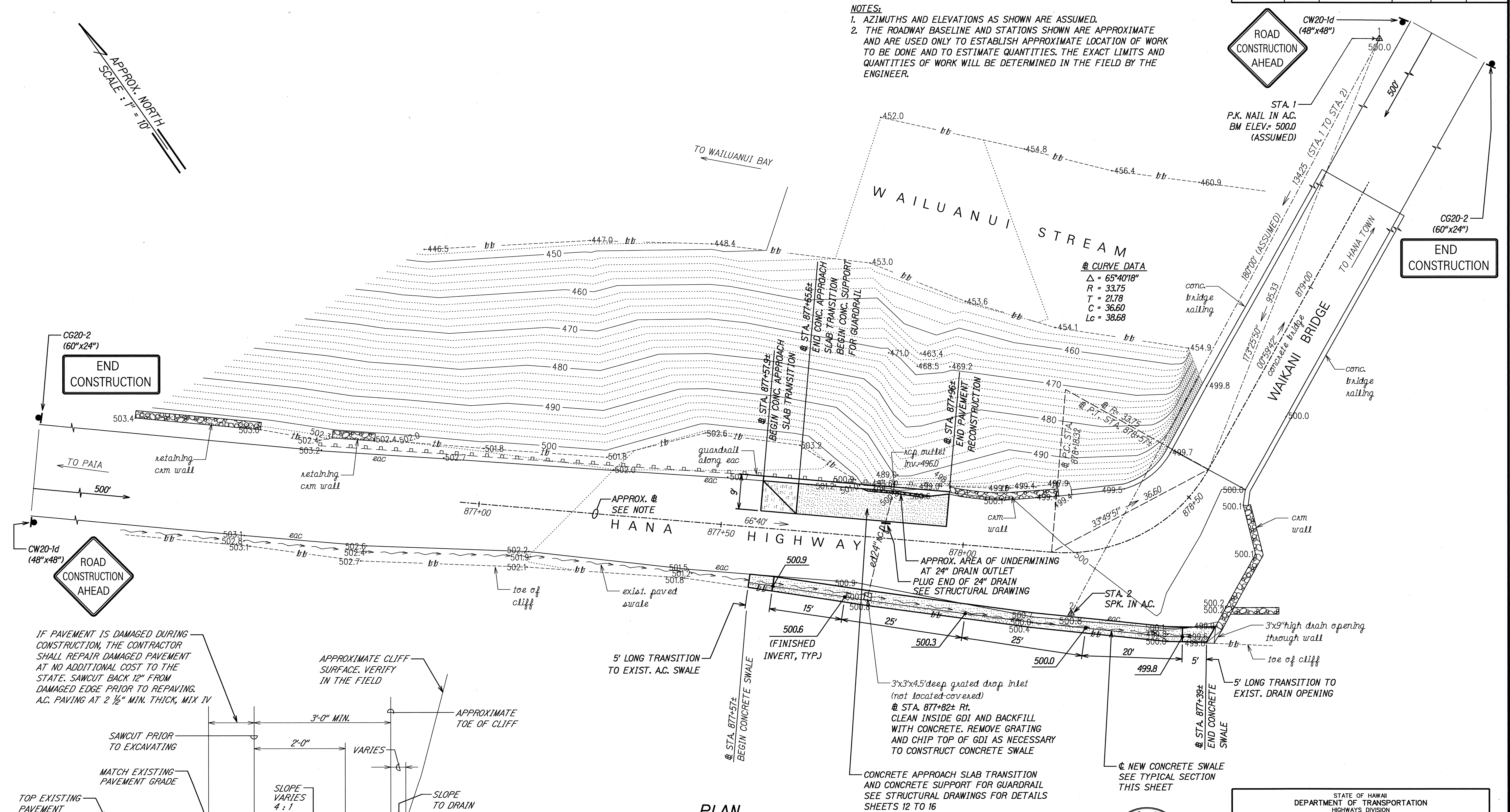


	FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	HAWAII	HAW.	ER-12(5)	2001	11	26

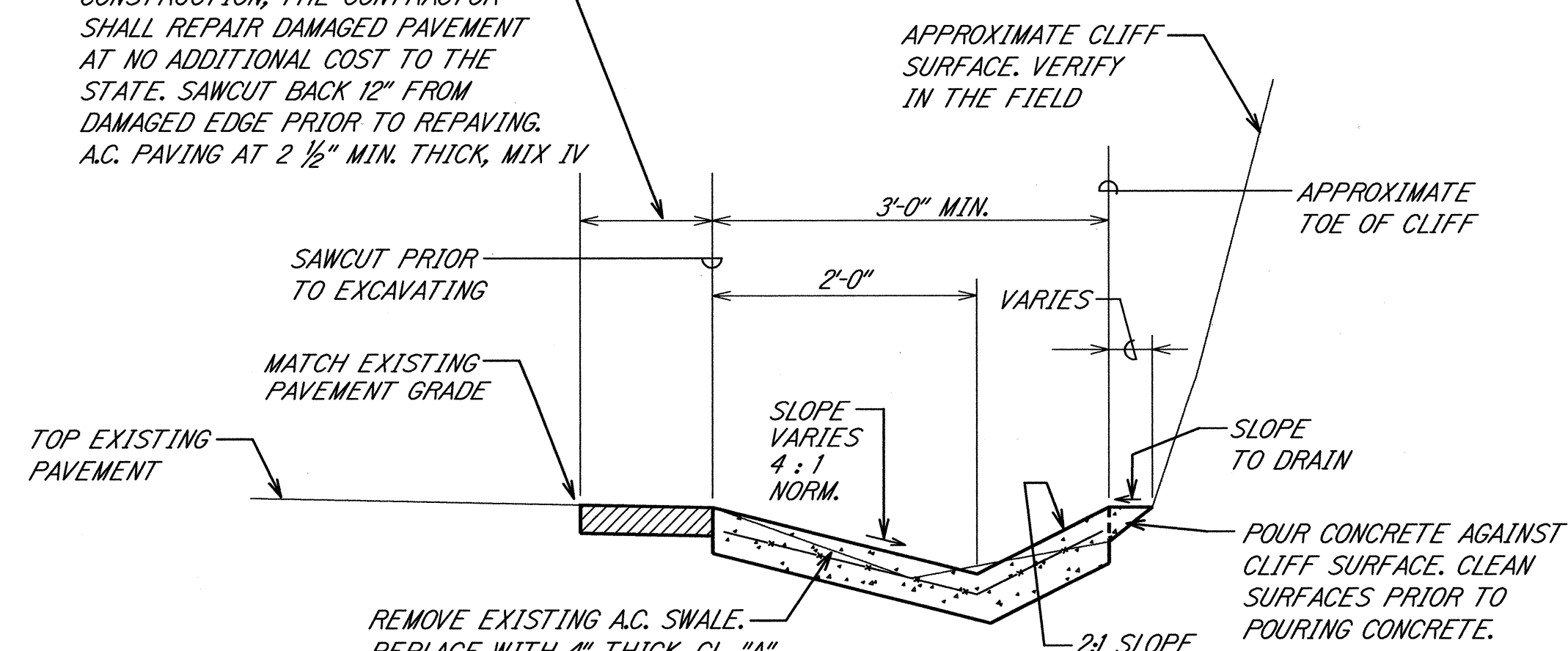
NOTES:

1. AZIMUTHS AND ELEVATIONS AS SHOWN ARE ASSUMED.
2. THE ROADWAY BASELINE AND STATIONS SHOWN ARE APPROXIMATE AND ARE USED ONLY TO ESTABLISH APPROXIMATE LOCATION OF WORK TO BE DONE AND TO ESTIMATE QUANTITIES. THE EXACT LIMITS AND QUANTITIES OF WORK WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

APPROX. NORTH.
SCALE : 1" = 10'



IF PAVEMENT IS DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL REPAIR DAMAGED PAVEMENT AT NO ADDITIONAL COST TO THE STATE. SAWCUT BACK 12" FROM DAMAGED EDGE PRIOR TO REPAVING. A.C. PAVING AT 2 1/2" MIN. THICK, MIX IV



TYPICAL SECTION - NEW CONCRETE SWALE
NOT TO SCALE

PLAN
SCALE: 1" = 10'

- NOTE:*

1. CONTRACTOR SHALL LAYOUT NEW CONCRETE SWALE IN THE FIELD AND THE ENGINEER SHALL APPROVE PRIOR TO ANY EXCAVATION WORK.
2. CONCRETE SWALE SURFACE TO BE ROUGH BROOM FINISHED TRANSVERSELY.



THIS WORK WAS PREPARED BY ME
OR UNDER MY DIRECT SUPERVISION

John D. Tanaka 02/13/01
R. T. TANAKA ENGINEERS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

