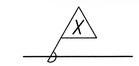
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	87	230

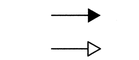
GENERAL TRAFFIC SIGNAL NOTES:

1. All Traffic Signal work shall conform to the requirements of the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highways Administration, 2009 Edition, and Amendments.
2. The locations of the traffic signal standards, traffic signal standards with mast arm, traffic controller, transformer, pullboxes, conduits, & loop detectors shall be staked out in the field by the Contractor and locations accepted by the Engineer prior to construction and installation. Locations shown on plans shall be adjusted as necessary to prevent conflict with existing or new facilities.
3. All direct-buried conduits shall be PVC Schedule 80.
4. Loop detectors shall be installed according to Loop Detector Details shown on the Plans.
5. Lead-in wires in pullbox near loops shall be tagged with Loop Number(s).
6. See sheet TS-9 for Restoration of Non-Roadway Areas and Restoration of Existing Pavement Details due to Trench Excavation.
7. Steel plates for covering trenches shall have skid resistant surface.
8. All structures, pavements, utilities, landscaping, and other topographical features shown on the Plans are existing and shall remain unless noted or indicated otherwise. All grassed areas damaged by construction activities shall be top soiled and grassed.
9. A solid #8 bare copper wire shall be pulled in all conduits with the traffic control cable for equipment ground.
10. All splicing shall be done in the pullboxes.
11. All traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signal as called for in the Plans.
12. The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the Plans.
13. The Contractor shall verify with the respective utility companies and government agencies, the locations of all electric, telephone, traffic signal, street light, cable television, fire alarm, gas, water, sewer, drain and other lines crossing the excavation path or in excavation areas.
14. All work and materials for the traffic signal system shall conform to Special Provisions Section 623 - Traffic Signal System, except as otherwise provided on the Plans.
15. Provide ground rod in all pullboxes, pullboxes adjacent to signal standards, pedestals, controller cabinets, and other locations ordered by the Engineer. Ground rod connectors shall be copper welded and shall meet ground to earth resistance as specified by the National Electric Code or local inspecting agency.
16. Underground pipes, cables, or ductlines known to exist are indicated on the Plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in 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.
17. During non-working hours, the Contractor shall provide two lanes for through traffic. On streets too narrow to make this practicable, the Contractor may work in one half of the roadway keeping one lane open to traffic and alternating the flow of traffic. During non-working hours, all trenches shall be covered with a safe, non-skid, traffic-bearing bridging material and all lanes shall be open to traffic.
18. Where pedestrian walkways exist, they shall be maintained in passable condition or other facilities for pedestrians shall be provided. Passage between walkways at intersections shall likewise be provided.
19. Driveways shall be kept open unless the owners of the property using these rights-of-way are otherwise provided for satisfactorily.
20. No material and/or equipment shall be stockpiled or otherwise stored within street rights-of-way except at locations designated in writing and accepted by the Engineer.
21. Traffic Signal Supports and Foundations shall meet the requirements of "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 5th Edition 2009."
22. Existing traffic signal standards to be replaced shall be removed together with its respective footing. The Contractor may elect to remove only the top portion of the footing. In such cases, the Contractor shall ensure that the remaining footing shall be 12 inches below the existing or finished grade.
23. The existing traffic signal system, including interconnect, shall remain in operation until the new traffic signal system is put into service. The Contractor shall arrange his work accordingly to provide temporary relocations and wirings, as necessary.

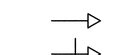
TRAFFIC SIGNAL LEGEND AND ABBREVIATIONS:



Conduits and Cables, Conduit Run X

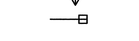


12" R-Y-↑ Traffic Signal Head

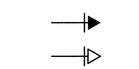


12" R-Y-G Traffic Signal Head

12" R-Y-← Traffic Signal Head

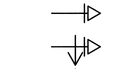


Pedestrian Signal Head

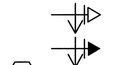


12" R-Y-↑ Traffic Signal Head with Back Plate

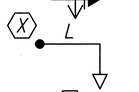
12" R-Y-G Traffic Signal Head with Back Plate



12" R-Y-← Traffic Signal Head with Back Plate

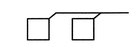


12" R-Y-G-← Traffic Signal Head with Back Plate

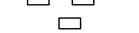


Signal Standard with Mast Arm Type II, or Type III
L=Length of Mast arm, Pole X, Footing Type C

Signal Standard Type I, Pole X,
H=3', 7' or 10', Footing Type A



Loop Detectors



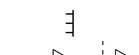
Pullbox Type A (Old Type "B")

Pullbox Type B (Old Type "C")

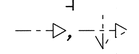
Pullbox Type C (Old Type "D")

Pedestrian Push Button Assembly
(Arrow denotes direction on Push Button Sign)

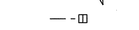
Traffic Controller Model 170E
and 332A Cabinet with Type D
Concrete Base for Controller Cabinet



Street Sign Mounted to Mast Arm



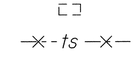
Existing Traffic Signal Head



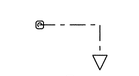
Existing Pedestrian Signal Head

Exisitng Controller Cabinet

Existing Pullbox



Existing Traffic Signal Items
to be removed



Existing Signal Standard with Mast Arm
Type II, or Type III

Existing Signal Standard Type I,
H=3', 7' or 10'

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/SHEETS/TSP/TS-NOTES.DGN

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/14 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL NOTES AND LEGEND

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS
AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-1 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 88	230

TRUE NORTH
SCALE : 1" = 10'

Replace Exist. Side Street 4-6'x6' Loop Detectors.

HELELUA AVE. (CITY)

Replace exist. pullbox with Type C Pullbox

Remove Exist. Traffic Signal Controller Cabinet

R/W

140+00

141+00

177'

To Waianae

FARRINGTON HIGHWAY (STATE)

Install Opticom

~~Install Thermal Sensor Camera~~

Install Opticom

~~Install Thermal Sensor Camera~~

Left Turn Yield on Green Sign 1 TS-2 TS-2

"HELELUA AVE" Street Name Sign. See Detail on Sht. TS-11.

Install State Furnished CCTV Camera

Type A Pullbox

72'

At Intersection, Layout Homerun Per DTS Direction.

In Lieu of Connection to Missing Exist. Lead-in Cable, Duct, and Pullbox, Sawcut and Install Extended Homerun Away from Wheel Path.

To Honolulu

smh
top=13.15
inv.=2.18

Sta. 140+58 os 61.0' Rt.

Sta. 140+68 os 59.0' Rt.

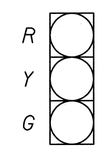
Sta. 141+08 os 59.0' Rt.

R/W

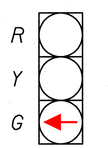
CONTRACT CHANGE ORDER NO. 34, 1st SUPPLEMENT

A-1
B-5
C-2
F-1

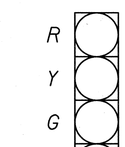
12" Signal Faces (R-Y- ↑)
D-3 +
D-6



12" Signal Faces (R-Y-G)
B-1 (E)
B-3 (E)
B-6
E-1
E-2
D-8 *+

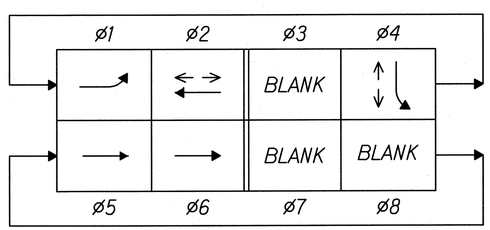


12" Signal Faces (R-Y-G)
D-5



12" Signal Faces (R-Y-G-GA/YA)
C-1 (E)
D-1 *+

* Programmed Visibility Signals
+ Signal Head w/ Back Plate



PHASE DIAGRAM
Model 170E Controller
Model 332A Cabinet
⟶ Vehicle Movement
⟷ Pedestrian Movement

R10-12
24"X30"

LEFT TURN YIELD ON GREEN SIGN
Not to Scale
1 TS-2 TS-2

Notes:
1. For foundation details see Sheet S6.1.
2. For Interconnect Plan, See Sheet C.0.94S-1.
3. Contractor to terminate all fiber optic cable in cabinet patch panel.
4. Contractor to terminate power in CCTV cabinet to terminal block and surge suppressor.
5. Contractor to pull coax, camera control, and 3C#12 into CCTV cabinet.
6. CCTV integration by others.

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms
	CCTV Camera and Interconnect
	Conduit & Cable

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/Sheets/TSP/TSP-HELE.DGN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN
FARRINGTON AND HELELUA

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: 1"=10' Date: April 2013

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

SHEET No. TS-2 OF 13 SHEETS

"AS-BUILT"

C.O. 88

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 89	230

FARRINGTON AND HELELUA

⚠

Material List

Pole ⬡	Base Type	Standard Type	Mounting Type	PPB Assembly
A(E)	exist	I-exist	(1) Type I (ped head)	
B(E)	exist	II-exist	(1) Type VI (exist)	
			(2) Opticom (Horiz.)	
			(3) Type VI (exist)	
			~~(4) Thermal Camera (Horiz.)~~	
			(5) Type VI (ped head)	
			(6) Type IV	
C(E)	exist	I-exist	(1) Type I (exist)	
			(2) Type III (ped head)	
D	*	II-35	(1) Type VI	
			(2) Opticom (Horiz.)	
			(3) Type VI	
			~~(4) Thermal Camera (Horiz.)~~	
			(5)(6) Type V	
			(7) CCTV Camera (Horiz.) **	
E	*	I-10	(1)(2) Type II	
			~~(3) Thermal Camera (Vert.)~~	
			(4) Opticom (Vert.)	
F	*	I-8	(1) Type I (ped head)	1
G	D		170E Controller	
			332A Cabinet and Base	
H	D		332A Cabinet and Base **	

(8) Type VI

* For Traffic Signal Pole Base, See Std. Plan TE-32, TE-33, TE-33A.1 and TE-33A.2.

** CCTV Camera and 332A Cabinet Base for CCTV System Furnished by the State

⚠

Cable and Conduit Schedule

Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 5 Signal Control 4C#14	Type 6 Power 3C#6	Type 7 Opticom 3C#20	12PR#19 Inter-connect	72F Single Mode FOC	Coax	Camera Control	3C#12
1	2"	1									
	2"		3								
	2-2"	Spare									
2	2"		2								
3	2"(E)		1(E)								
4	2"(E)		1(E)								
5	2"	1									
	3-2"	Spare									
6	2"	1									
	2"						1				
	2"							1			
	2"								1	1	1
	2"			1							
	2"					1					
6A	2"				1						
	2"							1			
	2"								1	1	1
	2"	Spare									
6B	2-2"	2									
	2"		5								
	2"		5								
	2"				1						
	2"					3					
	2"						1				
	2"			3							
7	2"		1								
7A	2"		4								
8	2"	1									
	2"		5								
	2"				2						
	2"			1							
	2"					1					
	2"	Spare									
9	2"						1				
	2"							1			
	2-2"	Spare									
10	2"(E)				1(E) 1						
11	2"	1									
	2"		5								
	2"				2						
	2"	Spare									

CONTRACT CHANGE ORDER NO. 30

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms,
	CCTV Camera and Interconnect
	Conduit & Cable

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MATERIAL LIST AND CABLE AND CONDUIT SCHEDULE

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-3 OF 13 SHEETS

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

T:/DOT - FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/CHANGEORDER/CO1/TSP-01B-HELE.DGN

"AS-BUILT"

C.O. 89

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 90	230

TRUE NORTH
SCALE : 1" = 10'

⚠ Remove Exist. Traffic Signal Controller Cabinet

⚠ Replace exist. pullbox with Type B Pullbox

Existing Power Service

Replace Exist. Side Street 4-6'x6' Loop Detectors.

⚠ Replace exist. pullbox with Type C Pullbox. Verify Clearance

R/W

HALEAKALA AVE. (CITY)

Replace exist. pullbox with Type C Pullbox. ⚠ Verify Clearance

In Lieu of Connection to Missing Exist. Lead-in Cable, Duct, and Pullbox, Sawcut and Install Extended Homerun Away from Wheel Path.

~~⚠ Install Thermal Sensor Camera~~

148+00

149+00

178'

To Waianae

FARRINGTON HIGHWAY (STATE)

⚠ Install Opticom

Exist. Street Name Sign to Remain

Install New Traffic Signal Controller Cabinet ⚠

Install Opticom ⚠

~~⚠ Install Thermal Sensor Camera~~

On Left Arrow Only Sign (1 TS-4 | TS-4)

"HALEAKALA AVE" Street Name Sign. See Detail on Sht. TS-11.

Install State Furnished CCTV Camera ⚠

At Intersection, Layout Homerun per DTS Direction.

To Honolulu

11D 11C 11B 11A 62B 62A 61B 61A 63B 63A 21A 21B 22A 22B 23A 23B

SC AT&T O/H W/P W/2 W/24 f.h. # hv WV top=13.14 ts=10.80 13.67

11' 35'

Sta. 148+23 os 61.0' Rt.

Sta. 148+45 os 59.0' Rt.

Sta. 148+87 os 59.0' Rt.

