

Z:\PROJECTS (NUMBERED)\2018\8087\DRAWING FILES\ELECTRICAL\IMPROVEMENT 2 - ROUNDABOUT\MAKUU & ORCHIDLAND\E-1-MAKUUORCHIDLAND.DWG 8/28/2020 4:27 PM KHANAKA

GENERAL NOTES - ELECTRICAL:

1. The scope of work for this project shall consist of installing new highway lighting, disconnecting and removal of existing street lighting systems, and provide power to EVC.
2. The Contractor is reminded of the requirements of State of Hawaii Department of Transportation 2005 Standard Subsection 105.16 - Subcontracts, which requires him/her to perform work accounting to not less than 30 percent of the total contract cost less deductible items. Non-compliance with this subsection may be grounds for rejection of bid.
3. The Contractor's attention is directed to the following sections of State of Hawaii Department of Transportation 2005 standard:

a. Subsection 104.11 - Utilities and Services

b. Subsection 107.06 - Contractor Duty Regarding Public Convenience

c. Section 645 - Work Zone Traffic Control
4. All necessary permits shall be obtained by the Contractor at his/her own cost.
5. The Contractor shall comply with the State of Hawaii's Occupational Safety and Health Law (DOSH).
6. Locations of existing underground structures and utilities such as pipelines, conduits, cables, manholes, monuments and structures shown on the plans are approximate only. It is not the intent of these plans to show the exact location of all underground utilities and structures. It is the responsibility of the Contractor to verify the locations of existing utilities with the respective owners. Existing utilities damaged by the Contractor shall be repaired by the Contractor at his own cost. Prior to any excavation work contractor shall call 'Hawaii One Call Center' at ph. 811 or ph. 1-866-423-7287.
7. All work shall be constructed in accordance with the following construction standards and specifications:

a. Construction Standards of Department of Transportation, State of Hawaii.

b. Current Standard Specifications for Road and Bridge Construction, State of Hawaii.

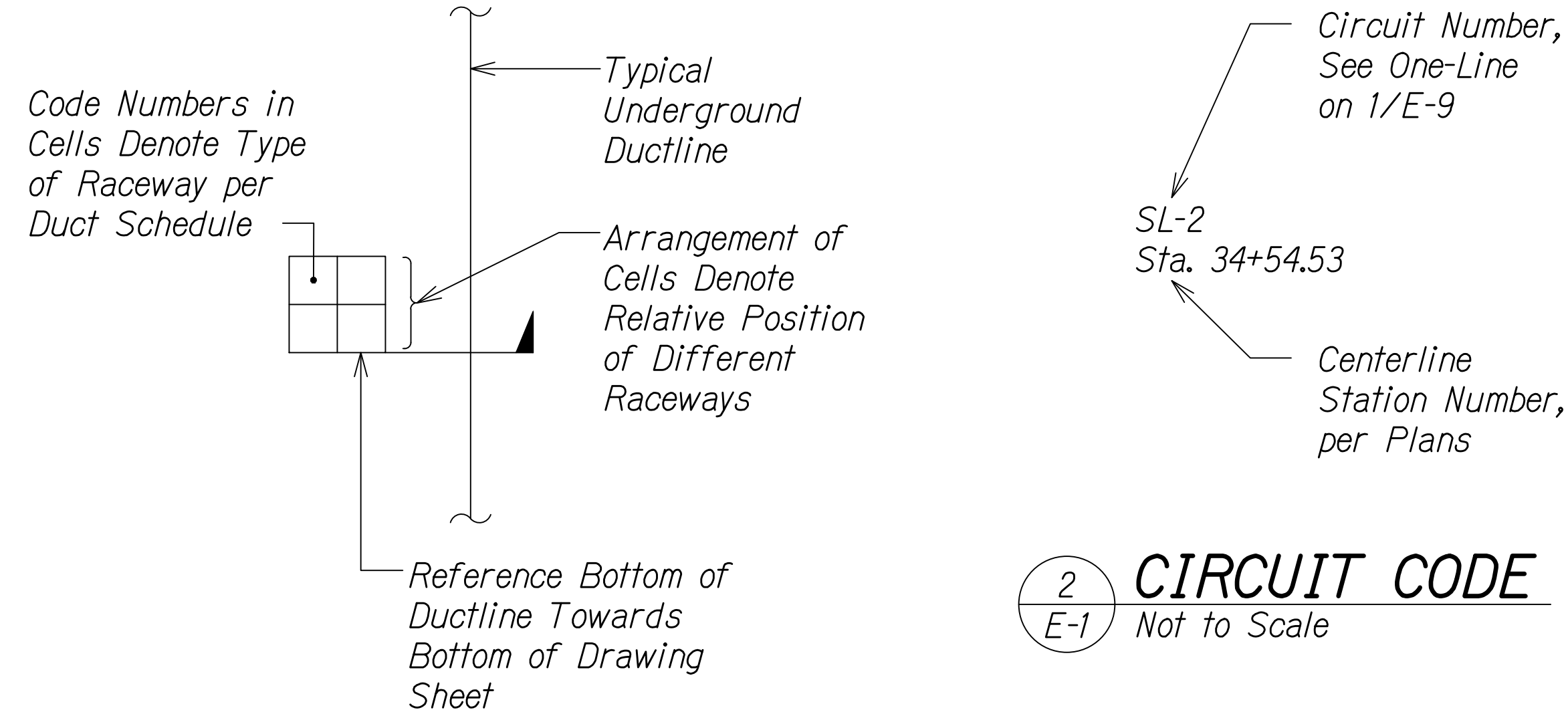
c. Standard Details for Public Works Construction, Department of Public Works, County of Hawaii.

d. Current Standard Specifications for Public Works Construction, Department of Public Works, City and County of Honolulu.

e. Construction Standards and Specifications of the Hawaii Electric Light Company.
8. It is not the intent of these plans and specifications to indicate all existing utilities. The information on the existing utilities are based on available plans and a limited amount of field work. The locations are approximate only and the Contractor shall verify the location and depth of the facilities and exercise proper care in excavating in this area. All existing utilities whether or not shown on the plans shall be protected at all times by the contractor unless specified on the plans to be abandoned or demolished. The Contractor shall be responsible for any damages to the facilities whether shown or not shown on plans. Any repair work shall be provided at no additional cost to this project.
9. The Contractor shall exercise proper care when excavating in areas with existing underground facilities, damages to the existing facilities shall be immediately reported to the respective utility companies, county or state agency. The repair work shall be provided at no additional cost to this project.
10. Contractor shall install 3 /16" polypropylene fish rope in all empty ducts. Plug all empty ducts with non-corrodible plugs manufactured for this purpose.
11. Refer to County of Hawaii, Department of Public Works, Traffic Division - Street Light Standards, dated October 15, 2019 for additional street light notes and details.

ELECTRICAL SYMBOL LIST / MOUNTING HEIGHT SCHEDULE					
Mounting Height From Floor to		(Special Mounting Heights Indicated on Plan)			
		Symbol		Description	
Top	℄	Existing	New		
		— —	— —	Underground Duct Line, See Duct Section Indicator and Schedule	
		⦶	⦶	Pole Light Assembly, Single Luminaire per Pole (Luminaire and Pole per DOT Standards)	
			1	Duct Section Indicator	

DUCT SCHEDULE		
No.	Description	Cables
5	3" PVC Schedule 40 with Pullstring	Provided by HELCO
1	2" PVC Schedule 40	See One Line Diagram
2	2" PVC Schedule 40 (Spare)	With Pullstring
3	Not Used	-
4	Not Used	-
5	Not Used	-
6	Not Used	-
7	Not Used	-
8	Not Used	-



1 DUCT SECTION FLAG CODE
E-1 Not to Scale

2 CIRCUIT CODE
E-1 Not to Scale

CHRIS D. KURAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 12564-E
HAWAII, U.S.A.

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Chris Kuramoto 04/30/22
SIGNATURE EXPIRATION DATE OF THE LICENSE

FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	90	116

ABBREVIATIONS	
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
Ckt	Circuit
CMU	Concrete Masonry Unit
EVC	Enhanced Vehicle Classification System
FC	Foot Candle
Gnd	Ground
HH	Handhole
HELCO	Hawaiian Electric Light Company
HDOT	Hawaii Department of Transporataion
Id	Identification
LRFD	Load and Resistance Factor Design
Max	Maximum
Min	Minimum
M.L.	Matchline
Mtd	Mounted
NEC	National Electric Code
No.	Number
O.D.	Outside Diameter
P.S.I.	Pounds per Square Inch
Rd.	Road
Sta.	Station
S.S.	Stainless Steel
T.M.K.	Tax Map Key
Typ.	Typical
W/	With
WP	Weatherproof
Xfmr	Transformer

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL GENERAL NOTES
AND SYMBOL LIST

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

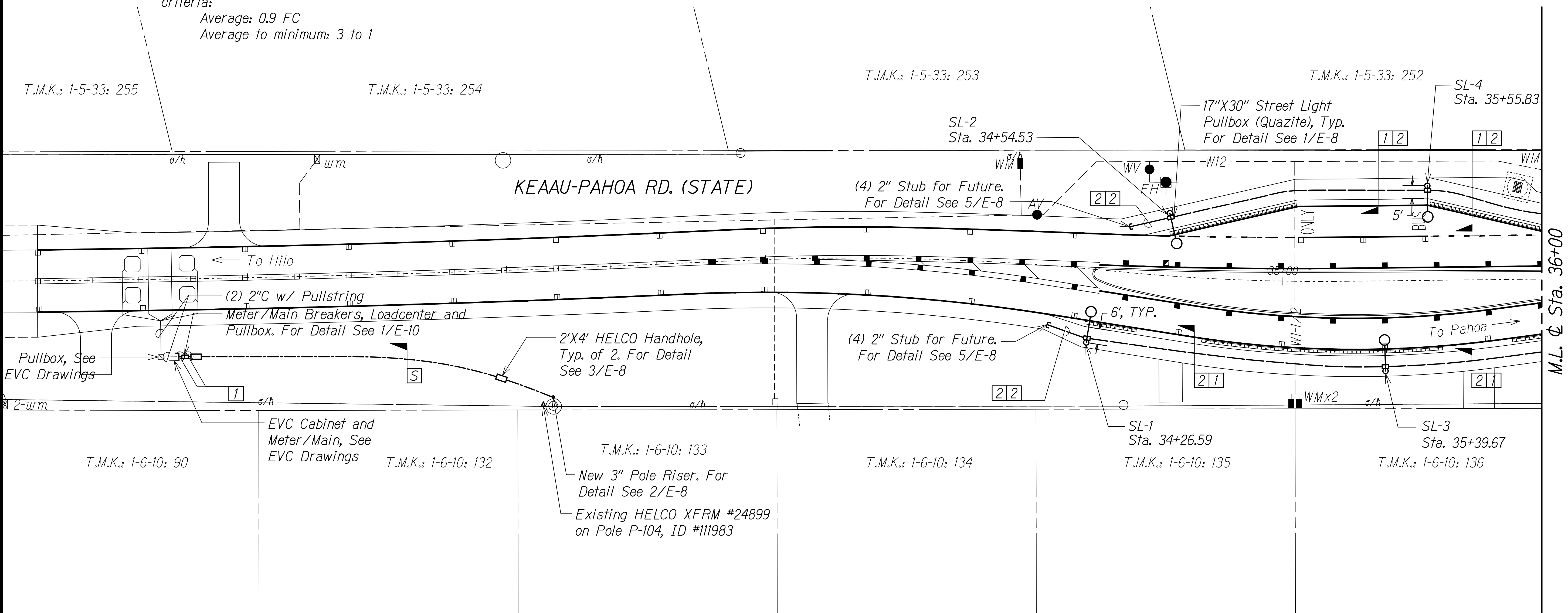
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SHEET No. 1 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	91	116

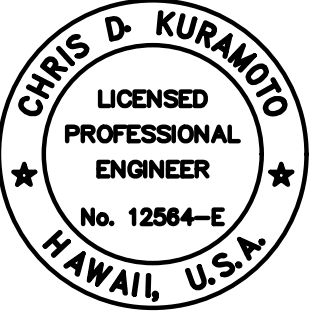
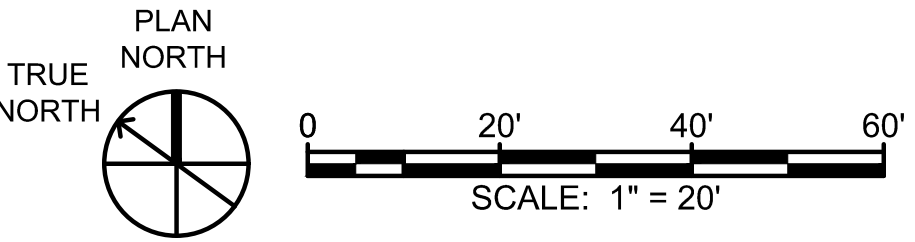
NOTES:

1. Light poles shall meet HDOT standards and AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st Edition, 2015 including interim revisions, as modified by HDOT.
2. Contractor shall provide illumination calculations based on the actual light locations. Illumination calculations shall meet the following illuminance criteria:
Average: 0.9 FC
Average to minimum: 3 to 1
3. Ensure a minimum clearance of 36" in front of the light pole, per ADA standards.
4. Maintain a minimum clearance of 36" around the drywell cover edge. Clearance requirements are applicable to aboveground and underground systems.



