GEOTECHNICAL ENGINEERING EVALUATIONS

PROPOSED TRAFFIC SIGNAL
MAST ARM POLE FOUNDATIONS

HOLLYWOOD BLVD NW & ROBINWOOD DRIVE NW
MAST ARM SIGNALIZATION

FORT WALTON BEACH, OKALOOSA COUNTY, FLORIDA

BET Project No. G19246
September 24, 2020

Prepared For:

Mr. Kurt Luman, Jr., P.E.
CPH Engineers, Inc.
500 Fulton Street
Sanford, Florida 32771

Prepared By:

Bechtol Engineering and Testing, Inc.
605 West New York Avenue
DeLand, Florida 32720

BECHTOL ENGINEERING AND TESTING, inc.

September 24, 2020
BET Project No. G19246

TO: Mr. Kurt Luman, Jr., P.E.
CPH Engineers, Inc.
500 Fulton Street
Sanford, Florida 32771

RE: Geotechnical Engineering Evaluations
Proposed Traffic Signal Mast Arm Pole Foundations
Hollywood Boulevard NW & Robinwood Drive NW Mast Arm Signalization
Fort Walton Beach, Okaloosa County, Florida

Dear Mr. Luman:

As requested, Bechtol Engineering and Testing, Inc. (BET) has completed engineering evaluations relative to the design and preparation of construction plans for mast arm pole foundations at the above referenced site. The following report summarizes BET's findings, evaluations and recommendations.

BET appreciates the opportunity to provide our services on this project, and trusts this report is sufficient for your needs. If you should have any questions regarding the contents of this report, or if you should require any additional information, please do not hesitate to call.

Respectfully,

Bechtol Engineering and Testing, Inc.
Certificate of Authorization No. 00005492

Love B. Patel, MS, EI
Project Engineer

Thomas Bechtol, P.E.
President / Principal Engineer
Thomas Bechtol, P.E., State of Florida, Professional Engineer, License No. 38538

G19246 Geotechnical Report - HARCOPY.wpd

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1.0 INTRODUCTION

1.1 PURPOSE OF EVALUATIONS

Construction of two (2) new mast arm traffic signal poles is proposed at the intersection of Hollywood Boulevard Northwest and Robinwood Drive Northwest in Fort Walton Beach, Okaloosa County, Florida. In conjunction with the preparation of Project Plans, a Geotechnical Engineering Report was completed by NOVA Engineering and Environmental, LLC (NOVA). The purpose of BET's evaluations was to review the results of test borings conducted at the pole foundation locations, as presented in the NOVA report, and based on these conditions to provide recommendations relative to the design and construction of the pole foundations.

1.2 INTENDED USE / LIMITATIONS

The intent of the following report is solely to evaluate site subsurface conditions and their potential reaction to proposed construction activity, in order to aid in the design and construction of traffic signal pole foundations. Such evaluations and subsequent recommendations are based on an extrapolation of limited data derived through soil sampling and laboratory testing completed by NOVA. Variations in subsurface conditions not disclosed by the borings and testing performed may occur, which could influence the performance and construction of the proposed improvements.

1.3 SCOPE OF SERVICES

1.3.1 Reviewed Okaloosa County Geographic Information Services (GIS) Mapping, United States Department of Agriculture-National Resources Conservation Service (USDA-NRCS) Soil Survey, and United States Geologic Service (USGS) Potentiometric Maps in order to geographically locate the project and evaluate general site surface and subsurface conditions.

1.3.2 Reviewed Geotechnical Engineering Report, dated June 5, 2020, prepared by NOVA Engineering and Environmental, LLC (NOVA), including the results of test borings conducted near the two (2) proposed pole foundation areas, in order to evaluate physical and strength characteristics of foundation support soils.

1.3.3 Reviewed the Signal Improvement Plans prepared by CPH, Inc. (CPH) in order to determine proposed mast arm lengths and signal head assembly layouts based on future use.

1.3.4 Calculated foundation reactions based on signal head assembly layouts shown in the CPH Signal Improvement Plans (based on future use) and conducted drilled shaft analysis based on soils data reported by NOVA using FDOT MastArm-LRFD v1.2.

1.3.5 Prepared this report which summarizes BET's findings, evaluations and recommendations.

2.0 PROJECT LOCATION AND DESCRIPTION

2.1 PROJECT LOCATION

The project site is situated approximately 0.6 miles north of the intersection of Miracle Strip Parkway Southwest (US Highway 98) and St. Mary Avenue Southwest and approximately 6 miles east of the Hurlburt Field Air Force Base, in Fort Walton Beach, Okaloosa County, Florida. The site is located in Section 14, Township 2 South, Range 24 West, and is centered near Latitude 30° 24' 45.6", Longitude -86° 37' 09.5".

2.2 PROPOSED IMPROVEMENTS

Proposed improvements, as pertain to BET's engineering evaluations, would consist of the construction of drilled-shaft foundations for support of two (2) proposed traffic signal poles, including double mast arms at the two locations. Foundations would be constructed in the northeast (pole designation "1") and southwest (pole designation "2") quadrants of the intersection of Hollywood Boulevard Northwest and Robinwood Drive Northwest . As reported by BET's client, drilled-shaft foundations are to be designed and constructed in general accordance with Index 649-031 - Mast Arm Assemblies (FDOT Design Standards, Last Revisions November 1, 2018 & November 1, 2019).

3.0 GENERAL SOILS AND GROUNDWATER CONDITIONS

3.1 GENERAL SOIL CONDITIONS

In reference to the United States Department of Agriculture-Natural Resources Conservation Services (USDA-NRCS) Soil Mapping of Okaloosa County, Florida, the map units relevant to the project site are map *Unit 27 - Urban Land*.

In areas of Urban land, 85 percent or more of the surface is covered with streets, parking lots, buildings, or other structures. The few areas that are not covered with impervious improvements are generally lawns, vacant lots, playgrounds or stormwater retention ponds.

3.2 GENERAL GROUNDWATER CONDITIONS

The NOVA report indicated that borings B-2 (southwest quadrant) and B-4 (northeast quadrant) encountered groundwater at depths ranging from 7.5 to 8.0 feet below existing grades at the time of drilling. Depth to seasonal high groundwater level is estimated to be about 5 to 6 feet below existing ground surface. Based on review of various USGS-FGS Potentiometric Surface of the Upper Floridan Aquifer, the potentiometric surface elevation of the Upper Floridan Aquifer in the project area is estimated to be at or about -80' National Geodetic Vertical Datum of 1929 (NGVD). Review of the Topographic Survey provided by CPH, dated February 27, 2020, indicates that the existing ground surface elevations at the drilled shaft construction areas for Pole 1 (northeast) and Pole 2 (southwest) are 19.67' and 19.2' NAVD88, respectively. No artesian conditions were noted on the soil profiles presented in the NOVA report, and no artesian conditions are anticipated during construction.

4.0 GEOTECHNICAL FIELD AND LABORATORY TESTING

4.1 STANDARD PENETRATION TEST BORINGS

On June 2, 2020, NOVA completed four (4) Standard Penetration Test (SPT) borings (ASTM D-1586) in each of the four quadrants of the Hollywood Boulevard Northwest and Robinwood Drive Northwest intersection, two of which were advanced near the proposed pole locations, each to depth of 25 feet below existing site grade. For boring locations and results, please refer to the NOVA Geotechnical Engineering Report, dated June 5, 2020, presented in Appendix A.

4.2 SOIL CLASSIFICATION TESTING

Soil classification testing was conducted on selected samples by NOVA, including moisture content, -200 sieve analysis, organic content and USCS soil classification. Test results are tabulated in Appendix C of the NOVA Geotechnical Engineering Report, dated June 5, 2020, presented in Appendix A of this report.

5.0 EVALUATIONS AND RECOMMENDATIONS

5.1 SUBGRADE SOIL CHARACTERISTICS

In general, the test borings B-2 (southwest quadrant) and B-4 (northeast quadrant) encountered about 8.0 to 11.0 feet of surficial deposits comprised of loose to medium dense light gray to light brown, gray-orange and gray-brown fine-grained sand and slightly silty fine-grained sand. Underlying soils at boring B-2 encountered wood debris between depths of 11 and 16 feet below the existing ground surface. At boring B-4, the surficial deposits were underlaid by loose to medium dense dark gray fine-grained sand with few organics / organic silt between depths of 8 and 13.5 feet below the existing ground surface. Underlying soils to the boring termination depths consisted of medium dense to very dense gray-brown fine-grained sand.

For a more in-depth soil stratification, please refer to the soil profiles in Appendix B of the NOVA Geotechnical Engineering Report, dated June 5, 2020, presented in Appendix A of this report.

5.2 DRILLED-SHAFT FOUNDATION DESIGN

As reported by BET's client, it is desirable to design the drilled-shaft foundations in general accordance with FDOT Index 649-031 - Mast Arm Assemblies (FDOT Design Standards, Last Revisions November 1, 2018 & November 1, 2019). BET has calculated foundation reactions based on signal head assembly layouts shown in the CPH Signal Improvement Plans and conducted drilled shaft analysis based on soils data reported by NOVA using FDOT MastArm-LRFD v1.2. Mast Arm analyses results are presented in Appendix B. For reference purposes, copies of the CPH Signal Improvement Plans and the FDOT Design Standard Index 649-031 are provided in Appendix C.

Based on the results of the analyses performed, BET recommends that the drilled-shaft foundations be designed and constructed in accordance with the FDOT Index 649-031 - Mast Arm Assemblies. **Recommended drilled shaft diameters and minimum recommended embedded shaft lengths are as follows:**

POLE ID	STATION / OFFSET	INTERSECTION QUADRANT	SHAFT DIAMETER	DRILLED SHAFT EMBEDMENT DEPTH
1 (F)	509+84.12 / 43.98' LT	NORTHEAST	4.5'	15'
2 (F)	509+41.28 / 32.20' RT	SOUTHWEST	4.5'	18'

5.3 FOUNDATION CONSTRUCTION CONSIDERATIONS

The contractor should be aware of the following plan notes and conditions which could potentially occur during drilled-shaft installation:

1. Drilled Shaft Foundations shall be constructed in accordance with Section 455 of the FDOT Standard Specifications for Road and Bridge Construction (July 2020) and Index 649-031 - Mast Arm Assemblies (FDOT Design Standards, Last Revisions November 1, 2018 & November 1, 2019).

2. The contractor should anticipate the possible presence of loose sandy soils and the presence of groundwater within the shaft length, and be prepared to use drilling fluids and/or temporary casing as needed to prevent caving of soils and maintain an open hole.

3. The contractor should anticipate wood debris in the probable installation area of the drilled shaft foundation for Pole 2 (southwest quadrant) and be prepared to utilize specialized drilling equipment in order to drill through the debris.

APPENDIX A

NOVA ENGINEERING AND ENVIRONMENTAL, LLC
GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL ENGINEERING REPORT

Fort Walton Beach Signal Poles

Fort Walton Beach, Okaloosa County, Florida

PREPARED FOR:
CPH, Inc.
1031-CW 23rd Street
Panama City, Florida 32405

NOVA Project Number: 10111-2020059

June 5, 2020

NOVA
PROFESSIONAL | PRACTICAL | PROVEN

NOVA

June 5, 2020

CPH, INC.
1031-CW 23rd Street
Panama City, Florida 32405

Attention: Mr. Kurt R. Luman, P.E.

Subject: Report of Subsurface Exploration and Geotechnical Engineering Evaluation
FORT WALTON BEACH SIGNAL POLES
Fort Walton Beach, Okaloosa County, Florida
NOVA Project Number 10111-2020059

Dear Mr. Luman,

NOVA Engineering and Environmental, LLC (NOVA) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the proposed traffic signal poles to be installed in Fort Walton Beach, Okaloosa County, Florida. The work was performed in general accordance with NOVA proposal number 011-20192892, dated October 23, 2019. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings, conclusions and recommendations.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
NOVA ENGINEERING AND ENVIRONMENTAL, LLC

David Ritzel

David Ritzel, E.I.
Staff Engineer
Florida Registration No. 1100023406

ANDRE KNIAZEFF LICENSE No 81315 STATE OF FLORIDA PROFESSIONAL ENGINEER

Andre Kniazeff, P.E.
Senior Geotechnical Engineer
Florida Registration No. 81315

Copies Submitted: Addressee (electronic)

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1.0 SUMMARY

A brief summary of pertinent findings, conclusions and recommendations is presented below. This information should not be utilized in design or construction without reading all of the recommendations presented in the text and Appendix of this report.

1.1 GENERAL

Our field exploration at the subject site included performing four (4) Standard Penetration Test (SPT) borings, each to a depth of about 25 feet below existing grade (BEG) in close vicinity of the proposed traffic signal pole foundation locations. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

The subsurface soils encountered in the SPT borings generally consisted of mixed strata of very loose to very dense fine-grained sands to slightly silty fine-grained sands (USCS classifications of SP and SP-SM, respectively) with trace to few organics from the existing ground surface elevation to the maximum depth explored of approximately 25 feet BEG. We note that a significant quantity of naturally occurring wood was encountered from approximately 11 feet to 16 feet BEG in Boring B-2. Subsurface conditions are described in greater detail on the attached Test Boring Records.

1.2 GROUNDWATER CONTROL

Groundwater was encountered in the test borings at depths of about 7½ feet to 8 feet BEG at the time of our subsurface exploration, which occurred during a period of relatively normal seasonal rainfall and shortly following the passing of several significant rain events. Groundwater should therefore be expected to adversely impact the installation of the proposed traffic signal poles and contractors should be prepared to employ an appropriate construction method (i.e., wet shaft construction).

1.3 FOUNDATION SOIL SUPPORT RECOMMENDATIONS

Based on the results of the test borings, the subsurface conditions encountered appear to be adaptable for providing adequate support of the proposed traffic signal poles. Geotechnical design parameters have been included in this report to aid in the mast arm foundation design, and the installation of the mast arms should be accomplished in accordance with the latest edition of the FDOT Standard Specifications for Road and Bridge Construction, with specific reference to Indexes 649-030 & 649-031 (Mast Arm Assemblies).

2.0 INTRODUCTION

2.1 PROJECT INFORMATION

NOVA understands that the project will consist of the installation of two (2) new mast arm signal poles within the right-of-way at the intersection of Hollywood Boulevard and Robinwood Drive in Fort Walton Beach, Okaloosa County, Florida.

2.2 SCOPE OF WORK

CPH, Inc., engaged NOVA to provide geotechnical engineering consulting services for the proposed **Fort Walton Beach Signal Poles** project. This report briefly discusses our understanding of the project, describes our exploratory procedures and presents our findings, conclusions, and recommendations. The primary objective of this study was to provide a geotechnical exploration of the near surface soils within the area of the proposed construction and to assess these findings as they relate to geotechnical aspects of the planned site improvements.

The authorized geotechnical engineering services included soil test borings and sampling, engineering evaluation of the field data, and the preparation of this report. The services were performed in general accordance with industry standards.

The assessment of site environmental conditions, including the presence of wetlands or detection of pollutants in the soil, rock or groundwater, laboratory testing of samples was beyond the scope of this geotechnical study. If requested, NOVA can provide these services.

3.0 SITE DESCRIPTION

3.1 GENERAL

The proposed traffic signal mast arms will be located within the right-of-way at the intersection of Hollywood Boulevard and Robinwood Drive in Fort Walton Beach, Okaloosa County, Florida. At the time of our field exploration, the proposed traffic signal locations were located within developed properties adjacent to the roadway.

3.2 GEOLOGY/HYDROLOGY

3.2.1 SITE AND AREA GEOLOGY

According to the United States Geological Survey (USGS), the subject site is located in Okaloosa County within the Gulf Coastal Plain, separated from the Florida Platform by geologic structures known as the Gulf Trough and Apalachicola Embayment. These structures formed a bathymetric and environmental barrier from the earliest Eocene or earliest Oligocene periods into the Miocene.

According to the "Text to Accompany the Geologic Map of Florida" by Scott, 2001, the site is generally underlain by undifferentiated sediments deposited during the Quaternary period. These sediments typically consist of siliciclastics (sand), organics and freshwater carbonates. These soils are highly permeable and form the Sand and Gravel Aquifer of the surficial aquifer system.

Surficial soils in the region are primarily siliciclastic sediments deposited in response to the renewed uplift and erosion in the Appalachian highlands to the north and sea-level fluctuations. The extent and type of deposit is influenced by numerous factors, including mineral composition of the parent rock and meteorological events.

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3.2.2 GROUNDWATER

Groundwater in the Gulf Coastal Plain typically occurs as an unconfined aquifer condition. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix can affect groundwater conditions. The groundwater table is expected to be a subdued replica of the original surface topography. Based on a review of topographic maps and our visual site observations, we anticipate the localized groundwater flow at the site to be generally towards the south.

4.0 FIELD AND LABORATORY PROCEDURES

4.1 FIELD EXPLORATION

Boring locations were established in the field by NOVA personnel by estimating distances and angles from existing site landmarks. Consequently, referenced boring locations should be considered approximate. If the Client desires increased accuracy, NOVA recommends that the boring locations and elevations be surveyed.

Our field exploration at the subject site included performing four (4) Standard Penetration Test (SPT) borings, each to a depth of about 25 feet below existing grade (BEG) in close vicinity of the proposed traffic signal pole foundation locations. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

Test Boring Records in Appendix B present the soil conditions encountered in the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the recovered samples, laboratory test data, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual.

Groundwater Levels: The groundwater levels reported on the Test Boring Records represent measurements made at the completion of each test boring. The test borings were subsequently backfilled with a cementitious grout material.

4.2 LABORATORY TESTING

A laboratory testing program was conducted to characterize materials which exist at the site using the recovered soil samples. Selected test data is presented on the Test Boring Records attached in the Appendix. The specific tests are briefly described below. It should be noted that all soil samples would be properly disposed of 30 days following the submittal of this NOVA subsurface exploration report unless you request otherwise.

4.2.1 Soil Classification

Soil classification provides a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current problems. In our explorations, samples obtained during drilling operations are observed in our laboratory and visually classified by an engineer. The soils are classified according to relative density or consistency (based on number of blows from standard penetration tests), color, and texture. These classification descriptions are included on our Test Boring Records. The classification system

discussed above is primarily qualitative; laboratory testing is generally required for detailed soil classification. Using the test results, the soils were visually/manually classified in accordance with the Unified Soil Classification System. This classification system and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in this report.

4.2.2 MOISTURE CONTENT

The moisture content is the ratio expressed as a percentage of the weight of water in a given mass of soil to the weight of the solid particles. This testing was conducted in general accordance with ASTM D-2216. Two (2) moisture content tests were performed in this study.

4.2.3 FINES CONTENT

The percentage of fines passing through the No. 200 sieve is generally considered to represent the amount of silt and clay of the tested soil sample. This testing was conducted in general accordance with ASTM Designations D-6913 and D-1140. Two (2) fines content tests were performed in this study.

4.2.4 ORGANIC CONTENT

The organic content is the ratio expressed as a percentage of the weight of organic material in a given mass of soil to the weight of the solid particles. This testing was conducted in general accordance with ASTM D-2974. Two (2) organic content tests were performed in this study.

4.3 SOIL CONDITIONS

The following paragraph provides a generalized description of the subsurface profiles and soil conditions encountered in the borings. The Test Boring Records provided in the Appendix should be reviewed to provide more detailed descriptions of the subsurface conditions encountered at each boring location. Conditions may vary at other locations and times.

The subsurface soils encountered in the SPT borings generally consisted of mixed strata of very loose to very dense fine-grained sands to slightly silty fine-grained sands (USCS classifications of SP and SP-SM, respectively) with trace to few organics from the existing ground surface elevation to the maximum depth explored of approximately 25 feet BEG. We note that a significant quantity of naturally occurring wood was encountered from approximately 11 feet to 16 feet BEG in Boring B-2. Subsurface conditions are described in greater detail on the attached Test Boring Records.

4.4 GROUNDWATER CONDITIONS

Groundwater was encountered in the test borings at depths of about 7½ feet to 8 feet BEG at the time of our subsurface exploration, which occurred during a period of relatively normal seasonal rainfall and shortly following the passing of several significant rain events.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors (tidal fluctuations). Groundwater levels in the Okaloosa County area are typically lowest in the late spring and the late fall and highest in the summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

The following conclusions and recommendations are based on our understanding of the proposed construction, our site observations, our evaluation and interpretation of the field data, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principles and practices.

Subsurface conditions in unexplored locations or at other times may vary from those encountered at the specific boring locations. If such variations are noted during construction, or if project development plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary. As previously noted, the boring locations were established by estimating distances and angles from existing site landmarks. If increased accuracy is desired by the Client, we recommend that the boring locations and elevations be surveyed.

5.2 GROUNDWATER CONTROL

Groundwater was encountered in the test borings at depths of about 7½ feet to 8 feet BEG at the time of our subsurface exploration, which occurred during a period of relatively normal seasonal rainfall and shortly following the passing of several significant rain events. Groundwater should therefore be expected to adversely impact the installation of the proposed traffic signal poles and contractors should be prepared to employ an appropriate construction method (i.e., wet shaft construction).

5.3 FOUNDATION SOIL PARAMETER RECOMMENDATIONS

5.3.1 GENERAL

NOVA understands that the project will consist of the installation of two (2) new signal poles within the right-of-way at the intersection of Hollywood Boulevard and Robinwood Drive in Fort Walton Beach, Okaloosa County, Florida.

5.3.2 SOIL DESIGN PARAMETERS

Geotechnical information to aid in foundation design for the proposed traffic signal poles is presented on the next page in Table 1. The design parameters are based on the recommended values provided in the FDOT Soils and Foundation Handbook (2019) and the subsurface conditions encountered in our exploration.

Table 1 – Soil Design Parameters for Boring B-1				
Approximate Depth (ft)		Average SPT 'N' Value	Effective Unit Weight (pcf)	Friction Angle (degrees)
From	To			
0	6	11	115	31
6	13	9	50	30
13	25	49	78	39
Environmental Classification: we recommend the most aggressive conditions should be assumed for design purposes.				

Table 1 – Soil Design Parameters for Boring B-2				
Approximate Depth (ft)		Average SPT 'N' Value	Effective Unit Weight (pcf)	Friction Angle (degrees)
From	To			
0	6	8	110	30
6	16	4	40	28
16	25	27	65	34
Environmental Classification: we recommend the most aggressive conditions should be assumed for design purposes.				

Table 1 – Soil Design Parameters for Boring B-3				
Approximate Depth (ft)		Average SPT 'N' Value	Effective Unit Weight (pcf)	Friction Angle (degrees)
From	To			
0	6	9	110	30
6	11	3	40	28
11	25	40	70	37
Environmental Classification: we recommend the most aggressive conditions should be assumed for design purposes.				

Table 1 – Soil Design Parameters for Boring B-4				
Approximate Depth (ft)		Average SPT 'N' Value	Effective Unit Weight (pcf)	Friction Angle (degrees)
From	To			
0	6	10	115	31
6	13	10	53	31
13	25	62	80	41
Environmental Classification: we recommend the most aggressive conditions should be assumed for design purposes.				

5.4 CONSTRUCTION OBSERVATIONS

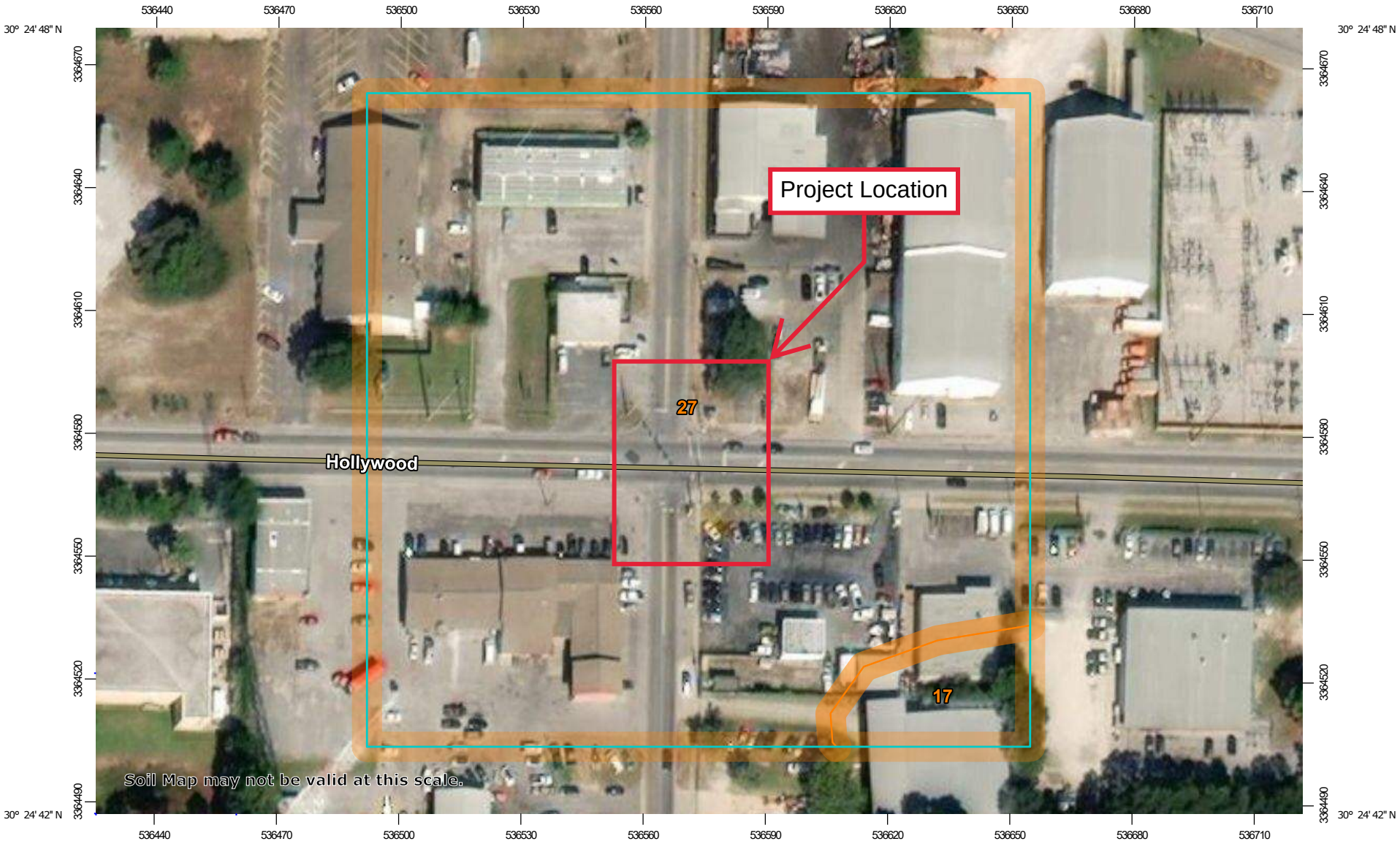
NOVA should be retained to provide construction observation and inspection during installation of the signal poles to confirm general compliance with the design documents and FDOT requirements.

APPENDIX A
Figures and Maps

Base map provided by ***Google Earth***

Scale: Not To Scale **Date Drawn:** June 1, 2020 **Drawn By:** D. Ritzel **Checked By:** A. Kniazeff	NOVA 17612 Ashley Drive Panama City Beach, Florida 32413 850.249.6682 ♦ 850.249.6683	**PROJECT LOCATION MAP** **Fort Walton Beach Signal Poles** Fort Walton Beach, Okaloosa County, Florida *NOVA Project Number 10111-2020059*

Soil Map—Okaloosa County, Florida
(Fort Walton Beach Signal Poles, 10111-2020059)



Map Scale: 1:1,360 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Soil Map—Okaloosa County, Florida
(Fort Walton Beach Signal Poles, 10111-2020059)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Okaloosa County, Florida
Survey Area Data: Version 18, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
17	Mandarin sand, 0 to 3 percent slopes	0.3	4.4%
27	Urban land	6.2	95.6%
Totals for Area of Interest		**6.4**	**100.0%**

APPENDIX B
Subsurface Data

LEGEND

25' SPT Boring Locations (B-1 through B-4)

Base map provided by **Google Earth**

Scale: Not To Scale	NOVA	**BORING LOCATION PLAN**
Date Drawn: June 1, 2020	17612 Ashley Drive Panama City Beach, Florida 32413 850.249.NOVA(6682) ♦ 850.249.6683	**Fort Walton Beach Signal Poles**
Drawn By: D. Ritzel		Fort Walton Beach, Okaloosa County, Florida
Checked By: A. Kniazeff		*NOVA Project Number 10111-2020059*

NOVA

KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts
			CH	Inorganic clays or clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve
** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY
(Sands and Gravels)
Very loose – Less than 4 Blow/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY
(Silts and Clays)
Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Medium Stiff – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS
(Limestone)
Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample
Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample
Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

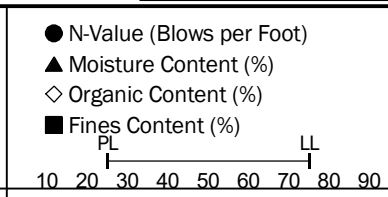
These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample
Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%

NOVA

TEST BORING RECORD B-1

PROJECT NAME: Fort Walton Beach Signal Poles
PROJECT NO.: 2020059 **CLIENT:** CPH, Inc.
PROJECT LOCATION: Fort Walton Beach, Okaloosa County, Florida
LOCATION: See Boring Location Plan **ELEVATION:** Existing Grade
DRILLED BY: L. Griffin **LOGGED BY:** D. Ritzel
DRILLING METHOD: Mud Rotary **DATE:** 6/2/2020
INITIAL GW DEPTH: ▼ 7.5 feet **ESHGW DEPTH:** ▽

Depth (feet)	Material Description	N-Value
0	Loose to medium dense grey/orange to grey/dark grey slightly silty fine-grained SAND (SP-SM)	13
5		10
		10
		11
10	Loose grey/dark grey slightly silty fine-grained SAND with trace organics - organic silt (SP-SM)	8
		8
15	Medium dense to very dense grey/light grey to grey/brown fine-grained SAND (SP)	28
		44
20		60
		54
25		58
	Boring Terminated at 25 feet	



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Note:

NOVA

TEST BORING RECORD B-2

PROJECT NAME: Fort Walton Beach Signal Poles
PROJECT NO.: 2020059 **CLIENT:** CPH, Inc.
PROJECT LOCATION: Fort Walton Beach, Okaloosa County, Florida
LOCATION: See Boring Location Plan **ELEVATION:** Existing Grade
DRILLED BY: L. Griffin **LOGGED BY:** D. Ritzel
DRILLING METHOD: Mud Rotary **DATE:** 6/2/2020
APPARENT GW DEPTH: ▼ 7.5 feet **ESHGW DEPTH:** ▽ GNE

Depth (feet)	Material Description	N-Value
0	Loose grey/orange to grey/brown slightly silty fine-grained SAND (SP-SM)	10
		10
5		4
		4
		4
10	Loose light grey fine-grained SAND (SP)	
	(WOOD)	4
15		4
	Medium dense to dense grey/brown fine-grained SAND (SP)	19
20		26
		28
25		33
	Boring Terminated at 25 feet	

Graphic: N-Value (Blows per Foot); Moisture Content (%); Organic Content (%); Fines Content (%); PL; LL; 10 20 30 40 50 60 70 80 90

Groundwater: ▼

Sample Type

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Note:

NOVA

TEST BORING RECORD B-3

PROJECT NAME: Fort Walton Beach Signal Poles
PROJECT NO.: 2020059 **CLIENT:** CPH, Inc.
PROJECT LOCATION: Fort Walton Beach, Okaloosa County, Florida
LOCATION: See Boring Location Plan **ELEVATION:** Existing Grade
DRILLED BY: L. Griffin **LOGGED BY:** D. Ritzel
DRILLING METHOD: Mud Rotary **DATE:** 6/2/2020
APPARENT GW DEPTH: ▼ 8.0 feet **ESHGW DEPTH:** ▽ GNE

Depth (feet)	Material Description	N-Value
0	Loose to medium dense grey/brown to grey/dark grey slightly silty fine-grained SAND (SP-SM)	13
		9
5		4
	Very loose grey/dark grey fine-grained SAND (SP)	3
	Very loose grey/dark grey slightly silty fine-grained SAND with trace organics - organic silt (SP-SM)	3
10		
	Dense dark grey slightly silty fine-grained SAND with few organics - organic silt (SP-SM)	40
	Dense grey/brown to light grey fine-grained SAND (SP)	46
15		46
		34
20		38
		40
25	Boring Terminated at 25 feet	

● N-Value (Blows per Foot)
▲ Moisture Content (%)
◇ Organic Content (%)
■ Fines Content (%)
PL LL
10 20 30 40 50 60 70 80 90

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Note:

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NOVA

TEST BORING RECORD B-4

PROJECT NAME: Fort Walton Beach Signal Poles
PROJECT NO.: 2020059 **CLIENT:** CPH, Inc.
PROJECT LOCATION: Fort Walton Beach, Okaloosa County, Florida
LOCATION: See Boring Location Plan **ELEVATION:** Existing Grade
DRILLED BY: L. Griffin **LOGGED BY:** D. Ritzel
DRILLING METHOD: Mud Rotary **DATE:** 6/2/2020
INITIAL GW DEPTH: ▼ 8.0 feet **ESHGW DEPTH:** ▽

Depth (feet)	Material Description	Graphic	Groundwater	Sample Type	N-Value
0	Loose grey/light brown slightly silty fine-grained SAND (SP-SM)				10
5	Loose to medium dense light brown to light grey fine-grained SAND (SP)		▼		11, 10, 9
10	Loose to medium dense dark grey fine-grained SAND with few organics - organic silt (SP)				13, 9
15	Very dense grey/brown fine-grained SAND (SP)				56, 68
20					71, 54
25	Boring Terminated at 25 feet				60

● N-Value (Blows per Foot)
▲ Moisture Content (%)
◇ Organic Content (%)
■ Fines Content (%)
PL LL
10 20 30 40 50 60 70 80 90

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Note:

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APPENDIX C
Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

Fort Walton Beach Signal Poles
Fort Walton Beach, Okaloosa County, Florida
NOVA Project Number 10111-2020059

Boring Number	Sample Depth (ft)	Natural Moisture (%)	Percent (%) Passing Sieve #200	Organic Content (%)	USCS Soil Classification
B-1	11.0 - 13.5	25	5.2	2.6	SP-SM
B-4	11.0 - 13.5	42	4.5	4.0	SP

NOVA

APPENDIX D
Support Documents

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study, and our previous experience. If additional information becomes available which might impact our geotechnical opinions, it will be necessary for NOVA to review the information, re-assess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings may differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process has altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to confirm that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of **CPH, Inc.,** only. The scope of work performed during this study was developed for purposes specifically intended by **CPH, Inc.,** only and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B

FDOT MAST ARM ANALYSIS RESULTS

FDOT Mast Arm Traffic Signal Support Analysis Program V1.2

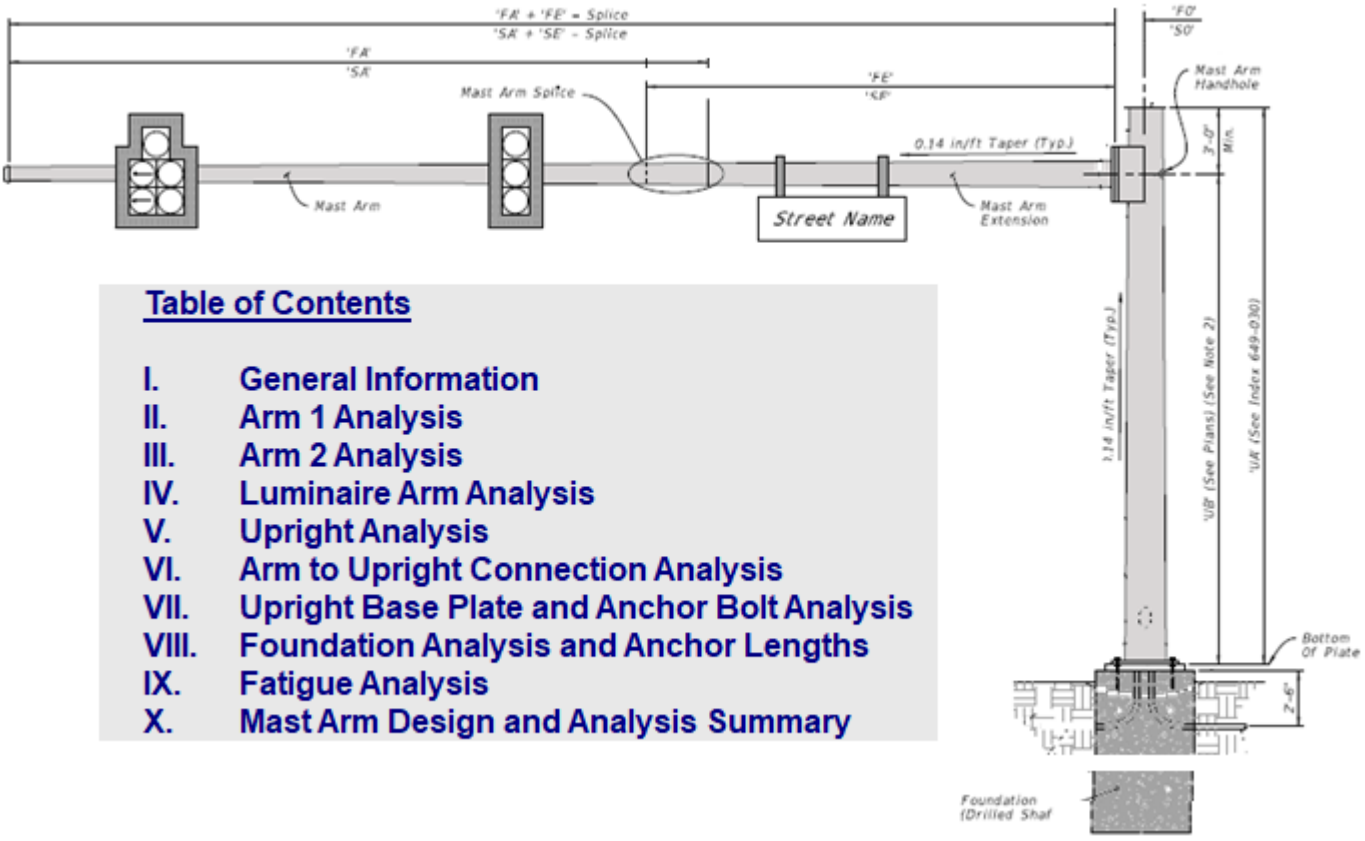
State Structures Design Office

This program works in conjunction with FDOT Mast Arm Standard Plans 649-030 & 649-031.

References:
AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LRFDLTS).
FDOT Structures Manual Volume 3 (SM V3).
AISC Steel Construction Manual

For more information see Reference.xmcd and Changes.xmcd.

Reference



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I. General Information
II. Arm 1 Analysis
III. Arm 2 Analysis
IV. Luminaire Arm Analysis
V. Upright Analysis
VI. Arm to Upright Connection Analysis
VII. Upright Base Plate and Anchor Bolt Analysis
VIII. Foundation Analysis and Anchor Lengths
IX. Fatigue Analysis
X. Mast Arm Design and Analysis Summary

Data Folder and Files

Data Files Folder

Change Folder

C:\Users\Engineer\Desktop\Engineering Software\2020 FDOT Mast Arm+Drilled Shaft Analysis v1.2\G19246 Fort Walton\Data\

Required - Open Existing Data File. To save New Data Files, enter data variables at the end of Section IX.

