

HIGHWAY LIGHTING NOTES

(For Additional Notes, See Sheet 84)

1.

The Contractor Shall Notify Electrical Maintenance Section, Department Of Transportation, State Highway Division, 72 hours In Advance Before Commencing Installation Of Highway Lighting System. Phone: 837-8056.

2.

All Luminaries Shall Be High Pressure Sodium Type With Wattage And I.E.S. Type Light Distribution As Shown On The Approved Plans.

3.

The Contractor Shall Have One Set Of Approved Plans At Job Site At All Times During The Construction Work And Record All Changes Occur On Construction Of Highway Lighting System.

4.

The Contractor Shall Stencil Date Of Installation At The Bottom Of Photocell. One Photocell Only Is Required As Indicated On Plan.

5.

Final Acceptance And Inspection Will Be Undertaken Only After All Work Has Been Completed.

6.

The Contractor Shall Measure And Record Ground Resistance At Each Standard in the Presence of an Oahu District Maintenance Representative and Submit Recorded Ground Resistance To Oahu District Maintenance Section, Department Of Transportation, State Highway. The Contractor's Electrical Engineer Shall Certify All Electrical Tests, Including But Not Limited To: Continuity Test and the Ground Rod Resistant Test Prior To Submission To The Engineer.

7.

Trim Tree Branches To Clear Removal Or Installation Of Street Light Standards, At No Additional Cost To The State.

8.

Construction Work Shall Be Scheduled In Such A Manner That Street Lighting Is Provided During All Hours Of Darkness Either With New Or Existing Luminaries Or A Combination Thereof Temporary Connections Shall Be Made To Accomplish This End. The Continuity Of Street Lighting Circuits Shall Be Maintained Until The Existing Series Street Lighting Fixtures Are Ready For Removal.  
The Contractor Shall Reconnect Electrical Power To All Existing Sign Lighting Systems And Underpass Lighting Fixtures. The Contractor Shall Provide Additional Wiring And Conduit As Required For An Operational System, At No Additional Cost To The State.

9.

Where Existing Circuit Highway Lighting Luminaries On Metal Standards Are Indicated To Be Removed, The Luminaire And Pole Shall Be Removed And Disposed Of By The Contractor. The Foundation Shall Be Demolished to 36" Below Grade And The Surfaces Affected Shall Be Restored To Match The Surroundings.

10.

New Pole Locations Shall Be Staked and Approval Of Locations Shall Be Obtained From The Engineer Prior to Installation. Poles Shall be Installed to Clear Utilities, Both Underground and Overhead, and Guardrails.

11.

The Contractor Shall At His Expense Keep The Project And Surrounding Area Free From Dust Nuisance And Shall Be Responsible For Cleaning And Removal Of All Silt And Debris Generated By The Excavation Work And Deposited And Accumulated Within Downstream Waterways, Ditches, Drain Pipes And On Public Roadways. Any Citations (Fines) Received By The State For The Contractor's Noncompliance Of Any Department Of Health Regulations Shall Be Deducted From The Progress Payment.

12.

The Contractor Shall Locate Existing Buried Utility Lined In The Vicinity Of The Excavation Work Prior To Commencing Excavation, As A Minimum An Electronic Magnetic Device For Detection Of Buried Lines Shall Be Utilized Prior To Excavation. This Work Shall Not Be Paid For Separately, But Considered Incidental to the Ductline. Trenches Shall Be Excavated With Care. The Contractor Shall Be Responsible For Damages To Existing Utilities Resulting From His Negligence And Shall Bear Cost Of Repairs To The Utilities. Method Of Repair Shall Be Determined By The Affected Utility Company.
13.

After The Exact Location Of The Lighting Pole Base Is Determined, Place 2" x 2" x 18" Hubs At These Locations To Inform The Engineer For Final Location Approval Prior To Construction Of Light Bases. Actual Field Conditions May Differ From That Shown On These Drawings. Use Extreme Caution When Excavating For New Ductlines.

14.

Provide Conduit Expansion Fitting To Accommodate Expansion And Deflection Where Conduits Cross Seismic Control And Expansion Joints Of Bridge Structures. Expansion Fittings Shall Be:  
a. Weathertight Construction  
b. Insulator Bushing On End Of Movable Conduit.  
c. Factory-Formed Copper Braid Ring Allowing Conduit Expansion And Contraction.  
d. End Fitting Of Feraloy  
e. Steel Conduit Body  
f. Zinc Electroplate And Aluminum Cellulose Lacquer Finish  
g. 8" Maximum Conduit Movement  
h. Crouse-Hinds XJ Series Or Approved Equal

15.

The Electrical Contractor Shall Have Personnel On The Project That Complies With The Following Qualifications:  
a. One (1) Registered Master Electrician In The Company.  
b. Certified Journeyman Electrician At Each Construction Location To Perform Splicing Of Cables And All Required Wiring Work.

16.

Street Lights Installed Behind Protective Barrier that Meet the Minimum 3'-0" Clearance Shall be the Non-Breakaway Type. All Other Conditions Shall Have Breakaway Transformer Bases.

17.

All Ductlines to be Installed in Concrete Shall be Inspected and Approved by the State Inspector and the State Electrical Maintenance Supervisor Before Placing Concrete. Notify the Inspector and Supervisor 48 Hours Before Placing Concrete.

HIGHWAY LIGHTING SYMBOLS

- New Single-Arm Aluminum Pole, 250W HPS w/ Transformer Base

New Single-Arm Aluminum Pole, 150W HPS w/ Transformer Base

Existing Single-Arm Steel Pole, Remove and Demolish Base to 36" Below Existing Adjacent Area. Repair Surface to Match Existing Adjacent Area.

Existing Single-Arm Steel Pole, to Remain

Existing Pullbox, Highway Lighting

New Underground Raceway, Highway Lighting

Existing Underground Raceway, Highway Lighting

Existing Underground Raceway to be Removed, Highway Lighting

New Temporary Overhead Line, Highway Lighting, Insulated Copper, with Messenger

Temporary Overhead Line to be Removed, Highway Lighting

Duct Section Indicator, See Sheet 67 for Duct Sections

Contract No.	Type Installation	Pole No.
Luminaire	1	6
Circuit No.	1-N250 (55V)	II
LBStation	2	A,B
	Sta. 101+40	15'
	Additional Description	

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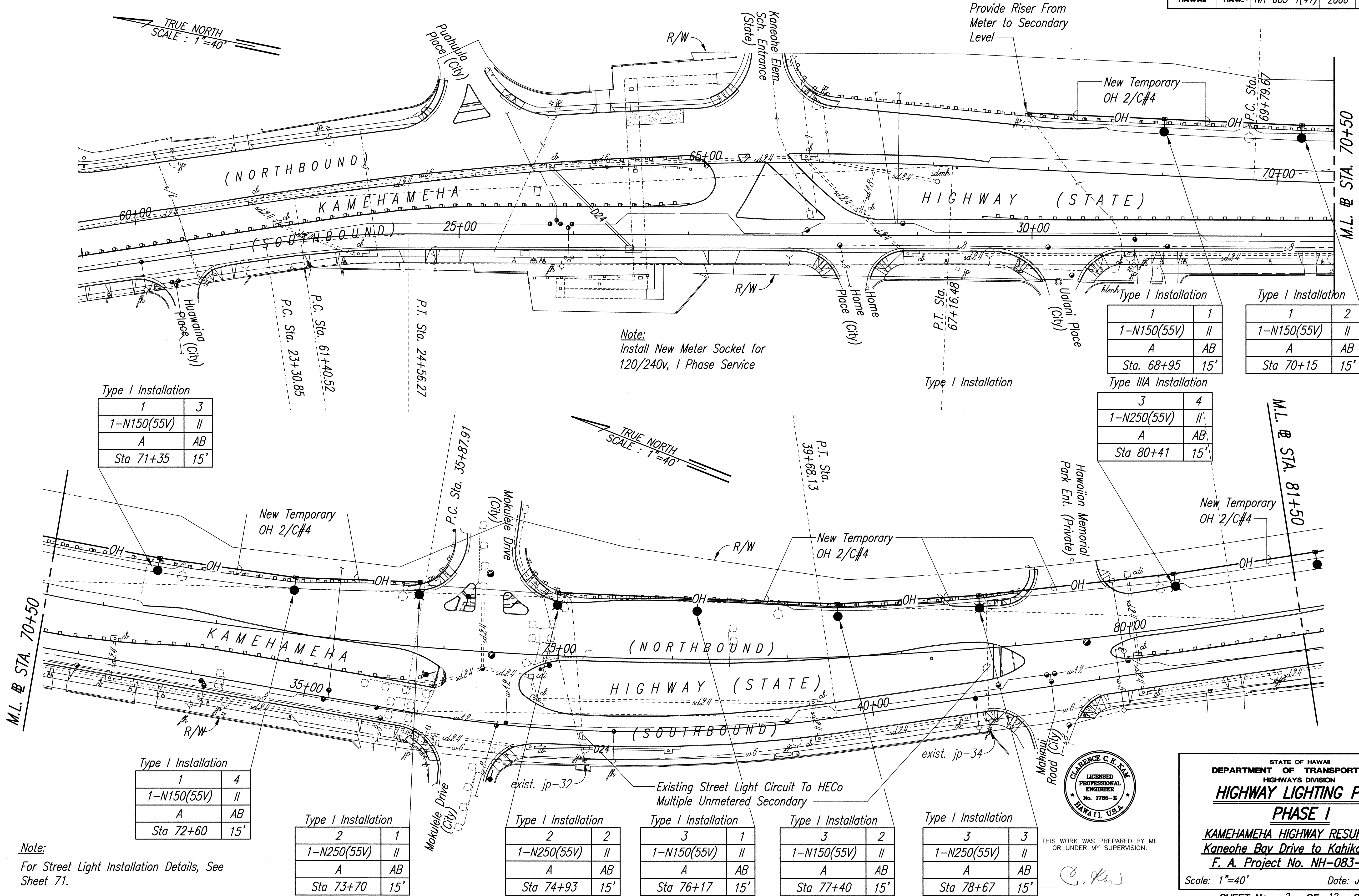
C. F. M.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
HIGHWAY LIGHTING NOTES  
KAMEHAMEHA HIGHWAY RESURFACING  
Kaneohe Bay Drive to Kahiko Street  
F. A. Project No. NH-083-1(41)  
Scale: None Date: June, 1999  
SHEET No. 1 OF 12 SHEETS

60



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	61	90



Type I Installation

1	3
1-N150(55V)	II
A	AB
Sta 71+35	15'

Type I Installation

1	1
1-N150(55V)	II
A	AB
Sta. 68+95	15'

Type I Installation

1	2
1-N150(55V)	II
A	AB
Sta 70+15	15'

Type IIIA Installation

3	4
1-N250(55V)	II
A	AB
Sta 80+41	15'

Type I Installation

1	4
1-N150(55V)	II
A	AB
Sta 72+60	15'

Type I Installation

2	1
1-N250(55V)	II
A	AB
Sta 73+70	15'

Type I Installation

2	2
1-N250(55V)	II
A	AB
Sta 74+93	15'

Type I Installation

3	1
1-N150(55V)	II
A	AB
Sta 76+17	15'

Type I Installation

3	2
1-N150(55V)	II
A	AB
Sta 77+40	15'

Type I Installation

3	3
1-N250(55V)	II
A	AB
Sta 78+67	15'

