

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(163)	2020	209	284

GENERAL NOTES

1. All materials shall conform to the drawings, Hawaii Standard Specifications for Road and Bridge Construction (2005 Edition).
2. The Contractor shall verify the location of all existing underground utility lines and notify the respective owners before commencing with work. See Civil drawings for additional information. Immediately notify the Engineer of any conflicts.
3. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction equipment, winds, seismic, etc.
4. The Contractor shall be solely responsible for all excavation and dewatering procedures including lagging, shoring and protection of streets and utilities, including treatment and discharge of pumped water.
5. The Contractor shall be solely responsible for coordinating the work of all trades and shall check all dimensions. All discrepancies shall be called to the attention of the Engineer and be resolved before proceeding with the work.
6. Shop drawings required by the standard specifications and special provisions shall be submitted to the Engineer for review prior to fabrication or ordering of materials. Shop drawings shall not be reproduction of contract drawings.
7. Notes and details on drawings shall take precedence over General Notes unless stricter requirements are noted in General Notes. Special provisions shall take precedence over Standard Specifications.
8. Except as otherwise noted, all vertical dimensions are measured plumb.
9. Design Criteria for Traffic Signal Pole With Mast Arm Foundation:

- A. Codes:  
AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, 1st Edition, 2015 and AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017.

Design Criteria for Bridges and Structures, August 8, 2014 State of Hawaii Department of Transportation Highways Division.

- B. Seismic Site Class: D

- C. Wind:  
Basic Wind Speed = 145 MPH  
Gust Effect Factor = 1.14  
MRI = 1700 Years  
Posted Speed Limit = 25 MPH (Max)

- D. Fatigue:  
Importance Factor, IF, shall be based on Fatigue Category I.

- E. Traffic Signal Support Structures shall be designed for a truck induced gust based on a truck speed of 20 mph over posted speed limit.

- F. Grout shall not be used under base plates for all Traffic Signal Poles with Mast Arm. Pole manufacturer shall design anchor bolts with leveling nuts to transfer all loads from pole structure to concrete foundation.

- G. Soil Design Data For Deep Foundations:  
1. Traffic Signal Pole Foundation Design is based on a geotechnical investigation report by Geolabs, Inc. "Geotechnical Engineering Exploration Traffic Signal Modernization Project Kahuapaani Street & Ulune Street Intersection, Halawa, Oahu Hawaii", dated August 6, 2019 with Addendum 1, dated September 9, 2019.  
2. Subsurface soil condition at site consists of silty clay over basalt rock.  
3. Bottom of foundations assumed to occur above groundwater table.

CONCRETE

1. Schedule of Structural Concrete 28-Day strength and water cement ratio:

Drilled Shafts and Pile Caps = 5,500 psi (W/C = 0.40)

Maximum Nominal Size of Coarse Aggregate = 3/4"

2. Concrete mix design shall be submitted to the Engineer for review.
3. Minimum clear cover of concrete over outer reinforcing bars or ties shall be as follows, unless otherwise noted. See Standard Specification Table 602.03-2 for additional information.

Pile Caps and Drilled Shafts = 3"  
Concrete cast directly against Earth = 3"  
All other concrete = 2"

4. Concrete admixtures containing chloride salts shall not be used.
5. All roughened surfaces in concrete shall be made with a minimum amplitude of 1/4".
6. Unless otherwise noted on drawings, all exterior corners and re-entrant angles 90 degrees or less in concrete work shall be chamfered 3/4"x3/4".

REINFORCING STEEL

1. Reinforcing steel bars shall be AASHTO M31 (ASTM A615) Grade 60, unless otherwise noted.
2. Reinforcing steel bars shall be uncoated, unless otherwise noted.
3. Splices in reinforcing steel shall not be permitted.
4. All reinforcing steel bars, anchor bolts, dowels and other embedded items shall be securely tied in place before concrete pour.

5. All reinforcing steel bar bends shall be made cold.
6. Welding of reinforcing steel shall not be permitted.

ABBREVIATIONS

CL	Centerline	O.C.	On Center
Clr	Clear	Pl	Plate
Conc	Concrete	Reinf	Reinforcing
Const	Construction	Sht	Sheet
Cont	Continuous	Sq	Square
Dia	Diameter	Stl	Steel
Dwgs	Drawings	TS	Traffic Signal
Ea	Each	Typ	Typical
Elec	Electrical	UON	Unless Otherwise Noted
EQ	Equal	Vert	Vertical
E.W.	Each Way	W/	With
Ft	Foot/Feet		
Galv	Galvanized		
Horiz	Horizontal		
Jt	Joint		
Manuf	Manufacturer		
Max	Maximum		
Min	Minimum		
MPH	Miles Per Hour		