1
E-2

ELECTRICAL PLAN ORCHIDLAND - NEW WORK
Scale: 1"=20'



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRICAL PLAN
ORCHIDLAND - NEW WORK**

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

Scale: As Noted Date: Sept 2020

SHEET No. 2 OF 10 SHEETS

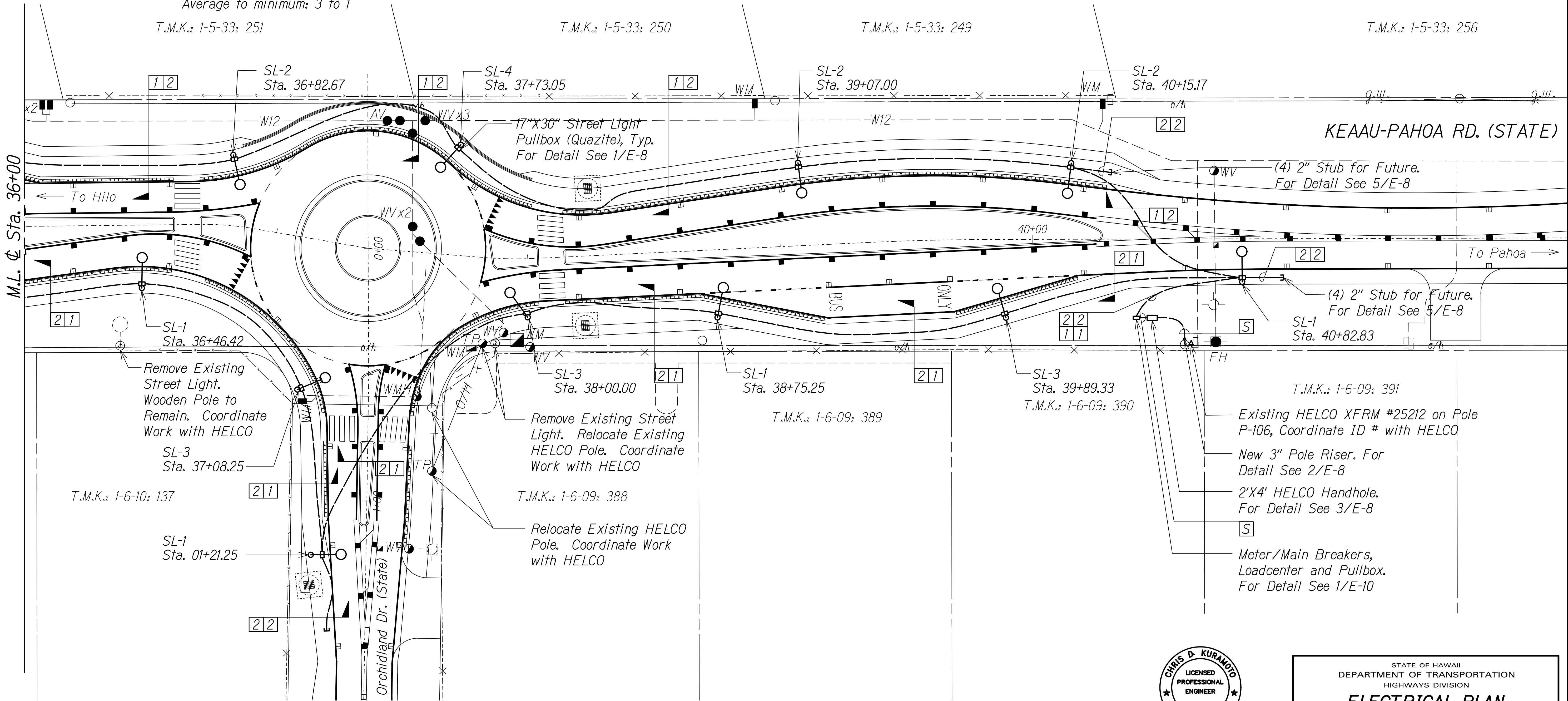
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FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	92	116

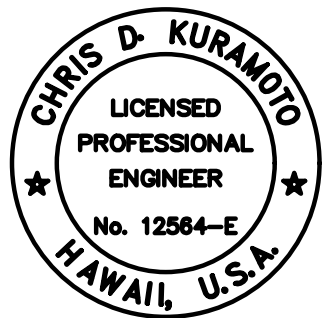
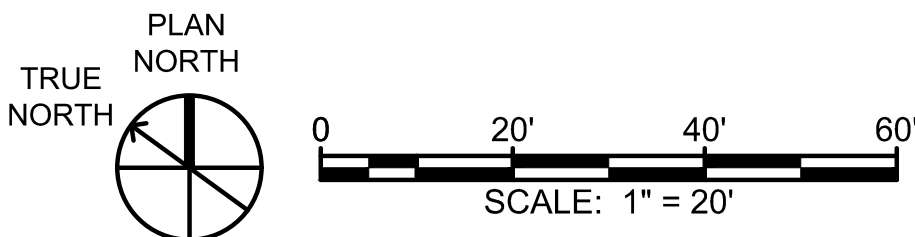
NOTES:

- Light poles shall meet HDOT standards and AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st Edition, 2015 including interim revisions, as modified by HDOT.
- Contractor shall provide illumination calculations based on the actual light locations. Illumination calculations shall meet the following illuminance criteria:
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1
E-3
ELECTRICAL PLAN ORCHIDLAND - NEW WORK
Scale: 1"=20'



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Chris Kuramoto
SIGNATURE
04/30/22
EXPIRATION DATE
OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN
ORCHIDLAND - NEW WORK

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchard Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

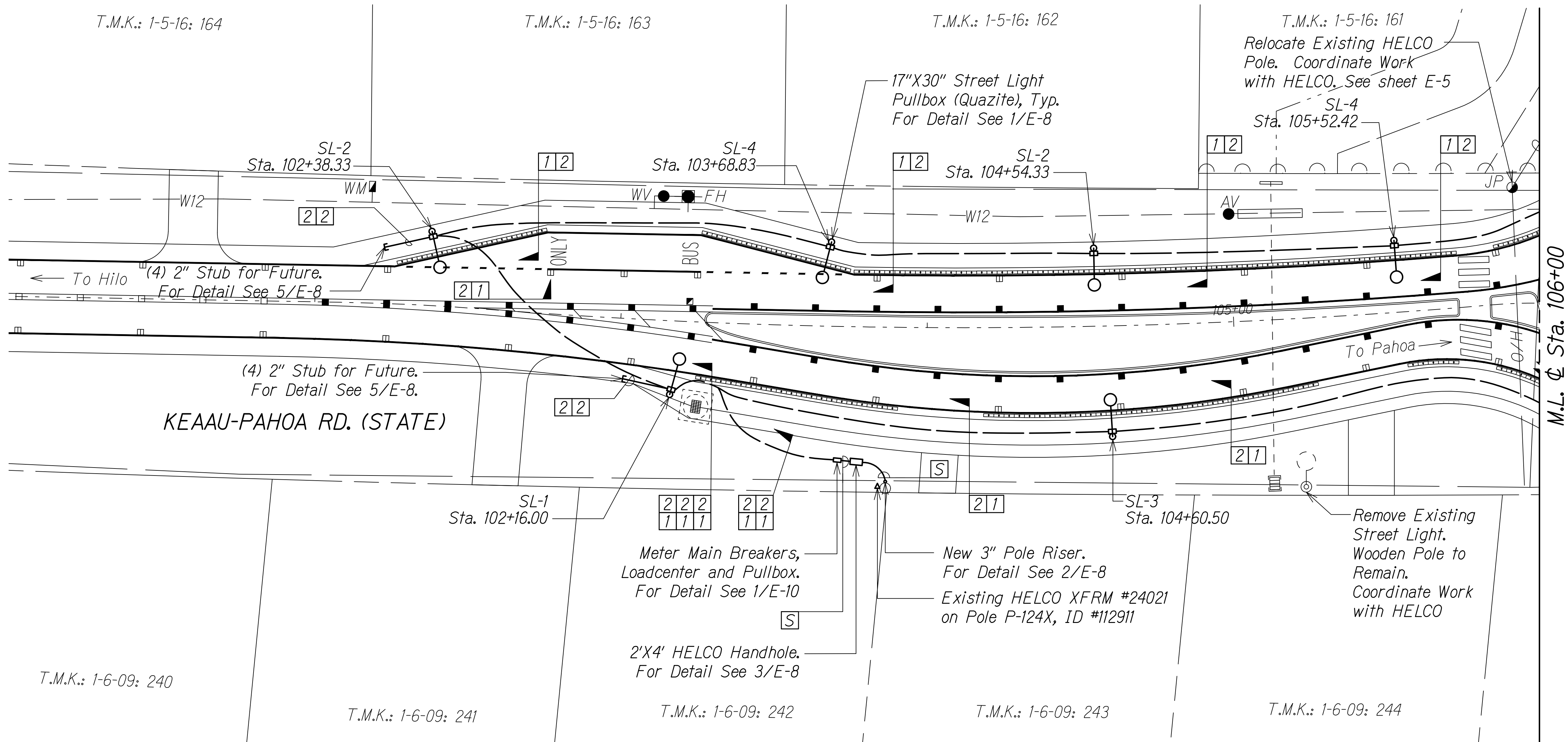
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SHEET No. 3 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	93	116

NOTES:

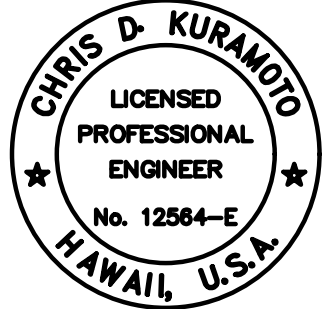
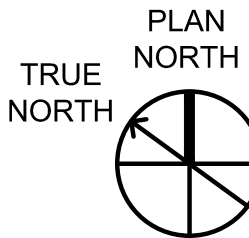
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1
E-4

ELECTRICAL PLAN MAKUU - NEW WORK

Scale: 1"=20'



