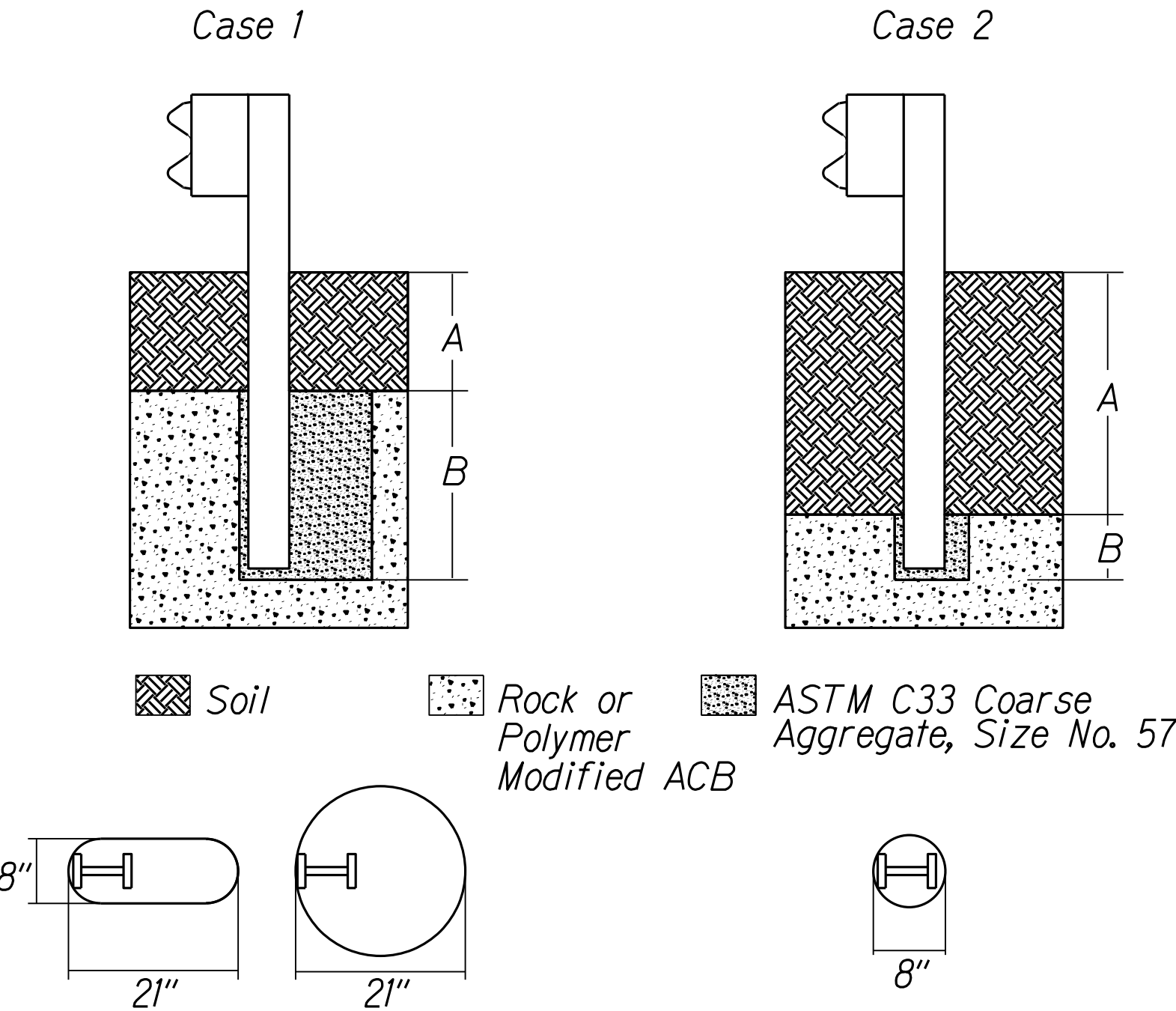


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	8	23

NOTES (STRONG POST W-BEAM IN ROCK OR IN POLYMER MODIFIED ACB):

- Backfill of drilled holes shall be with compressible material, ASTM C33 Coarse Aggregate, Size No. 57.
- Elongated 21-inch long hole can be accomplished by drilling three 8-inch diameter holes at 6 1/2-inches on center.



Plan View Steel Posts
Either hole configuration acceptable

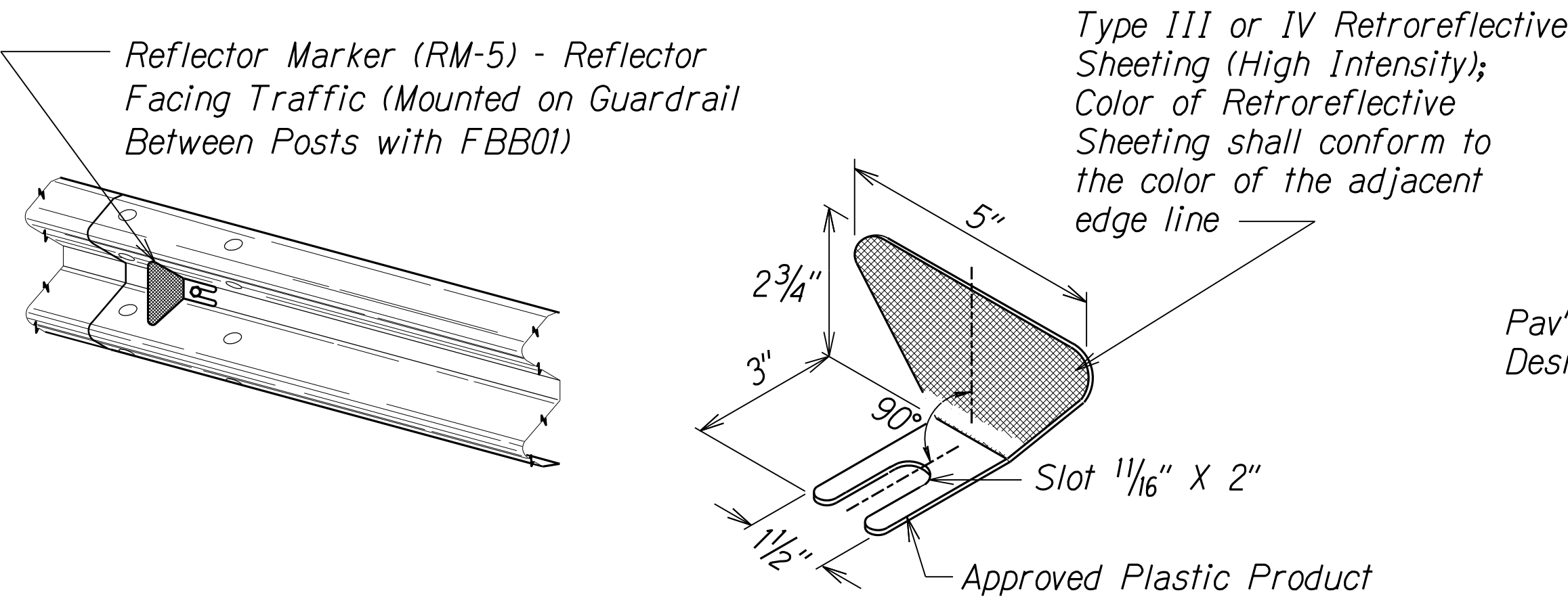
(A) ranging from 0 to 18-inches,
the depth of required drilling
(B) is equal to 24-inches.

Overlying Soil Depths of
0 to 18-inches

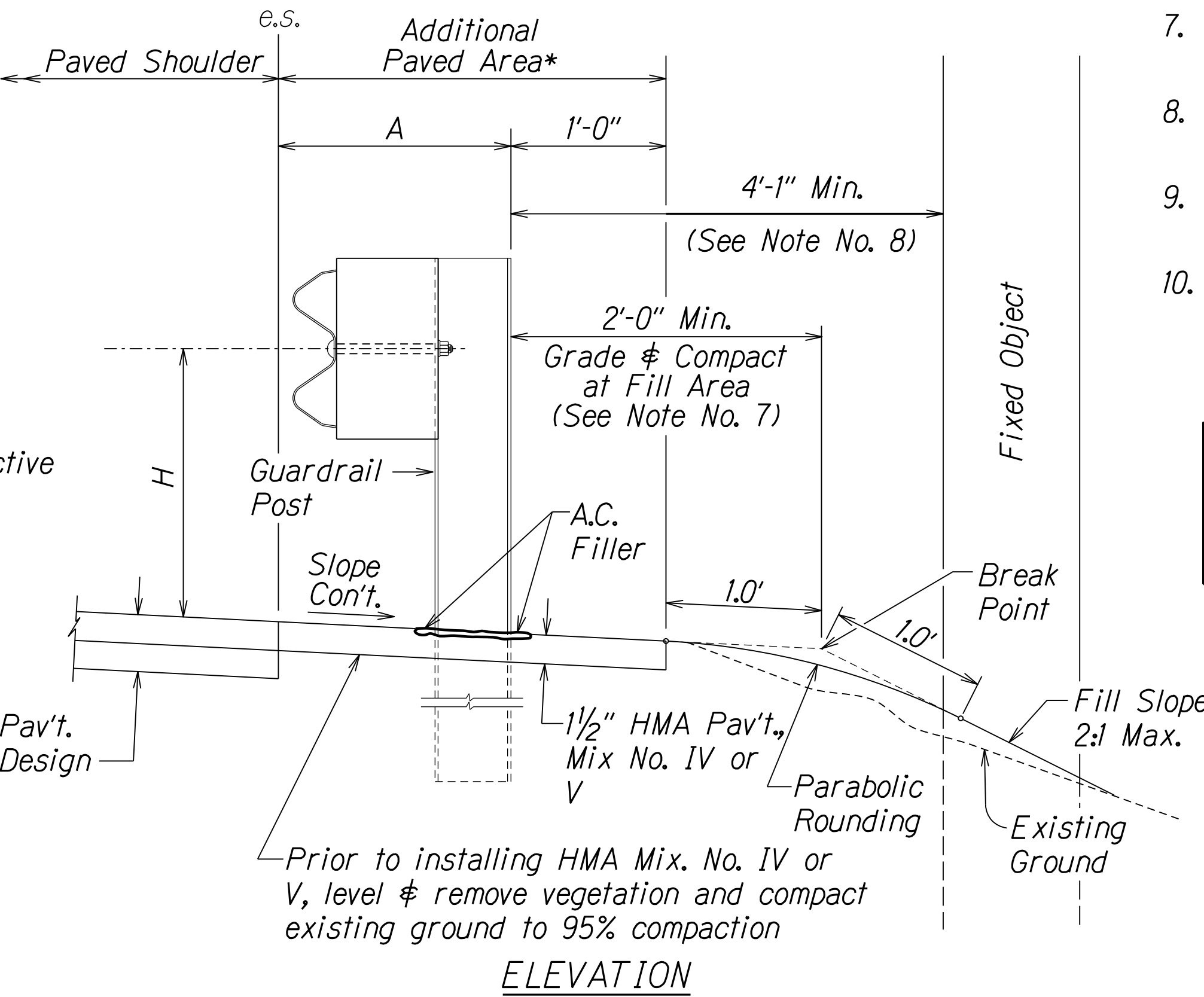
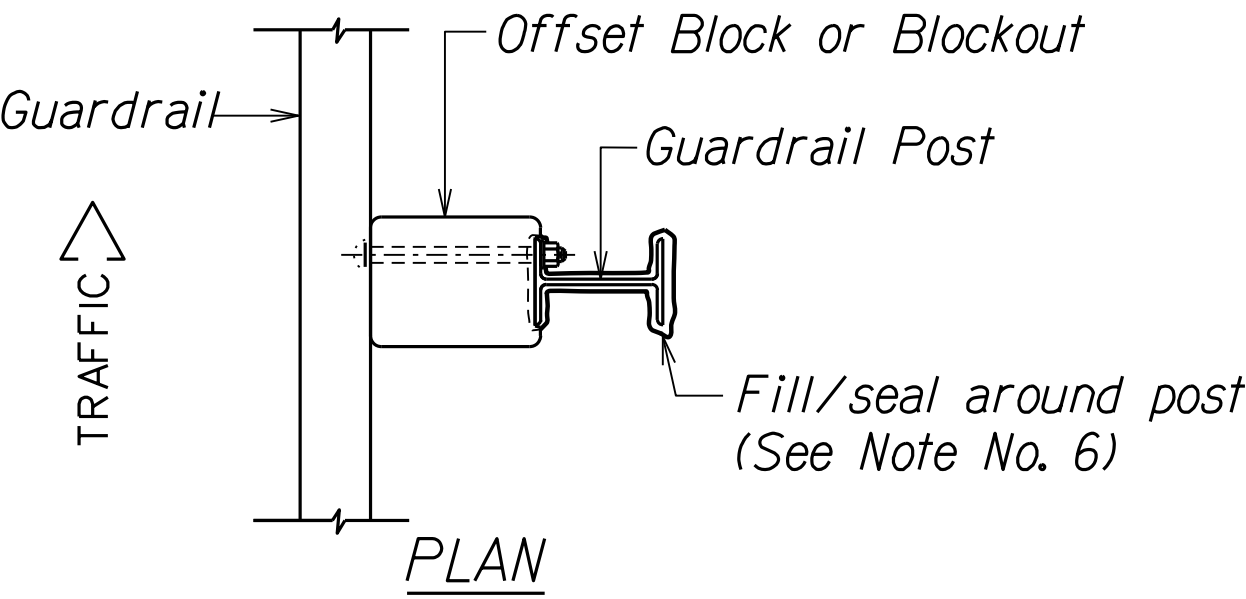
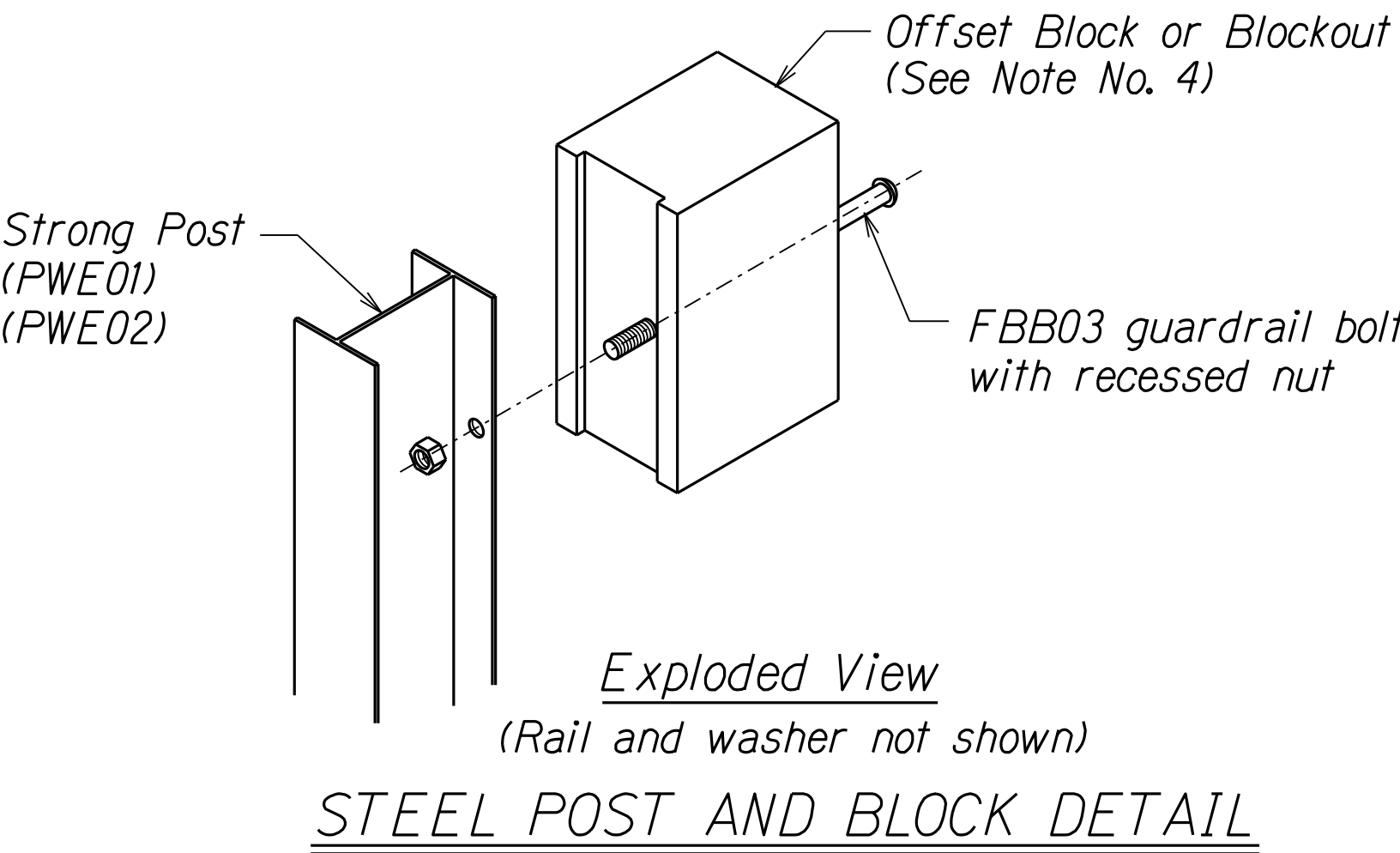
(A) ranging from 18-inches to the
embedment depth of the post, depth
of required drilling (B) is equal to
either 12-inches or the desired
embedment depth minus the depth
of soil whichever is less.