R/W

250'

CONTRACT CHANGE ORDER NO. 34, 1st SUPPLEMENT

A-1
C-2
G-1
H-5

12" Signal Faces (R-Y-↑)
E-3 +
E-5 +

12" Signal Faces (R-Y-G)
E-7
F-1
F-2
G-2
H-1 (E)
H-3 (E)
H-6
⚠ E-9 *+

12" Signal Faces (R-Y-←)
C-1
E-1 *+
E-6

* Programmed Visibility Signals
\+ Signal Head w/ Back Plate

ø1	ø2	ø3	ø4
→	←→	BLANK	↑↓
BLANK	→	BLANK	BLANK
ø5	ø6	ø7	ø8

PHASE DIAGRAM
Model 170E Controller
Model 332A Cabinet
→ Vehicle Movement
←→ Pedestrian Movement

Notes:
1. For foundation details see Sheet S6.1
2. For Interconnect Plan, See Sheet C.O. 94 S-1

ON LEFT ARROW ONLY
R17-3
30"X36"

ON LEFT ARROW ONLY SIGN (1 TS-4 | TS-4)
Not to Scale

DATE	REVISION
2/9/18	⚠ Add Contra-Flow Signal Head
6/21/17	⚠ Add Thermal Cameras, Opticoms
	New Controller, CCTV Camera and
	Interconnect Conduit & Cable

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

T:/DOT-FARRINGTON HWY. INTERSECTIONS NANAKULI HALEAKALA/CADD/Sheets/TSP/TSP-HALE.DGN

GERALD D. ANDRADE LICENSED PROFESSIONAL ENGINEER No. 10377-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN
FARRINGTON AND HALEAKALA

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: 1"=10' Date: April 2013

SHEET No. TS-4 OF 13 SHEETS

"AS-BUILT"

C.O. 90

FARRINGTON AND HALEAKALA

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 91	230

⚠ Material List

Pole ⬡	Base Type	Standard Type	Mounting Type	PPB Assembly
A(E)	exist	I-exist	(1) Type I (ped head)	
B(E)	exist	I-exist		
C(E)	exist	I-exist	(1) Type I (exist)	
			(2) Type III (ped head)	
D(E)	exist	I-exist		1
E	*	II-35	(1) Type VI	
			(2) Opticom (Horiz.)	
			(3) Type VI	
			~~(4) Thermal Camera (Horiz.)~~	
			(5) Type VI	
			(6)(7) Type V	
			(8) CCTV Camera (Horiz.)**	
2			(9) Type VI	
F	*	I-10	(1)(2) Type II	
			~~(3) Thermal Camera (Horiz.)~~	
			(4) Opticom (Horiz.)	
G	*	I-8	(1) Type I (ped head)	1
			(2) Type II	
H(E)	exist	II-exist	(1) Type VI (exist)	
			(2) Opticom (Horiz.)	
			(3) Type VI (exist)	
			~~(4) Thermal Camera (Horiz.)~~	
			(5) Type VI (ped head)	
			(6) Type IV	
I	D		170E Controller	
			332A Cabinet	
			and Base	
J	D		332A Cabinet and Base**	

* For Traffic Signal Pole Base, See Std. Plan TE-32, TE-33, TE-33A.1 and TE-33A.2.

** CCTV Camera and 332A Cabinet Base for CCTV System Furnished by the State

⚠ Cable and Conduit Schedule

Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 5 Signal Control 4C#14	Type 6 Power 3C#6	Type 7 Opticom 3C#20	12PR#19 Inter-connect	72F Single Mode FOC	Coax	Camera Control	3C#12
1	2"	1									
	3-2"	Spare									
2	2"(E)		1								
3	2"(E)		1								
4	2"	1									
	2"		3								
	2-2"	Spare									
5	2"	1									
	2"		3								
	2"							1			
	2"								1	1	1
	2"						1				
	2"			1							
	2"					1					
	2"	Spare									
5A	2"	1									
	2"		3								
	2"			2							
	2"				1						
	2"					2					
	2"						1				
	2"							1			
	2"								1	1	1
5B	2"				1						
	2"							2			
	2"								1	1	1
	2"	Spare									
6	2"		3								
	2"						1				
	2"							1			
	2"	Spare									
7	2"		1								
	2"						1				
	2"							1			
	2"	Spare									
8	2"	1									
	2"		2								
	2"			1							
	2"				2						
	2"					1					
	2"			Spare							
9	2"(E)	1(E)									
10	2"		2								
	2"				1						
	2"				1						
	2"	Spare									
11	2"		1								
	2"				1						
	2"				1						
	2"	Spare									
12	2"(E)				1 1(E)						

CONTRACT CHANGE ORDER NO. 30

DATE	REVISION
2/9/18	⚠ Add Contra-Flow Signal Head
6/21/17	⚠ Add Thermal Cameras, Opticoms
	CCTV Camera and Interconnect
	Conduit & Cable

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE — 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MATERIAL LIST AND CABLE AND CONDUIT SCHEDULE

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-5 OF 13 SHEETS

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

T:/DOT - FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/SHEETS/TSP/TSP-02B-HALE.DGN

"AS-BUILT"

C.O. 91

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 91S-1	230

FARRINGTON AND HALEAKALA

⚠ Cable and Conduit Schedule

Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 5 Signal Control 4C#14	Type 6 Power 3C#6	Type 7 Opticom 3C#20	12PR#19 Inter-connect	72F Single Mode FOC	Coax	Camera Control	3C#12
13	2"						1				
	2"							1			
	2-2"	Spare									
14	2-2"	2									
	2"		5								
	2"		4								
	2"			3							
	2"				1						
	2"					3					
	2"						2				
15	2"						1				
	2"							1			
	2-2"	Spare									

CONTRACT CHANGE ORDER NO. 17

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms
	CCTV Camera and Interconnect
	Conduit & Cable

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MATERIAL LIST AND CABLE AND CONDUIT SCHEDULE

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-5A OF 13 SHEETS

ORIGINAL PLAN
NOTE BOOK
No.

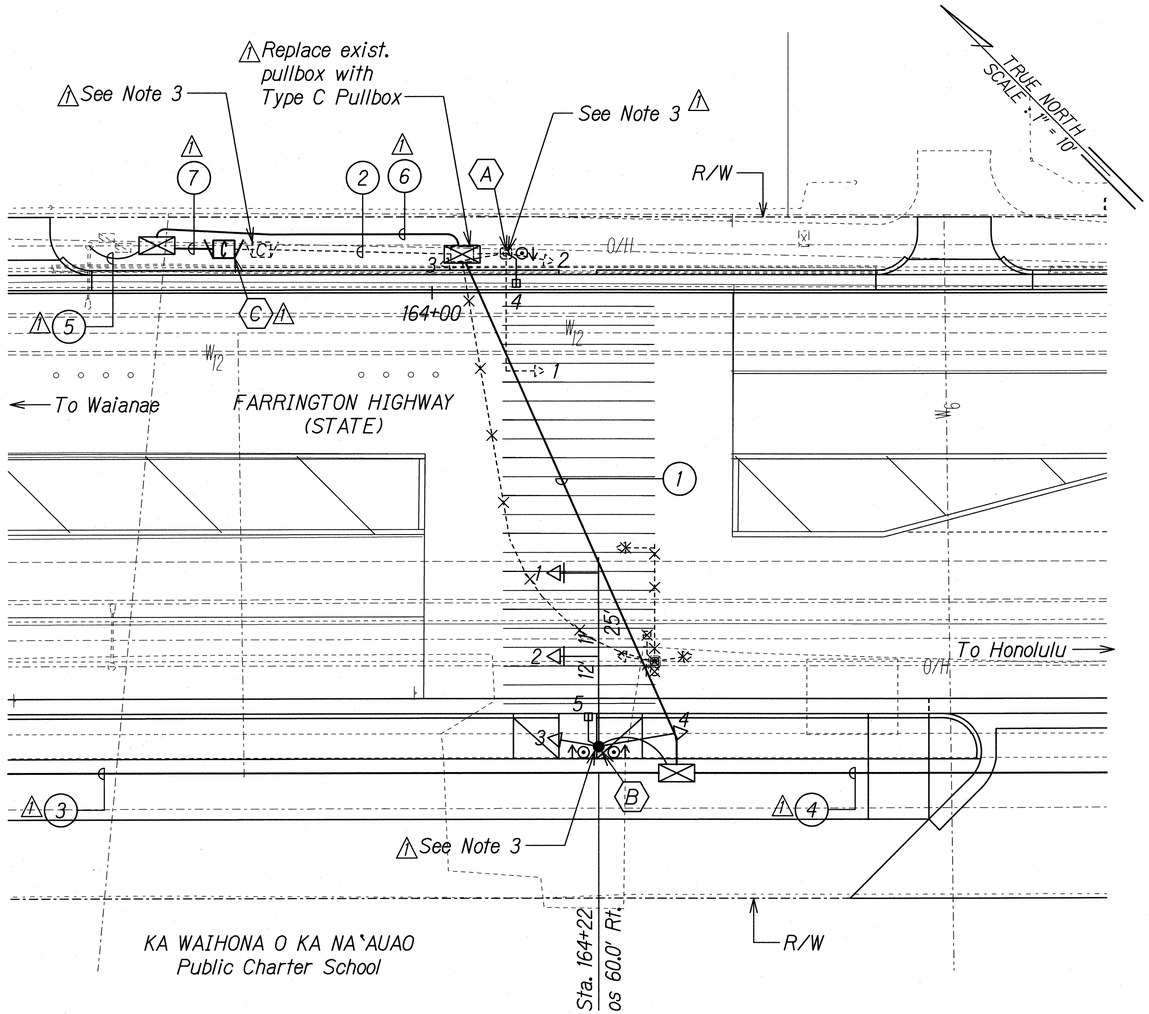
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

T:/DOT - FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/SHEETS/TSP/TSP-02B-HALE.DGN

"AS-BUILT"

C.O. 91S-1

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 92	230



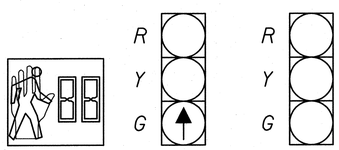
Material List				
Pole ⬡	Base Type	Standard Type	Mounting Type	PPB Assembly
A(E)	exist	II-exist	(1) Type VI (exist)	
			(2)(3) Type IV (exist)	
			(4) Type IV (ped head) (exist)	
B	*	II-25	(1) Type VI	
			(2) Type VI	
			(3)(4) Type IV	
			(5) Type IV (ped head)	1
C	D		332A Cabinet and Base**	

* For Traffic Signal Pole Base, See Std. Plan TE-33, TE-33A.1 and TE-33A.2.

** 332A Cabinet Base for CCTV System Furnished by the State

⚠

Cable and Conduit Schedule							
Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 6 Power 3C#6	12PR#19 Inter-connect	Other	72F Single Mode FOC
1	2-2"	1					
	2"		2				
	2"				2		
	2"						2
	2"	Spare					
2	2-2"(E)	2					
	2"(E)		1				
	2"(E)				2		
3	2"				1		
	2"						1
	2-2"	Spare					
4	2"				1		
	2"						1
	2-2"	Spare					
5	2"			1		1-12 Strand Fiber Optic Cable	
6	2"						2
	2"	Spare					
7	2"			1			
	2"					1-12 Strand Fiber Optic Cable	
	2"						2
	2"	Spare					



A-4
B-5

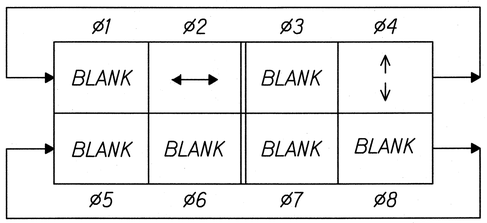
12" Signal Faces (R-Y-↑)

A-2 (E)
A-3 (E)
B-1 +
B-2 +

12" Signal Faces (R-Y-G)

A-1 (E)
B-3
B-4

+ Signal Head w/ Back Plate



PHASE DIAGRAM
Model 170E Controller
Model 332A Cabinet

⟶ Vehicle Movement
⟷ Pedestrian Movement

⚠Notes:

1. For foundation details see Sheet S6.1
2. For Interconnect Plan, See Sheet C.O. 94S-1
3. Existing traffic signal controller and traffic signal poles to be removed and salvaged upon completion of Nanakuli Village Center intersection. Eradicate crosswalk markings upon removal of traffic signal. Interconnect system and traffic signal pullboxes to remain.