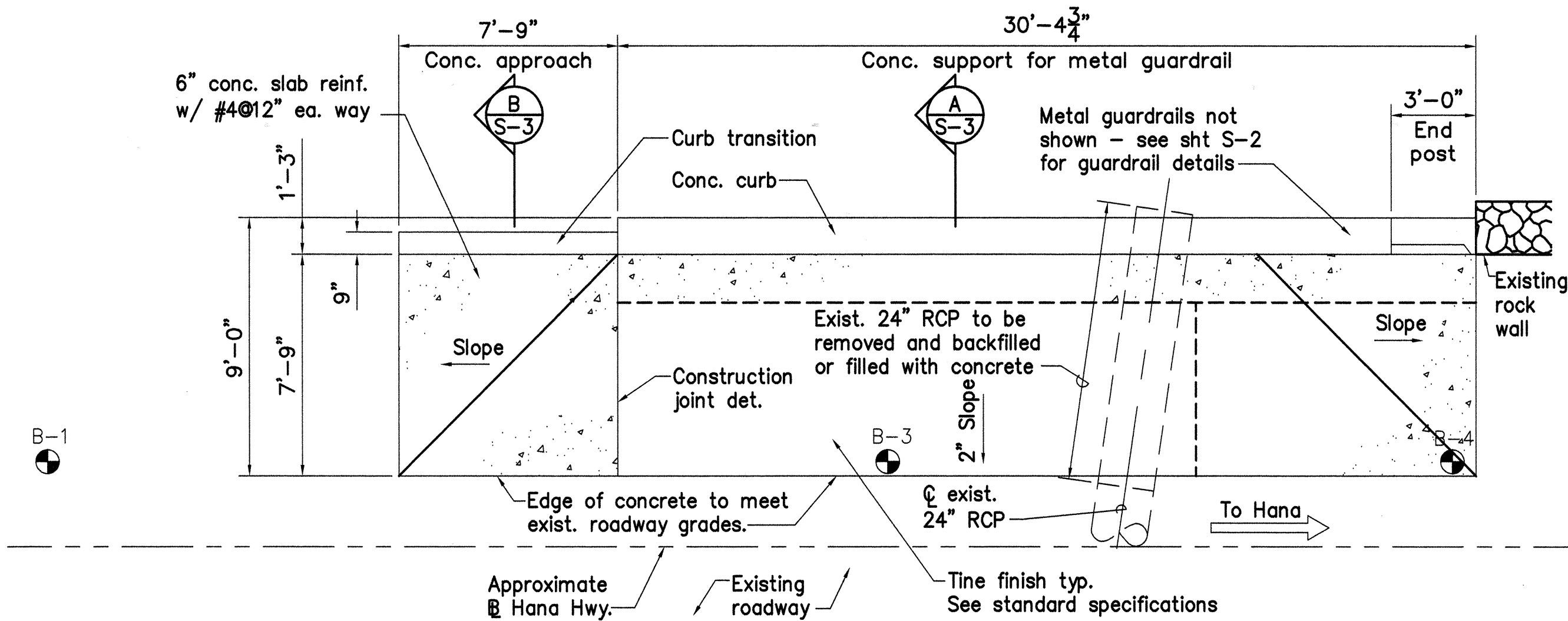
ROADWAY REPAIRS
AT MILE POST 19.2

HANA HIGHWAY
EMERGENCY FEDERAL-AID PROJECT
ROADWAY REPAIRS
AT VARIOUS LOCATIONS
FED. AID PROJ. NO. ER-12(5)

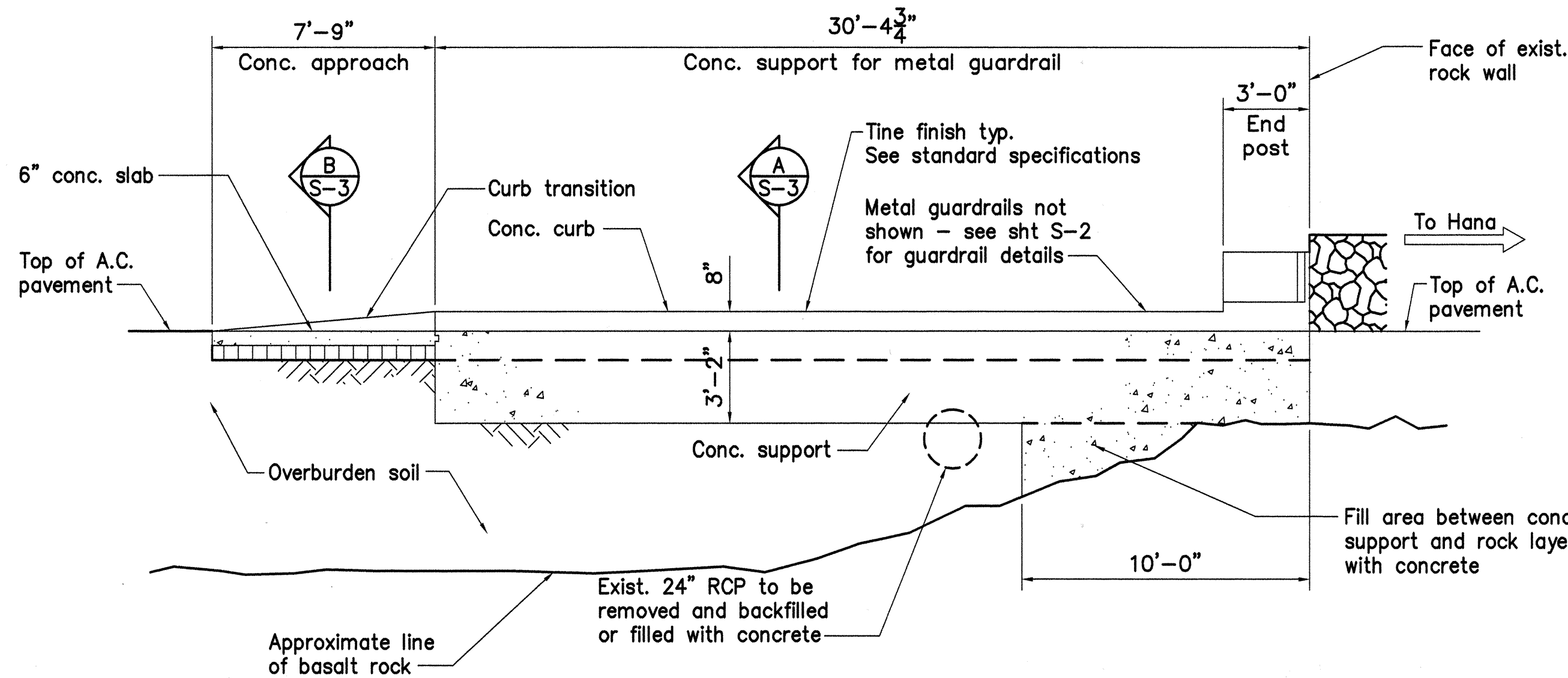
SCALE: AS NOTED

DATE: FEBRUARY 2001

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(5)	2001	12	26



FOUNDATION PLAN
SCALE: 1/4"=1'-0"



CONCRETE SUPPORT PROFILE
SCALE: 1/4"=1'-0"

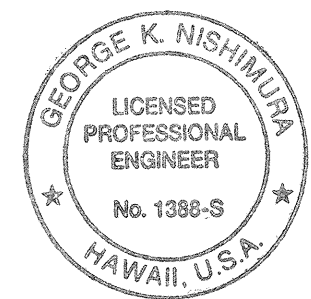
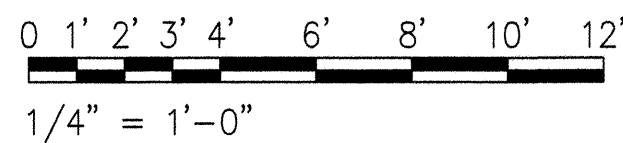
LOG OF BORING NO. 1									
ELEVATION: Top of Asphalt Concrete					ELEVATION: Top of Asphalt Concrete				
EQUIPMENT USED: Truck Mounted Drill Rig					EQUIPMENT USED: Truck Mounted Drill Rig				
DATE DRILLED: December 12, 2000					DATE DRILLED: December 12, 2000				
DEPTH OF BORING (FT.): 28					DEPTH OF BORING (FT.): 28				
DEPTH OF GROUNDWATER: unknown					DEPTH OF GROUNDWATER: unknown				
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE BLOW/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (pcf)	WET DENSITY (pcf)
0	GW	GC	Asphalt Concrete (5" thick)	114	black	mod. moist to moist	dense	106.9	9.1
4	SC	GC	GRAVEL with sand (Base Course: 8" thick)	25	dark greenish gray	mod. moist to moist	dense	96.7	17.3
8	SC	GC	clayey GRAVEL with sand - refusal at 1.6'	61	black	mod. moist to moist	dense	95.0	25.7
12	SC	GC	clayey SAND with gravel	45/4"	gray	mod. moist to moist	dense	95.0	17.9
16	SC	GC	clayey GRAVEL with sand						
20	SC	GC	BASALT ROCK						
24	SC	GC	HQ CORE Run from 10' to 13' Recovery = 100% RQD = 92%						
28	SC	GC	HQ CORE Run from 13' to 18' Recovery = 100% RQD = 47%						
32	SC	GC	CLINKERS ALLUVIAL DEPOSIT						
36	SC	GC	HQ CORE Run from 18' to 23' Recovery = 40% RQD = 15%						
40	SC	GC	HQ CORE Run from 23' to 28' Recovery = 33% RQD = 12%						
44	SC	GC	End Of Boring						

LOG OF BORING NO. 2									
ELEVATION: Top of Asphalt Concrete					ELEVATION: Top of Asphalt Concrete				
EQUIPMENT USED: Truck Mounted Drill Rig					EQUIPMENT USED: Truck Mounted Drill Rig				
DATE DRILLED: December 12, 2000					DATE DRILLED: December 12, 2000				
DEPTH OF BORING (FT.): 5					DEPTH OF BORING (FT.): 5				
DEPTH OF GROUNDWATER: unknown					DEPTH OF GROUNDWATER: unknown				
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE BLOW/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (pcf)	WET DENSITY (pcf)
0	GW	GC	Asphalt Concrete (5" thick)		black	mod. moist to moist	dense		
2	GW	GC	GRAVEL with sand (Base Course: 8" thick)						
4	GW	GC	clayey GRAVEL with sand and cobbles						
6	GW	GC	GRAVEL with sand	61				103.8	19.8
8	GW	GC	---REFUSAL						
10	GW	GC	BASALT ROCK						
12	GW	GC	End Of Boring						

LOG OF BORING NO. 3									
ELEVATION: Top of Asphalt Concrete					ELEVATION: Top of Asphalt Concrete				
EQUIPMENT USED: Truck Mounted Drill Rig					EQUIPMENT USED: Truck Mounted Drill Rig				
DATE DRILLED: January 5, 2001					DATE DRILLED: January 5, 2001				
DEPTH OF BORING (FT.): 10.25					DEPTH OF BORING (FT.): 10.25				
DEPTH OF GROUNDWATER: unknown					DEPTH OF GROUNDWATER: unknown				
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE BLOW/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (pcf)	WET DENSITY (pcf)
0	GW	GC	Asphalt Concrete (6" thick)		black	mod. moist to moist	dense		
2	GW	GC	GRAVEL with sand (Base Course: 6" thick)		gray black	mod. moist to moist	dense		
4	GW	GC	clayey GRAVEL with sand & cobbles						
6	BLDR		BOULDER (grinding from 6' to 7')						
8	COB		COBBLE (grinding from 7' to 7.5')						
10	GM-GC		silty GRAVEL with sand						
12	ROCK		BASALT ROCK		gray		hard rock		
14	ROCK		End Of Boring						

