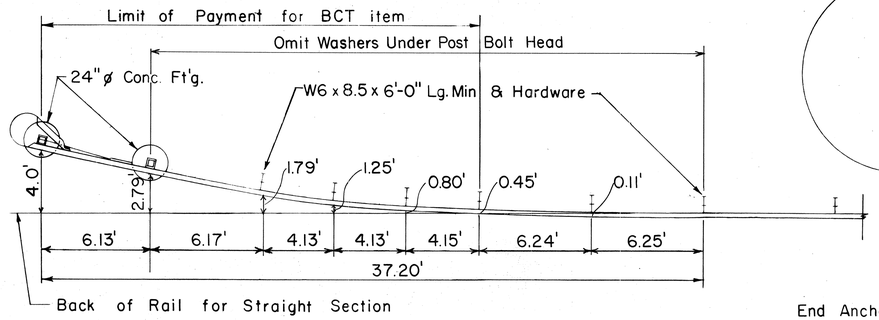
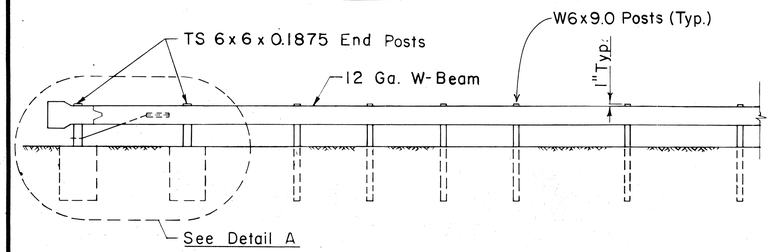
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-86	1986	10	17

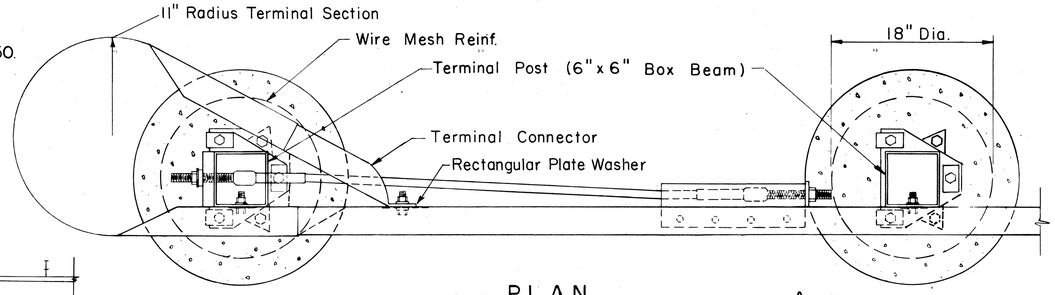
Use 12" long Backup Plate at Posts where W-Beam splice does not occur. For Details see Sht. No. TE-50.



