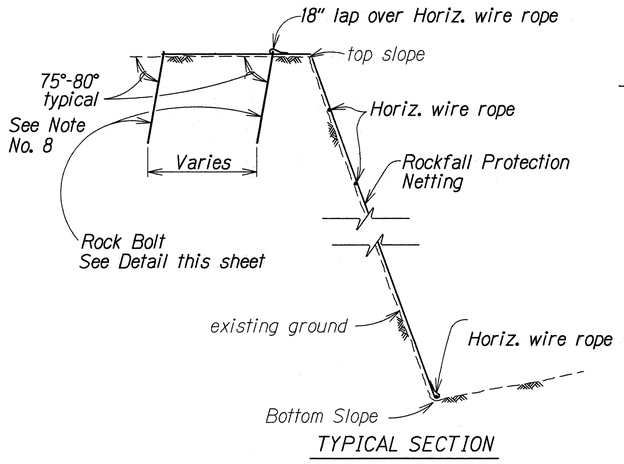
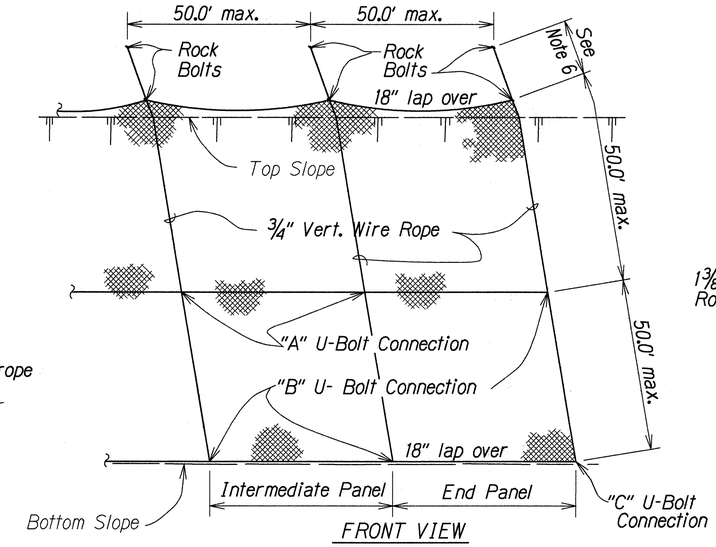
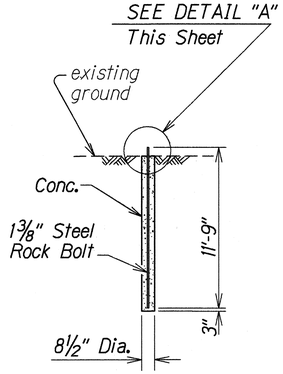
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(26)	1996	ADD. 4	20