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Chris Kuramoto
SIGNATURE

04/30/22
EXPIRATION DATE
OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRICAL PLAN
MAKUU - NEW WORK**

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

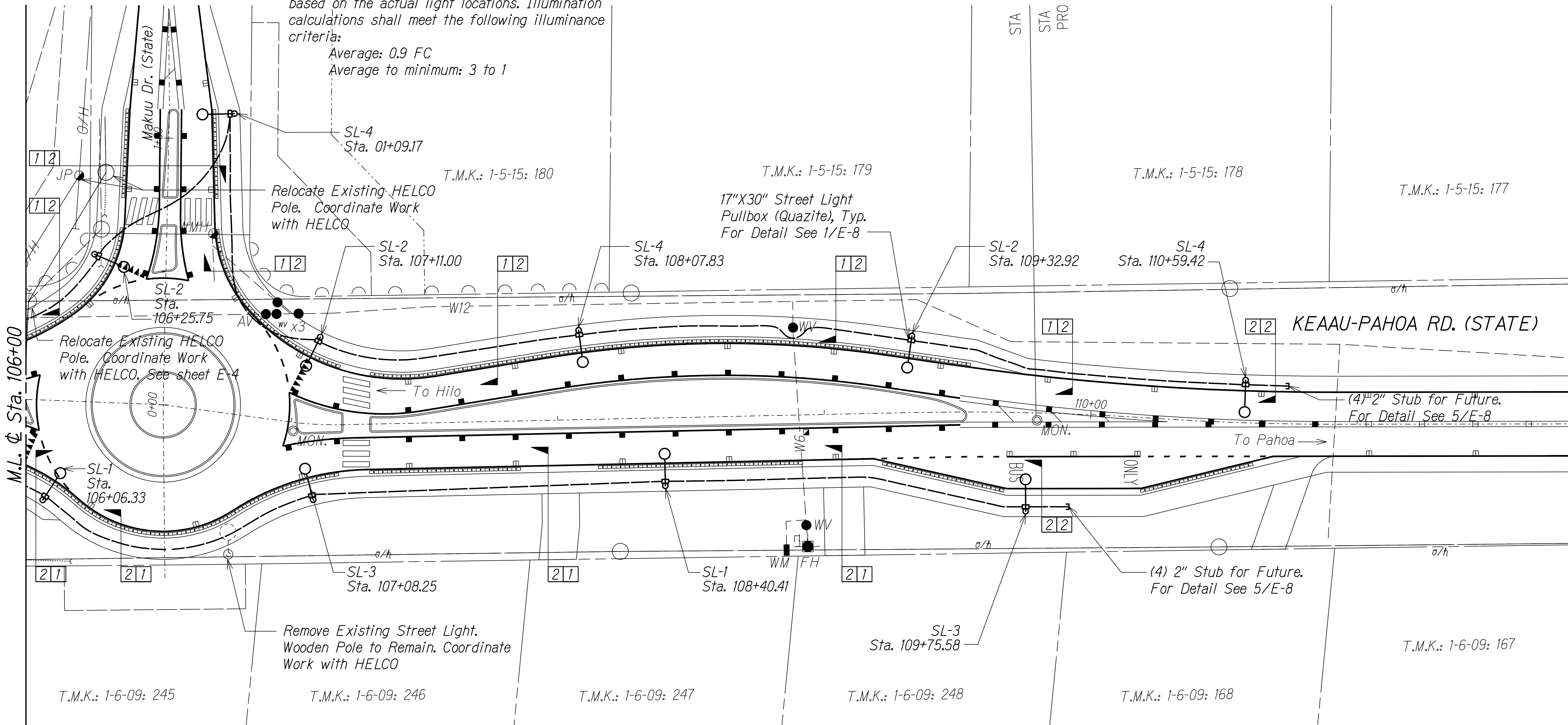
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SHEET No. 4 OF 10 SHEETS

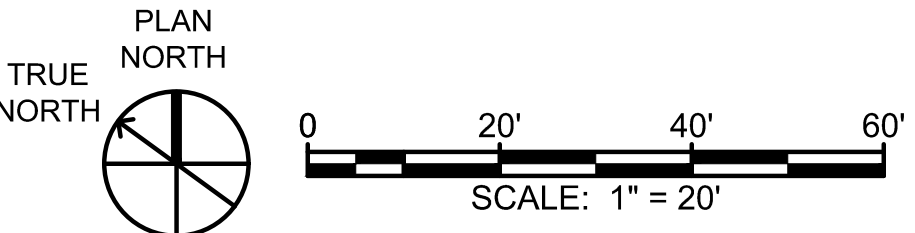
FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	94	116

NOTES:

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1 ELECTRICAL PLAN MAKUU - NEW WORK
E-5 Scale: 1"=20'



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Chris D. Kuramoto 04/30/22
SIGNATURE EXPIRATION DATE OF THE LICENSE

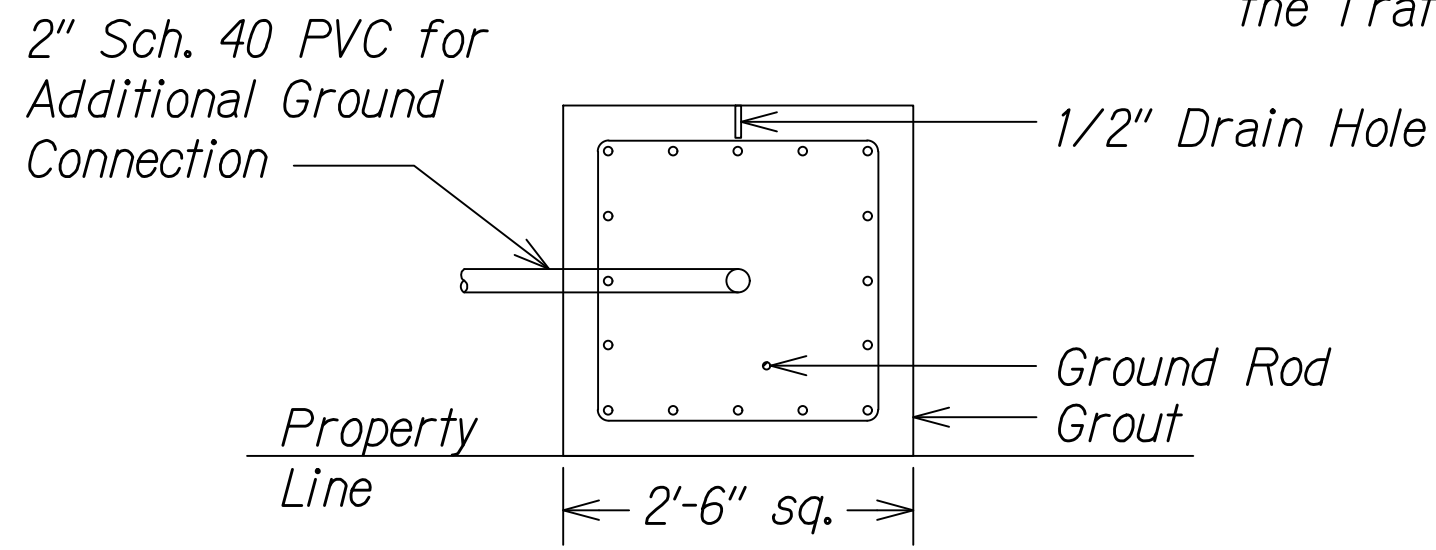
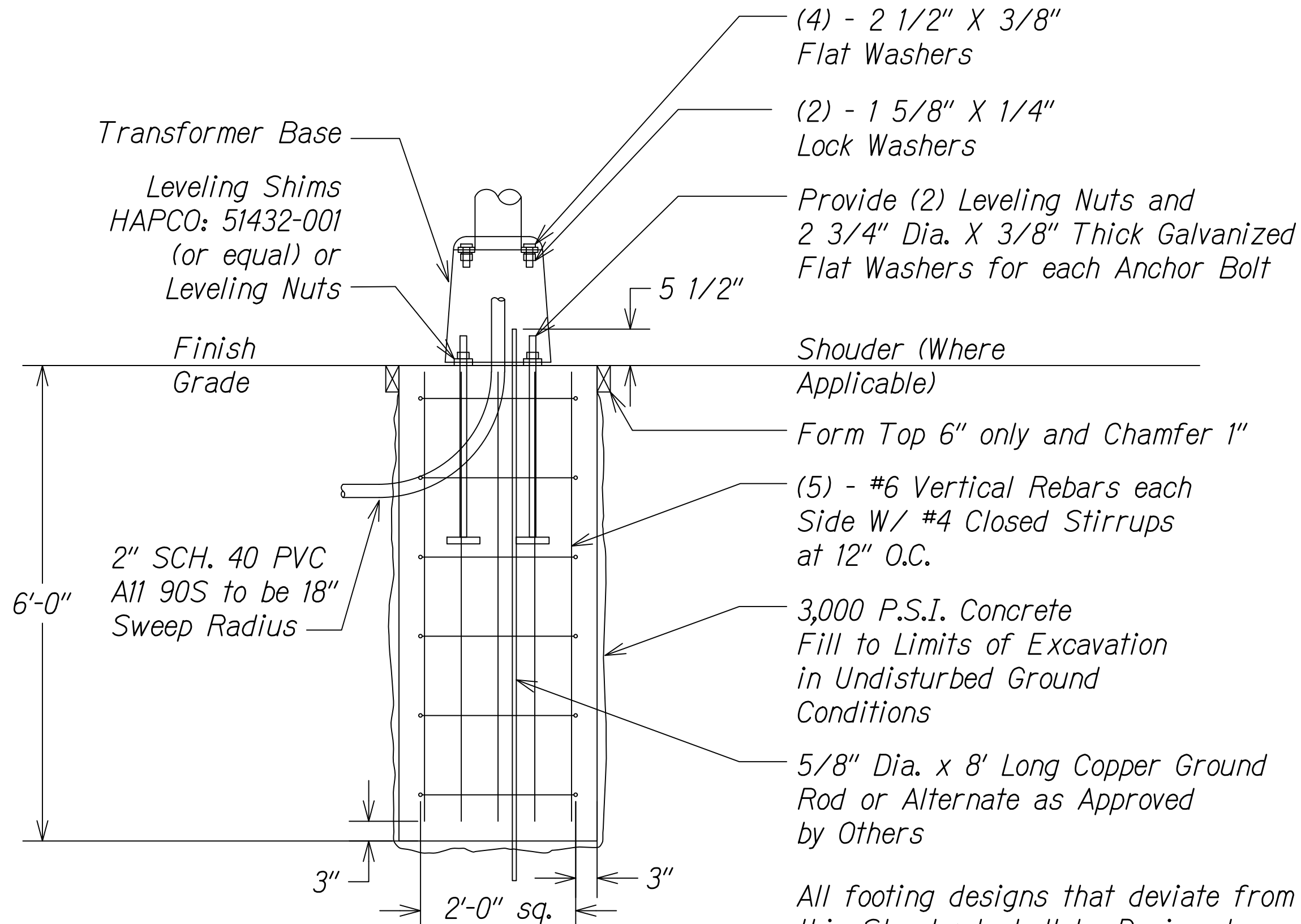
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN
MAKUU - NEW WORK
KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)
Scale: As Noted Date: Sept 2020

SHEET No. 5 OF 10 SHEETS

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FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	95	116

