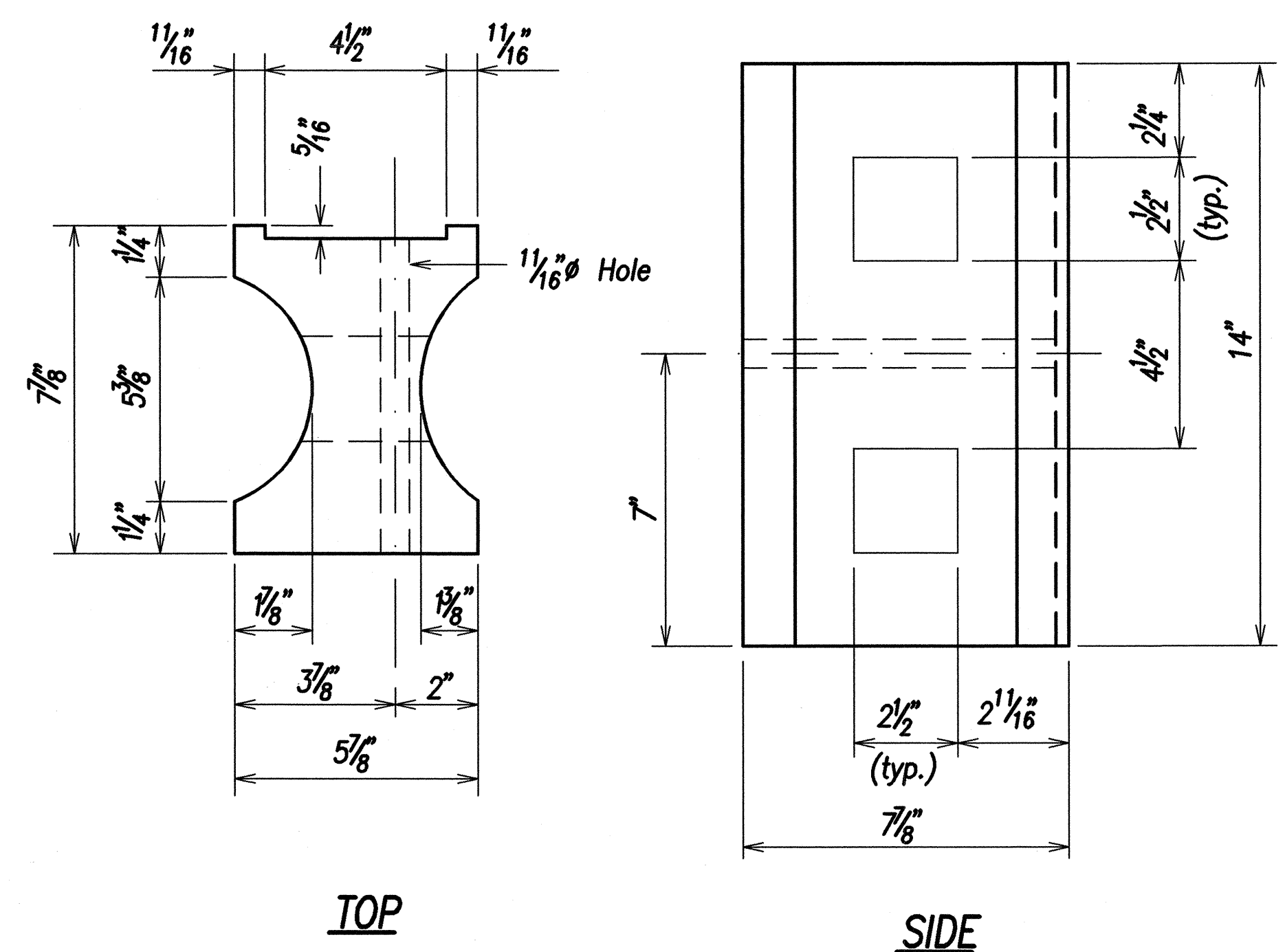
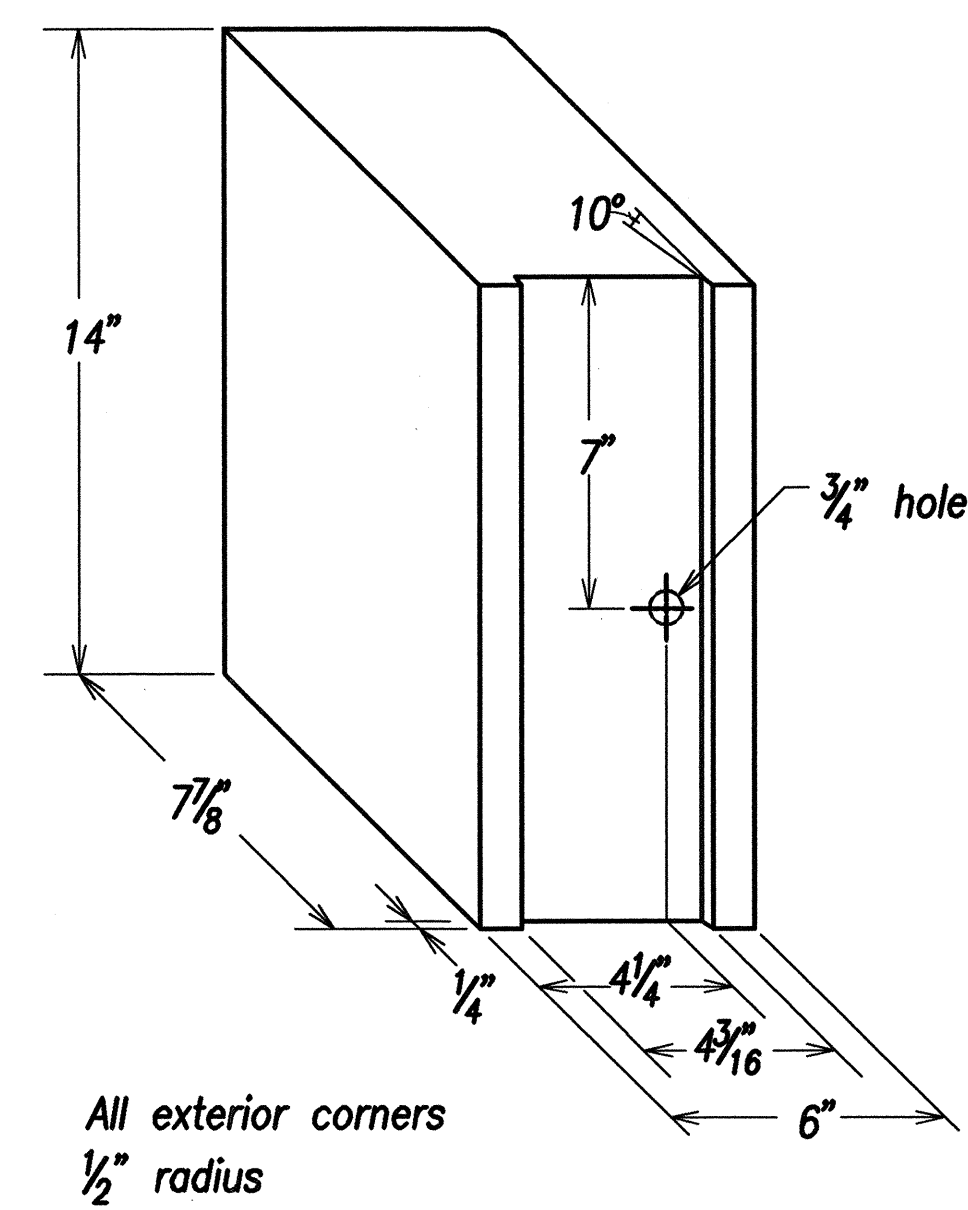


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	99	124

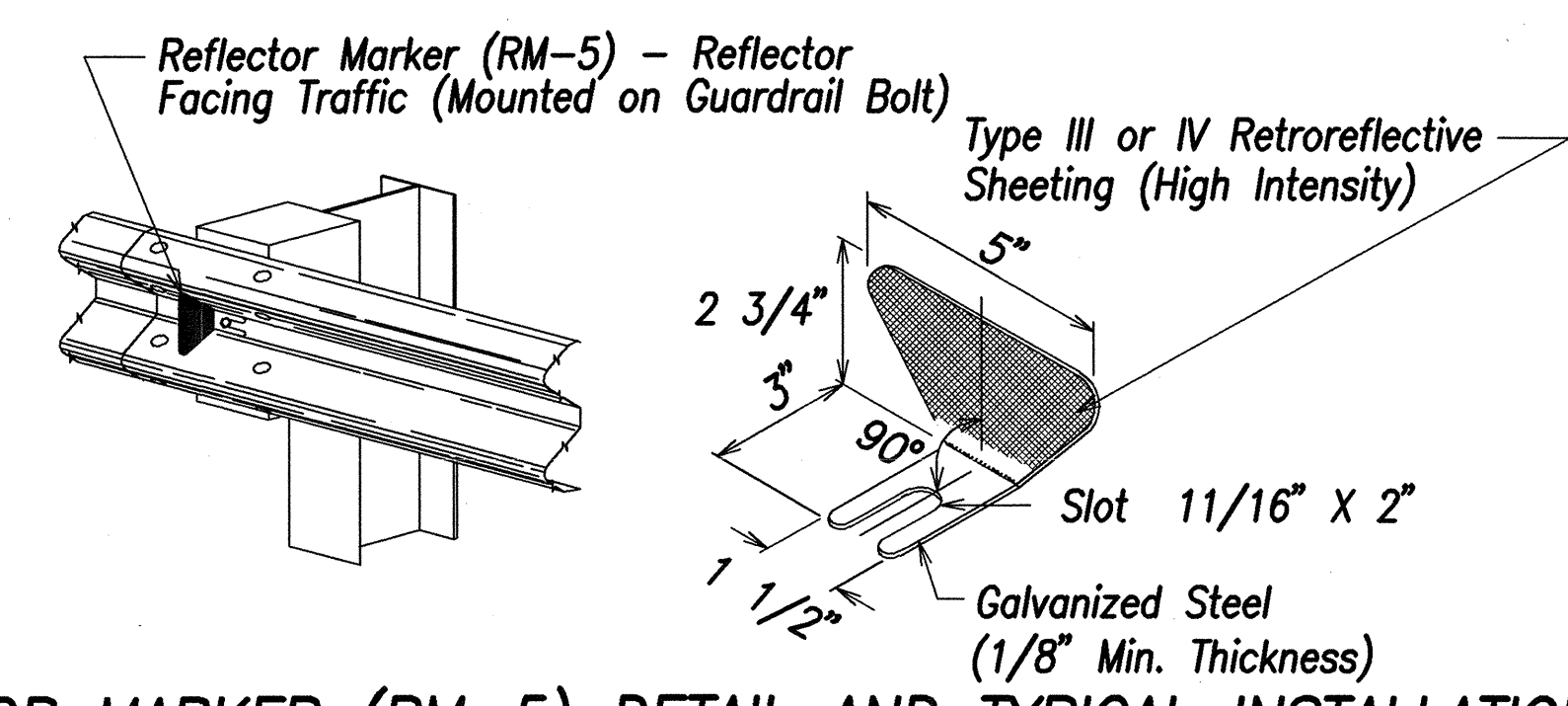
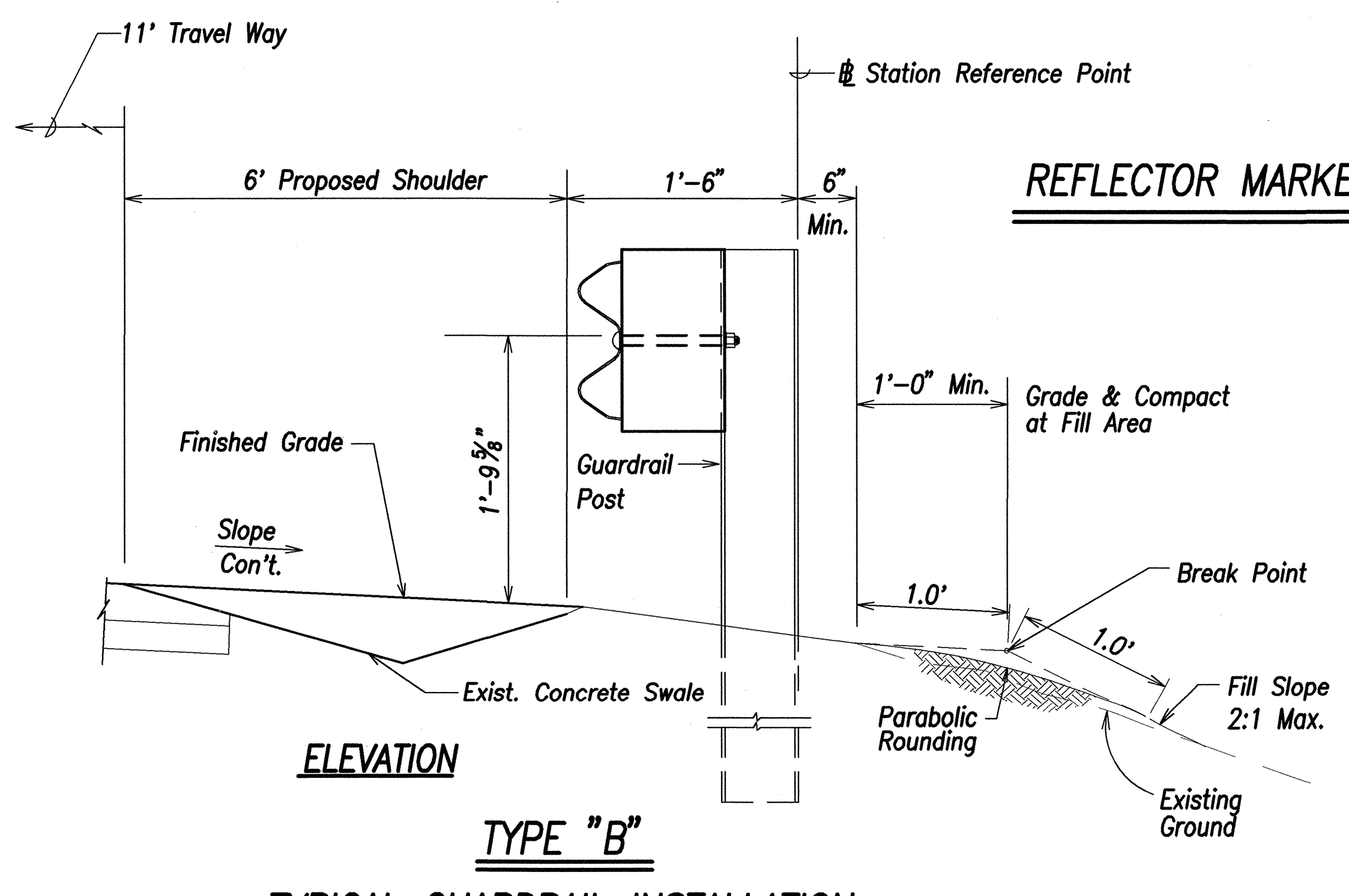
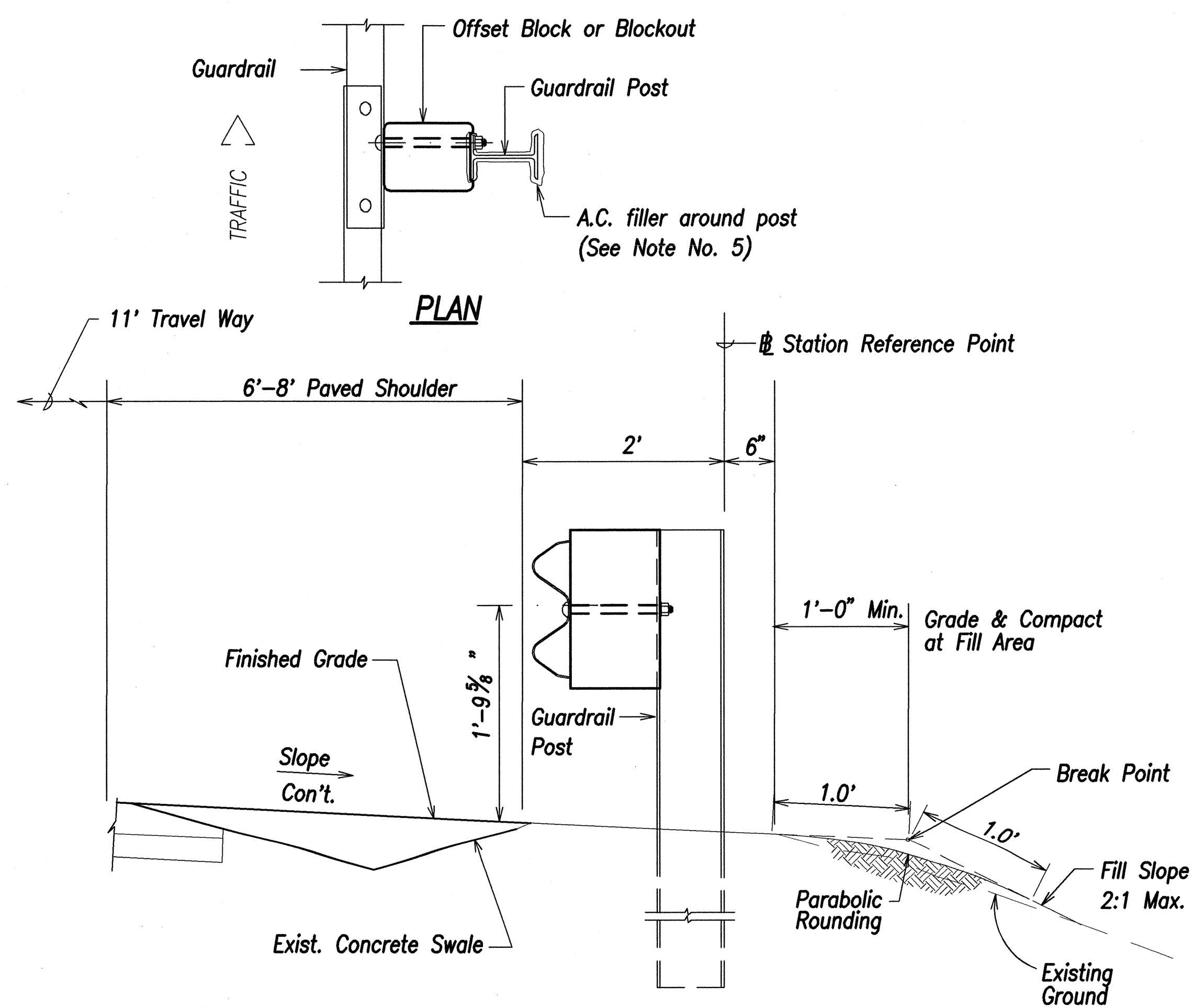
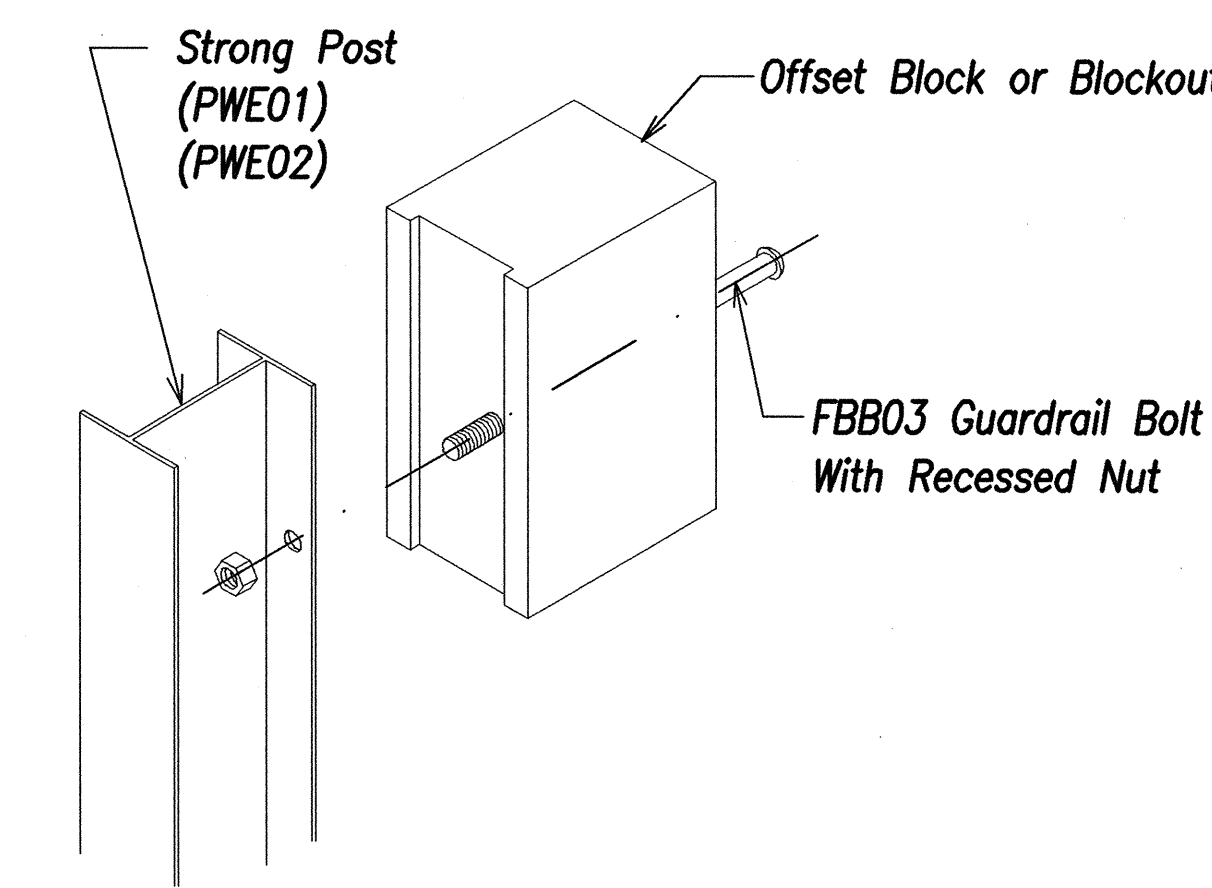


