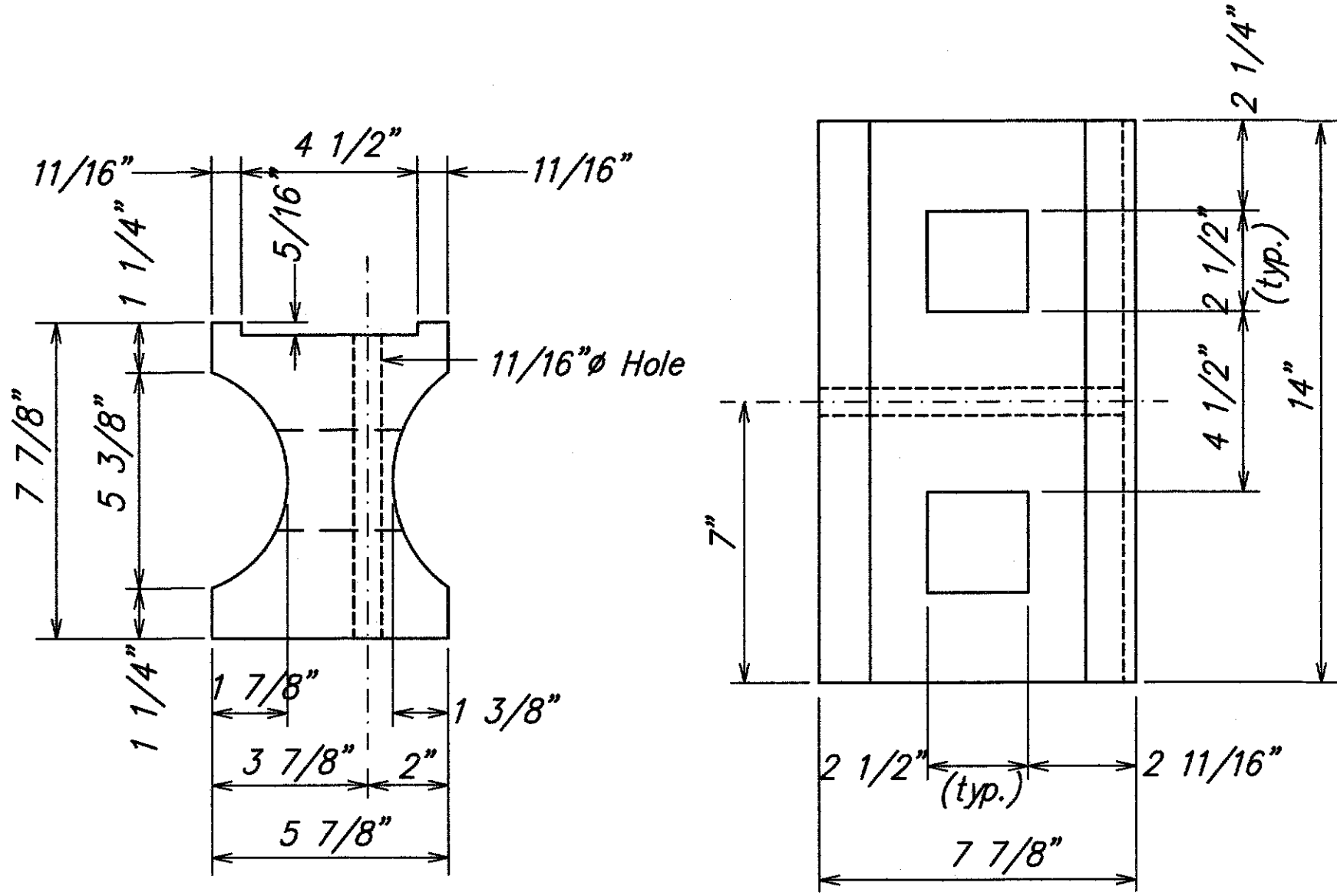


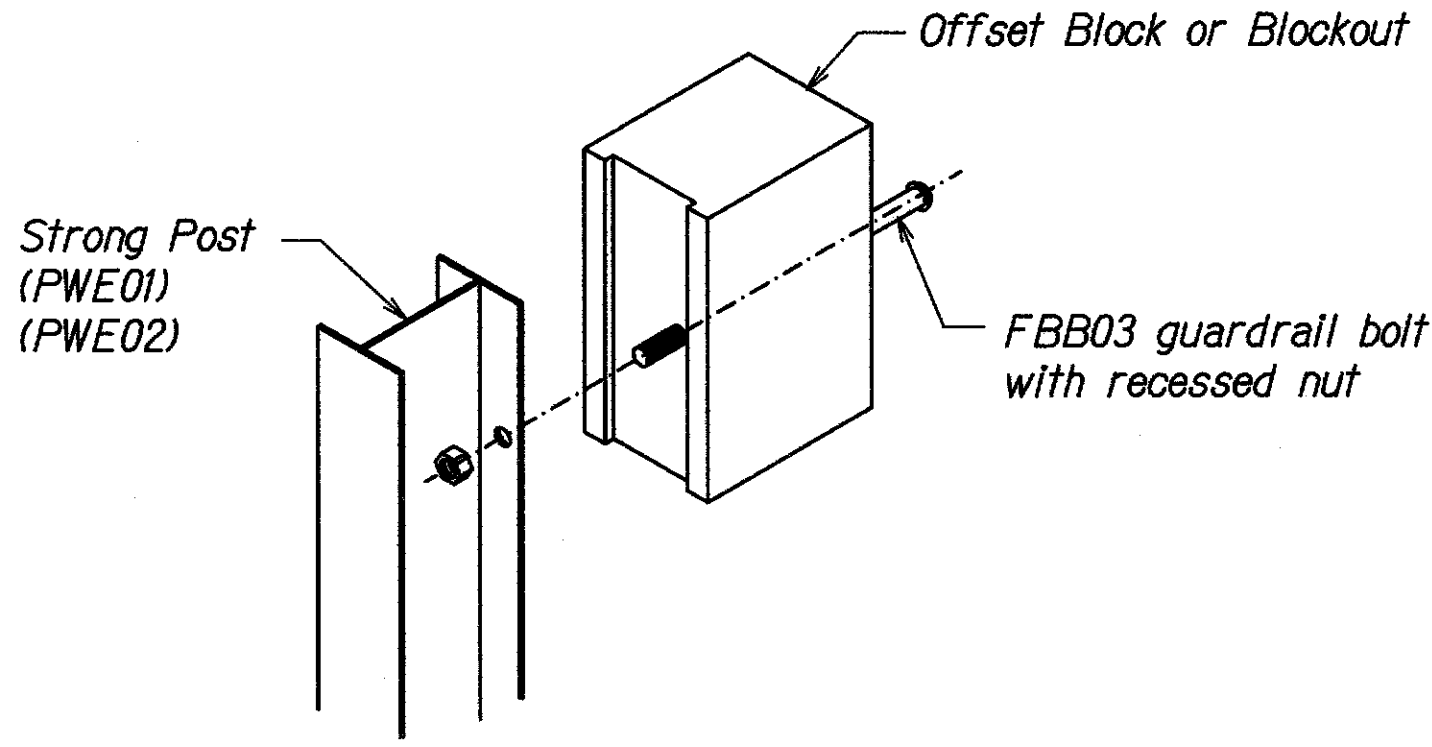
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Last Save by: JSK
Last Saved: 2/7/2019
Plotted on: 8/27/2004

DESIGNED BY	DATE
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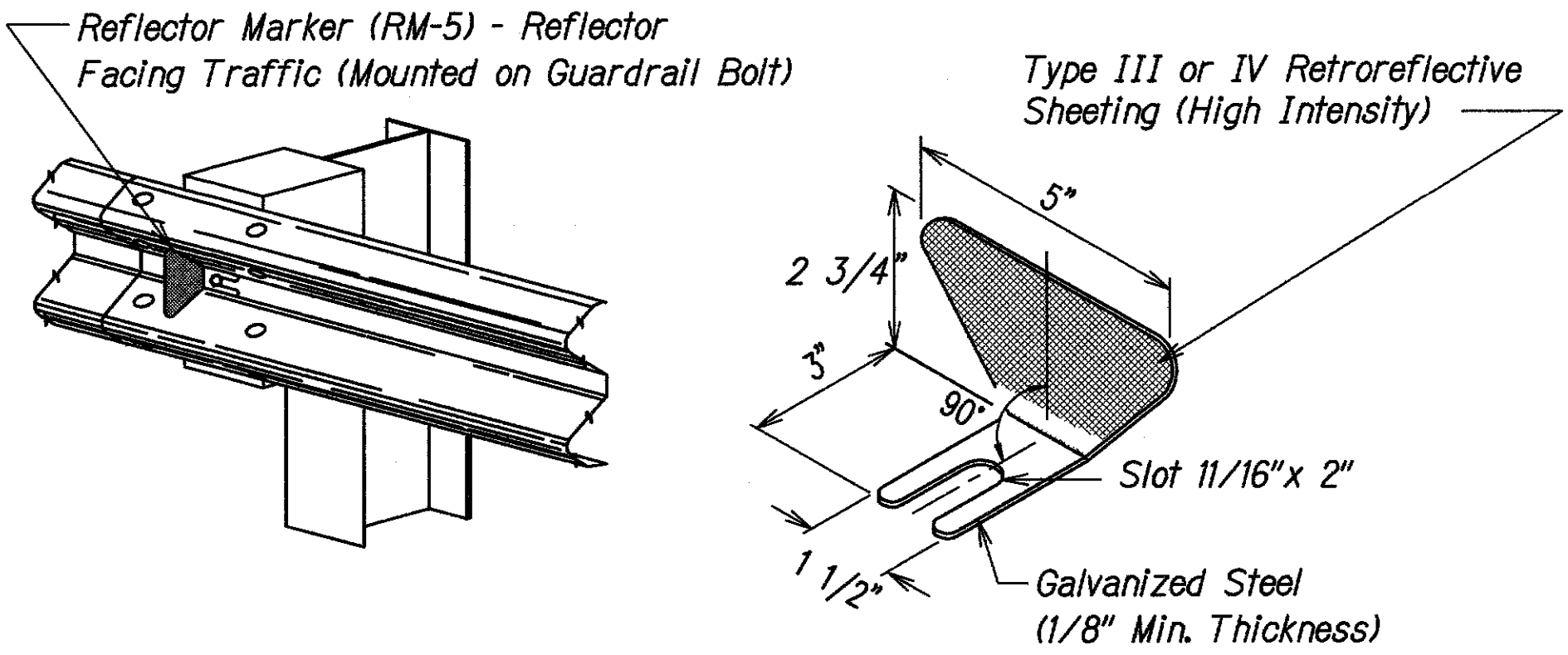
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(055)	2018	8	25