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

Aug 15, 2020 1:45 PM  
F:\163000\163000-001 Traffic Signal Mod - Foundation\Draw - 163000-001\Struct-163000-001\Draw - 163000-001\Trd\_Sig\_Dwg.dwg

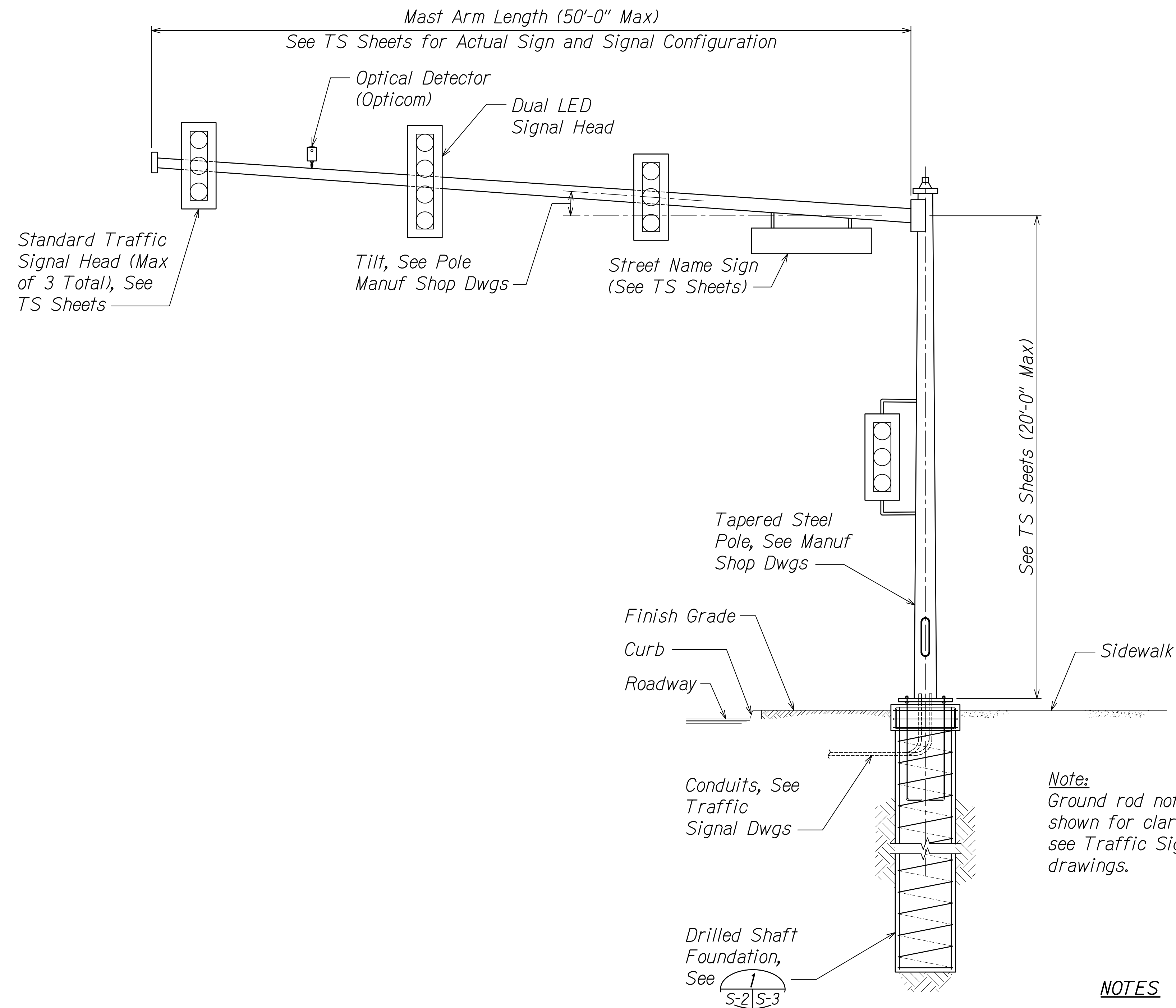


License Expiration Date: 04-30-22  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAWAII TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.

