NB+C Engineering Services

Proposed Wood Pole Antenna Installation

Prepared for Crown Castle Fiber, LLC

SITE INFORMATION

Address	101 Bell Rock Street Malden, MA 02148 Middlesex County Latitude: 42.415163º Longitude: -71.068198º
Crown Castle Node Number	ODAS_2F-30
NB+C Project Number	100723
Date	November 16, 2023

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1.0 INTRODUCTION

The structure is a proposed class H1-40 ft. wood pole located in Malden, MA. As per your request **NB+C ES** performed a structural analysis and design for the proposed wood pole to verify that the structure can support the new loads and are in compliance with the applicable codes and standards. Information we have received and used for this analysis includes:

- Final Construction Drawings prepared by **NB+C ES**, dated November 7, 2023
- Field Notes and Photos by **NB+C ES** personnel dated October 2, 2023

2.0 APPURTENANCES LOADING

As per the information provided to us, the final antenna configuration is shown in Table 1 below.

Table 1 – Final Antenna and Cable Information

Center Line Elevation (ft)	Antenna Model	Carrier	Feed Lines
36.75	**(1) Amphenol 6U4MT360X12Fxys4 antenna**	T-Mobile	(4) 1/2" Coax Cable
13.92	**(1) Charles Industries Curved Shroud SH60-702322 w/ (1) Ericsson Radio 4455 B2/B25, (1) Radio 8863 B41**		
10.17	**(1) PTS90526 AC Load Center**		
8.67	(1) Existing Meter		

Note: Proposed Equipment marked in bold

3.0 ASSUMPTIONS

This report is based on the theoretical capacity of the existing/proposed structural elements and is not an assessment of the overall suitability of the existing structure or its components for any particular use other than specified here in this report:

- This report makes no warranties, expressed and/or implied, and disclaims any liability arising from material, fabrication and erection of the existing structure and any other existing or proposed components or appurtenances.
- All proposed and existing antennas, mounts, coaxial cables, and appurtenances are assumed to be properly installed and configured according to manufacturer requirements.
- All existing structural elements are assumed to be in place and in good condition and were previously designed and constructed in accordance with applicable codes and standards.
- All antennas and equipment are conservatively assumed to be normal to the wind for all load combinations considered.
- Contractor to verify existing site condition including the existing soil type. In the event the existing site conditions are different than the assumptions made in this report, this has to

be brought to the structural engineer's attention before proceeding any further with bidding, fabrication and/or erection.

4.0 ANALYSIS

Calculations for this analysis are provided in Appendix A of this report.

5.0 CONCLUSIONS & RECOMMENDATIONS

Based on the performed analysis of this structure for applied gravity and lateral loads, the proposed wood pole structure was calculated to have ***adequate*** structural capacity to support the existing T-Mobile telecommunication equipment and is in compliance with building codes and standards listed here in this report. **The wood pole was calculated to be stressed to a maximum of 72.8% of its theoretical design capacity.** Refer to the construction drawings prepared by **NB+C ES** for the proposed location of the appurtenances.

The results in Appendix A of the report show that the additional forces imparted to the proposed wood pole due to the proposed telecommunications antenna and mount are within acceptable limits considering the overall configuration of the support structure.

The conclusions reached by **NB+C ES** in this report are only applicable for the previously mentioned existing and proposed structural members supporting the T-Mobile telecommunication antennas. Further, no structural qualification is made or implied by this report for existing structural members not supporting the T-Mobile equipment.

NB+C ENGINEERING SERVICES, LLC

Prepared by: Hitesh Pandey, P.E.

Respectfully Submitted by:

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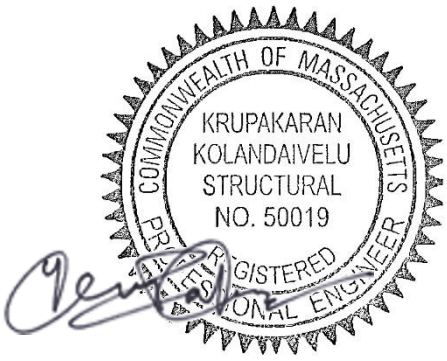

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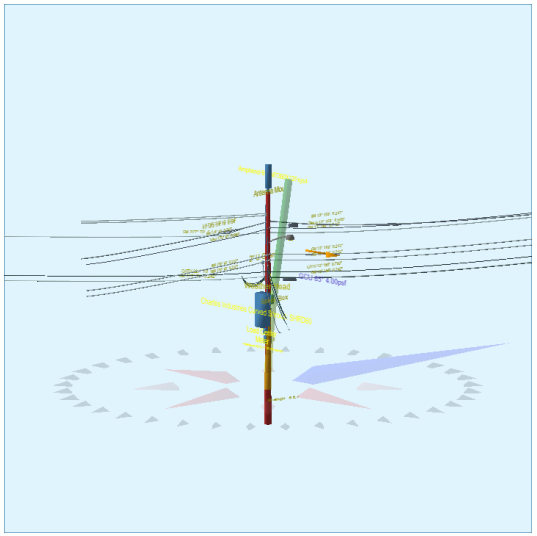
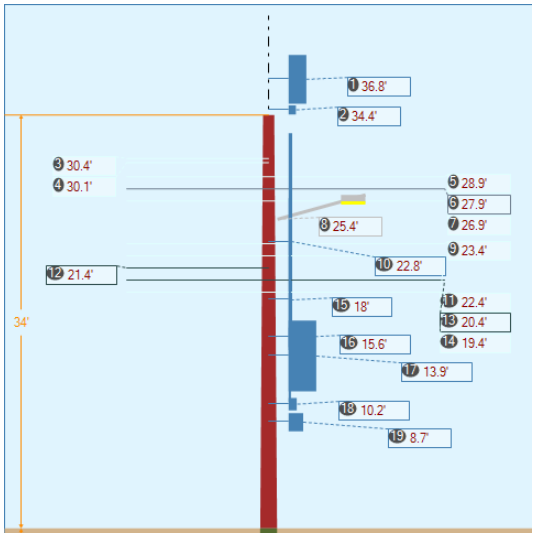
APPENDIX A

CALCULATIONS

Pole Num:	**ODAS-2F-30**	Pole Length / Class:	**40 / H1**	Code:	**NESC**	Structure Type:	**Unguyed Tangent**
Aux Data 1	**Unset**	Species:	**SOUTHERN PINE**	NESC Rule:	**Rule 250B**	Status	**Unguyed**
Aux Data 2	**Unset**	Setting Depth (ft):	**6.00**	Construction Grade:	**C**	Pole Strength Factor:	**0.85**
Aux Data 3	**Unset**	G/L Circumference (in):	**43.50**	Loading District:	**Heavy**	Transverse Wind LF:	**1.75**
Aux Data 4	**Unset**	G/L Fiber Stress (psi):	**8,000**	Ice Thickness (in):	**0.50**	Wire Tension LF:	**1.00**
Aux Data 5	**Unset**	Allowable Stress (psi):	**6,800**	Wind Speed (mph):	**39.53**	Vertical LF:	**1.90**
Aux Data 6	**Unset**	Fiber Stress Ht. Reduc:	**No**	Wind Pressure (psf):	**4.00**		
Latitude:	**0.000000 Deg**	Longitude:	**0.000000 Deg**	Elevation:	**0 Feet**		





Pole Capacity Utilization (%)		Height (ft)	Wind Angle (deg)
Maximum	**65.4**	0.0	84.8
Groundline	**65.4**	0.0	84.8
Vertical	**8.1**	19.8	84.8

Pole Moments (ft-lb)		Load Angle (deg)	Wind Angle (deg)
Max Cap Util	**95,558**	69.6	84.8
Groundline	**95,558**	69.6	84.8
GL Allowable	**147,688**		

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 69.6°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
Powers	42	1.0	**1,070**	1.1	**0.7**	**49**	208	1	**50**	**0.7**
Comms	3,820	88.1	**85,644**	89.6	**58.0**	**3,927**	2,252	15	**3,941**	**58.0**
GenericEquipments	233	5.4	**4,015**	4.2	**2.7**	**184**	1,087	7	**191**	**2.8**
Pole	221	5.1	**3,864**	4.0	**2.6**	**177**	2,852	19	**196**	**2.9**
SpanAdditions	2	0.0	**44**	0.1	**0.0**	**2**	22	0	**2**	**0.0**
Streetlights	18	0.4	**908**	1.0	**0.6**	**42**	114	1	**42**	**0.6**
Insulators	0	0.0	**13**	0.0	**0.0**	**1**	124	1	**1**	**0.0**
Pole Load	4,335	100.0	**95,558**	100.0	**64.7**	**4,381**	6,658	44	**4,425**	**65.1**
Pole Reserve Capacity			**52,130**		**35.3**	**2,419**			**2,375**	**34.9**

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 69.6°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
<Undefined>	4,114	94.9	**91,694**	96.0	**62.1**	**4,204**	3,806	25	**4,229**	**62.2**
Pole	221	5.1	**3,864**	4.0	**2.6**	**177**	2,852	19	**196**	**2.9**
Totals:	4,335	100.0	**95,558**	100.0	**64.7**	**4,381**	6,658	44	**4,425**	**65.1**