TYPICAL SECTION



FRONT VIEW



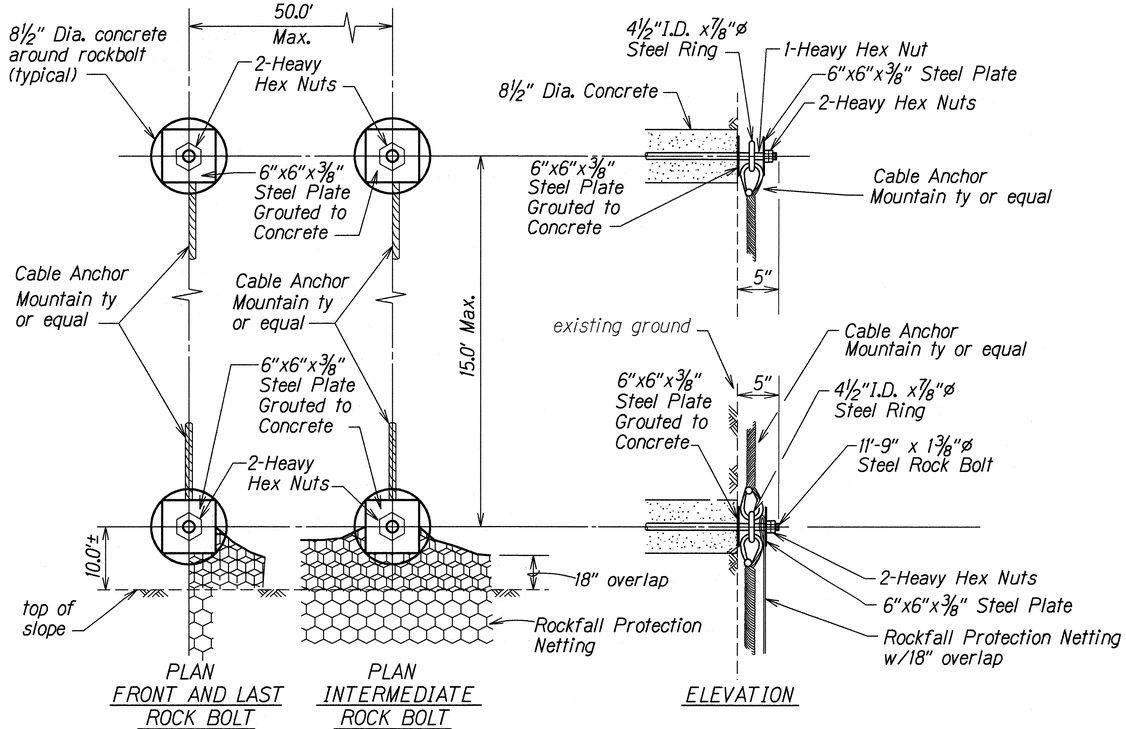
ROCK BOLT DETAIL

ROCKFALL PROTECTION NETTING

Not To Scale

NOTES:

1. Steel rock bolts with double heavy hex nuts shall be ASTM A 615 Hot-Dipped Galvanized grade 60 steel.
2. Steel plates shall be ASTM A572 Steel and shall be galvanized. Steel rings shall be AISI 4140 Hot-Dipped Galvanized.
3. Concrete shall have a 28 day compressive strength of fc'=5,000 psi.
4. The two rock bolts for the vertical wire rope shall be placed 10'+ from top of slope with a spacing of 15' between the two rock bolts.
5. The top supporting 3/4" wire rope shall have a parabolic sag with a maximum deflection of 4' at 50' midspan.
6. With the written approval of the Engineer, the distance between the upper and lower rock bolts can be reduced to not less than 10' due to the topography.
7. A minimum of one intermediate horizontal wire rope shall be installed for all heights of rockfall slope protection. Maximum Continuous length for horizontal wire rope is 150 feet.
8. 75° - 80° typical angle for rockbolt placement is measured from the slope of the existing ground.



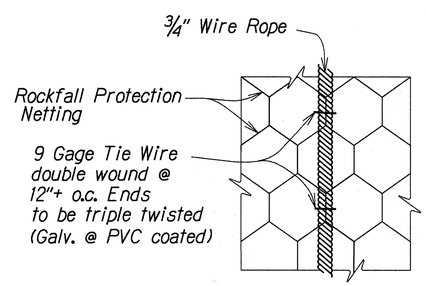
PLAN FRONT AND LAST ROCK BOLT

PLAN INTERMEDIATE ROCK BOLT

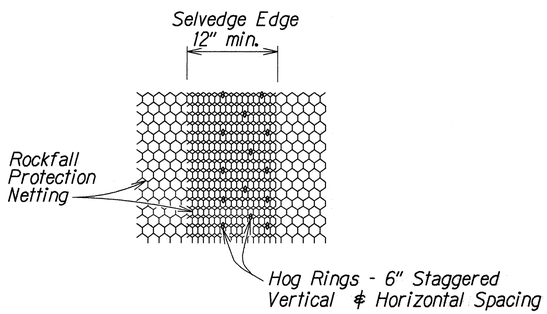
ELEVATION

DETAIL "A"
ROCK BOLT CONNECTION DETAIL

Not To Scale



TYING TO WIRE ROPE DETAIL
(Horizontal and Vertical)



OVERLAPPING DETAIL

PROTECTION NETTING DETAILS

Not To Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY A. Tomlinda	12-2-96
NOTE BOOK dated	TRACED BY	
	DESIGNED BY R. Takeshi/D. Taniguchi	
	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
06/18/96	Revised Rock Bolt Detail

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETAILS

HONOAPIILANI HIGHWAY
Rockfall Protection Along Pali Section, Phase III
Project No. NH-030-1(26)

