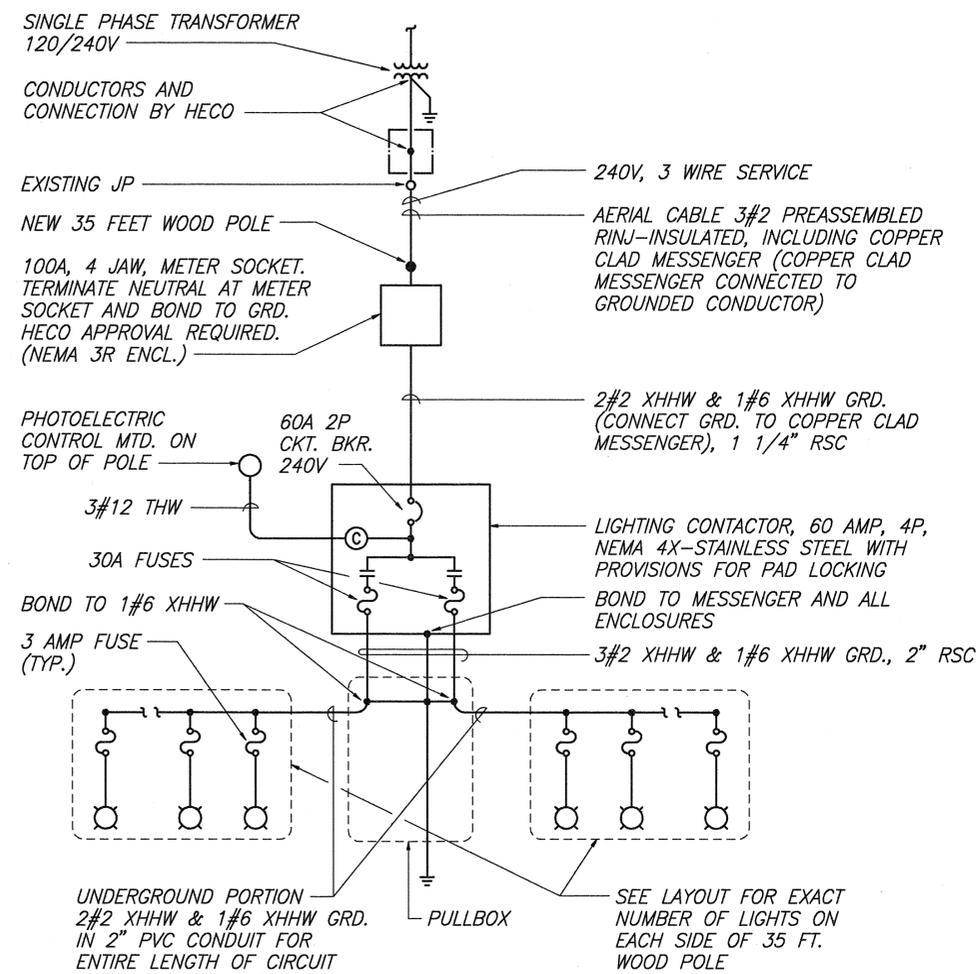
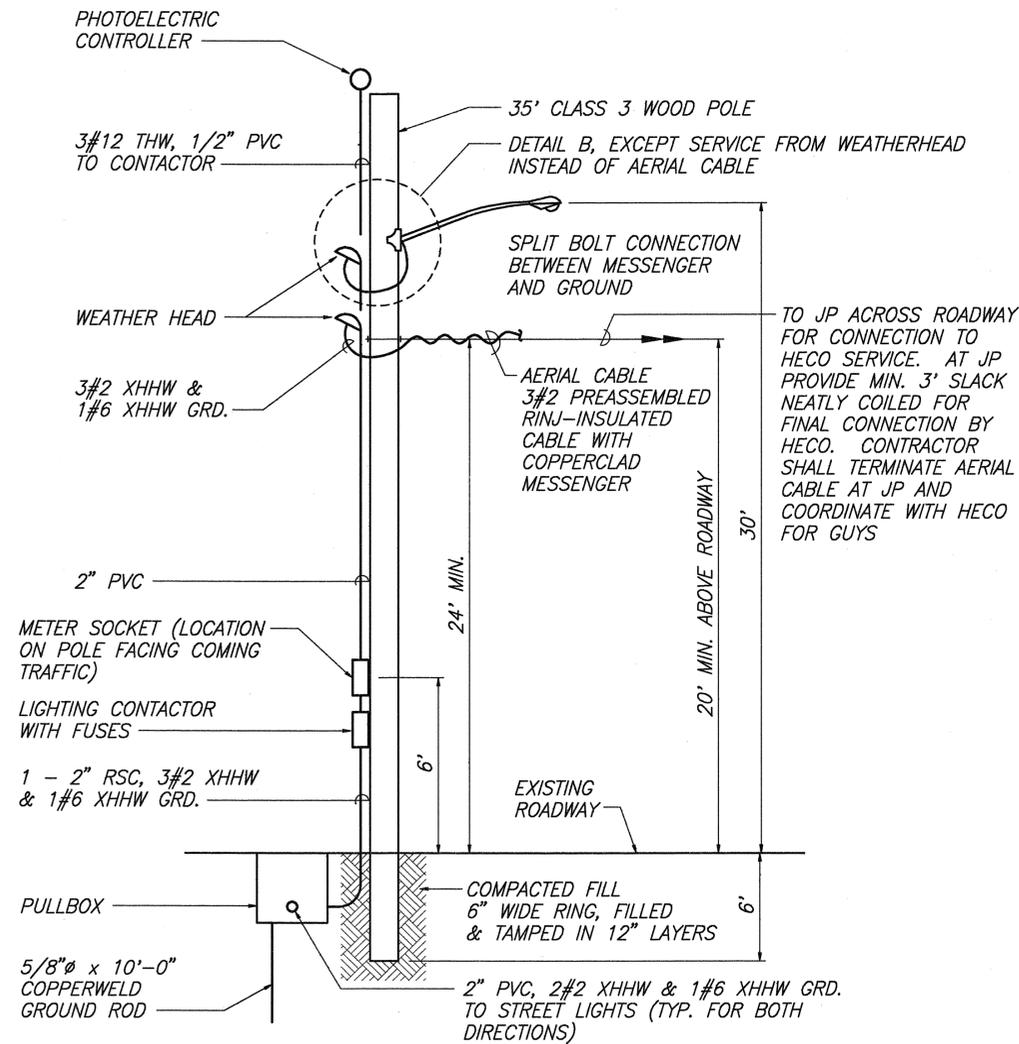