Overlying Soil Depths of
18 to 42-inches

STRONG POST W-BEAM GUARDRAIL IN ROCK



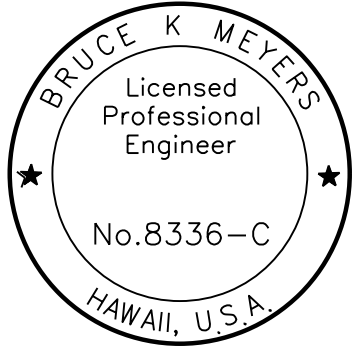
REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION



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 by the Engineer.
- All fasteners, posts, and rail elements (i.e. FBB03, PWE01, RWM04b, 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 Blockout or Offset Block shall be approved by the State.
- All new guardrail systems (system consists of total length of guardrail including both end treatments) shall include the Additional Paved Area.
- 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.
- When standards for the fill slope area cannot be met, a site specific, engineer approved design may be used.
- Minimum working width (clear distance) between back of MGS post to any fixed object is 4'-1" (49").
- New Hot Mix Asphalt (HMA) pavement at guardrails shall extend 6 feet longitudinally beyond terminal ends.
- 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 guardrail system.

GUARDRAIL TYPE	DIMENSION	
	H	A
MGS w/ Standard 8" Offset Block	2'-1"	1'-6"
MGS w/ No Blockout	2'-7/8"	9 1/4"



This work was prepared by me
or under my supervision.

Expiration Date of License 4/22

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

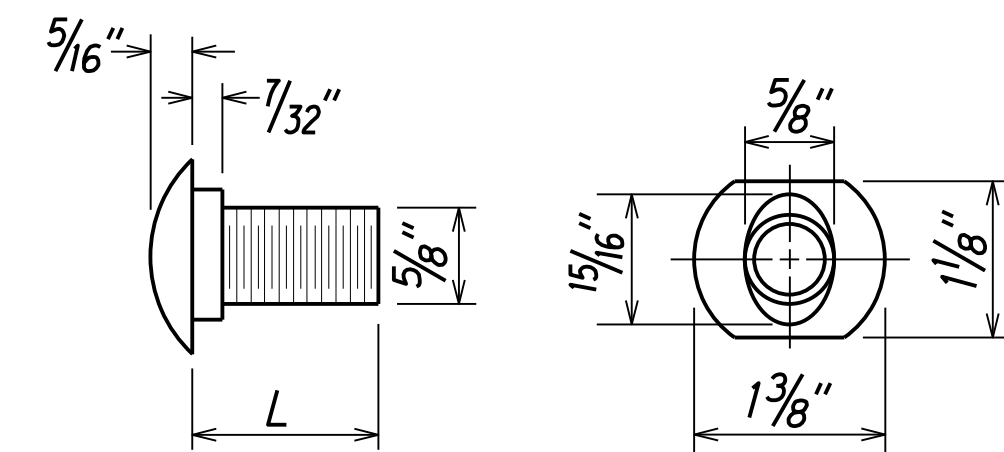
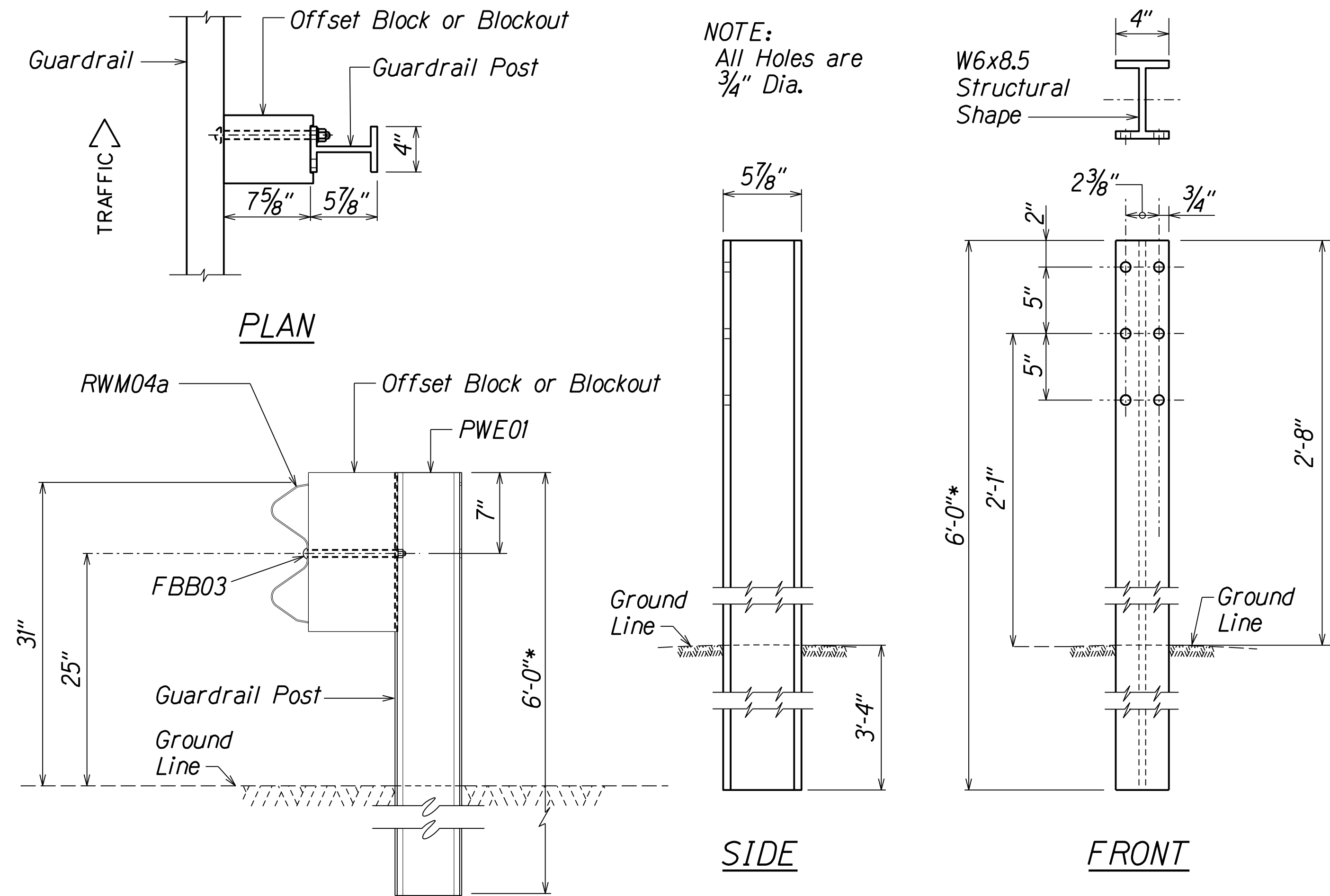
GUARDRAIL DETAILS & NOTES

PAHOA-KALAPANA ROAD
2018 KILAUEA ERUPTION PERMANENT REPAIRS
Federal Aid Project No. ER-21(005)

