FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	106	183

NOTES:

1. The Contractor shall plan his working items to fit the available construction hours as indicated in Special Provisions Section 645-Work Zone Traffic Control.
2. For safety of motorists, begin the construction of bridge parapet modifications (excluding the end post modifications) from abutment B (Koko Head Abutment) toward Abutment A (Ewa Abutment).
3. Remove the existing end post concrete as shown. The exposed rebars shall remain and be cleaned for end post modification.
4. The interface between new and old concrete shall be roughened, cleaned and free of laitance. Drill hole 1/8" larger in diameter than dowel to be inserted into existing concrete, clean the hole, install epoxy adhesive rebar anchor dowel per manufacturer's recommendation. The embedment of the epoxy adhesive rebar anchor shall have the minimum depth as shown on the plans.
5. The dowel holes shall be drilled as shown whenever possible into the existing concrete surfaces. When the drill contacts any existing rebar, the hole shall be filled with epoxy and a replacement hole shall be drilled so that the spacing of dowels will be maintained. Contractor shall not cut existing rebar. The Contractor shall locate all rebar before drilling by using non-destructive techniques.
6. Prior to removal of end post concrete, Contractor shall record the name and date of structure. The same name and date of structure shall be placed on the same side of the finished end post.
7. For letter size and detail of name and date of structure, see Standard Plan B-01.
8. The portions of required Terminal Connector bolt holes through new concrete shall be preformed and the portion of bolt holes through existing end post concrete shall be drilled. In order to match the locations of the preformed holes in new concrete as shown, the Contractor may cut the existing rebars during drilling. After drilling, coat the perimeter of the drilled hole with bituminous material to protect the existing rebars. The bituminous material shall meet the requirements of ASTM D449.
9. Use fast-settings concrete for all concrete. The fast-setting concrete shall attain a minimum cylinder compressive strength of 3000 psi in 12 hours or less. Install metal guardrail terminal connectors and open the lanes to traffic only after tests indicate the minimum strength of concrete is obtained.
10. All rebars shall be ASTM A615 Grade 60.
11. All anchor bolts connecting thrie beam to concrete end posts shall be high strength conforming to the requirements of AASHTO M164 and shall be galvanized.
12. All open joints in existing concrete parapet shall be maintained.
13. All anchor bolts for light standards shall be A193/A193M class 2, grade B8MN.
    All anchor bolt nuts for light standards shall be ASTM A194/A194M grade 8MNA.
    All anchor bolt washers for light standards shall be ASTM A240 type 316.
14. The existing Hwy Light poles and electrical services shall remain during the construction of this project. Remove the existing light poles and terminate the existing electrical services only after the new light poles and conduits are connected and are in operation.
15. The Contractor shall provide safety devices to protect pedestrians and vehicles moving underneath Waimalu Viaduct during construction.
16. Unless otherwise noted, all exposed concrete edges shall be chamfered 3/4"x3/4".

TABLE I - LOCATIONS OF CONCRETE SPALL AND REPAIR AT EXISTING CONCRETE RAILING

LOCATIONS (See Sht. No. S2)	TYPE	DESCRIPTIONS OF EXISTING CONCRETE RAILING CONDITIONS
(4)(5)(6)(7)(8)(9)(10)	Type I	Concrete spalled. Spall area: 10" long parallel to traffic with dimension a=10"
(11) to (12)	Type I	Concrete spalled and 3 rebars exposed. Spall area: 2'-3" long parallel to traffic with dimension a=10"
(13)(14)	Type I	Concrete spalled. Spall area: 10" long parallel to traffic with dimension a=10"
(15) to (16)	Type I	Concrete spalled and 3 rebars exposed. Spall area: 2'-3" long parallel to traffic with dimension a=10"
(17)	Type I	Concrete spalled and 1 rebar exposed. Spall area: 10" long parallel to traffic with dimension a=10"
(18)(19)(20)	Type I	Concrete spalled. Spall area: 10" long parallel to traffic with dimension a=10"
(21)(22)(23)(24)(25)(26)	Type I	Concrete spalled and 1 rebar exposed. Spall area: 10" long parallel to traffic with dimension a=10"
(27)	Type I	Concrete spalled and 5 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension a=10"
(28)(29)(30)(31)(32)(33)(34)	Type I	Concrete spalled and 2 rebars exposed. Spall area: 1'-6" long parallel to traffic with dimension a=10"
(35)(36)	Type I	Concrete spalled and 3 rebars exposed. Spall area: 2'-3" long parallel to traffic with dimension a=10"
(37)	Type III	Concrete spalled and 5 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension c=2"
(38)	Type III	Concrete spalled and 3 rebars exposed. Spall area: 2'-3" long parallel to traffic with dimension c=2"
(39)	Type III	Concrete spalled and 2 rebars exposed. Spall area: 1'-6" long parallel to traffic with dimension c=2"
(40)	Type III	Concrete spalled and 10 rebars exposed. Spall area: 7'-6" long parallel to traffic with dimension c=2"
(41)(42)(43)(44)(45)(46)	Type I	Concrete spalled and 1 rebar exposed. Spall area: 10" long parallel to traffic with dimension a=10"
(47)	Type III	Concrete spalled and 16 rebars exposed. Spall area: 12'-0" long parallel to traffic with dimension c=2"
(48)	Type III	Concrete spalled and 7 rebars exposed. Spall area: 6'-0" long parallel to traffic with dimension c=2"
(49)	Type III	Concrete spalled and 8 rebars exposed. Spall area: 7'-0" long parallel to traffic with dimension c=2"
(50)	Type III	Concrete spalled and 18 rebars exposed. Spall area: 14'-0" long parallel to traffic with dimension c=2"
(51)	Type III	Concrete spalled and 4 rebars exposed. Spall area: 3'-0" long parallel to traffic with dimension c=2"
(52)	Type III	Concrete spalled and 5 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension c=2"
(52)	Type I	Concrete spalled and 5 rebars exposed. Spall area: 4'-0" long parallel to traffic with dimension a=10"
(53)	Type III	Concrete spalled and 7 rebars exposed. Spall area: 6'-0" long parallel to traffic with dimension c=2"
(54)	Type I	Concrete spalled and 1 rebar exposed. Spall area: 10" long parallel to traffic with dimension a=10"
(55)	Type III	Concrete spalled and 4 rebars exposed. Spall area: 3'-0" long parallel to traffic with dimension c=2"
(56)	Type III	Concrete spalled and 4 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension c=2"
(56)	Type I	Concrete spalled and 4 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension a=10"
(57)	Type I	Concrete spalled and 9 rebars exposed. Spall area: 7'-0" long parallel to traffic with dimension a=10"
(58)	Type I	Concrete spalled and 9 rebars exposed. Spall area: 7'-0" long parallel to traffic with dimension a=10"
(58)	Type III	Concrete spalled and 9 rebars exposed. Spall area: 7'-0" long parallel to traffic with dimension c=2"
(59)	Type I	Concrete spalled and 4 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension a=10"
(59)	Type III	Concrete spalled and 4 rebars exposed. Spall area: 3'-6" long parallel to traffic with dimension c=2"

