Indexes 649-030 & 649-031 Mast Arm Assemblies

Design Criteria

AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LRFDLTS-1); ***Structures Manual (SM)***, Volume 3, FDOT Modifications to LRFDLTS-1; ***Structures Manual (SM)*** Introduction, I.6 References; ***FDOT Design Manual (FDM)***

Design Assumptions and Limitations

See ***FDM 232***, ***FDM 261***, and ***Structures Manual (SM)***, Volume 3 for additional design criteria. **FDOT Signal Support Programs** website provides mast arm design programs to support both "Standard" and "Special" (Custom) designs

Design all mast arm assemblies with backplates in accordance with ***FDM 232***.

Knowing galvanizing thickness may vary, mast arm assemblies are designed for a 3 foot splice. If actual galvanizing thicknesses are as specified, the splice length will be 3 feet and the arm length will be the design length. However, if actual galvanizing thicknesses are significantly larger than specified (not uncommon), the arm may be a foot or so longer than designed, while the splice length will still comply with AASHTO requirements.

Standard Mast Arm Assemblies:

The maximum span length of Standard Mast Arm Assemblies is 78 feet. Mast arms with an arm length greater than 78 feet require a Variation approved by the District Structures Design Engineer, in accordance with ***FDM 261***. Standard Mast Arm Assemblies comply with the minimum requirements and details shown on ***Index 649-031***.

Standard Mast Arm Assemblies may be single arm, single arm with luminaire, double arms, or double arms with luminaire. Standard double arms are limited to arm orientations of 90° or 270° only.

The mast arm design Excel program, located on the **Structures Design Programs Library** website, will provide design loads and arm, pole and foundation capacities which the designer can use to choose arm type(s), pole type and foundation type for Standard designs. Additionally, the mast arm Mathcad program is also provided for detailed design evaluations/validations of Standard Mast Arm Assemblies. Available arm(s) and pole combinations are shown on ***Index 649-030***.

Arm mounting height UB must be between 18-22 feet.

Pole types P2 and larger require a minimum 4.5 foot diameter drilled shaft. Pole types P5 and larger require a minimum 5.0 foot diameter drilled shaft.

Standard foundation (Drilled Shaft) capacities are based on the following soil criteria:

Classification: Cohesionless (Fine Sand)

Friction Angle: 30 Degrees

Unit Weight: 50 pcf (assumed submerged)

N-blowcount: 15

When the designer considers soil types at the specific site location to be of lesser strength properties than shown above, an analysis is required. Auger borings, SPT borings, or CPT soundings may be used as needed to verify the assumed soil properties, and at sites confirmed to be uniform, a single boring or sounding may cover several foundations. Borings in the area that were performed for other purposes may be used to confirm the assumed soil properties. The Geotechnical Engineer must justify the differing soil criteria to the District Structures Design Engineer during the design phase of the project.

If only Standard arm(s), pole and foundation are used, shop drawings are not required.

Special (Custom) Mast Arm Assemblies:

Special mast arms are those with unique loadings, soil conditions, and/or geometric constraints that contain any component (arm, pole, or drill shaft) that is outside the range of those available on ***Index 649-030***.

The mast arm Mathcad program, located on the **Structures Design Programs Library** website, will provide the necessary variables to be shown in the "*Special Mast Arm Assemblies Data Table*" cell from the FDOT CADD Menu.

Plan Content Requirements

The signal designer completes the "*Mast Arm Tabulation Sheets*", and the structures designer completes the "*Standard Mast Arm Assemblies Data Table"* or "*Special Mast Arm Assemblies Data Table*", as appropriate. See samples of these sheets below. These are the only plan sheets required for mast arm assemblies. The structures data table may be placed on a signal plan sheet, if space permits.

The following instructions are for use with the "*Mast Arm Tabulation Sheets*":

1. Each mast arm assembly is identified by a unique ID number.
2. Dimensions 1-5 are for signals and dimensions A-E are for signs. Record the distance from the edge of the pole, at ground level, to the center of the signal or sign.
3. Signals may be mounted vertically or horizontally. Indicate the mounting in the appropriate column in the table.
4. The entire line for arm #2 and the space for the angle between dual arms are left blank for single arm assemblies.
5. All arms and poles will be galvanized. If a color is required, indicate the color in the table, otherwise leave blank.