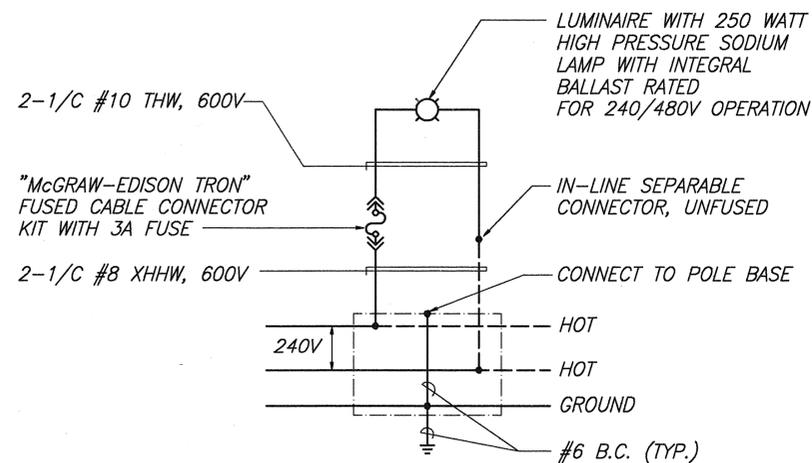
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93A-02-95	1996	10	13



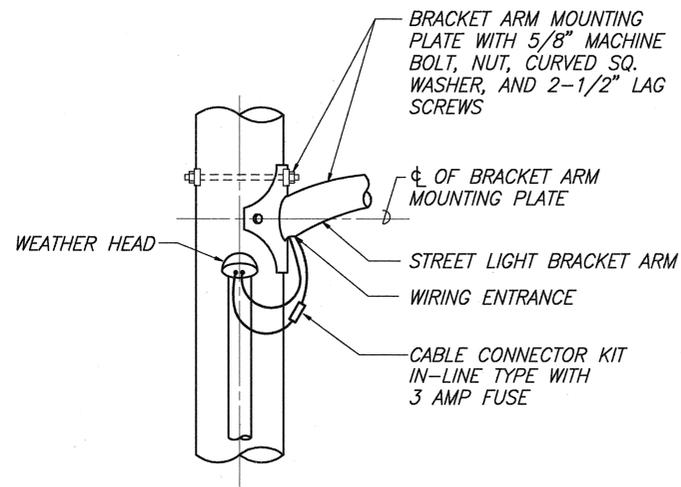
TYPICAL ONE-LINE DIAGRAM



WOOD POLE FOR HECO SERVICE



TYPICAL LUMINAIRE CONNECTION DIAGRAM



STREET LIGHT MAST ARM MOUNTING

STREET LIGHT ON WOOD POLE DETAIL B

ONE-LINE DIAGRAM LEGEND:

- STREET LIGHT AND POLE NUMBER
- FUSE ELEMENT
- CONNECTION
- CONNECTION TO HECO TRANSFORMER SECONDARY BY HECO
- GROUND ROD

DRAWING REVIEW:
 Reviewed for HECO's Facilities Only
 Date 5/14/96 By [Signature]
 Distribution Engineering Department
 Hawaiian Electric Company, Inc.
 HECO's review of these drawings shall in no way relieve the Customer, its Consultant, its Contractor or anyone acting on Customers behalf from the responsibility for engineering, design, materials and any liability associated with this project.



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[Signature]

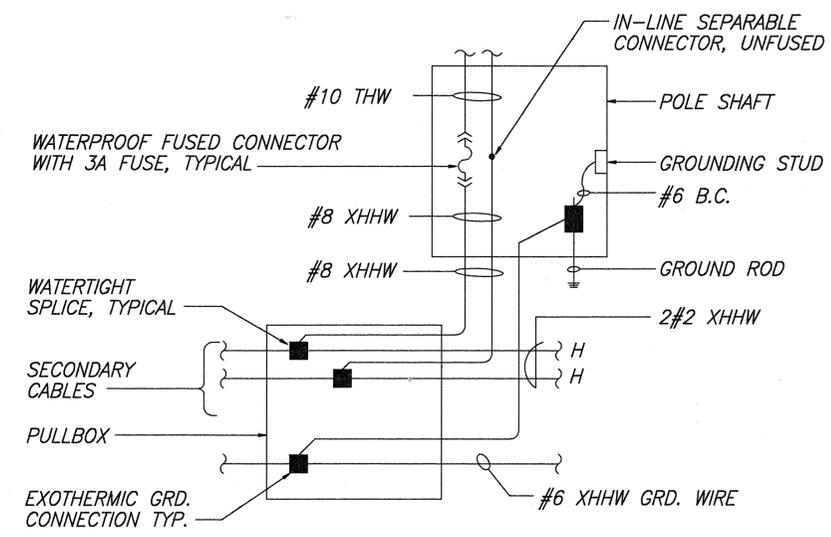
APPROVED:
 HAWAIIAN ELECTRIC COMPANY, DATE

