DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	29	48

Electrical Symbols

Symbol	Description
	Exst. Street Light
1	Note Symbol, See Plan For Notes
	Breakline To Begin & End Duct Section Type
A 2-2E	Electric/Signal Ductline With Designators; Indicates Type "A" Duct Section With "2-2E" Ducts. See Sheet E010 For Duct Sections And This Sheet For The Conduit Schedule
	Saw Cut Exst A.C. Pavement, Conc. Sidewalk, Curb & Gutter Prior To Trench Excavation. Restore Subbase, Basecourse, Pavement, Conc. Sidewalk, Curb & Gutter Per Hdot Requirements, Thickness Shall Match Exst Road Design See Civil Sheets For Restoration Details.
TS	Traffic Signal Ducts & Wiring
st	Exst Street Light Ducts & Wiring
ts	Exst Traffic Signal Ducts & Wiring
	HECO 2' X 4' Handhole
	Type "A" Metric State Highway Traffic Signal Pullbox
	Type "B" Metric State Highway Traffic Signal Pullbox
	Type "C" Metric State Highway Traffic Signal Pullbox
	Exst Street Light Pullbox

Electrical Symbols

Symbol	Description
T	Traffic Signal Controller, See Detail A/E017
C	CCTV Controller, See Detail A/E017
B 25'	Type II Traffic Signal Standard With Traffic Signal Heads Mounted On Mast Arm Standard; Pole "B" with 25' Mast Arm Indicated, Standard; Pole "B" With 25' Mast Arm Indicated, See Detail A/E013
	Pedestrian Push Button, See Detail B/E014
	Vehicle Loop Detector, See Sht E016
A	Signal Standard, 10' Height, Unless Indicated Otherwise With Designator; Pole "A" Indicated, See Detail C/E014
	12" RYG Traffic Signal Head, See Mounting Details A/E014
	12" RYGA Traffic Signal Head (Left Turn Arrow Indicated), See Mounting Details A/E014
	12" RYGA Programmed Visibility Traffic Signal Head (Left Turn Arrow Indicated), See Mounting Details A/E014
	Pedestrian Signal Head, See Mounting Detail C/E015
	Optical Pre-emption Detector, See Mounting Details A & B/E015
	CCTV Camera, See Mounting Detail B/E020
	HECO Meter Pedestal, See Detail A/E011

Note: Dashed Symbol Indicates Exst

Notes for Construction

A. The Location of Overhead and Underground Facilities Shown on the Plans are From Existing Records With Varying Degrees of Accuracy and are Not Guaranteed As Shown. the Contractor Shall Exercise Extreme Caution Whenever Construction Crosses Or is In Proximity of Underground Lines and Shall Maintain Adequate Clearance When Operating Equipment Under Any Overhead Lines.

B. The Contractor is to Comply With the Directions of the State of Hawaii Occupational Safety and Health Law (HIOSH).

C. When Trench Excavation is Adjacent to Existing Structures Or Facilities, the Contractor is Responsible For Properly Sheeting and Bracing the Excavation and Stabilizing the Existing Ground to Render it Safe and Secure From Possible Slides, Cave-ins and Settlement, and For Properly Supporting Existing Structures and Facilities With Beams, Struts Or Underpinning to Fully Protect it From Damage.

D. As Required by Section 645, the Contractor Shall Provide Two Off-duty Police Officers to Control the Flow of Traffic at Each Location.

E. Where Pedestrian Walkways Exist, Such Walkways Shall Be Maintained In Passable Condition Or Other Facilities For Pedestrians Shall Be Provided. Passage Between Walkways At Intersections Shall Likewise Be Provided, All Shall Be ADA Compliant.

F. Driveways Shall Be Kept Open Unless the Owners of the Property Using These Right-of-ways are Otherwise Provided For Satisfactorily.

G. The Underground Pipes, Cables Or Ductlines Known by the Engineer to Exist From His Search of Records are Indicated on the Plans. the Contractor Shall Verify the Location and Depth of the Facilities and Exercise Proper Care In Excavating the Area. Wherever Connections of New Utilities to Existing Utilities are Shown on the Plans, the Contractor Shall Expose the Existing Lines At the Proposed Connections to Verify Their Locations and Depths Prior to Excavation For the New Lines.

General Notes

1. Provide 5' Minimum Clear Between Street Light Poles & Sewer Laterals.
2. Provide 3' Minimum Clear Between Pullboxes & Sewer Laterals.
3. Provide 6' Minimum Clear Between Transformer Pads & Sewer Laterals (Do Not Straddle).
4. Provide 3' Minimum Clear Between Ductlines & Sewer Lines.
5. Contractor Shall Verify Sewer Lateral Locations with Civil Sheets.
6. Provide 3' Minimum Horizontal Clear & 6" Vertical Clear Between Water Lines & All Electrical Systems.
7. Contractor Shall Be Responsible to Arrange with the General Contractor to Identify the Locations of Civil Site Utilities, Driveways, Etc. Prior to Electrical Contractors Layout of Electric, Telephone, Street Light, Traffic Signal, And CATV Systems.

Traffic Signals And Technology Division Notes:

1. The Contractor Shall Notify The Traffic Signals And Technology Division, Department Of Transportation Services, Three (3) Working Days Prior To Commencing Work On The Traffic Signal System (Phone: 768-8388).
2. The Traffic Signal System Shall Be Kept Operational During Construction. Any Relocation Required Shall Be Approved By The Traffic Signals And Technology Division, Department Of Transportation Services, And Paid For By The Contractor.
3. The Contractor Shall Be Responsible For Any Damages To The Existing Traffic Signal Facilities, Including But Not Limited To The Traffic Signal Fiber Optic Cable System, And Interconnect System. Any And All Damages To The Facilities Shall Be Repaired By The Contractor At Their Cost In Accordance With The Requirements Of The Traffic Signal And Technology Division, Department Of Transportation Services.

Equipment Schedule

The Hawaiian Electric CO. (HECO) Handholes Shall Be Constructed by the Contractor as Shown in These Drawings & in Accordance with the Following Standard Drawings:

TYPE	DESCRIPTION
2' X 4' HECO Handhole	2' X 4' Precast Concrete Handhole with Precast Concrete Cover, Provided in Accordance with HECO Standard Drawing No. 103782.

Conduit Schedule

Item	Description
3E	Hawaiian Electric Co. 1-3"C
2TS	Traffic Signal 1-2"C
2-2TS	Traffic Signal 2-2"C
3-2TS	Traffic Signal 3-2"C
6-2TS	Traffic Signal 6-2"C
8-2TS	Traffic Signal 8-2"C
2-3TS	Traffic Signal 2-3"C

Note: Dashed Symbol Indicates Exst Conduit(s)

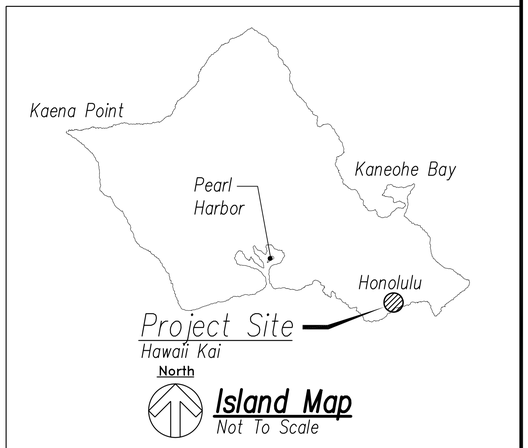
DRAWING REVIEW

Reviewed for Hawaiian Electric Company's Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric Company, Inc.

Hawaiian Electric Company'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.



Island Map
Not To Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
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GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

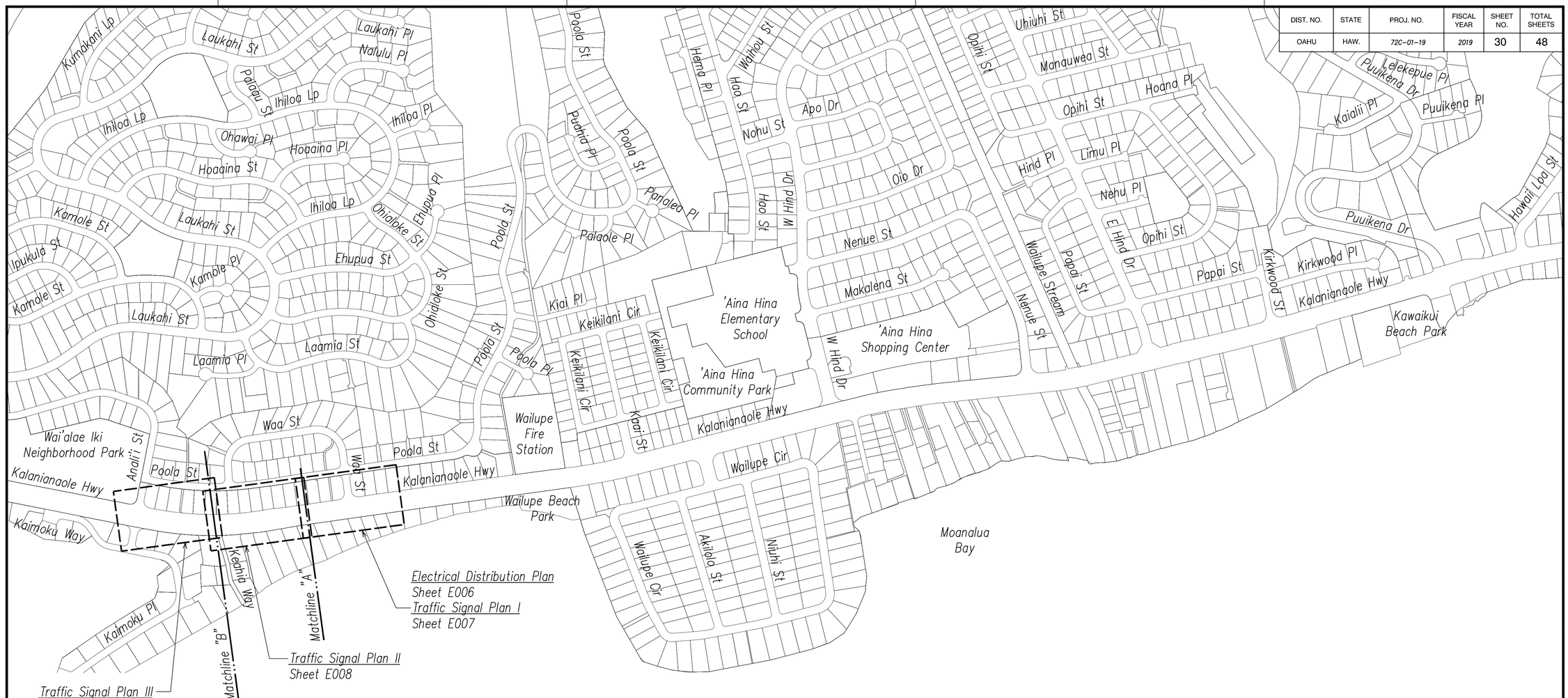
ISLAND MAP, NOTES, SYMBOL LIST, AND CONDUIT AND EQUIPMENT SCHEDULES

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E001 SHEET No. 29 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	30	48



North

Site Plan
Scale: 1"=300'

DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

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300' 150' 0 300' 600'
SCALE: 1"=300'
GRAPHIC SCALE

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SITE PLAN

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E002 SHEET No. **30** OF **48** SHEETS

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

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Guidelines for Minimum Horizontal (parallel) Clearances Between Hawaiian Electric and Other Underground Utilities

Underground Utility	Hawaiian Electric Direct Buried Cable	Hawaiian Electric Direct Buried in Conduit (No Concrete Encasement)	Hawaiian Electric 3" (Minimum) Concrete Encasement	Applicable Notes:
Hawaiian Electric DB Conduits	12"	3"	0"	
Hawaiian Electric 3" Encasement	0"	0"	0"	
Telephone/CATV DB	12"	12"	6"	
Telephone/CATV DB Ducts	12"	12"	6"	
Telephone/CATV 3" Encasement	0"	0"	0"	5
Traffic Signal	12"	12"	12"	
Water DB (BWS Owned)	36"	36"	36"	1, 4
Customer Owned Water Service Laterals	12"	12"	12"	
Water (Concrete Jacketed) (BWS Owned)	36"	36"	36"	1, 4
Gas DB	12"	12"	12"	1
Gas (Concrete Jacketed)	12"	12"	12"	1
Sewer DB	36"	36"	36"	1, 2
Sewer (Concrete Jacketed)	36"	36"	36"	1, 2
Drain	12"	12"	12"	1
Fuel Pipelines				3

Notes:

1. Where Space is Available, Parallel Clearance to Other Utilities, or Foreign Structures Other Than Communication or Traffic Signal Shall Be 36"
2. If 36" Clearance Cannot Be Met:
   - If Clearance is Less Than 12", Jacket Sewer Line with Reinforced Concrete (Per HECO's Std. 30-1030) for a Distance of 5' Plus Pipe Diameter.
   - If Clearance is Between 12" and 36", Jacket Sewer Line with Plain Concrete.
3. All Fuel Pipeline Crossings Shall Be Reviewed and Approved by the Company That Owns and Maintains it.
4. 5 Feet Clear to Water Mains 16" or Larger.
5. For Situations with 0" Minimum Separation, a 6" Separation is Recommended.
6. Clearances Measured from Outer Edges or Diameters of Utilities. Whenever Concrete Jackets are Involved, Clearances Shall Be Total Clear Distance Between the Concrete Jacket and Utility Concerned.