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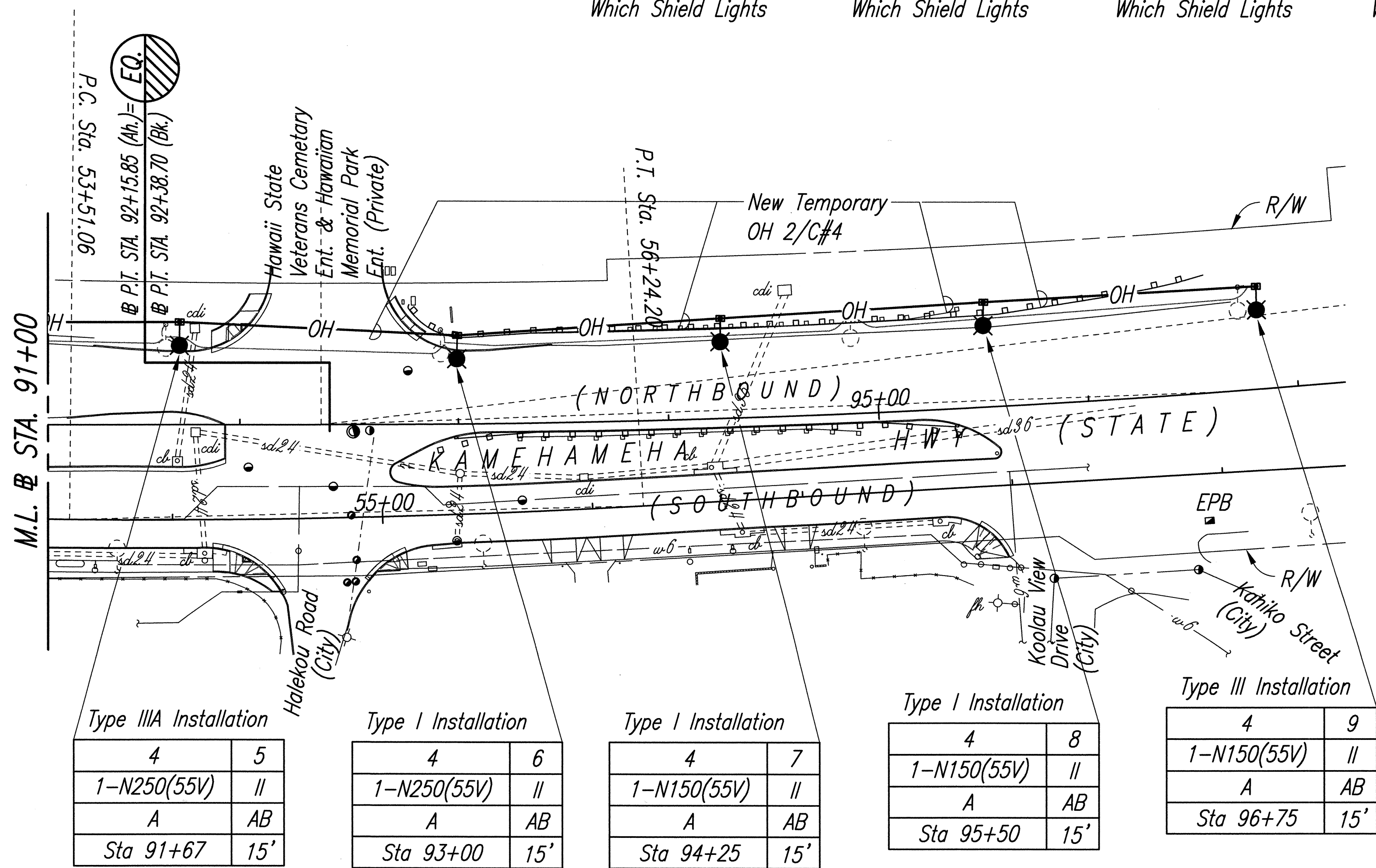
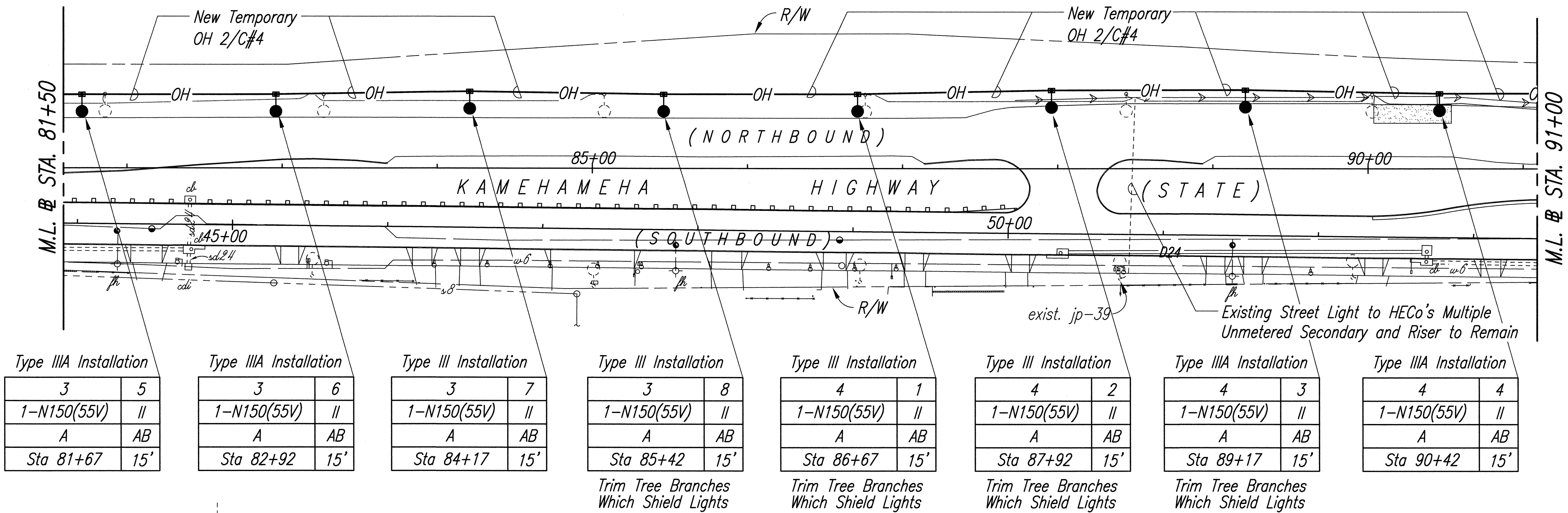
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING PLAN**  
**PHASE I**  
**KAMEHAMEHA HIGHWAY RESURFACING**  
**Kaneohe Bay Drive to Kahiko Street**  
**F. A. Project No. NH-083-1(41)**

Scale: 1"=40'  
Date: June, 1999  
SHEET No. 2 OF 12 SHEETS

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

Note:  
For Street Light Installation Details, See Sheet 71.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	62	90



- Notes:
- For Street Light Installation Details, See Sheet 71.
  - For Tree Trimming, Comply with Requirements of Spec. Section 201. Trim Branches Minimum of 20-Feet on Both Sides of Light Pole. Tree Trimming Shown on Plans are Minimum Requirements.

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



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING PLAN**  
**PHASE I**  
**KAMEHAMEHA HIGHWAY RESURFACING**  
**Kaneohe Bay Drive to Kahiko Street**  
**F. A. Project No. NH-083-1(41)**

Scale: 1"=40'  
Date: June, 1999  
SHEET No. 3 OF 12 SHEETS

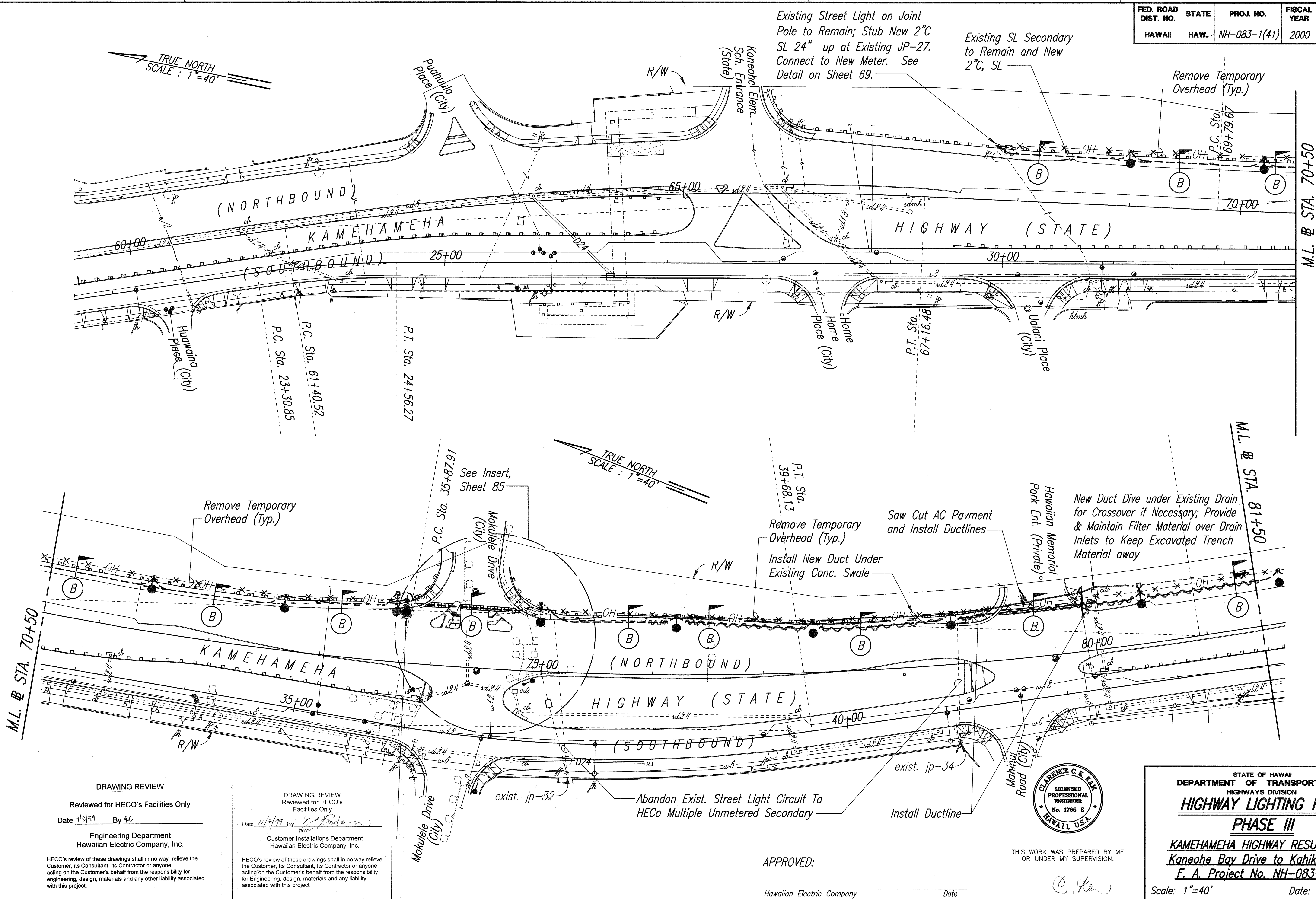








FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	65	90



ORIGINAL PLAN	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
No.	

**DRAWING REVIEW**  
Reviewed for HECO's Facilities Only  
Date 1/2/99 By [Signature]  
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 the Customer's behalf from the responsibility for engineering, design, materials and any other liability associated with this project.

**DRAWING REVIEW**  
Reviewed for HECO's Facilities Only  
Date 1/2/99 By [Signature]  
Customer Installations Department  
Hawaiian Electric Company, Inc.  
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**APPROVED:**  
Hawaiian Electric Company  
Date

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[Signature]  
CLARENCE C.F. KIM  
LICENSED PROFESSIONAL ENGINEER  
No. 17865-E  
HAWAII, U.S.A.

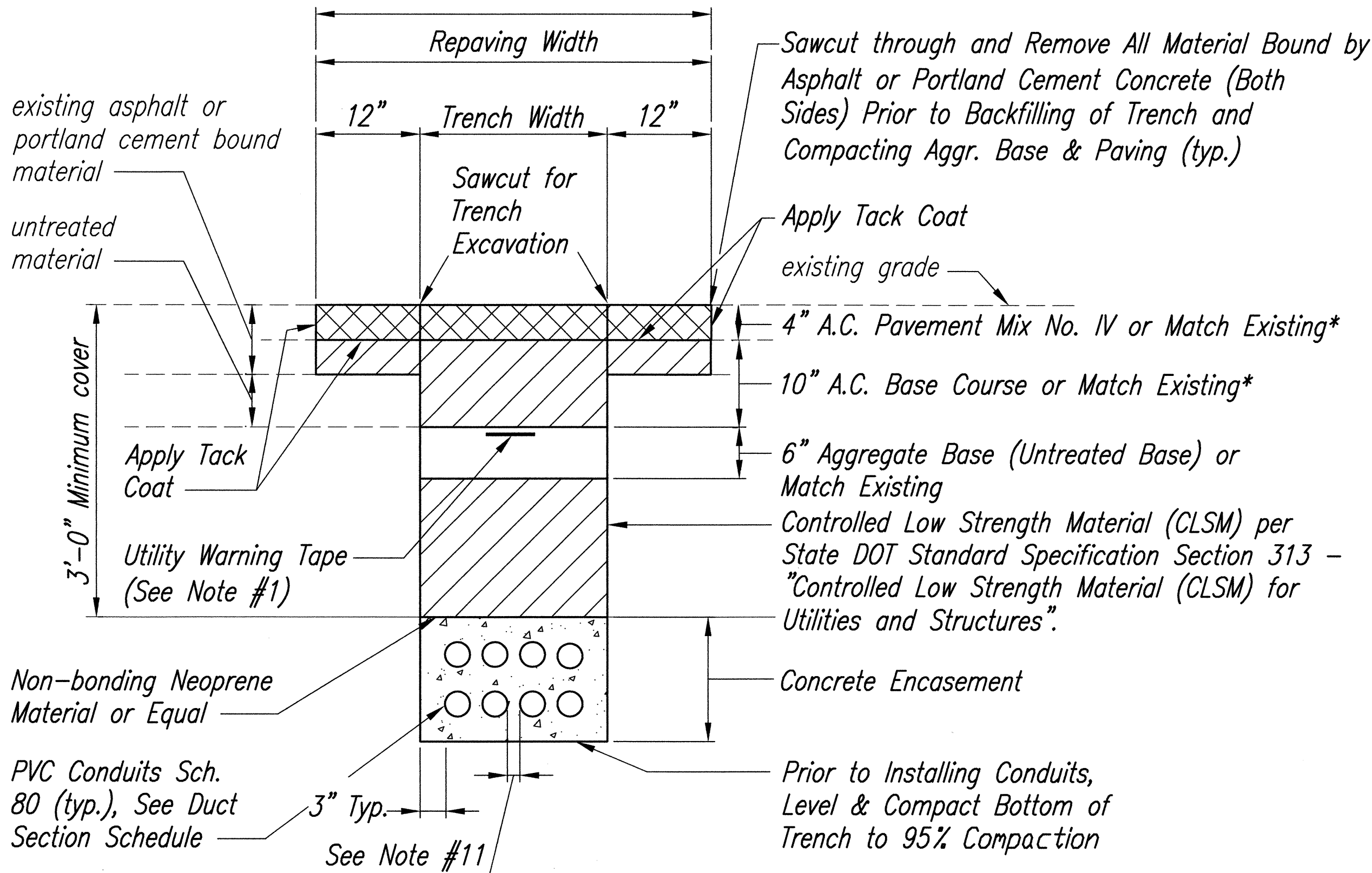
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING PLAN**  
**PHASE III**  
**KAMEHAMEHA HIGHWAY RESURFACING**  
**Kaneohe Bay Drive to Kahiko Street**  
**F. A. Project No. NH-083-1(41)**  
Scale: 1"=40' Date: June, 1999  
SHEET No. 6 OF 12 SHEETS

"AS-BUILT"