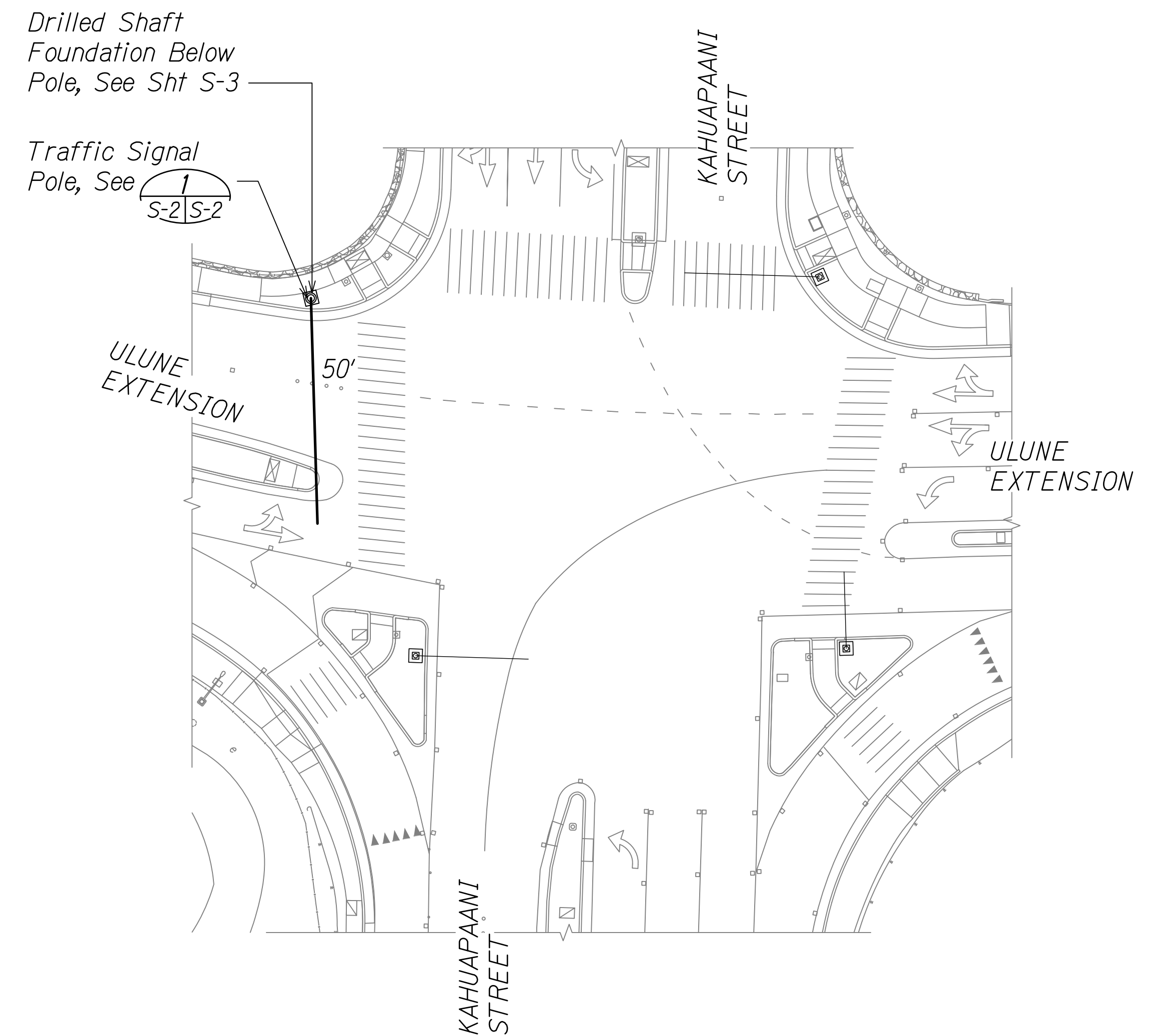
Dwight M. Okawa

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRUCTURAL  
GENERAL NOTES**  
*Traffic Signal Modernization,  
Oahu, Phase 1*  
**Federal-Aid Project No. STP-0300(163)**  
Scale: As Shown Date: July 2020  
SHEET No. S-1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(163)	2020	210	284



1  
S-2/S-2  
TRAFFIC SIGNAL POLE WITH MAST ARM DETAIL  
Not To Scale



2  
S-2, S-3/S-2  
KEYPLAN - DRILLED SHAFT FOUNDATION  
Not To Scale

Note:  
Ground rod not shown for clarity, see Traffic Signal drawings.

NOTES

1. Refer to general notes on sheet S-1 for additional information.
2. Refer to traffic signal drawings for dimensions, locations poles and existing information not shown on structural drawings.
3. Refer to electrical drawings for locations of all pipes, conduits, equipment, etc.
4. Contractor shall field verify all existing dimensions and any discrepancies shall be brought to the attention of the Contracting Officer prior to fabrication.