Guidelines for Minimum Vertical (Crossing) Clearances Hawaiian Electric and Other Underground Utilities

Underground Utility	Hawaiian Electric Direct Buried Cable	Hawaiian Electric Direct Buried In Conduit (No Concrete Encasement)	Hawaiian Electric 3" (Minimum) Concrete Encasement	Applicable Notes:
Hawaiian Electric DB Conduits	6"	3"	0"	
Hawaiian Electric 3" Encasement	0"	0"	0"	
Telephone/CATV DB	12"	12"	6"	
Telephone/CATV DB Ducts	12"	12"	6"	
Telephone/CATV 3" Encasement	0"	0"	0"	3
Traffic Signal	12"	12"	6"	
Water DB (BWS Owned)	12"	12"	12"	5
Customer Owned Water Service Laterals	6"	6"	6"	
Water (Concrete Jacketed) (BWS Owned)	12"	12"	12"	5
Gas DB	12"	12"	12"	
Gas (Concrete Jacketed)	12"	12"	12"	
Sewer DB	24"	24"	24"	1
Sewer (Concrete Jacketed)	24"	24"	24"	1
Drain	12"	12"	6"	
Fuel Pipelines				2

Notes:

1. If Clearance Cannot be Met:
   - If Clearance is Less Than 12", Jacket Sewer Line with Reinforced Concrete (Per HECO's Std. 30-1030) for a Distance of 5' Plus Pipe Diameter.
   - If Clearance is Between 12" and 24", Jacket Sewer Line with Plain Concrete.
2. All Fuel Pipeline Crossings Shall Be Reviewed and Approved by the Company That Owns and Maintains it.
3. For Situations with 0" Minimum Separation, a 6" Separation is Recommended.
4. Clearances Measured from Outer Edges or Diameters of Utilities. Whenever Concrete Jackets are Involved, Clearances Shall Be Total Clear Distance Between the Concrete Jacket and Utility Concerned.
5. 36" Clearance is Required for Trenchless Installation Work.

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	31	48

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DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

Hawaiian Electric'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 including revisions made beyond the reviewed date.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES I

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E003 SHEET No. 31 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	32	48

Hawaiian Electric Company Notes

(rev. 1/14/19)

1. Location of Hawaiian Electric Facilities

the Location of Hawaiian Electric's Overhead and Underground Facilities Shown on the Plans are from Existing Records with Varying Degrees of Accuracy and are Not Guaranteed as Shown. the Contractor Shall Verify in the Field the Locations of the Facilities and Shall Exercise Proper Care in Excavating and Working in the Area. Wherever Connections of New Utilities to Existing Utilities and Utility Crossings are Shown, the Contractor Shall Expose the Existing Lines At the Proposed Connections and Crossings to Verify the Depths Prior to Excavation for the New Lines. the Contractor Shall Be Responsible for Any Damages to Hawaiian Electric's Facilities Whether Shown or Not Shown on the Plans.

2. Compliance with Hawaii Occupational Safety and Health Laws

The Contractor Shall Comply with the State of Hawaii's Occupational Safety and Health Laws and Regulations, Including Without Limitation, Those Related to Working on or Near Exposed or Energized Electrical Lines and Equipment.

3. Excavation Clearance

The Contractor Shall Obtain An Excavation Clearance from Hawaiian Electric's Planning and Design Section of the Customer Installations Division (543-5654) Located At 820 Ward Avenue, 4th Floor, a Minimum of Ten (10) Working Days Prior to Starting Construction.

4. Caution!!! Electrical Hazard!!!

Existing Hawaiian Electric Overhead and Underground Lines are Energized and Will Remain Energized During Construction Unless Prior Special Arrangements Have Been Made with Hawaiian Electric. Only Hawaiian Electric Personnel are to Handle These Energized Lines and Erect Temporary Guards to Protect These Lines from Damage. The Contractor Shall Work Cautiously At all Times to Avoid Accidents and Damage to Existing Hawaiian Electric Facilities, Which Can Result in Electrocution.

5. Overhead Lines

State Law (OSHA) Requires That a Worker and the Longest Object He or She May Contact Cannot Come Closer Than a Specified Minimum Radial Clearance When Working Close to or Under Any Overhead Lines. It is the Contractor's Responsibility to Be Informed of and Comply with the Law.

At Any Time Should the Contractor Anticipate That His Work Will Result in the Need to Encroach within the Minimum Required Clearance as Stated in the Law, the Contractor Shall Notify Hawaiian Electric At Least Three (3) Months Prior to the Planned Encroachment So That, if Feasible, the Necessary Protections (e.g. Relocate or De-energize Hawaiian Electric Lines) Can Be Investigated. Hawaiian Electric May Also Be Able to Blanket its Distribution (12kV and Below) Lines to Provide a Visual Aid in Preventing Accidental Contact. Hawaiian Electric's Cost of Safeguarding or Identifying its Lines Will Be Charged to the Contractor.

Contact Hawaiian Electric's Customer Installations Division At 543-7070 for Assistance in Identifying and Safeguarding Overhead Power Lines.

6. Pole Bracing

Contractor Shall Not Excavate within 10 Feet from Hawaiian Electric's Utility Poles or Any Anchor System Supporting the Utility Pole. If Contractor Must Excavate Closer Than 10 Feet from a Utility Pole or its Anchor System, Contractor Will Be Responsible for Protecting, Supporting, Securing and Taking all Precautions to Prevent Damage to or Leaning of Existing Poles. Before Commencing Such Excavation, Contractor Must Submit its Bracing Calculations and Drawings, Prepared and Stamped by a Licensed Structural Engineer, to Hawaiian Electric's Customer Installations Division (543-7070) for Review. Hawaiian Electric Requires a Minimum of Ten (10) Working Days to Conduct the Review of Contractor's Submittal. Contractor Shall Be Responsible for the Design, Installation, and Removal of the Temporary Pole Bracing System, as Well as all Costs Incurred by Hawaiian Electric to Review Contractor's Drawings and to Repair or Straighten Poles Impacted by Contractor's Activities, Including Response and Restoration Costs Incurred by Hawaiian Electric Arising Out of or Related to Outages Caused by Contractor's Failure to Meet the Foregoing Requirements. Hawaiian Electric's Review and Approval of Any Contractor Submittals Including its Work Procedure Shall Not Relieve Contractor from Any Liability Resulting from Contractor's Excavation Near or Around Hawaiian Electric's Utility Poles.

7. Underground Lines

The Contractor Shall Exercise Extreme Caution Whenever Construction Crosses or is in Close Proximity of Underground Lines. Hawaiian Electric's Existing Electrical Cables are Energized and Will Remain Energized During Construction. Only Hawaiian Electric Personnel are to Break into Existing Hawaiian Electric Facilities, Handle These Cables, and Erect Temporary Guards to Protect These Cables from Damage. the Cost of Hawaiian Electric's Assistance in Providing Proper Support and Protection of its Underground Lines Will Be Charged to the Contractor. For Assistance/coordination in Providing Proper Support and Protection of These Lines, the Contractor Shall Call Hawaiian Electric's Customer Installations Division At 543-7070 a Minimum of Ten (10) Working Days in Advance.

Special Precautions are Required When Excavating Near Hawaiian Electric's 138kV or 46kV Underground Lines (See Hawaiian Electric Instructions to Consultants/contractors on "Excavation Near Hawaiian Electric's Underground 138kV and/or 46kV Lines" for Detailed Requirements).

For Verification of Underground Lines, the Contractor Shall Call the Hawaii One Call Center At 866-423-7287 Minimum of Five (5) Working Days in Advance.

8. Underground Fuel Pipelines

The Contractor Shall Exercise Extreme Caution Whenever Construction Crosses or is in Close Proximity of Hawaiian Electric's Underground Fuel Oil Pipelines. Special Precautions are Required When Excavating Near Hawaiian Electric's Underground Fuel Oil Pipelines (see Hawaiian Electric's Specific Fuel Pipeline "Guidelines" to Consultants/contractors on Excavation Near Hawaiian Electric's Underground Fuel Pipelines for Detailed Requirements).

9. Excavations

When Trench Excavation is Adjacent to or Beneath Hawaiian Electric's Existing Structures or Facilities, the Contractor is Responsible For:

A) Arranging for Hawaiian Electric Standby Personnel to Observe Work At Contractor's Cost.
B) Sheeting, Bracing, or Otherwise Supporting the Excavation and Stabilizing the Existing Ground to Render it Safe and Secure and to Prevent Possible Slides, Cave-ins, and Settlements.
C) Properly Supporting Existing Structures or Facilities with Beams, Struts, Under-pinnings, or Other Necessary Methods to Fully Protect it from Damage.
D) Backfilling with Proper Backfill Material Including Special Thermal Backfill Where Existing (Refer to Engineering Division for Thermal Backfill Specifications).

10. Relocation of Hawaiian Electric Facilities

Any Work Required to Relocate or Modify Hawaiian Electric Facilities Shall Be Done by Hawaiian Electric, or by the Contractor Under Hawaiian Electric's Supervision. The Contractor Shall Be Responsible for all Coordination, and Shall Provide Necessary Support for Hawaiian Electric's Work, Which May Include, But Not Be Limited to, Staking of Pole/anchor Locations, Identifying Right of Way and Property Lines, Excavation and Backfill, Permits and Traffic Control, Barricading, and Restoration of Pavement, Sidewalks, and Other Facilities.

All Costs Associated with Any Relocation or Modification (Either Temporary or Permanent) for the Convenience of the Contractor, or to Enable the Contractor to Perform His Work in a Safe and Expeditious Manner in Fulfilling His Contract Obligations Shall Be Borne by the Contractor.

11. Conflicts

Any Redesign or Relocation of Hawaiian Electric's Facilities Not Shown on the Plans May Be Cause for Lengthy Delays. the Contractor Acknowledges That Hawaiian Electric is Not Responsible for Any Delay or Damage That May Arise as a Result of Any Conflicts Discovered or Identified with Respect to the Location or Construction of Hawaiian Electric's Electrical Facilities in the Field, Regardless of Whether the Contractor Has Met the Requested Minimum Advance Notices. In Order to Minimize Any Delay or Impact Arising from Such Conflicts, Hawaiian Electric Should Be Notified Immediately Upon Discovery or Identification of Such Conflict.

DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

Hawaiian Electric'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 including revisions made beyond the reviewed date.

GEORGE D. TAKASE
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No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES II

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E004 SHEET No. 32 OF 48 SHEETS

ORIGINAL PLAN | NOTE BOOK | No. | DATE
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DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	33	48

Hawaiian Electric Company Notes (Continued) (rev. 1/14/19)

12. Damage to Hawaiian Electric Facilities
The Contractor Shall Be Responsible for the Protection of all Hawaiian Electric Surface and Subsurface Utilities and Shall Be Responsible for Any Damages to Hawaiian Electric's Facilities as a Result of His Operations. The Contractor Shall Immediately Report Such Damages or Any Hazardous Conditions Related to Hawaiian Electric's Lines to Hawaiian Electric's Trouble Dispatcher At 548-7961. Repair Work Shall Be Done by Hawaiian Electric or by the Contractor Under Hawaiian Electric's Supervision. Costs for Damages to Hawaiian Electric's Facilities Shall Be Borne by the Contractor.

In Case of Damage or Suspected Damage to Hawaiian Electric's Fuel Pipeline, the Contractor Shall Immediately Notify Hawaiian Electric's Security Command Center At 543-7685 (A 24-hour Number) So Hawaiian Electric Personnel Can Secure the Damaged Section and Report Any Oil Spills to the Proper Authorities. all Costs Associated with the Damage, Repair, and Oil Spill Cleanup Shall Be Borne by the Contractor.

13. Hawaiian Electric Stand-by Personnel
The Contractor May Request Hawaiian Electric to Provide An Inspector to Stand-by During Construction Near Hawaiian Electric's Facilities. The Cost of Such Inspection Will Be Charged to the Contractor.

The Contractor Shall Call Hawaiian Electric's Customer Installations Division At 543-7070 a Minimum of Three (3) Months in Advance to Arrange for Hawaiian Electric Stand-by Personnel.