LOG OF BORING NO. 4									
ELEVATION: Top of Asphalt Concrete					ELEVATION: Top of Asphalt Concrete				
EQUIPMENT USED: Truck Mounted Drill Rig					EQUIPMENT USED: Truck Mounted Drill Rig				
DATE DRILLED: January 5, 2001					DATE DRILLED: January 5, 2001				
DEPTH OF BORING (FT.): 4.25					DEPTH OF BORING (FT.): 4.25				
DEPTH OF GROUNDWATER: unknown					DEPTH OF GROUNDWATER: unknown				
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE BLOW/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (pcf)	WET DENSITY (pcf)
0	GW	GC	Asphalt Concrete (6" thick)		black	mod. moist to moist	dense		
2	GW	GC	GRAVEL with sand (Base Course: 6" thick)		gray black	mod. moist to moist	dense		
4	ROCK		BASALT ROCK		gray		hard rock		
6	ROCK		End Of Boring						

GRAPHIC SCALE



THIS WORK WAS PREPARED BY
ME UNDER MY SUPERVISION

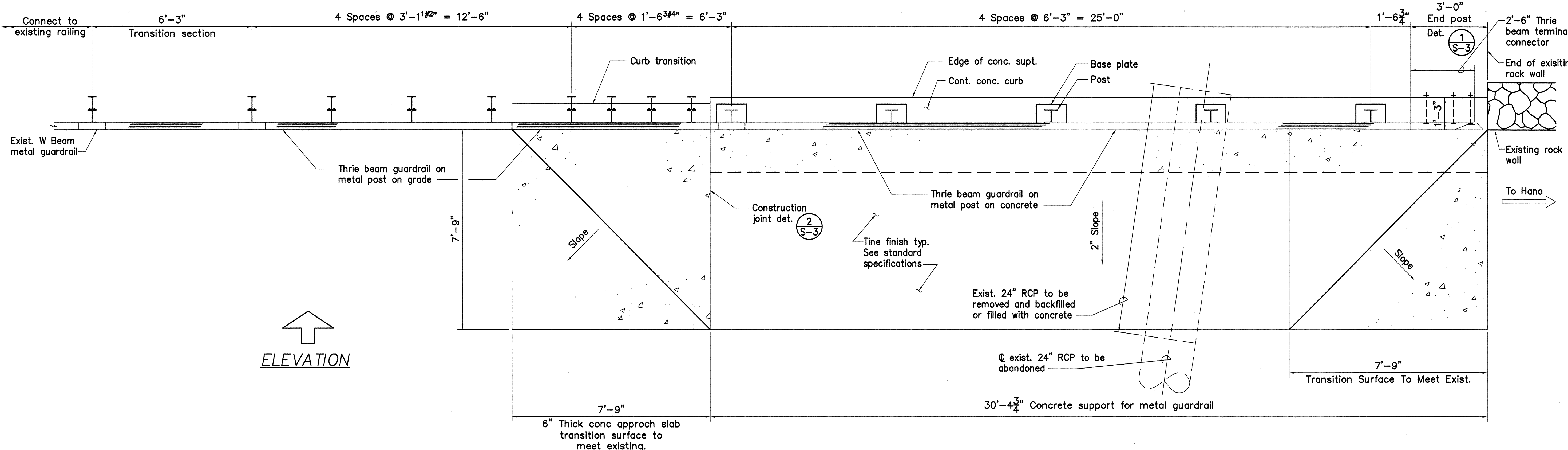
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY REPAIRS
AT MILE POST 19.2

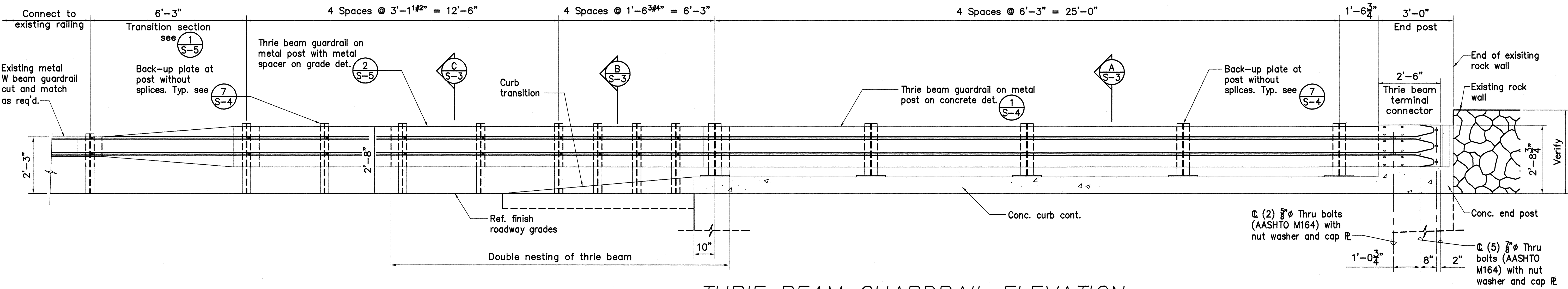
HANA HIGHWAY
EMERGENCY FEDERAL-AID PROJECT
ROADWAY REPAIRS VARIOUS LOCATIONS
PROJECT No. ER-12(5)

Scale: AS NOTED Date: FEB. 2001
SHEET No. S-1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(5)	2001	13	26

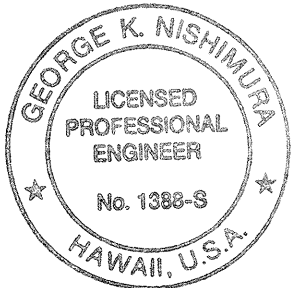
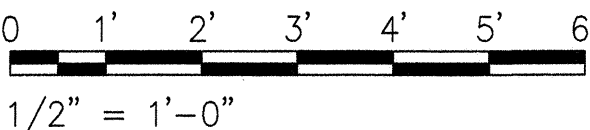


THRIE BEAM GUARDRAIL PLAN
SCALE: 1/2"=1'-0"



THRIE BEAM GUARDRAIL ELEVATION
SCALE: 1/2"=1'-0"

GRAPHIC SCALE



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION
[Signature]

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY REPAIRS
AT MILE POST 19.2

HANA HIGHWAY
EMERGENCY FEDERAL-AID PROJECT
ROADWAY REPAIRS VARIOUS LOCATIONS
PROJECT No. ER-12(5)

Scale: AS NOTED
Date: FEB. 2001

SHEET No. S-2 OF 5 SHEETS

DWG No.

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

Technical drawing of a rectangular frame with dimensions and callouts:

- Overall width: 1'-3"
- Overall height: 2'-8 1/4"
- Inner width: 1'-0"
- Inner height: 1'-0"
- Top chamfer: 3/4" Chamfer, typ.
- Bottom chamfer: 3/4" Chamfer, typ.
- Left side: 2" Clr. typ.
- Right side: 4- #4 Horiz. E.F.
- Bottom reinforcement: #5 Vert. © 12" typ.
- Bottom dimension: 1'-0" Typ.

PLAN

1 END POST DETAIL
S-3 SCALE: 3/4"=1'-0"

1. GENERAL SPECIFICATIONS: HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION, 1994, TOGETHER WITH SPECIAL PROVISIONS PREPARED FOR THIS CONTRACT.
2. DESIGN SPECIFICATIONS: "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS," SECOND EDITION, 1998.
3. LOADS:
 - A. LIVE LOAD: HL-93
 - B. RAILING TEST LEVEL: TL-2
4. MATERIALS:
 - A. MINIMUM CONCRETE COMPRESSIVE STRENGTH (AT 28 DAYS) SHALL BE 4,000 PSI.
 - B. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS OTHERWISE NOTED.
 - C. ALL MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 AND BE HOT-DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED.
 - D. ALL ANCHOR BOLTS, WASHERS, AND NUTS SHALL CONFORM TO ASTM A325 AND BE HOT-DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED.
5. REINFORCEMENT:
 - A. UNLESS OTHERWISE NOTED, THE COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY REINFORCING BARS SHALL BE AS FOLLOWS:
 - 1) DECK SLABS
 - A) TOP BARS = 2"
 - B) BOTTOM BARS = 1-1/4"
 - 2) RAILINGS AND PARAPETS = 2"
 - 3) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"
6. CONSTRUCTION NOTES:
 - A. SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.
 - B. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS BEFORE COMMENCING WITH WORK.
 - C. UNLESS OTHERWISE NOTED, ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" X 3/4".
7. FOUNDATION:

THESE FOUNDATION NOTES WERE BASED ON RECOMMENDATIONS CONTAINED IN A FOUNDATION INVESTIGATION REPORT BY ISLAND GEOTECHNICAL ENGINEERING, INC. DATED JANUARY 7, 2001 ALONG WITH ADDENDUM NO. 1 (DATED JANUARY 29, 2001) AND ADDENDUM NO. 2 (DATED FEBRUARY 7, 2001). THE REPORT SHALL BE CONSIDERED AS PART OF THE CONSTRUCTION DOCUMENTS AND ITS RECOMMENDATIONS SHALL BE IMPLEMENTED, UNLESS OTHERWISE DIRECTED BY THE SOILS ENGINEER.