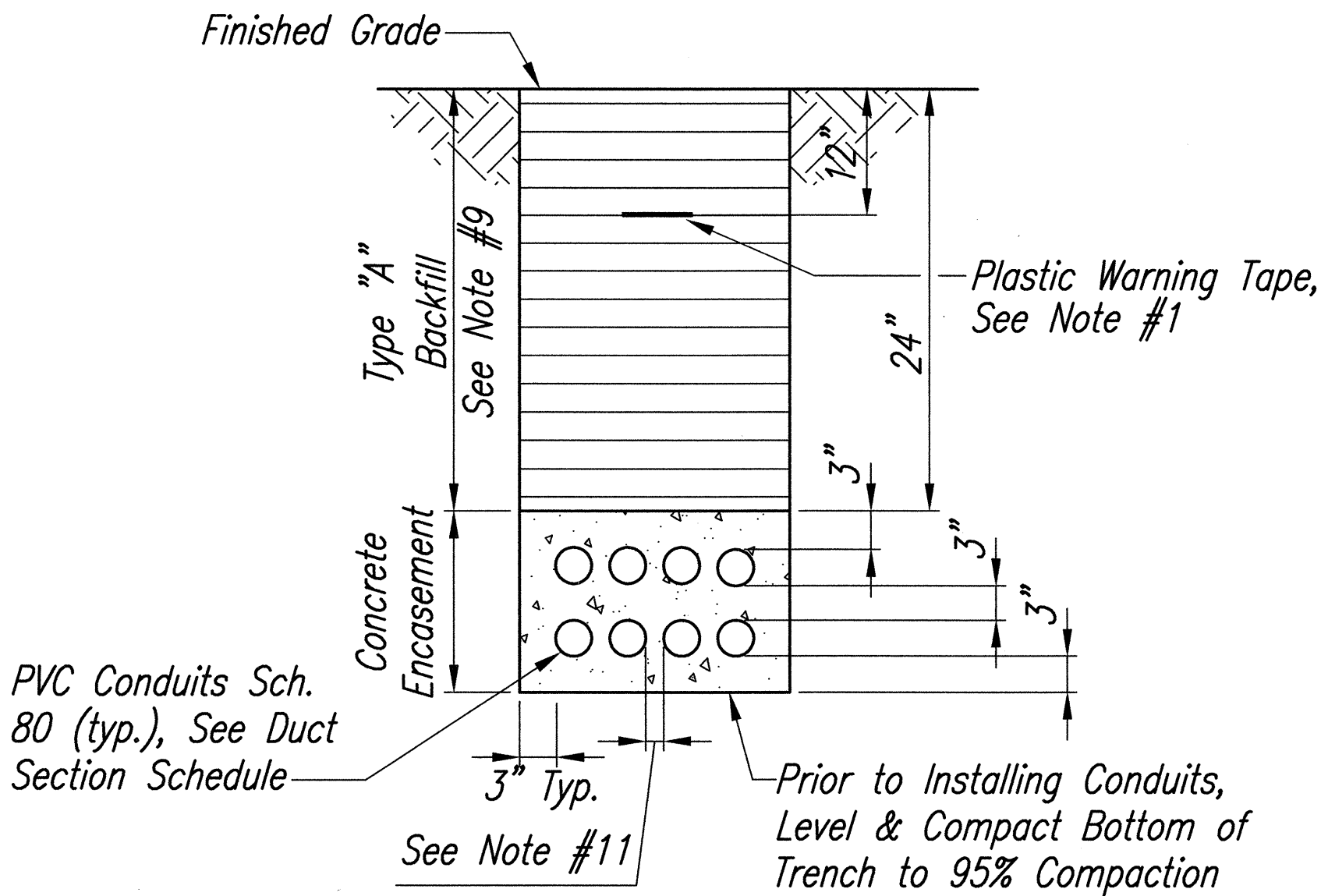


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	67	90

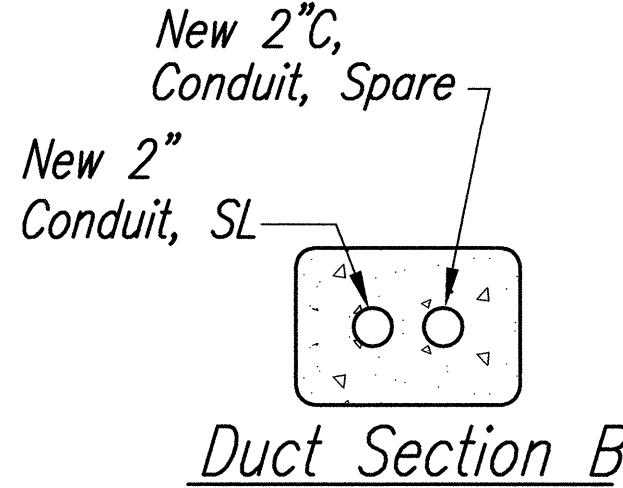


\* Minimum Thickness or Replace to Existing Thickness if Greater.

#### A.C. PAVEMENT AREAS



#### NON-PAVEMENT AREAS



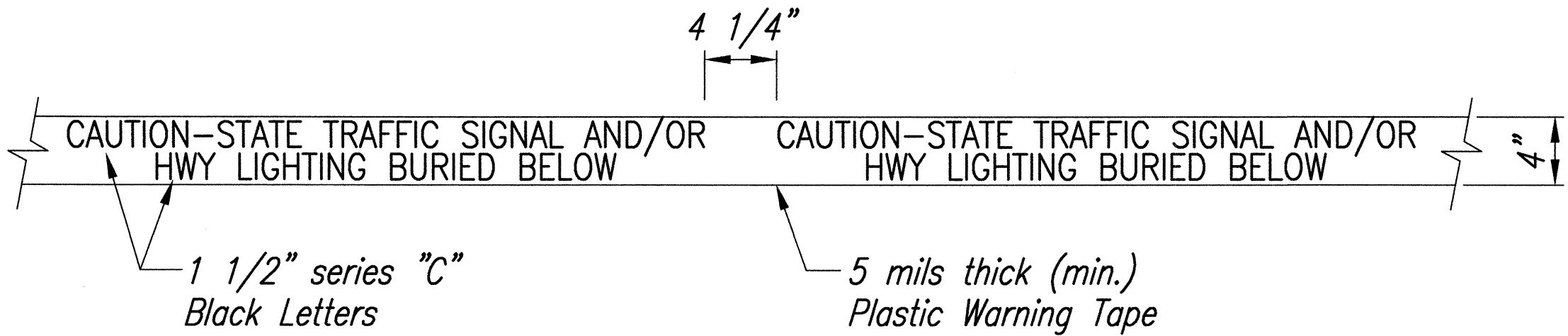
Note: Refer to Plans for Duct Section Locations.

#### DUCT SECTION WITH CONCRETE ENCASED DUCTS DETAIL

Not to Scale

#### TRENCH NOTES:

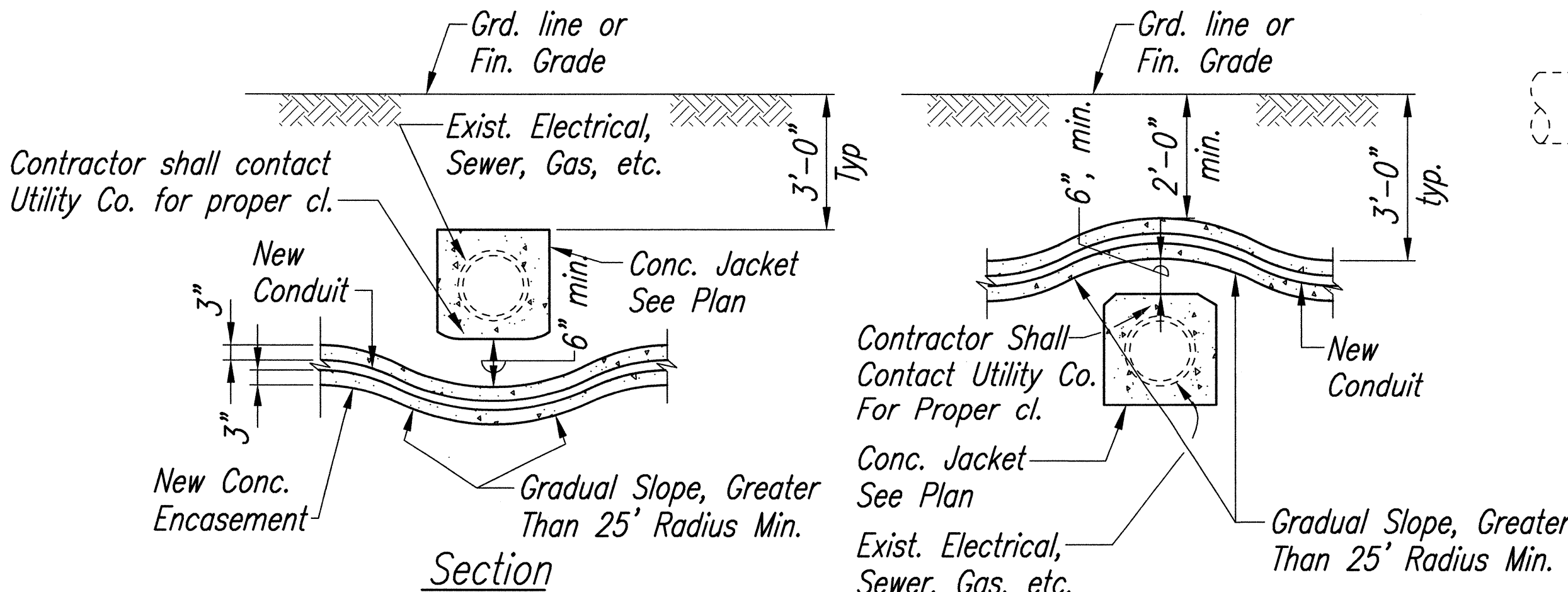
- 5 mil Thick Yellow Colored Plastic Warning Tape 4" Wide, Entire Length of Duct. Tape to have Continuous Metallic Backing and Corrosion Resistant Foil Core. Warning and Identification to be Imprinted on Tape and Shall Read, "CAUTION BURIED ELECTRIC CABLE, TELEPHONE CABLE, TRAFFIC SIGNAL AND/OR HWY LIGHTING BELOW". Message Shall be Repeated Approximately Every Ten Feet. Tape Shall be Considered Incidental to Ductline Work. See Detail, This Sheet.
- The Contractor May Begin Backfilling the Conduit Trench When the Concrete Reaches 2500 psi Compressive Strength.
- Maximum Four (4) Conduits Per Row for Multiple Conduit Duct Section.
- Saw Cut Existing Pavement, Curbs, Sidewalks and Repair to the Satisfaction of the Engineer.
- Excavation, Ductline Including Concrete Jacket, Backfill, Compaction, Shall be Completed and Ready for Acceptance. Incomplete Work Shall be Provided with Approved Safety Protection Measures.
- Traffic Bearing Pavement Shall be Completed and Ready for Traffic Each Day. During the Course of the Work, Maintain a Minimum of (11-foot wide) Traffic Lane at All Times.
- Backfill Shall Include Appropriate Road Base and Subbase Courses to Match Existing Condition and Compaction to Standard Specifications Requirements.
- Trees and Shrub Encounters Shall be Avoided By Shifting Ductline. Adjust Ductline Route to Avoid Obstruction Both Above and Below Grade.
- For Grassed Area, Re-sod and Maintain Per Specifications.
- At Sidewalks, Replace the Entire Modular Section of Sidewalks From Construction Joint to Construction Joint. Trench Width Patches in Sidewalks Shall Not be Accepted. Replace Curbs and Gutters in Similar Manner.
- Provide 1 1/2" Separation Between Ducts of Same System.
- Where Ductlines and Other Utilities Exist, the New Ductline May be Constructed Adjacent to Existing. When Necessary, Dive Under Existing Ductline or Utilities for Crossover. Existing Ductline Shall Remain Active Until New Street Light System is Completed.
- Type "A" Backfill: Beach Sand, Earth, or 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.
- If Material Below Duct Is Not Equivalent to Backfill Material "A", Excavate Material and Provide 3" Backfill Material "A".



For Additional Information See Note No. 1.

#### METAL DETECTABLE YELLOW PLASTIC WARNING TAPE

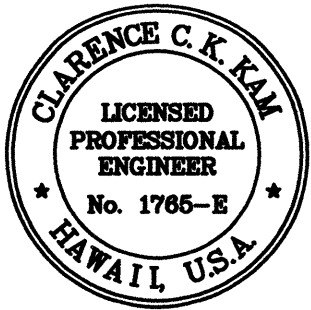
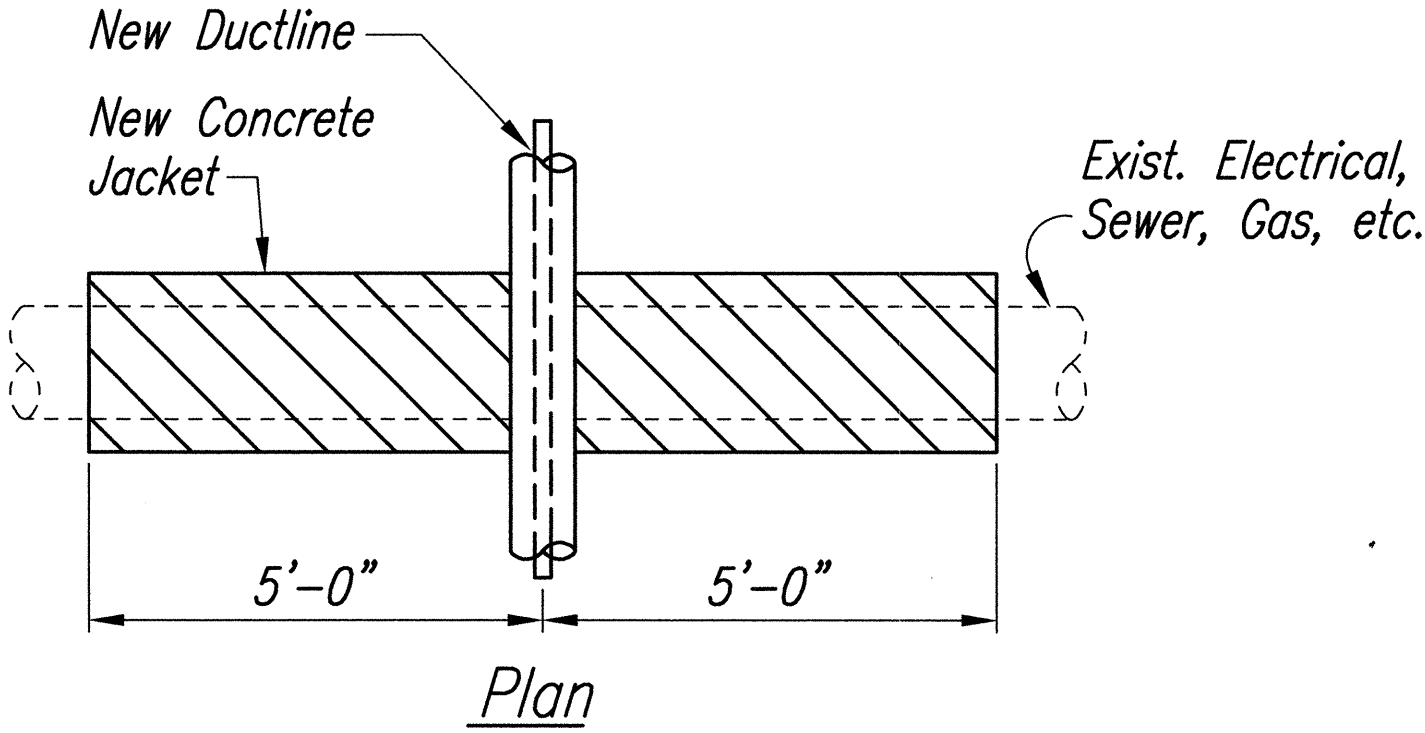
Not to Scale