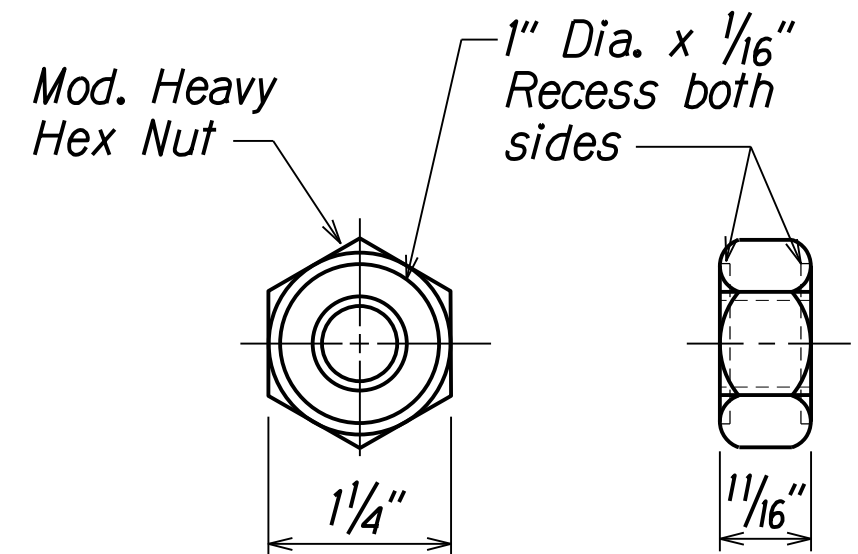
Scale: NTS Date: August 2021

SHEET No. 1 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	9	23

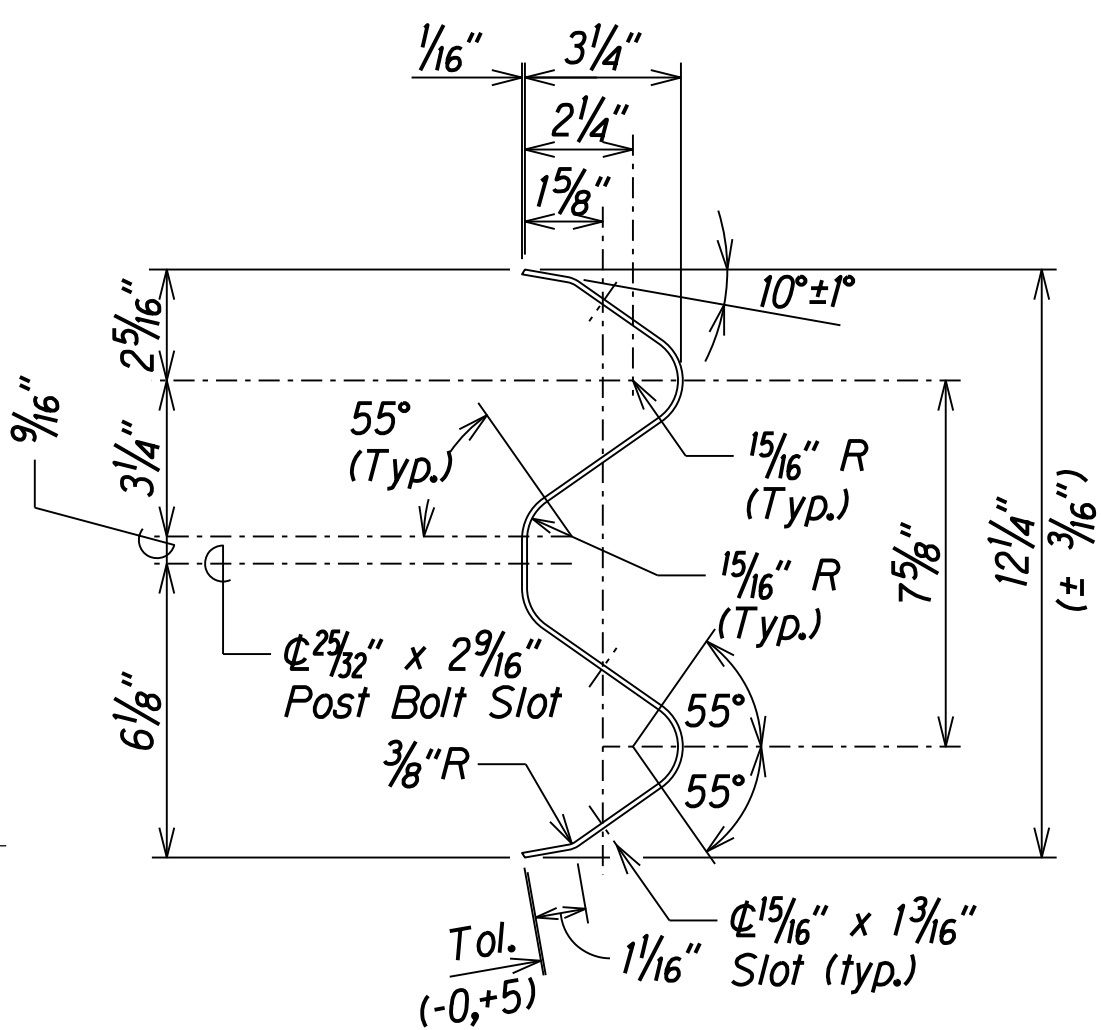
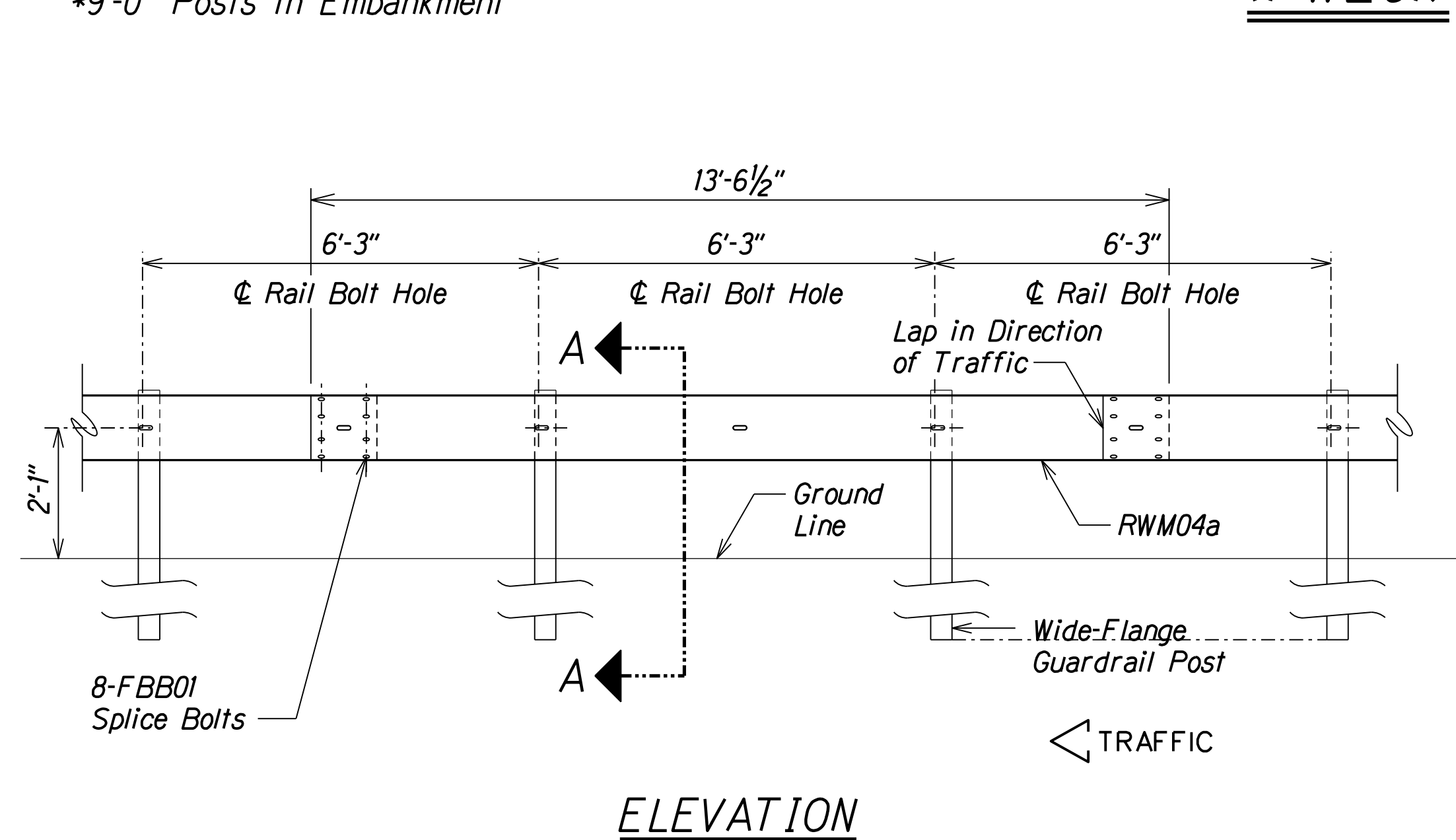
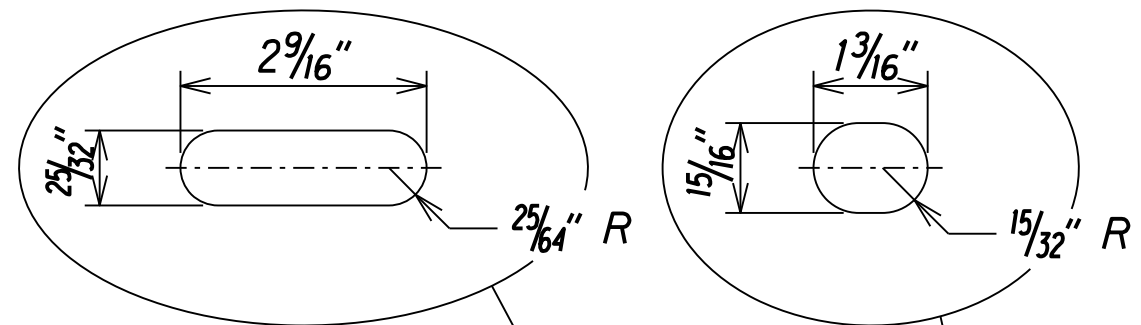


DESIGNATOR	L
FBB01	1 $\frac{3}{8}$ "
FBB02	2"
FBB03	10"

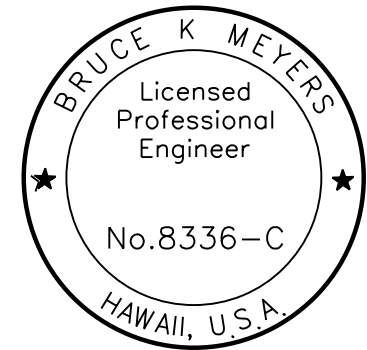


GUARDRAIL BOLTS AND RECESSED NUT

DESIGNATOR	BASE METAL THICKNESS
RWM04a	12 Gauge



4 SPACE W-BEAM GUARDRAIL (RWM04a)



This work was prepared by me or under my supervision.

Expiration Date of License 4/22.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

31" W-BEAM GUARDRAIL WITH STANDARD 8" OFFSET BLOCK

PAHOA-KALAPANA ROAD

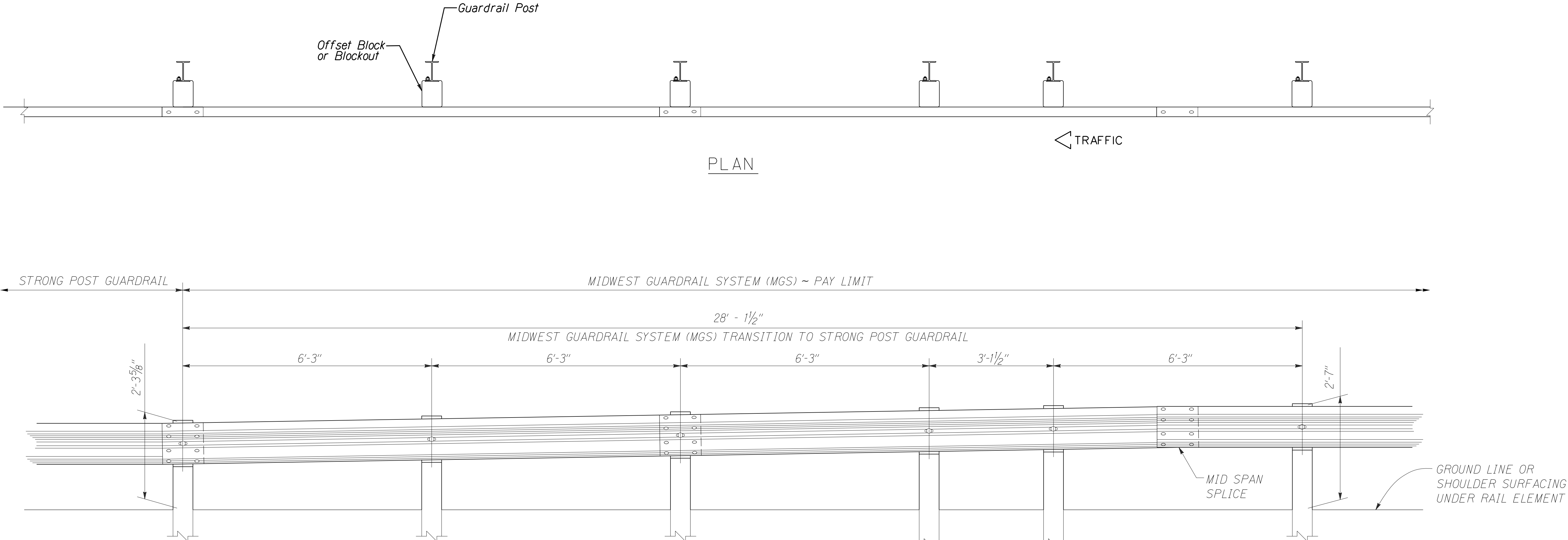
2018 KILAUEA ERUPTION PERMANENT REPAIRS

Federal Aid Project No. ER-21(005)

Scale: NTS Date: August 2021

SHEET No. 2 OF 6 SHEETS

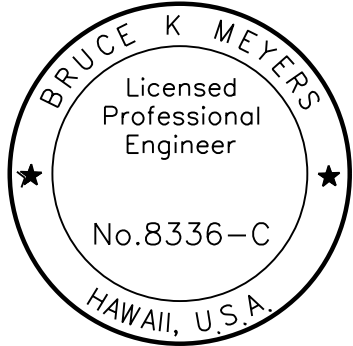
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	10	23



PLAN

ELEVATION

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



This work was prepared by me or under my supervision.