Detailed Load Components:

Power		Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Secondary	TRIPLEX 1/0		26.90	7.67	0.2500		0.097	160.0	13.0	160.2			-17	182	166
Secondary	TRIPLEX 1/0		26.90	7.54	0.2500		0.097	160.0	13.0	160.2			-16	182	167
Secondary	TRIPLEX 1/0		26.90	7.66	0.2500		0.097	70.0	227.0	70.1			-7	24	17
Secondary	TRIPLEX 1/0		26.90	7.53	0.2500		0.097	70.0	227.0	70.1			-7	24	17
Overlashed Bundle	6M		26.92	7.60	0.2420	3.52	0.104	160.0	13.0	160.2	837	12,412	-17	1,178	13,574
Overlashed Bundle	6M		26.92	7.60	0.2420	1.29	0.104	70.0	227.0	70.1	524	-13,021	-7	154	-12,874
											Totals:	**-609**	**-71**	**1,745**	**1,066**

Comm	Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)

Overlashed Bundle	1/4" EHS	30.42	7.36	0.2500	0.21	0.121	45.0	179.0	45.0	609	-6,122	-6	481	-5,647
Overlashed Bundle	1/4" EHS	30.08	7.38	0.2500	0.21	0.121	45.0	179.0	45.0	609	-6,054	-6	475	-5,584
Overlashed Bundle	6M	28.92	7.46	0.2420	0.56	0.104	45.0	179.0	45.0	1,230	-11,825	-3	457	-11,371
Telco	TELE 0.5	28.90	7.57	0.5000		0.500	45.0	179.0	45.0			-7	100	93
Telco	TELE 0.5	28.90	7.36	0.5000		0.500	45.0	179.0	45.0			-6	100	94
Telco	TELE 0.5	28.86	7.46	0.5000		0.500	45.0	179.0	45.0			-7	100	93
Overlashed Bundle	6M	28.92	7.46	0.2420	4.81	0.104	160.0	13.0	160.5	1,686	26,848	11	1,374	28,233
Telco	TELE 0.5	28.90	7.37	0.5000		0.500	160.0	13.0	160.5			20	482	502
Telco	TELE 0.5	28.90	7.57	0.5000		0.500	160.0	13.0	160.5			25	304	329
Telco	TELE 0.5	28.86	7.46	0.5000		0.500	160.0	13.0	160.5			23	303	326
Telco	TELE 0.5	27.92	7.53	0.5000	3.78	0.500	160.0	13.0	160.2	1,147	17,636	100	1,549	19,286
Telco	TELE 0.5	27.92	7.53	0.5000	0.79	0.500	45.0	179.0	45.0	905	-8,402	28	517	-7,857
Overlashed Bundle	6M	23.42	7.83	0.2420	3.47	0.104	160.0	13.0	160.2	1,146	14,789	53	1,303	16,146
Telco	TELE 0.75	23.38	7.84	0.7500		0.360	160.0	13.0	160.2			77	436	513
Overlashed Bundle	6M	23.42	7.83	0.2420	0.65	0.104	45.0	179.0	45.0	619	-4,818	15	435	-4,368
Telco	TELE 0.75	23.38	7.81	0.7500		0.360	45.0	179.0	45.0			22	146	167
Overlashed Bundle	6M	22.42	7.90	0.2420	3.44	0.104	160.0	13.0	160.2	1,211	14,958	48	1,162	16,168
Telco	TELE 0.5	22.39	7.93	0.5000		0.500	160.0	13.0	160.2			85	332	417
Overlashed Bundle	6M	22.42	7.90	0.2420	0.63	0.104	45.0	179.0	45.0	663	-4,939	13	384	-4,542
Telco	TELE 0.5	22.39	7.92	0.5000		0.500	45.0	179.0	45.0			24	107	131
Telco	TELE 0.5	22.27	25.40	0.5000	2.67	0.500	62.0	132.0	62.4	200	1,967	-1	376	2,342
CATV	CATV .25	21.42	7.97	0.2500	1.36	0.263	62.0	132.0	62.1	292	2,890	10	315	3,215
CATV	CATV .25	21.42	7.97	0.2500	1.10	0.263	62.0	132.0	62.1	361	3,571	8	315	3,895
CATV	CATV .25	20.42	7.54	0.2500	3.54	0.263	160.0	13.0	160.2	710	7,983	32	944	8,959
CATV	CATV .25	20.42	7.54	0.2500	1.10	0.263	62.0	132.0	62.1	361	3,405	8	300	3,713
CATV	CATV .25	20.42	7.54	0.2500	1.30	0.263	70.0	227.0	70.1	451	-8,507	14	123	-8,370
CATV	CATV .25	20.42	7.54	0.2500	1.74	0.263	36.0	308.0	36.3	71	-746	-12	156	-601
CATV	CATV .25	20.42	7.54	0.2500	2.02	0.263	36.0	308.0	36.4	63	-652	-11	156	-507
CATV	CATV .25	20.42	7.54	0.2500	2.26	0.263	36.0	308.0	36.5	56	-583	-10	156	-437
Overlashed Bundle	6M	19.42	8.11	0.2420	3.25	0.104	160.0	13.0	160.2	2,570	27,493	28	869	28,389
Telco	TELE 0.5	19.40	8.39	0.5000		0.500	160.0	13.0	160.2			68	150	219
Telco	TELE 0.5	19.40	7.82	0.5000		0.500	160.0	13.0	160.2			63	150	213
Telco	TELE 0.5	19.37	8.11	0.5000		0.500	160.0	13.0	160.2			66	284	350
CATV	CATV .35	19.37	8.49	0.3500		0.140	160.0	13.0	160.2			33	150	183
CATV	CATV .35	19.36	7.76	0.3500		0.140	160.0	13.0	160.2			29	150	179
Overlashed Bundle	6M	19.42	8.11	0.2420	1.08	0.104	62.0	132.0	62.1	1,176	10,559	14	291	10,864
Telco	TELE 0.5	19.40	7.86	0.5000		0.500	62.0	132.0	62.1			28	62	91
Telco	TELE 0.5	19.40	8.34	0.5000		0.500	62.0	132.0	62.1			30	62	93
Telco	TELE 0.5	19.36	8.11	0.5000		0.500	62.0	132.0	62.1			29	62	92
Overlashed Bundle	6M	19.42	8.11	0.2420	1.28	0.104	70.0	227.0	70.1	605	-10,843	-15	116	-10,742

CATV	CATV .35	19.40	8.27	0.3500	0.140	70.0	227.0	70.1		-17	22	6
CATV	CATV .35	19.40	7.95	0.3500	0.140	70.0	227.0	70.1		-16	22	7
									Totals:	**68,608**	**888**	**15,783**	**85,279**

GenericEquipment		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Cylinder	Amphenol 6U4MT360X12Fxys4		36.75	0.73	0.0	0.0	42.00	48.20	--	14.60	--	2	1,213	1,215
Cylinder	Antenna Mount		34.38	0.41	270.0	0.0	30.00	9.00	--	6.00	--	2	87	89
Cylinder	2" U-Guard		22.80	6.88	270.0	0.0	100.00	214.00	--	3.00	--	-102	687	585
Cylinder	Weather Head		18.05	6.70	143.0	0.0	100.00	201.00	--	2.00	--	30	340	371
Box	Splice Box		15.63	10.86	90.0	0.0	10.00	19.00	4.00	--	8.00	16	175	192
Box	Charles Industries Curved Shroud: SHRD60		13.92	16.75	180.0	0.0	250.00	69.96	21.54	--	22.73	-231	1,577	1,346
Box	Load Center		10.17	8.90	180.0	0.0	20.00	12.00	5.33	--	6.70	-10	49	39
Box	Sign		8.67	6.83	53.0	0.0	5.00	18.00	1.00	--	12.00	5	121	126
Box	Meter		8.67	8.33	180.0	0.0	15.00	16.00	4.00	--	6.00	-7	42	35
											Totals:	**-295**	**4,292**	**3,997**

SpanAddition		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Maintenance Loop	Span Addition		28.50	120.00	179.0	179.0	7.00	20.00	20.00	20.00	20.00	0	21	21
Maintenance Loop	Span Addition		25.80	300.00	13.0	13.0	7.00	20.00	20.00	20.00	20.00	0	23	23
											Totals:	**0**	**44**	**44**

Streetlight		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
General	Streetlight - 6 ft. Arm		25.42	5.20	104.0	104.0	60.00	24.00	20.00	3.00	72.00	456	448	904
											Totals:	**456**	**448**	**904**

Insulator		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Bolt	Single Bolt		30.42	0.00	180.0	180.0	5.00	3.00	0.00	-2	0	-2
Bolt	Single Bolt		30.08	0.00	180.0	180.0	5.00	3.00	0.00	-2	0	-2
Bolt	Single Bolt (Relocated)		28.92	0.00	179.0	179.0	5.00	3.00	0.00	-2	0	-2
Bolt	Single Bolt (Relocated)		28.92	0.00	358.0	358.0	5.00	3.00	0.00	2	0	2
Bolt	Single Bolt (Relocated)		27.92	0.00	90.0	90.0	5.00	3.00	0.00	6	0	6
Bolt	Single Bolt (Relocated)		26.92	0.00	307.0	307.0	5.00	3.00	0.00	-3	0	-3
Bolt	Single Bolt (Relocated)		23.42	0.00	90.0	90.0	5.00	3.00	0.00	6	0	6
Bolt	Single Bolt (Relocated)		22.42	0.00	90.0	90.0	5.00	3.00	0.00	6	0	6