6. Starting at the pole, select the signals and/or signs that match the configuration you are tabulating. The spaces representing the signs or signals not used will be blank. Example 1: If no sign is located between the pole and signal 1, the spaces for Sign A would be blank. Example 2: A configuration for three signals and one sign between signal 1 and signal 2 - Only the spaces for signals 1, 2, 3 and sign B would be completed; the others will be blank.
7. Record the number of sections in each signal head in the space following the distance to that head.
8. Record the height and width of each sign in the space following the distance to the sign.
9. When double arm poles are used for a skewed intersection, the standard design should be used whenever possible. The standard orientation for arm #2 is 90 or 270 degrees measured in a counter clockwise direction from arm #1. The normal orientation of the mast arm is perpendicular to the roadway. Adjustments in mounting hardware can compensate for a skew angle of approximately 15 degrees or more from the normal, depending upon the attachment method. The designer should verify the mounting hardware capability before specifying an arm with a skew greater than 15 degrees.
10. The arm mounting height should be calculated to provide a minimum vertical clearance of 17'-6" from the roadway crown elevation to the lowest sign or signal. A standard signal section is approximately 14" square. Therefore the length of a 3-section head is about 42" and a 5-section is about 70". The use of back plates will add about 6" to each side of the signal head. Additionally, approximately 3" should be added to the end of the signal head to compensate for the attachment hardware. This information may be used to determine the arm mounting height. The designer should coordinate with the maintaining agency to insure the signal assembly and all appropriate hardware has been considered in determining the vertical clearance. The maintaining agency can also provide guidance on the vertical or horizontal mounting of the signal assemblies.
11. The standard handhole location is 90 degrees from arm #1 facing away from traffic. Other handhole locations must be noted in the Special Instructions.
12. A free swinging internally illuminated street name sign may be attached to the pole by an independent bracket arm if the sign area does not exceed 18 square feet and weigh more than 144 pounds. The Structures Design Engineer must review other signs attached to the pole or any size sign of this type attached to the signal mast arm.
13. The "Special Instructions" Table is used to tabulate pedestrian buttons and pedestrian signal locations and handhole locations when the handholes are not in the standard location. Tabulate the ID No. and the orientation of the pedestrian buttons and signals in degrees measured counter clockwise from arm #1. The handhole location should be left blank if the handhole is in the standard location (see note 11).

14. Arm #1 is the arm for a single arm assembly or the longer arm for a double arm assembly. If the arms are equal length, arm #1 is over the project roadway.
15. Identify assemblies that require a terminal compartment with a “yes” in the correct column. For assemblies with a “no”, only handholes will be provided.

Standard Mast Arm Assemblies Data Table:

STANDARD MAST ARM ASSEMBLIES DATA TABLE											Table Date 11-01-16
STRUCTURE ID NUMBERS	DESIGNATION	FIRST ARM		SECOND ARM		UF (deg)	LL (deg)	POLE			DRILLED SHAFT ID
		ARM ID	FAA (ft.)	ARM ID	SAA (ft.)			POLE ID	UAA (ft.)	UB (ft.)	

NOTES [Notes Date 11-01-16]:

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. Work this sheet with the Signal Designer's "Mast Arm Tabulation". See "Mast Arm Tabulation" for special instructions that include non-standard Handhole location, paint color, terminal compartment requirement, and pedestrian features.

4. Work with Indexes 649-030 and 649-031.

Special Mast Arm Assemblies Data Table:

SPECIAL MAST ARM ASSEMBLIES DATA TABLE																								Table Date 01-01-12
NUMBER OF LOCATIONS	STRUCTURE NUMBER	FIRST ARM				FIRST ARM EXTENSION				SECOND ARM				SECOND ARM EXTENSION				POLE						
		FA(ft)	FB(in)	FC(in)	FD(in)	FE(ft)	FF(in)	FG(in)	FH(in)	SA(ft)	SB(in)	SC(in)	SD(in)	SE(ft)	SF(in)	SG(in)	SH(in)	UA(ft)	UB(ft)	UC(in)	UD(in)	UE(in)	UF(deg)	UG(ft)

