GUARDRAIL SCHEDULE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	16	G2

LIMITS ~ ℄ STA. TO ℄ STA.	DESCRIPTION OF GUARDRAIL WORK	Reference Plan Sheet No. For Details	APPROXIMATE QUANTITIES																			
			Remove Exist. Metal Guardrail	Reinstall Metal Guardrail Element, Rubrail & Spacer Blocks	Furnish & Install Steel Post & Spacer Block	Terminal Section Type "G" Flare	Reset Exist. Metal Guardrail Post	Remove & Reinstall Exist. Metal Guardrail	Type 6 Bituminous Curb	Concrete Barrier Transition	Type 50C Concrete Barrier	Type 50 Concrete Barrier	Renovate Pier Barrier	Transition Section ~ Pearl City Viaduct Concrete Barrier	Median Concrete Barrier Glare Screen on Pearl City Viaduct	Concrete Glare Screen on Exist. Median Barrier	Transition Section-Perm. Port. Conc. Barrier to Exist. Conc. Barrier	Permanent Portable Concrete Barrier-Type 50 P1	Permanent Portable Concrete Barrier-Type 50 P2	Remove Exist. Concrete Median Barrier	Furnish & Install Rubrail Element	Terminal Section Type "C" Flare
			L.F.	L.F.	Ea.	Ea.	Ea.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	L.F.	L.F.	L.F.	L.F.	Ea.
I.B. 514+00± – I.B. 518+87±	Remove Exist. Type 3-Single Metal Guardrail w/Metal Posts & Rubrail		487																			
O.B. 515+50± – O.B. 519+50± (I.B. 518+87±)	Reinstall Metal Guardrail Element, Rubrail & Spacer Blocks on I.B. Side of Exist. O.B. Median Guardrail	19		400	4																	
I.B. 518+87± – I.B. 519+20±	Construct Concrete Barrier Transition	19								33												
I.B. 518+87± – 527+81±	Remove Exist. Type 3-Double Face Metal Guardrail w/Metal Posts & Rubrail		894																			
I.B. 519+20± – I.B. 520+37±	Install Type 50C Concrete Barrier including Modification Over Drop Inlet	20									117											
I.B. 520+37± – 527+81±	Install Type 50 Concrete Barrier	20										744										
527+81± – 528+93±	Renovate Pier Barriers & Install Concrete Glare Screen (Struct. No. 1)	21											74 (74)			16 (16)						
528+93± – 532+00±	Remove Exist. Type 3-Double Face Metal Guardrail w/Metal Posts & Rubrail Install Type 50 Concrete Barrier	20	397									397 (397)										
532+00± – 533+04± (3+70±)	Replace Transition Barrier at Pearl City Viaduct	21												14 (14)								
532+08± Rt. – 533+22± Rt.	Stiffen 25' Exist. Guardrail Connection to the Approach End at Concrete Bridge. Install Rubrail	2(Note 7)			4 (4)																25	
3+70± – 63+00±	Install Median Concrete Barrier Glare Screen on Pearl City Viaduct	20													5,020 (5,020)							
63+00± – 94+67±	Install Concrete Glare Screen on Exist. Median Barrier	20														3,167 (3,167)						
94+67± – 95+63±	Renovate Pier Barrier & Install Concrete Glare Screen (Kaahumanu St. Separation)	21											30 (30)			51 (51)						
95+63± – 102+41±	Install Concrete Glare Screen on Exist. Median Barrier	20														678 (678)						
102+41± – 102+44±	Construct Transition to Exist. Concrete Median Barrier	22															1 (1)					
102+44± – 110+84±	Remove Exist. Concrete Median Barrier. Install Permanent Portable Concrete Barrier	22																840		840		
H-2 Inbound 482+60± – 483+10 ± Lt.	Remove Exist. Type-3 Single Metal Guardrail w/Metal Posts & Rubrail. Install Type "C" Flare Terminal Section w/Rubrail.	CO 26 S-1	50																–		50	1
H-1 Inbound 507+69± – 508+13 ± Rt.	Remove Exist. Type 3-Single Metal Guardrail w/Metal Posts & Rubrail. Install Type "C" Flare Terminal Section w/Rubrail.	CO 26 S-1	50																		50	1
Sub-total 1			1,878	400	8	–	–	–	–	33	117	1141	104	14	5,020	3,012	1	840	–	840	125	2

DATE	REVISION
9/3/86	Added work, item, and quantities; Totals revised.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL SCHEDULE

INTERSTATE ROUTE H-1
ADDITIONAL LANES
F.A.I. Proj. No. IR-HI-1(193)

Date: Aug, 1985

SHEET No. 18 OF 14 SHEETS

C.O. 16

GUARDRAIL SCHEDULE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	17	62

LIMITS ~ ℄ STA. TO ℄ STA.	DESCRIPTION OF GUARDRAIL WORK	Reference Plan Sheet No. For Details	APPROXIMATE QUANTITIES																		
			Remove Exist. Metal Guardrail	Reinstall Metal Guardrail & Element, Rubrail & Spacer Blocks	Furnish & Install Steel Post & Spacer Block	Terminal Section Type "G" Flare	Reset Exist. Metal Guardrail Post	Remove & Reinstall Exist. Metal Guardrail	Type 6 Bituminous Curb	Concrete Barrier Transition	Type 50C Concrete Barrier	Type 50 Concrete Barrier	Renovate Pier Barrier	Transition Section ~ Pearl City Viaduct Concrete Barrier	Median Concrete Barrier Screen on Pearl City Viaduct	Concrete Glare Screen on Exist. Median Barrier	Transition Section-Perm. Port. Conc. Barrier to Exist. Conc. Barrier	Permanent Portable Concrete Barrier-Type 50 P1	Permanent Portable Concrete Barrier-Type 50 P2	Remove Exist. Concrete Median Barrier	Furnish & Install Rubrail Element
			L.F.	L.F.	Ea.	Ea.	Ea.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	L.F.	L.F.	L.F.	L.F.
110+84± - 110+87±	Construct Transition to Exist. Concrete Median Guardrail	22															1				
102+00±Rt. - 110+50±Rt.	Remove & Reinstall Exist. Metal Guardrail w/Bituminous Curb	7						850	850												
102+00±Lt. - 110+50±Lt.	Reset Exist. Metal Guardrail Posts	24					142														
110+50±Rt. - 110+75±Rt.	Stiffen 25' Exist. Guardrail Connection to the Approach End at Concrete Bridge. Install Rubrail	2(Note 7)			4																25
110+87± - 138+54±	Install Concrete Glare Screen on Exist. Median Barrier	20														2,767					
123+80±Lt. - 124+05±Lt.	Stiffen 25' Exist. Guardrail Connection to the Approach End at Concrete Bridge. Install Rubrail	2(Note 7)			4																25
138+54± - 139+77±	Install Concrete Glare Screen on Exist. Median Barrier (Kaonohi Street Separation)	21														109					
139+77± - 144+81±	Install Concrete Glare Screen on Exist. Median Barrier	20														504					
144+81± - 144+84±	Construct Transition to Exist. Concrete Median Barrier	22															1				
144+84± - 149+64±	Remove Exist. Concrete Median Barrier. Install Permanent Portable Concrete Barrier	22																480		480	
145+00±Rt. - 149+20±Rt.	Remove & Reinstall Exist. Metal Guardrail w/Bituminous Curb	7						420	420												
145+00±Lt. - 149+20±Lt.	Reset Exist. Metal Guardrail Posts	24					70														
149+64± - 149+67±	Construct Transition to Exist. Concrete Median Barrier	22															1				
149+67± - 162+67±	Install Concrete Glare Screen on Exist. Median Barrier	20														1,300					
162+67± - 162+70±	Construct Transition to Exist. Concrete Median Barrier	22															1				
162+70± - 168+70±	Remove Exist. Concrete Median Barrier. Install Permanent Portable Concrete Barrier	22																	600	600	
Sub-total 2			-	-	8	-	212	1,270	1,270	-	-	-	-	-	-	4,680	4	480	600	1,080	50

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL SCHEDULE

INTERSTATE ROUTE H-1
ADDITIONAL LANES
F.A.I. Proj. No. IR-HI-1(193)
Date: Aug., 1985

SHEET No. 28 OF 14 SHEETS

GUARDRAIL SCHEDULE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	18	62

LIMITS – ℄ STA. TO ℄ STA.	DESCRIPTION OF GUARDRAIL WORK	Reference Plan Sheet No. For Details	APPROXIMATE QUANTITIES																				
			Remove Exist. Metal Guardrail	Reinstall Metal Guardrail Element, Rubrail & Spacer Blocks	Furnish & Install Steel Post & Spacer Block	Terminal Section Type "G" Flare	Reset Exist. Metal Guardrail Post	Remove & Reinstall Exist. Metal Guardrail	Type G Bituminous Curb	Concrete Barrier Transition	Type 50C Concrete Barrier	Type 50 Concrete Barrier	Renovate Pier Barrier	Transition Section – Pearl City Viaduct Concrete Barrier	Median Concrete Barrier Glare Screen on Pearl City Viaduct	Concrete Glare Screen on Exist. Median Barrier	Transition Section-Perm. Port. Concrete Barrier to Exist. Concrete Barrier	Permanent Portable Concrete Barrier-Type 50 P1	Permanent Portable Concrete Barrier-Type 50 P2	Remove Exist. Concrete Median Barrier	Furnish & Install Rubrail Element	Terminal Section Type "C" Flare
			L.F.	L.F.	Ea.	Ea.	Ea.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	L.F.	L.F.	L.F.	L.F.	Ea.
163+50± Rt. – 168+70± Rt.	Remove & Reinstall Exist. Metal Guardrail w/Bituminous Curb	7						520	520													
162+60± Lt. – 163+10± Lt.	Remove Exist. Type 3-Single Metal Guardrail w/Metal Posts. Install Type "G" Flare Terminal Section	27	50			1																
163+10± Lt. – 168+70± Lt.	Reset Exist. Metal Guardrail Posts	24					94															
168+70± – 168+73±	Construct Transition to Exist. Concrete Median Barrier	22															1	1				
168+73± – 172+14±	Install Concrete Glare Screen on Exist. Median Barrier	20														341						
172+14± – 173+20±	Install Concrete Glare Screen on Exist. Median Barrier (Kaamilo Street Separation)	21														97						
173+20± – 180+25±	Install Concrete Glare Screen on Exist. Median Barrier	20														705						
180+25± – 180+82±	Renovate Pier Barriers & Install Concrete Glare Screen (Mahiko Street Pedestrian Overpass)	21											50			3						
180+82± – 191+71±	Install Concrete Glare Screen on Exist. Median Barrier	20														1,080						
181+00± Rt. – 180+00± Rt.	Reset Exist. Metal Guardrail Posts	24					134															
191+71± – 192+00±	Renovate Pier Barrier (Aiea Heights Drive Separation)	21											29									
Sub-total 3			50	–	–	1	228	520	520	–	–	–	79	–	–	2,235	1	–	–	–	–	–
Sub-total 2			–	–	8	–	212	1,270	1,270	–	–	–	–	–	–	4,680	4	480	600	1,080	50	–
Sub-total 1			1,878	400	8	–	–	–	–	33	117	1,141	104	14	5,920	3,912	1	840	–	840	125	2
TOTAL			1,928	400	16	1	440	1,790	1,790	33	117	1,141	183	14	5,920	10,827	6	1,320	600	1,920	175	2

DATE	REVISION
9/3/86	Added item; Totals revised.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL SCHEDULE