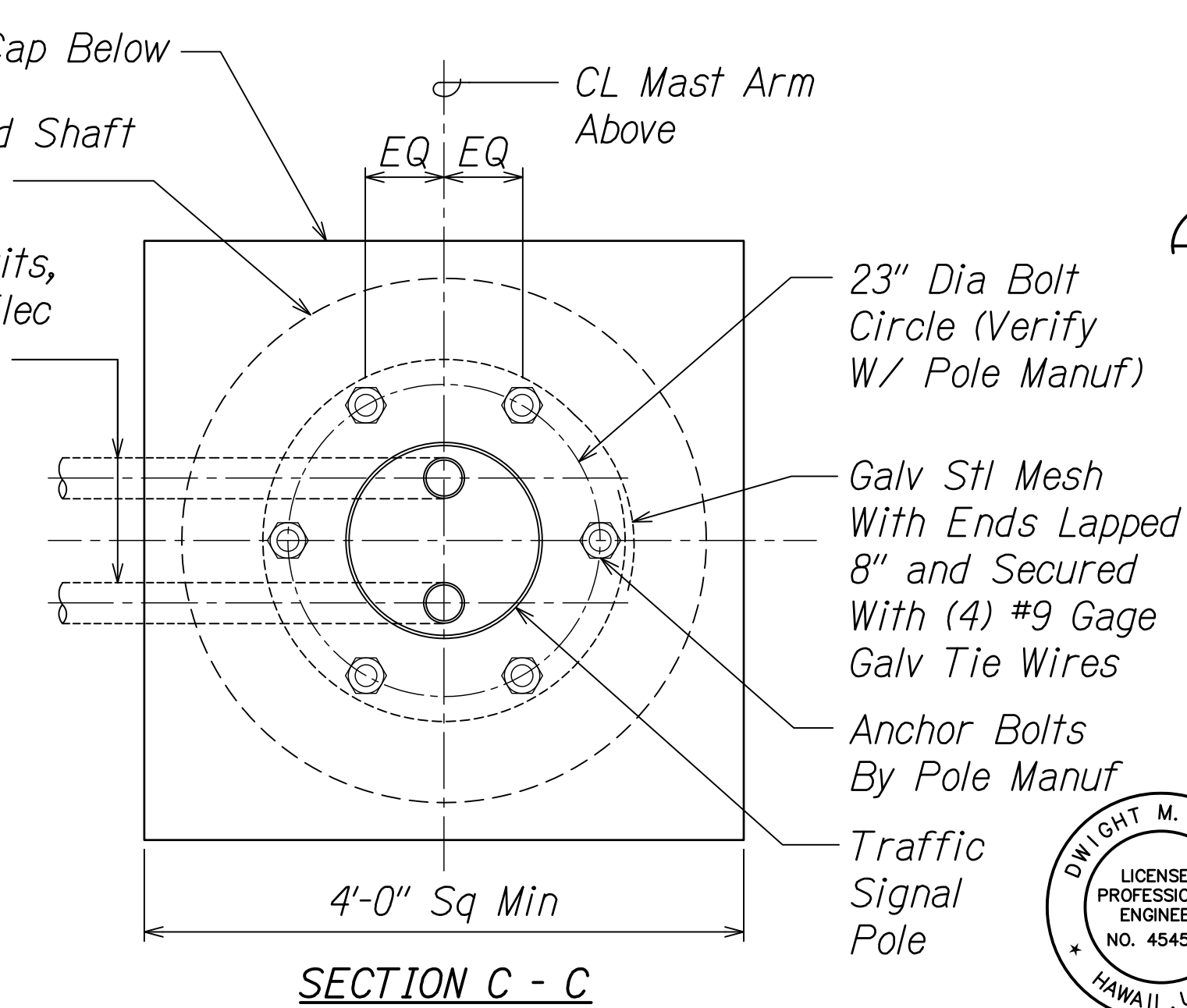
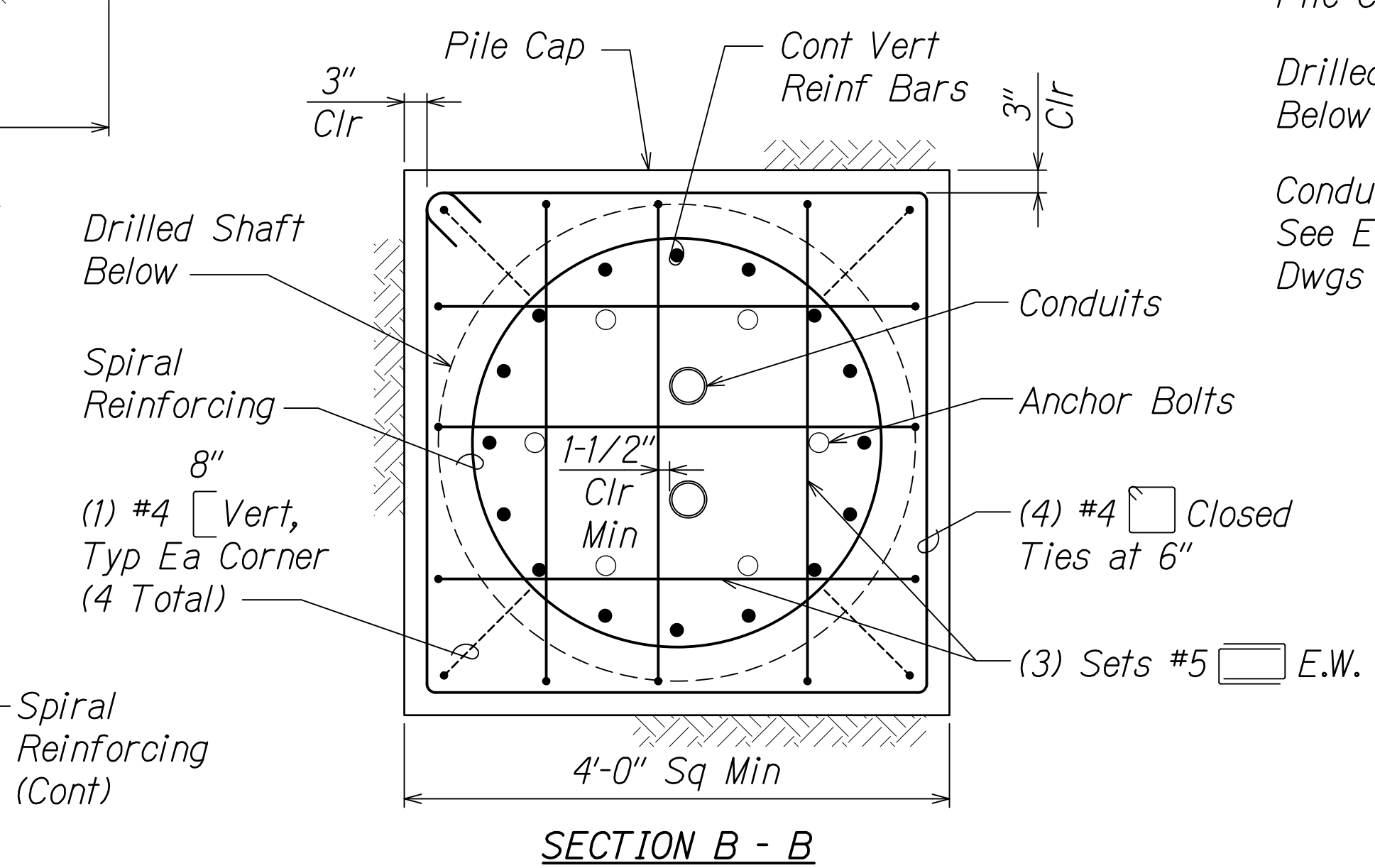
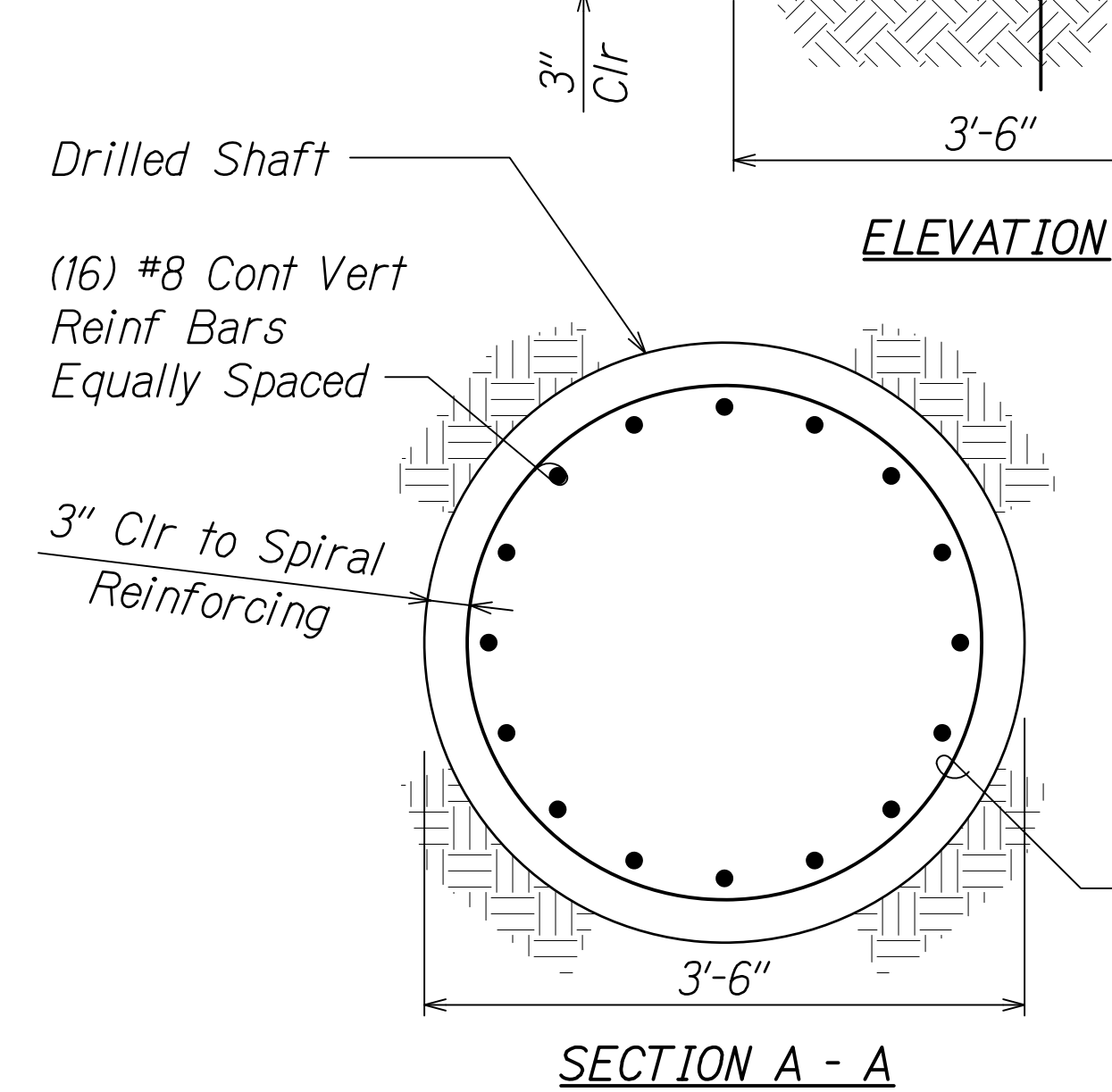