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

J:/COE HI-REHAB/STRUCT/ST-DET1.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Hui Pang Chen

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

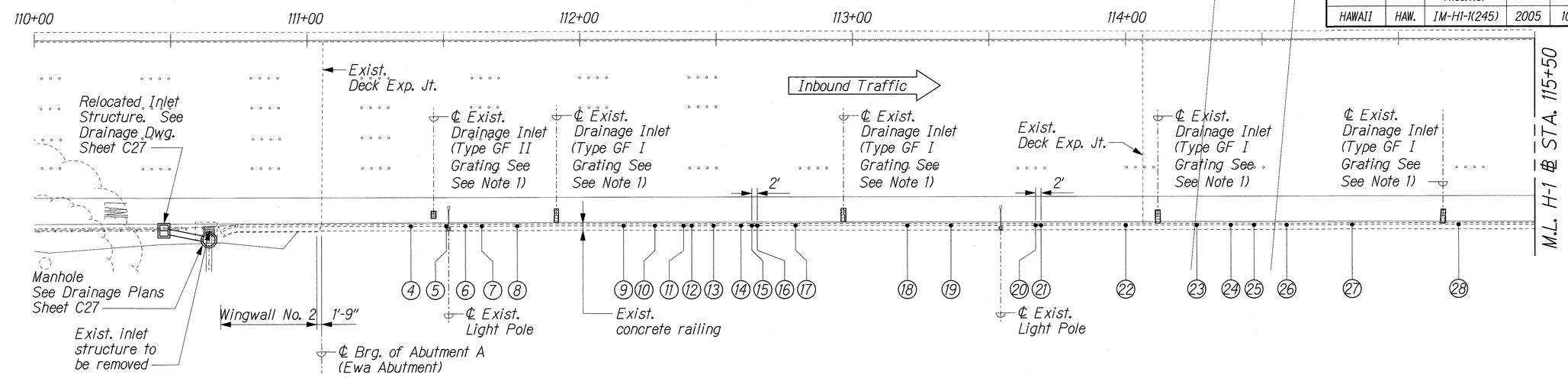
WAIMALU VIADUCT
NOTES AND TABLE

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: As Shown Date: Jan. 24, 2006

SHEET No. 51 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	107	183



LEGEND:

(5) Denotes approximate Locations of Concrete Spalls in existing Concrete Railing. See Table 1 descriptions on Sheet S1.

NOTES:

1. Remove existing deck drain gratings and replace them with steel grates according to details of Type GF I and Type GF II gratings shown on Sheet S10.
2. Remove upper 1'-3" portion of existing open inlet structure and place steel frame and grate according to the details shown on Sheet C27.