Refresh List

Open File

A78DH-A70D-P7DL-DS205.dat
A78DH-A70DH-P7DL-DS205.dat
A78DH-A78D-P7DL-DS205.dat
A78DH-A78DH-P7DL-DS205.dat
A78S-P6SL-DS185.dat
A78SH-P6SL-DS185.dat
Pole1_A50D-A30D-P3DL-DS1645.dat
Pole2_A50D-A30D-P3DL-DS1645.dat

I. General Information and Sign & Signal Data

Enter Project Information

Project Name	Hollywood Blvd NW _Robinwood Dr NW, Fort Walton Beach, FL		
Project No.	G19246		
Designed by	LBP	*Date*	9 / 21 / 2020
Checked by	TB	*Date*	9 / 23 / 2020
Signal Name	Pole 1 (Future Use)		
Station/Offset	STA509+84.12 / 43.98' LT		

Enter Wind Speed

Design Wind Speed 150 *mph*

Extreme Event Wind Speed

SDG Wind Speeds by County

Enter Arm Lengths, Signal and Sign Data

Arm 1

Arm 1 Length 50 Reset Arm 1 Data

Arm1 Signal Number	*Distance to Signal (ft)*	*Number of Heads*
1	33	4
2	41	3
3	49	3
4		
5		
6		
7		
8		
9		
10		

Arm 2 *Set Arm 2 Length = 0 for single arm Mast Arms*

Arm 2 Length 30 Reset Arm 2 Data

Arm2 Signal Number	*Distance to Signal (ft)*	*Number of Heads*
1	6	3
2	14	3
3		
4		
5		
6		
7		
8		
9		
10		

Arm 1 Sign Panels

Arm1 Sign Panel Number	*Distance to Panel (ft)*	*Panel Area (sf)*
1	8	8.75
2		
3		
4		
5		

Arm 2 Sign Panels

Arm2 Sign Panel Number	*Distance to Panel (ft)*	*Panel Area (sf)*
1	20	8.75
2		
3		
4		
5		

Save Data for Signs and Signals

II. Arm 1 Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Values for $Dist_{splice.from.base.arm}$ *that give a base diameter in even inches*

"Wall Thickness"	"dia-1in"	"dia-2in"	"dia-3in"	"dia-4in"	"dia-5in"	"d-6in"
$t_{wall.arm} = 0.179 \cdot in$	***9.9***·ft	***17.0***·ft	***24.2***·ft	***31.3***·ft	***38.5***·ft	***45.6***·ft
$t_{wall.arm} = 0.25 \cdot in$	***10.9***·ft	***18.0***·ft	***25.2***·ft	***32.3***·ft	***39.4***·ft	***46.6***·ft

Help - Base Diameters | Help - Arm Tip Diameter | Help - Tube Wall Thickness | Help - Arm Lengths | Recommended Distance to Splice

Reference:C:\Users\Engineer\Desktop\Engineering Software\2020 FDOT Mast Arm+Drilled Shaft Analysis v1.2\G19246 Fort Walton\LRFD Equ

Enter Arm 1 Data

Arm Length (ft)	*Base Diameter (in)*	*Wall Thickness 1 (in)*	*Wall Thickness 2 (in)*	*Distance to Splice (ft)*
$L_{total.arm1} = 50\,ft$	14	0.25	0.3125	17.5
feet, 40 ft. max. for 1 piece arms	*Measured flat to flat* **'FG'**	*for 1 & 2 piece arms* **'FD'**	*for 2 piece arms only* **'FH'**	*for 2 piece arms only* **('Larm' - 'FA')**

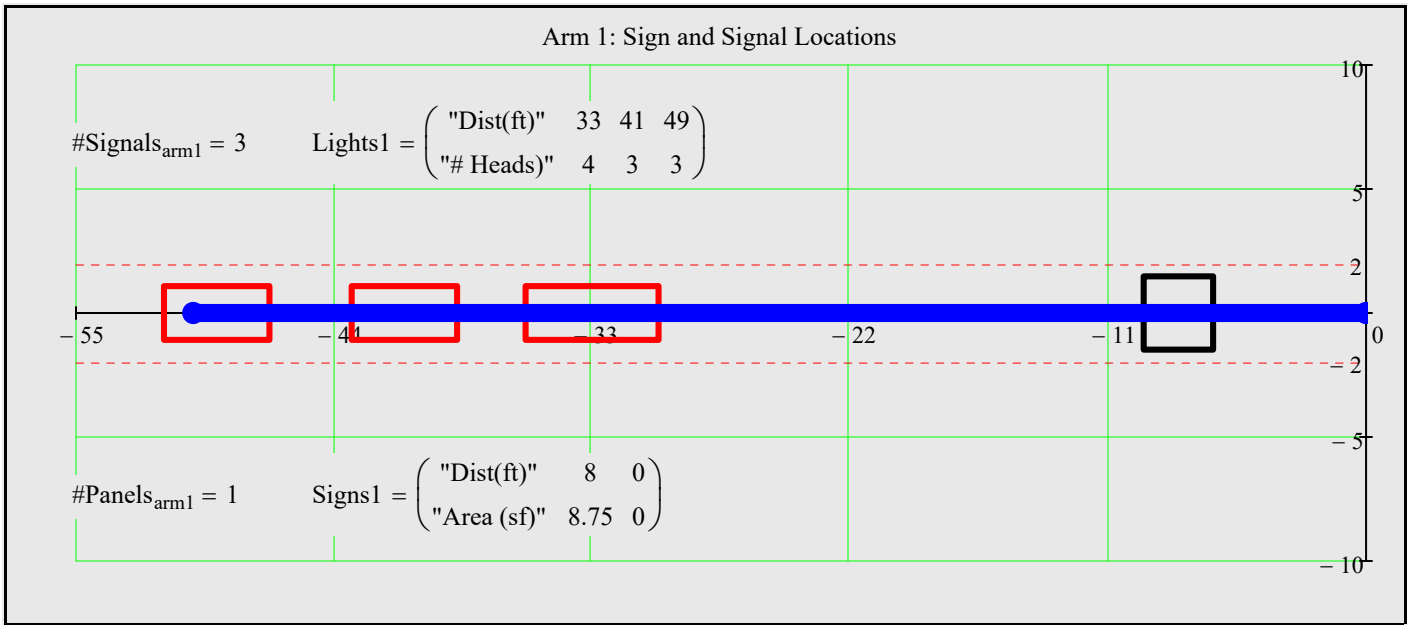
Arm 1 Analysis including Existing Mast Arm Analysis (Additional Variables Required)

Arm 1 Combined Force Interaction Ratio and Deflection

BackPlate = "Rigid, 6 inches wide"

$\max(CFI_{arm1}) = 0.63$ $\max(\Delta_{arm1}) = 7.6 \cdot in$ $2 \cdot deg \cdot L_{total.arm1} = 20.9 \cdot in$

Summary - Arm 1 Geometry and Loading



$\max(CFI_{arm1}) = 0.63$

$\max(\Delta_{arm1}) = 7.6 \cdot in$

$L_{total.arm1} = 50\,ft$

'FA'= 'FE'= $L_{fabricated.arm1} = \begin{pmatrix} 32.5 \\ 21.0 \end{pmatrix} \cdot ft$

'FB'= 'FF'= $Diameter_{tip.arm1} = \begin{pmatrix} 7.52 \\ 11.06 \end{pmatrix} \cdot in$

'FC'= 'FG'= $Diameter_{base.arm1} = \begin{pmatrix} 12.07 \\ 14.00 \end{pmatrix} \cdot in$

'FD'= 'FH'= $t_{wall.arm1} = \begin{pmatrix} 0.250 \\ 0.313 \end{pmatrix} \cdot in$

$Classification_{arm1} = \begin{pmatrix} "Compact" \\ "Compact" \end{pmatrix}$

$L_{splice.provided.arm1} = 3.5 \cdot ft$

III. Arm 2 Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

$Dist_{splice.from.base.arm}$ *values that give a base diameter in even inches*

"Wall Thickness"	Δdia = 1·in	Δdia = 2·in	Δdia = 3·in	Δdia = 4·in	Δdia = 5·in	Δdia = 6·in
$t_{wall.arm}$ = 0.179·in	***9.9***·ft	***17.0***·ft	***24.2***·ft	***31.3***·ft	***38.5***·ft	***45.6***·ft
$t_{wall.arm}$ = 0.25·in	***10.9***·ft	***18.0***·ft	***25.2***·ft	***32.3***·ft	***39.4***·ft	***46.6***·ft

Help - Base Diameters | Help - Arm Tip Diameter | Help - Tube Wall Thickness | Help - Arm Lengths | Recommended Distance to Splice

Enter Arm 2 Data

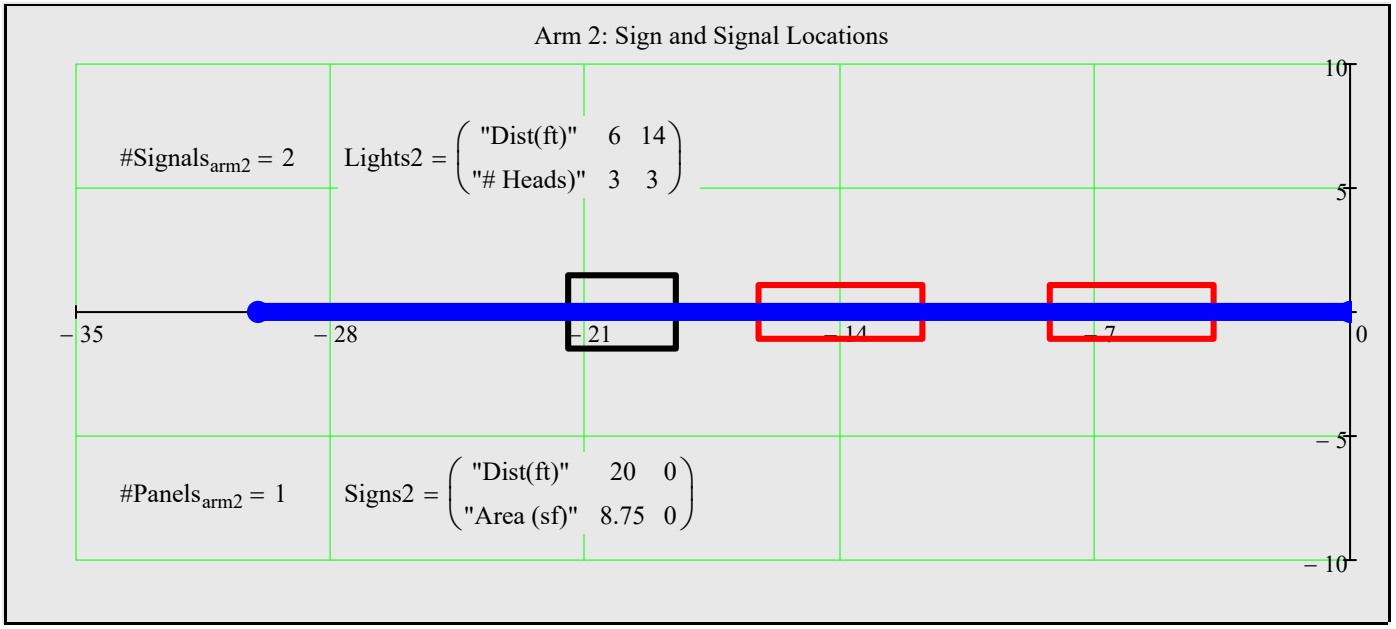
Arm Length (ft)	*Base Diameter (in)*	*Wall Thickness 1 (in)*	*Wall Thickness 2 (in)*	*Distance to Splice (ft)*
$L_{total.arm2}$ = 30 ft	11	0.25		
feet, 40 ft. max. for 1 piece arms	*Measured flat to flat* **'SG'**	*for 1 & 2 piece arms* **'SD'**	*for 2 piece arms only* **'SH'**	*for 2 piece arms only (***'Larm' - 'SA'***)*

Arm 2 Analysis including Existing Mast Arm Analysis

Arm 2 Combined Force Interaction Ratio and Deflection

$\max(CFI_{arm2}) = 0.35$ BackPlate = "Rigid, 6 inches wide"

Summary - Arm 2 Geometry and Loading $\max(\Delta_{arm2}) = 1.6 \cdot in$ $2 \cdot deg \cdot L_{total.arm2} = 12.6 \cdot in$



$\max(CFI_{arm2}) = 0.35$

$\max(\Delta_{arm2}) = 1.6 \cdot in$

$L_{total.arm2} = 30\,ft$

'SB'= 'SF'= $Diameter_{tip.arm2} = \begin{pmatrix} 6.80 \\ 0.00 \end{pmatrix} \cdot in$

'SC'= 'SG'= $Diameter_{base.arm2} = \begin{pmatrix} 11.00 \\ 0.00 \end{pmatrix} \cdot in$

'SA'= 'SE'= $L_{fabricated.arm2} = \begin{pmatrix} 30.0 \\ 0.0 \end{pmatrix} \cdot ft$

'SD'= 'SH'= $t_{wall.arm2} = \begin{pmatrix} 0.250 \\ 0.000 \end{pmatrix} \cdot in$

$Classification_{arm2} = \begin{pmatrix} "Compact" \\ "N/A" \end{pmatrix}$

$L_{splice.provided.arm2} = 0 \cdot ft$

IV. Luminaire Arm Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Enter Luminaire Data

Set Lum. Ht. = 0 for no Luminaire

See Design Standards 649-030 and 649-031 for input values.

Luminaire Height (ft)	Lum Horiz Length (ft)	Lum Arm Base Dia (in)	Lum Wall Thickness (in)	Slope	Lum Arm Radius (ft)	Lum Bolt Dia (in)	Lum Base Plate Thickness (in)
0							
Std = 40 feet	10 feet	3 inches	0.125 inches	0.5	8 feet	0.5 inches	0.75 inches

Analyze Luminaire

Summary - Luminaire Arm Geometry

$$\begin{pmatrix} CFI_{base.lumarm} \\ CSR_{bolt.lum} \\ D/C_{baseplate.lum} \\ D/C_{conn.plate.lum} \end{pmatrix} = \begin{pmatrix} 0.00 \\ 0.00 \\ 0.00 \\ 0.00 \end{pmatrix}$$

'LA'= $Y_{luminaire} = 0\ ft$

'LB'= $X_{luminaire} = 0\ ft$

'LC'= $Diameter_{base.lumarm} = 0 \cdot in$

'LD'= $t_{wall.lumarm} = 0 \cdot in$

'LE'= $Slope_{lumarm} = 0$

'LF'= $r_{lumarm} = 0\ ft$

'LG'= $d_{bolt.lum} = 0 \cdot in$

'LH'= $t_{baseplate.lum} = 0 \cdot in$

'LJ'= $w_{base.lum} = 0 \cdot in$

'LK'= $w_{channel.lum} = 0 \cdot in$

V. Upright Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Help - Upright Base Diameter and Wall Thickness | Help - Gap Distance

Enter Upright Data

Total Height (ft)	Height to Arm Connection (ft)	Base Diameter (in)	Wall Thickness (in)	Gap (in)	
25	21	20	0.375	14.0	arm 1 gap
				14.0	arm 2 gap
'UA'	'UB'	'UD' measured flat to flat	'UE'		

Analyze Upright

Upright Combined Force Interaction Ratio and Deflections

Classification$_{pole}$ = "Compact"

$\max(CFI_{pole}) = 0.36$

$Check_{slope}$ = "OK"

$Check_{deflection}$ = "OK"

$\max(\Delta_{x.dl}) = 0.7 \cdot in$

$\max(\Delta_{z.dl}) = -0.19 \cdot in$

$Slope_z = 0.1 \cdot deg$

$Slope_x = 0.34 \cdot deg$

$Diameter_{conn.pole} = 17.1 \cdot in$

$$\max\begin{pmatrix} Diameter_{base.arm1_0} \\ Diameter_{base.arm2_0} \end{pmatrix} = 12.1 \cdot in$$

'UA'= $Y_{pole} = 25 \cdot ft$

'UB'= $Y_{arm.conn} = 21 \cdot ft$

'UC'= $Diameter_{tip.pole} = 16.5 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'UE'= $t_{wall.pole} = 0.375 \cdot in$

'UF'= $\alpha = 90 \cdot deg$

'UG'= $Y_{lum.conn} = 0\ ft$

VI. Arm to Upright Connection Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat"

for double arms, both connection plate heights must be equal

Help - Arm Connection Dimensions

Enter Connection Data

Connection Plate Height(in)	Connection Plate Width (in)	Vertical Plate Thickness (in)	Bolt Diameter (in)	Arm Base Plate Thickness (in)
30	36	0.75	1.25	3
	36	0.75	1.25	3
'HT'	'FJ', 'SJ'	'FL', 'SL'	'FP', 'SP'	'FK', 'SK'

Analyze Connection

Connection Summary

'HT'= $h_{conn.plate} = 30 \cdot in$ $D/C_{ht.conn.plate} = 0.58$ $CheckHt_{conn.plate} = "OK"$

$D/C_{width.conn.plate_0} = 0.81$

$CheckWidth_{conn.plate_0} = "OK"$

$$\begin{pmatrix} D/C_{t.baseplate.arm_0} \\ CFI_{t.vert.plate_0} \\ CSR_{bolt.conn_0} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.29 \\ 0.12 \end{pmatrix}$$

$\#Bolts_{conn_0} = 6$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FK'= $t_{baseplate.arm_0} = 3.00 \cdot in$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FN'= $w_{vertical.plate_0} = \frac{1}{4} \cdot in$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

'FP'= $d_{bolt.conn_0} = 1.25 \cdot in$

'FR'= $t_{conn.plate_0} = 2.00 \cdot in$

'FS'= $Spacing_{bolts.conn_0} = 12.5 \cdot in$

'FT'= $w_{conn.plate_0} = \frac{5}{16} \cdot in$

$D/C_{width.conn.plate_1} = 0.81$

$CheckWidth_{conn.plate_1} = "OK"$

$$\begin{pmatrix} D/C_{t.baseplate.arm_1} \\ CFI_{t.vert.plate_1} \\ CSR_{bolt.conn_1} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.05 \\ 0.01 \end{pmatrix}$$

$\#Bolts_{conn_1} = 6$

'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SK'= $t_{baseplate.arm_1} = 3.00 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SN'= $w_{vertical.plate_1} = \frac{1}{4} \cdot in$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

'SP'= $d_{bolt.conn_1} = 1.25 \cdot in$

'SR'= $t_{conn.plate_1} = 2.00 \cdot in$

'SS'= $Spacing_{bolts.conn_1} = 12.50 \cdot in$

'ST'= $w_{conn.plate_1} = \frac{5}{16} \cdot in$

VII. Upright Base Plate & Anchor Bolt Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat"

Enter Anchorage Data

Anchor Bolt Diameter (in)	Number of Anchor Bolts
2	6
'BC'	'#Bolts'

Help - Number of Anchor Bolts

$Diameter_{base.pole} = 20 \cdot in$

Analyze Base Plate & Anchors

Base Plate and Anchor Summary

'#Bolts'= #AnchorBolts = 6

'BB'= $t_{baseplate.pole} = 2.50 \cdot in$

$CSR_{anchor} = 0.15$

$Diameter_{boltcircle.pole} = 28 \cdot in$

'BC'= $d_{anchorbolt} = 2.00 \cdot in$

$CheckCSR_{anchorbolt}$ = "OK"

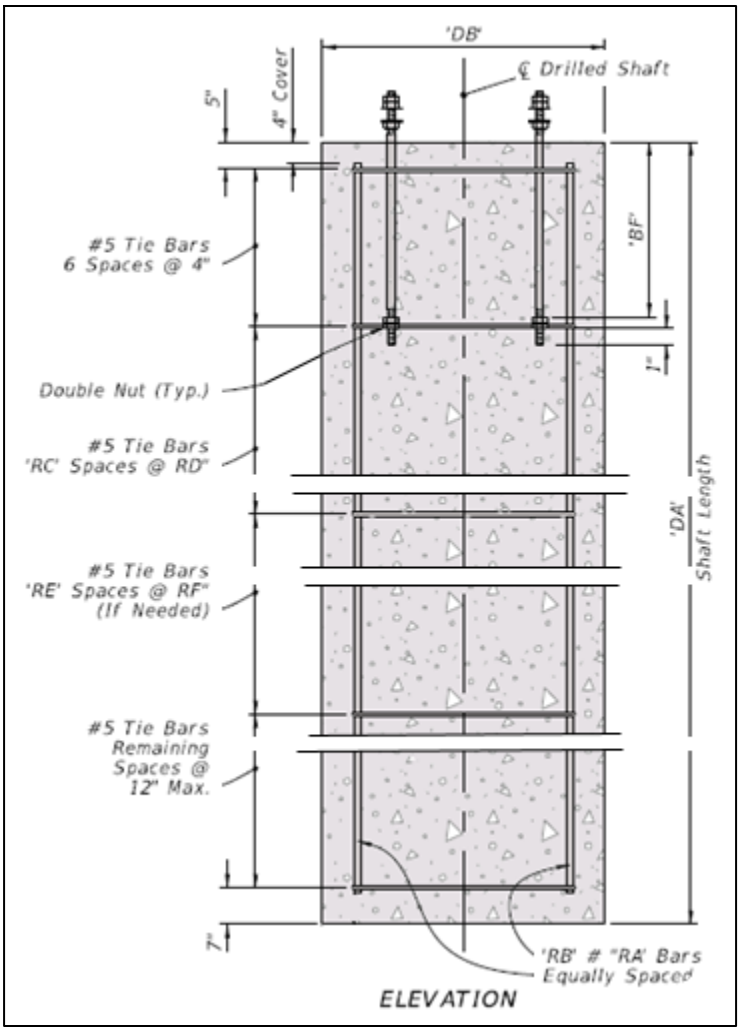
'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

VIII. Foundation Analysis & Anchor Bolt Lengths

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat"

Enter Drilled Shaft Data

Soil Type	Sand / Clay	
Soil Density, γ_{soil} (45-50 pcf typ.)	50	pcf
Friction Angle, ϕ (Sands)	30	deg
SPT Number (N_{blows} 5 min.,) (Sands)	9	
Shear Strength, c (Clays)	2000	psf
Ground to Top of Shaft Offset	0.0	ft
First Set of User Defined Stirrups:		
Number of Stirrup Spaces 'RC'	10	
Stirrup Spacing 'RD'	8	in
Second Set of User Defined Stirrups:		
Number of Stirrup Spaces enter zero for 12 inch spacing 'RE'	4	
Stirrup Spacing enter zero for 12 inch spacing 'RF'	12	in
Stirrup Bar Size, use #5 for all Standard Shafts	#5 / #6	



Analyze Foundation

Shaft Length *Stirrup spacing* *Number of stirrup spaces*

$L_{shaft} = 15\,ft$ $s_v = \begin{pmatrix} 4 \\ 8 \\ 12 \\ 12 \end{pmatrix} \cdot in$ $\#Spaces_{vbar} = \begin{pmatrix} 6 \\ 10 \\ 4 \\ 1 \end{pmatrix}$

Foundation Summary

CheckReinfClearSpacing = "OK"

$CheckLongReinf_{shr.tor}$ = "OK"

CheckMaxSpacingTransvReinf = "OK"

OverlapDesign = "Based on Overlap of Failure Cones"

OverlapTest = "Overlap of Failure Cones"

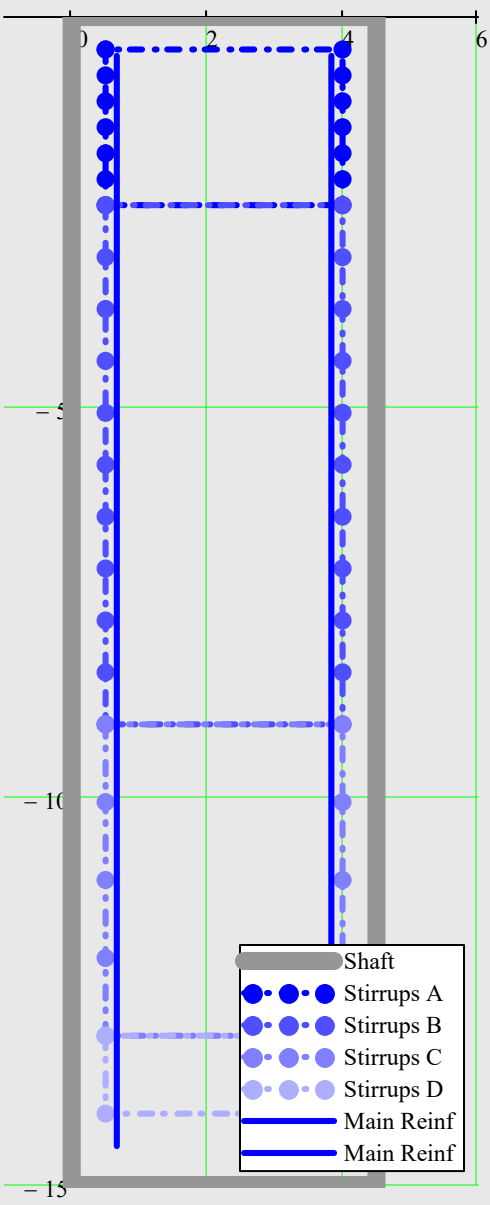
BreakoutTest = "OK"

Stirrups $s_{v_0} = 4 \cdot in$ @ $\#Spaces_{vbar_0} = 6$: $D/C_{torsion_0} = 0.2$

Stirrups 'RC' ($s_{v_1} = 8 \cdot in$) @ 'RD' ($\#Spaces_{vbar_1} = 10$) : $D/C_{torsion_1} = 0.3$

Stirrups 'RE' ($s_{v_2} = 12 \cdot in$) @ 'RF' ($\#Spaces_{vbar_2} = 4$) : $D/C_{torsion_2} = 0.3$

Stirrups $s_{v_3} = 12 \cdot in$ @ $\#Spaces_{vbar_3} = 1$



Offset = 0 ft

$d_{long.bar} = 1.41 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

'DA'= $L_{shaft} = 15 \cdot ft$

'DB'= $Diameter_{shaft} = 4.5 \cdot ft$

'BF'= $L_{embedment.anchor} = 40 \cdot in$

$L_{anchor.bolt} = 53 \cdot in$

'RA'= $\text{round}\left(\frac{d_{long.bar}}{0.125in}\right) = 11$

'RB'= $\#LongBars_{prov} = 15$

$\#Spaces_{vbar_0} = 6$

$s_{v_0} = 4 \cdot in$

'RC'= $\#Spaces_{vbar_1} = 10$

'RD'= $s_{v_1} = 8 \cdot in$

'RE'= $\#Spaces_{vbar_2} = 4$

'RF'= $s_{v_2} = 12 \cdot in$

$\#Spaces_{vbar_3} = 1$

$s_{v_3} = 12 \cdot in$

IX. Fatigue Analysis

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat"

$FatigueCategory_{galloping} := 2$ $FatigueCategory_{natural.wind} := 2$ ***SM V3 11.6***

Analyze Structure for Fatigue

Fatigue Summary

K1 values within 2% of LTS thresholds of 3.0 and 4.0 may use next higher CAFT values

Arm and Pole Welds

$Check_{galloping.arm1} = "OK"$	$f_{galloping.arm1} = 4.7 \cdot ksi$	$CAFT_{fullpengroove.weld.arm1} = 7 \cdot ksi$
$Check_{galloping.arm2} = "OK"$	$f_{galloping.arm2} = 2.6 \cdot ksi$	$CAFT_{fullpengroove.weld.arm2} = 10 \cdot ksi$
$Check_{galloping.pole} = "OK"$	$f_{galloping.pole} = 1.9 \cdot ksi$	$CAFT_{fullpengroove.weld.pole} = 4.5 \cdot ksi$
$Check_{nwg.arm1} = "OK"$	$f_{nwg.arm1} = 3.0 \cdot ksi$	$CAFT_{fullpengroove.weld.arm1} = 7 \cdot ksi$
$Check_{nwg.arm2} = "OK"$	$f_{nwg.arm2} = 1.7 \cdot ksi$	$CAFT_{fullpengroove.weld.arm2} = 10 \cdot ksi$
$Check_{nwg.pole} = "OK"$	$f_{nwg.pole} = 1.4 \cdot ksi$	$CAFT_{fullpengroove.weld.pole} = 4.5 \cdot ksi$

$$CheckK1Values = \begin{pmatrix} "K1 \text{ is outside of 2\% of K1 thresholds}" \\ "K1 \text{ is outside of 2\% of K1 thresholds}" \\ "K1 \text{ is outside of 2\% of K1 thresholds}" \end{pmatrix} \quad \begin{pmatrix} K_{I.arm1} \\ K_{I.arm2} \\ K_{I.pole} \end{pmatrix} = \begin{pmatrix} 3.460 \\ 2.873 \\ 6.307 \end{pmatrix} \quad \begin{pmatrix} "Arm\ 1\ Base\ Weld" \\ "Arm\ 2\ Base\ Weld" \\ "Upright\ Base\ Weld" \end{pmatrix}$$

A325 Connection Bolts

$$Check_{g.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix} \quad f_{t.g.bolt} = \begin{pmatrix} 3.3 \\ 0.9 \end{pmatrix} \cdot ksi \quad CAFT_{conn.bolt} = 16 \cdot ksi$$

$$Check_{nwg.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix} \quad f_{t.nwg.bolt} = \begin{pmatrix} 2.1 \\ 0.6 \end{pmatrix} \cdot ksi$$

Anchor Bolts

$Check_{g.anchor} = "OK"$	$f_{t.g.anchor} = 1.7 \cdot ksi$	$CAFT_{anchor.bolts} = 7 \cdot ksi$
$Check_{nwg.anchor} = "OK"$	$f_{t.nwg.anchor} = 1.3 \cdot ksi$	

Save Data File (optional)

☑ Use current input file

File Name Pole1_A50D-A30D-P3DL-DS1645.dat

Note: Select an output folder by using the "Change Folder" option above.

Save Data

Arm Designation Example

A70/D-A30/D/H-P5/D/L-DS/16/5

A70/D - *Arm 70 feet long, Double Arm*

A30/D/H - *Arm 30 feet long, Double Arm, Heavy Duty*

P5/D/L - *Pole 5 , Double Arm, with Luminaire*
DS/16/5 - *Drilled Shaft 16 ft deep, 5 foot diameter*

X. Mast Arm Design and Analysis Summary

InputDataFile = "Pole1_A50D-A30D-P3DL-DS1645.dat"

If comparing results to Standard Index 649-030, some values in the index have been increased to reduce the number of variations.

Subject = "Hollywood Blvd NW & Robinwood Dr NW **DesignedBy** = "LBP" 'L" **PoleLocation** = "STA509+84.12 / 43.98' LT"

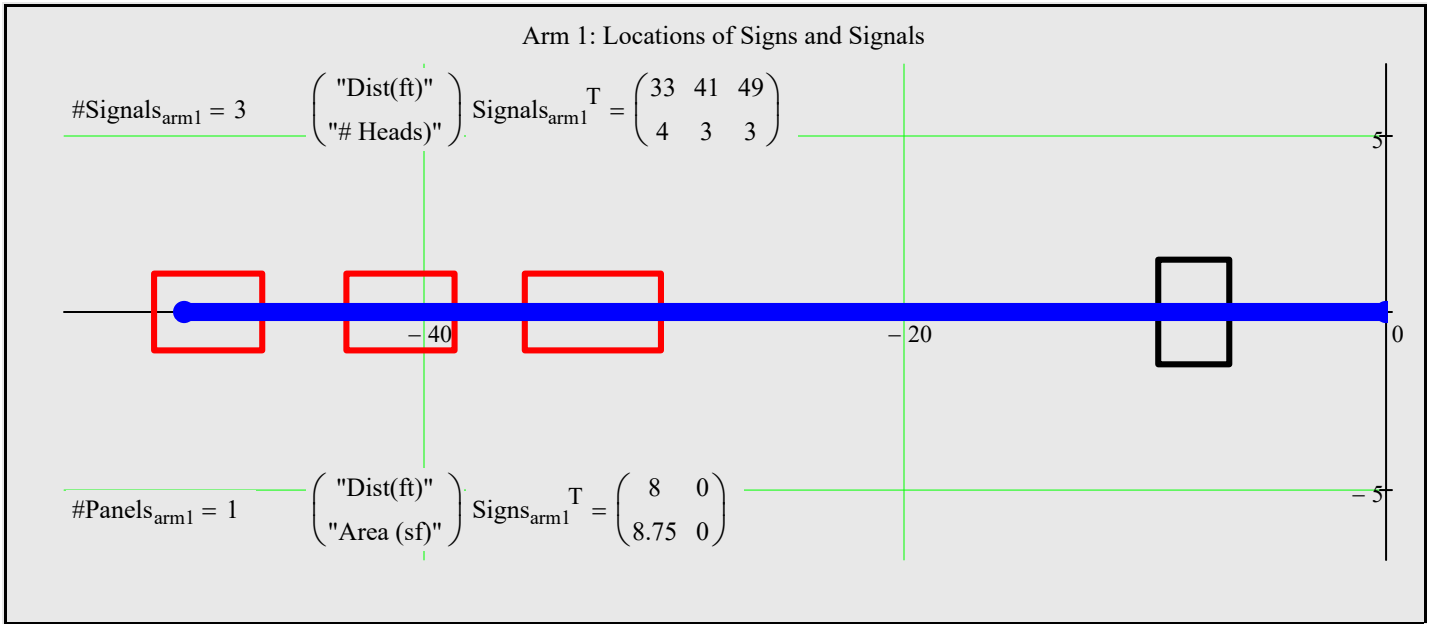
ProjectNo = "G19246" **CheckedBy** = "TB" **Date** = "9 / 21 / 2020"

ExistingMastArm = "No"

For FDOT Mast Arm Support Structures, $\max(CFI) \le 0.95$ ***(See Structures Manual Volume3)***

1st Mast Arm

$V_{extreme} = 150 \cdot mph$ ExistingMastArm = "No" BackPlate = "Rigid, 6 inches wide"

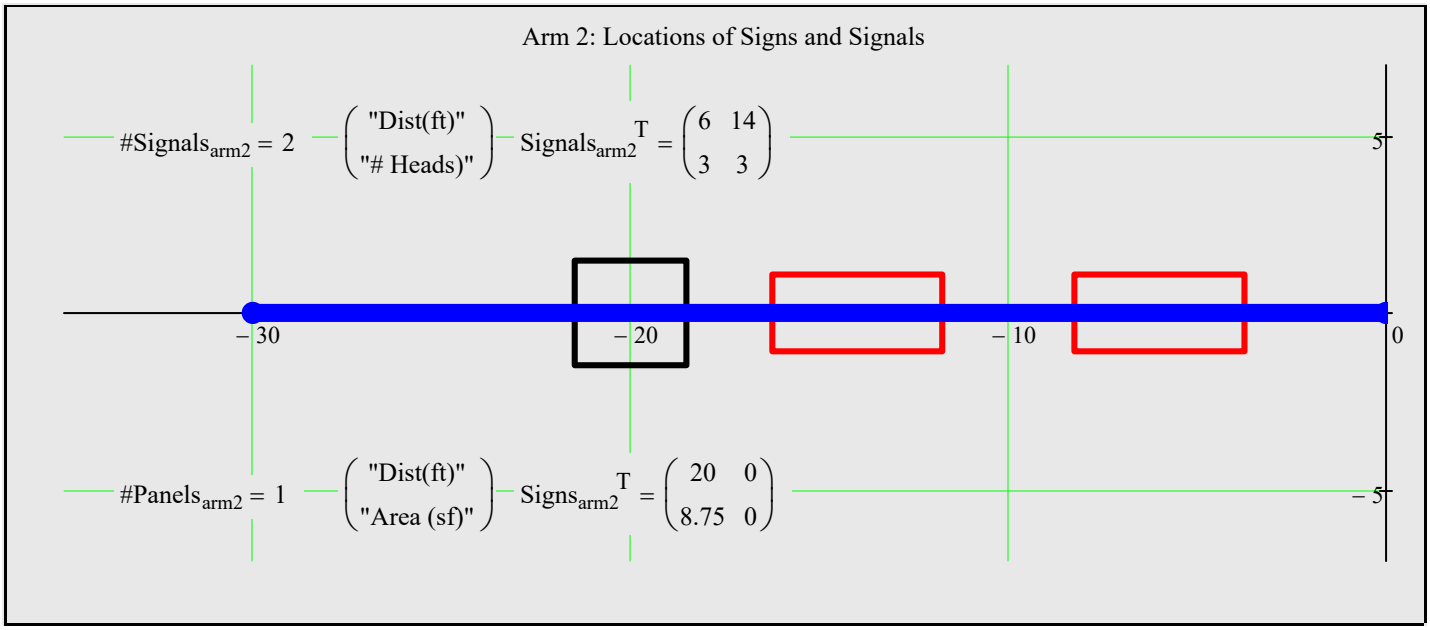


$\max(CFI_{arm1}) = 0.63$ $L_{total.arm1} = 50\,ft$ $L_{splice.provided.arm1} = 3.5 \cdot ft$ $\max(\Delta_{arm1}) = 7.6 \cdot in$

'FA'= 'FE'= $L_{fabricated.arm1} = \begin{pmatrix} 32.5 \\ 21 \end{pmatrix} \cdot ft$ 'FC'= 'FG'= $Diameter_{base.arm1} = \begin{pmatrix} 12.07 \\ 14.00 \end{pmatrix} \cdot in$

'FB'= 'FF'= $Diameter_{tip.arm1} = \begin{pmatrix} 7.52 \\ 11.06 \end{pmatrix} \cdot in$ 'FD'= 'FH'= $t_{wall.arm1} = \begin{pmatrix} 0.250 \\ 0.313 \end{pmatrix} \cdot in$

2nd Mast Arm



$\max(CFI_{arm2}) = 0.35$ $L_{total.arm2} = 30\,ft$ $L_{splice.provided.arm2} = 0 \cdot ft$ $\max(\Delta_{arm2}) = 1.6 \cdot in$

'SA'= 'SE'= $L_{fabricated.arm2} = \begin{pmatrix} 30 \\ 0 \end{pmatrix} \cdot ft$

'SC'= 'SG'= $Diameter_{base.arm2} = \begin{pmatrix} 11.00 \\ 0.00 \end{pmatrix} \cdot in$

'UF'= $\alpha = 90 \cdot deg$ **(Angle Between Arms)**

'SB'= 'SF'= $Diameter_{tip.arm2} = \begin{pmatrix} 6.80 \\ 0.00 \end{pmatrix} \cdot in$

'SD'= 'SH'= $t_{wall.arm2} = \begin{pmatrix} 0.250 \\ 0.000 \end{pmatrix} \cdot in$

Luminaire Arm and Connection *(use MC10x33.6 channel for connection)*

$$\begin{pmatrix} CFI_{base.lumarm} \\ CSR_{bolt.lum} \\ D/C_{baseplate.lum} \\ D/C_{conn.plate.lum} \end{pmatrix} = \begin{pmatrix} 0.00 \\ 7.17 \times 10^{-9} \\ 0.00 \\ 0.00 \end{pmatrix}$$

'LA'= $Y_{luminaire} = 0\,ft$

'LB'= $X_{luminaire} = 0\,ft$

'LC'= $Diameter_{base.lumarm} = 0 \cdot in$

'LD'= $t_{wall.lumarm} = 0 \cdot in$

'LE'= $Slope_{lumarm} = 0$

'LF'= $r_{lumarm} = 0\,ft$

'LG'= $d_{bolt.lum} = 0 \cdot in$

'LH'= $t_{baseplate.lum} = 0 \cdot in$

'LJ'= $w_{base.lum} = 0 \cdot in$

'LK'= $w_{channel.lum} = 0 \cdot in$

Upright

$\max(CFI_{pole}) = 0.36$ $Check_{deflection} = "OK"$ $Check_{slope} = "OK"$

'UA'= $Y_{pole} = 25 \cdot ft$

'UC'= $Diameter_{tip.pole} = 16.5 \cdot in$

'UE'= $t_{wall.pole} = 0.375 \cdot in$

'UB'= $Y_{arm.conn} = 21 \cdot ft$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'UF'= $\alpha = 90 \cdot deg$

'UG'= $Y_{lum.conn} = 0\ ft$

1st Arm to Upright Connection

$D/C_{ht.conn.plate} = 0.58$

'HT'= $h_{conn.plate} = 30 \cdot in$

$CheckHt_{conn.plate} = "OK"$

$\#Bolts_{conn_0} = 6$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

$D/C_{width.conn.plate_0} = 0.81$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FP'= $d_{bolt.conn_0} = 1.25 \cdot in$

$CheckWidth_{conn.plate_0} = "OK"$

'FK'= $t_{baseplate.arm_0} = 3 \cdot in$

'FR'= $t_{conn.plate_0} = 2 \cdot in$

$$\begin{pmatrix} D/C_{t.baseplate.arm_0} \\ CFI_{t.vert.plate_0} \\ CSR_{bolt.conn_0} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.29 \\ 0.12 \end{pmatrix}$$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FS'= $Spacing_{bolts.conn_0} = 12.5 \cdot in$

'FN'= $w_{vertical.plate_0} = \frac{1}{4} \cdot in$

'FT'= $w_{conn.plate_0} = \frac{5}{16} \cdot in$

2nd Arm to Upright Connection

$D/C_{width.conn.plate_1} = 0.81$

'HT'= $h_{conn.plate} = 30 \cdot in$

$CheckWidth_{conn.plate_1} = "OK"$

$\#Bolts_{conn_1} = 6$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

$$\begin{pmatrix} D/C_{t.baseplate.arm_1} \\ CFI_{t.vert.plate_1} \\ CSR_{bolt.conn_1} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.05 \\ 0.01 \end{pmatrix}$$

'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SP'= $d_{bolt.conn_1} = 1.25 \cdot in$

'SK'= $t_{baseplate.arm_1} = 3 \cdot in$

'SR'= $t_{conn.plate_1} = 2 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SS'= $Spacing_{bolts.conn_1} = 12.5 \cdot in$

'SN'= $w_{vertical.plate_1} = \frac{1}{4} \cdot in$

'ST'= $w_{conn.plate_1} = \frac{5}{16} \cdot in$

Pole Base Plate

$CSR_{anchor} = 0.15$

'#Bolts'= $\#AnchorBolts = 6$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

$CheckCSR_{anchorbolt} = "OK"$

$Diameter_{boltcircle.pole} = 28 \cdot in$

'BB'= $t_{baseplate.pole} = 2.5 \cdot in$

'BC'= $d_{anchorbolt} = 2.00 \cdot in$

'BF'= $L_{embedment.anchor} = 40 \cdot in$

$L_{anchor.bolt} = 53 \cdot in$

Foundation

$D/C_{torsion.max} = 0$

$CheckD/C_{shear.and.torsion} = "OK"$

$CheckReinfClearSpacing = "OK"$

$CheckLongReinf_{shr.tor} = "OK"$

$CheckMaxSpacingTransvReinf = "OK"$

$OverlapDesign = "Based on Overlap of Failure Cones"$

$OverlapTest = "Overlap of Failure Cones"$

$BreakoutTest = "OK"$

$Clearance_{csl.to.nut} = 2.5 \cdot in$

$Offset = 0\ ft$

$d_{long.bar} = 1.41 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

'DA'= $L_{shaft} = 15 \cdot ft$

'DB'= $Diameter_{shaft} = 4.5 \cdot ft$

'RA'= $round\left(\frac{d_{long.bar}}{0.125in}\right) = 11$

'RB'= $\#LongBars_{prov} = 15$

'RC'= $\#Spaces_{vbar_1} = 10$

'RD'= $s_{v_1} = 8 \cdot in$

'RE'= $\#Spaces_{vbar_2} = 4$

'RF'= $s_{v_2} = 12 \cdot in$

Fatigue

$Check_{galloping.arm1} = "OK"$

$Check_{galloping.arm2} = "OK"$

$Check_{galloping.pole} = "OK"$

$Check_{nwg.arm1} = "OK"$

$Check_{nwg.arm2} = "OK"$

$Check_{nwg.pole} = "OK"$

$Check_{g.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix}$

$Check_{nwg.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix}$

$Check_{g.anchor} = "OK"$

$Check_{nwg.anchor} = "OK"$

K1 values within 2% of LTS thresholds may use next higher CAFT values

$$CheckK1Values = \begin{pmatrix} "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \\ "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \\ "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \end{pmatrix}$$

$$\begin{pmatrix} K_{I.arm1} \\ K_{I.arm2} \\ K_{I.pole} \end{pmatrix} = \begin{pmatrix} 3.460 \\ 2.873 \\ 6.307 \end{pmatrix} \quad \begin{pmatrix} "Arm\ 1\ Base\ Weld" \\ "Arm\ 2\ Base\ Weld" \\ "Upright\ Base\ Weld" \end{pmatrix}$$

WRITEPRN to Line 1-2-3 for Mast Arm Data Table

Mast Arm Tip Deflection

Compare Mast Arm deflection of each arm to a proposed camber

$Camber_{arm1} := 2 \cdot deg$ $Camber_{arm2} := 2 \cdot deg$

$Deflection_{arm1} := Slope_x \cdot L_{total.arm1} + \max(\Delta_{arm1}) = 11.2 \cdot in$

$CamberArm1_{upward} := \sin(Camber_{arm1}) \cdot L_{total.arm1} = 20.9 \cdot in$

$Deflection_{arm2} := \left[Slope_z \cdot L_{total.arm2} \cdot (\sin(\alpha))\right] + Slope_x \cdot L_{total.arm2} \cdot \cos(\alpha) + \max(\Delta_{arm2}) = 2.2 \cdot in$

$CamberArm2_{upward} := \sin(Camber_{arm2}) \cdot L_{total.arm2} = 12.6 \cdot in$

Check Clearance Between Connection Plates *(for Two Arm Structures only)*

$\alpha = 90 \cdot deg$ $\alpha := if[(\alpha > 180 \cdot deg), (360 \cdot deg - \alpha), \alpha]$

$Offset_{conn_0} = 22.5 \cdot in$ $b_{conn.plate_0} = 36 \cdot in$ $h_{conn.plate} = 30 \cdot in$ $\alpha = 90 \cdot deg$

$Offset_{conn_1} = 22.5 \cdot in$ $b_{conn.plate_1} = 36 \cdot in$

$$x1 := Offset_{conn_0} - t_{conn.plate_0} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm1})}{2} = 20 \cdot in \qquad y1 := \frac{b_{conn.plate_0}}{2} = 18 \cdot in$$

$$x2 := \left(Offset_{conn_1} - t_{conn.plate_1} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm2})}{2}\right) \cdot \cos(\alpha) + \frac{b_{conn.plate_1}}{2} \cdot \sin(\alpha) = 18 \cdot in$$

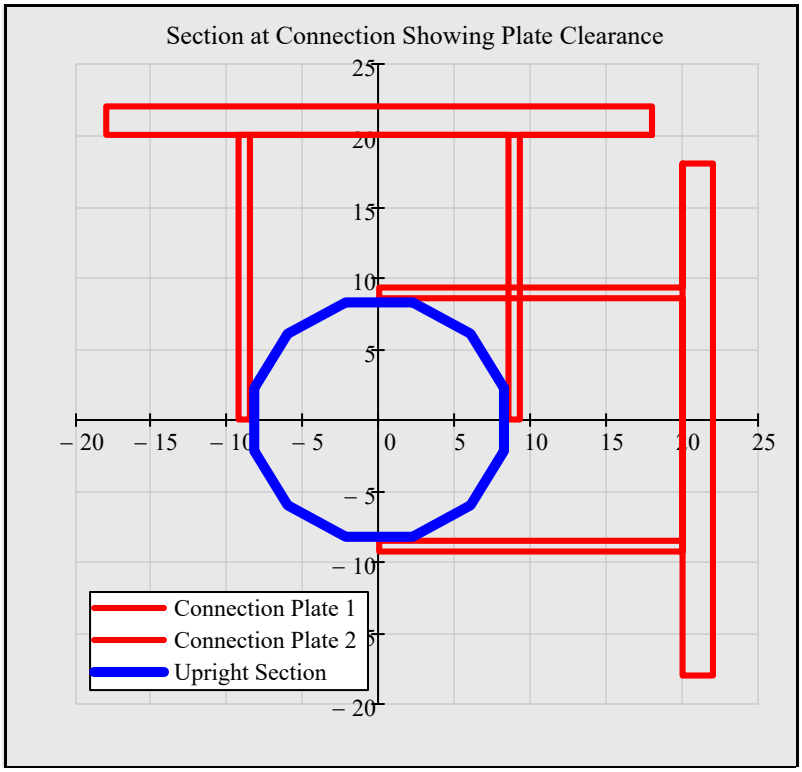
$$y2 := \left(Offset_{conn_1} - t_{conn.plate_1} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm2})}{2}\right) \cdot \sin(\alpha) - \frac{b_{conn.plate_1}}{2} \cdot \cos(\alpha) = 20 \cdot in$$

$Clearance_{plate.to.plate} := if\left[(x1 > x2) \cdot (y2 > y1), \sqrt{(x1 - x2)^2 + (y1 - y2)^2}, 0 \cdot in\right] = 2.9 \cdot in$

(if Clearance < 2 inches, a redesign is required.