\* To be determined by Electrical Inspector/Engineer

#### CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

Not to Scale



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C. F. Kim

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HIGHWAY LIGHTING DETAILS

KAMEHAMEHA HIGHWAY RESURFACING

Kaneohe Bay Drive to Kahiko Street

F. A. Project No. NH-083-1(41)

Scale: As Shown

Date: June, 1999

SHEET No. 8 OF 12 SHEETS



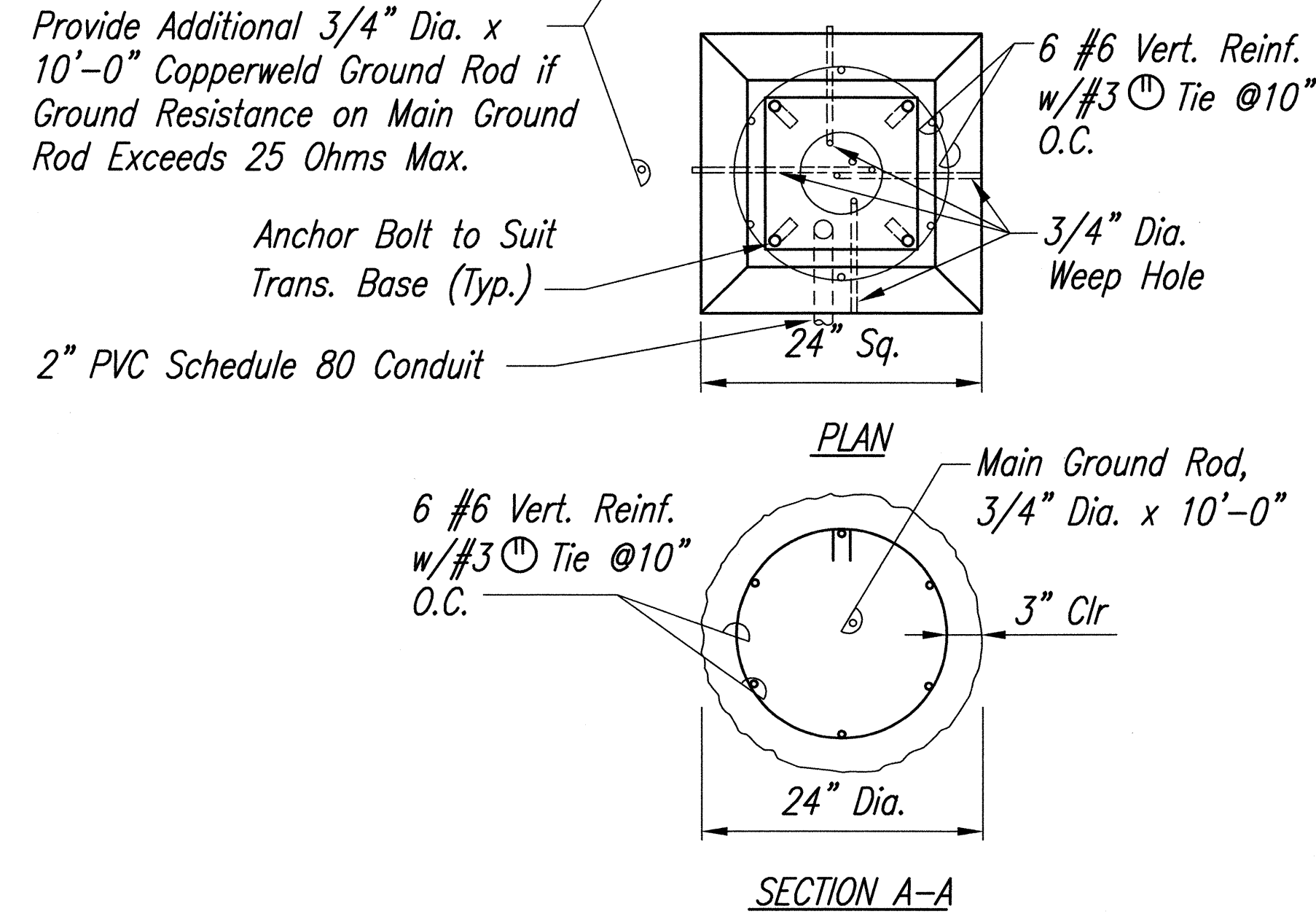
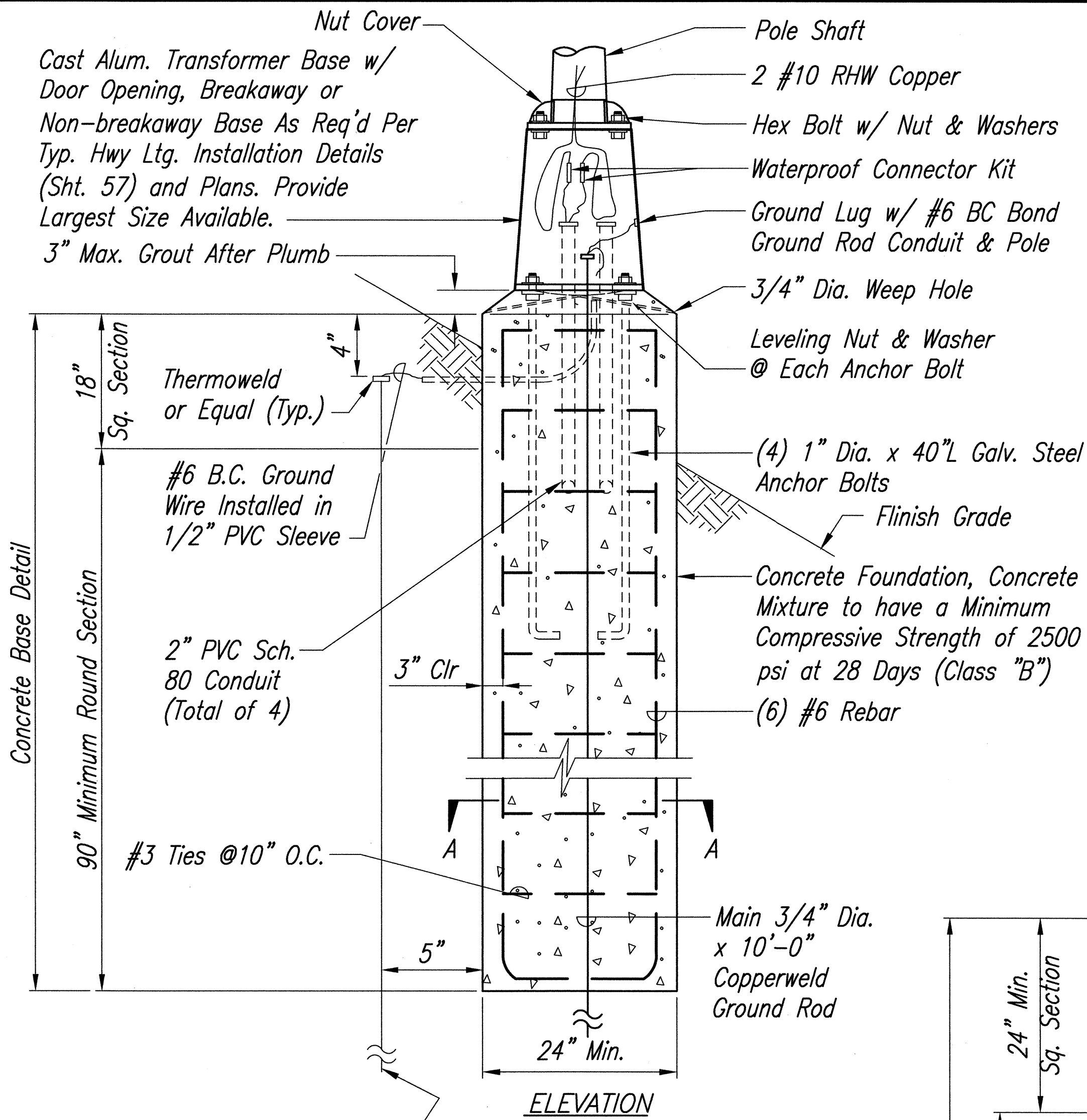
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	68	90

NOTES FOR I.D. TAG:

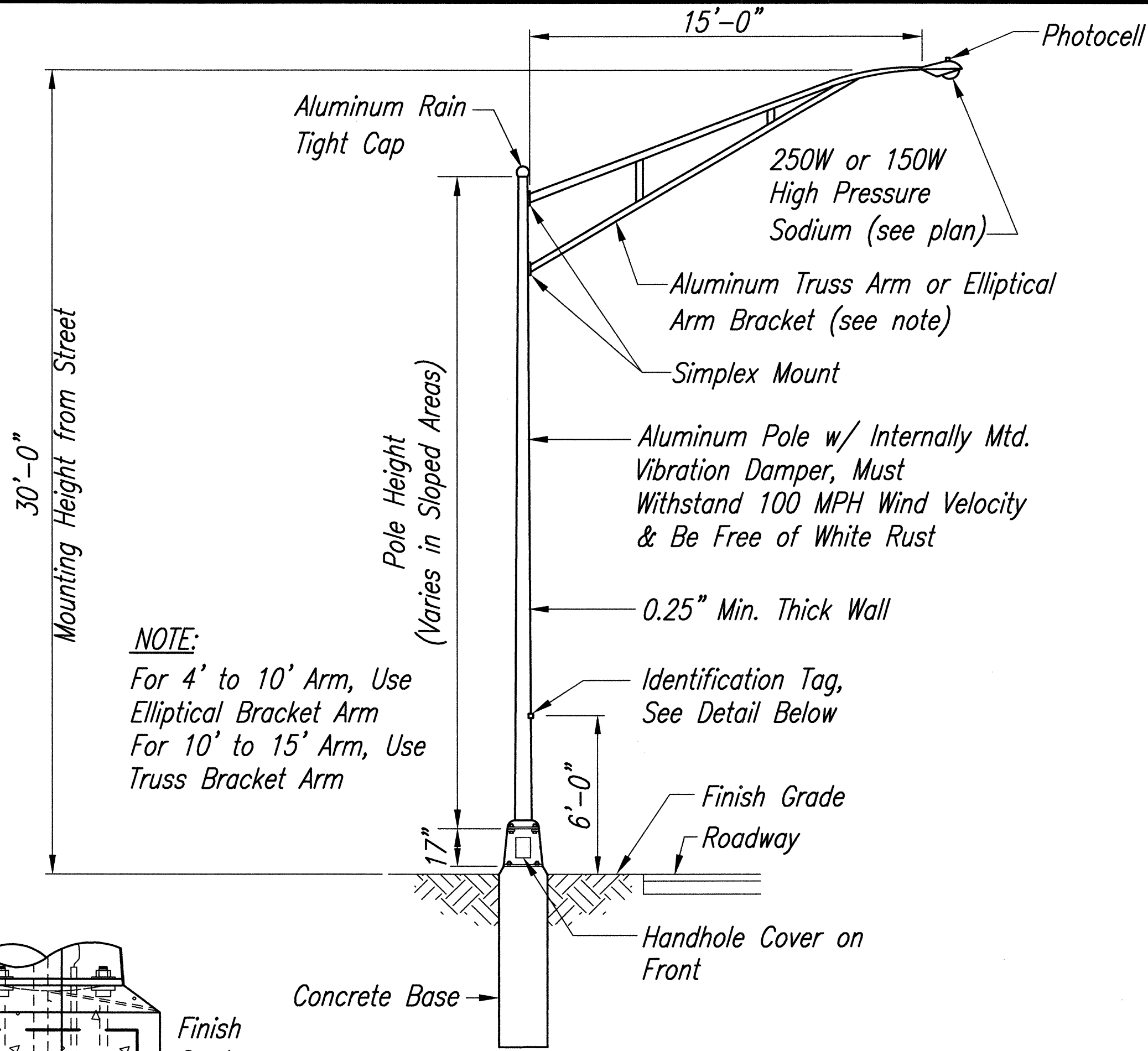
1. Use 3 Ply Laminated Flexible Plastic Black-White-Black. Thickness: Black Cap Sheet-0.010", White Base Sheet-0.052", Black Base Sheet-0.010".
2. Light Pole Number Size Shall Be 1" High and Engraved 1/8" Wide, White in Color (Number as Required).
3. Nomenclature Size Shall Be 5/16" High and Engraved 1/32" Wide, White in Color (Meter Number, Circuit Number, Line Voltage, Lamp Data and Refractor Data As Required).
4. Attach to Aluminum and Steel Post w/ No. 8 Stainless Steel, 1/2" Long Drive Screws in 1/8" Drill Hole. Attach to Wood Poles w/ 4D Aluminum Nails.
5. Numbers are Inscribed by Cutting Through "Black Cap Sheet" to Expose "White Letters".
6. Contract Number, Light Number and Pole Number Shall be Obtained from the State.