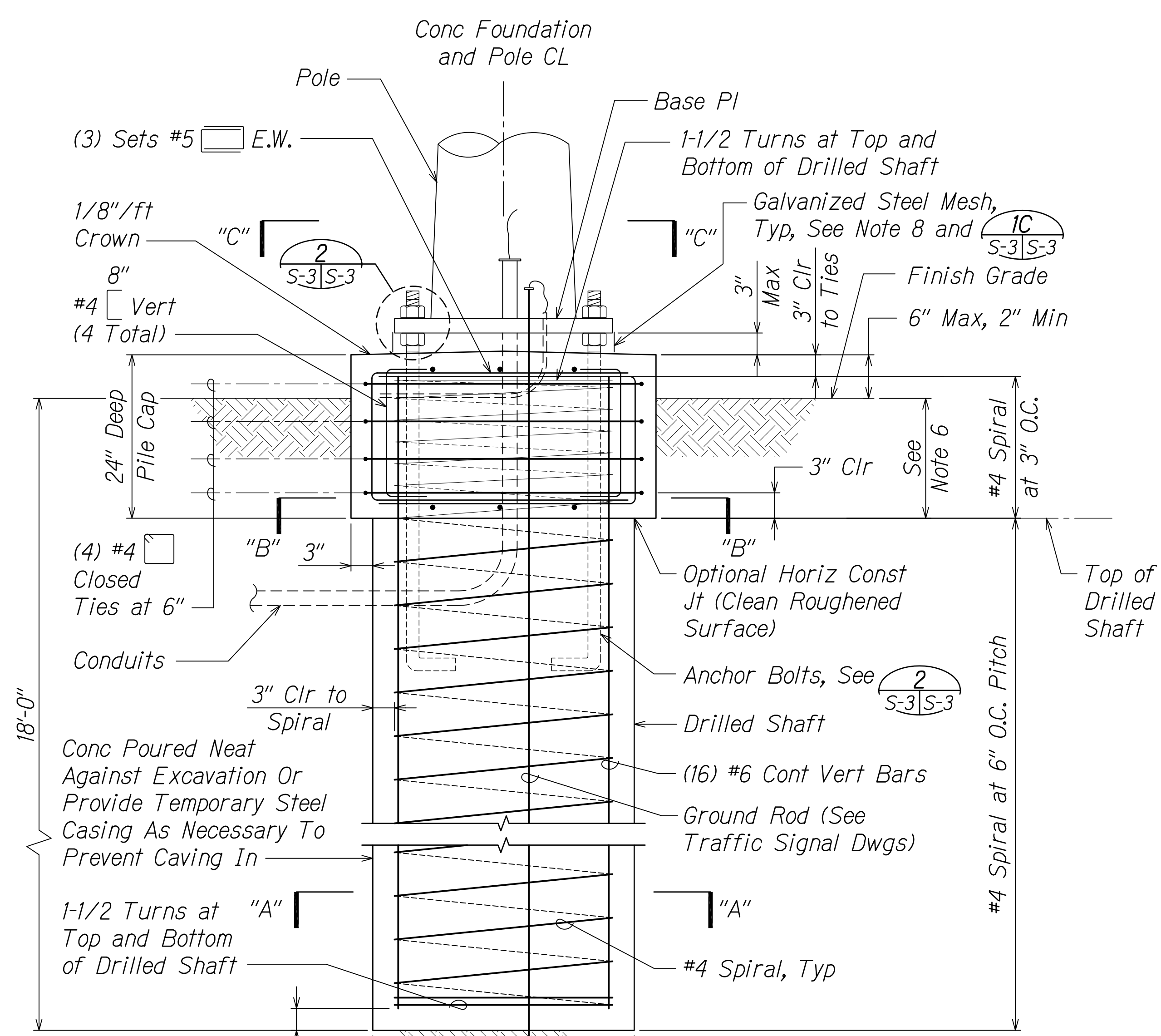
License Expiration Date: 04-30-22  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAWAII TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.  
Dwight M. Okawa