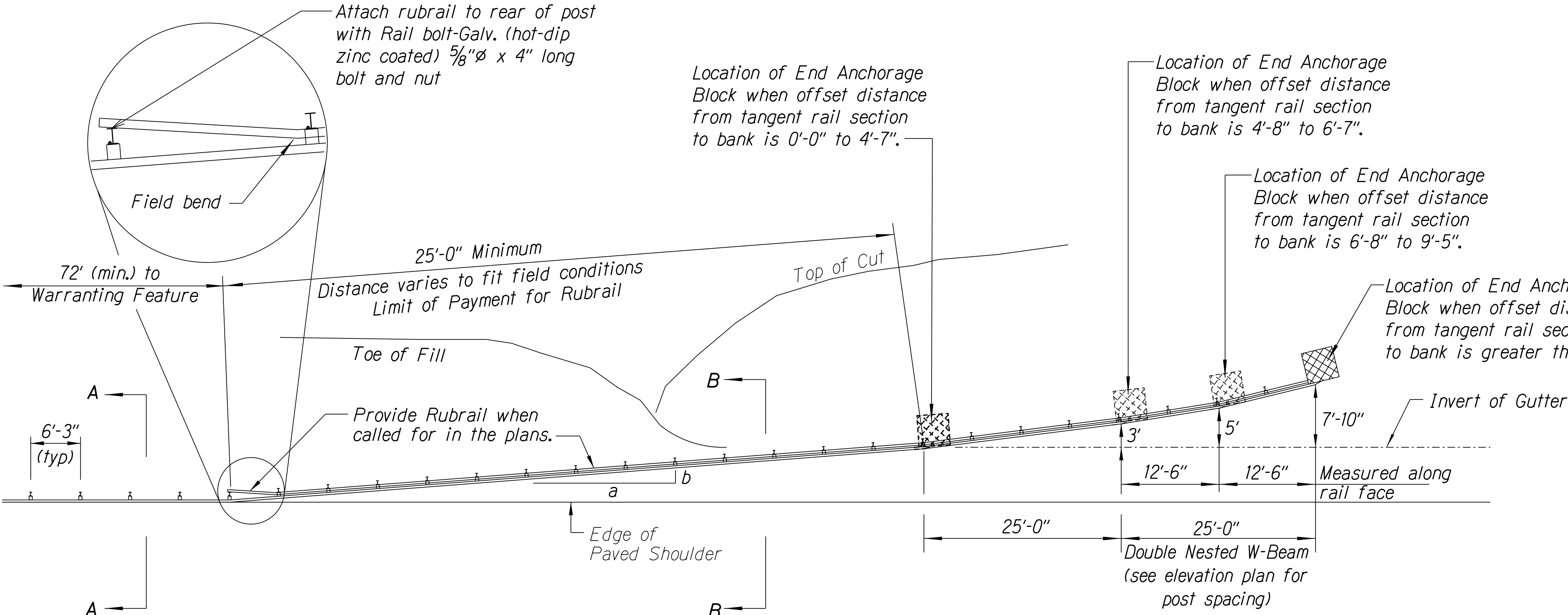
Expiration Date of License 4/22

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**MGS TRANSITION TO
STRONG POST GUARDRAIL**
PAHOA-KALAPANA ROAD
2018 KILAUEA ERUPTION PERMANENT REPAIRS
Federal Aid Project No. ER-21(005)
Scale: Not to Scale Date: August 2021