Coordinates for Drawings

Plan View - Connection Plate Clearance for Two Arm Connections



$Clearance_{plate.to.plate} = 2.9 \cdot in$

$Diameter_{conn.pole} = 17.1 \cdot in$

'FR'= $t_{conn.plate_0} = 2 \cdot in$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

$Gap_0 = 14 \cdot in$

'SR'= $t_{conn.plate_1} = 2 \cdot in$

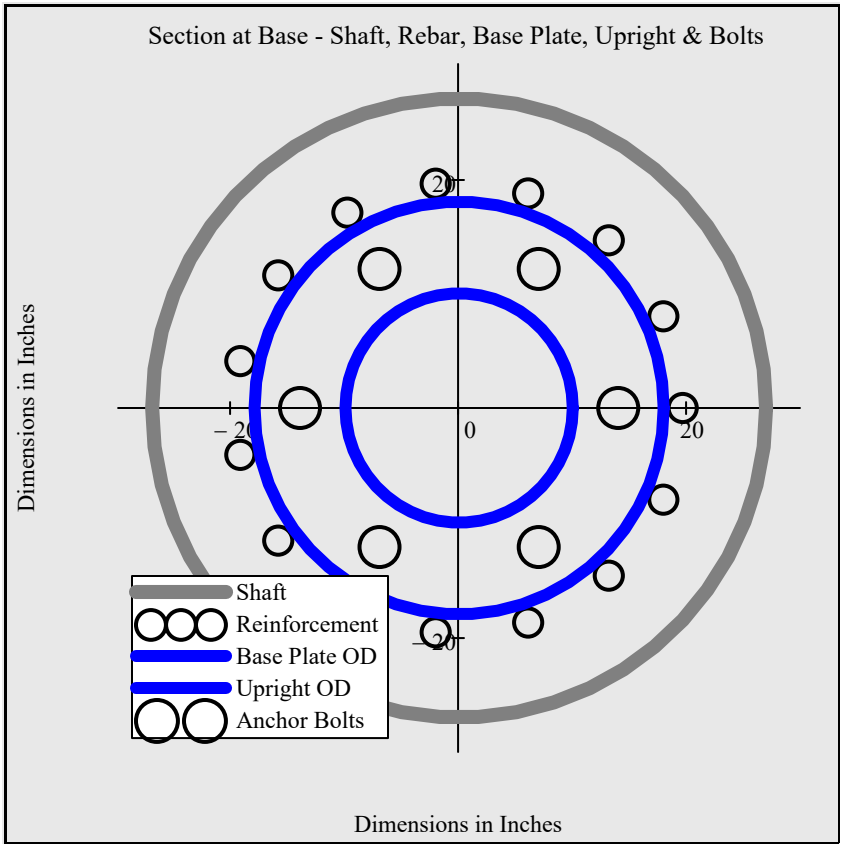
'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

$Gap_1 = 14 \cdot in$

Plan View - Drilled Shaft, Base Plate, Upright, Anchor Bolts, & Reinforcing Steel



$Clearance_{bar.to.nut} = 3.1 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

'DB'= $Diameter_{shaft} = 54 \cdot in$

$Diameter_{boltcircle.pole} = 28 \cdot in$

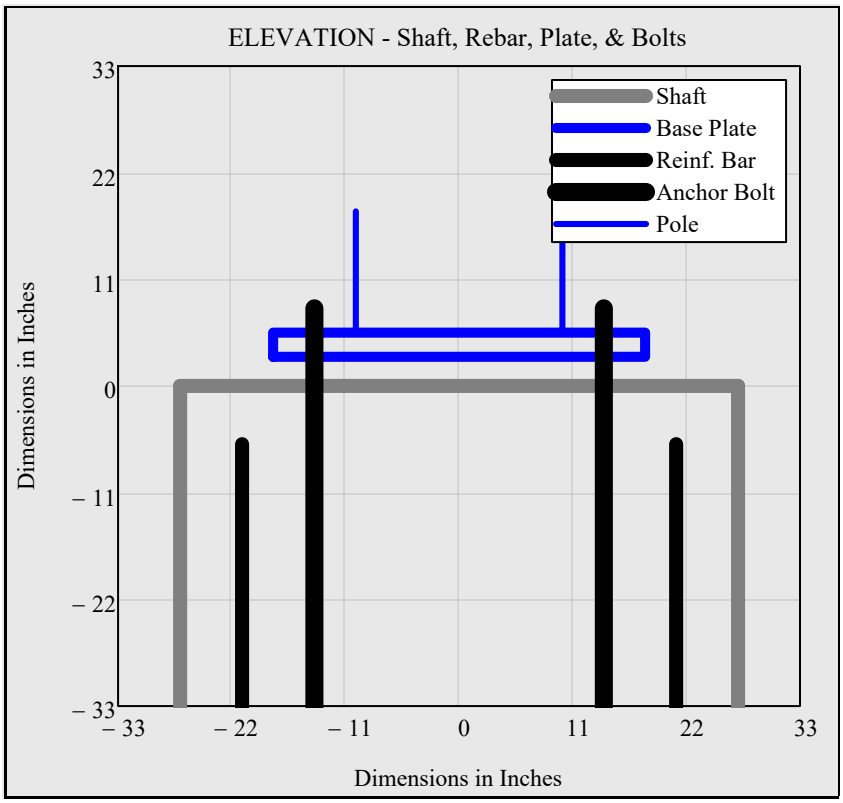
$Dia_{bar.circle} = 39.3 \cdot in$

$\#AnchorBolts = 6$

$\#LongBars_{prov} = 15$

Note: The Plan and Elevation Views do not show the 4 or 5 1.9" O.D. Nondestructive Integrity Testing Access Tubes that are tied to the inside of the reinforcing cage (see FDOT Spec 455-16.4).

Elevation View - Drilled Shaft, Base Plate, Anchor Bolts, & Reinforcing Steel



$Clearance_{bar.to.nut} = 3.1 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

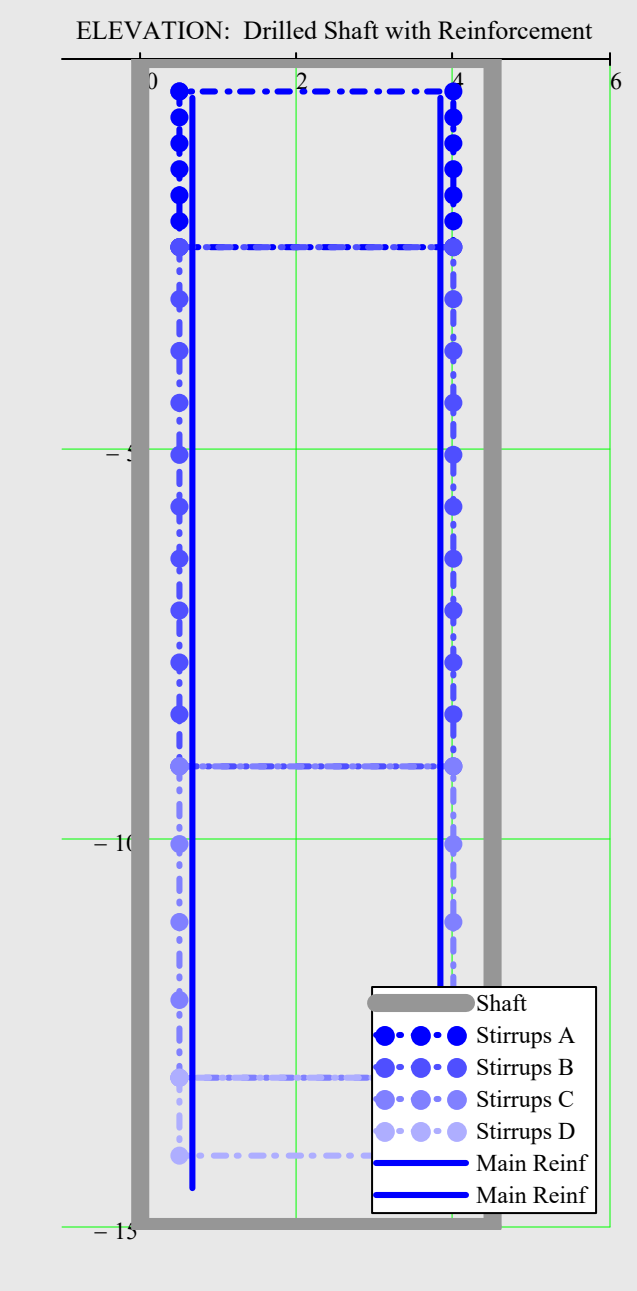
'BB'= $t_{baseplate.pole} = 2.5 \cdot in$

'DB'= $Diameter_{shaft} = 54 \cdot in$

$Diameter_{boltcircle.pole} = 28 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

Elevation View - Drilled Shaft with Main Reinforcement and Stirrups



$$s_v = \begin{pmatrix} 4 \\ 8 \\ 12 \\ 12 \end{pmatrix} \cdot \text{in} \qquad \textit{stirrup spacing}$$

$$\#\text{Spaces}_{vbar} = \begin{pmatrix} 6 \\ 10 \\ 4 \\ 1 \end{pmatrix} \qquad \textit{number of stirrup spaces}$$

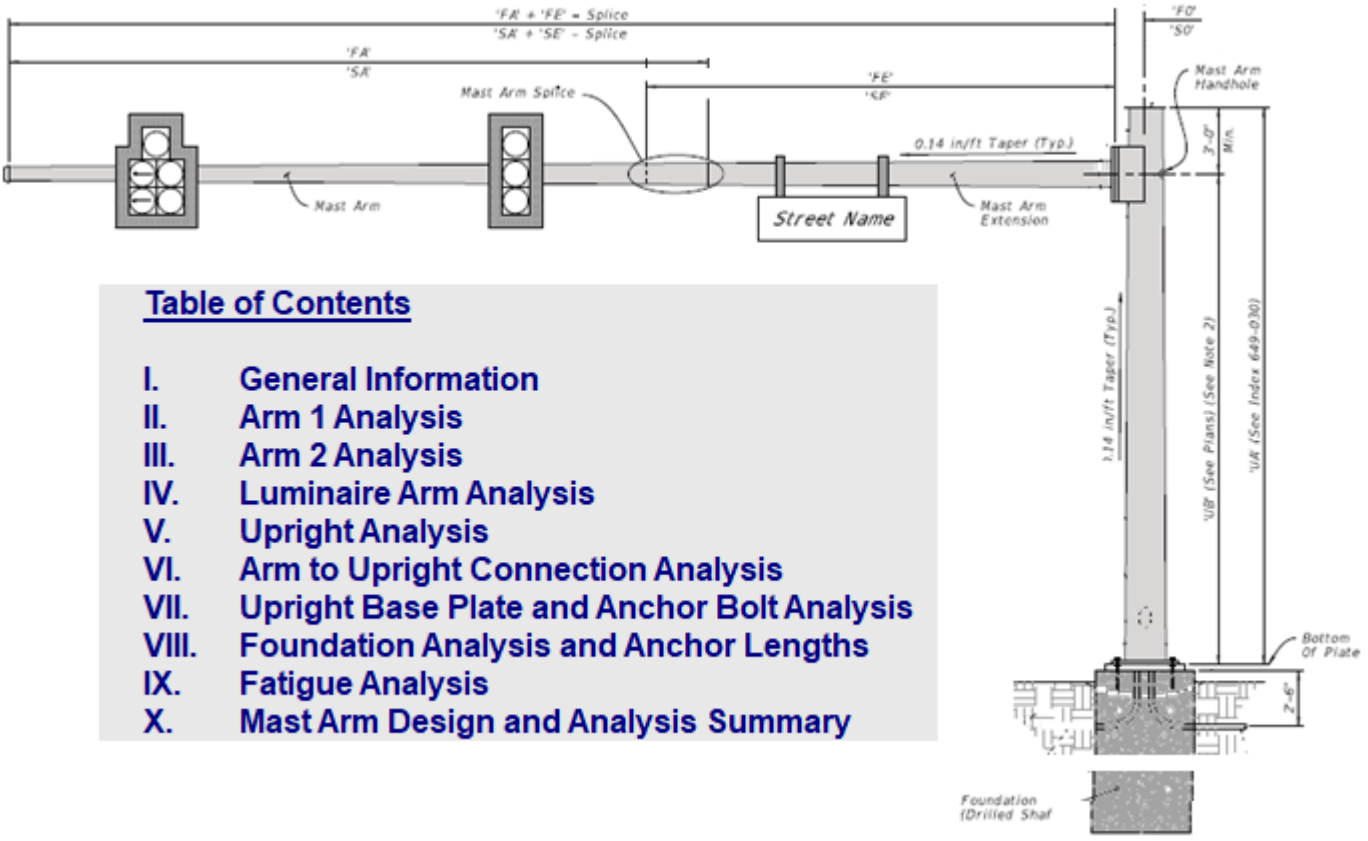
FDOT Mast Arm Traffic Signal Support Analysis Program V1.2

This program works in conjunction with FDOT Mast Arm Standard Plans 649-030 & 649-031.

References:
AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LRFDLTS).
FDOT Structures Manual Volume 3 (SM V3).
AISC Steel Construction Manual

For more information see Reference.xmcd and Changes.xmcd.

Reference



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III. Arm 2 Analysis
IV. Luminaire Arm Analysis
V. Upright Analysis
VI. Arm to Upright Connection Analysis
VII. Upright Base Plate and Anchor Bolt Analysis
VIII. Foundation Analysis and Anchor Lengths
IX. Fatigue Analysis
X. Mast Arm Design and Analysis Summary

Data Folder and Files

Data Files Folder

Change Folder

C:\Users\Engineer\Desktop\Engineering Software\2020 FDOT Mast Arm+Drilled Shaft Analysis v1.2\G19246 Fort Walton\Data\

Required - Open Existing Data File. To save New Data Files, enter data variables at the end of Section IX.

Refresh List

Open File

A78DH-A70D-P7DL-DS205.dat
A78DH-A70DH-P7DL-DS205.dat
A78DH-A78D-P7DL-DS205.dat
A78DH-A78DH-P7DL-DS205.dat
A78S-P6SL-DS185.dat
A78SH-P6SL-DS185.dat
Pole1_A50D-A30D-P3DL-DS1645.dat
Pole2_A50D-A30D-P3DL-DS1645.dat

I. General Information and Sign & Signal Data

Enter Project Information

Project Name	Hollywood Blvd NW _Robinwood Dr NW, Fort Walton Beach, FL		
Project No.	G19246		
Designed by	LBP	*Date*	9 / 21 / 2020
Checked by	TB	*Date*	9 / 23 / 2020
Signal Name	Pole 2 (Future Use)		
Station/Offset	STA509+41.28 / 32.20' RT		

Enter Wind Speed

Design Wind Speed 150 *mph*

Extreme Event Wind Speed

SDG Wind Speeds by County

Enter Arm Lengths, Signal and Sign Data

Arm 1

Arm 1 Length 50 Reset Arm 1 Data

Arm1 Signal Number	*Distance to Signal (ft)*	*Number of Heads*
1	33	4
2	41	3
3	49	3
4		
5		
6		
7		
8		
9		
10		

Arm 2 *Set Arm 2 Length = 0 for single arm Mast Arms*

Arm 2 Length 30 Reset Arm 2 Data

Arm2 Signal Number	*Distance to Signal (ft)*	*Number of Heads*
1	13.5	3
2	21.5	3
3		
4		
5		
6		
7		
8		
9		
10		

Arm 1 Sign Panels

Arm1 Sign Panel Number	*Distance to Panel (ft)*	*Panel Area (sf)*
1	8	8.75
2		
3		
4		
5		

Arm 2 Sign Panels

Arm2 Sign Panel Number	*Distance to Panel (ft)*	*Panel Area (sf)*
1	8	8.75
2		
3		
4		
5		

Save Data for Signs and Signals

II. Arm 1 Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Values for $Dist_{splice.from.base.arm}$ *that give a base diameter in even inches*

"Wall Thickness"	"dia-1in"	"dia-2in"	"dia-3in"	"dia-4in"	"dia-5in"	"d-6in"
$t_{wall.arm} = 0.179 \cdot in$	***9.9***·ft	***17.0***·ft	***24.2***·ft	***31.3***·ft	***38.5***·ft	***45.6***·ft
$t_{wall.arm} = 0.25 \cdot in$	***10.9***·ft	***18.0***·ft	***25.2***·ft	***32.3***·ft	***39.4***·ft	***46.6***·ft

Help - Base Diameters | Help - Arm Tip Diameter | Help - Tube Wall Thickness | Help - Arm Lengths | Recommended Distance to Splice

Reference:C:\Users\Engineer\Desktop\Engineering Software\2020 FDOT Mast Arm+Drilled Shaft Analysis v1.2\G19246 Fort Walton\LRFD Equ

Enter Arm 1 Data

Arm Length (ft)	*Base Diameter (in)*	*Wall Thickness 1 (in)*	*Wall Thickness 2 (in)*	*Distance to Splice (ft)*
$L_{total.arm1} = 50\,ft$	14	0.25	0.3125	17.5
feet, 40 ft. max. for 1 piece arms	*Measured flat to flat* **'FG'**	*for 1 & 2 piece arms* **'FD'**	*for 2 piece arms only* **'FH'**	*for 2 piece arms only* **('Larm' - 'FA')**

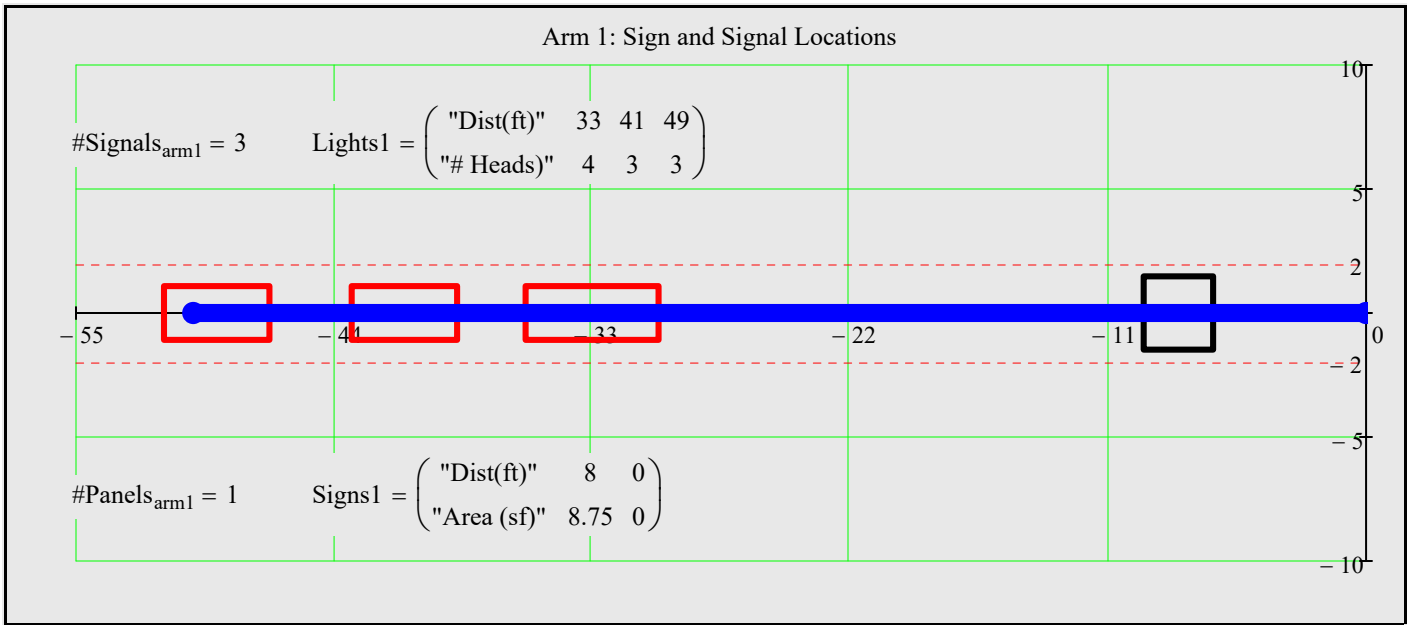
Arm 1 Analysis including Existing Mast Arm Analysis (Additional Variables Required)

Arm 1 Combined Force Interaction Ratio and Deflection

BackPlate = "Rigid, 6 inches wide"

$\max(CFI_{arm1}) = 0.63$ $\max(\Delta_{arm1}) = 7.6 \cdot in$ $2 \cdot deg \cdot L_{total.arm1} = 20.9 \cdot in$

Summary - Arm 1 Geometry and Loading



$\max(CFI_{arm1}) = 0.63$

$\max(\Delta_{arm1}) = 7.6 \cdot in$

$L_{total.arm1} = 50\,ft$

'FA'= 'FE'= $L_{fabricated.arm1} = \begin{pmatrix} 32.5 \\ 21.0 \end{pmatrix} \cdot ft$

'FB'= 'FF'= $Diameter_{tip.arm1} = \begin{pmatrix} 7.52 \\ 11.06 \end{pmatrix} \cdot in$

'FC'= 'FG'= $Diameter_{base.arm1} = \begin{pmatrix} 12.07 \\ 14.00 \end{pmatrix} \cdot in$

'FD'= 'FH'= $t_{wall.arm1} = \begin{pmatrix} 0.250 \\ 0.313 \end{pmatrix} \cdot in$

$Classification_{arm1} = \begin{pmatrix} "Compact" \\ "Compact" \end{pmatrix}$

$L_{splice.provided.arm1} = 3.5 \cdot ft$

III. Arm 2 Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat" $V_{extreme}$ = 150·mph

$Dist_{splice.from.base.arm}$ *values that give a base diameter in even inches*

"Wall Thickness"	Δdia = 1·in	Δdia = 2·in	Δdia = 3·in	Δdia = 4·in	Δdia = 5·in	Δdia = 6·in
$t_{wall.arm}$ = 0.179·in	***9.9***·ft	***17.0***·ft	***24.2***·ft	***31.3***·ft	***38.5***·ft	***45.6***·ft
$t_{wall.arm}$ = 0.25·in	***10.9***·ft	***18.0***·ft	***25.2***·ft	***32.3***·ft	***39.4***·ft	***46.6***·ft

Help - Base Diameters | Help - Arm Tip Diameter | Help - Tube Wall Thickness | Help - Arm Lengths | Recommended Distance to Splice

Enter Arm 2 Data

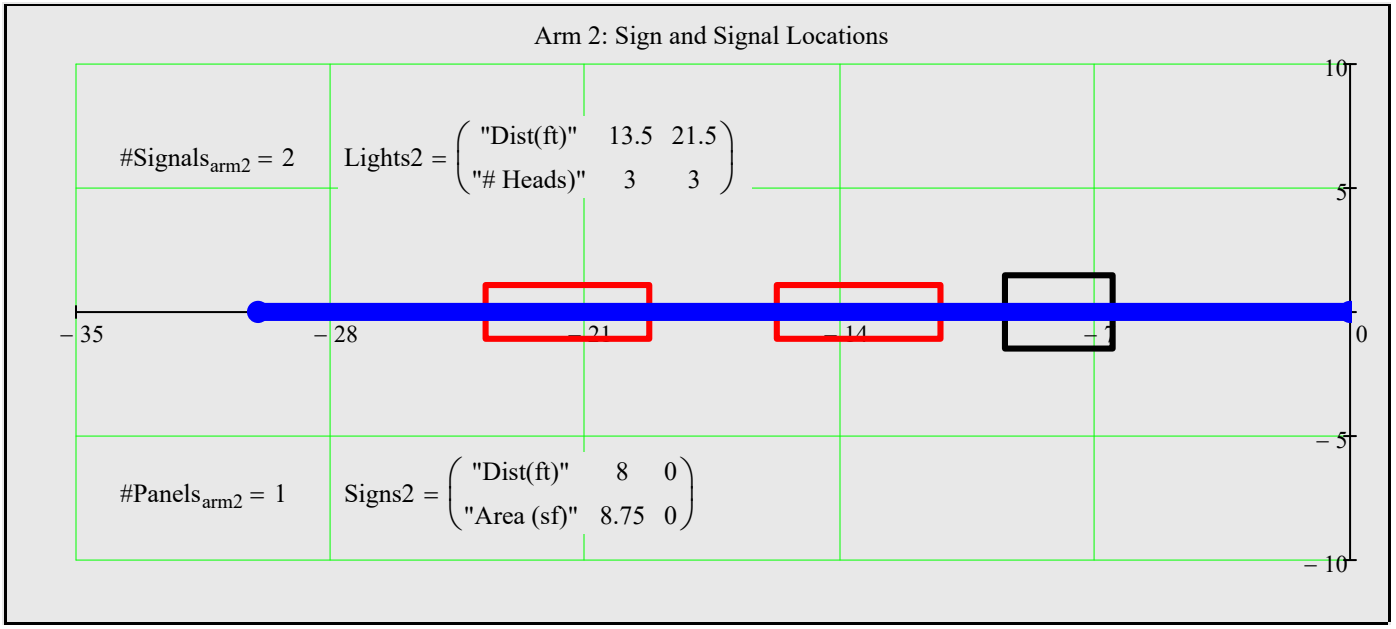
Arm Length (ft)	*Base Diameter (in)*	*Wall Thickness 1 (in)*	*Wall Thickness 2 (in)*	*Distance to Splice (ft)*
$L_{total.arm2}$ = 30 ft	11	0.25		
feet, 40 ft. max. for 1 piece arms	*Measured flat to flat* **'SG'**	*for 1 & 2 piece arms* **'SD'**	*for 2 piece arms only* **'SH'**	*for 2 piece arms only (***'Larm' - 'SA'***)*

Arm 2 Analysis including Existing Mast Arm Analysis

Arm 2 Combined Force Interaction Ratio and Deflection

$\max(CFI_{arm2})$ = 0.38 BackPlate = "Rigid, 6 inches wide"

Summary - Arm 2 Geometry and Loading $\max(\Delta_{arm2})$ = 1.7·in 2·deg·$L_{total.arm2}$ = 12.6·in



$\max(CFI_{arm2})$ = 0.38

$\max(\Delta_{arm2})$ = 1.7·in

$L_{total.arm2}$ = 30 ft

'SA'= 'SE'= $L_{fabricated.arm2} = \begin{pmatrix} 30.0 \\ 0.0 \end{pmatrix}$·ft

'SB'= 'SF'= $Diameter_{tip.arm2} = \begin{pmatrix} 6.80 \\ 0.00 \end{pmatrix}$·in

'SC'= 'SG'= $Diameter_{base.arm2} = \begin{pmatrix} 11.00 \\ 0.00 \end{pmatrix}$·in

'SD'= 'SH'= $t_{wall.arm2} = \begin{pmatrix} 0.250 \\ 0.000 \end{pmatrix}$·in

$Classification_{arm2} = \begin{pmatrix} \text{"Compact"} \\ \text{"N/A"} \end{pmatrix}$

$L_{splice.provided.arm2}$ = 0·ft

IV. Luminaire Arm Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Enter Luminaire Data

Set Lum. Ht. = 0 for no Luminaire

See Design Standards 649-030 and 649-031 for input values.

Luminaire Height (ft)	Lum Horiz Length (ft)	Lum Arm Base Dia (in)	Lum Wall Thickness (in)	Slope	Lum Arm Radius (ft)	Lum Bolt Dia (in)	Lum Base Plate Thickness (in)
0							
Std = 40 feet	10 feet	3 inches	0.125 inches	0.5	8 feet	0.5 inches	0.75 inches

Analyze Luminaire

Summary - Luminaire Arm Geometry

$$\begin{pmatrix} CFI_{base.lumarm} \\ CSR_{bolt.lum} \\ D/C_{baseplate.lum} \\ D/C_{conn.plate.lum} \end{pmatrix} = \begin{pmatrix} 0.00 \\ 0.00 \\ 0.00 \\ 0.00 \end{pmatrix}$$

'LA'= $Y_{luminaire} = 0\ ft$

'LB'= $X_{luminaire} = 0\ ft$

'LC'= $Diameter_{base.lumarm} = 0 \cdot in$

'LD'= $t_{wall.lumarm} = 0 \cdot in$

'LE'= $Slope_{lumarm} = 0$

'LF'= $r_{lumarm} = 0\ ft$

'LG'= $d_{bolt.lum} = 0 \cdot in$

'LH'= $t_{baseplate.lum} = 0 \cdot in$

'LJ'= $w_{base.lum} = 0 \cdot in$

'LK'= $w_{channel.lum} = 0 \cdot in$

V. Upright Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat" $V_{extreme} = 150 \cdot mph$

Help - Upright Base Diameter and Wall Thickness | Help - Gap Distance

Enter Upright Data

Total Height (ft)	Height to Arm Connection (ft)	Base Diameter (in)	Wall Thickness (in)	Gap (in)	
25	21	20	0.375	14.0	arm 1 gap
				14.0	arm 2 gap
'UA'	'UB'	'UD' measured flat to flat	'UE'		

Analyze Upright

Upright Combined Force Interaction Ratio and Deflections

Classification$_{pole}$ = "Compact"

$\max(CFI_{pole}) = 0.36$

$Check_{slope}$ = "OK"

$Check_{deflection}$ = "OK"

$\max(\Delta_{x.dl}) = 0.7 \cdot in$

$\max(\Delta_{z.dl}) = -0.2 \cdot in$

$Slope_z = 0.1 \cdot deg$

$Slope_x = 0.34 \cdot deg$

$Diameter_{conn.pole} = 17.1 \cdot in$

$$\max\begin{pmatrix} Diameter_{base.arm1_0} \\ Diameter_{base.arm2_0} \end{pmatrix} = 12.1 \cdot in$$

'UA'= $Y_{pole} = 25 \cdot ft$

'UB'= $Y_{arm.conn} = 21 \cdot ft$

'UC'= $Diameter_{tip.pole} = 16.5 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'UE'= $t_{wall.pole} = 0.375 \cdot in$

'UF'= $\alpha = 90 \cdot deg$

'UG'= $Y_{lum.conn} = 0\ ft$

VI. Arm to Upright Connection Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat"

for double arms, both connection plate heights must be equal

Help - Arm Connection Dimensions

Enter Connection Data

Connection Plate Height(in)	Connection Plate Width (in)	Vertical Plate Thickness (in)	Bolt Diameter (in)	Arm Base Plate Thickness (in)
30	36	0.75	1.25	3
	36	0.75	1.25	3
'HT'	'FJ', 'SJ'	'FL', 'SL'	'FP', 'SP'	'FK', 'SK'

Analyze Connection

Connection Summary

'HT'= $h_{conn.plate} = 30 \cdot in$ $D/C_{ht.conn.plate} = 0.58$ $CheckHt_{conn.plate} = "OK"$

$D/C_{width.conn.plate_0} = 0.81$

$CheckWidth_{conn.plate_0} = "OK"$

$$\begin{pmatrix} D/C_{t.baseplate.arm_0} \\ CFI_{t.vert.plate_0} \\ CSR_{bolt.conn_0} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.29 \\ 0.12 \end{pmatrix}$$

$\#Bolts_{conn_0} = 6$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FK'= $t_{baseplate.arm_0} = 3.00 \cdot in$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FN'= $w_{vertical.plate_0} = \frac{1}{4} \cdot in$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

'FP'= $d_{bolt.conn_0} = 1.25 \cdot in$

'FR'= $t_{conn.plate_0} = 2.00 \cdot in$

'FS'= $Spacing_{bolts.conn_0} = 12.5 \cdot in$

'FT'= $w_{conn.plate_0} = \frac{5}{16} \cdot in$

$D/C_{width.conn.plate_1} = 0.81$

$CheckWidth_{conn.plate_1} = "OK"$

$$\begin{pmatrix} D/C_{t.baseplate.arm_1} \\ CFI_{t.vert.plate_1} \\ CSR_{bolt.conn_1} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.06 \\ 0.01 \end{pmatrix}$$

$\#Bolts_{conn_1} = 6$

'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SK'= $t_{baseplate.arm_1} = 3.00 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SN'= $w_{vertical.plate_1} = \frac{1}{4} \cdot in$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

'SP'= $d_{bolt.conn_1} = 1.25 \cdot in$

'SR'= $t_{conn.plate_1} = 2.00 \cdot in$

'SS'= $Spacing_{bolts.conn_1} = 12.50 \cdot in$

'ST'= $w_{conn.plate_1} = \frac{5}{16} \cdot in$

VII. Upright Base Plate & Anchor Bolt Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat"

Enter Anchorage Data

Anchor Bolt Diameter (in)	Number of Anchor Bolts
2	6
'BC'	'#Bolts'

Help - Number of Anchor Bolts

$Diameter_{base.pole} = 20 \cdot in$

Analyze Base Plate & Anchors

Base Plate and Anchor Summary

'#Bolts'= #AnchorBolts = 6

'BB'= $t_{baseplate.pole} = 2.50 \cdot in$

$CSR_{anchor} = 0.15$

$Diameter_{boltcircle.pole} = 28 \cdot in$

'BC'= $d_{anchorbolt} = 2.00 \cdot in$

$CheckCSR_{anchorbolt}$ = "OK"

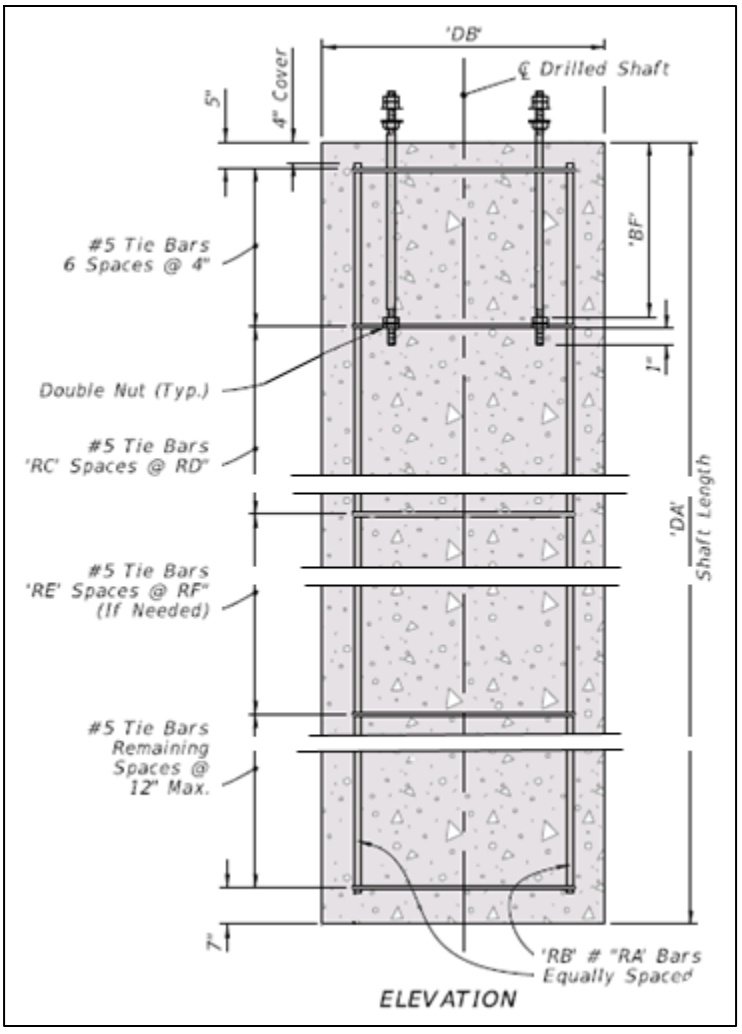
'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

VIII. Foundation Analysis & Anchor Bolt Lengths

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat"

Enter Drilled Shaft Data

Soil Type	Sand / Clay	
Soil Density, γ_{soil} (45-50 pcf typ.)	50	pcf
Friction Angle, ϕ (Sands)	29	deg
SPT Number (N_{blows} 5 min.,) (Sands)	6	
Shear Strength, c (Clays)	2000	psf
Ground to Top of Shaft Offset	0.0	ft
First Set of User Defined Stirrups:		
Number of Stirrup Spaces 'RC'	10	
Stirrup Spacing 'RD'	8	in
Second Set of User Defined Stirrups:		
Number of Stirrup Spaces 'RE' *enter zero for 12 inch spacing*	4	
Stirrup Spacing 'RF' *enter zero for 12 inch spacing*	12	in
Stirrup Bar Size, use #5 for all Standard Shafts	#5 / #6	