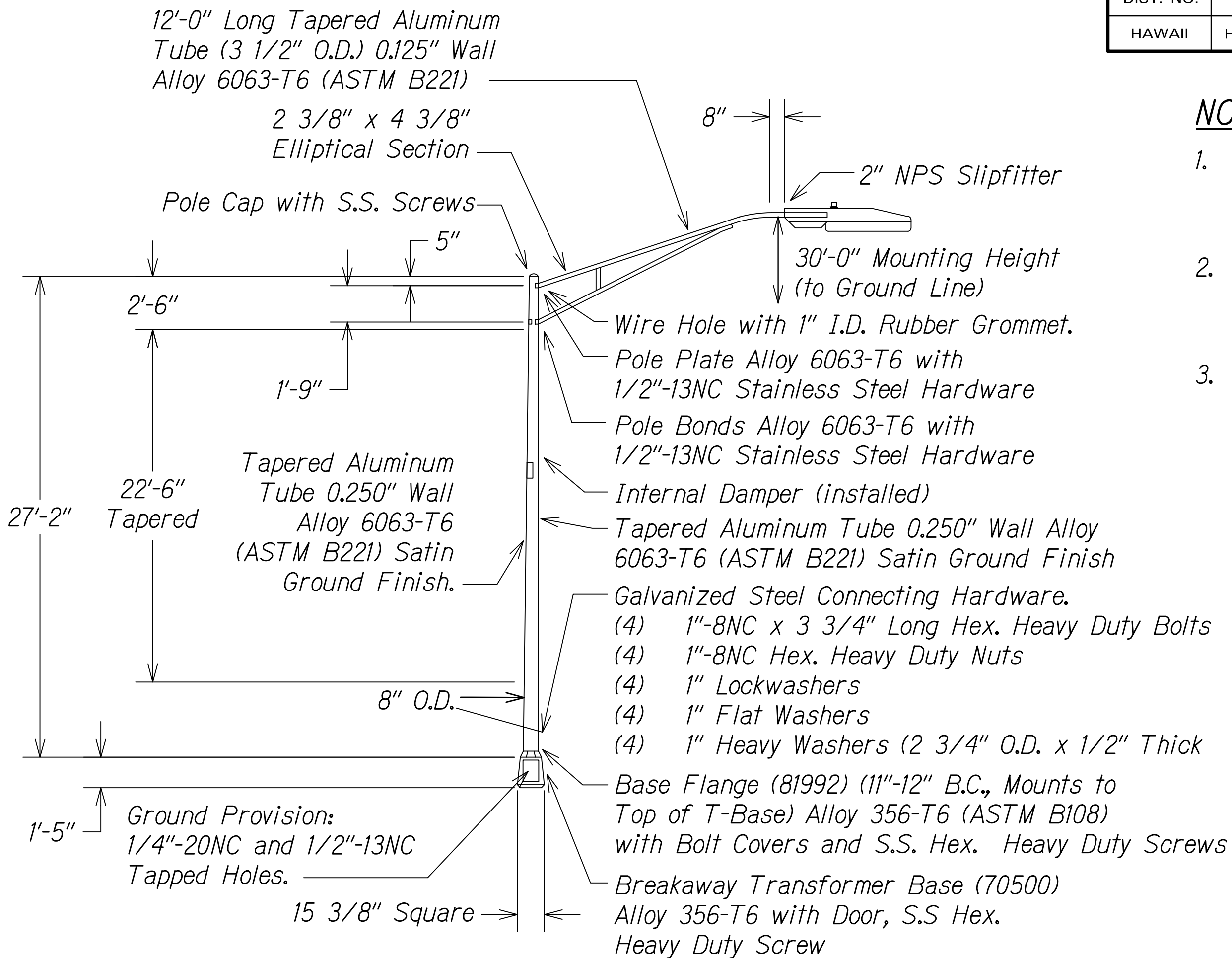


NOTES:

- If foundations are precast, manufacturer and materials suppliers shall be in compliance with the most current Edition of the Hawaii Standard. Specifications for Road, Bridge and Public Works Construction and where applicable the National Precast Concrete Association.
- 3,000 P.S.I. 28-day compression strength concrete shall be used.
- Each foundation shall not be handled or transported until at least 80% of the 28-day concrete compression strength has been reached.
- Each foundation shall not be installed until the 28-day concrete compression strength has been achieved.
- CLSM or equivalent shall be use to backfill around each foundation (cast-in-place or precast).
- For inspections, contact the Traffic Division at 808-961-8341 and plan for 3-day minimum lead time.

STREET LIGHT FOUNDATION

Not to Scale

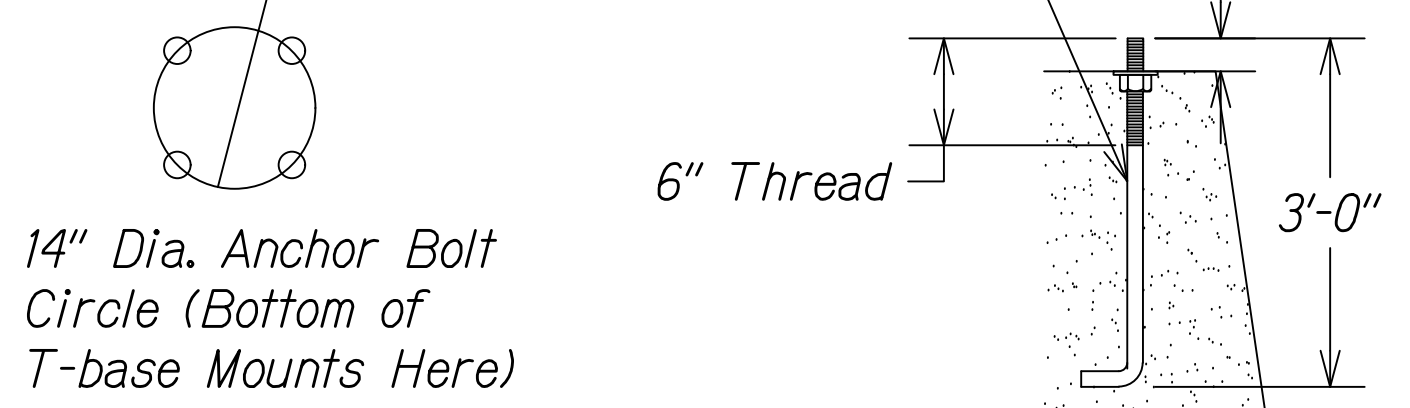


⊙ = E2 Lighting/LED Hawaii 85W LED Luminaire, #E2-H150-ST-85W-7PD-SF or Approved Equal

NOTE:

- LED Luminaire: Full Cutoff Electronic Fixture With <2% Blue Light Content.

- (4) 1"-8NC S.S. Anchor Bolts, (86518) Type 316 Per ASTM A193 Grade B8M Class 1 (30KSI Min Yield).
- (8) 1"-8NC S.S. Hex. Nuts
- (4) 1" S.S. Lockwashers
- (4) 1" S.S. Flatwashers
- (4) 1" Galvanized Steel Heavy Washers (2 3/4" O.D. x 1/2" Thick)



TYPICAL STREET LIGHT STANDARD

Not to Scale



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Signature: Chris Kuramoto Date: 04/30/22
EXPIRATION DATE OF THE LICENSE

NOTES:

- Pole type: HAPCO part #RTA30D8BFT1*-GC or approved equal.
- Photoelectric cells: Fisher Pierce FP-7790B-SPS or approved equal.
- Provide a Type II post mounted object marker on each light pole, per standard plan TE-15.

4 3"

NOTES:

- Font style: Standard Highway.
- Font size: 3" (height).
- Machine cut on black adhesive Scotchlite (or equal) sheeting.
- Affix number to clean surface of pole 3'-0" above finished grade.
- Street light number to face street.

POLE IDENTIFICATION

Not to Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ELECTRICAL STREET LIGHT DETAIL
KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)
Scale: As Noted Date: Sept 2020
SHEET No. 6 OF 10 SHEETS

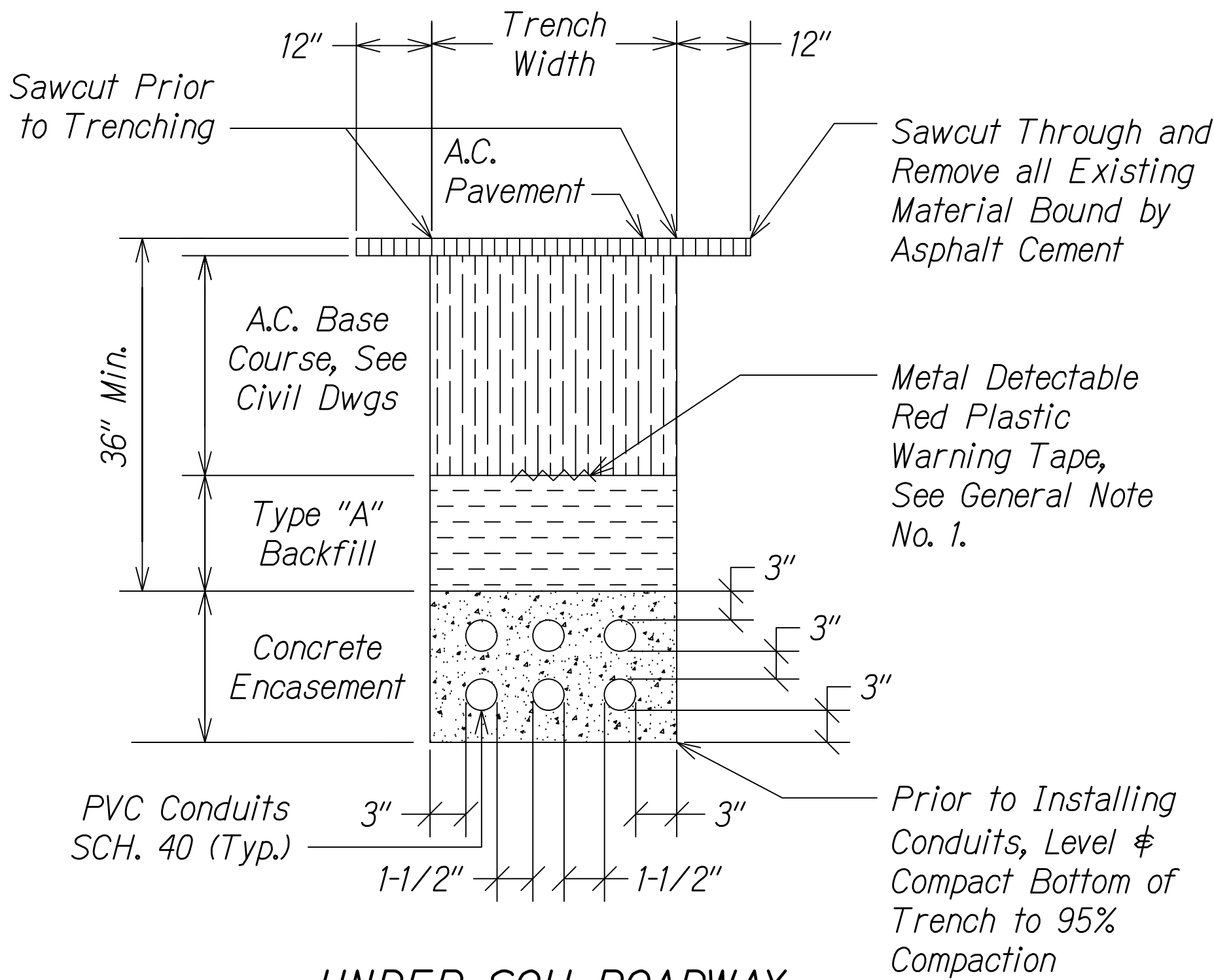
FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	96	116

NOTES:

- All conduit shall be PVC schedule 80 for direct buried and PVC schedule 40 for concrete encasement, unless otherwise noted.
- Backfill over concrete duct sections shall be Type "A" per backfill type notes.
- Backfill over direct buried conduits shall be Type "B" per backfill type notes.
- If the normal material in the bottom of a trench containing a direct burrial conduit is not Type "B" an additional 3" shall be excavated and Type "B" backfill provided.
- Concrete for ducts shall be 3000 P.S.I. in 28 days.
- All conductor sizes shall be copper conductors.