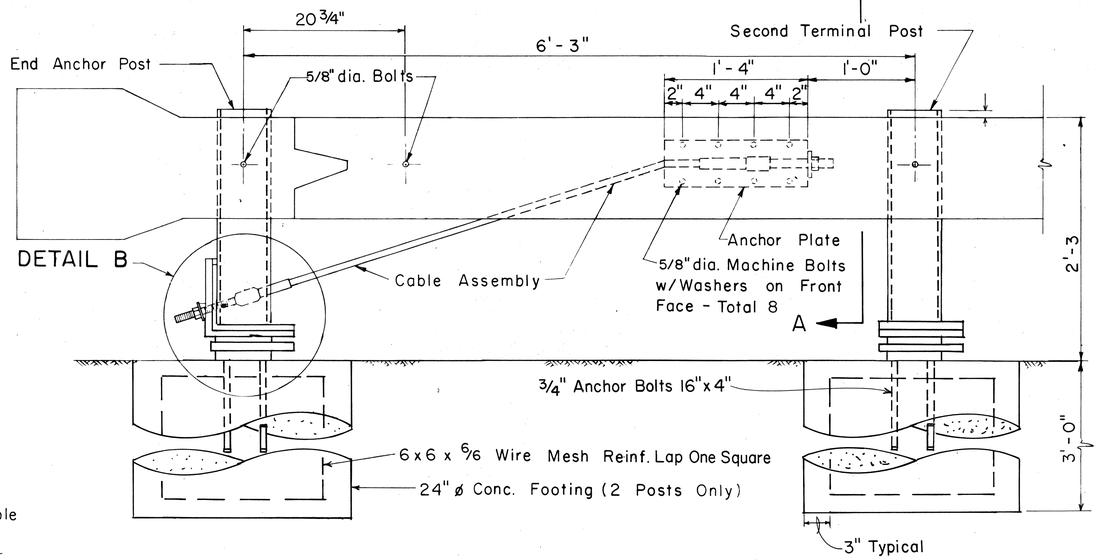
PLAN



ELEVATION

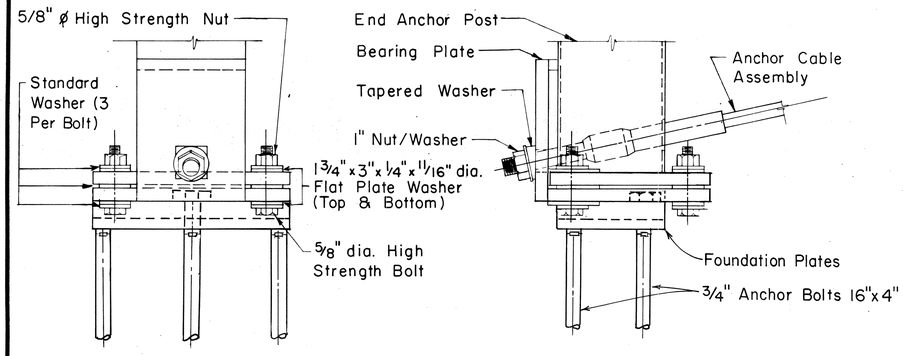


PLAN

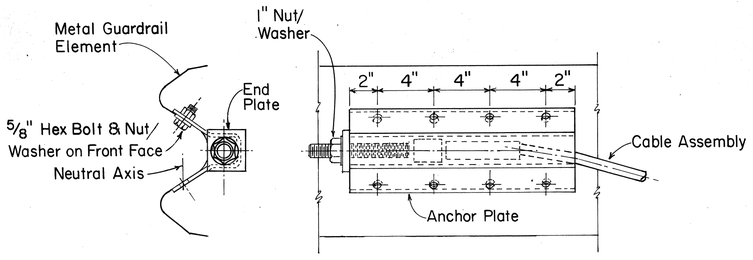


ELEVATION

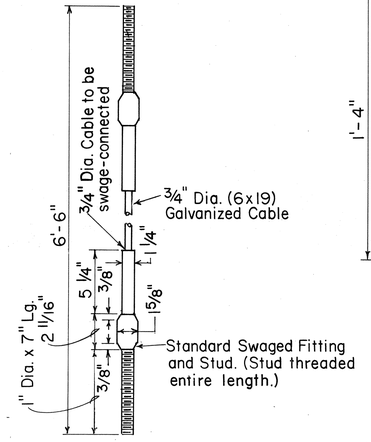
DETAIL A



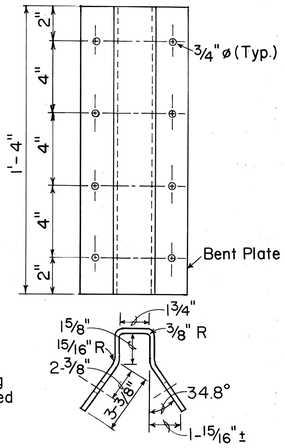
DETAIL B



SECTION A-A



CABLE ASSEMBLY



ANCHOR PLATE

NOTES:

1. For Details of 5/8" Button Head Bolt and Nut, 5/8" Hex Bolt and Nut, and W Beam Terminal Connector, refer to Standard Detail TE-51.
2. Other Anchor Cable Assemblies may be used. Minimum breaking strength of assembly should be 40,000 lbs.
3. Second Terminal Post does not require holes to accomodate Anchor Cable.
4. Slip Base Load shall be controlled with a Calibrated Torque Wrench - Torque 155 - 170 ft. lbs.
5. Concrete shall be Class A.
6. For additional and or revised BCT Details to "A Guide to Standardized Highway Barrier Rail Hardware," a report prepared and approved by the AASHTO-AGC-ARTBA joint cooperation committee. All hardware shall conform to above mentioned publication and as revised from time to time.
7. For additional details refer to Plan Sheet No. 11.

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

DATE	REVISION	APP'D.

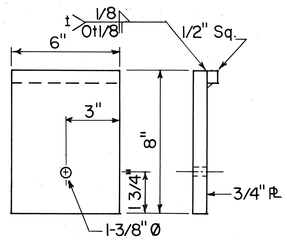
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS

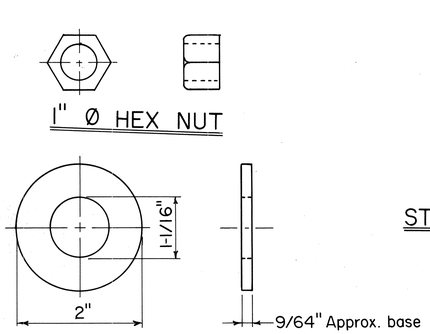
BREAKAWAY CABLE TERMINAL (BCT)

SHEET No. 1 OF 8 SHEETS

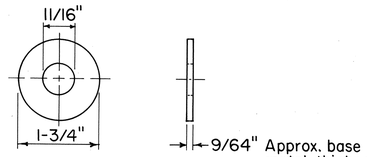
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-86	1986	11	17