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**HIGHWAY LIGHTING DETAILS
 & ONE-LINE DIAGRAM**
 FARRINGTON HIGHWAY LIGHTING IMPROVEMENTS
 MAIPELA ST. TO LUALEI PLACE
 PROJECT NO. 93A - 02 - 95
 SCALE: As Noted May, 1996
SHEET No. 10 OF 13 SHEETS

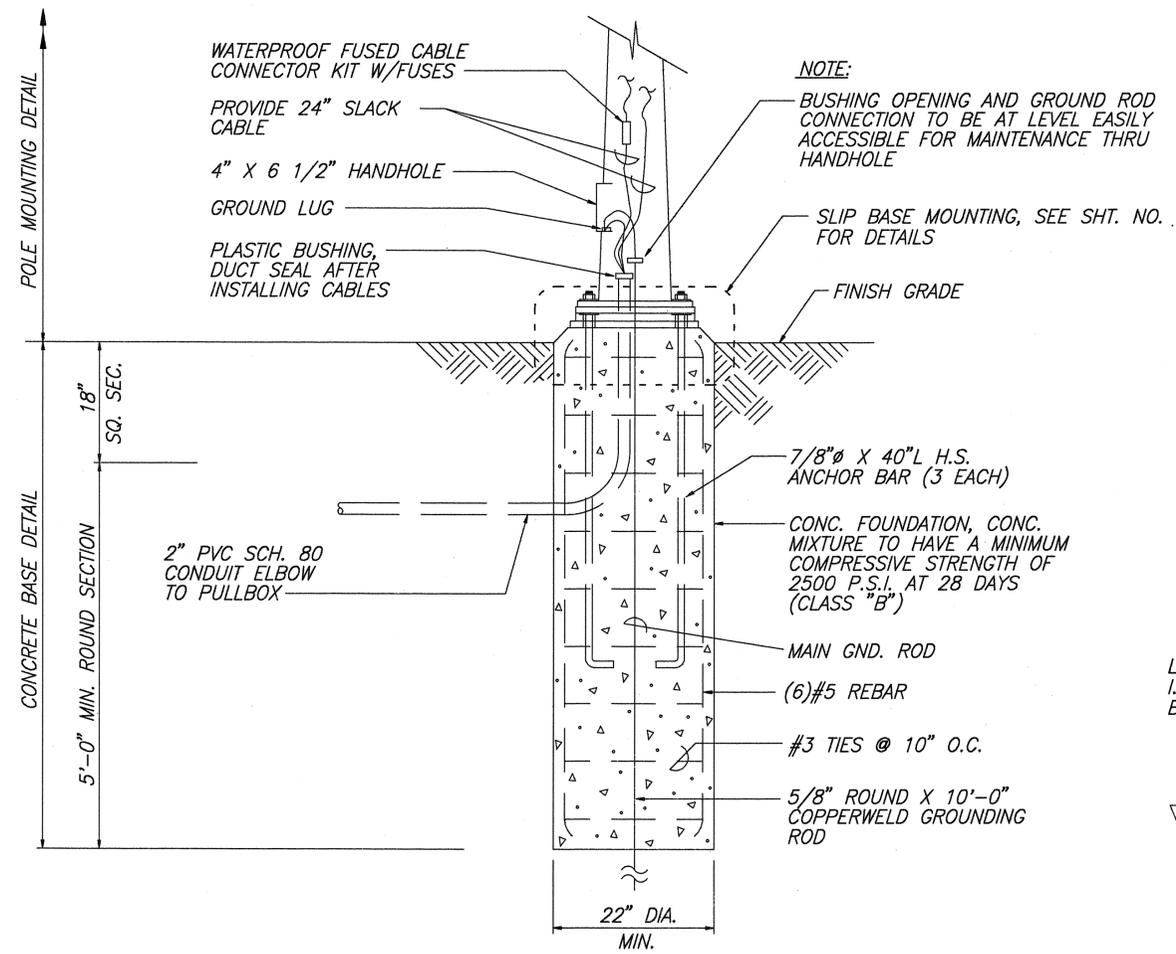
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93A-02-95	1996	11	13

NOTES:

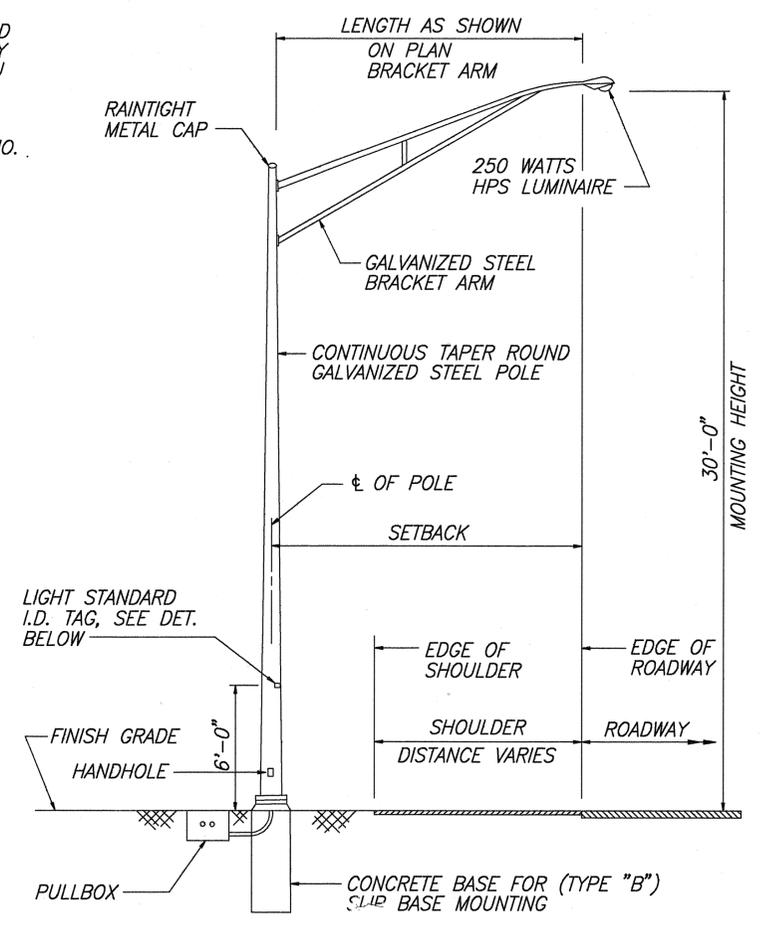
- ALL STEEL SHAFTS, PLATES, MAST ARMS, BOLTS, SCREWS, NUTS AND WASHERS TO BE GALV. AFTER FABRICATION OR MODIFICATION.
- 4" X 6 1/2" HANDHOLE REINFORCED W/#3 GA. RING 1 1/2" WIDE WELDED TO OUTSIDE OF POLE COVER OF 10 GA. PLATE LOCATE 90 DEGREES OF MAST ARM UNLESS SHOWN OTHERWISE.
- ROUND TAPERED STEEL TUBE W/MAX. TAPER OF 0.15"/FOOT.
- NO. 11 GAGE SHEET STEEL OF WELDABLE GRADE ACCEPTABLE IF STEEL AFTER FABRICATION HAS A MIN. YIELD STRENGTH OF 40,000 PSI.