CONTRACT CHANGE ORDER NO. 17

DATE	REVISION
6/21/17	⚠ Add Interconnect Conduit & Cable

GERALD D. ANDRADE ★ LICENSED PROFESSIONAL ENGINEER ★ No. 10377-C ★ HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN AT STA. 164+00

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: 1"=10' Date: April 2013

SHEET No. TS-6 OF 13 SHEETS

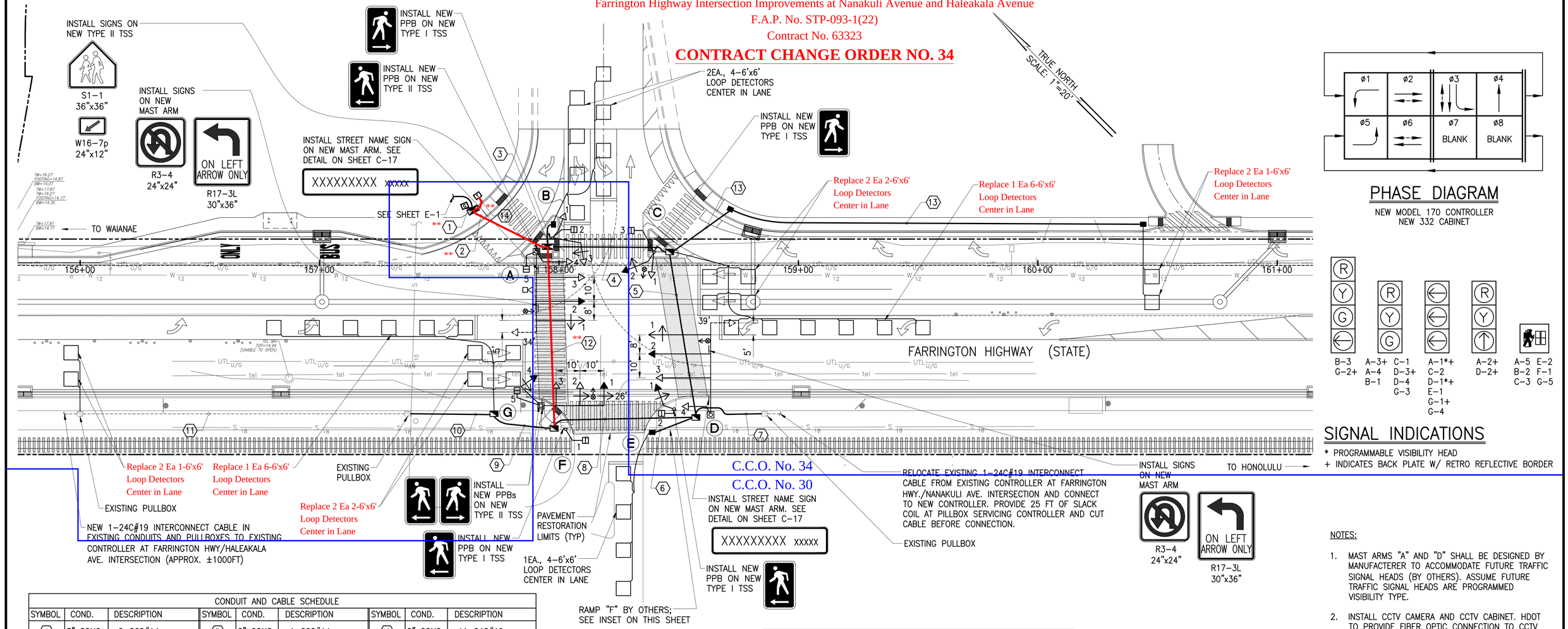
C.O. 92

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/Sheets/TSP/TSP-KAWAIHONA.DGN

Farrington Highway Intersection Improvements at Nanakuli Avenue and Haleakala Avenue
F.A.P. No. STP-093-1(22)
Contract No. 63323

CONTRACT CHANGE ORDER NO. 34



PHASE DIAGRAM

NEW MODEL 170 CONTROLLER
NEW 332 CABINET

SIGNAL INDICATIONS

* PROGRAMMABLE VISIBILITY HEAD
\+ INDICATES BACK PLATE W/ RETRO REFLECTIVE BORDER

NOTES:

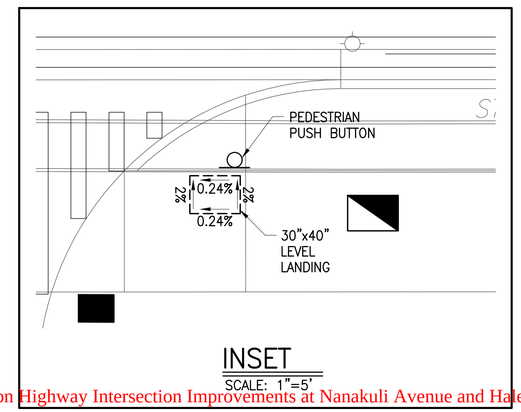
1. MAST ARMS "A" AND "D" SHALL BE DESIGNED BY MANUFACTERER TO ACCOMMODATE FUTURE TRAFFIC SIGNAL HEADS (BY OTHERS). ASSUME FUTURE TRAFFIC SIGNAL HEADS ARE PROGRAMMED VISIBILITY TYPE.
2. INSTALL CCTV CAMERA AND CCTV CABINET. HDOT TO PROVIDE FIBER OPTIC CONNECTION TO CCTV CABINET AND COMMISSION CCTV CAMERA AS PART OF THE "FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NALEAKALA AVENUE" PROJECT. COORDINATE WITH HDOT.

CONDUIT AND CABLE SCHEDULE

SYMBOL	COND.	DESCRIPTION
1	3" CONC.	2-26C#14
	3" CONC.	2-26C#14
	3" CONC.	21-2C#14
	2" CONC.	2-3C#4
	2" CONC.	*1-24C#19
	2" CONC.	*EXIS~~**~~1-24C#19
	2" CONC.	4-EVP
	2" CONC.	SPARE
2	3" CONC.	2-26C#14
	3" CONC.	2-26C#14
	3" CONC.	21-2C#14
	2" CONC.	*1-24C#19
	2" CONC.	*EXIS~~**~~1-24C#19
	2" CONC.	4-EVP
	2" CONC.	CAMERA CABLES
	2" CONC.	~~SPARE~~ **1-72F SM FOC
	2" CONC.	~~SPARE~~ **1-72F SM FOC
	2" CONC.	SPARE
3	2" CONC.	4-2C#14
4	2" CONC.	1-26C#14
	2" CONC.	1-26C#14
	2" CONC.	7-2C#14
	2" CONC.	2-EVP
	2" CONC.	SPARE
5	2" CONC.	1-26C#14
	2" CONC.	1-26C#14
	2" CONC.	1-EVP
	2" CONC.	SPARE
6	2" CONC.	2-2C#14
	2" CONC.	SPARE
7	2" CONC.	*EXIST. 1-24C#19
	2" CONC.	SPARE
	2" CONC.	SPARE
	2" CONC.	SPARE
8	2" CONC.	1-26C#14
	2" CONC.	1-26C#14
	2" CONC.	3-2C#14
	2" CONC.	*EXIST. 1-24C#19
	2" CONC.	SPARE
	2" CONC.	SPARE
	2" CONC.	SPARE
	2" CONC.	SPARE
9	2" CONC.	*1-24C#19
	2" CONC.	6-2C#14
	2" CONC.	SPARE
	2" CONC.	SPARE
	2" CONC.	SPARE
10	2" CONC.	*1-24C#19
	2" CONC.	2-2C#14
	2" CONC.	SPARE
	2" CONC.	SPARE
	2" CONC.	SPARE
11	EXIST.	*1-24C#19
		2-2C#14
12	2" CONC.	1-26C#14
	2" CONC.	1-26C#14
	2" CONC.	5-2C#14
	2" CONC.	5-2C#14
	2" CONC.	*1-24C#19
		*EXIST~~**~~1-24C#19
	2" CONC.	1-EVP
	2" CONC.	SPARE
	2" CONC.	~~SPARE~~ **1-72F SM FOC
	2" CONC.	~~SPARE~~ **1-72F SM FOC
	2" CONC.	SPARE
13	2" CONC.	2-2C#14
14	3" CONC.	1-3C#4
	3" CONC.	CAMERA CABLES
	3" CONC.	~~SPARE~~ **2-72F SM FOC

*INSTALLED WITH FABRIC INNER DUCT

**Furnish and Install Additional Cables as Shown/Noted. Provide Slack for Connection by Others.



INSET
SCALE: 1"=5'

TRAFFIC SIGNAL PLAN
SCALE: 1"=20'

Farrington Highway Intersection Improvements at Nanakuli Avenue and Haleakala Avenue
F.A.P. No. STP-093-1(22)
Contract No. 63323

CONTRACT CHANGE ORDER NO. 30

REVISION	DATE	BRIEF	MADE BY	APPROVED

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAI'I

NANAKULI HAWAIIAN HOMESTEAD COMMUNITY ASSOCIATION
NANAKULI, OAHU, HAWAI'I
NANAKULI VILLAGE CENTER–OFFSITE IMPROVEMENTS ON FARRINGTON HWY.

TRAFFIC SIGNAL PLAN

TERRANCE S. ARASHIRO LICENSED PROFESSIONAL ENGINEER No. 6998-C HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION
EXP. 4/30/18

DESIGNED BY	DRAWN BY	CHECKED BY
KS	DK	DH

APPROVED BY
N/A
MANAGER AND CHIEF ENGINEER, BWS DATE
(FOR WORK AFFECTING BWS FACILITIES IN CITY/STATE ROW AND BWS ELEMENTS ONLY)

DWG. NO. C-35
SHEET 36 OF 58

0 1 2
LINE IS 2 INCHES AT FULL SIZE
(If NOT 2-inches : Scale Accordingly)

"AS-BUILT"

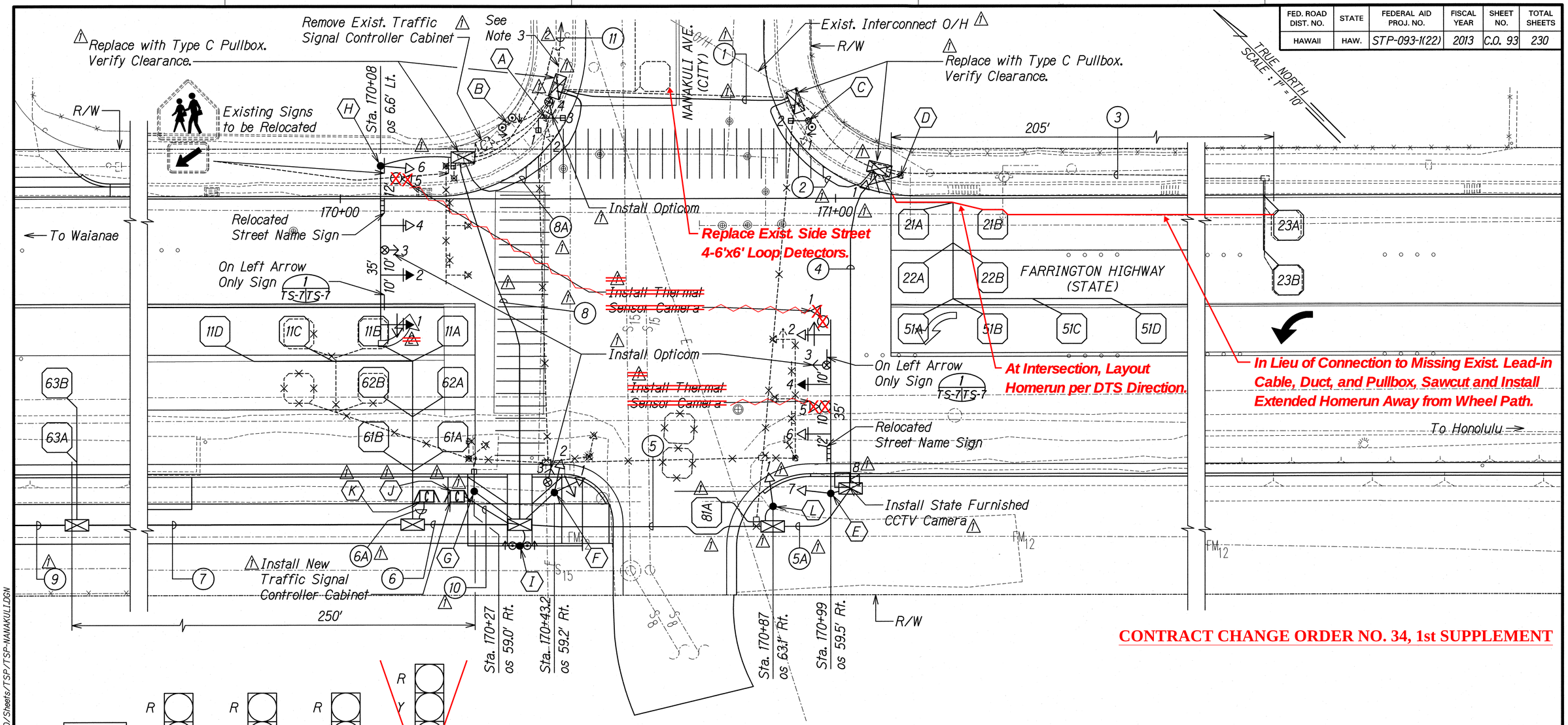
DATE: SEPTEMBER 2016

FILE	POCKET	FOLDER	NO.