Analyze Foundation

Shaft Length *Stirrup spacing* *Number of stirrup spaces*

$L_{shaft} = 18\,ft$ $s_v = \begin{pmatrix} 4 \\ 8 \\ 12 \\ 12 \end{pmatrix} \cdot in$ $\#Spaces_{vbar} = \begin{pmatrix} 6 \\ 10 \\ 4 \\ 4 \end{pmatrix}$

Foundation Summary

CheckReinfClearSpacing = "OK"

$CheckLongReinf_{shr.tor}$ = "OK"

CheckMaxSpacingTransvReinf = "OK"

OverlapDesign = "Based on Overlap of Failure Cones"

OverlapTest = "Overlap of Failure Cones"

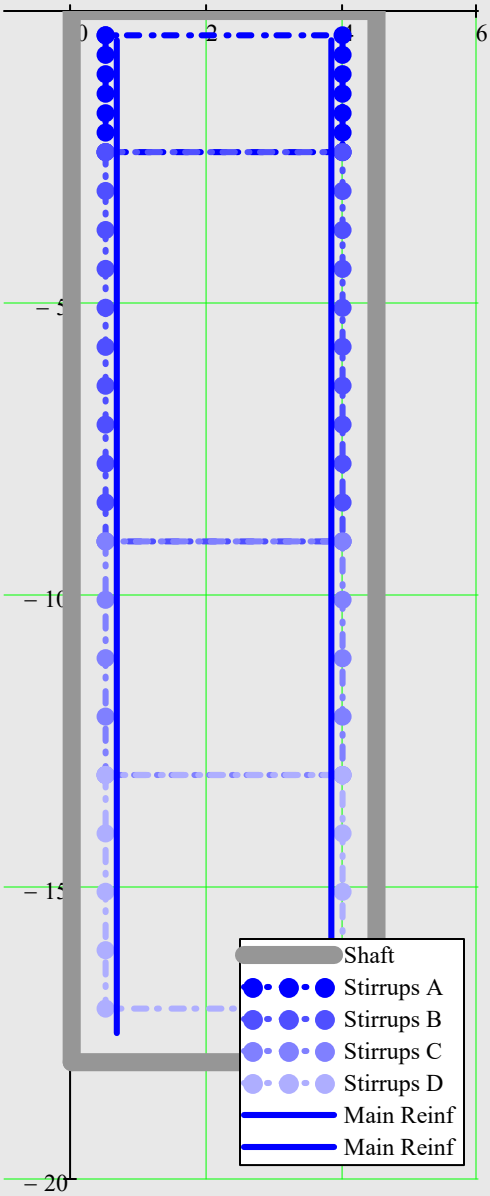
BreakoutTest = "OK"

Stirrups $s_{v_0} = 4 \cdot in$ @ $\#Spaces_{vbar_0} = 6$: $D/C_{torsion_0} = 0.2$

Stirrups 'RC' ($s_{v_1} = 8 \cdot in$) @ 'RD' ($\#Spaces_{vbar_1} = 10$) : $D/C_{torsion_1} = 0.3$

Stirrups 'RE' ($s_{v_2} = 12 \cdot in$) @ 'RF' ($\#Spaces_{vbar_2} = 4$) : $D/C_{torsion_2} = 0.4$

Stirrups $s_{v_3} = 12 \cdot in$ @ $\#Spaces_{vbar_3} = 4$



Offset = 0 ft

$d_{long.bar} = 1.41 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

'DA'= $L_{shaft} = 18 \cdot ft$

'DB'= $Diameter_{shaft} = 4.5 \cdot ft$

'BF'= $L_{embedment.anchor} = 40 \cdot in$

$L_{anchor.bolt} = 53 \cdot in$

'RA'= $\text{round}\left(\frac{d_{long.bar}}{0.125in}\right) = 11$

'RB'= $\#LongBars_{prov} = 15$

$\#Spaces_{vbar_0} = 6$

$s_{v_0} = 4 \cdot in$

'RC'= $\#Spaces_{vbar_1} = 10$

'RD'= $s_{v_1} = 8 \cdot in$

'RE'= $\#Spaces_{vbar_2} = 4$

'RF'= $s_{v_2} = 12 \cdot in$

$\#Spaces_{vbar_3} = 4$

$s_{v_3} = 12 \cdot in$

IX. Fatigue Analysis

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat"

$FatigueCategory_{galloping} := 2$ $FatigueCategory_{natural.wind} := 2$ ***SM V3 11.6***

Analyze Structure for Fatigue

Fatigue Summary

K1 values within 2% of LTS thresholds of 3.0 and 4.0 may use next higher CAFT values

Arm and Pole Welds

$Check_{galloping.arm1} = "OK"$	$f_{galloping.arm1} = 4.7 \cdot ksi$	$CAFT_{fullpengroove.weld.arm1} = 7 \cdot ksi$
$Check_{galloping.arm2} = "OK"$	$f_{galloping.arm2} = 2.9 \cdot ksi$	$CAFT_{fullpengroove.weld.arm2} = 10 \cdot ksi$
$Check_{galloping.pole} = "OK"$	$f_{galloping.pole} = 1.9 \cdot ksi$	$CAFT_{fullpengroove.weld.pole} = 4.5 \cdot ksi$
$Check_{nwg.arm1} = "OK"$	$f_{nwg.arm1} = 3.0 \cdot ksi$	$CAFT_{fullpengroove.weld.arm1} = 7 \cdot ksi$
$Check_{nwg.arm2} = "OK"$	$f_{nwg.arm2} = 1.8 \cdot ksi$	$CAFT_{fullpengroove.weld.arm2} = 10 \cdot ksi$
$Check_{nwg.pole} = "OK"$	$f_{nwg.pole} = 1.4 \cdot ksi$	$CAFT_{fullpengroove.weld.pole} = 4.5 \cdot ksi$

$$CheckK1Values = \begin{pmatrix} "K1 \text{ is outside of 2\% of K1 thresholds}" \\ "K1 \text{ is outside of 2\% of K1 thresholds}" \\ "K1 \text{ is outside of 2\% of K1 thresholds}" \end{pmatrix} \quad \begin{pmatrix} K_{I.arm1} \\ K_{I.arm2} \\ K_{I.pole} \end{pmatrix} = \begin{pmatrix} 3.460 \\ 2.873 \\ 6.307 \end{pmatrix} \quad \begin{pmatrix} "Arm\ 1\ Base\ Weld" \\ "Arm\ 2\ Base\ Weld" \\ "Upright\ Base\ Weld" \end{pmatrix}$$

A325 Connection Bolts

$$Check_{g.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix} \quad f_{t.g.bolt} = \begin{pmatrix} 3.3 \\ 1.0 \end{pmatrix} \cdot ksi \quad CAFT_{conn.bolt} = 16 \cdot ksi$$

$$Check_{nwg.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix} \quad f_{t.nwg.bolt} = \begin{pmatrix} 2.1 \\ 0.6 \end{pmatrix} \cdot ksi$$

Anchor Bolts

$Check_{g.anchor} = "OK"$	$f_{t.g.anchor} = 1.7 \cdot ksi$	$CAFT_{anchor.bolts} = 7 \cdot ksi$
$Check_{nwg.anchor} = "OK"$	$f_{t.nwg.anchor} = 1.3 \cdot ksi$	

Save Data File (optional)

☑ Use current input file

File Name Pole2_A50D-A30D-P3DL-DS1645.dat

Note: Select an output folder by using the "Change Folder" option above.

Save Data

Arm Designation Example

A70/D-A30/D/H-P5/D/L-DS/16/5

A70/D - *Arm 70 feet long, Double Arm*

A30/D/H - *Arm 30 feet long, Double Arm, Heavy Duty*

P5/D/L - *Pole 5 , Double Arm, with Luminaire*
DS/16/5 - *Drilled Shaft 16 ft deep, 5 foot diameter*

X. Mast Arm Design and Analysis Summary

InputDataFile = "Pole2_A50D-A30D-P3DL-DS1645.dat"

If comparing results to Standard Index 649-030, some values in the index have been increased to reduce the number of variations.

Subject = "Hollywood Blvd NW & Robinwood Dr NW **DesignedBy** = "LBP" "L" **PoleLocation** = "STA509+41.28 / 32.20' RT"

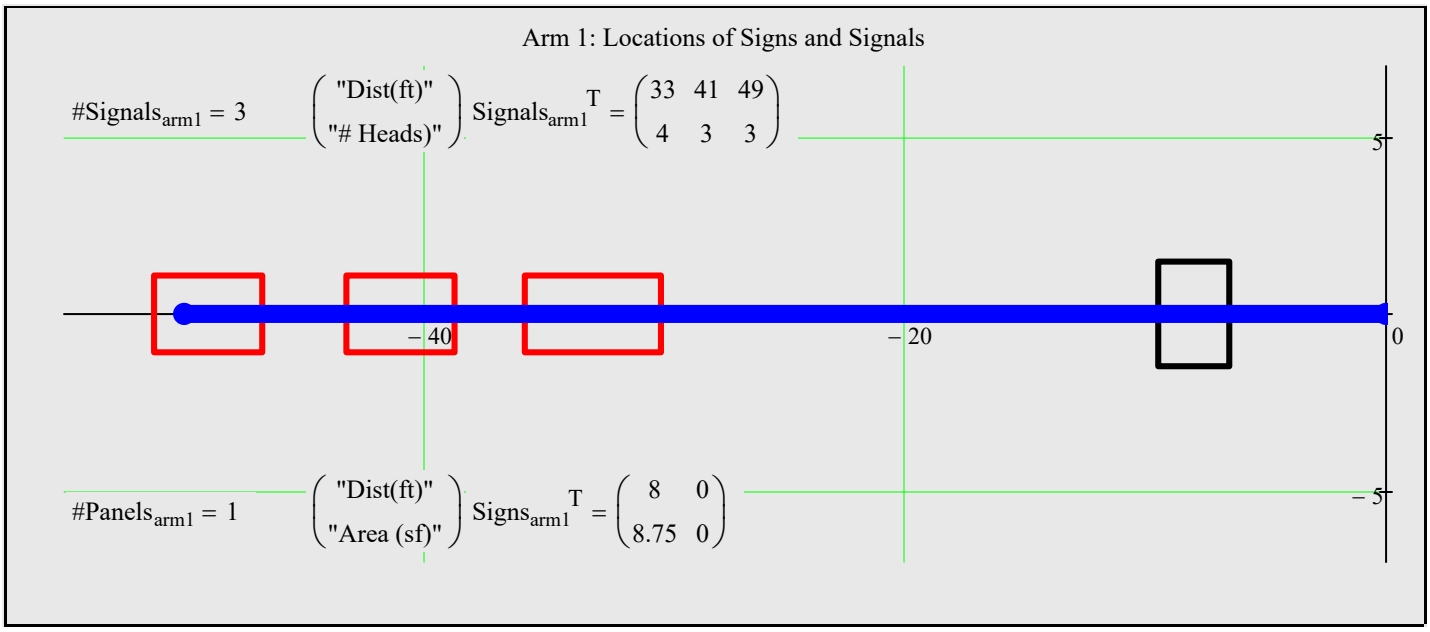
ProjectNo = "G19246" **CheckedBy** = "TB" **Date** = "9 / 21 / 2020"

ExistingMastArm = "No"

For FDOT Mast Arm Support Structures, $\max(CFI) \le 0.95$ ***(See Structures Manual Volume3)***

1st Mast Arm

$V_{extreme} = 150 \cdot mph$ ExistingMastArm = "No" BackPlate = "Rigid, 6 inches wide"

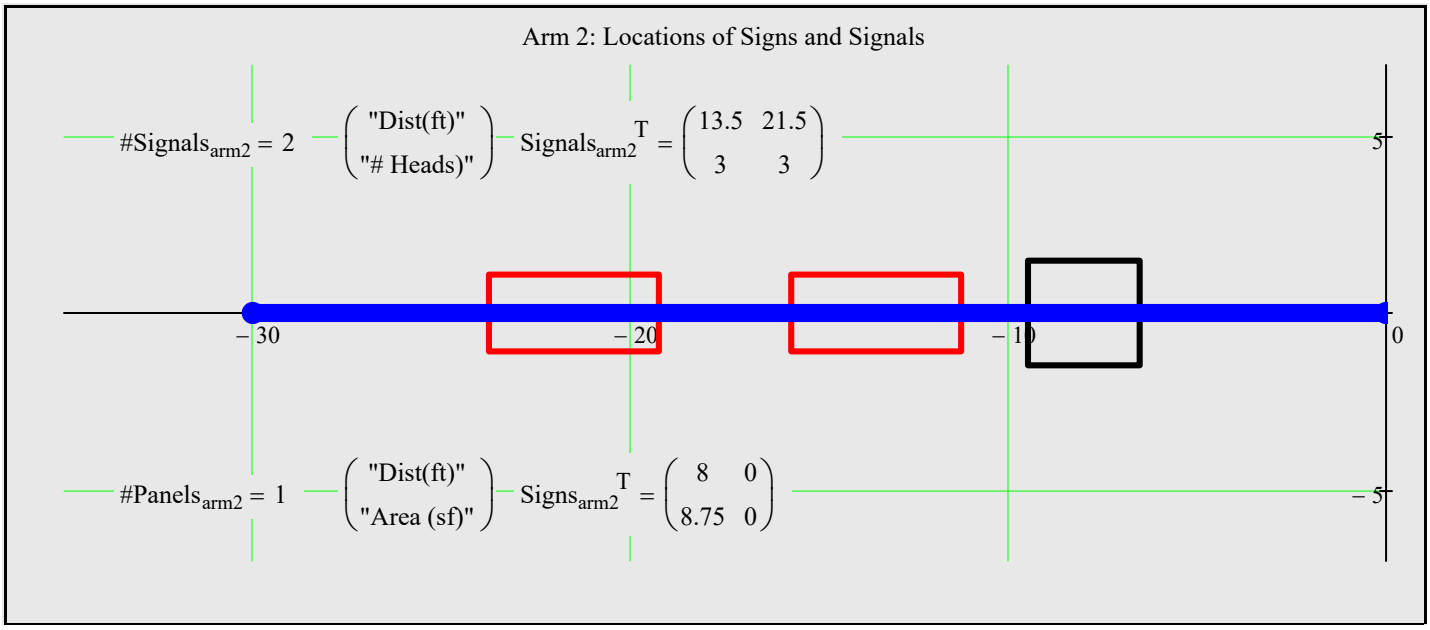


$\max(CFI_{arm1}) = 0.63$ $L_{total.arm1} = 50\,ft$ $L_{splice.provided.arm1} = 3.5 \cdot ft$ $\max(\Delta_{arm1}) = 7.6 \cdot in$

'FA'= 'FE'= $L_{fabricated.arm1} = \begin{pmatrix} 32.5 \\ 21 \end{pmatrix} \cdot ft$ 'FC'= 'FG'= $Diameter_{base.arm1} = \begin{pmatrix} 12.07 \\ 14.00 \end{pmatrix} \cdot in$

'FB'= 'FF'= $Diameter_{tip.arm1} = \begin{pmatrix} 7.52 \\ 11.06 \end{pmatrix} \cdot in$ 'FD'= 'FH'= $t_{wall.arm1} = \begin{pmatrix} 0.250 \\ 0.313 \end{pmatrix} \cdot in$

2nd Mast Arm



$\max(CFI_{arm2}) = 0.38$ $L_{total.arm2} = 30\,ft$ $L_{splice.provided.arm2} = 0 \cdot ft$ $\max(\Delta_{arm2}) = 1.7 \cdot in$

'SA'= 'SE'= $L_{fabricated.arm2} = \begin{pmatrix} 30 \\ 0 \end{pmatrix} \cdot ft$

'SC'= 'SG'= $Diameter_{base.arm2} = \begin{pmatrix} 11.00 \\ 0.00 \end{pmatrix} \cdot in$

'UF'= $\alpha = 90 \cdot deg$ **(Angle Between Arms)**

'SB'= 'SF'= $Diameter_{tip.arm2} = \begin{pmatrix} 6.80 \\ 0.00 \end{pmatrix} \cdot in$

'SD'= 'SH'= $t_{wall.arm2} = \begin{pmatrix} 0.250 \\ 0.000 \end{pmatrix} \cdot in$

Luminaire Arm and Connection *(use MC10x33.6 channel for connection)*

$\begin{pmatrix} CFI_{base.lumarm} \\ CSR_{bolt.lum} \\ D/C_{baseplate.lum} \\ D/C_{conn.plate.lum} \end{pmatrix} = \begin{pmatrix} 0.00 \\ 7.17 \times 10^{-9} \\ 0.00 \\ 0.00 \end{pmatrix}$

'LA'= $Y_{luminaire} = 0\,ft$

'LB'= $X_{luminaire} = 0\,ft$

'LC'= $Diameter_{base.lumarm} = 0 \cdot in$

'LD'= $t_{wall.lumarm} = 0 \cdot in$

'LE'= $Slope_{lumarm} = 0$

'LF'= $r_{lumarm} = 0\,ft$

'LG'= $d_{bolt.lum} = 0 \cdot in$

'LH'= $t_{baseplate.lum} = 0 \cdot in$

'LJ'= $w_{base.lum} = 0 \cdot in$

'LK'= $w_{channel.lum} = 0 \cdot in$

Upright

$\max(CFI_{pole}) = 0.36$ $Check_{deflection} = "OK"$ $Check_{slope} = "OK"$

'UA'= $Y_{pole} = 25 \cdot ft$

'UC'= $Diameter_{tip.pole} = 16.5 \cdot in$

'UE'= $t_{wall.pole} = 0.375 \cdot in$

'UB'= $Y_{arm.conn} = 21 \cdot ft$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'UF'= $\alpha = 90 \cdot deg$

'UG'= $Y_{lum.conn} = 0\ ft$

1st Arm to Upright Connection

$D/C_{ht.conn.plate} = 0.58$

'HT'= $h_{conn.plate} = 30 \cdot in$

$CheckHt_{conn.plate} = "OK"$

$\#Bolts_{conn_0} = 6$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

$D/C_{width.conn.plate_0} = 0.81$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FP'= $d_{bolt.conn_0} = 1.25 \cdot in$

$CheckWidth_{conn.plate_0} = "OK"$

'FK'= $t_{baseplate.arm_0} = 3 \cdot in$

'FR'= $t_{conn.plate_0} = 2 \cdot in$

$$\begin{pmatrix} D/C_{t.baseplate.arm_0} \\ CFI_{t.vert.plate_0} \\ CSR_{bolt.conn_0} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.29 \\ 0.12 \end{pmatrix}$$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FS'= $Spacing_{bolts.conn_0} = 12.5 \cdot in$

'FN'= $w_{vertical.plate_0} = \frac{1}{4} \cdot in$

'FT'= $w_{conn.plate_0} = \frac{5}{16} \cdot in$

2nd Arm to Upright Connection

$D/C_{width.conn.plate_1} = 0.81$

'HT'= $h_{conn.plate} = 30 \cdot in$

$CheckWidth_{conn.plate_1} = "OK"$

$\#Bolts_{conn_1} = 6$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

$$\begin{pmatrix} D/C_{t.baseplate.arm_1} \\ CFI_{t.vert.plate_1} \\ CSR_{bolt.conn_1} \end{pmatrix} = \begin{pmatrix} 0.83 \\ 0.06 \\ 0.01 \end{pmatrix}$$

'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SP'= $d_{bolt.conn_1} = 1.25 \cdot in$

'SK'= $t_{baseplate.arm_1} = 3 \cdot in$

'SR'= $t_{conn.plate_1} = 2 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SS'= $Spacing_{bolts.conn_1} = 12.5 \cdot in$

'SN'= $w_{vertical.plate_1} = \frac{1}{4} \cdot in$

'ST'= $w_{conn.plate_1} = \frac{5}{16} \cdot in$

Pole Base Plate

$CSR_{anchor} = 0.15$

'#Bolts'= $\#AnchorBolts = 6$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

$CheckCSR_{anchorbolt} = "OK"$

$Diameter_{boltcircle.pole} = 28 \cdot in$

'BB'= $t_{baseplate.pole} = 2.5 \cdot in$

'BC'= $d_{anchorbolt} = 2.00 \cdot in$

'BF'= $L_{embedment.anchor} = 40 \cdot in$

$L_{anchor.bolt} = 53 \cdot in$

Foundation

$D/C_{torsion.max} = 0$

$CheckD/C_{shear.and.torsion} = "OK"$

$CheckReinfClearSpacing = "OK"$

$CheckLongReinf_{shr.tor} = "OK"$

$CheckMaxSpacingTransvReinf = "OK"$

$OverlapDesign = "Based on Overlap of Failure Cones"$

$OverlapTest = "Overlap of Failure Cones"$

$BreakoutTest = "OK"$

$Clearance_{csl.to.nut} = 2.5 \cdot in$

$Offset = 0\ ft$

$d_{long.bar} = 1.41 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

'DA'= $L_{shaft} = 18 \cdot ft$

'DB'= $Diameter_{shaft} = 4.5 \cdot ft$

'RA'= $round\left(\frac{d_{long.bar}}{0.125in}\right) = 11$

'RB'= $\#LongBars_{prov} = 15$

'RC'= $\#Spaces_{vbar_1} = 10$

'RD'= $s_{v_1} = 8 \cdot in$

'RE'= $\#Spaces_{vbar_2} = 4$

'RF'= $s_{v_2} = 12 \cdot in$

Fatigue

$Check_{galloping.arm1} = "OK"$

$Check_{galloping.arm2} = "OK"$

$Check_{galloping.pole} = "OK"$

$Check_{nwg.arm1} = "OK"$

$Check_{nwg.arm2} = "OK"$

$Check_{nwg.pole} = "OK"$

$Check_{g.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix}$

$Check_{nwg.conn.bolt} = \begin{pmatrix} "OK" \\ "OK" \end{pmatrix}$

$Check_{g.anchor} = "OK"$

$Check_{nwg.anchor} = "OK"$

K1 values within 2% of LTS thresholds may use next higher CAFT values

$$CheckK1Values = \begin{pmatrix} "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \\ "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \\ "K1\ is\ outside\ of\ 2\%\ of\ K1\ thresholds" \end{pmatrix}$$

$$\begin{pmatrix} K_{I.arm1} \\ K_{I.arm2} \\ K_{I.pole} \end{pmatrix} = \begin{pmatrix} 3.460 \\ 2.873 \\ 6.307 \end{pmatrix} \quad \begin{pmatrix} "Arm\ 1\ Base\ Weld" \\ "Arm\ 2\ Base\ Weld" \\ "Upright\ Base\ Weld" \end{pmatrix}$$

WRITEPRN to Line 1-2-3 for Mast Arm Data Table

Mast Arm Tip Deflection

Compare Mast Arm deflection of each arm to a proposed camber

$Camber_{arm1} := 2 \cdot deg$ $Camber_{arm2} := 2 \cdot deg$

$Deflection_{arm1} := Slope_x \cdot L_{total.arm1} + \max(\Delta_{arm1}) = 11.2 \cdot in$

$CamberArm1_{upward} := \sin(Camber_{arm1}) \cdot L_{total.arm1} = 20.9 \cdot in$

$Deflection_{arm2} := \left[Slope_z \cdot L_{total.arm2} \cdot (\sin(\alpha))\right] + Slope_x \cdot L_{total.arm2} \cdot \cos(\alpha) + \max(\Delta_{arm2}) = 2.3 \cdot in$

$CamberArm2_{upward} := \sin(Camber_{arm2}) \cdot L_{total.arm2} = 12.6 \cdot in$

Check Clearance Between Connection Plates *(for Two Arm Structures only)*

$\alpha = 90 \cdot deg$ $\alpha := if[(\alpha > 180 \cdot deg), (360 \cdot deg - \alpha), \alpha]$

$Offset_{conn_0} = 22.5 \cdot in$ $b_{conn.plate_0} = 36 \cdot in$ $h_{conn.plate} = 30 \cdot in$ $\alpha = 90 \cdot deg$

$Offset_{conn_1} = 22.5 \cdot in$ $b_{conn.plate_1} = 36 \cdot in$

$$x1 := Offset_{conn_0} - t_{conn.plate_0} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm1})}{2} = 20 \cdot in \qquad y1 := \frac{b_{conn.plate_0}}{2} = 18 \cdot in$$

$$x2 := \left(Offset_{conn_1} - t_{conn.plate_1} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm2})}{2}\right) \cdot \cos(\alpha) + \frac{b_{conn.plate_1}}{2} \cdot \sin(\alpha) = 18 \cdot in$$

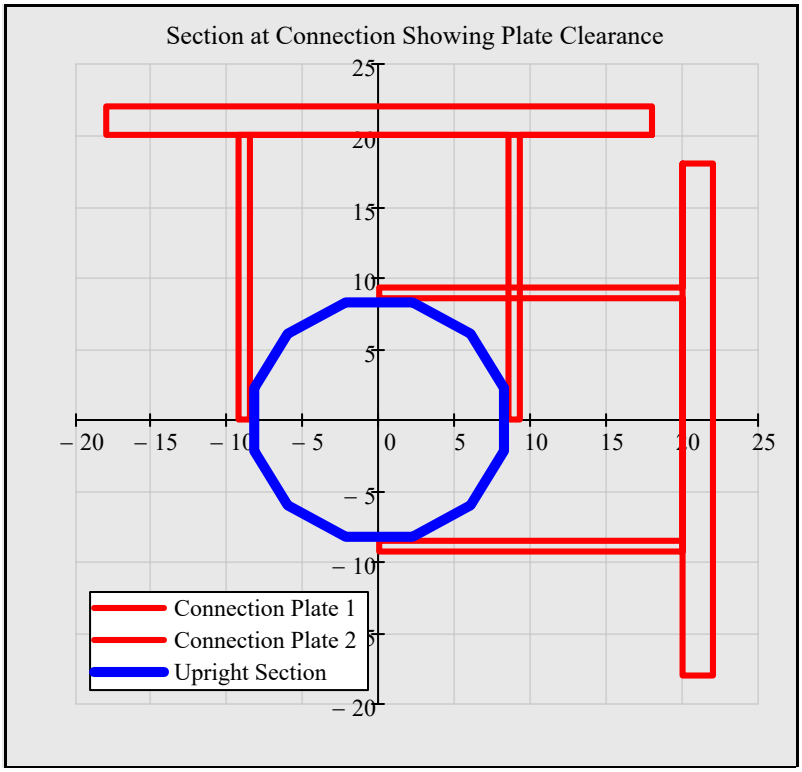
$$y2 := \left(Offset_{conn_1} - t_{conn.plate_1} - h_{conn.plate} \cdot \frac{\sin(Camber_{arm2})}{2}\right) \cdot \sin(\alpha) - \frac{b_{conn.plate_1}}{2} \cdot \cos(\alpha) = 20 \cdot in$$

$$Clearance_{plate.to.plate} := if\left[(x1 > x2) \cdot (y2 > y1), \sqrt{(x1 - x2)^2 + (y1 - y2)^2}, 0 \cdot in\right] = 2.9 \cdot in$$

(if Clearance < 2 inches, a redesign is required.

Coordinates for Drawings

Plan View - Connection Plate Clearance for Two Arm Connections



$Clearance_{plate.to.plate} = 2.9 \cdot in$

$Diameter_{conn.pole} = 17.1 \cdot in$

'FR'= $t_{conn.plate_0} = 2 \cdot in$

'FJ'= $b_{conn.plate_0} = 36 \cdot in$

'FL'= $t_{vertical.plate_0} = 0.75 \cdot in$

'FO'= $Offset_{conn_0} = 22.5 \cdot in$

$Gap_0 = 14 \cdot in$

'SR'= $t_{conn.plate_1} = 2 \cdot in$

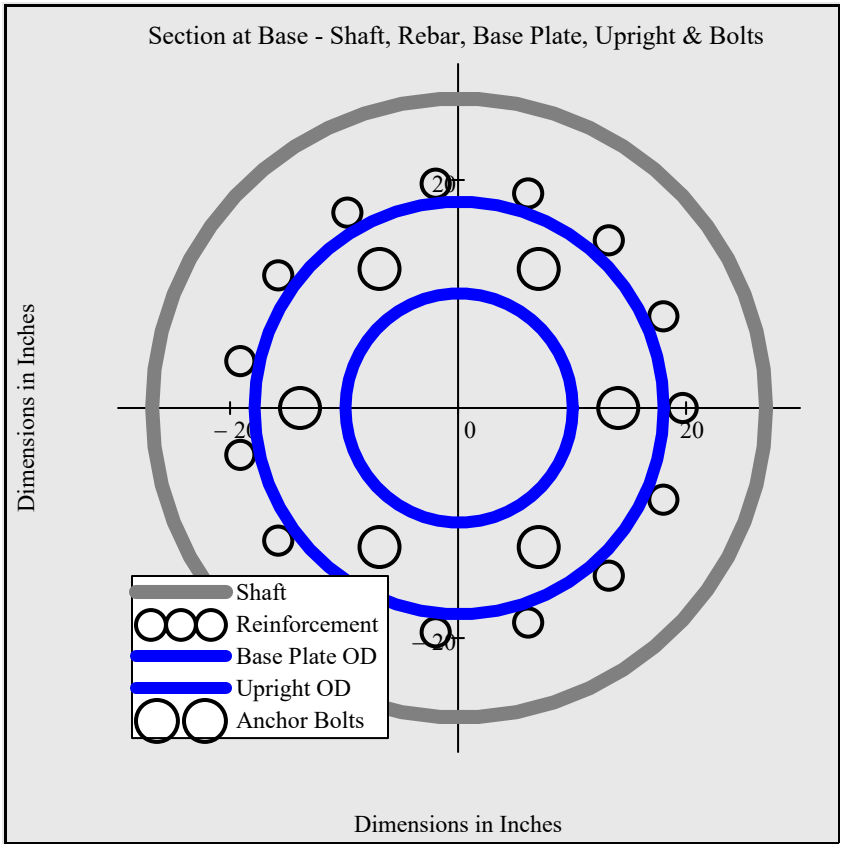
'SJ'= $b_{conn.plate_1} = 36 \cdot in$

'SL'= $t_{vertical.plate_1} = 0.75 \cdot in$

'SO'= $Offset_{conn_1} = 22.5 \cdot in$

$Gap_1 = 14 \cdot in$

Plan View - Drilled Shaft, Base Plate, Upright, Anchor Bolts, & Reinforcing Steel



$Clearance_{bar.to.nut} = 3.1 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

'DB'= $Diameter_{shaft} = 54 \cdot in$

$Diameter_{boltcircle.pole} = 28 \cdot in$

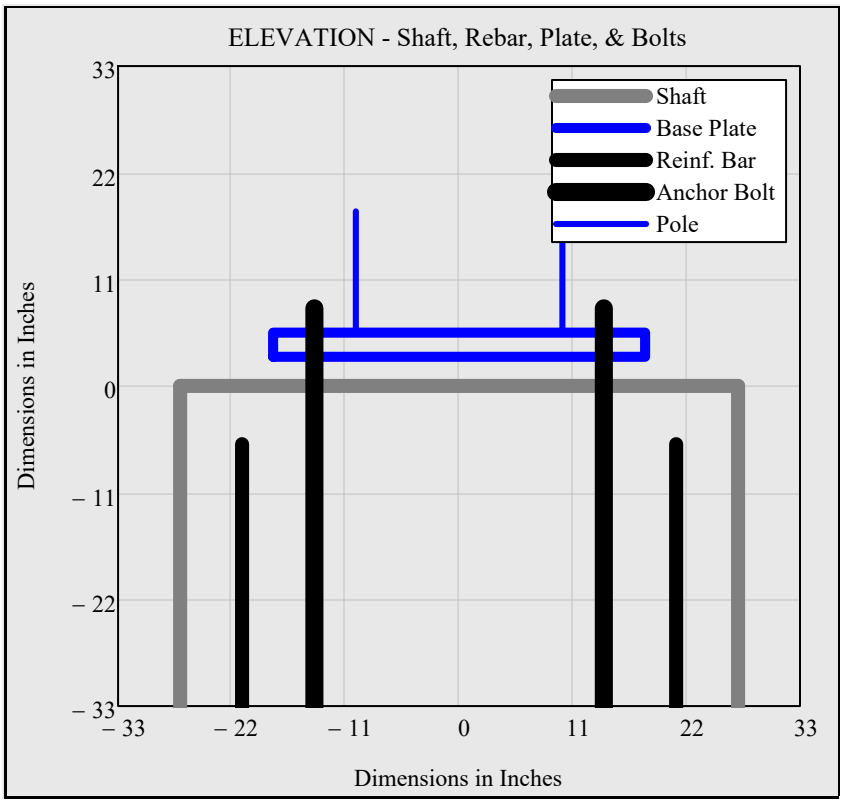
$Dia_{bar.circle} = 39.3 \cdot in$

$\#AnchorBolts = 6$

$\#LongBars_{prov} = 15$

Note: The Plan and Elevation Views do not show the 4 or 5 1.9" O.D. Nondestructive Integrity Testing Access Tubes that are tied to the inside of the reinforcing cage (see FDOT Spec 455-16.4).

Elevation View - Drilled Shaft, Base Plate, Anchor Bolts, & Reinforcing Steel



$Clearance_{bar.to.nut} = 3.1 \cdot in$

'UD'= $Diameter_{base.pole} = 20 \cdot in$

'BA'= $Diameter_{baseplate.pole} = 36 \cdot in$

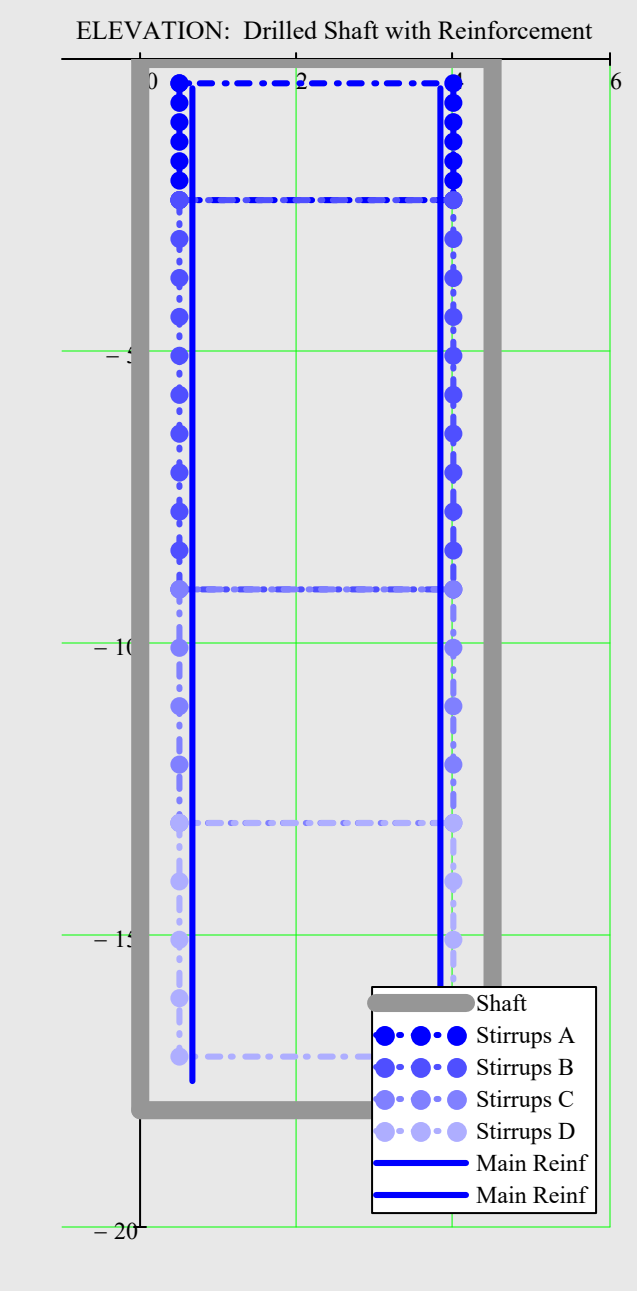
'BB'= $t_{baseplate.pole} = 2.5 \cdot in$

'DB'= $Diameter_{shaft} = 54 \cdot in$

$Diameter_{boltcircle.pole} = 28 \cdot in$

$Dia_{bar.circle} = 39.3 \cdot in$

Elevation View - Drilled Shaft with Main Reinforcement and Stirrups



$$s_v = \begin{pmatrix} 4 \\ 8 \\ 12 \\ 12 \end{pmatrix} \cdot \text{in}$$ *stirrup spacing*

$$\#\text{Spaces}_{vbar} = \begin{pmatrix} 6 \\ 10 \\ 4 \\ 4 \end{pmatrix}$$ *number of stirrup spaces*

APPENDIX C

CPH SIGNAL IMPROVEMENT PLANS
AND
FDOT DESIGN STANDARDS - INDEX 649-031

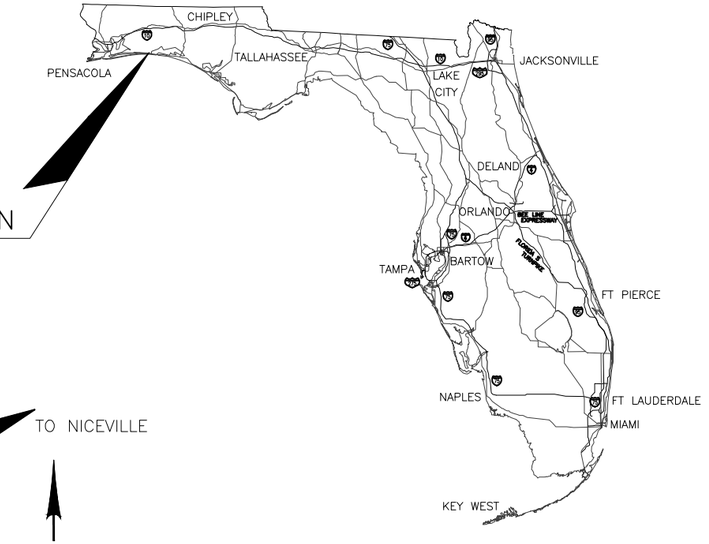
(For Reference Purposes Only)

SIGNAL IMPROVEMENT PLANS

AT

HOLLYWOOD BLVD. & ROBINWOOD DR.

FORT WALTON BEACH, FL



INDEX OF PLANS

SHEET NO.	DESCRIPTION
T-1	KEY SHEET
T-2	TABULATION OF QUANTITIES
T-3 to T-4	SIGNAL NOTES
T-5	SIGNAL LAYOUT
T-6	CURB RETURN DETAILS
T-7	MAST ARM TABULATION
T-8	STANDARD MAST ARM ASSEMBLIES
T-9	GUIDSIGN WORKSHEET
TCP-1	TRAFFIC CONTROL NOTES
TCP-2 to TCP-8	FDOT INDEX SHEETS

LIST OF REVISED DRAWINGS

REV	DATE	SHEETS

LOCATION MAP
N.T.S.

SHOP DRAWINGS TO BE SUBMITTED TO:

CPH CORP.
500 W. FULTON STREET
SANFORD, FLORIDA 32771
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PLANS PREPARED BY:

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Traffic / Transportation

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CPH CORP.
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SANFORD, FLORIDA 32771
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GOVERNING DESIGN STANDARDS:

FLORIDA DEPARTMENT OF TRANSPORTATION, FY2020–21 STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION AND APPLICABLE INTERIM REVISIONS (IRS).

STANDARD PLANS FOR ROAD CONSTRUCTION AND ASSOCIATED IRS ARE AVAILABLE AT THE FOLLOWING WEBSITE:

http://www.fdot.gov/design/standardplans

APPLICABLE IRS: NONE

GOVERNING STANDARD SPECIFICATIONS:

FLORIDA DEPARTMENT OF TRANSPORTATION, JULY 2020 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AT THE FOLLOWING WEBSITE:

http://www.fdot.gov/programmanagement/Implemented/SpecBooks

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

ALL CONSTRUCTION ACTIVITIES SHALL COMPLY WITH LATEST AMERICANS WITH DISABILITIES ACT (A.D.A.) STANDARDS FOR ACCESSIBLE DESIGN.

REVISIONS		
BY	DATE	DESCRIPTION

SIGNAL IMPROVEMENT PLANS
AUGUST 11, 2020

SIGNAL & ROADWAY PLANS
ENGINEER OF RECORD:

MATTHEW C. CUSHMAN, P.E.
FL P.E. No. 73150

Sunshine 811 Always call 811 before you dig.