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

H:/COE H1 REHAB/STRUCT/ST-DET2.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Hui Pang Chen

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

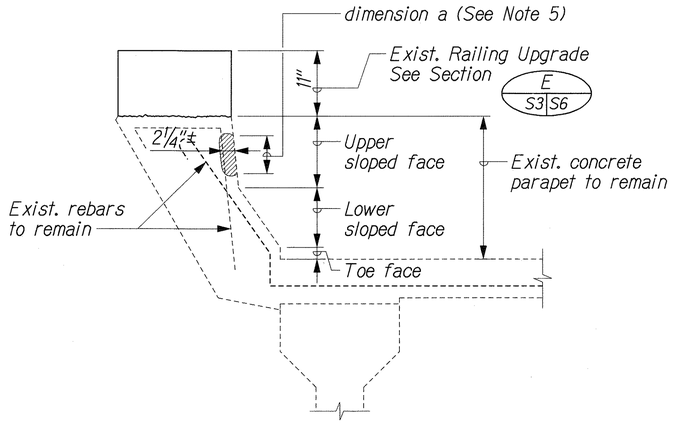
WAIMALU VIADUCT
PARTIAL EXIST. BRIDGE RAILING PLAN

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: 1" = 20' Date: Jan. 24, 2006

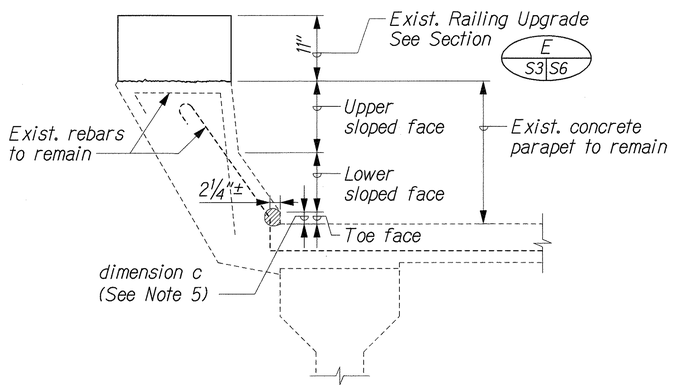
SHEET No. S2 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	108	183



TYPE I: CONCRETE SPALL AND REPAIR AT UPPER SLOPED FACE

Scale: 1" = 1'- 0"



TYPE III: CONCRETE SPALL AND REPAIR AT TOE FACE

Scale: 1" = 1'- 0"

NOTES:

1. See Note 1 on Sht. S1.
2. Remove all deteriorated concrete, dirt, oil, grease and all bond-inhibiting materials at the indicated spalled areas.
3. All exposed rebars in the spalled areas shall be thoroughly prepared by mechanical cleaning to remove all traces of rust and unsound concrete. Where corrosion has occurred due to the presence of chlorides, the rebars shall be high pressure washed (15,000 psi min.) with clean water after mechanical cleaning.
4. The patch material for the spalled areas shall be polymer-modified, cementitious, fast-setting, high early strength, penetrating corrosion inhibitor, non-sag mortar. Minimum compressive strength of patch mortar shall be able to attain 3000 psi in 12 hours or less.
5. For dimensions a and c, see Table 1 on Sht. S1.
6. Removal of spalled areas shall be started with sawcut to prevent disturbance to sound concrete areas. Only vibratory tools (15 lbs. max.) approved by the Engineer will be allowed for the concrete removal.
7. Forming for repair area may be required as per recommendations of patch material manufacturer.

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

J:/COE HI-REHAB/STRUCT/ST-DET3.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Huipang Chen

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WAIMALU VIADUCT

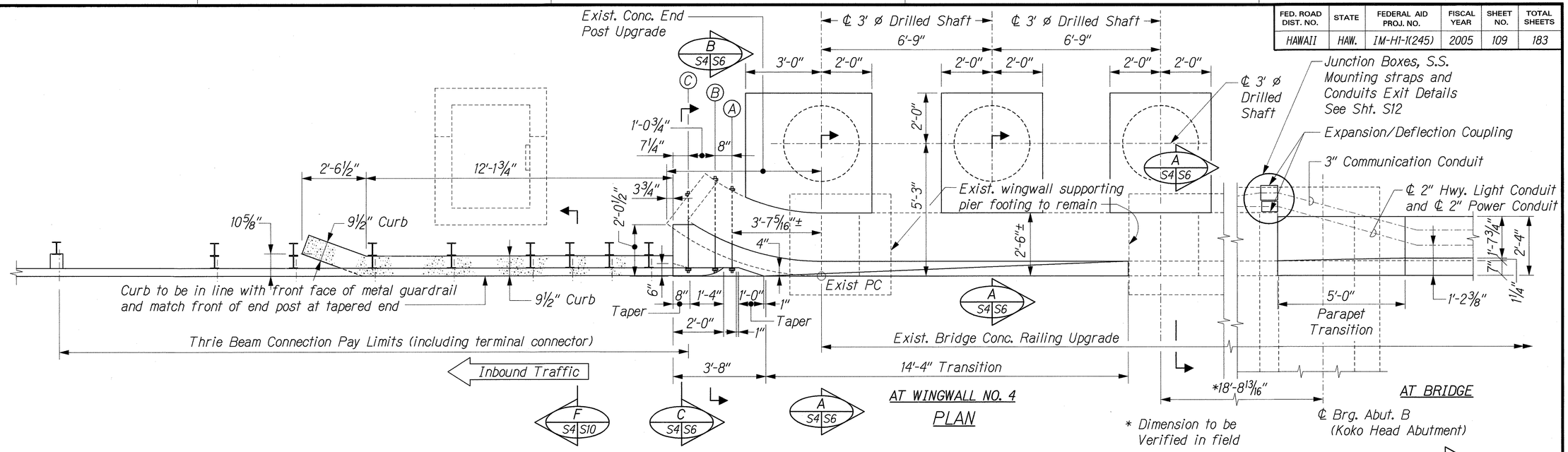
EXIST. CONC. SPALL REPAIR DETAILS

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: As Shown Date: Jan. 24, 2006