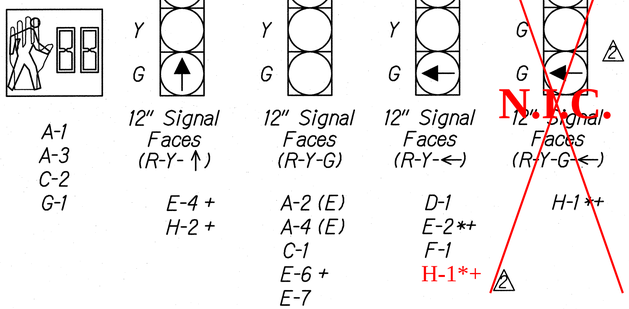
JOB NO. 15-002.05

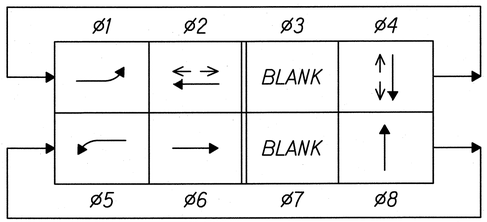
Y:\2015\15-002\DWG\C-35 TRAFFIC SIGNAL PLAN.DWG Aug 14, 2017-8:37 AM

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 93	230



CONTRACT CHANGE ORDER NO. 34, 1st SUPPLEMENT





PHASE DIAGRAM
Model 170E Controller
Model 332A Cabinet
⟶ Vehicle Movement
⟷ Pedestrian Movement

Notes:
1. For foundation details see Sheet S6.1
2. For Interconnect Plan, See Sheet C.O. 94S-1
3. For Traffic Signal System electrical details, See Sheet C.O. 145S-3 Δ2

R17-3
30"X36"

ON LEFT ARROW ONLY SIGN 1 TS-7 TS-7
Not to Scale

DATE	REVISION
2/9/18	Δ2 Revised Contra-Flow Signal Head
6/21/17	Δ1 Add Thermal Cameras, Opticoms
	New Controller, CCTV Camera and
	Interconnect Conduit & Cable

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN FARRINGTON AND NANAKULI

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: 1"=10' Date: April 2013

GERALD D. ANDRADE LICENSED PROFESSIONAL ENGINEER No. 10377-C HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

SHEET No. TS-7 OF 13 SHEETS

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/Sheets/TSP/TSP-NANAKULIDGN

"AS-BUILT"

C.O. 93

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94	230

FARRINGTON AND NANAKULI

⚠

Material List				
Pole ⬡	Base Type	Standard Type	Mounting Type	PPB Assembly
A(E)	exist	I-exist	(1)(3) Type IV (ped head)	
			(2) Type I (exist)	
			(4) Opticom (Vert.)	
B(E)	exist	I-exist		
C(E)	exist	I-exist	(1) Type I (exist)	
			(2) Type IV (ped head)	
D(E)	exist	I-exist	(1) Type I	
E	*	II-35	~~(1) Thermal Camera (Horiz.)~~	
			(2) Type VI	
			(3) Opticom (Horiz.)	
			(4) Type VI	
			~~(5) Thermal Camera (Horiz.)~~	
			(6) Type VI	
			(7) Type V	
			(8) CCTV Camera (Horiz.)**	
F	*	I-10	(1)(2) Type II	
			(3) Opticom (Vert.)	
G	*	I-8	(1) Type I (ped head)	1
H	*	II-35	(1) Type VI	
			(2) Type VI	
			(3) Opticom (Horiz.)	
			(4) Type VI	
			~~(5) Thermal Camera (Horiz.)~~	
			(6) Type IV	
I	*	I-3		2
J	D		170E Controller	
			332A Cabinet and Base	
K	D		332A Cabinet and Base**	
L	*	I-10	(1) Type II	

* For Traffic Signal Pole Base, See Std. Plan TE-32, TE-33, TE-33A.1 and TE-33A.2.

** CCTV Camera and 332A Cabinet Base for CCTV System furnished by the State.

⚠

Cable and Conduit Schedule											
Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 5 Signal Control 4C#14	Type 6 Power 3C#6	Type 7 Opticom 3C#20	12PR#19 Inter-connect	72F Single Mode FOC	Coax	Camera Control	3C#12
1	2"	1									
	3-2"		Spare								
2	2"	1									
	2"		1								
	2-2"		Spare								
3	2"(E)		1								
4	2"	1									
	2"		4								
	2-2"			Spare							
5	2"	1									
	2"								1	1	1
	2"			2							
	2"		5								
	2"					1					
	2"			Spare							
5A	2"	1									
	2"		4								
	2"			2							
	2"					1					
	2"								1	1	1
	2"			Spare							
6	2"		3								
	2"				1						
	2"						1				
	2"			Spare				≠			
	2"								1	1	1
	2"			Spare							
6A	2"				1						
	2"							1			
	2"								1	1	1
	2"			Spare							
7	2"		1								
	2"						1				
	2"							1			
	2"			Spare							
8	2"	1									
	2"		2								
	2"				1						
	2"				1						
	2"					1					
	2"			1							
	2"						1				
	2"			Spare							

CONTRACT CHANGE ORDER NO. 30

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms,
	CCTV Camera, Interconnect Conduit
	≠ Cable

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/18 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MATERIAL LIST AND CABLE AND CONDUIT SCHEDULE

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-8 OF 13 SHEETS

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

T:/DOT - FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/CHANGEORDERCO1/TSP-03B-NANAKULI.DGN

"AS-BUILT"

C.O. 94

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-1	230

FARRINGTON AND NANAKULI

Cable and Conduit Schedule

Run ◯	Conduit Size	Type 1 Signal Control 26C#14	Type 2 PPB/ Loops 2C#14	Type 5 Signal Control 4C#14	Type 6 Power 3C#6	Type 7 Opticom 3C#20	12PR#19 Inter-connect	72F Single Mode FOC	Coax	Camera Control	3C#12
8A	2"	1									
	2"		2								
	2"				1						
	2"				1						
	2-2"	Spare									
9	2"						1				
	2"							1			
	2-2"	Spare									
10	2-2"	2									
	2"		5								
	2"		6								
	2"				1						
	2"						1				
	2"			3							
	2"					3					
11	2"(E)				1(E) 1						
	2"				1						
	2"				1						

CONTRACT CHANGE ORDER NO. 30

DATE	REVISION
2/9/18	Revised Contra-Flow Signal Head
6/21/17	Add Thermal Cameras, Opticoms, CCTV Camera, Interconnect Conduit & Cable

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LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MATERIAL LIST AND CABLE AND CONDUIT SCHEDULE

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-8A OF 13 SHEETS

ORIGINAL PLAN
NOTE BOOK No.

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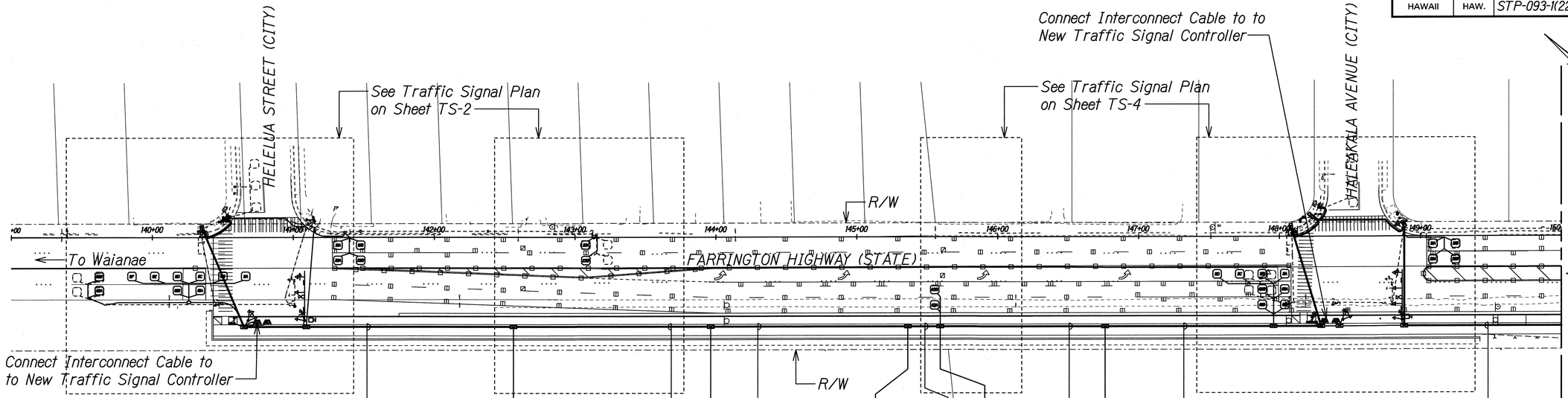
"AS-BUILT"

C.O.94S-1

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-2	230

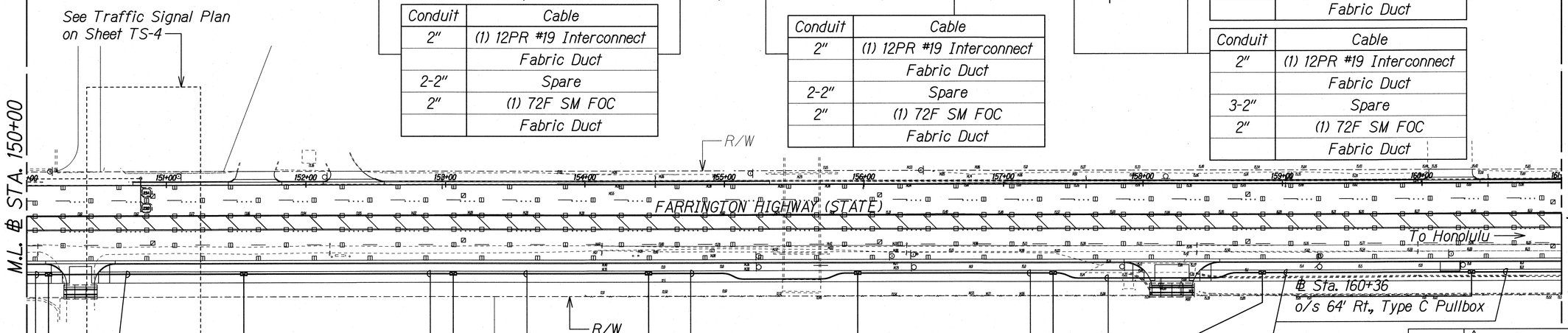


Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
3-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

NOTE:
All concrete encased conduits under sidewalk shall be Schedule 40 PVC



Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms
	New Controller, CCTV Camera and
	Interconnect Conduit & Cable

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

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INTERCONNECT PLAN

CONTRACT CHANGE ORDER NO. 17

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

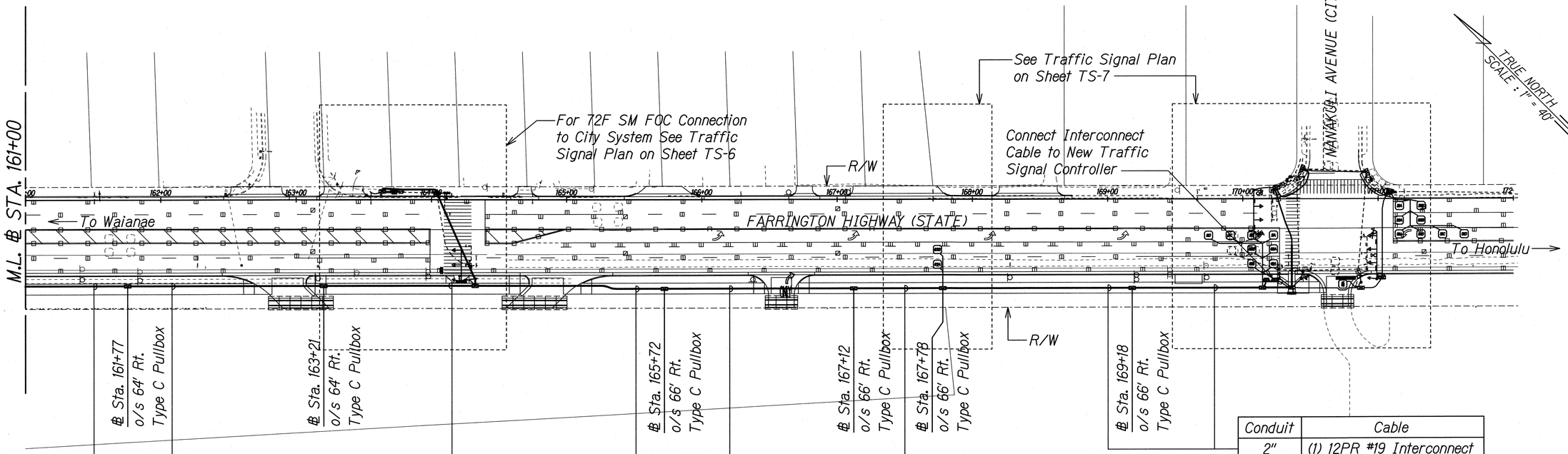
Scale: 1"=40' Date: April 2013

SHEET No. TS-8B OF 13 SHEETS

"AS-BUILT"

C.O. 94S-2

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-3	230



Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
2-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

Conduit	Cable
2"	(1) 12PR #19 Interconnect
	Fabric Duct
3-2"	Spare
2"	(1) 72F SM FOC
	Fabric Duct

NOTE:
All concrete encased conduits under sidewalk shall be Schedule 40 PVC

CONTRACT CHANGE ORDER NO. 17

DATE	REVISION
6/21/17	⚠ Add Thermal Cameras, Opticoms
	New Controller, CCTV Camera and
	Interconnect Conduit ⊄ Cable

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INTERCONNECT PLAN

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: 1"=40' Date: April 2013

SHEET No. TS-8C OF 13 SHEETS

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NOTE BOOK | No.