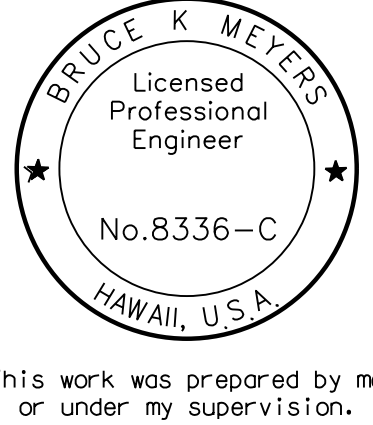
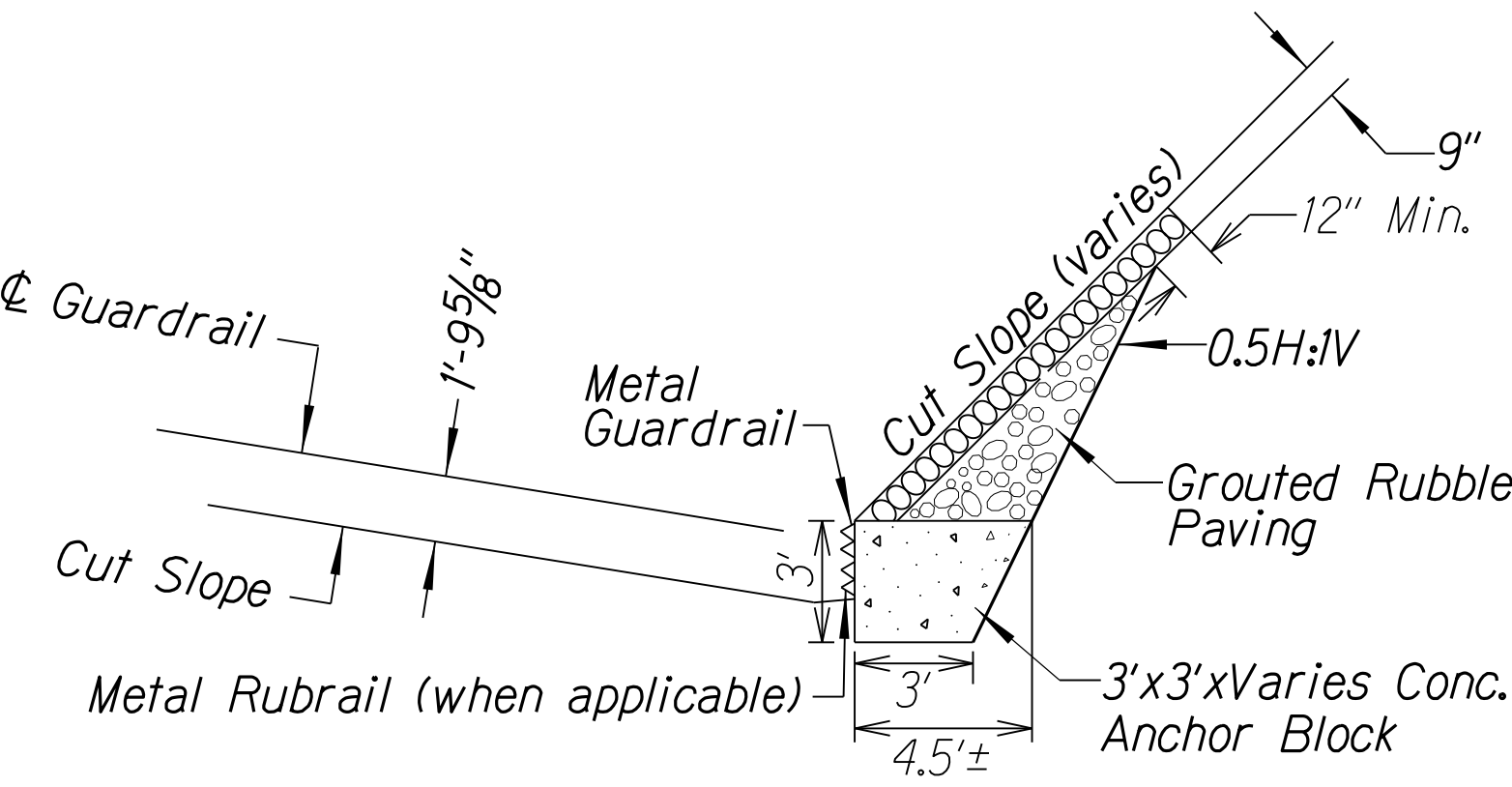
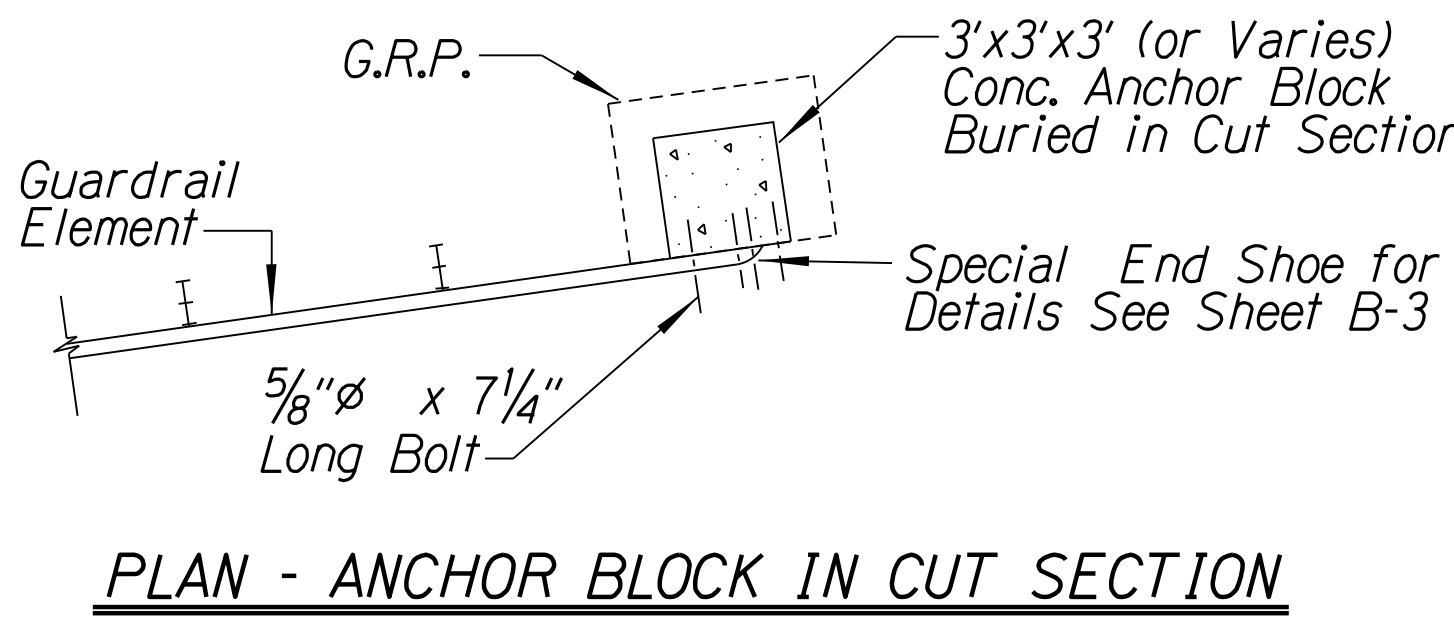
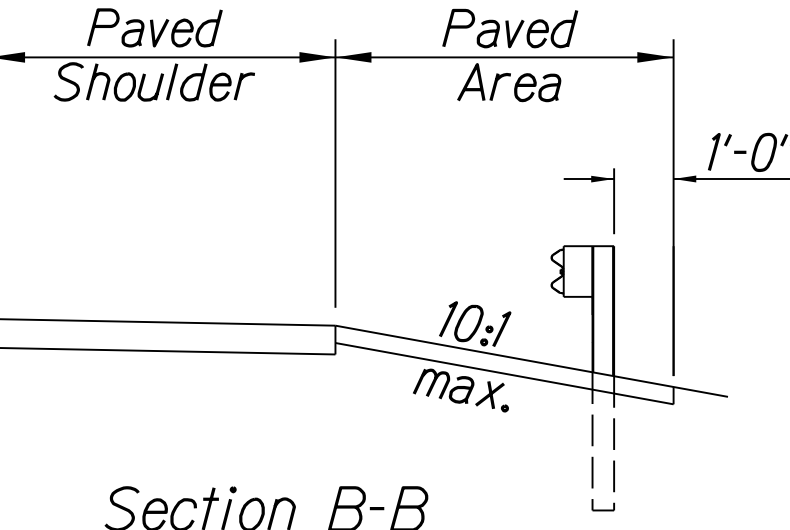
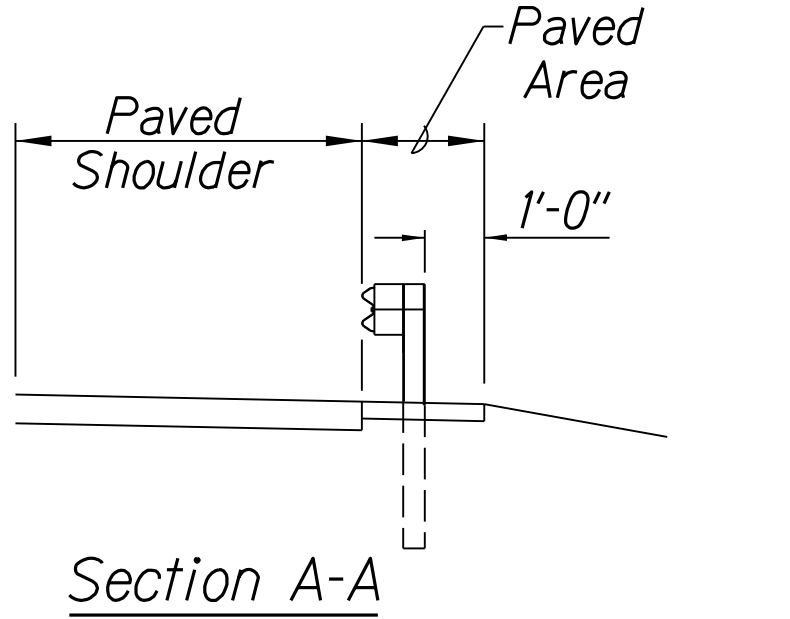
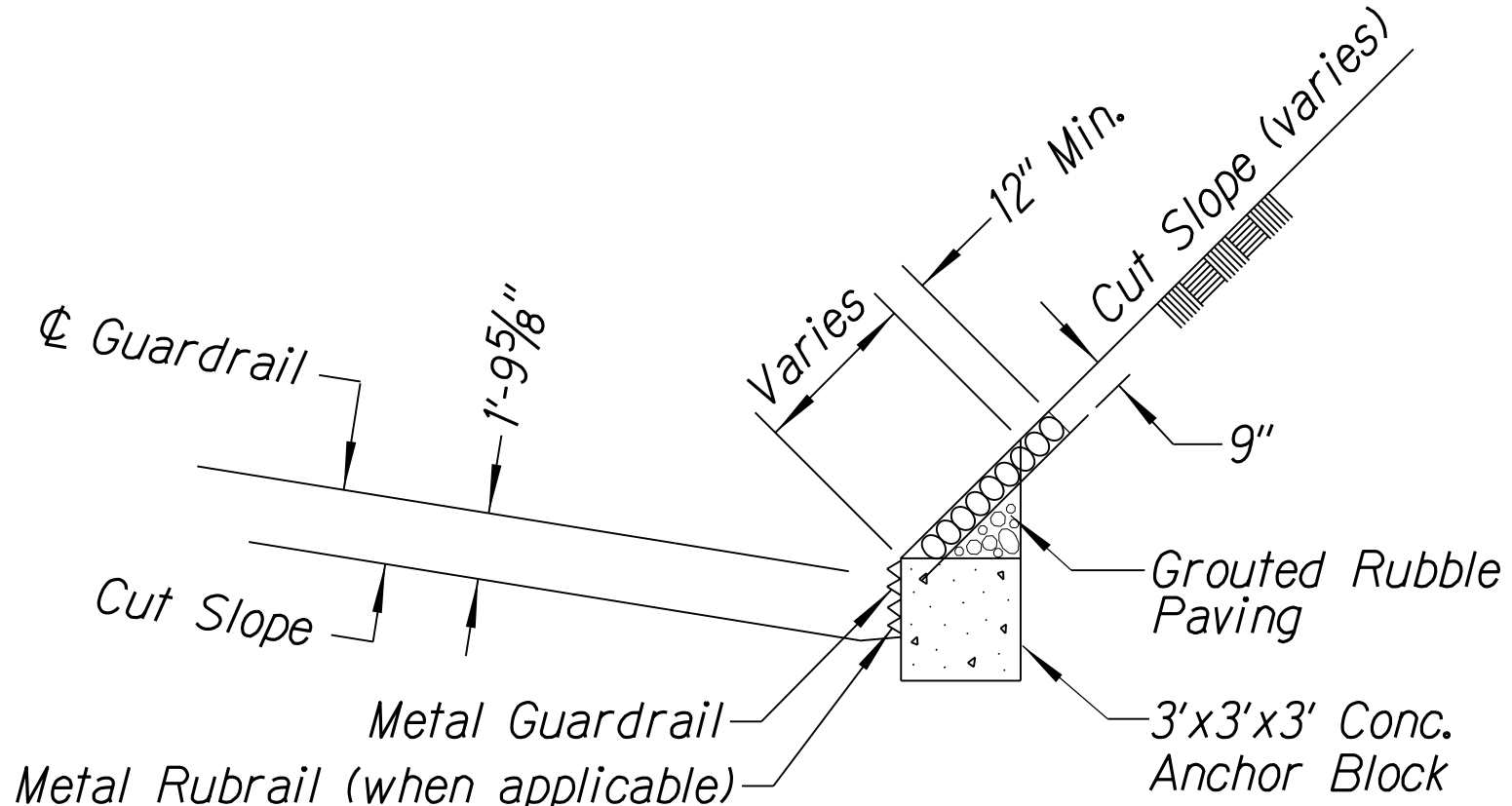
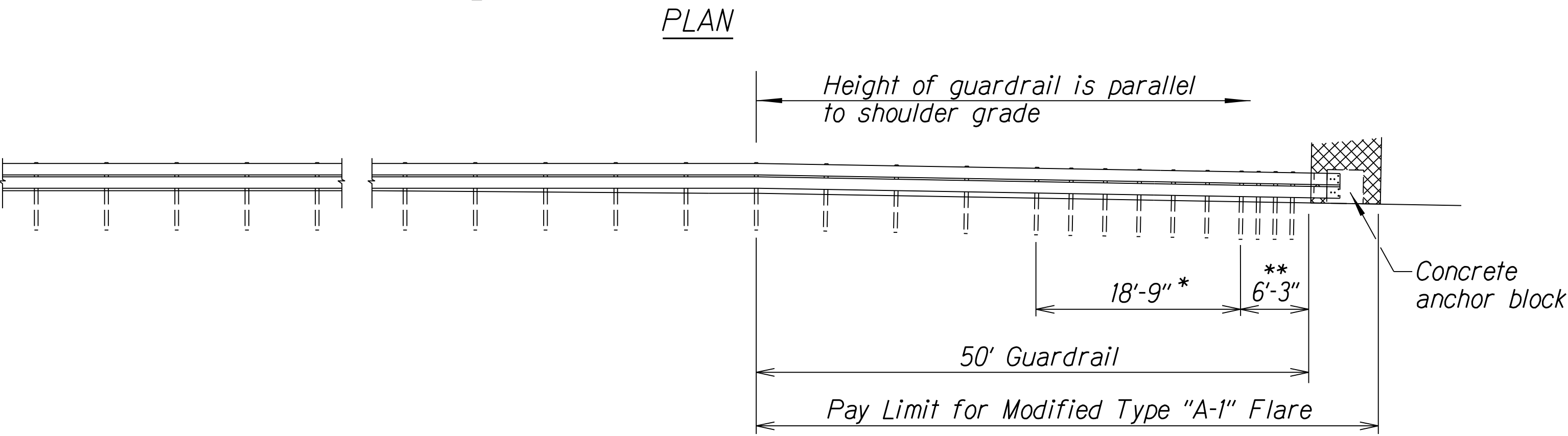
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	11	23

General Notes

- All posts are 6'-0" in length within the 50'-0" pay limit for the Modified Type "A-1" Flare without rubrail.
- Whenever swales or a change in grade is encountered within the 50'-0" pay limit for the Modified Type "A-1" Flare, a rubrail shall be installed and all posts shall have a minimum embedment of 4'-0". Post lengths shall be adjusted to provide the minimum embedment.
- 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.
- 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.
- Excavation, Anchor Block 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

PAHOA-KALAPANA ROAD
2018 KILAUEA ERUPTION PERMANENT REPAIRS
Federal Aid Project No. ER-21(005)