Bolt	Single Bolt (Relocated)	21.42	0.00	132.0	132.0	5.00	3.00	0.00	3	0	3
J-Hook	J-Hook (Relocated)	20.42	0.00	132.0	132.0	5.00	2.00	0.00	3	0	3
J-Hook	J-Hook (Relocated)	20.42	0.00	308.0	308.0	5.00	2.00	0.00	-3	0	-3
Bolt	Single Bolt	19.42	0.00	90.0	90.0	5.00	3.00	0.00	6	0	6
Bolt	Single Bolt	19.42	0.00	227.0	227.0	5.00	3.00	0.00	-6	0	-6
								Totals:	**12**	**0**	**12**

Pole Buckling

Buckling Constant	Buckling Column Height* (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diameter (in)	Minimum Buckling Diameter at GL (in)	Diameter at Tip (in)	Diameter at GL (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Height (lbs)	Buckling Load Applied at Height (lbs)	Buckling Load Factor of Safety
2.00	19.81	32.91	12.96	18.68	9.24	13.85	1.60e+6	60.00	57.00	34.00	82,235	**822.03**	**12.35**

O-Calc® Pro Capacity Summary Info

Pole Identification: ODAS-2F-30

Report Created: 11/16/2023

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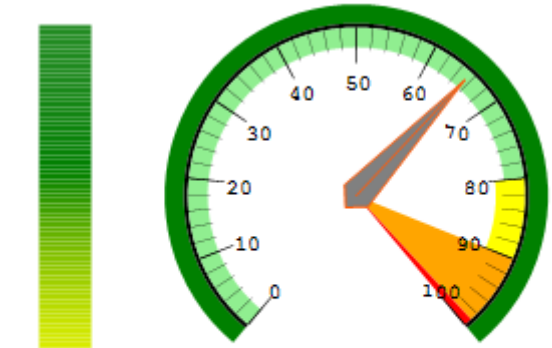

65.4% of Allowed MCU

Unguyed

O-Calc® Pro Heat Map View

Report Created: 11/16/2023

O-Calc® Pro Schematic View

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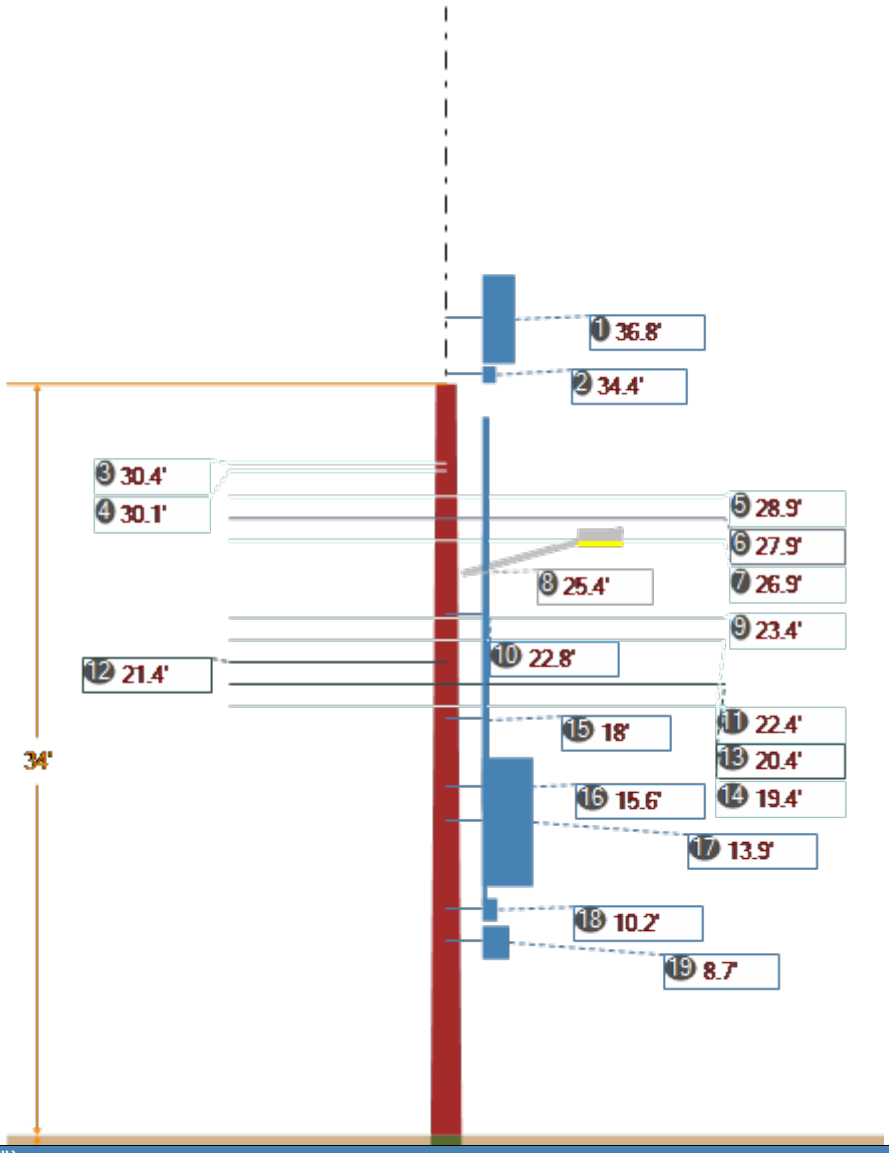
Report Created: 11/16/2023

File: ODAS_2f-30.pplx



1 - 36.8' (441")
Amphenol 6U4MT360X12Fxys4

2 - 34.4' (412.6")
Antenna Mount

3 - 30.4' (365")
1/4" EHS 179° 45' Msgr:0.250"

4 - 30.1' (361")
1/4" EHS 179° 45' Msgr:0.250"

5 - 28.9' (347")
6M 179° 45' Msgr:0.242"
6M 13° 160' Msgr:0.242"

6 - 27.9' (335")
Telco 13° 160' 0.500" (TELE 0.5)
Telco 179° 45' 0.500" (TELE 0.5)

7 - 26.9' (323")
6M 13° 160' Msgr:0.242"
6M 227° 70' Msgr:0.242"

8 - 25.4' (305")
Streetlight - 6 ft. Arm 6.0 ft arm

9 - 23.4' (281")
6M 13° 160' Msgr:0.242"
6M 179° 45' Msgr:0.242"

10 - 22.8' (273.6")
2" U-Guard

11 - 22.4' (269")
6M 13° 160' Msgr:0.242"
6M 179° 45' Msgr:0.242"

12 - 21.4' (257")
CATV 132° 62' 0.250" (CATV .25)
CATV 132° 62' 0.250" (CATV .25)

13 - 20.4' (245")
CATV 13° 160' 0.250" (CATV .25)
CATV 132° 62' 0.250" (CATV .25)
CATV 227° 70' 0.250" (CATV .25)
CATV 308° 36' 0.250" (CATV .25)
CATV 308° 36' 0.250" (CATV .25)
CATV 308° 36' 0.250" (CATV .25)

14 - 19.4' (233")
6M 13° 160' Msgr:0.242"
6M 132° 62' Msgr:0.242"
6M 227° 70' Msgr:0.242"