SHEET No. S3 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	109	183



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

J:\COE HI-REHAB\STRUCT\ST-DET4.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

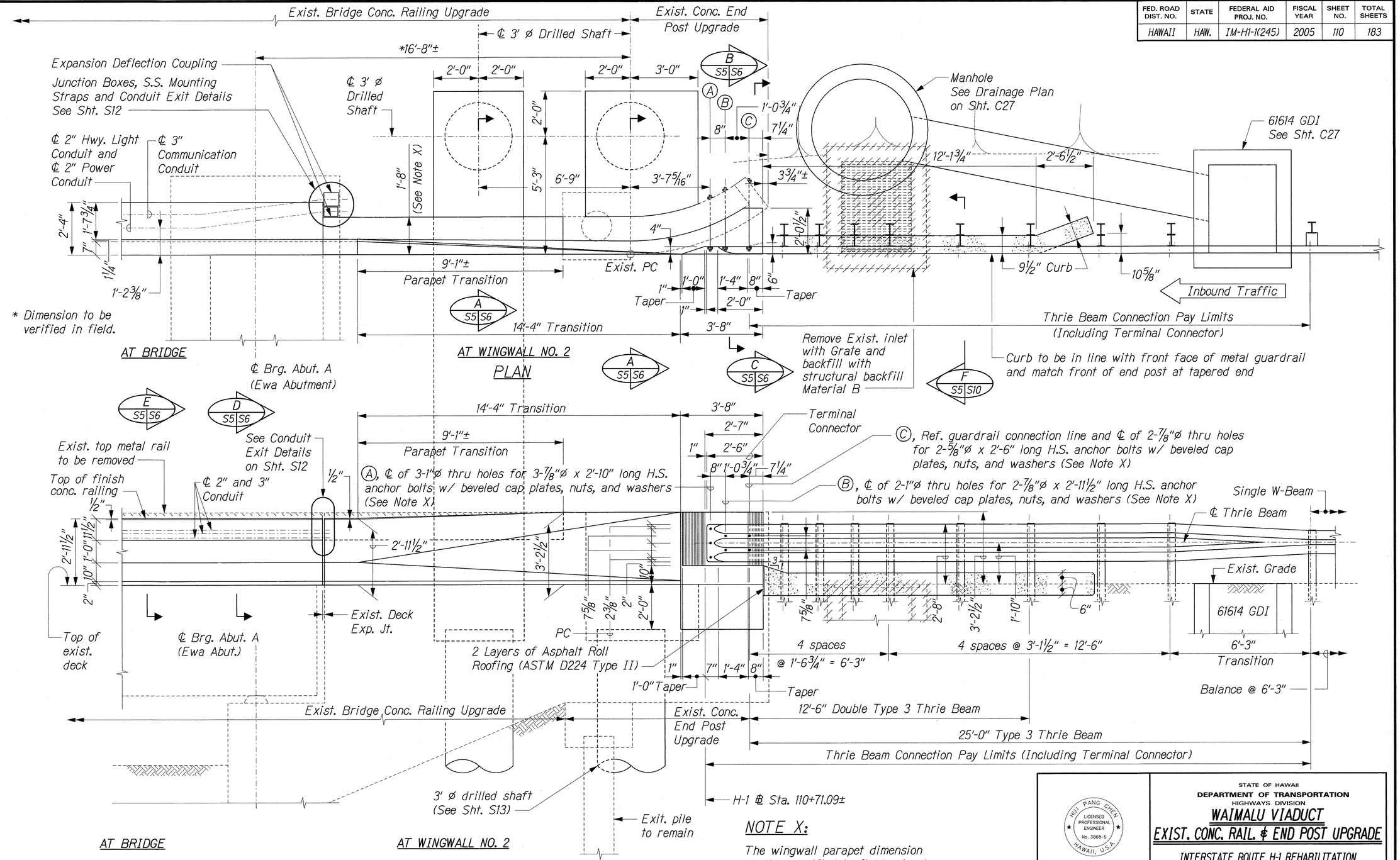
WAIMALU VIADUCT
EXIST. CONC. RAIL & END POST UPGRADE

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: As Shown Date: Jan. 24, 2006

SHEET No. S4 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	110	183



NOTE X:

The wingwall parapet dimension shall be verified in field prior to fabrication of the guardrail anchor bolts. The Contractor shall adjust the lengths of anchor bolts after verification.