SHEET NO.
T-1

TABULATION OF QUANTITIES

PAY ITEM NO.			PAY ITEM DESCRIPTION	UNIT	SHEET NUMBERS				TOTAL THIS SHEET		GRAND TOTAL		REF. SHEET
					T-5		T-6						
					PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	
101	1		MOBILIZATION	LS	1				1		1		
102	1		MAINTENANCE OF TRAFFIC	LS	1				1		1		
110	1	1	CLEARING & GRUBBING	AC			0.05		0.05		0.05		
110	4	10	REMOVAL OF EXISTING CONCRETE PAVEMENT	SY			70		70		70		
520	1	10	CONCRETE CURB & GUTTER, TYPE F	LF			238		238		238		
520	2	4	CONCRETE CURB & GUTTER, TYPE D	LF			56		56		56		
522	1		CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY			19		19		19		
522	2		CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY			78		78		78		
527	2		DETECTABLE WARNINGS	SF			108		108		108		
570	1	2	PERFORMANCE TURF, SOD	SY			84		84		84		
630	2	11	CONDUIT, F&I, OPEN TRENCH	LF	370				370		370		
630	2	12	CONDUIT, F&I, DIRECTIONAL BORE	LF	215				215		215		
632	7	1	SIGNAL CABLE - NEW INTERSECTION, F&I	PI	1				1		1		
633	1	121	FIBER OPTIC CABLE, F&I, UNDERGROUND, 2-12 FIBERS	LF	125				125		125		
663	2	31	FIBER OPTIC CONNECTION, INSTALL, SPLICE	EA	12				12		12		
633	2	32	FIBER OPTIC CONNECTION, INSTALL, TERMINATION	EA	12				12		12		
633	3	11	FIBER OPTIC CONNECTION HARDWARE, F&I, SPLICE ENCLOSURE	EA	1				1		1		
633	3	12	FIBER OPTIC CONNECTION HARDWARE, F&I, SPLICE TRAY	EA	1				1		1		
633	3	14	FIBER OPTIC CONNECTION HARDWARE, F&I, BUFFER FAN OUT KIT	EA	1				1		1		
633	3	16	FIBER OPTIC CONNECTION HARDWARE, F&I, PATCH PANEL - FIELD TERMINATED	EA	1				1		1		
635	2	11	PULL & SPLICE BOX, F&I, 13"x24"	EA	21				21		21		
635	2	12	PULL & SPLICE BOX, F&I, 24"X36"	EA	2				2				
639	1	122	ELECTRICAL POWER SERVICE, F&I, UNDERGROUND, METER PURCH. BY CONTRACTOR	AS	1				1		1		
639	2	1	ELECTRICAL SERVICE WIRE, FURNISH AND INSTALL	LF	50				50		50		
641	2	12	PREST CONC POLE, F&I, TYPE P-II, SERVICE POLE	EA	1				1		1		
646	1	11	ALUMINUM SIGNALS POLE, PEDESTAL	EA	8				8		8		
649	21	7	STEEL MAST ARM ASSEMBLY, FURNISH AND INSTALL, DOUBLE ARM 50'-30'	EA	2				2		2		
650	1	14	VEHICULAR TRAFFIC SIGNAL, F&I, ALUMINUM, 3 SECTION, 1 WAY	AS	6				6		6		
650	1	18	VEHICULAR TRAFFIC SIGNAL, F&I ALUMINUM, 5 SECTION STRAIGHT, 1 WAY	AS	2				2		2		
653	1	11	PEDESTRIAN SIGNAL, F&I, LED COUNTDOWN, 1 WAY	AS	8				8		8		
660	1	109	LOOP DETECTOR INDUCTIVE, F&I, TYPE 9	EA	6				6		6		
660	2	101	LOOP ASSEMBLY- F&I, TYPE A (6'x20')	EA	2				2		2		
660	2	101	LOOP ASSEMBLY- F&I, TYPE A (6'x40')	EA	4				4		4		
665	1	11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA	8				8		8		
670	5	110	TRAFFIC CONTROLLER ASSEMBLY, F&I, NEMA	AS	1				1		1		
684	1	1	MANAGED FIELD ETHERNET SWITCH, F&I	EA	1				1		1		
685	1	14	UNINTERRUPTIBLE POWER SUPPLY, F&I, ONLINE/DOUBLE CONV. W/ CABINET	EA	1				1		1		
700	3	201	SIGN PANEL, FURNISH & INSTALL OVERHEAD MOUNT, UP TO 12 SF	EA	4				4		4		
711	11	123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF	295				295		295		
711	11	125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	13				13		13		
711	17		THERMOPLASTIC, REMOVE	SF	104				104		104		

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No.	Date	Revision	By

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Drawn by: SAN
Checked by: MCC
Approved by: MCC
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Date: 04/23/20
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TABULATION OF QUANTITIES

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-2

DEFINITION OF ENTITIES:

1. FOR THE PURPOSE OF THESE PLANS, THE FOLLOWING ENTITIES SHALL BE DEFINED AS:
   - MAINTAINING AGENCY - OKALOOSA COUNTY OR ANY OF THE COUNTY'S ASSIGNEES OR AUTHORIZED REPRESENTATIVES. E.G. COUNTY DEPARTMENTS, INSPECTORS, ENGINEERS OR OTHER INDIVIDUALS AS THE COUNTY MAY DESIGNATE AS REPRESENTING THE COUNTY'S INTERESTS.
   - ENGINEER OF RECORD - MATTHEW C. CUSHMAN, CPH INC.
   - CONTRACTOR - THE INDIVIDUAL, FIRM, JOINT VENTURE, OR COMPANY PERFORMING THE WORK.

GOVERNING DOCUMENTS:

1. THE CONTRACTOR SHALL REVIEW ALL PERMITS, PERMIT EXEMPTIONS, AND REPORT LOGS LOCATED IN THE CONTRACT DOCUMENTS PRIOR TO BIDDING ON THE PROJECT AND BECOME FAMILIAR WITH ALL OF THE CONDITIONS OF THESE DOCUMENTS. THE CONTRACTOR SHALL INSURE THAT THE CONSTRUCTION ACTIVITIES ARE IN COMPLIANCE WITH THESE PERMITS.
2. ALL REFERENCED GOVERNING DOCUMENTS SHALL BE UNDERSTOOD TO REFER TO THE LATEST EDITION AND/OR REVISION UNLESS OTHERWISE NOTED IN THE CONTRACT DOCUMENTS OR AS IDENTIFIED ON THE COVER SHEET OF THIS PLAN SET. THE "CURRENT" EDITION OR REVISION OF THE REFERENCED GOVERNING DOCUMENTS ON THE DATE OF BID SOLICITATION/ADVERTISEMENT SHALL BE THE DEFAULT/EARLIEST REFERENCED GOVERNING DOCUMENT UNLESS OTHERWISE NOTED.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AS DEFINED WITHIN THE CONTRACT DOCUMENTS. CONSTRUCTION WORK SHALL CONFORM TO THE CONSTRUCTION SPECIFICATIONS OF THE MAINTAINING AGENCY (IF ANY), THE FDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND UTILITY CONSTRUCTION, AND THE FDOT STANDARD PLANS (EDITIONS AND REVISIONS CURRENT AT THE TIME OF PROJECT ADVERTISEMENT FOR BID) AT A MINIMUM.
4. THE EROSION CONTROL MEASURES PER "STATE OF FLORIDA EROSION AND SEDIMENT CONTROL MANUAL" AND FDOT STANDARD SPECIFICATION SECTION 104 ARE THE MINIMUM REQUIRED. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DUE TO FIELD CONDITIONS AS DETERMINED BY THE MAINTAINING AGENCY OR OTHER GOVERNING REGULATORY AGENCIES.
5. TRAFFIC & PEDESTRIAN CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH FDOT STANDARD PLANS INDEX SERIES 102 AT A MINIMUM. NO LANE CLOSURES WILL BE PERMITTED DURING PEAK TRAFFIC HOURS, USUALLY BETWEEN THE HOURS OF 7:00AM AND 9:00AM AND 4:00PM AND 6:00PM. APPROVED LANE CLOSURES MAY BE PERMITTED ONLY DURING ACTIVE WORKING PERIODS, WHEN REQUIRED. NO LONG TERM LANE CLOSURES WILL BE PERMITTED.

NOTIFICATION REQUIREMENTS:

1. THE CONTRACTOR SHALL NOTIFY THE MAINTAINING AGENCY A MINIMUM OF ONE (1) WEEK PRIOR TO COMMENCING ANY CONSTRUCTION RELATED ACTIVITY.
2. CONSTRUCTION ACTIVITIES SPECIFICALLY REQUIRING INSPECTIONS/TESTING BY THE MAINTAINING AGENCY, ENGINEER OF RECORD, OR ANY OTHER REGULATORY AGENCY SHALL BE CLEARLY IDENTIFIED DURING THE PRECEDING CONSTRUCTION PROGRESS MEETING NO LESS THAN 72 HOURS PRIOR TO THE ASSOCIATED CONSTRUCTION ACTIVITY. FOR ON-GOING/PERIODIC CONSTRUCTION ACTIVITY WHICH SPECIFICALLY REQUIRES INSPECTION AND/OR TESTING (AS IDENTIFIED BY THE MAINTAINING AGENCY DURING THE PRE-CONSTRUCTION MEETING OR THEREAFTER, IN THE REGULAR/DUE COURSE OF THE PROJECT), THE CONTRACTOR SHALL PROVIDE A MINIMUM 48 HOUR NOTICE TO THE MAINTAINING AGENCY AND/OR RESPONSIBLE ENTITY. ANY WORK SPECIFICALLY IDENTIFIED AS REQUIRING INSPECTION/TESTING BY THE MAINTAINING AGENCY, REGULATORY/GOVERNING AGENCY, OR THE ENGINEER OF RECORD MAY BE REQUIRED TO BE REMOVED AND REPLACED AT NO COST TO THE OWNER/PROJECT. CONTRACTORS FAILURE TO ADHERE TO MINIMUM NOTIFICATION PERIODS SHALL NOT BE CONSIDERED AS CAUSE FOR DELAY.
3. ANY APPARENT PLAN DISCREPANCY OR PROPOSED CONSTRUCTED FACILITY WHICH DOES NOT APPEAR TO BE CONSTRUCTABLE ACCORDING TO THE LATEST AMERICANS WITH DISABILITIES ACT (A.D.A.) OR OTHER GOVERNING STANDARD, SHALL BE BROUGHT TO THE ATTENTION (IN WRITING) OF THE MAINTAINING AGENCY & ENGINEER OF RECORD IMMEDIATELY UPON IDENTIFICATION. ENGINEER OF RECORD WILL PROVIDE CORRECTIVE ACTION OR CLARIFICATION OF INTENT AS NECESSARY TO ADDRESS CONCERN PRIOR TO THE COMMENCEMENT/CONTINUATION OF CONSTRUCTION FOR ANY POTENTIALLY AFFECTED IMPROVEMENT.
4. THE CONTRACTOR SHALL NOTIFY ALL UTILITY OWNERS A MINIMUM OF SEVEN (7) WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION. RECORDS OF ALL NOTICES SHALL BE SUBMITTED TO THE MAINTAINING AGENCY UPON REQUEST.
5. THE CONTRACTOR SHALL COORDINATE AND SEEK ANY NECESSARY APPROVAL FROM OTHER UTILITIES PRIOR TO WORKING ON OR INSTALLING JOINT-USE POLES, SPAN WIRE ASSEMBLIES, OR SIGNAL POLES ADJACENT TO THEIR FACILITIES OR POWER LINES.
6. THE CONTRACTOR SHALL STAKE ALL POLE LOCATIONS PRIOR TO SETTING AND HAVE THE POLE LOCATIONS FIELD CHECKED BY THE MAINTAINING AGENCY AND THE ENGINEER OF RECORD. NOTIFY MAINTAINING AGENCY AND ENGINEER OF RECORD FOR FIELD CHECK, ALLOWING 72 HOURS FOR POLE LOCATION APPROVAL.
7. ALL PERSONAL PROPERTY WITHIN THE RIGHT-OF-WAY SHALL BE RELOCATED BY THE PROPERTY OWNER. THE CONTRACTOR SHALL COORDINATE WITH THE PROPERTY OWNERS TO PROVIDE NOTIFICATION AND A REASONABLE TIME FRAME TO RELOCATE ITEMS. THE CONTRACTOR SHALL NOTIFY THE MAINTAINING AGENCY PRIOR TO REMOVING THE ITEMS NECESSARY TO CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE PLANS UNLESS OTHERWISE STATED IN THE PLANS.
8. UPON COMPLETION OF THE CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT DRAFT "AS-BUILTS" FOR REVIEW TO THE MAINTAINING AGENCY & ENGINEER OF RECORD AND REQUEST A SUBSTANTIAL COMPLETION INSPECTION. THE INTENT OF THE SUBSTANTIAL COMPLETION INSPECTION IS TO PROVIDE THE CONTRACTOR WITH A PUNCH LIST OF INCOMPLETE OR SUBSTANDARD WORK THAT MUST BE CORRECTED. ONCE CORRECTIONS ARE MADE THE CONTRACTOR SHALL SCHEDULE A FINAL INSPECTION WITH THE MAINTAINING AGENCY & ENGINEER OF RECORD.

PRE-CONSTRUCTION REQUIREMENTS:

1. THE CONTRACTOR SHALL PLAN AND SCHEDULE THE SEQUENCE OF WORK IN ORDER TO PREVENT UNNECESSARY DELAYS OR COSTS ASSOCIATED WITH CRITICAL PATH ITEMS OF THE WORK.
2. ANY DRAINAGE PROBLEMS EXISTING BEFORE CONSTRUCTION COMMENCES SHALL BE BROUGHT TO THE ATTENTION OF THE MAINTAINING AGENCY AND ENGINEER OF RECORD PRIOR TO THE BEGINNING OF CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE TO FIND AND MAINTAIN THEIR OWN EQUIPMENT AND MATERIAL STORAGE YARD.
4. ALL EXISTING VALVE, PULL BOX, & MANHOLE TOPS SHALL BE MARKED PRIOR TO CONSTRUCTION OPERATIONS. ALL SUCH TOPS SHALL BE ADJUSTED TO MATCH PROPOSED GRADE PRIOR TO SUBSTANTIAL COMPLETION OF WORK.
5. AS PART OF THE PRE-CONSTRUCTION MEETING, PROJECT MILESTONES/STAGES SHALL BE CLEARLY DEFINED AS NECESSARY TO DELINEATE FOUNDATION PLACEMENTS, MAST ARM POLE/UPRIGHT ERECTION, MAST ARM INSTALLATION, SIGNAL DETECTION INSTALLATION, SUBSTANTIAL COMPLETION, SIGNAL TURN-ON (FLASH MODE), SIGNAL BURN-IN PERIOD, SIGNAL TURN-ON (FULL/NORMAL OPERATION), ETC. REQUIREMENTS.
6. IT SHOULD BE NOTED THAT NO TEST BORINGS WERE MADE WHERE CONDUIT RUNS ARE TO BE INSTALLED BY JACKING, DIRECTIONAL BORING, OR TRENCHING. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE THE JOB SITE CONDITIONS BEFORE SUBMITTING A BID PROPOSAL.

BASELINE OF CONSTRUCTION:

1. BASELINE OF CONSTRUCTION IS DEFINED AS THE N LINE OF THE SE 1/4 SECTION 14, T2S, R24W ALSO GENERALLY BEING THE CENTERLINE OF ROAD AND APPROX. THE FORTY FOOT (40') OFFSET OF THE NORTHERN R/W LINE OF HOLLYWOOD BLVD. TO THE SOUTH.

AMERICANS WITH DISABILITIES ACT COMPLIANCE (A.D.A.):

1. THE MAXIMUM ALLOWABLE LONGITUDINAL GRADE ON PEDESTRIAN FACILITIES IS 5% UNLESS OTHERWISE INDICATED IN THE PLANS. THE MAXIMUM ALLOWABLE CROSS-SLOPE ON ALL PEDESTRIAN FACILITIES IS 2% (PLAN INTENT IS 1.5% UNLESS SPECIFICALLY NOTED OTHERWISE). ALL GRADES AND CROSS SLOPES SHALL COMPLY WITH THE LATEST AMERICANS WITH DISABILITIES ACT (A.D.A.) STANDARDS FOR ACCESSIBLE DESIGN. ALL NON-COMPLIANT FACILITIES, PROPOSED OR CONSTRUCTED, SHALL BE IMMEDIATELY IDENTIFIED (REFER TO NOTIFICATION REQUIREMENTS SECTION).
2. ALL PEDESTRIAN FACILITIES PROPOSED WITHIN THIS PLAN SET ARE GRAPHICAL IN NATURE UNLESS SPECIFICALLY NOTED IN THE PLANS. LINE WORK FOR PEDESTRIAN FACILITIES ARE TYPICALLY REPRESENTATIVE OF EXTERIOR LIMITS OF THE PEDESTRIAN FACILITY, PAVEMENT DIFFERENTIATION, SURFACE TREATMENT DETAILS AND/OR GRADE BREAKS. NEITHER CONCRETE EXPANSION JOINTS, COLD JOINTS, NOR SAW CUTS SHALL BE INFERRED FROM THESE PLANS UNLESS SPECIFICALLY NOTED. PEDESTRIAN FACILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL GOVERNING CRITERIA (A.D.A AND FDOT STANDARD PLANS/SPECIFICATIONS AT A MINIMUM) AS NECESSARY TO PROVIDE AN A.D.A. COMPLIANT FACILITY.
3. ALL CURB RAMPS SHALL BE CONSTRUCTED ACCORDING TO FDOT DESIGN STANDARD PLANS INDEX NO. 522-002.

GENERAL NOTES:

1. CONTRACTOR'S USE OF THE PREMISES SHALL BE CONFINED TO THE LIMITS OF THE EXISTING RIGHT-OF-WAY AND/OR EASEMENTS. ALL PUBLIC AND PRIVATE PROPERTY AFFECTED BY THE CONSTRUCTION SHALL BE PROTECTED WHERE POSSIBLE. ALL AREAS DISTURBED AS PART OF THIS WORK SHALL BE RESTORED TO ORIGINAL, OR BETTER CONDITION, AT NO ADDITIONAL COST TO THE OWNER. ALL EXISTING SODDED AREAS DISTURBED DURING THE CONSTRUCTION SHALL BE REPLACED WITH THE SAME TYPE OF SOD IN CONFORMANCE WITH THE STANDARD SPECIFICATIONS. THE MAINTAINING AGENCY SHALL APPROVE THE REMOVAL AND REPLACEMENT OF EXISTING IRRIGATION SYSTEMS, AS REQUIRED, AT NO ADDITIONAL COST TO THE MAINTAINING AGENCY OR PROPERTY OWNER. PROPER TEMPORARY ADJUSTMENTS SHALL BE DONE AT SUCH TIME TO MAINTAIN IRRIGATION SYSTEMS FROM BEING INTERRUPTED FOR EXTENDED PERIODS DURING CONSTRUCTION.
2. THE MAINTENANCE RESPONSIBILITY FOR ALL SIGNALS WITHIN THE CONSTRUCTION LIMITS SHALL REMAIN THE FULL RESPONSIBILITY OF THE CONTRACTOR, FROM THE TIME CONTRACT WORK BEGINS UNTIL FINAL ACCEPTANCE BY OKALOOSA COUNTY TRAFFIC ENGINEERING, ON A BY INTERSECTION BASIS. THE CONTRACTOR SHALL HAVE AN I.M.S.A LEVEL 2 SIGNAL TECHNICIAN ON SITE THROUGH ALL PHASES OF CONSTRUCTION AND ON CALL WITH A 2 HOUR MAXIMUM RESPONSE TIME.
3. ALL EXCAVATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE TRENCH SAFETY ACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER STORAGE AND/OR DISPOSAL OF ALL EXCESS OR UNSUITABLE EXCAVATED MATERIAL. TRENCH PROTECTION WILL BE NEEDED FOR ALL EXCAVATION IN EXCESS OF FIVE (5') IN DEPTH.
4. ALL CONCRETE TO BE REMOVED SHALL BE SAW CUT AT THE NEAREST GOOD JOINT. GUTTERS SHALL BE SAW CUT BETWEEN ASPHALT AND GUTTER PRIOR TO REMOVAL. ALL SAW CUTTING SHALL BE WET CUT TO CONTROL DUST.
5. THE CONTRACTOR SHALL PROVIDE THE SERVICES OF A TESTING LABORATORY TO DETERMINE WHETHER THE REQUIREMENTS FOR MATERIALS SPECIFICATIONS ARE MET. (REFER TO NOTIFICATION REQUIREMENTS)
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY CONTROLS AND/OR STRUCTURES REQUIRED TO MAINTAIN SUITABLE AND SAFE WORKING CONDITIONS AT ALL TIMES. SUCH ITEMS SHALL BE REMOVED ONCE THE ASSOCIATED COMPONENT OF WORK HAS BEEN COMPLETED.
7. ALL GRASSED AREAS DISTURBED AS A RESULT OF CONSTRUCTION SHALL BE SODDED, "IN KIND" UNLESS OTHERWISE MENTIONED IN THE PLANS. RE-SODDING SHALL BE A MINIMUM OF 30" WIDE FOR THE LENGTH OF THE DISTRUBED AREA.
8. ALL PUBLIC AND PRIVATE PROPERTY AFFECTED BY THE CONSTRUCTION WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE PRE-CONSTRUCTION CONDITION.
9. CONSTRUCTION SHALL INCLUDE REPLACING, WITH MATCHING MATERIALS: ANY DRIVEWAYS, WALKS, CURBS, SOD, ETC. THAT ARE DAMAGED OR REMOVED DUE TO CONSTRUCTION. THIS WORK SHALL BE COORDINATED WITH THE PROPERTY OWNERS. PAYMENT FOR THIS WORK SHALL BE INCIDENTAL TO THE OTHER CONTRACT ITEMS.
10. ALL PROPOSED GRADES ARE FINISHED GRADES.
11. THE CONTRACTOR SHALL NOT DURING OR AFTER CONSTRUCTION INTRODUCE ANY FORM OF UNPERMITTED STORM WATER DISCHARGE INTO ANY RIGHT OF WAY, EASEMENTS OR STORM WATER SYSTEM.
12. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND COMPLY WITH ALL APPLICABLE COUNTY AND MUNICIPAL ORDINANCES THAT ARE MORE STRINGENT THAN FDOT REQUIREMENTS.
13. COAT ALL THREADED HARDWARE AND MECHANICAL/ELECTRICAL CONNECTION TERMINATIONS WITH AN OXIDE INHIBITOR.
14. WEATHERPROOF IRREGULAR MATTING SURFACES SUCH AS AREAS INCLUDING SEPARATED SIGNAL COUPLINGS, CONTROLLER CABINET FOUNDATION, PEDESTRIAN PUSH BUTTONS, AND ANY OTHER AREAS TYPICALLY PRONE TO MOISTURE INFILTRATION BY APPLYING A BEAD OF SILICONE CAULK.
15. WHEREVER A CABLE ENTERS OR EXITS A FIELD-DRILLED HOLE, THE HOLE SHALL BE PROTECTED BY A PERMANENTLY INSTALLED RUBBER GROMMET.
16. THE CONTRACTOR SHALL VERIFY COLOR CODES FOR SIGNAL CABLE WITH MAINTAINING AGENCY BEFORE ORDERING.
17. EXISTING SIGNS SHALL REMAIN IN PLACE TO THE EXTENT POSSIBLE AND SHALL BE USED FOR MAINTENANCE OF TRAFFIC AS REQUIRED. THE MAINTENANCE OF EXISTING SIGNS, UNTIL REMOVED, SHALL REMAIN THE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL FIELD WIRING SHALL BE NEATLY BUNDLED AND CLEARLY IDENTIFIED WITH PERMANENT LEGIBLE, WEATHERPROOF TAGS THAT ARE SECURELY ATTACHED TO EACH CABLE. THE TAGGING SYSTEM PROPOSED SHALL BE SUBMITTED FOR APPROVAL WITH THE OTHER EQUIPMENT SUBMITTALS REQUIRED FOR THIS PROJECT.
19. THE USE OF JONES PLUGS IS NOT PERMITTED.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTAINING ALL REMOVED SPOIL FROM ALL CONSTRUCTION ACTIVITIES AND SHALL PROTECT ALL DRAINAGE FACILITIES FROM SUCH SPOIL. IF DRAINAGE FACILITIES BECOME FILLED WITH SPOIL AS A RESULT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING THE SPOIL AND RESTORING THE FACILITY TO ITS ORIGINAL CONDITION.

UTILITIES:

1. THE CONTRACTOR IS TO CONTACT THE SUNSHINE STATE ONE CALL OF FLORIDA, INC. CENTER (1-800-432-4770) AT LEAST TWO (2) DAYS (48 HOURS) PRIOR TO THE START OF CONSTRUCTION (PER CHAPT. 556 OF THE F.S.).
2. ATTENTION IS DRAWN TO THE PRESENCE OF MULTIPLE UTILITIES WITHIN THE PROJECT AREA. CONTRACTOR SHALL NOTIFY ALL UTILITY OWNERS 72 HOURS IN ADVANCE OF COMMENCING WORK. CONTRACTOR SHALL HAND DIG IN ALL AREAS WHERE UTILITIES STAKE OR LOCATE A POSSIBLE CONFLICT OR WHEN HAND DIGGING IS SPECIFIED IN THE PLANS. THE EXACT LOCATION OF UTILITIES SHALL BE DETERMINED BY THE CONTRACTOR, WHEN NECESSARY, DURING CONSTRUCTION.
3. UNDER NO CIRCUMSTANCE SHALL THE ACTIVITIES OF THE CONTRACTOR OR HIS SUBCONTRACTORS CAUSE ANY INTERRUPTIONS TO THE SERVICE OR OPERATION OF EXISTING UTILITIES WITHOUT WRITTEN AUTHORIZATION FROM AN AUTHORIZED REPRESENTATIVE OF THE UTILITY COMPANY OR OWNER. ANY PIPING OR OTHER UTILITIES WHICH CAN BE REMOVED DURING CONSTRUCTION WITHOUT UNDUE INTERRUPTION OF SERVICE MAY BE REMOVED AND REPLACED BY THE CONTRACTOR WITH THE PERMISSION OF THE MAINTAINING AGENCY AND THE UTILITY OWNER. CONTRACTOR SHALL COPY THE MAINTAINING AGENCY OF ALL CORRESPONDENCE WITH UTILITY OWNER.
4. ALL EXISTING UTILITIES ARE TO BE ADJUSTED BY THE UTILITY OWNER UNLESS OTHERWISE NOTED IN THE PLANS. CONTRACTOR IS TO COORDINATE WITH THE UTILITY OWNER FOR SCHEDULING OF UTILITY ADJUSTMENTS SUCH THAT THEY WILL NOT INTERFERE WITH THE CONTRACTORS CONSTRUCTION SCHEDULE. FAILURE OF CONTRACTOR TO PROPERLY NOTIFY AND/OR SCHEDULE WORK BY THE UTILITY OWNER WILL NOT BE CONSIDERED AS CAUSE FOR DELAY.
5. EXISTING IRRIGATION LINES/SYSTEMS IN CONFLICT WITH PROPOSED IMPROVEMENTS SHALL BE ADJUSTED AS NECESSARY TO BE RELOCATED OUTSIDE OF THE PROPOSED PAVEMENT. THE COST FOR THESE ADJUSTMENTS SHALL BE INCIDENTAL TO THE PAYMENT OF ASSOCIATED PAVING UNLESS OTHERWISE NOTED IN THE PLANS.
6. LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING UTILITIES AND STRUCTURES ARE APPROXIMATE. WHILE CONSIDERABLE EFFORT HAS BEEN MADE BY THE MAINTAINING AGENCY, THE SURVEYOR, THE VARIOUS UTILITY COMPANIES AND THE ENGINEER TO ACCURATELY LOCATE EXISTING LINES AND APPURTENANCES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS, ELEVATIONS AND DIMENSIONS BY UTILIZING EXPLORATORY EXCAVATION, WHICH SHALL BE MADE 7 DAYS OR 1000 FEET IN ADVANCE OF THE WORK, WHICHEVER IS GREATER. IF THERE IS A POTENTIAL CONFLICT, THE CONTRACTOR IS TO NOTIFY THE MAINTAINING AGENCY AND ENGINEER OF RECORD IMMEDIATELY. NO CLAIMS FOR DELAYS WILL BE PAID UNLESS THIS PROCEDURE HAS BEEN FULLY FOLLOWED. ANY DAMAGE TO UTILITIES, STRUCTURES AND/OR SERVICES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE, IN A MANNER APPROVED BY AND COORDINATED WITH THE UTILITY OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE UTILITY OWNER REGARDING ANY UNINTENDED INTERRUPTION TO SERVICE OR DAMAGE TO EXISTING STRUCTURES OR UTILITIES.
7. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING LOCATE SERVICES FOR ALL TRAFFIC CONTROL DEVICES, INTERCONNECT, AND STREET LIGHTING WITHIN THE LIMITS OF THE PROJECT ONCE WORK HAS BEGUN ON ANY PORTION OF THE PROJECT. CONTRACTOR REQUESTS FOR EQUIPMENT LOCATES WILL BE GRANTED ONLY ONCE PRIOR TO THE START OF THE CONTRACT. ADDITIONAL REQUESTS SHALL BE AT THE EXPENSE OF THE CONTRACTOR. THE LOCATING OF UNDERGROUND FACILITIES DOES NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO REPAIR ANY ITEMS DAMAGED DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE. LOCATE REQUESTS FROM COMPANIES OR INDIVIDUALS NOT ASSOCIATED WITH THE CONSTRUCTION PROJECT WILL BE FORWARDED TO THE CONTRACTOR.
8. WHERE MAST ARMS, STRAIN POLES, OR ANY OTHER SIGNAL EQUIPMENT REQUIRING FOUNDATIONS ARE PROPOSED WITHIN 4 FEET OF ANY UNDERGROUND UTILITY, THE UTILITY SHALL BE LOCATED AND PROTECTED AND THE INITIAL 5 FEET OF THE SHAFT INSTALLATION SHALL BE HAND DUG
9. CHAPTER 17-153 OF THE FLORIDA STATUTES REQUIRES THAT THE COMPANY PERFORMING THE EXCAVATION WORK SHALL NOTIFY ALL GAS UTILITIES A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO EXCAVATING. DRAWINGS SHOW ONLY THE APPROXIMATE LOCATION OF GAS MAINS (IF ANY ARE PRESENT), AND DO NOT SHOW SERVICE LINES. THE ONLY SAFE AND PROPER WAY TO LOCATE EITHER MAINS OR SERVICE LINES IS BY AN ON-SITE INSPECTION BY GAS SYSTEM PERSONNEL. THEREFORE, THE COMPANY PERFORMING THE EXCAVATION WORK IS INSTRUCTED TO TELEPHONE SUNSHINE STATE ONE CALL AT 1-800-432-4770 AT LEAST THREE (3) WORKING DAYS BEFORE DIGGING IN THE CONSTRUCTION AREA. NO MACHINE EXCAVATION SHALL BE PERFORMED WITHIN FIVE (5) FEET OF A GAS MAIN WITHOUT THE UTILITY OWNERS PRESENCE.
10. THE POWER COMPANY IS TO ASSIST THE CONTRACTOR IN PERFORMING ALL NECESSARY WORK UNDER THEIR POWER LINES, SUCH AS THE INSTALLATION OF MAST ARM POLES, MAST ARMS, SIGNAL HEADS, FIBERGLASS INSULATORS, ETC. CONTRACTOR TO NOTIFY THE POWER COMPANY AT LEAST THREE (3) FULL BUSINESS DAYS PRIOR TO INSTALLATION OF THIS EQUIPMENT.
11. ALL EXISTING UTILITIES ARE TO REMAIN IN PLACE UNLESS OTHERWISE NOTED.
12. KNOWN UTILITY OWNERS WITHIN THE PROJECT LIMITS INCLUDE BUT MAY NOT BE LIMITED TO:

COX COMMUNICATIONS
ROGER DIXON
(850) 314-8163

OKALOOSA GAS DISTRICT
EOC DEPARTMENT
(850) 729-4880

A T & T DISTRIBUTION
USIC DISPATCH CENTER
(800) 778-9140

AT&T COMMUNICATION
RAMA AGGALA
(770) 356-4657

CENTURYLINK
THOMAS STURMER
(720) 578-8090

CITY OF FORT WALTON BEACH (SEWER, WATER)
DEBORAH FOUSEK
(850) 833-9613

GULF POWER - FT WALTON EAST
USIC DISPATCH CENTER
(800) 778-9140

GULF POWER - FT WALTON WEST
USIC DISPATCH CENTER
(800) 778-9140

OKALOOSA COUNTY TRAFFIC SIGNALS
TRAFFIC SIGNAL MAINTENANCE SHOP
(850) 651-7295

OKALOOSA COUNTY INFO. TECH.
JASON SNYDER
(850) 978-0331

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MATTHEW C. CUSHMAN, P.E. FL P.E. No. 73150

No.	Date	Revision	By

Designed by:	SAN
Drawn by:	SAN
Checked by:	MCC
Approved by:	MCC
Scale:	
Date:	04/23/20
Job No.:	F15801
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SIGNAL NOTES

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-3

AS-BUILT DRAWING REQUIREMENTS:

1. AT THE TIME OF CONTRACTOR REQUEST FOR SUBSTANTIAL COMPLETION INSPECTION, THE CONTRACTOR SHALL PROVIDE A SET OF DRAFT “AS-BUILT” PLANS IN ELECTRONIC FORM (PDF) TO THE MAINTAINING AGENCY AND ENGINEER OF RECORD.
2. AT THE TIME OF FINAL INSPECTION, THE CONTRACTOR SHALL PROVIDE FOUR (4) HARD COPY SETS OF CONSTRUCTION "AS-BUILT" DRAWINGS; ONE TO THE MAINTAINING AGENCY, ONE TO THE CITY, ONE TO THE ENGINEER OF RECORD, AND ONE FOR THE CABINET.
3. WHEN CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL PROVIDE A SET OF "AS-BUILT" PLANS IN ELECTRONIC FORM (PDF) TO THE MAINTAINING AGENCY AND ENGINEER OF RECORD.

MAST ARMS:

1. THE CONTRACTOR SHALL VERIFY ALL ELEVATIONS AND ATTACHMENT HEIGHTS PRIOR TO ORDERING AND FABRICATION OF POLES. ALSO, THE CONTRACTOR SHALL LOCATE ALL UTILITIES AND CLEAR THE LOCATION OF THE POLE FOUNDATIONS (THROUGH SOFT DIGS) PRIOR TO ORDERING AND FABRICATING POLES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING APPROVED SHOP DRAWING SHOWING THE BOLT PATTERN AND ARM ORIENTATION PRIOR TO THE PRE-DRILL SHAFT MEETING.
3. USE THREE 2" AND ONE 3/4" CONDUIT STUBBED OUT THROUGH THE MAST ARM POLE FOUNDATION AND TEMPORARY SEAL.
4. ALL MAST ARM ASSEMBLIES SHALL HAVE A TERMINAL COMPARTMENT.
5. ALL MAST ARMS AND MONOTYPE STRUCTURES SHALL CONFORM TO FDOT STANDARD PLANS INDEX NO.'S 649-030 AND 649-031.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING A CERTIFIED DRILLED SHAFT(CTQP) LEVEL 1 CONSTRUCTION ENGINEERING AND INSPECTION (CEI) FIRM, AND A CONCRETE TESTING LABORATORY FOR THE PURPOSE OF INSPECTING ALL DRILL SHAFT INSTALLATIONS PER FDOT STANDARDS. THE FIRM SHALL THEN SUBMIT A SIGNED AND SEALED REPORT VERIFIED BY THE P.E. IN RESPONSIBLE CHARGE OF THE DRILLED SHAFT INSPECTOR TO THE MAINTAINING AGENCY FOR APPROVAL. FAILURE TO OBTAIN THESE SERVICES PRIOR TO THE CONSTRUCTION OF THE DRILLED SHAFTS SHALL RESULT IN THE REJECTION OF THE DRILLED SHAFTS.
7. CONTRACTOR SHALL PROVIDE A MINIMUM OF 24 HOURS ADVANCED NOTICE TO MAINTAINING AGENCY PRIOR TO CONCRETE PLACEMENT FOR MAST ARM STRUCTURE FOUNDATIONS.
8. THE TOP OF THE TRAFFIC SIGNAL MAST ARM FOUNDATION SHOULD BE AT LEAST 6 INCHES ABOVE GRADE TO PREVENT THE ANCHOR BOLTS FROM BEING SUBMERGED IN WATER AND / OR BURIED, UNLESS ADJACENT TO AN EXISTING, OR PROPOSED SIDEWALK, THEN THE TOP OF THE FOUNDATION SHOULD BE FLUSH WITH THE SIDEWALK.
9. MAST ARMS SHALL NOT BE ATTACHED TO MAST ARM POLES BEFORE THE CONCRETE ACHIEVES THE REQUIRED STRENGTH SPECIFIED BY THE POLE MANUFACTURER'S ENGINEER OF RECORD.
10. MAST ARMS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SHOP DRAWINGS AND WILL NOT BE INSTALLED WITHOUT REQUIRED LOADING.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE MAST ARM FOUNDATIONS ARE INSTALLED IN THE CORRECT LOCATION AND AT THE CORRECT ELEVATION SPECIFIED IN THE PLANS. THE CONTRACTOR SHALL VERIFY THE BOLT PROJECTION FROM THE CONCRETE. CUTTING OF EXCESS ANCHOR BOLT MATERIAL IS UNACCEPTABLE. HITTING MAST ARM ANCHOR BOLTS TO STRENGTHEN THEM IS UNACCEPTABLE.

SIGNALS:

1. A CLEARANCE OF NO LESS THAN 17'-6" SHALL BE MAINTAINED BETWEEN THE SIGNAL HEADS AND THE ROADWAY. MAXIMUM SIGNAL HEAD HEIGHT AND SPACING SHALL BE IN ACCORDANCE WITH THE MUTCD AND FDOT STANDARDS.
2. SPLICE SIGNAL CABLE TO A SEPARATE CABLE IN THE BASE OF THE MAST ARM STRUCTURES UTILIZING A TERMINAL STRIP. A PERMANENT MARKING IS TO BE PLACED ON THE WIRE DESIGNATING THE PHASE USED. AT LEAST 6' OF SLACK CABLE SHALL BE PROVIDED FOR TROUBLESHOOTING.
3. USE RED, YELLOW, GREEN, AND WHITE TTHN # 14 COPPER WIRES FROM DISCONNECT TO SIGNAL HEAD. PLACE A PERMANENT MARKING ON THE WIRE DESIGNATING THE PHASE USED.
4. VERIFY THE COLOR CODE OF ALL SIGNAL CABLE WITH THE MAINTAINING AGENCY PRIOR TO WIRING INTERSECTION.
5. USE LOUVERED ALUMINUM SIGNAL HEAD BACK PLATES WITH A 2" YELLOW REFLECTORIZED (TYPE III REFLECTIVITY) OUTER EDGE BORDER. BACK PLATES ARE TO BE ONE-PIECE ALUMINUM.
6. ALL SIGNAL HEADS SHALL BE ALUMINUM WITH TUNNEL VISORS. PLASTIC/POLYCARBONATE HOUSINGS ARE UNACCEPTABLE. ALL SIGNAL INDICATIONS SHALL MEET CURRENT FDOT SPECIFICATIONS AND BE L.E.D.
7. RIGID MOUNT TRAFFIC SIGNAL HEADS TO MAST ARMS UTILIZING STAINLESS STEEL WIRE ROPE CABLE.
8. PROTECTED AND THROUGH MOVEMENT SIGNAL DISPLAYS SHALL BE PLACED IN THE CENTER OF THE LANE, AS REQUIRED BY GEOMETRICS.
9. ALL SIGNAL HEADS, PEDESTRIAN HEADS, AND PEDESTRIAN BUTTONS SHALL HAVE WEEP HOLES.

CONTROLLER:

1. USE POLYMER CONCRETE CONSTRUCTION CONTROLLER BASE, AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. BASE SHALL HAVE A TWELVE INCH (12") BED OF PEA ROCK OR CRUSHED STONE FOR DRAINAGE. STUB UP CONDUITS SHALL BE SIX INCHES (6") TO TWELVE INCHES (12") BELOW THE ACCESS HOLE IN THE CABINET PAD. A SERVICE SLAB SHALL BE THE WIDTH OF THE CABINET AND SHALL EXTEND OUT THIRTY INCHES (30").
2. BASE OF CONTROLLER TO BE SAME ELEVATION AS CENTER OF ROADWAY OR GREATER. USE CONCRETE STEPS AS REQUIRED.
3. PROVIDE A NAZTEC SERIES 900 TS2 TYPE 2 HYBRID CONTROLLER WITH A TYPE VI CABINET. ALL CONTROLLER EQUIPMENT TO BE COMPATIBLE WITH MAINTAINING AGENCY'S INTERCONNECT SYSTEM (IF APPLICABLE). CONTACT MAINTAINING AGENCY PRIOR TO ORDERING CONTROLLER ASSEMBLY TO CONFIRM EQUIPMENT COMPATIBILITY.
4. INCLUDE AN UNINTERRUPTIBLE POWER SUPPLY UNIT (UPS). ATTACH UPS UNIT TO THE OUTSIDE OF THE CONTROLLER CABINET. INSTALL UPS UNIT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. UPS EQUIPMENT TO BE COMPATIBLE WITH MAINTAINING AGENCY'S EXISTING SYSTEM AND SHALL INCLUDE 110 W/ETHERNET AND SNMP (PROTOCOL). UPS ALARM TO BE WIRED IN COORDINATION WITH MAINTAINING AGENCY DURING INSTALLATION.
5. WITH THE EXCEPTION OF GROUNDING CONDUIT, ALL CONDUITS ENTERING THE SIGNAL CONTROLLER BASE SHALL UTILIZE 4" PVC CONDUIT BETWEEN THE PULL BOX AND SIGNAL CONTROLLER BASE.
6. ALL POLES, FOUNDATIONS, AND CABINET ASSEMBLIES SHALL HAVE 50' OF GROUND ROD AND SHALL BE BONDED IN THE SIGNAL PULL BOX NEXT TO THE TRAFFIC SIGNAL CABINET.
7. INCLUDE 1 ADDITIONAL SPARE CONDUIT (FOR A TOTAL OF 3 SPARES) FOR CONTROLLER CABINET IN THE CABINET BASE.
8. CONTROLLER CABINET SHALL HAVE A 16 CHANNEL EDI MMU (MALFUNCTION MANAGEMENT UNIT) TO BE COMPATIBLE WITH FOUR SECTION HEAD OPERATION/LOGIC AND ETHERNET READY.
9. THE COORDINATION TIMINGS WILL BE SUPPLIED BY THE MAINTAINING AGENCY (IF APPLICABLE) UPON REQUEST FROM THE CONTRACTOR. REQUESTS SHOULD BE MADE TO THE MAINTAINING AGENCY.