**RECYCLED PLASTIC BLOCKOUT (TYPE I)**



**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 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. 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. Spacing of RM-5's on Horizontal Curves shall comply with Table III-1 of the MUTCD. RM-5's shall not be installed on Terminal Sections.



**REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION**

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
ORIGINAL PLAN	No.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

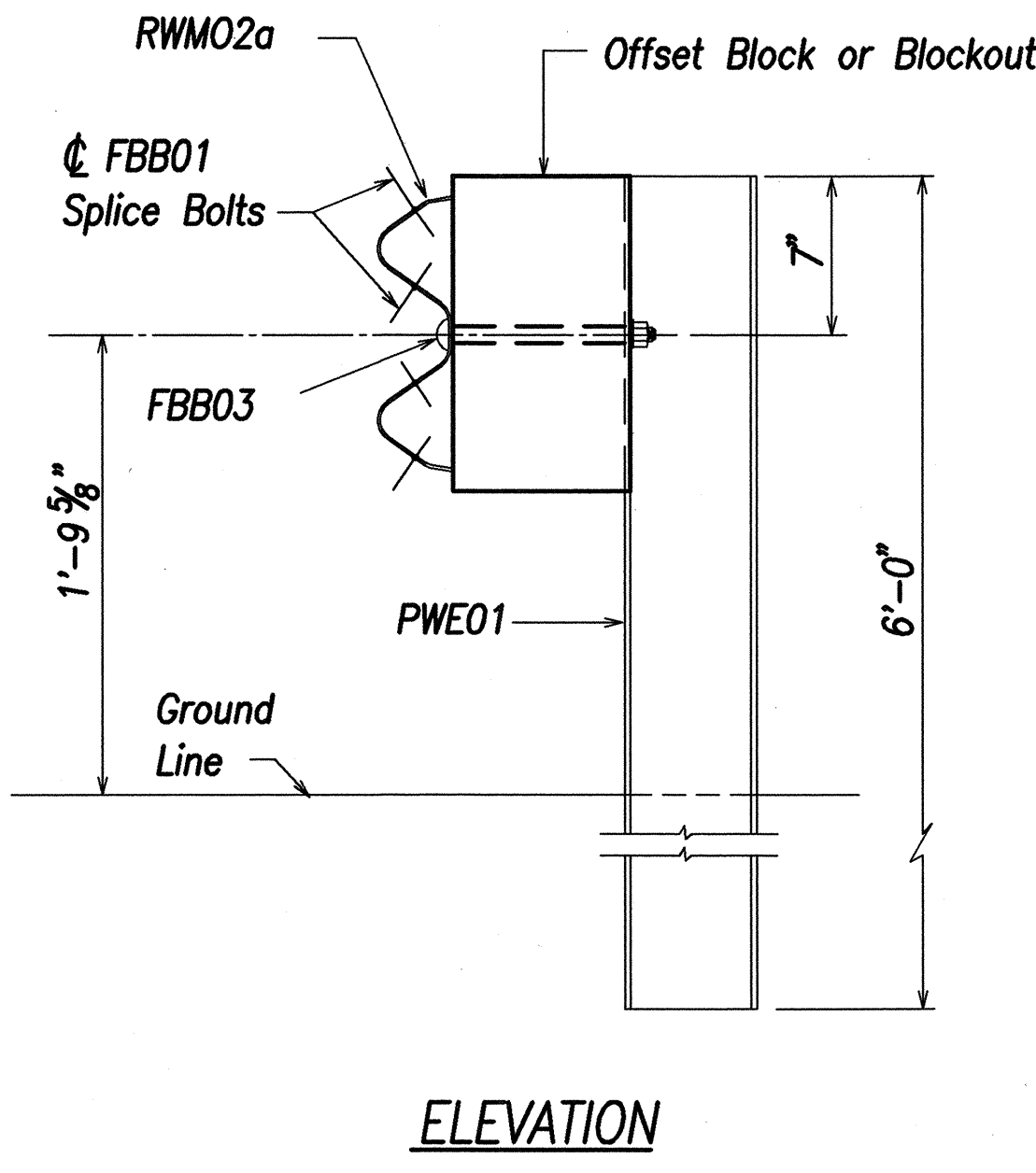
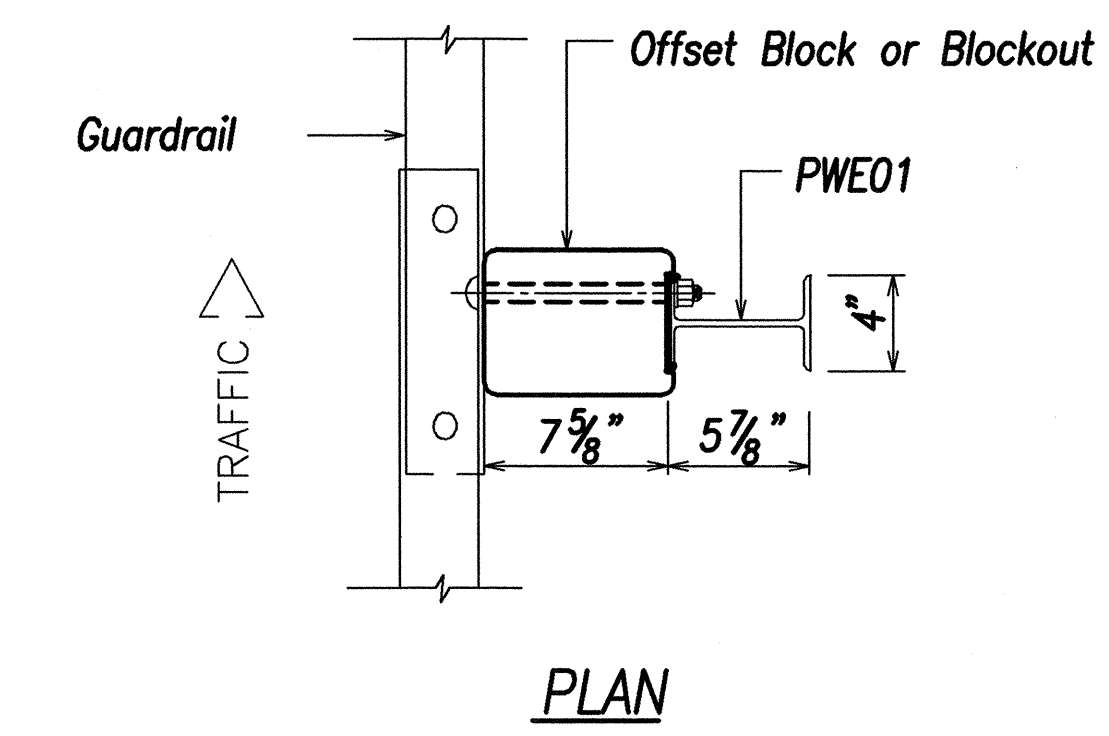
**GUARDRAIL DETAILS AND NOTES**