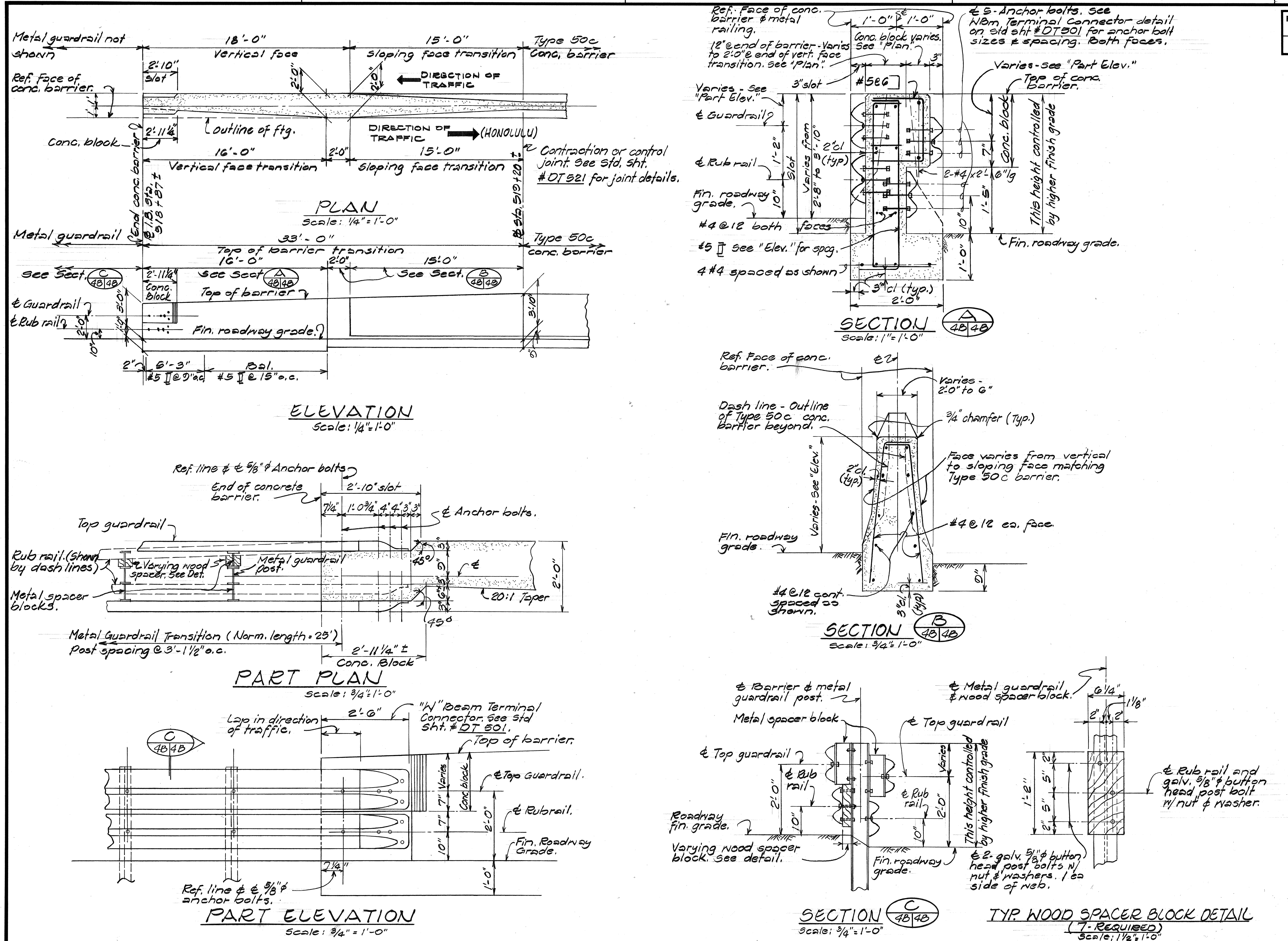
INTERSTATE ROUTE H-1
ADDITIONAL LANES
F.A.I. Proj. No. IR-HI-1(193)
Date: Aug., 1985

SHEET No. 38 OF 14 SHEETS

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

C.O. 18

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-H1-1(193)	1986	19	62



METAL GUARDRAIL TO CONCRETE BARRIER TRANSITION CONNECTION DETAILS

ORIGINAL PLAN	SURVEY PLOTTED BY
	DRAWN BY E.L.Y.
NOTE BOOK	TRACED BY
	DESIGNED BY T.S.
	QUANTITIES BY
No.	CHECKED BY L.A. B.T.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

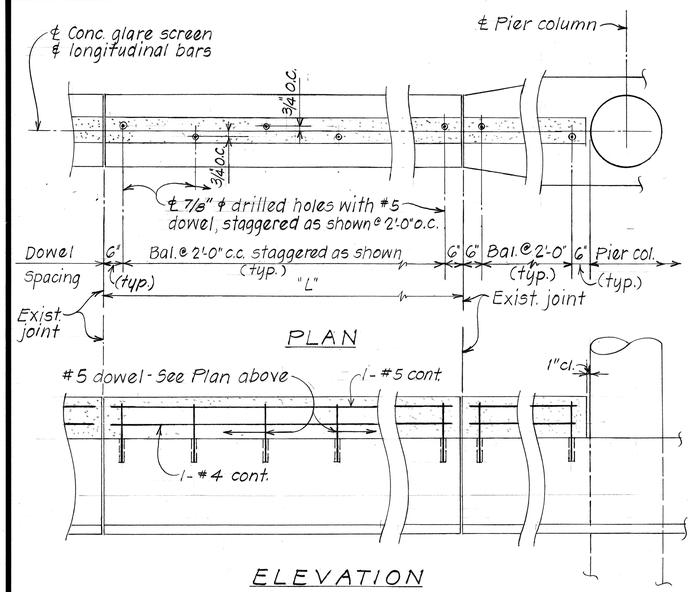
METAL GUARDRAIL TO BARRIER TRANSITION DETAILS

INTERSTATE ROUTE H-1, ADDITIONAL LANES
WAIAWA I.C. TO HALAWA I.C.
F.A.I.P. NO. IR-H1-1(193)

Scale: As Shown Date: Sept. 1985

SHEET No. 48 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(103)	1986	20	62

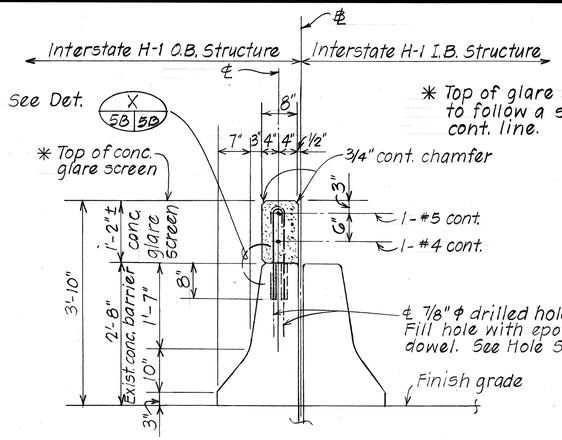


ELEVATION

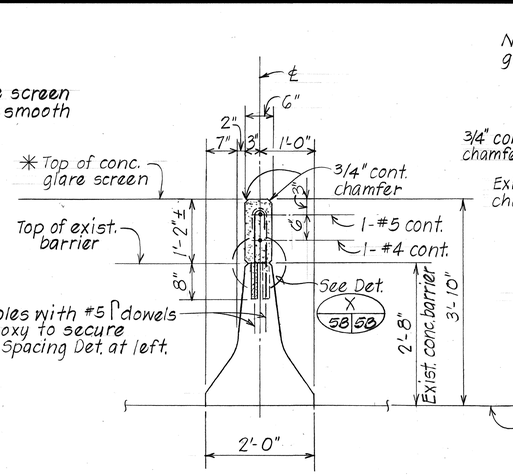
PLAN

HOLE SPACING DETAILS FOR CONCRETE GLARE SCREEN ON EXIST. CONCRETE BARRIER

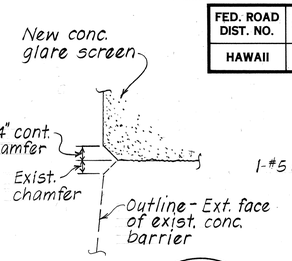
Not to scale



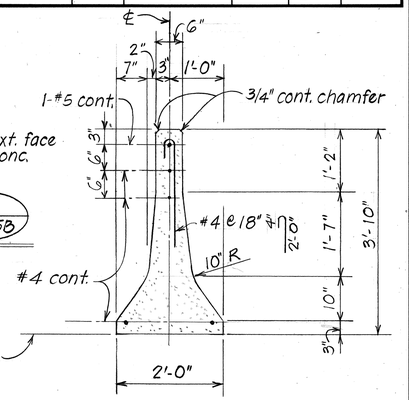
ON PEARL CITY VIADUCT
(℄ STA. 3 + 79± TO ℄ STA. 63 + 00)



TYPICAL SECTION



DETAIL X 58 58
Scale : 3" = 1'-0"

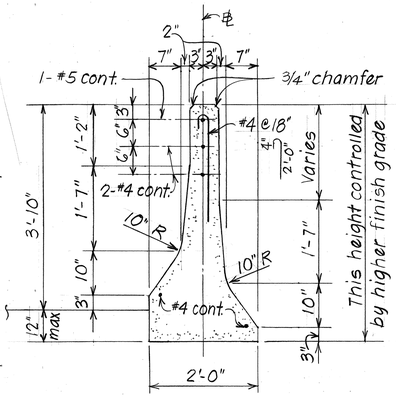


TYPE 50
Scale : 3/4" = 1'-0"

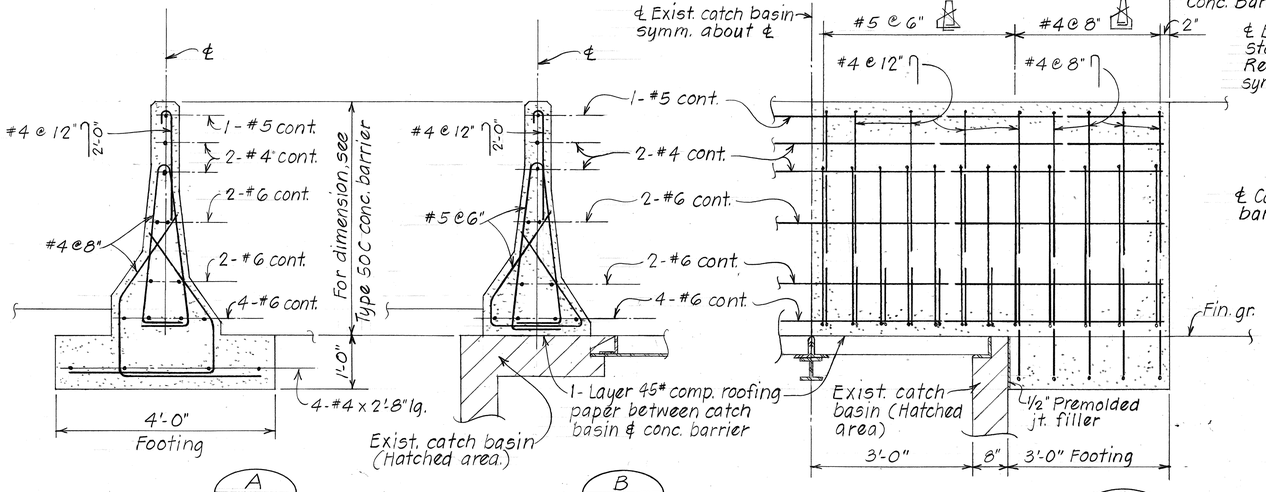
CONCRETE GLARE SCREEN ON EXISTING MEDIAN BARRIER

Scale : 3/4" = 1'-0"

NOTE:
1. The Contractor shall be responsible for the location of existing reinforcement by whatever means, including the use of scanning devices in his drilling operations.
2. Joints on glare screen to match existing barrier joints.
3. For additional details & information for concrete barrier Type 50 & 50c, see Standard Details Sht. #29.



TYPE 50C
Scale : 3/4" = 1'-0"



CONCRETE MEDIAN BARRIER AT CATCH BASIN

(I.B. ℄ STA. 519 + 34 ±)

Scale : 3/4" = 1'-0"

DATE	REVISION
1/27/86	Revised diameter of drilled hole from 1 1/4" to 7/8" on plan view of detail titled "HOLE SPACING DETAILS FOR CONCRETE GLARE SCREEN ON EXIST. CONCRETE BARRIER" per Addendum No. 1.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY L.M.A.	8/85
NOTE BOOK	TRACED BY T.S.	8/85
No.	DESIGNED BY	
	QUANTITIES BY	8/85
	CHECKED BY L.A., G.T.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE 50 & 50c CONC. BARRIER & CONC. GLARE SCREEN DETAIL

INTERSTATE ROUTE H-1, ADDITIONAL LANES
WAIAWA I.C. TO HALAWA I.C.