PEDESTRIAN POLES:

1. USE LOCKING COLLARS WHEN MOUNTING ALUMINUM PEDESTRIAN POLES TO PEDESTRIAN PEDESTAL BASES.
2. USE BREAKAWAY ALUMINUM SQUARE BASE ASSEMBLIES WITH ALUMINUM DOORS FOR PEDESTRIAN PEDESTALS. SPLICE SIGNAL CABLE IN BASE OF PEDESTAL (NOT IN PEDESTRIAN HEADS).
3. EACH PEDESTRIAN PUSH BUTTON IS TO BE WIRED WITH A DEDICATED CABLE, CONTINUOUS ALL THE WAY BACK TO THE CONTROLLER CABINET.
4. DRILL AND TAP ALUMINUM PEDESTAL FOR MOUNTING PEDESTRIAN DETECTOR AND SIGNS.
5. PEDESTRIAN SIGNAL HEADS TO BE 16" INTERNATIONAL SYMBOL, LED COUNTDOWN TYPE. MOUNT PEDESTRIAN SIGNAL HEADS 9'-6" ABOVE GRADE.
6. USE PEDESTRIAN BUTTON SIGNAL SIGN FTP-68B-06 OR R103E. STREET NAME SHALL BE IN ACCORDANCE WITH THE STREET NAMES SHOWN ON THE SIGNALIZATION PLAN SHEETS. SIGN COST SHALL BE INCLUDED IN PAY ITEM 665-11: PEDESTRIAN DETECTOR (F&I).
7. CONTRACTOR TO ENSURE THAT A 4 FT. X 4 FT. FLAT (A.D.A. COMPLIANT) LANDING AREA IS ADJACENT TO ALL PED BUTTONS FOR PEDESTRIANS.

ELECTRICAL POWER SERVICE:

1. USE GALVANIZED (STEEL) RIGID ABOVEGROUND CONDUIT FOR ELECTRICAL POWER SERVICE.
2. USE A LEVER-TYPE BYPASS METER SOCKET.
3. ELECTRICAL SERVICE DISCONNECT IS 125 AMP, COMPRISING OF A SIX (6) CIRCUIT DISCONNECT BOX WITH FOUR CIRCUIT BREAKERS; ONE 50 AMP/120 VOLT FOR CONTROLLER, ONE 15 AMP/120 FOR THE INTERNALLY ILLUMINATED STREET SIGNS (IF APPLICABLE), ONE 15 AMP/ 120 VOLT (FUTURE USE), AND ONE 15 AMP/120 OR 240 VOLT FOR LIGHTING LUMINAIRE (IF APPLICABLE).
4. THE CONTRACTOR SHALL CONTACT THE COMPANY PROVIDING ELECTRICAL POWER SERVICE TO DETERMINE IF A SERVICE PROCESSING OR CONNECTION FEE IS REQUIRED. THE COST OF ANY SUCH FEE SHALL BE INCLUDED AS PART OF PAYMENT FOR ELECTRICAL POWER SERVICE ASSEMBLY.
5. A 30 AMP BREAKER SHALL BE INSTALLED FOR ELECTRICAL POWER SERVICE, UNLESS THE CURRENT REQUIREMENT FOR NORMAL OPERATION OF THE INTERSECTION EXCEEDS 25 AMPS. AT MINIMUM, THE BREAKER FOR THE ELECTRICAL SERVICE SHALL EXCEED THE CURRENT REQUIREMENT FOR NORMAL OPERATION BY 25 PERCENT.
6. THE ELECTRICAL SERVICE SHALL BE INSTALLED ON A PII CONCRETE SERVICE POLE SEPARATE FROM THE SIGNAL CABINET. THE ELECTRICAL SERVICE POINTS SHALL BE METERED.

CONDUIT/ PULL BOXES/DETECTION SYSTEM:

1. SIGNAL CABLE AND LOOP WIRE ARE NOT TO BE IN THE SAME PULL BOX.
2. CABLE GRIP SHALL BE OF SUFFICIENT SIZE TO NOT COMPROMISE THE INSTALLATION OF THE SIGNAL CABLE.
3. ALL CABLES WILL HAVE THREE SPARE CONDUCTORS.
4. USE POLYMER CONCRETE CONSTRUCTION PULL BOXES (STANDARDS) TO BE A MINIMUM OF TWENTY-FOUR INCHES (24") (LENGTH) X THIRTEEN INCHES (13") (WIDTH) X TWELVE INCHES (12") (DEPTH). PULL BOX COVER LOGOS TO SPECIFY FUNCTION.
5. USE POLYMER CONCRETE CONSTRUCTION PULL BOXES WITH A POLYMER CONCRETE COVER MARKED "INTERCONNECT" FOR FIBER OPTIC COMMUNICATION. USE THIRTY-SIX INCHES (36") (LENGTH) X TWENTY-FOUR INCHES (24") (WIDTH) X TWENTY-FOUR INCHES (24") (DEPTH) PULL BOXES.
6. PULL BOXES SHALL HAVE IDENTIFYING LOGOS AS FOLLOWS: TRAFFIC SIGNAL (ALL SIGNAL FUNCTIONS), TRAFFIC CONTROL (ALL LOOP AND/OR VIDEO DETECTION) AND COMMUNICATIONS (INTERCONNECT).
7. PULL BOXES ARE TO BE PLACED BEHIND CURB AND GUTTER. IF THERE IS NO CURB AND GUTTER, PULL BOXES SHALL BE PLACED A MINIMUM OF 7' FROM THE EDGE OF PAVEMENT. ALL PULL BOXES SHALL BE 20K RATED, TRAFFIC BEARING BOXES.
8. CONSTRUCT A SIX INCH (6") THICK CONCRETE PAD TWO FEET (2') BEYOND PULL BOX WITH REINFORCED WELDED WIRE (SIX INCH (6") X SIX INCH (6") W6XW6).
9. NOTCH CONDUIT FOR RIGHT ANGLE CABLE ENTRY AND USE REMOVABLE PVC PRESSURE CAPS TO SEAL CONDUIT.
10. ALL CONDUITS AND FITTINGS, EITHER FOR TRENCHING OR DIRECTIONAL BORE, SHALL BE UTILIZED FOR THE PURPOSE FOR WHICH IT WAS DESIGNED AND SHALL CONFORM TO FDOT AND MAINTAINING AGENCY STANDARDS (IF APPLICABLE).
11. FABRICATION OF NON-STANDARD SWEEPS BY CUTTING STANDARD SWEEPS IS UNACCEPTABLE.
12. NO CONDUIT SHALL BE FILLED BEYOND THE CAPACITY STATED IN THE NATIONAL ELECTRIC CODE.
13. ALL SIGNALIZATION, FIBER OPTIC, AND LIGHTING CONDUITS SHALL BE PLACED A MINIMUM DEPTH OF 36" UP TO A MAXIMUM DEPTH OF 120". NO CONDUIT SHALL BE PLACED ABOVE 36" WITHOUT MAINTAINING AGENCY APPROVAL. THE MAINTAINING AGENCY ALSO RESERVES THE RIGHT TO REDIRECT THE TERMINATION POINT OF ANY OR ALL CONDUITS FROM WHAT IS SHOWN IN THE PLANS. IF THE QUANTITY OF MATERIAL IS INCREASED, THE CONTRACTOR SHALL BE COMPENSATED ACCORDING TO THE PER UNIT PRICE OF THIS CHANGE.
14. ALL CONDUIT RUN BENEATH PAVEMENT SHALL BE ACCOMPLISHED BY DIRECTIONAL BORE. THE CONTRACTOR SHALL PROVIDE THE MAINTAINING AGENCY WITH DIRECTIONAL BORE LOGS TAKEN AT 10' INTERVALS FOR ALL DIRECTIONAL BORES.
9. ONE SPARE CABINET CONDUIT SHALL BE STUBBED OUT AND CAPPED IN EACH CABINET ENTRY PULL BOX.
15. THE DEPTH OF ANY DIRECTIONAL BORE SHALL NOT EXCEED 120" WITHOUT APPROVAL FROM THE MAINTAINING AGENCY.
16. AS DIRECTED BY THE MAINTAINING AGENCY, THE CONTRACTOR SHALL ADJUST CONDUIT VERTICALLY TO AVOID ANY POSSIBLE CONFLICTS WITH UNDERGROUND UTILITIES.
17. STACKING PULL BOXES IS NOT PERMITTED. ALL PULL BOXES SHALL BE USED FOR A SINGLE, DEDICATED FUNCTION AND SHALL NOT CARRY CABLES OF VARYING FUNCTIONS.
18. PLAN LOCATIONS OF CONDUIT AND PULL BOXES MAY BE ADJUSTED TO MEET FIELD CONDITIONS SUCH AS TO AVOID EXISTING UTILITIES. FINAL LOCATIONS OF ALL CONDUIT AND PULL BOXES (INCLUDING DESIGNATED SERVICE TYPE I.E. POWER SERVICE, SIGNAL CABLE, LOOPS, ETC…) SHALL BE CLEARLY INDICATED ON AS-BUILT PLANS TO BE SUBMITTED TO MAINTAINING AGENCY AND ENGINEER OF RECORD FOR REVIEW/APPROVAL.
19. MAINTAINING AGENCY RESERVES THE RIGHT TO ADD OR DELETE FROM THE OVERALL QUANTITY OF PULL BOXES FROM WHAT IS SHOWN ON THE PLANS. IF THE QUANTITY OF MATERIAL IS INCREASED, THE CONTRACTOR SHALL BE COMPENSATED ACCORDING TO THE PER UNIT PRICE OF THIS CHANGE.
20. TYPE "A" LOOPS SHALL BE 6'X40' AND SHALL EXTEND 5' PAST THE STOP BAR. WHENEVER POSSIBLE, LOOPS ARE TO BE CUT BEFORE FRICTION COURSE. LOOP WINDOW SHALL BE INSTALLED IN CONCRETE CURB; ALL SAW CUTS FOR LOOP INSTALLATION SHALL BE CLEAN OF DUST, DIRT, AND OTHER DEBRIS WITH COMPRESSED AIR PRIOR TO THE INSTALLATION OF LOOP WIRE OR LEAD-IN CABLE. FLEXIBLE LOOP SEALANT SHALL BE USED PER SPECIFICATIONS SECTION A660-9.4.1. ALL LOOP LEAD-INS FOR LOOPS SHALL BE CUT FROM THE BACK OF THE LOOP TO A PULL BOX AWAY FROM THE ROAD RADIUS AND TRENCHED, NOT SAW CUT, TO THE CABINET. ALL LOOP SPLICES SHALL BE SOLDERED AND COVERED WITH A WATERPROOF SEAL.

*** SPECIAL PROJECT NOTES: ***

1. AS IDENTIFIED THROUGH A POLE FOUNDATION CLEARING INVESTIGATION DURING DESIGN, AN APPROXIMATE 2” 4” PVC LINE WAS IDENTIFIED IN CLOSE PROXIMITY TO THE FOUNDATION OF MAST ARM NO. 2 AT AN APPROX. 7' DEPTH. VISUAL IDENTIFICATION WAS NOT POSSIBLE AT THE TIME OF INVESTIGATION. TWO POSSIBLE IDENTIFICATIONS FOR THIS UTILITY INCLUDE A 300 CT PAIR COMMUNICATION CONDUIT OWNED BY CENTURYLINK, OR AN ABANDONED FORCEMAIN. CONTRACTOR SHALL PERFORM EXCAVATION AS NECESSARY TO POSITIVELY IDENTIFY THE UNKNOWN UTILITY. IF UTILITY IS IDENTIFIED AS OWNED BY CENTURY LINK, CONTRACTOR SHALL COORDINATE WITH UTILITY OWNER FOR APPROVED MEANS OF FIELD ADJUSTMENT (TRENCH CUT LENGTH REQUIRED TO SHIFT CONDUIT OUT OF CONFLICT) OR COORDINATE UTILITY OWNERS RELOCATION OF UTILITY LINE. IF UTILITY IS IDENTIFIED AS ABANDONED FORCEMAIN, THE CONFLICT SECTION OF PIPE MAY BE REMOVED. CITY, MAINTAINING AGENCY, AND ENGINEER OF RECORD SHALL BE NOTIFIED PRIOR TO ANY ADJUSTMENT/REMOVAL OF CONFLICT UTILITY.
2. PRIOR TO INSTALLATION OF FOUNDATION FOR MAST ARM NO. 2, LOCATION OF GRAVITY SEWER TO WEST OF FOUNDATION SHALL BE POSITIVELY LOCATED. IF SEPARATION FROM FOUNDATION TO GRAVITY SEWER IS LESS THAN 2', SHEET STEEL SHALL BE INSTALLED BETWEEN THE FOUNDATION AND GRAVITY SEWER. SEPARATION SHALL BE NO LESS THAN 1' HORIZONTALLY.
3. A MIN. 3' SEPARATION BETWEEN FOUNDATION OF MAST ARM NO.2 & 10” GAS MAIN TO NORTH SHALL BE MAINTAINED. MAST ARM NO. 2 FOUNDATION MAY BE SHIFTED UP TO 6” SOUTH TO ENSURE SEPARATION REQUIREMENT IS MET.

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MATTHEW C. CUSHMAN, P.E.
FL P.E. No. 73150

No.	Date	Revision	By

Designed by: SAN
Drawn by: SAN
Checked by: MCC
Approved by: MCC
Scale:
Date: 04/23/20
Job No.: F15801

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SIGNAL NOTES

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-4

FLAMINGO GRAPHICS

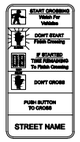
PROPOSED OVERHEAD SIGNS

SIGNS SHALL BE SINGLE FACE PLACARDS/PANELS WITH UPPERCASE LETTERS. SIGNS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM, VERTICAL CENTERED WITH CENTERLINE OF MAST ARM. REFER TO SIGN GUIDSIGN WORKSHEET No. T-9 FOR QUANTITY AND LAYOUT OF SIGN FACE(S).

Ⓐ HOLLYWOOD BLVD — 60"x21" | 700-3-201 | 2 EA | * SINGLE FACED

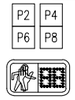
Ⓑ ROBINWOOD DRIVE — 60"x21" | 700-3-201 | 2 EA | * SINGLE FACED

PEDESTRIAN SIGN DETAILS



STREET NAMES ARE TO BE:
HOLLYWOOD BLVD (4 EA)
ROBINWOOD DR (4 EA)
FTP-68B-06 8 EA
(INCLUDED IN COST OF PAY ITEM 665-1-11)

PEDESTRIAN SIGNAL HEAD DETAILS



PED. SIGNAL LED COUNT-DOWN 1-SECT., 1-WAY
653-1-11 8 AS
665-1-11 8 EA

OVERHEAD UTILITY WIRE ELEVATIONS

1	45.37	7	40.03
2	39.01	8	39.08
3	38.96	9	47.57
4	38.12	10	44.07
5	54.07	11	39.09
6	45.58	12	38.05

NORTHWEST CORNER

140 LF	630-2-11
35 LF	630-2-12
6 EA	635-2-11
2 AS	653-1-11

SOUTHWEST CORNER

30 LF	630-2-11
3 EA	635-2-11
2 AS	653-1-11

SIGNAL REMOVAL

1 AS	670-5-600
1 PI	632-7-6
2 EA	641-2-80

INTERSECTION S&PM

295 LF	711-14-123
13 LF	711-14-125
104 SF	711-17

NORTHEAST CORNER

160 LF	630-2-11
155 LF	630-2-12
20 LF	630-2-14
9 EA	635-2-11
1 EA	635-2-12
2 AS	653-1-11

POWER SERVICE

1 AS	639-1-122
50 LF	639-2-1
1 EA	641-2-12

CONTROLLER CABINET

1 PI	632-7-1
125 LF	633-1-121
12 EA	633-2-31
12 EA	633-2-32
1 EA	633-3-11
1 EA	633-3-12
1 EA	633-3-14
1 EA	633-3-16
6 EA	660-1-109
1 AS	670-5-110
1 EA	684-1-1
1 EA	685-1-12

SOUTHEAST CORNER

40 LF	630-2-11
3 EA	635-2-11
1 EA	635-2-12
2 AS	653-1-11

GRAPHIC SCALE
10 0 5 10 20
(IN FEET)

N
GRID

SIGNAL HEAD DETAILS

2 4 6 8 — R Y G — 3-SECT., 1-WAY LED — 650-1-14 6 AS

1 6 5 2 — R Y FY G G — 5-SECT., 1-WAY LED — 650-1-18 2 AS

BACKPLATES REQUIRED FOR ALL SIGNAL HEADS

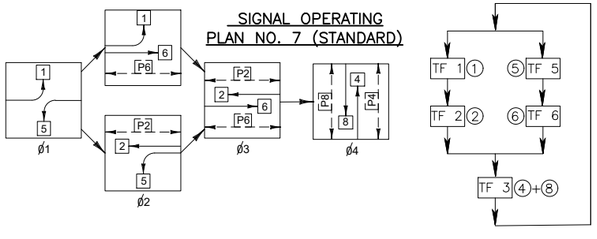
LEGEND OF SYMBOLS

- SIGNAL HEAD LOCATION (FUTURE USE)
- PROP. 3/5 SECT. SIGNAL HEAD
- PROP. PEDESTRIAN SIGNAL (1-WAY)
- PROP. OVERHEAD STREET NAME SIGN

CONTROLLER OPERATIONS

1. MAJOR STREET IS HOLLYWOOD BLVD. (MOVEMENTS 1, 2, 5 AND 6) AND MINOR STREET IS ROBINWOOD DRIVE (MOVEMENTS 4 AND 8).
2. CONTROLLER SHALL BE CAPABLE OF SIGNAL OPERATING PLAN No. 10 AND No. 7 AS DEPICTED BELOW.
3. EXISTING SPAN WIRE SIGNAL TO REMAIN IN OPERATION UNTIL PROPOSED SIGNAL IMPROVEMENTS HAVE BEEN APPROVED FOR PLACEMENT INTO NORMAL/FULL OPERATION.

SIGNAL OPERATING PLAN NO. 7 (STANDARD)



CONTROLLER TIMINGS TO MATCH EXISTING

KELLER'S TIRE

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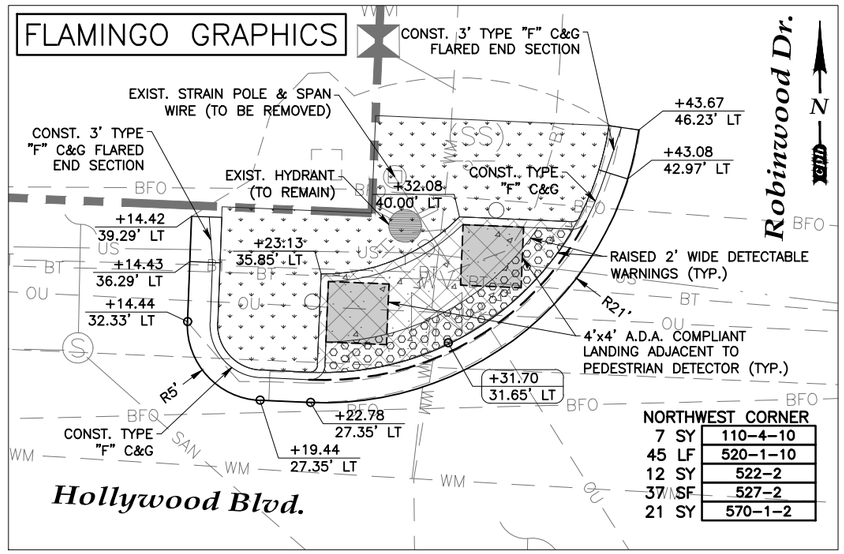
Signal Plan

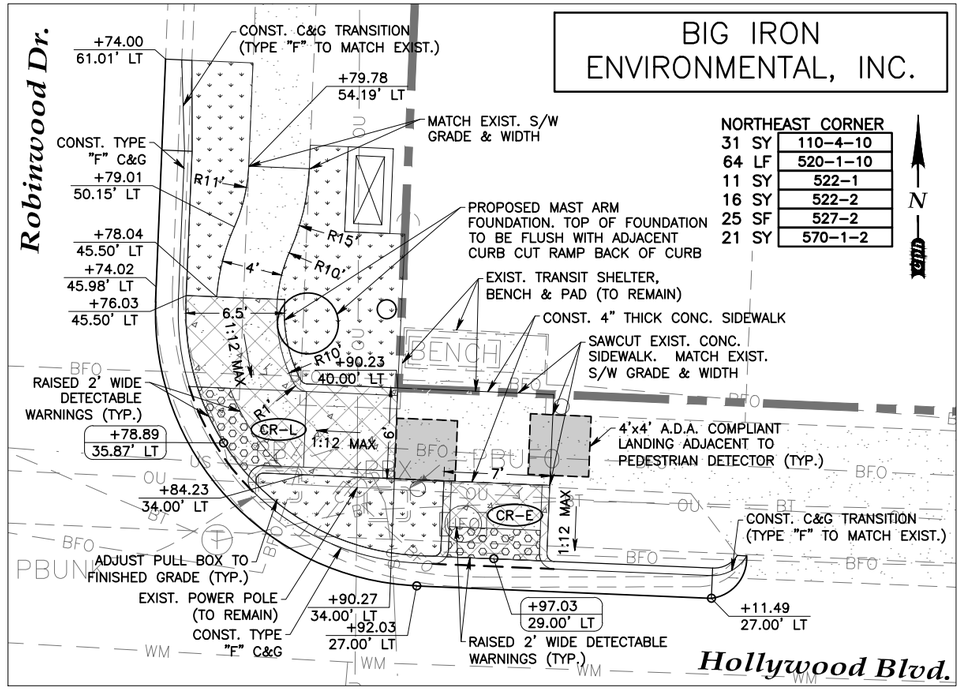
Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-5

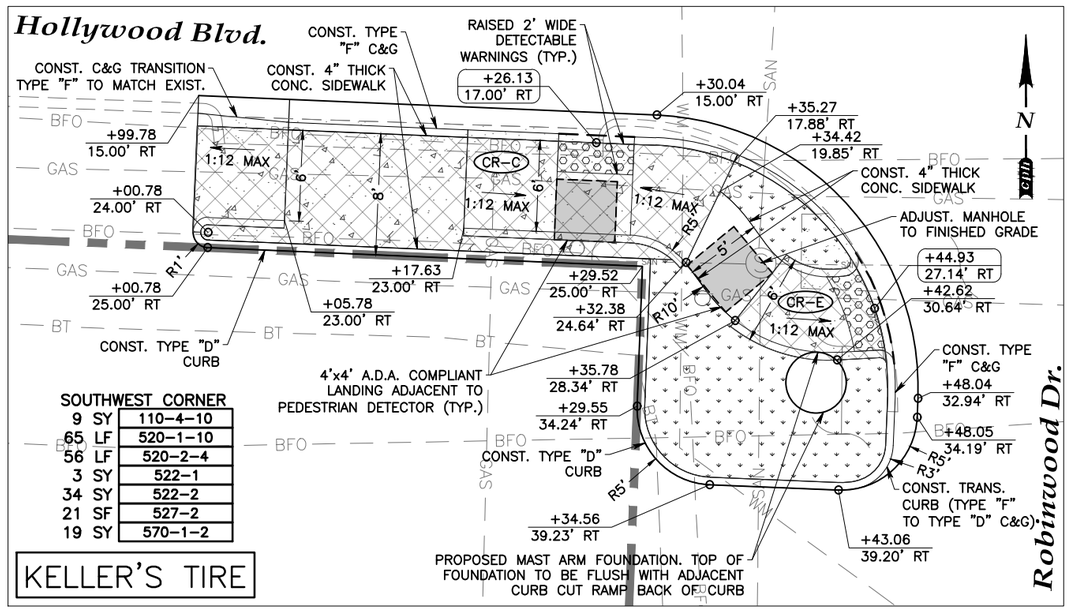
PROP. 2' DETECTABLE WARNING SURFACE
PROP. SOD
4" CONC. S/W
6" CONC. S/W
+XX.XX / XX.XX' XX — STATION / OFFSET TO ℄ SURVEY (HOLLYWOOD)
+XX.XX / XX.XX' XX — CURB RAMP & DRIVEWAY REFERENCE POINT
4'X4' ADA LANDING



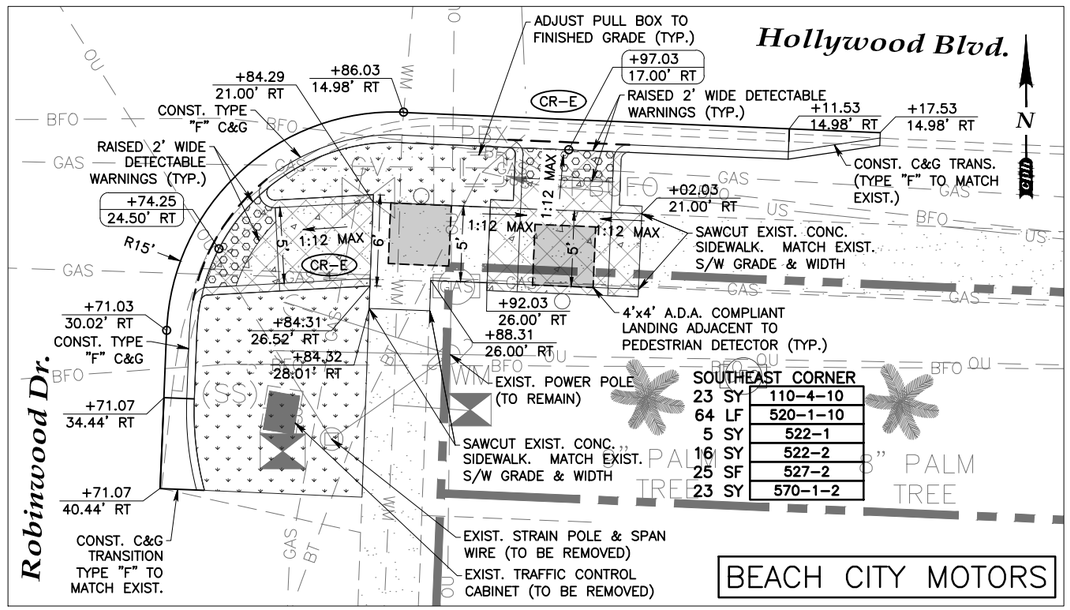
Northwest Corner / Curb Return
Scale : 1" = 10'



Northeast Corner / Curb Return
Scale : 1" = 10'



Southwest Corner / Curb Return
Scale : 1" = 10'



Southeast Corner / Curb Return
Scale : 1" = 10'

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Curb Return Detail Sheet

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-5

Drawing name: J:\F15801\Roadway\Signal\UTLS001.dwg Aug 11, 2020 - 1:48pm mcushman

SPECIAL INSTRUCTIONS						
ID No.	PED. BUTTON		PED. SIGNALS		HANDHOLE LOCATION	
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
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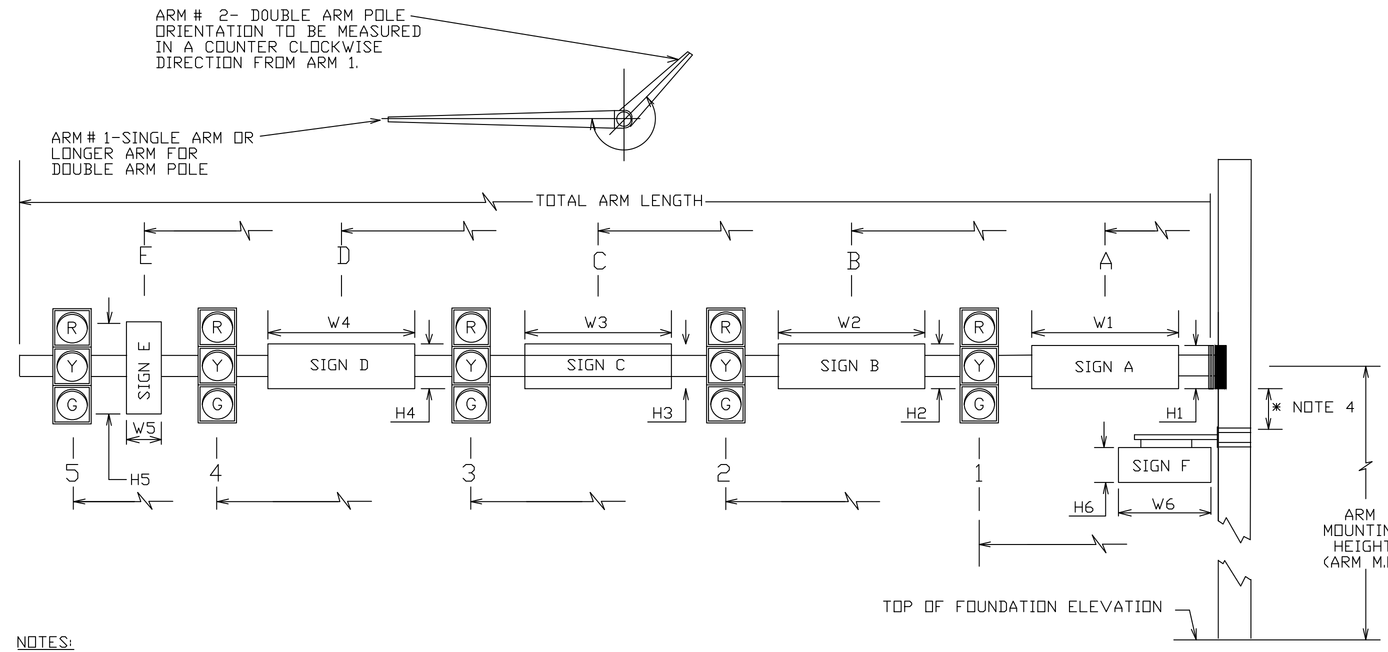

NOTES:

1. VERTICAL SIGNAL HEADS DEPICTED FOR REFERENCE ONLY. VERIFY SIGNAL HEAD ORIENTATION PER SIGN DATA TABLE BELOW.
2. SIGN PANELS SHALL BE SIZED, ORIENTED AND LOCATED PER SIGN DATA TABLE BELOW.
3. ALTERNATE INTERNALLY ILLUMINATED SIGN 'F' SHALL BE MOUNTED FREE-SWINGING SIX (6") INCHES BELOW ARM FACE PLATE.
4. SINGLE FACE STREET NAME SIGN/PLACARD SHALL BE RIGIDLY MOUNTED TO MAST ARM (IF PROPOSED). VERTICAL CENTER LINE OF SIGN SHALL COINCIDE WITH VERTICAL CENTERLINE OF MAST ARM.
5. SHOP DRAWINGS AND SUPPORT CALCULATIONS ARE REQUIRED FOR POLE CANTILEVER ARMS AND HARDWARE WHEN INTERNALLY ILLUMINATED STREET NAME SIGNS EXCEED 18 SQUARE FEET AND/OR 144 LBS.

* DENOTES NUMBER OF SECTIONS IN SIGNAL HEAD ASSEMBLY

						SIGNAL DATA																	SIGN DATA														
ID No.	SHEET No.	LOCATION BY STA.	TOP OF FOUND. ELEV.	RDWY ARM No.	CROWN ELEV.	SIGNAL V/H	BACK PLATES Y/N	PED SIGNAL Y/N	DISTANCE FROM POLE (FT.)										TOTAL ARM LENGTH	ARM M.H	< BETWEEN DUAL ARMS (90° - 270°)	DISTANCE FROM POLE (FT.) / HEIGHT & WIDTH OF SIGN (IN.)															MAST ARM PAINT COLOR
									1	*	2	*	3	*	4	*	5	*				A	H1	W1	B	H2	W2	C	H3	W3	D	H4	W4	E	H5	W5	
1	T-4	STA. 509+84.12	19.75	1	19.61	H	Y	N	39.8'	5	47.8'	3	-	-	-	-	-	-	50'	21'	270°	8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	BRONZE
				2	19.63	H	Y	N	6.0'	3	14.0'	3	-	-	-	-	-	-	30'	21'		-	-	-	-	-	-	20.0'	21''	60''	-	-	-	-	-	-	BRONZE
2	T-4	STA. 509+41.28	19.40	1	19.55	H	Y	N	39.5'	5	47.5'	3	-	-	-	-	-	-	50'	21'	270°	8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	BRONZE
				2	19.25	H	Y	N	13.5'	3	21.5'	3	-	-	-	-	-	-	30'	21'		8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	BRONZE
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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1(F)	T-4	STA. 509+84.12	19.75	1	19.61	H	Y	N	33.0'	4	41.0'	3	49.0'	3	-	-	-	-	50'	21'	270°	8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	N/A
		FUTURE USE		2	19.63	H	Y	N	6.0'	3	14.0'	3	-	-	-	-	-	-	30'	21'		-	-	-	-	-	-	20.0'	21''	60''	-	-	-	-	-	-	N/A
2(F)	T-4	STA. 509+41.28	19.40	1	19.55	H	Y	N	33.0'	4	41.0'	3	49.0'	3	-	-	-	-	50'	21'	270°	8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	N/A
		FUTURE USE		2	19.25	H	Y	N	13.5'	3	21.5'	3	-	-	-	-	-	-	30'	21'		8.0'	21''	60''	-	-	-	-	-	-	-	-	-	-	-	-	N/A
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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NOTES:

INCLUSION OF POLE ID NO.'S 1(F) & 2(F) ARE FOR THE PURPOSE OF STRUCTURAL EVALUATION OF MAST ARM(S) INCORPORATING 4 SECTION PROTECTED/PERMISSIVE LEFT TURN TREATMENTS AND RESULTANT 3 SECTION THROUGH MOVEMENTS FOR FUTURE USE. THESE ARE FOR REFERENCE ONLY AND SHALL NOT BE CONSTRUCTED AS PART OF THIS PROJECT.

Drawing name: J:\F15801\Roadway\Signal\PLANSG01.dwg Aug 11, 2020 - 1:48pm mcushman

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MATTHEW C. CUSHMAN, P.E.
FL P.E. No. 73150

No	Date	Revision	By

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Drawn by: SAN
Checked by: MCC
Approved by: MCC
Scale:
Date: 04/23/20
Job No.: F15801
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MAST ARM TABULATION

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-7

STANDARD MAST ARM ASSEMBLIES DESIGN TABLE											
STRUCTURE ID NUMBERS	DESIGNATION	FIRST ARM		SECOND ARM		UF (deg)	LL (deg)	POLE			DRILLED (4) SHAFT ID
		ARM ID	FAA (ft.)(1)	ARM ID	SAA (ft.)(1)			POLE ID	UAA (ft.)(2)	UB (ft.)	
1	A50/D–A30/D–P3/D	A50/D	–	A30/D	–	–	–	P3/D	–	21.0’	DS/12/4.5
2	A50/D–A30/D–P3/D	A50/D	–	A30/D	–	–	–	P3/D	–	21.0’	DS/12/4.5
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–

GENERAL NOTES:

1. IF AN ENTRY APPEARS IN COLUMN FAA, A SHORTER ARM IS REQUIRED. THIS IS OBTAINED BY REMOVING LENGTH FROM THE ARM TIP AND THE ARM LENGTH SHORTENED FROM FA TO FAA. SAA SIMILAR

2. IF AN ENTRY APPEARS IN COLUMN UAA, A SHORTER POLE IS REQUIRED. THIS IS OBTAINED BY REMOVING LENGTH FROM THE POLE TIP AND THE POLE HEIGHT SHORTENED FROM UA TO UAA.

3. ARM MOUNTING HEIGHT UB MUST BE BETWEEN 18–22 FEET.

4. POLE TYPES P2 AND LARGER REQUIRE A MINIMUM 4.5 FOOT DIAMETER DRILLED SHAFT. POLE TYPES P5 REQUIRE A MINIMUM 5.0 FOOT DIAMETER DRILLED SHAFT.

5. WORK THIS SHEET WITH THE ”MAST ARM TABULATION”. SEE ”MAST ARM TABULATION” FOR SPECIAL INSTRUCTIONS THAT INCLUDE NON–STANDARD HANDHOLE LOCATION, PAINT COLOR, TERMINAL COMPARTMENT REQUIREMENT, AND PEDESTRIAN FEATURES.

6. WORK WITH FDOT STANDARD PLANS INDEXES 649–030 AND 649–031.

7. THE CONTRACTOR SHALL VERIFY ALL ELEVATIONS PRIOR TO FABRICATION OF POLES.

8. NATURAL SLURRY SHALL NOT BE RELIED UPON TO PREVENT CAVING OF SOILS AND MAINTAINING AN OPEN HOLE. OTHERWISE, DRILLED SHAFTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 455.

9. CONSTRUCT SPECIAL DESIGN DRILLED SHAFT MAST ARM FOUNDATIONS PER TABLE BELOW (IF APPLICABLE)

STRUCTURE ID	DESIGNATION	SPECIAL DESIGN DRILLED SHAFT ID	SPECIAL DESIGN DRILLED SHAFT DATA							
			DA (ft)	DB (ft)	RA	RB	RC	RD (in)	RE	RF (in)
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–

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No.	Date	Revision	By

Designed by: SAN
Drawn by: SAN
Checked by: MCC
Approved by: MCC
Scale:
Date: 04/23/20
Job No.: F15801

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STANDARD MAST ARM ASSEMBLIES

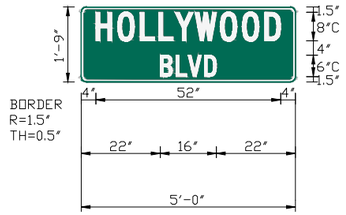
Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
T-8

SIGN NAME	A		QTY	2	SIGN NUMBER	STATION(S)
PANEL		BORDER				
WIDTH	5'-0"	WIDTH	0.5"			
HEIGHT	1'-9"	RADII	1.5"			
LEGEND	White	COLOR	White			
COLOR	Green					

SYMBOL(S)	ANGLE	X	Y	WID	HT

SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge Of Lane	COLUMN SIZE		AVERAGE LENGTH



NO. OF LIGHT FIXTURES | FIXTURE SPACING | PHOTOMETRIC CURVE | WATT | VOLTAGE

COPY	H	O	L	L	Y	W	O	O	D		L
SPACE	4.1	10.2	16.5	21.7	26.3	31.9	38.9	45.1	51.4		51.8

COPY	B	L	V	D		L
SPACE	22.1	26.5	29.9	34.5		15.7

COPY	
SPACE	

COPY	
SPACE	

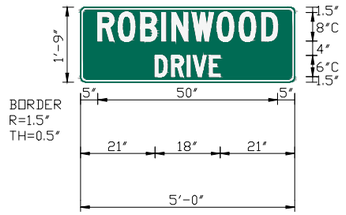
COPY	
SPACE	

COPY	
SPACE	

SIGN NAME	B		QTY	2	SIGN NUMBER	STATION(S)
PANEL		BORDER				
WIDTH	5'-0"	WIDTH	0.5"			
HEIGHT	1'-9"	RADII	1.5"			
LEGEND	White	COLOR	White			
COLOR	Green					

SYMBOL(S)	ANGLE	X	Y	WID	HT

SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge Of Lane	COLUMN SIZE		AVERAGE LENGTH



NO. OF LIGHT FIXTURES | FIXTURE SPACING | PHOTOMETRIC CURVE | WATT | VOLTAGE

COPY	R	O	B	I	N	W	O	O	D		L
SPACE	4.8	10.5	16.8	22.7	25.6	31.2	38.2	44.4	50.7		50.3

COPY	D	R	I	V	E		L
SPACE	20.9	25.4	29.8	31.5	36.1		18.2

COPY	
SPACE	

COPY	
SPACE	

COPY	
SPACE	

COPY	
SPACE	

SIGN NAME		QTY		SIGN NUMBER	STATION(S)
PANEL		BORDER			
WIDTH		WIDTH			
HEIGHT		RADII			
LEGEND		COLOR			
COLOR					

SYMBOL(S)	ANGLE	X	Y	WID	HT

SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge Of Lane	COLUMN SIZE		AVERAGE LENGTH

NO. OF LIGHT FIXTURES | FIXTURE SPACING | PHOTOMETRIC CURVE | WATT | VOLTAGE

COPY	
SPACE	

COPY	
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SIGN NAME		QTY		SIGN NUMBER	STATION(S)
PANEL		BORDER			
WIDTH		WIDTH			
HEIGHT		RADII			
LEGEND		COLOR			
COLOR					

SYMBOL(S)	ANGLE	X	Y	WID	HT

SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge Of Lane	COLUMN SIZE		AVERAGE LENGTH

NO. OF LIGHT FIXTURES | FIXTURE SPACING | PHOTOMETRIC CURVE | WATT | VOLTAGE

COPY	
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GUIDSIGN WORKSHEET

Hollywood Blvd. & Robinwood Drive

FORT WALTON BEACH, FLORIDA

Sheet No.
T-9

DEFINITION OF ENTITIES:

1. FOR THE PURPOSE OF THESE PLANS, THE FOLLOWING ENTITIES SHALL BE DEFINED AS:
   - MAINTAINING AGENCY - OKALOOSA COUNTY OR ANY OF THE COUNTY'S ASSIGNEES OR AUTHORIZED REPRESENTATIVES. E.G. COUNTY DEPARTMENTS, INSPECTORS, ENGINEERS OR OTHER INDIVIDUALS AS THE COUNTY MAY DESIGNATE AS REPRESENTING THE COUNTY'S INTERESTS.
   - ENGINEER OF RECORD - MATTHEW C. CUSHMAN, CPH INC.
   - CONTRACTOR - THE INDIVIDUAL, FIRM, JOINT VENTURE, OR COMPANY PERFORMING THE WORK.