14. Clearances
The Following Clearances Shall Be Maintained Between Hawaiian Electric's Ductline and all Adjacent Structures (Charted and Uncharted) in the Trench:
(See Tables)

The Contractor Shall Notify the Construction Manager & Hawaiian Electric of Any Heat Sources (Power Cable Duct Bank, Steamline, Etc.) Encountered That are Not Properly Identified on the Drawing.

15. Indemnity
The Contractor Shall Indemnify, Defend and Hold Harmless Hawaiian Electric from and Against all Losses, Damages, Claims, and Actions, Including But Not Limited to Reasonable Attorney's Fees and Costs Based Upon or Arising Out of Damage to Property or Injuries to Persons, or Other Tortious Acts Caused or Contributed to by Contractor or Anyone Acting Under its Direction or Control or on its Behalf; Provided Contractor's Indemnity Shall Not Be Applicable to Any Liability Based Upon the Sole Negligence of Hawaiian Electric.

Additional Notes When Work Involves Construction of Hawaiian Electric Facilities

16. Schedule
Contractor Shall Furnish His Construction Schedule Six (6) Months Prior to Starting Work on Hawaiian Electric Facilities. Contractor Shall Give Hawaiian Electric, in Writing, Three (3) Months Notice to Proceed with Hawaiian Electric's Portion of Work.

17. Authority
All Construction, Restoration Work, and Inspection Shall Be Subject to Whichever Governmental Agency Has Authority Over the Work.

18. Specifications
Construction of Hawaiian Electric's Underground Facilities Shall Be Constructed in Accordance with the Latest Revisions of Hawaiian Electric Specifications CS7001, CS7003, CS7202, CS9301, and CS9401 and Applicable Hawaiian Electric Standards.

19. Construction
Contractor Shall Furnish all Labor, Materials, Equipment, and Services to Properly Perform and Fully Complete all Work Shown on the Contract, Drawings, and Specifications. all Materials Shall Be New and Manufactured in the United States of America. all Manhole, Handhole, and Ductline Installations Shall Be Inspected and Approved by Hawaiian Electric Prior to Excavation and Prior to Placing Concrete. Contractor Shall Notify Hawaiian Electric's Inspection Department At 543-4399 At Least Five (5) Working Days Prior to Installing Facilities or Placing Concrete.

Contractor to Coordinate Work to Break into Hawaiian Electric's Existing Electrical Facilities with Hawaiian Electric's Inspection Department At 543-4399 At Least Ten (10) Working Days in Advance.

20. Stakeout
The Contractor Shall Arrange for Toneouts of all Underground Facilities and Shall Stakeout all Proposed Hawaiian Electric Facilities within the Project Area So as to Not Conflict with Any Utility (Existing or Proposed) and Any Proposed Construction or Improvement Work for Verification by Hawaiian Electric Before Proceeding with Hawaiian Electric Work.

21. Ductlines
All Ductline Installations Shall Be Pvc Schedule 40 Encased in Concrete, Unless Otherwise Noted. all Completed Ductlines Shall Be Mandrel Tested by the Contractor in the Presence of Hawaiian Electric's Inspector Using Hawaiian Electric's Standard Practice. The Contractor Shall Install 1800# Tensile Strength Muletape Pull Line in all Completed Ductlines After Mandrel Testing is Complete.

22. Joint Pole Removal
The Last Joint Pole Occupant Off the Poles Shall Remove the Poles.

23. As-Built Plans
The Contractor Shall Provide Hawaiian Electric with a Set of Electronic and Hard Copy Plans of Each Sheet Showing the Offsets, Stationing, and Vertical Elevation of the Duct Line(s) Constructed.

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

PR: Z:\ACAD\PROJECTS\218062A\E005_218062A_HECO Notes.dwg 11/20/19 - 2:11pm rsilva

DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

Hawaiian Electric'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 including revisions made beyond the reviewed date.

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS. STATE OF HAWAII

APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES III

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E005 SHEET No. 33 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	ADD. 34	48

Poola Street
(City)

Wa'a Street
(City)

Kalanianaole Highway
(State)

Kalanianaole Highway
(State)

Matchline "A"
See Cont. Sheet E008

See Enlarged Plan Below

Exst JP65 | Exst JP66 | Exst JP67 | Exst JP68 | Exst JP69 | Exst JP70

ROW

TMK:3-5-45:10 | TMK:3-5-45:08 | TMK:3-5-45:06 | TMK:3-5-45:05 | TMK:3-5-45:04 | TMK:3-5-45:02 | TMK:3-5-46:01

BIKE ROUTE

AHEAD

NO STOPPING

STOP

TS

2-d 30"

w - 12" (ABANDONED)

w - 16"

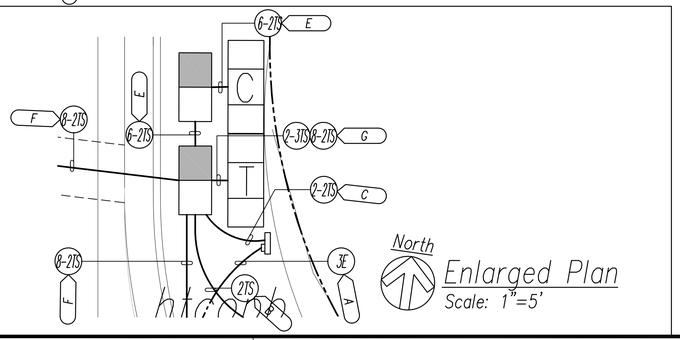
w - 24"

g - 4"

g - 11 1/4"

sdmh | cb | htcomh | hhcomh | dmh | wm | t(o) | t(u) | fh

53+00 | 54+00 | 55+00 | 56+00 | 57+00 | 58+00



North
Enlarged Plan
Scale: 1"=5'

Note:

1 Traffic Rated Type "C" Traffic Signal Pullbox.

2 Traffic Rated Type "B" Traffic Signal Pullbox.

North
Electrical Distribution Plan
Scale: 1"=20'

DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

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20' 10' 0 20' 40' 60'
SCALE: 1"=20'
GRAPHIC SCALE

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

DATE	REVISION
12/30/19	Addressed BWS Review Comments

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL DISTRIBUTION PLAN

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E006 SHEET No. OF 48 SHEETS

ADD. 34

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

FN: Z:\ACAD\PROJECTS\218062A\E006_218062A_Dist.dwg 01/03/20 – 11:40am rsilva

1117

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	ADD. 35	48

Matchline "A"
See Cont. Sheet E008

AHEAD

NO STOPPING

STOP

Wa'a Street (City)

See Enlarged Plan Below

Hiapo

ROW

210' to Stopbar

Kalanianaole Highway (State)

MAST ARM: 45'

MAST ARM: 25'

MAST ARM: 40'

w - 12" (ABANDONED)

g - 11/4"

g - 4"

g 3/4"

Exst JP65

Exst JP66

Exst JP67

Exst JP68

Exst JP69

Exst JP70

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14 TSP
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	9-2/C #14 TSP
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	2-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	10-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	3-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	10-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	5-4/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE

CONDUIT	CABLE
2"	6-4/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE

CONDUIT	CABLE
2"	4-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2"	3-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14 TSP

CONDUIT	CABLE
2"	5-2/C #14 TSP

CONDUIT	CABLE
2"	1-4/C #14, #8 GND

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
4-2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	3-4/C #14, #8 GND
	1-2/C #14

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2-2"	ITS SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2"	3-2/C #14 TSP

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	9-2/C #14 TSP
2"	(2) 12-2/C #19 TSP INTERCONNECT
2"	2#6, #8 GND
2"	1-OUTDOOR CAT6
2"	2-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	4#6, #8 GND
2"	SPARE

CONDUIT	CABLE
2-2"	1-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	2-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	5-4/C #14, #8 GND
	7-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	10-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	2-26/C #14 & #8 GND
2"	2-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	9-2/C #14 TSP
2"	(2) 12-2/C #19 TSP INTERCONNECT
2"	2#6, #8 GND
2"	1-OUTDOOR CAT6
2"	2-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2-2"	1-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	2-26/C #14 & #8 GND
3"	2-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	9-2/C #14 TSP
2"	(2) 12-2/C #19 TSP INTERCONNECT
2"	2#6, #8 GND
2"	1-OUTDOOR CAT6
2"	2-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
4-2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2-2"	SPARE

CONDUIT	CABLE
2"	3-4/C #14, #8 GND
	1-2/C #14

CONDUIT	CABLE
2-2"	ITS SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	1-2/C #14, #8 GND
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
2"	2-26/C #14 & #8 GND
2"	2-26/C #14 & #8 GND
2"	10-2/C #14 TSP
2"	9-2/C #14 TSP
2"	(2) 12-2/C #19 TSP INTERCONNECT
2"	2#6, #8 GND
2"	1-OUTDOOR CAT6
2"	2-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
2"	8-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
4-2"	SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-4/C #14, #8 GND
	1-2/C #14 TSP

CONDUIT	CABLE
2"	1-26/C #14 & #8 GND
2"	1-26/C #14 & #8 GND
4-2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2"	3-4/C #14, #8 GND
	1-2/C #14

CONDUIT	CABLE
2"	1-12 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
2-2"	ITS SPARE

CONDUIT	CABLE
3" HECO	2#2, #2 GND

CONDUIT	CABLE
2"	1-4/C #14, #8 GND
	1-2/C #14 TSP

Note:

1. Traffic Rated Type "C" Traffic Signal Pullbox.
2. Traffic Rated Type "B" Traffic Signal Pullbox.
3.

CONDUIT	CABLE
2"	5-4/C #14, #8 GND
	7-2/C #14, #8 GND
2"	1-3/C #20 W/ DRN
	OPTICAL PRE-EMPTION
2"	1-VIDEO COAXIAL
	1-2/C #18 CCTV CONTROL
	CAMERA POWER CABLE

Signal Indication	(LED)	(LED)	(LED)	(LED)
Description	12" RYG Traffic Signal Head	12" RYG (Left Arrow) Traffic Signal Head	12" RYG (Str. Arrow) Traffic Signal Head	Pedestrian Signal Head
Pole Letter-Signal Head Number	C-4 G-2 C-5 G-3 E-2 G-4 F-1 G-5* F-2 H-2 G-1	B-1 C-1*	C-2 C-3	A-1 B-2 D-1 D-2 E-1 H-1

* Indicates Programmed Visibility Signal Head (Non-LED)

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

PW: Z:\ACAD\PROJECTS\218062A\E007_218062A_TrafSig Plan 1.dwg 01/03/20 - 11:39am rsilva

North

Enlarged Plan

Scale: 1"=5'

North

Traffic Signal Plan I

Scale: 1"=20'

20' 10' 0 20' 40' 60'

SCALE: GRAPHIC SCALE 1"=20'

12/30/19	Addressed BWS Review Comments
DATE	REVISION

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN I

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

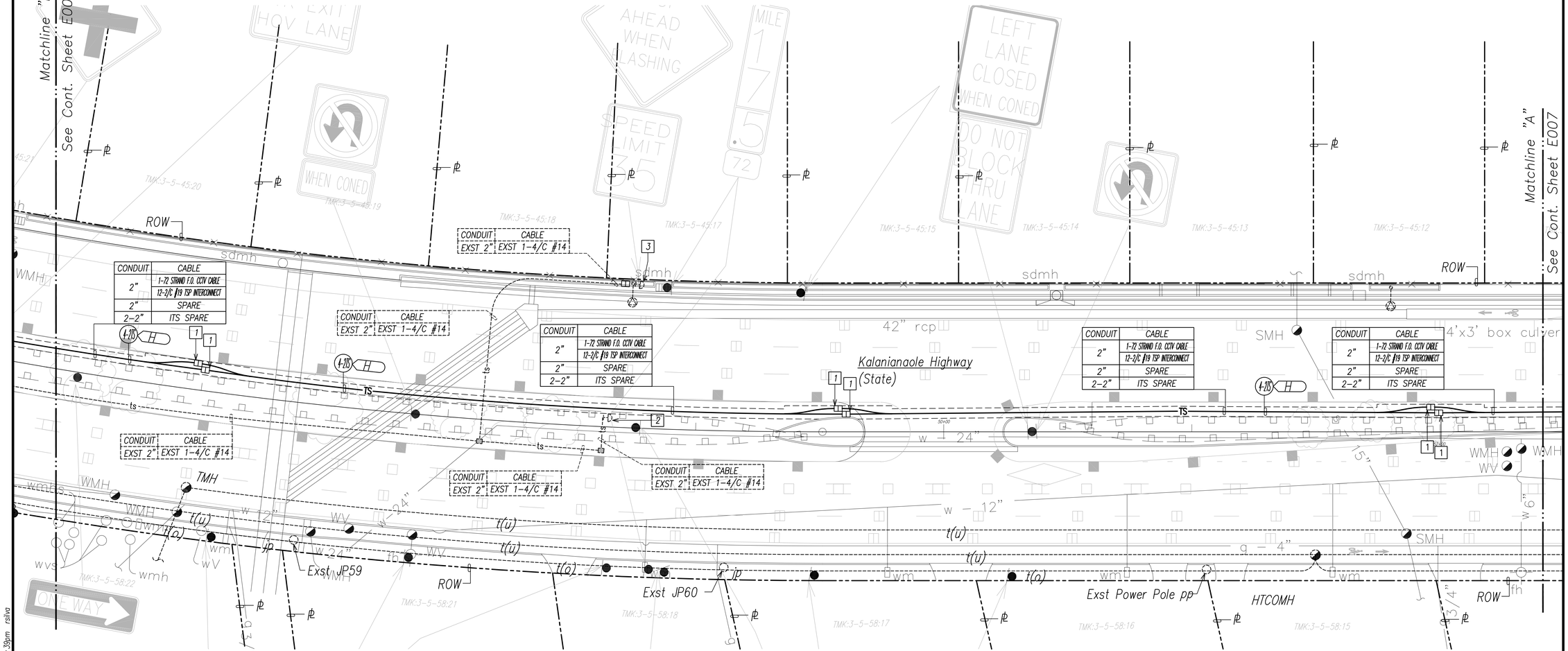
Scale: AS NOTED Date: NOVEMBER 2019

E007 SHEET No. OF 48 SHEETS

ADD. 35

1117

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	36	48



Notes:

1. Traffic Rated Type "B" Traffic Signal Pullbox.
2. Exst Flashing Traffic Signal.
3. Exst Flashing Traffic Signal Mounted to Exst Street Light.
4. Location and Size of Existing Traffic Signal Boxes are Approximate.
   Location of Existing Traffic Signal Ductline is Approximate.
   Contractor to Verify Exact Location in Field Prior to Beginning Construction.

North

Traffic Signal Plan II

Scale: 1"=20'

20' 10' 0 20' 40' 60'

SCALE: 1"=20'

GRAPHIC SCALE

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN II

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

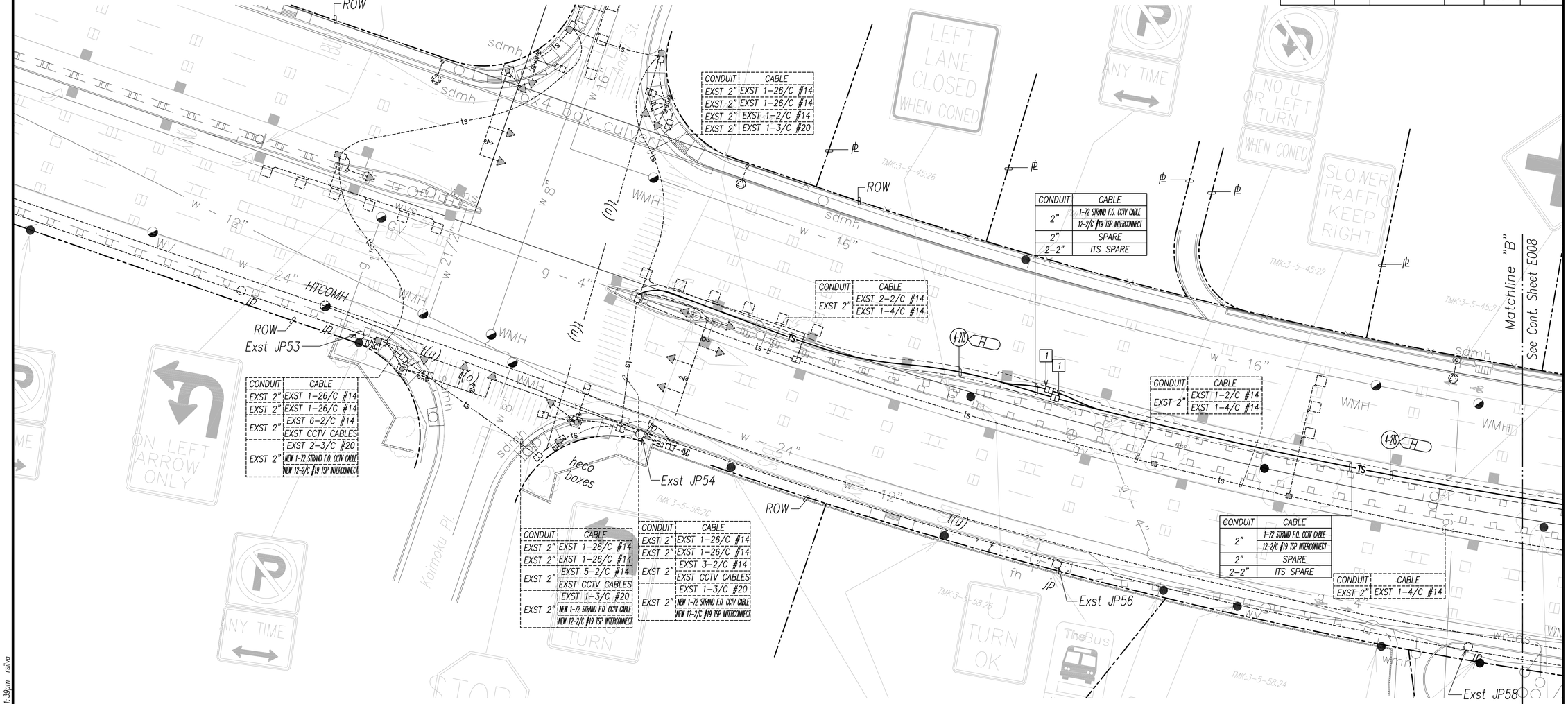
E008 SHEET No. 36 OF 48 SHEETS

ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

PW Z:\ACAD\PROJECTS\218062A\E008_218062A_TrafSig Plan 2.dwg 11/20/19 - 1:39pm rsilva

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	37	48



CONDUIT	CABLE
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 1-2/C #14
EXST 2"	EXST 1-3/C #20

CONDUIT	CABLE
2"	1-72 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
EXST 2"	EXST 2-2/C #14
	EXST 1-4/C #14

CONDUIT	CABLE
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 6-2/C #14
	EXST CCTV CABLES
EXST 2"	EXST 2-3/C #20
	NEW 1-72 STRAND F.O. CCTV CABLE
	NEW 12-2/C #19 TSP INTERCONNECT

CONDUIT	CABLE
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 5-2/C #14
	EXST CCTV CABLES
	EXST 1-3/C #20
EXST 2"	NEW 1-72 STRAND F.O. CCTV CABLE
	NEW 12-2/C #19 TSP INTERCONNECT

CONDUIT	CABLE
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 1-26/C #14
EXST 2"	EXST 3-2/C #14
	EXST CCTV CABLES
	EXST 1-3/C #20
EXST 2"	NEW 1-72 STRAND F.O. CCTV CABLE
	NEW 12-2/C #19 TSP INTERCONNECT

CONDUIT	CABLE
EXST 2"	EXST 1-2/C #14
	EXST 1-4/C #14

CONDUIT	CABLE
2"	1-72 STRAND F.O. CCTV CABLE
	12-2/C #19 TSP INTERCONNECT
2"	SPARE
2-2"	ITS SPARE

CONDUIT	CABLE
EXST 2"	EXST 1-4/C #14

Notes:

1. Traffic Rated Type "B" Traffic Signal Pullbox.

2. Not All Boxes, Conduits and Cables are Shown. Location and Size of Existing Traffic Signal Boxes, Conduits, and Cables are Approximate. Contractor to Verify Existing Conditions in Field Prior to Beginning Construction.

North

Traffic Signal Plan III

Scale: 1"=20'

20' 10' 0 20' 40' 60'

SCALE: 1"=20'

GRAPHIC SCALE

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN III

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E009 SHEET No. 37 OF 48 SHEETS

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

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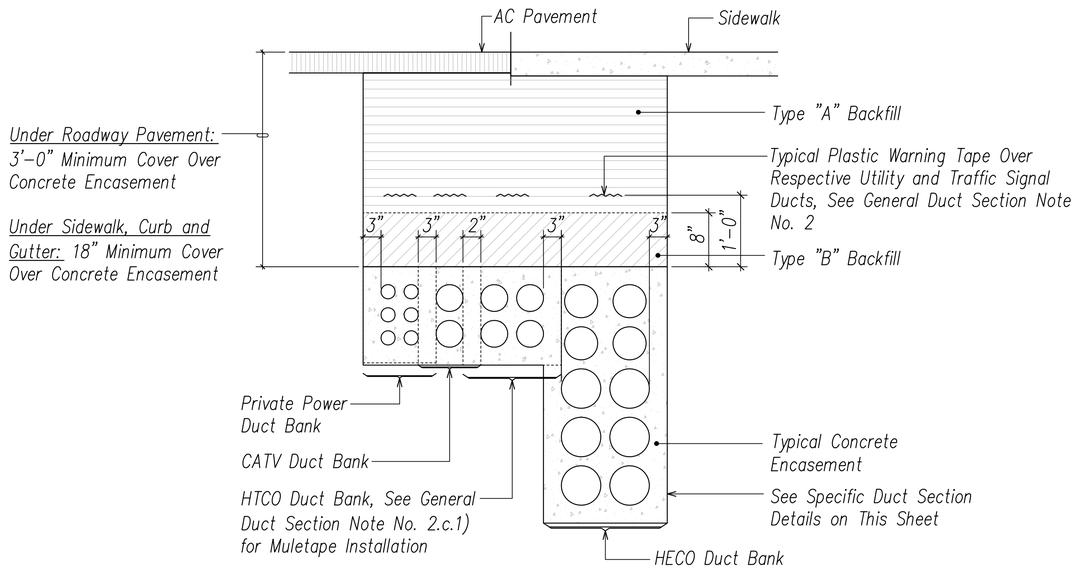
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	38	48



Typical Concrete Encased Duct Section Details

Not to Scale

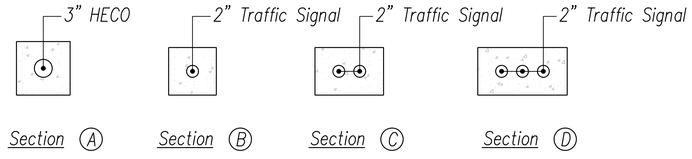
Minimum Duct Separation Dimension Between Duct Systems (Concrete Encased):

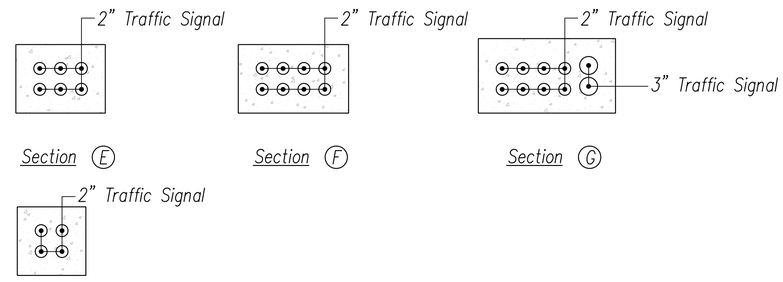
Elec – Elec:	3"
Elec – Other Systems:	3"
Tel – Tel:	1.5"
Tel – Elec:	3"
Tel – CATV:	2"
CATV – CATV:	1.5"
CATV – Elec:	3"
CATV – Tel:	2"

Minimum of 3" Concrete Encasement Shall Be Provided Around Ductbank

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".





General Duct Section Notes:

1. For Trench Restoration Detail Requirements, See Sheet Civil Sheets.

2. 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 – 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.

   A. for the Respective Utility Company Ducts, Provide Metal Detectable Warning Tape Over Respective Utility Company Ducts per Respective Utility Company Requirements And Approval.

   B. for HECO, Provide Warning Tape per HECO Specification M0302-0.

   C. for HTCO:

      1) 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.

      2) 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".

3. The Contractor May Begin Backfilling the Conduit Trench When the Concrete Reaches 2800 PSI Compressive Strength or After 3 Days.

4. Clearances: Refer To HECO Note No. 14 for Clearance Requirements Between All Ductlines and All Adjacent Structures (Charted and Uncharted) Near the Trench.

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

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DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

Hawaiian Electric'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 including revisions made beyond the reviewed date.