F.A.I.P. NO. IR-HI-1(103)

Scale: As Shown Date: Sept. 1985

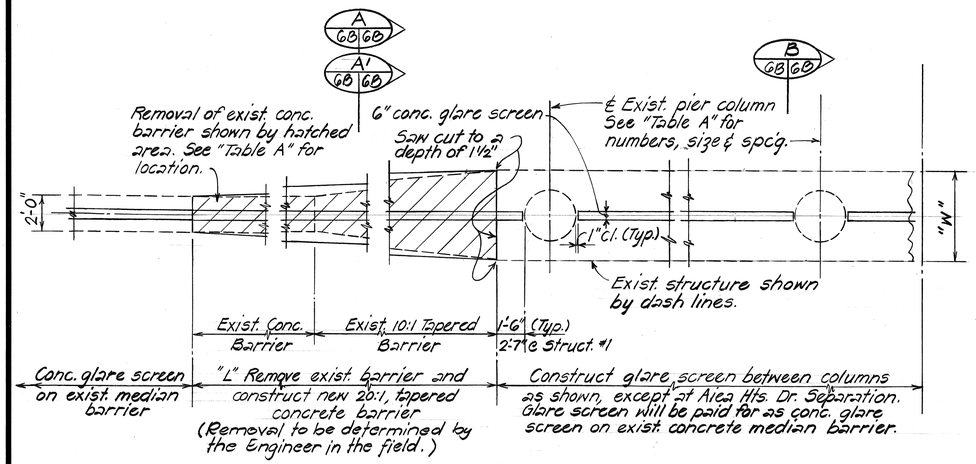
SHEET No. 58 OF 14 SHEETS

20R

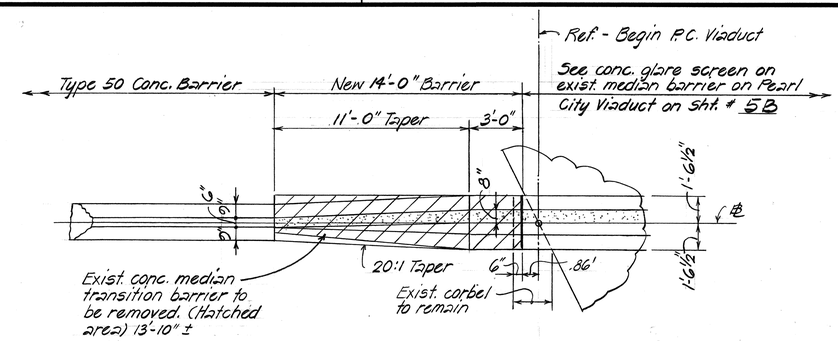
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	21	62

TABLE "A"

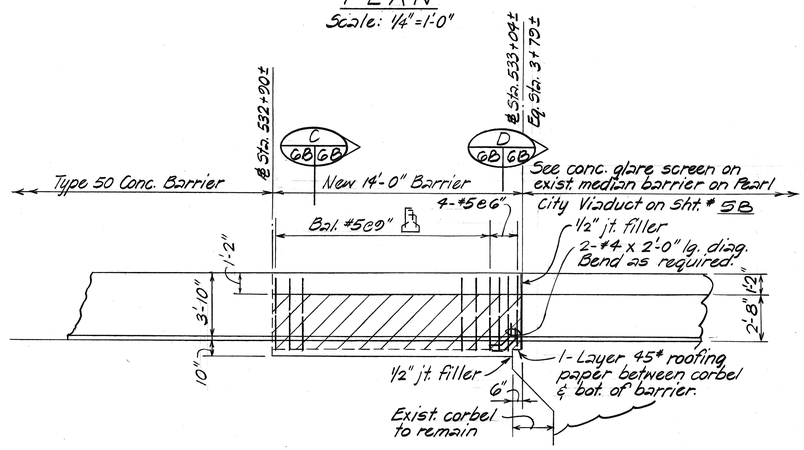
LOCATION	"W"	NO. OF COLS., SIZE & SPACING	"L"	BARRIER REMOVAL LOCATION (AS DIRECTED BY THE ENGINEER)
Structure № 1	5'-8"	3 - 4'-0" ϕ Cols. @ 14'-8" o.c.	36'-8"	Waiawa End & Hon. End
Kaahumanu St. Separation	5'-0"	4 - 3'-0" ϕ Cols. 21'-0" 15'-6" 23'-9"	30'-0"	Waiawa End Only
Kaonohi St. Separation	5'-6"	4 - 3'-6" ϕ Cols. @ 18'-10" o.c.		Barrier to Remain
Kaamilo St. Separation	5'-0"	3 - 3'-0" ϕ Cols. @ 20'-3" o.c.		Barrier to Remain
Mahiko St. Ped. Overpass	4'-6"	1 - 2'-6" x 7'-8" Col.	25'-0"	Waiawa End & Hon. End
Aiea Heights Dr. Separation	4'-10"	No Glare Screens between Cols.	28'-9"	Waiawa End Only



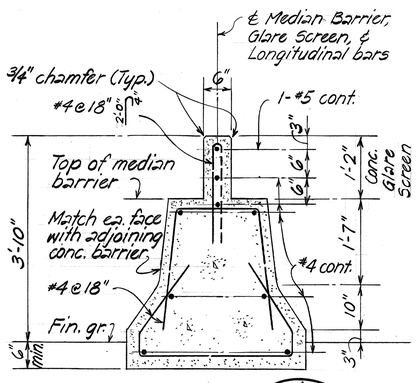
PLAN



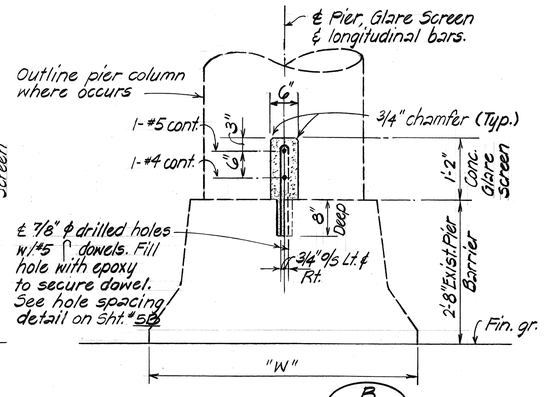
PLAN
Scale: 1/4"=1'-0"



ELEVATION
Scale: 1/4"=1'-0"



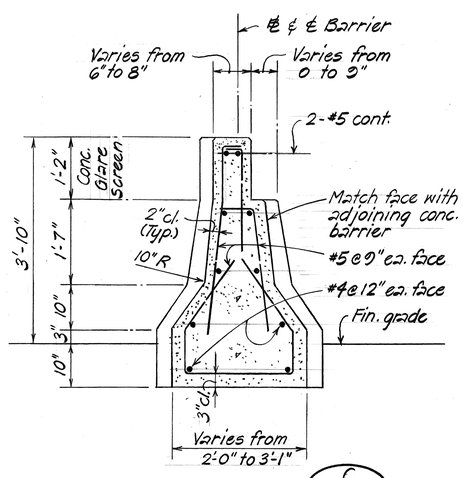
SECTION A GB GB (AT NEW)
Scale: 3/4" = 1'-0"



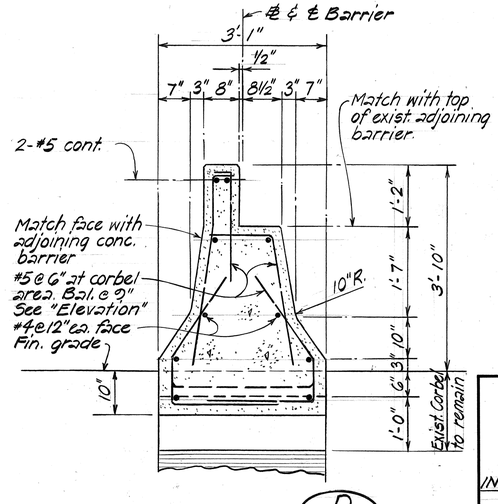
SECTION B GB GB
Scale: 3/4" = 1'-0"

SECTION A1 GB GB SIMILAR, EXCEPT TAKEN AT EXIST. PIER BARRIER TRANSITION, SEE SECTION B GB GB FOR GLARE SCREEN DETAIL

TYPICAL DETAILS - RENOVATION OF PIER BARRIER



SECTION C GB GB
Scale: 3/4" = 1'-0"



SECTION D GB GB
Scale: 3/4" = 1'-0"

DETAILS - REPLACEMENT OF TRANSITION BARRIER ON PEARL CITY VIADUCT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BARRIER TRANSITION DETAILS

INTERSTATE ROUTE H-1, ADDITIONAL LANES
WAIAWA I.C. TO HALAWA I.C.

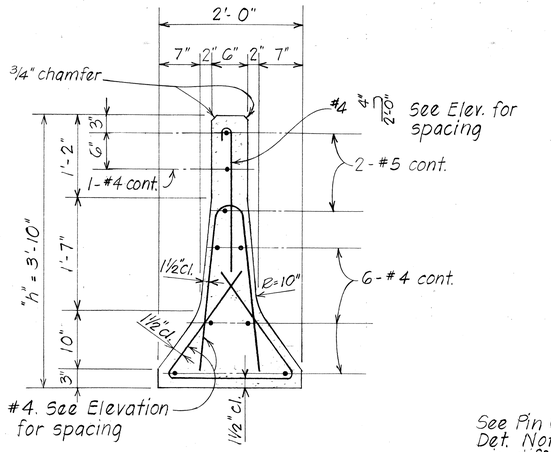
F.A.I.P. NO. IR-HI-1(193)

Scale: As Shown Date: Sept. 1985

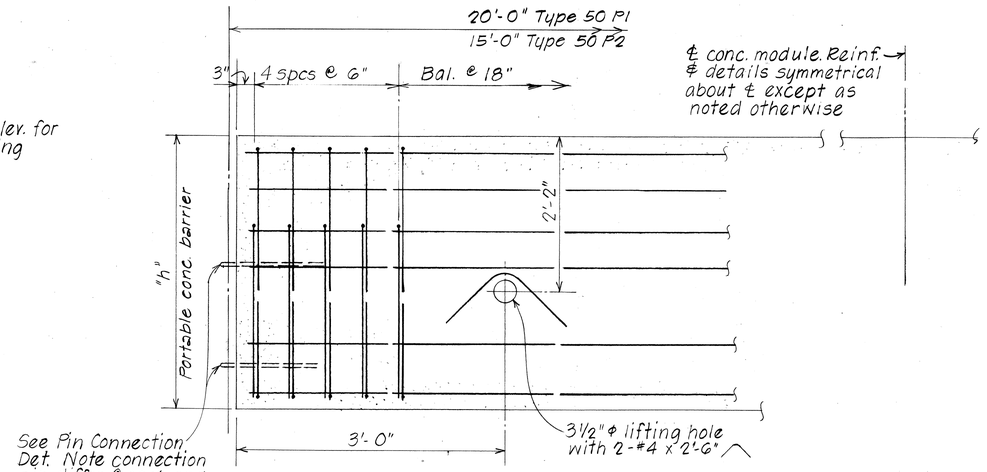
SHEET No. 68 OF 14 SHEETS

ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY F.E.M.	B/85
NOTE BOOK	TRACED BY	
	DESIGNED BY T.S.	B/85
No.	QUANTITIES BY	
	CHECKED BY L.A.O.T.	B/85

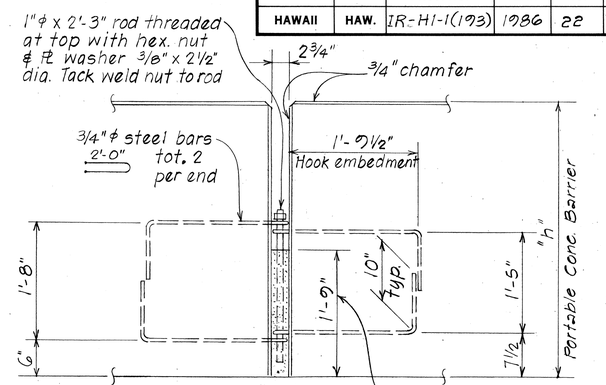
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	22	62



TYPE 50 P1



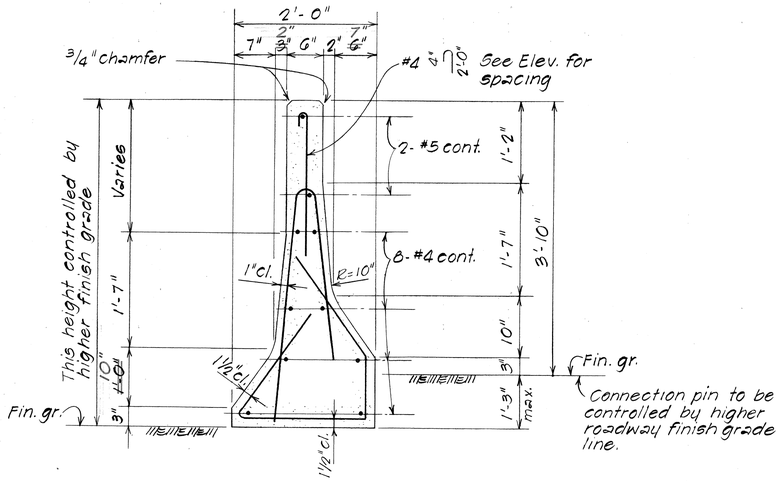
PART ELEVATION - PRECAST CONC. MODULE



NOTE: Proper connection pin shall be located at each terminus of the barrier to receive its mate. Payment shall be incidental to it's respective module.