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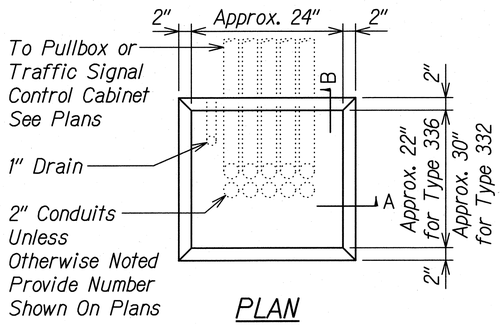
"AS-BUILT"

C.O.94S-3

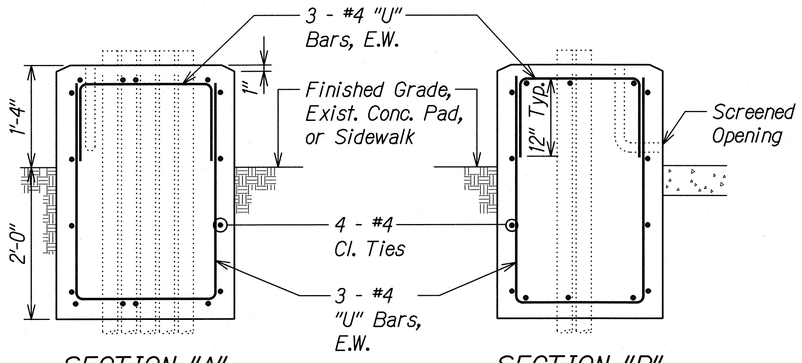
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-4	230



PLAN

NOTE(S):

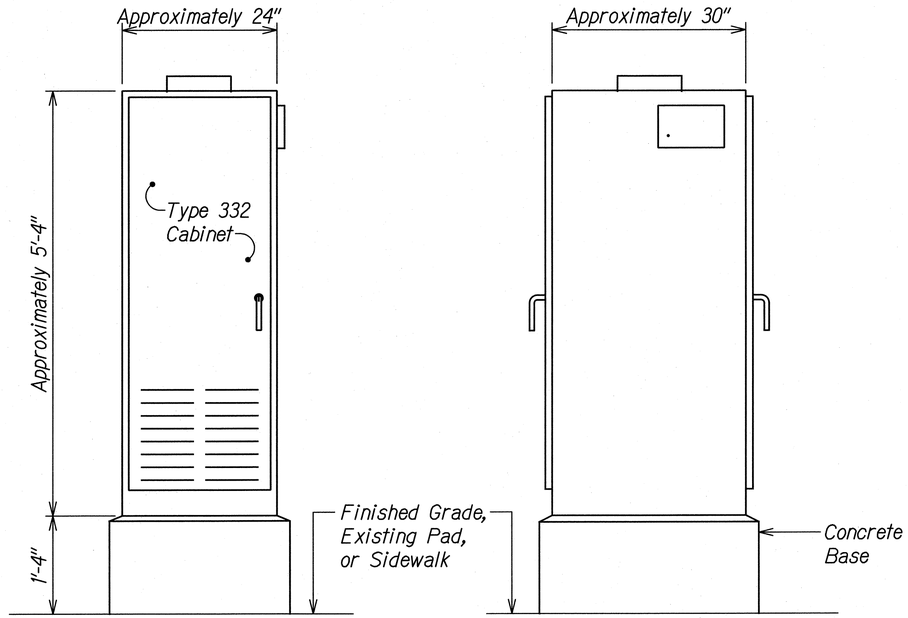
1. Concrete shall be Class "B".
2. Dimensions shall be altered to suit controller cabinet actually furnished.
3. Conduit bends and drain are incidental to concrete base.
4. Refer to Cabinet Manufacturer's Specifications for details of anchor bolts and base setting.
5. All exposed surfaces of concrete base shall be given a Class 2, Rubbed Finish.



SECTION "A" SECTION "B"

TYPE "D" CONCRETE BASE FOR CCTV CABINET

Not to Scale



FRONT VIEW SIDE VIEW

TYPE 332 CCTV EQUIPMENT CABINET

Not to Scale

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CONTRACT CHANGE ORDER NO. 18

DATE	REVISION
6/21/17	⚠ Added this Sheet

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CCTV DETAILS 1

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

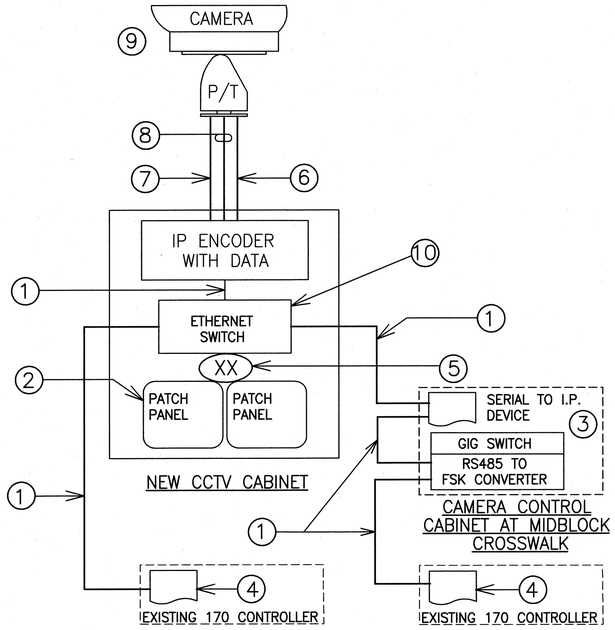
Scale: NTS Date: April 2013

SHEET No. TS-8D OF 13 SHEETS

"AS-BUILT"

C.O.94S-4

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-5	230



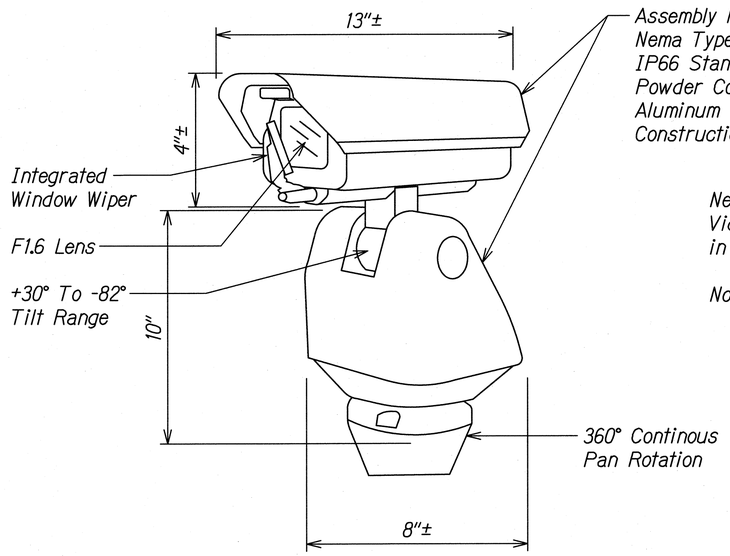
ISOLATED TRAFFIC SIGNAL CONTROL CABINET

INTERCONNECTED TRAFFIC SIGNAL CONTROL CABINET

CABINET DEVICE LAYOUT DETAIL

Not to Scale

1. Category 5e cable.
2. 72-port patch panels, provide number as shown on system block diagram on sheet TS-8E. Fiber pairs to be terminated and spliced color for color with st connectors to patch panel. Fusion splice connectors to fiber in splice trays, coordinate all splicing with the City Department of Transportation Services.
3. Interconnected signals equipment, serial to I.P. device and RS485 to FSK Converter.
4. Provide I.P. card for isolated intersection in existing traffic signal controller. Verify requirements with Department of Trasportation Services.
5. Fiber optic cabling and connectors as required. Connection to fiber pair as indicated on system block diagram on sheet TS-8E.
6. Coaxial cable with sun resistant jacket.
7. One pair #18 cable for camera controls with sun resistant jacket.
8. Coaxial camera cable with sun resistant jacket.
9. CCTV camera with pan/tilt unit.
10. 10/100 mb hardened switch or hardened gigabit switch as indicated on system block diagram on sheet TS-8E.

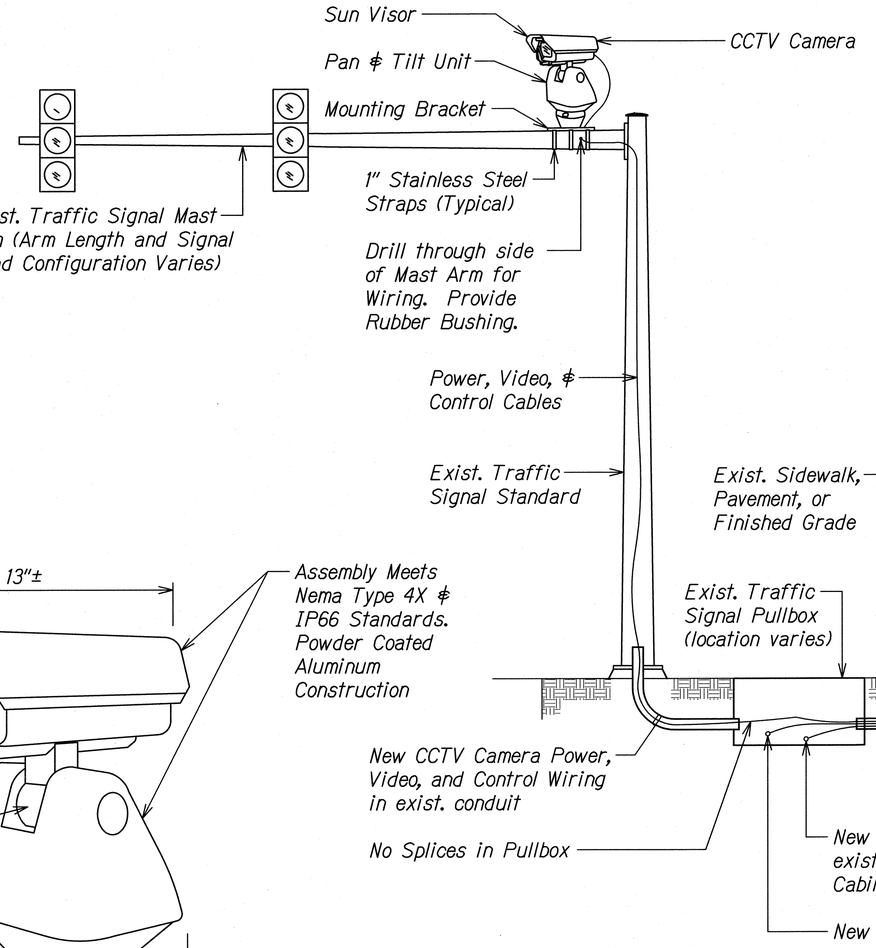


NOTES:

1. Digital position and zoom control feedback using "D" protocol.
2. UL listed, rated for full continuous duty, CE Class B.
3. Assembly rated for 90 mph operation.

CAMERA DETAIL

Not to Scale



NOTE:

1. Coordinate aiming/placement of all cameras with the City Department of Transportation Services.

TYPICAL CCTV CAMERA MOUTING DETAIL

Not to Scale

CONTRACT CHANGE ORDER NO. 18

DATE	REVISION
6/21/17	⚠ Added this Sheet

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HIGHWAYS DIVISION

CCTV DETAILS 2

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

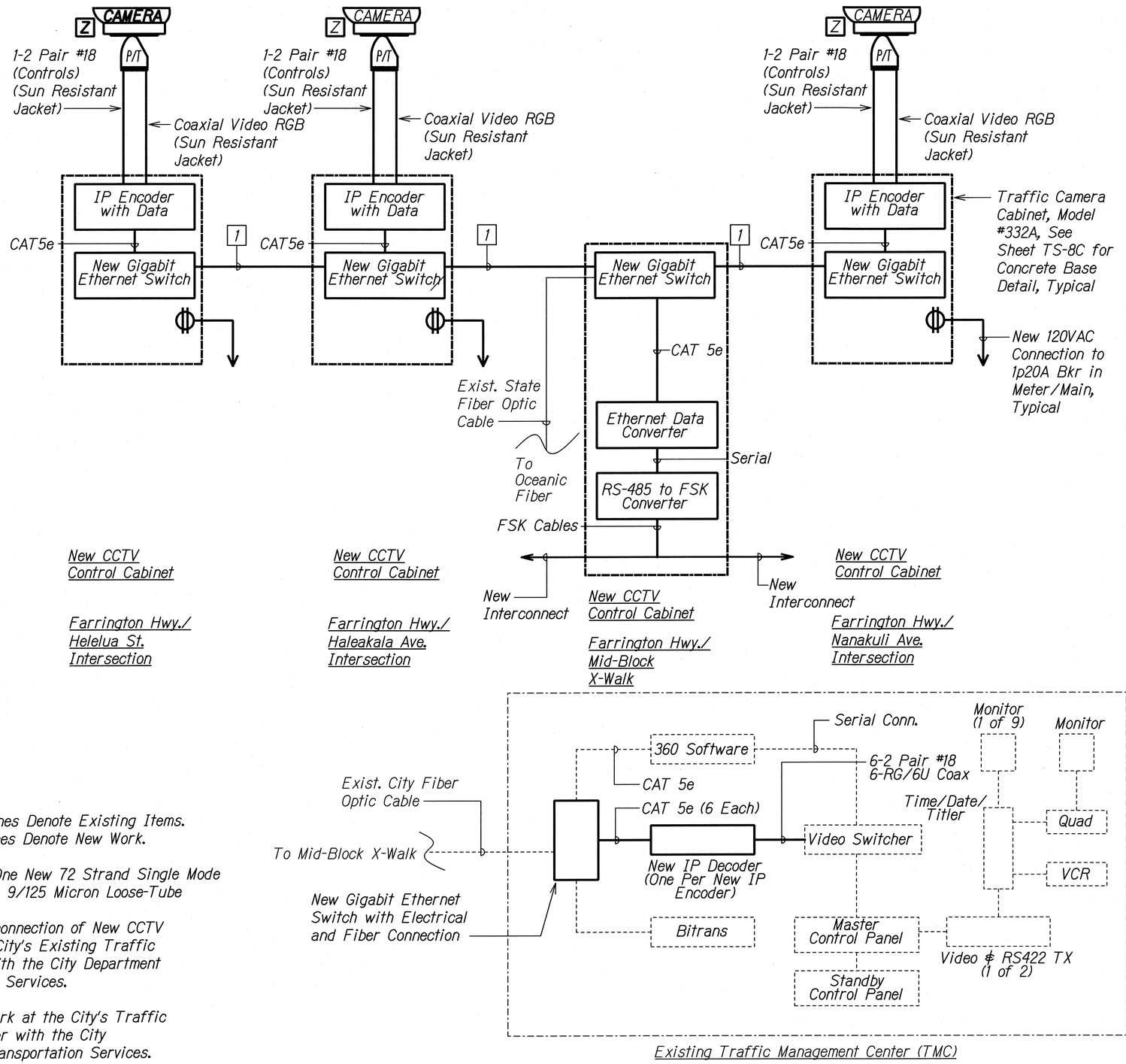
Scale: NTS Date: April 2013

SHEET No. TS-8E OF 13 SHEETS

"AS-BUILT"