BACKFILL TYPES ARE:

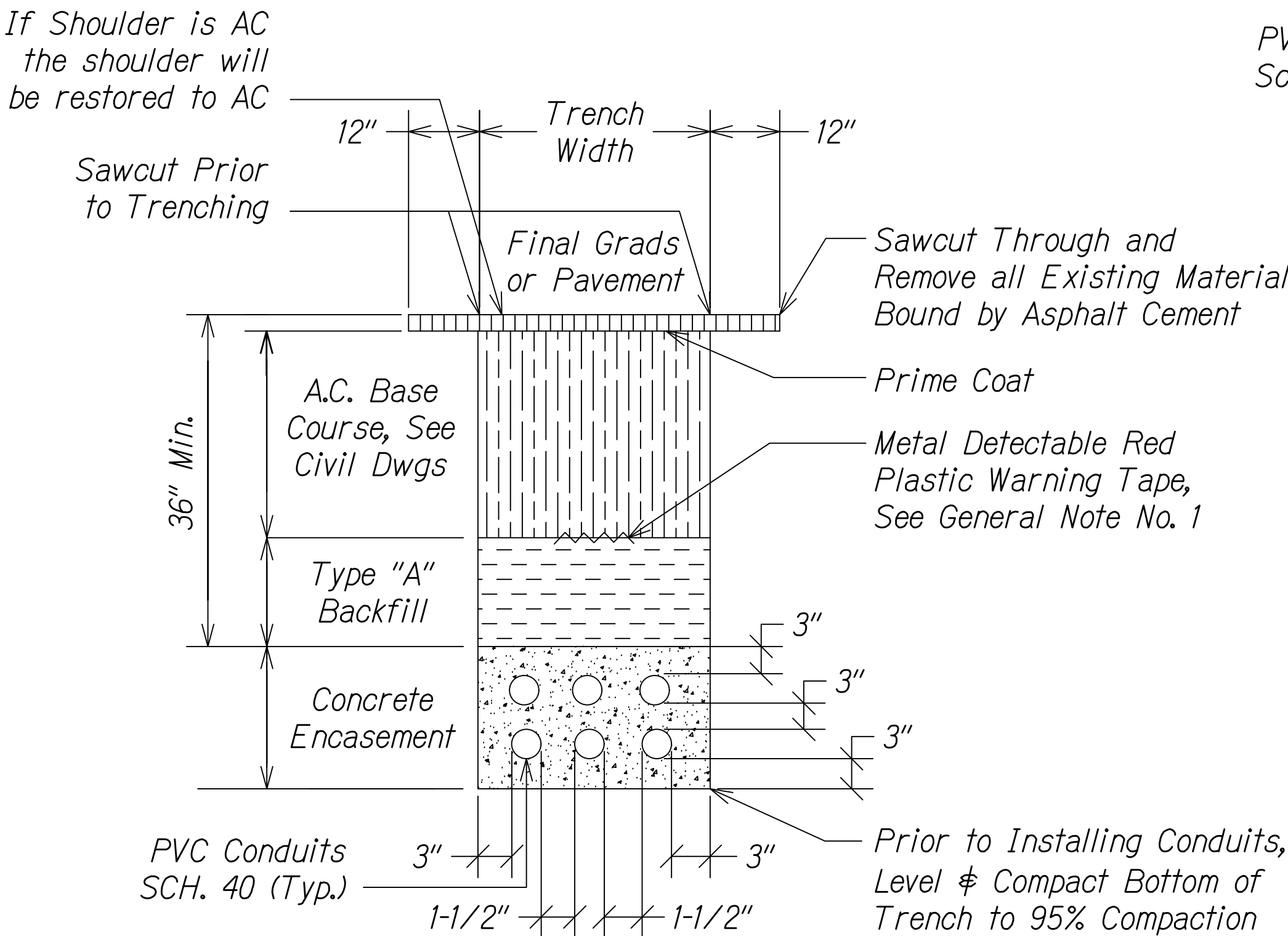
- Type "A" Beach Sand, Earth or Earth and Gravel. If Earth and Gravel Used, the Maximum Rock Size Shall be 1" and the Mixture Shall Contain Not More Than 50% By Volume of Rock Particles.
- Type "B" Beach Sand, Earth or Earth and Gravel. If Earth and Gravel Used, Mixture Must Pass a 1/2" Mesh Screen and Contain Not More Than 20% By Volume of Rock Particles.



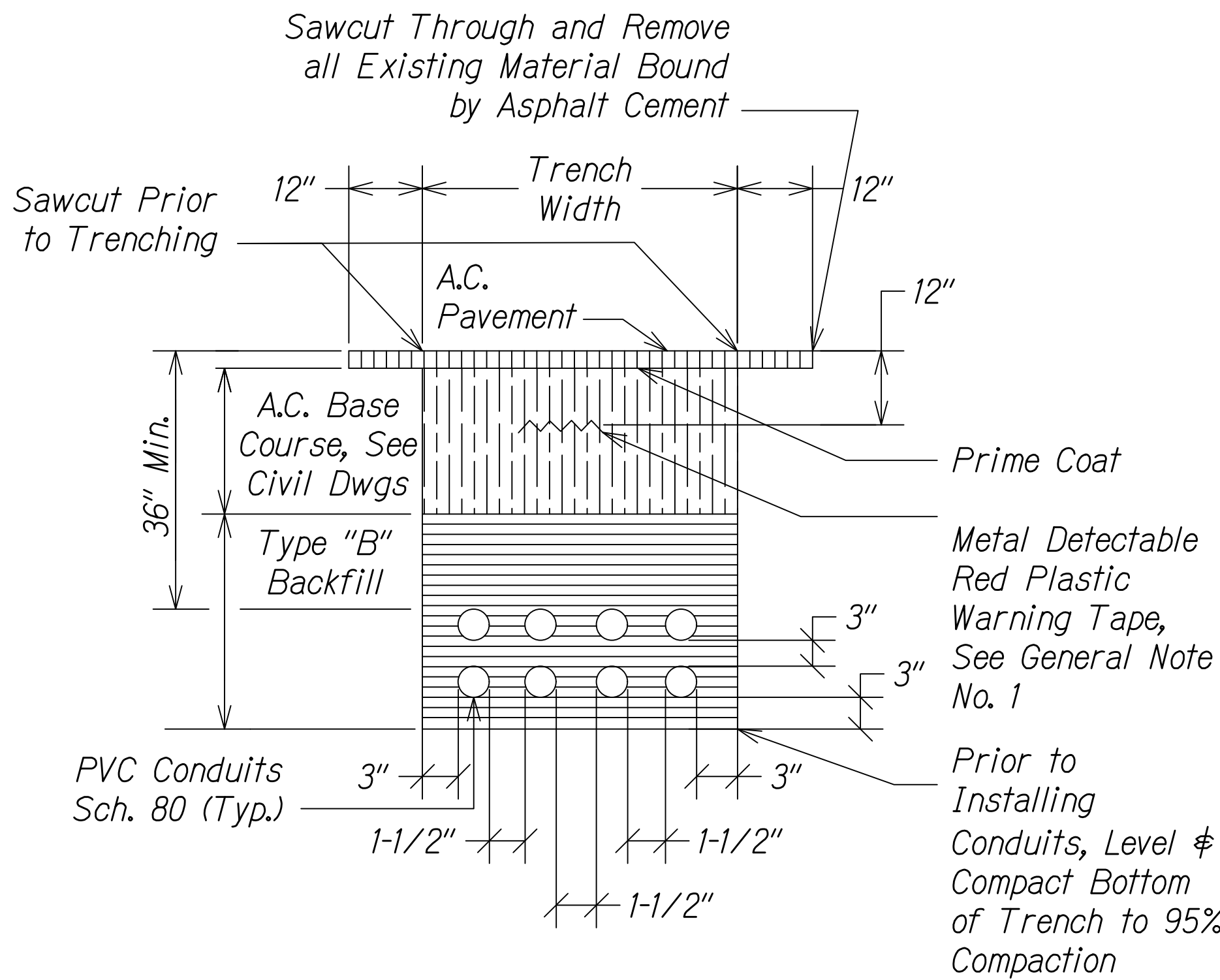
TYPICAL DUCT SECTION
(CONCRETE ENCASED DUCTS)

1
E-7

Not to Scale



WITHIN SOH SHOULDER



TYPICAL DUCT SECTION
(DIRECT BURIED DUCTS)

2
E-7

Not to Scale

GENERAL NOTE:

- The metal detectable red plastic warning tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "Caution - State Traffic Signal and/or Hwy Lighting Buried Below," utilizing 1-1/2 inches series "C" black lettering. The message will be repeated with a 4-1/4" spacing between top line of message and start of next text.



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SIGNATURE

04/30/22
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

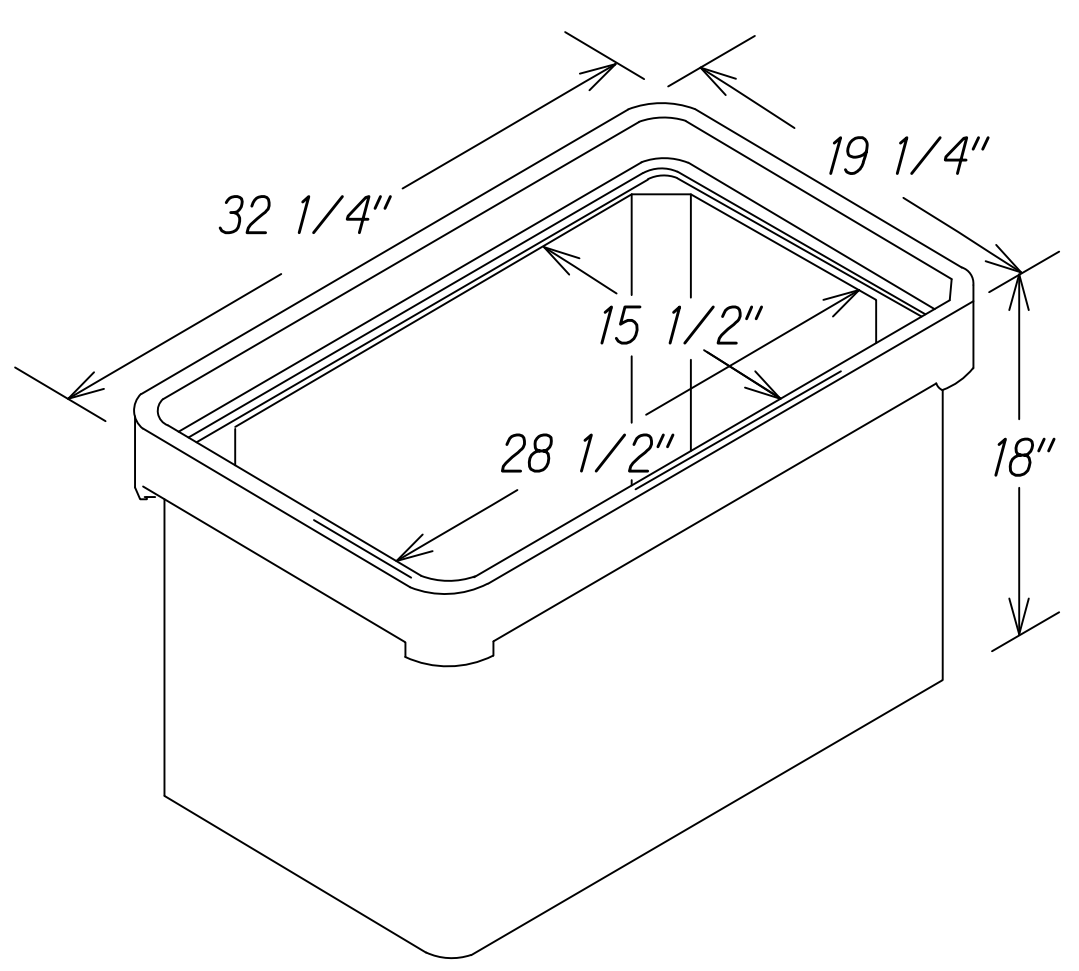
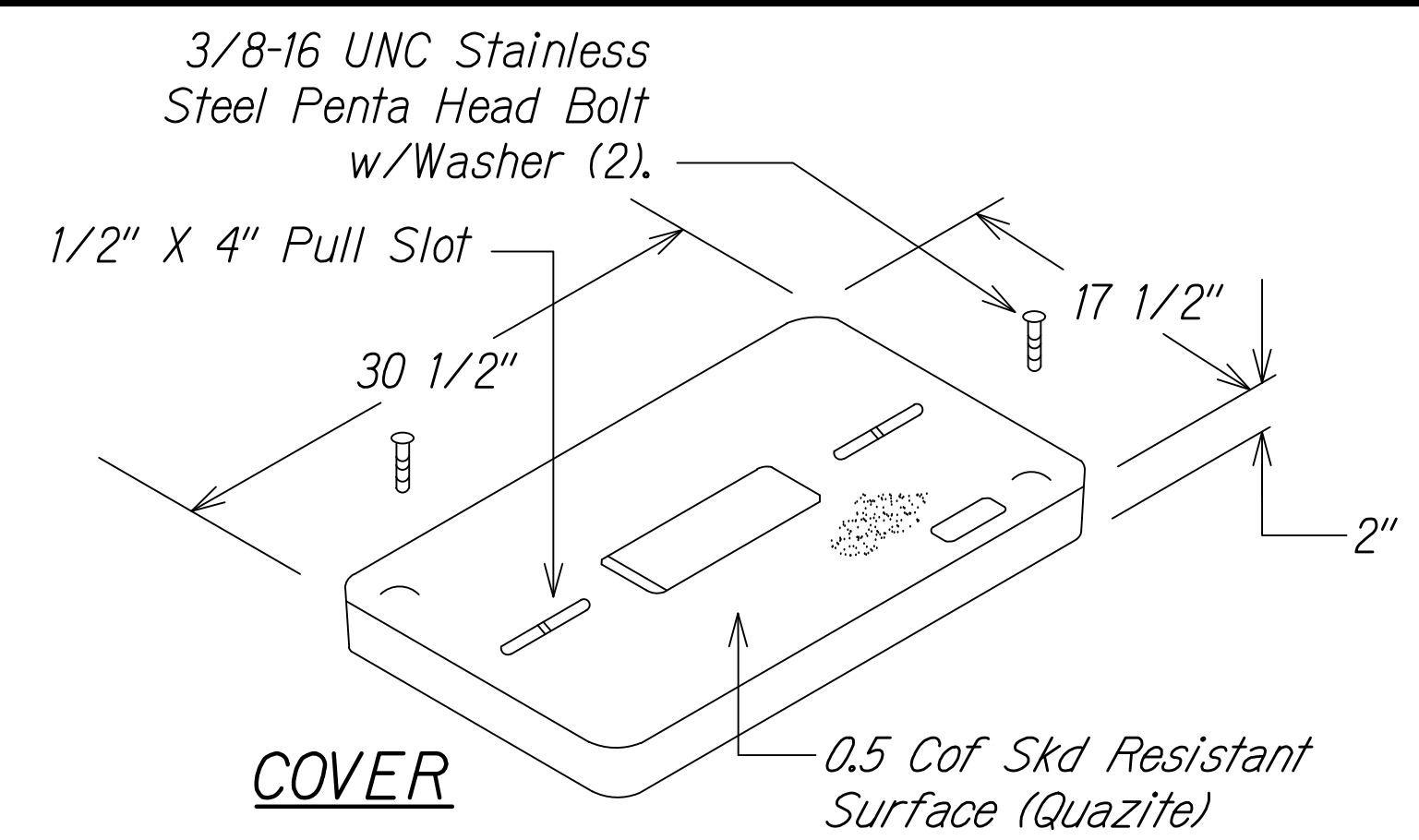
**ELECTRICAL STREET LIGHT
DETAIL**