Notes:

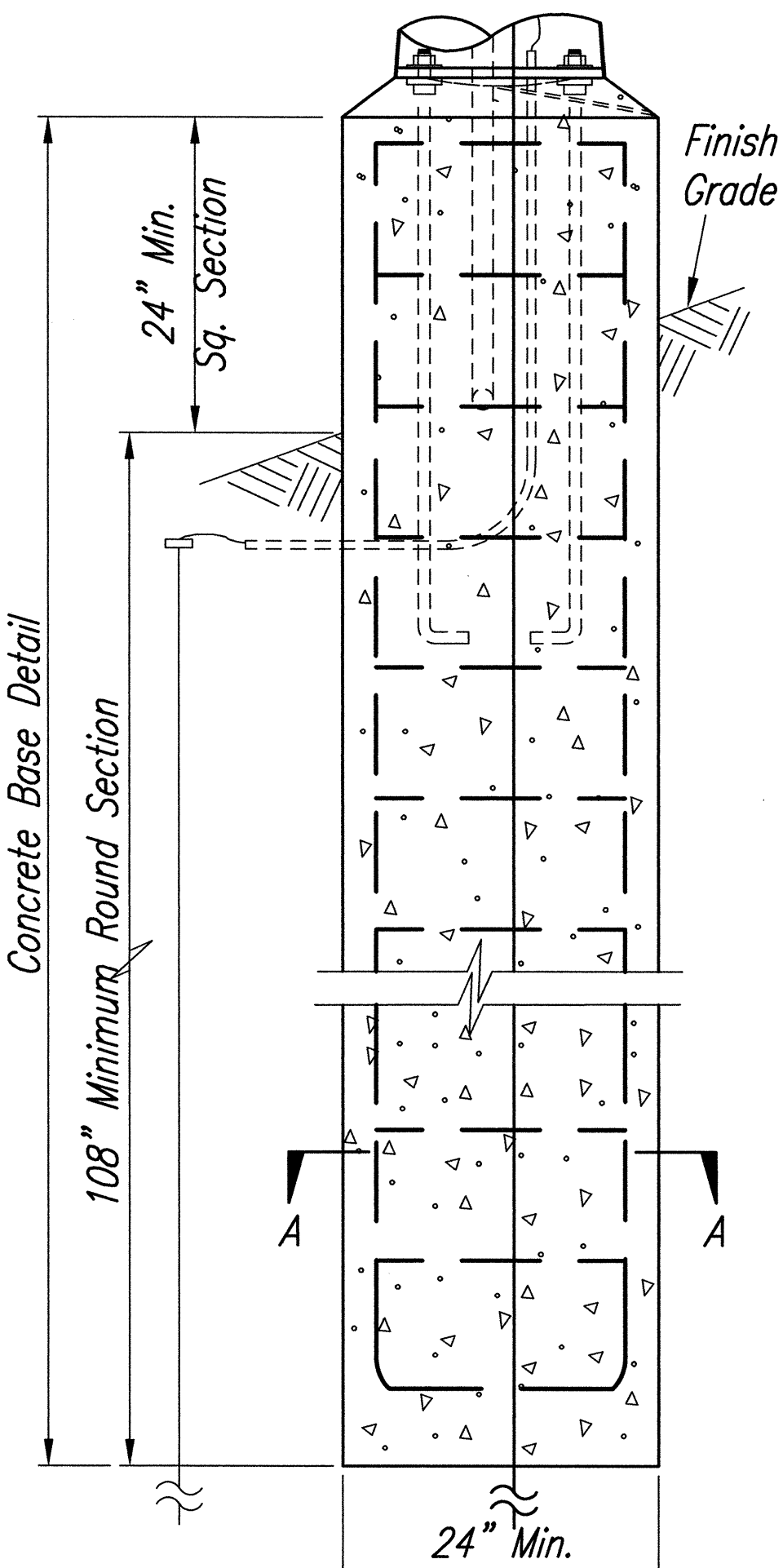
1. Use 3 Ply Laminated Flexible Plastic Black-White-Black Thickness: Black Cap Sheet-0.010", White Base Sheet-0.052", Black Base Sheet-0.010".
2. 1/8" Wide, White in Color (Number As Required).
3. Wide, White in Color (Meter Number, Circuit Number, Line Voltage, Lamp Data and Refractor Data as Required).
4. Attach to Aluminum and Steel Poles With No. 8 Stainless Steel, 1/2" Long Drive Screws in 1/8" Drill Hole. Attach to Wood Poles With 4d Aluminum Mails.
5. Numbers Are Inscribed by Cutting Through "Black Cap Sheet" to Expose White Letters".
6. Assign Circuit Number For Systems With Two or More Circuits (Letter Indicates Panel Board, Number Indicates Circuit).



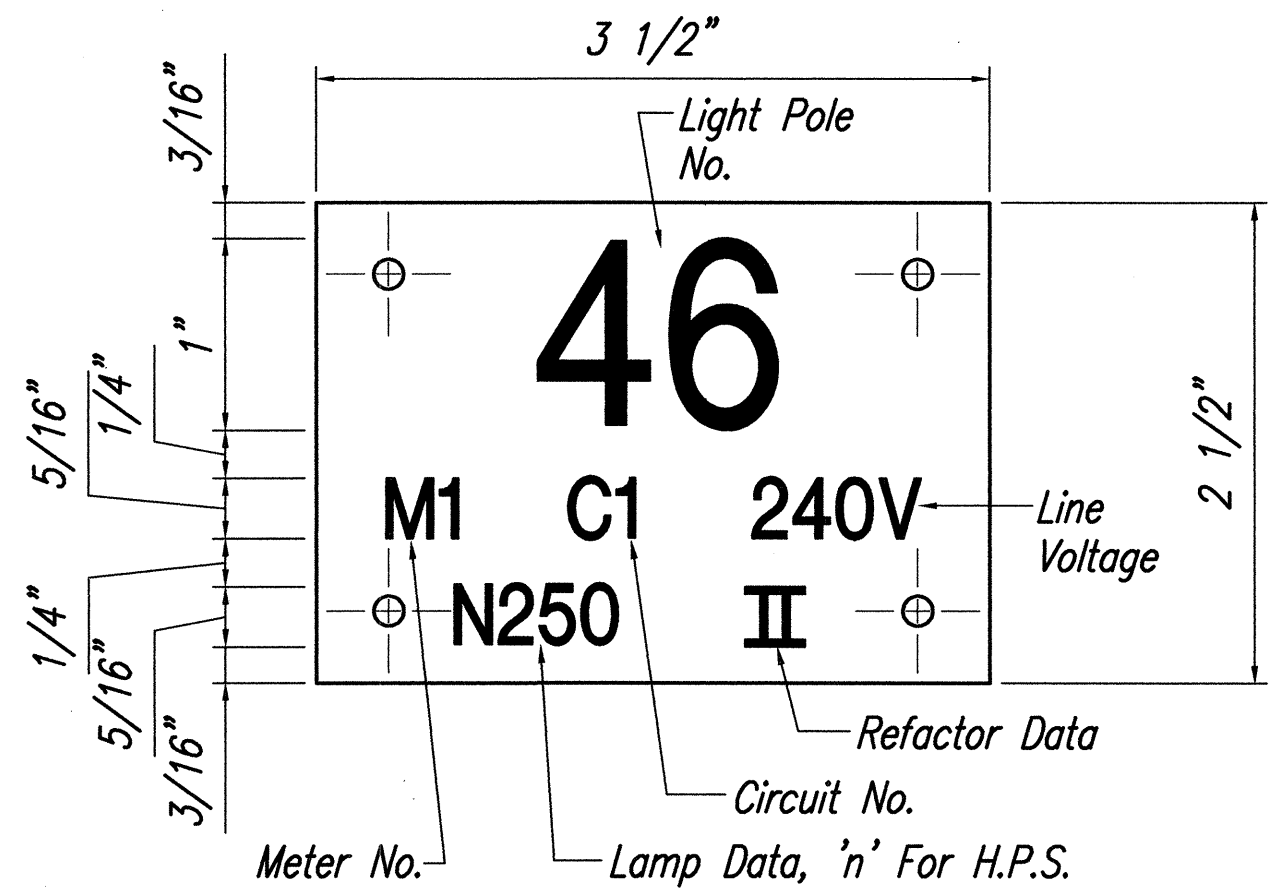
**TYPICAL CONCRETE FOUNDATION AND TRANSFORMER BASE DETAIL**  
Not to Scale



**TYPICAL LIGHT STANDARD INSTALLATION WITH TRANSFORMER BASE**  
Not to Scale



**FOUNDATION @ FILL SLOPE**  
Not to Scale



**HIGHWAY LIGHT I.D. TAG DETAIL - METERED SYSTEM**  
Not to Scale



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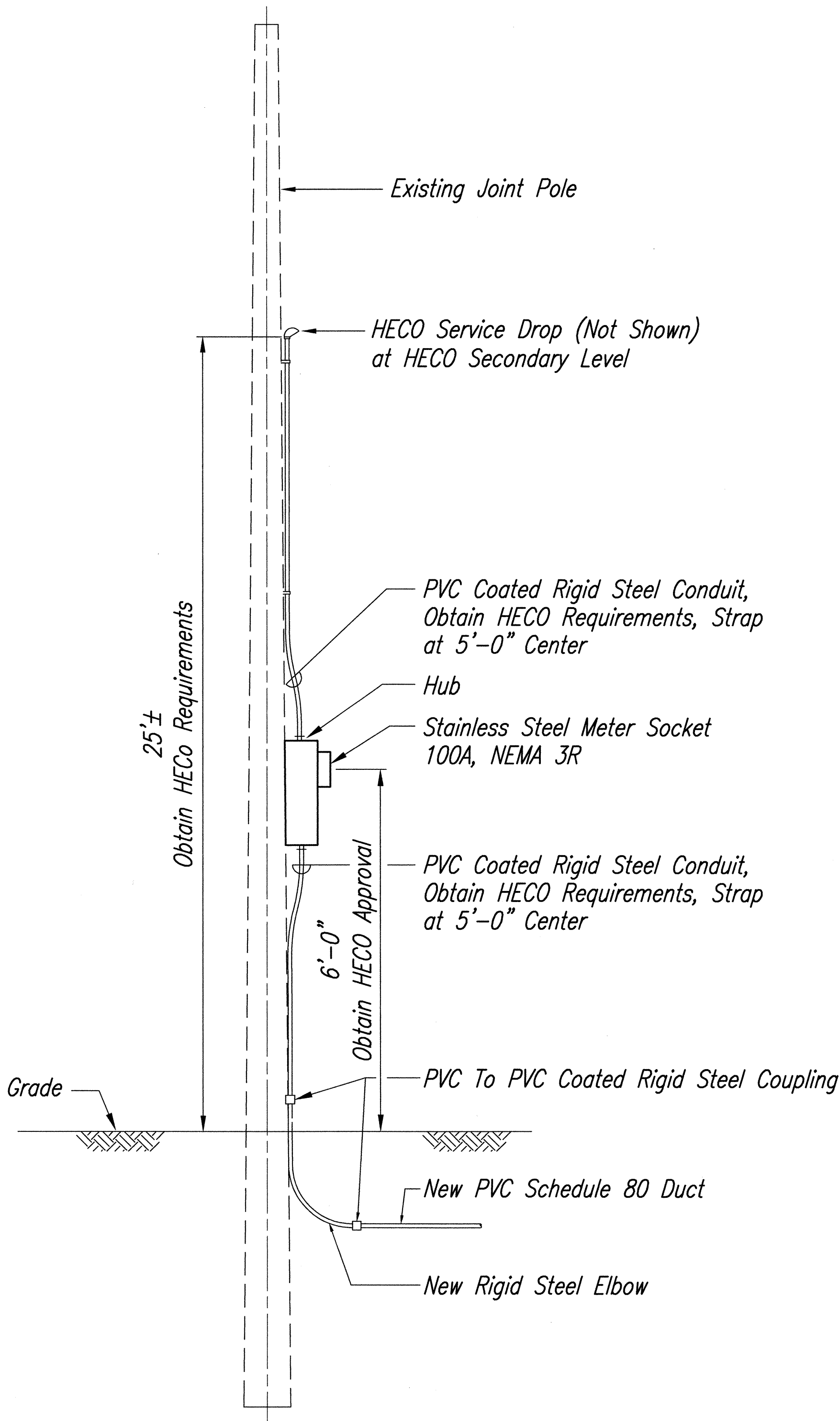


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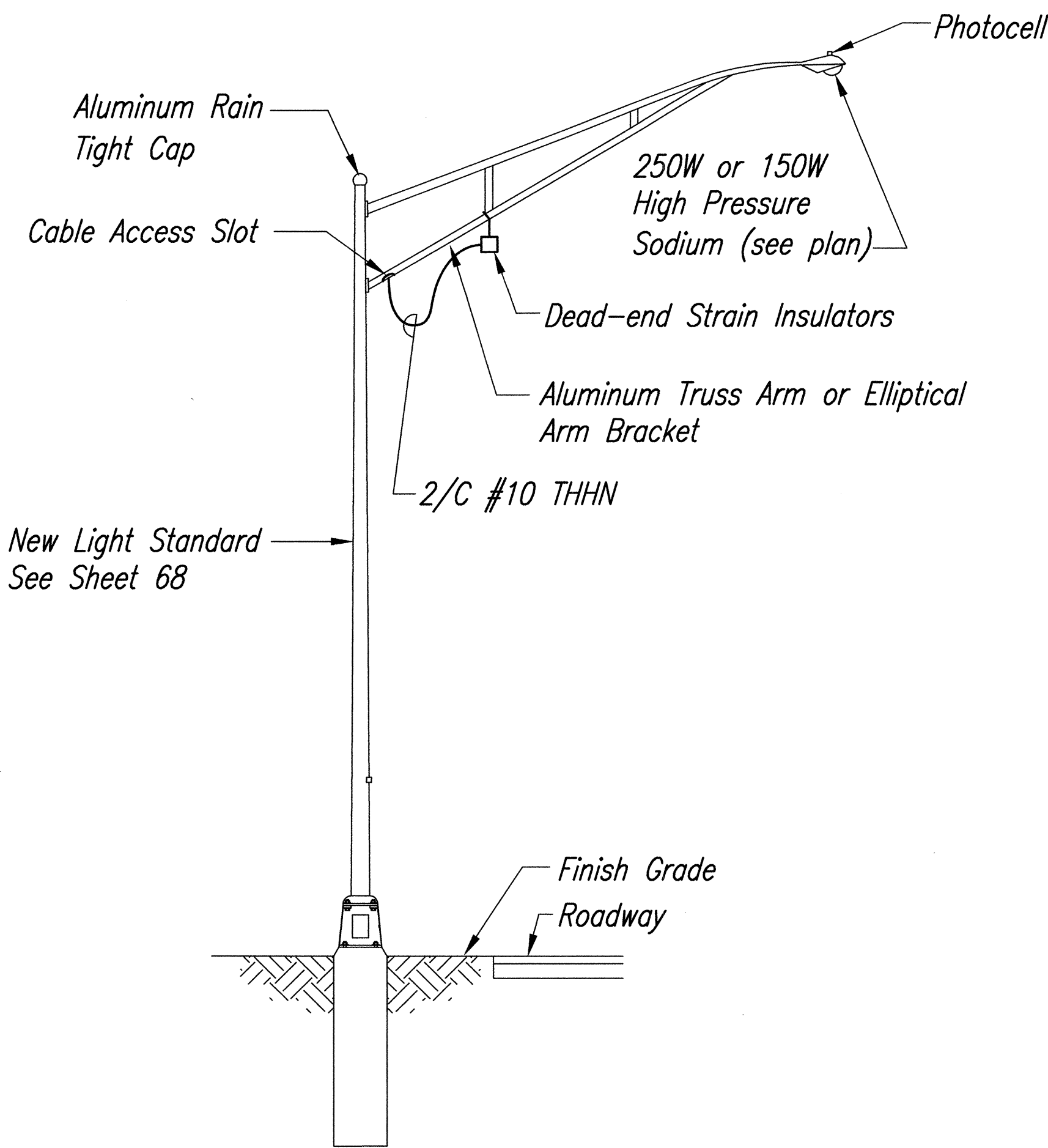
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING DETAILS**  
  