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WAIMALU VIADUCT

EXIST. CONC. RAIL. & END POST UPGRADE

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

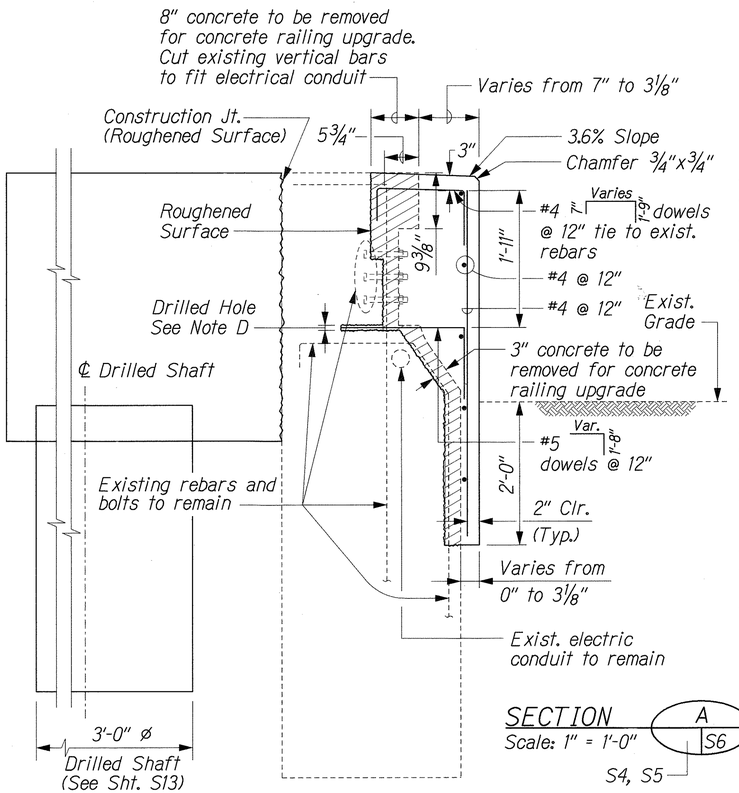
Scale: As Shown Date: Jan. 24, 2006

SHEET No. S5 OF 14 SHEETS

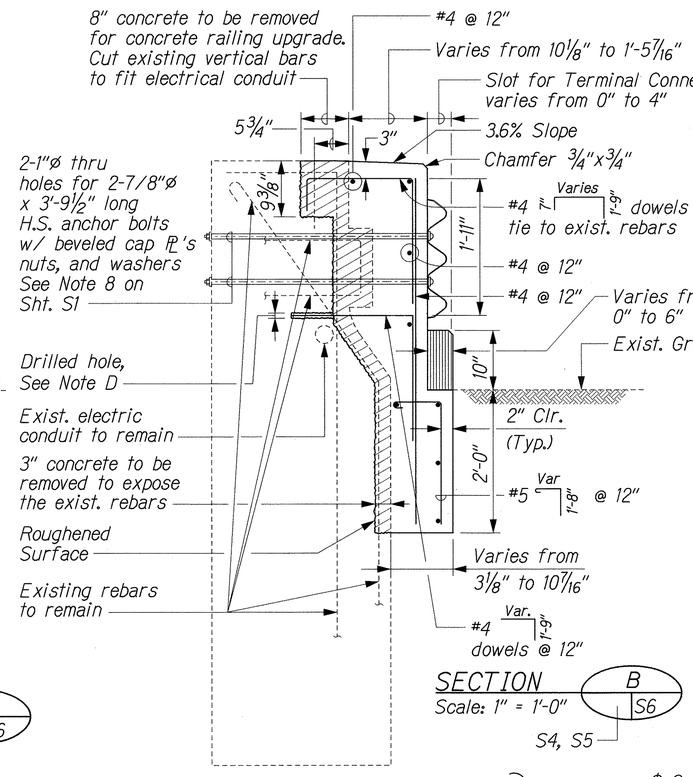
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

J:/COE HI-REHAB/STRUCT/ST-DET5.dgn

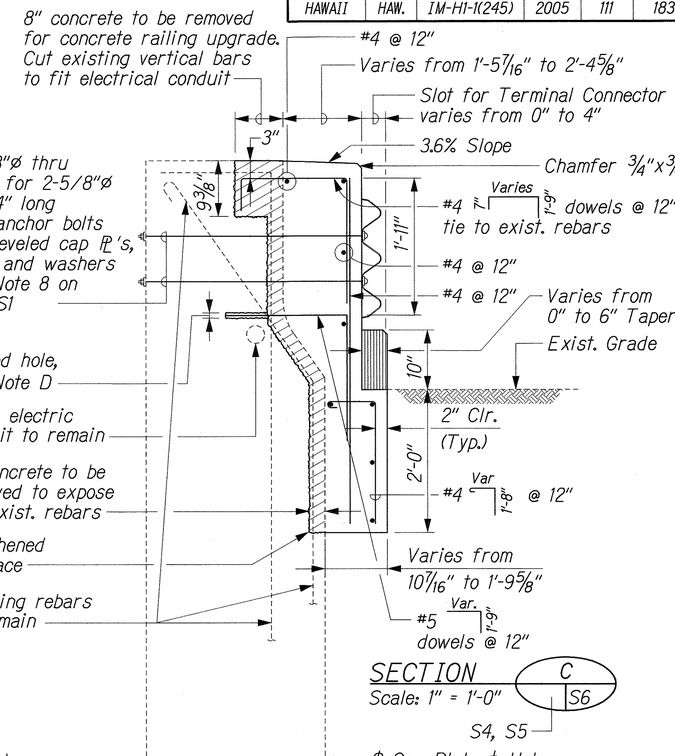
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	111	183