**PILANI HIGHWAY INTERIM WIDENING**  
**Project No. 31AB-01-02**

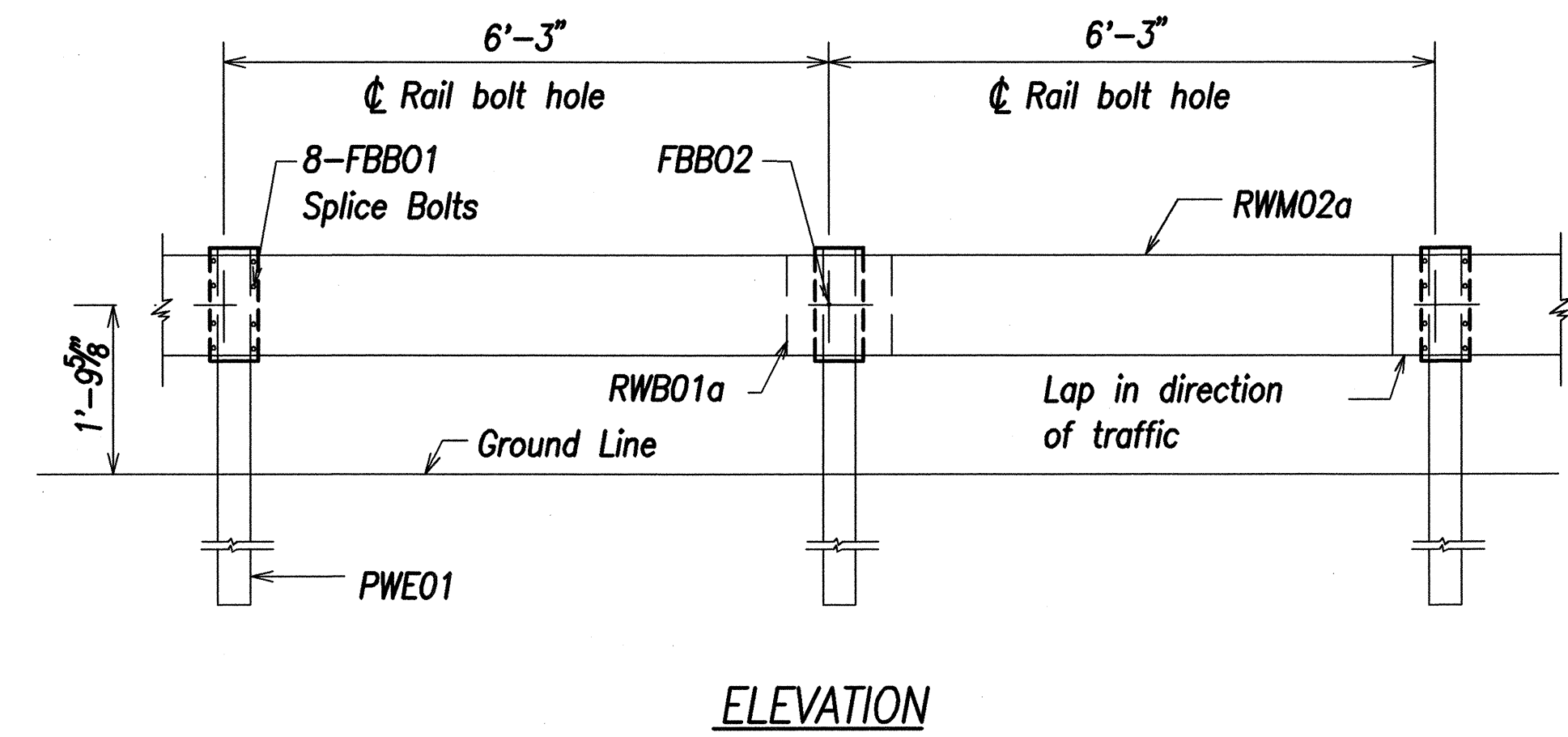
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SHEET No. C-97 OF 124 SHEETS

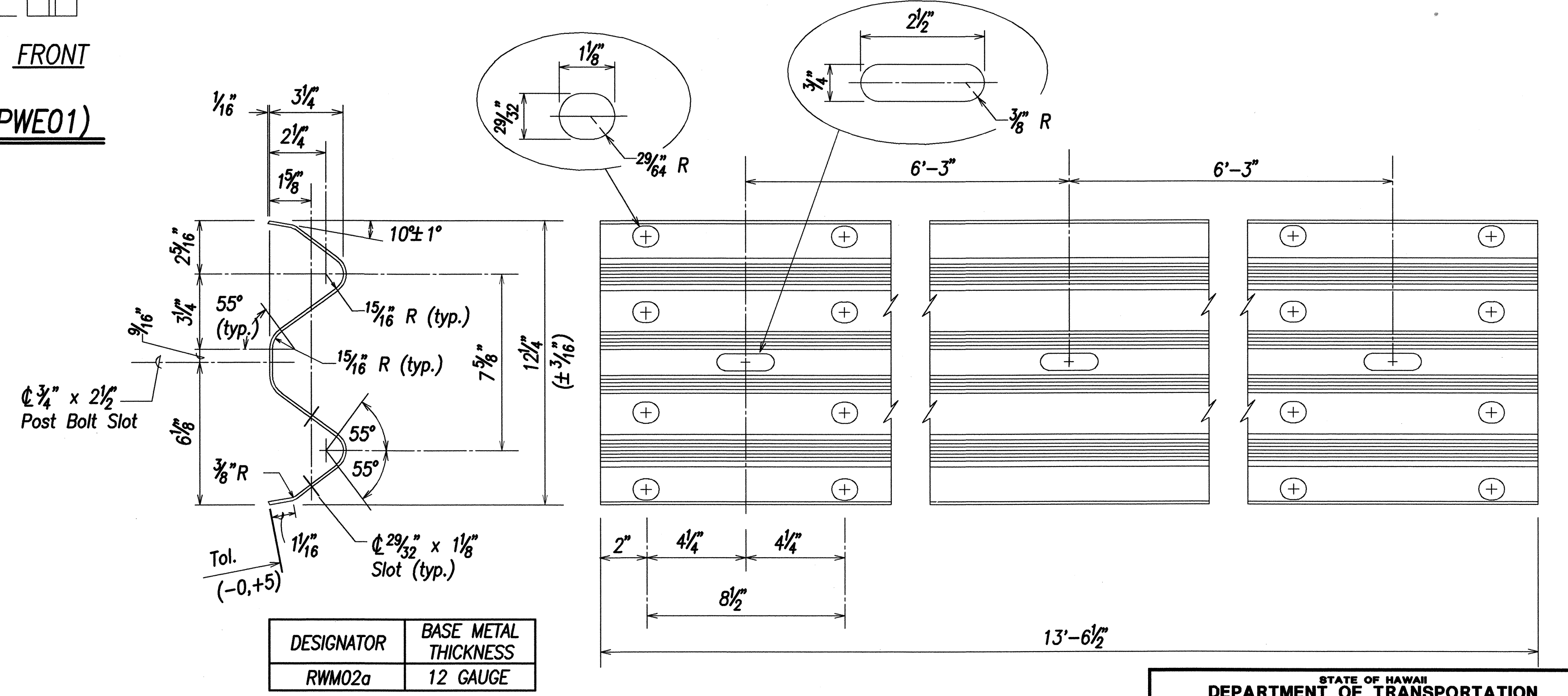
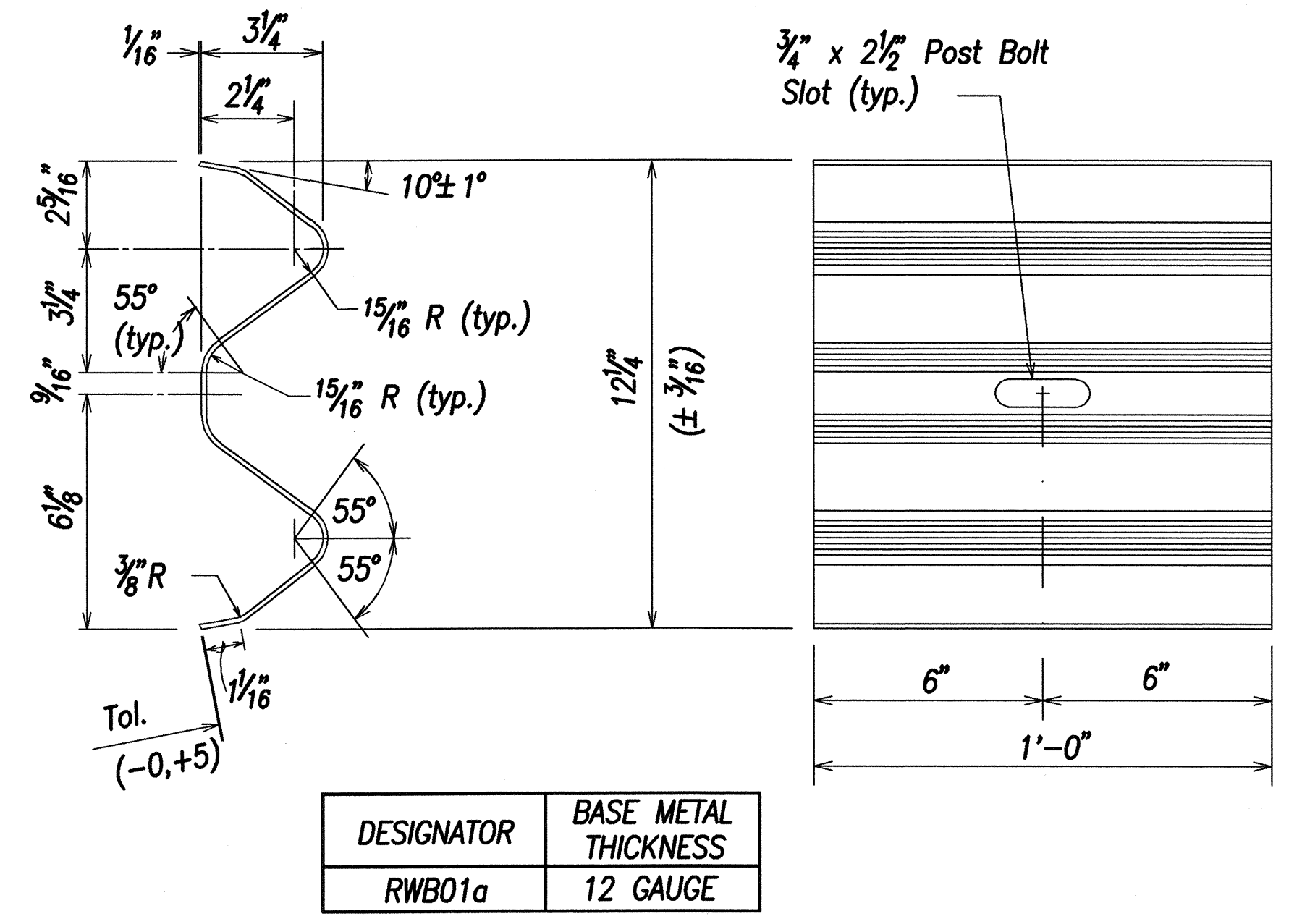
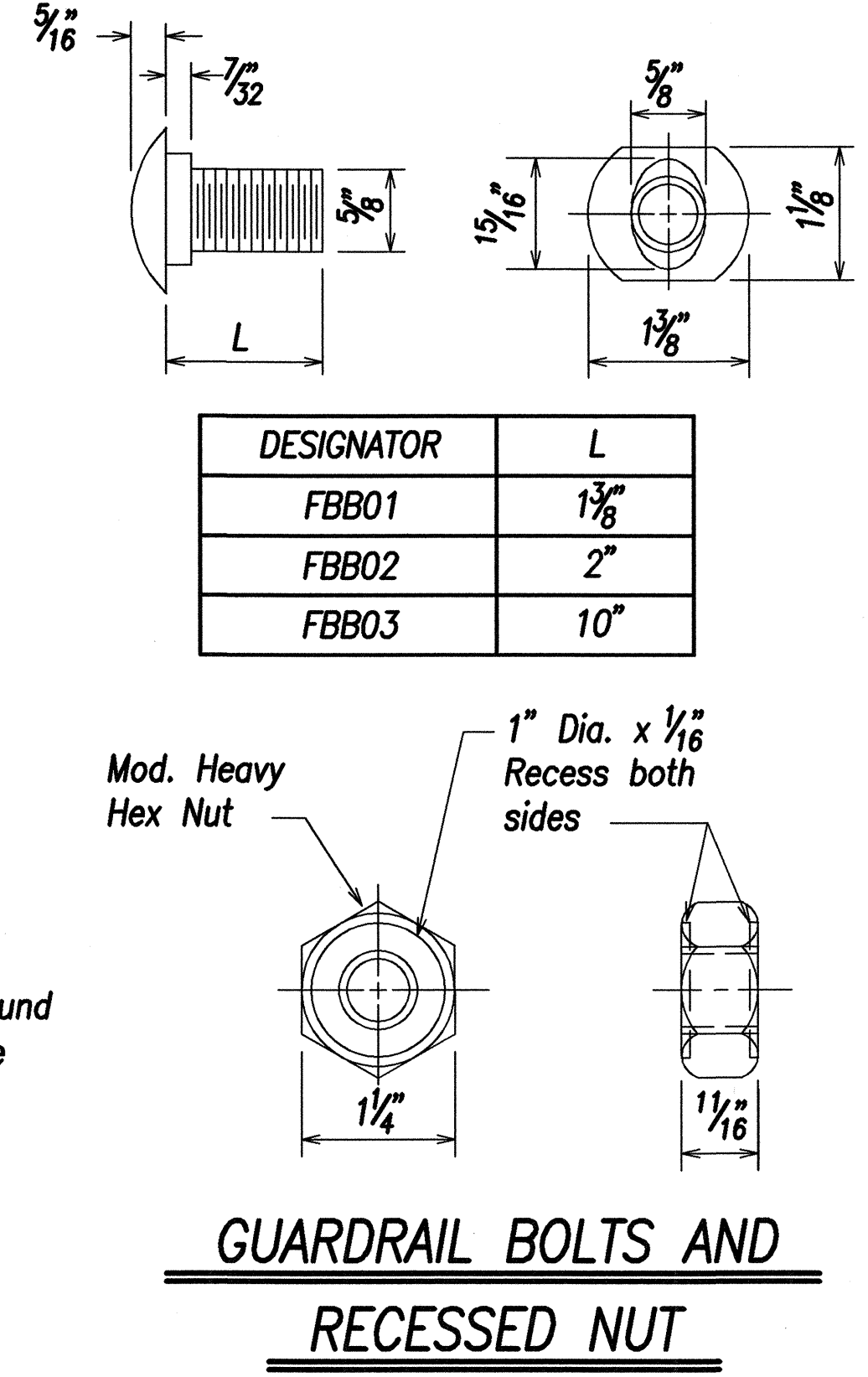
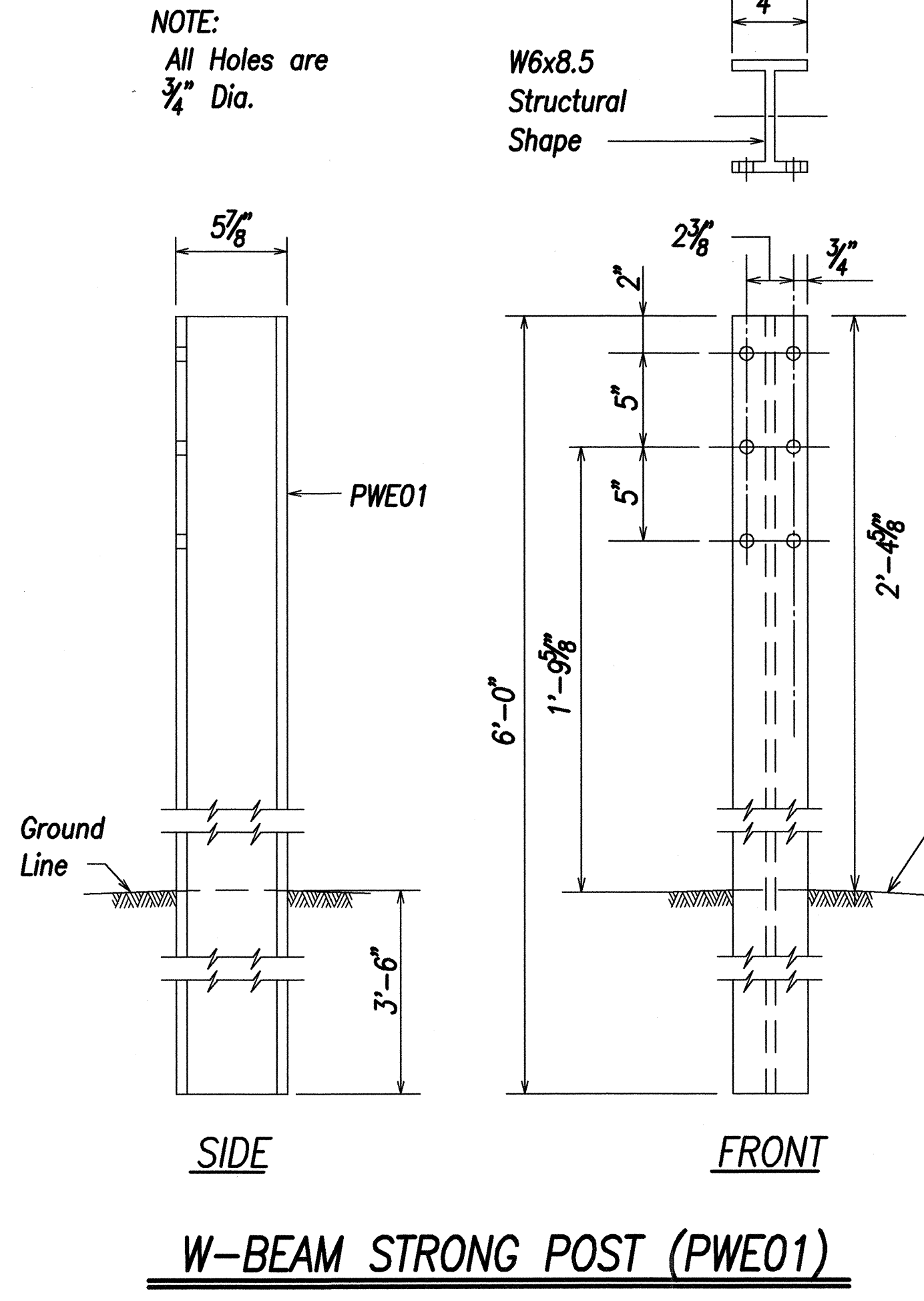
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	100	124