 - A. PREPARATION OF THE BOTTOM OF EXCAVATION:
 - 1) BOTTOM OF EXCAVATION IN OVERBURDEN SHALL BE MECHANICALLY COMPACTED TO 95% COMPACTION.
 - 2) BOTTOM OF EXCAVATION ON ROCK SHALL BE CLEANED OF ALL LOOSE MATERIAL.
 - B. ISLAND GEOTECHNICAL ENGINEERING, INC. SHALL BE CONTACTED TO OBSERVE THE CONDITION OF THE EXCAVATION 2 DAYS PRIOR TO PLACEMENT OF CONCRETE. (PHONE: (808) 243-9355)
 - C. THE FOLLOWING SOIL PARAMETERS WERE USED FOR DESIGN:
 - 1) DESIGN EARTH PRESSURE (LEVEL BACKFILL):
 - A) ACTIVE = 30 PCF
 - B) AT-REST = 45 PCF
 - 2) PASSIVE EARTH PRESSURE = 300 PCF
 - 3) COEFFICIENT OF FRICTION:
 - A) OVERBURDEN = 0.4
 - B) ROCK = 0.6
 - 4) ALLOWABLE SOIL BEARING PRESSURE:
 - A) OVERBURDEN = 5,400 PSF (STRENGTH LIMIT STATE)
= 12,000 PSF (EXTREME EVENT LIMIT STATE)
 - B) ROCK = 36,000 PSF (STRENGTH LIMIT STATE)
= 60,000 PSF (EXTREME EVENT LIMIT STATE)

2 CONSTRUCTION JOINT DETAIL
S-3 SCALE: 1/2"=1'-0"

$3/8" = 1'-0"$


$1/2" = 1'-0"$


$3/4" = 1'-0"$




THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY REPAIRS
AT MILE POST 19.2

HANA HIGHWAY
~~EMERGENCY FEDERAL-AID PROJECT~~
~~ROADWAY REPAIRS VARIOUS LOCATIONS~~
PROJECT No. ER-12(5)

Scale: AS NOTED Date: FEB. 2001

SHEET No. S-3 OF 5 SHEETS

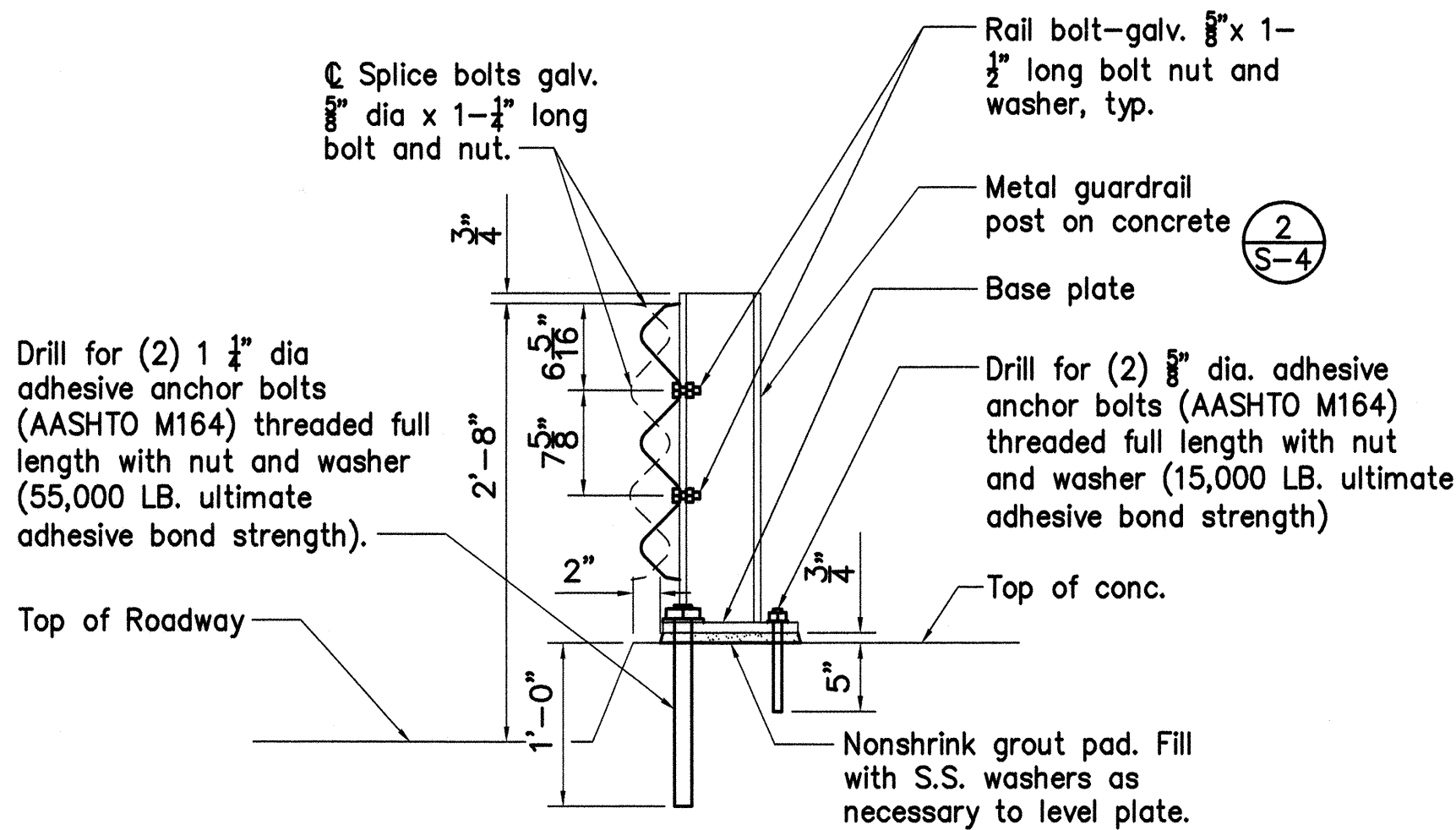
DWG No.

14

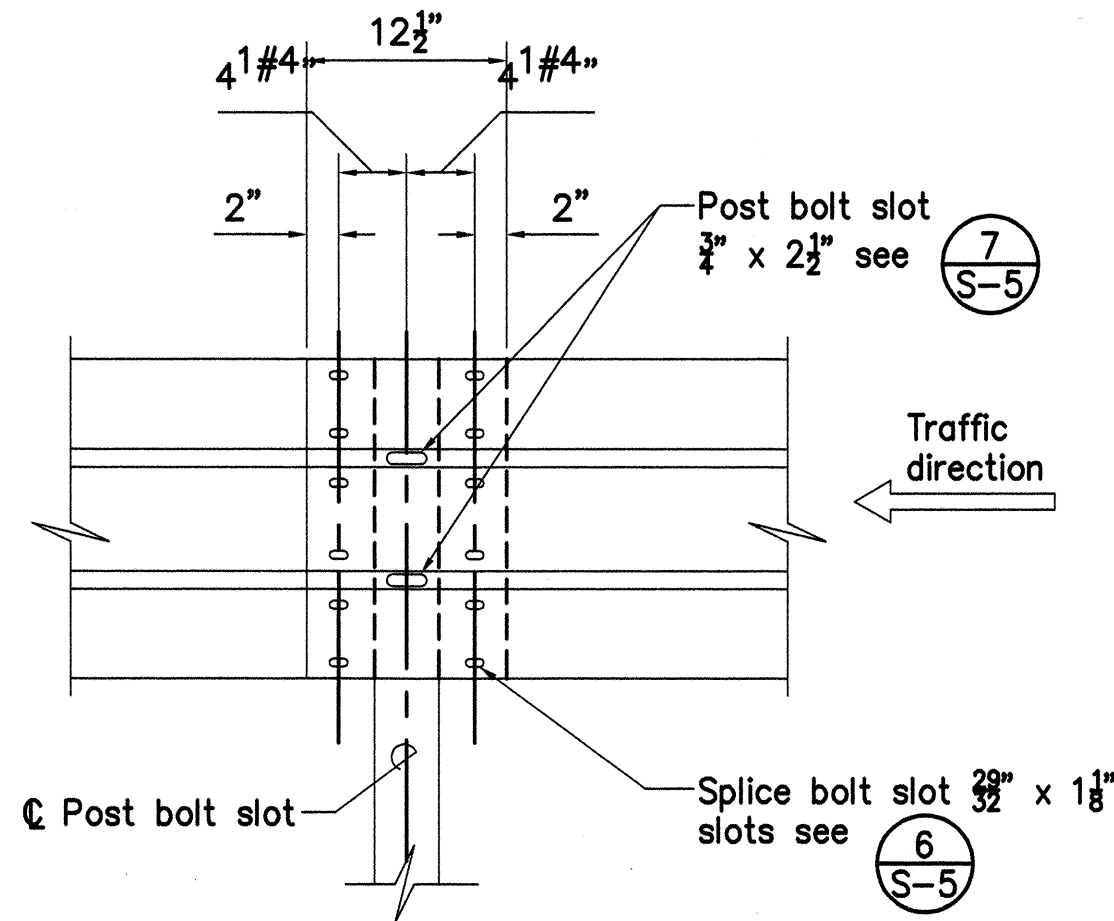
ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____
NOTE BOOK	DRAWN BY _____
	TRACED BY _____
	DESIGNED BY _____
	QUANTITIES BY _____
N-	CHECKED BY _____