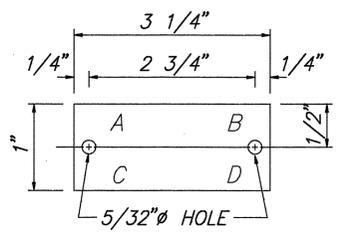
**WIRING CONNECTION DIAGRAM
SLIP BASE**



**CONCRETE BASE AND POLE MOUNTING DETAIL
SLIP BASE (TYPE "B")**



**TYPICAL LIGHT STANDARD INSTALLATION
SLIP BASE (TYPE "B")**

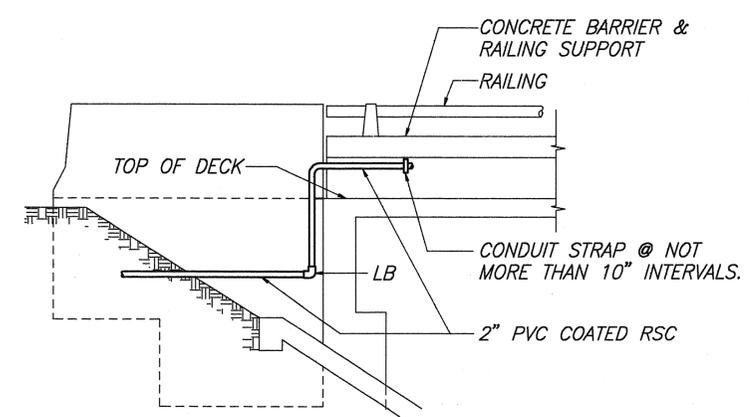


LEGEND
A- METER NUMBER
B- LIGHT POLE NUMBER
C- LAMP DATA, N FOR H.P.S.
D- REFRACTOR DATA

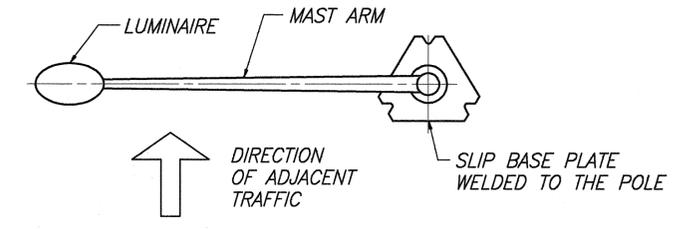
NOTES:

- TAG SHALL BE MADE FROM 3 PLY BLACK-WHITE-BLACK LAMINATED PLASTIC.
- ATTACH TO STEEL POLE WITH NO. 7 CADMIUM PLATED DRIVE SCREWS NO. 29 DRILL HOLES IN POLE.
- ATTACHED ACCORDING TO POLE MANUFACTURER'S RECOMMENDATION.
- LETTERS, NO. 5 REDUCTION 1/64" ENGRAVED.

HIGHWAY LIGHT ID TAG DETAIL



**@ ABUTMENT JOINT
CONDUIT MOUNTING AT MAIPALAOA BRIDGE
(SIMILAR DETAIL @ OPPOSITE END)**



LUMINAIRE SLIP BASE ORIENTATION



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY LIGHTING
SLIP BASE POLE
FARRINGTON HIGHWAY LIGHTING IMPROVEMENTS
MAIPELA ST. TO LUALEI PLACE
PROJECT NO. 93A - 02 - 95
SCALE: None May, 1996
SHEET No. 11 OF 13 SHEETS

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

DESIGN BY: JAMES GUY, CIVIL ENGINEER
DATE: 27, 1995
SCALE: AS SHOWN

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93A-02-95	1996	12	13

NOTES

- ① All steel shafts, \bar{r} 's, mast arms, bolts, screws nuts & washers to be galv. after fab. or modification.
- ② \bar{r} 's to conform to ASTM A-36.
- ③ Cast option to conform to ASTM A-486 CL.90.
- ④ Torque 7/8" \bar{r} H.S. slip base \bar{r} bolts to 84 ft. lbs.
- ⑤ 7/8" \bar{r} H.S. anchor bolts, wrench tighten-torque requirements waived.
- ⑥ Fabricators electing larger than min arm diameters must adjust details as required to permit solid seating of cap screws. In lieu of torque requirements for H.S. bolts, cap screws shall be tightened by the turn of nut method 1/6 turn from snug tight condition. No washer will be required.
- ⑦ 4" x 6 1/2" handhole reinforced w/#3 ga. ring 1 1/2" wide welded to outside of pole cover of 10 ga. \bar{r} . Locate 90 degrees to mast arm unless shown otherwise.
- ⑧ 28 ga. keeper \bar{r} , ASTM A 526, 125 commercial. Place on top of middle flat washer.
- ⑨ Plate washer
- ⑩ 3-7/8" \bar{r} H.S. bolts, thread 6" & galv. 10", w/hex, hd, nut, leveling nut & washer.
- ⑪ Anchor \bar{r} 's may be retained w/hex. hd. nut as shown or as an alt. det. w/5/16" fillet welds all around or formed heads.
- ⑫ Round tapered steel tube w/max. taper of 0.15"/foot.
- ⑬ No. 11 gage sheet steel of weldable grade acceptable if after fabrication steel has a min. yield strength of 40,000 p.s.i.