15 - 18' (216.6")
Weather Head

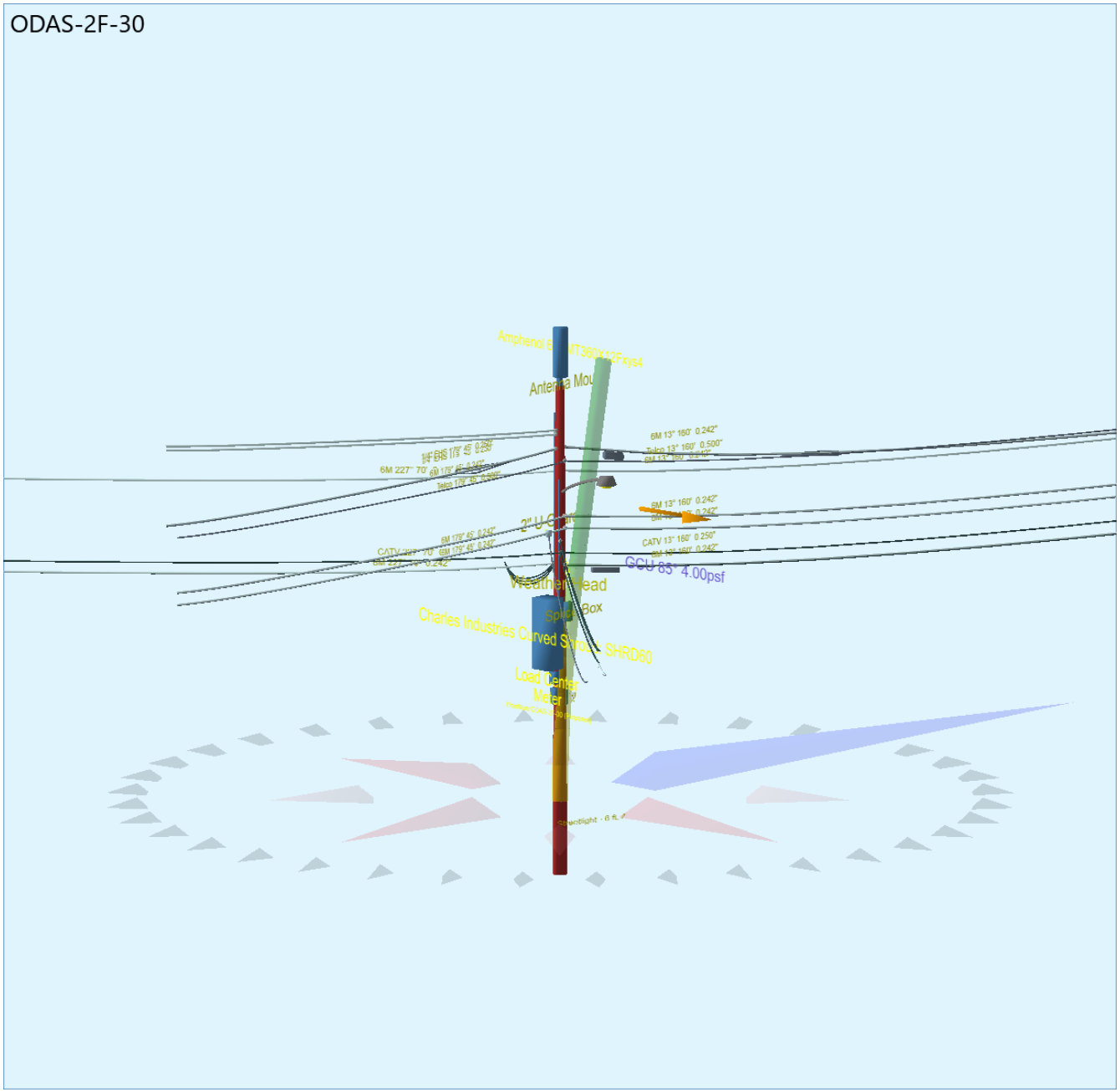
16 - 15.6' (187.6")
Splice Box

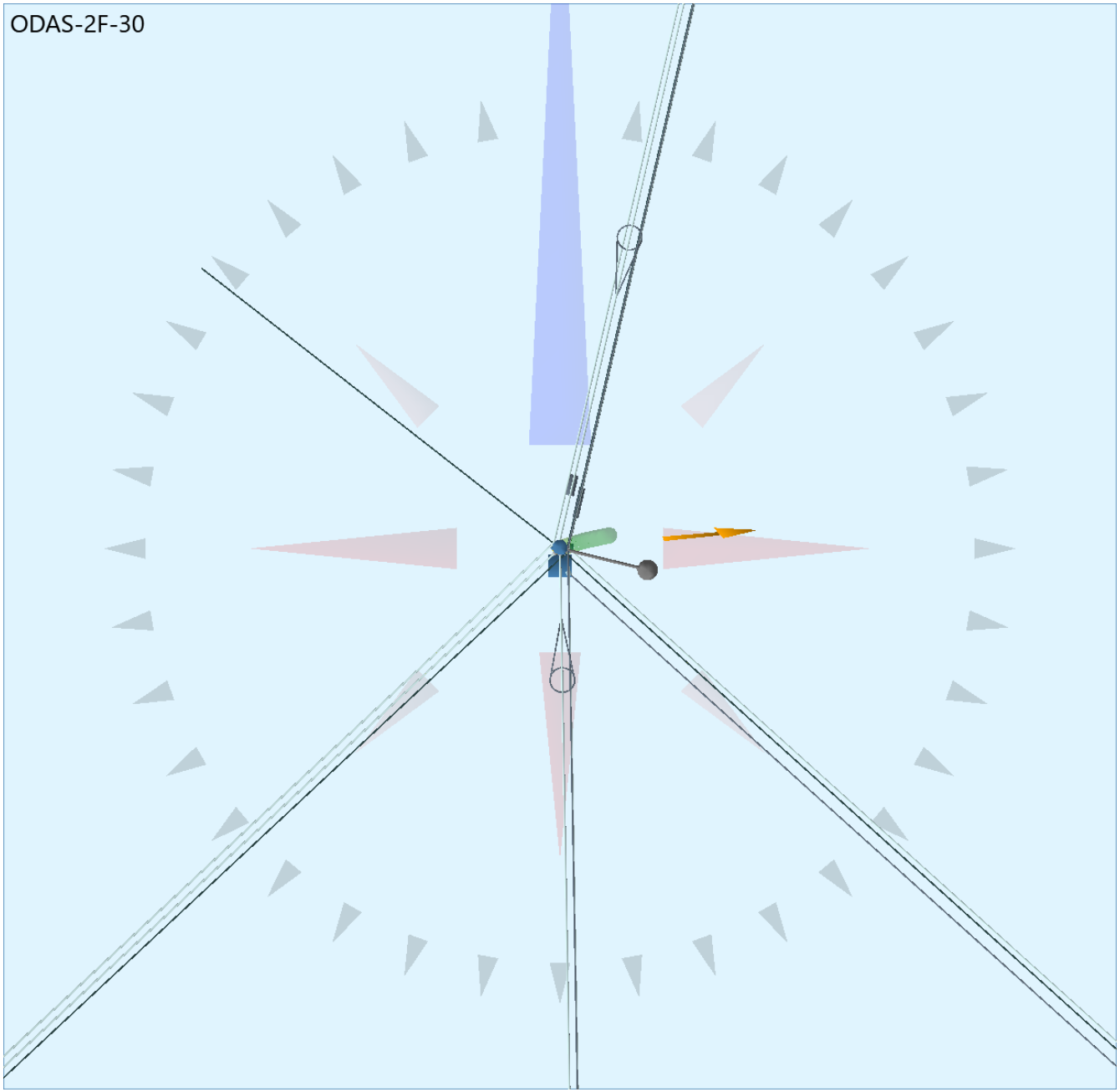
17 - 13.9' (167")
Generic Equipment

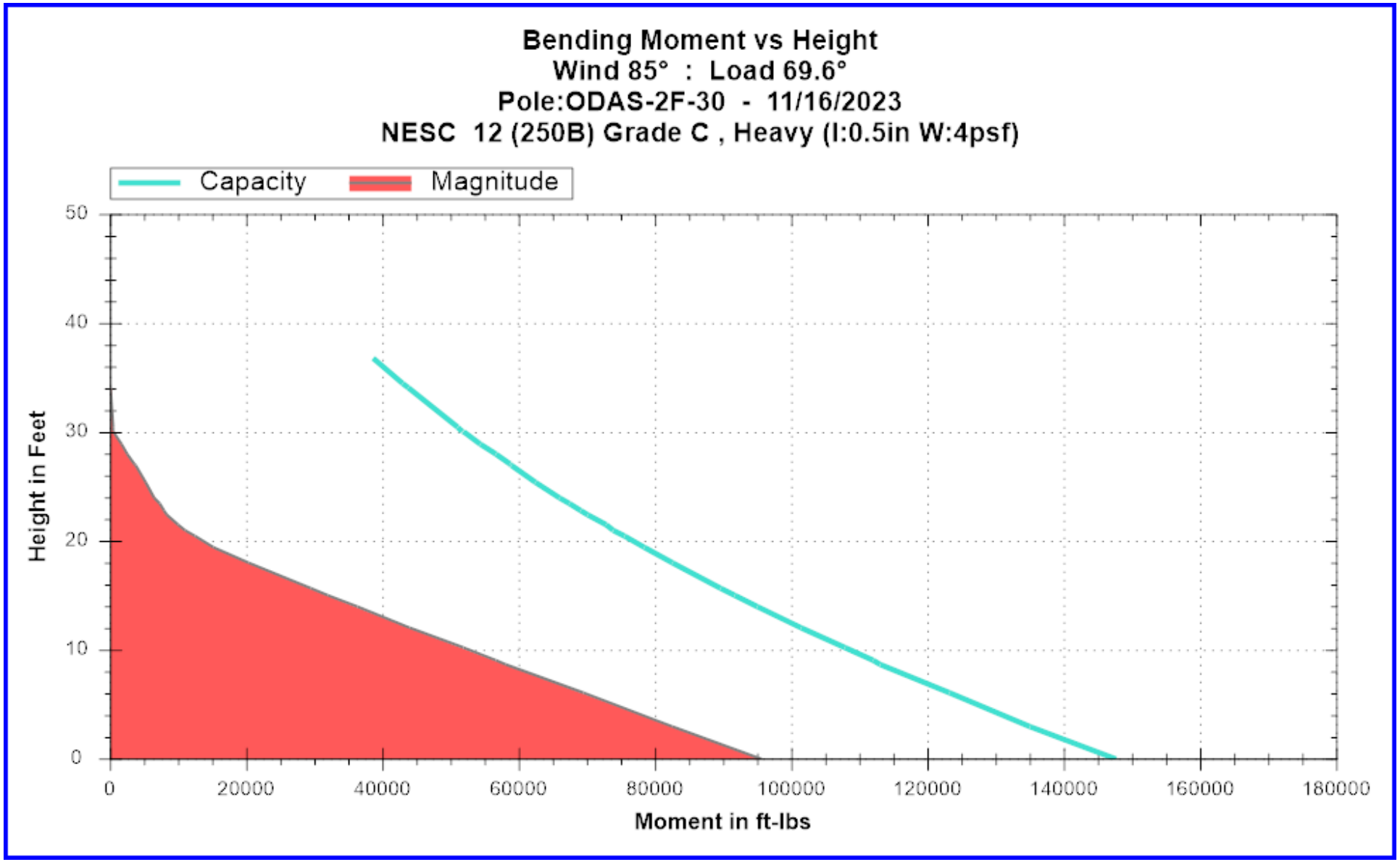
18 - 10.2' (122")
Load Center

19 - 8.7' (104")
Sign
Meter

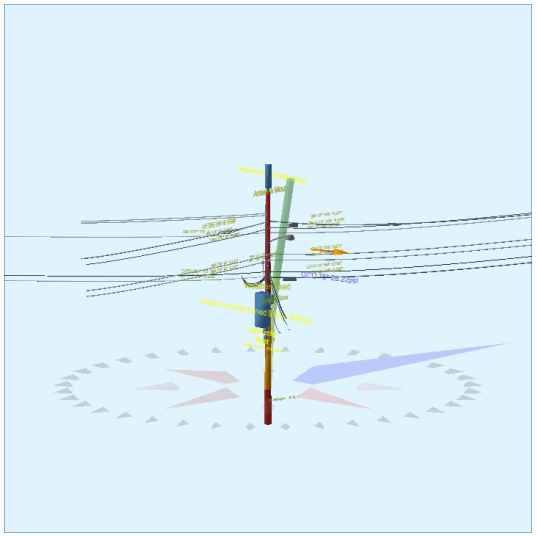
ODAS-2F-30

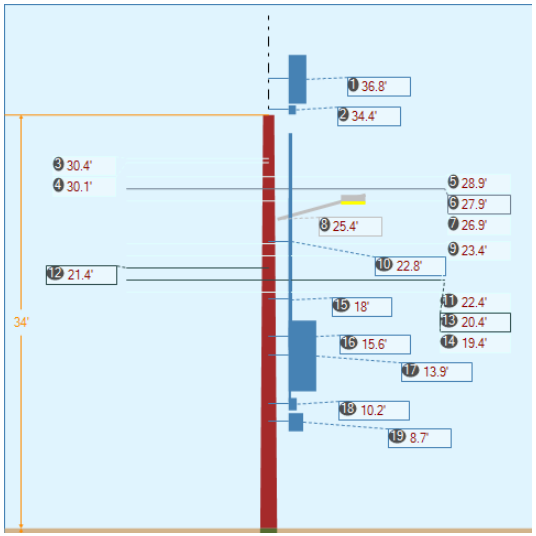

6M 13° 160° 0.242"
Telco 13° 160° 0.500"
6M 13° 160° 0.242"
6M 13° 160° 0.242"
CATV 13° 160° 0.250"
6M 13° 160° 0.242"
GCU 85° 4.00psf
Weatherhead
Charles Industries Curved
SHRD60
Load Center
Meter


ODAS-2F-30


Bending Moment vs Height
Wind 85° : Load 69.6°
Pole:ODAS-2F-30 - 11/16/2023
NESC 12 (250B) Grade C , Heavy (I:0.5in W:4psf)
Capacity
Magnitude
Height in Feet
0
10
20
30
40
50
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
Moment in ft-lbs

Pole Num:	**ODAS-2F-30**	Pole Length / Class:	**40 / H1**	Code:	**NESC**	Structure Type:	**Unguyed Tangent**
Aux Data 1	**Unset**	Species:	**SOUTHERN PINE**	NESC Rule:	**Rule 250C**	Status	**Unguyed**
Aux Data 2	**Unset**	Setting Depth (ft):	**6.00**	Construction Grade:	**C**	Pole Strength Factor:	**0.75**
Aux Data 3	**Unset**	G/L Circumference (in):	**43.50**	Loading District:	**Special**	Transverse Wind LF:	**0.75**
Aux Data 4	**Unset**	G/L Fiber Stress (psi):	**8,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.00**
Aux Data 5	**Unset**	Allowable Stress (psi):	**6,000**	Wind Speed (mph):	**105.00**	Vertical LF:	**1.00**
Aux Data 6	**Unset**	Fiber Stress Ht. Reduc:	**No**	Wind Pressure (psf):	**28.22**	Max 250C Wind (mph)	**147.78**
Latitude:	**0.000000 Deg**	Longitude:	**0.000000 Deg**			Elevation:	**0 Feet**





Pole Capacity Utilization (%)		Height (ft)	Wind Angle (deg)
Maximum	**72.8**	0.0	74.8
Groundline	**72.8**	0.0	74.8
Vertical	**3.4**	18.7	74.8

Pole Moments (ft-lb)		Load Angle (deg)	Wind Angle (deg)