00501c.DWG

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(5)	2001	15	26

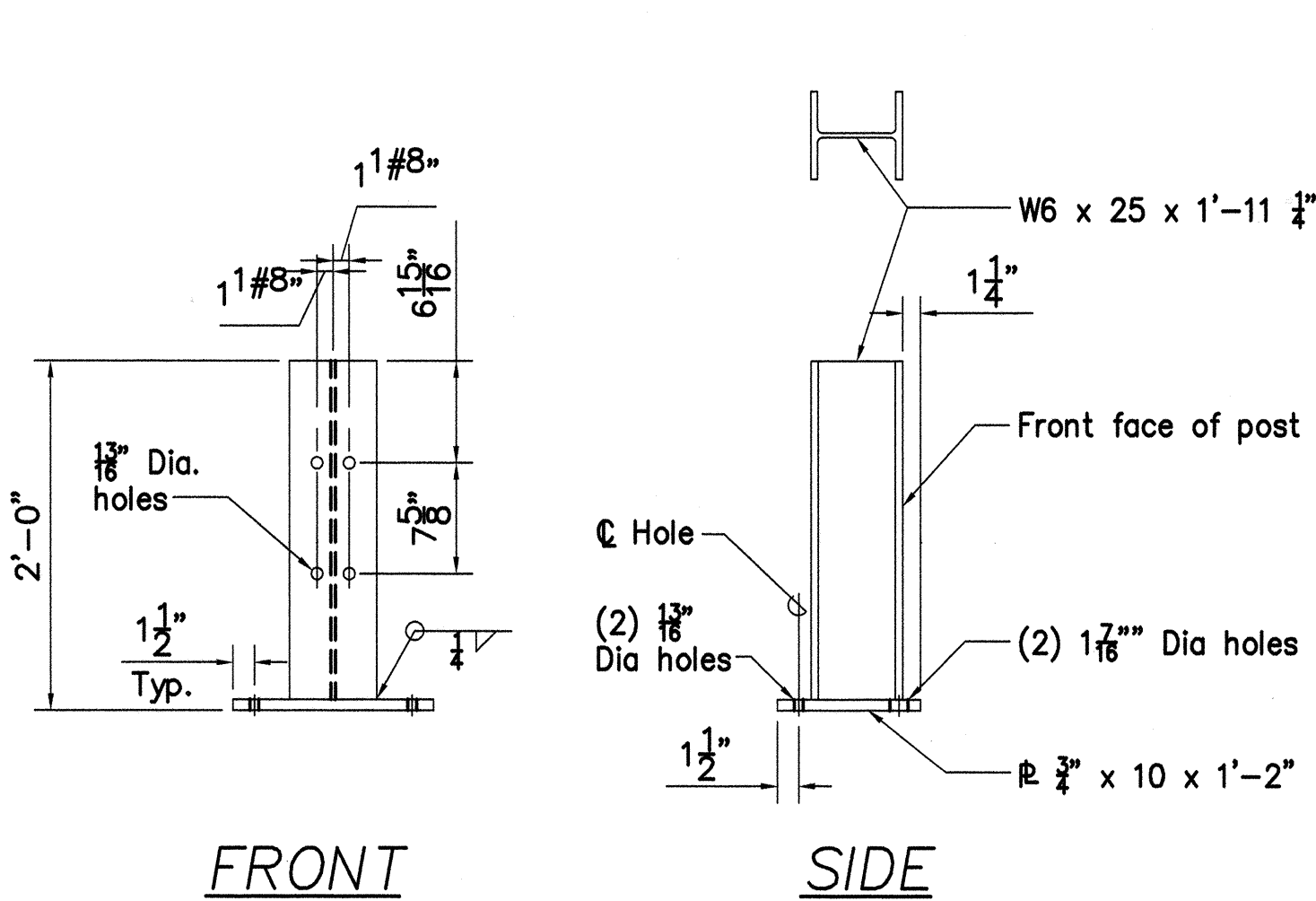


1
S-4 THRIE BEAM GUARDRAIL ON METAL POST ON CONCRETE
SCALE: 1"=1'-0"

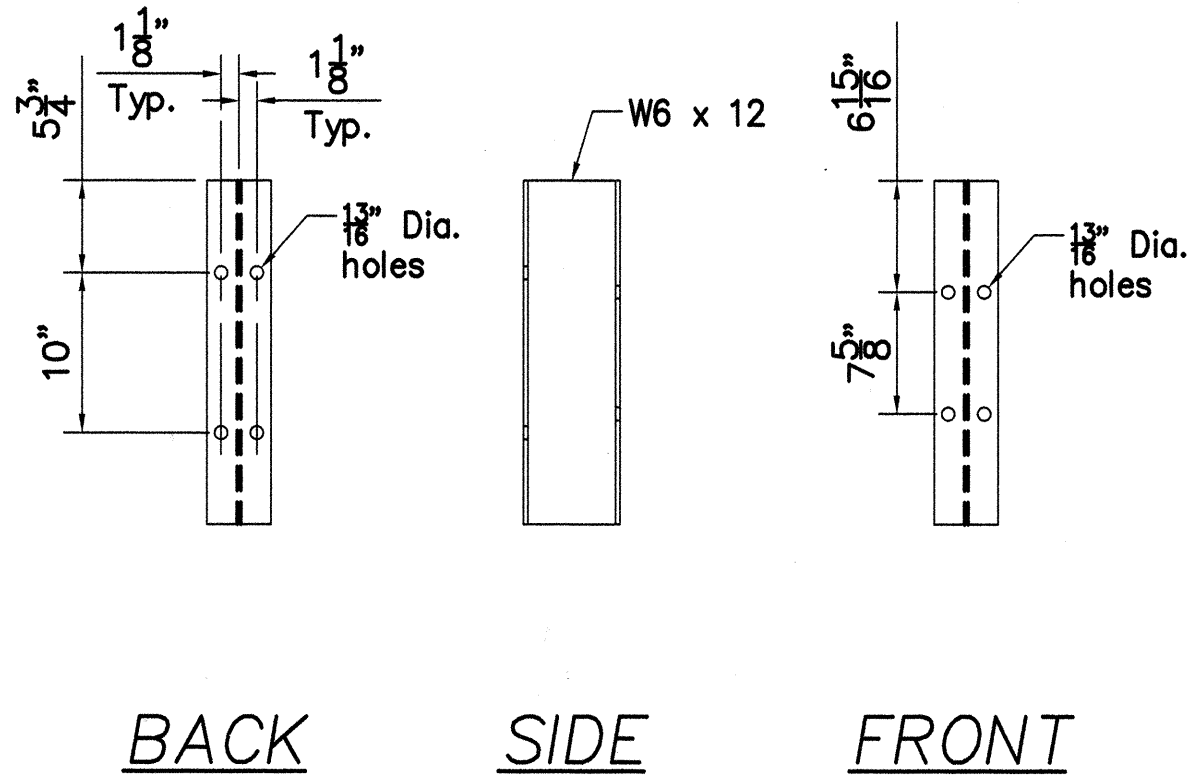


4
S-4 THRIE BEAM RAIL SPLICE
SCALE: 1"=1'-0"

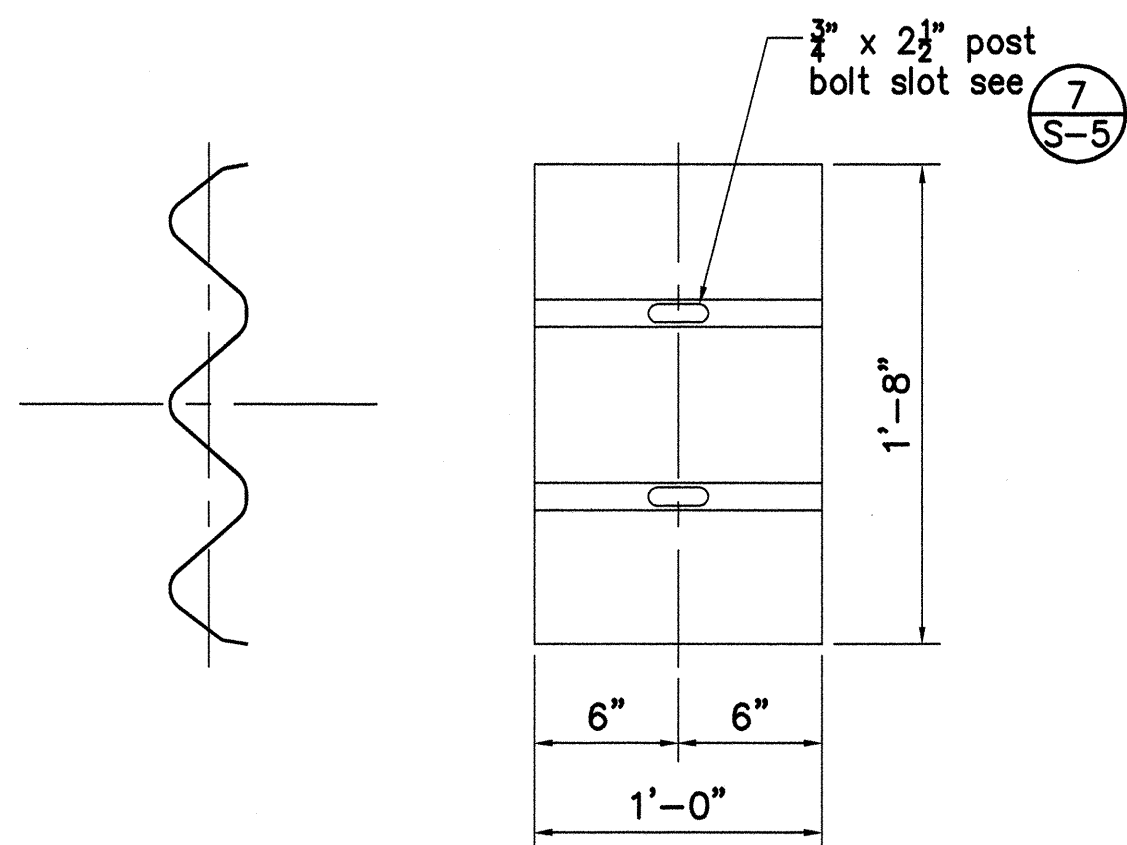
- All guardrail beams, posts, backup plates, blocks, ect. shall be hot dip galvanized. No punching, drilling or cutting will be permitted after galvanizing.
- For details of end sections, bolts and nuts, see sheet S-5.
- All fasteners, posts, blocks and rail elements shall conform to the latest edition and amendments of "A Guide to Standardized Highway Barrier Rail Hardware," a report prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee, unless otherwise noted.
- Rail thickness shall be 0.135" of steel (AASHTO M180 Class B, Type 2).



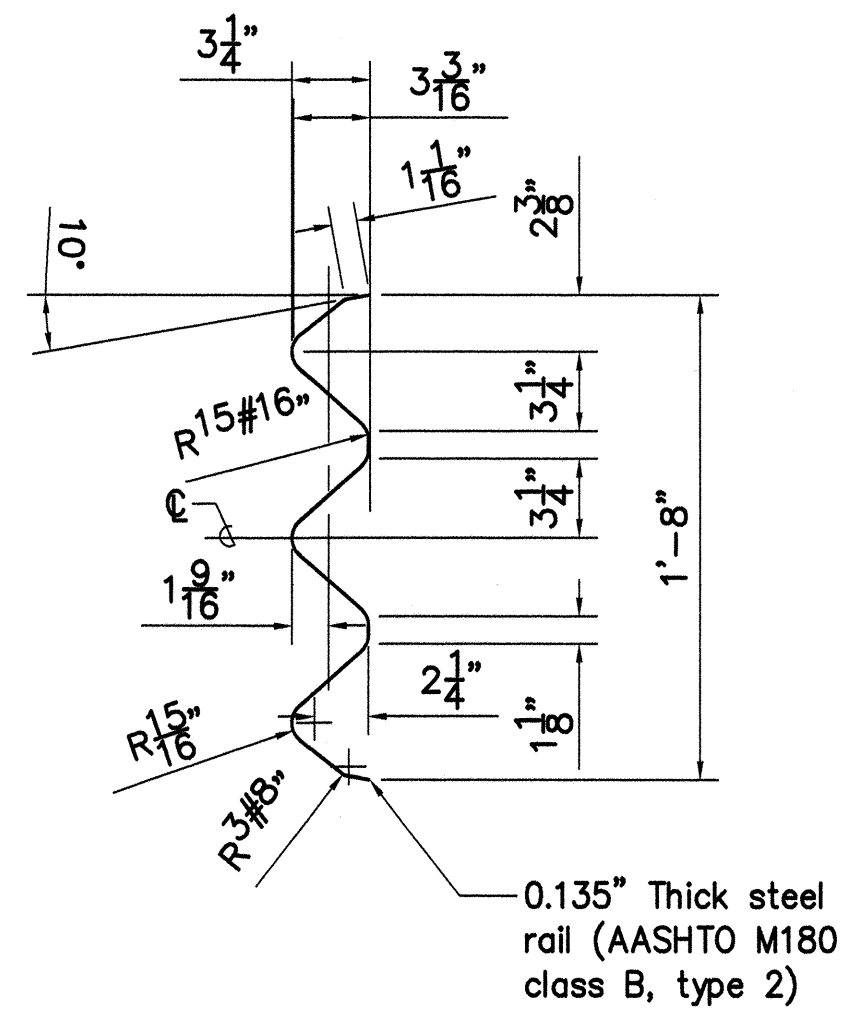
2
S-4 POST DETAILS ON CONCRETE
SCALE: 1"=1'-0"