C.O.94S-5

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	C.O. 94S-6	230



TRAFFIC CAMERA BLOCK DIAGRAM

Not to Scale

NOTES:

1. ——— Light Lines Denote Existing Items.
   ——— Bold Lines Denote New Work.
2. [1] - Indicates One New 72 Strand Single Mode Fiber Optic Cable, 9/125 Micron Loose-Tube
3. Coordinate Interconnection of New CCTV System with the City's Existing Traffic Control System with the City Department of Transportation Services.
4. Coordinate all Work at the City's Traffic Management Center with the City Department of Transportation Services.

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CONTRACT CHANGE ORDER NO. 18

DATE	REVISION
6/21/17	⚠ Added Sheet

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STATE OF HAWAII
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HIGHWAYS DIVISION

TRAFFIC CAMERA DIAGRAM

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

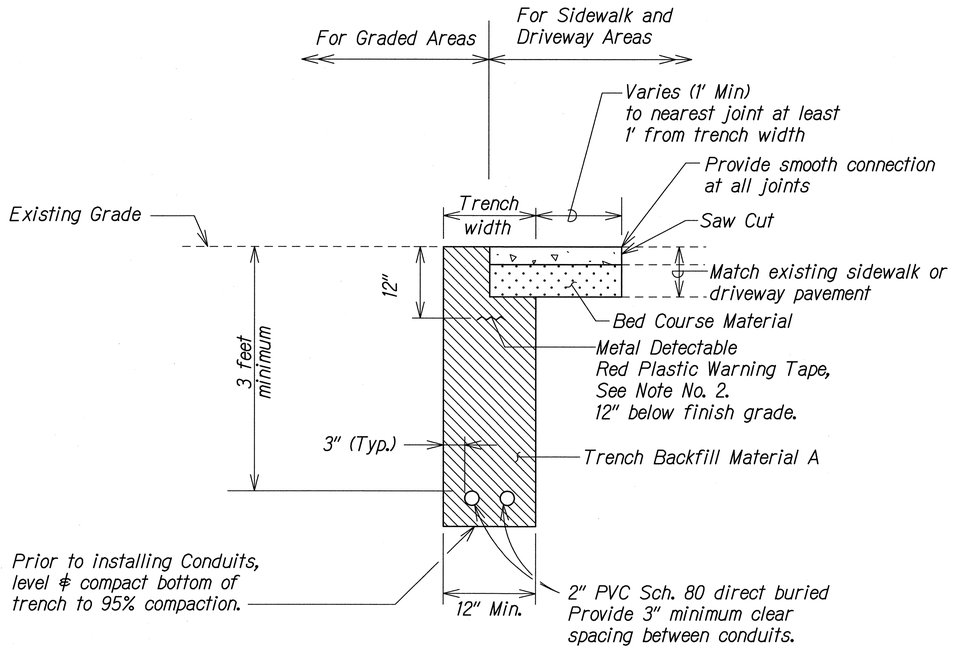
Scale: None Date: April 2013

SHEET No. TS-8F OF 13 SHEETS

"AS-BUILT"

C.O. 94S-6

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	95	230

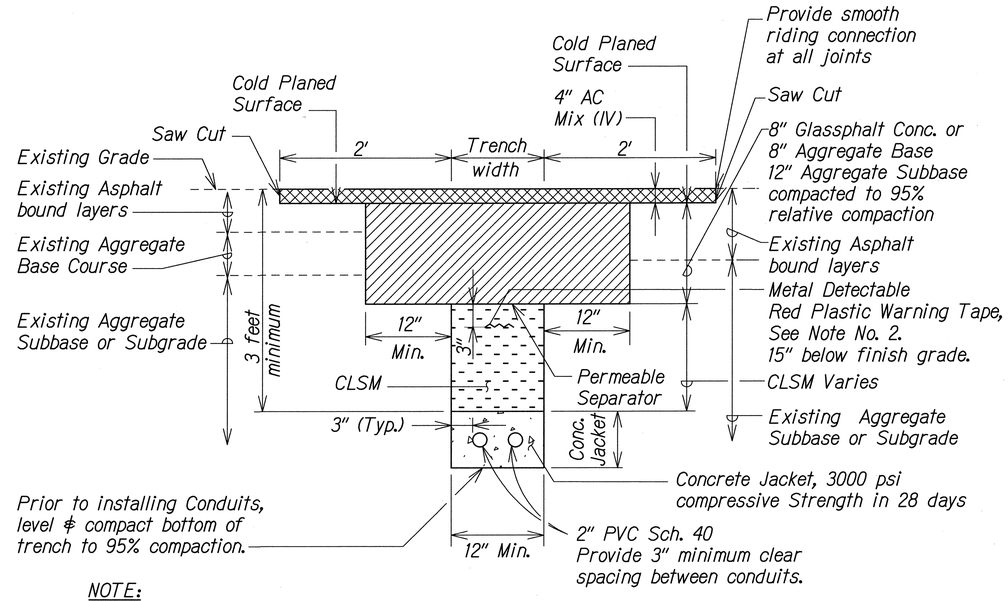


RESTORATION OF NON-ROADWAY AREAS DUE TO TRENCH EXCAVATION

Not to Scale

GENERAL NOTES

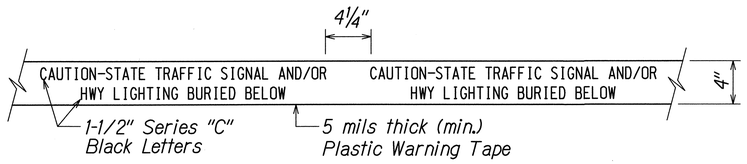
1. If trench is located on unpaved area, the Contractor shall replace 10" A.C. Base Course and 4" A.C. Pavement with Type "A" backfill material.
2. The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY. LIGHTING BURIED BELOW," utilizing 1-1/2 inches series "C" black lettering. The message will be repeated with a 4-1/4" spacing between top line of message and start of next repeat.
3. The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
4. Maximum four (4) conduits per row for multiple conduit duct section.
5. For direct buried duct sections, the concrete jacket required at the conduit by-pass for various utilities shall not be paid for separately but considered incidental to the direct buried conduits.
6. After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.



NOTE:
Tack Coat faces of Existing Asphalt Bound Materials prior to filling excavation with New Asphalt bound materials.

RESTORATION OF EXISTING PAVEMENT DUE TO TRENCH EXCAVATION

Not to Scale



For additional information, see Note No. 2.

METAL DETECTABLE RED PLASTIC WARNING TAPE

Not to Scale

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRENCHING AND MISCELLANEOUS DETAILS

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-9 OF 13 SHEETS

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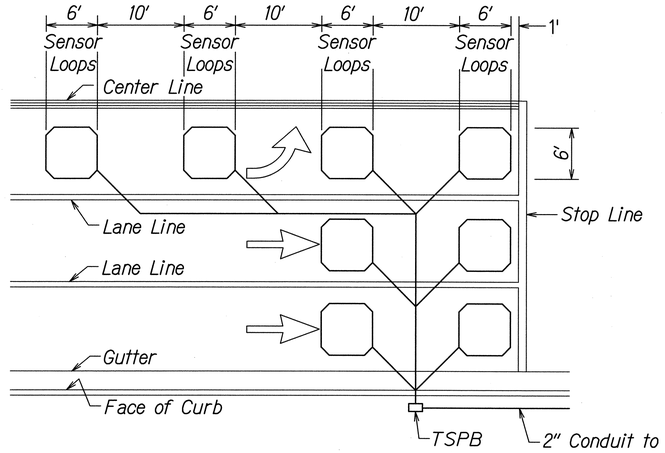
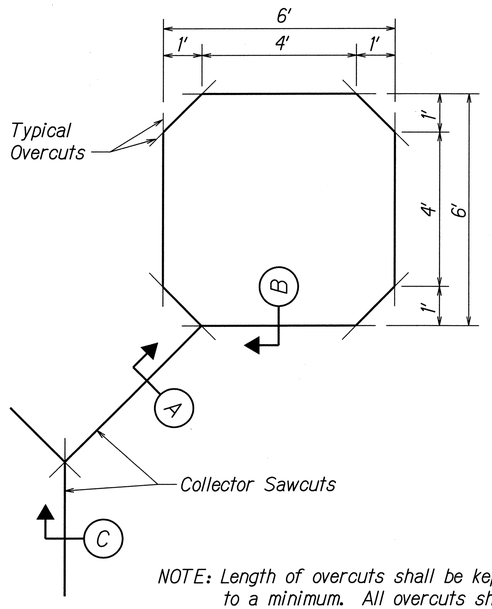
HAWAII	HAW.	STP-093-1(22)	2013	96	230



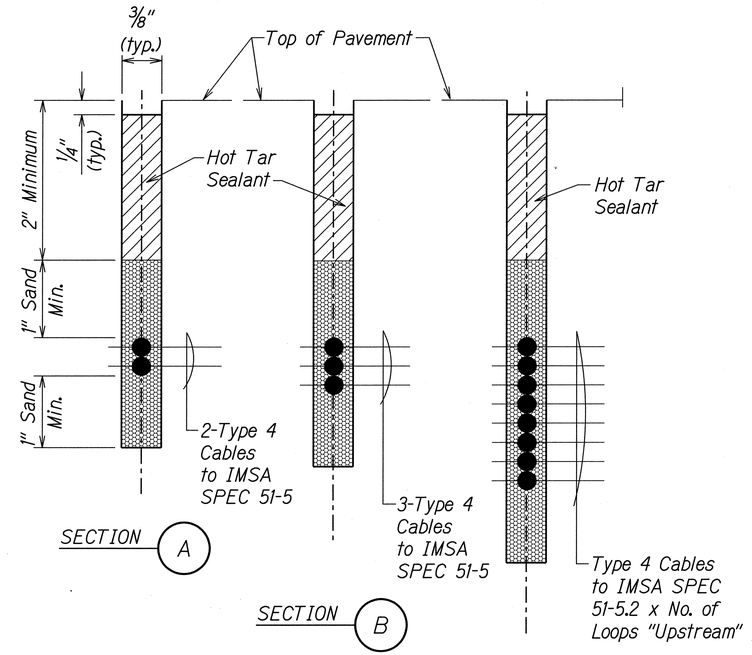
NOTES:
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of loops and locations vary. See project plans.
4. Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT

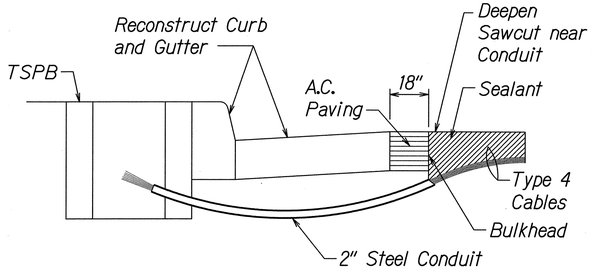


NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL

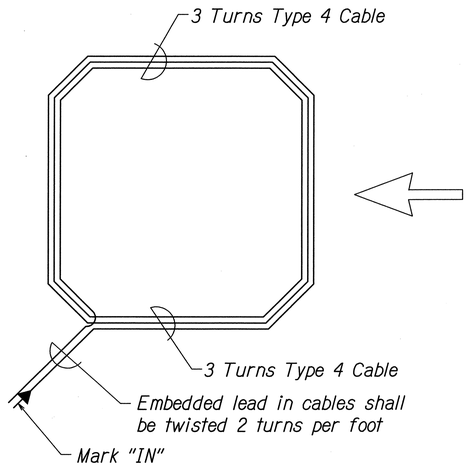


TYPICAL SECTION THROUGH SENSOR LOOP



NOTES ON CONSTRUCTION AT END OF SAWCUT
1. Seal roadway end of conduit after installation of conductors.
2. Install bulkhead across conduit trench.
3. Place hot tar in sawcut.
4. Backfill over conduit with new A.C.
5. Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