Max Cap Util	**94,411**	60.3	74.8
Groundline	**94,411**	60.3	74.8
GL Allowable	**130,313**		

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 60.3°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
Powers	89	2.0	**2,437**	2.6	**1.9**	**110**	34	0	**110**	**1.8**
Comms	3,058	69.5	**69,207**	73.3	**53.1**	**3,120**	558	4	**3,123**	**52.1**
GenericEquipments	606	13.8	**11,489**	12.2	**8.8**	**518**	572	4	**522**	**8.7**
Pole	595	13.5	**9,638**	10.2	**7.4**	**434**	1,501	10	**444**	**7.4**
SpanAdditions	4	0.1	**129**	0.1	**0.1**	**6**	11	0	**6**	**0.1**
Streetlights	50	1.1	**1,507**	1.6	**1.2**	**68**	60	0	**68**	**1.1**
Insulators	0	0.0	**5**	0.0	**0.0**	**0**	65	0	**1**	**0.0**
Pole Load	4,402	100.0	**94,411**	100.0	**72.5**	**4,256**	2,802	19	**4,274**	**71.2**
Pole Reserve Capacity			**35,902**		**27.6**	**1,744**			**1,726**	**28.8**

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 60.3°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
<Undefined>	3,807	86.5	**84,773**	89.8	**65.1**	**3,821**	1,301	9	**3,830**	**63.8**
Pole	595	13.5	**9,638**	10.2	**7.4**	**434**	1,501	10	**444**	**7.4**
Totals:	4,402	100.0	**94,411**	100.0	**72.5**	**4,256**	2,802	19	**4,274**	**71.2**

Detailed Load Components:

Power		Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Secondary	TRIPLEX 1/0		26.90	7.67	0.2500		0.097	160.0	13.0	160.2			-2	373	371
Secondary	TRIPLEX 1/0		26.90	7.54	0.2500		0.097	160.0	13.0	160.2			-2	373	371
Secondary	TRIPLEX 1/0		26.90	7.66	0.2500		0.097	70.0	227.0	70.1			-1	29	28
Secondary	TRIPLEX 1/0		26.90	7.53	0.2500		0.097	70.0	227.0	70.1			-1	29	28
Overlashed Bundle	6M		26.92	7.60	0.2420	3.54	0.104	160.0	13.0	160.2	328	5,975	-2	374	6,347
Overlashed Bundle	6M		26.92	7.60	0.2420	1.29	0.104	70.0	227.0	70.1	183	-4,789	-1	29	-4,761
											Totals:	**1,186**	**-9**	**1,208**	**2,386**

Comm	Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)