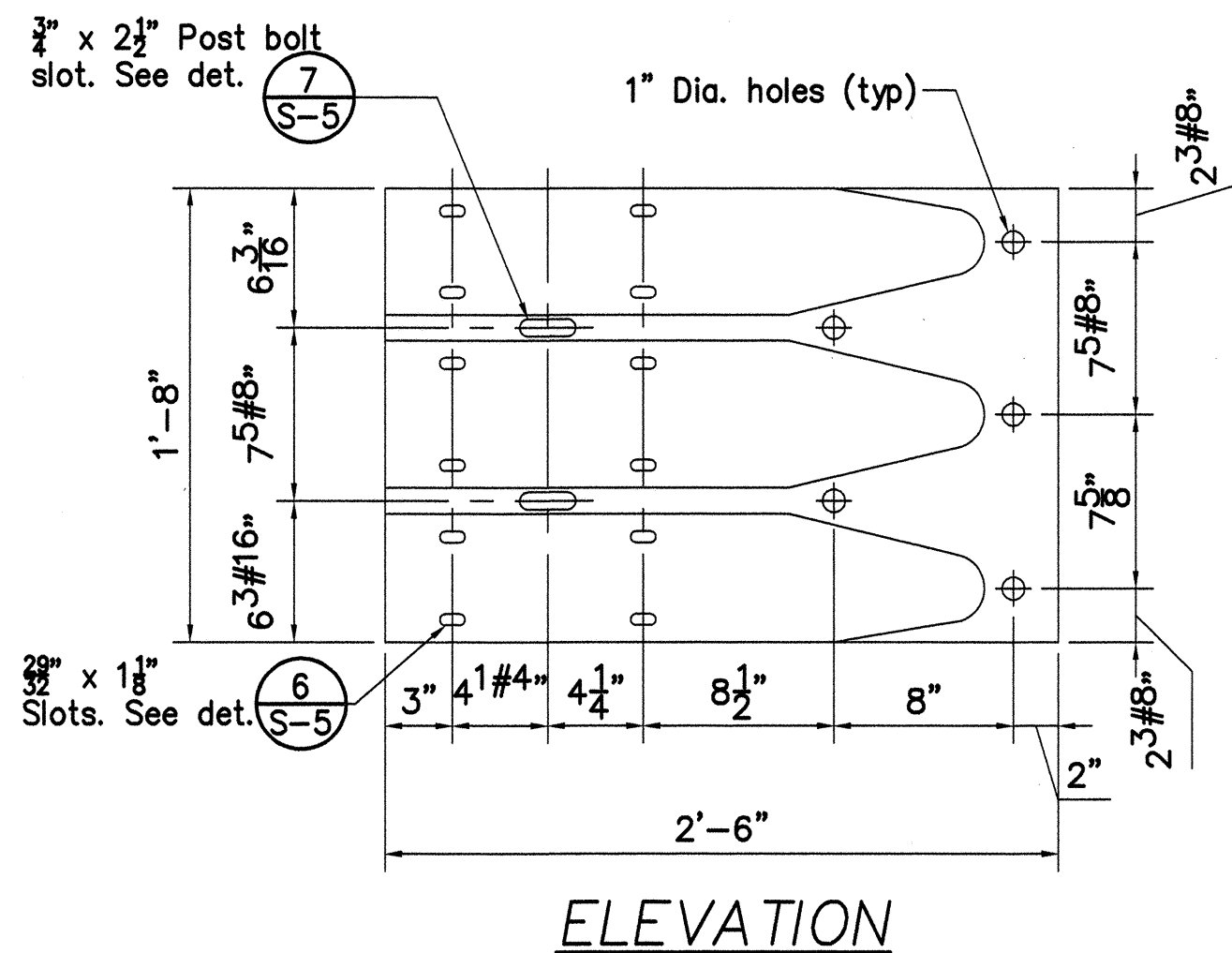
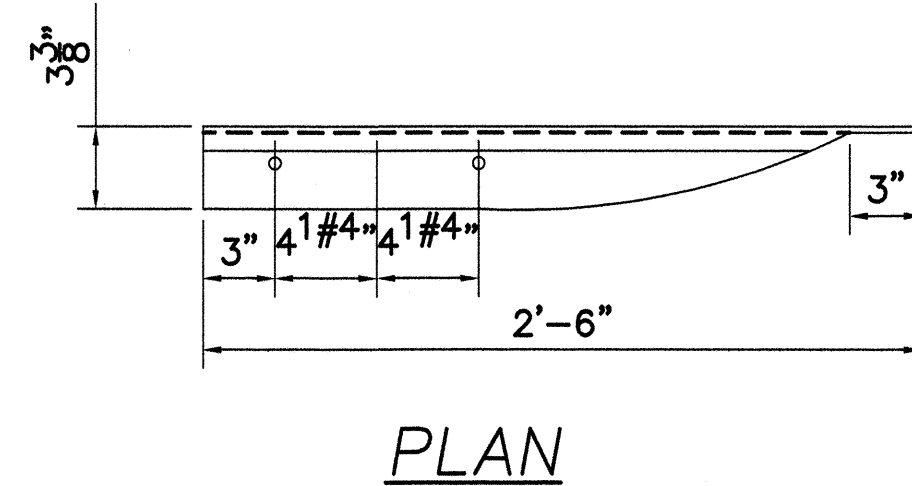
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S-4 SPACER BLOCK
SCALE: 1"=1'-0"



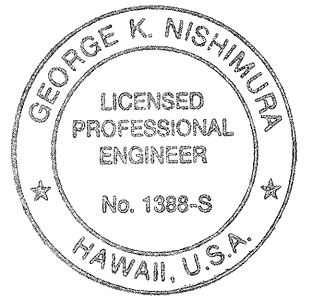
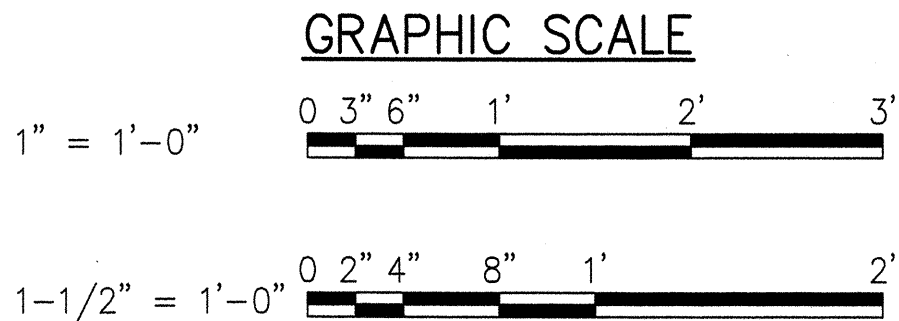
7
S-4 THRIE BEAM BACK-UP-PLATE
SCALE: 1-1/2"=1'-0"



3
S-4 SECTION THRU THRIE BEAM
SCALE: 1-1/2"=1'-0"



6
S-4 THRIE BEAM TERMINAL CONNECTOR
SCALE: 1-1/2"=1'-0"



THIS WORK WAS PREPARED BY
MECHANICAL SUPERVISOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY REPAIRS
AT MILE POST 19.2