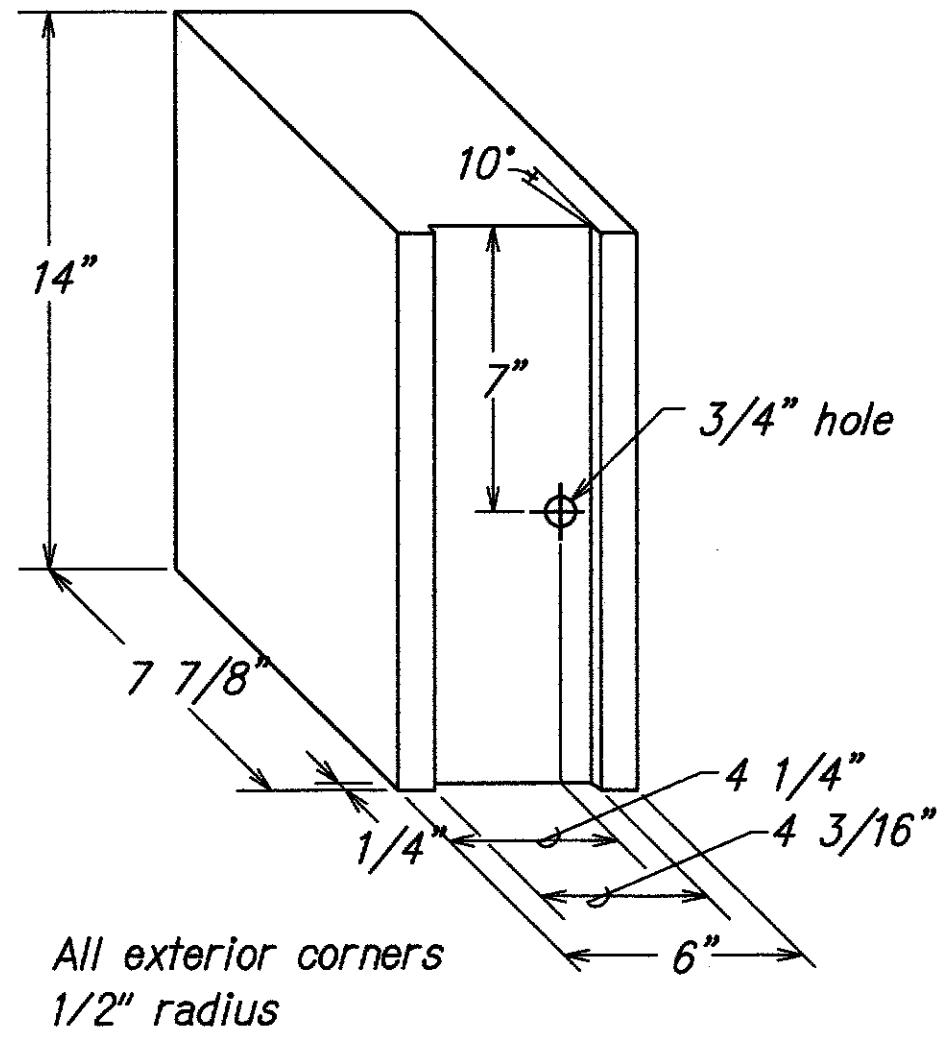
TOP
SIDE
RECYCLED PLASTIC BLOCKOUT (TYPE I)
Not to Scale



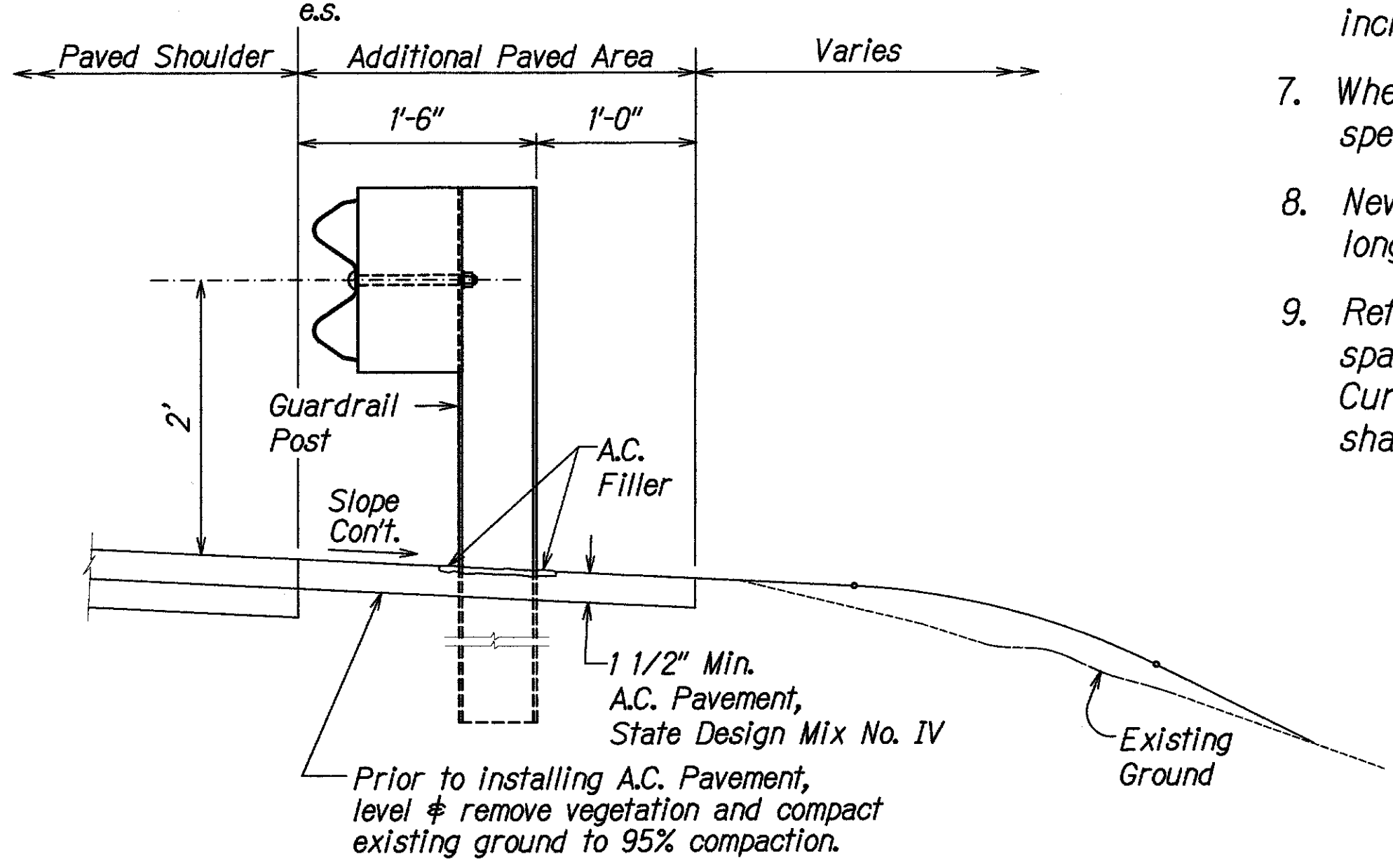
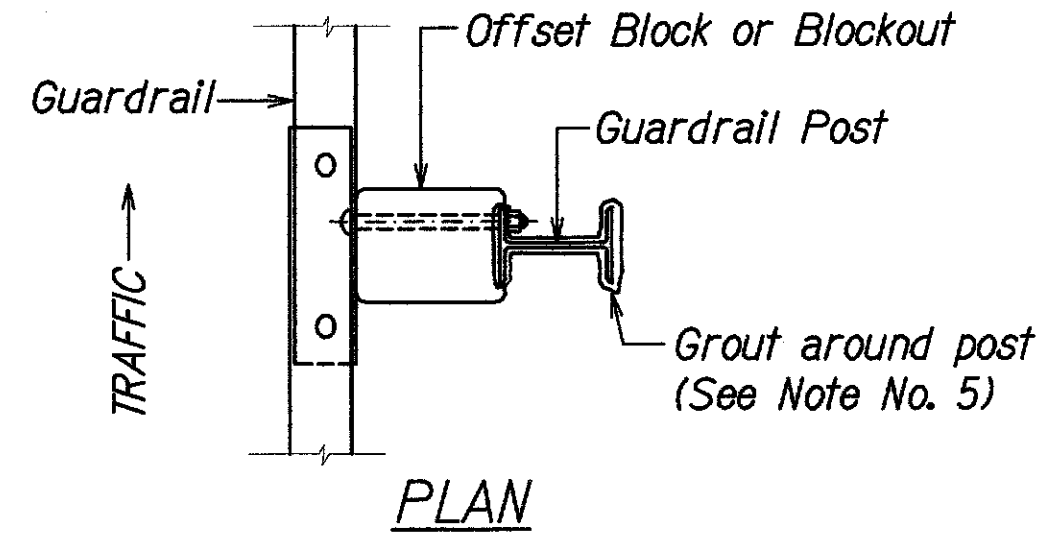
EXPLODED VIEW
(Rail and washer not shown)
STEEL POST AND BLOCK DETAIL
Not to Scale