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

Scale: As Noted Date: Sept 2020

SHEET No. 7 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	97	116



HEAVY DUTY PULL BOX (OPEN BOTTOM)

NOTE:

1. Provide 6 inch minimum 3/4" crushed gravel base course, well compacted.

Equivalency Reference:
Quazite Precast Polymer Concrete Box, Part #PG1730BA18

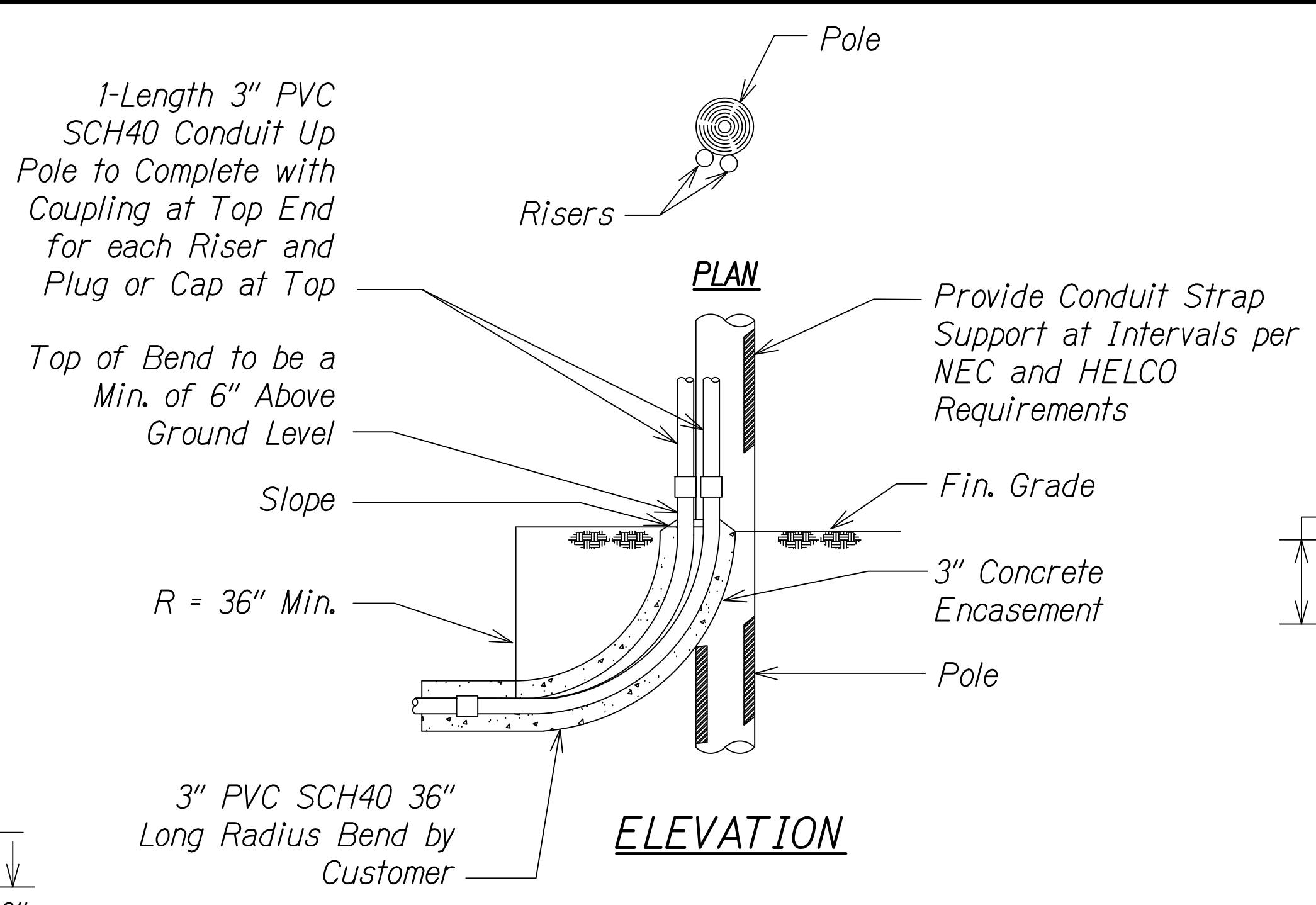
NOTES:

1. All conduits shall enter vertically at the bottom of the pullboxes.
2. All dimensions and lines are approximate.
3. Field-adjust pullbox locations and conduit clearances as required.
4. Conduit 90 degree bend radii shall be a minimum of 18".
5. Pullbox covers shall be labeled "Traffic Signals" or "Street lights" as appropriate.
6. Pullbox covers shall use penta head bolts.
7. Install one ground rod in each pullbox.
8. All pullboxes shall be quazite with tier 22 rating.
9. For more information, contact Traffic Division at 808-961-8341.

1

17" x 30" x 18"D STREETLIGHT PULLBOX

Not to Scale



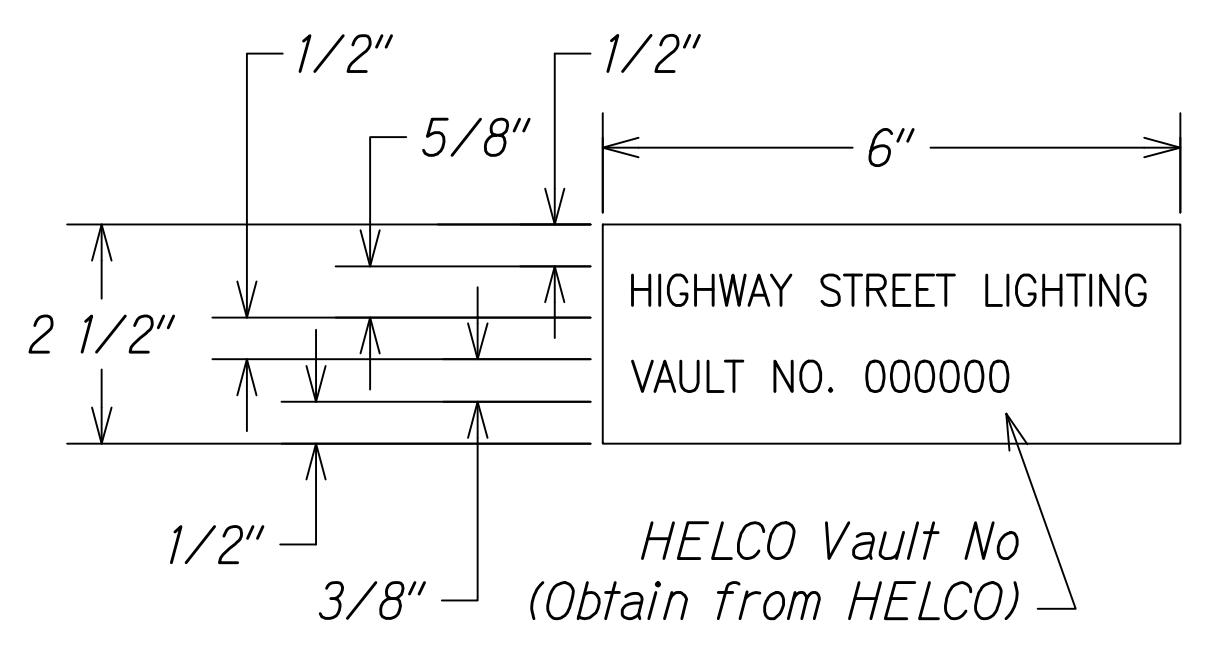
NOTE:

1. Coordinate and provide riser detail in accordance with HELCO requirements.

2

TYPICAL RISER DETAIL

Not to Scale



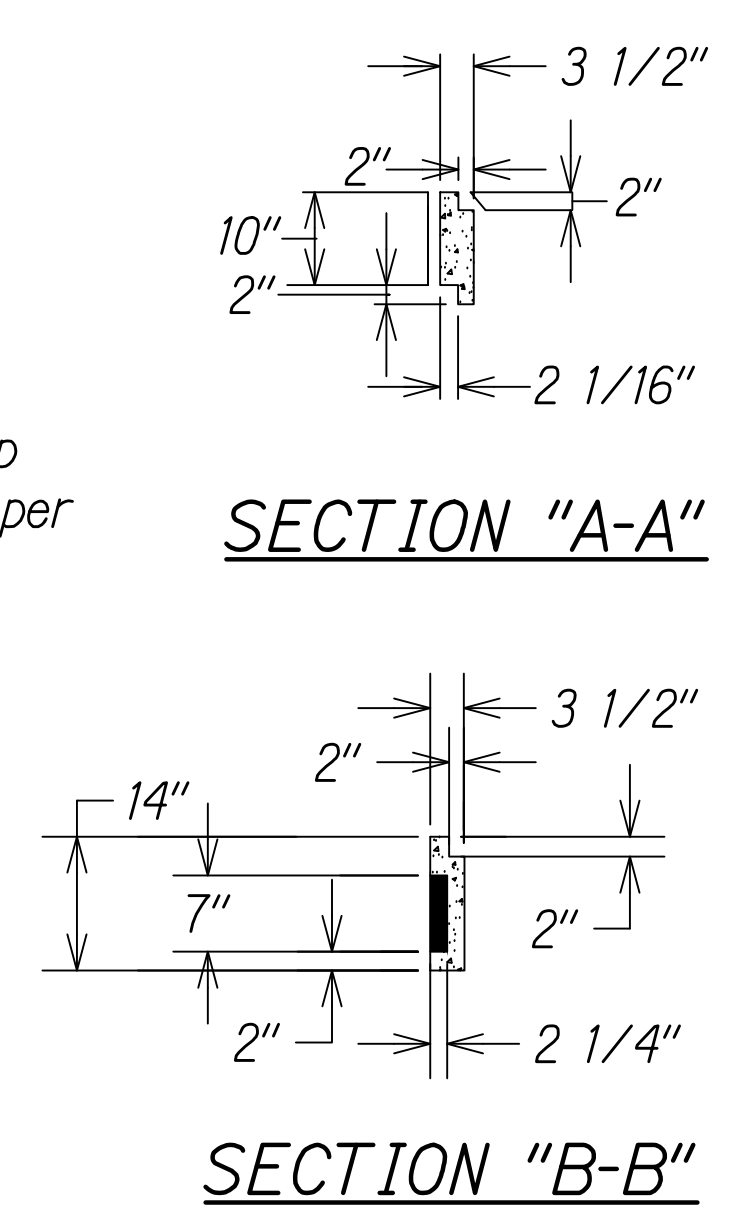
NOTES:

1. Use 3-ply laminated flexible plastic, Black-White-Black. Thickness: 0.010"-Black Cap Sheet 0.052"-White Base Sheet. 0.010"-Black Base Sheet.
2. Attach to meter socket using scotch 3M brand very high bond (VHB) double coated acrylic foam tape or equivalent.
3. Letters/numbers shall be 1/16" stroke, (white in color).
4. Letters/numbers area inscribed by cutting through "Black Cap Sheet" to expose white letters/numbers.

4

METER I.D. TAG

Not to Scale



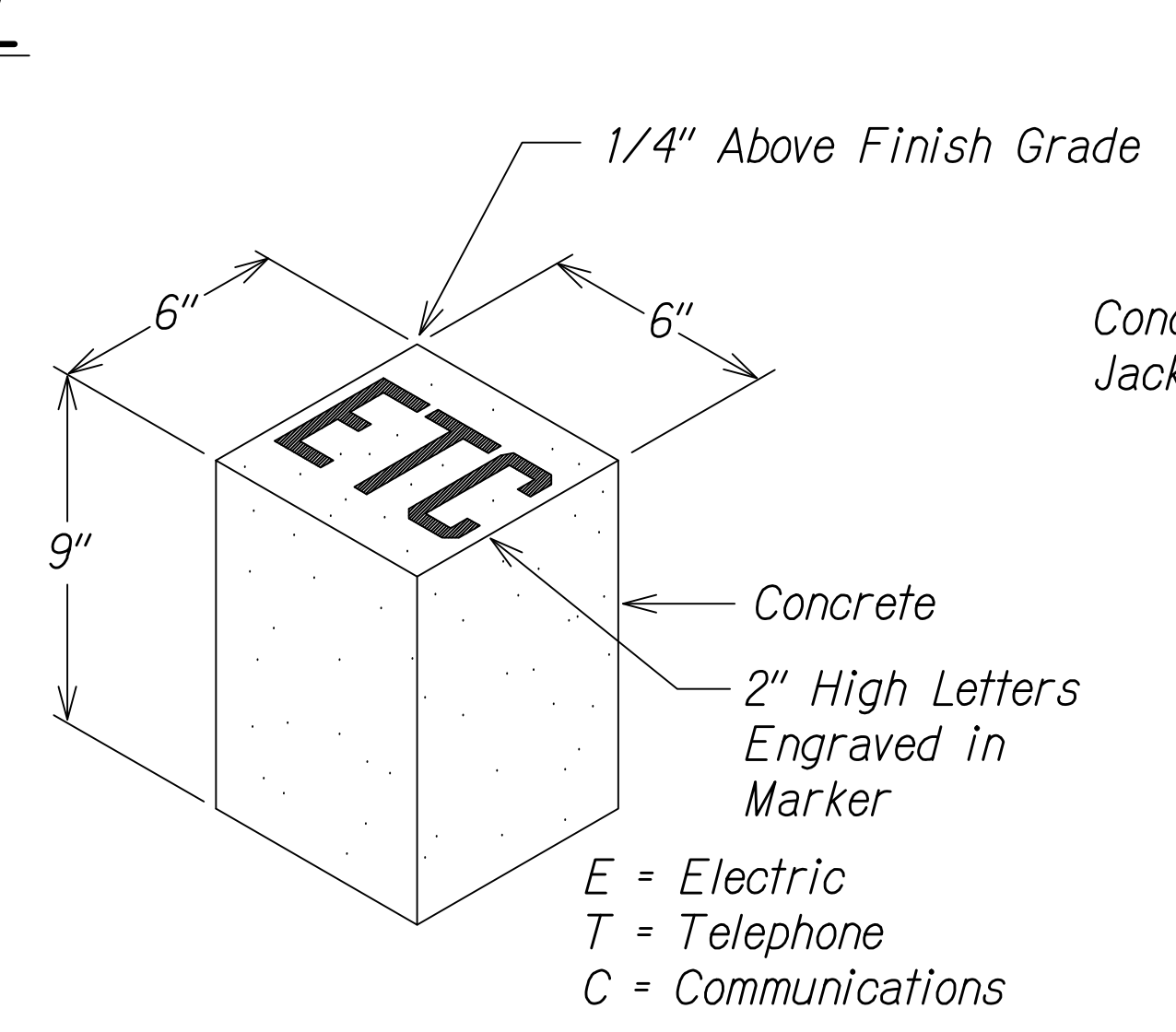
NOTE:

1. Coordinate and provide pullbox detail in accordance with HELCO requirements.

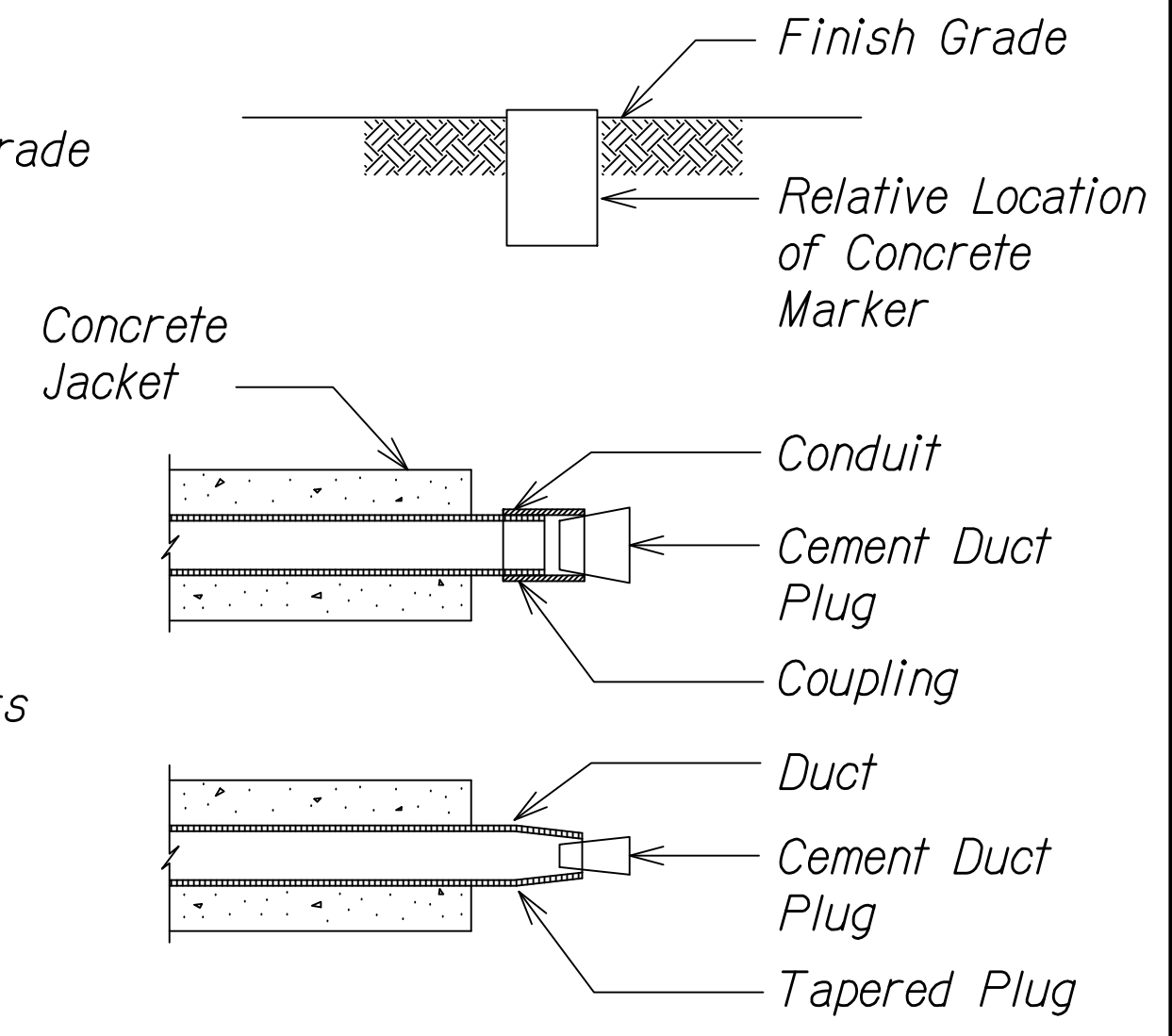
3

2' x 4' ELECTRIC PULLBOX ASSEMBLY

Not to Scale



CONCRETE MARKER

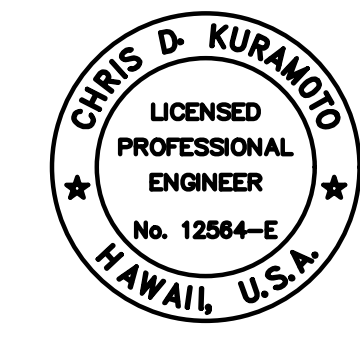


STUB-OUT DETAIL

5

STUB OUT CONCRETE MARKER DETAIL

Not to Scale



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Signature: Chris Kuramoto Date: 04/30/22
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL STREET LIGHT
DETAIL