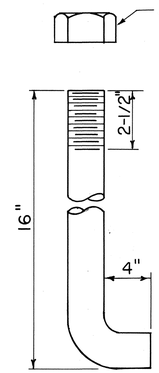
BEARING PLATE



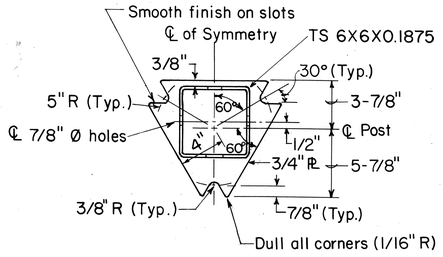
STEEL WASHER

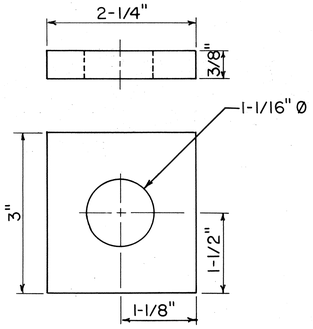


STANDARD STEEL WASHER

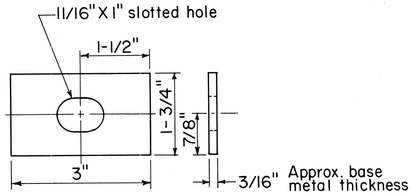


3/4" Ø ANCHOR BOLT X 16" LONG

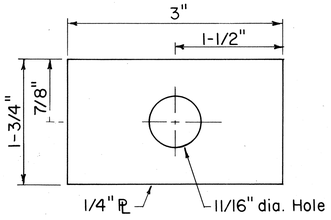




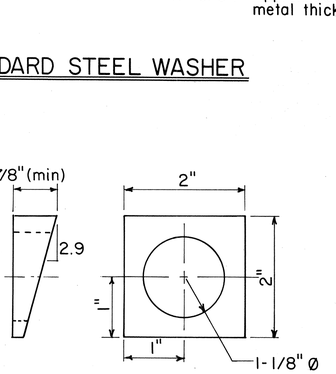
END PLATE



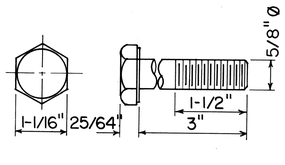
RECTANGULAR PLATE WASHER



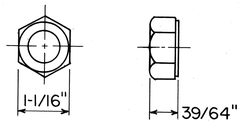
FLAT PLATE WASHER



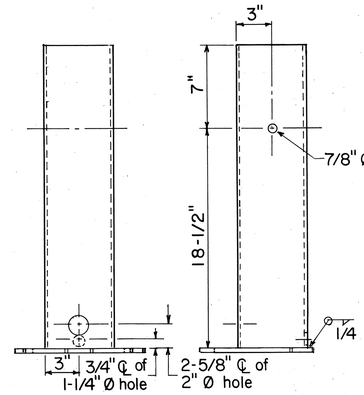
TAPERED WASHER



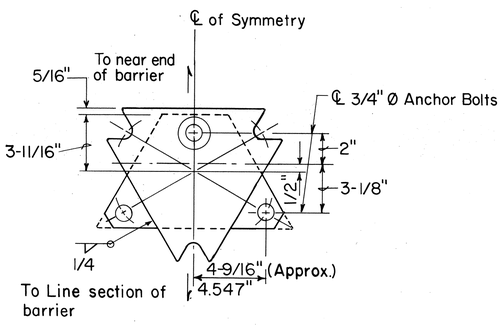
5/8" Ø HS BOLT



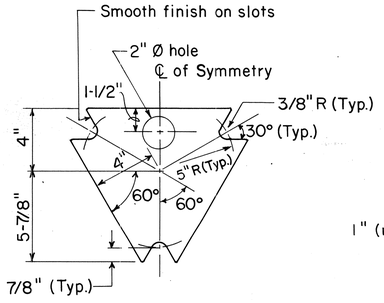
5/8" Ø HS NUT



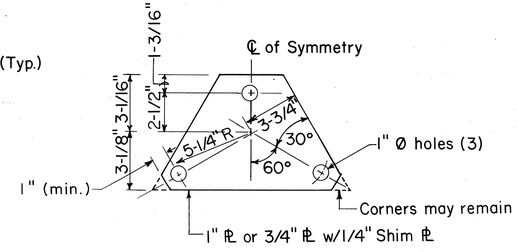
TERMINAL POST



TOP VIEW



TOP PLATE



BOTTOM PLATE

FOUNDATION PLATES

NOTE:

For additional details refer to Plan Sheet No. 10.

DATE	REVISION	APP'D.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

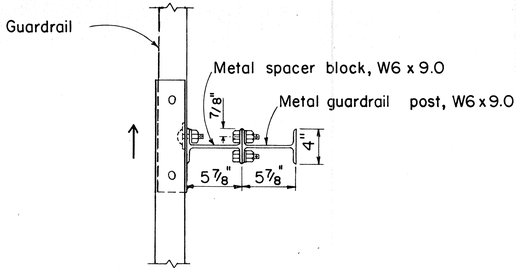
TYPICAL DETAILS

BREAKAWAY CABLE TERMINAL (BCT)

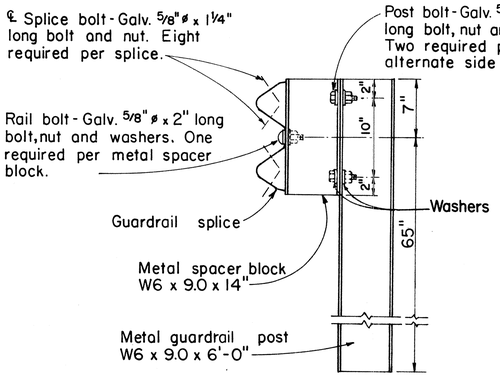
SHEET No. 2 OF 8 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	120-01-86	1986	12	17



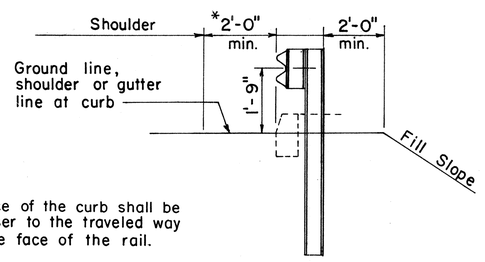
PLAN



ELEVATION

SINGLE METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

SCALE: 1 1/2" = 1'-0"

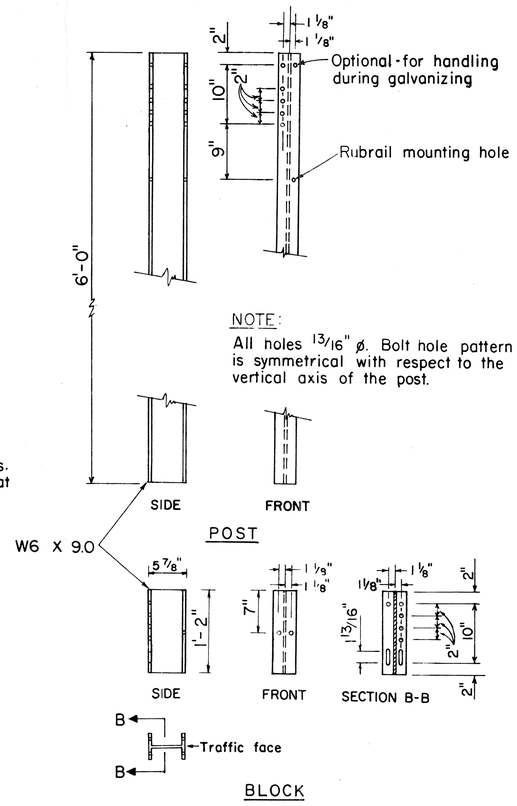


Note:
The face of the curb shall be no closer to the traveled way than the face of the rail.

AT SHOULDER SECTION

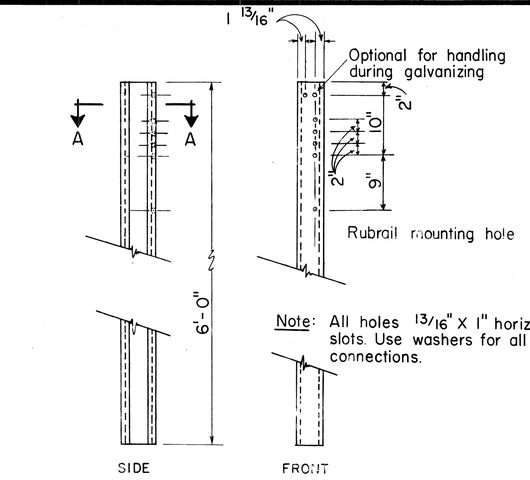
TYPICAL METAL GUARDRAIL DETAIL

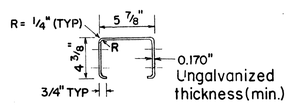
SCALE: 1/2" = 1'-0"



STRUCTURAL SHAPE POST AND BLOCK

SCALE: 1" = 1'-0"

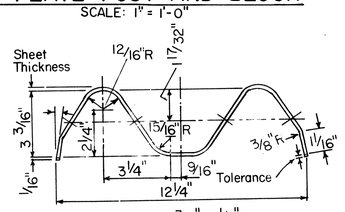


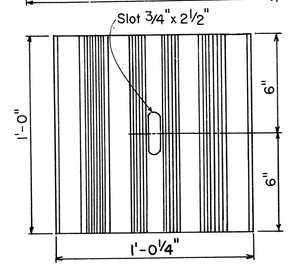


SECTION A-A
N.T.S.