REFLECTOR MARKER (RM-5)
DETAIL AND TYPICAL INSTALLATION
Not to Scale



RECYCLED POLYETHYLENE
OFFSET BLOCK (TYPE II)
Not to Scale



ELEVATION
TYPICAL GUARDRAIL INSTALLATION
Not to Scale

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. 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 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.
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 200 feet. Spacing of RM-5's on Horizontal Curves shall comply with Table 3D-1 of the MUTCD. RM-5's shall not be installed on Terminal Sections.

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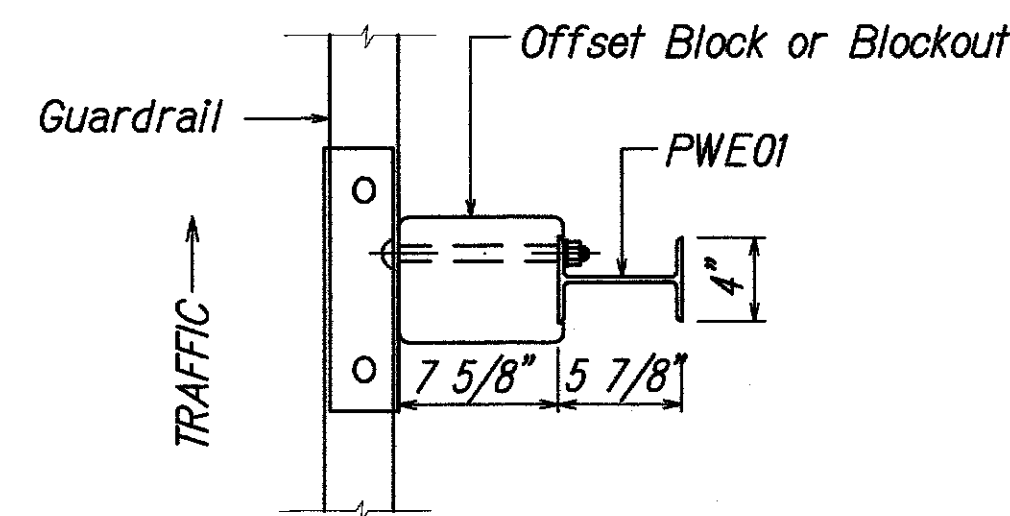
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS & NOTES

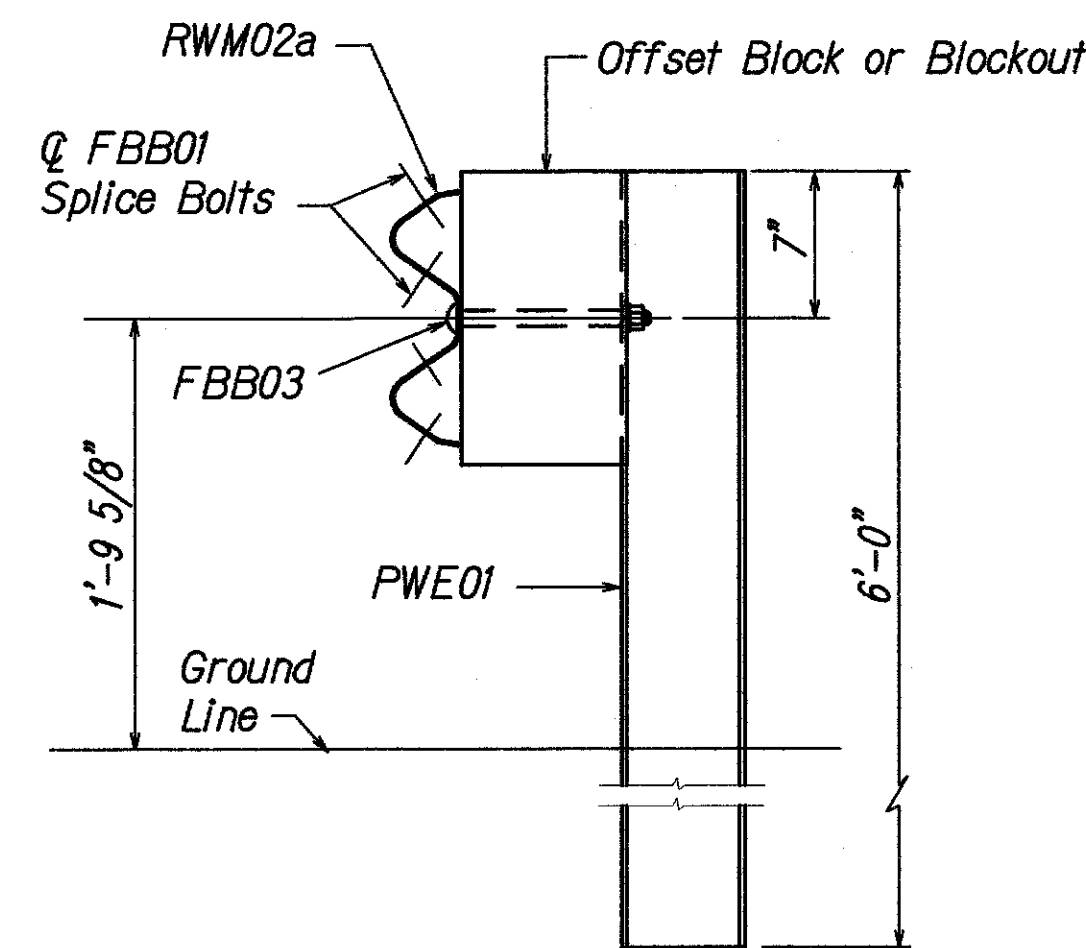
HONOAPILANI HIGHWAY
SAFETY IMPROVEMENTS
Vicinity of Ukumehame to Olowalu
Federal Aid Project No. HSIP-030-1(055)

Scale: As Shown Date: September 2017

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(055)	2018	9	25



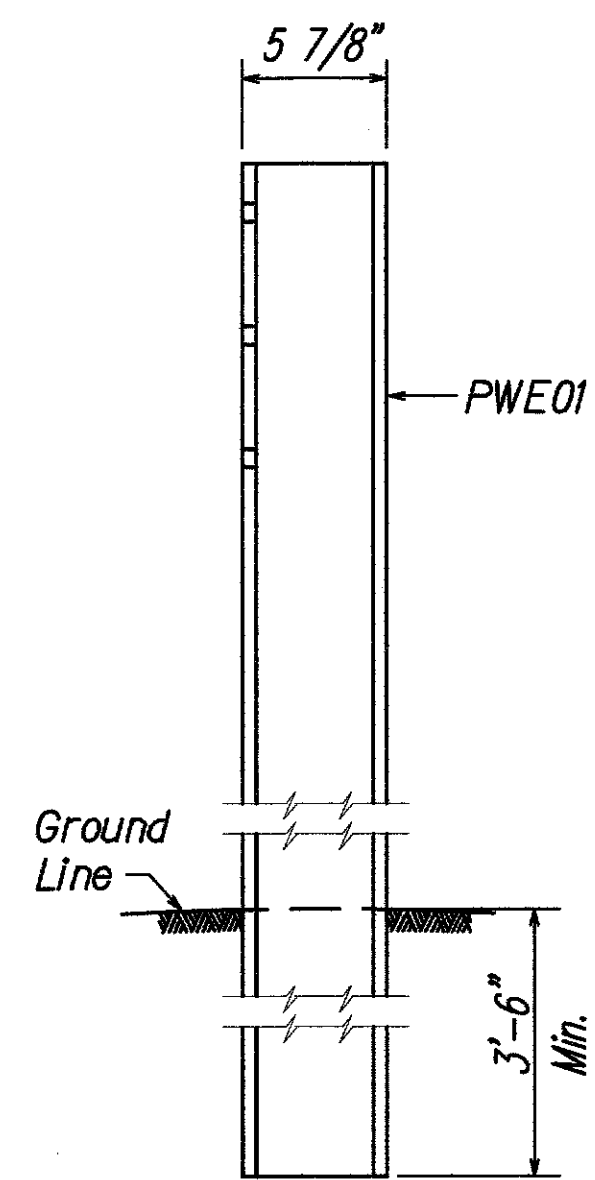
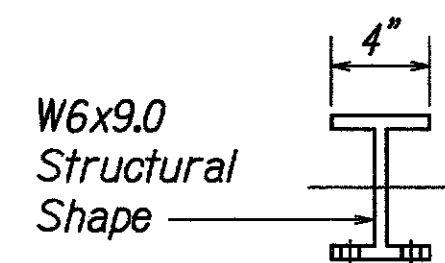
PLAN