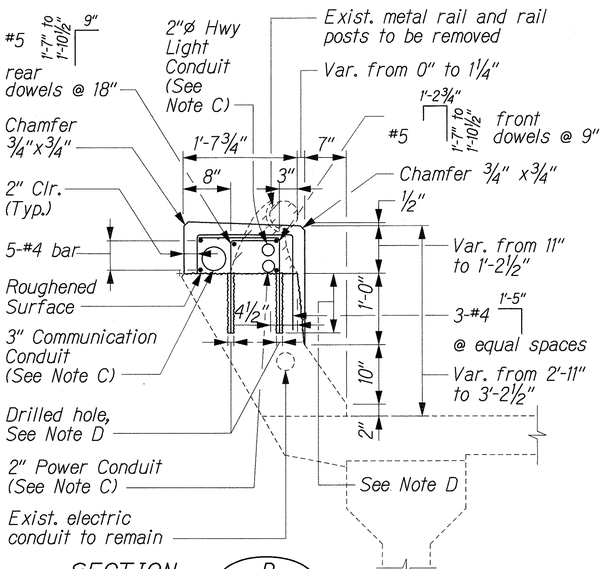
SECTION A
Scale: 1" = 1'-0"
S6
S4, S5



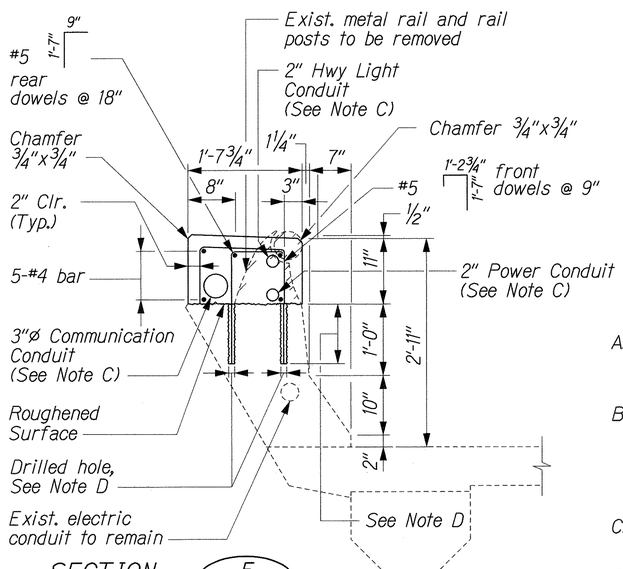
SECTION B
Scale: 1" = 1'-0"
S6
S4, S5



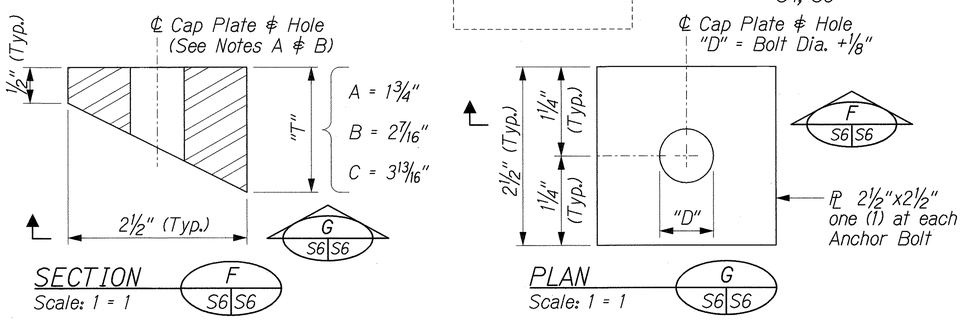
SECTION C
Scale: 1" = 1'-0"
S6
S4, S5



SECTION D
Scale: 1" = 1'-0"
S6
S3, S4, S5



SECTION E
Scale: 1" = 1'-0"
S6
S3, S4, S5, S7



NOTES:

BEVELED CAP PLATE DETAILS

A. Beveled cap plates shall be per ASTM A36 and galvanized after fabrication per ASTM A123.

B. Beveled cap plates, anchor bolts including nuts and washers and other appurtenances will be considered incidental to the metal guardrail.

C. For conduit locations in parapet, See Shts. S11 and S12.

D. Provide ¾"ø x 9½" min. depth drilled holes for #5 dowels of epoxy adhesive rebar anchors. See Notes 4 and 5 on Sheet S1.