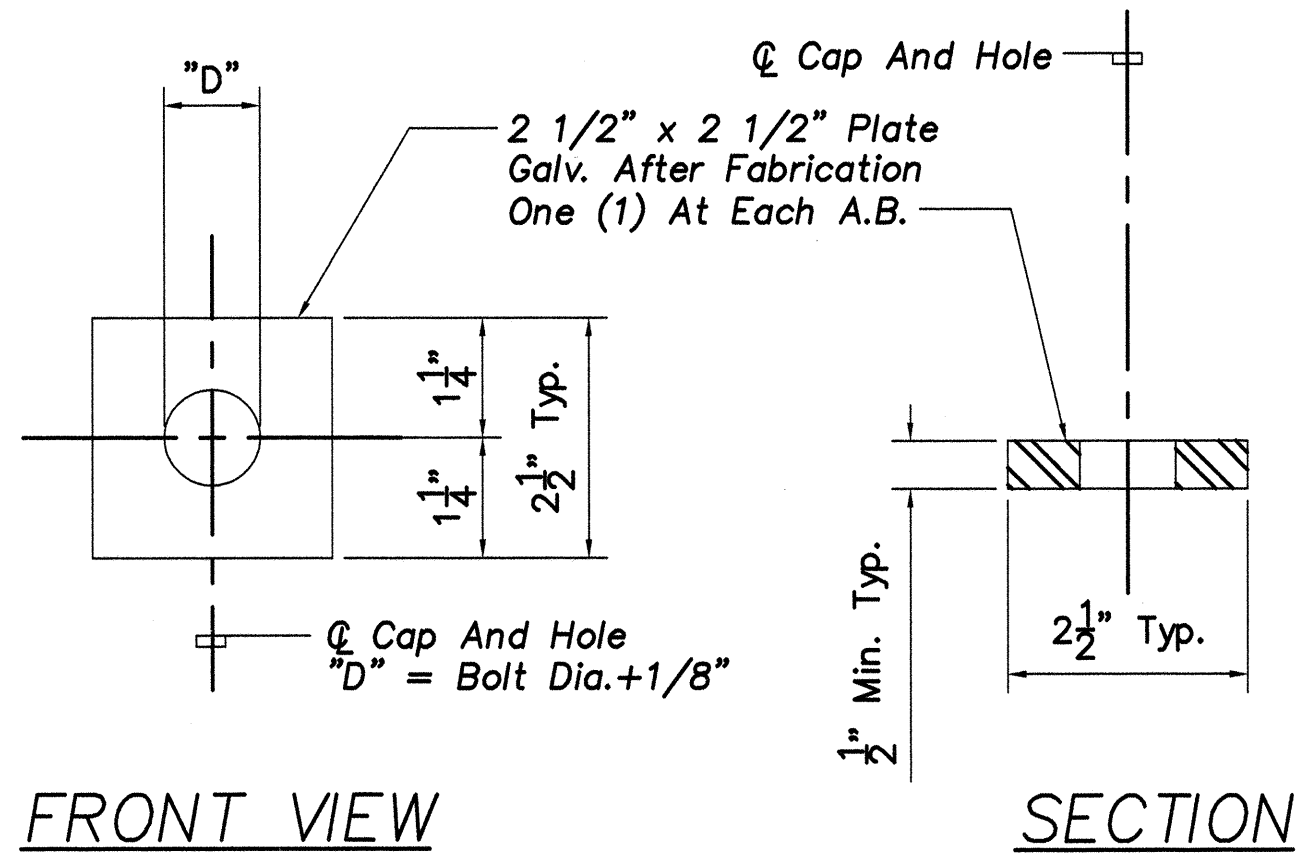
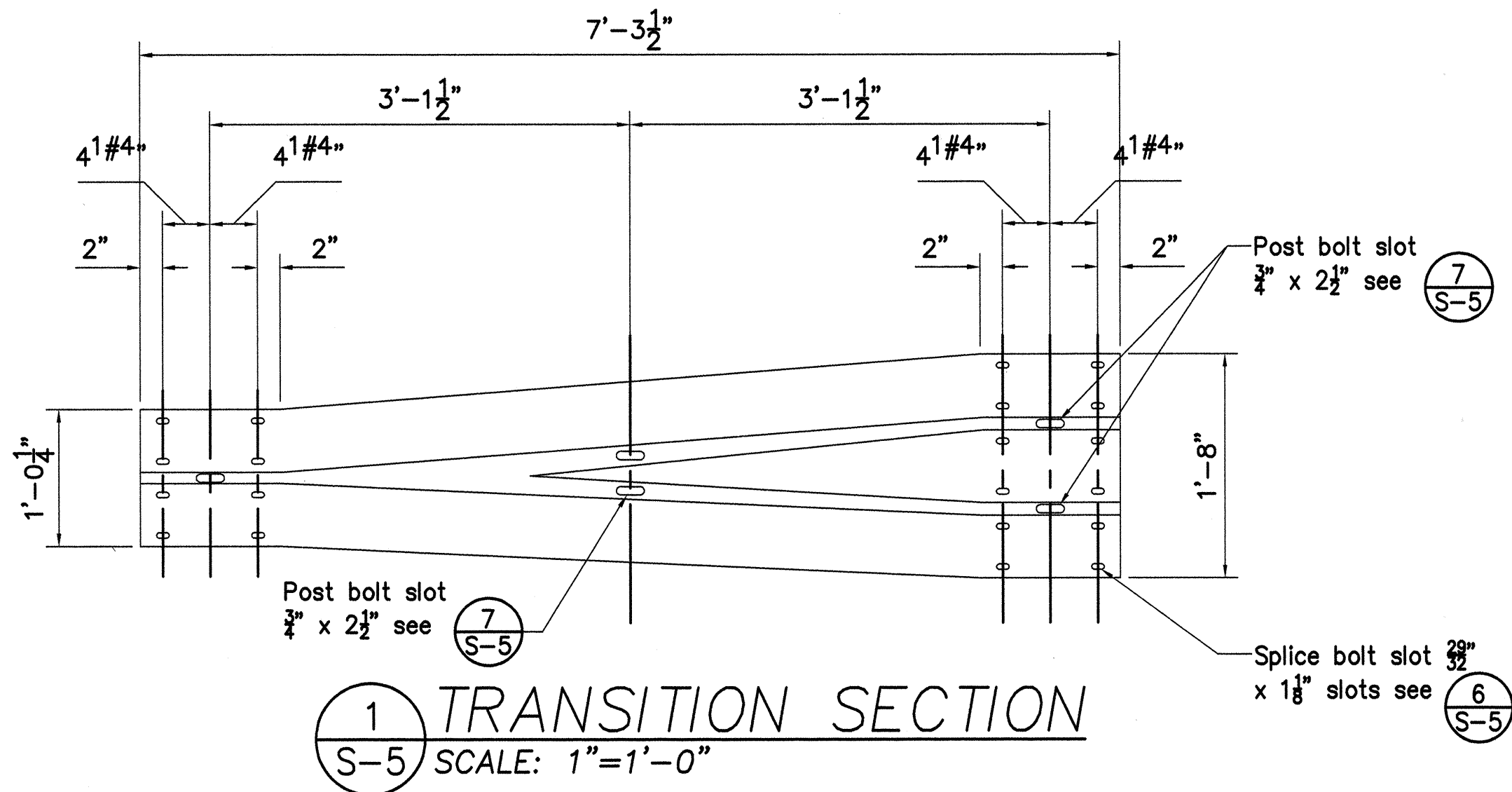
HANA HIGHWAY
EMERGENCY FEDERAL-AID PROJECT
ROADWAY REPAIRS VARIOUS LOCATIONS
PROJECT No. ER-12(5)

Scale: AS NOTED Date: FEB. 2001

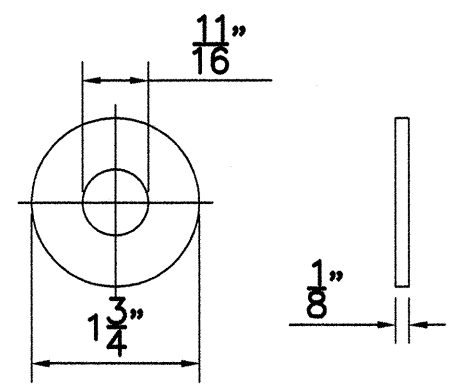
SHEET No. S-4 OF 5 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	" "
TRACED BY	" "
DESIGNED BY	" "
CHECKED BY	" "
ORIGINAL PLAN	No.
NOTE BOOK	No.

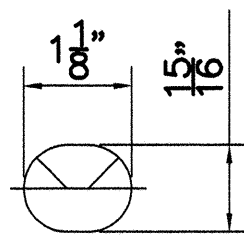
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(5)	2001	16	26



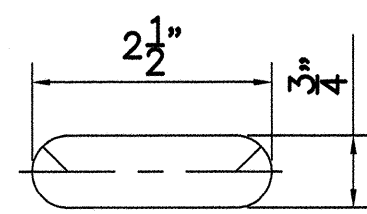
4 CAP (BEARING) PLATE DETAIL
S-5 SCALE: 6"=1'-0"



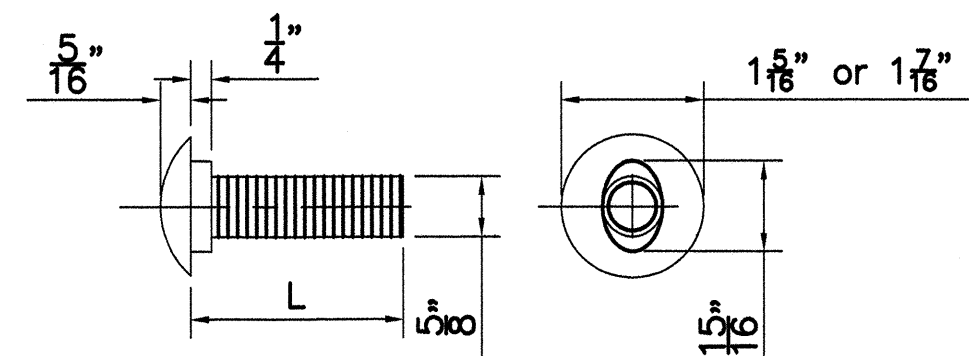
5 GALV. STEEL WASHER
FOR 5/8" BOLT, TYPICAL
S-5 SCALE: 6"=1'-0"



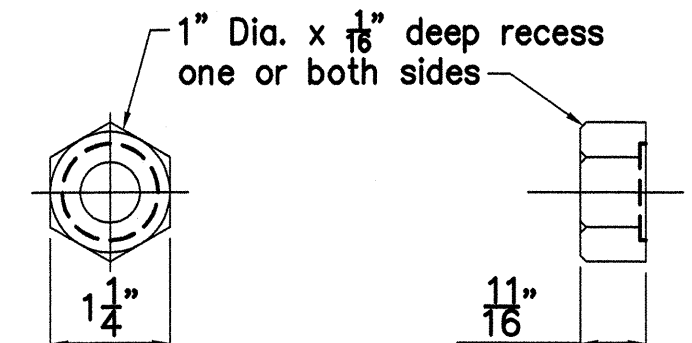
6 SPLICE BOLT SLOT
S-5 SCALE: 6"=1'-0"