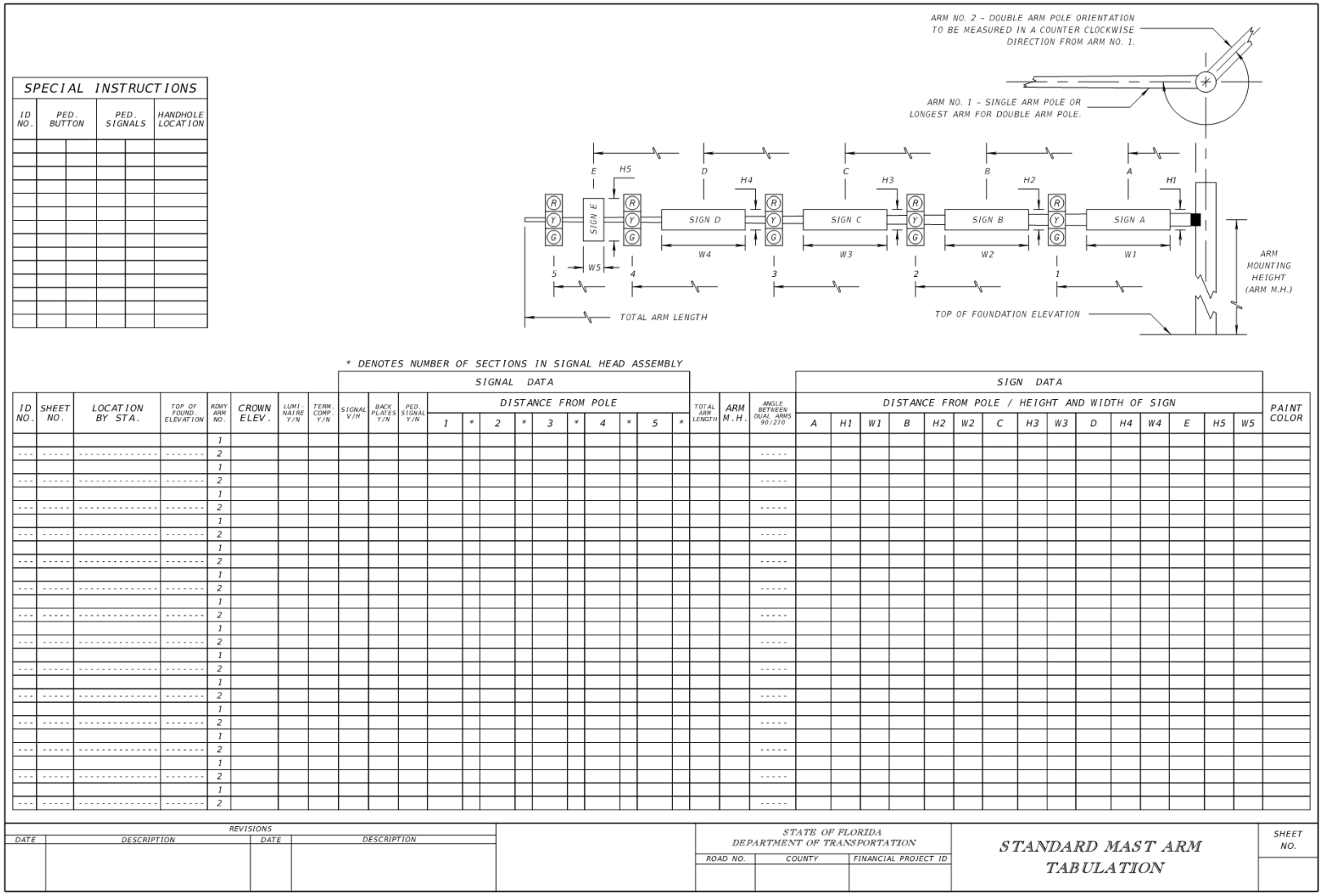
SPECIAL MAST ARM ASSEMBLIES DATA TABLE (CONT.)																							Table Date 01-01-12
STRUCTURE NUMBER	FIRST ARM CONNECTION (in)					First Arm Camber Angle = 2 Degrees						SECOND ARM CONNECTION (in)					Second Arm Camber Angle = 2 Degrees						
	#Bolts	HT	FJ	FK	FL	FN	FO	FP	FR	FS	FT	#Bolts	HT	SJ	SK	SL	SN	SO	SP	SR	SS	ST	

SPECIAL MAST ARM ASSEMBLIES DATA TABLE (CONT.)																								Table Date 07-01-15
STRUCTURE NUMBER	POLE BASE CONNECTION (in)					SHAFT AND REINF.								LUMINAIRE AND LUMINAIRE CONNECTION										
	#Bolts	BA	BB	BC	BF	DA(ft)	DB(ft)	RA	RB	RC	RD(in)	RE	RF(in)	LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)

NOTES [Notes Date 07-01-13]:
1. Work with Index 649-031.
2. Design Wind Speed = mph

FOUNDATION NOTES [Notes Date 01-01-12]:
1. Design based on Borings taken
   sealed by
2. Assumptions and Values used in design:
   Soil Type
   Soil Layer Thickness = ft.
   Soil Friction Angle = deg.
   Soil Weight = pcf
   Design Water Table Is ft. below surface

Mast Arm Tabulation Sheet:



Payment

Item number	Item Description	Unit Measure
649-2A-BB	Steel Mast Arm Assembly	EA

See the ***BOE*** and ***Specification 649*** for additional information on payment, pay item use and compensation.