Scale: Not to Scale Date: Sept., 1994

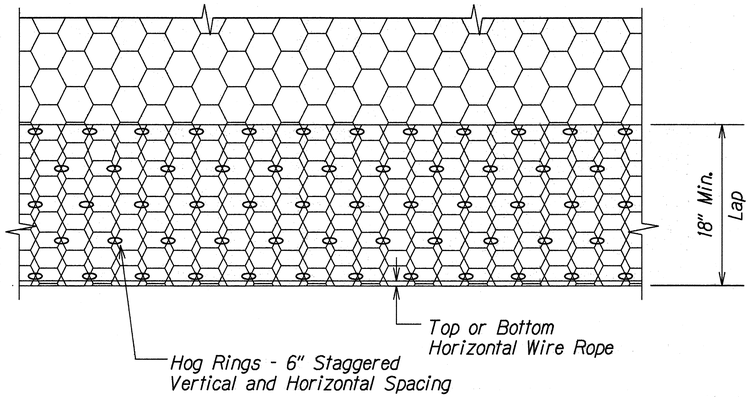
SHEET No. 1 OF 2 SHEETS

ADD. 4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(26)	1996	ADD. 5	20

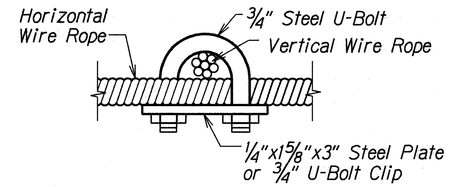
ROCKFALL PROTECTION SCHEDULE

LIMITS	ESTIMATED QUANTITIES			
℄ STA. TO ℄ STA.	ROCKFALL PROTECTION NETTING	ROCK BOLT	WIRE ROPE	CABLE ANCHOR
	SQ. YD.	EACH	LIN. FT.	EACH
289+53.92 to 297+40.01 Lt.	2,504.54	36	3,116.19	88
300+00.0 to 304+00 Lt.	1,713.25	18	1,682.48	43
306+50 to 309+76.72 Lt.	1,793.54	16	1,464.16	38
314+61.60 to 316+65.12 Lt.	646.67	10	732.02	23
317+55.72 to 320+51.46 Lt.	1,979.54	14	1,544.16	33
295+55.33 to 296+80.01 Rt.	383.47	8	490.04	18
300+55.01 to 303+06.81 Rt.	1,416.52	12	1,168.90	28
307+21.21 to 308+11.21 Rt.	285.00	8	400.50	18
318+00.72 to 320+00 Rt.	1,041.57	10	825.78	23
Total	11,764.10	132	11,424.23	312
Overlap Quantities	1,764.61		1,311.96	
Maintenance of Existing Wire Mesh				
PHASE I 219+00 to 226+00 Lt. 232+00 to 252+50 Lt.				
Total	1,500	3	1,500	15
PHASE II 258+25 to 261+75 265+40 to 271+20 277+75 to 279+75				
Total	1,500	3	1,500	15



OVERLAPPING DETAIL AT TOP OR BOTTOM HORIZONTAL WIRE ROPE

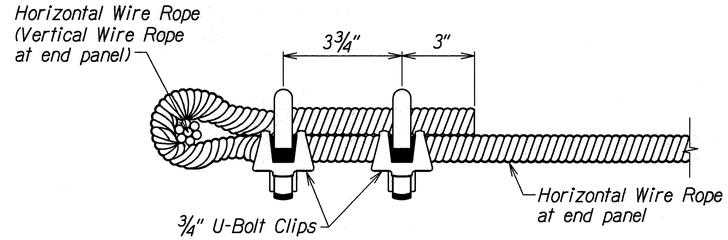
Not to Scale



TYPE "A" U-BOLT CONNECTION

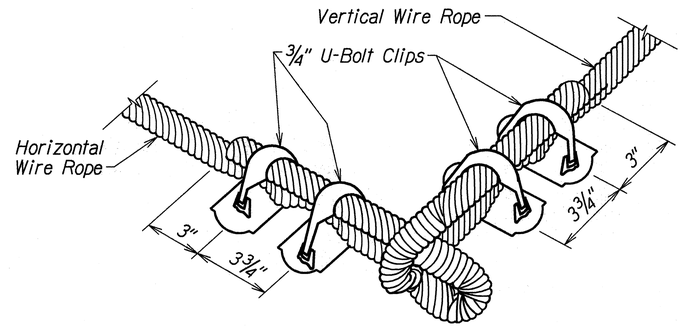
Not to Scale

Note: If ¾" U-Bolt Clips are used for Type "A" U-Bolt Connectors, then no crimping of the cable is allowed.



TYPE "B" U-BOLT CONNECTION

Not to Scale



TYPE "C" U-BOLT CONNECTION

Not to Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 5/28/96
	DRAWN BY J. Tom-Hirata	
NOTE BOOK dd2#	TRACED BY	
	DESIGNED BY R. Takeuchi/D. Tanouchi	
	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
06/18/96	Revised Rockfall Protection Schedule

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETAILS

HONOAPIILANI HIGHWAY
Rockfall Protection Along Pali Section, Phase III
Project No. NH-030-1(26)

Scale: Not to Scale Date: Mar., 1996

SHEET No. 2 OF 2 SHEETS

ADD. 5