KAMEHAMEHA HIGHWAY RESURFACING  
Kaneohe Bay Drive to Kahiko Street  
F. A. Project No. NH-083-1(41)  
Scale: As Shown Date: June, 1999  
SHEET No. 9 OF 12 SHEETS

68

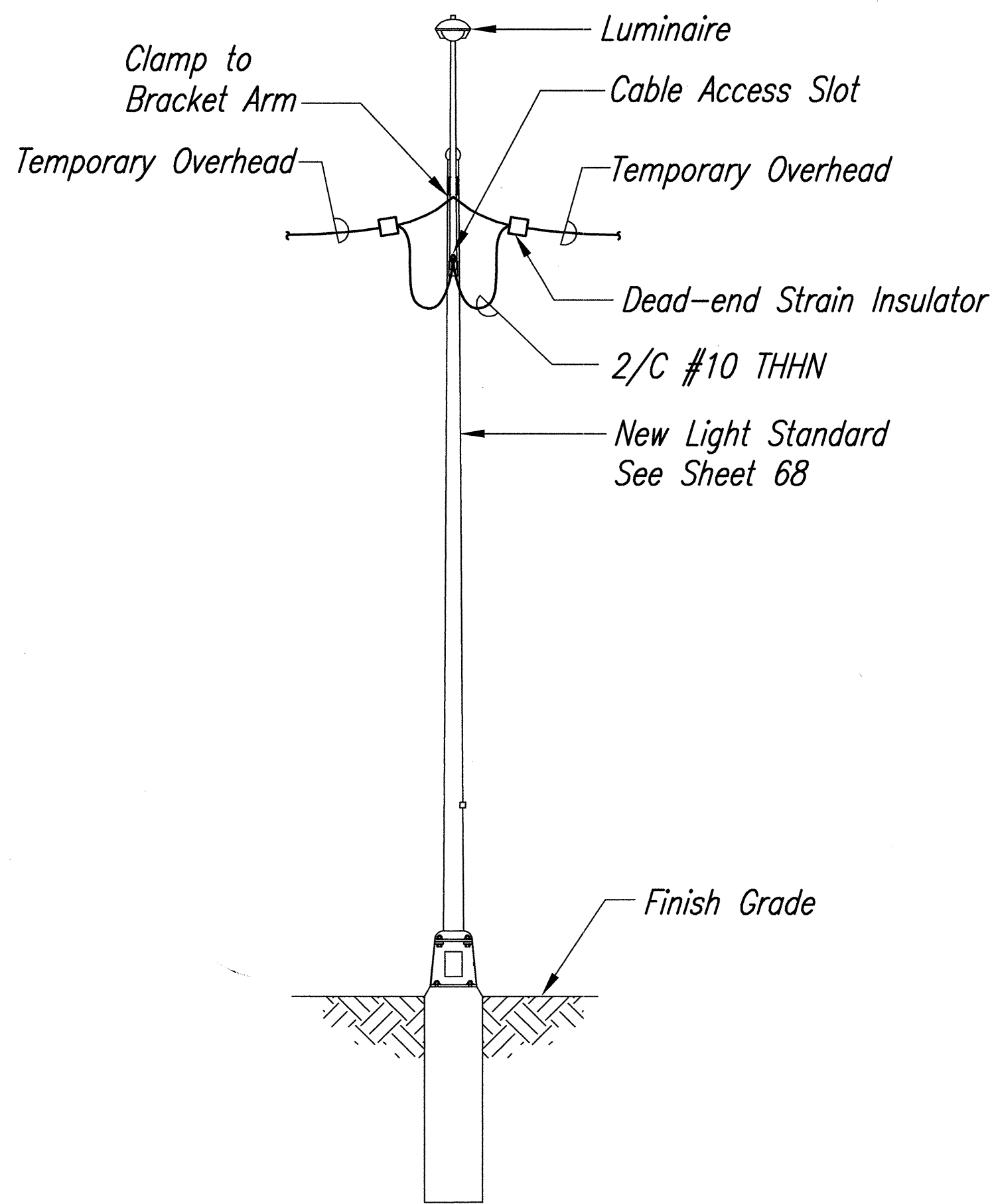
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	69	90



**RISER DETAIL**  
Not to Scale



**SIDE ELEVATION**



**FRONT ELEVATION**

- Note:**
1. Remove All Temporary Wiring.
  2. Pull-in Temporary and Permanent Wiring Through Shaft and Arm After Pole Installed. Do Not Reuse Temporary Wiring In Permanent Configuration.

**TEMPORARY OVERHEAD SERVICE INSTALLATION**  
Not to Scale

DRAWING REVIEW  
Reviewed for HECO's  
Facilities Only

Date: 11/2/99 By: [Signature]

Customer Installations 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 the Customer's behalf from the responsibility for Engineering, design, materials and any liability associated with this project.

APPROVED:

Hawaiian Electric Company \_\_\_\_\_ Date \_\_\_\_\_

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



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[Signature]

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**HIGHWAY LIGHTING DETAILS**

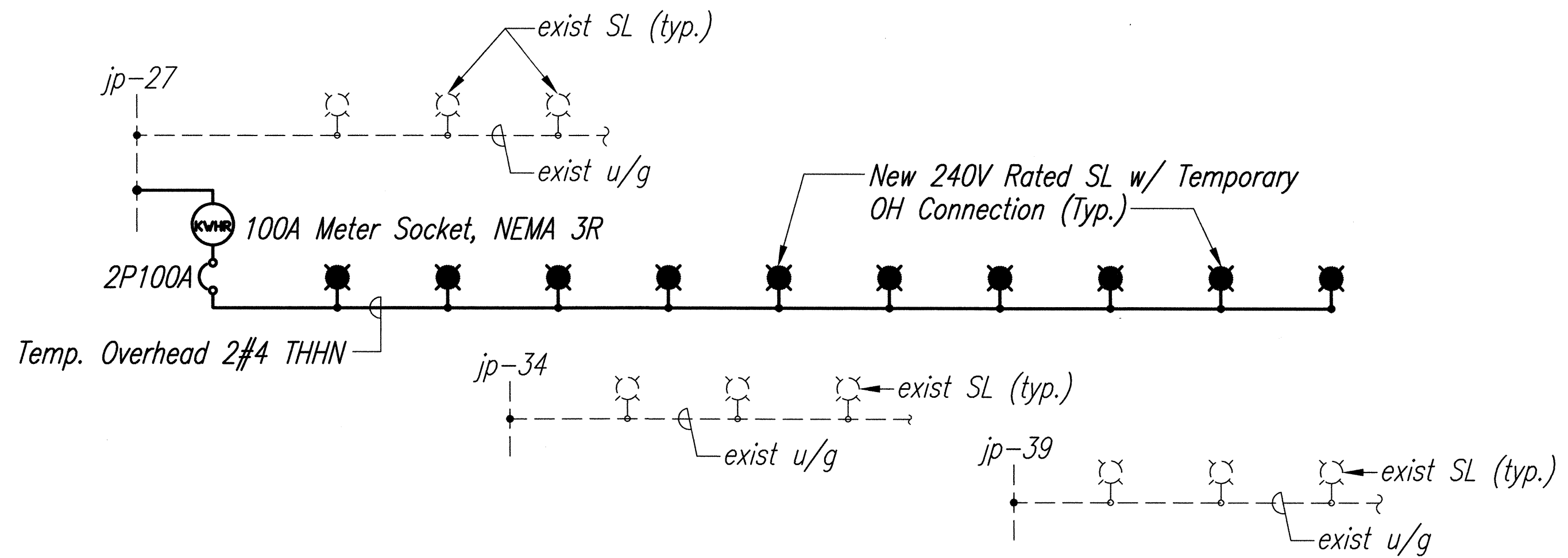
**KAMEHAMEHA HIGHWAY RESURFACING**  
**Kaneohe Bay Drive to Kahiko Street**  
**F. A. Project No. NH-083-1(41)**

Scale: As Shown Date: June, 1999

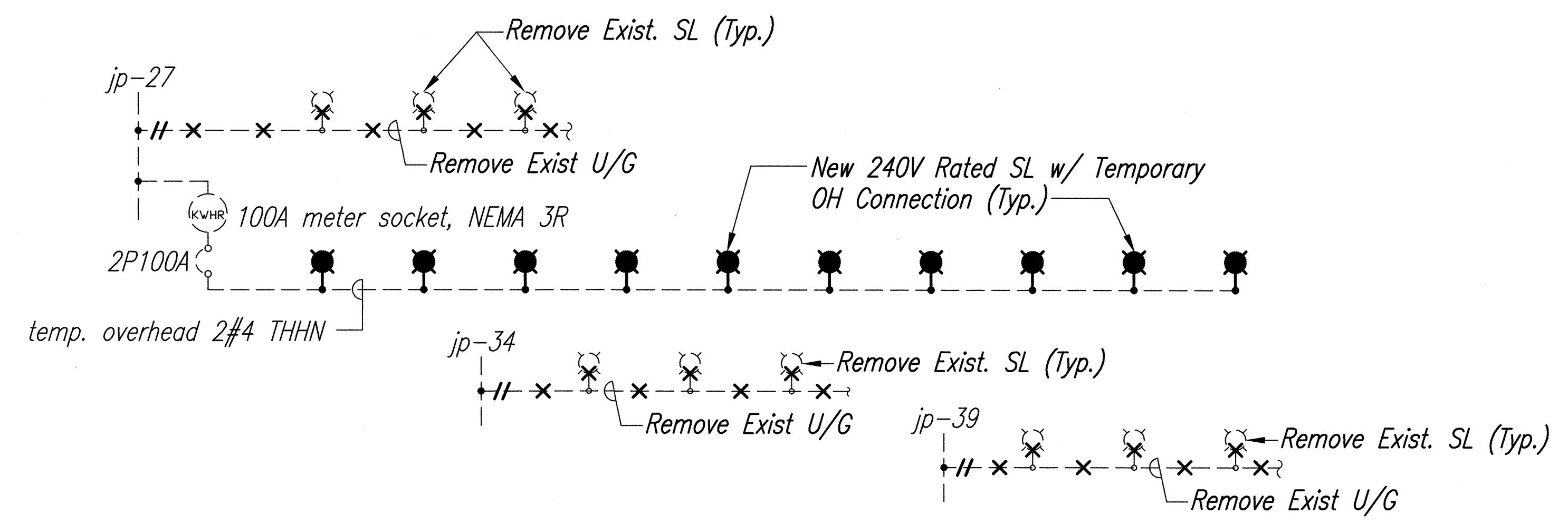
SHEET No. 10 OF 12 SHEETS



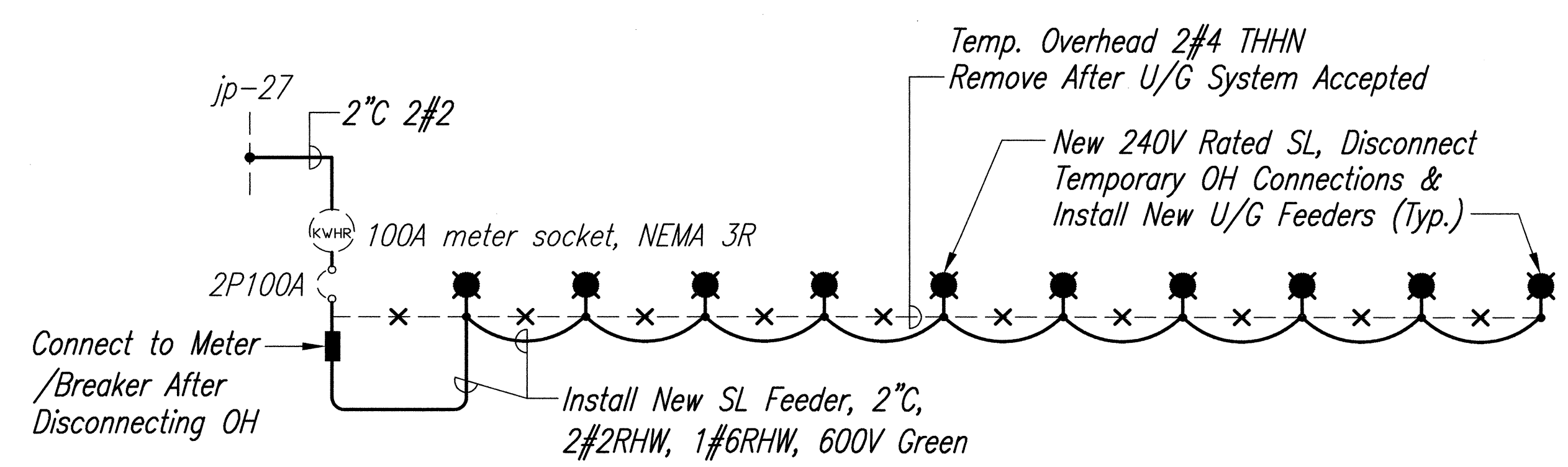
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HAWAII	HAW.	NH-083-1(41)	2000	70	90



