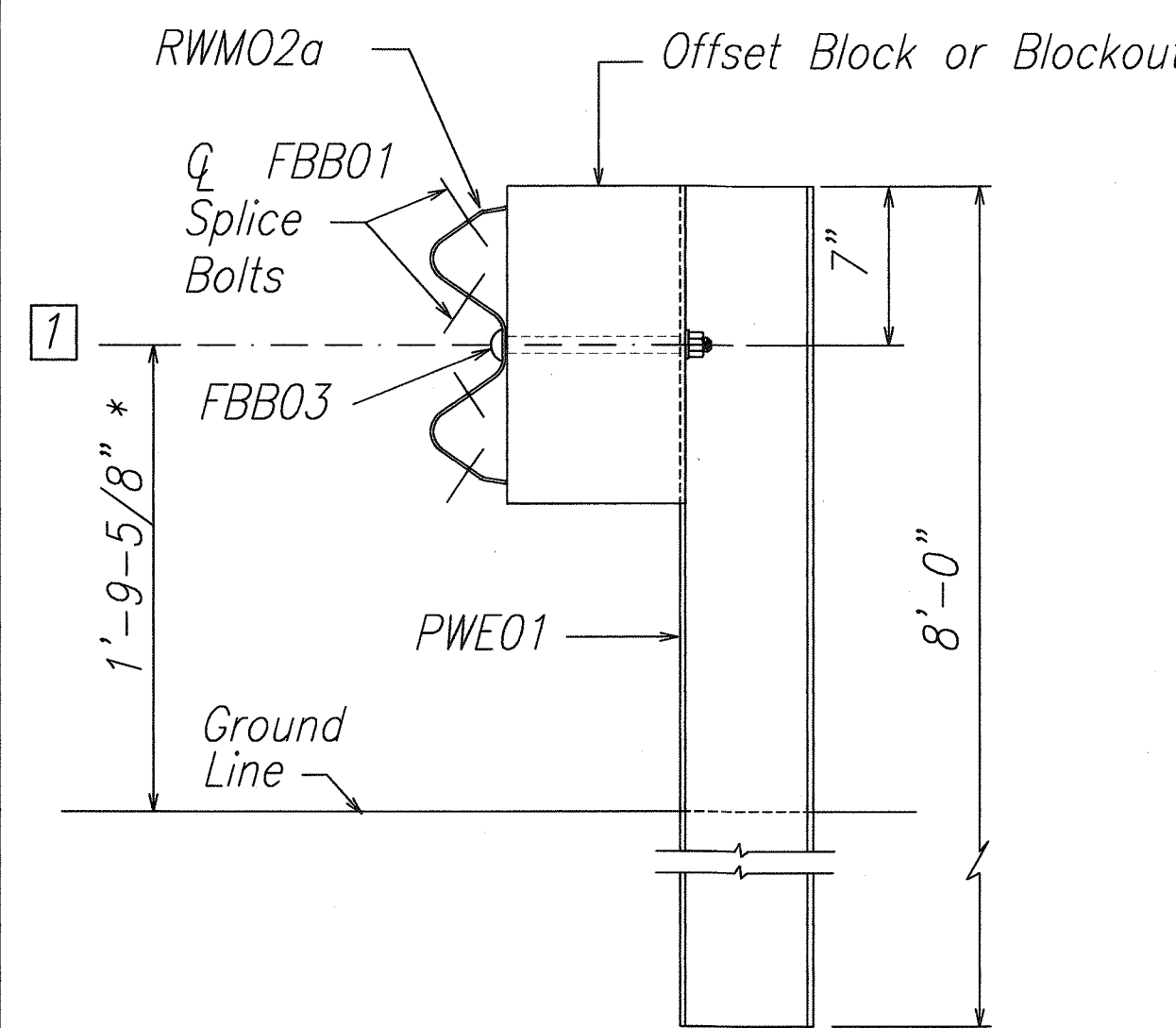
NOTE:  
All Holes are 3/4" Dia.