Overlashed Bundle	1/4" EHS	30.42	7.36	0.2500	0.21	0.121	45.0	179.0	45.0	169	-2,444	-1	260	-2,185
Overlashed Bundle	1/4" EHS	30.08	7.38	0.2500	0.21	0.121	45.0	179.0	45.0	169	-2,417	-1	257	-2,161
Overlashed Bundle	6M	28.92	7.46	0.2420	0.56	0.104	45.0	179.0	45.0	905	-12,573	-1	246	-12,328
Telco	TELE 0.5	28.90	7.57	0.5000		0.500	45.0	179.0	45.0			-4	246	242
Telco	TELE 0.5	28.90	7.36	0.5000		0.500	45.0	179.0	45.0			-3	246	243
Telco	TELE 0.5	28.86	7.46	0.5000		0.500	45.0	179.0	45.0			-3	245	242
Overlashed Bundle	6M	28.92	7.46	0.2420	4.82	0.104	160.0	13.0	160.5	1,148	22,498	2	628	23,129
Telco	TELE 0.5	28.90	7.37	0.5000		0.500	160.0	13.0	160.5			11	996	1,007
Telco	TELE 0.5	28.90	7.57	0.5000		0.500	160.0	13.0	160.5			13	628	640
Telco	TELE 0.5	28.86	7.46	0.5000		0.500	160.0	13.0	160.5			12	627	639
Telco	TELE 0.5	27.92	7.53	0.5000	3.79	0.500	160.0	13.0	160.2	539	10,198	22	1,063	11,283
Telco	TELE 0.5	27.92	7.53	0.5000	0.79	0.500	45.0	179.0	45.0	285	-3,817	6	421	-3,391
Overlashed Bundle	6M	23.42	7.83	0.2420	3.51	0.104	160.0	13.0	160.2	514	8,158	5	876	9,038
Telco	TELE 0.75	23.38	7.84	0.7500		0.360	160.0	13.0	160.2			16	875	891
Overlashed Bundle	6M	23.42	7.83	0.2420	0.66	0.104	45.0	179.0	45.0	273	-3,062	1	347	-2,713
Telco	TELE 0.75	23.38	7.81	0.7500		0.360	45.0	179.0	45.0			5	347	351
Overlashed Bundle	6M	22.42	7.90	0.2420	3.46	0.104	160.0	13.0	160.2	654	9,929	5	663	10,597
Telco	TELE 0.5	22.39	7.93	0.5000		0.500	160.0	13.0	160.2			23	662	685
Overlashed Bundle	6M	22.42	7.90	0.2420	0.64	0.104	45.0	179.0	45.0	345	-3,709	1	253	-3,454
Telco	TELE 0.5	22.39	7.92	0.5000		0.500	45.0	179.0	45.0			6	253	259
Telco	TELE 0.5	22.27	25.40	0.5000	2.67	0.500	62.0	132.0	62.4	97	650	-1	397	1,046
CATV	CATV .25	21.42	7.97	0.2500	1.36	0.263	62.0	132.0	62.1	102	688	1	199	887
CATV	CATV .25	21.42	7.97	0.2500	1.11	0.263	62.0	132.0	62.1	128	861	0	199	1,060
CATV	CATV .25	20.42	7.54	0.2500	3.54	0.263	160.0	13.0	160.2	284	3,921	4	371	4,297
CATV	CATV .25	20.42	7.54	0.2500	1.11	0.263	62.0	132.0	62.1	128	821	0	188	1,009
CATV	CATV .25	20.42	7.54	0.2500	1.30	0.263	70.0	227.0	70.1	161	-3,206	2	28	-3,176
CATV	CATV .25	20.42	7.54	0.2500	1.75	0.263	36.0	308.0	36.3	26	-198	-2	103	-97
CATV	CATV .25	20.42	7.54	0.2500	2.00	0.263	36.0	308.0	36.4	23	-171	-2	103	-70
CATV	CATV .25	20.42	7.54	0.2500	2.27	0.263	36.0	308.0	36.5	20	-154	-2	103	-52
Overlashed Bundle	6M	19.42	8.11	0.2420	3.26	0.104	160.0	13.0	160.2	2,019	26,584	5	293	26,882
Telco	TELE 0.5	19.40	8.39	0.5000		0.500	160.0	13.0	160.2			24	293	318
Telco	TELE 0.5	19.40	7.82	0.5000		0.500	160.0	13.0	160.2			22	293	316
Telco	TELE 0.5	19.37	8.11	0.5000		0.500	160.0	13.0	160.2			24	555	578
CATV	CATV .35	19.37	8.49	0.3500		0.140	160.0	13.0	160.2			7	293	300
CATV	CATV .35	19.36	7.76	0.3500		0.140	160.0	13.0	160.2			6	293	299
Overlashed Bundle	6M	19.42	8.11	0.2420	1.09	0.104	62.0	132.0	62.1	776	4,726	2	194	4,922
Telco	TELE 0.5	19.40	7.86	0.5000		0.500	62.0	132.0	62.1			9	194	203
Telco	TELE 0.5	19.40	8.34	0.5000		0.500	62.0	132.0	62.1			10	194	204
Telco	TELE 0.5	19.36	8.11	0.5000		0.500	62.0	132.0	62.1			10	194	203
Overlashed Bundle	6M	19.42	8.11	0.2420	1.28	0.104	70.0	227.0	70.1	236	-4,459	-2	26	-4,435

CATV	CATV .35	19.40	8.27	0.3500	0.140	70.0	227.0	70.1			-3	26	22
CATV	CATV .35	19.40	7.95	0.3500	0.140	70.0	227.0	70.1			-3	26	23
										Totals:	**52,825**	**225**	**14,702**	**67,753**

GenericEquipment		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Cylinder	Amphenol 6U4MT360X12Fxys4		36.75	0.73	0.0	0.0	42.00	48.20	--	14.60	--	1	3,589	3,591
Cylinder	Antenna Mount		34.38	0.41	270.0	0.0	30.00	9.00	--	6.00	--	1	255	256
Cylinder	2" U-Guard		22.80	6.88	270.0	0.0	100.00	214.00	--	3.00	--	-50	1,849	1,799
Cylinder	Weather Head		18.05	6.70	143.0	0.0	100.00	201.00	--	2.00	--	7	873	880
Box	Splice Box		15.63	10.86	90.0	0.0	10.00	19.00	4.00	--	8.00	8	414	422
Box	Charles Industries Curved Shroud: SHRD60		13.92	16.75	180.0	0.0	250.00	69.96	21.54	--	22.73	-173	3,916	3,743
Box	Load Center		10.17	8.90	180.0	0.0	20.00	12.00	5.33	--	6.70	-7	125	117
Box	Sign		8.67	6.83	53.0	0.0	5.00	18.00	1.00	--	12.00	3	332	334
Box	Meter		8.67	8.33	180.0	0.0	15.00	16.00	4.00	--	6.00	-5	110	105
											Totals:	**-215**	**11,463**	**11,248**

SpanAddition		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Maintenance Loop	Span Addition		28.50	120.00	179.0	179.0	7.00	20.00	20.00	20.00	20.00	0	61	61
Maintenance Loop	Span Addition		25.80	300.00	13.0	13.0	7.00	20.00	20.00	20.00	20.00	0	66	66
											Totals:	**0**	**126**	**126**

Streetlight		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
General	Streetlight - 6 ft. Arm		25.42	5.20	104.0	104.0	60.00	24.00	20.00	3.00	72.00	210	1,266	1,476
											Totals:	**210**	**1,266**	**1,476**

Insulator		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Bolt	Single Bolt		30.42	0.00	180.0	180.0	5.00	3.00	0.00	-2	0	-2
Bolt	Single Bolt		30.08	0.00	180.0	180.0	5.00	3.00	0.00	-2	0	-2
Bolt	Single Bolt (Relocated)		28.92	0.00	179.0	179.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		28.92	0.00	358.0	358.0	5.00	3.00	0.00	1	0	1
Bolt	Single Bolt (Relocated)		27.92	0.00	90.0	90.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		26.92	0.00	307.0	307.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		23.42	0.00	90.0	90.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		22.42	0.00	90.0	90.0	5.00	3.00	0.00	3	0	3

Bolt	Single Bolt (Relocated)	21.42	0.00	132.0	132.0	5.00	3.00	0.00	1	0	1
J-Hook	J-Hook (Relocated)	20.42	0.00	132.0	132.0	5.00	2.00	0.00	1	0	1
J-Hook	J-Hook (Relocated)	20.42	0.00	308.0	308.0	5.00	2.00	0.00	-1	0	-1
Bolt	Single Bolt	19.42	0.00	90.0	90.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt	19.42	0.00	227.0	227.0	5.00	3.00	0.00	-3	0	-3
								Totals:	**5**	**0**	**5**

Pole Buckling

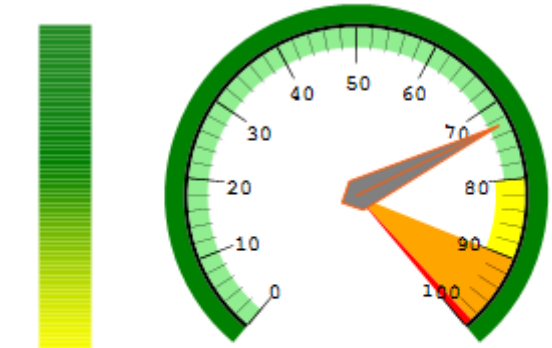
Buckling Constant	Buckling Column Height* (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diameter (in)	Minimum Buckling Diameter at GL (in)	Diameter at Tip (in)	Diameter at GL (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Height (lbs)	Buckling Load Applied at Height (lbs)	Buckling Load Factor of Safety
2.00	18.72	32.75	13.01	12.12	9.24	13.85	1.60e+6	60.00	57.00	34.00	82,649	**824.08**	**29.41**