Form & fill with shrinkage compensating grout.

PIN CONNECTION DETAILS

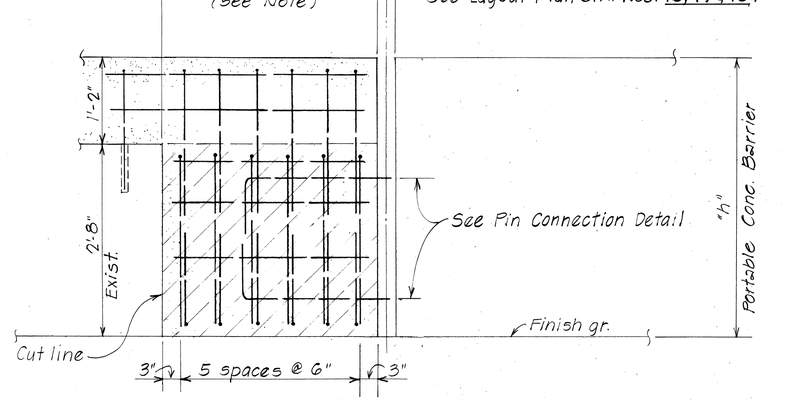


TYPE 50 P2

NOTE:
The revised Type 50 P2 Barrier is shown with dimension changes for H-1 Sta. 162+70± to 168+70±.

NOTE:

1. Remove 3' of median barrier (hatched area) beyond the theoretical end limits of the permanent portable barrier and rebuild as shown and noted to match adjacent sections.
2. Where a portion of barrier is to be removed, or saw cut is called for, the line of separation between the portions that is to remain and be removed, shall be saw cut to a minimum depth of 1½ inches.
3. Existing horizontal reinforcement in the section to be rebuilt shall be cut, cleaned and incorporated in the new pour.
4. Reinf. and pin shall be incidental to concrete.



TRANSITION SECTION-
PERMANENT PORTABLE CONC. BARRIER
TO EXISTING CONC. BARRIER
Scale: 1"=1'-0"

TYPICAL PERMANENT PORTABLE CONCRETE BARRIER DETAILS
Scale: 1"=1'-0"

		DATE
ORIGINAL PLAN	SURVEY PLOTTED BY	
	DRAWN BY L.M.A.	8/85
NOTE BOOK	TRACED BY L.A.	8/86
	DESIGN BY L.A.	8/86
No.	QUANTITIES BY	
	CHECKED BY L.A.G.T.	8/86

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PERMANENT PORTABLE CONCRETE BARRIER

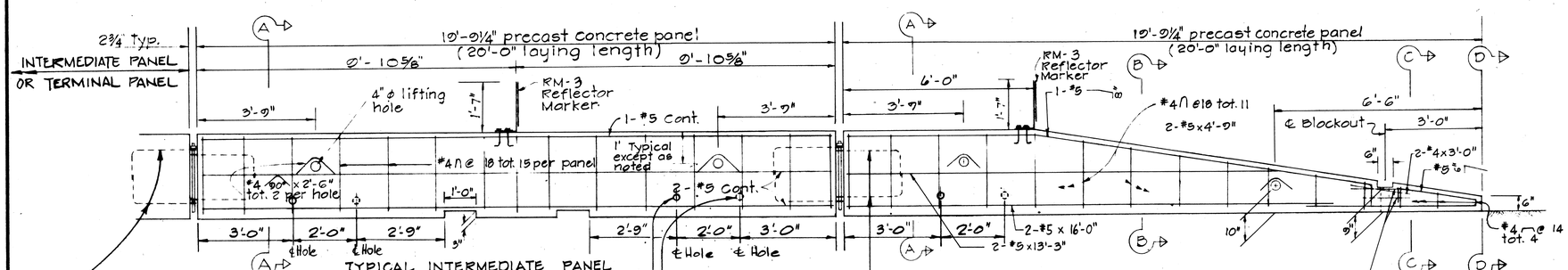
INTERSTATE ROUTE H-1, ADDITIONAL LANES
WAIAWA I.C. TO HALAWA I.C.

F.A.I. Proj. No. IR-HI-1(193)

Scale: As shown Date: Sept. 1985

SHEET No. 78 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	23	62



50% of all terminal panels to have connection bar arrangement as shown

TYPICAL INTERMEDIATE PANEL

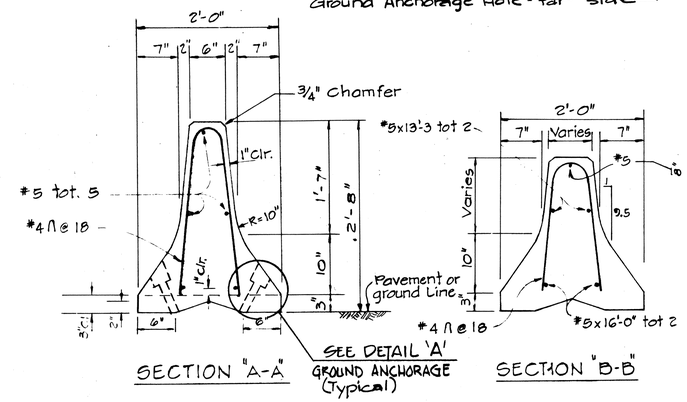
Concrete: 1.93 c.y. per panel
Reinf: 169 lbs. per panel
Weight 3.9 tons per panel
Ground Anchorage Hole - near side
Ground Anchorage Hole - far side

ELEVATION
Scale: ½" = 1'-0"

TERMINAL PANEL

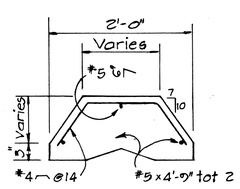
Concrete: 1.55 c.y. per panel
Reinf: 144 lbs. per panel
Weight: 3.1 tons per panel

50% of all terminal panels to have connection bar arrangement as shown

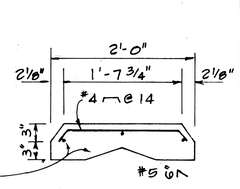


SECTION "A-A"

SECTION "B-B"

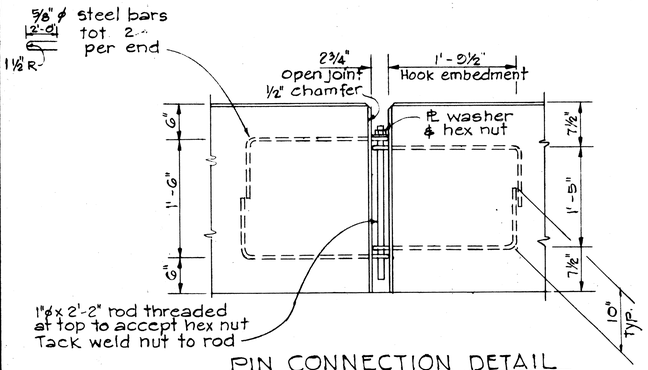


SECTION "C-C"

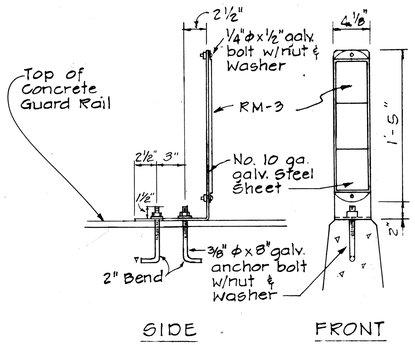


SECTION "D-D"

SECTIONS
Scale: 1" = 1'-0"



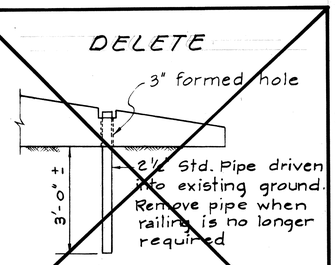
PIN CONNECTION DETAIL
Scale: 1" = 1'-0"



SIDE FRONT

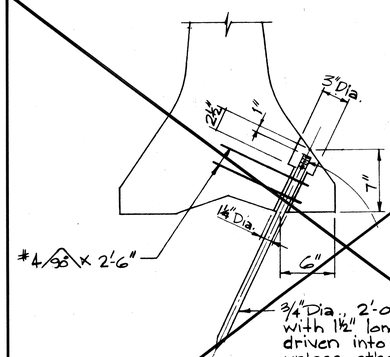
REFLECTOR MARKER MOUNTING DETAIL
Scale: 1½" = 1'-0"

DELETE



GROUND ANCHORAGE FOR RAMPED END OF TERMINAL PANEL
Scale: ½" = 1'-0"

DELETE



Protect threaded head with cap when driving steel pin. Threaded Head to facilitate pin removal.

¾" Dia., 2'-0" long steel pin with 1½" long threaded head, driven into existing ground unless otherwise directed.

DETAIL A - GROUND ANCHORAGE
Scale: 1½" = 1'-0"

NOTES

1. For details not shown in Sections B-B, C-C, & D-D, see Section A-A
2. Reflector Marker shall not be paid for separately but shall be considered incidental to "Portable Concrete Guard Rail."
3. Concrete shall be Class "A".
4. All bolts to have cut washers unless otherwise noted.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PORTABLE CONCRETE GUARD RAIL TYPICAL DETAILS

INTERSTATE ROUTE H-1
ADDITIONAL LANES
F.A.I. Proj. No. IR-HI-1(193)
Scale: As Noted Date: Sept., 1985

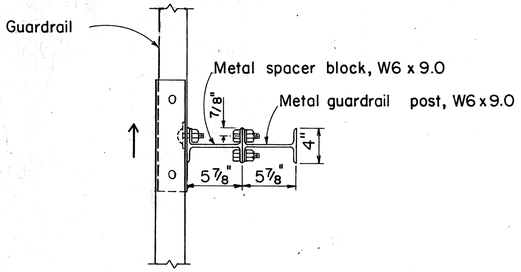
SHEET No. 8B OF 14 SHEETS

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

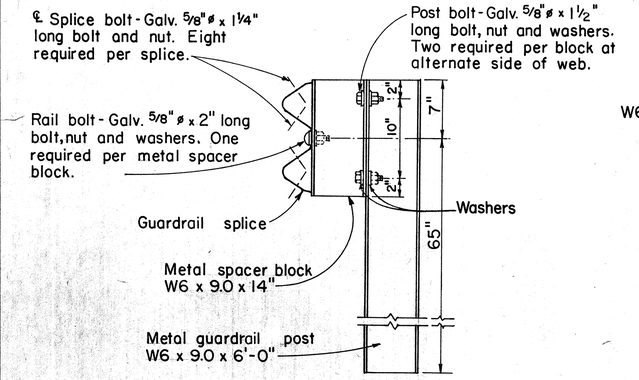
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	24	62

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.