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

J:/COE HI-REHAB/STRUCT/ST-DET6.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

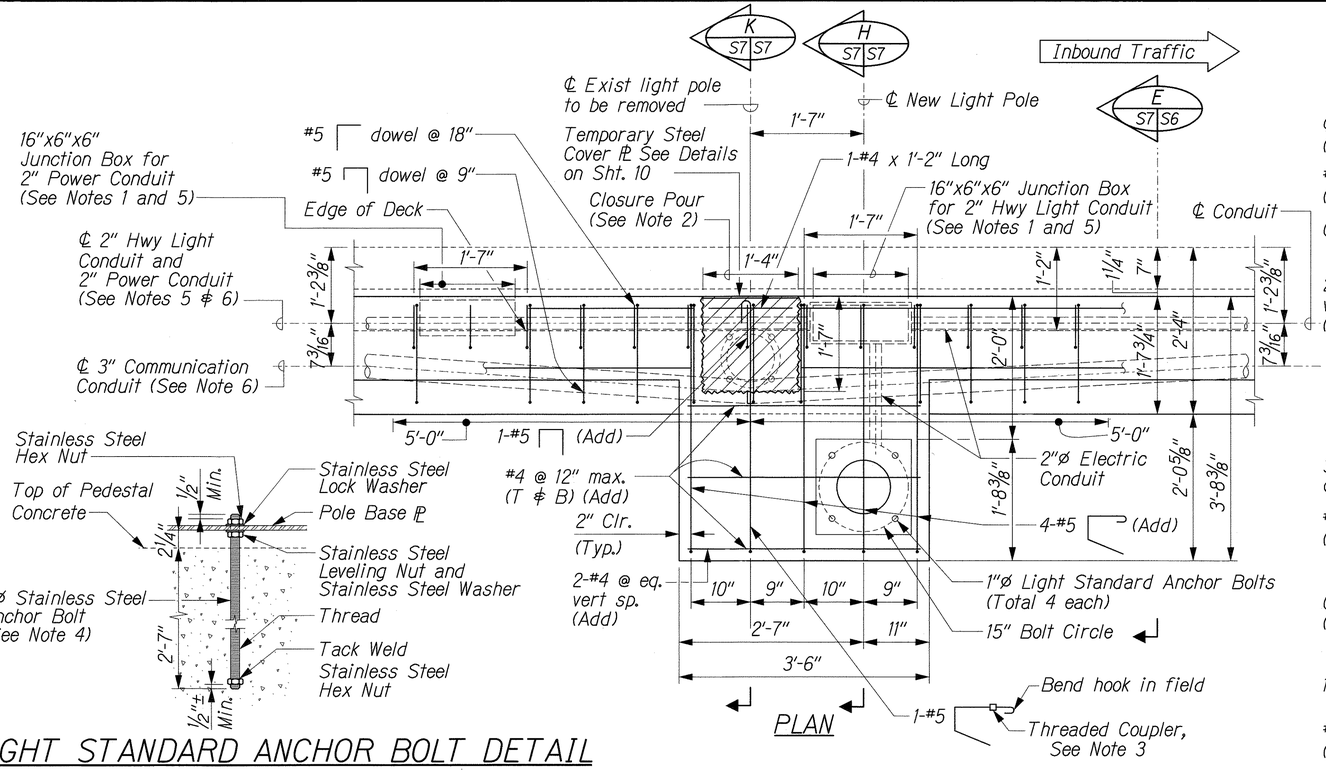
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WAIMALU VIADUCT
MISCELLANEOUS DETAILS - 1
INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: As Shown Date: Jan. 24, 2006

SHEET No. S6 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(245)	2005	112	183



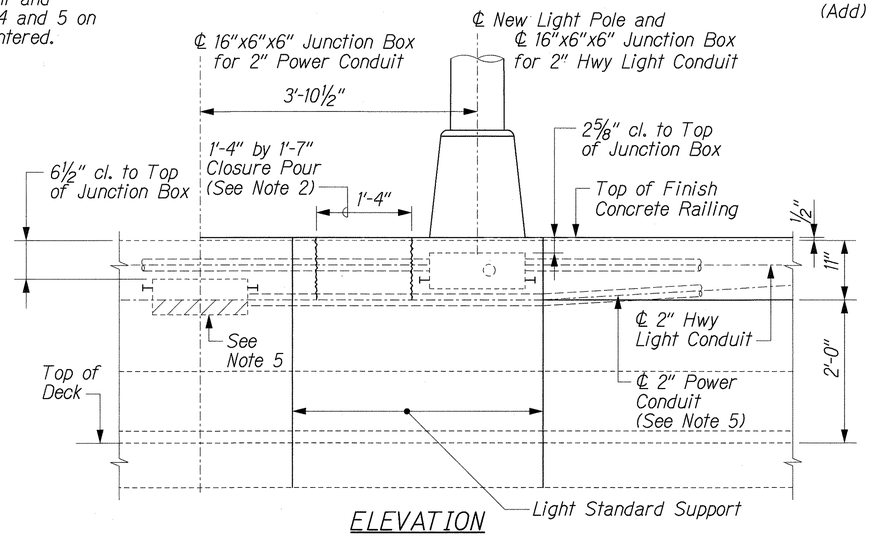
LIGHT STANDARD ANCHOR BOLT DETAIL

Not to Scale

NOTES:

(See Note 13 on Sheet S1)