GEORGE D. TAKASE
LICENSED PROFESSIONAL ENGINEER
No. 13741-E
HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

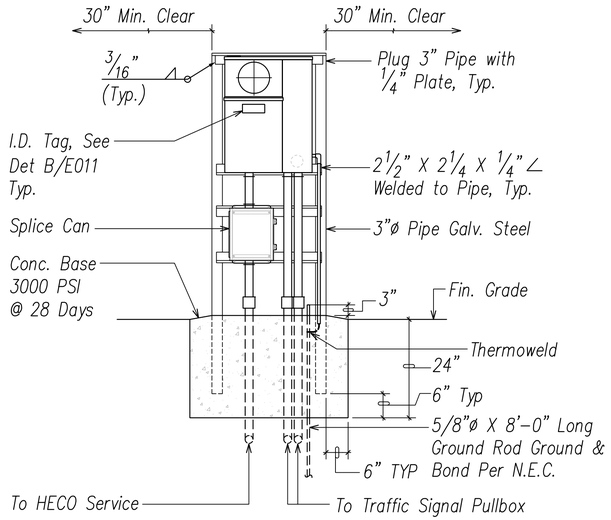
TYPICAL DUCT SECTION

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

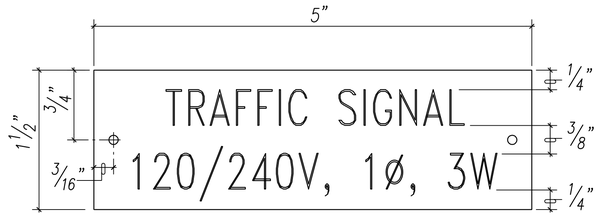
Scale: AS NOTED Date: NOVEMBER 2019

E010 SHEET No. 38 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	39	48



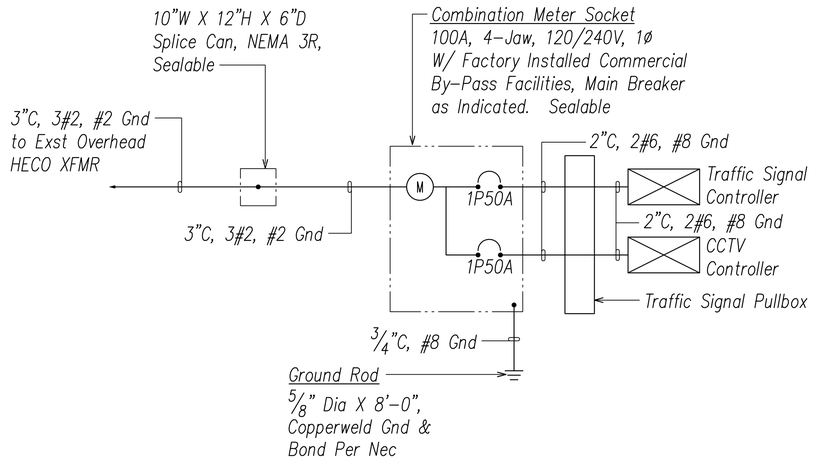
Front Elevation



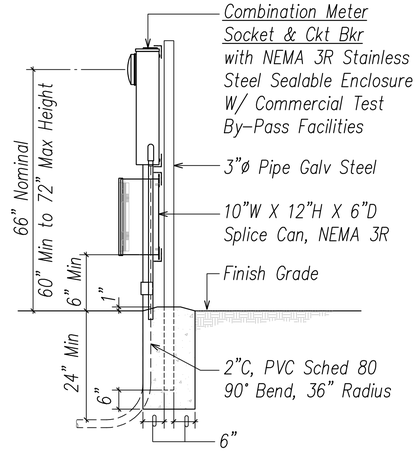
Notes:

1. Use 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.

B E011 **City & County Meter Socket I.D. Tag Detail**
Not to Scale



C E011 **Traffic Signal One-Line Diagram**
Not to Scale



See One-Line Diagram on This Sheet

Side Elevation

A E011 **Traffic Signal Metering Equipment Elevation**
Not to Scale

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. Individual Pedestal 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 Plastic Meter Socket Cover and Bands for Blank Meter Sockets. Identify Covers for Return.

DRAWING REVIEW

Reviewed for Hawaiian Electric Company Facilities Only

Req# 6087962 By _____ Date _____

Customer Installations Department
Hawaiian Electric

Hawaiian Electric'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 including revisions made beyond the reviewed date.

GEORGE D. TAKASE LICENSED PROFESSIONAL ENGINEER No. 13741-E HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL METERING DETAIL

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E011 SHEET No. 39 OF 48 SHEETS

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

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DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	40	48

New Design Requirements for Traffic Signal Standards
(January 8, 2018)

(Highway Lighting Luminaires, 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 Luminaires 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, Luminaires 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 Luminaires 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).*

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

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

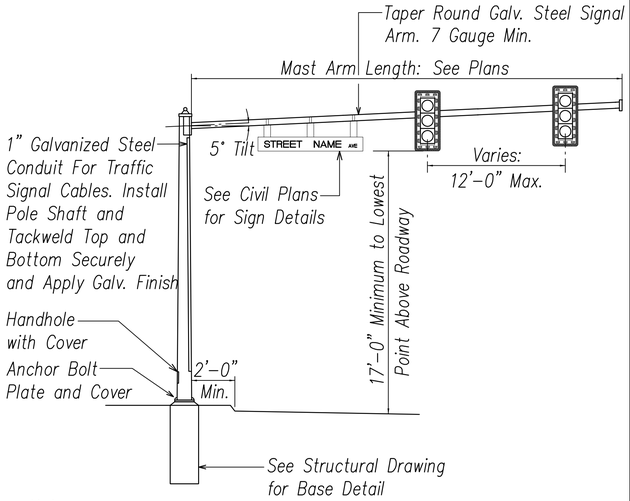
TRAFFIC SIGNAL NOTES

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E012 SHEET No. 40 OF 48 SHEETS

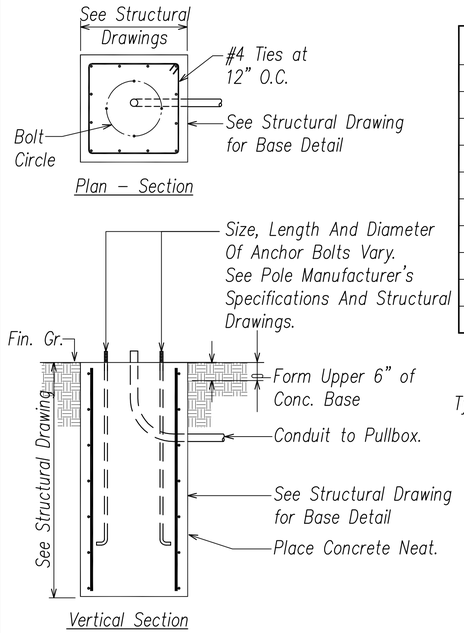
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	41	48



Notes:

1. Standard and Mast Arm Shall be Designed in Accordance with Latest Edition of "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals", with Revisions Noted on Sheet E012.
2. Mounting: Signals At Intermediate Points of Mast Arm Shall be of The Adjustable Type.
3. Signals Shall be Centered Over Lane Lines.
4. Submit Shop Drawings for Approval.
5. Back Plate to be Installed on All Traffic Signal Heads Attached to Mast Arms. See Detail D/E014.

A / E013 **Type II Traffic Signal Standard**
Not to Scale



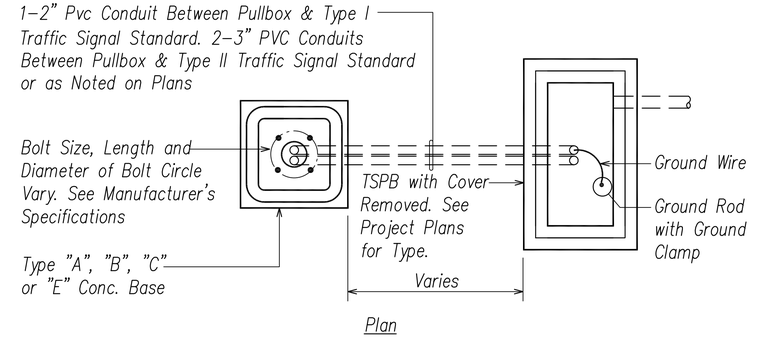
Notes:

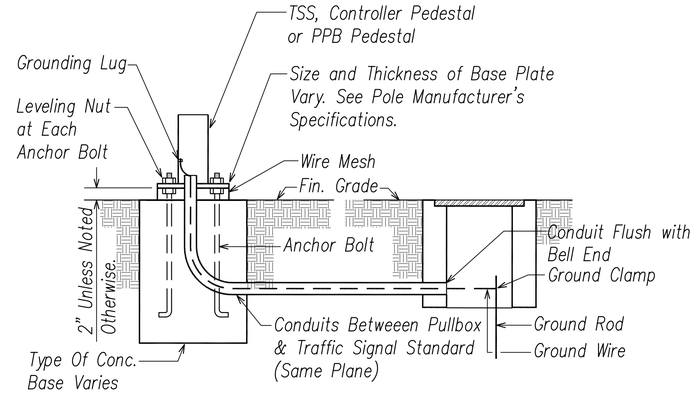
1. Design Lateral Pressure: 1,500 PSF.
2. Conduit Bend is Incidental to Concrete Base.
3. Footing Shall be Cast-In-Place, Over Excavating and Backfilling Will Not be Acceptable. Footing Shall be Square. Drilling an Equivalent Footing Will Not be Acceptable.

B / E013 **Type II Traffic Signal Standard Base Detail**
Not to Scale

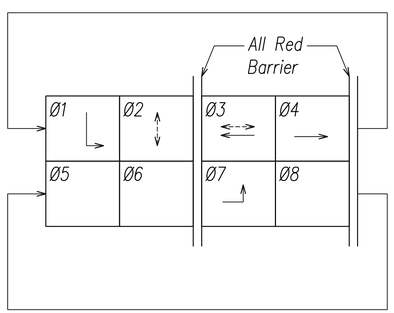
Traffic Standard Designation	
Pole	Designation
A	I-10
B	I-10
C	II-55
D	I-10
E	I-10
F	I-10
G	II-25, II-45
H	I-10

Type
Typical Standard Designation: II – 25
Mast Arm Length

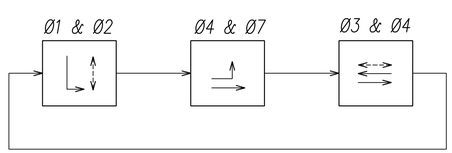




C / E013 **Typical Standard & Pedestal Detail**
Not to Scale



Phase Assignment



Phase Sequence

Wa'a Street and Kalanianaole Highway Intersection Phase Diagram

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

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GEORGE D. TAKASE LICENSED PROFESSIONAL ENGINEER No. 13741-E HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

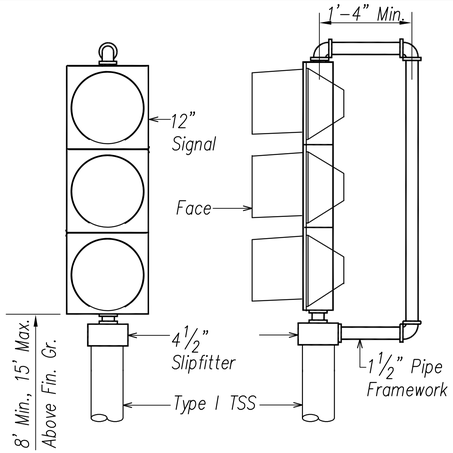
TRAFFIC SIGNAL DETAILS I

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

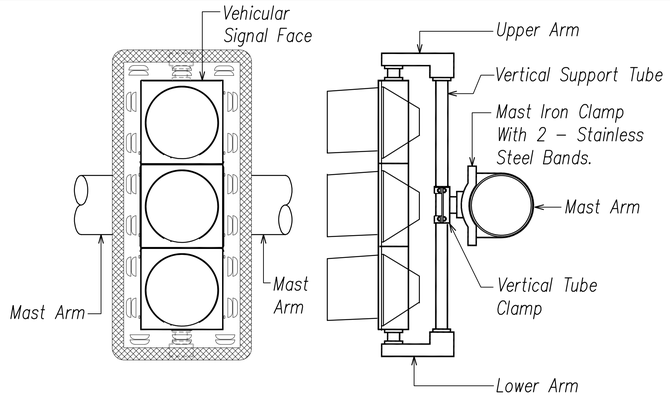
Scale: AS NOTED Date: NOVEMBER 2019

E013 SHEET No. 41 OF 48 SHEETS

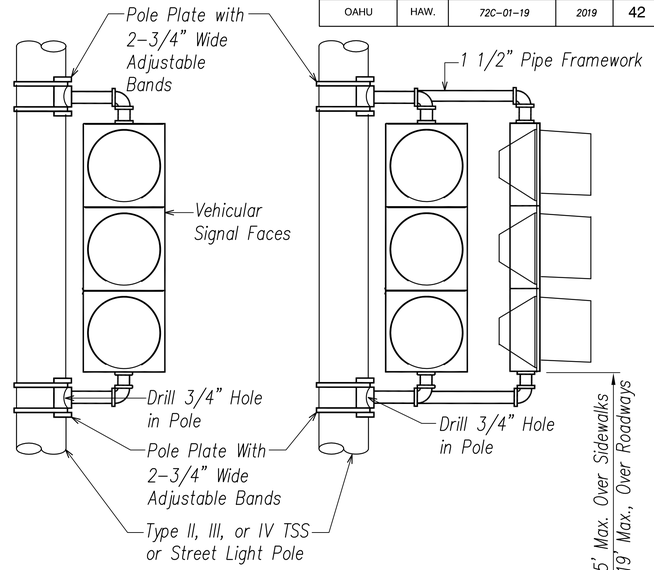
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	42	48