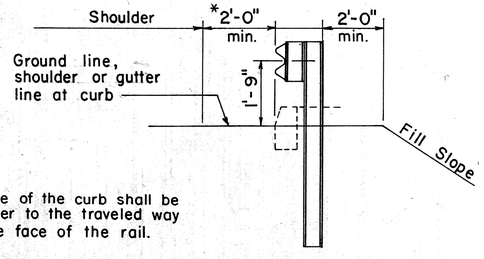
PLAN



ELEVATION

SINGLE METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

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

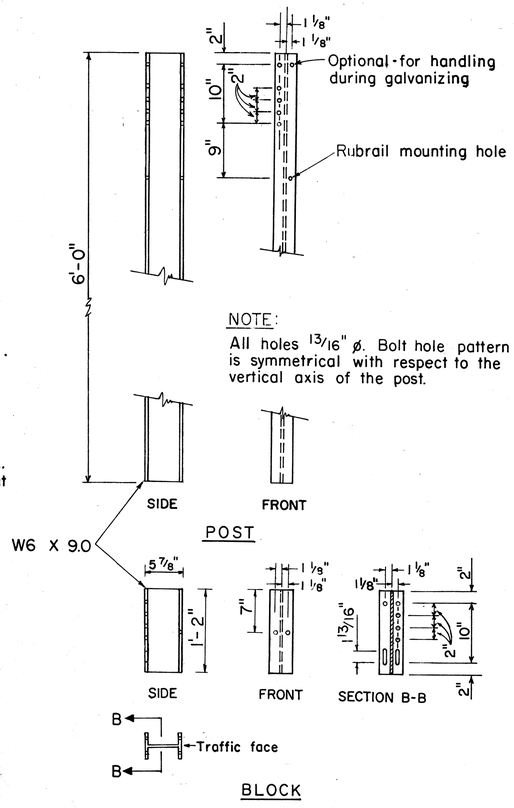


Note:
The face of the curb shall be no closer to the traveled way than the face of the rail.

AT SHOULDER SECTION

TYPICAL METAL GUARDRAIL DETAIL

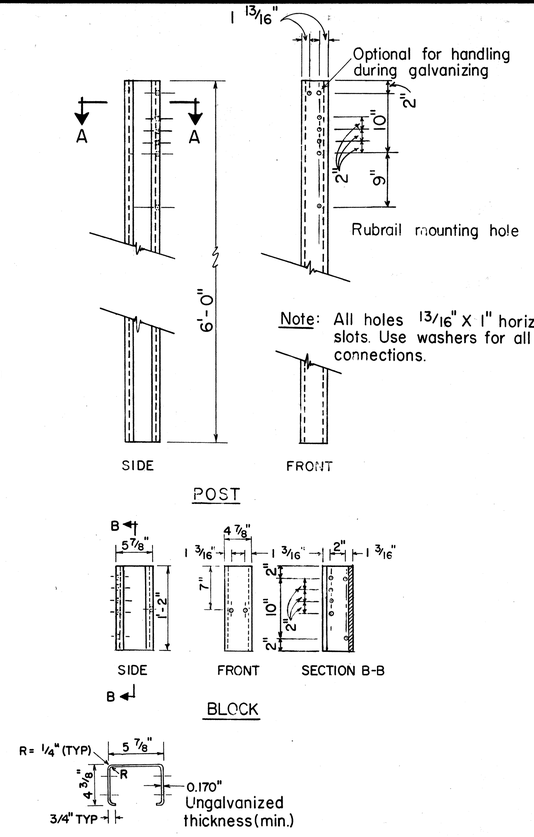
SCALE: 1/2" = 1'-0"



NOTE:
All holes 13/16" ø. Bolt hole pattern is symmetrical with respect to the vertical axis of the post.

STRUCTURAL SHAPE POST AND BLOCK

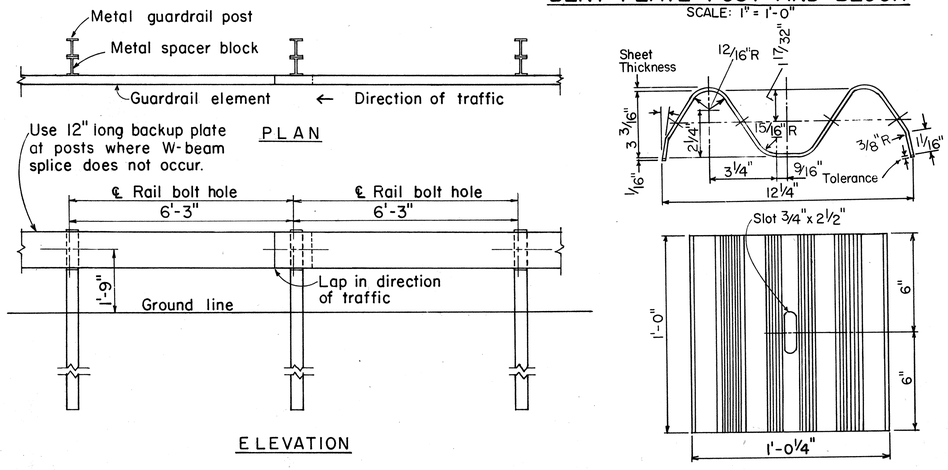
SCALE: 1" = 1'-0"



SECTION A-A
N.T.S.

BENT PLATE POST AND BLOCK

SCALE: 1" = 1'-0"



ELEVATION

METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

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

BACK-UP-PLATE

N.T.S.

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

APPROVED:
Herbert Sakishi — 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

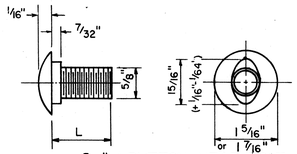
METAL GUARDRAIL

Scale: As Shown — July, 1982

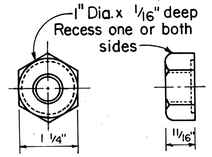
SHEET No. 23 OF 14 SHEETS DT 500

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	25	62



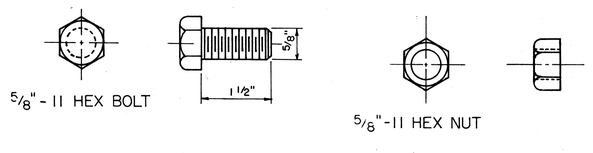
5/8" ø BUTTON HEAD BOLT



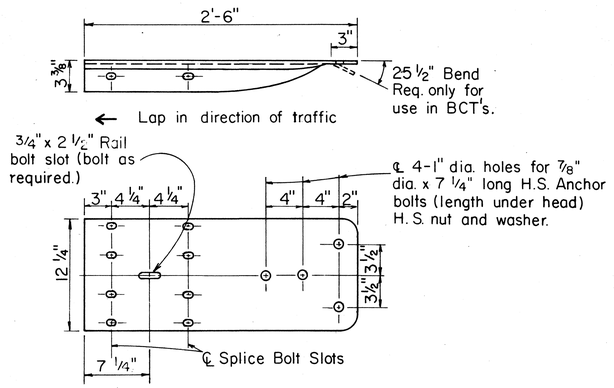
5/8" ø RECESS NUT

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

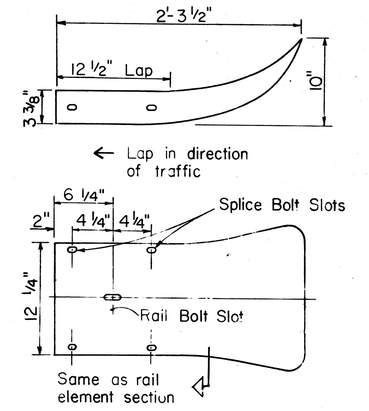


5/8" HEX POST BOLT AND NUT
Scale: N.T.S.

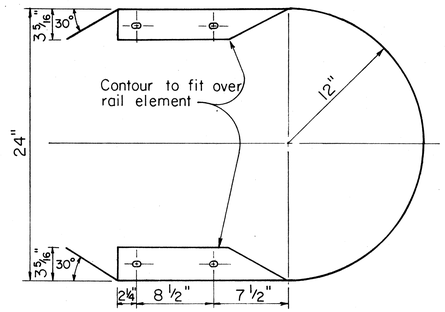


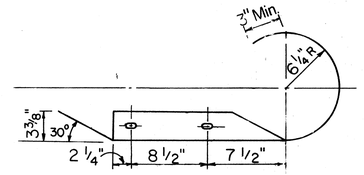
W BEAM TERMINAL CONNECTOR
Scale: 1 1/2" = 1'-0"

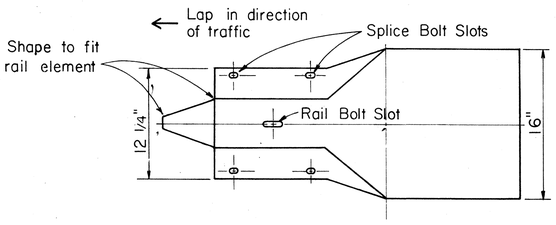
← Lap in direction of traffic



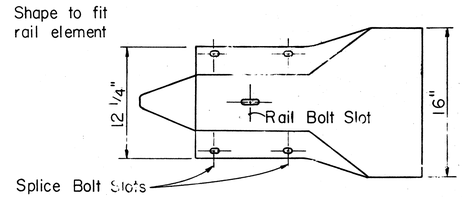
W BEAM END SECTION (FLARED)
Scale: 1 1/2" = 1'-0"



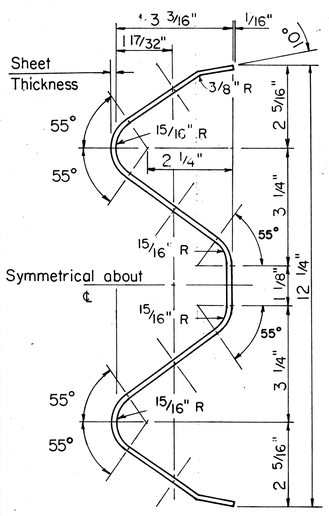




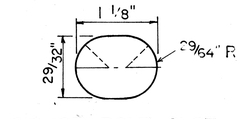
W BEAM END SECTION (BUFFER)
Scale: 1 1/2" = 1'-0"



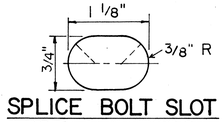
W BEAM END SECTION (ROUNDED)
Scale: 1 1/2" = 1'-0"



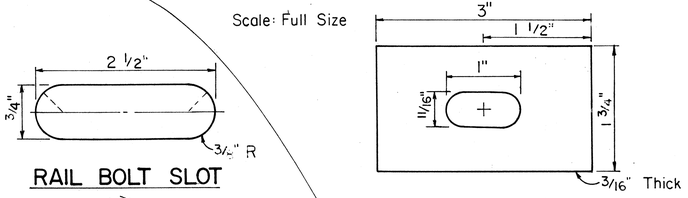
RAIL ELEMENT SECTION
Scale: 6" = 1'-0"



SPLICE BOLT SLOT

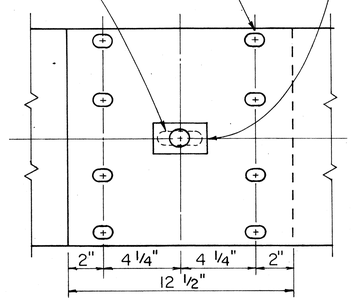


SPLICE BOLT SLOT FOR ALL ENDS



RAIL BOLT SLOT

RAIL BOLT WASHER



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

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

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

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

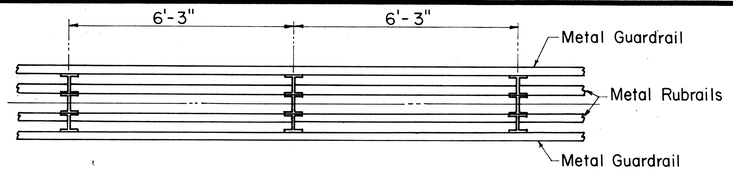
STANDARD DETAILS
METAL GUARDRAIL

Scale: As Noted — July, 1982

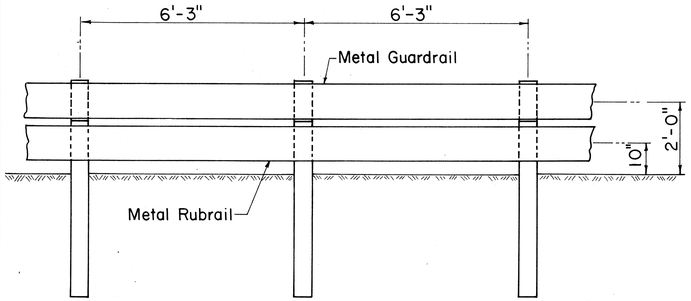
SHEET No. 108 OF 14 SHEETS DT 501

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

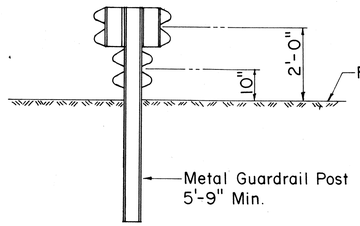
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(103)	1986	26	62