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Kenneth S. Iwama

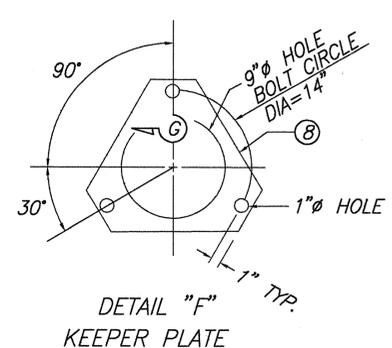
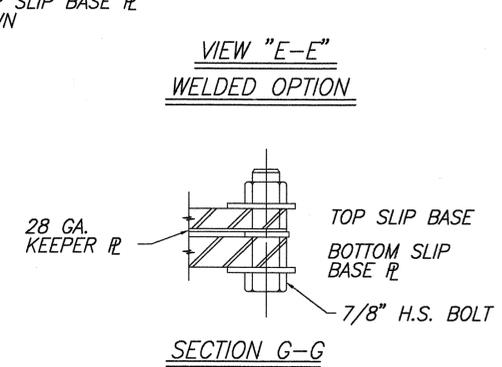
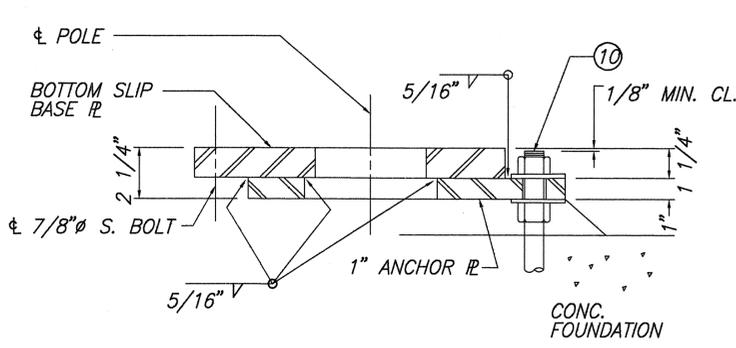
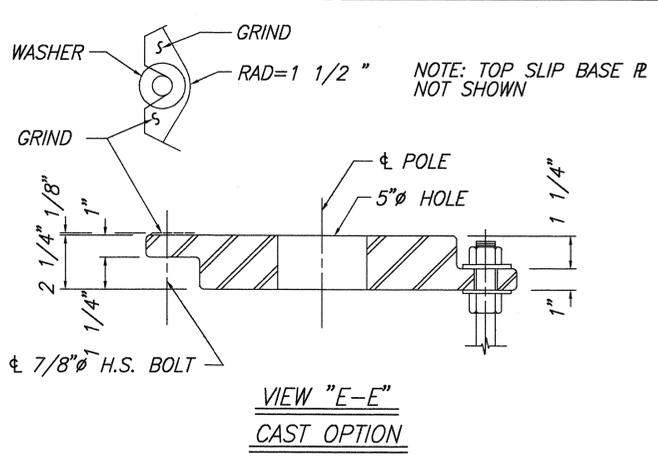
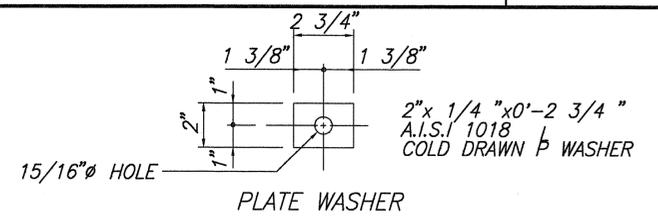
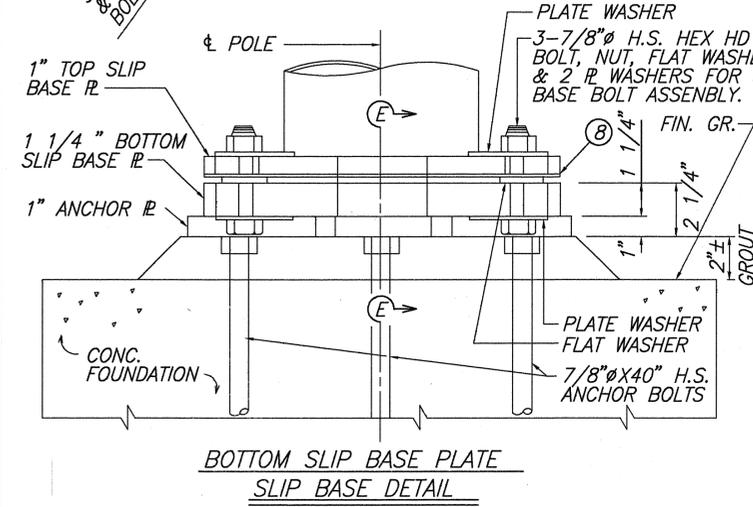
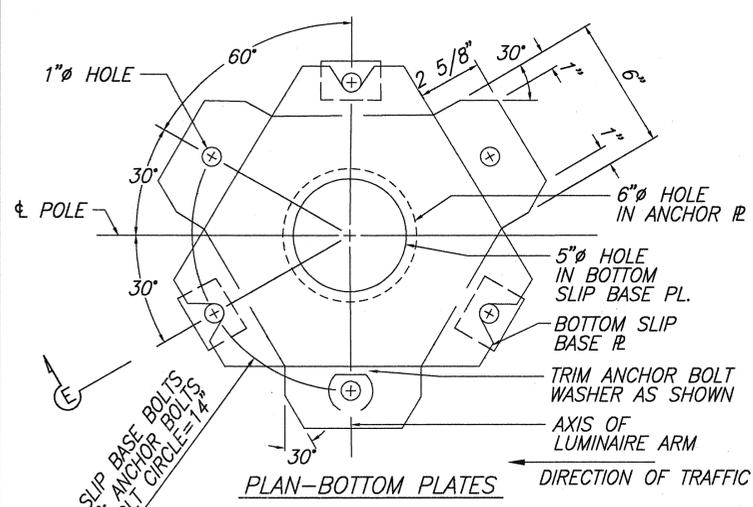
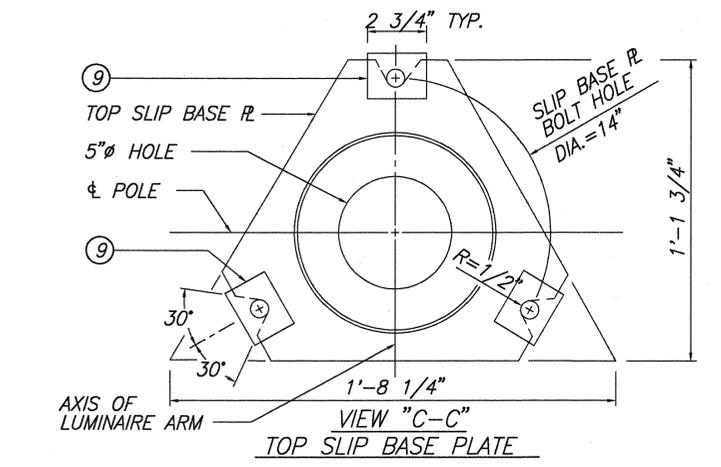
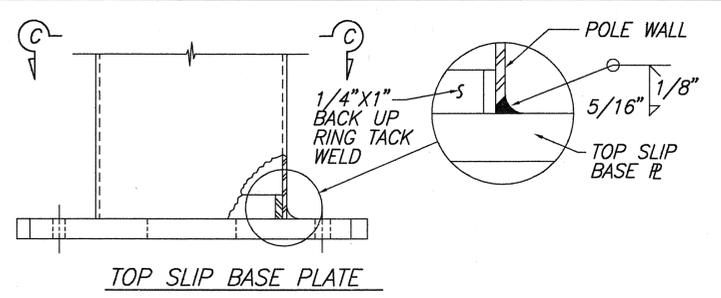
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HIGHWAY LIGHTING
SLIP BASE POLE