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRUCTURAL**  
**TRAFFIC SIGNAL POLE**  
**DETAIL & KEYPLAN**  
*Traffic Signal Modernization,*  
*Oahu, Phase 1*  
*Federal-Aid Project No. STP-0300(163)*  
Scale: As Shown Date: July 2020  
SHEET No. S-2 OF 3 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	

Aug 15, 2020 1:45 PM  
F:\163000\163000-001 Traffic Signal Mod - Foundation\Draw - Foundation\0300(163)001.Txd Sig Draw.dwg

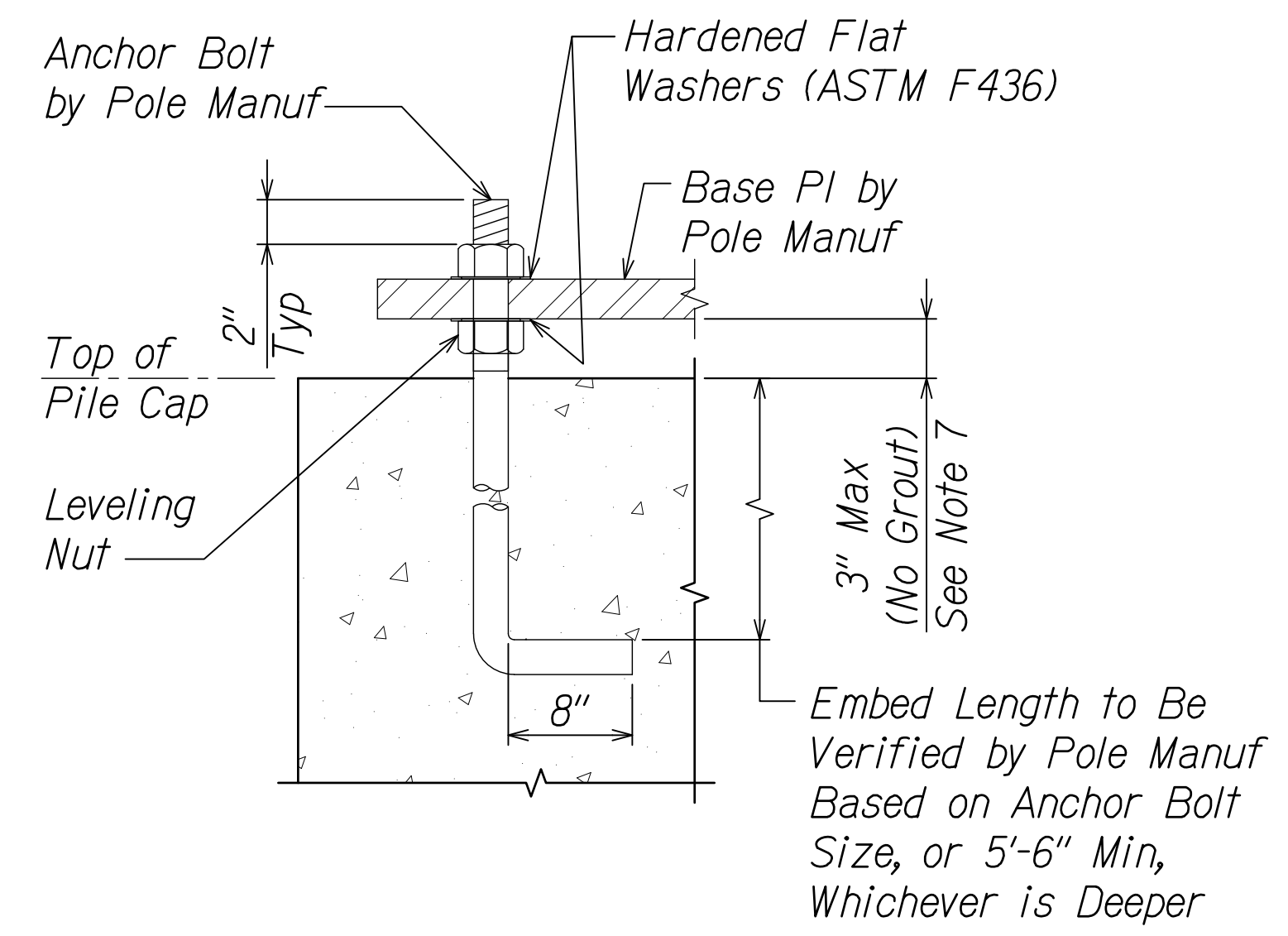
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(163)	2020	211	284