BENT PLATE POST AND BLOCK

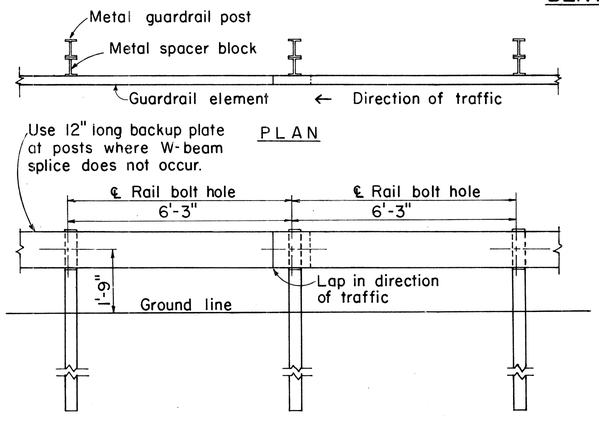
SCALE: 1" = 1'-0"





BACK-UP-PLATE

N.T.S.



ELEVATION

METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. Both of the alternate type posts may be used on any one project however, only one type of post shall be used in any single run of guardrail.
2. All hardware, posts and blocks shall be galvanized. No punching, drilling or cutting will be permitted after galvanizing.
3. Connection details for bent plate post and block shall be similar to the details shown for structural shape post, and block.
4. Where conditions require, special post lengths in increments of 6 inches may be specified.
5. For details of rail elements, bolts and nuts, see sheet DT 501.
6. 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.

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 9/7/82 DATE

APPROVED:
Herbert Matsushi — ASSISTANT CHIEF, ENGINEERING — 9/22/82 DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes sht. DT 500 approved 12/30/69.	H.F.	9/22/82
2	Added General Notes No. 6	[illegible]	9-28-83
3	Added details for adjusting guardrail height and added Back-up Plate and washer	E.T.	9/18/85

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

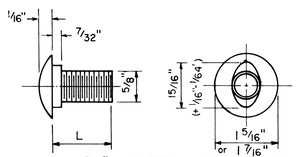
STANDARD DETAILS
METAL GUARDRAIL

Scale: As Shown — July, 1982

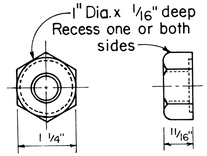
SHEET No. 3 OF 8 SHEETS DT 500

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IDJ-01-86	1986	13	17



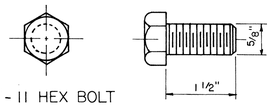
5/8" ø BUTTON HEAD BOLT



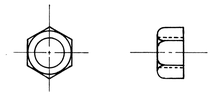
5/8" ø RECESS NUT

L	Thread Length	Intended Use
1 1/4"	Full length thread	Splice rail elements
2"	1 1/2" min. thread len.	Fasten rails to posts

5/8" BUTTON HEAD BOLT AND RECESS NUT
Scale: NTS

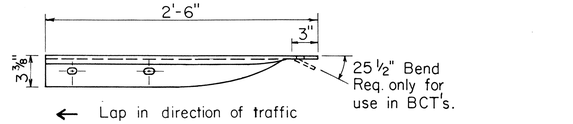


5/8"-11 HEX BOLT

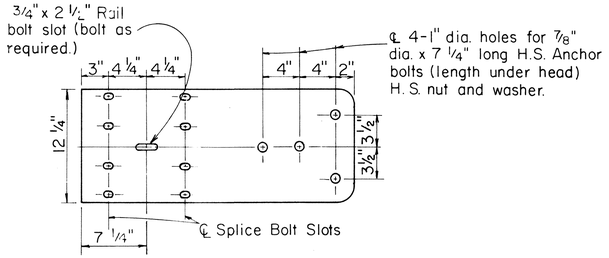


5/8"-11 HEX NUT

5/8" HEX POST BOLT AND NUT
Scale: N.T.S.

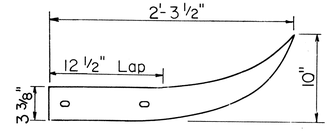


← Lap in direction of traffic

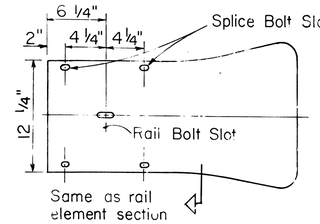


W BEAM TERMINAL CONNECTOR
Scale: 1 1/2" = 1'-0"

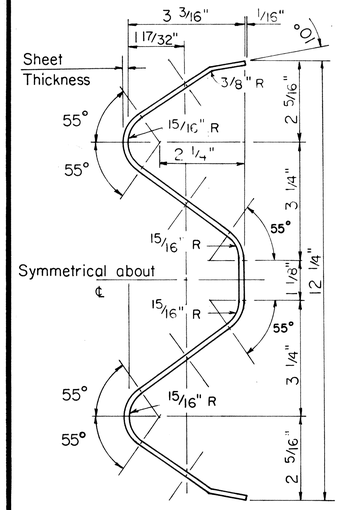
← Lap in direction of traffic



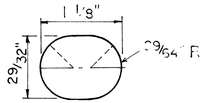
← Lap in direction of traffic



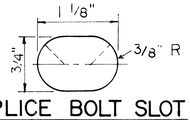
W BEAM END SECTION (FLARED)
Scale: 1 1/2" = 1'-0"



RAIL ELEMENT SECTION
Scale: 6" = 1'-0"

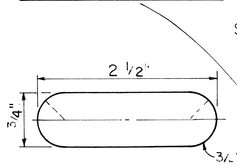


SPLICE BOLT SLOT

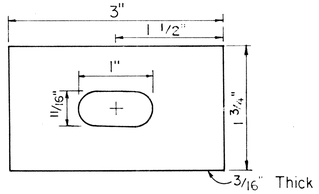


SPLICE BOLT SLOT FOR ALL ENDS

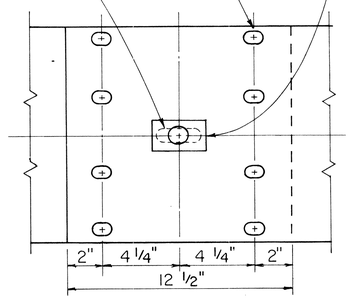
Scale: Full Size



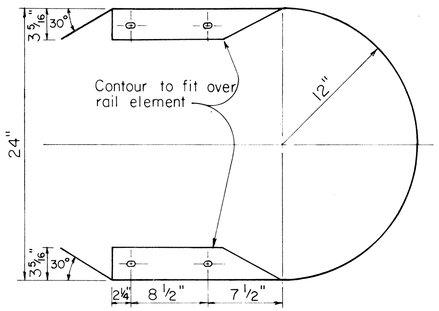
RAIL BOLT SLOT

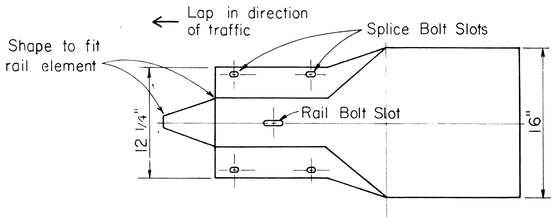


RAIL BOLT WASHER

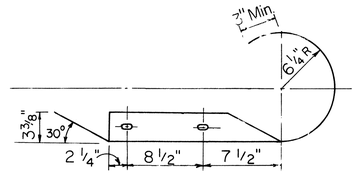


RAIL SPLICE
Scale: 3" = 1'-0"