W-BEAM STRONG POST

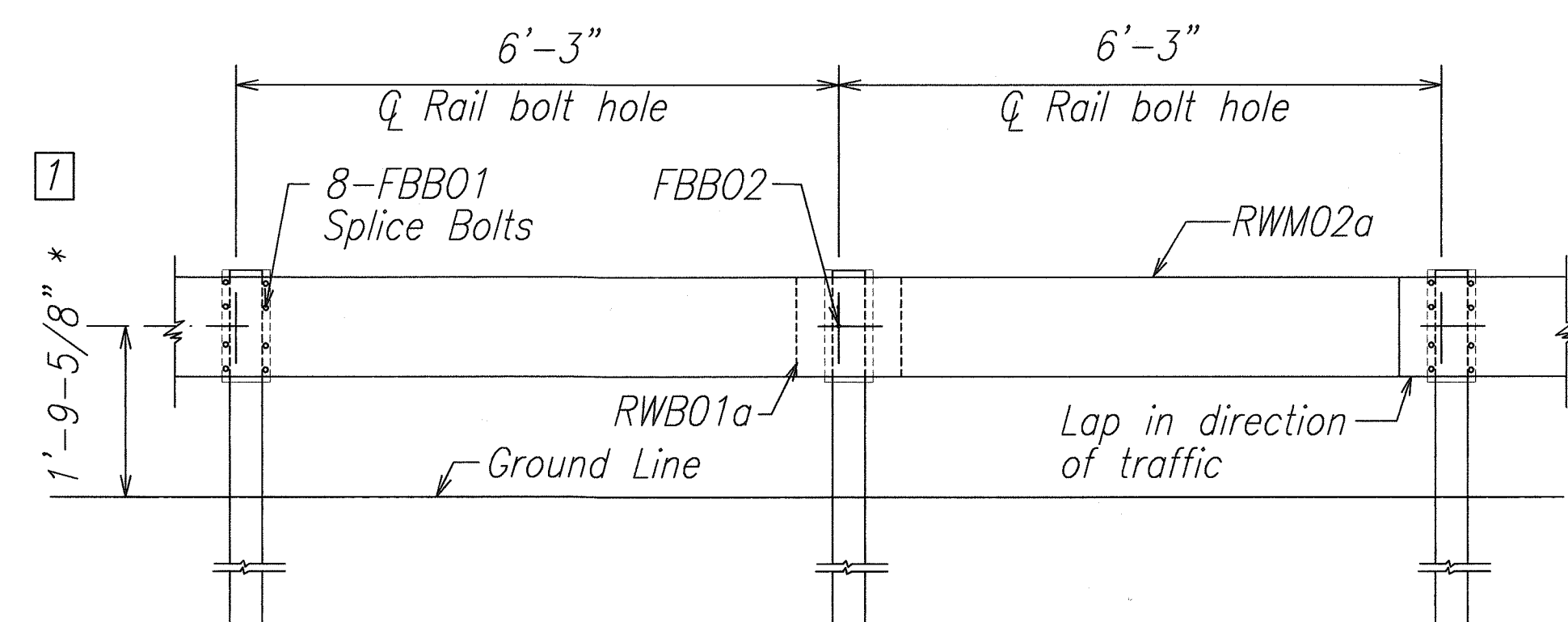


PLAN



ELEVATION

STRONG POST W-BEAM GUARDRAIL \* Or As Directed By The Engineer. 1

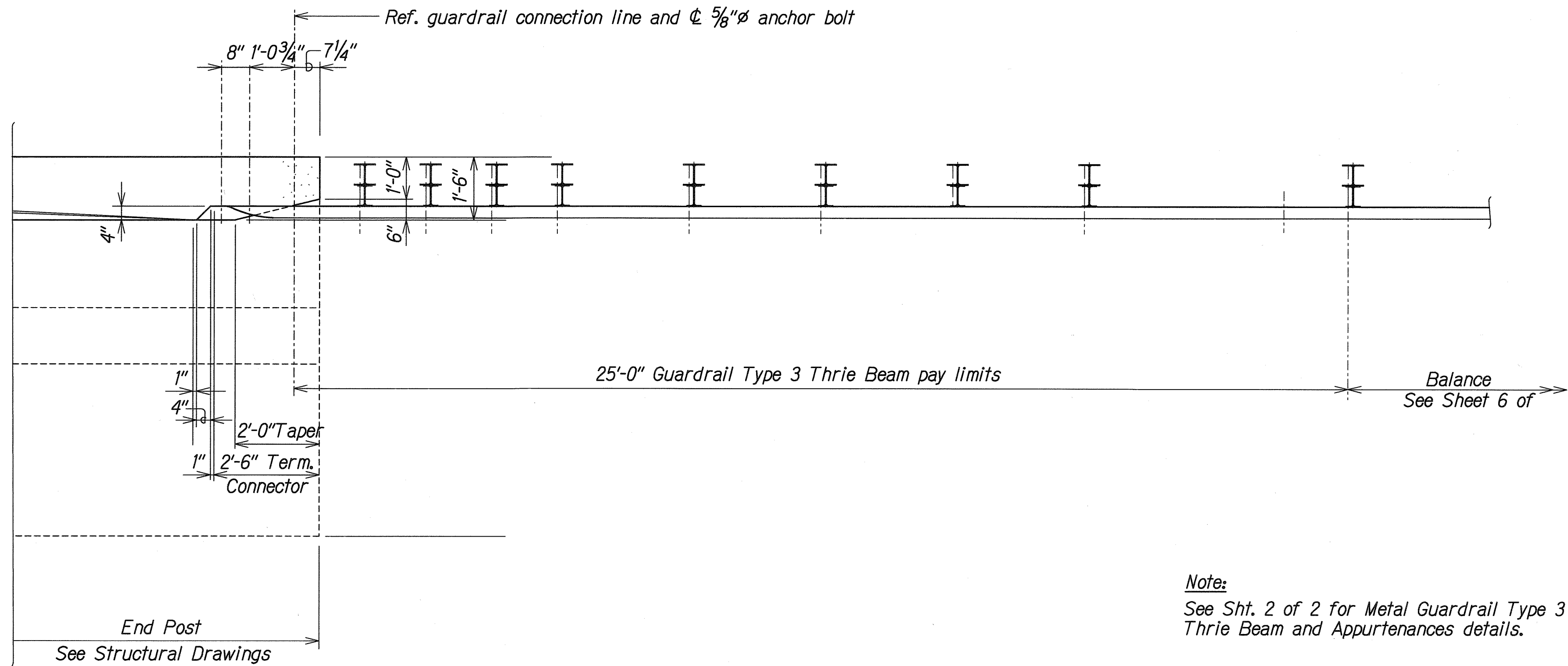


ELEVATION

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

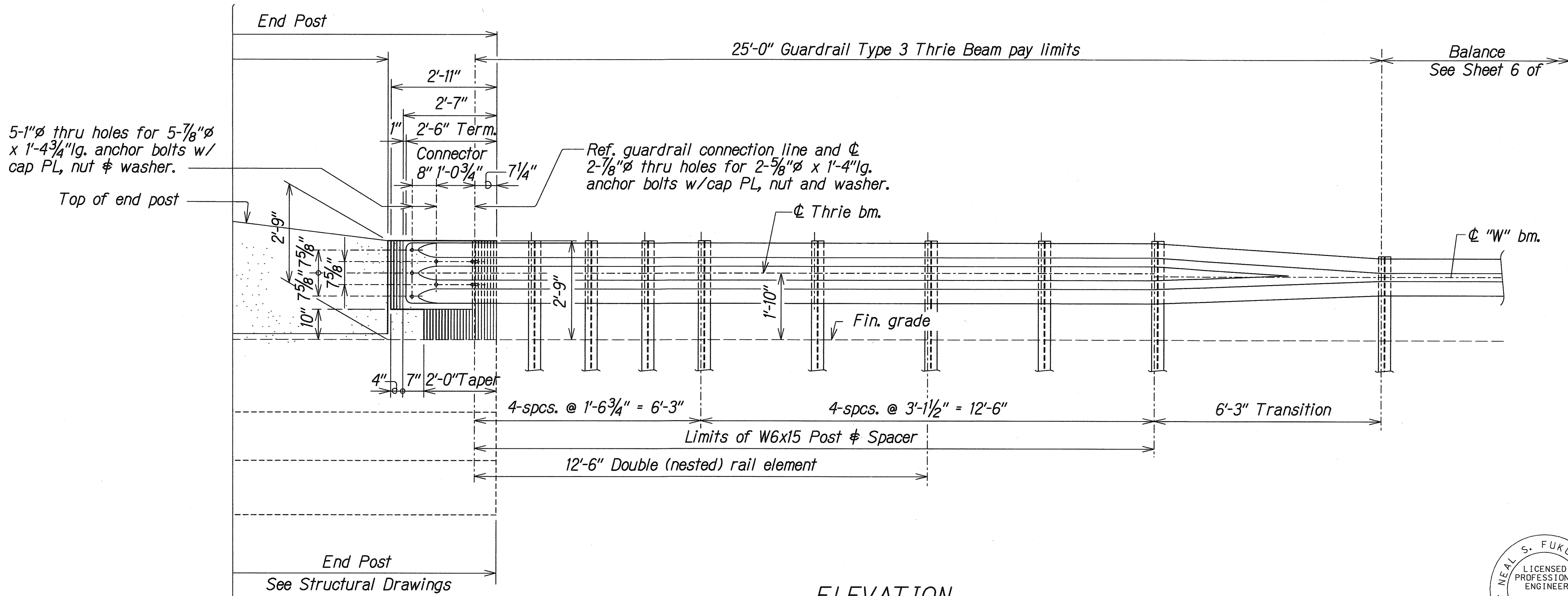
ORIGINAL PLAN	DATE
NOTE BOOK	JAN 01
DESIGNED BY	JAN 01
QUANTITIES BY	
CHECKED BY	
No. dwg.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	69	77



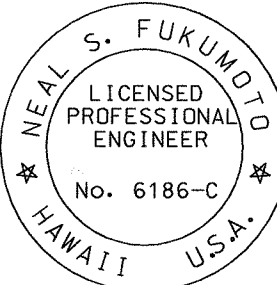
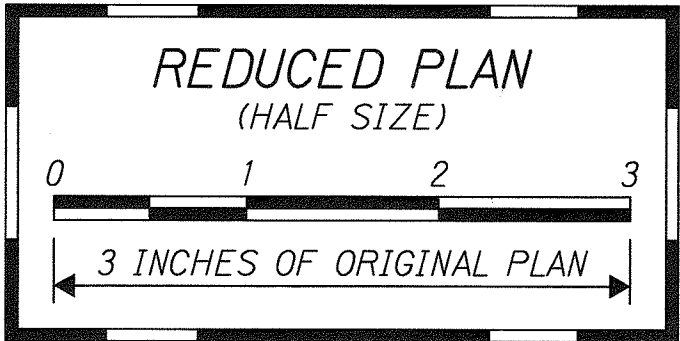
Note:  
See Sht. 2 of 2 for Metal Guardrail Type 3  
Thrie Beam and Appurtenances details.

PLAN  
Scale: 1/2" = 1'-0"



ELEVATION  
Scale: 1/2" = 1'-0"

# THRIE BEAM PLAN AND ELEVATION



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Wesley R. Segawa & Associates, Inc.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**THRIE BEAM & APPURTENANCE DETAILS**  
MAMALAHOA HIGHWAY  
EMERGENCY REPLACEMENT OF  
KEAIIWA STREAM BRIDGE  
Federal Aid Project No. ER-12(1)R  
Scale: NTS Date: January 2001  
SHEET No. 1 OF 2 SHEETS