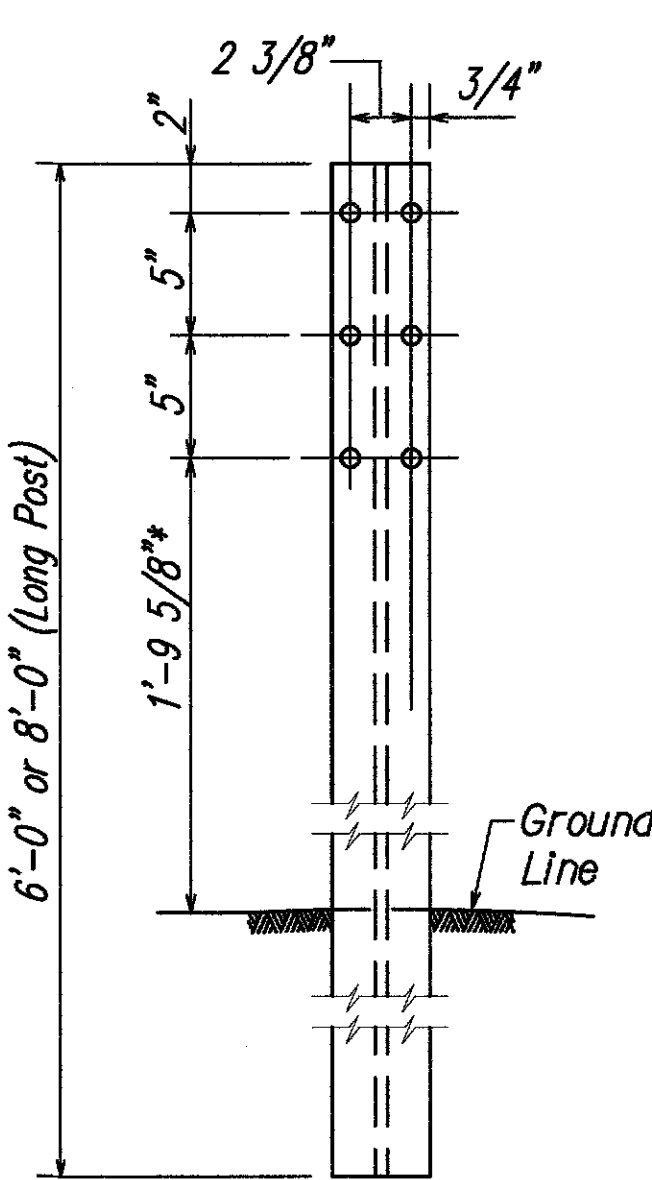
ELEVATION

STRONG POST W-BEAM GUARDRAIL (SGR04a)
Not to Scale

NOTE:
All Holes are
3/4" Dia.