O-Calc® Pro Capacity Summary Info

Pole Identification: ODAS-2F-30

Report Created: 11/16/2023

File: ODAS_2f-30.pplx



72.8% of Allowed MCU

Unguyed

O-Calc® Pro Heat Map View

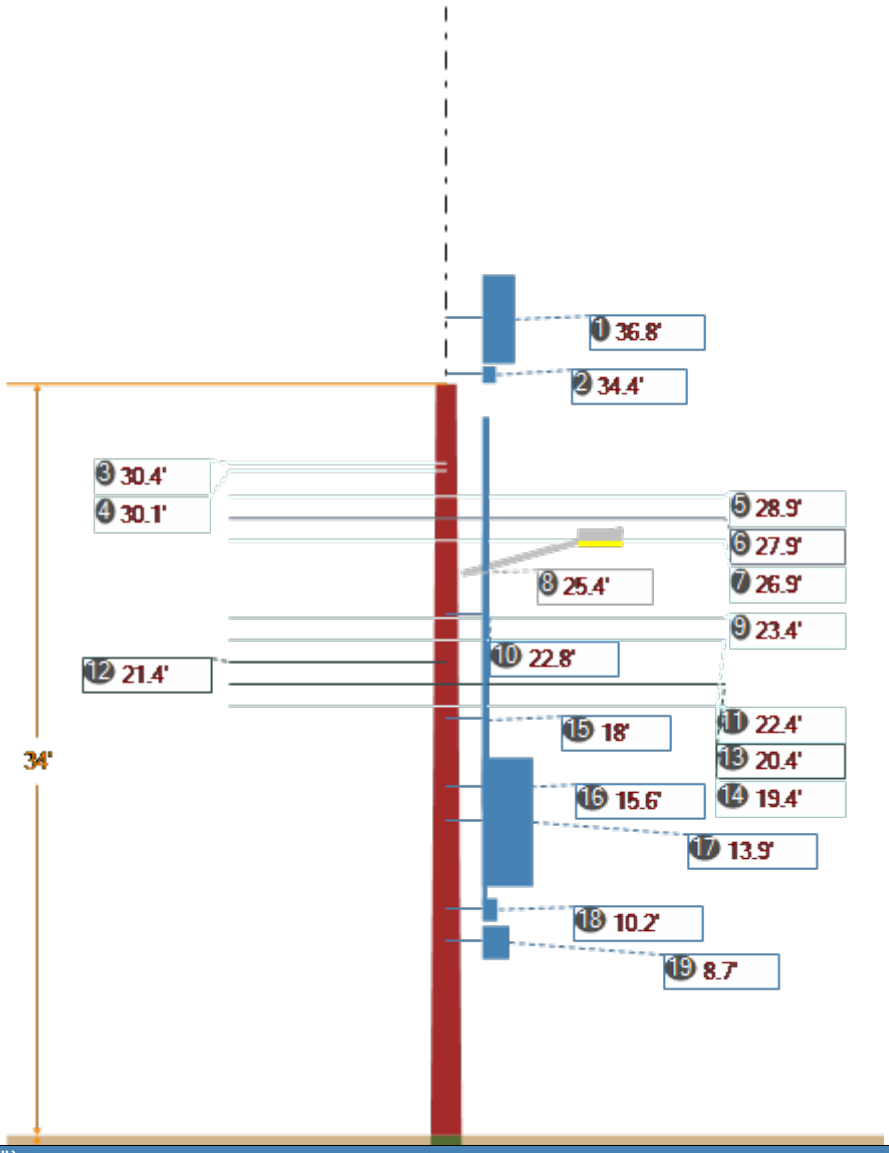
Report Created: 11/16/2023

O-Calc® Pro Schematic View

Pole Identification: ODAS-2F-30

Report Created: 11/16/2023

File: ODAS_2f-30.pplx



1 - 36.8' (441")
Amphenol 6U4MT360X12Fxys4

2 - 34.4' (412.6")
Antenna Mount

3 - 30.4' (365")
1/4" EHS 179° 45' Msgr:0.250"

4 - 30.1' (361")
1/4" EHS 179° 45' Msgr:0.250"

5 - 28.9' (347")
6M 179° 45' Msgr:0.242"
6M 13° 160' Msgr:0.242"

6 - 27.9' (335")
Telco 13° 160' 0.500" (TELE 0.5)
Telco 179° 45' 0.500" (TELE 0.5)

7 - 26.9' (323")
6M 13° 160' Msgr:0.242"
6M 227° 70' Msgr:0.242"

8 - 25.4' (305")
Streetlight - 6 ft. Arm 6.0 ft arm

9 - 23.4' (281")
6M 13° 160' Msgr:0.242"
6M 179° 45' Msgr:0.242"

10 - 22.8' (273.6")
2" U-Guard

11 - 22.4' (269")
6M 13° 160' Msgr:0.242"
6M 179° 45' Msgr:0.242"

12 - 21.4' (257")
CATV 132° 62' 0.250" (CATV .25)
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CATV 308° 36' 0.250" (CATV .25)
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14 - 19.4' (233")
6M 13° 160' Msgr:0.242"
6M 132° 62' Msgr:0.242"
6M 227° 70' Msgr:0.242"