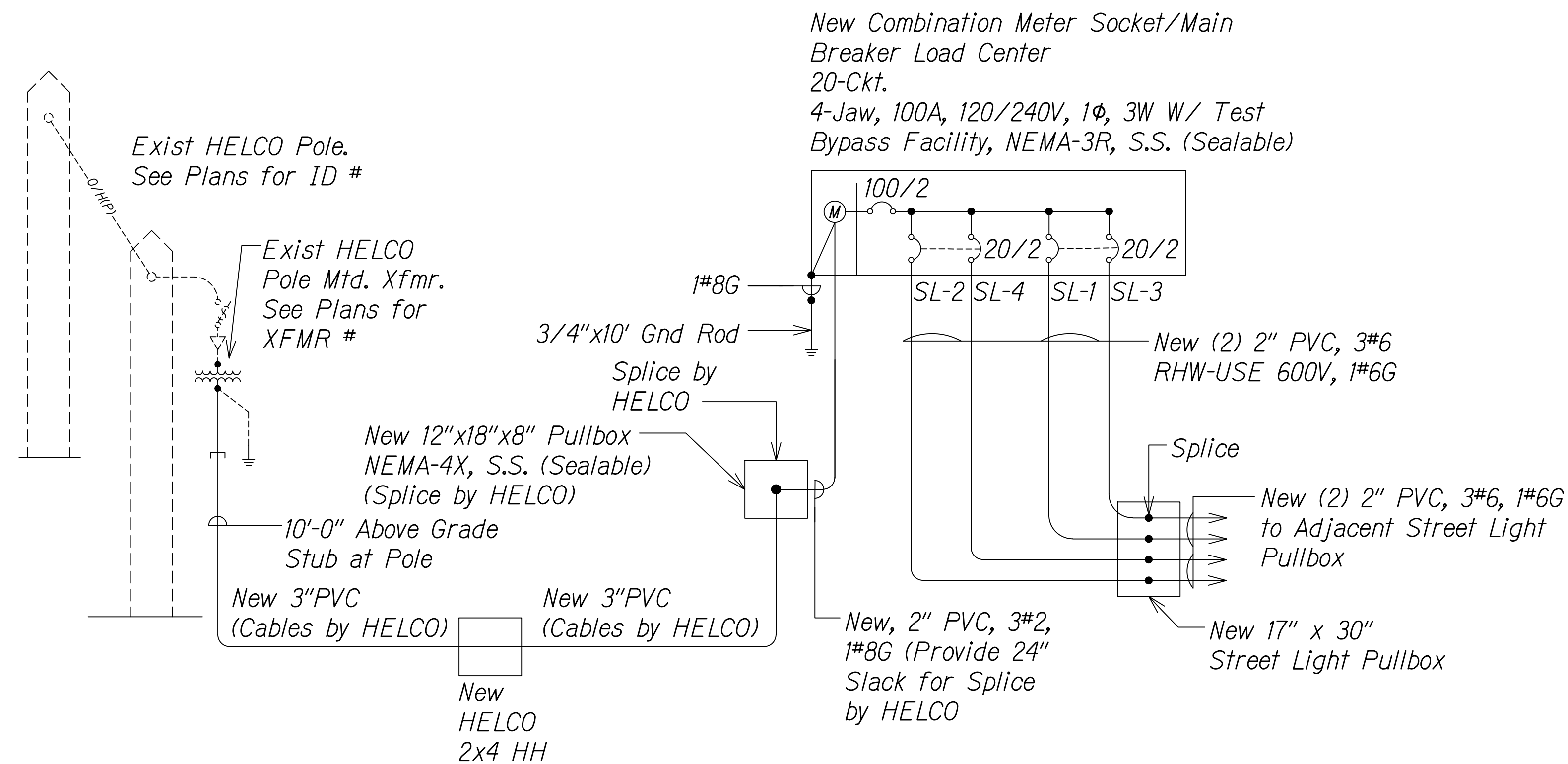
KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

Scale: As Noted Date: Sept 2020

SHEET No. 8 OF 10 SHEETS

Z:\PROJECTS (NUMBERED)\2018\8087\DRAWING FILES\ELECTRICAL\IMPROVEMENT 2 - ROUNDABOUT\MAKU & ORCHIDLAND\E-8-MAKU&ORCHIDLAND.DWG 8/31/2020 4:16 PM KHANAKA

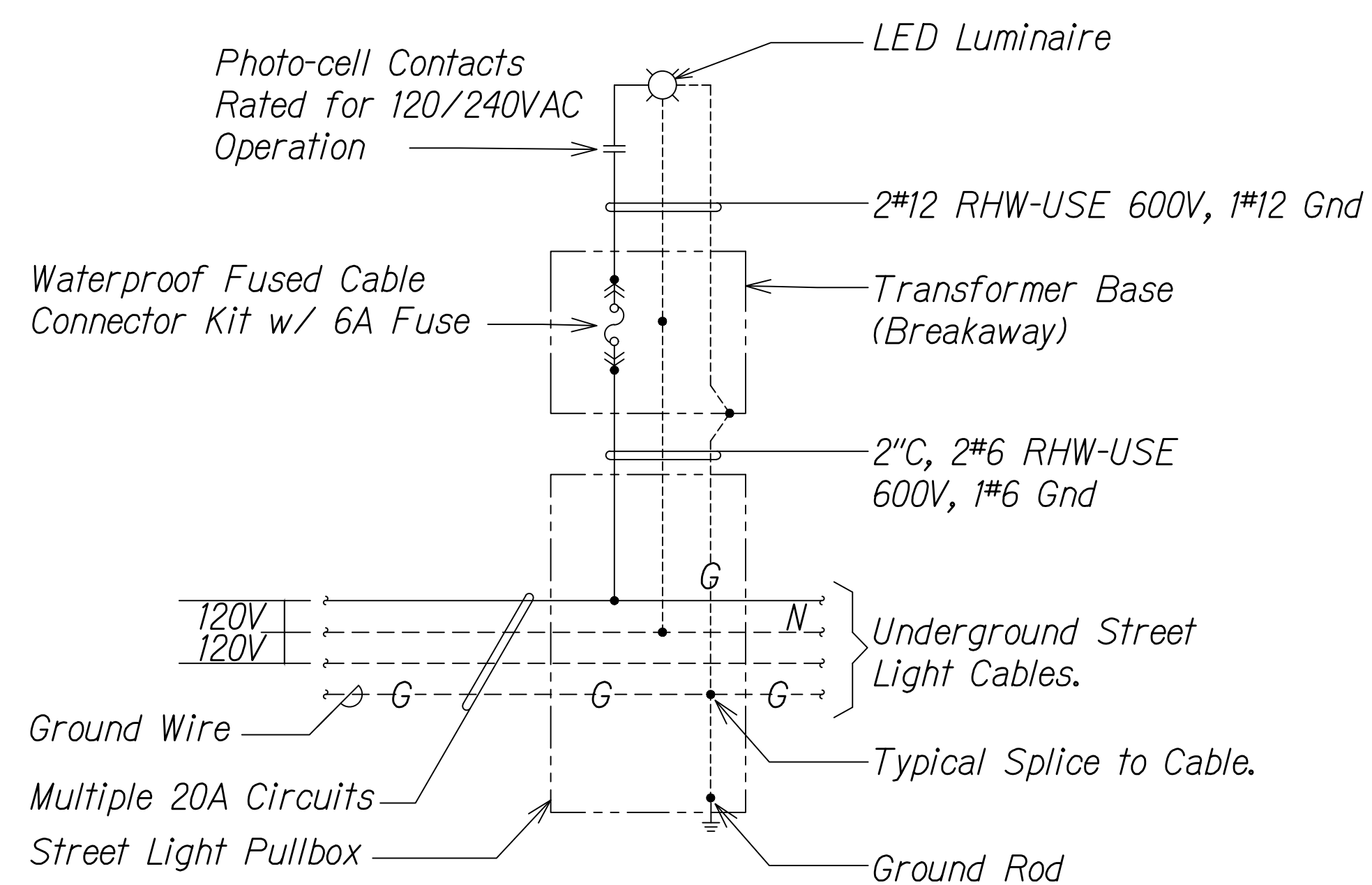
FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(27)	2021	98	116



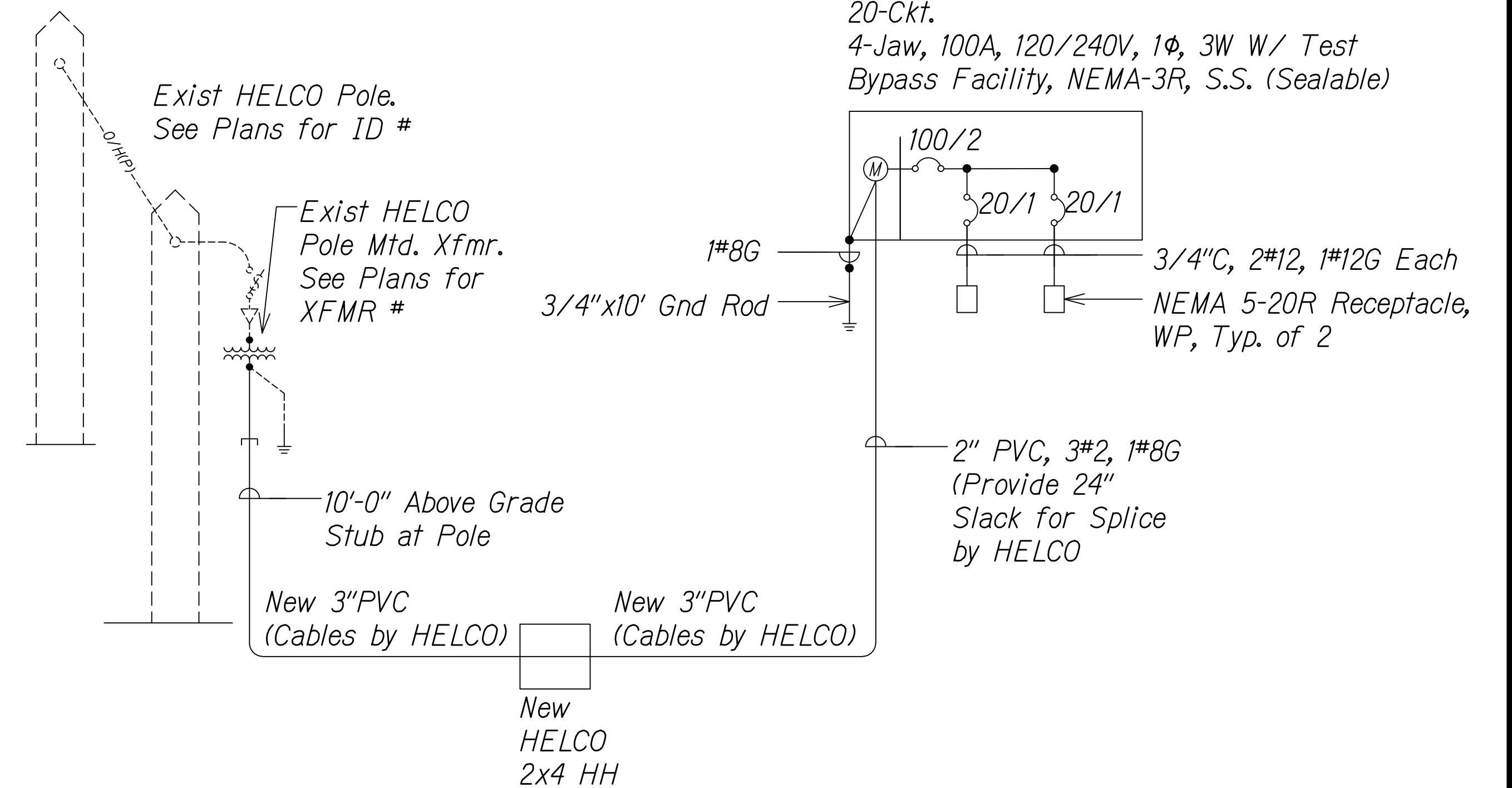
NOTES:

1. Phase work to maintain existing traffic signals and street lights in operation as required.
2. All new conductors shall be copper.

1 MAKUU AND ORCHIDLAND ONE-LINE DIAGRAM
E-9 Not to Scale



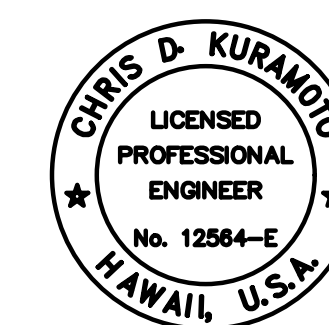
3 STREET LIGHT CONNECTION DIAGRAM
E-9 Not to Scale



NOTES:

1. Phase work to maintain existing traffic signals and street lights in operation as required.
2. All new conductors shall be copper.

2 ENHANCED VEHICLE CLASSIFICATION SYSTEM (EVC) ONE-LINE DIAGRAM
E-9 Not to Scale



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE: *Chris Kuramoto* Date: 04/30/22
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRICAL STREET LIGHT
DETAIL**

KEAAU-PAHOA ROAD
INTERSECTION IMPROVEMENTS
at Orchidland Drive & Makuu Drive
Federal-Aid Project No. STP-0130(27)

Scale: As Noted Date: Sept 2020

SHEET No. 9 OF 10 SHEETS