Top of Pole – One Way Mounting



Adjustable
Mast Arm One Way Mounting at Intermediate Point



Bracket Mount – One Way (B-1W)

Bracket Mount – Two Way (B-2W)

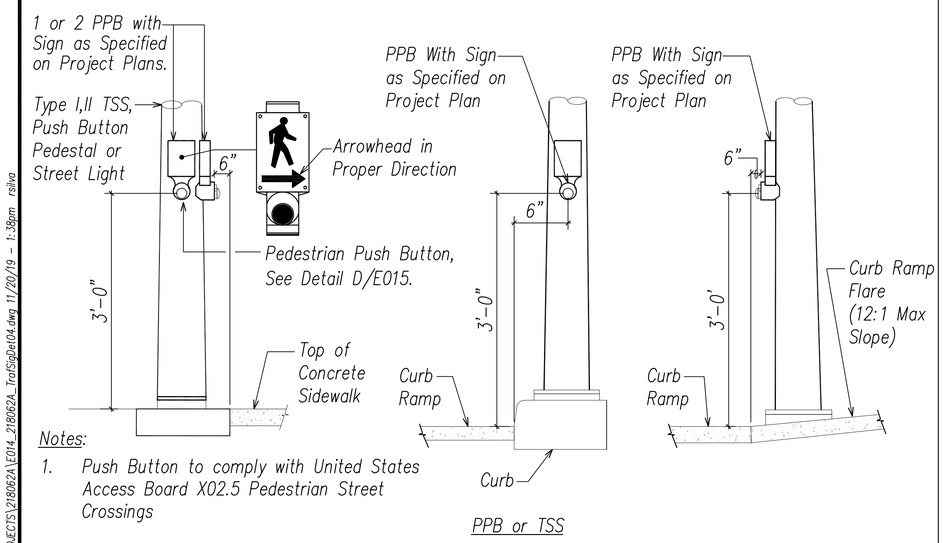
Notes:

1. Stainless Steel Bands Shall be 1/2" Wide X .050" Thick, Minimum. Tensile Strength Shall be 100,000 PSI Minimum.
2. Upper Arm, Lower Arm and Vertical Support Tube Shall be of 356 Cast Aluminum.
3. All Wiring Shall be Concealed.
4. Vertical Tube Clamp Shall be of Malleable Iron, Grade 32510.
5. All Aluminum Parts Shall Have an Alodine 1200 Finish.
6. Signal as Noted on Plans.
7. Back Plates to be Installed on All Mast Arm Signal Heads. See Detail D on This Sheet.

A / E014

Vehicular Signal Mounting Details

Not to Scale



Notes:

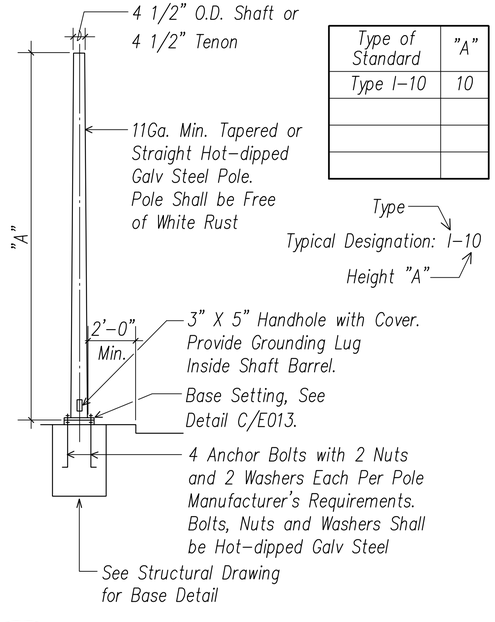
1. Push Button to comply with United States Access Board X02.5 Pedestrian Street Crossings

PPB or TSS

B / E014

Pedestrian Push Button Mounting Details

Not to Scale



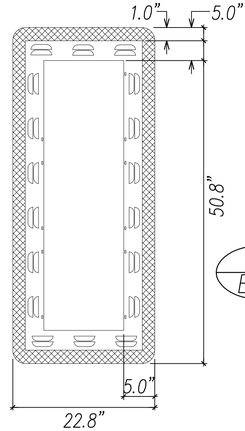
Type of Standard	"A"
Type I-10	10

Type
Typical Designation: I-10
Height "A"

C / E014

Type "I" Standard and Pedestal Detail

Not to Scale



3-Section

Notes:

1. 5" Border
2. Louvered
3. Aluminum
4. 1" Reflective Border. 2" Reflective Border by Special Request.
5. Backplates to be Installed Only on Signal Heads Attached to Mast Arms.

D / E014

Backplate Detail

Not to Scale

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

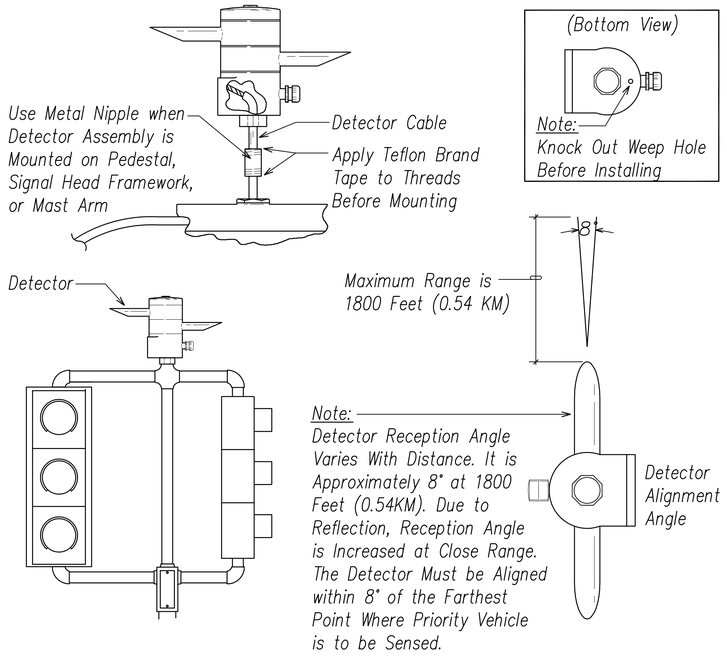
TRAFFIC SIGNAL DETAILS II

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

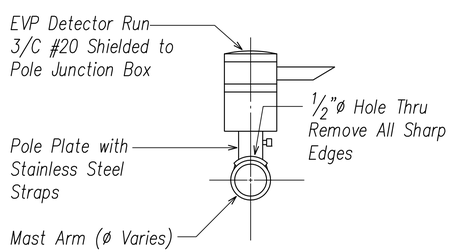
Scale: AS NOTED Date: NOVEMBER 2019

E014 SHEET No. 42 OF 48 SHEETS

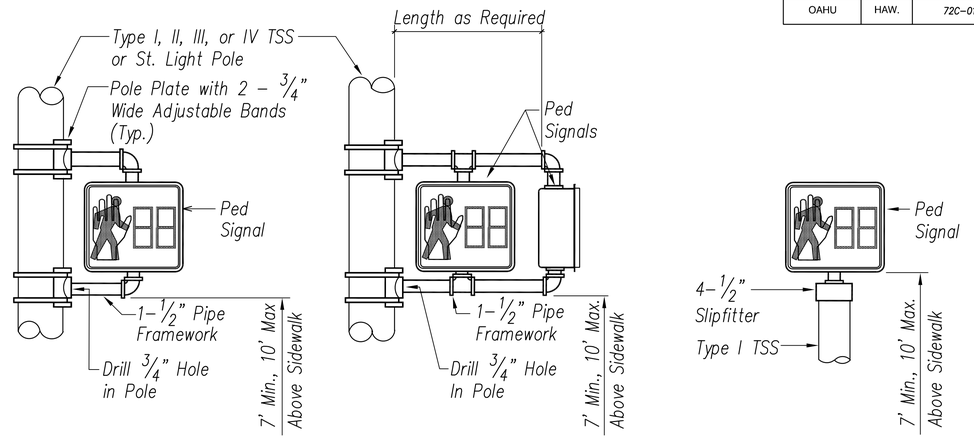
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	43	48



A E015 **Typical Pedestal/Mast Arm Installation of EVP Detector**
Not to Scale

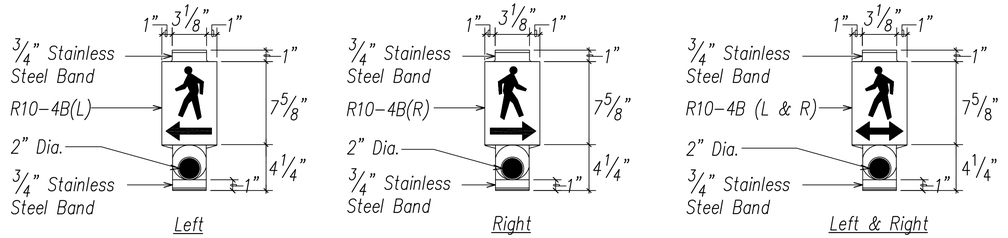


B E015 **Typical Horizontal Mount of EVP Detector**
Not to Scale



Bracket Mount – One Way | Bracket Mount – Two Way | Top of Pole – One Way

C E015 **Pedestrian Signal Mounting Details**
Not to Scale



The Color Scheme Shall be:
White–Man, Arrow and Push Button
Black–Background

Notes:

1. On Plan Sheet, Use Applicable Detail
2. ADA Approved

D E015 **Pedestrian Push Button Detail**
Not to Scale

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS III

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E015 SHEET No. 43 OF 48 SHEETS

ORIGINAL PLAN | NOTE BOOK | No. | DATE
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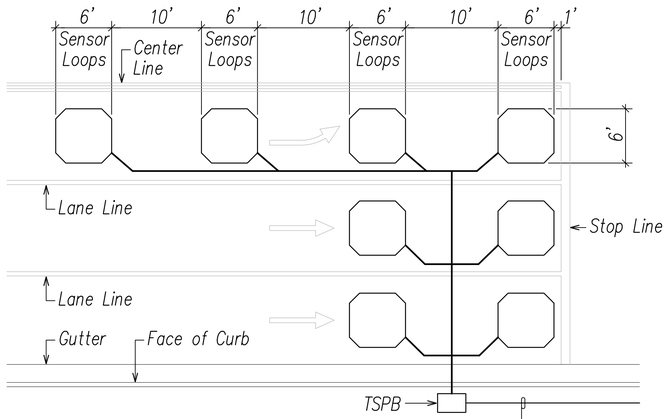
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	44	48



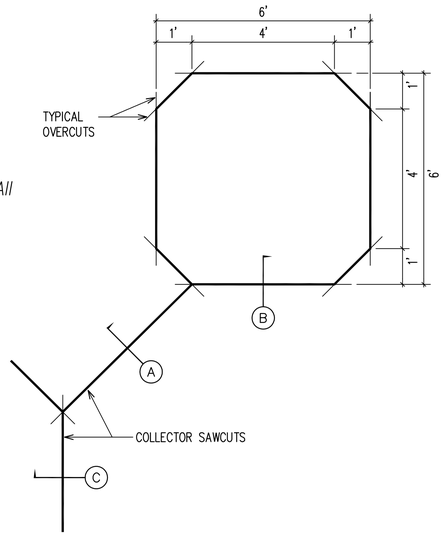
Notes:

1. Center Sensor Loops in Lanes.
2. Collector Cables Shall be Twisted 2 Turns Per Foot.
3. Number of Loops and Locations Vary. See Project Plans.
4. Number and Locations of Collector Sawcuts May be Varied in the Field to Suit.