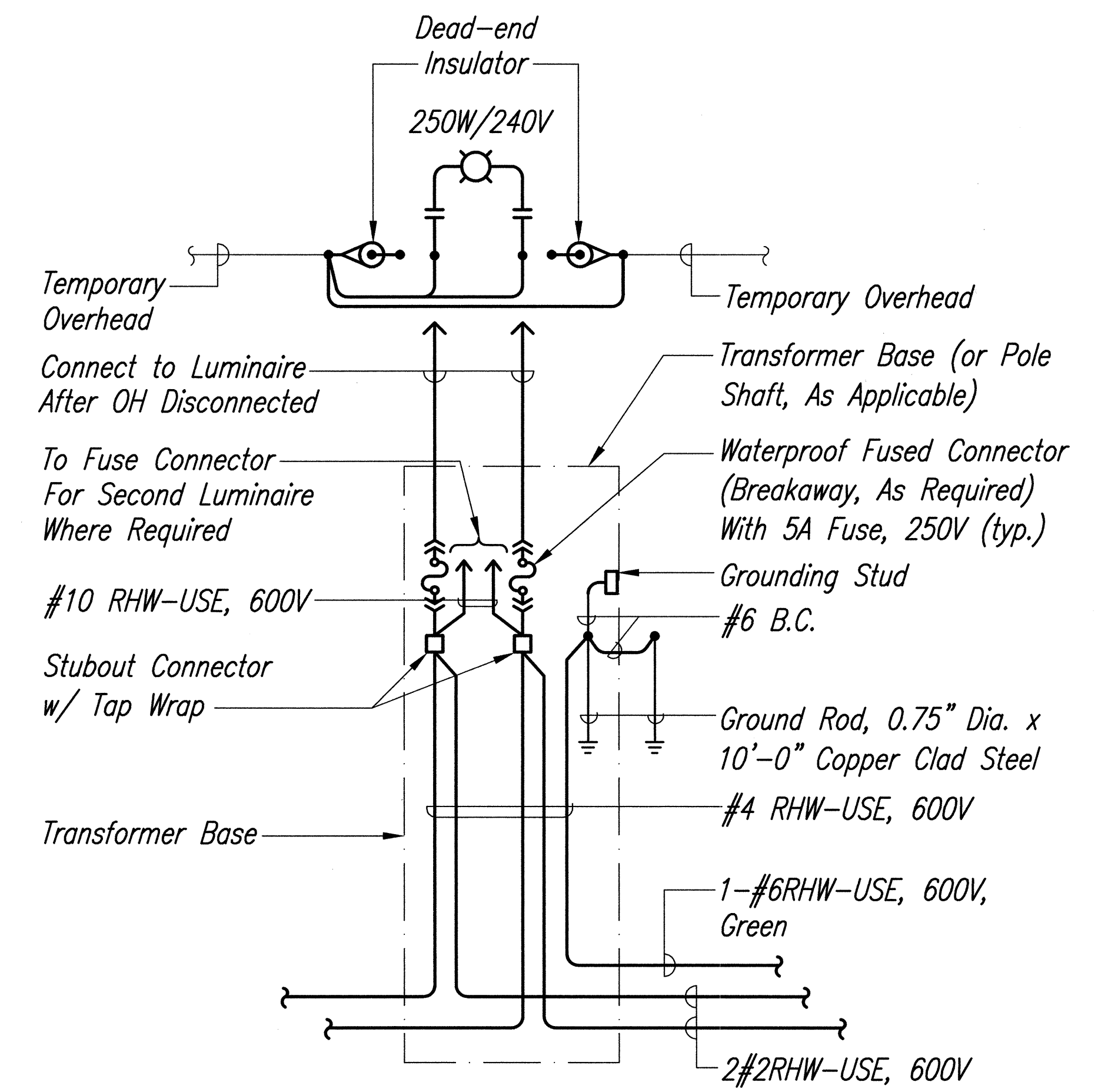
PHASE I - EXISTING & TEMPORARY SCHEMATIC DIAGRAM  
Not to Scale



PHASE II - DEMOLISH EXISTING DUCTLINE & TEMPORARY SCHEMATIC DIAGRAM  
Not to Scale



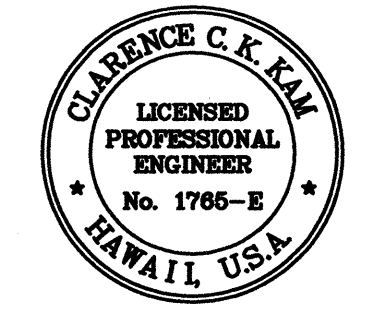
PHASE III - NEW SCHEMATIC DIAGRAM  
Not to Scale



TYPICAL POLE WIRING CONNECTION DIAGRAM

DRAWING REVIEW  
Reviewed for HECO's  
Facilities Only  
Date 11/2/99 By [Signature]  
Customer Installations Department  
Hawaiian Electric Company, Inc.  
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associated with this project

APPROVED:  
Hawaiian Electric Company Date

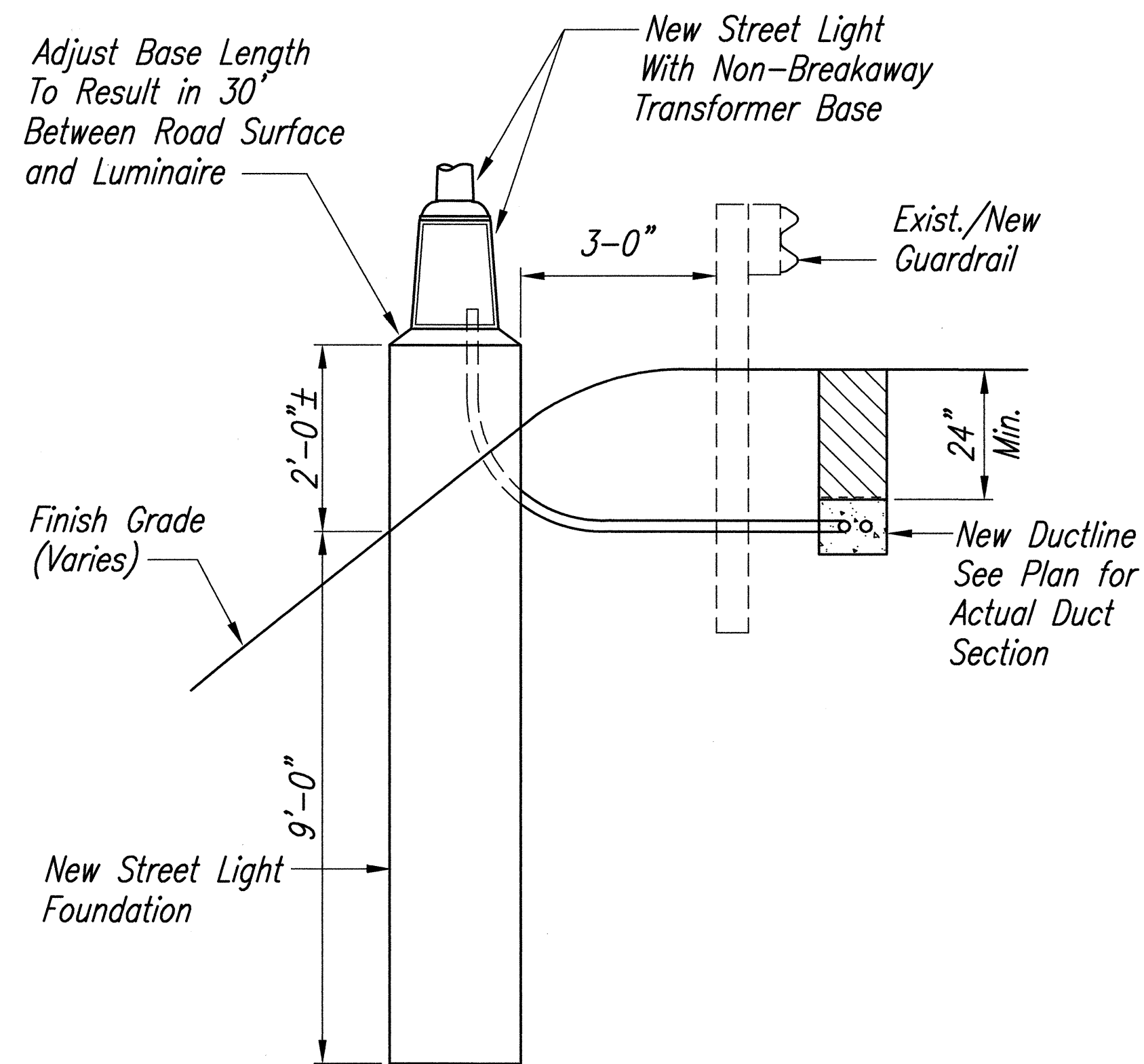


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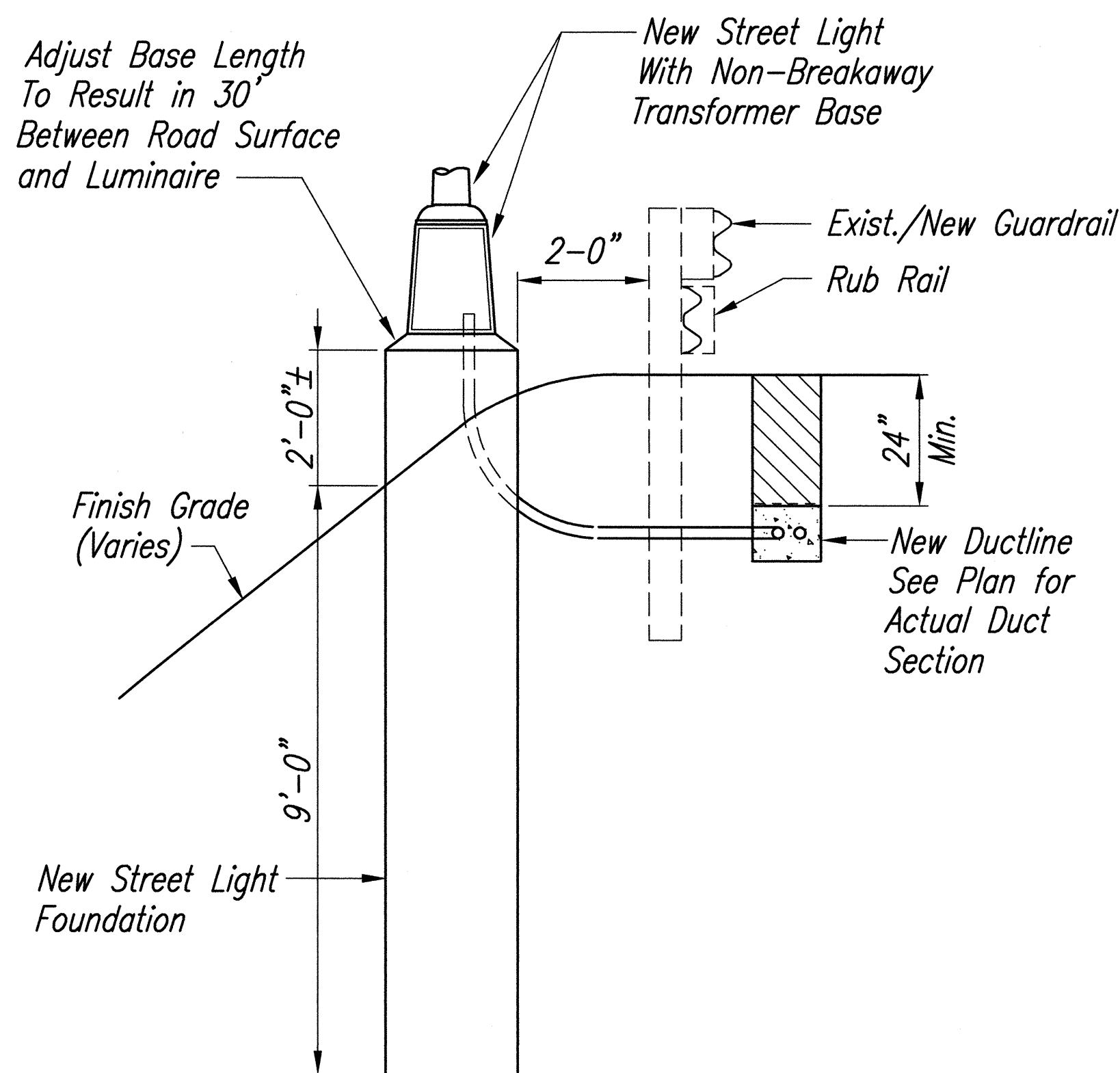
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING DETAILS**  
**SINGLE LINE DIAGRAMS**  
**KAMEHAMEHA HIGHWAY RESURFACING**  
**Kaneohe Bay Drive to Kahiko Street**  
**F. A. Project No. NH-083-1(41)**  
Scale: As Shown Date: June, 1999  
SHEET No. 11 OF 12 SHEETS

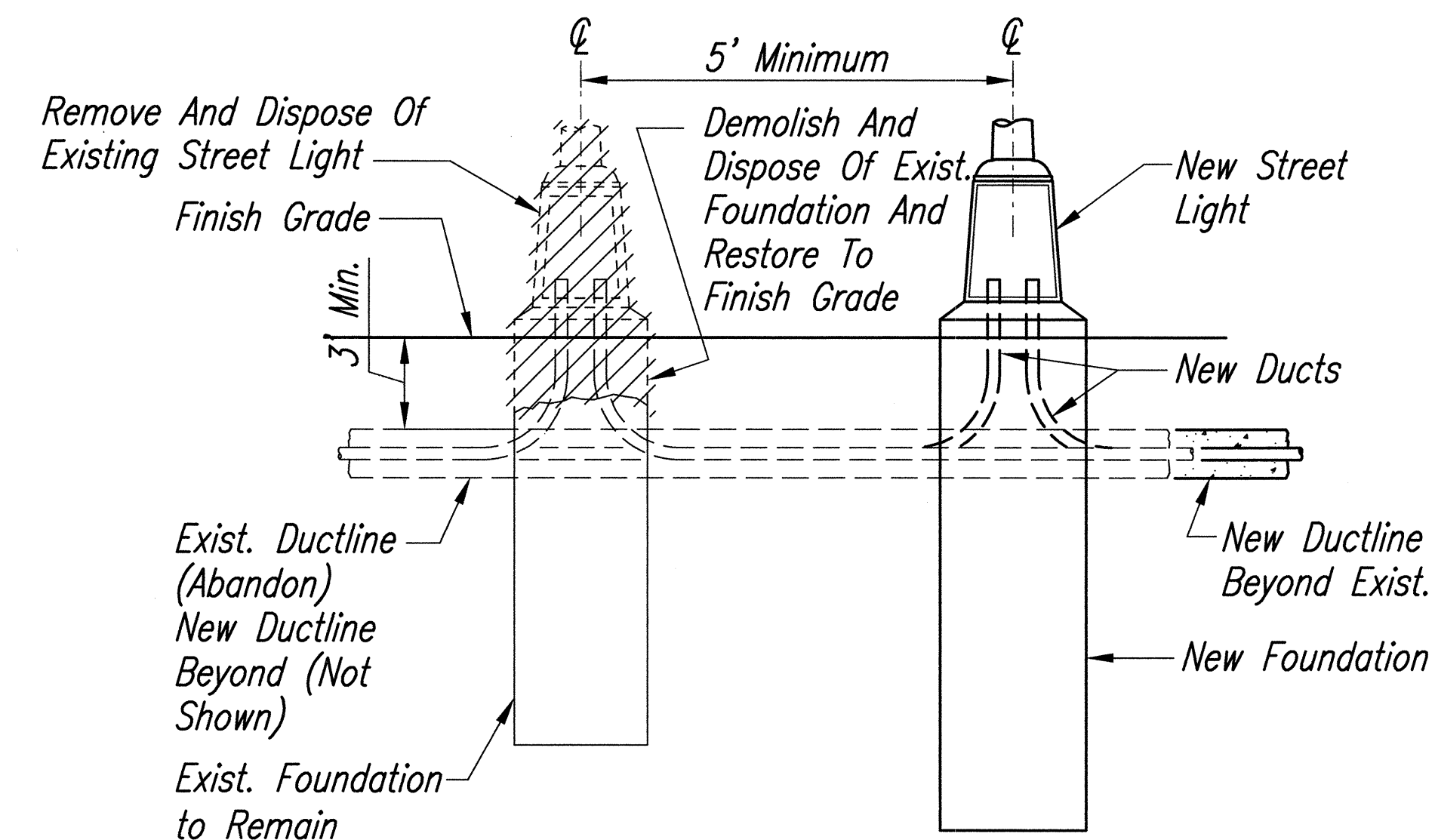
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(41)	2000	71	90