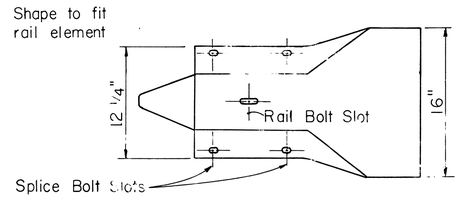




W BEAM END SECTION (BUFFER)
Scale: 1 1/2" = 1'-0"



← Lap in direction of traffic



W BEAM END SECTION (ROUNDED)
Scale: 1 1/2" = 1'-0"

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 9/20/82 DATE

APPROVED:
Edward Sakihara — ASSISTANT CHIEF, ENGINEERING — 9/22/82 DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes sht. DT 501 approved 12/30/69	H.F.	9/22/82

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
METAL GUARDRAIL

Scale: As Noted — July, 1982

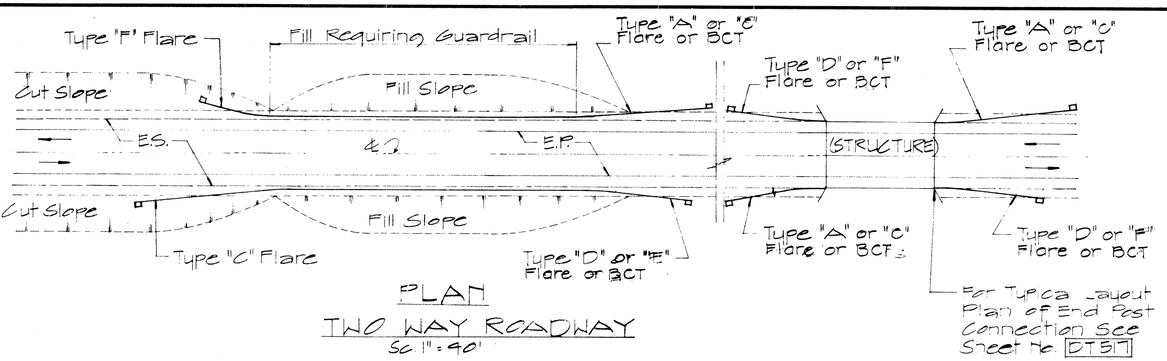
SHEET No. 4 OF 8 SHEETS DT 501

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

NOTE:

1. Metal guard rail connection to structures requires End Post Connection. See structure plans.
2. For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 519

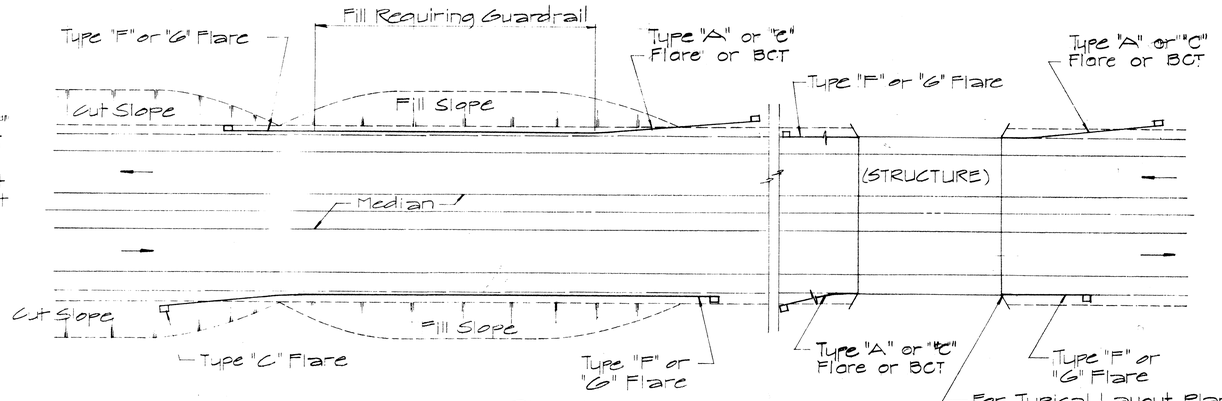
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-86	1986	14	17



PLAN

TWO WAY ROADWAY

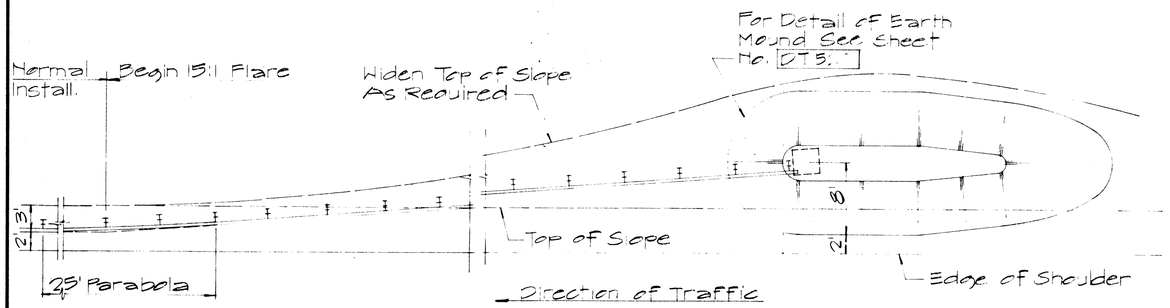
Sc. 1" = 40'



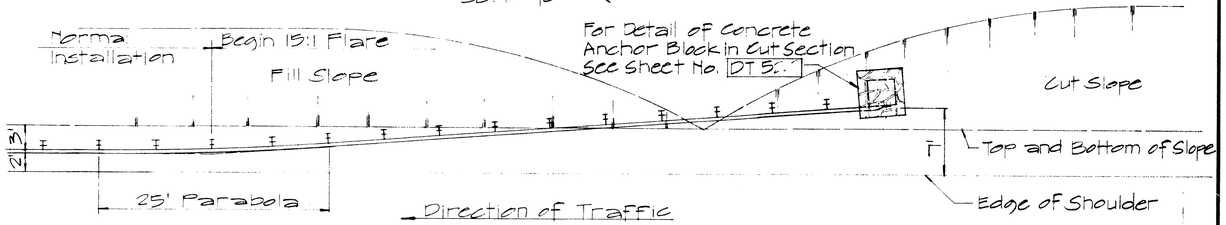
PLAN

ONE WAY ROADWAY (DIVIDED HIGHWAY)