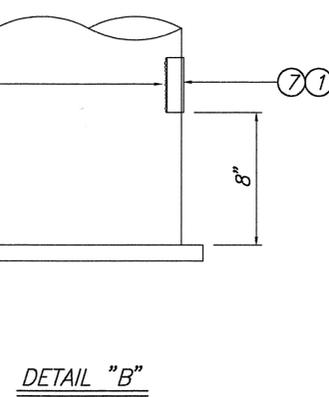
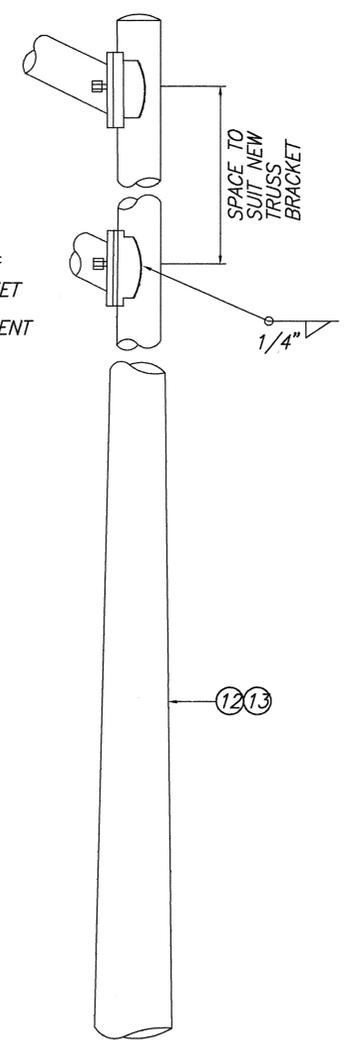
FARRINGTON HIGHWAY LIGHTING IMPROVEMENTS
MAIPELA ST. TO LUALEI PLACE
PROJECT NO. 93A - 02 - 95

SCALE: None May, 1996

SHEET No. 12 OF 13 SHEETS



DETAIL "A"
TRUSS BRACKET
2 BOLTS
ARM ATTACHMENT



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

K.C.L. INC. FAR-HAWAII DOT FAR-LTDZ
May 5, 1996 10:03AM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93A-02-95	1996	13	13