Note: *Project Specific Pay Items are required for Special Mast Arm Assemblies with arm lengths greater than 78 feet.*

Examples

EXAMPLE 1

1. Select Arm and Pole Combination.

   Select A40/S - P2/S from the Mast Arm Combinations Tables.
   Specify shorter arm, enter 36 under FAA.
   Leave Second Arm, UF and LL blank as there is no second arm or luminaire.

2. Determine Arm Mounting Height.

   UB + 10' = 12.5' + 17.5'min. + 2'
   UB = 22' min. Use 22'

3. Select Drilled Shaft ID.

   Select DS/12/4.5.

4. Use the **FDOT Signal Support Programs** to verify adequacy of the arm, pole, and foundation.

EXAMPLE 2

1. Select Arms and Pole Combination.

   Select A60/D - A40/D - P4/D from the Mast Arm Combinations Tables.
   Specify shorter arms, enter 27.5 under FAA for First Arm.
   FAA = FA - (60' - 52') = 35.5' - 8' = 27.5'

2. Enter angle between arms.

   Angle UF is measured counter-clockwise from the First Arm and must be either 90° or 270°.

3. Specify shorter Pole.

   Enter 23.5 under UAA.

4. Determine Arm Mounting Height.

   UB + 10' = 9.5' + 17.5' min. + 2'
   UB = 19' min. Use 20'

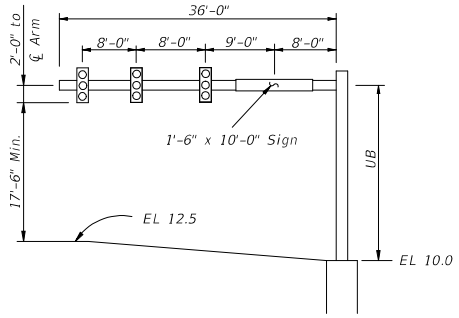
5. Select Drilled Shaft ID.

   Select DS/16/4.5

6. Use the **FDOT Signal Support Programs** to verify adequacy of the arm, pole, and foundation.

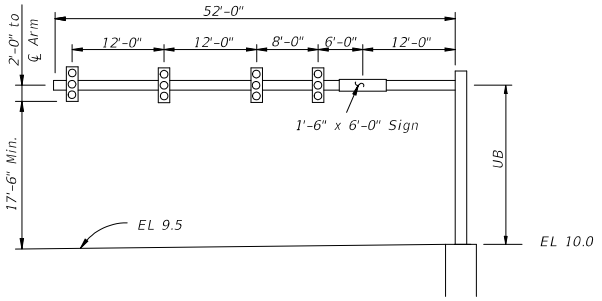
EXAMPLE 1

Single Arm Structure as shown,
130 mph Wind Speed with Signal Backplates.



EXAMPLE 2

First Arm Structure as shown, Second Arm same as Example 1
except 150 mph Wind Speed with Signal Backplates.