**TRAFFIC SIGNAL POLE FOUNDATION GENERAL NOTES**

1. Reinforcing steel (rebar) shall conform to AASHTO M31 (ASTM A615) Grade 60. Dimensions refer to the centerline of reinforcing steel unless otherwise noted on the plans. All reinforcing shall be incidental to concrete.
2. Anchor bolts shall be ASTM F1554, refer to pole manufacturer's shop drawings for number, grade and diameter. Provide a top hex nut, bottom leveling nut, and 2 hardened flat washers for each bolt at base plate. Bolts, nuts, and washers shall be hot dip galvanized after fabrication.
3. Anchor bolt minimum embedment length shall be as shown in detail  $\frac{2}{S-3|S-3}$ . Contractor shall coordinate this with their pole manufacturer.
4. Contractor shall use rigid templates to install anchor bolts (see Special Provisions). Anchor bolts shall be vertical.
5. 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.
6. Excavation and backfill shall be considered incidental to the cost of the traffic signal foundation. If sides of pile cap are formed, backfill material around pile cap shall be granular fill compacted to 95% compaction (see specs Section 204).
7. Grout shall not be used under base plates for all Traffic Signal Poles with Mast Arm. Pole manufacturer shall design anchor bolts with leveling nuts to transfer all loads from pole structure to concrete foundation.
8. Provide 2x2 galvanized steel mesh with 0.063" diameter wires.

ESTIMATED QUANTITIES		
ITEM NO.	ITEM	QUANTITY
511.0100	Furnishing Drilled Shaft Drilling Equipment	Lump Sum
511.0200	Drilled Shaft	18 Ft
511.0300	Standard Excavation	18 Ft



**2 ANCHOR BOLT DETAIL**  
Not To Scale

**1 DETAIL - DRILLED SHAFT FOUNDATION FOR TRAFFIC SIGNAL POLE**  
S-2, S-3|S-3 Not To Scale

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

LICENSED PROFESSIONAL ENGINEER  
NO. 4545-S  
HAWAII, U.S.A.  
Dwight M. Okawa  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAWAII TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRUCTURAL**  
**TRAFFIC SIGNAL POLE**  
**FOUNDATION DETAILS**  
*Traffic Signal Modernization,*  
*Oahu, Phase 1*  
*Federal-Aid Project No. STP-0300(163)*  
Scale: As Shown Date: July 2020  
SHEET No. S-3 OF 3 SHEETS