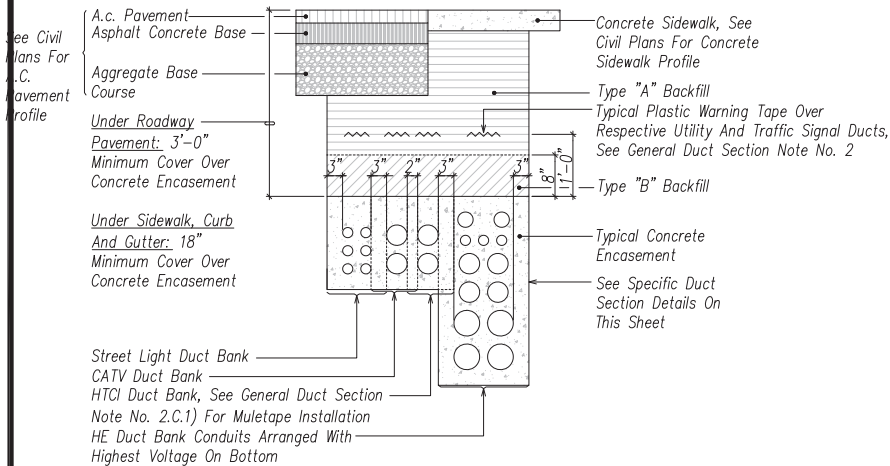


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ORIGINAL PLAN	DATE
DATE PLOTTED BY	DATE
NOTED BY	DATE
QUANTITIES BY	DATE
CHECKED BY	DATE



TYPICAL CONCRETE ENCASED DUCT SECTION DETAILS

NOT TO SCALE

General Duct Section Notes:

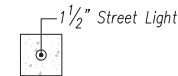
- For Trench Restoration Detail Requirements, See Sheet Civil Sheets.
- The Metal Detectable Red Plastic Warning Tape Shall Be A Minimum 5 Mils Thick And 4" Wide With A Continuous Metallic Backing And Corrosion Resistant 1' Min Thick Foil Core. For The State Dot Highway Lighting Ducts, The Message On The Tape Shall Read, "Caution - State Highway Cables Buried Below," Utilizing 1 1/2 Inches Series "c" Block Lettering. The Message Will Be Repeated With A 4 1/4" Spacing Between Top Line Of Message And Start Of Next Repeat. For The Private Street Lighting Ducts, The Message On The Tape Shall Read, "Caution - Street Lighting Cables Buried Below," Utilizing 1 1/2 Inches Series "C" Block Lettering. The Message Will Be Repeated With A 4 1/4" Spacing Between Top Line Of Message And Start Of Next Repeat.
 - For The Respective Utility Company Ducts, Provide Metal Detectable Warning Tape Over Respective Utility Company Ducts Per Respective Utility Company Requirements And Approval.
 - For HE, Provide Warning Tape Per HE Specification M0302-0.
 - For HTCO:
 - Contractor Shall Place Muletape (WP 1800P) In Each Duct Throughout Its Entire Length With Protrusions Of 2 Feet In Manholes And Handholes At Each End, And 1 Foot In Pullboxes. Muletape Is Rated For 1800 Lb Pull And Has Footage Markings For Measuring Duct Lengths.
 - Contractor Shall Place 8-mil Orange Colored Plastic Warning Tape, Not Less Than 4" Wide, Entire Length Of Trench For All Underground Installations. Tape Should Read "Warning-Stop Digging-Call HTCO, Communications Cable Buried Below, Failure To Comply Could Result In Legal Action".
- The Contractor May Begin Backfilling The Conduit Trench When The Concrete Reaches 2800 Psi Compressive Strength Or After 3 Days, Whichever Is Later.
- Clearances: Refer To HECO Note No. 14 For Clearance Requirements Between All Ductlines And All Adjacent Structures (Charted And Uncharted) Near The Trench.

Minimum Duct Separation Dimension Between Duct Systems (Concrete Encased):

Elec - Elec:	1.5"
Elec - Other Systems:	3"
Tel - Tel:	1.5"
Tel - Elec:	3"
Tel - Catv:	2"

Catv - Catv:	1.5"
Catv - Elec:	3"
Catv - Tel:	2"

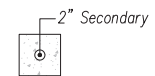
Minimum Of 3" Concrete Encasement Shall Be Provided Around Ductbank



SECTION A



SECTION B



SECTION C

Backfill Notes:

Type "a" Backfill - Earth & Gravel. Rock Size To Be 1" Max & The Mixture To Contain Not More Than 50% By Volume Of Rock Particles. The Material Shall Be Nonexpansive. 95% Compaction.