7 RAIL BOLT SLOT
S-5 SCALE: 6"=1'-0"

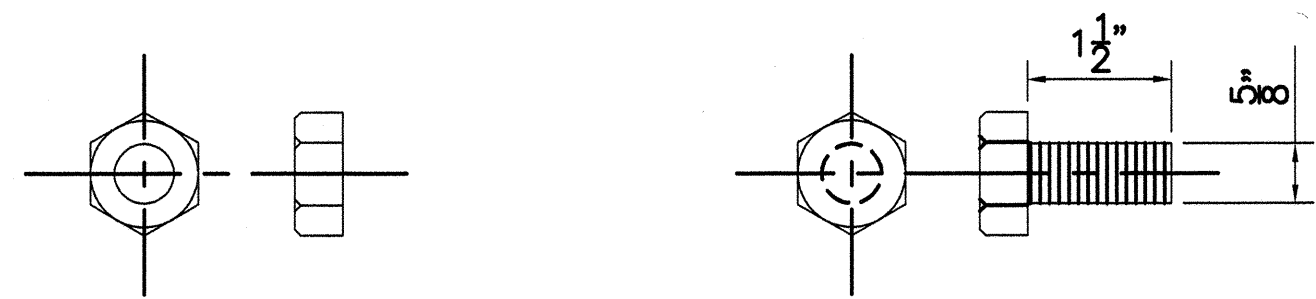


5/8" DIA BUTTON HEAD BOLT

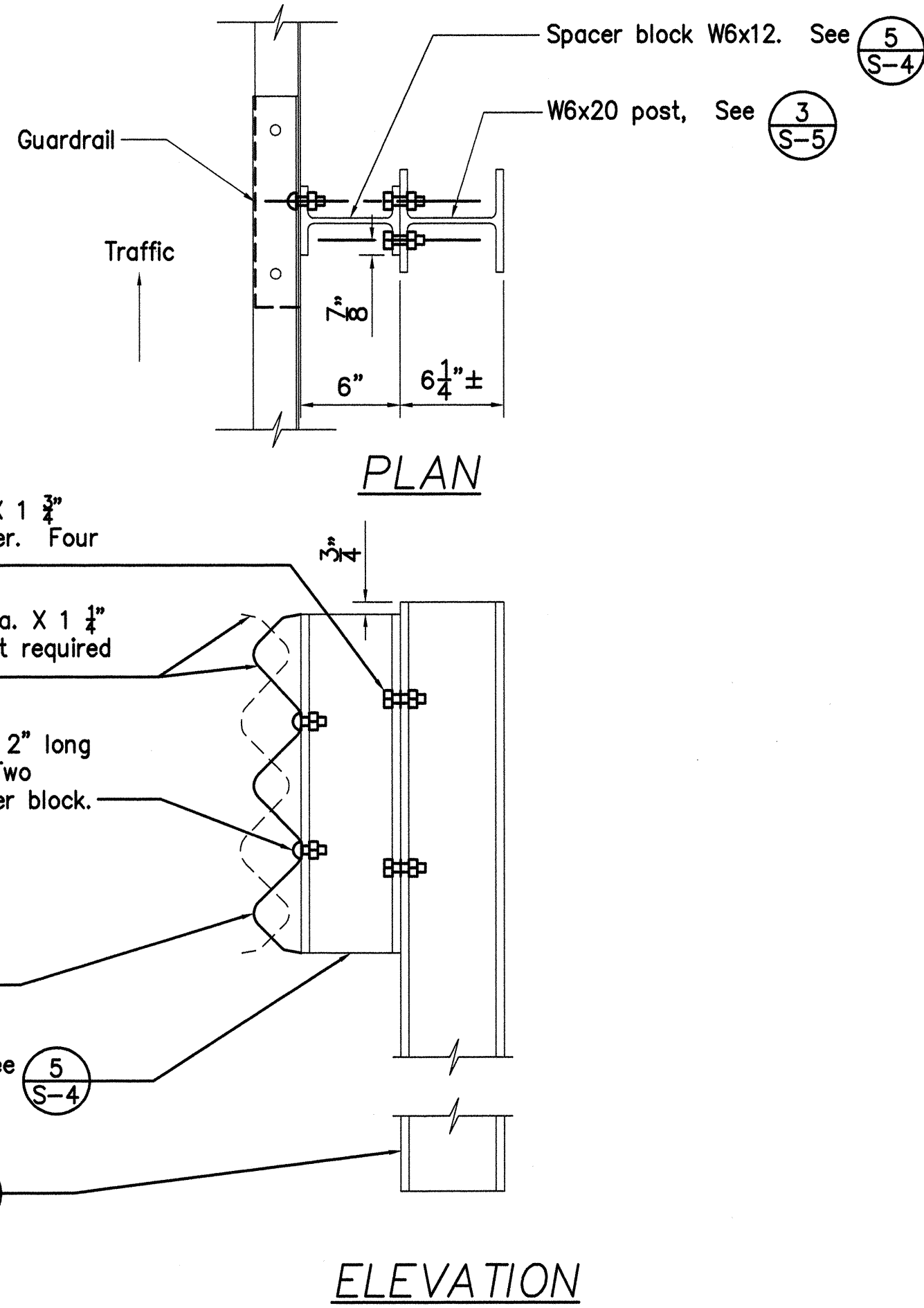


5/8" DIA RECESS NUT

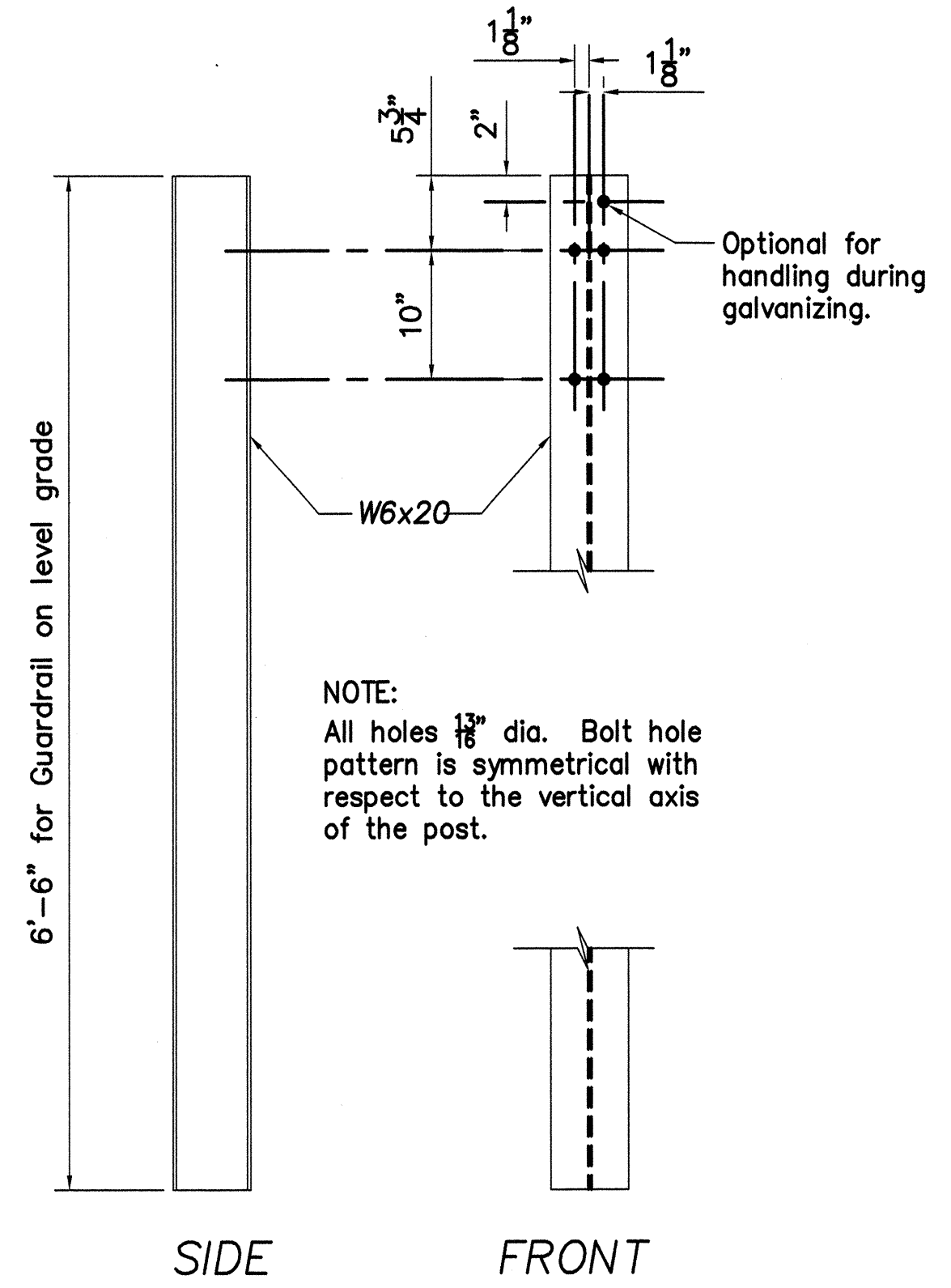
5/8" BUTTON HEAD BOLT
AND RECESS NUT (GALV.)
S-5 SCALE: 6"=1'-0"



5/8"-11 Hex Nut
5/8"-11 Hex Bolt
9 5/8" DIA. HEX BOLT AND NUT
S-5 SCALE: 6"=1'-0"



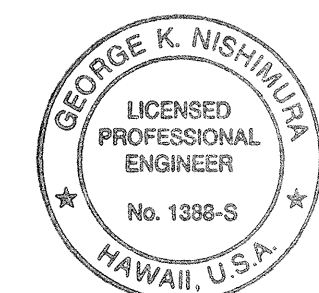
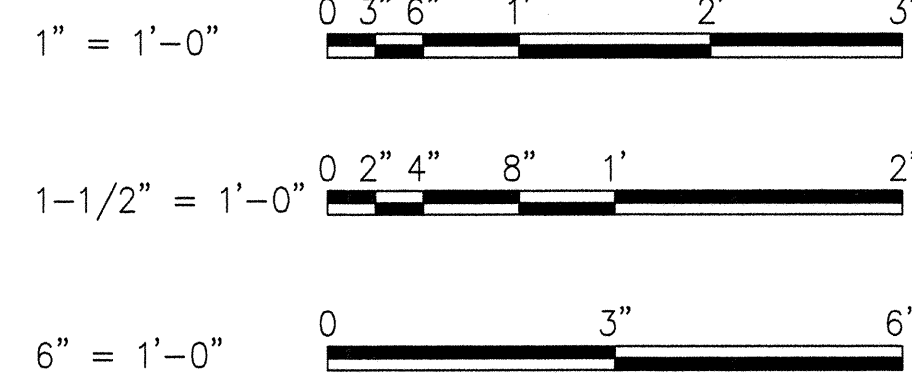
THRIE BEAM GUARDRAIL ON METAL POST
WITH METAL SPACE BLOCK ON GRADE
2 S-5 SCALE: 1 1/2"=1'-0"



THRIE BEAM STRUCTURAL
SHAPE POST
3 S-5 SCALE: 1"=1'-0"

L	Threaded Length	Intended Use
1 1/2"	Full length	Slide rails elements
2"	1 1/2" min.	Fasten rails to post

GRAPHIC SCALE



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
George K. Nishimura

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY REPAIRS
AT MILE POST 19.2

HANA HIGHWAY
EMERGENCY FEDERAL-AID PROJECT
ROADWAY REPAIRS VARIOUS LOCATIONS
PROJECT No. ER-12(5)

Scale: AS NOTED Date: FEB. 2001
SHEET No. S-5 OF 5 SHEETS

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
ORIGINAL PLAN	
NO. BOOK	
DATE	