**STRONG POST W-BEAM GUARDRAIL (SGR04a)**



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



DESIGNED BY	DATE
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QUANTITIES BY	
NOTED BY	
TRACED BY	
DRAWN BY	
ORIGINAL PLAN	

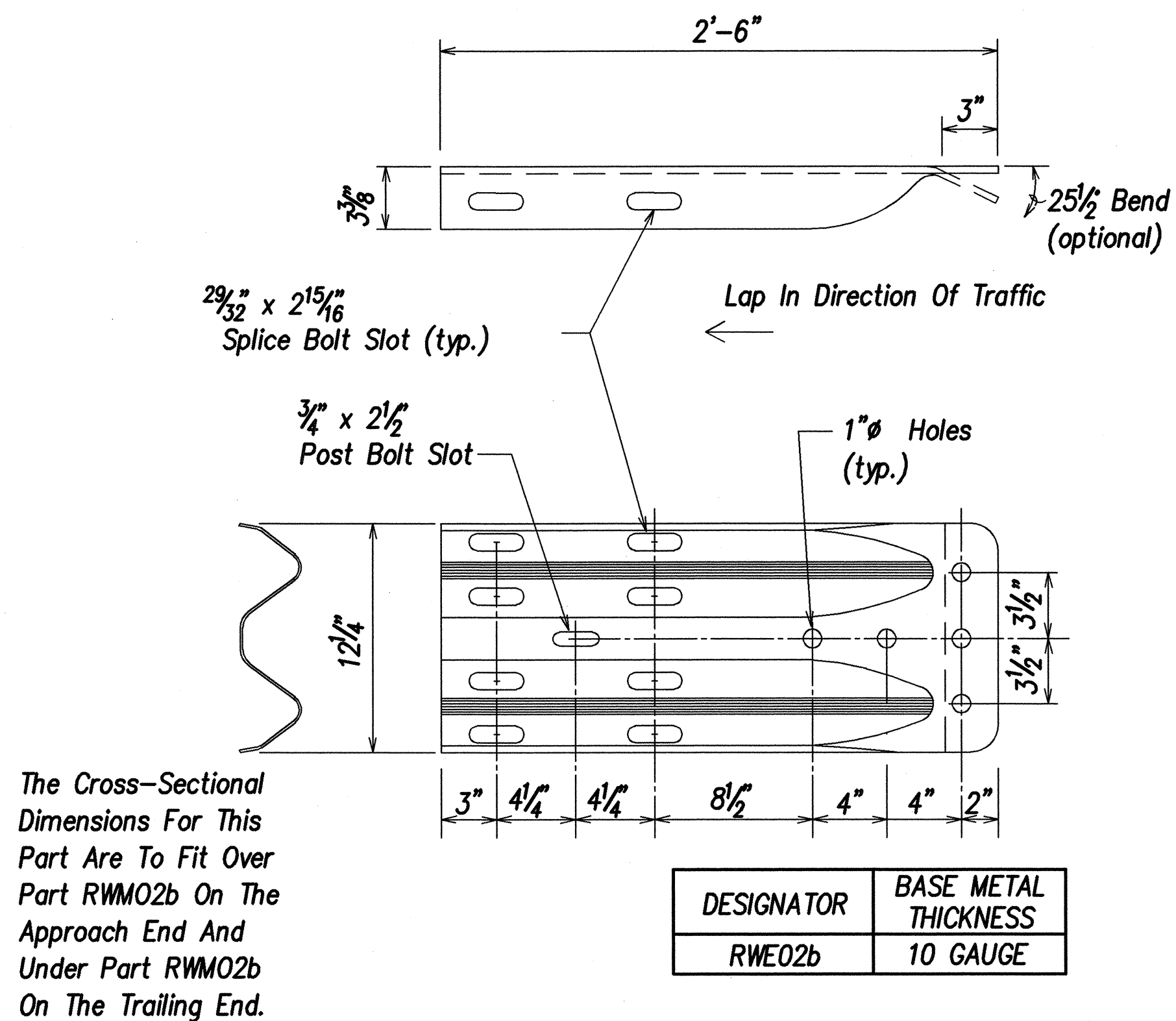
THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION  
DATE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

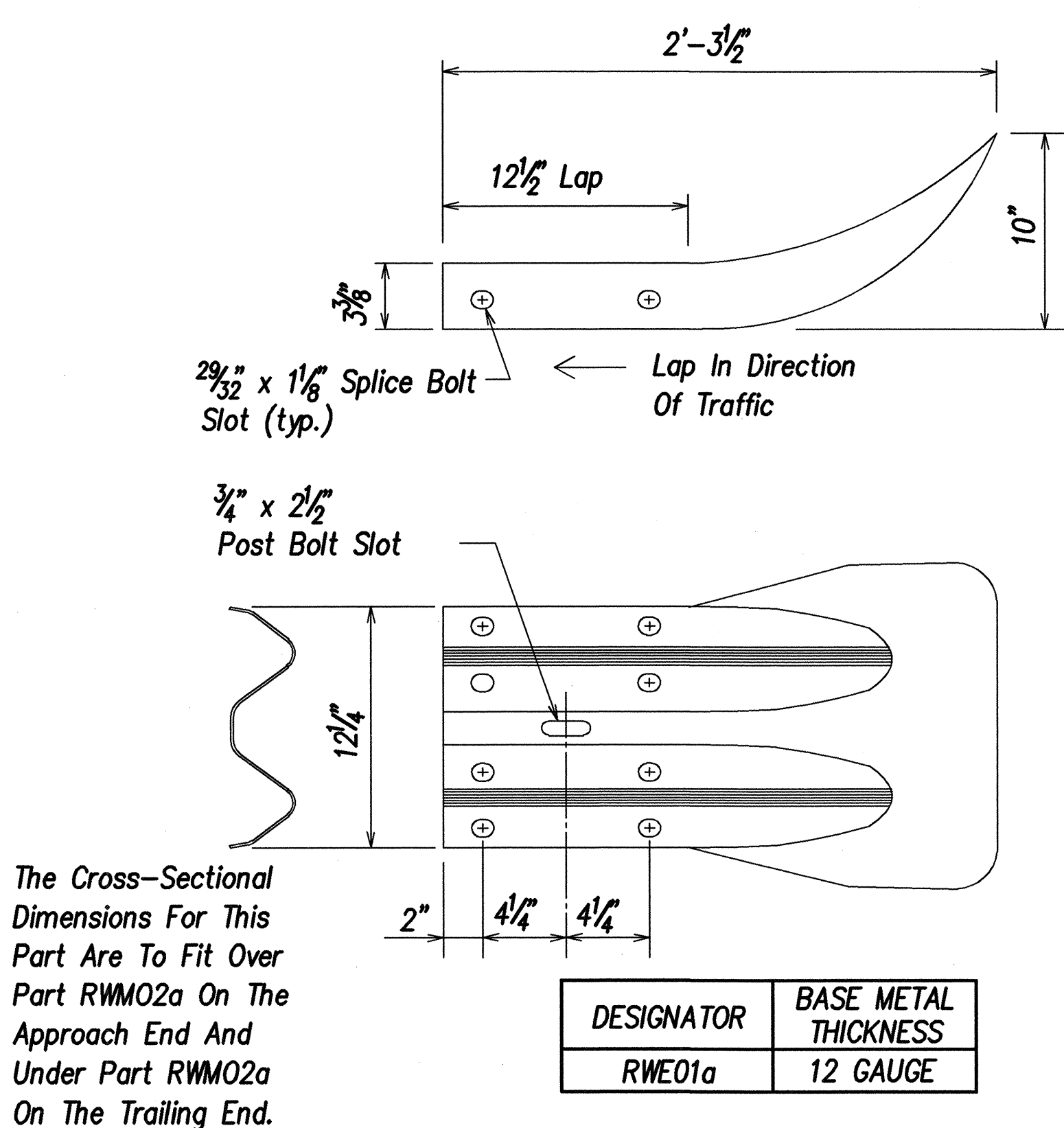
STRONG POST W-BEAM GUARDRAIL  
PILANI HIGHWAY INTERIM WIDENING  
Project No. 31AB-01-02  
Scale: Not To Scale      Date: May 1, 2002  
SHEET No. C-98 OF 124 SHEETS



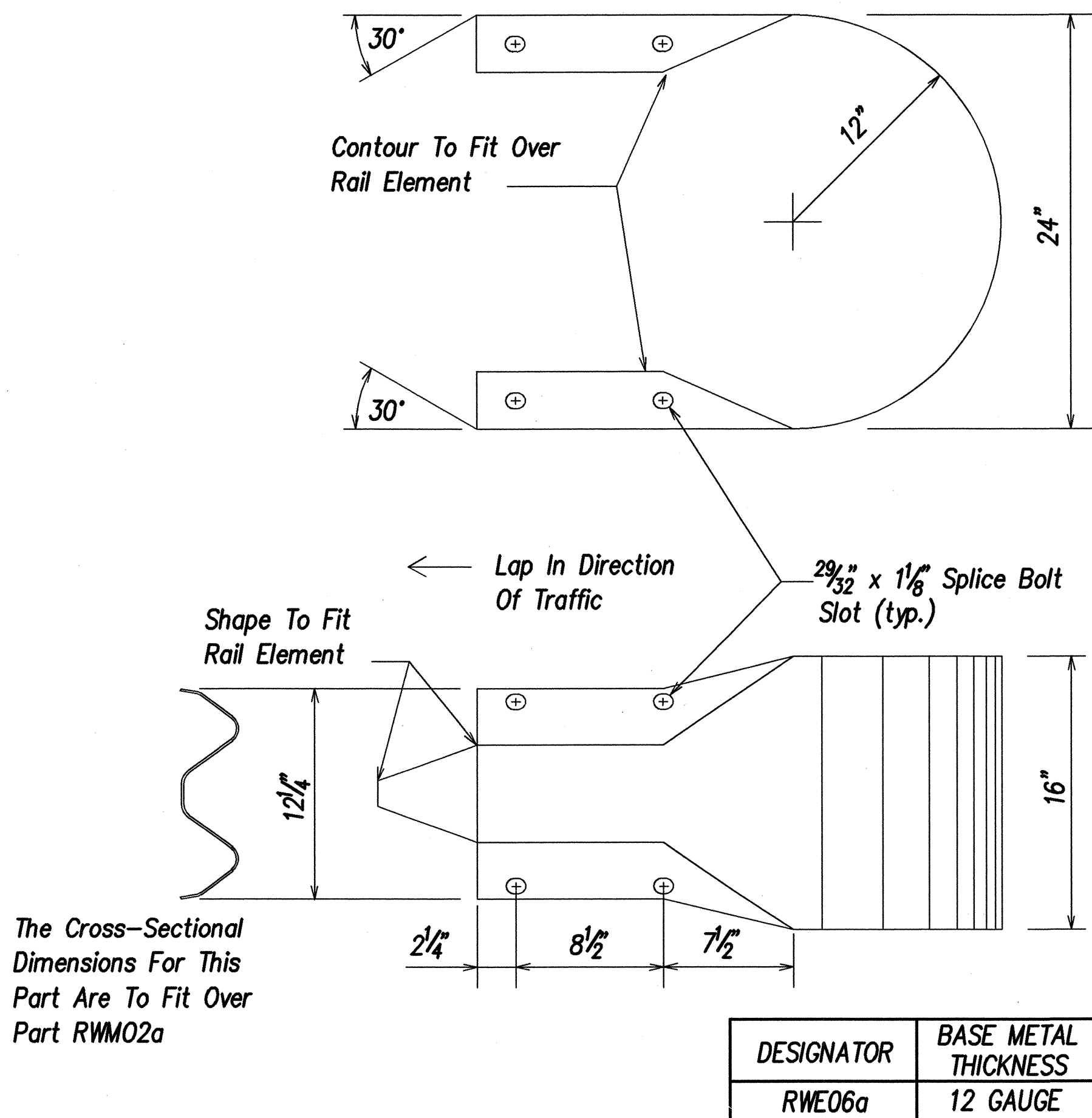
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HAWAII	HAW.	31AB-01-02	2002	101	124