TYPES OF CABLES

Type 1 Signal Loop Cable: Stranded No. 14, 26 conductors

Type 2 Detector lead in cable and pedestrian push button circuit cable: Stranded, No. 14, two conductors

Type 3 Interconnect Cable: Solid No. 19, 12 pairs

Type 4 Loop Sensor Cable: Solid No. 12, single conductor to IMSA spec. 51-5

Type 5 Cable from signal loop to signal head: Stranded, No. 14, four conductors

Type 6 Service Cable: Solid, No. 6, three conductors

Type 7 Optical Detector Cable: Berktek Type B, Stranded, No. 20, three conductors

Type 8 Drop Cable: Solid, No. 14, four conductors

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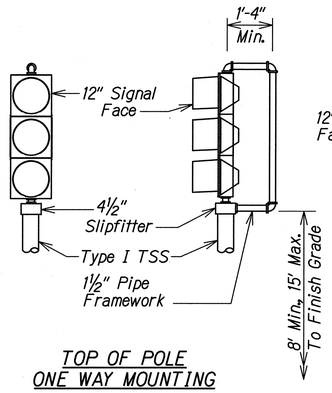
LOOP DETECTOR DETAILS

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

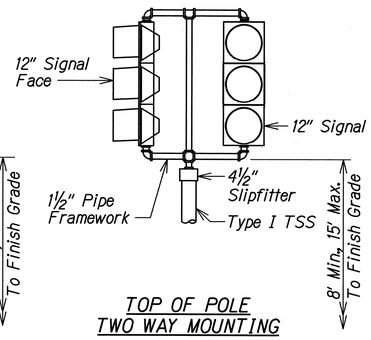
Scale: None Date: April 2013

SHEET No. TS-10 OF 13 SHEETS

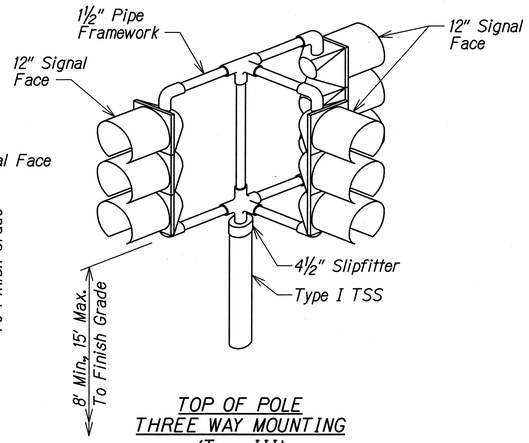
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	97	230



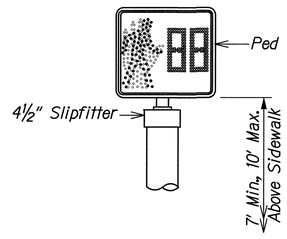
TOP OF POLE
ONE WAY MOUNTING
(Type I)



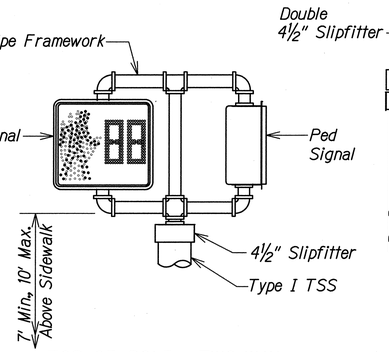
TOP OF POLE
TWO WAY MOUNTING
(Type II)



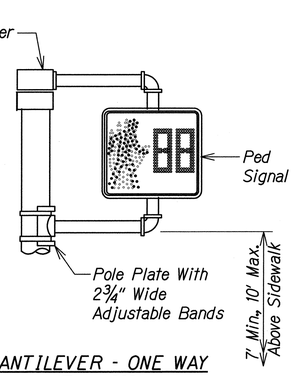
TOP OF POLE
THREE WAY MOUNTING
(Type III)



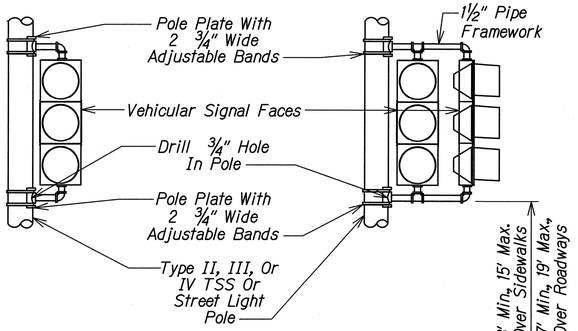
TOP OF POLE - ONE WAY
(Type I)



TOP OF POLE - TWO WAY
(Type II)

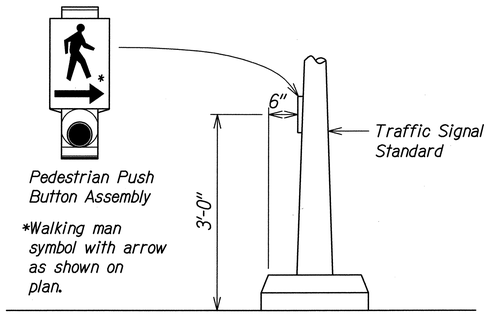


CANTILEVER - ONE WAY
(Type III)

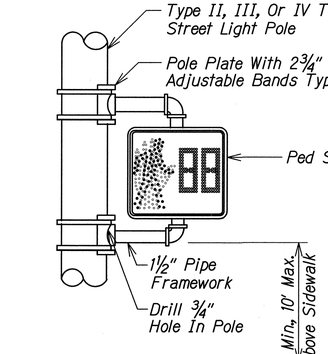


BRACKET MOUNT
ONE WAY
(Type IV)

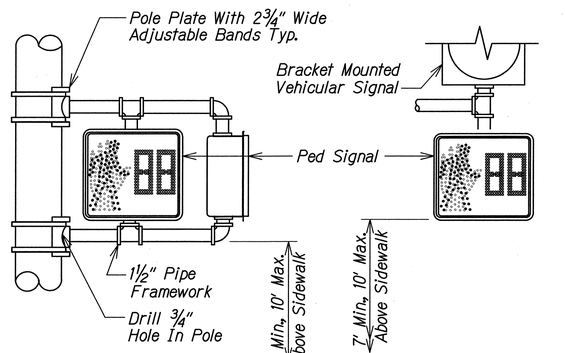
BRACKET MOUNT
TWO WAY
(Type V)



PEDESTRIAN PUSH BUTTON PLACEMENT



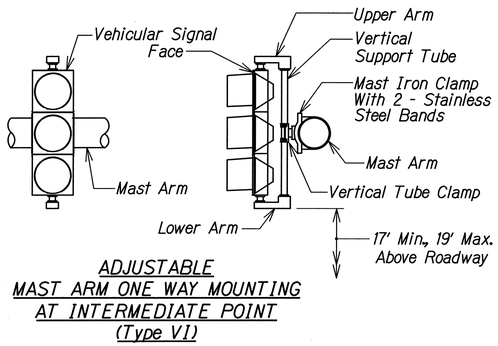
BRACKET MOUNT - ONE WAY
(Type IV)



BRACKET MOUNT - TWO WAY
(Type V)

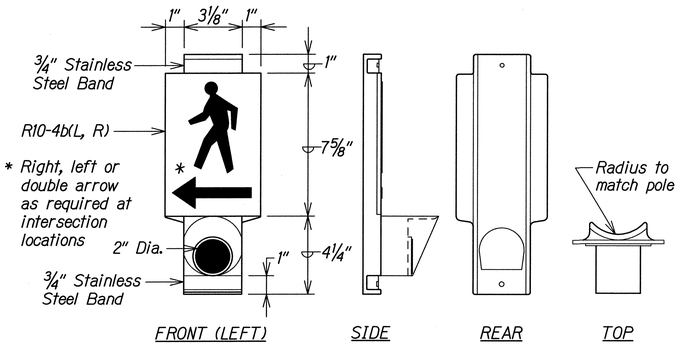
UNDERSLUNG - ONE WAY
(Type VI)

PEDESTRIAN SIGNAL MOUNTINGS



ADJUSTABLE
MAST ARM ONE WAY MOUNTING
AT INTERMEDIATE POINT
(Type VI)

VEHICULAR SIGNAL MOUNTINGS



PEDESTRIAN PUSH BUTTON ASSEMBLY

NOTES:

1. Stainless Steel Bands shall be ½" 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.

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/SHEETS/TSP/TS_DET-03.DGN

GERALD D. ANDRADE
LICENSED PROFESSIONAL ENGINEER
No. 10377-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/14 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

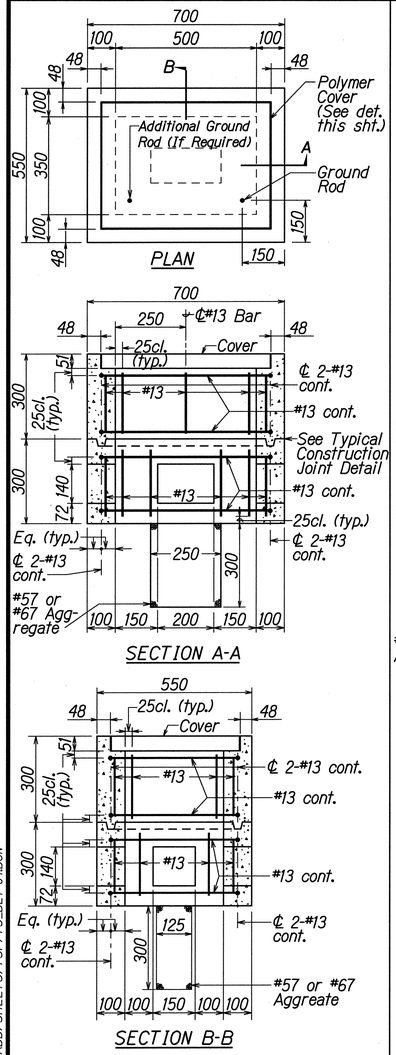
TRAFFIC SIGNAL PLAN
MOUNTING BRACKET DETAILS

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

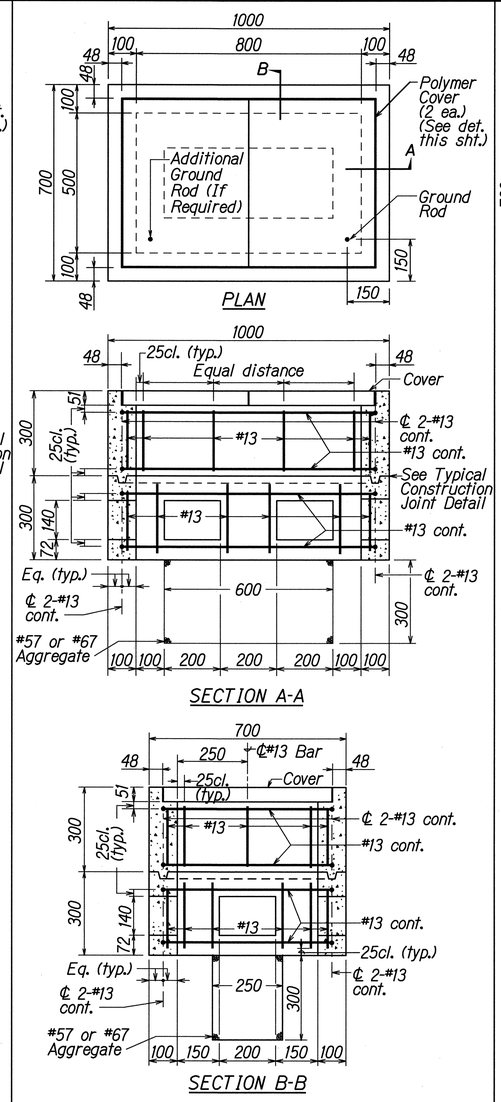
Scale: None Date: April 2013

SHEET No. TS-11 OF 13 SHEETS

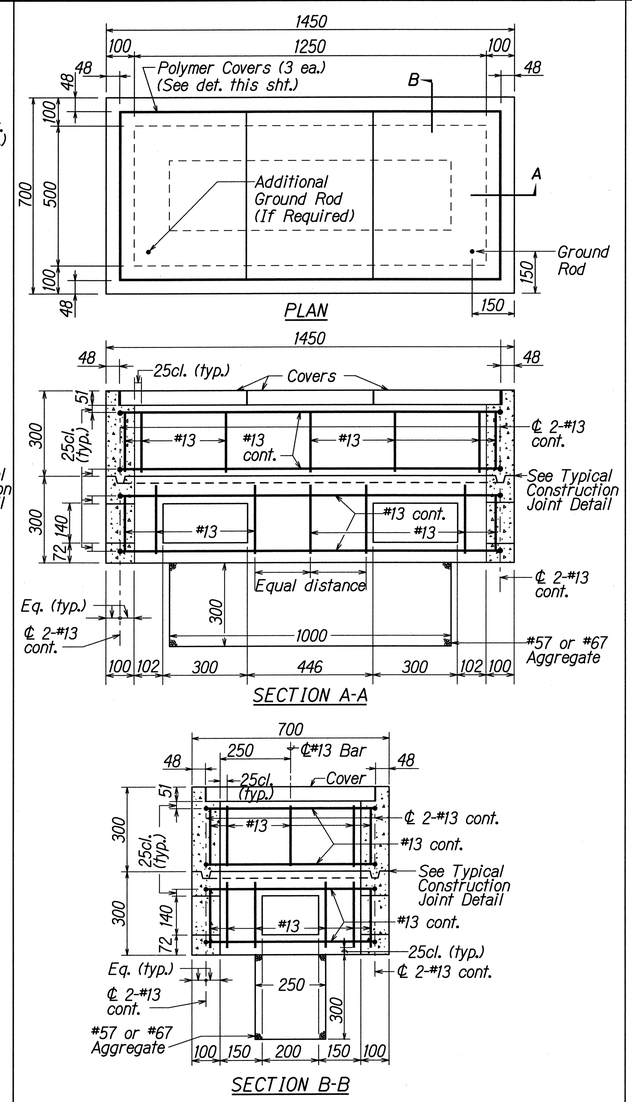
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	98	230