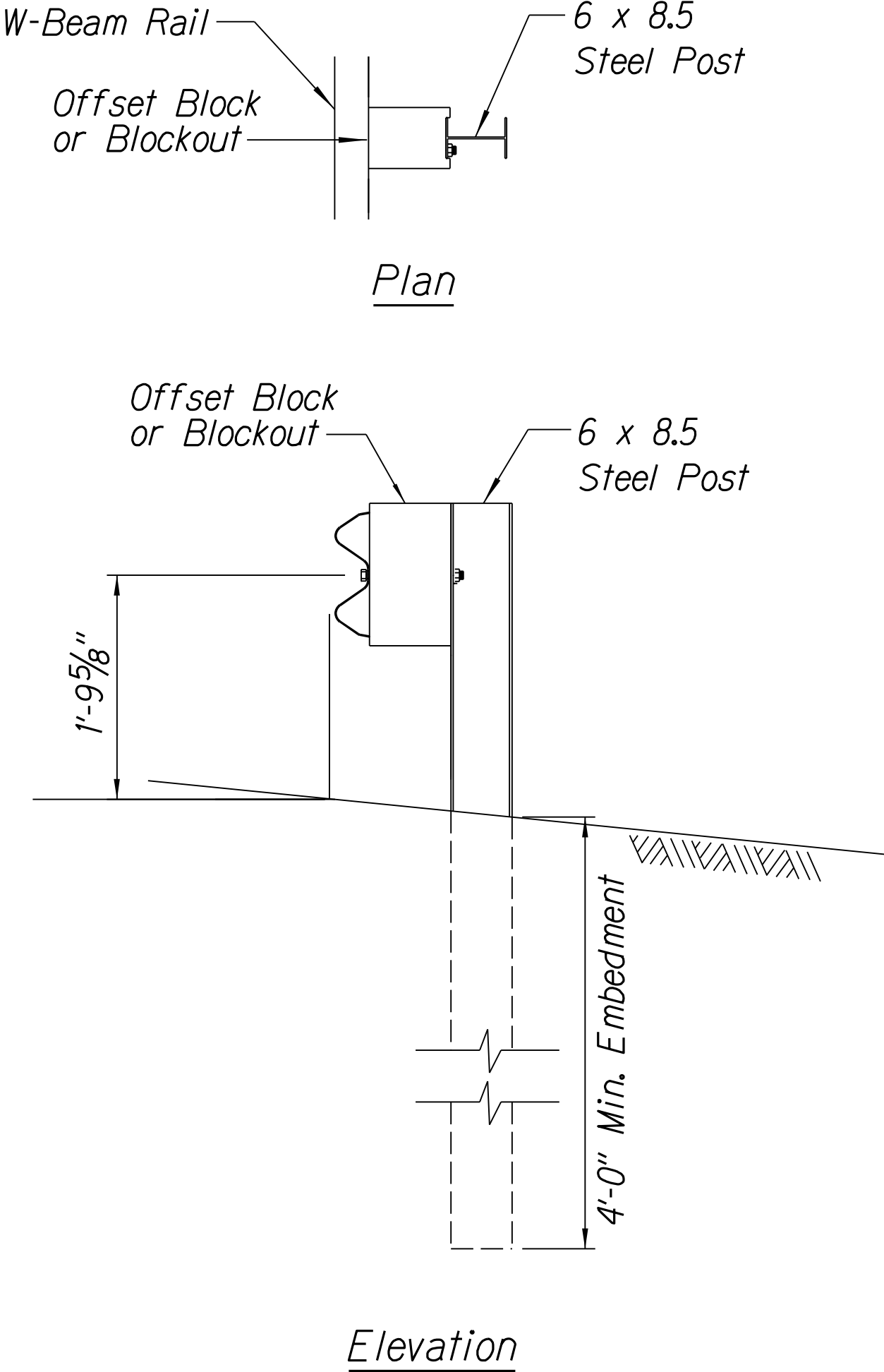
Scale: Not To Scale Date: August 2021

Expiration Date of License 4/22

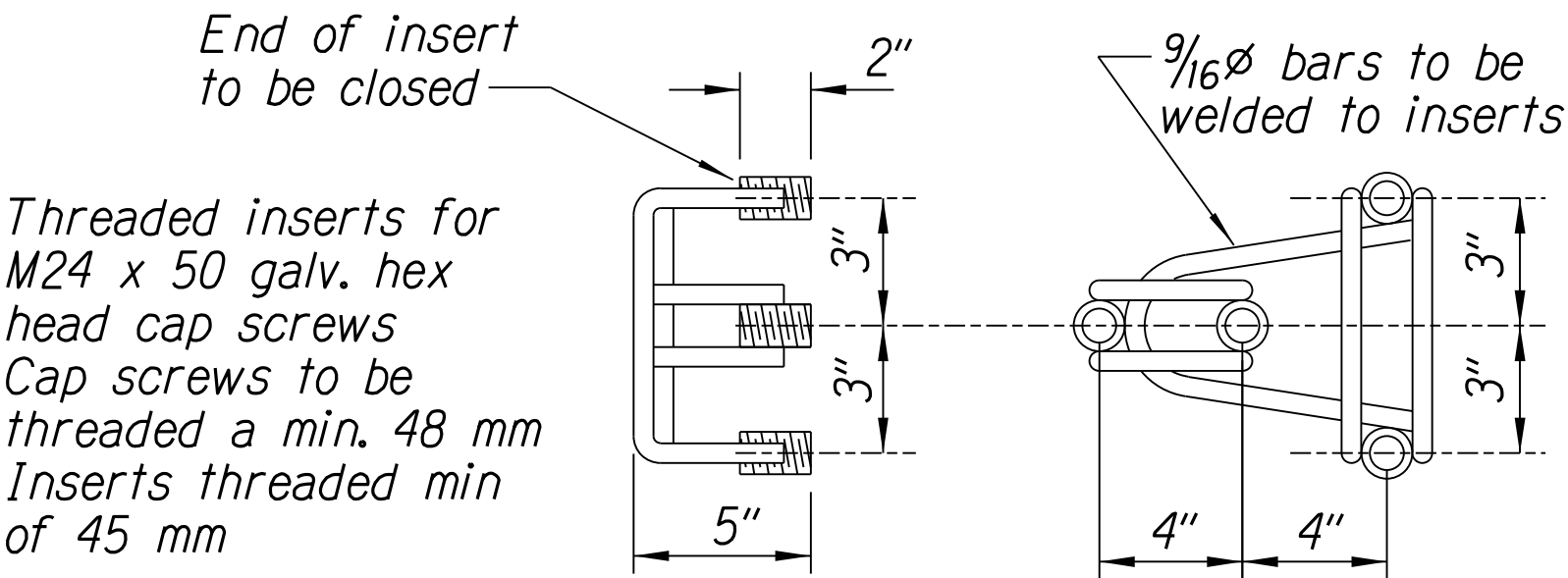
SHEET No. 4 OF 6 SHEETS

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

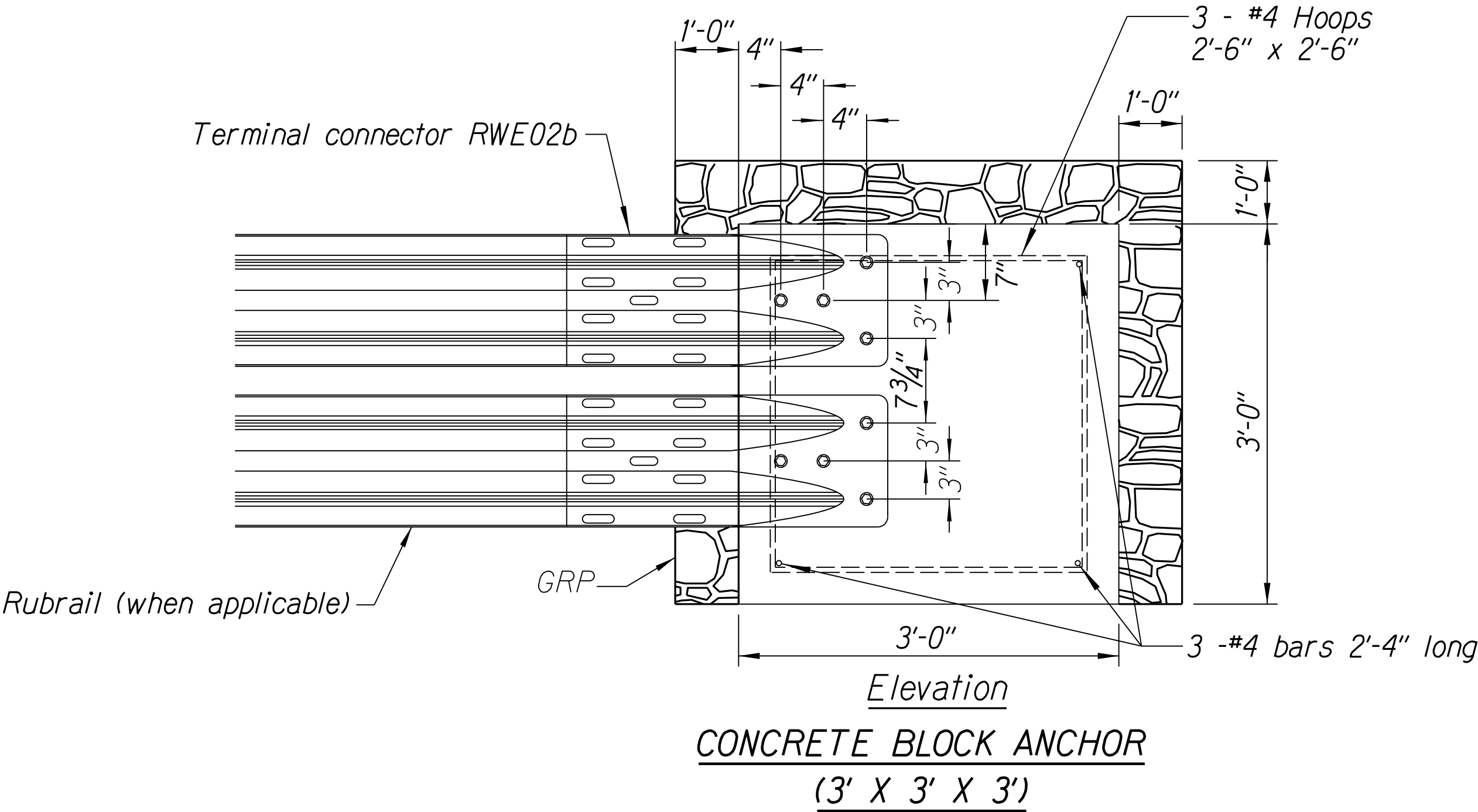
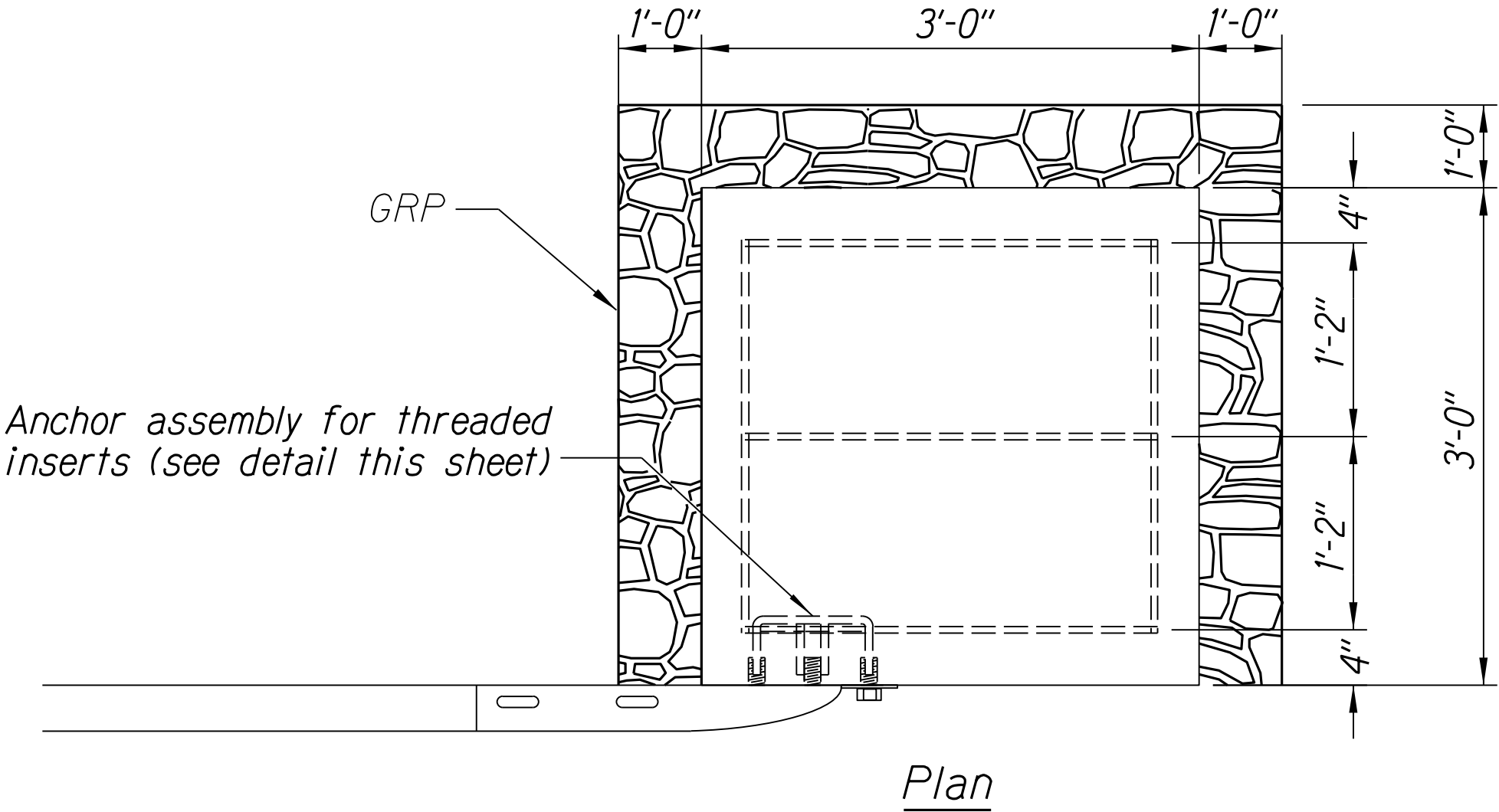
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	12	23



STRONG POST W-BEAM GUARDRAIL



**ANCHOR ASSEMBLY
CONCRETE BLOCK ANCHOR**

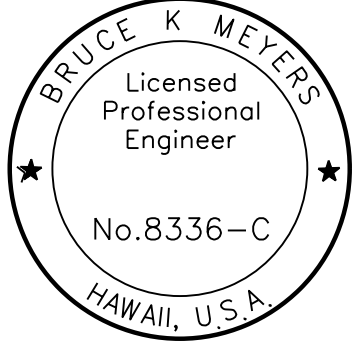


**CONCRETE BLOCK ANCHOR
(3' X 3' X 3')**

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

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



This work was prepared by me or under my supervision.