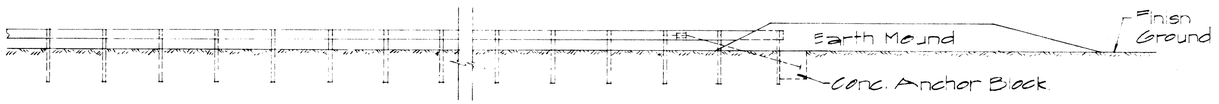
Sc. 1" = 40'



PLAN



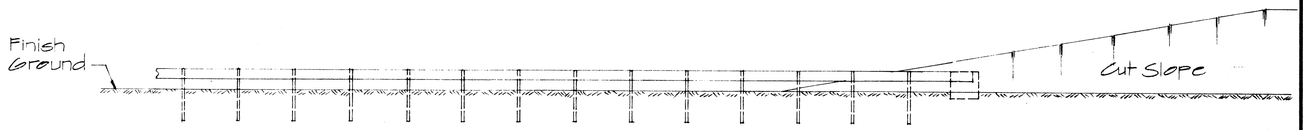
PLAN



ELEVATION

TYPE "A" FLARE

Sc. 1/8" = 1'-0"



ELEVATION

TYPE "C" FLARE

Sc. 1/8" = 1'-0"

APPROVAL RECOMMENDED:

Euichi Tanaka — TRAFFIC ENGINEER — 12/23/69 DATE

APPROVED

Alvin S. Belt — ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

NO.	REVISION	APPROVED BY	DATE
1	Delete Type "B" Flare and Type "E" Flare	H.T.	6/15/78

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

STANDARD DETAILS OF APPROACH END FLARE - ONE & TWO WAY ROADWAY

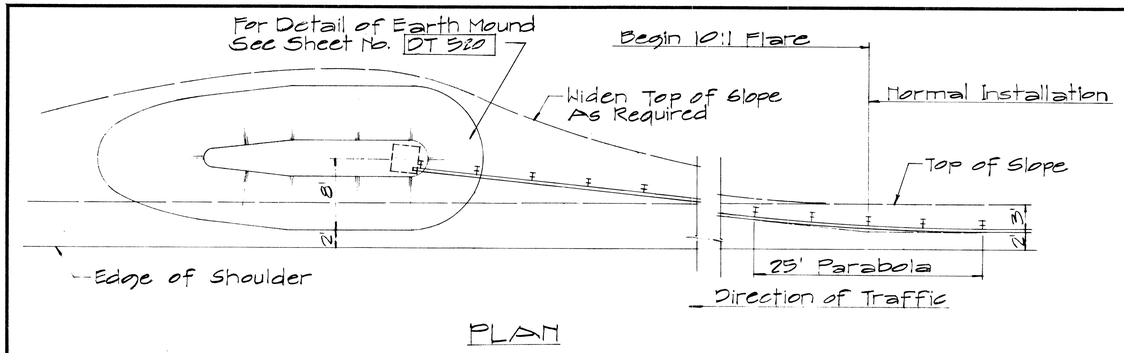
Sc. As Noted — April 1969

SHEET No. 5 OF 8 SHEETS DT 516

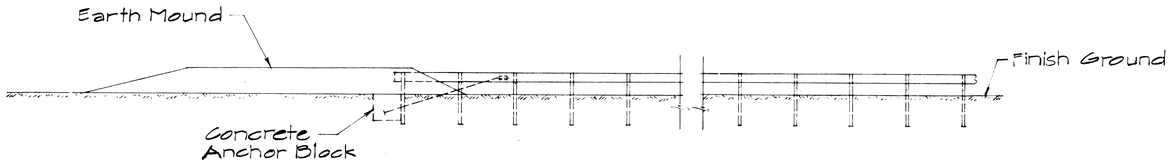
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IOJ-01-86	1986	15	17



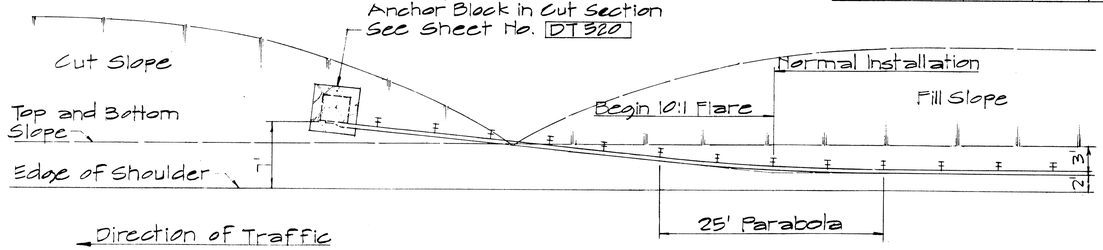
PLAN



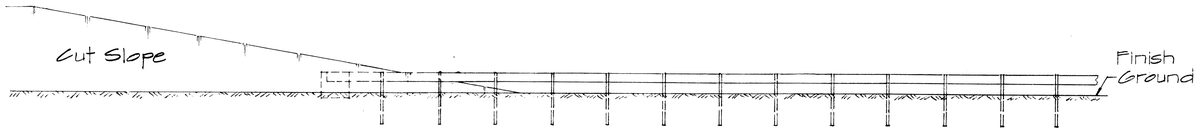
ELEVATION

TYPE "D" FLARE

Sc. 1/8" = 1'-0"



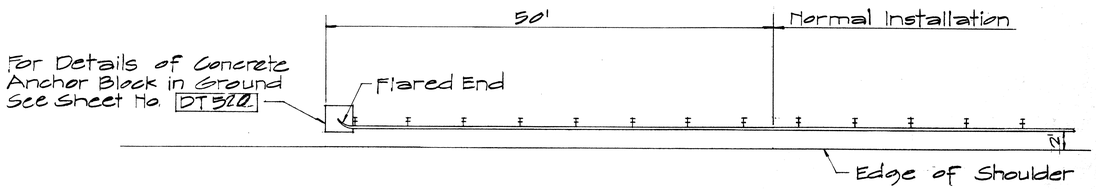
PLAN



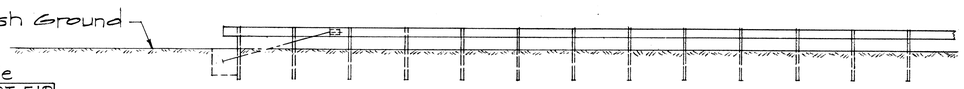
ELEVATION

TYPE "F" FLARE

Sc. 1/8" = 1'-0"