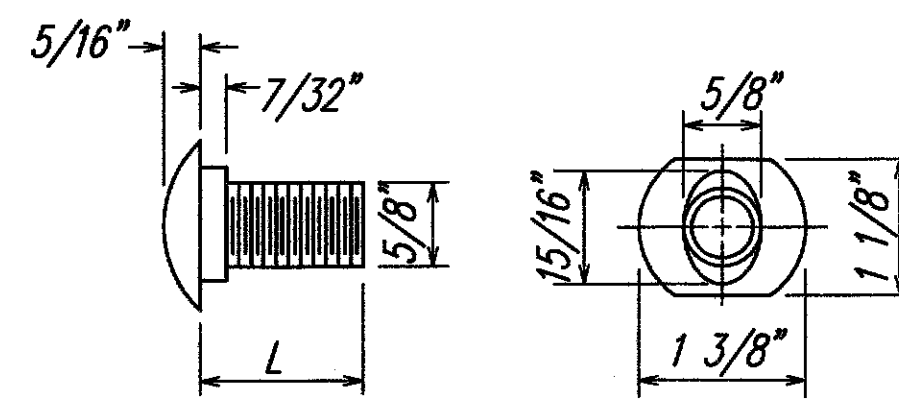


SIDE

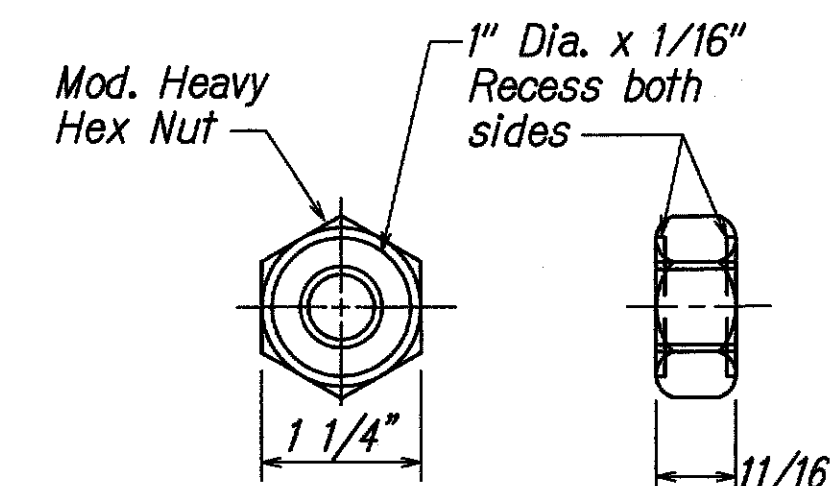


FRONT

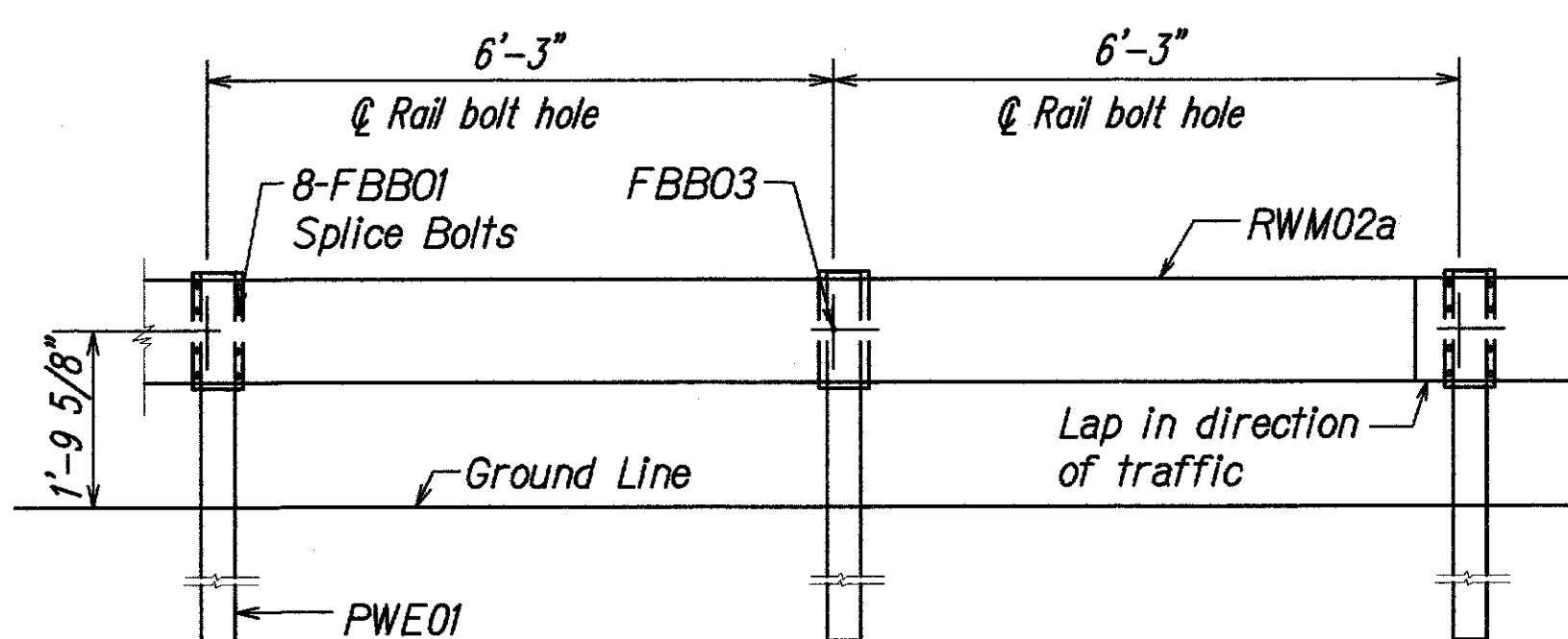
W-BEAM STRONG POST (PWE01)
Not to Scale



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

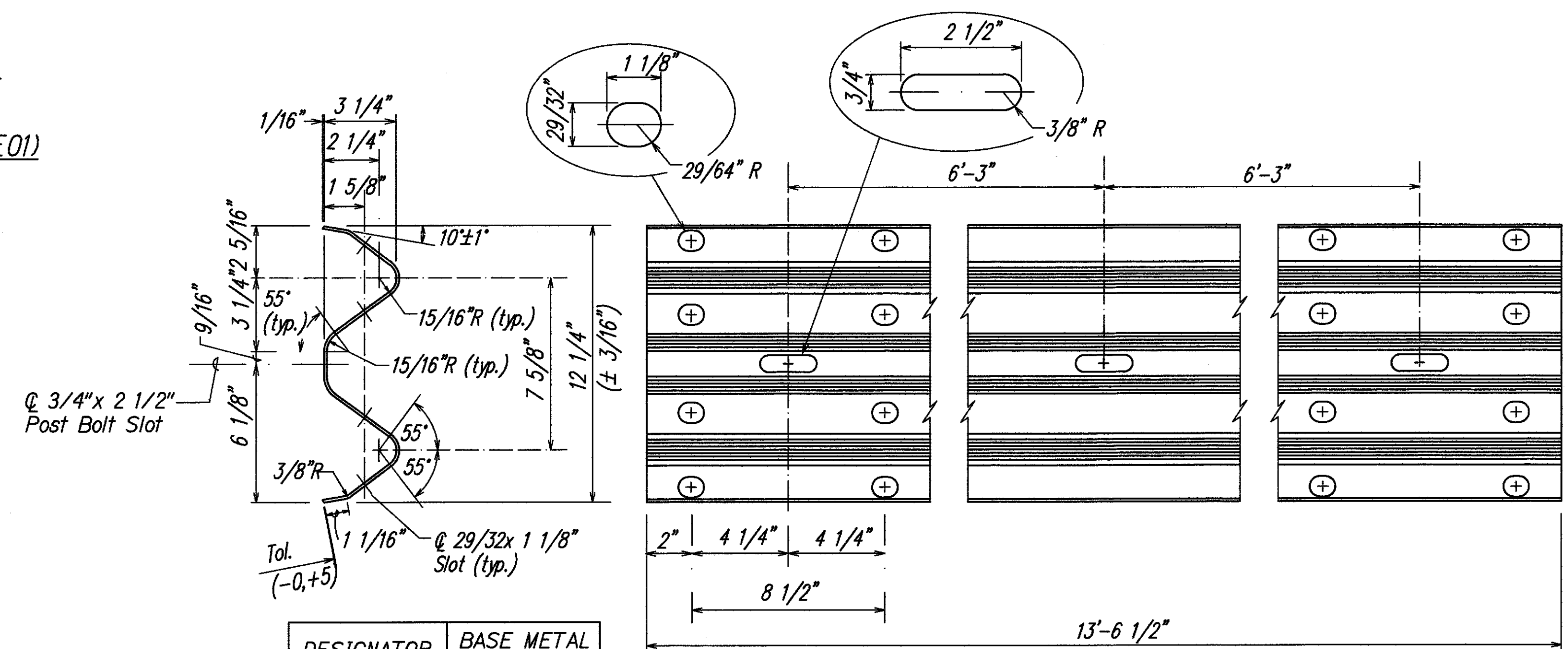


GUARDRAIL BOLTS AND RECESSED NUT
Not to Scale



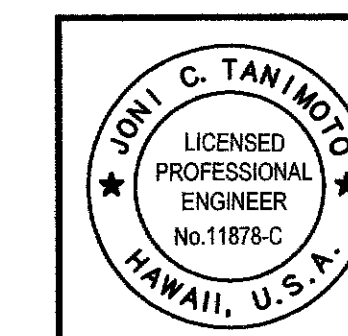
ELEVATION

STRONG POST W-BEAM GUARDRAIL WITH
RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT
Not to Scale



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Gauge

2 SPACE W-BEAM GUARDRAIL (RWM02a)
Not to Scale



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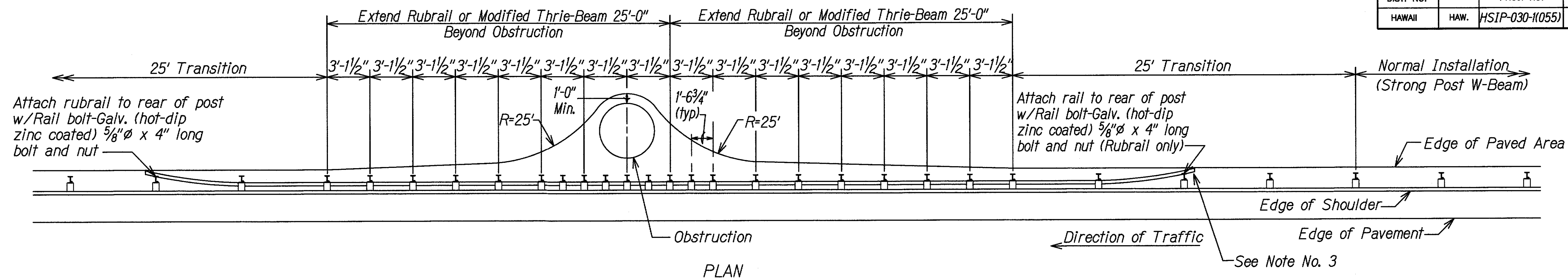
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRONG POST W-BEAM GUARDRAIL
HONOAPIILANI HIGHWAY
SAFETY IMPROVEMENTS
Vicinity of Ukumehame to Olowalu
Federal Aid Project No. HSIP-030-1(055)
Scale: As Shown Date: September 2017

DESIGNED BY	DATE
CHECKED BY	
APPROVED BY	
NOTED BY	
DATE	

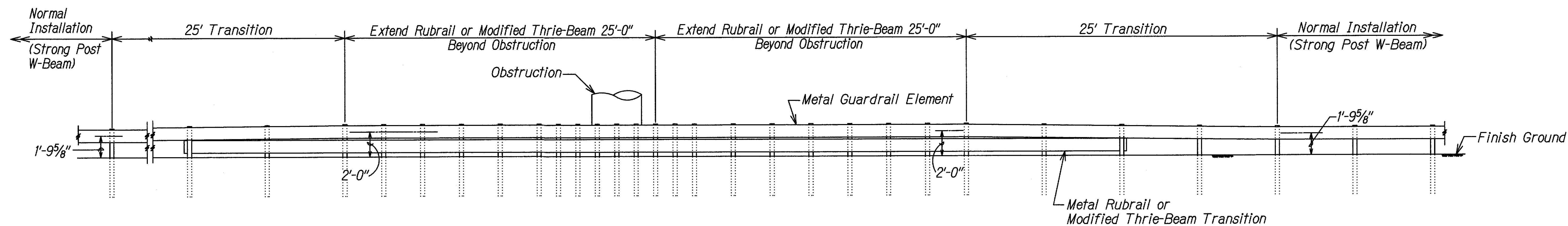
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Last Saved: 2/7/2019
Plotted on: 8/27/2004

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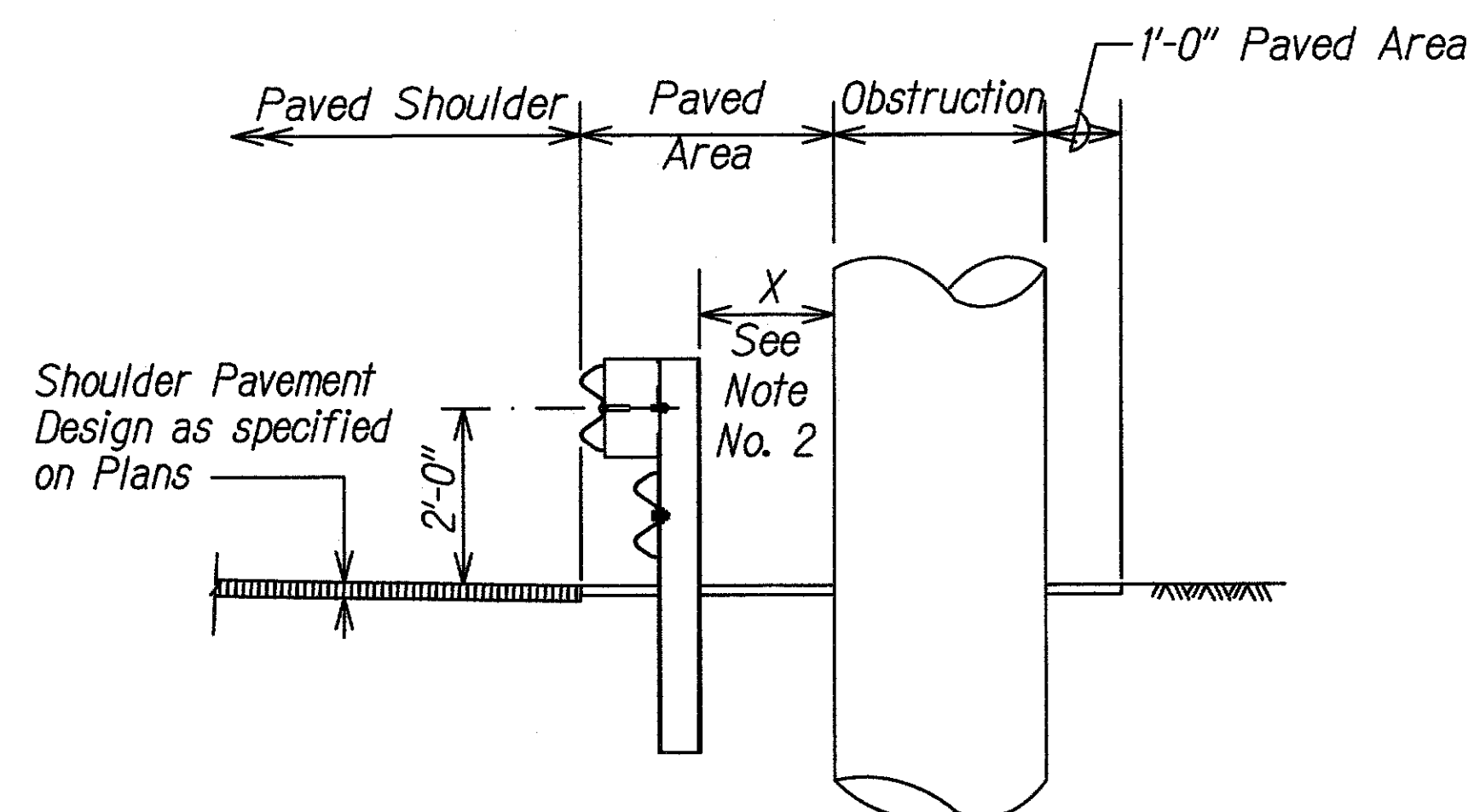
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(055)	2018	10	25