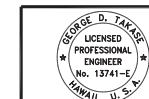
Type "b" Backfill - Earth & Gravel. Mixture Must Pass A 1/2" Mesh Screen & Contain Not More Than 20% By Volume Of Rock Particles. 95% Compaction.

Note - If Normal Material At Bottom Of Trench Is Not Type "b", An Additional 3" Shall Be Excavated & Type "b" Backfill Provided.

Concrete - 3" Encasement, 2800 Psi Compressive Strength @ 28 Days. With A Maximum Aggregate Size Of 3/4".

Chief, Civil Engineering Branch
Department of Planning & Permitting
City & County of Honolulu
(FOR CONSTRUCTION IN CITY RIGHT-OF-WAY ONLY)

Date



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

Signature: [Signature]
April 30, 2024
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRENCH AND DUCT SECTION DETAILS

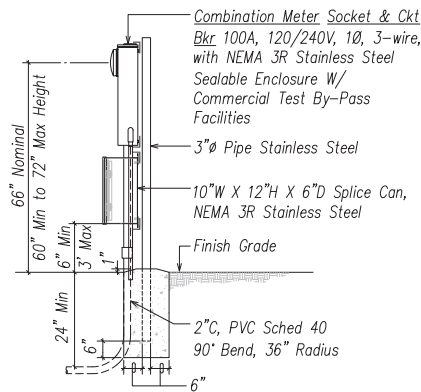
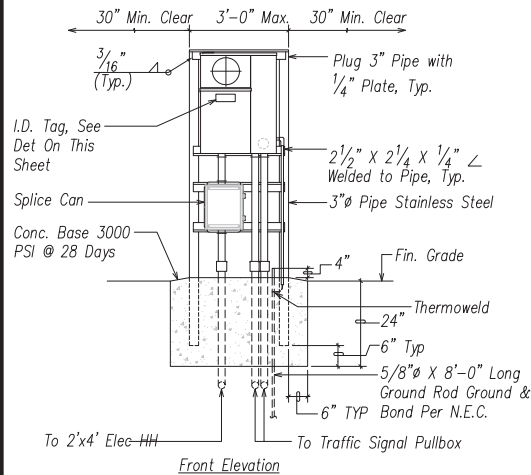
KAILUA ROAD INTERSECTION IMPROVEMENTS
Vicinity of Ulukou Street and Ulumau Drive
Project No. 61D-01-23

Scale: As Noted Date: DEC, 2023

SHEET No. E-06 OF 10 SHEETS

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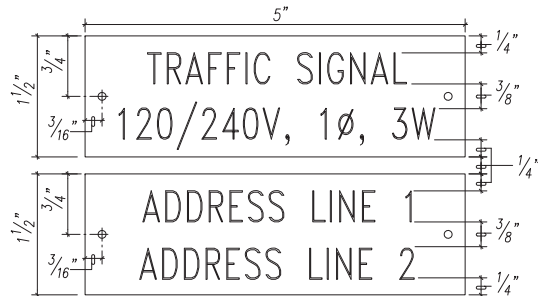
ORIGINAL PLAN	DATE
DATE PLOTTED BY	DATE
TRACED BY	DATE
QUANTITIES BY	DATE
CHECKED BY	DATE



See One-Line Diagram on This Sheet

A
E-07
NOT TO SCALE

TRAFFIC SIGNAL METERING EQUIPMENT ELEVATION



Notes:

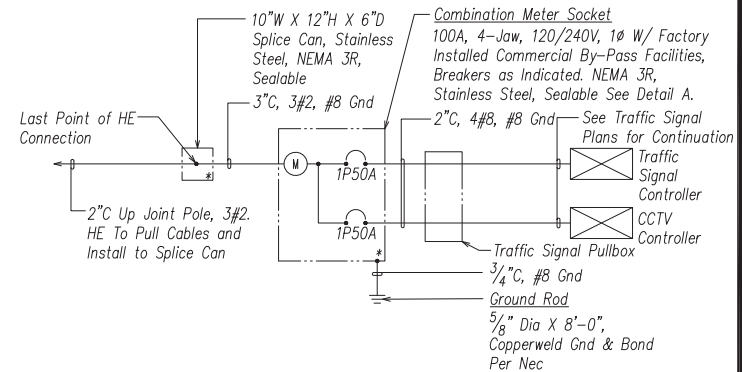
1. Use (2) 2 Ply Plastic - Black, White.
2. Traffic Signal Letters Shall be 3/8" High, 1/16" Stroke, (White in Color).
3. 120/240V, 1Ø, 3W Letters and Numbers Shall Be 1/4" High and Engraved 1/32" Wide (White in Color).
4. Attach to Meter Enclosure with No. 7 Stainless Steel Drive Screws.
5. Contractor to Coordinate and Verify Address with HE