15 - 18' (216.6")
Weather Head

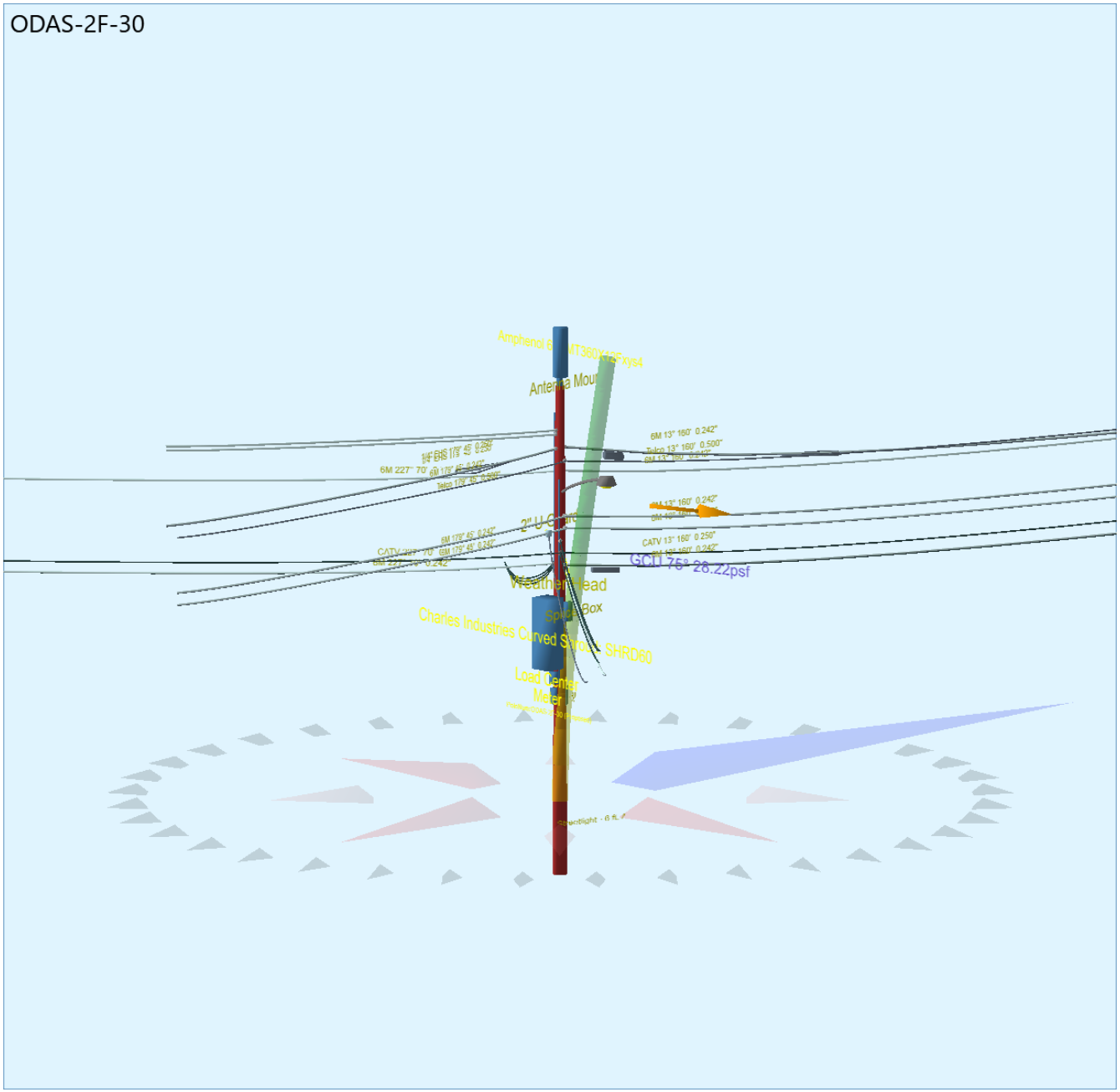
16 - 15.6' (187.6")
Splice Box

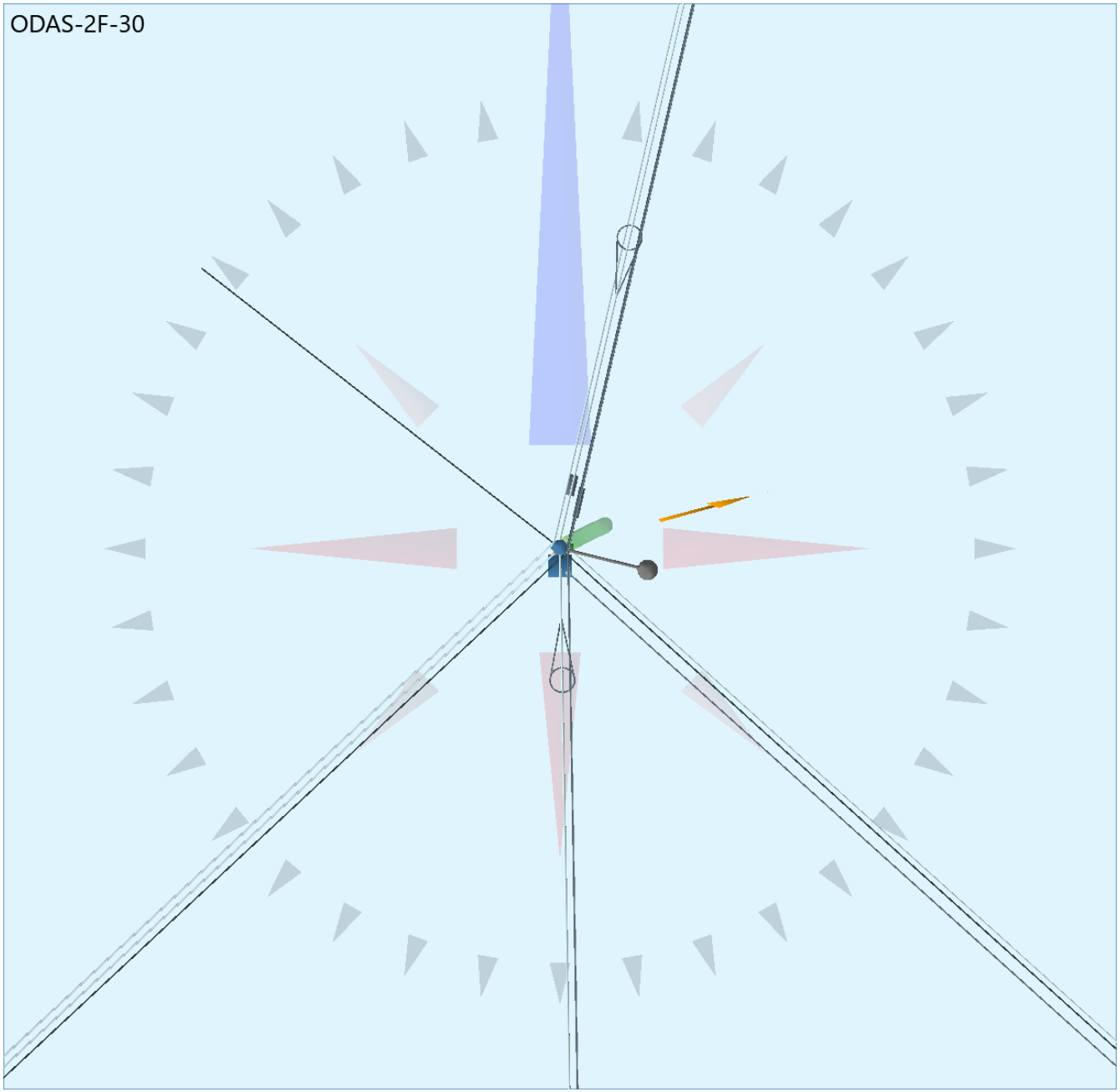
17 - 13.9' (167")
Generic Equipment

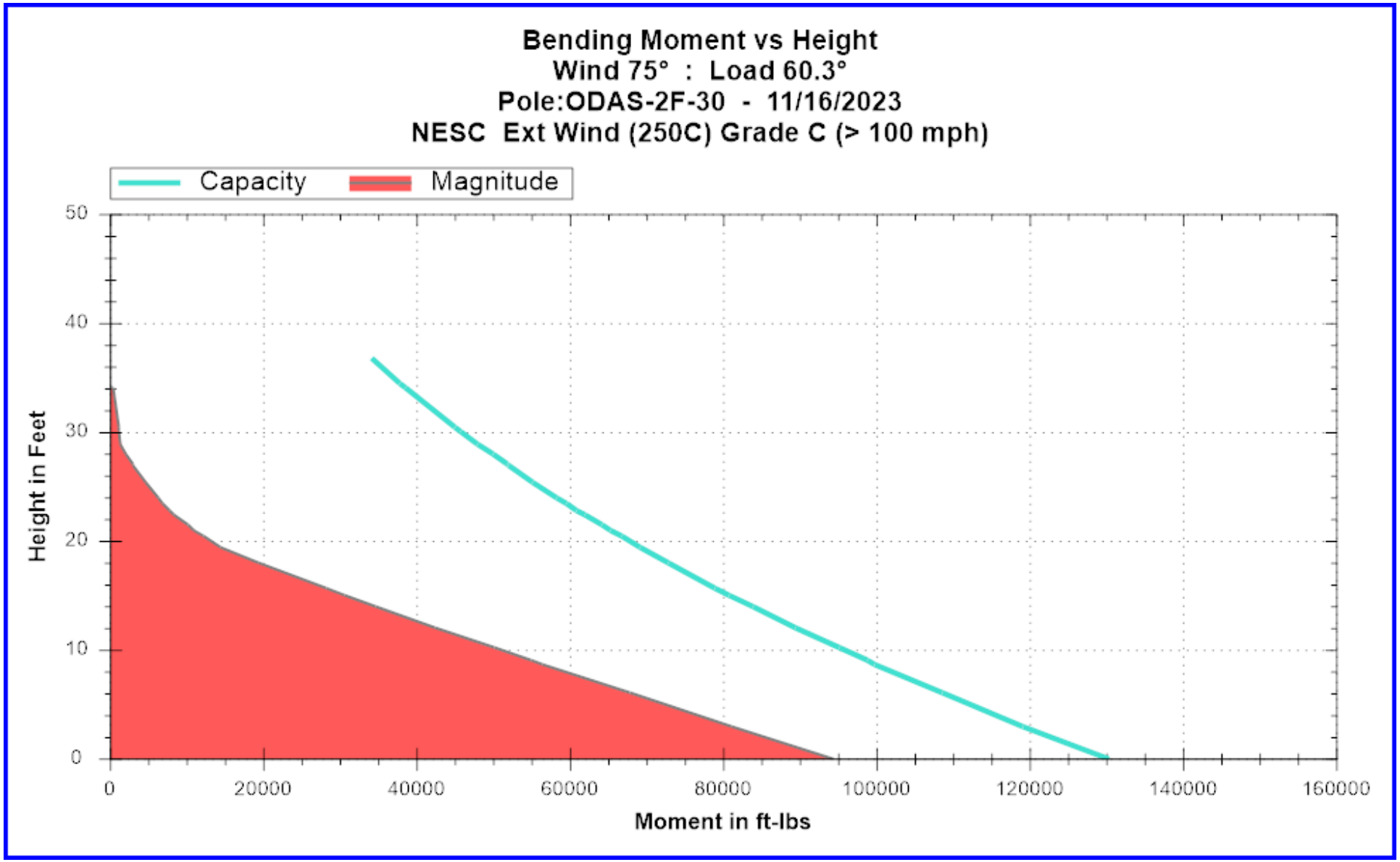
18 - 10.2' (122")
Load Center

19 - 8.7' (104")
Sign
Meter

ODAS-2F-30


6M 13° 160° 0.242"
Telco 13° 160° 0.500"
6M 13° 160° 0.242"
CATV 13° 160° 0.250"
6M 13° 160° 0.242"
GCU 75° 28.22psf
Weatherhead
Charles Industries Curved
SHRD60
Meter


ODAS-2F-30


Bending Moment vs Height
Wind 75° : Load 60.3°
Pole:ODAS-2F-30 - 11/16/2023
NESC Ext Wind (250C) Grade C (> 100 mph)
Capacity
Magnitude
Height in Feet
50
40
30
20
10
0
0
20000
40000
60000
80000
100000
120000
140000
160000
Moment in ft-lbs

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information

Coordinates: 42.415163, -71.068198

Elevation: 24 ft

Timestamp: 2023-11-16T08:59:48.773Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	75 mph
MRI 25-Year	84 mph
MRI 50-Year	91 mph
MRI 100-Year	98 mph
Risk Category I	109 mph
Risk Category II	119 mph
Risk Category III	128 mph
Risk Category IV	132 mph

You are in a wind-borne debris region if you are also within 1 mile of the coastal mean high water line.

ASCE 7-10

MRI 10-Year	78 mph
MRI 25-Year	88 mph
MRI 50-Year	96 mph
MRI 100-Year	103 mph
Risk Category I	117 mph
Risk Category II	127 mph
Risk Category III-IV	139 mph

If the structure under consideration is a healthcare facility and you are also within 1 mile of the coastal mean high water line, you are in a wind-borne debris region. If other occupancy, use the Risk Category II basic wind speed contours to determine if you are in a wind-borne debris region.

ASCE 7-05

ASCE 7-05 Wind Speed	105 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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