PLAN



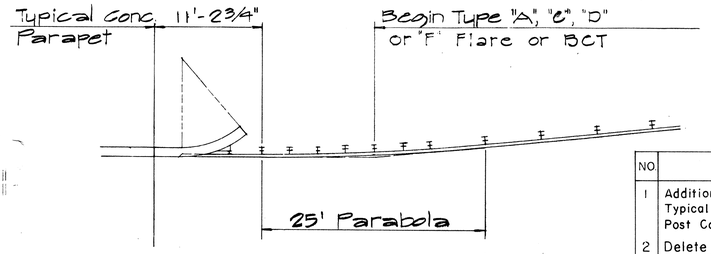
ELEVATION

TYPE "G" FLARE

Sc. 1/8" = 1'-0"

NOTE:

For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 519



TYPICAL LAYOUT PLAN OF END POST CONNECTION

Sc. 1/8" = 1'-0"

APPROVAL RECOMMENDED:

Eiichi Tanaka — TRAFFIC ENGINEER — 12/29/69 DATE

APPROVED:

[signature] — ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

NO.	REVISION	APPROVED BY	DATE
1	Additional Posts Added to Typical Layout Plan Of End Post Connection	H.C.	4-12-72
2	Delete Type "B" Flare and Type "E" Flare	H.C.	6-15-78

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS TRAILING END FLARE - ONE & TWO WAY ROADWAY

Scale: As Noted — April 1969

SHEET No. 6 OF 8 SHEETS | DT 517

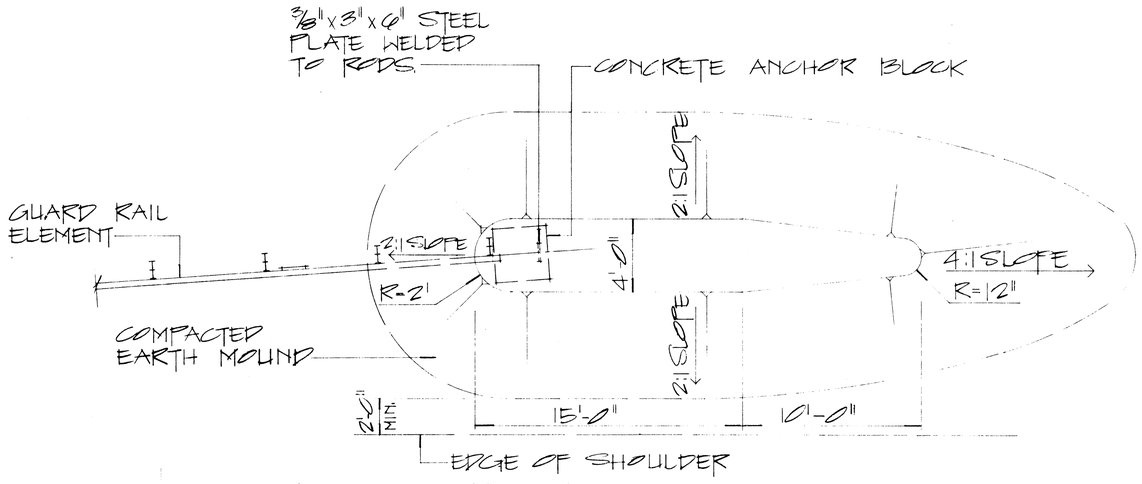
ORIGINAL PLAN

NOTE BOOK No.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

PRINTED ON NO. 1000H CLEARPRINT

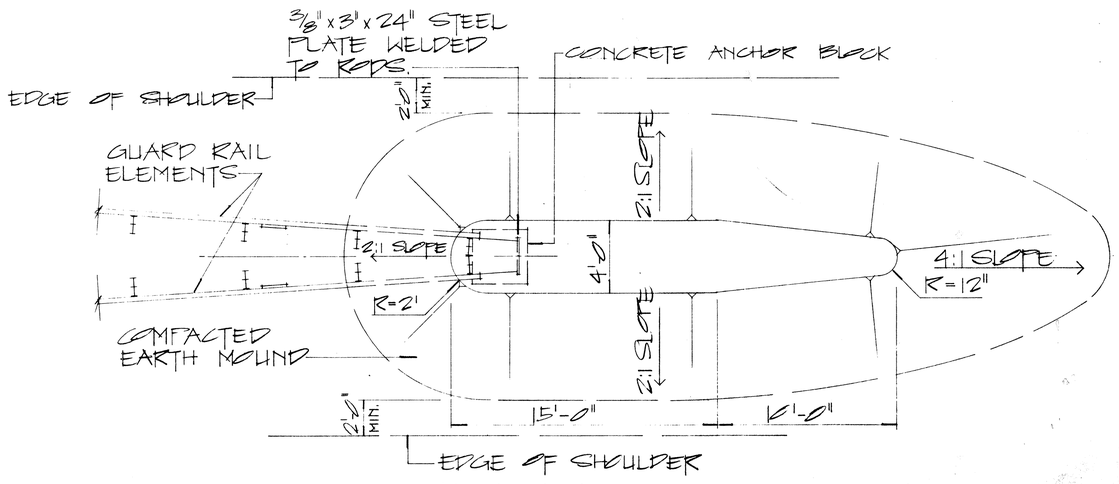
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-86	1986	16	17



PLAN

EARTH MOUND DETAIL (SINGLE GUARD RAIL)

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

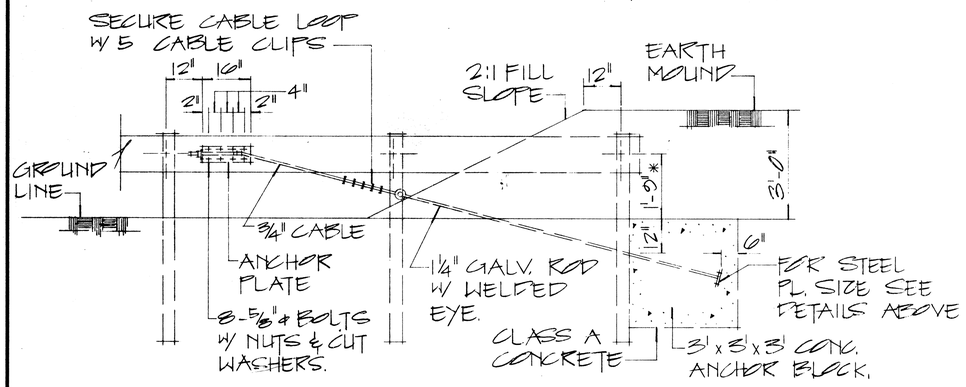


PLAN

EARTH MOUND DETAIL (DOUBLE GUARD RAIL)