B
E-07
NOT TO SCALE

METER SOCKET I.D. TAG DETAIL

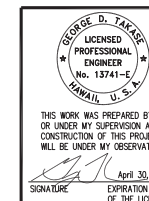
Notes:

1. Contractor Shall Make All Electrical Connection to Controller, Provide 2-1P50A Breakers, Ground and 2" Conduit.
2. All Conduits to Contain a Polyolefin Pull Line. (Jet Line Cat. #232 or Equiv)
3. All Metal Parts Shall be Hot-dipped Galvanized After Fabrication or Stainless Steel.
4. All Fastening Bolts, Nuts & Washers Shall be Stainless Steel. Provide One Coat Shop Primer & Two Coats of Acrylic Enamel Finish, Color to Match Controller Cabinet.
5. Provide 48" Clearance in Front of Meter.
6. Provide Glass Meter Socket Cover and Bands for Blank Meter Sockets. Identify Covers for Return.



C
E-07
NOT TO SCALE

TRAFFIC SIGNAL ONE-LINE DIAGRAM



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

Signature: [Signature] April 30, 2024
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

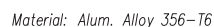
METERING DETAILS

KAILUA ROAD INTERSECTION IMPROVEMENTS
Vicinity of Ulukou Street and Ulukou Drive
Project No. 61D-01-23

Scale: As Noted Date: DEC, 2023

SHEET No. E-07 OF 10 SHEETS

85



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

TYPICAL HIGHWAY LIGHT CONNECTION DIAGRAM



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ORIGINAL PLANT	DATE
DATE PLOTTED BY	DATE
NOTED BY	DATE
QUANTITIES BY	DATE
CHECKED BY	DATE

New Design Requirements for Light Standards
(January 8, 2018)

(Highway Lighting Luminares, Pole Standards, Bracket Arms and Traffic Signal Standards and Mast Arms Being Furnished for this Project Shall Conform with the New Design Requirements Noted Below)

1. Equipment Manufacturers Providing Structural Supports for Luminares and Traffic Signals, the Following Design Parameters to be Included in the Design of the Project Materials.
2. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminares and Traffic Signals, 1st Edition, (2015) Including Subsequent Interim Revisions, Published by the American Association of State Highway and Transportation Officials, as Modified Herein.
3. Basic Wind Speed [Article 3.8.2] to Determine the Design Wind Pressure Shall be 145 Mph. for Unusual or Differing Exposure Conditions, the Basic Wind Speed Should be Increased Using Rational Procedures and Sound Engineering Judgment. Alternatively, the Design Wind Pressure May be Increased by Using a Higher Wind Importance Factor [Table 3.8.3-1] Corresponding to a Recurrence Interval of At Least One Level Greater Than Recommended. the Wind Maps for Effective Wind Speed, Topographic Effects and Exposure Category Included in the State Building Code (Hawaii Administrative Rules, Chapter 3-180) Should be Used for Guidance.
4. Wind Importance Factors [Article 3.8.3-1] and Velocity Conversion Factors [Table 3.8.3-3] Used to Determine the Design Wind Pressure Shall be Based on the Following Recurrence Intervals:
 - A. For Overhead Sign Structures: 1700 Years
 - B. For Traffic Signal Structures: 1700 Years
 - C. For Luminaire Support Structures Less Than 50 Feet in Height: 25 Years
 - D. For Other Support Structures Including Luminaire Support Structures 50 Feet or More in Height, and When Luminaire is Mounted on a Traffic Signal Structure: 50 Years
 - E. For Roadside Sign Structures and Temporary Support Structures: 10 Years
5. Height and Exposure Factor [Article 3.8.4]. for Support Structures on Bridges, the Height and Exposure Factor Shall be Determined Based on the Maximum Height They Are Above the Surrounding Ground. for Severe Exposure Conditions Such as Along the Coastline, the Factor Shall be Increased Based on the Latest Asce Standard ASCE/SEI 7,


Minimum Design Loads for Buildings and Other Structures. the Wind Maps for Effective Wind Speed, Topographic Effects and Exposure Category Included in the State Building Code (Hawaii Administrative Rules, Chapter 3-180) Should Also be Used for Guidance.