Expiration Date of License 4/22

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

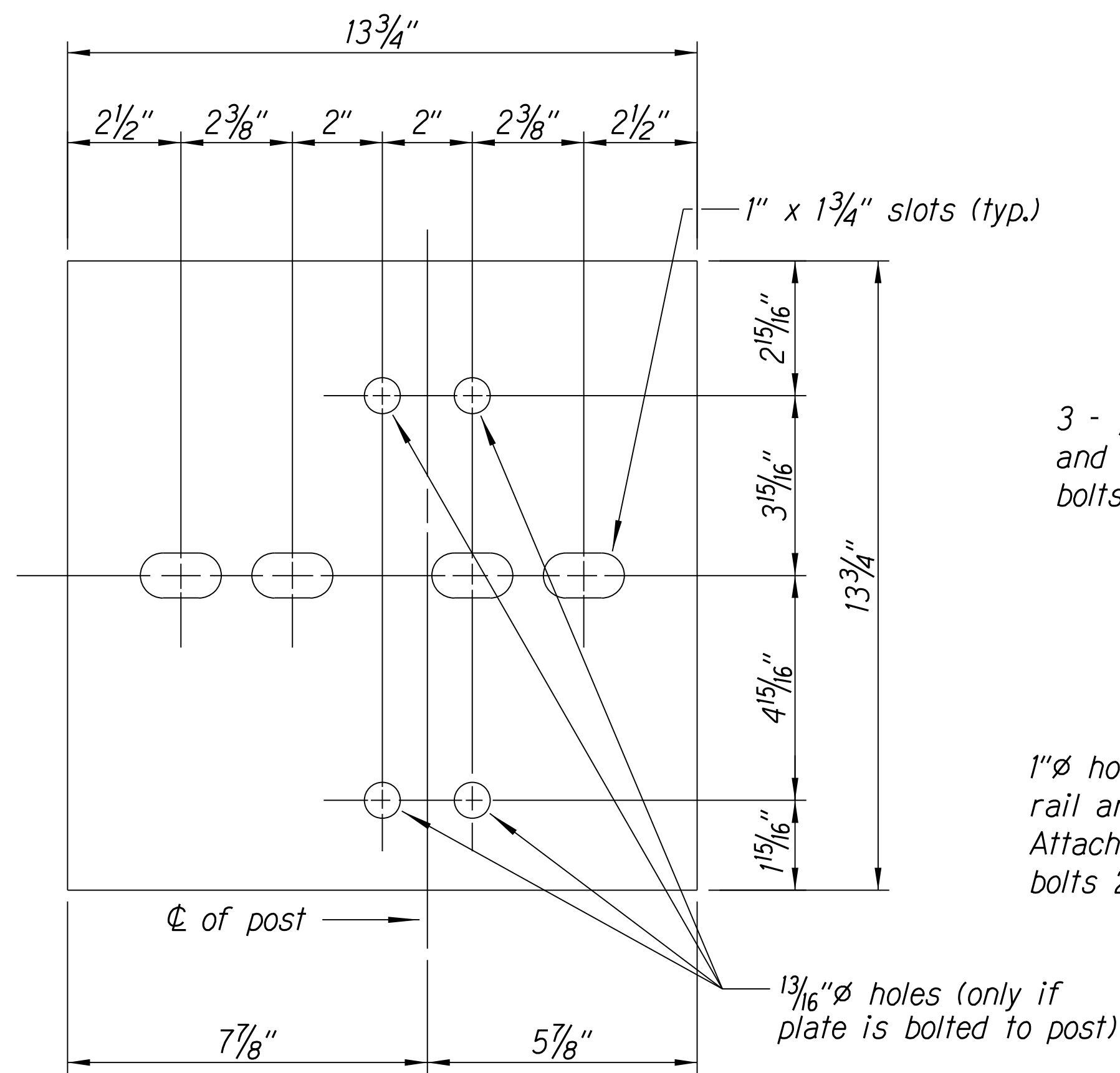
MODIFIED TYPE "A-1" FLARE

PAHOA-KALAPANA ROAD
2018 KILAUEA ERUPTION PERMANENT REPAIRS
Federal Aid Project No. ER-21(005)

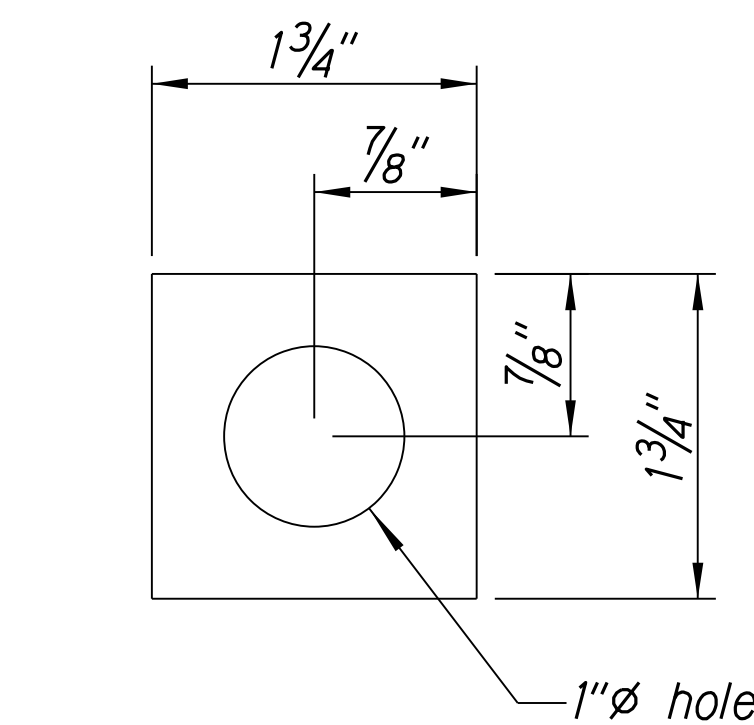
Scale: Not To Scale Date: August 2021

SHEET No. 5 OF 6 SHEETS

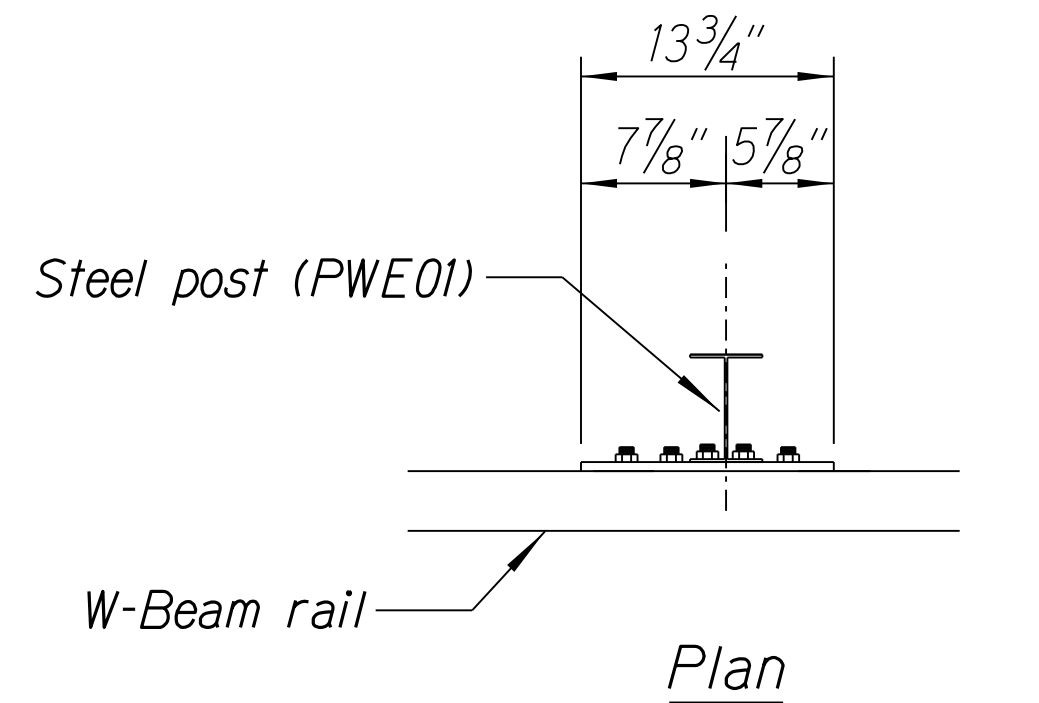
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-21(005)	2021	13	23



Steel Plate - 1/2"
(Hot-dip Zinc Coated Galvanized-
Welded or Bolted to Post)



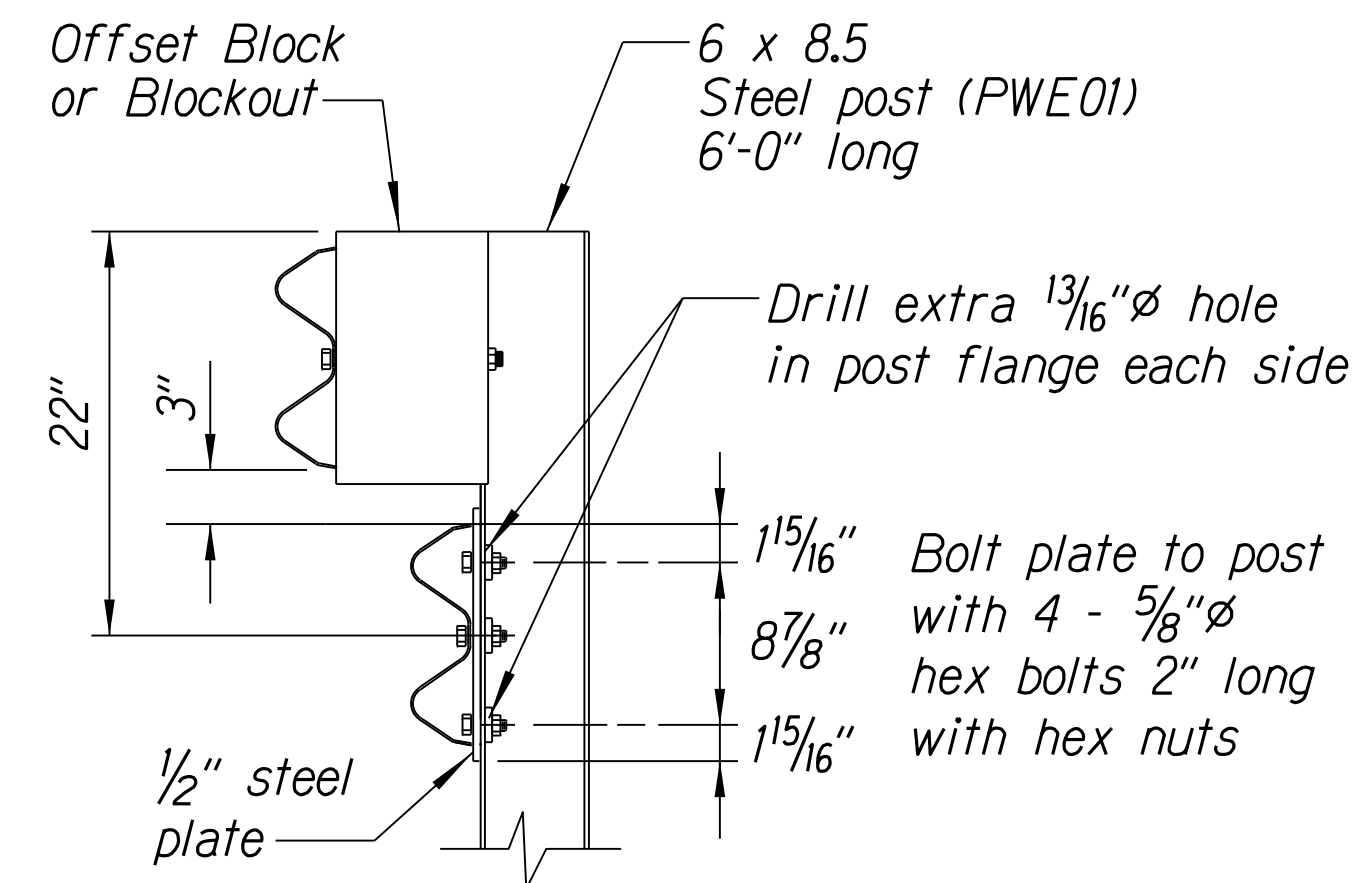
Square Washer
(3/16" Thick - Hot-dip
Zinc Coated Galvanized)



3 - 7/8" ϕ holes to be field drilled in rail
and attached to steel plate with 7/8" ϕ hex
bolts 1 5/16" long with square washer