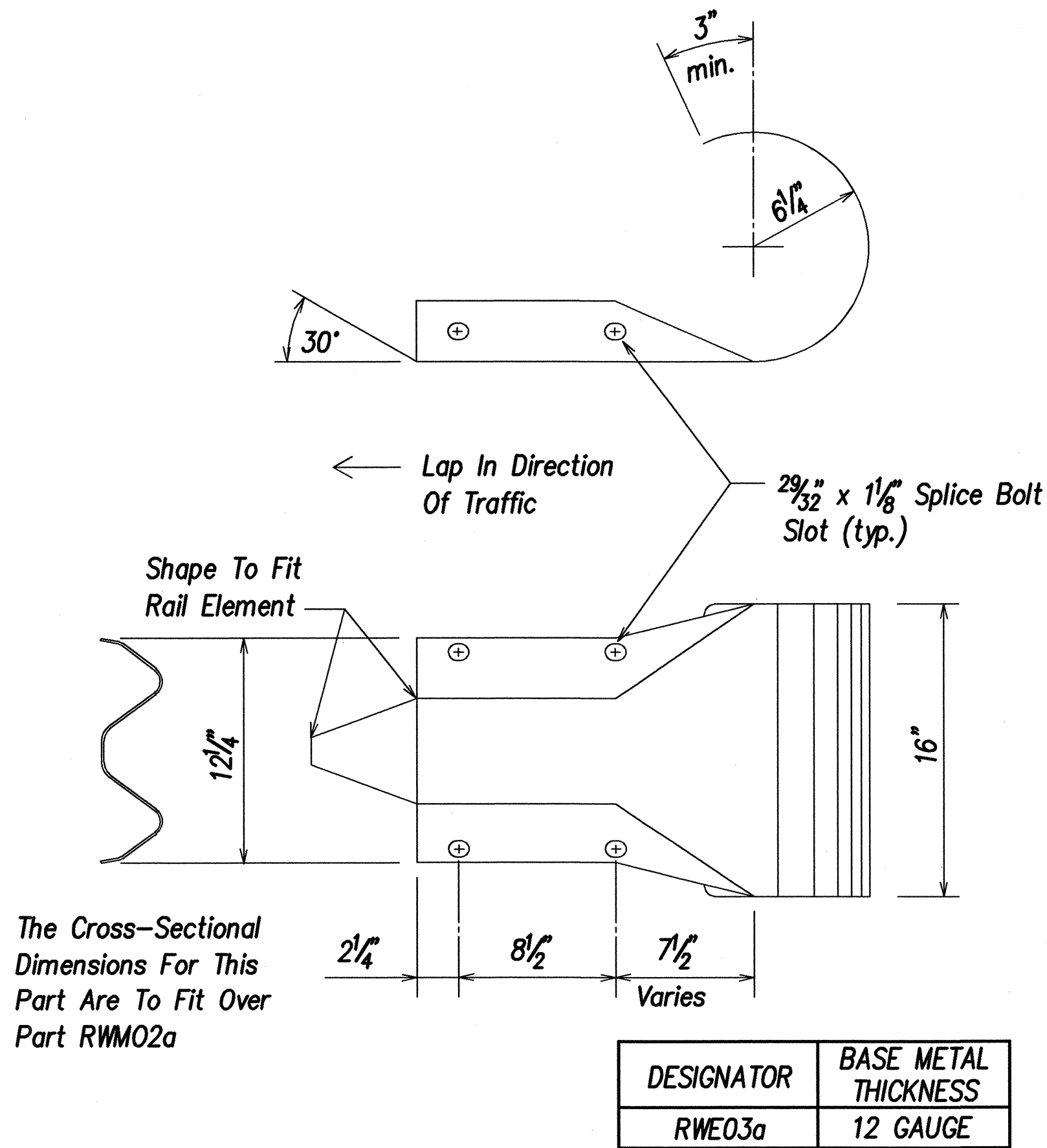
**W-BEAM TERMINAL CONNECTOR (RWE02b)**



**W-BEAM END SECTION (FLARED RWE01a)**



**W-BEAM END SECTION (BUFFER RWE06a)**



**W-BEAM END SECTION (ROUNDED RWE03a)**

- Notes:**
1. All steel and bolts to be hot-dipped galvanized.
  2. The Contractor shall adjust the height of the guardrail steel post as necessary to match the height of the typical guardrail installation along the roadway.
  3. All work and materials necessary to install the guardrail post onto a box culvert or headwall shall be considered incidental to the various guardrail contract items.
  4. Thrie beam guardrail shall be used in lieu of W-Beam wherever guardrail posts are attached to headwalls. The 6'-3" transition shown on Sht. S-19 shall be installed on both ends of the thrie beam section to connect to the W-Beam guardrail.
  5. The thrie beam guardrail segments and transition sections used for headwall connections shall be considered incidental to the various guardrail pay items.

ORIGINAL PLAN	DATE
DESIGNED BY	DATE
TRACED BY	DATE
NOTED BY	DATE
CHECKED BY	DATE

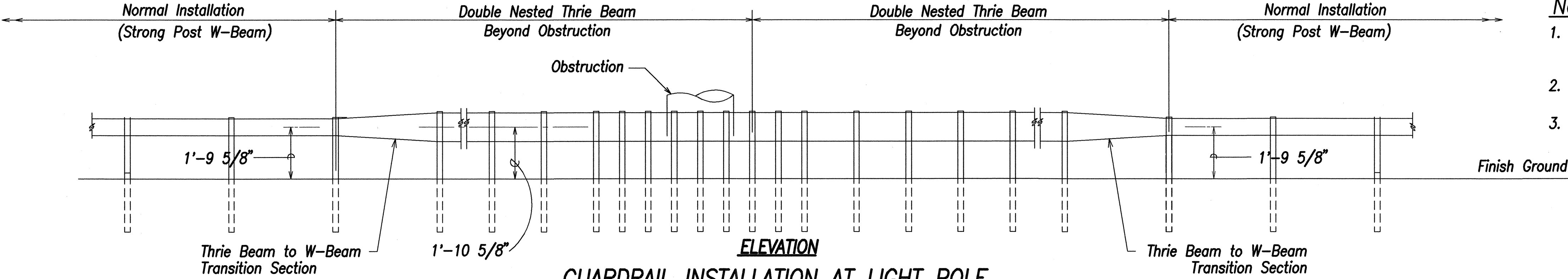
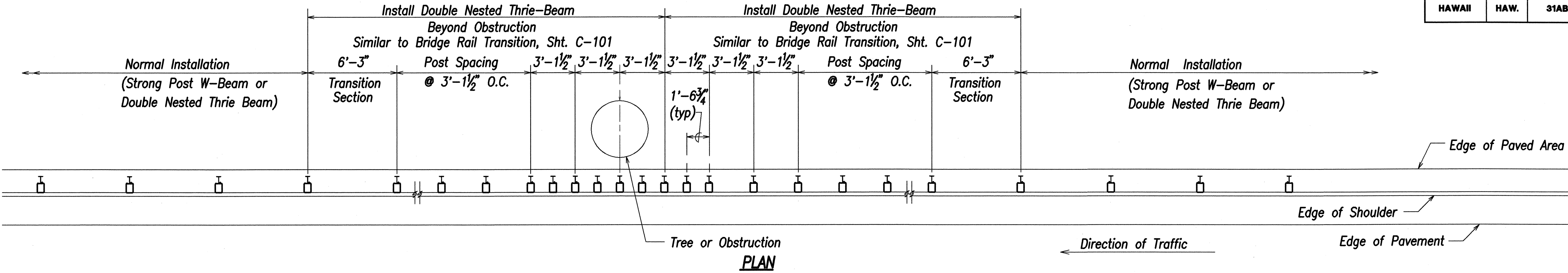
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ME OR UNDER MY SUPERVISION  
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

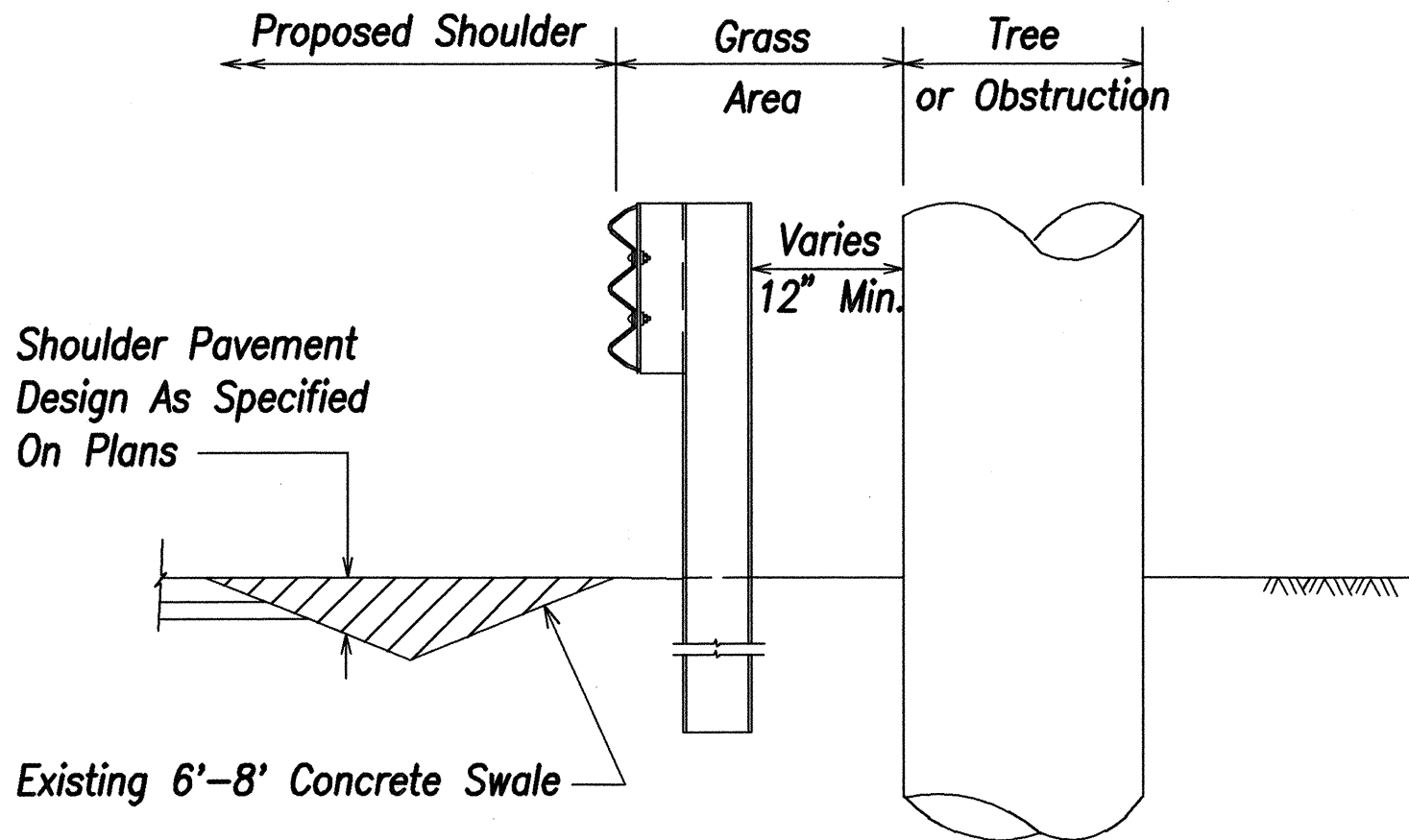
STRONG POST W-BEAM GUARDRAIL  
  
PILANI HIGHWAY INTERIM WIDENING  
Project No. 31AB-01-02  
Scale: Not To Scale Date: May 1, 2002

SHEET No. C-99 OF 124 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	102	124



- Notes:**
1. Double Nested Thrie beam guardrail shall be installed according to the details shown on sheet
  2. For required lengths of thrie beam, see Roadway Plans.
  3. 6'-3" transition sections shall be considered incidental to the various guardrail items.



- Notes:**
1. Double Nested Thrie Beam Guardrail shall be installed according to the details shown on Sheet
  2. For required lengths of W-beam, see Roadway Plans.
  3. 6'-3" transition sections shall be considered incidental to the various guardrail items.

DESIGNED BY	DATE
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ORIGINAL PLAN	No.

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*[Signature]*  
DATE 5/1/02

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

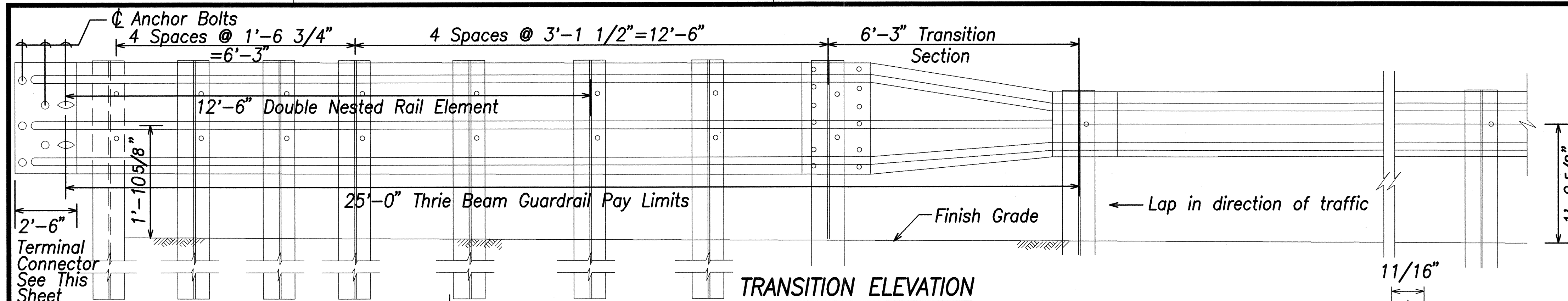
**THRIE BEAM GUARDRAIL  
AT OBSTRUCTION**