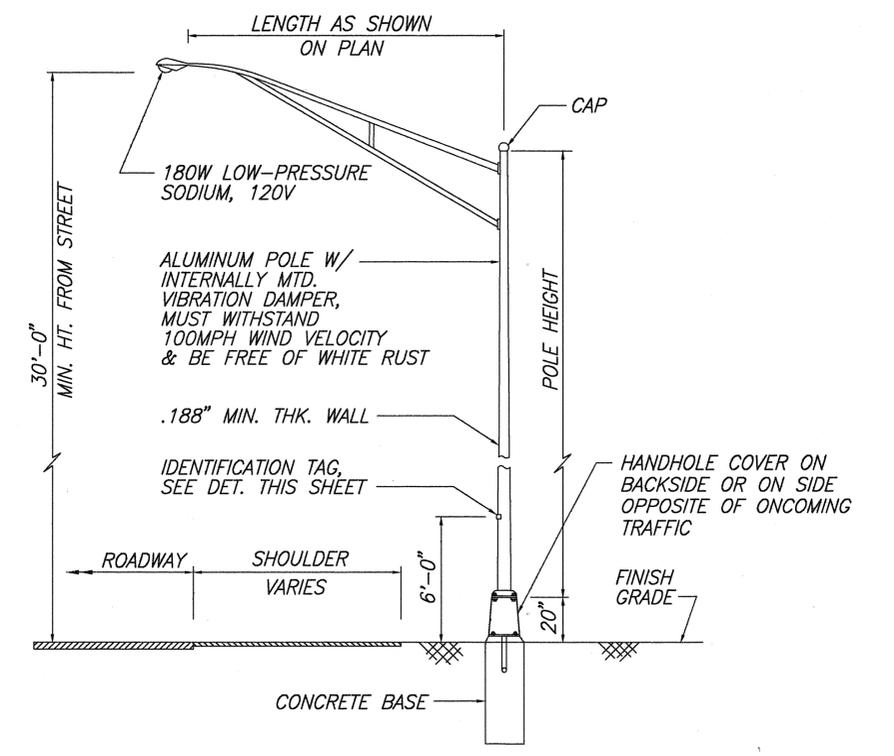
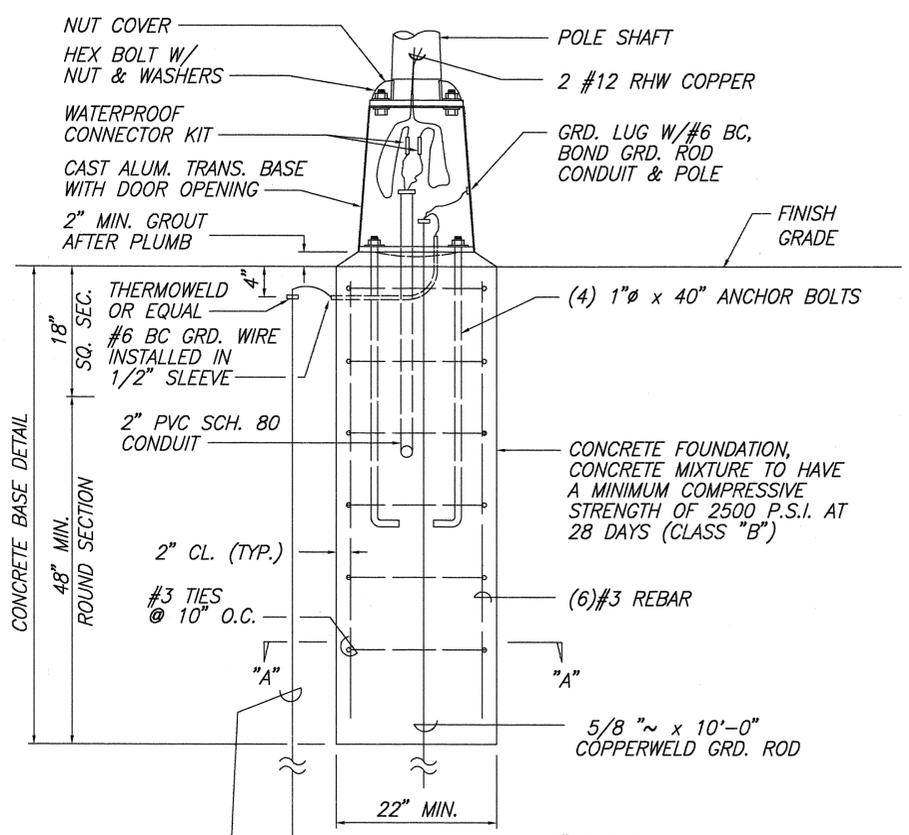
NOTES:

- ALL CONDUIT SHALL BE "PVC" SCHED. 80 FOR DIRECT BURIED OR CONCRETE ENCASEMENT, U.O.N.
- BACKFILL OVER CONCRETE DUCT SECTIONS SHALL BE TYPE "A"
- BACKFILL OVER DIRECT BURIED CONDUITS SHALL BE TYPE "B"
- IF THE NORMAL MATERIAL IN THE BOTTOM OF A TRENCH CONTAINING A DIRECT BURIAL CONDUIT IS NOT TYPE "B" AN ADDITIONAL 3" SHALL BE EXCAVATED AND TYPE "B" BACKFILL PROVIDED.
- CONCRETE FOR DUCTS TO BE 2500 P.S.I. IN 28 DAYS.

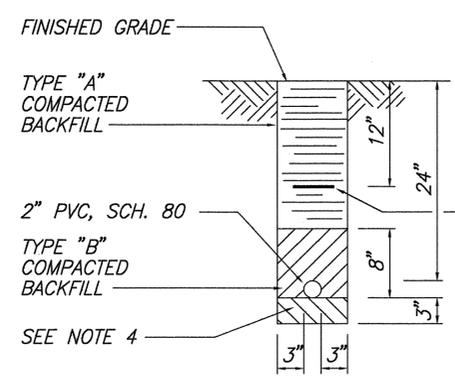
BACKFILL TYPES ARE:

TYPE "A": BEACH SAND, EARTH, OR EARTH AND GRAVEL. IF EARTH AND GRAVEL USED, THE MAXIMUM ROCK SIZE SHALL BE 1" AND THE MIXTURE SHALL CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES.