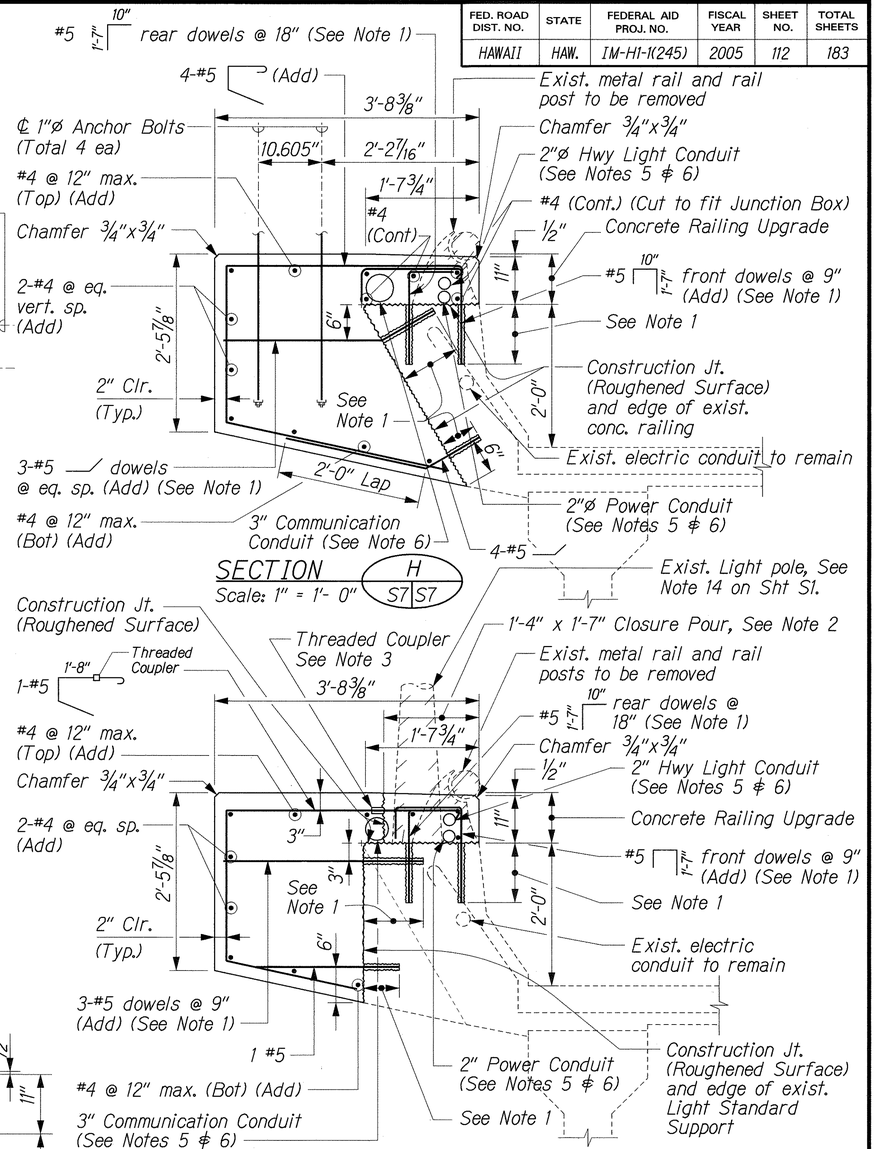
1. Provide 3/4"ø x 9 1/2" minimum depth drilled holes for #5 front and rear dowels of epoxy adhesive rebar anchors. See Notes 4 and 5 on Sheet S1. Omit the front dowel where Junction Box encountered.
2. Provide 1'-4" x 1'-7" pocket around each existing Light Standard for closure pour of concrete railing upgrade. Each closure pour concrete shall be placed only after each existing Light Standard is removed. See Note 14 on Sheet S1.
3. The rebar coupler shown shall be protected for rebar connection in the closure pour.
4. All Light Standard Anchor Bolts shall be supported by rigid template to hold the bolts in position as shown during Light Standard Support Construction. The Stainless Steel anchor bolts shall not contact any rebar in placement.
5. At the junction box area, the Contractor may chip the top of existing parapet concrete 2" down to allow for the 2" conduits passing either over or under the junction box without conflicting each other.
6. The 2" Hwy Light conduit shall have transitions in both horizontal and vertical directions so that the conduit can continuously go around the existing light pole and pole base anchor bolts for power connection. If the transitions for the 2" power conduit and 3" communication conduit are difficult to avoid conflicting with the existing light pole and anchor bolts, the Contractor may provide conduit stub-outs at the closure pour ends to allow for the removal of the existing light pole and splicing conduits prior to closure pour. All the stub-out conduits shall be protected during the concrete placements, if any.



ELEVATION

MODIFICATION OF CONCRETE RAILING AT LIGHT STANDARD SUPPORT

Scale: 1" = 1'- 0"



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

J:/COE HI-REHAB/STRUCT/ST-DET1.dgn

HUI PANG CHEN
LICENSED PROFESSIONAL ENGINEER
No. 3865-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Hui Pang Chen

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WAIMALU VIADUCT
MISCELLANEOUS DETAILS - 2

INTERSTATE ROUTE H-1 REHABILITATION
EASTBOUND LANES
WAIAU INTERCHANGE TO KAIMAKANI STREET

Scale: As Shown Date: Jan. 24, 2006

SHEET No. S7 OF 14 SHEETS