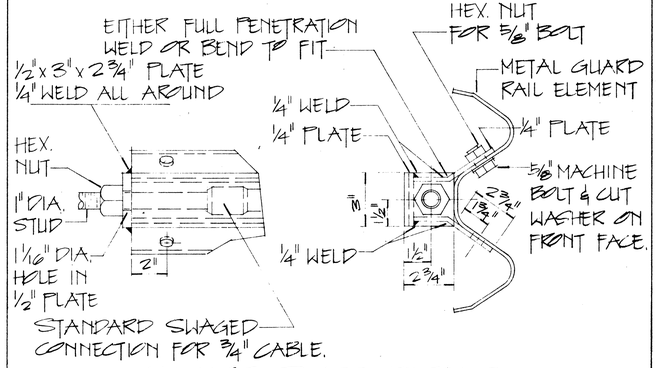
SCALE: 1/4" = 1'-0"

*NOTE: 2'-0" WHEN INSTALLED WITH RUB RAIL.



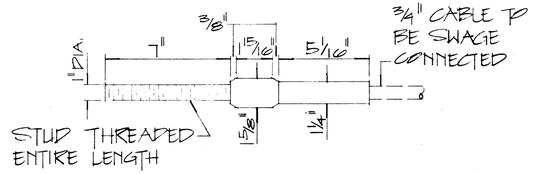
ANCHOR BLOCK DETAIL IN EARTH MOUND

SCALE: 1/2" = 1'-0"



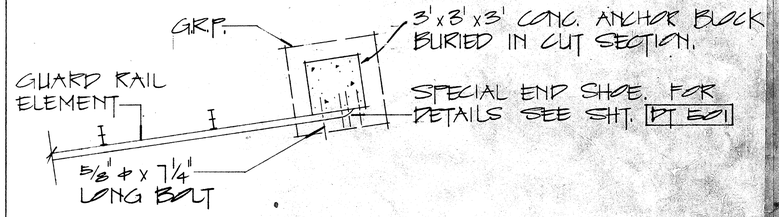
ANCHOR PLATE DETAILS

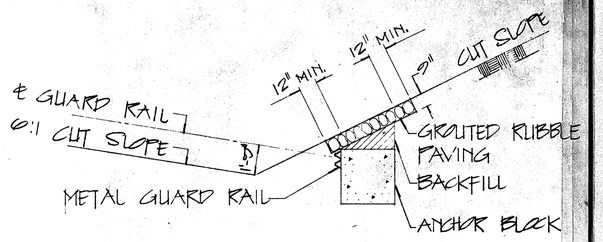
SCALE: 1" = 3"



STANDARD SWAGED FITTING AND STUD

SCALE: 1" = 3"





ANCHOR BLOCK IN CUT SECTION

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

NOTE:

1. GALVANIZED ANCHOR ROD, METAL GUARD RAIL AND POST BURIED IN GROUND SHALL BE COVERED WITH a Min. 20-Mil thickness of Coal TAR ENAMEL. Conforming to AWWA Standard: C 203
2. CONCRETE, GRP., EXCAVATION, EARTH MOUND, ANCHOR RODS AND MISCELLANEOUS APPURTENANCES NECESSARY TO ANCHOR THE GUARD RAIL ENDS SHALL BE INCIDENTAL TO THE METAL GUARD RAIL.

APPROVAL RECOMMENDED:

Eneki Tanaka — 12/23/69
TRAFFIC ENGINEER — DATE

APPROVED:

[signature] — 12-30-69
ASSISTANT CHIEF, ENGINEERING — DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
EARTH MOUND AND ANCHOR BLOCK DETAILS

SCALE: AS SHOWN — OCT 1969

SHEET No. 7 OF 8 SHEETS PT 520

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

K&E CRYSTALENE® LA 2920 TRACING PAPER

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-86	1986	17	17

CW20-1a 48"x48"

CW20-2d 48"x48"

CW20-3b 48"x48"

CW20-4d 48"x48"

CW20-5d(L) 48"x48"

CW20-7c 36"x36"
24"x18"
CW20-7c-A 48"x48"
24"x18"

CW21-1 30"x30"

CW21-2 30"x30"

CW21-3 36"x36"

CW21-4 36"x36"

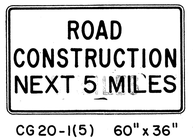
CW21-5 30"x30"

CW21-6 30"x30"

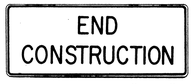
CW22-1b 48"x48"

CW22-2 42"x36"

CW22-3 42"x36"



CG20-1(5) 60"x36"



CG20-2 60"x24"

CM4-9(R) 30"x24"

CM4-10(R) 48"x18"

CG20-4 36"x18"

CW23-1 36"x36"

CW23-2b 48"x48"

CW23-3(R) 48"x48"

GENERAL NOTES

1. Sign details shall conform to the latest editions of FHWA publications "Manual on Uniform Traffic Control Devices for Streets and Highways," "Standard Alphabets for Highway Signs," and "Standard Highway Signs," and as amended.
2. All construction signs shall be reflectorized.
3. All construction signs shall have $^{3}/_{8}$" bolt holes drilled at appropriate locations.
4. Numerals in ( ) indicates numerals to be inserted for sign message. (R) or (L) indicates right or left.
5. For "CW" series signs, suffixes a,b,c and d are as follows: a-1500 FT, b-1000 FT, c-500 FT and d-AHEAD.

APPROVAL RECOMMENDED:
Eiichi Tanaka 3/21/72
TRAFFIC ENGINEER DATE

APPROVED:
Walter Raleigh 3/23/72
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes Sht. DT 104 Approved 12-30-69	H.T.	3/23/72
2	Revised General Note 1	H.T.	10/16/74
3	Revised General Note 2	MH	9-16-75
4	Revised General Note 2 and sign CG20-1(5)	H.T.	9-14-76
5	Revised General Note 1 and sign CW20-7c	E.T.	9/18/85

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONSTRUCTION SIGNS

NOT TO SCALE

SHEET No. 8 OF 8 SHEETS DT 104

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