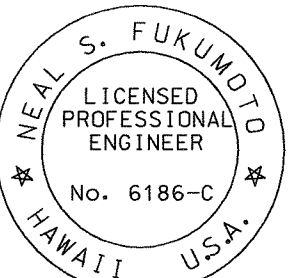
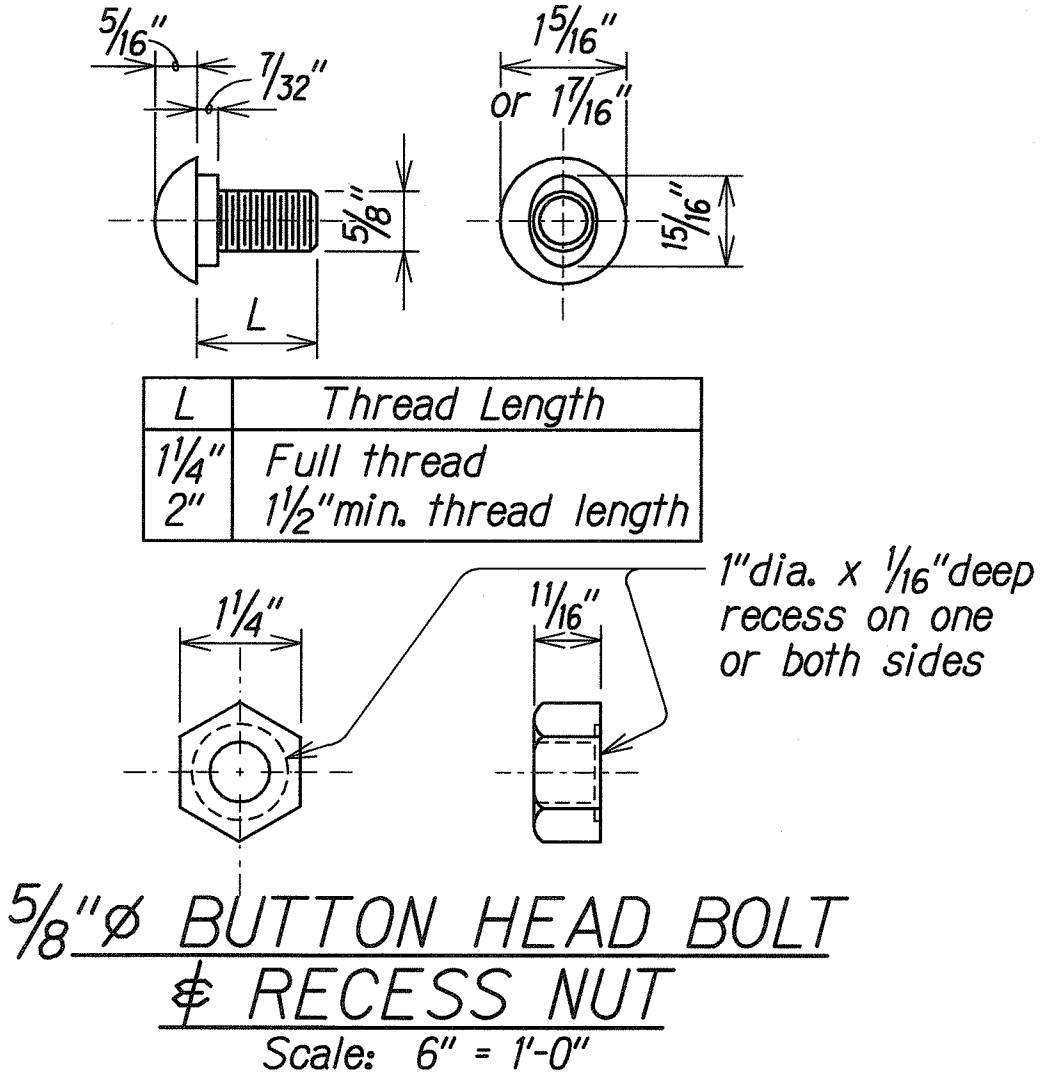
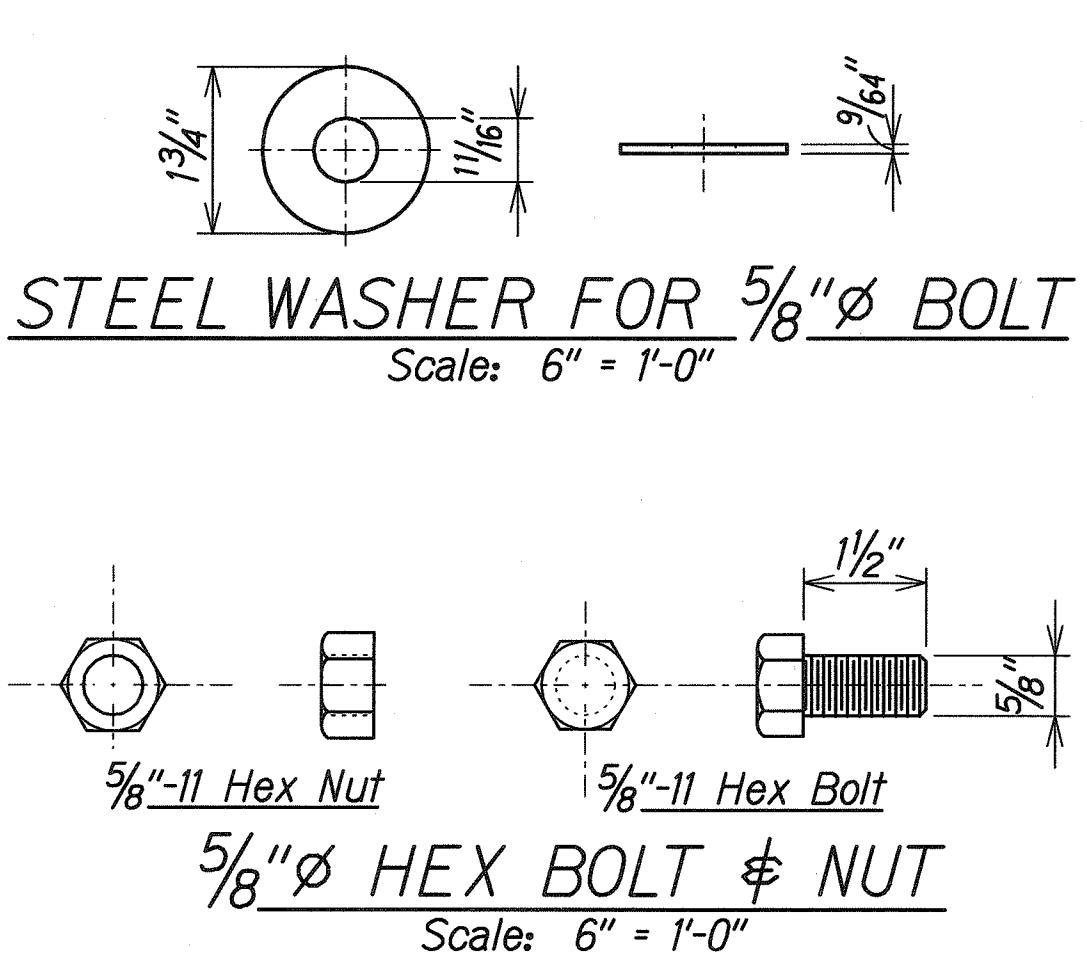
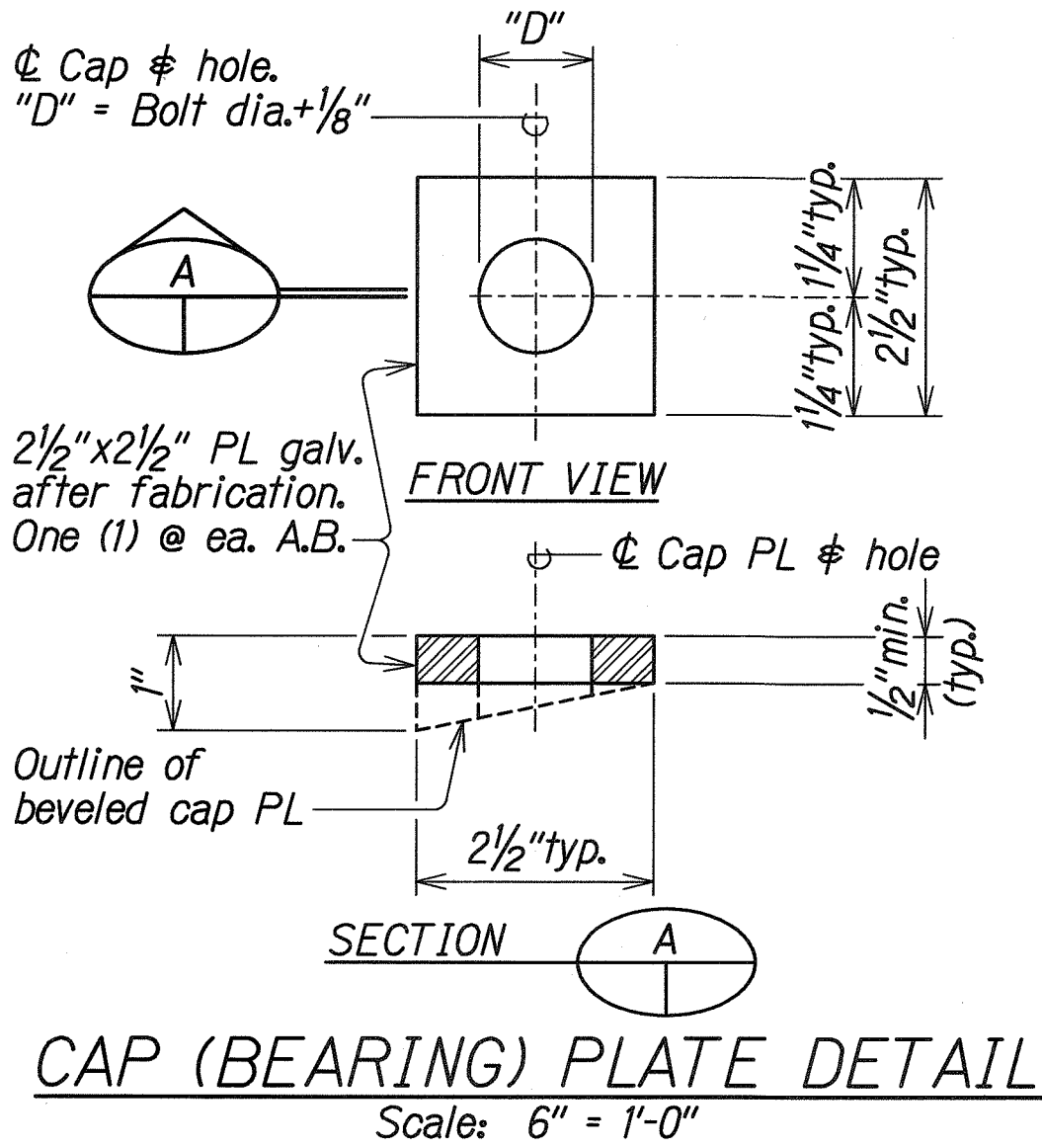