PLAN



ELEVATION

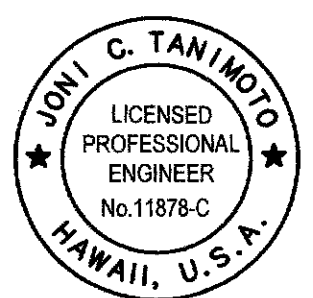


TYPICAL SECTION AT OBSTRUCTION

DETAIL OF GUARDRAIL INSTALLATION AT OBSTRUCTION
Not to Scale

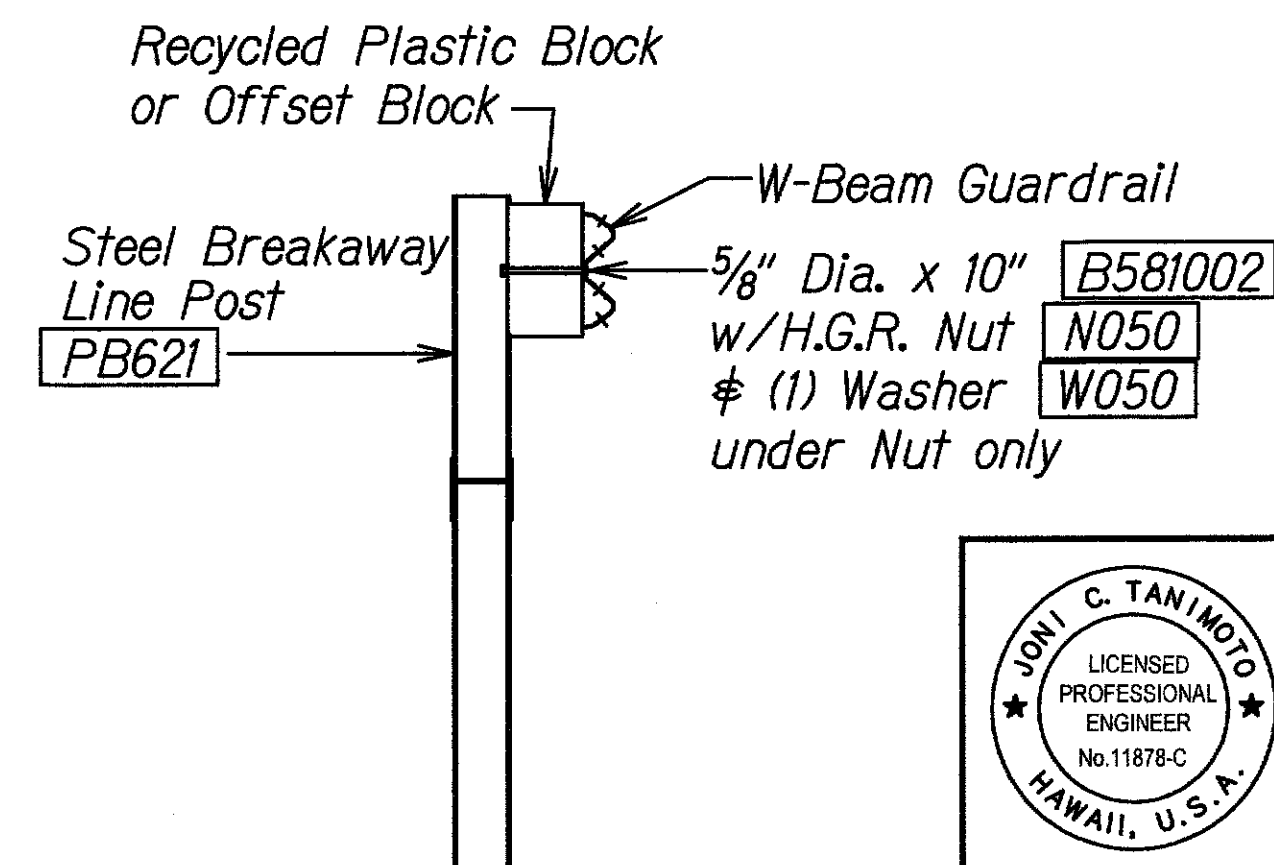
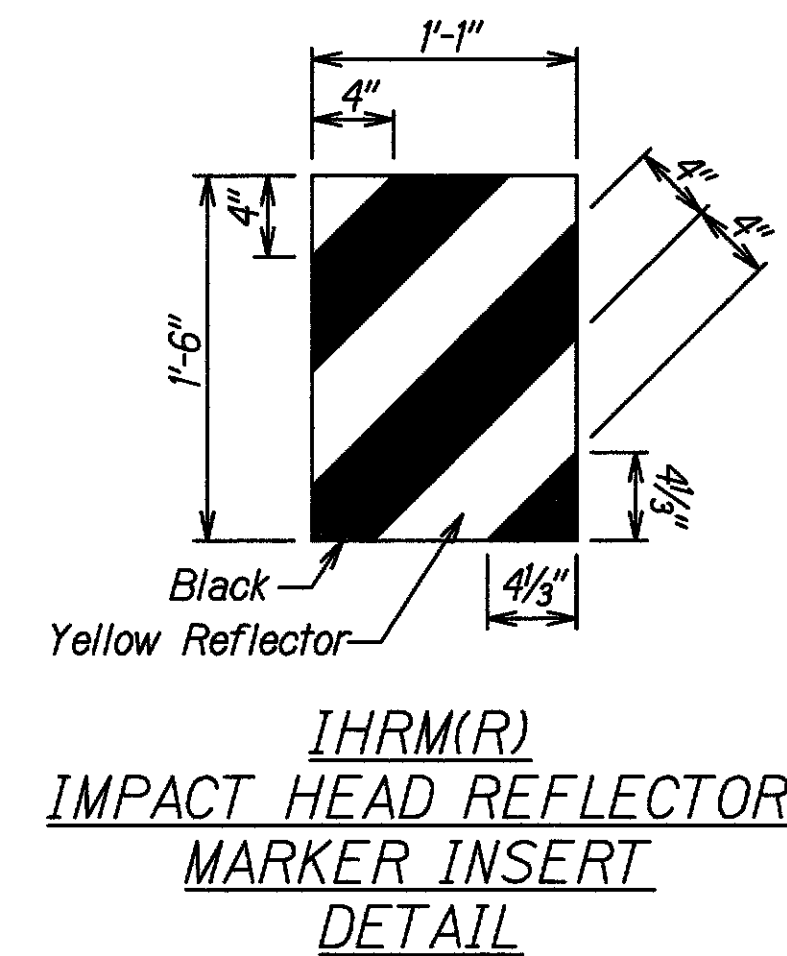