TRAFFIC CONTROL GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING FULLY DETAILED MAINTENANCE OF TRAFFIC (M.O.T.) PLANS TO BE UTILIZED FOR TRAFFIC CONTROL OF VEHICLES AND PEDESTRIANS THROUGH THE CONSTRUCTION AREA. THE PREPARATION OF THESE PLANS MUST CONFORM TO ALL THE REQUIREMENTS IDENTIFIED ON THIS PLAN SHEET. THESE PLANS MUST BE PREPARED AND SIGNED AND SEALED BY A FLORIDA REGISTERED ENGINEER WHO HAS THE NECESSARY TRAINING AND EXPERIENCE. THE ENGINEER WHO WILL PREPARE THE PLANS AND THE CONTRACTOR'S PERSONNEL WHO WILL ADMINISTER THE PLANS MUST MEET THE F.D.O.T. TRAINING REQUIREMENTS (F.D.O.T. TRAINING PROCEDURE #625-010-010A).
2. TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH F.D.O.T. STANDARD PLANS, 102-600 SERIES (LATEST EDITION).
3. TRAFFIC SHALL BE MAINTAINED ON PAVED SURFACES AT ALL TIMES. TEMPORARY TRAVEL LANES SHALL BE A MINIMUM WIDTH OF TEN FEET (10').
4. TRAFFIC CONDITIONS (ACCIDENTS AND OTHER UNFORSEEN CONDITIONS MAY REQUIRE THE PROJECT ENGINEER TO RESTRICT OR REMOVE LANE CLOSURES OR CHANNELIZATIONS OR EVEN REVISE THE IMPLEMENTED M.O.T. PLAN. THE CONTRACTOR SHALL RESPOND AND PROVIDE ADJUSTMENTS AS DIRECTED BY THE PROJECT ENGINEER WITHOUT DELAY UNDER THESE CONDITIONS. THE CONTRACTOR SHALL ALSO RESPOND WITHIN 30 MINUTES UNDER NOTIFICATION BY THE MAINTAINING AGENCY TO ANY REQUESTS FOR CORRECTION, IMPROVEMENT, OR MODIFICATION TO THE TRAFFIC CONTROL PLAN AND/OR DEVICES.
5. ACCESS TO ALL PROPERTIES SHALL BE MAINTAINED AT ALL TIMES. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS IF TEMPORARY CLOSURES ARE REQUIRED.
6. TEMPORARY PAVEMENT MARKINGS SHALL INCLUDE LANE LINES, EDGE LINES, STORAGE AREAS, STOP BARS, AND MESSAGES TO FULLY DEFINE TRAFFIC MOVEMENT. ALL TEMPORARY MARKINGS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 102 OF THE F.D.O.T. STANDARD SPECIFICATIONS. ALL MARKINGS SHALL BE RETRO-REFLECTIVE. THESE TEMPORARY MARKINGS SHALL BE PROVIDED AS SOON AS POSSIBLE AT THE END OF EACH DAY'S PAVING OPERATIONS AND PRIOR TO OPENING TO TRAFFIC.
7. UNLESS OTHER SPECIFIED, THE CROSS SLOPE FOR ALL TEMPORARY PAVEMENT WHICH ABUTS EXISTING OR NEW PAVEMENT SHALL MATCH THE CROSS SLOPE OF THE ABUTTING PAVEMENT. CROSS SLOPE TRANSITIONS SHALL CONFORM TO F.D.O.T. STANDARD PLAN 000-511 (LATEST EDITION). THE CONTRACTOR SHALL INSURE ADEQUATE DRAINAGE OF ALL TEMPORARY PAVEMENT.
8. A DISCUSSION OF LANE CLOSURE OPERATIONS WILL BE MADE PART OF ALL PRECONSTRUCTION CONFERENCES. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A WRITTEN PLAN WHICH DETAILS EACH ACTIVITY INVOLVED IN LANE CLOSURE. THE PLAN SHALL INCLUDE BACK-UP FOR ALL SUBCONTRACTOR OPERATIONS AS WELL AS THE PRIME CONTRACTORS.
9. ALL EXISTING PAVEMENT MARKINGS OUTSIDE THE LIMITS OF CONSTRUCTION THAT ARE ALTERED OR DAMAGED SHALL BE REPLACED UPON COMPLETION OF THE PROJECT.
10. NOTIFICATION OF LANE CLOSURES OR TEMPORARY DETOURS SHALL BE ACCOMPLISHED 14 WORKING DAYS PRIOR TO CLOSURE OR DETOUR BY SUBMITTING THE REQUIRED LANE CLOSURE FORM, SKETCHES, CALCULATIONS, AND OTHER DATA TO THE MAINTAINING AGENCY.
11. THE TRAFFIC AND TRAVEL WAYS SHALL NOT BE ALTERED BY THE CONTRACTOR TO CREATE A WORK ZONE UNTIL ALL LABOR AND MATERIAL ARE AVAILABLE FOR CONSTRUCTION IN THAT AREA.
12. AS DETERMINED BY THE MAINTAINING AGENCY, THE CONTRACTOR SHALL REMOVE WORK ZONE SIGNS WHEN CONDITIONS NO LONGER WARRANT THEIR USE.
13. CONTRACTOR SHALL REMOVE, RELOCATE, OR COVER ANY EXISTING OR PROPOSED SIGNS DURING CONSTRUCTION THAT CONFLICT WITH THE TRAFFIC CONTROL PLANS. WHEN THE CONFLICT NO LONGER EXISTS, THE CONTRACTOR SHALL RESTORE THE SIGNS TO THEIR ORIGINAL POSITION.
14. EACH EXISTING STREET NAME AND STOP SIGN AFFECTED BY CONSTRUCTION SHALL BE RELOCATED AND MAINTAINED IN AN APPROPRIATE LOCATION FOR THE DURATION OF THE CONSTRUCTION.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE REMOVAL OF STORM WATER FROM THE ROADWAYS UTILIZED FOR MAINTAINING TRAFFIC IN A MANNER APPROVEDD BY THE MAINTAINING AGENCY.
16. THE CONTRACTOR SHALL REMOVE ANY EXISTING OR TEMPORARY PAVEMENT MARKINGS THAT CONFLICT WITH THE TRAFFIC CONTROL PLANS. THE CONTRACTOR SHALL UTILIZE A NON-DESTRUCTIVE F.D.O.T. APPROVED METHOD FOR THE REMOVAL OF STRIPING. EXCESSIVE DAMAGE TO ASPHALT AS DETERMINED BY THE MAINTAINING AGENCY SHALL BE REPAIRED AT THE CONTRACTOR'S OWN EXPENSE.
17. ALL EXISTING SIDEWALKS WITHIN THE RIGHT-OF-WAY SHALL REMAIN OPEN FOR PROVISION OF A TEMPORARY WALKWAY UNLESS OTHERWISE APPROVED BY THE MAINTAINING AGENCY . THIS SHALL BE IN ACCORDANCE WITH F.D.O.T. STANDARD PLAN 102-660 (LATEST EDITION).
18. ALL LANES MUST BE REOPENED TO TRAFFIC WITHIN 12 HOURS AFTER RECEIVING A NOTIFICATION OF A HURRICANE EVACUATION OR ANY OTHER CATASTROPHIC EVENT AND SHALL REMAIN OPEN FOR THE DURATION OF THE EVACUATION OR EVENT AS DIRECTED BY THE MAINTAINING AGENCY.

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TCP General Notes

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
TCP-1

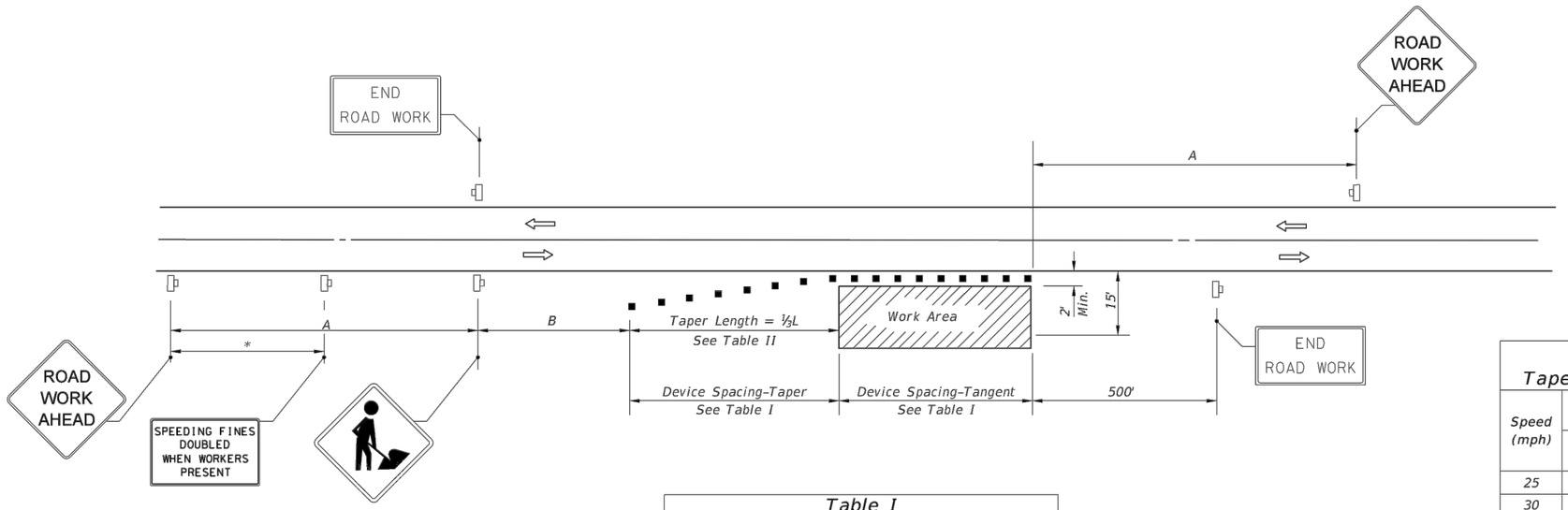

Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II
Taper Length - Shoulder

Speed (mph)	½L (ft)			Notes
	8' Shldr.	10' Shldr.	12' Shldr.	
25	28	35	42	$L=\frac{WS^2}{60}$
30	40	50	60	
35	55	68	82	
40	72	90	107	
45	120	150	180	L=WS
50	133	167	200	
55	147	183	220	
60	160	200	240	
65	173	217	260	
70	187	233	280	

8' minimum shoulder width

½L = Length of shoulder taper in feet

W = Width of total shoulder in feet (combined paved and unpaved width)

S = Posted speed limit (mph)

DISTANCE BETWEEN SIGNS

Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

*Midway between signs.

SYMBOLS

Work Area

Channelizing Device (See Index 102-600)

Work Zone Sign

Lane Identification + Direction of Traffic

GENERAL NOTES

1. When four or more work vehicles enter the through traffic lanes in a one hour period or less (excluding establishing and terminating the work area), the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index 102-603.
2. SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign only on the side where the shoulder work is being performed.
3. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
4. For general TCZ requirements and additional information, refer to Index 102-600.

DURATION NOTES

1. Signs and channelizing devices may be omitted if all of the following conditions are met:
   a. Work operations are 60 minutes or less.
   b. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.

LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2020-21 STANDARD PLANS	TWO-LANE, TWO-WAY, WORK ON SHOULDER	INDEX	SHEET
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MATTHEW C. CUSHMAN, P.E. FL P.E. No. 73150

No.	Date	Revision	By

Designed by:	SAN	Scale:		Job No.:	F15801	© 2020	
Drawn by:	SAN	Date:	04/23/20				
Checked by:	MCC						
Approved by:	MCC						

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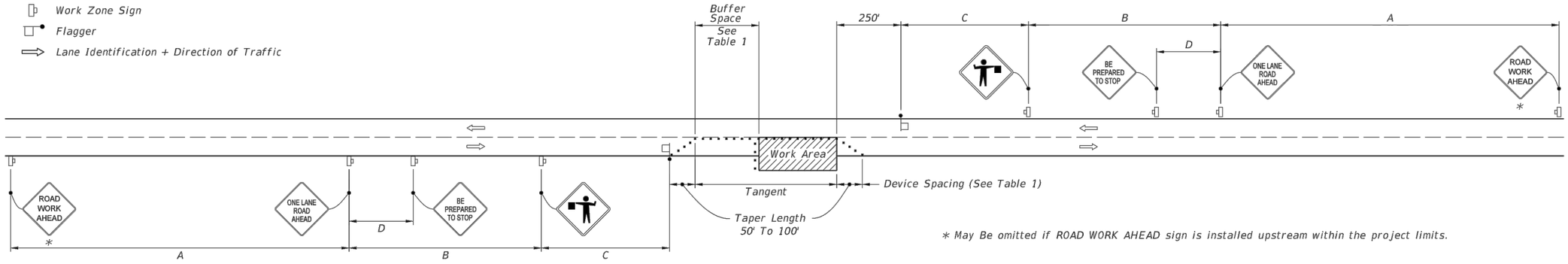
FDOT Index Sheet

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
TCP-2

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic



* May Be omitted if ROAD WORK AHEAD sign is installed upstream within the project limits.

WITHOUT TEMPORARY RAISED RUMBLE STRIPS

GENERAL NOTES:

1. Special Conditions may be required in accordance with these notes and the following sheets:
   - A. Railroad Crossings:
     - a. If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 3.
     - b. If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.
   - B. If the Work Area encroaches on the Centerline, use the Layout for Temporary Lane Shift to Shoulder on Sheet 3 only if the Existing Paved Shoulder width is sufficient to provide for an 11' lane between the Work Area and the Edge of Existing Paved Shoulder. Reduce the posted speed when appropriate.
2. Temporary Raised Rumble Strips:
   - A. Use when both of the following conditions are met concurrently:
     - a. Existing Posted Speed is 55 mph or greater;
     - b. Work duration is greater than 60 minutes.
   - B. Use a consistent Strip color throughout the work zone.
   - C. Place each Rumble Strip Set transversely across the lane at locations shown.
   - D. Use Option 1 or Option 2 as shown on Sheet 2. Use only one option throughout work zone.
3. Additional one-way control may be provided by the following means:
   - A. Flag-carrying vehicle;
   - B. Official vehicle;
   - C. Pilot vehicles;
   - D. Traffic signals.

   When flaggers are the sole means of one-way control, the flaggers must be in sight of each other or in direct communication at all times.
4. When a side road intersects the highway within the TTC zone, place additional TTC devices in accordance with other applicable TCZ Indexes.
5. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
6. When Buffer Space cannot be attained due to geometric constraints, use the greatest attainable length, not less than 200 ft, for posted speeds greater than 25 mph.
7. ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
   - A. Work operations are 60 minutes or less.
   - B. Speed limit is 45 mph or less.
   - C. There are no sight obstructions to vehicles approaching the work area for a distance equal to the Buffer Space shown in Table 1.
   - D. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
   - E. Volume and complexity of the roadway has been considered.
   - F. If a railroad crossing is present, vehicles will not queue across rail tracks.
   - G. AFADs are not in use.
8. See Index 102-600 for general TCZ requirements and additional information.
9. Automated Flagger Assistance Devices (AFADs) may be used in accordance with Specifications Section 102, 990 and the APL vendor drawings.

TABLE 1

Posted Speed	DEVICE SPACING: Maximum Spacing of Cones or Tubular Markers		DEVICE SPACING: Maximum Spacing of Type I or Type II Barricades/Panels/Drums		Distance Between Signs				Buffer Space
	On a Taper	On a Tangent	On a Taper	On a Tangent	A	B	C	D	
25	20'	50'	20'	50'	200'	200'	200'	100'	155'
30	20'	50'	20'	50'	200'	200'	200'	100'	200'
35	20'	50'	20'	50'	200'	200'	200'	100'	250'
40	20'	50'	20'	50'	200'	200'	200'	100'	305'
45	20'	50'	20'	50'	350'	350'	350'	175'	360'
50	20'	50'	20'	100'	500'	500'	500'	250'	425'
55	20'	50'	20'	100'	2640'	1500'	1000'	500'	495'
60	20'	50'	20'	100'	2640'	1500'	1000'	500'	570'
65	20'	50'	20'	100'	2640'	1500'	1000'	500'	645'
70	20'	50'	20'	100'	2640'	1500'	1000'	500'	730'

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.

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No.	Date	Revision	By

Designed by:	SAN
Drawn by:	SAN
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Date:	04/23/20
Job No.:	F15801

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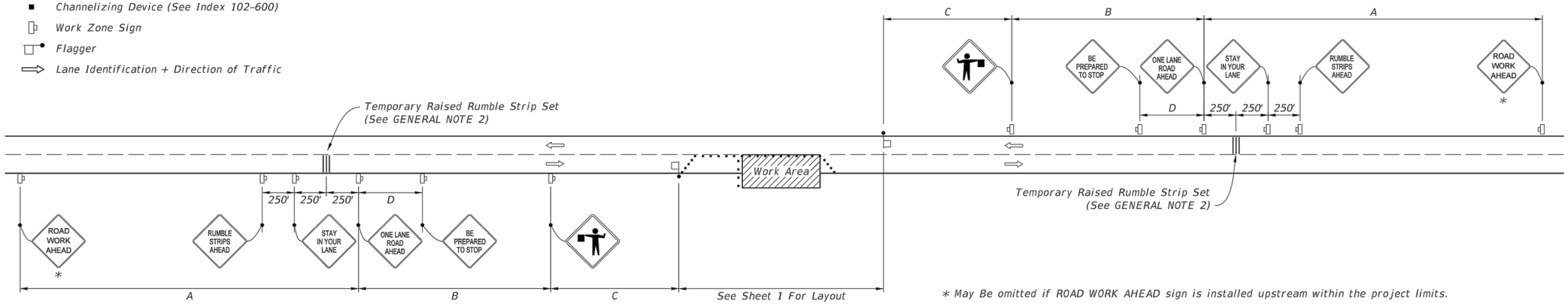
FDOT Index Sheet

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
TCP-3

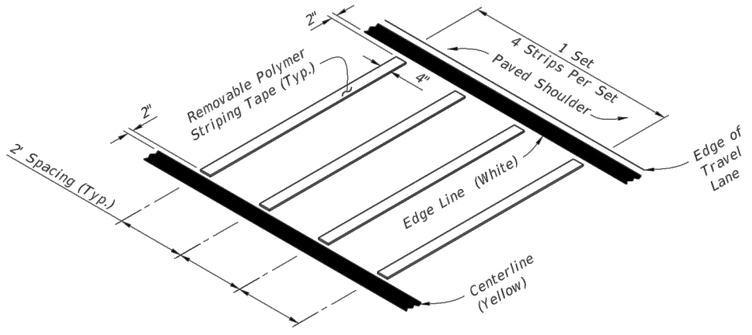
SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic



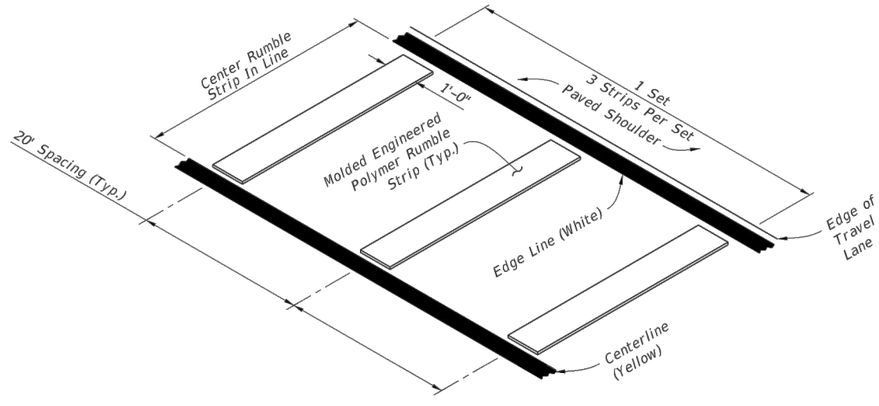
* May Be omitted if ROAD WORK AHEAD sign is installed upstream within the project limits.

WITH TEMPORARY RAISED RUMBLE STRIPS
(When Required See GENERAL NOTE 2)



REMOVABLE POLYMER STRIPING TAPE

RUMBLE STRIP SET
OPTION - 1



MOLDED ENGINEERED POLYMER SET

RUMBLE STRIP SET
OPTION - 2

TEMPORARY RAISED RUMBLE STRIPS

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No.	Date	Revision	By

Designed by:	SAN
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Checked by:	MCC
Approved by:	MCC
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Job No.:	F15801
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FDOT Index Sheet

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

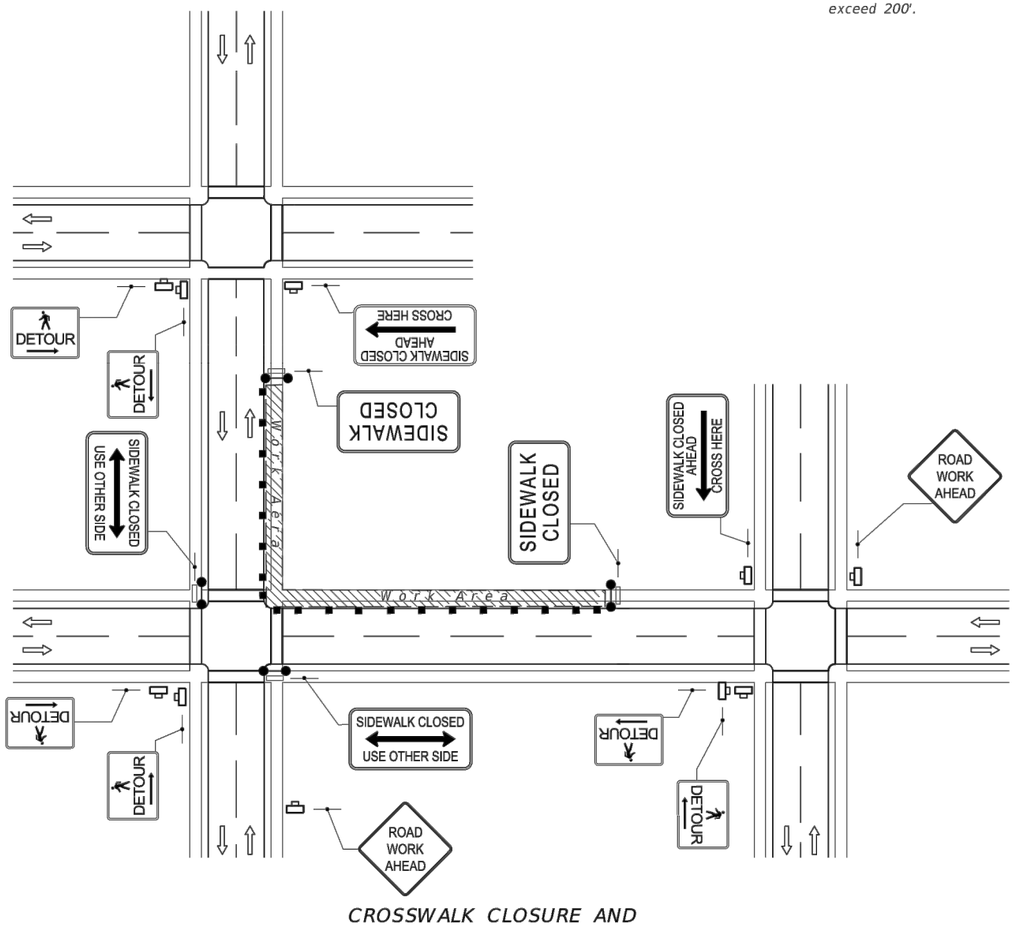
Sheet No.
TCP-4

SYMBOLS

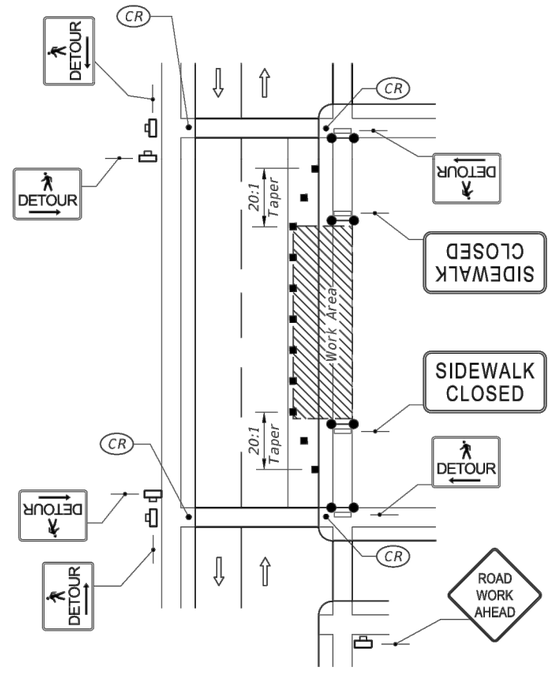
- Work Area
- Channelizing Device
- Work Zone Sign
- CR — Required Locations For Either Temporary Or Permanent Curb Ramps.
- Lane Identification + Direction of Traffic
- Pedestrian Longitudinal Channelizing Device (LCD) with Mounted Work Zone Sign or separate Work Zone Sign
- Pedestrian Longitudinal Channelizing Device (LCD)
- Temporary Sidewalk

GENERAL NOTES:

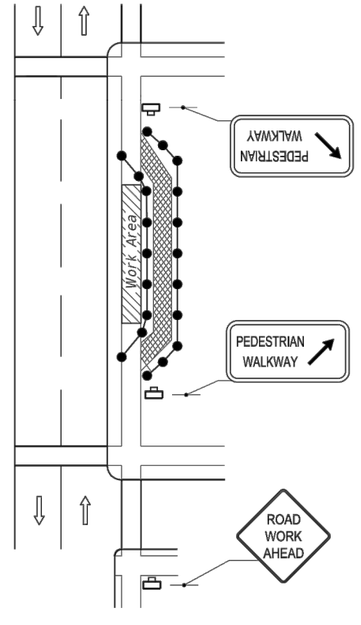
1. When encroaching work requires a sidewalk closure for 60 minutes or greater, provide an alternate pedestrian route.
2. For spacing of vehicular Channelizing Devices, see applicable vehicular temporary traffic control Indexes.
3. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.
4. For post mounted signs located near or adjacent to a sidewalk, maintain a minimum 7' clearance from the bottom of the sign panel to the surface of the sidewalk.
5. Provide a 5' wide temporary walkway, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary walkways less than 5' in width at intervals not to exceed 200'.
6. Provide a cross-slope with a maximum value of 0.02 for all temporary walkways.
7. Maintain temporary walkway surfaces and ramps that are stable, firm, slip-resistant, and free of any obstructions or hazards such as holes, debris, mud, construction equipment, and stored material.
8. Remove temporary walkways immediately after reopening of the sidewalk, unless otherwise noted in the plans.
9. Meet the requirements of Index 522-002 for temporary curb ramps.
10. Place pedestrian longitudinal channelizing device(s) across the full width of the closed sidewalk. For temporary walkways, similar to the Sidewalk Diversion, place LCDs to delineate both sides of the temporary walkway.
11. For sidewalk diversions, ensure that there is sufficient R/W for placement of temporary sidewalk and pedestrian longitudinal channelizing devices.



CROSSWALK CLOSURE AND PEDESTRIAN DETOUR



SIDEWALK DETOUR



SIDEWALK DIVERSION

LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2020-21 STANDARD PLANS	PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS	INDEX	SHEET
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No.	Date	Revision	By

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Drawn by: SAN
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Job No.: F15801

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FDOT Index Sheet

Hollywood Blvd. & Robinwood Drive
FORT WALTON BEACH, FLORIDA

Sheet No.
TCP-5

GENERAL NOTES:

1. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

2. Prior to Fabrication: Verify the installed foundation elevation will result in the required signal elevation and adjust the Pole height as needed.

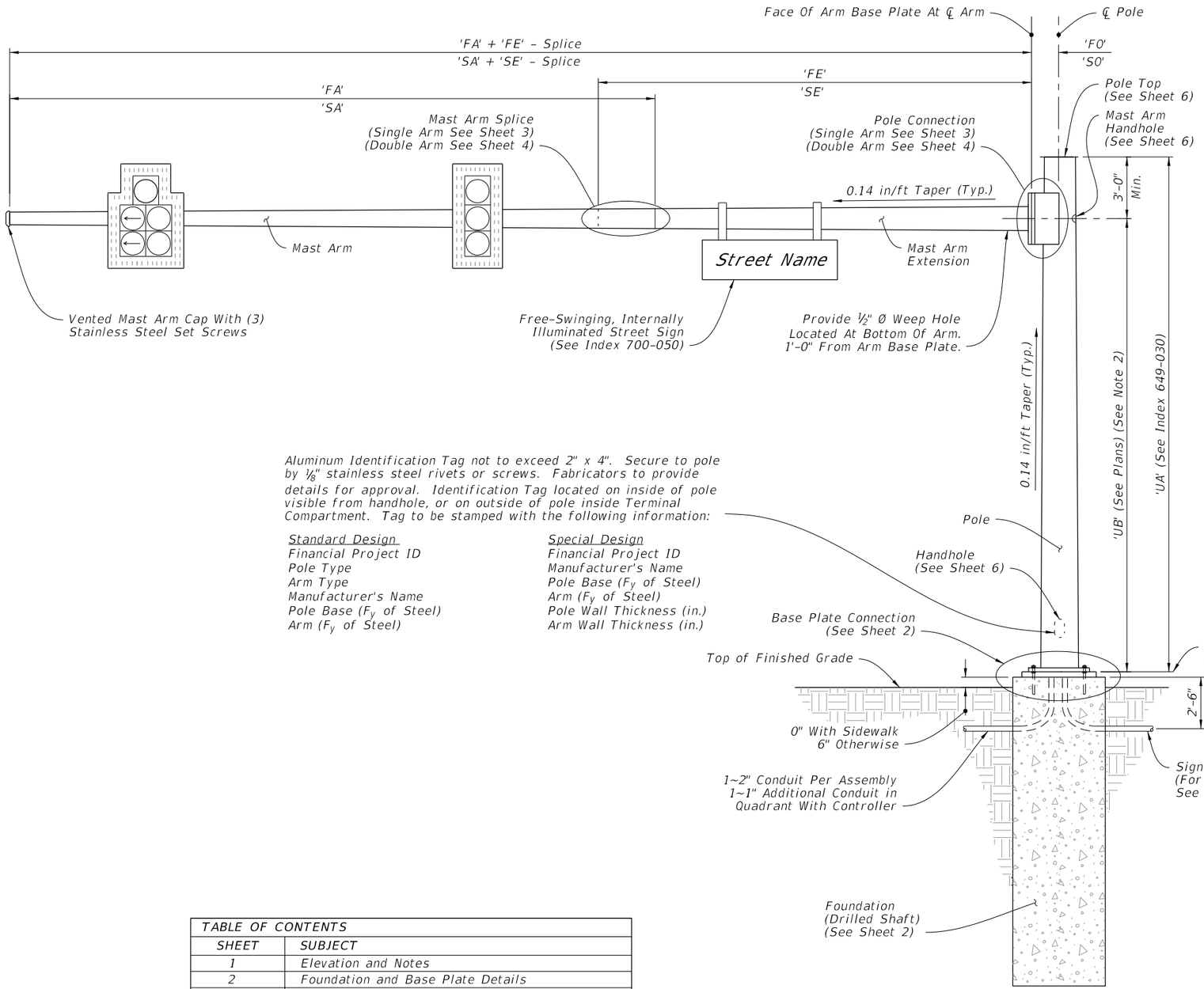
3. Details for Signal and Sign locations, Signal Head attachment, Sign attachment, Pedestrian Head attachment, and Foundation Conduit are not shown for simplicity.

4. Materials:
   - A. Poles, Mast Arms and Backing Rings:
     - a. Less than 3/16": ASTM A1011 Grade 50, 55, 60 or 65
     - b. Greater than or equal to 3/16": ASTM A572 Grade 50, 55, 60 or 65
     - c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   - B. Steel Plates: ASTM A36
   - C. Weld Metal: E70XX
   - D. Bolts, Nuts and Washers:
     - a. High Strength Hex Head Bolts: ASTM F3125, Grade A325, Type 1
     - b. Nuts: ASTM A563 DH Heavy-Hex
     - c. Washers: ASTM F436 Type 1, one under turned element
   - E. Anchor Bolts, Nuts and Washers:
     - a. Anchor Bolts: ASTM F1554 Grade 55
     - b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
     - c. Plate Washers: ASTM A36 (2 per bolt)
   - F. Threaded Bars/Studs: ASTM A36 or ASTM A307
   - G. Handhole Frame: ASTM A709 or ASTM A36, Grade 36
   - H. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65
   - I. Aluminum Pole Caps and Nut Covers: ASTM B26 (319-F)
   - J. Stainless Steel Screws: AISI Type 316
   - K. Concrete: Class IV (Drilled Shaft) for all environmental classifications.
   - L. Reinforcing Steel: Specification 415

5. Fabrication:
   - A. Welding:
     - a. Specification 460-6.4 and
     - b. AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   - B. Poles and Mast Arms:
     - a. Round or 12-sided (Min.)
     - b. Taper pole diameter at 0.14 inches per foot
     - c. Upright poles must be a single section. For arms and upright poles, circumferential welds and laminated sections are not permitted.
     - d. Arms may be either one or two sections. See Sheet 4 for telescopic splice detail
     - e. Fabricate longitudinal seam welds with 60 percent minimum penetration or fusion welds except:
       1. Use a full-penetration groove weld within 6 inches of the circumferential tube-to-plate connection.
       2. Use full-penetration groove welds on the female end section of telescopic (i.e., slip type) field splices for a minimum length of one and one-half times the inside diameter of the female section plus 6 inches.
     - f. Locate longitudinal seams weld along the:
       1. Lower quadrant of the arms.
       2. Same side of the pole as the arm connections
     - g. Face handhole perpendicular from arm on single arm poles, perpendicular from the first arm of double arms poles facing away from traffic or see special instructions on the Mast Arm Tabulation Sheet.
     - h. Provide a 'J' or 'C' hook at the top of the pole for signal wiring support (See Sheet 6)
     - i. First and Second arm camber angle = 2"
     - j. Bolt holes diameters as follows:
       1. Bolts (except Anchor bolts): Bolt diameter plus 1/16" prior to galvanizing.
       2. Anchor Bolts: Bolt diameter plus 1/2" (Max.).

6. Coatings:
   - A. All Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329
   - B. All other steel items including plate washers ASTM A123

7. Construction:
   - A. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   - B. Install Pole vertically.
   - C. Place structural grout pad with drain between top of foundation and bottom of baseplate in accordance with Specification 649-7.
   - D. Attach Sign Panels and Signals centered on the elevation of the Mast Arm.
   - E. Wire Access holes are 1 1/2" or less in diameter.



Aluminum Identification Tag not to exceed 2" x 4". Secure to pole by 1/8" stainless steel rivets or screws. Fabricators to provide details for approval. Identification Tag located on inside of pole visible from handhole, or on outside of pole inside Terminal Compartment. Tag to be stamped with the following information:

Standard Design	Special Design
Financial Project ID	Financial Project ID
Pole Type	Manufacturer's Name
Arm Type	Pole Base (F_y of Steel)
Manufacturer's Name	Arm (F_y of Steel)
Pole Base (F_y of Steel)	Pole Wall Thickness (in.)
Arm (F_y of Steel)	Arm Wall Thickness (in.)

TABLE OF CONTENTS

SHEET	SUBJECT
1	Elevation and Notes
2	Foundation and Base Plate Details
3	Single Arm Connection and Splice Details
4	Double Arm Connection and Splice Details
5	Luminaire Arm and Connection Details
6	Handhole and Pole Top Details

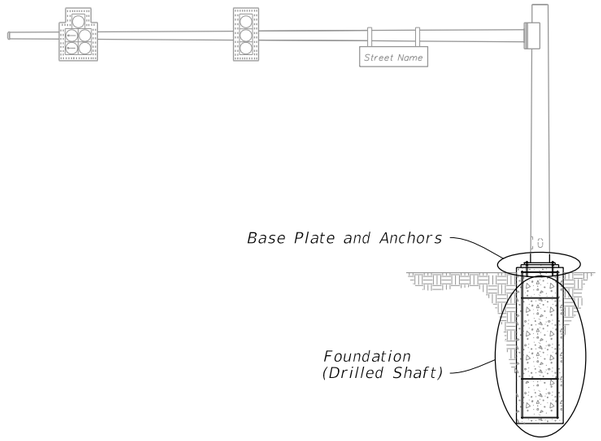
Single Arm Shown, Double Arm Similar
(Luminaire Arm Not Shown)

MAST ARM ASSEMBLY

ELEVATION AND NOTES

10/14/2019 2:17:35 PM

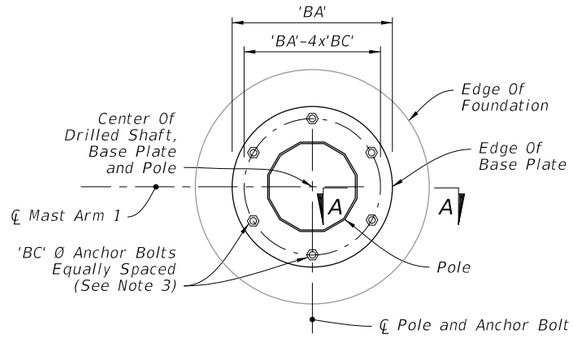
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2020-21 STANDARD PLANS	MAST ARM ASSEMBLIES	INDEX	SHEET
11/01/18						649-031	1 of 6



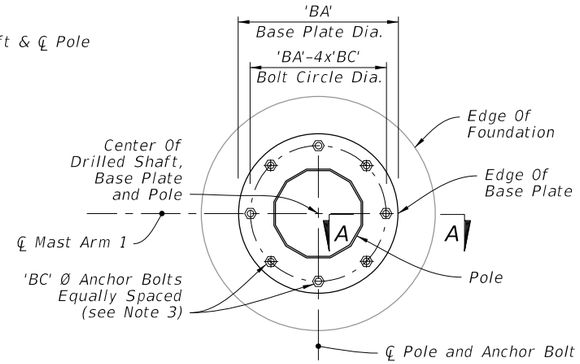
MAST ARM ASSEMBLY

NOTES:

1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and/or accessibility considerations.
2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.
3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers (not shown) for each bolt.