STANDARD MAST ARM ASSEMBLIES DATA TABLE

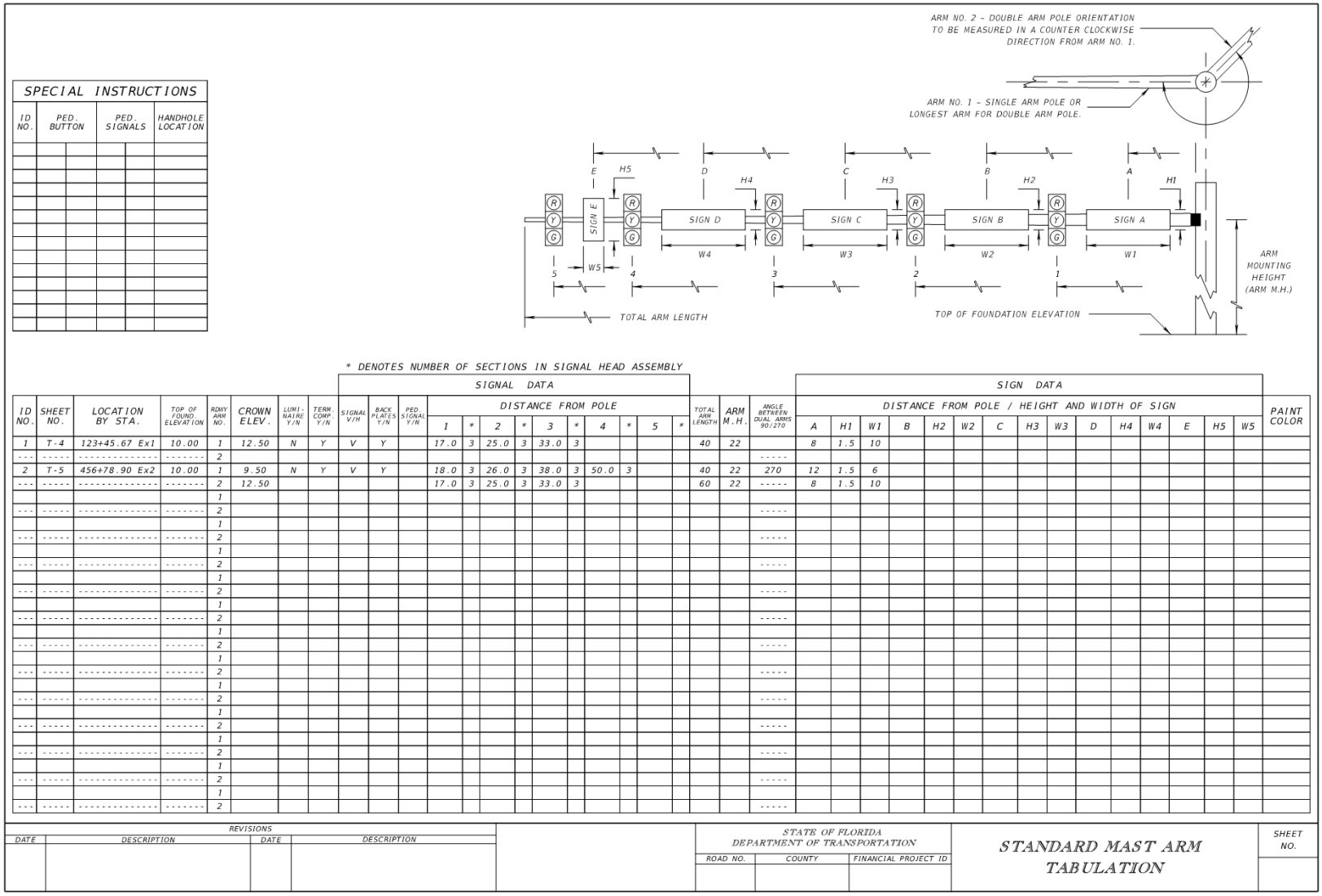
Table Date 11-01-16

STRUCTURE ID NUMBERS	DESIGNATION	FIRST ARM		SECOND ARM		UF (deg)	LL (deg)	POLE			DRILLED SHAFT ID
		ARM ID	FAA (ft.)	ARM ID	SAA (ft.)			POLE ID	UAA (ft.)	UB (ft.)	
Example 1	A40/S - P2/S	A40/S	36					P2/S		22	DS/12/4.5
Example 2	A60/D - A40/D - P4/D	A60/D	27.5	A40/D	36	90		P4/D	23.5	20	DS/16/4.5

NOTES [Notes Date 11-01-16]:

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. Work this sheet with the Signal Designer's "Mast Arm Tabulation". See "Mast Arm Tabulation" for special instructions that include non-standard Handhole location, paint color, terminal compartment requirement, and pedestrian features.
4. Work with Indexes 649-030 and 649-031.

Mast Arm Tabulation Sheet Example:



SPECIAL INSTRUCTIONS

ID NO.	PED. BUTTON		PED. SIGNALS		HANDHOLE LOCATION

ARM NO. 2 - DOUBLE ARM POLE ORIENTATION TO BE MEASURED IN A COUNTER CLOCKWISE DIRECTION FROM ARM NO. 1.

ARM NO. 1 - SINGLE ARM POLE OR LONGEST ARM FOR DOUBLE ARM POLE.

E H5 D H4 C H3 B H2 A H1

SIGN E | SIGN D | SIGN C | SIGN B | SIGN A

W5 W4 W3 W2 W1

5 4 3 2 1

TOTAL ARM LENGTH

TOP OF FOUNDATION ELEVATION

ARM MOUNTING HEIGHT (ARM M.H.)