PLAN

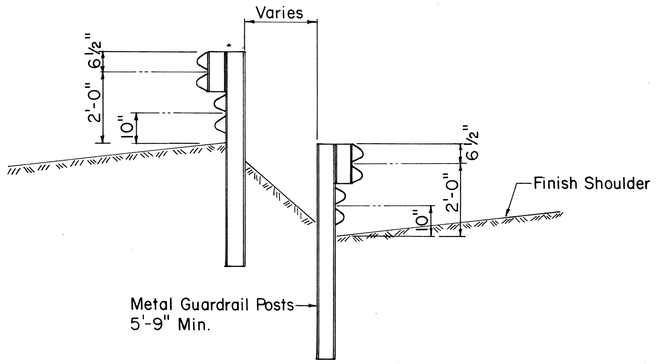


ELEVATION

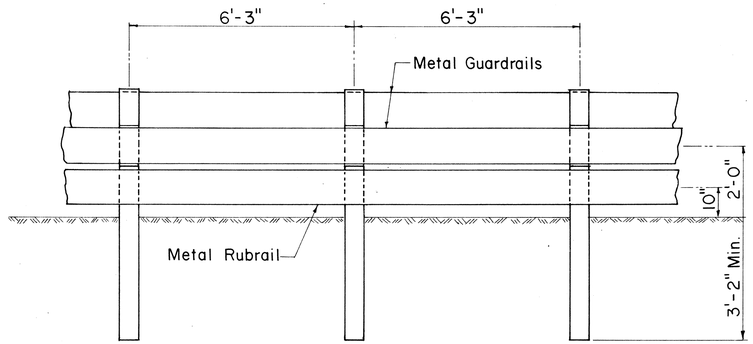


SECTION

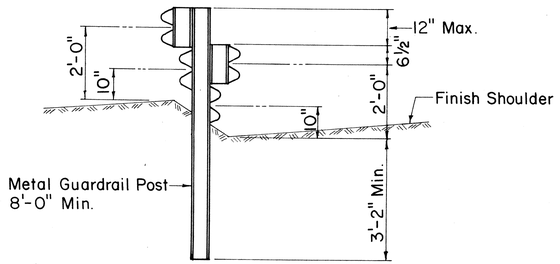
TYPICAL MEDIAN BARRIER INSTALLATION



TYPICAL DOUBLE POST SECTION

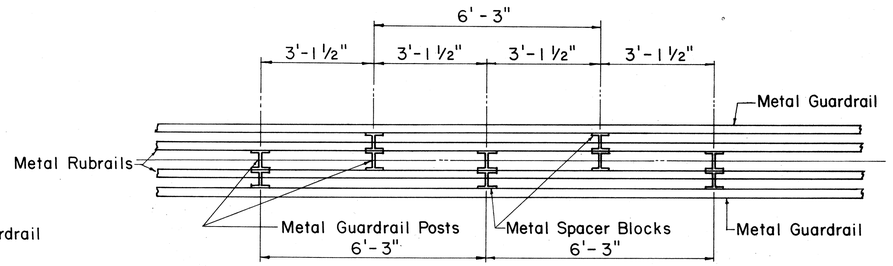


ELEVATION

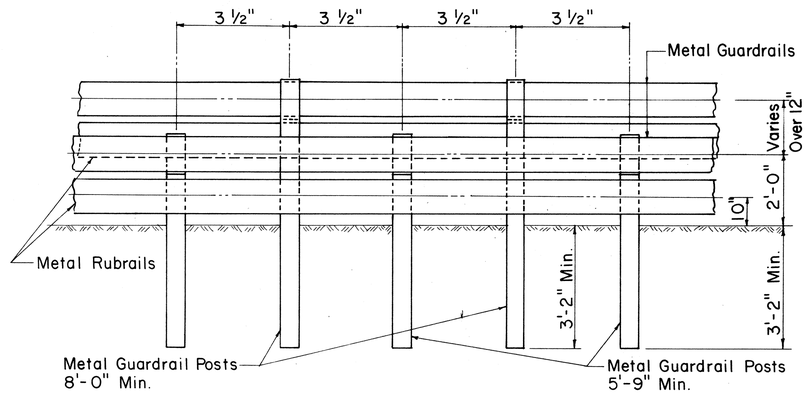


SECTION

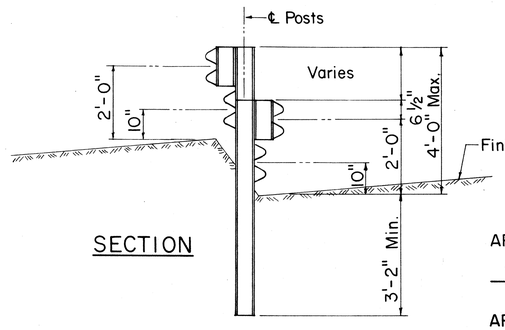
TYPICAL SAW TOOTH INSTALLATION



PLAN



ELEVATION



SECTION

TYPICAL STAGGERED INSTALLATION

APPROVAL RECOMMENDED:

Euichi Tanaka — TRAFFIC ENGINEER — 1/28/83 DATE

APPROVED:

[illegible] Fujiyama — ASSISTANT CHIEF, ENGINEERING — 1-31-83 DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes DT 514 Approved 12/30/69	[illegible]	1-31-83

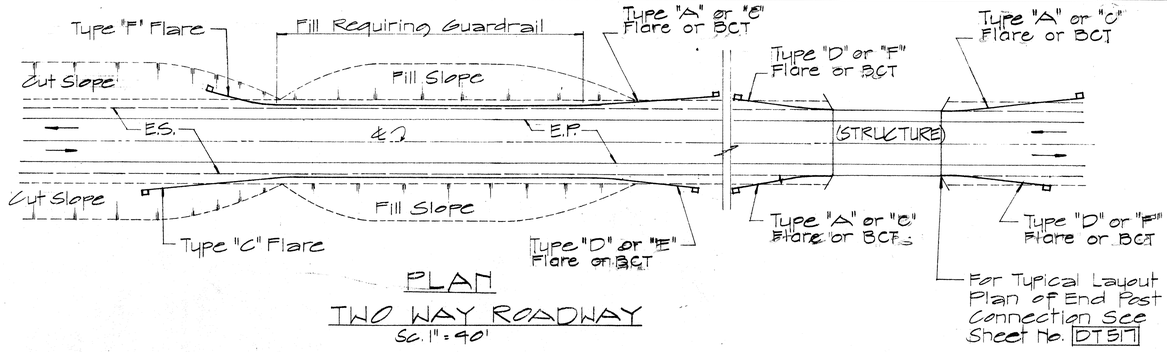
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
METAL GUARDRAIL WITH RUBRAIL

Scale: ½" = 1'-0" October 1982

SHEET No. 11B OF 14 SHEETS DT 514

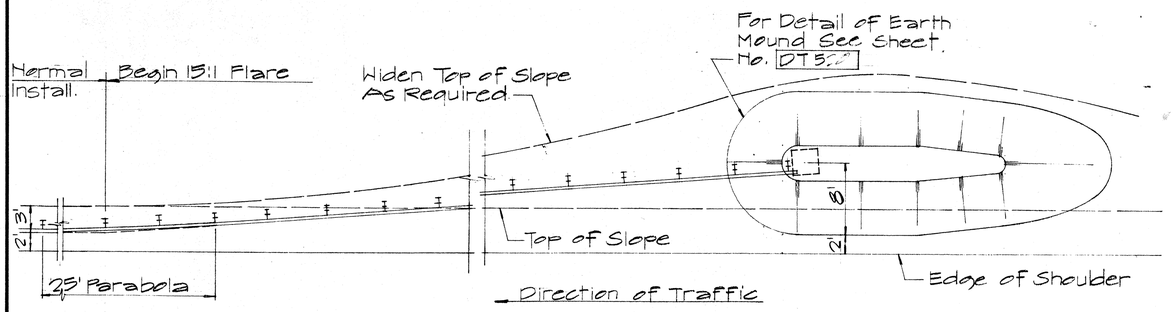
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.



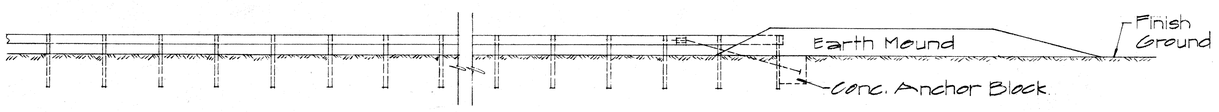
PLAN

TWO WAY ROADWAY

Sc. 1" = 40'



PLAN



ELEVATION

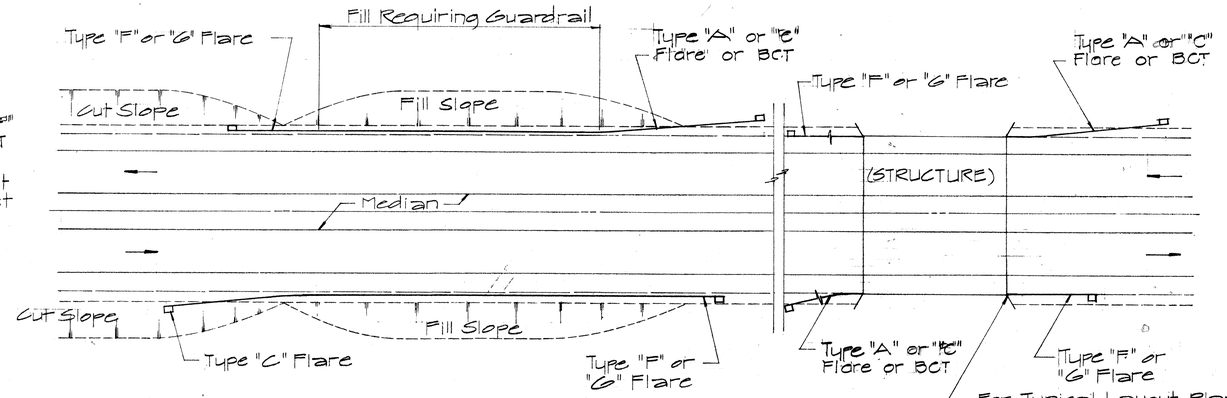
TYPE "A" FLARE

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

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

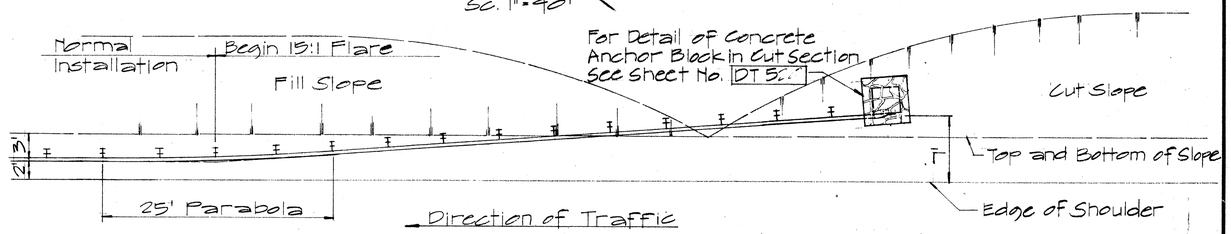
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IRHI-1(193)	1987	C02651	62



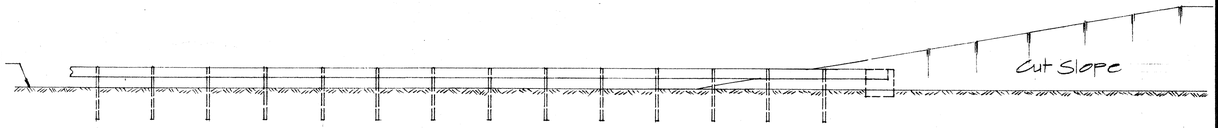
PLAN

ONE WAY ROADWAY (DIVIDED HIGHWAY)

Sc. 1" = 40'



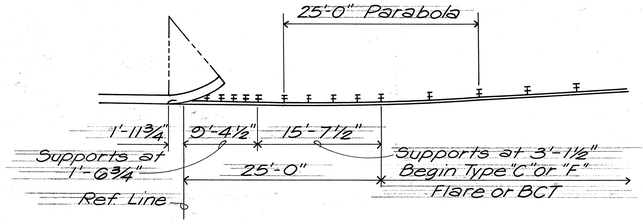
PLAN



ELEVATION

TYPE "C" FLARE

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



TYPICAL LAYOUT PLAN OF END POST CONNECTION

SKETCH "A"
CHANGE ORDER NO. 17

NOTE:
The approach end of the concrete structure that used sketch "A" end post connection were as follows:
H-1 Sta. 533+22± Rt.
H-1 Sta. 110+75± Rt.
H-1 Sta. 123+80± Lt.