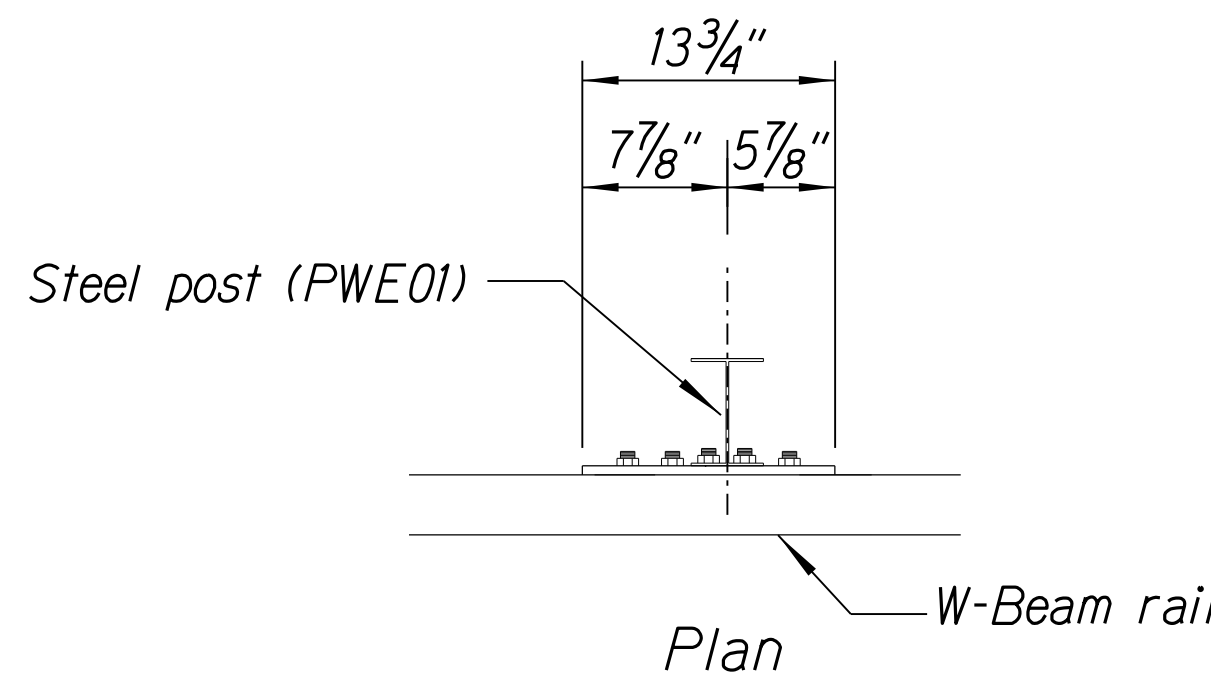
1" ϕ holes to be field drilled in
rail and through post flange.
Attach to steel plate with 7/8" ϕ hex
bolts 2" long with square washer

Front View



Elevation

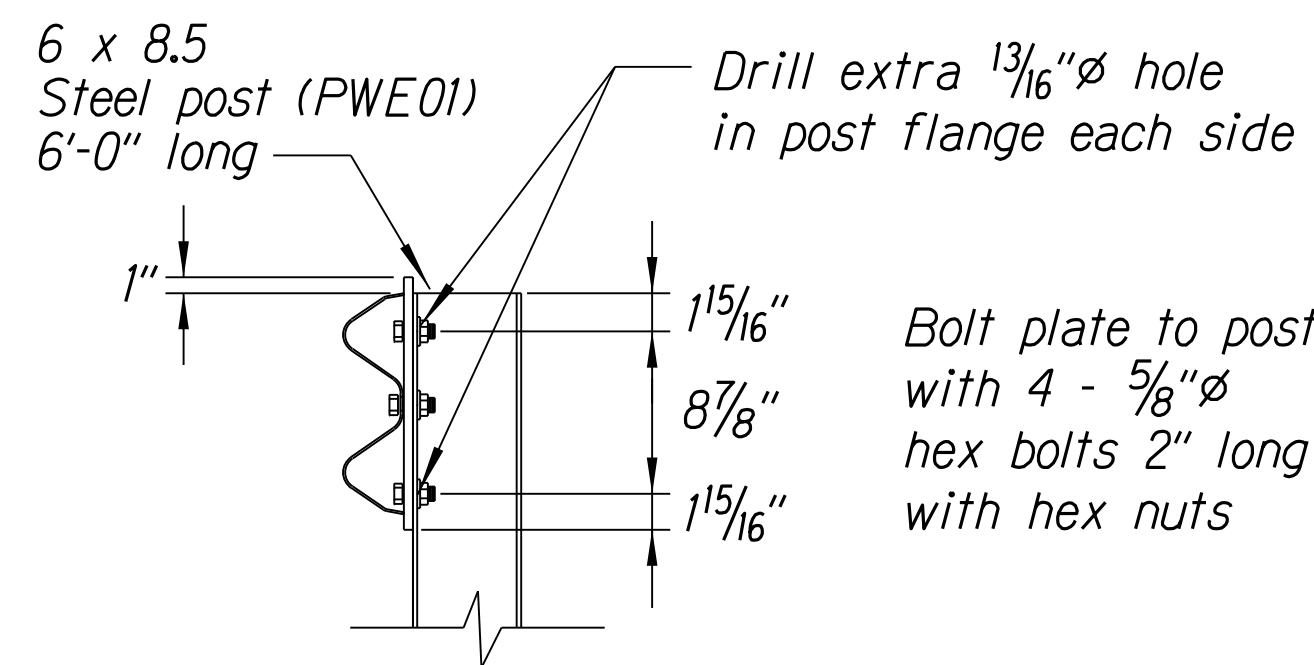
RUBRAIL ANCHOR DETAILS



3 - 7/8" ϕ holes to be field drilled in rail
and attached to steel plate with 7/8" ϕ hex
bolts 1 5/16" long with square washer

1" ϕ holes to be field drilled in
rail and through post flange.
Attach to steel plate with 7/8" ϕ hex
bolts 2" long with square washer

Front View



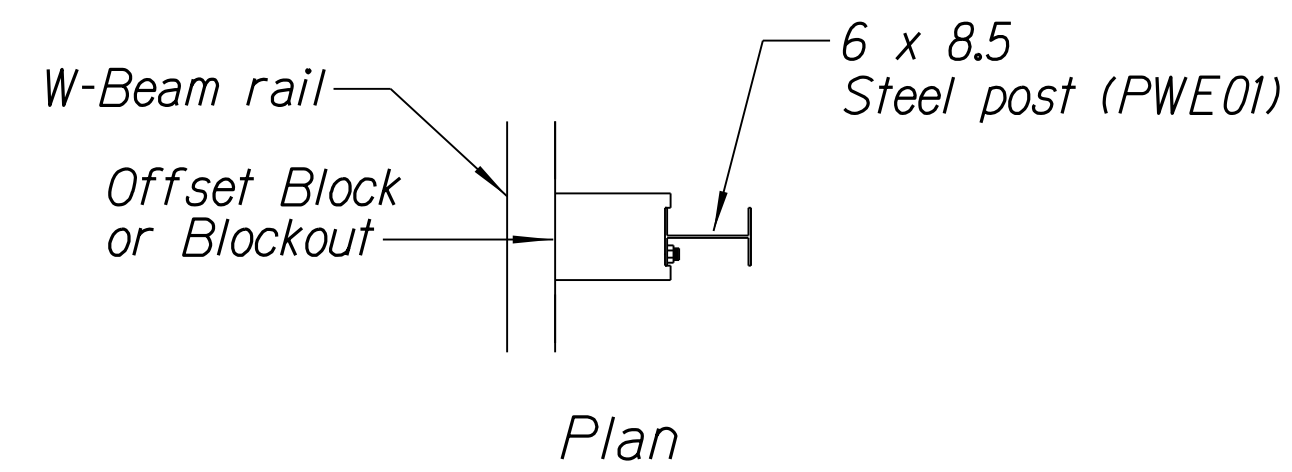
Elevation

POST ANCHOR DETAILS

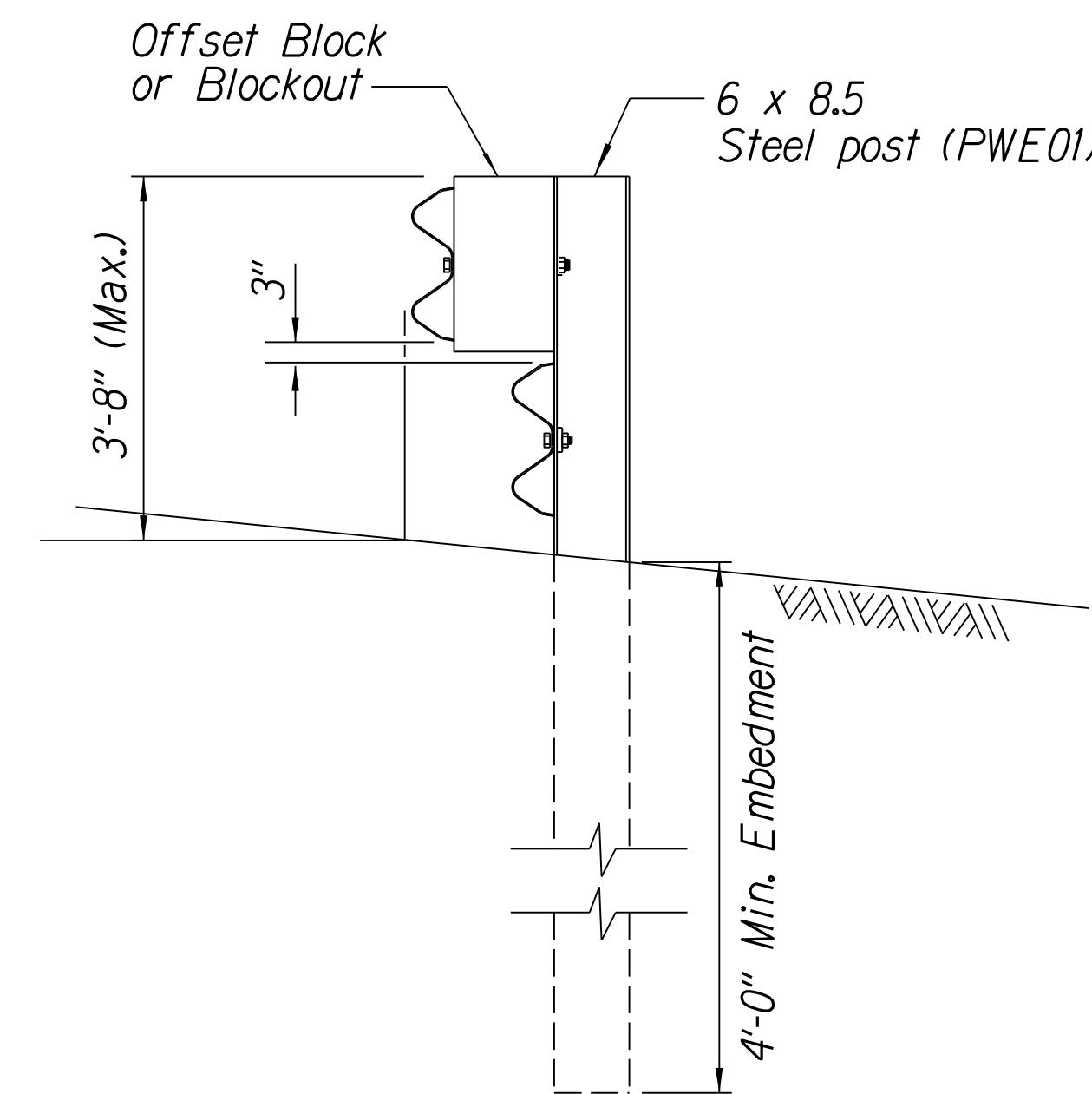
**RUBRAIL DETAIL FOR MODIFIED TYPE "A-1" FLARE
(WHEN CALLED FOR IN PLANS)**

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.

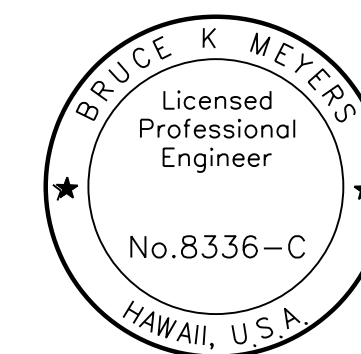


Plan



Elevation

**STEEL POST GUARDRAIL
WITH RUBRAIL**



This work was prepared by me
or under my supervision.

Expiration Date of License 4/22

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**MODIFIED TYPE "A-1"
FLARE RUBRAIL DETAILS**
PAHOA-KALAPANA ROAD
2018 KILAUEA ERUPTION PERMANENT REPAIRS
Federal Aid Project No. ER-21(005)
Scale: Not To Scale Date: August 2021
SHEET No. 6 OF 6 SHEETS