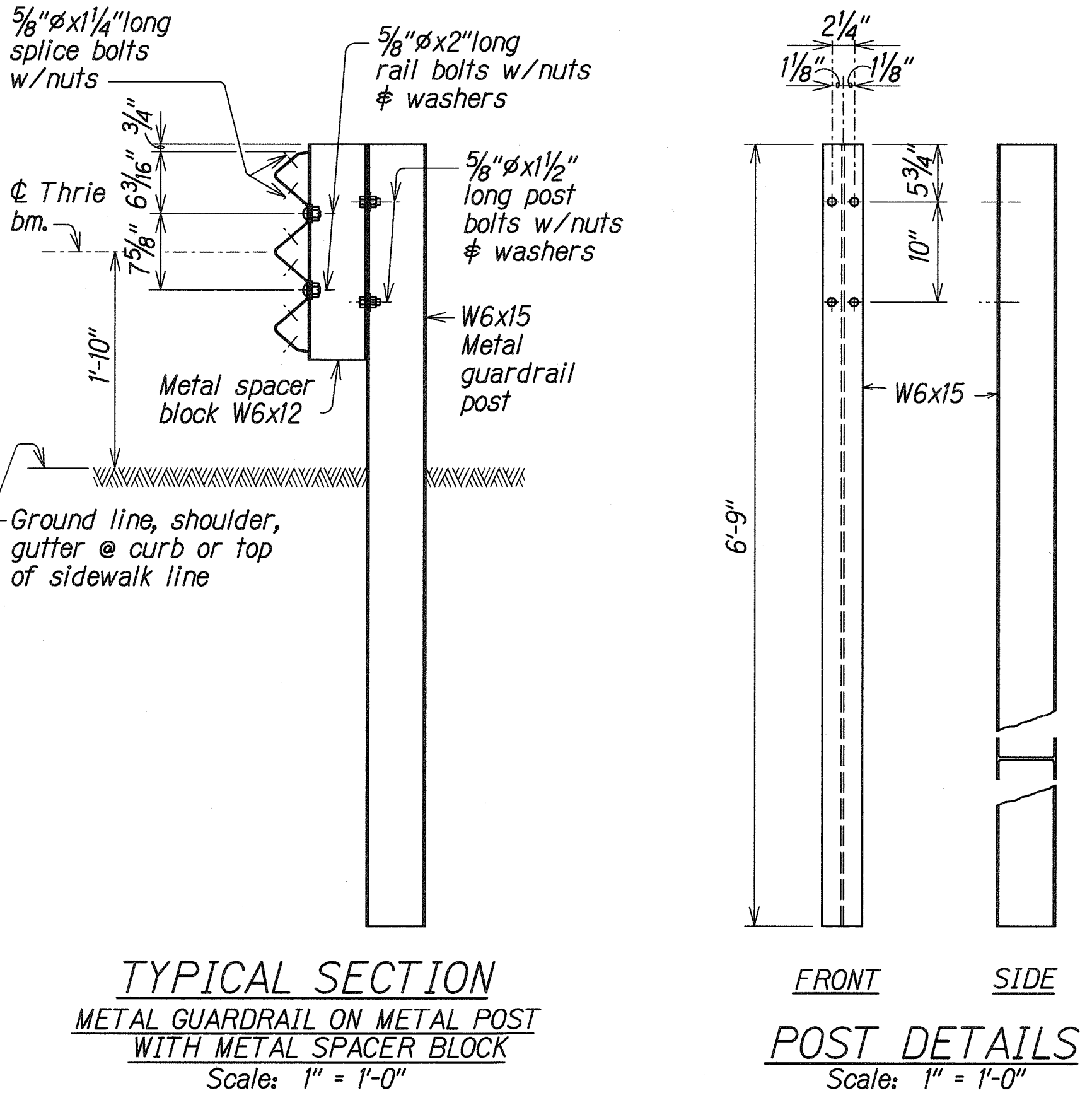
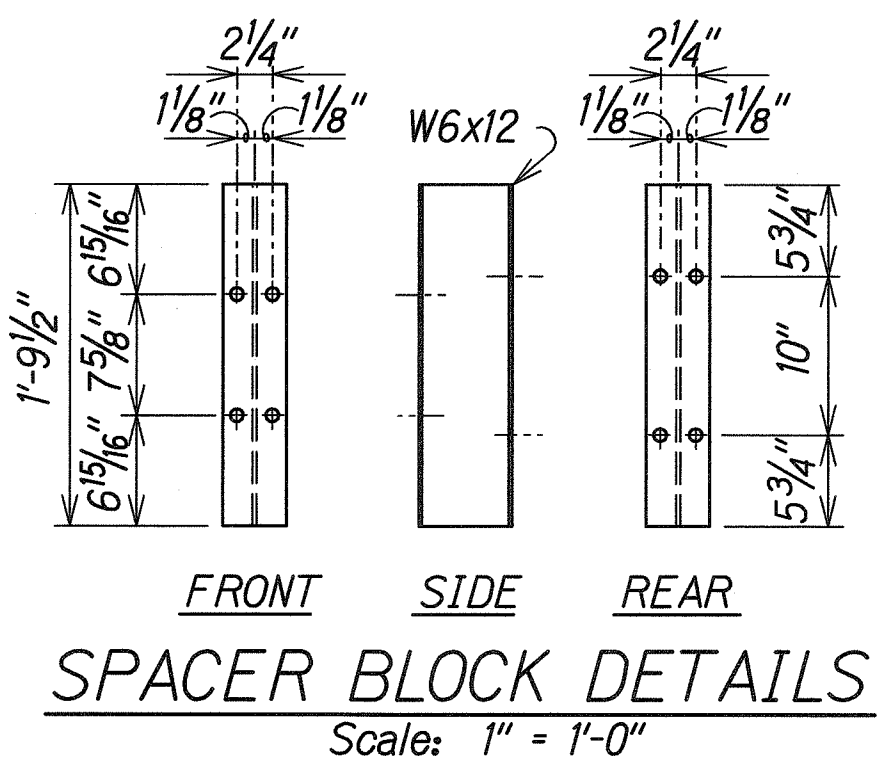
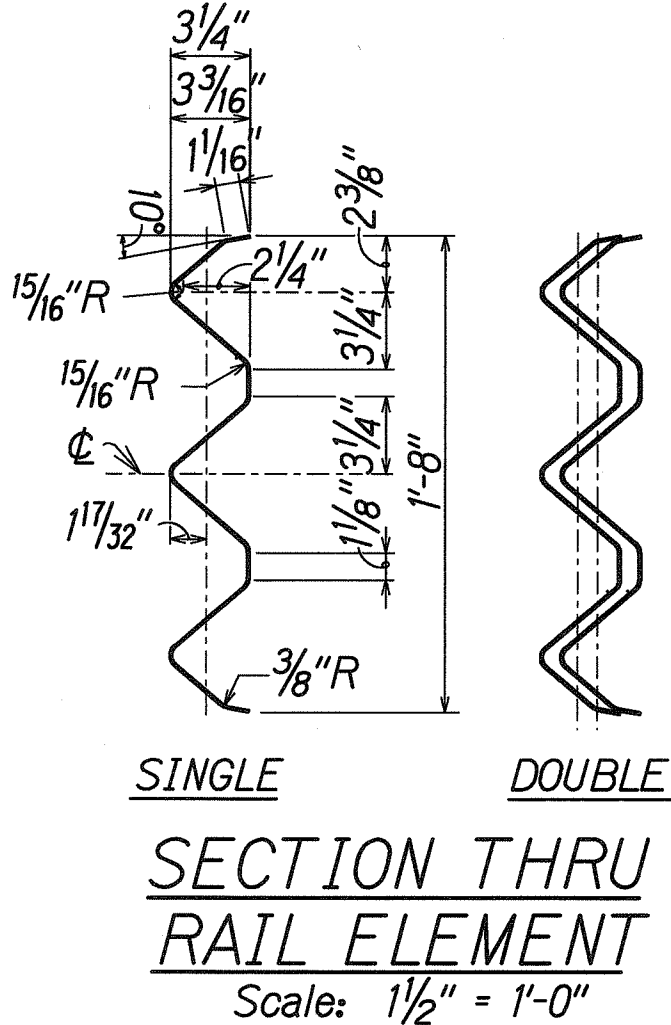
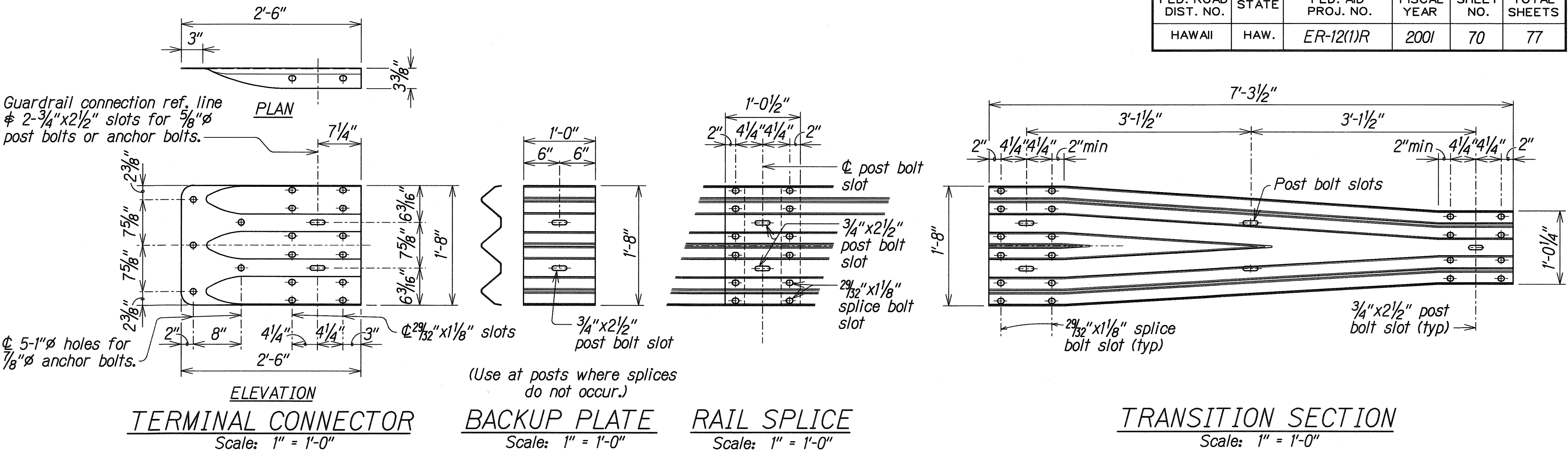
69