* DENOTES NUMBER OF SECTIONS IN SIGNAL HEAD ASSEMBLY

										SIGNAL DATA														SIGN DATA																
ID NO.	SHEET NO.	LOCATION BY STA.	TOP OF FOUND. ELEVATION	RDWY ARM NO.	CROWN ELEV.	LUMI-NAIRE Y/N	TERM. COMP. Y/N	SIGNAL V/H	BACK PLATES Y/N	PED. SIGNAL Y/N	DISTANCE FROM POLE										TOTAL ARM LENGTH	ARM M.H.	ANGLE BETWEEN DUAL ARMS 90/270	DISTANCE FROM POLE / HEIGHT AND WIDTH OF SIGN																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	123+45.67 Ex1	10.00	1	12.50	N	Y	V	Y		17.0	3	25.0	3	33.0	3					40	22		8	1.5	10														
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2	T-5	456+78.90 Ex2	10.00	1	9.50	N	Y	V	Y		18.0	3	26.0	3	38.0	3	50.0	3			40	22	270	12	1.5	6														
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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

STANDARD MAST ARM TABULATION

SHEET NO.

Design Aids

30 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
30'	N/A	Reg	No	A30/S		P1/S
			Yes	A30/S		P1/S/L
		HD	No	A30/S/H		P1/S
			Yes	A30/S/H		P1/S/L
	30'	Reg/Reg	No	A30/D	A30/D	P2/D
			Yes	A30/D	A30/D	P2/D/L
		Reg/HD	No	A30/D	A30/D/H	P2/D
			Yes	A30/D	A30/D/H	P2/D/L
		HD/Reg	No	A30/D/H	A30/D	P2/D
			Yes	A30/D/H	A30/D	P2/D/L
		HD/HD	No	A30/D/H	A30/D/H	P2/D
			Yes	A30/D/H	A30/D/H	P2/D/L
30 foot Mast Arm Total = 12						

40 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
40'	N/A	Reg	No	A40/S		P2/S
			Yes	A40/S		P2/S/L
		HD	No	A40/S/H		P2/S
			Yes	A40/S/H		P2/S/L
	30'	Reg/Reg	No	A40/D	A30/D	P2/D
			Yes	A40/D	A30/D	P2/D/L
		Reg/HD	No	A40/D	A30/D/H	P2/D
			Yes	A40/D	A30/D/H	P2/D/L
		HD/Reg	No	A40/D/H	A30/D	P2/D
			Yes	A40/D/H	A30/D	P2/D/L
		HD/HD	No	A40/D/H	A30/D/H	P2/D
			Yes	A40/D/H	A30/D/H	P2/D/L
	40'	Reg/Reg	No	A40/D	A40/D	P2/D
			Yes	A40/D	A40/D	P2/D/L
		Reg/HD	No	A40/D	A40/D/H	P2/D
			Yes	A40/D	A40/D/H	P2/D/L
		HD/Reg	No	A40/D/H	A40/D	P2/D
			Yes	A40/D/H	A40/D	P2/D/L
		HD/HD	No	A40/D/H	A40/D/H	P2/D
			Yes	A40/D/H	A40/D/H	P2/D/L
40 foot Mast Arm Total = 20						

50 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
50'	N/A	Reg	No	A50/S		P3/S
			Yes	A50/S		P3/S/L
		HD	No	A50/S/H		P3/S
			Yes	A50/S/H		P3/S/L
	30'	Reg/Reg	No	A50/D	A30/D	P3/D
			Yes	A50/D	A30/D	P3/D/L
		Reg/HD	No	A50/D	A30/D/H	P3/D
			Yes	A50/D	A30/D/H	P3/D/L
		HD/Reg	No	A50/D/H	A30/D	P3/D
			Yes	A50/D/H	A30/D	P3/D/L
		HD/HD	No	A50/D/H	A30/D/H	P3/D
			Yes	A50/D/H	A30/D/H	P3/D/L
	40'	Reg/Reg	No	A50/D	A40/D	P3/D
			Yes	A50/D	A40/D	P3/D/L
		Reg/HD	No	A50/D	A40/D/H	P3/D
			Yes	A50/D	A40/D/H	P3/D/L
		HD/Reg	No	A50/D/H	A40/D	P3/D
			Yes	A50/D/H	A40/D	P3/D/L
		HD/HD	No	A50/D/H	A40/D/H	P3/D
			Yes	A50/D/H	A40/D/H	P3/D/L
	50'	Reg/Reg	No	A50/D	A50/D	P4/D
			Yes	A50/D	A50/D	P4/D/L
		Reg/HD	No	A50/D	A50/D/H	P4/D
			Yes	A50/D	A50/D/H	P4/D/L
		HD/Reg	No	A50/D/H	A50/D	P4/D
			Yes	A50/D/H	A50/D	P4/D/L
		HD/HD	No	A50/D/H	A50/D/H	P4/D
			Yes	A50/D/H	A50/D/H	P4/D/L
50 foot Mast Arm Total = 28						