6. Minimum Anchor Bolts [Article 5.16]. Cantilevered Traffic Signal Structures with Mast Arms Greater Than 40 Feet and Other Cantilevered Support Structures with Design Life of 50 Years or More Shall Have Base Plate Connections with a Minimum of Six (6) Anchor Bolts. A Minimum of Four (4) Anchor Bolts Shall be Provided for All Other Base Plate Connections.
7. Use of Grout [Article 5.16]. Grout Shall Not be Used Under Base Plates for All Support Structures Except for Ordinary Street Light Poles Unless Approved by the Bridge Design Engineer. Anchor Bolts with Leveling Nuts Shall be Designed to Transfer All Loads From the Structure to Its Base Support. a Wire Cloth Screen Shall Specified to be Placed Vertically Between the Base Plate and the Top of the Foundation and Wrapped Horizontally Around the Base Plate with a 3 Inches Minimum Lap. the Wire Cloth Shall be Galvanized Steel Standard Grade Plain Weave 2x2 Mesh 0.063 inch Diameter Wires. Secure the Wire Cloth At the Lapped Ends with Stainless Steel Wire Ties (Min 2). Loop the Wire Ties and Twist Tie Them Securely. Also, Alternate Means of Protecting the Underside of the Base Plate From Debris, Birds, Bees and Other Nesting Animals May be Proposed for Consideration.
8. Plumbness of Anchor Bolts [Article 5.16]. Anchor Bolts Shall be Installed with Misalignments of Less Than 1:40 From Vertical. After Installation, Firm Contact Shall Exist Between the Anchor Bolt Nuts, Washers, and Base Plate on Any Anchor Bolt Installed in a Misaligned Position.
9. Fatigue Importance Factors [Article 11.6] Noted in Table 11.6-1 for Overhead Sign and Traffic Signal Structures Shall be Based on Fatigue Category I. support Structures Other Than That Noted in Table 11.6-1 with Round Cross Sections Under 50 Feet, Roadside Sign Structures, and Temporary Structures Do Not Need to be Designed for Fatigue. Support Structures 50 Feet or More in Height Shall be Designed for Fatigue and be Based on Fatigue Category I.
10. Galloping [Article 11.7.1.1]. Provisions Shall be Made to Install Effective Vibration Mitigation Devices on Overhead Cantilevered Sign and Traffic Signal Support Structures Unless They Are Designed for

Galloping-Induced Cyclic Loads. With Approval from HDOT, Mitigation Devices May be Installed after Construction If Vibration Due to Galloping is Identified.

11. Natural Wind Gust [Article 11.7.1.2]. Overhead Sign, Traffic Signal, and High-Level Support Structures Shall be Designed to Resist An Equivalent Static Natural Wind Gust Pressure.
12. Truck-Induced Gust [Article 11.7.1.3]. Overhead Sign and Traffic Signal Support Structures Shall be Designed to Resist An Equivalent Static Truck Gust Pressure Range Based on a Truck Speed of 20 MPH Over the Posted Speed.
13. Equipment Manufacturers Providing Structural Supports for Luminares and Traffic Signals, is Responsible to Provide the Engineer with Any Information That Will Impact the Current Foundation Design.
14. Square or Rectangular Steel Post Sections [Sections 5 and 11]. Square or Rectangular Steel Sections Are Not Recommended to be Used for Overhead Sign and Traffic Signal Supports Because They Are More Prone to Poor Fatigue Performance. However, the Post Sections Contained in the Highways Division Standard Plans (2008) for Overhead Sign Structures (Standard Plans TE-17A Through TE-19M) Shall be Considered Acceptable and May Still be Used. Any Special Designs or Deviations from the Standard Plans Shall be Considered with the Bridge Design Engineer.
15. Traffic Signs on Light Poles and Traffic Signals. All Light Poles of Highway Light Standards Shall be Designed for a Traffic Sign of Nine (9) SF with its Resulting Wind Force Applied 10 Feet Above the Finish Grade. See Standard Plan TE-47 (5/21/07).

FED. ROAD DIST. NO.	STATE	FISCAL NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61D-01-23	2024	87	87

 <p>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.</p> <p>EXPIRATION DATE OF THE LICENSE: April 30, 2024</p> <p>SIGNATURE: _____</p>	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
	<u>STREET LIGHT NOTES</u>
	<u>KAILUA ROAD INTERSECTION IMPROVEMENTS</u> <u>Vicinity of Ulukou Street and Uluamanu Drive</u> <u>Project No. 61D-01-23</u>
	Scale: As Noted Date: DEC, 2023

SHEET No. E-10 OF 10 SHEETS