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	70	77

NOTES:

- A. The work necessary to connect guardrail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and will not be paid for separately.
- B. Lap terminal connector and rail element in direction of traffic to prevent snagging.
- C. All anchor bolts shall be high strength bolts conforming to the requirements of ASTM 325 and Standard Specification, Section 713.04.
- D. Anchor bolt length shall be such that a snug fit of the elements and full thread engagement plus 1/4" (max) is attained.
- E. "Terminal Connector", "Transition Section" and thrie beam shall be fabricated from 10gauge steel conforming to the requirements of AASHTO M 180, Type II, Class B.
- F. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.
- G. Cap PL shall be fabricated from ASTM A 36.
- H. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined in field.
- I. Double (nest 1st panel) thrie beam elements at all end post connections, except on highways with one-way traffic pattern, use single thrie beam elements at end post on trailing end only.
- J. Where double (nested) beam occur, 12" "Back-up Plate" not required.
- K. Heads of through anchor bolts shall be placed on the traffic side of the rail.
- L. All steel shapes, rails and plates shall conform to ASTM A 36 specifications.



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Wesley R. Segawa & Associates, Inc.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**THRIE BEAM & APPURTENANCE DETAILS**  
MAMALAHOA HIGHWAY  
EMERGENCY REPLACEMENT OF  
KEAIIWA STREAM BRIDGE  
Federal Aid Project No. ER-12(1)R  
Scale: NTS Date: January 2001  
SHEET No. 2 OF 2 SHEETS

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

This work was prepared by me or under my supervision.

Wesley R. Segawa & Associates, Inc.

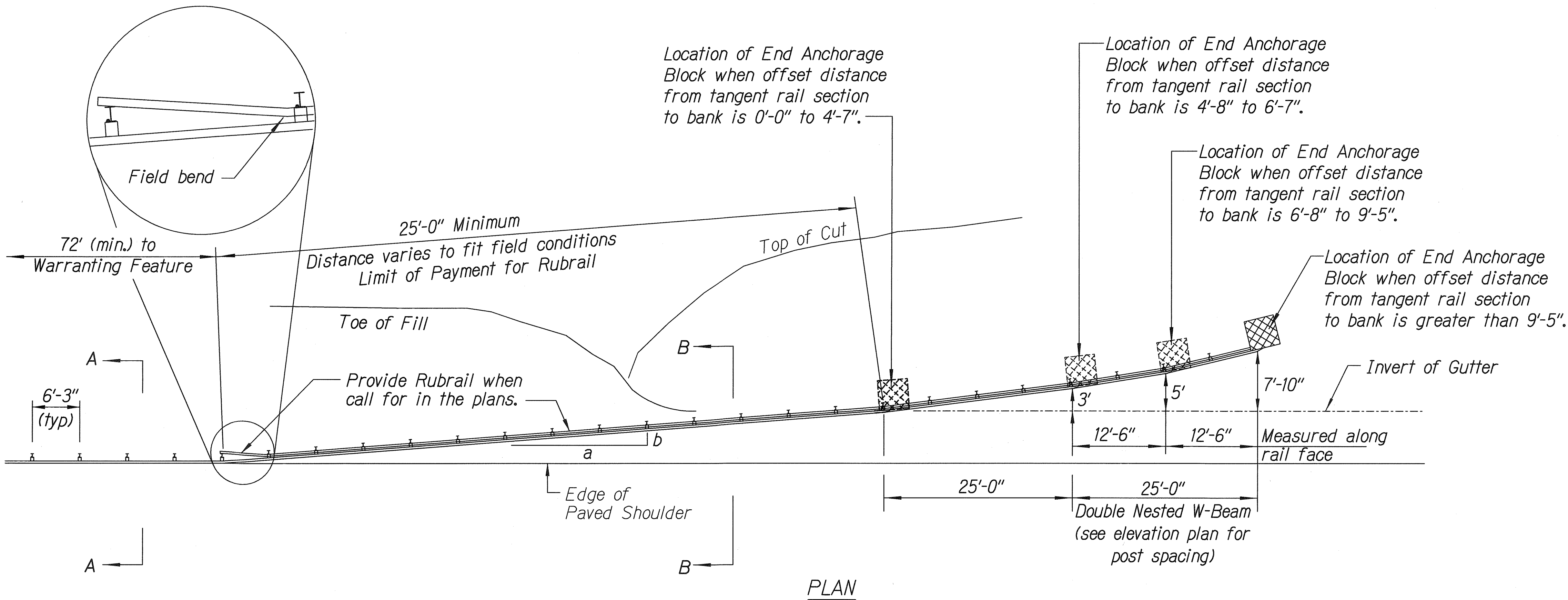
DESIGNED BY	CD	DATE	JAN. 01
DRAWN BY	NSF	CHECKED BY	
NOTED BY		QUANTITIES BY	
ORIGINAL PLAN			

METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS

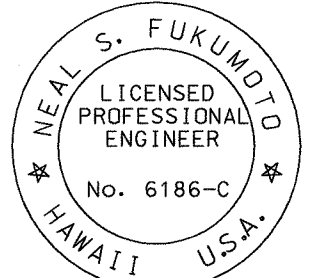
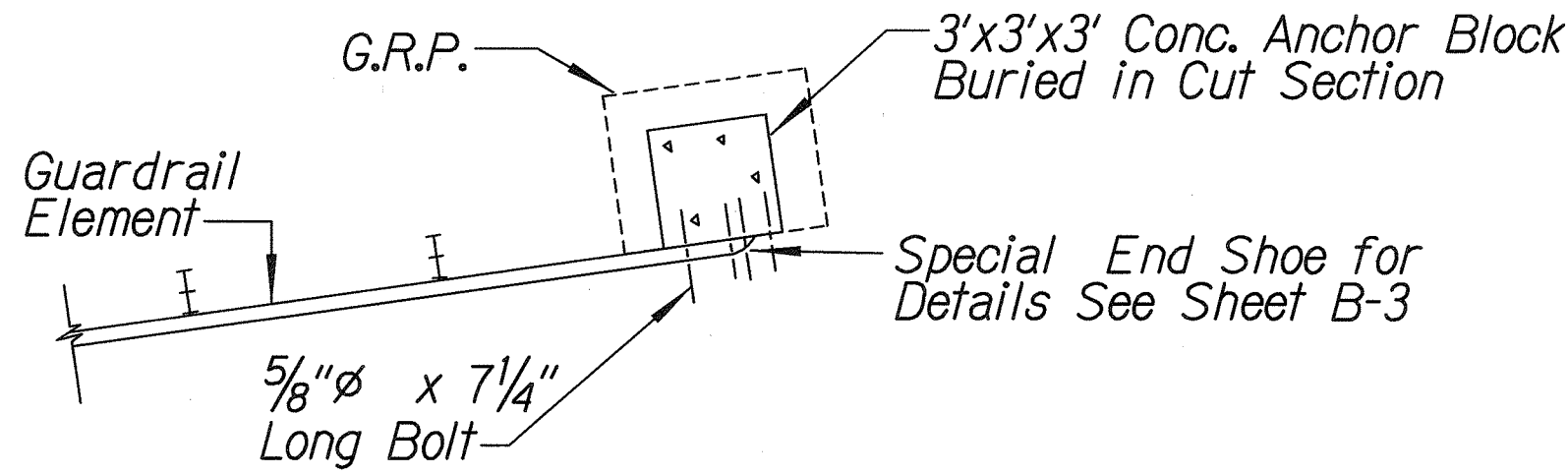
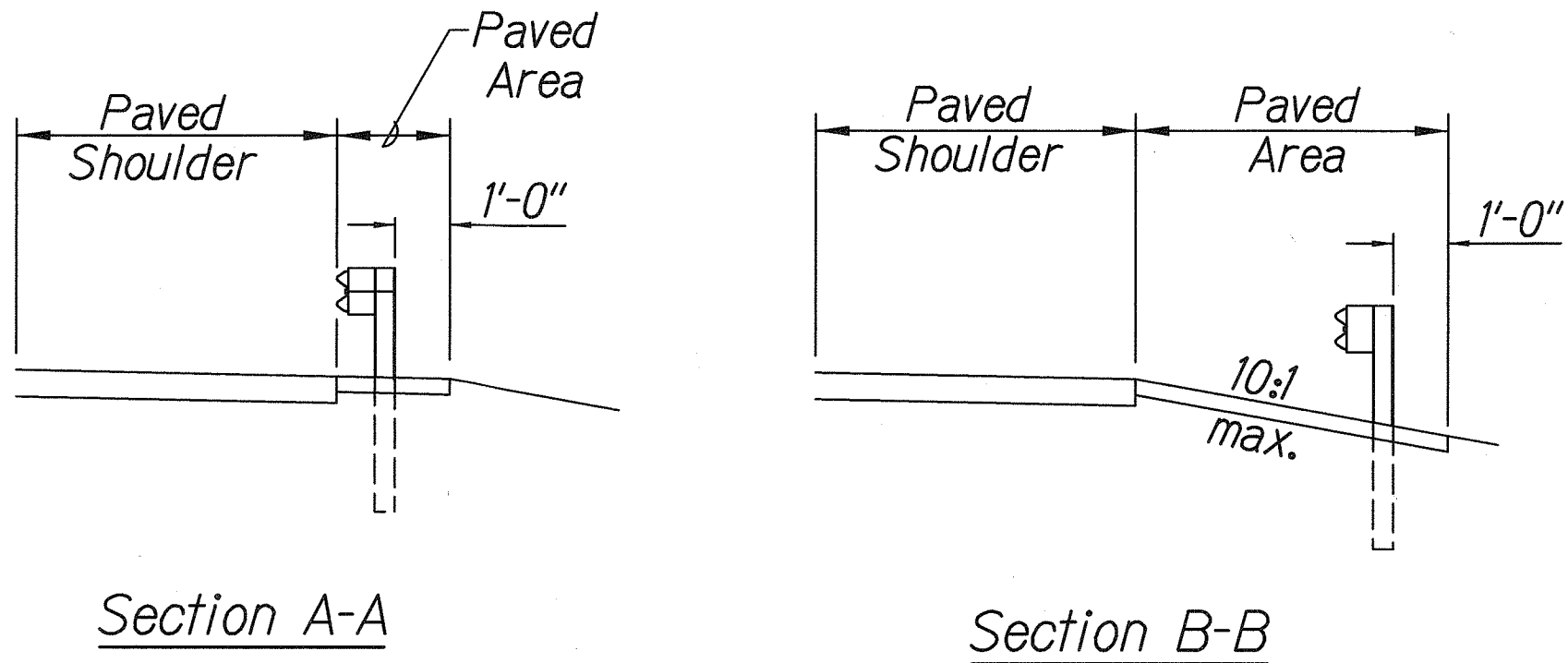
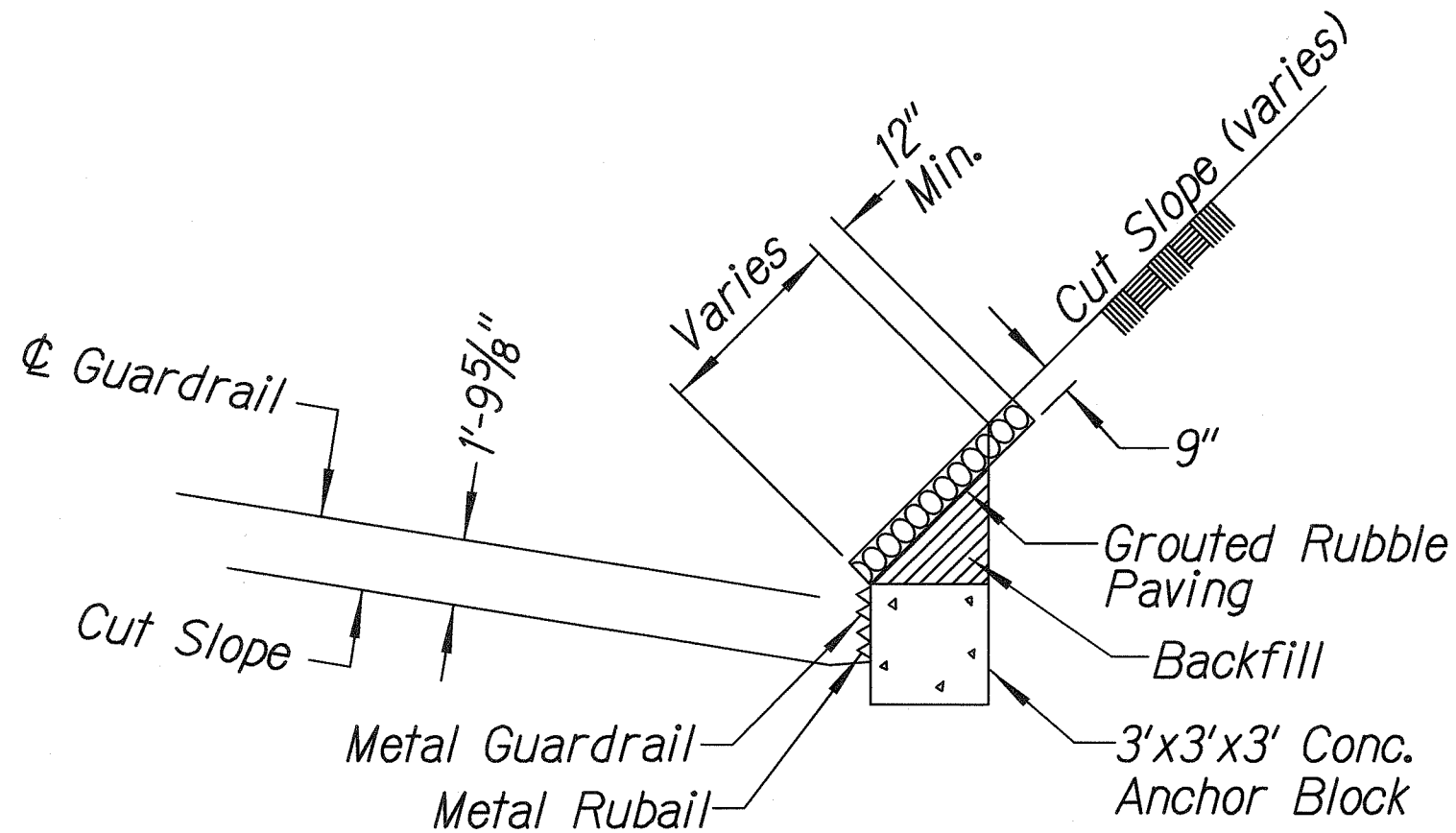
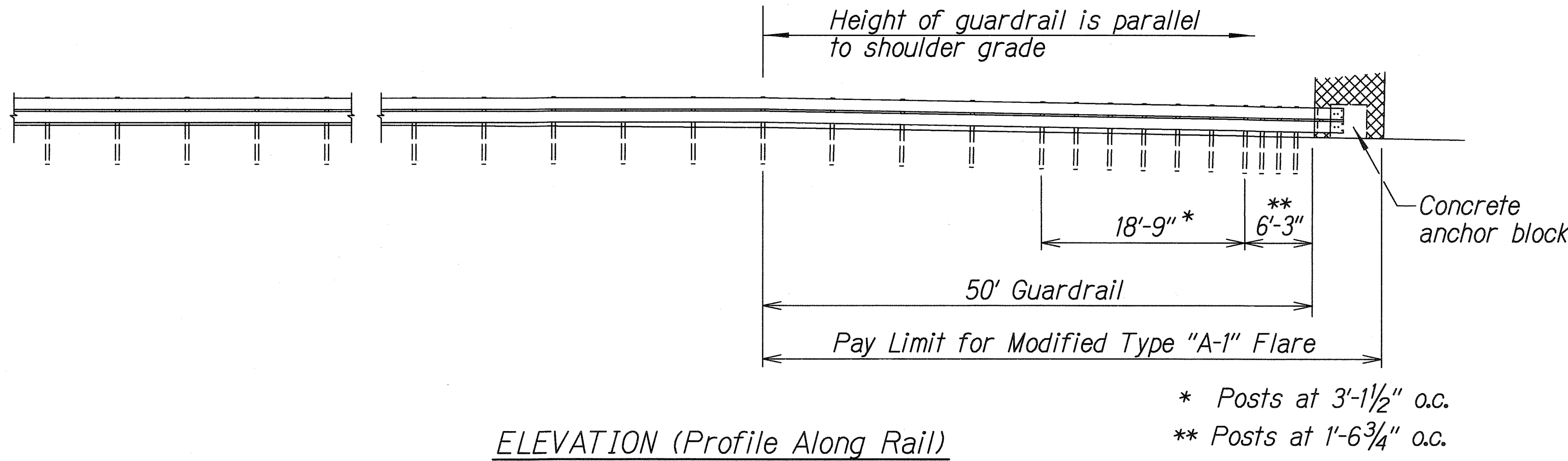
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	71	77

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 and HDOT's Statewide Guideline for Permanent Highway Safety Hardware.
3. Limit of payment for Modified Type "A-1" Flare shall be 50'-0" from End Shoe including Rubrail (when applicable), 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



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Wesley R. Segawa & Associates, Inc.