PILANI HIGHWAY INTERIM WIDENING  
Project No. 31AB-01-02

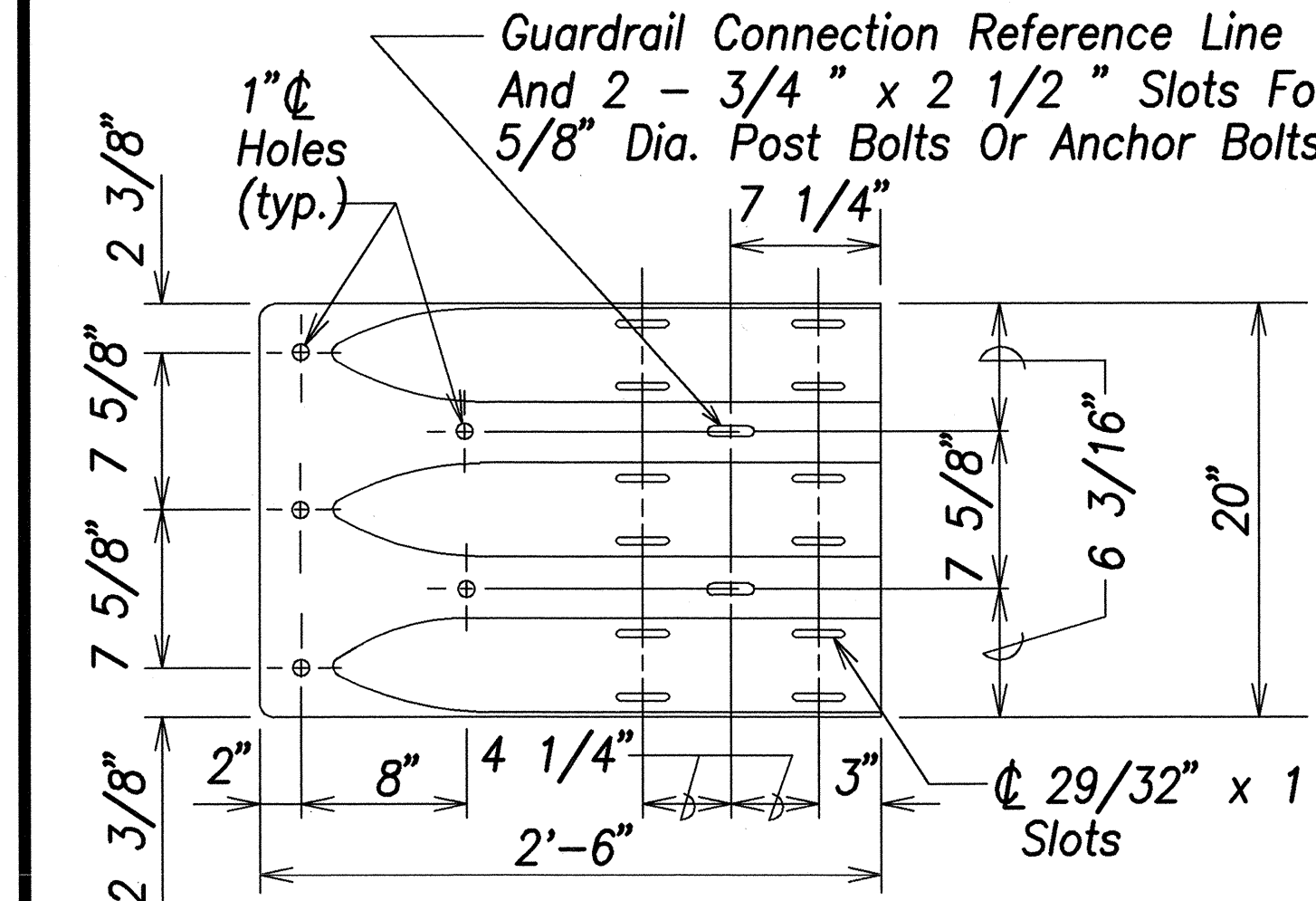
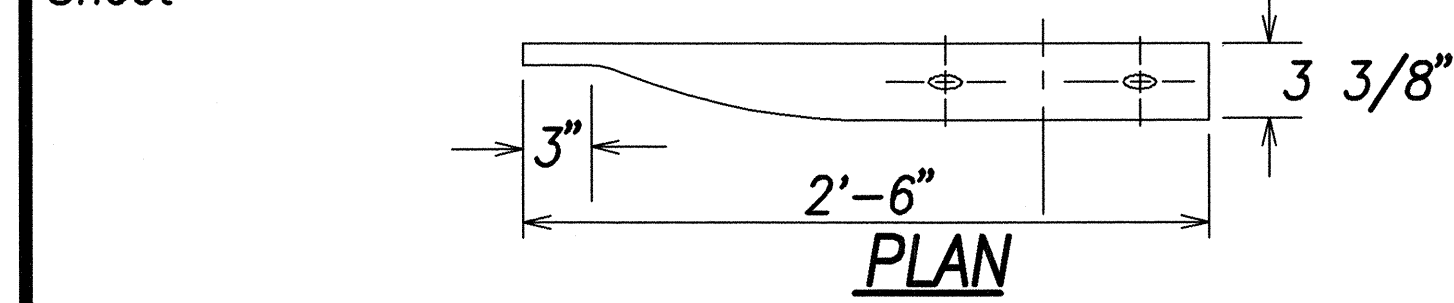
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FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	103	124



**NOTE:**  
All Holes are 13/16" Dia.

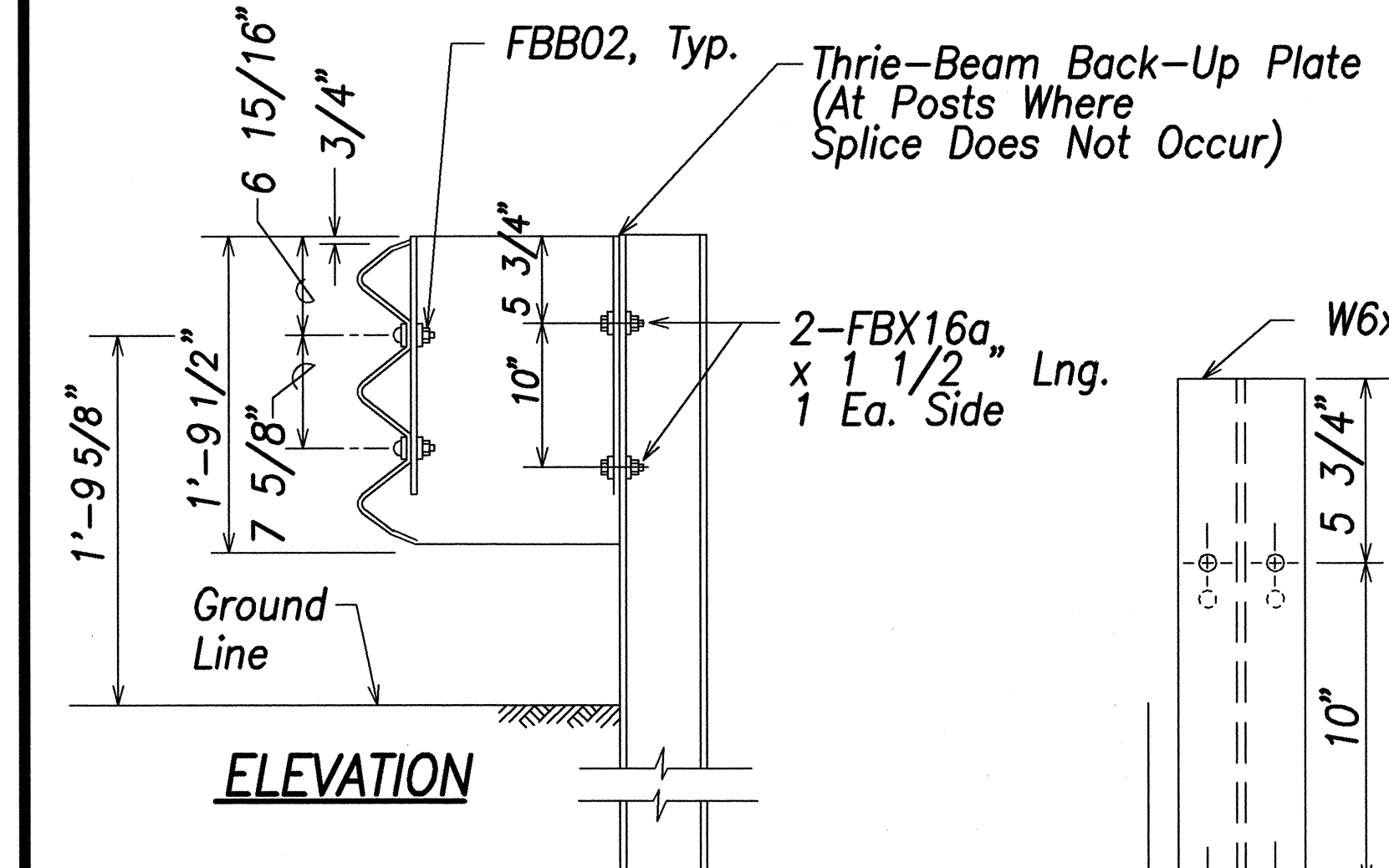


**ELEVATION**

Designator	Base Metal Thickness
RTE01b	10 Gauge

**TERMINAL CONNECTOR**

(RTE01b)

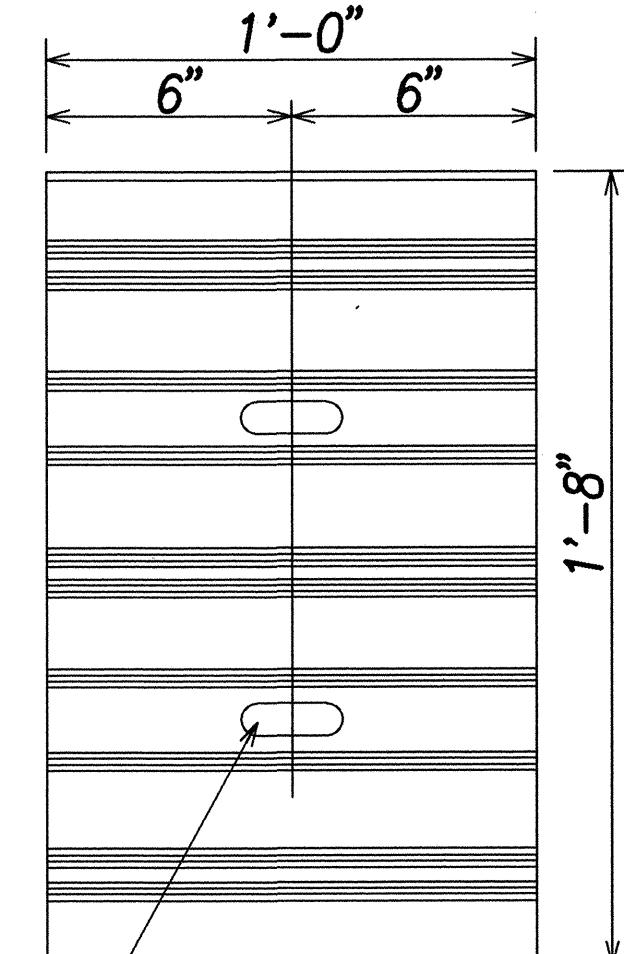


**ELEVATION**

**STRONG POST**

**THRIE-BEAM GUARDRAIL**

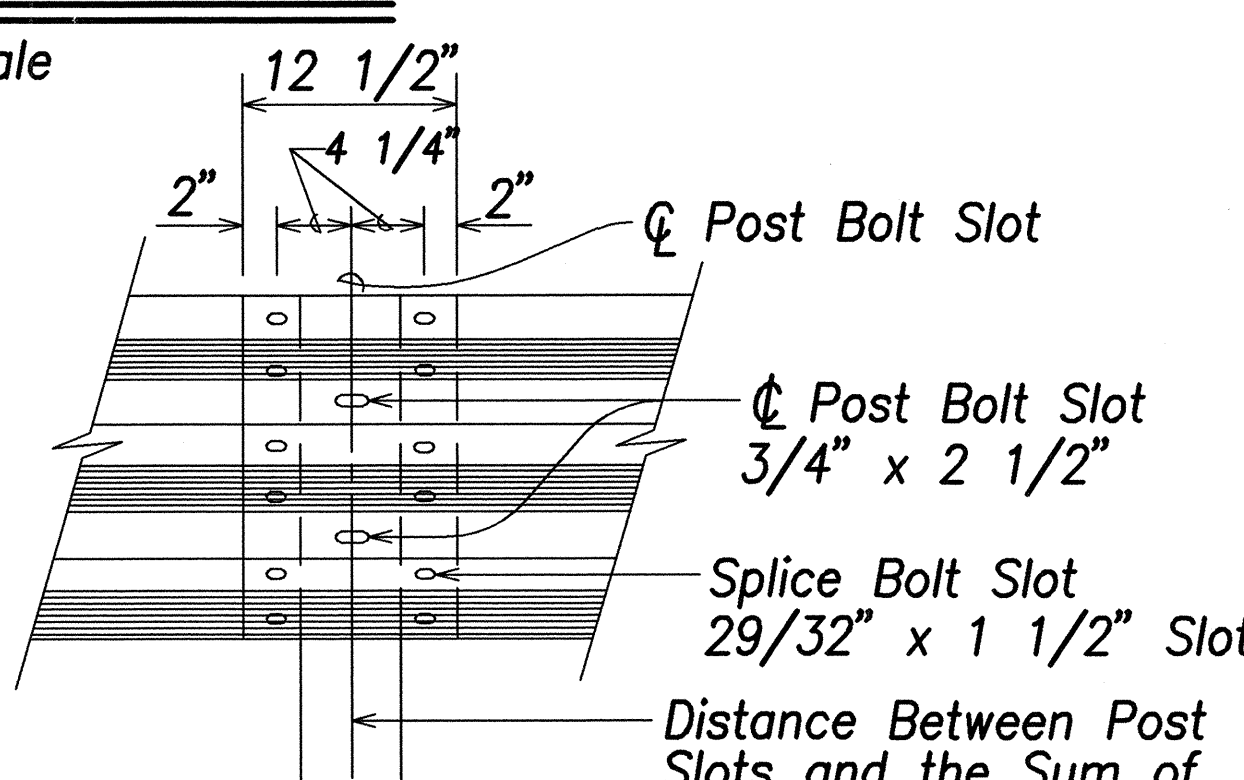
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**ELEVATION**

**BACKUP PLATE**

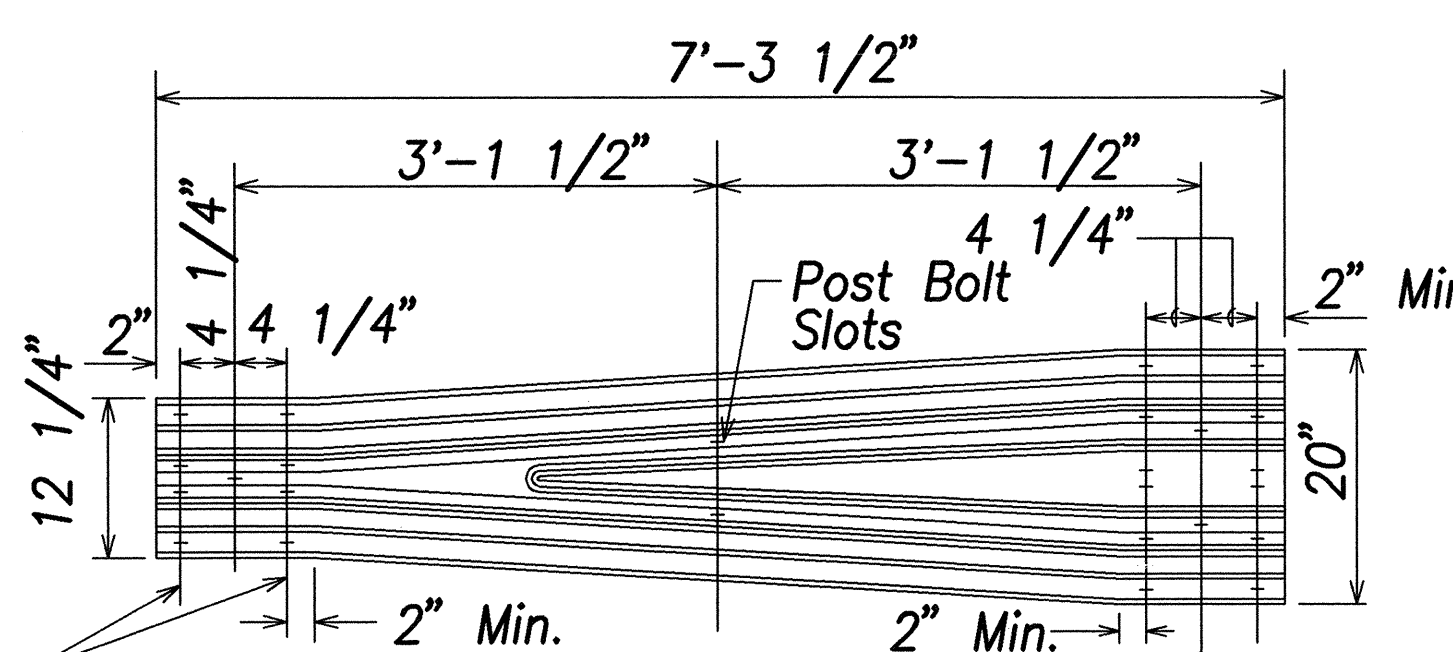
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**ELEVATION**