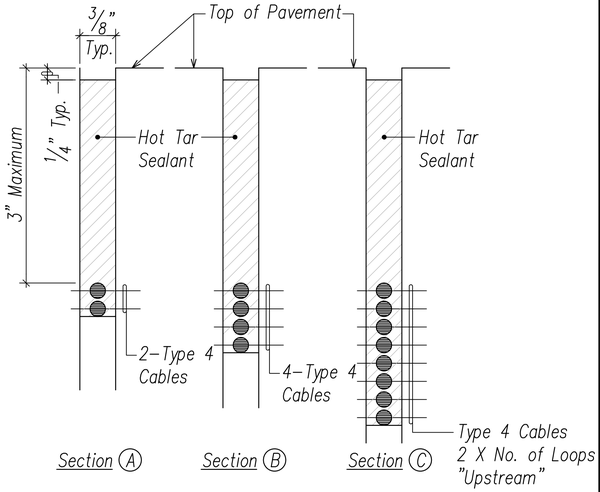
A E016 **Typical Sensor Loop Layout**
Not to Scale

Notes:

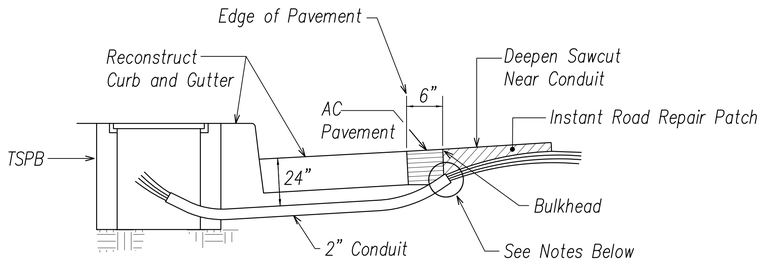
1. Length of Overcuts Shall be Kept to a Minimum. All Overcuts Shall be Backfilled with Loop Cable Sealant.
2. All Saw-Cutting Slurry Shall be Wet Vacuumed, Either Simultaneous with or Immediately After the Saw-Cutting Operations, and the Collected Slurry Disposed of Appropriately (I.E., Either Placed in a Filter Fabric Lined Filtration Box or In a Filter Fabric Lined Dug Up Retention/Percolation Basin, and After Filtration/Percolation, the Filter Fabric and the Retained Sediments, Disposed of Appropriately).
3. Type 4 Cable - Loop Sensor Cable: Solid No. 12, Single Conductor to IMSA Spec 51-5.



B E016 **Typical Sensor Loop Wiring Diagram**
Not to Scale



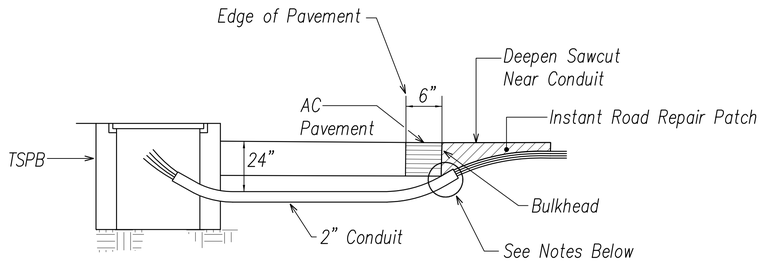
C E016 **Typical Sensor Loop Sawcut Detail**
Not to Scale



Notes:

1. Seal Roadway End of Conduit After Installation of Conductors.
2. Install Bulkhead Across Conduit Trench.
3. Place Loop Cable Sealant in Loop Cable Sawcut.
4. Backfill Over Conduit with Instant Road Repair Patch.
5. Reconstruct Curb and Gutter as Required.

D E016 **Detail of Sensor Loop Installation at Curb and Gutter**
Not to Scale



Notes:

1. Seal Roadway End of Conduit After Installation of Conductors.
2. Install Bulkhead Across Conduit Trench.
3. Place Loop Cable Sealant In Loop Cable Sawcut.
4. Backfill Over Conduit with Instant Road Repair Patch.

E E016 **Detail of Sensor Loop Installation at Edge of Roadway**
Not to Scale

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOOP DETECTOR DETAILS

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E016 SHEET No. 44 OF 48 SHEETS

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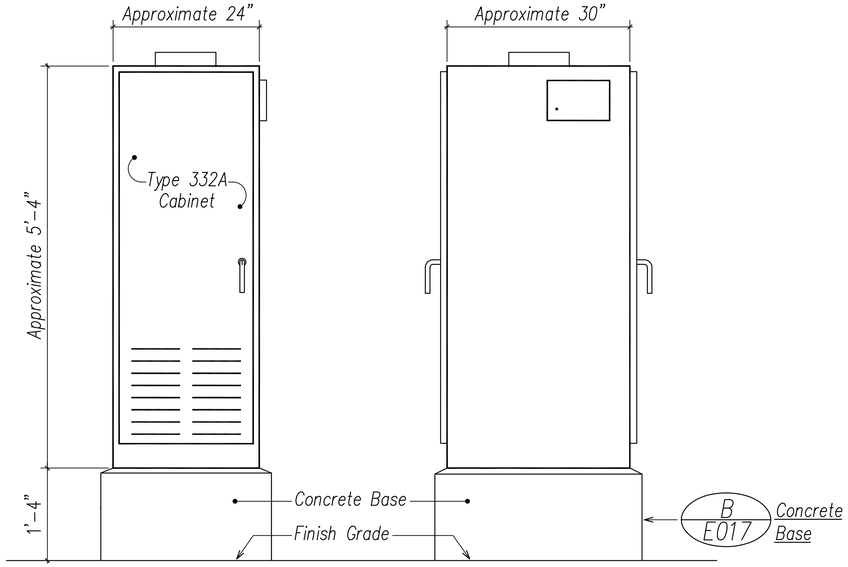
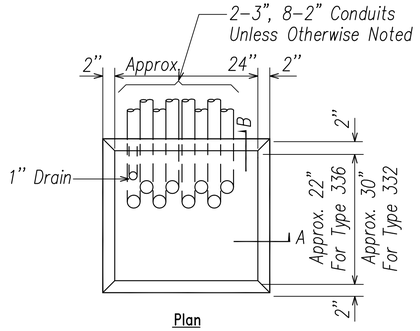
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	45	48



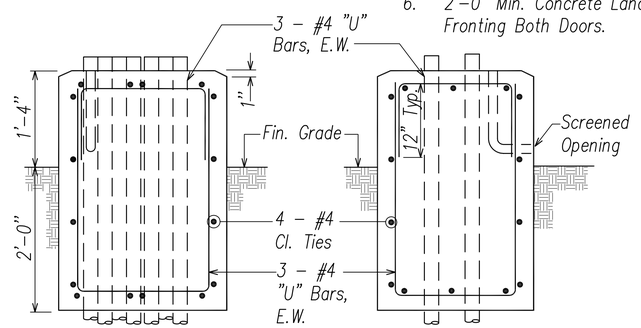
A E017 **Type 332A Cabinet Detail**
Not to Scale



Plan

NOTES:

1. Concrete Shall Be Class "B".
2. Dimensions Shall Be Altered To Suit Controller Cabinet Actually Furnished.
3. Conduit Bends And Drain Are Incidental To Concrete Base.
4. Refer To Cabinet Manufacturer's Specifications For Details Of Anchor Bolts And Base Setting.
5. All Exposed Surfaces Of Concrete Base Shall Be Given A Class 2, Rubbed Finish.
6. 2'-0" Min. Concrete Landing Area To Be Provided In Area Fronting Both Doors.



B E017 **Type "D" Concrete Base Detail**
Not to Scale

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONTROLLER CABINET DETAIL

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

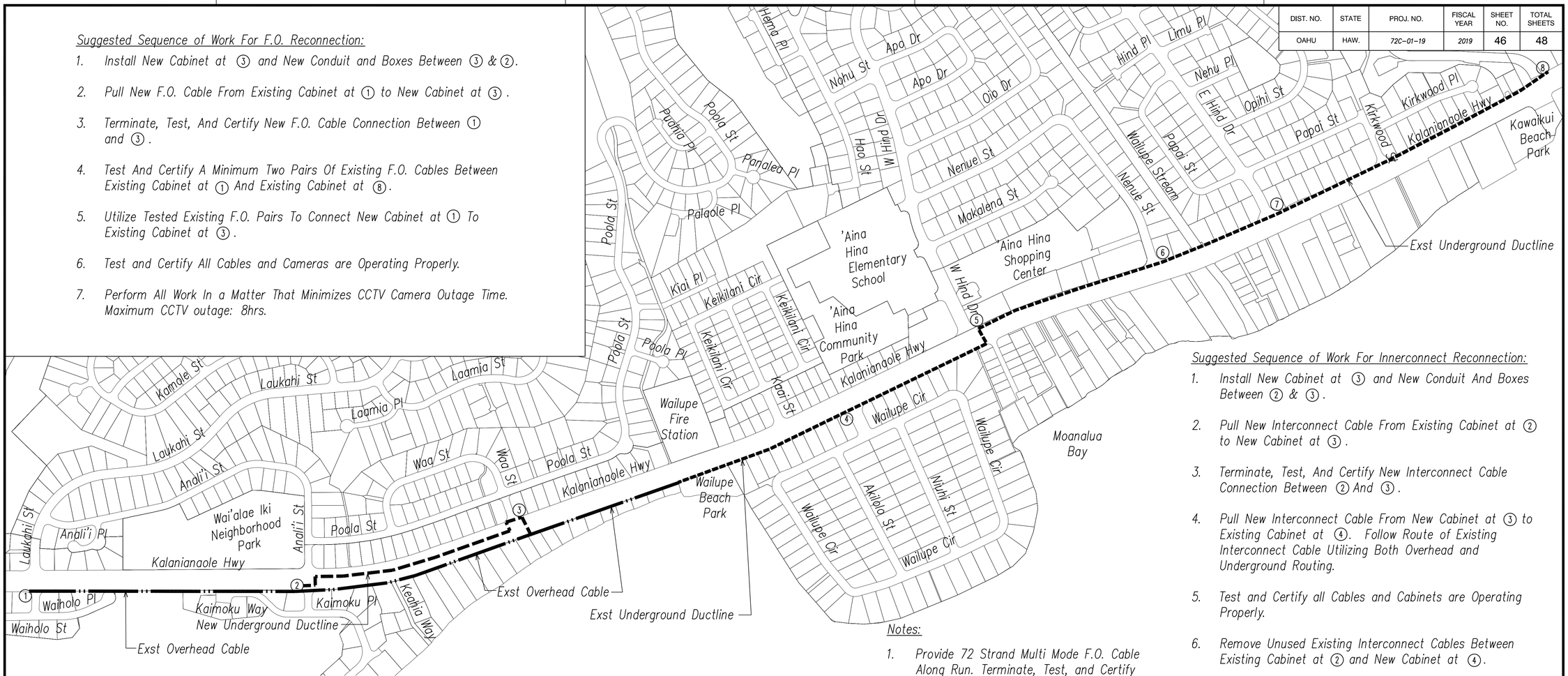
Scale: AS NOTED Date: NOVEMBER 2019

E017 SHEET No. 45 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	46	48

Suggested Sequence of Work For F.O. Reconnection:

1. *Install New Cabinet at ③ and New Conduit and Boxes Between ③ & ②.*
2. *Pull New F.O. Cable From Existing Cabinet at ① to New Cabinet at ③.*
3. *Terminate, Test, And Certify New F.O. Cable Connection Between ① and ③.*
4. *Test And Certify A Minimum Two Pairs Of Existing F.O. Cables Between Existing Cabinet at ① And Existing Cabinet at ⑧.*
5. *Utilize Tested Existing F.O. Pairs To Connect New Cabinet at ① To Existing Cabinet at ③.*
6. *Test and Certify All Cables and Cameras are Operating Properly.*
7. *Perform All Work In a Matter That Minimizes CCTV Camera Outage Time. Maximum CCTV outage: 8hrs.*



Cabinet Description:

① *Existing CCTV Cabinet Located on the Town/Makai Side of Kalanianaole Highway/Laukahi St Intersection*

② *Existing Traffic Signal Controller And CCTV Cabinet with Fiber Hub Located on the Town/Makai Side of the Kalanianaole Highway/Anali'i St/Kaimoku St Intersection*

③ *New Traffic Signal Controller And CCTV Cabinet With Hub Located On The East/Mauka Side of the Kalanianaole Highway/Wa'a St Intersection*

④ *Existing Traffic Signal Controller Located on the Town/Makai Side Of The Kalanianaole Highway/Wailupe Circle Intersection*

⑤ *Existing Traffic Signal Controller and CCTV Cabinet Located on the East/Mauka Side Of The Kalanianaole Highway/West Hind Drive Intersection*

⑥ *Existing Traffic Signal Controller Located on the East/Mauka Side Of The Kalanianaole Highway/Nenue St Intersection*

⑦ *Existing Traffic Signal Controller Located on the East/Mauka Side Of The Kalanianaole Highway/East Hind Drive Intersection*

⑧ *Existing Traffic Signal Controller and CCTV Cabinet with Hub Located on the East/Mauka Side of the Kalanianaole Highway/Pu'uikena Dr Intersection*

NORTH

Innerconnect and CCTV Fiber Connection Plan

Scale: 1"=300'

Suggested Sequence of Work For Innerconnect Reconnection:

1. *Install New Cabinet at ③ and New Conduit And Boxes Between ② & ③.*
2. *Pull New Interconnect Cable From Existing Cabinet at ② to New Cabinet at ③.*
3. *Terminate, Test, And Certify New Interconnect Cable Connection Between ② And ③.*
4. *Pull New Interconnect Cable From New Cabinet at ③ to Existing Cabinet at ④. Follow Route of Existing Interconnect Cable Utilizing Both Overhead and Underground Routing.*
5. *Test and Certify all Cables and Cabinets are Operating Properly.*
6. *Remove Unused Existing Interconnect Cables Between Existing Cabinet at ② and New Cabinet at ④.*
7. *Perform All Work In a Matter That Minimizes Outage Time.*

Notes:

1. *Provide 72 Strand Multi Mode F.O. Cable Along Run. Terminate, Test, and Certify all Strands.*
2. *Should Any Strand of the Re-pulled Fiber Fail The OTDR Testing, The Entire Run Shall Be Re-pulled At Contractor's Expense. All Strands of the Replacement Cable Shall be Terminated, Tested, and Certified.*
3. *Provide 3-Lobe Fabric Inner-duct in all Conduits Prior to Installing Cables.*
4. *Minimize Outage on the Fiber Optic Cable.*
5. *Traffic Signal Interconnect Cables to be Replaced Utilizing the Same Method as the CCTV Cables.*

300' 150' 0 300' 600'

SCALE: 1"=300'

GRAPHIC SCALE

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INNERCONNECT AND CCTV FIBER CONNECTION PLAN

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: *AS NOTED* Date: *NOVEMBER 2019*

E018 SHEET No. **46** OF **48** SHEETS

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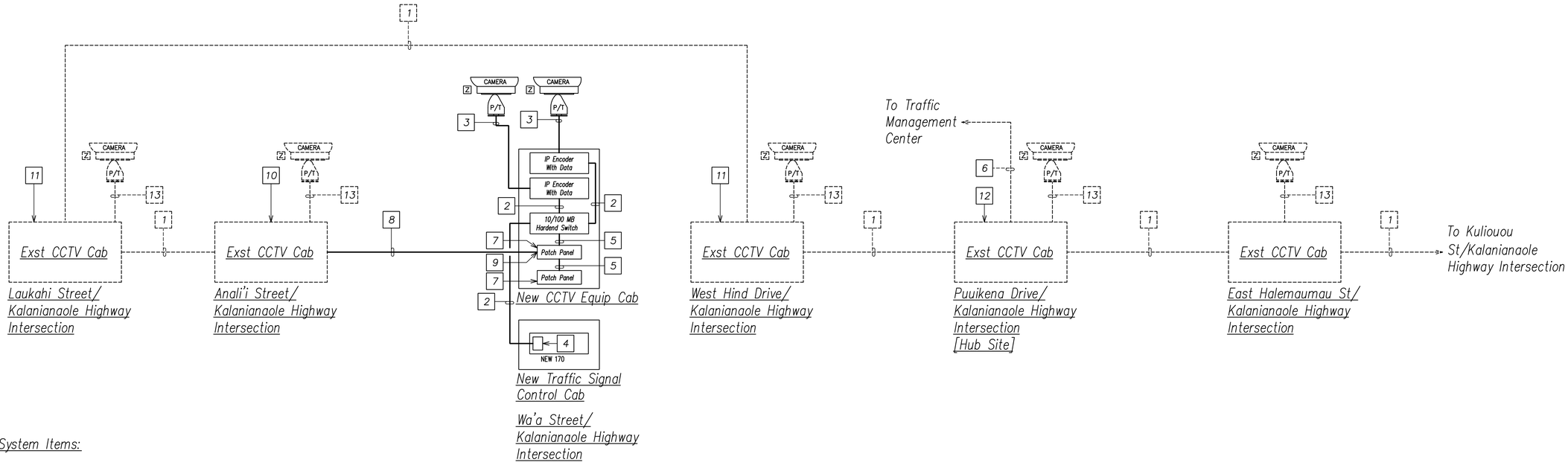
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	47	48



CCTV System Items:

1. Existing Multi Mode Fiber Optic Cable.
2. Category 6 Outdoor Cable.
3. New CCTV Camera Power and Control Wires Per Manufacturer.
4. Provide IP Card At Traffic Signal Controller. Verify Requirements With Department Of Transportation Services.
5. Fiber Optic Cabling As Required.
6. Existing 72-Strand Single Mode Fiber Optic Cable.
7. 72 Port Patch Panel. In A Splice Tray, Fusion Splice ST Connectors To Each Fiber. Connect Fibers To Back Of Patch Panel Using The ST Connectors.
8. New 72-Strand Multi Mode Fiber Optic Cable Installed In New and Existing Signal Conduit.
9. Fusion Splice Pigtail with ST Connectors to New Multi Mode Fiber Optic Cable.
10. Fusion Splice Straight Through Using Spare Multi Mode Fiber Optic Cable To New Multi Mode Fiber Optic Cable.
11. Fusion Splice Straight Through Using Spare Multi Mode Fiber Optic Cable.
12. Fusion Splice Pigtail with ST Connector to Spare Multi Mode Fiber Optic Cable.
13. Existing CCTV Camera Power and Data Cables.

CCTV System Block Diagram

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

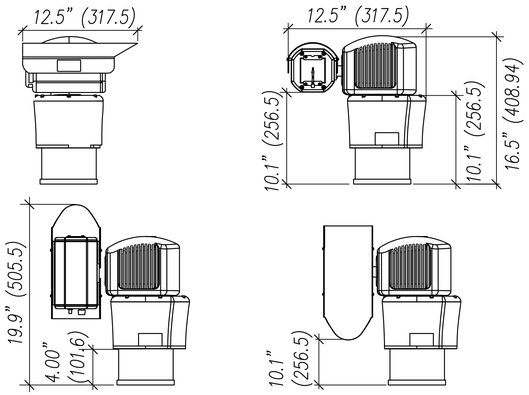
CCTV SYSTEM BLOCK DIAGRAM

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E019 SHEET No. 47 OF 48 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	72C-01-19	2019	48	48



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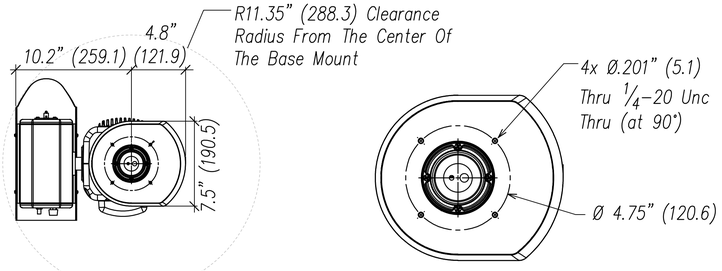
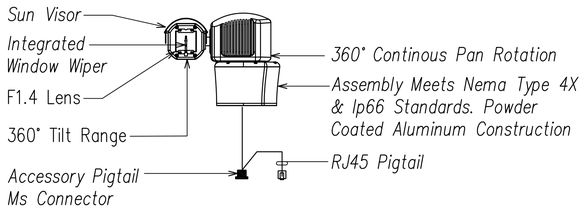


Clearance

Mounting Bolt Pattern

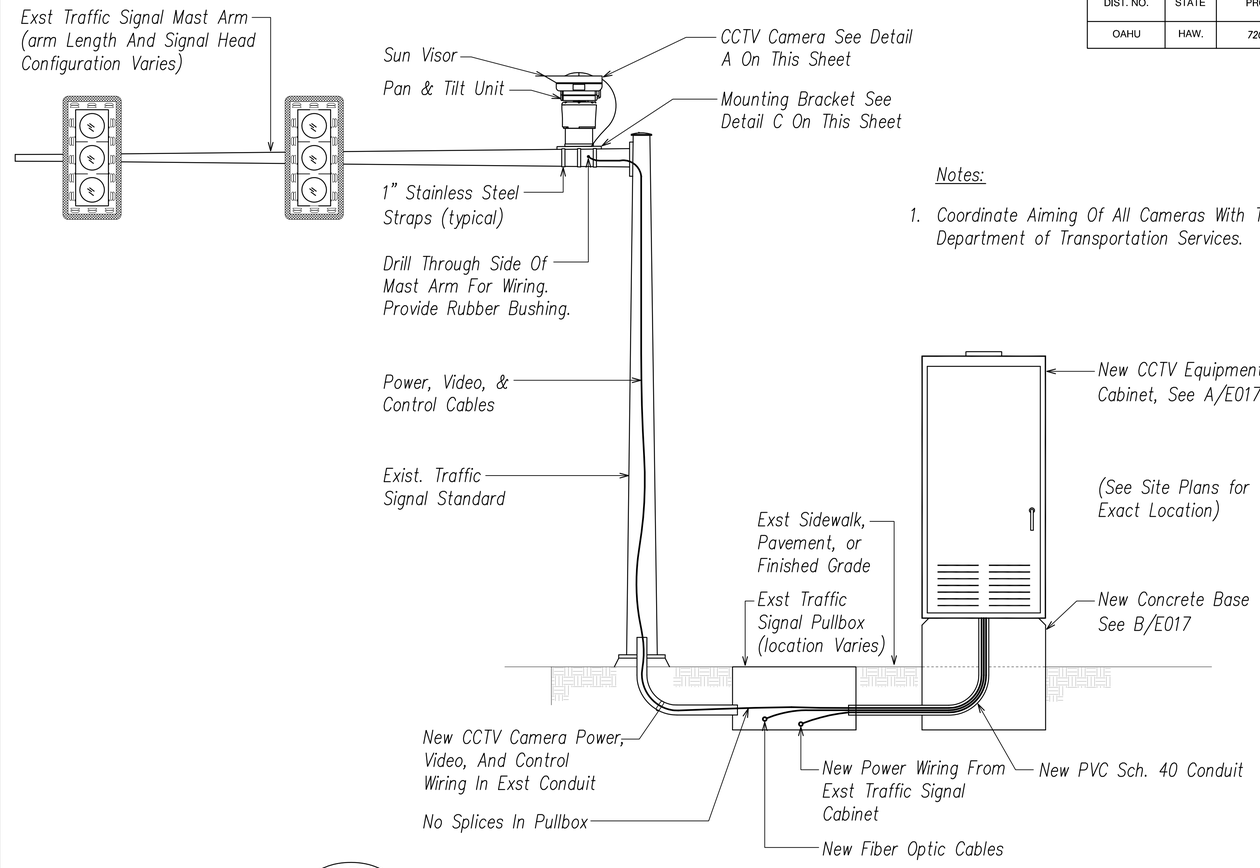


Camera Model: Cohu Rise 4268-1100

Notes:

1. Camera Options: 120VAC Power, MS Connector Pigtail, RJ45 Whip, I-series Pinout
   HD 1080P 30X Camera Module
   Faceplate Wiper
2. Each Camera Must Be Provided With ER6099B Cable Assembly/Harness
3. Each Camera Must Be Provided With Horizontal Leveling Plate For Installation On Traffic Pole Mast Arm

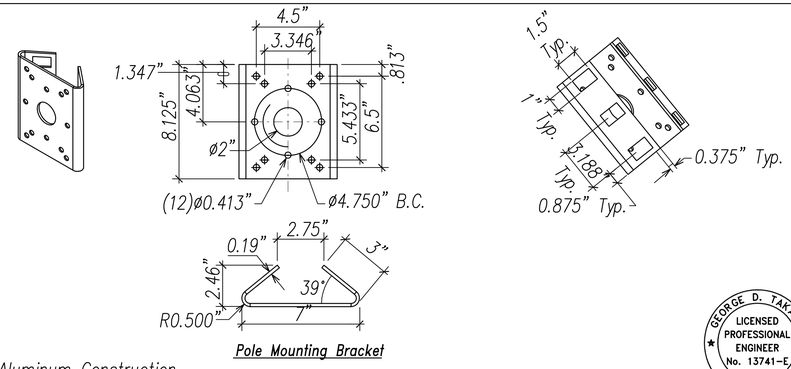
A E020 **Typical CCTV Camera Detail**
Not to Scale



Notes:

1. Coordinate Aiming Of All Cameras With The City Department of Transportation Services.

B E020 **Typical CCTV Camera Mounting Detail**
Not to Scale



Pole Mounting Bracket

Notes:

1. Powder Coated Aluminum Construction

C E020 **Typical CCTV Camera Mounting Bracket**
Not to Scale

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

PW: Z:\ACAD\PROJECTS\218062A\E020_218062A_CCTVDet01.dwg 11/20/19 - 1:36pm rsilva

GEORGE D. TAKASE LICENSED PROFESSIONAL ENGINEER No. 13741-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CCTV CAMERA DETAIL

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: AS NOTED Date: NOVEMBER 2019

E020 SHEET No. 48 OF 48 SHEETS