60 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
60'	N/A	Reg	No	A60/S		P4/S
			Yes	A60/S		P4/S/L
		HD	No	A60/S/H		P4/S
			Yes	A60/S/H		P4/S/L
	30'	Reg/Reg	No	A60/D	A30/D	P4/D
			Yes	A60/D	A30/D	P4/D/L
		Reg/HD	No	A60/D	A30/D/H	P4/D
			Yes	A60/D	A30/D/H	P4/D/L
		HD/Reg	No	A60/D/H	A30/D	P4/D
			Yes	A60/D/H	A30/D	P4/D/L
		HD/HD	No	A60/D/H	A30/D/H	P4/D
			Yes	A60/D/H	A30/D/H	P4/D/L
	40'	Reg/Reg	No	A60/D	A40/D	P4/D
			Yes	A60/D	A40/D	P4/D/L
		Reg/HD	No	A60/D	A40/D/H	P4/D
			Yes	A60/D	A40/D/H	P4/D/L
		HD/Reg	No	A60/D/H	A40/D	P4/D
			Yes	A60/D/H	A40/D	P4/D/L
		HD/HD	No	A60/D/H	A40/D/H	P4/D
			Yes	A60/D/H	A40/D/H	P4/D/L
	50'	Reg/Reg	No	A60/D	A50/D	P4/D
			Yes	A60/D	A50/D	P4/D/L
		Reg/HD	No	A60/D	A50/D/H	P4/D
			Yes	A60/D	A50/D/H	P4/D/L
		HD/Reg	No	A60/D/H	A50/D	P4/D
			Yes	A60/D/H	A50/D	P4/D/L
		HD/HD	No	A60/D/H	A50/D/H	P4/D
			Yes	A60/D/H	A50/D/H	P4/D/L
	60'	Reg/Reg	No	A60/D	A60/D	P5/D
			Yes	A60/D	A60/D	P5/D/L
		Reg/HD	No	A60/D	A60/D/H	P5/D
			Yes	A60/D	A60/D/H	P5/D/L
		HD/Reg	No	A60/D/H	A60/D	P5/D
			Yes	A60/D/H	A60/D	P5/D/L
		HD/HD	No	A60/D/H	A60/D/H	P5/D
			Yes	A60/D/H	A60/D/H	P5/D/L
60 foot Mast Arm Total = 36						

70 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
70'	N/A	Reg	No	A70/S		P5/S
			Yes	A70/S		P5/S/L
		HD	No	A70/S/H		P5/S
			Yes	A70/S/H		P5/S/L
	30'	Reg/Reg	No	A70/D	A30/D	P5/D
			Yes	A70/D	A30/D	P5/D/L
		Reg/HD	No	A70/D	A30/D/H	P5/D
			Yes	A70/D	A30/D/H	P5/D/L
		HD/Reg	No	A70/D/H	A30/D	P5/D
			Yes	A70/D/H	A30/D	P5/D/L
		HD/HD	No	A70/D/H	A30/D/H	P5/D
			Yes	A70/D/H	A30/D/H	P5/D/L
	40'	Reg/Reg	No	A70/D	A40/D	P5/D
			Yes	A70/D	A40/D	P5/D/L
		Reg/HD	No	A70/D	A40/D/H	P5/D
			Yes	A70/D	A40/D/H	P5/D/L
		HD/Reg	No	A70/D/H	A40/D	P5/D
			Yes	A70/D/H	A40/D	P5/D/L
		HD/HD	No	A70/D/H	A40/D/H	P5/D
			Yes	A70/D/H	A40/D/H	P5/D/L
	50'	Reg/Reg	No	A70/D	A50/D	P5/D
			Yes	A70/D	A50/D	P5/D/L
		Reg/HD	No	A70/D	A50/D/H	P5/D
			Yes	A70/D	A50/D/H	P5/D/L
		HD/Reg	No	A70/D/H	A50/D	P5/D
			Yes	A70/D/H	A50/D	P5/D/L
		HD/HD	No	A70/D/H	A50/D/H	P5/D
			Yes	A70/D/H	A50/D/H	P5/D/L
	60'	Reg/Reg	No	A70/D	A60/D	P6/D
			Yes	A70/D	A60/D	P6/D/L
		Reg/HD	No	A70/D	A60/D/H	P6/D
			Yes	A70/D	A60/D/H	P6/D/L
		HD/Reg	No	A70/D/H	A60/D	P6/D
			Yes	A70/D/H	A60/D	P6/D/L
		HD/HD	No	A70/D/H	A60/D/H	P6/D
			Yes	A70/D/H	A60/D/H	P6/D/L