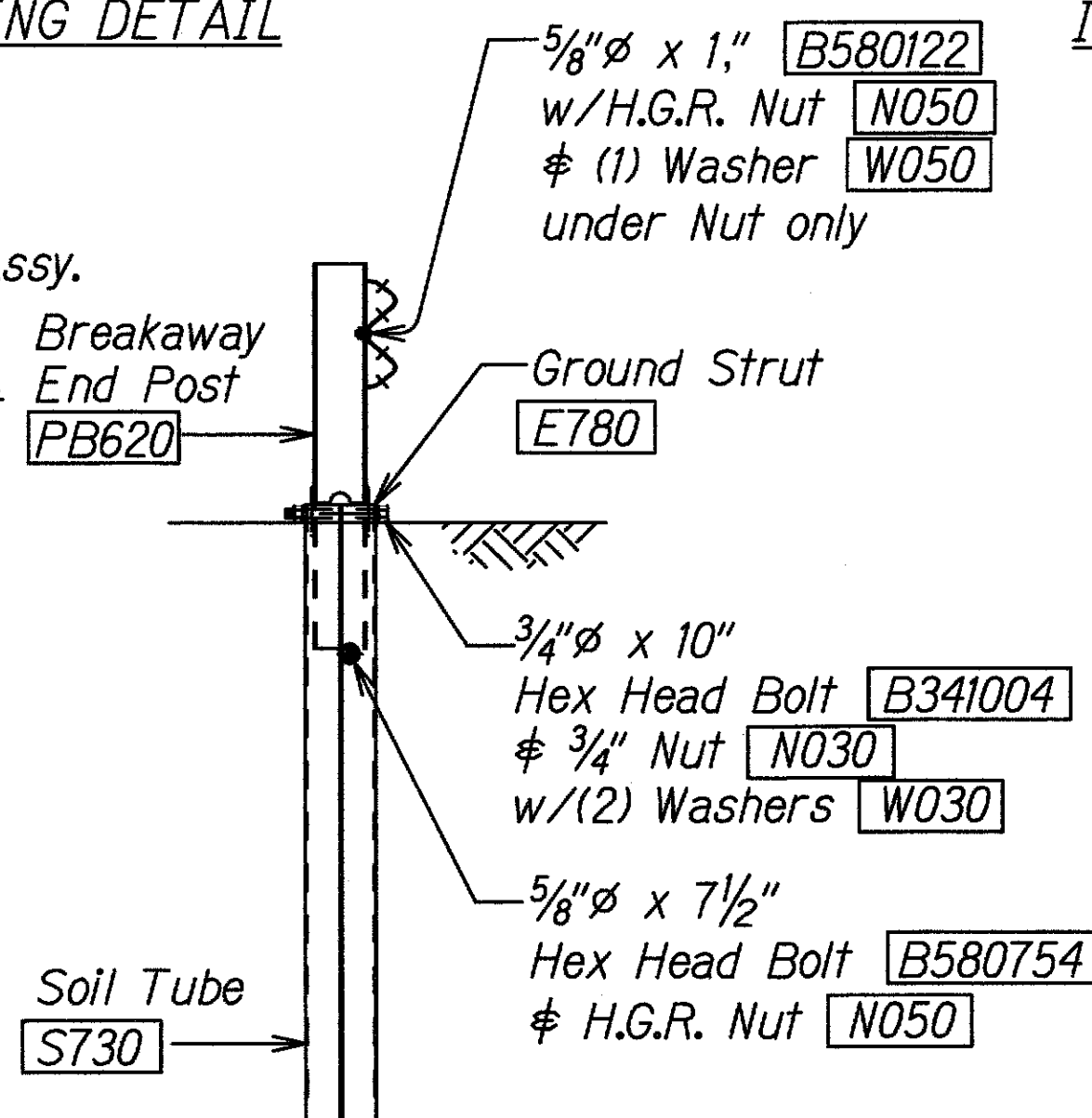
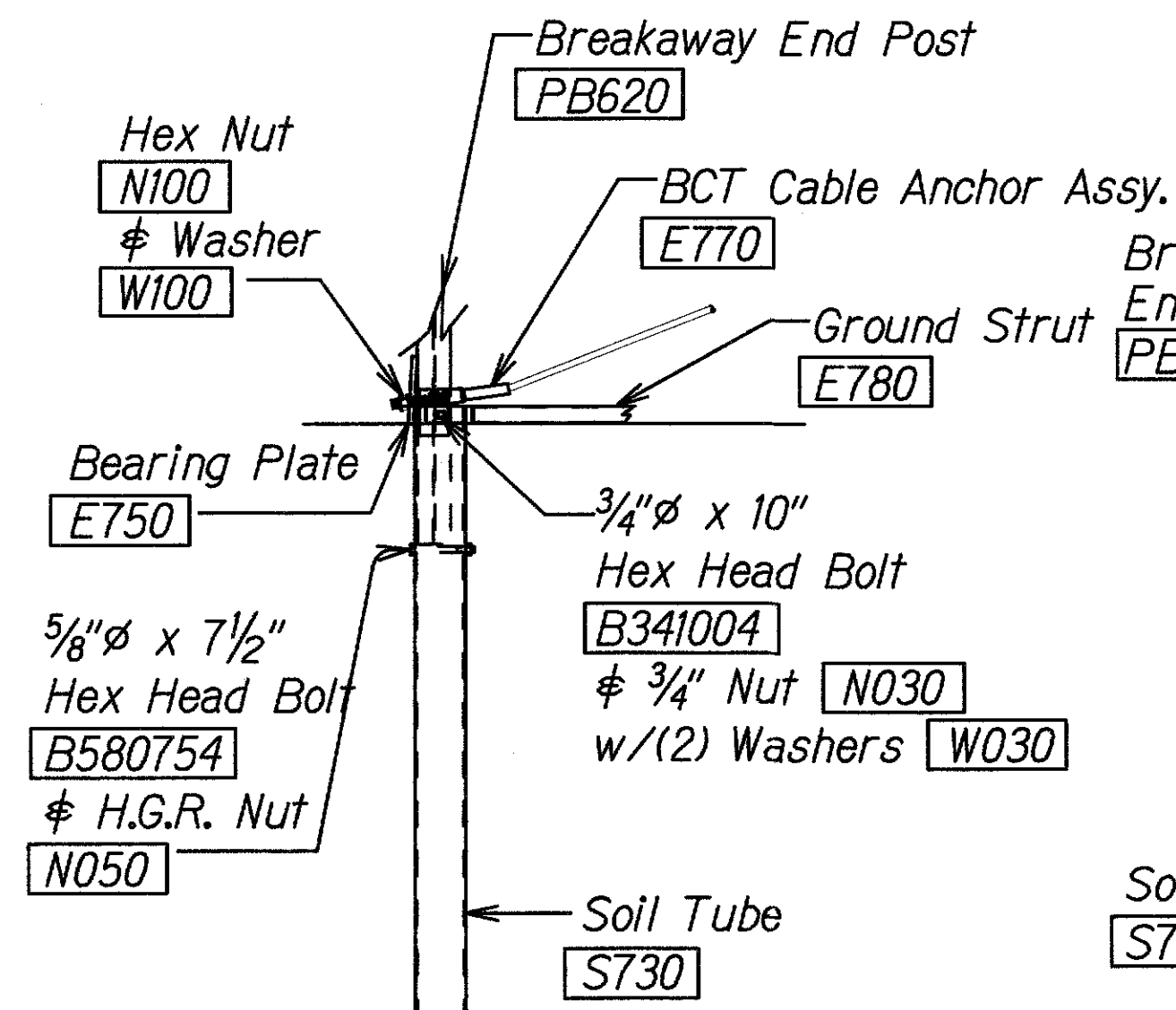
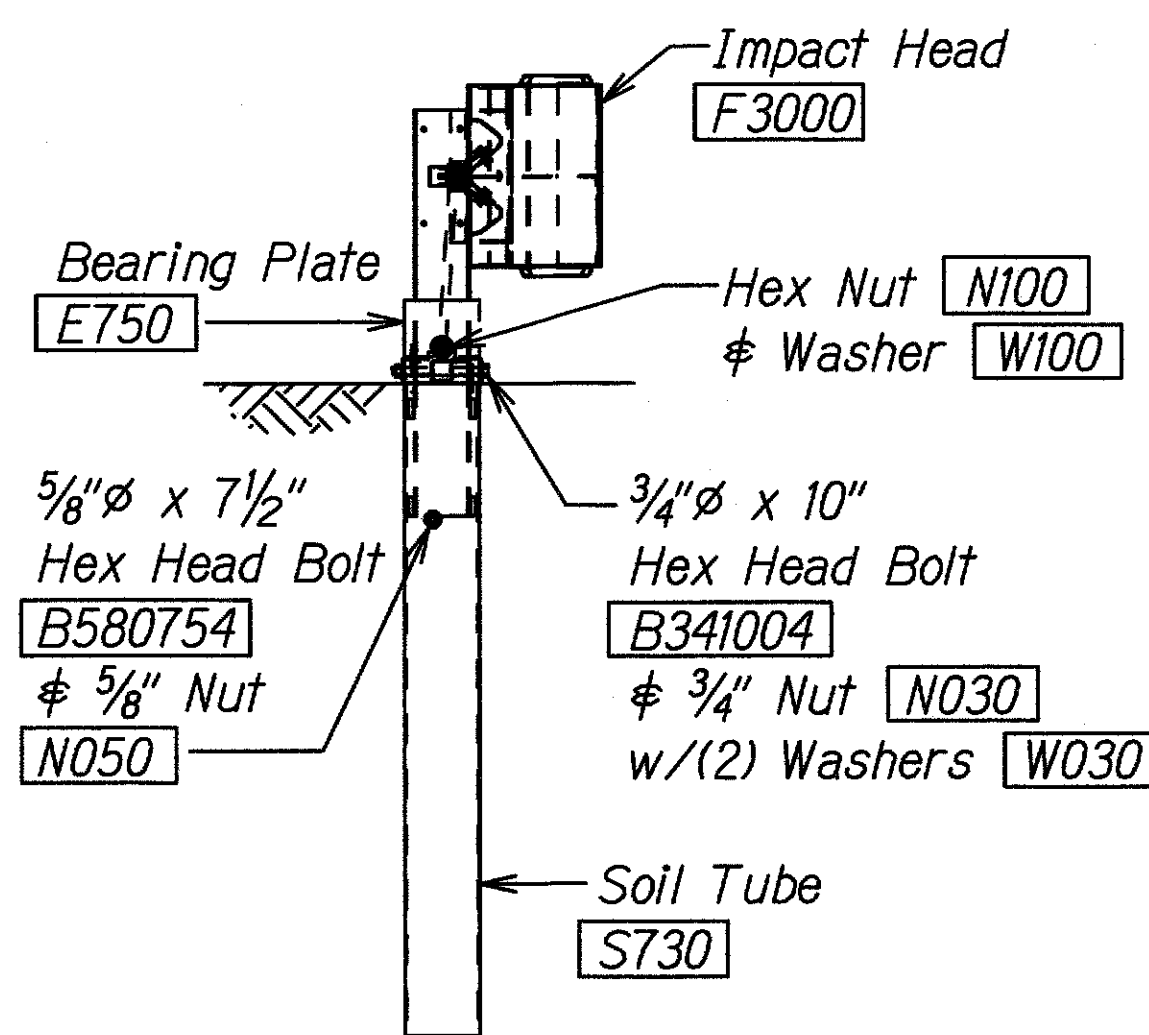
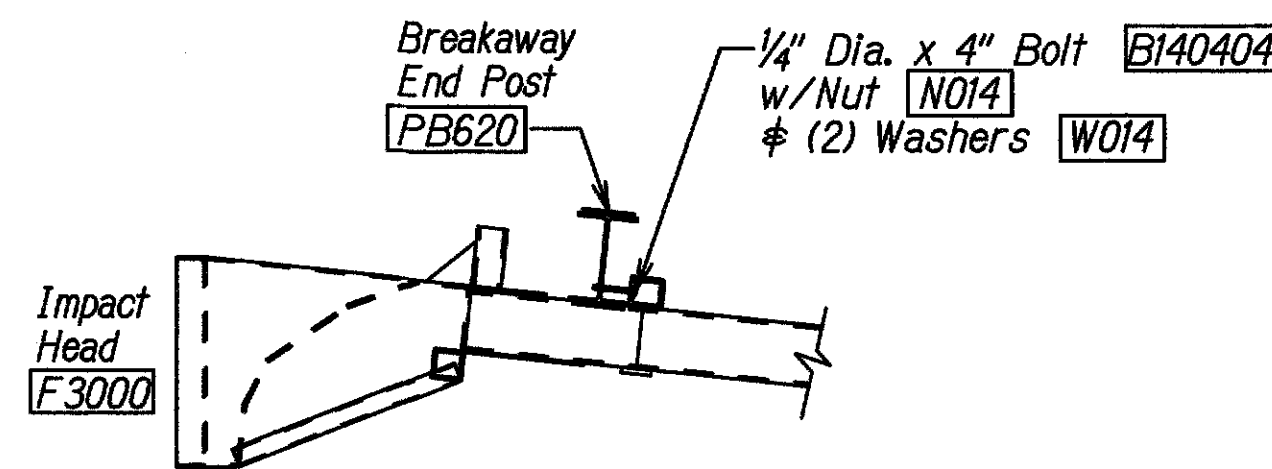
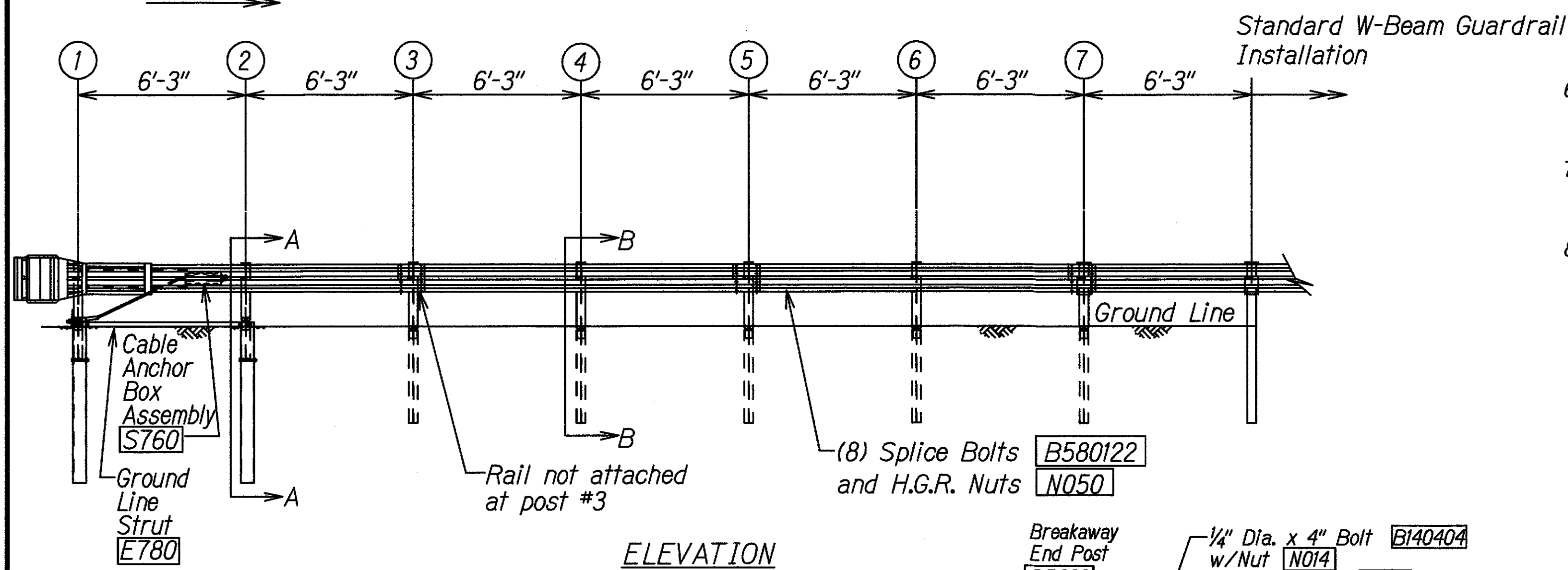
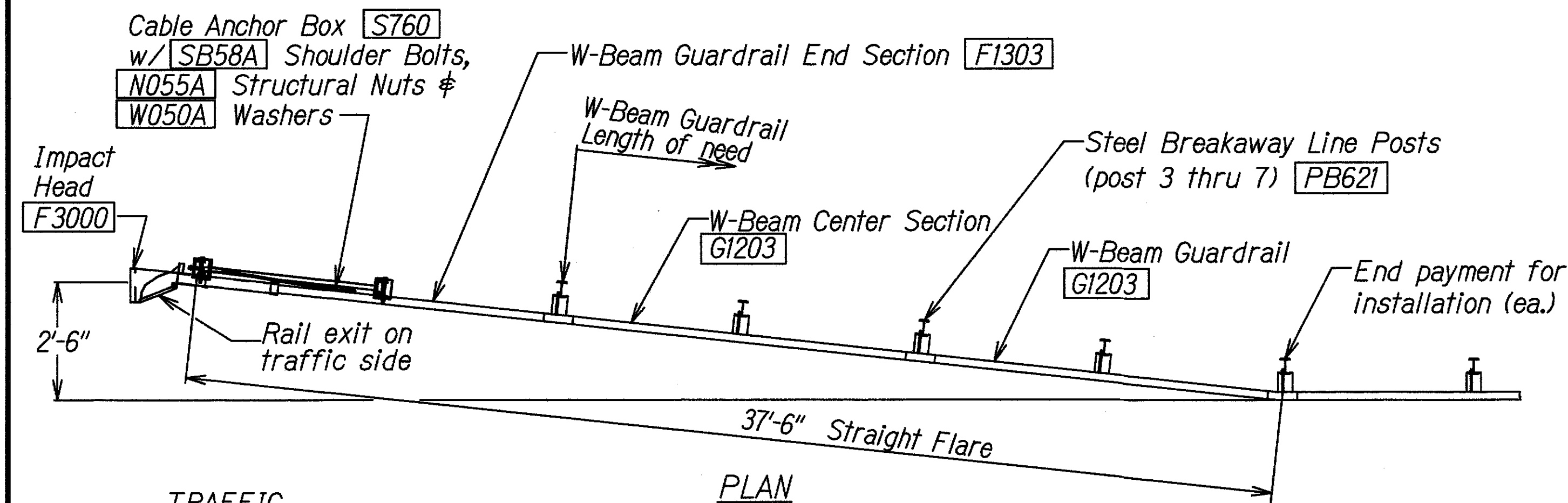
NOTES:

1. All Guardrail and Concrete Barrier Designs at Obstructions shall be approved by the Engineer.
2. If $X < 2'-0"$, Concrete Barrier or special guardrail design;
 $2'-0" \leq X < 3'-0"$, Strong Post Rubrail or Strong Post Thrie-Beam with reduced post spacing;
 $3'-0" \leq X$, Strong Post W-Beam with 6'-3" post spacing (Normal Installation).
3. If a pedestrian walkway or bicycle route is located behind the guardrail, the Engineer should install the Modified Thrie-Beam System. The Rubrail termini may become a hazard to pedestrians & bicyclists.

 <small>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION Expiration Date of the License: 04/30/2019</small>	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION GUARDRAIL DETAILS (AT OBSTRUCTION) HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS Vicinity of Ukumehame to Olowalu Federal Aid Project No. HSIP-030-1(055) Scale: As Shown Date: September 2017
	SHEET No. 10 OF 25 SHEETS

FILE: G:\DOT\H1501 HONOLULU HIGHWAY SAFETY IMPROVEMENTS\300 DSGN\310 PLANS\DOT\H1501 FLEAT-350 DETAIL.DWG
Last Save by: JSK
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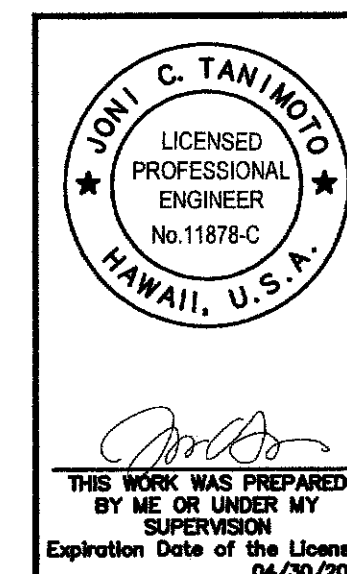


- GENERAL NOTES**
1. Breakaway steel posts are required with the FLEAT Terminal.
 2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
 3. The soil tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading may be necessary to meet 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	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(055)	2018	11	25

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" 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	1/16" 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



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
FLEAT-350 FLARED ENERGY ABSORBING TERMINAL
HONOLULU HIGHWAY SAFETY IMPROVEMENTS
Vicinity of Ukumehame to Olowalu
Federal Aid Project No. HSIP-030-1(055)
Scale: As Shown Date: September 2017
SHEET No. 11 OF 25 SHEETS

AS-BUILT

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