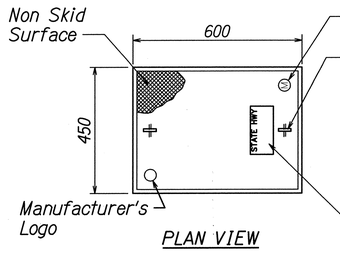
TYPE "A" PULLBOX (Old Type "B")

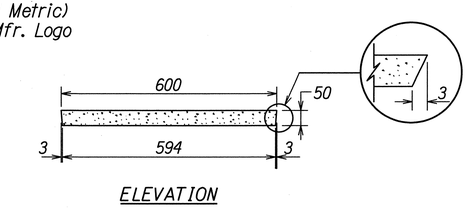


TYPE "B" PULLBOX (Old Type "C")

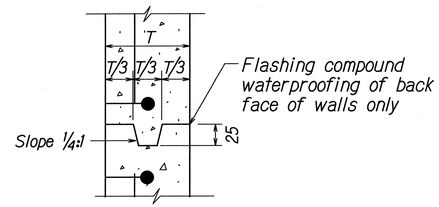


TYPE "C" PULLBOX (Old Type "D")





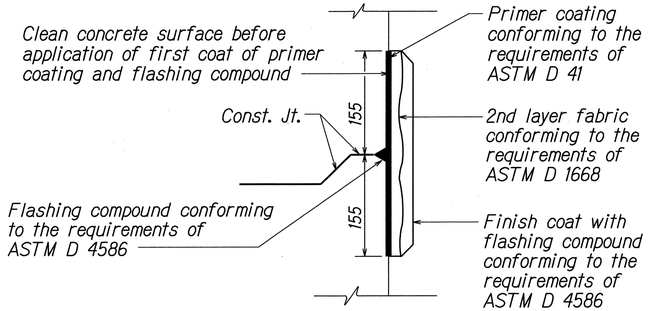
POLYMER CONCRETE COVER



TYPICAL CONSTRUCTION JOINT DETAIL

GENERAL NOTES

1. Provide a minimum of one 16 ø x 2.5m Copperweld Ground Rod in each pullbox. When directed by the Traffic Signal Inspector/Engineer, install additional Ground Rods. Cost of Ground Rods shall be incidental to the pullboxes.
2. All pre-cast concrete pullboxes shall be manufactured in two pieces.
3. The pullbox with cover shall be capable of supporting an MS 18 Loading.
4. The maximum weight of the pullbox cover shall not exceed 27 kilograms.
5. The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
6. After installing the conduits in the openings of the pullboxes, the Contractor shall fill the excess opening in the pre-cast knockouts with concrete mortar.
7. Prior to installing the pullboxes, the Contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
8. All concrete shall be Class A (21 MPa (3,000 psi), min.)
9. Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
10. The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
11. Type "C" Pullbox shall be installed in a location protected from vehicular traffic (i.e. raised sidewalk, behind A.C. curbs, traffic signal standard or pipe guards).



TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

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

T:/DOT-FARRINGTON HWY INTERSECTIONS NANAKULI HALEAKALA/CADD/SHEETS/TSP/TS_DET-04.DGN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

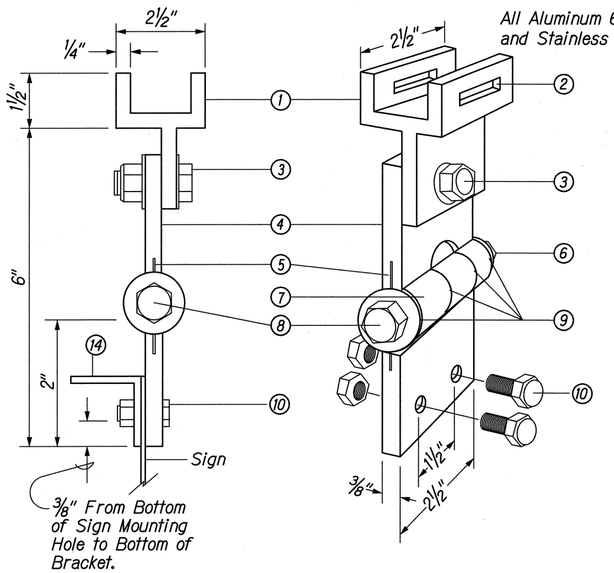
PULLBOX AND COVER DETAILS

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-12 OF 13 SHEETS

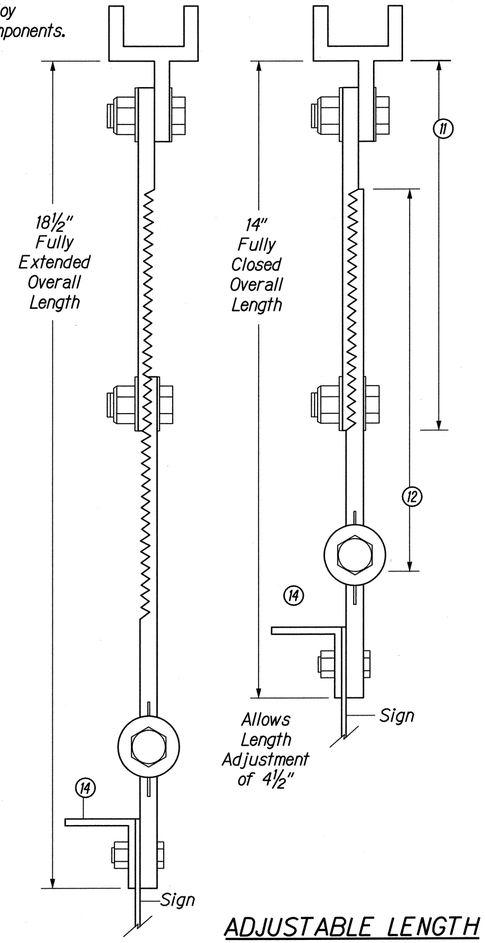
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-093-1(22)	2013	97	230



All Aluminum 6061T6 Alloy and Stainless Steel Components.

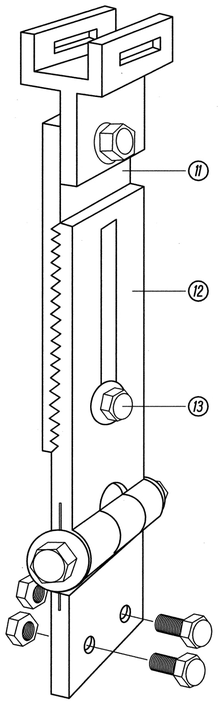
FIXED LENGTH NON-ADJUSTABLE SWING SIGN BRACKET

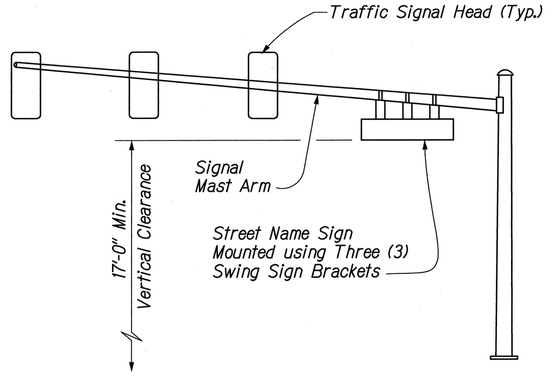
1. Pivotal Upper Bracket
2. 1⅝" X¼" Slot for Double Strapping to Electrolier Mast Arm. (M2G-34S(HD) .030" X ¾" Heavy Duty Stainless Steel Strap With M2G-34B(HD) Buckle Recommended.)
3. ½" - 13 X 1½" Stainless Steel Hex Head Bolt with Stainless Steel Hex Lock Nut and 1/16" Stainless Steel Washer (Both Sides). Allows Upper Bracket to Pivot and Align with Electolier Mast Arm.
4. 6" Overall Drop with Fixed Length Sign Bracket
5. Stainless Steel Damperer Spring (Removable)
6. Stainless Steel Hex Lock Nut with 1/16" Stainless Steel Washer
7. 1" O.D. Axle Housing
8. ½" - 13 X 4" Stainless Steel Hex Head Bolt with 1/16" Stainless Steel Washer
9. Oilite Bushing
10. Sign Mounting Sets, Consisting of Two Each 5/16" - 18 X 1" Stainless Steel Hex Head Bolt with Stainless Steel Hex Lock Nut. Two Holes on 1½' Centers Provide Positive Lock Sign Mounted to Bracket.
11. 8¼" Overall Length Upper Adjustable Sigh Bracket Section
12. 9" Overall Length Lower Adjustable Sign Bracket Section, Including Axle Housing (8" Overall Length to Top of Axle Housing)
13. ½" - 13 X 1½" Stainless Steel Hex Bolt with Stainless Steel Hex Lock Nut and1/16" Stainless Steel Washer (Both Sides). Loosen Lock Nut . Adjust Bracket Teeth to Level Sign.
14. 1¼" X 1¼" X⅛" Aluminum Angle



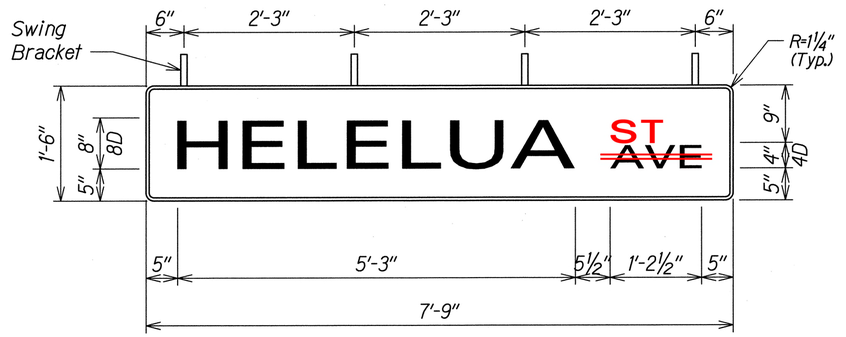
ADJUSTABLE LENGTH SWING SIGN BRACKET

Note: Dimensions may vary slightly





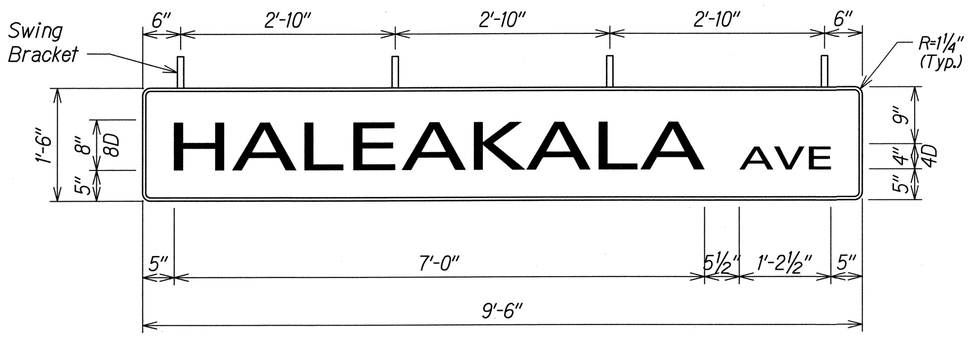
SIGN MOUNTING ON MAST ARM



STREET NAME SIGN DETAIL 1

NTS

TS-2 TS-1



STREET NAME SIGN DETAIL 2

NTS

TS-4 TS-1

NOTES:

1. Font size and spacing shall conform to Federal Highway Administration Standard Highway signs convention.
2. Legend shall be the same on both sides of sign.
3. Colors: Legend - White
   Background - Green
4. Adjust Swing Sign bracket lengths to level sign.

CONTRACT CHANGE ORDER NO. 30

GERALD D. ANDRADE LICENSED PROFESSIONAL ENGINEER No. 10377-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/14 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGN BRACKET DETAILS

FARRINGTON HIGHWAY INTERSECTION IMPROVEMENTS AT NANAKULI AVENUE AND HALEAKALA AVENUE
Federal-Aid Project No. STP-093-1(22)

Scale: None Date: April 2013

SHEET No. TS-13 OF 13 SHEETS

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

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"AS-BUILT"