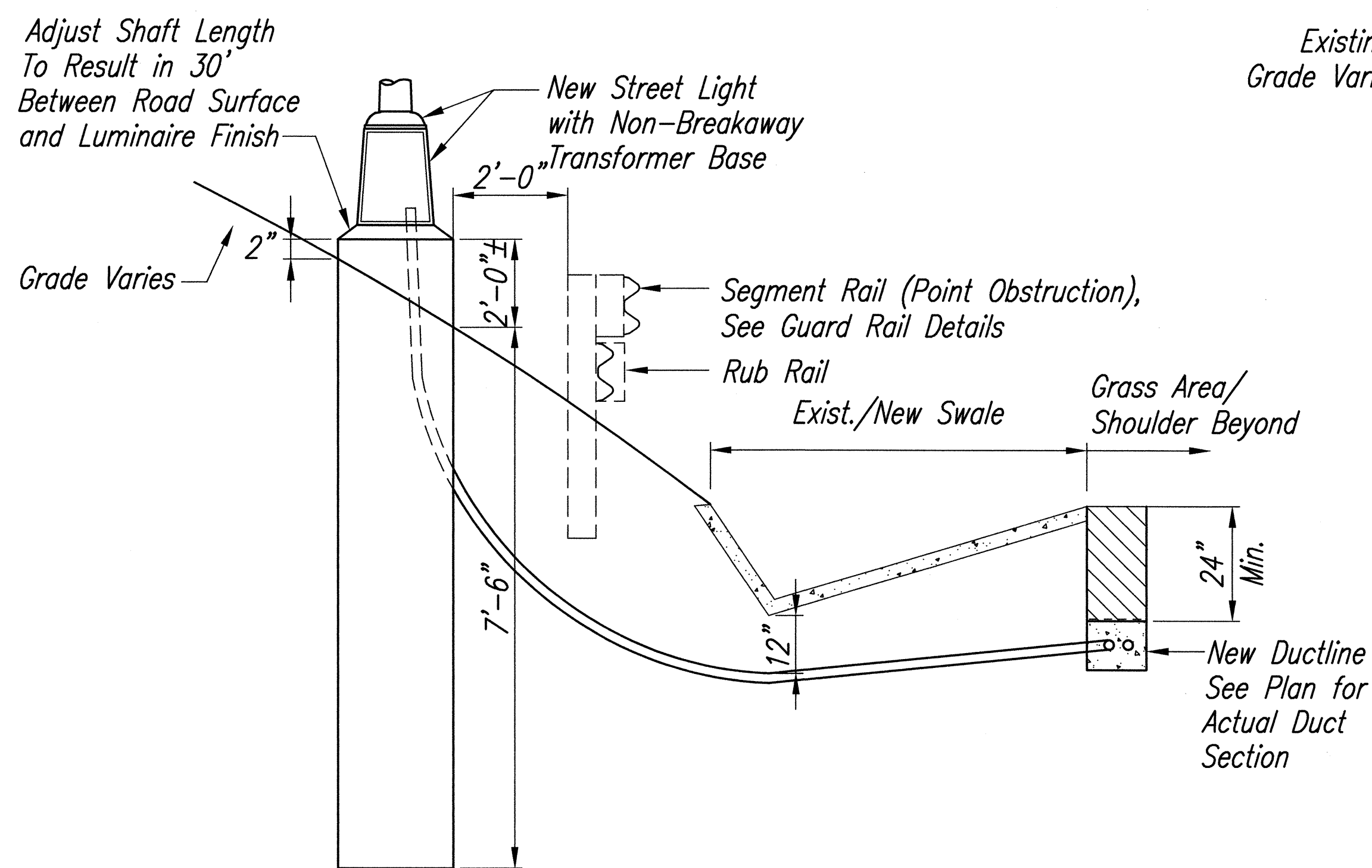
@ GUARD RAIL AND FILL SLOPE (TYPE I)



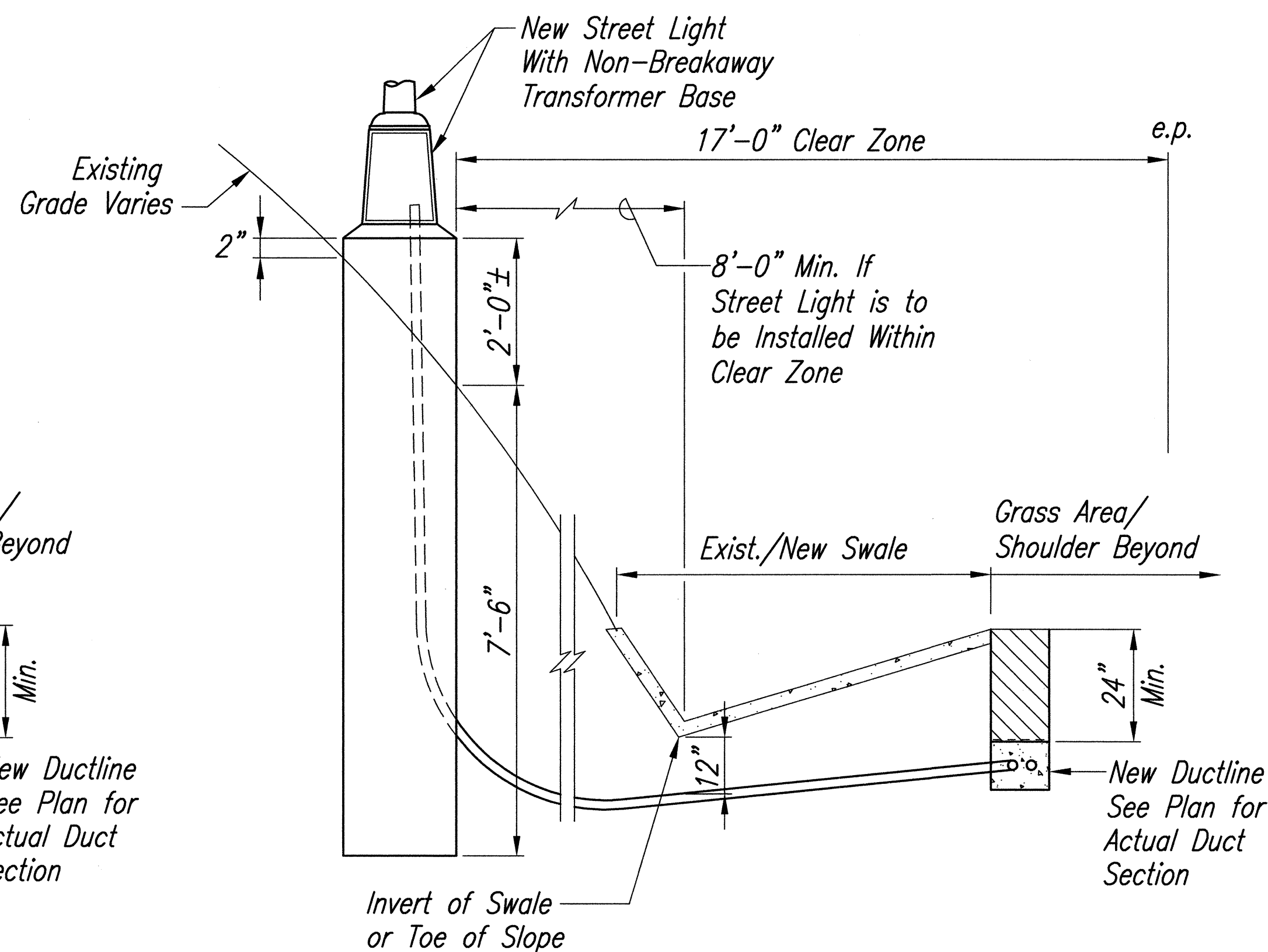
@ GUARD RAIL AND FILL SLOPE (TYPE I, ALTERNATE)



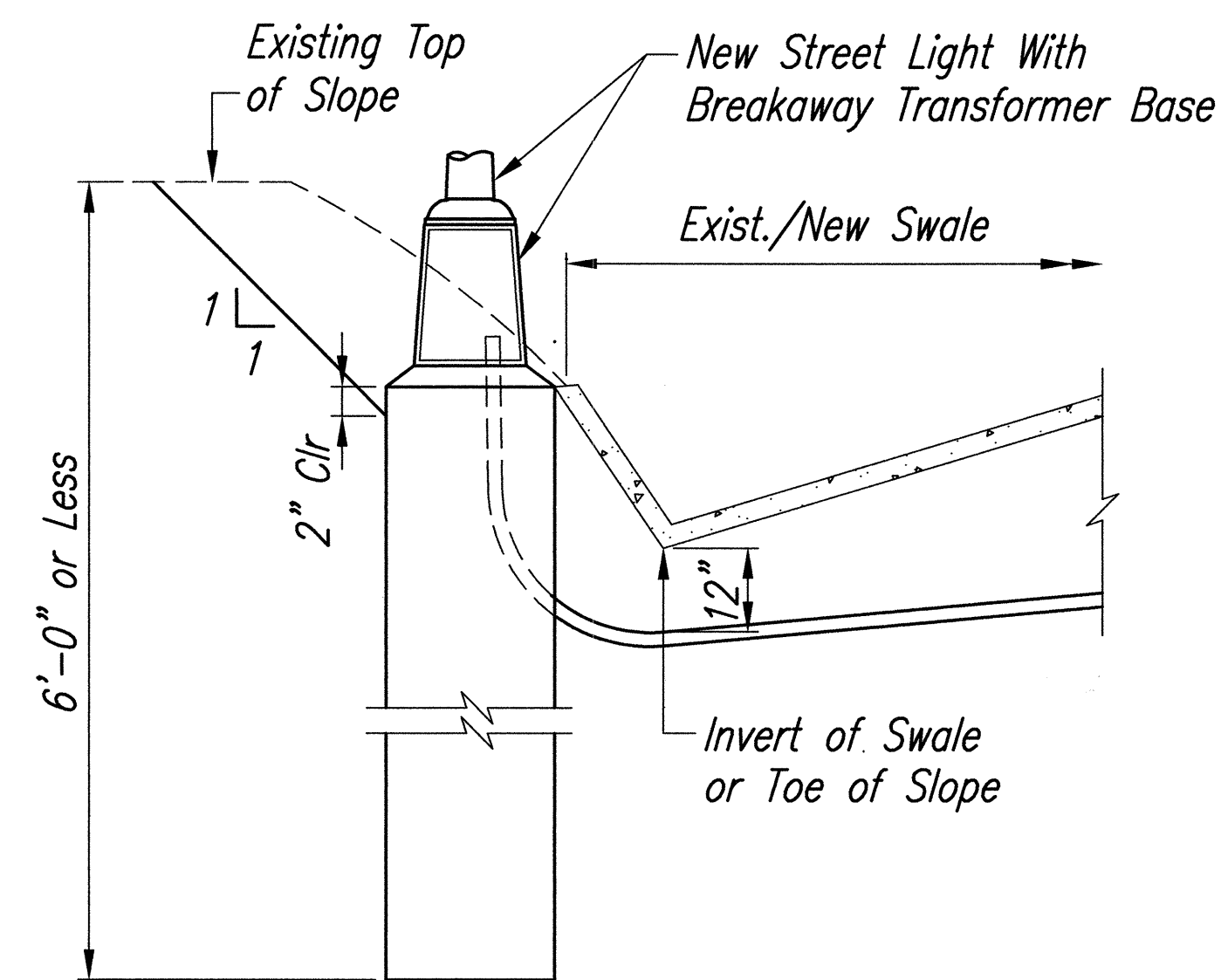
ADJACENT TO EXISTING STREET LIGHT



@ CUT SLOPE AND SWALE (TYPE II)  
BEHIND GUARDRAIL



@ HIGH CUT SLOPE AND SWALE (STEEP) (TYPE III)



@ LOW CUT SLOPE AND SWALE (STEEP) (TYPE IIIA)

# TYPICAL STREET LIGHT INSTALLATION Not to Scale

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
QUANTITIES BY	
CHECKED BY	
NO.	



THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION.

C. K. K.M.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**HIGHWAY LIGHTING DETAILS**  
  
KAMEHAMEHA HIGHWAY RESURFACING  
Kaneohe Bay Drive to Kahiko Street  
F. A. Project No. NH-083-1(41)  
Scale: As Shown  
Date: June, 1999  
SHEET No. 12 OF 12 SHEETS

11/11/99  
CLARENCE C. K. K.M.  
LICENSED PROFESSIONAL ENGINEER  
No. 1765-E  
HAWAII, U.S.A.