

**MAST ARM DESIGN CRITERIA:**

THE DESIGN OF THE MAST ARM STRUCTURES SHOWN ON SIG-031-A, SIG-032-A & SIG-033-A IS BASED ON THE AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION (2015), WITH 2017 TO 2022 INTERIM REVISIONS.

**LOAD PARAMETERS:**

WIND LOAD (EXTREME EVENT LIMIT STATE): 1700-YEAR MRI BASIC WIND SPEED MAP, 120 MPH DESIGN WIND SPEED

WIND LOAD (SERVICE I EVENT LIMIT STATE): 10-YEAR MRI BASIC WIND SPEED MAP, 76 MPH DESIGN WIND SPEED

HEIGHT AND EXPOSURE FACTOR ( $K_z$ ):  $K_z$  IS CALCULATED USING A HEIGHT (Z) MEASURED FROM TOP OF THE DRILLED SHAFT (IT IS ASSUMED THAT THE POLE IS GROUND-MOUNTED).

DIRECTIONALITY FACTOR ( $K_d$ ): 0.85

GUST EFFECT FACTOR (G): 1.14

MAST ARM LOADING: SEE MAST ARM LOADING TABLE BELOW. AREAS AND WEIGHTS SHOWN IN THE TABLE FOR SIGNALS INCLUDE BACKPLATES EXTENDING 5" FROM SIGNAL ON ALL SIDES. FOR TWIN MAST ARMS, THE LOADING IS THE SAME ON BOTH ARMS.

**SERVICEABILITY PARAMETERS:**

LIMIT FOR SLOPE AT TOP OF POLE UNDER DEAD LOAD ONLY: 0.35 IN/FT

LIMIT FOR MAST ARM VERTICAL DEFLECTION UNDER GALLOPING AND TRUCK GUST-INDUCED LOADING: 8 IN

**FATIGUE PARAMETERS:**

**FATIGUE CATEGORY:**

- SIG-031-A: CATEGORY I
- SIG-032-A: CATEGORY II
- SIG-033-A: CATEGORY III

MINIMUM BEND RADIUS FOR 16-SIDED SECTIONS: 5 X WALL THICKNESS OR 1", WHICHEVER IS GREATER

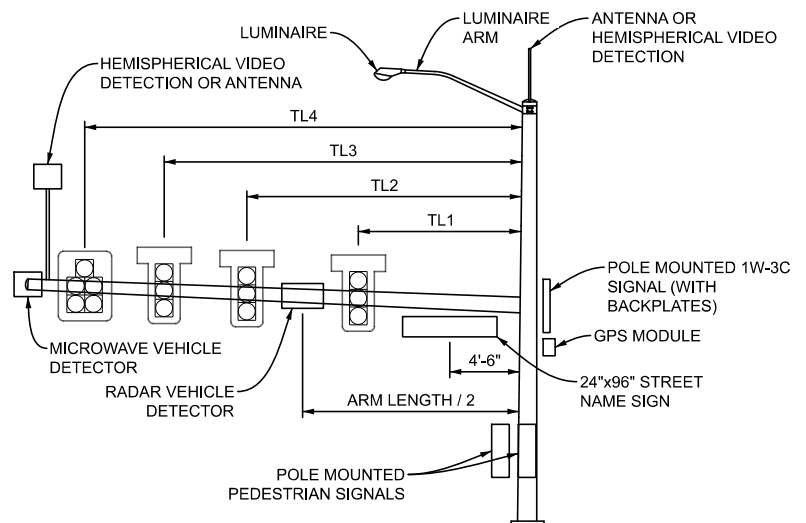
MAST ARM LOADING TABLE																			
MAST ARM DATA			TL1 (1W-3C SIGNAL)**				TL2 (1W-3C SIGNAL)				TL3 (1W-3C SIGNAL)				TL4 (1W-5C DOGHOUSE SIGNAL)				
SPAN FT	MTG HT SINGLE	MTG HT TWIN*	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	
20	19'-0"	18'-6" & 21'-0"	-	--	-	-	12'-0"	43	8.67	NO	20'-0"	43	8.67	NO	-	--	-	-	
25							17'-0"				25'-0"								
30							22'-0"				30'-0"								
35							19'-0"	27'-0"	75	10.92	YES	35'-0"	69	13.72					NO
40							24'-0"	32'-0"											
45							29'-0"	37'-0"											
50	26'-0"***	75**	10.92**	YES**	34'-0"	42'-0"	50'-0"												

\*TWIN MAST ARMS NOT ALLOWED FOR CATEGORY III MAST ARMS. MINIMUM ALLOWABLE ANGLE BETWEEN ARMS IS 45 DEGREES.

\*\*TL1 NOT ALLOWED FOR 50FT TWIN MAST ARMS

MAST ARM LOADING TABLE (CONT'D)		
EQUIPMENT	WEIGHT LBS	AREA SFT
ANTENNA	20	0.09
GPS MODULE	30	0.75
POLE MOUNTED PEDESTRIAN SIGNAL	25	1.78
1W-3C SIGNAL (WITH BACKPLATE)	43	8.67
LUMINAIRE	50	1.00
LUMINAIRE ARM	SEE SIG-031, SIG-032, AND SIG-033 FOR DETAILS	
HEMISPHERICAL VIDEO DETECTION	22	2.11
MICROWAVE VEHICLE DETECTOR	4	0.97
RADAR VEHICLE DETECTOR	4	0.97
24x96 STREET NAME SIGN	90	14.93

SEE ELEVATION VIEW FOR EQUIPMENT MOUNTING LOCATIONS.



1 DETAIL - MAST ARM LOADING ELEVATION VIEW

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM  
LOADING TABLE AND DESIGN CRITERIA

(SPECIAL DETAIL) 07/27/23  
FHWA APPROVAL PLAN DATE

**SIG-030-A**

SHEET  
1 OF 1