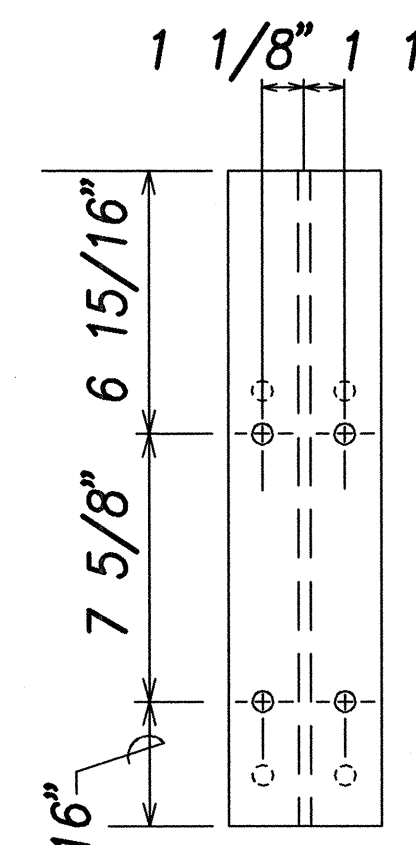
**RAIL SPLICE**

Not to Scale



**TRANSITION SECTION**

Not to Scale



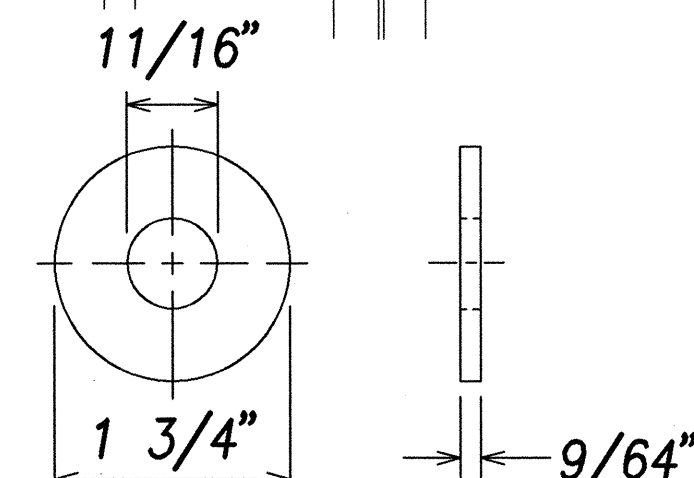
**FRONT**

**BACK**

**SIDE**

**SPACER BLOCK**

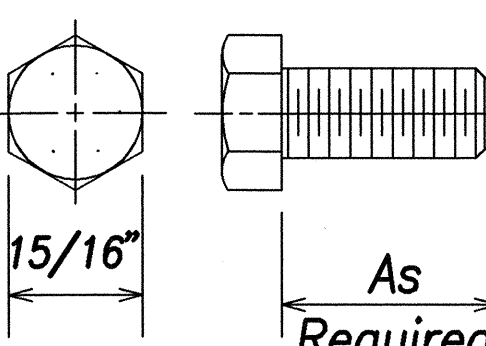
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**STEEL WASHER**

**FOR 5/8" BOLT**

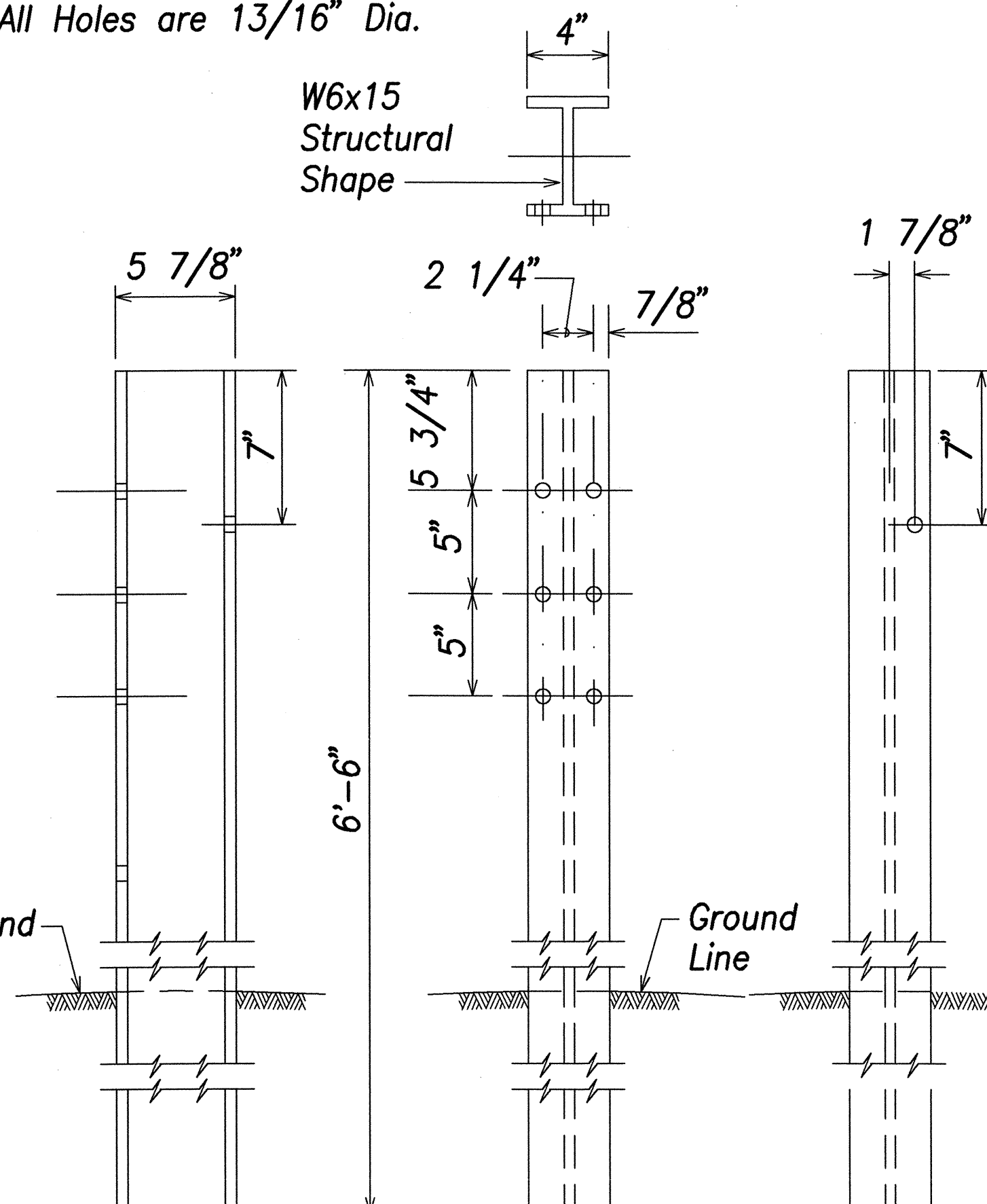
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**HEX BOLT & NUT**