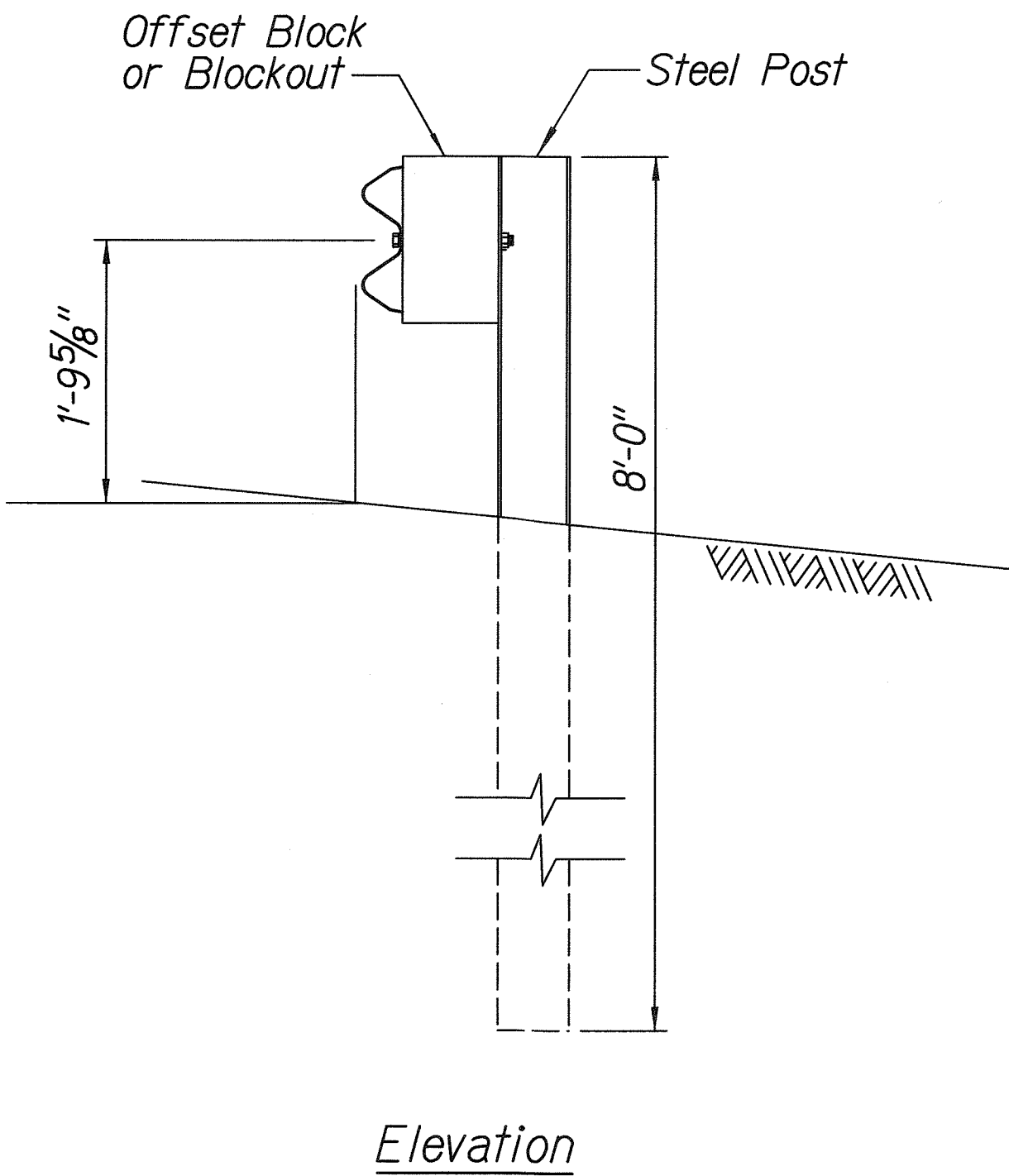
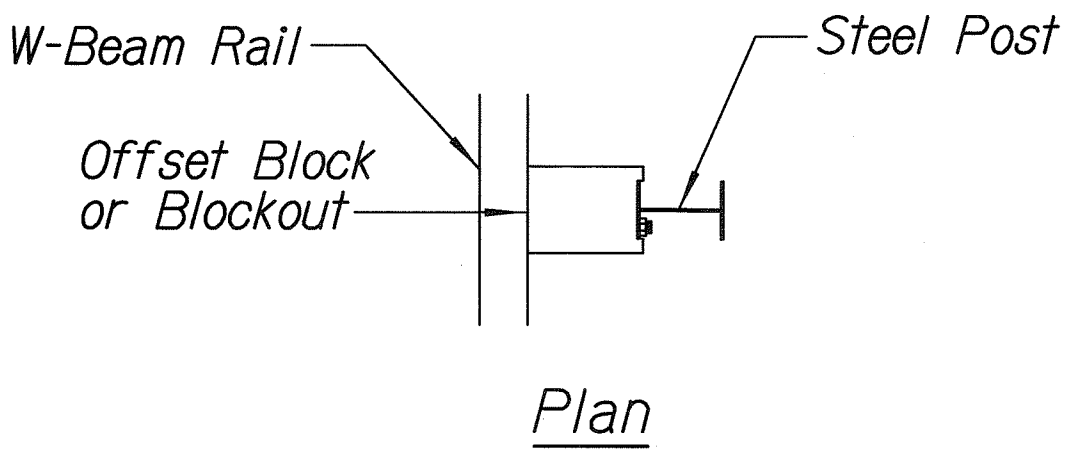
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**MODIFIED TYPE "A-1" FLARE**

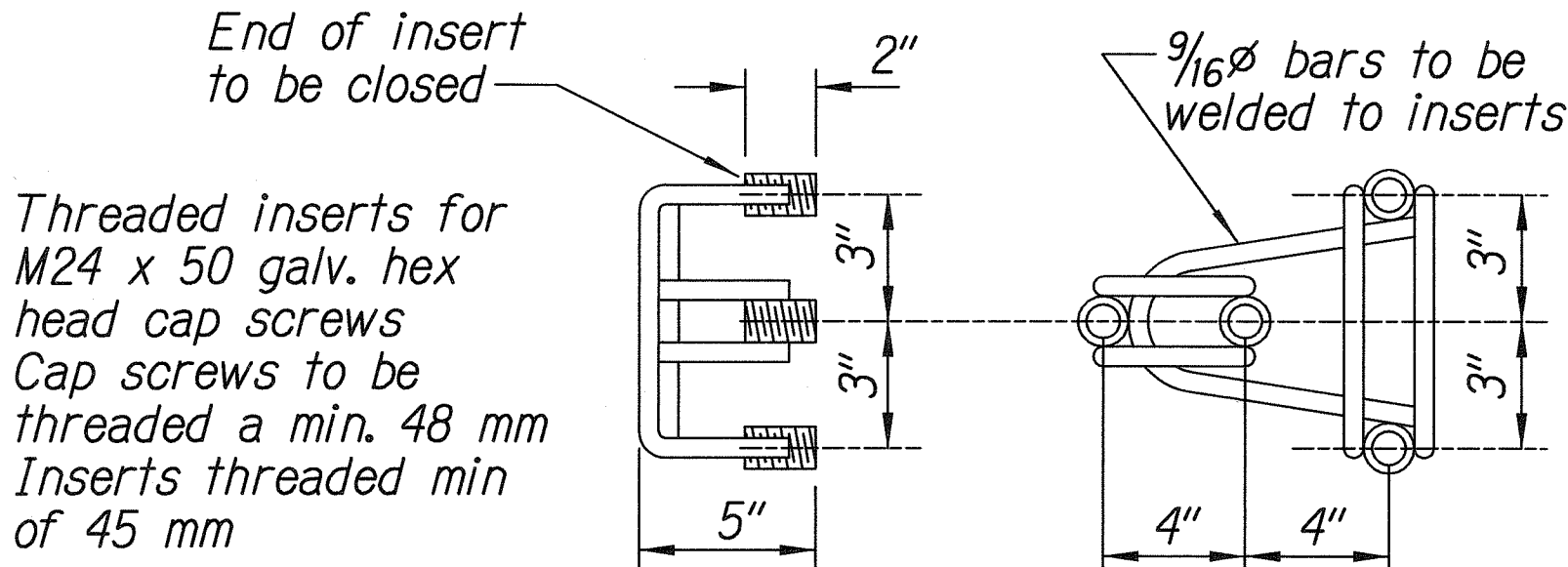
MAMALAHOA HIGHWAY  
EMERGENCY REPLACEMENT OF  
KEAIIWA STREAM BRIDGE  
Federal Aid Project No. ER-12(1)R  
Scale: Not To Scale Date: January 2001