Note: This tracing prepared during "As-Built" posting.

NO.	REVISION	APPROVED BY	DATE
1	Delete Type "B" Flare and Type "E" Flare	H.J.	6/15/18

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 12/29/69 DATE

APPROVED
ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

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. 118 OF 14 SHEETS | DT 516

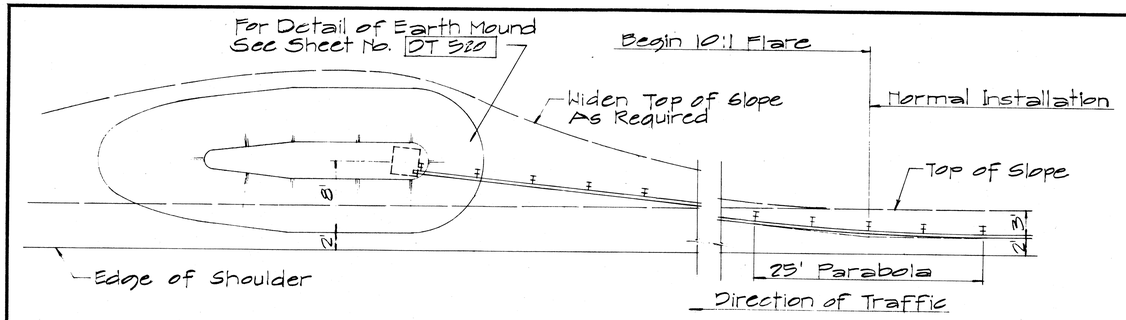
C.O. 26S-1

ORIGINAL PLAN

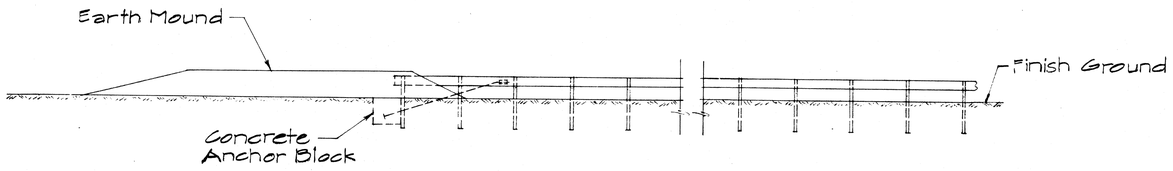
DATE
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
NOTE BOOK
QUANTITIES BY
CHECKED BY
No.

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(103)	1986	27	62



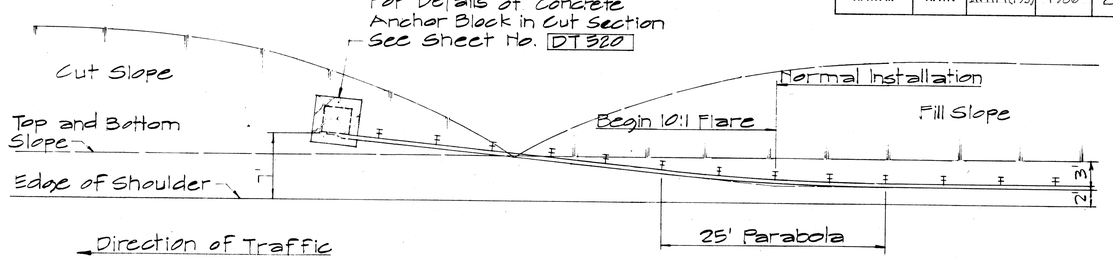
PLAN



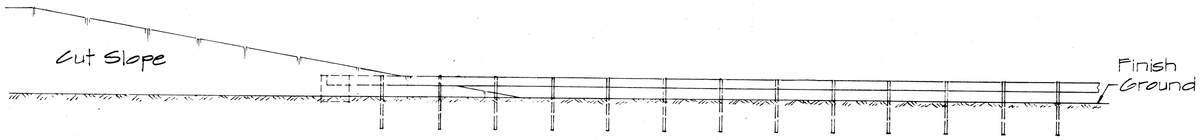
ELEVATION

TYPE "D" FLARE

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



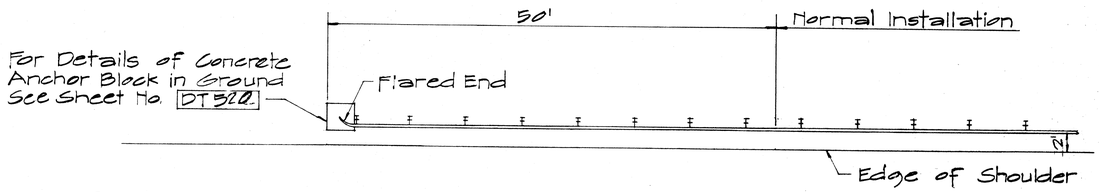
PLAN



ELEVATION

TYPE "F" FLARE

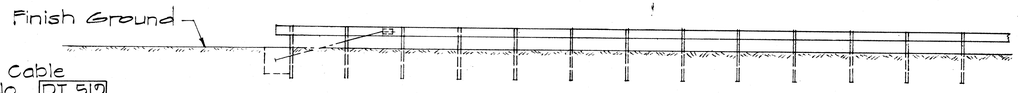
Sc. 1/8" = 1'-0"



PLAN

NOTE:

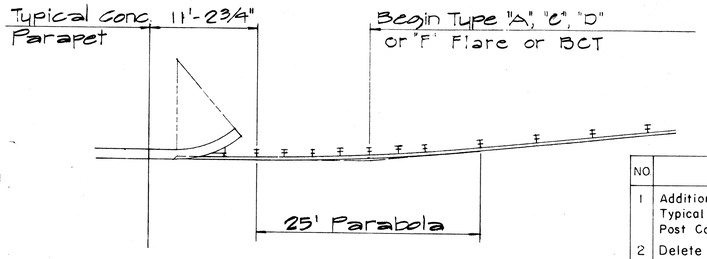
For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 519



ELEVATION

TYPE "G" FLARE

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



TYPICAL LAYOUT PLAN OF END POST CONNECTION

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

APPROVAL RECOMMENDED:

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

APPROVED:

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

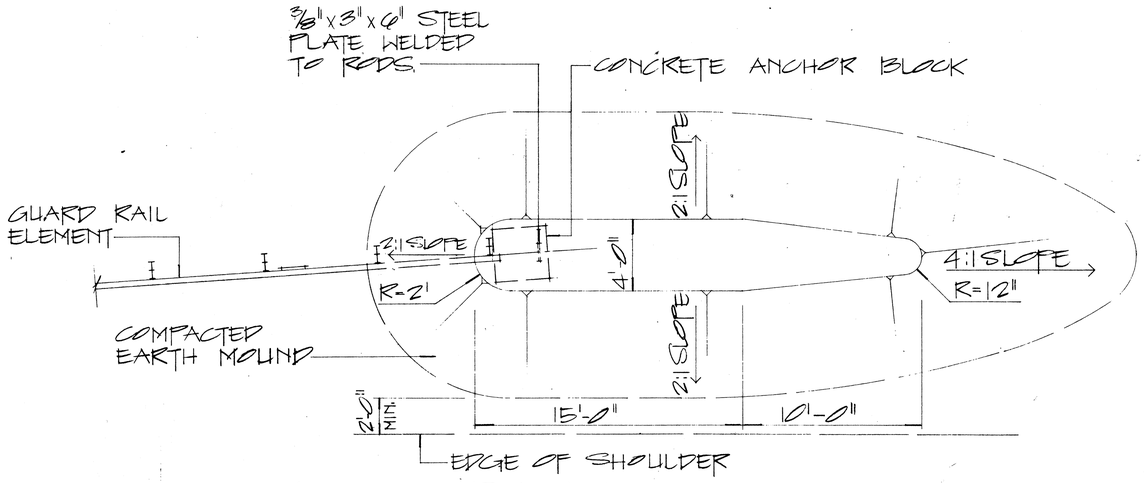
Scale: As Noted — April 1969

SHEET No. 12B OF 14 SHEETS | DT 517

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

PRINTED ON NO. 1000H CLEARPRINT

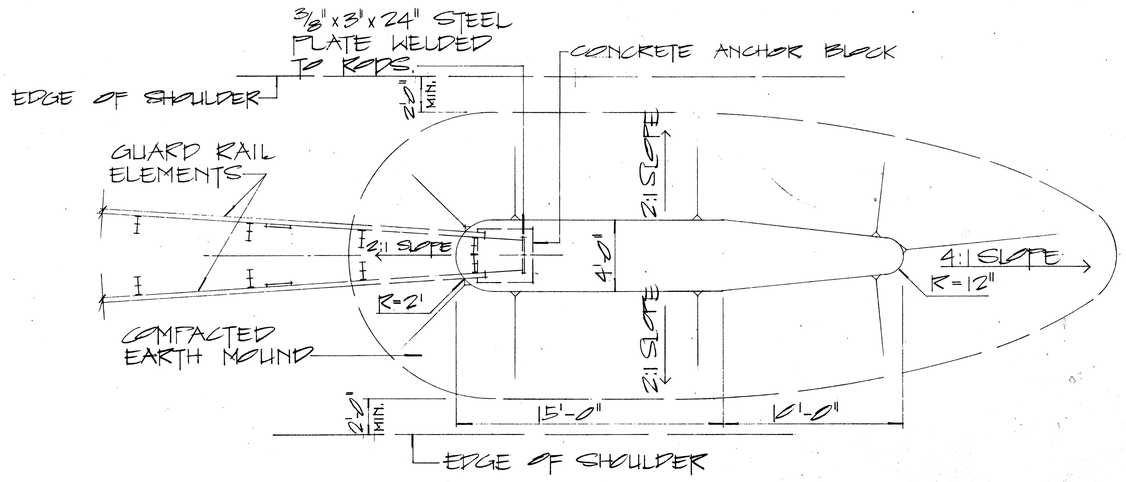
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(193)	1986	28	62



PLAN

EARTH MOUND DETAIL (SINGLE GUARD RAIL)

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

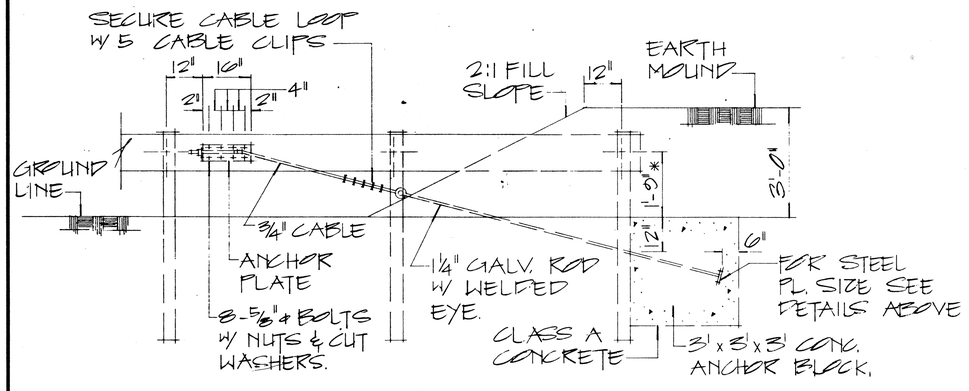


PLAN

EARTH MOUND DETAIL (DOUBLE GUARD RAIL)

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

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

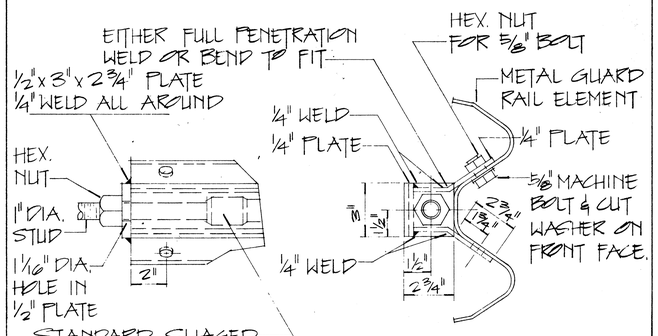


ANCHOR BLOCK DETAIL IN EARTH MOUND

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

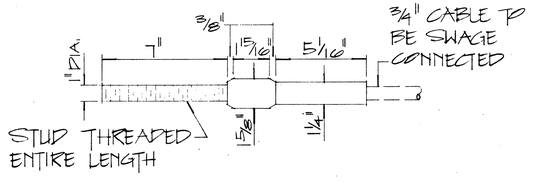
NOTE:

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, G.R.P., EXCAVATION, EARTH MOUND, ANCHOR RODS AND MISCELLANEOUS APPURTENANCES NECESSARY TO ANCHOR THE GUARD RAIL ENDS SHALL BE INCIDENTAL TO THE METAL GUARD RAIL.