**(FBX16a)**

Not to Scale



**SIDE**

**FRONT**

**BACK**

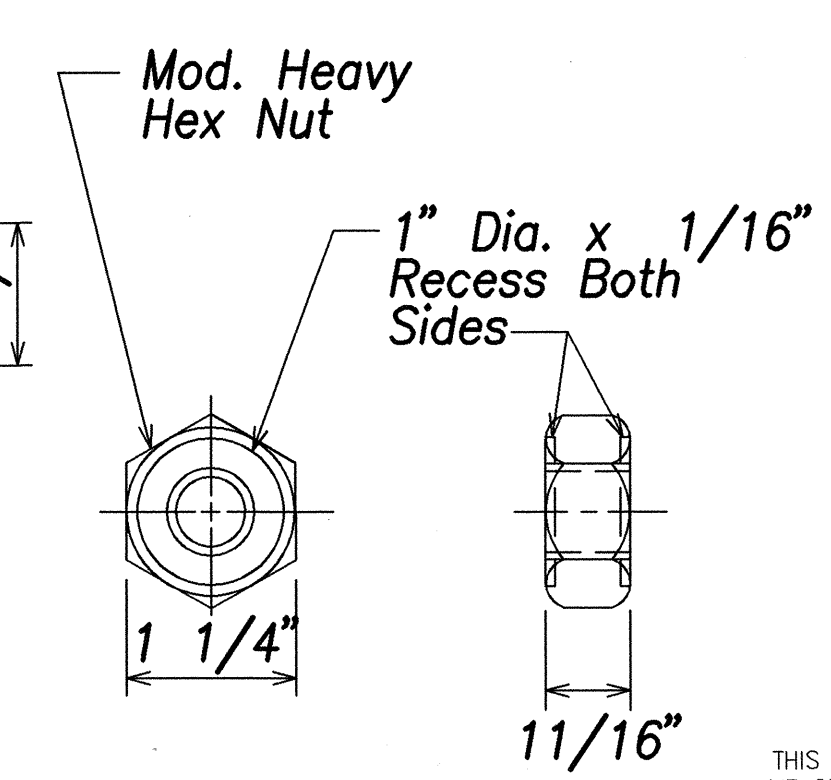
**W-BEAM STRONG POST**

Not to Scale

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

**GUARDRAIL BOLTS AND RECESSED NUT**

Not to Scale



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HIGHWAYS DIVISION

**TYPICAL STRONG POST &  
THRIE BEAM GUARDRAIL DETAILS**

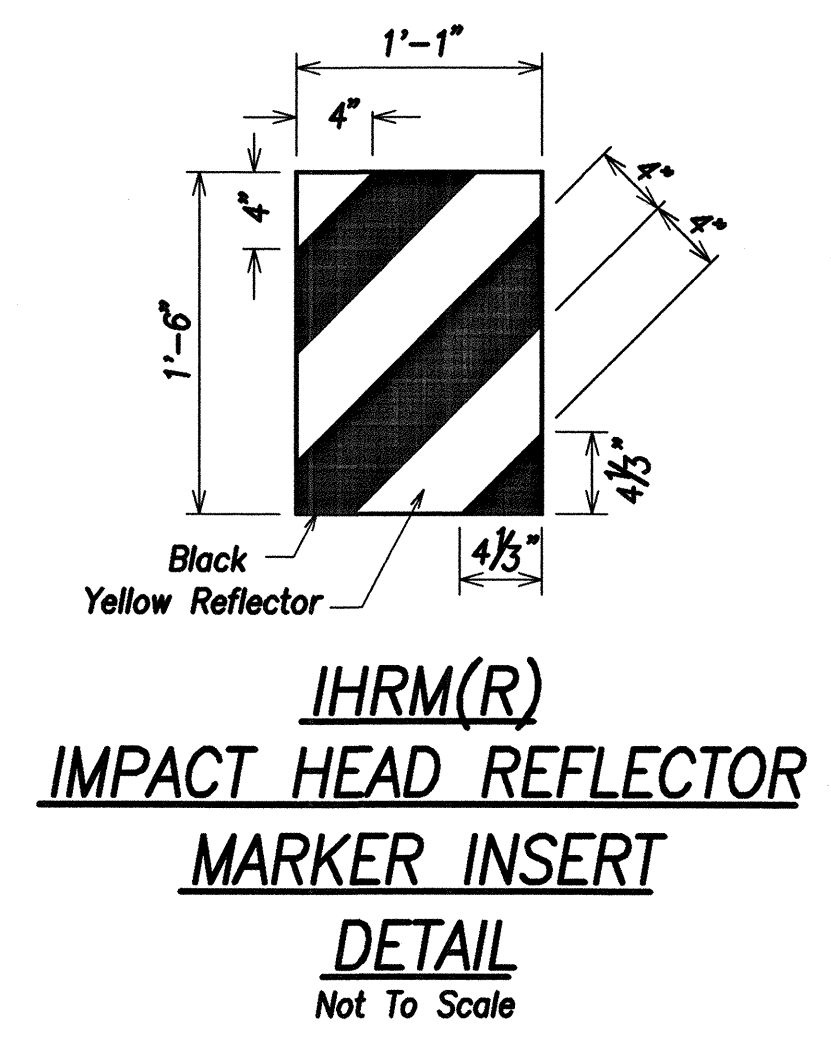
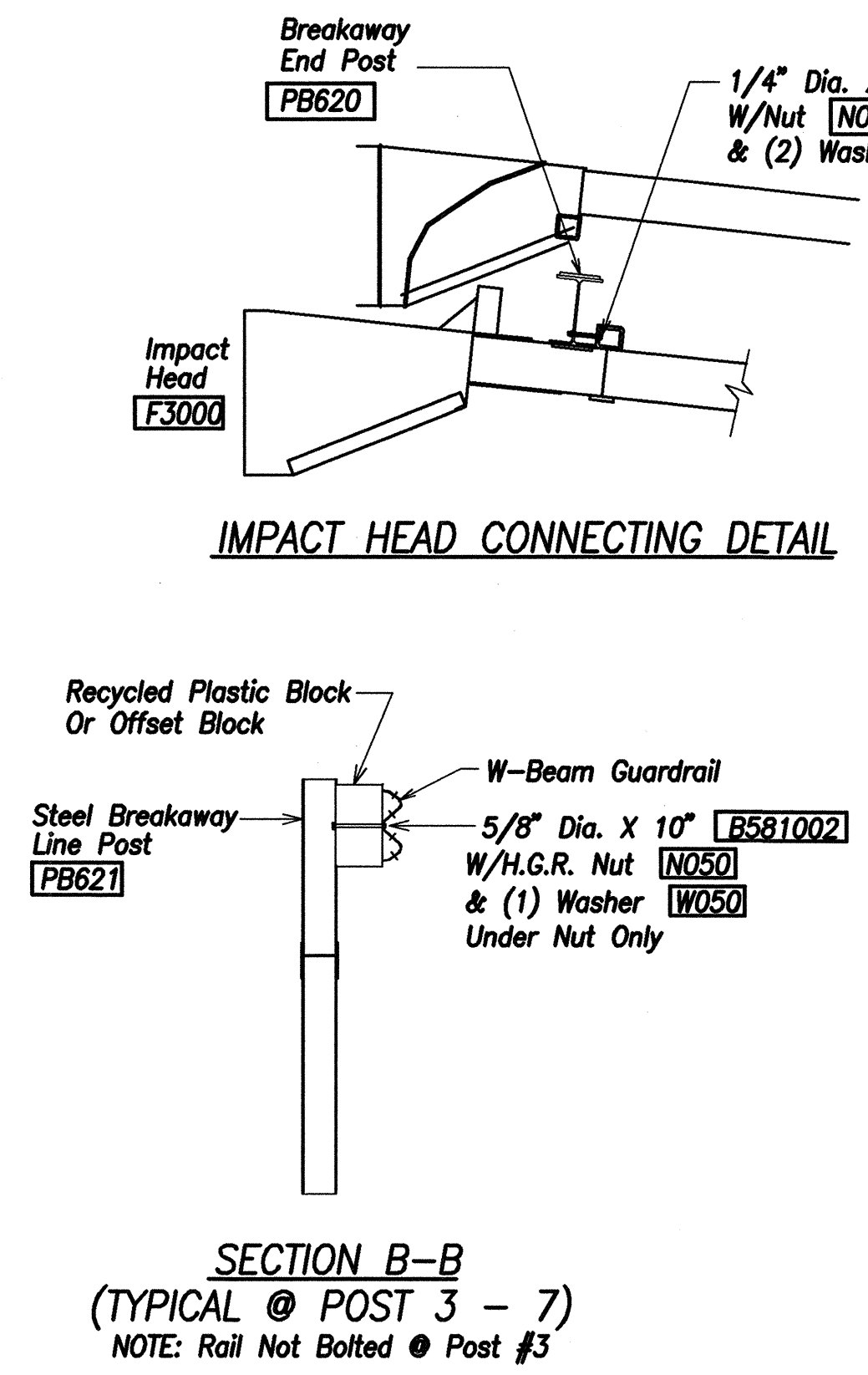
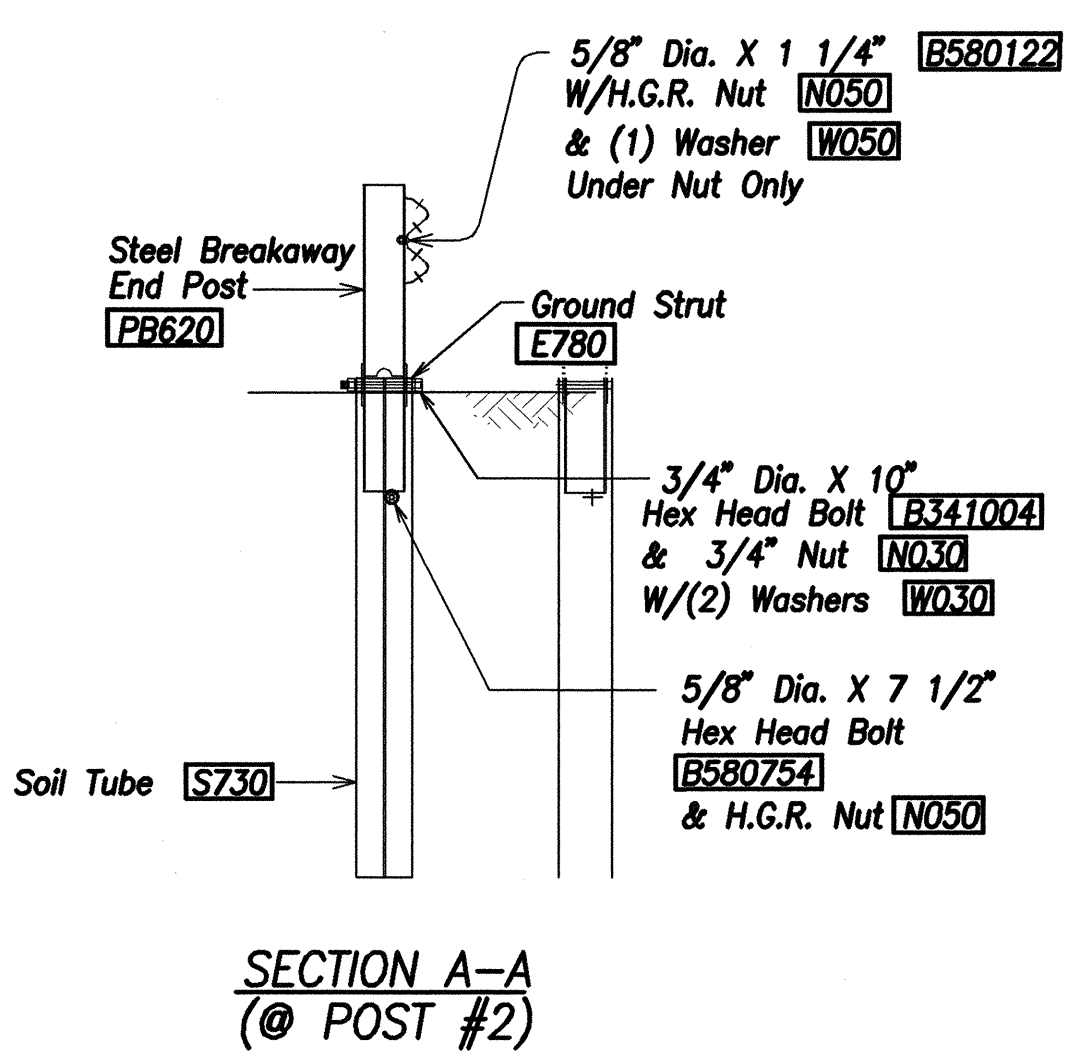
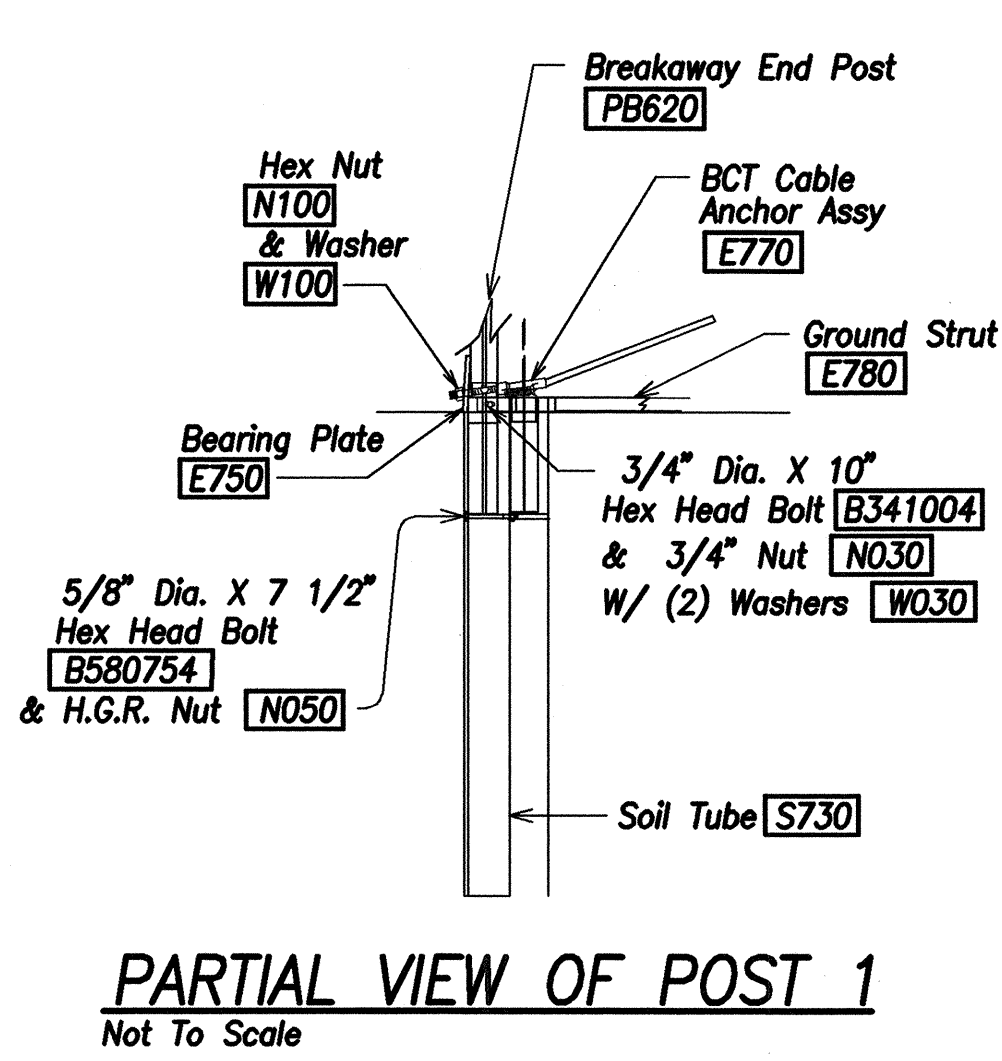
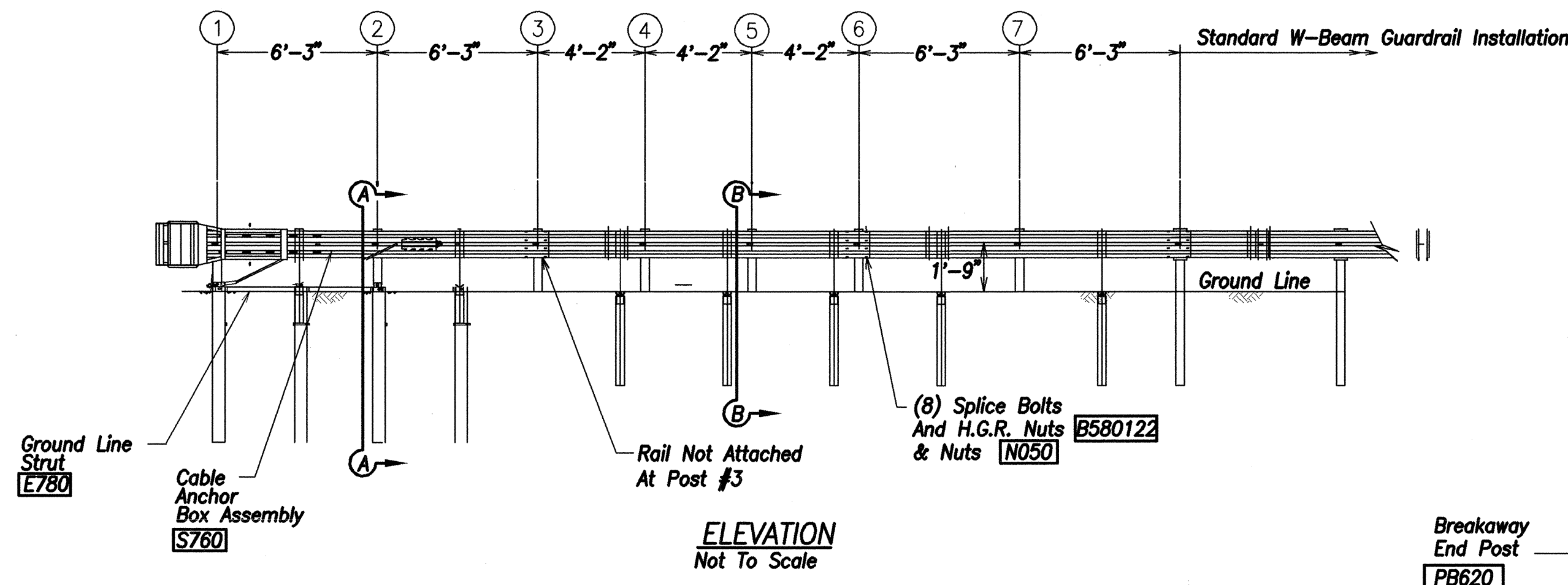
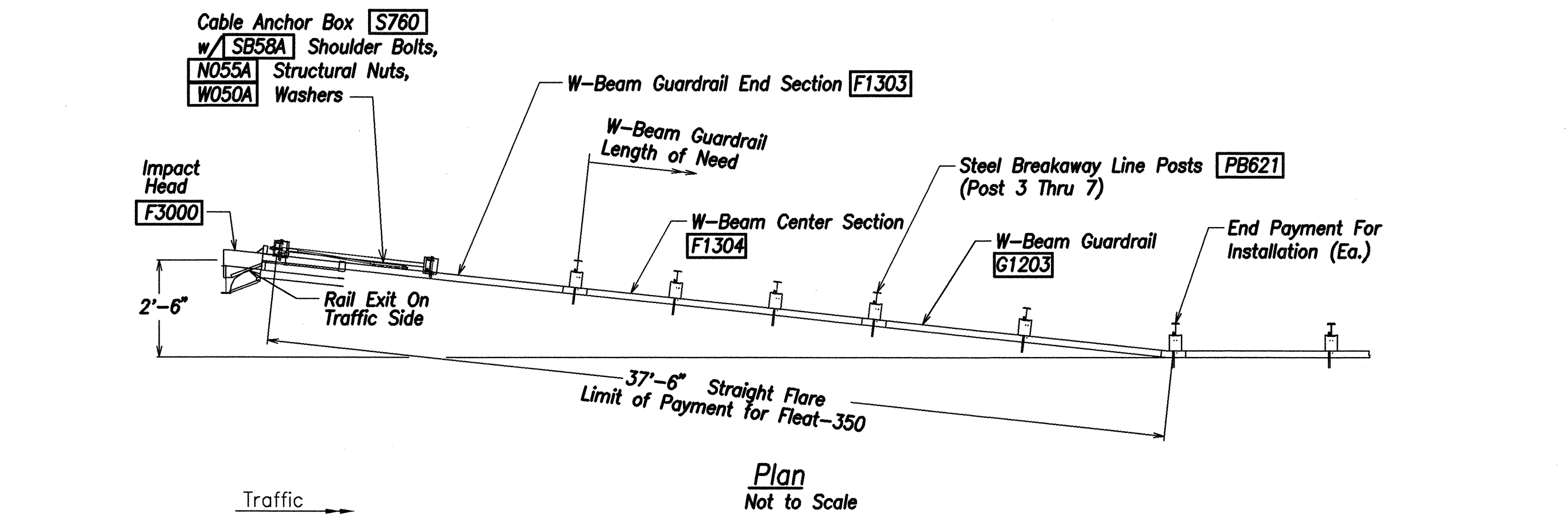
**PIILANI HIGHWAY INTERIM WIDENING**  
Project No. 31AB-01-02

Scale: Not To Scale Date: May 1, 2002

**SHEET No. C-101 OF 124 SHEETS**



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	104	124



**General Notes**

- Breakaway Steel Posts Are Required With the FLEAT Terminal.
- All Bolts, Nuts, Cable Assemblies, Cable Anchors and Bearing Plates Shall Be Galvanized.
- 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.
- 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.
- 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.
- 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.
- (R) Or (L) Indicates Right Or Left Impact Head Reflector Marker (IHRM). Providing And Installing Of IHRM Shall Be Considered Incidental To End Treatment.
- The Stripes For IHRM Shall Slope Downward At An Angle Of 45° Towards The Side Of The End Treatment That Traffic Is To Pass.

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
	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 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

DATE	.....
SURVEY PLOTTED BY	.....
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ORIGINAL PLAN	.....
NOTE BOOK	.....
No.	.....

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 SIGNATURE *[Signature]* DATE 5/16/02

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

FLEAT-350  
FLARED ENERGY  
ABSORBING TERMINAL

PILANI HIGHWAY INTERIM WIDENING  
Project No. 31AB-01-02

Scale: Not To Scale      Date: May 1, 2002

SHEET No. C-102 OF 124 SHEETS