70 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
70'	70'	Reg/Reg	No	A70/D	A70/D	P6/D
			Yes	A70/D	A70/D	P6/D/L
		Reg/HD	No	A70/D	A70/D/H	P6/D
			Yes	A70/D	A70/D/H	P6/D/L
		HD/Reg	No	A70/D/H	A70/D	P6/D
			Yes	A70/D/H	A70/D	P6/D/L
		HD/HD	No	A70/D/H	A70/D/H	P6/D
			Yes	A70/D/H	A70/D/H	P6/D/L
70 foot Mast Arm Total = 44						

78 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
78'	N/A	Reg	No	A78/S		P6/S
			Yes	A78/S		P6/S/L
		HD	No	A78/S/H		P6/S
			Yes	A78/S/H		P6/S/L
	30'	Reg/Reg	No	A78/D	A30/D	P6/D
			Yes	A78/D	A30/D	P6/D/L
		Reg/HD	No	A78/D	A30/D/H	P6/D
			Yes	A78/D	A30/D/H	P6/D/L
		HD/Reg	No	A78/D/H	A30/D	P6/D
			Yes	A78/D/H	A30/D	P6/D/L
		HD/HD	No	A78/D/H	A30/D/H	P6/D
			Yes	A78/D/H	A30/D/H	P6/D/L
	40'	Reg/Reg	No	A78/D	A40/D	P6/D
			Yes	A78/D	A40/D	P6/D/L
		Reg/HD	No	A78/D	A40/D/H	P6/D
			Yes	A78/D	A40/D/H	P6/D/L
		HD/Reg	No	A78/D/H	A40/D	P6/D
			Yes	A78/D/H	A40/D	P6/D/L
		HD/HD	No	A78/D/H	A40/D/H	P6/D
			Yes	A78/D/H	A40/D/H	P6/D/L

78 Foot Mast Arm Combinations						
Arm 1 Length	**Arm 2 Length**	**Regular or Heavy Duty**	**Luminaire?**	**Designation**		
78'	50'	Reg/Reg	No	A78/D	A50/D	P6/D
			Yes	A78/D	A50/D	P6/D/L
		Reg/HD	No	A78/D	A50/D/H	P6/D
			Yes	A78/D	A50/D/H	P6/D/L
		HD/Reg	No	A78/D/H	A50/D	P6/D
			Yes	A78/D/H	A50/D	P6/D/L
		HD/HD	No	A78/D/H	A50/D/H	P6/D
			Yes	A78/D/H	A50/D/H	P6/D/L
	60'	Reg/Reg	No	A78/D	A60/D	P6/D
			Yes	A78/D	A60/D	P6/D/L
		Reg/HD	No	A78/D	A60/D/H	P6/D
			Yes	A78/D	A60/D/H	P6/D/L
		HD/Reg	No	A78/D/H	A60/D	P6/D
			Yes	A78/D/H	A60/D	P6/D/L
		HD/HD	No	A78/D/H	A60/D/H	P6/D
			Yes	A78/D/H	A60/D/H	P6/D/L
	70'	Reg/Reg	No	A78/D	A70/D	P7/D
			Yes	A78/D	A70/D	P7/D/L
		Reg/HD	No	A78/D	A70/D/H	P7/D
			Yes	A78/D	A70/D/H	P7/D/L
		HD/Reg	No	A78/D/H	A70/D	P7/D
			Yes	A78/D/H	A70/D	P7/D/L
		HD/HD	No	A78/D/H	A70/D/H	P7/D
			Yes	A78/D/H	A70/D/H	P7/D/L
	78'	Reg/Reg	No	A78/D	A78/D	P7/D
			Yes	A78/D	A78/D	P7/D/L
		Reg/HD	No	A78/D	A78/D/H	P7/D
			Yes	A78/D	A78/D/H	P7/D/L
		HD/Reg	No	A78/D/H	A78/D	P7/D
			Yes	A78/D/H	A78/D	P7/D/L
		HD/HD	No	A78/D/H	A78/D/H	P7/D
			Yes	A78/D/H	A78/D/H	P7/D/L
78 foot Mast Arm Total = 52						