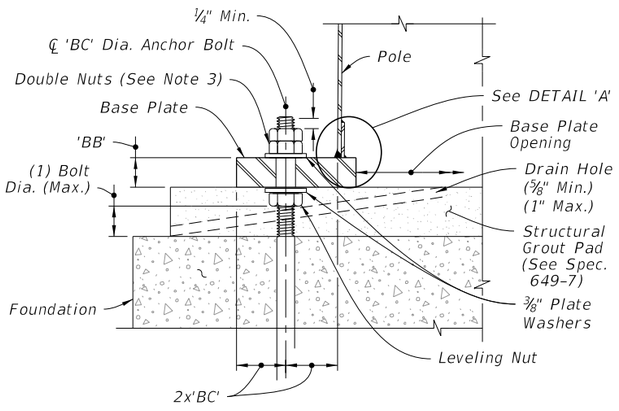


(6 Anchor Bolts)

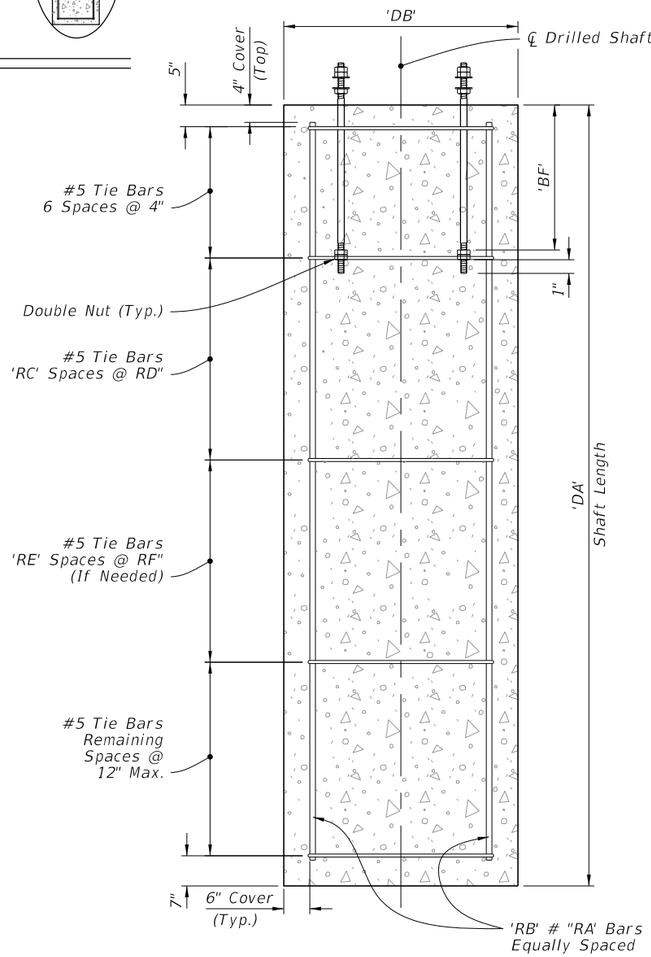


(8 Anchor Bolts)

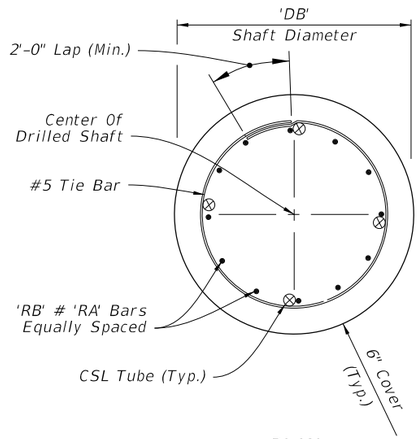
PLAN



SECTION A-A

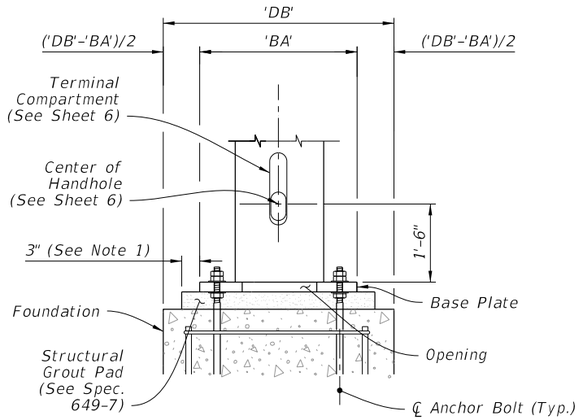


ELEVATION

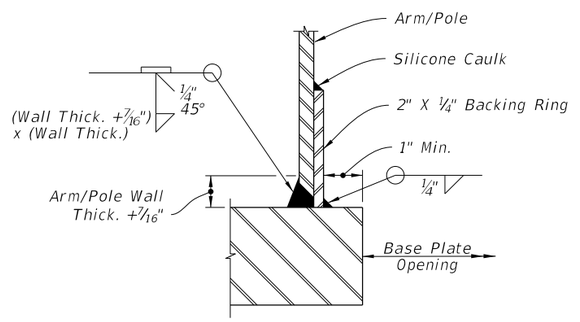


PLAN

FOUNDATION



ELEVATION
(Back Face Shown)



JOINT WELD DETAIL

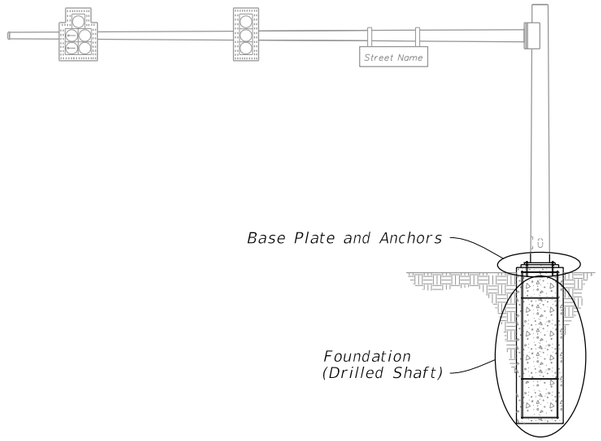
DETAIL 'A'

BASE PLATE CONNECTION

FOUNDATION AND BASE PLATE DETAILS

10/14/2019 2:17:36 PM

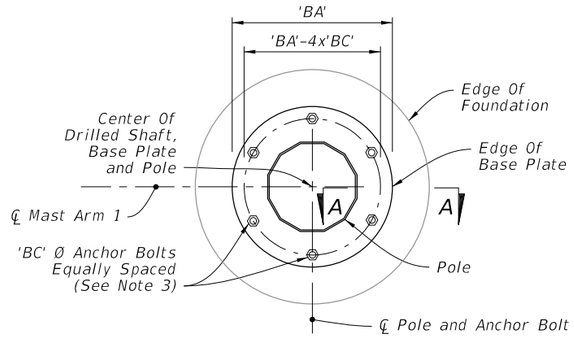
LAST REVISION	REVISION	DESCRIPTION:				
11/01/19			FY 2020-21 STANDARD PLANS	MAST ARM ASSEMBLIES	INDEX 649-031	SHEET 2 of 6



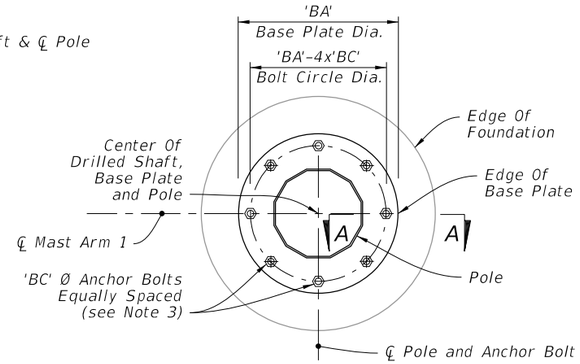
MAST ARM ASSEMBLY

NOTES:

1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and/or accessibility considerations.
2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.
3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers (not shown) for each bolt.

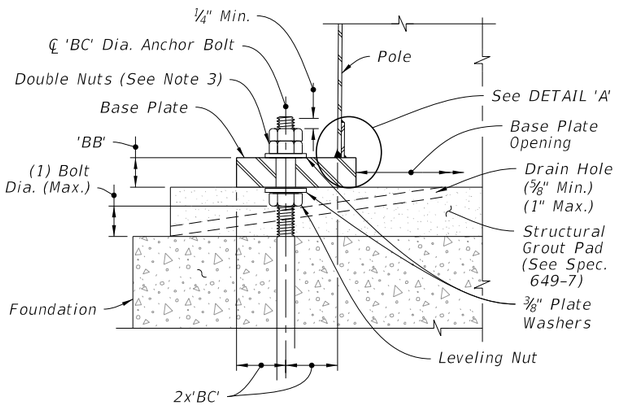


(6 Anchor Bolts)

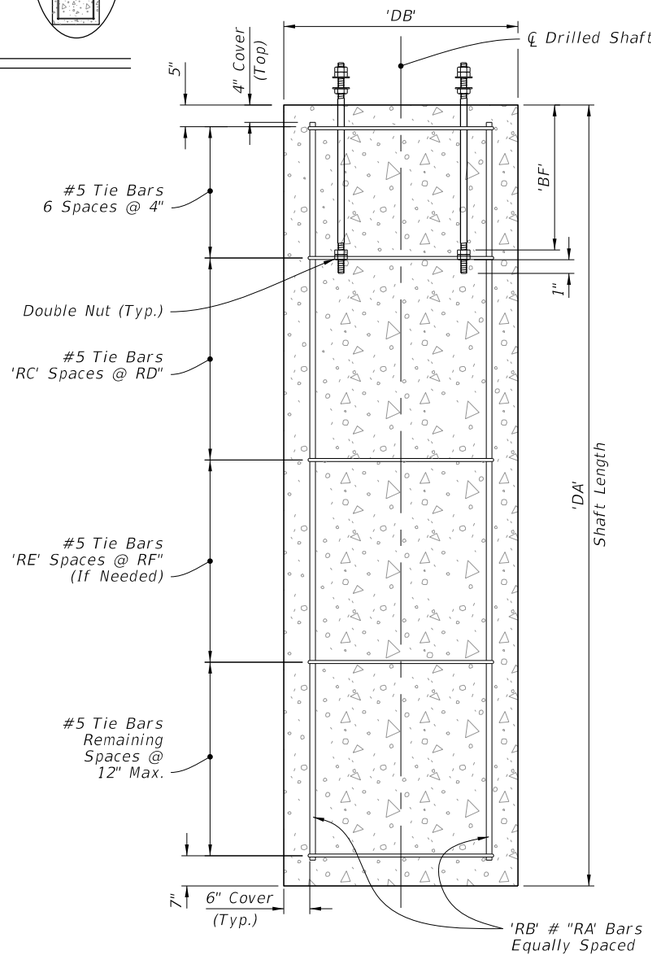


(8 Anchor Bolts)

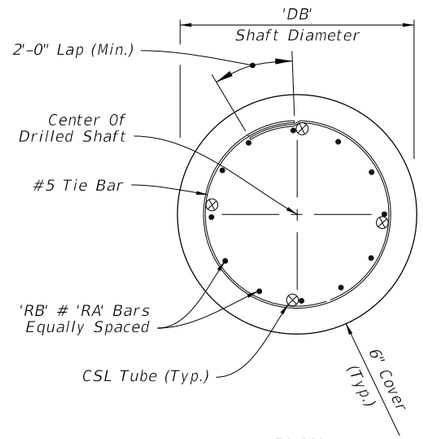
PLAN



SECTION A-A

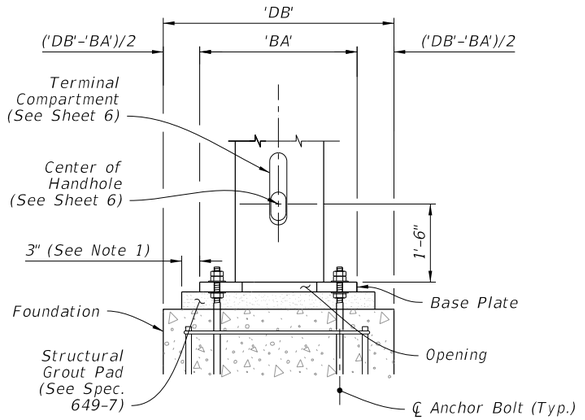


ELEVATION

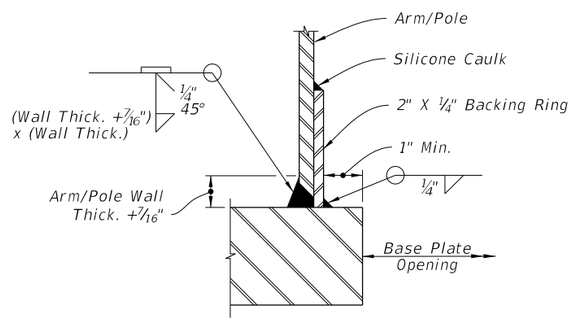


PLAN

FOUNDATION



ELEVATION
(Back Face Shown)



JOINT WELD DETAIL

DETAIL 'A'

BASE PLATE CONNECTION

FOUNDATION AND BASE PLATE DETAILS

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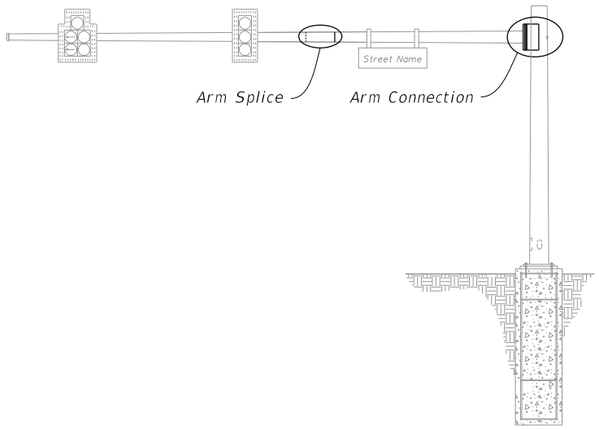
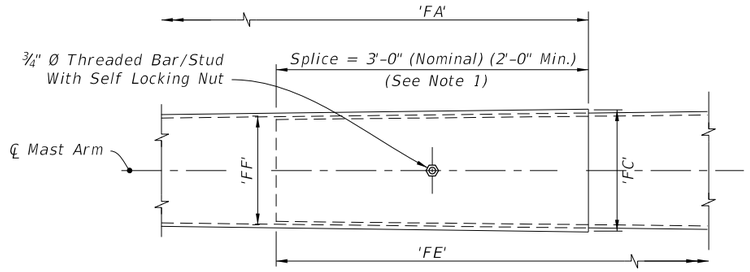
11/01/19			FY 2020-21 STANDARD PLANS	MAST ARM ASSEMBLIES	INDEX 649-031	SHEET 2 of 6

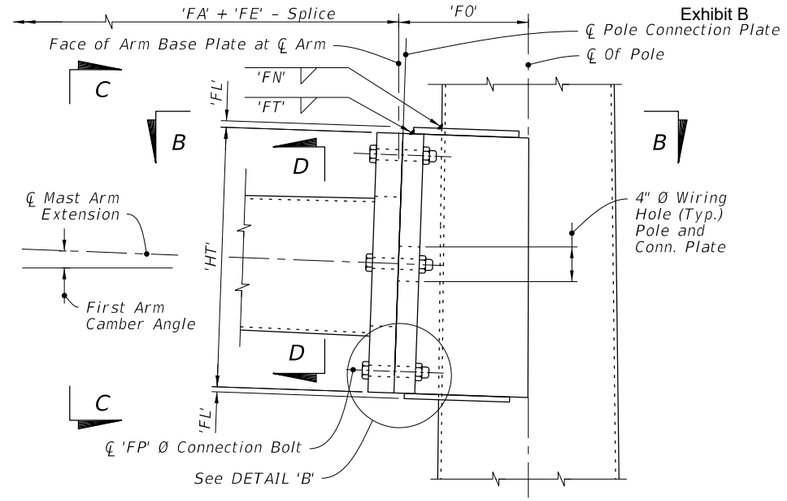
Exhibit B



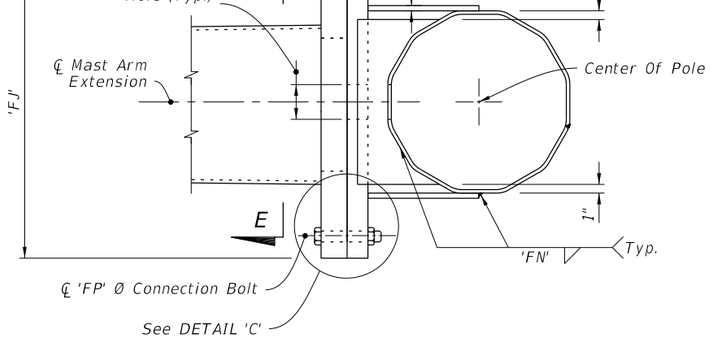
MAST ARM ASSEMBLY



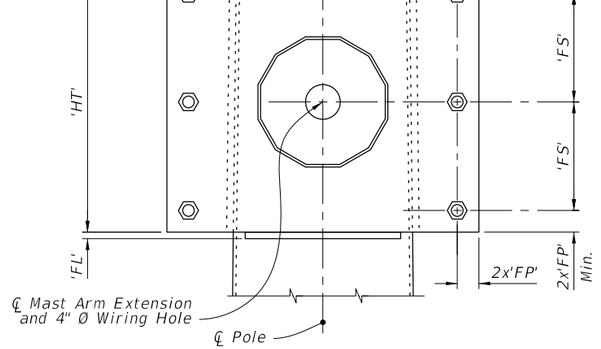
ARM SPLICE



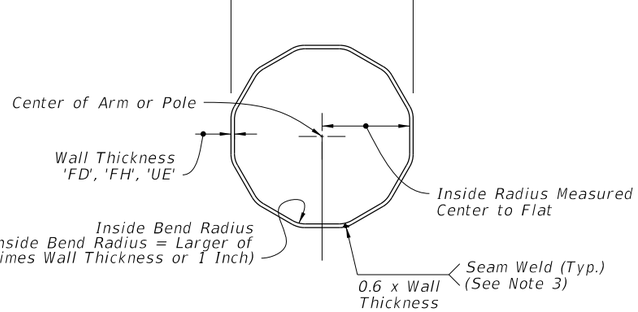
SINGLE ARM CONNECTION



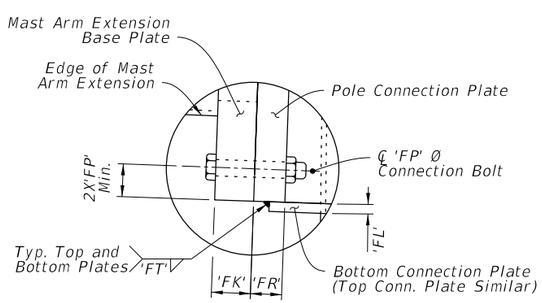
SECTION B-B



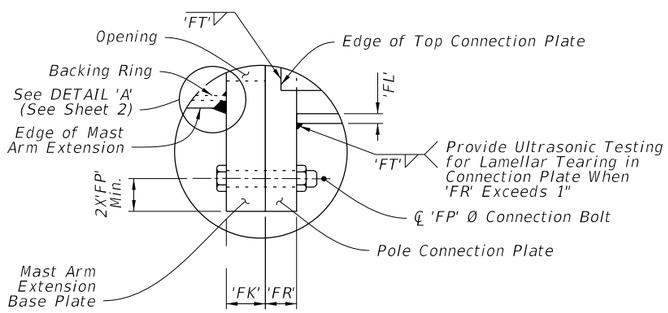
SECTION C-C



SECTION D-D



DETAIL 'B'



DETAIL 'C'

NOTE:

1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.
2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).

SINGLE ARM CONNECTIONS & SPLICE DETAILS

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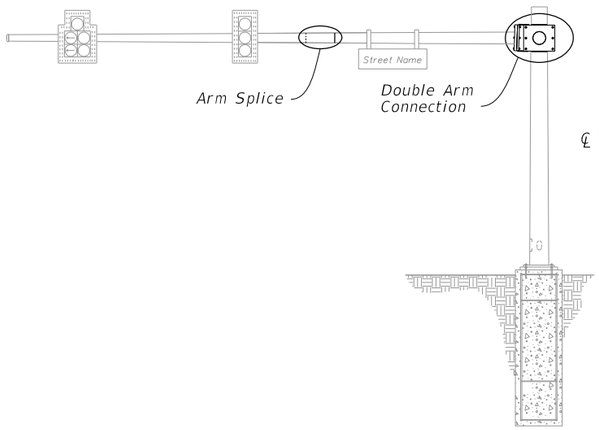
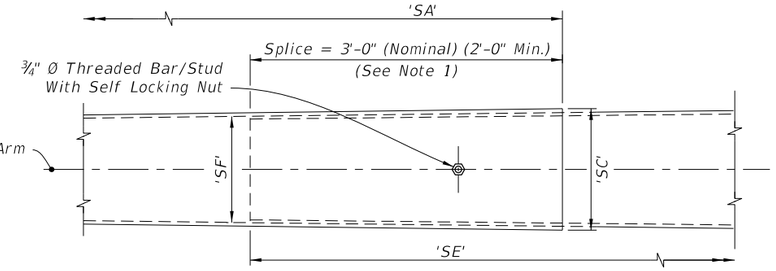
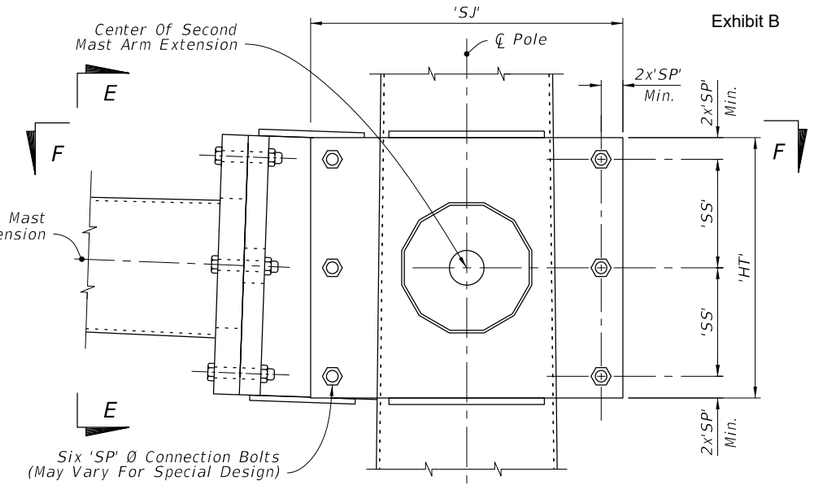
Exhibit B



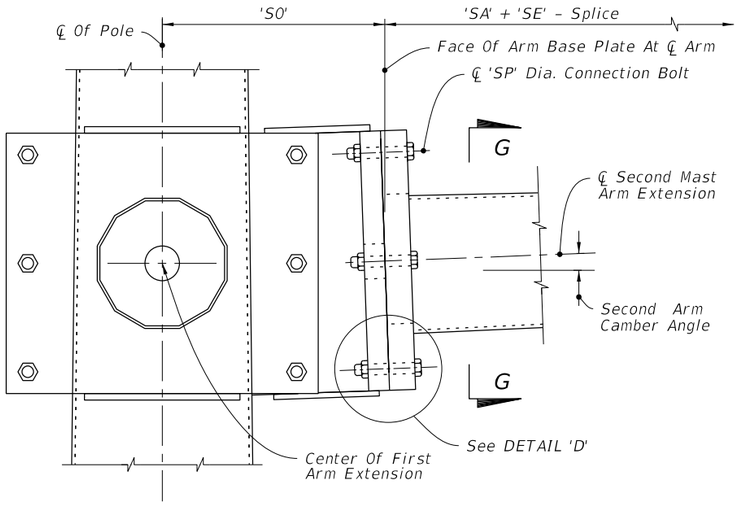
MAST ARM ASSEMBLY



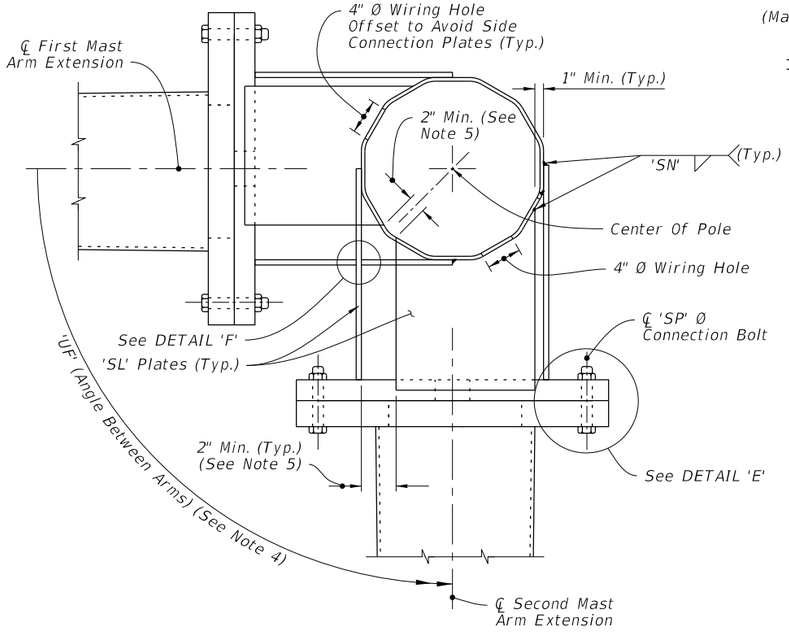
ARM SPLICE



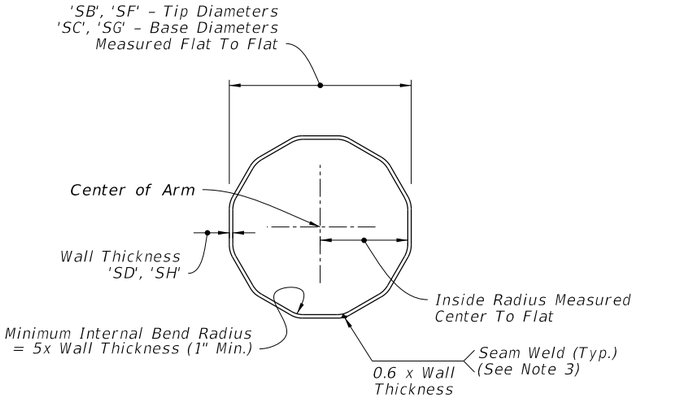
DOUBLE ARM CONNECTION



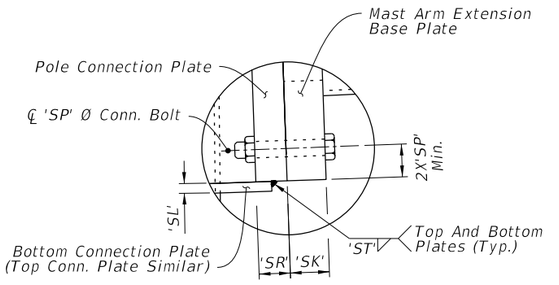
SECTION E-E



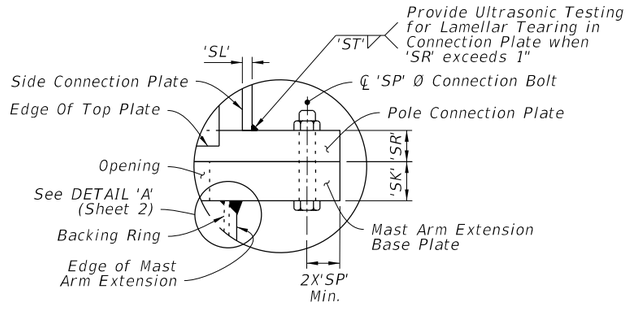
SECTION F-F



SECTION G-G



DETAIL 'D'



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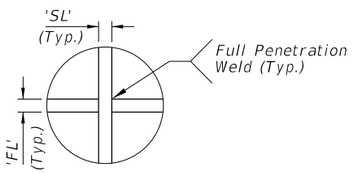
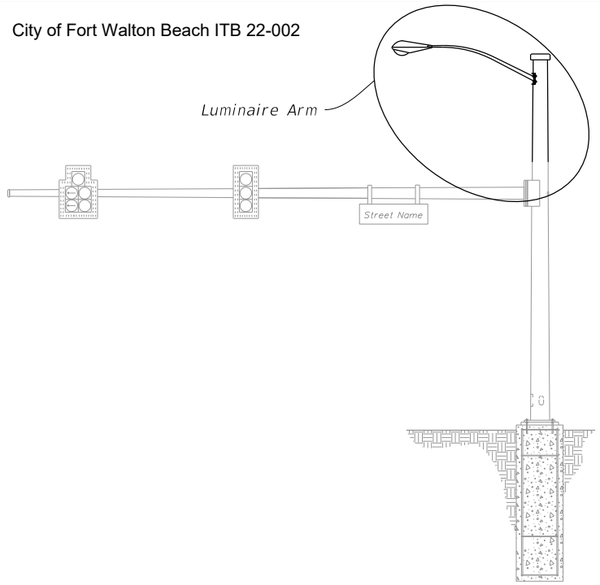


DETAIL 'F'

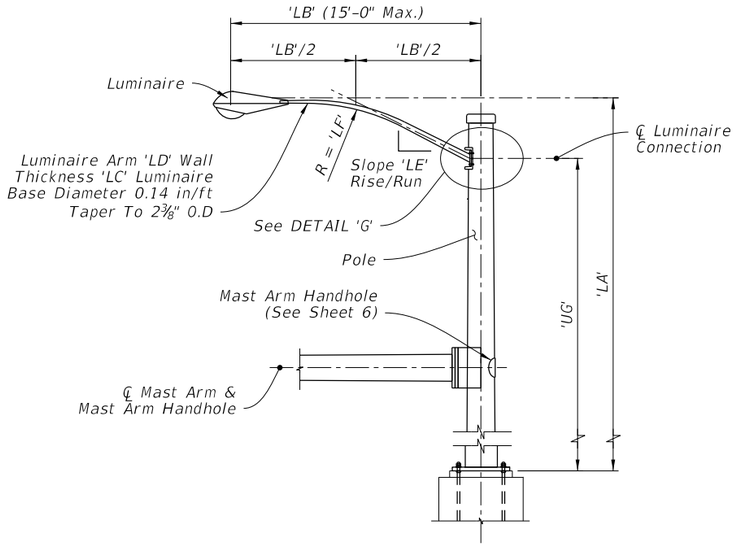
NOTE:

1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.
2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).
4. 'UF' measured counter clockwise from ℄ First Mast Arm Extension.
5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

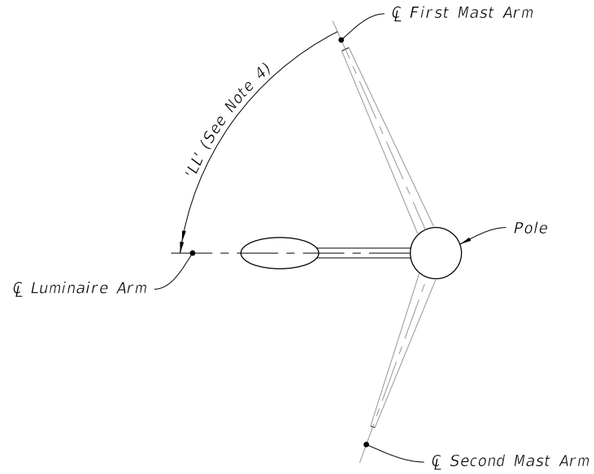
DOUBLE ARM CONNECTIONS & SPLICE DETAILS



MAST ARM ASSEMBLY



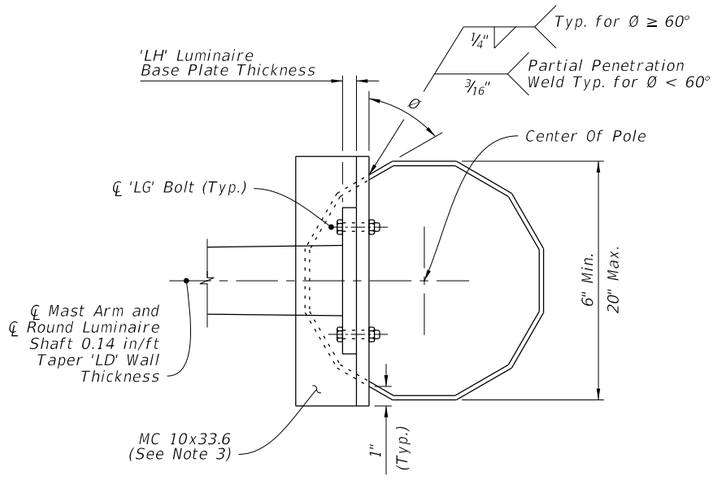
LUMINAIRE ELEVATION



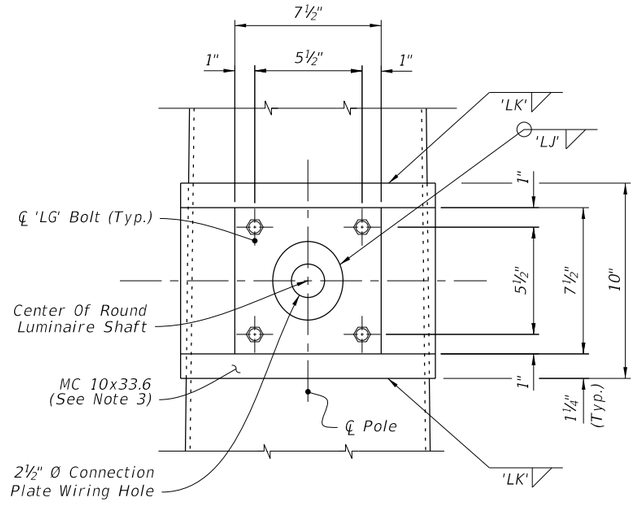
LUMINAIRE ORIENTATION

NOTES:

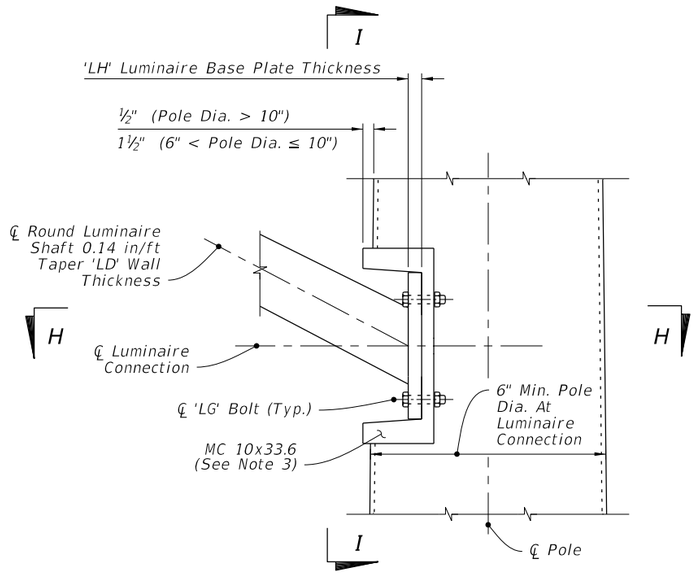
1. Galvanized steel luminaire type and luminaire length may be found in the Lighting Plans.
2. Align Luminaire Arm with Single Mast Arm or First Arm of Double Mast Arm unless indicated otherwise in the plans.
3. The fabricator may substitute a ½" thick bent plate with the same flange width, height, and length as the MC 10x33.6 Channel section.
4. 'LL' measure counter clockwise from First Mast Arm.



SECTION H-H



SECTION I-I



LUMINAIRE CONNECTION ELEVATION

DETAIL 'G'

LUMINAIRE ARM AND CONNECTION DETAILS

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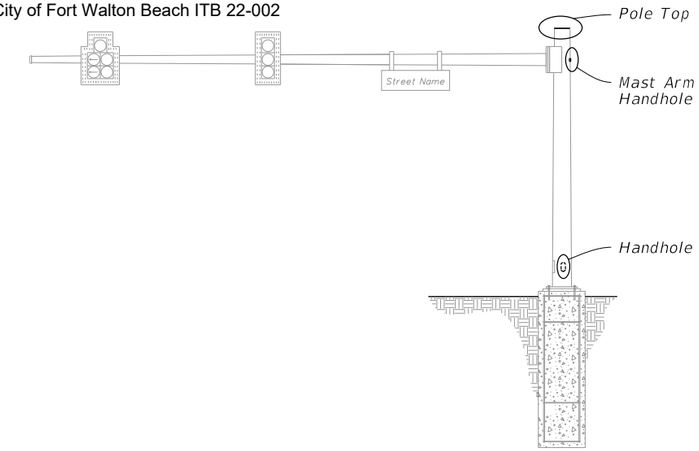
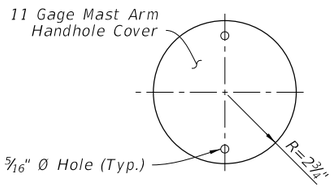


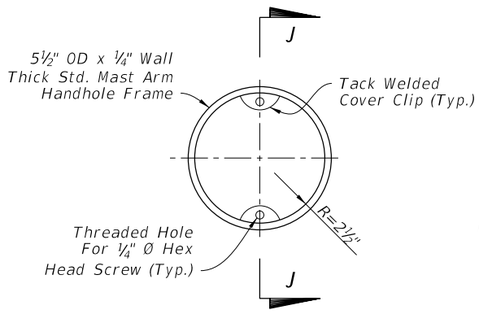
MAST ARM ASSEMBLY

NOTES:

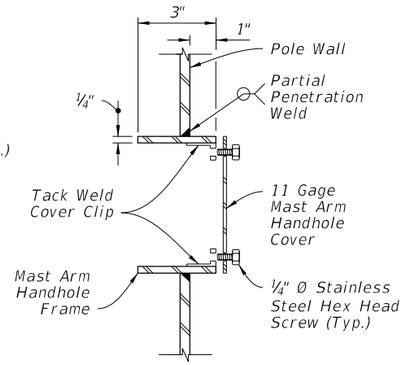
1. Handhole covers may be omitted when Terminal Compartment is provided.
2. See Mast Arm Tabulation sheet to see if Terminal Compartment is required and for locations.
3. Terminal Compartment Frame Height 2'-0" minimum to 2'-6" maximum. Align bottom of Terminal Compartment a minimum of 1" below the bottom of the Handhole Frame.
4. Any combination of Option 'a' or 'b' may be used, provided both lifting and wiring is accommodated.



COVER

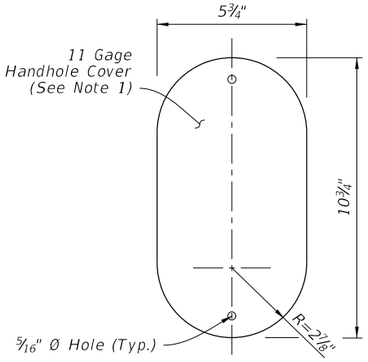


FRAME

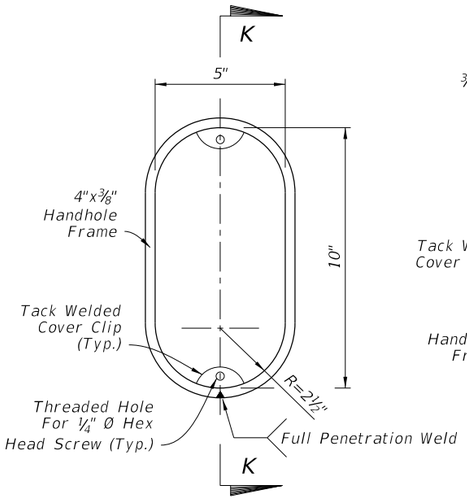


SECTION J-J

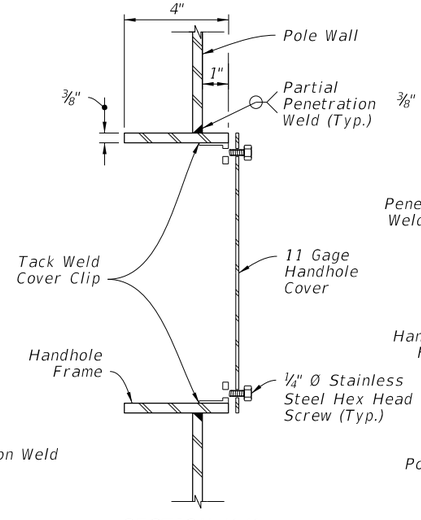
MAST ARM HANDHOLE



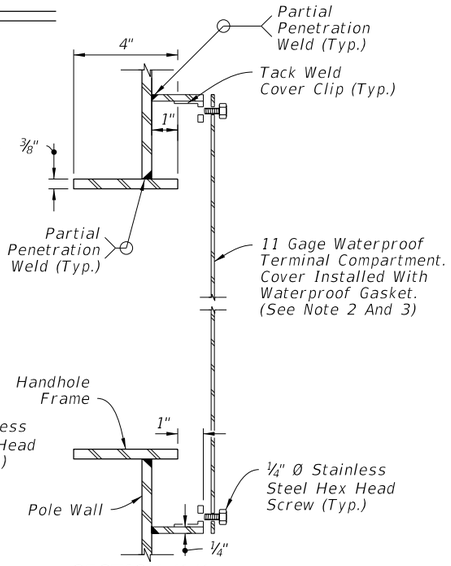
COVER



FRAME

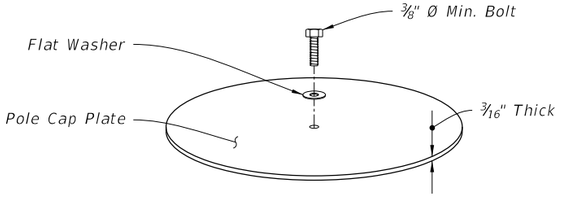


SECTION K-K
(Thru Handhole)

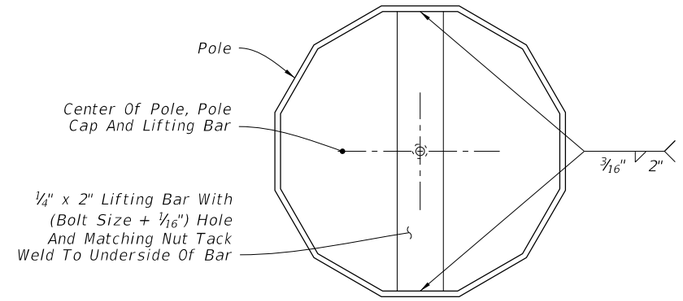


SECTION K-K
(Terminal Compartment)

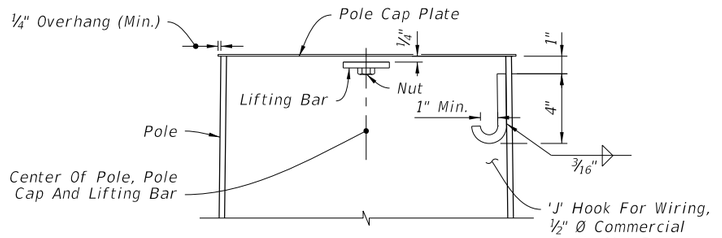
HANDHOLE



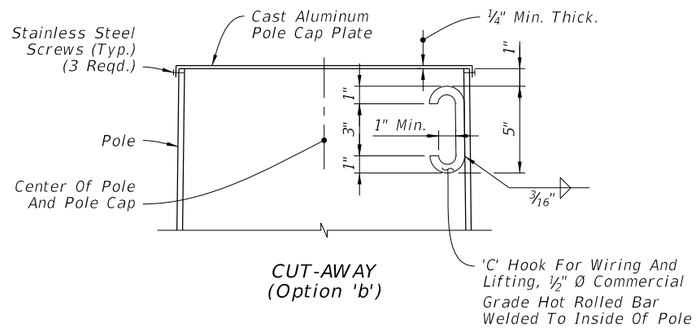
ISO VIEW
(Option 'a')



TOP VIEW
(Option 'a')



CUT-AWAY
(Option 'a')



CUT-AWAY
(Option 'b')

POLE TOP

HANDHOLE AND POLE TOP DETAILS

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