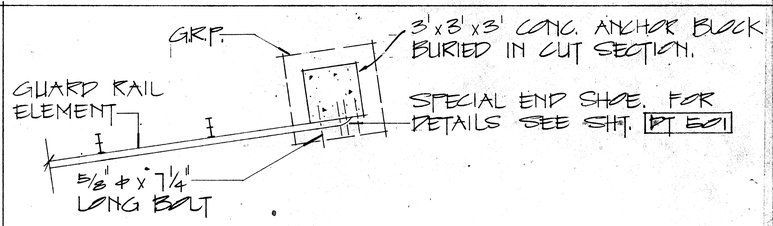
ANCHOR PLATE DETAILS

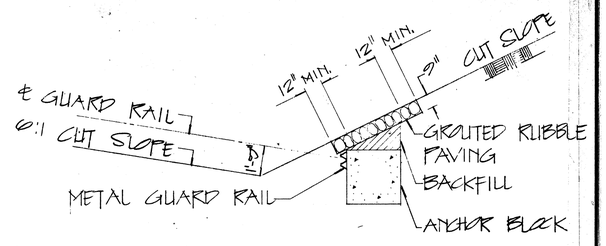
SCALE: 1" = 3"



STANDARD SWAGED FITTING AND STUD

SCALE: 1" = 3"





ANCHOR BLOCK IN CUT SECTION

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

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 12/23/69 DATE

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

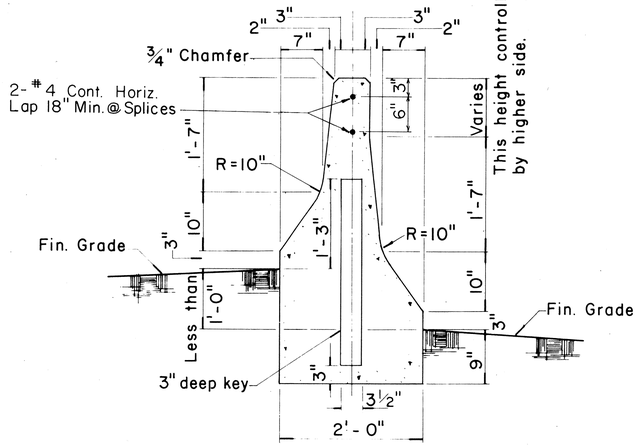
SHEET No. 138 OF 14 SHEETS PT 520

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

K+E CRYSTALGRAPH® LA 2920 TRACING PAPER

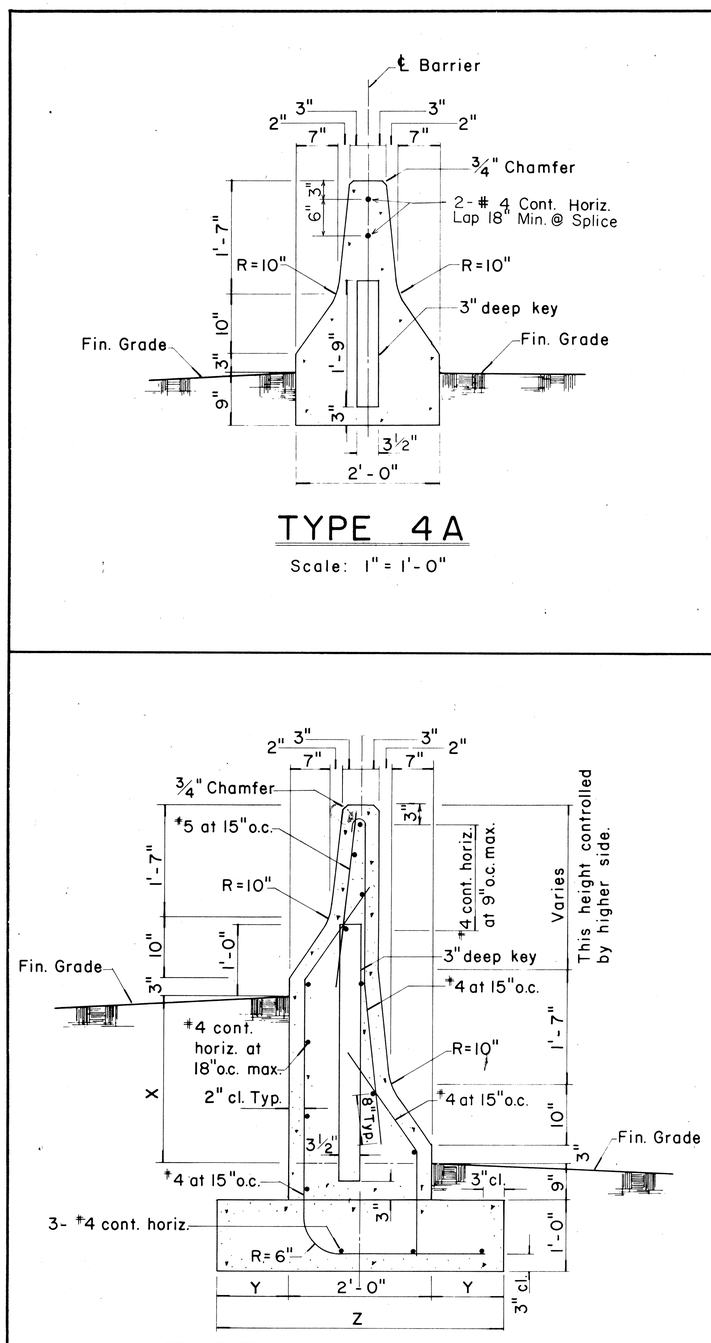
TYPE 4A

Scale: 1" = 1'-0"



TYPE 4B

Scale: 1" = 1'-0"

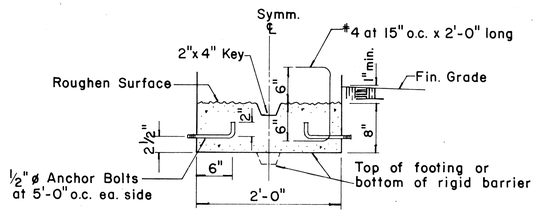


TYPE 4C & TYPE 4D

Scale: 1" = 1'-0"

TYPE	DIFFERENCE IN FIN. GRADE	FOOTING	
	X	Y	Z
4C	1'-0" min., 2'-4" max.	1'-0"	4'-0"
4D	Greater than 2'-4", 4'-4" max.	1'-3"	4'-6"

NOTE:
Except where noted all dimensions shall be the same for Type 4C and Type 4D.

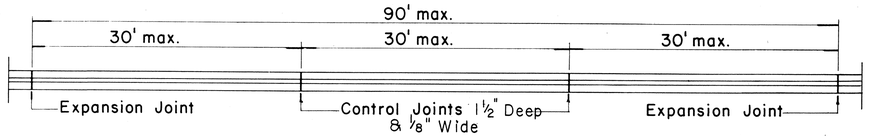


OPTIONAL CONSTRUCTION JOINT DETAILS

Scale: 1" = 1'-0"

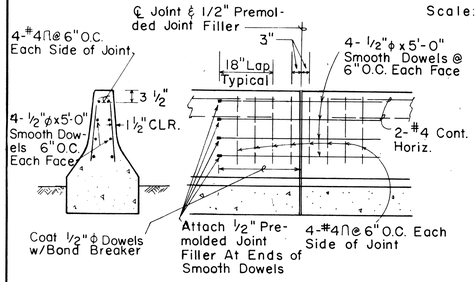
NOTE:
The intent of the optional construction joint details for the Type 4 Rigid Barrier Guard Rail is to provide a method of securing the forms and preventing uplift so that the barrier will have a uniform and presentable appearance.
The Contractor may submit an alternate method of constructing the barrier for the approval of the Engineer and for use on a trial basis. Any unsatisfactory work shall be removed or corrected as directed by the Engineer and at the Contractor's expense.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(103)	1986	29	62



PLAN

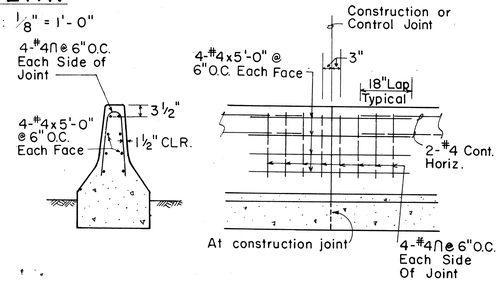
Scale: ⅛" = 1'-0"



SECTION ELEVATION

EXPANSION JOINT DETAIL

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

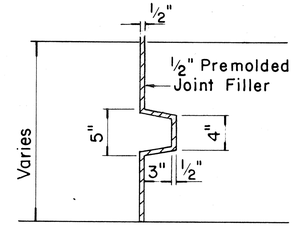


SECTION ELEVATION

CONSTRUCTION & CONTROL JOINT DETAIL

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

NOTE: 1/2" PREMOLDED JOINT FILLER IS NOT REQUIRED AT CONSTRUCTION JOINTS.



SECTION THRU KEY AT EXPANSION JOINT

Scale: 1½" = 1'-0"

GENERAL NOTES

1. Precast Rigid Barrier Guard Rail may be installed as an option to cast-in-place Type 4 Rigid Barrier Guard Rail. Contractor shall submit shop drawings to Engineer for approval.
2. Expansion Joints shall be constructed at ninety-foot (90 ft.) maximum intervals and at existing expansion joints of structures. (Use ½" premolded joint filler, incidental to Type 4 Rigid Barrier Guard Rail). Control Joints shall be placed between expansion joints at 30' maximum. Shear keys shall be required at all construction joints.
3. The exterior surface and vertical alignment of the Type 4 Rigid Barrier Guard Rail shall be constructed to give a uniform and presentable appearance. Variation of more than ¼" in 20' max. and ½" in 40' or more will be considered objectionable. The Engineer will determine the acceptability of the work.
   During the course of the work, samples may be tested and measurements made to establish whether or not the specified values or dimensions are being met. If the specified values or dimensions are not being met, the Engineer will determine the degree of the non-conformance, the effect on the serviceability of the project, whether the work be accepted and remain in place and, if so, the amount to be paid for such work, or whether the work shall be removed and replaced or otherwise corrected at the Contractor's expense.

NO.	REVISION	APPROVED BY	DATE
1	Supersede Sht. DT 521 Approved 2-18-72	H.K.	3/27/81

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 1/20/81 DATE

APPROVED:
[signature] — ASSISTANT CHIEF, ENGINEERING — 1/21/81 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
GUARD RAIL TYPE 4 (RIGID BARRIER)

Scale: As Shown

SHEET No. 28 OF 14 SHEETS | DT 521

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