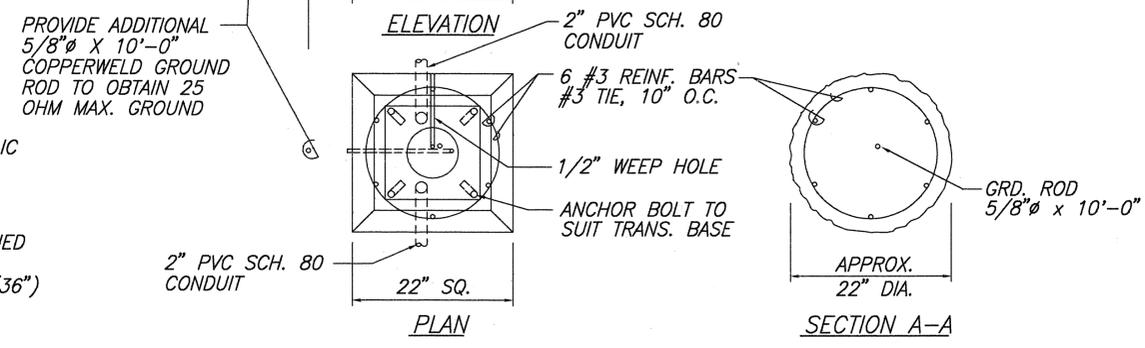
TYPE "B": BEACH SAND, EARTH, OR EARTH AND GRAVEL. IF EARTH AND GRAVEL USED, MIXTURE MUST PASS A 1/2" MESH SCREEN AND CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.



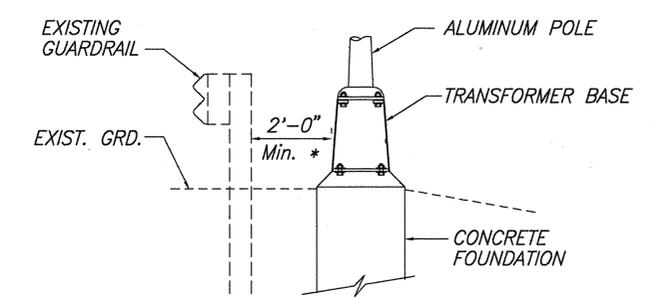
TYPICAL LIGHT STANDARD INSTALLATION WITH TRANSFORMER BASE



TYPICAL DUCT SECTION (DIRECT BURIED)



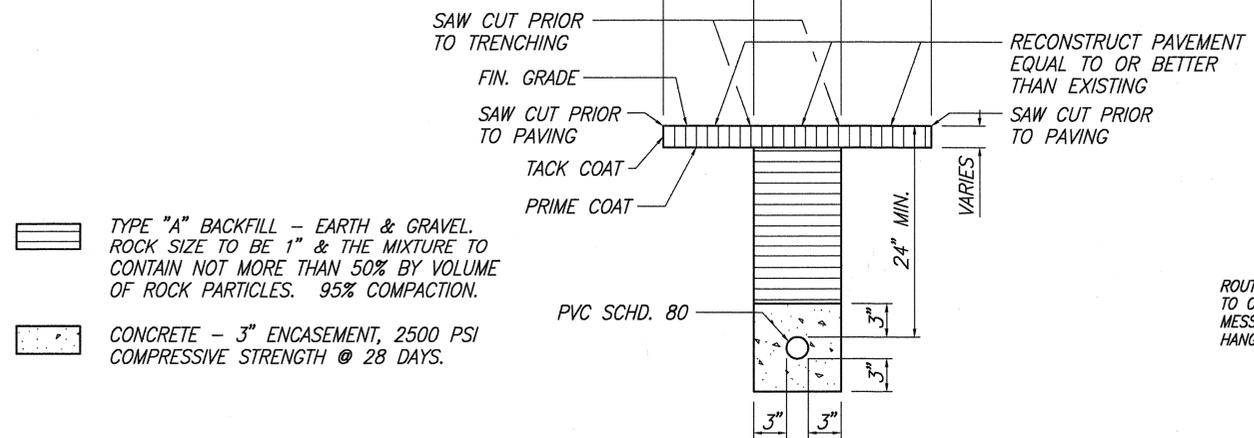
CONCRETE FOUNDATION AND TRANSFORMER BASE DETAIL



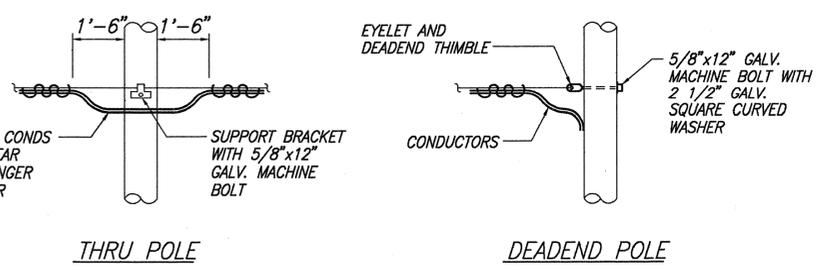
* - IF 2'-0" MIN. CAN NOT BE MAINTAINED DUE TO CONFLICT WITH OTHER UTILITIES, COORDINATE FIELD ADJUSTMENTS WITH ENGINEER.

HIGHWAY LIGHTING DETAIL

SURVEY PLOTTED BY: _____ DATE: _____
 DRAWN BY: _____
 CHECKED BY: _____
 ORIGINAL PLAN: _____
 NOTE BOOK: _____
 No. _____



TYPICAL TRENCH DETAIL - STREET LIGHT NOT TO SCALE



AERIAL CABLE TERMINATION DETAILS NOT TO SCALE



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Kenneth S. Izumi

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

**HIGHWAY LIGHTING
 TRANSFORMER BASE POLE**

FARRINGTON HIGHWAY LIGHTING IMPROVEMENTS
 MAIPELA ST. TO LUALEI PLACE
 PROJECT NO. 93A - 02 - 95

SCALE: None May, 1996

SHEET No. 13 OF 13 SHEETS