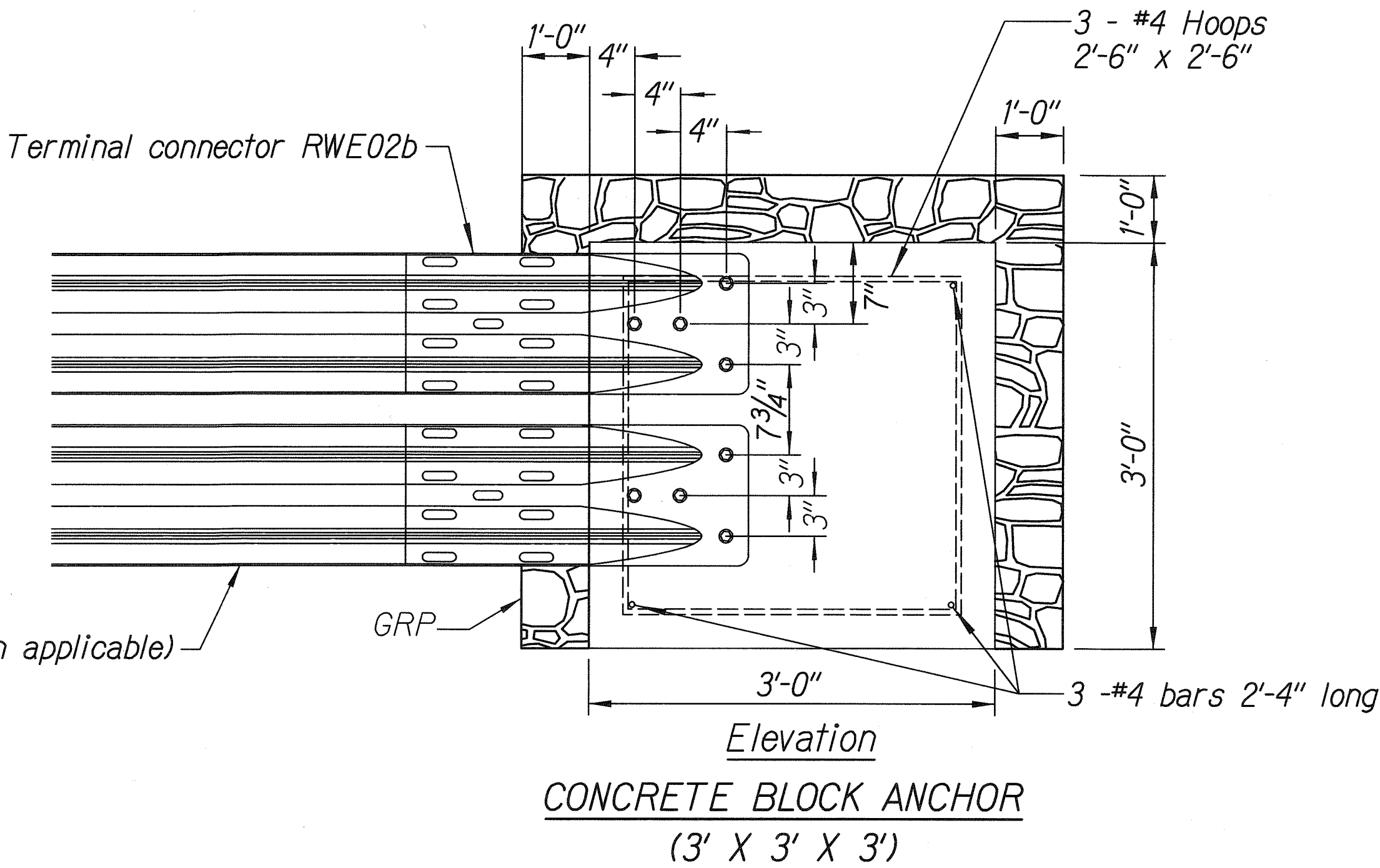
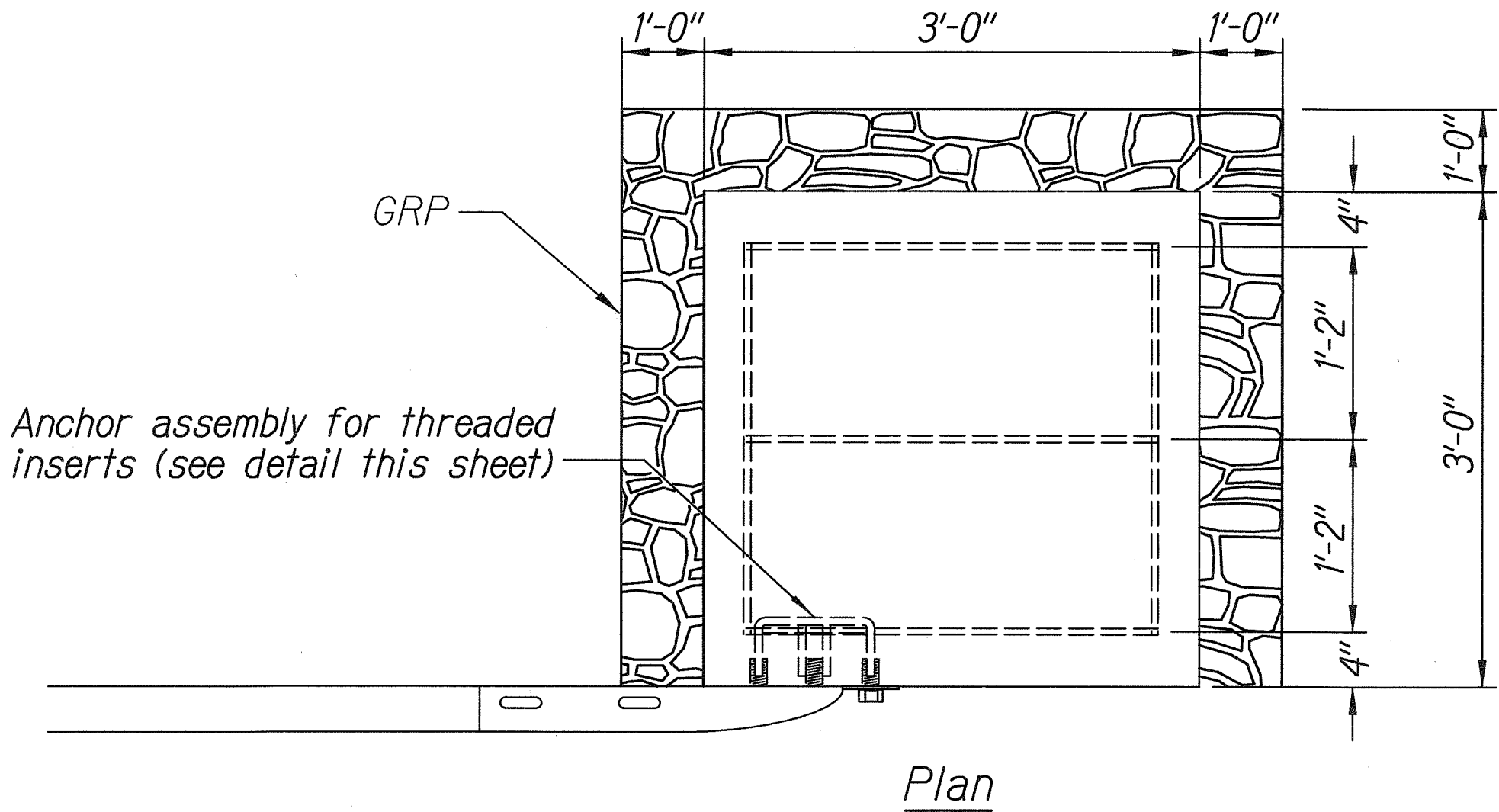
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	72	77



STRONG POST W-BEAM GUARDRAIL



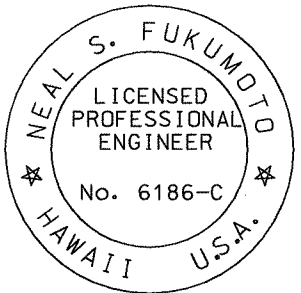
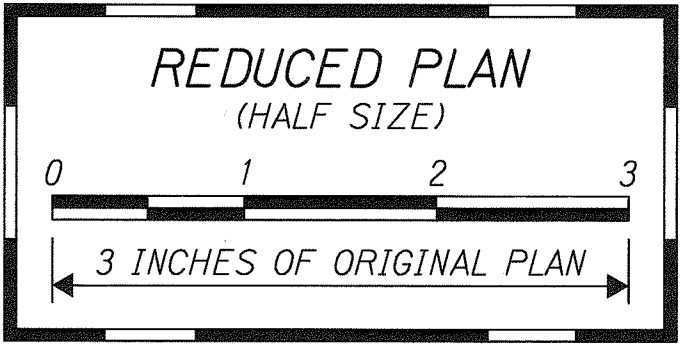
ANCHOR ASSEMBLY  
CONCRETE BLOCK ANCHOR



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 and HDOT's Statewide Guideline for Permanent Highway Safety Hardware.



This work was prepared by me or under my supervision.

*Neal S. Fukumoto*  
Wesley R. Gogawa & Associates, Inc.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE  
  
MAMALAHOA HIGHWAY  
EMERGENCY REPLACEMENT OF  
KEAIWA STREAM BRIDGE  
Federal Aid Project No. ER-12(1)R  
Scale: Not To Scale Date: January 2001

SHEET No. 2 OF 2 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLATTED BY	JAN 01
DRAWN BY	JAN 01
TRACED BY	
DESIGNED BY	JSF
QUANTITIES BY	
CHECKED BY	
NO. 100	