NEEL-SCHAFFER
Solutions you can build upon

engineers
planners
surveyors
environmental scientists
landscape architects

September 18, 2020

PASS*
Capacity: 94.8%
Tower
(see below as noted)

Mr. Ike Andrews
Cellular South Real Estate, Inc.
1018 Highland Colony Parkway
Ridgeland, MS 39157

Subject: **Rigorous Structural Reanalysis**

Engineering Firm Designation: **Neel-Schaffer Inc. Project Number:** 15584.000

Carrier Designation: ***C Spire***
Site Name: **Cooper Rd.**
Site Number: **MS0831**

Tower Owner Designation: Site Name: **Cooper Rd.**
City of Jackson Site Number: **21**

Site Data: **731 Cooper Road, Jackson, MS, Hinds**
Latitude *32° 15' 12.70"*, Longitude *-90° 14' 46.10"*
190 Foot - Monopole

Dear Mr. Andrews,

Neel-Schaffer, Inc. (NSI) has completed a **Rigorous Structural** to determine the structural integrity of the above mentioned tower. We understand that C Spire desires to use the tower for the collocation of telecommunications equipment and has requested NSI to determine if the addition of the proposed equipment would adversely affect the structure.

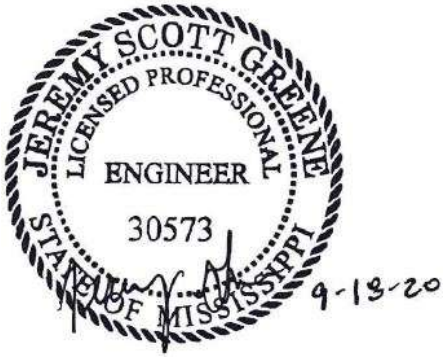
NSI has conducted this analysis of the subject tower using the tnxTower computer software to model and analyze the structure. TnxTower (formerly RISA Tower) is a finite element analysis program specifically used for communications towers. Our analysis indicates that with the proposed appurtenance configuration, the tower and foundation ***WILL*** satisfy the structural strength requirements of ANSI/TIA-222-G-2-2009, Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 (industry standard) and the 2012 International Building Code (references ASCE 7-10 wind provisions for:

- 115 mph (ultimate) / 89 mph (nominal) three-second gust basic wind speed [per Eqn. 16-33 of the IBC 2012]
- 30 mph basic wind speed with 0.50-inch ice thickness

We appreciate the opportunity to work with C Spire and look forward to contributing to the success of this project. If we can be of further assistance, please do not hesitate to contact us.

*City of Jackson requires all capacity ratings to be below 95%.

Sincerely,



Jeremy Greene, P.E.
Engineer I

INTRODUCTION:
This tower is a 190 foot monopole tower located in Hinds County, MS. The tower was designed by Engineered Endeavors, Inc. in March of 2000 and was originally designed for a wind speed of 75 mph with 0.50 inch ice per the TIA/EIA-222-F Standard.

ANALYSIS CRITERIA:
The structural analysis was performed for this tower in accordance with the requirements of ANSI/TIA-222-G Structural Standard for Antenna Supporting Structures and Antennas and the 2012 International Building Code (ASCE 7-10 wind provisions) using a 3-second gust wind speed of 115 mph (89 mph nominal) with no ice, 30 mph with 0.5 inch ice thickness and 60 mph under service loads.

RESOURCES:
NSI was provided with the following information to analyze the tower:

- Site Audit performed by NSI dated February 7, 2020
- RF Data Sheet provided by C Spire dated January 29, 2020
- Post Mod Inspection provided by NSI dated May 3, 2016
- Modification Drawings performed by NSI dated July 20, 2015
- Modification Drawings performed by NSI dated April 26, 2012
- Previous Structural Analysis provided by Tower Engineering, Inc. dated December 18, 2009
- Original Tower Drawings provided by Engineered Endeavors, Inc. dated March 3, 2000
- Geotechnical Investigation Report provided by GeoScience Engineers, LLC dated February 25, 2000

LOADING INFORMATION:
Per the information received by NSI the following existing antenna and feedline equipment is included in the analysis.

Existing Loading Data:

Equipment Centerline Elevation	Carrier	Item	Feedline	Mount	Mount Elevation
194’	AT&T	(3) HPA-65R-BUU-H6-K	(6) 1 5/8” (3) Power (2) Fiber (1) 5/16” RET (1) 3/4” DC (2) 7/8” DC	(1) Platform Mount	190’
		(3) TPA-65R-LCUUUU-H8-K			
		(3) RRU-32s			
		(3) RRU-11s			
		(3) RRUS-12s			
		(3) A2 Modules			
		(12) 860-10025 RETs			
		(3) B14 4478 RRUs			
		(3) 4426 B66 RRUs			
		(3) 4478 B5 RRUs			
		(3) DC6-48-60-18-18-8F			
184’	C Spire	(3) X7C-865-VR2	(9) 1 5/8” (2) Fiber Cables (2) Power Cables	(3) Sector Mounts	184’
		(3) HBXX-6517DS-VTM			
		(3) HBX-6517DS-VTM			
		(3) 9442 RRH2X			
		(3) ALU 4x40 RRH			
		(1) Fiber Distribution Box			
180’	City of Jackson	(1) 800/900 MHz Omni	(1) LMR 400	(1) Chain Mount	180’
		(1) Mi.Hub XR Base Unit			

Equipment Elevation	Carrier	Item	Feedline	Mount	Mount Elevation
176’	Verizon	(3) LNX-6515DS-A1M Antennas	(6) 1 5/8” (1) 1.43” Hybrid Fiber Cable	(3) MTC3752MC Sector Mounts	176’
		(6) SBNHH-1D65C Antennas			
		(3) B66A RRH4x45			
		(3) B13 RRH4x30			
		(1) RCMDC-6627-PF-48			

Loading to be Removed:

Equipment Elevation	Carrier	Item	Feedline	Mount	Mount Elevation
184’	C Spire	(3) 4x40 RRH	-	-	-

Proposed Loading Data:

Equipment Elevation	Carrier	Item	Feedline	Mount	Mount Elevation
184’	C Spire	(3) AHFIG (4T4R) B25		-	-

Final Loading Data:

Equipment Centerline Elevation	Carrier	Item	Feedline	Mount	Mount Elevation
184’	C Spire	(3) X7C-865-VR2	(9) 1 5/8” (2) Fiber Cables (2) Power Cables	(3) Sector Mounts	184’’
		(3) HBXX-6517DS-VTM			
		(3) HBX-6517DS-VTM			
		(3) 9442 RRH2X			
		(3) AHFIG (4T4R) B25			
		(1) Fiber Distribution Box			

FOUNDATION ANALYSIS:
A full foundation structural analysis was completed and the foundations were found to be capable of supporting the indicated loads. Therefore foundation modifications are not necessary.

ANALYSIS ASSUMPTIONS:
The following assumptions have been made for this structural analysis.

1. This evaluation is based on the assumption that the tower has been properly designed, installed, and maintained in accordance with TIA standards and/or with manufacturer’s specifications. The evaluation of antenna connections, mount capacities, and connection components is beyond our scope of service.

2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.

3. Where specific information regarding antenna and mount types/models was not provided, assumed areas and weights were made based on similar and/or typical antenna and mount types.

4. The soil parameters are as per data supplied or as assumed and stated in the calculations.

5. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.

6. Any prior structural modifications are assumed to be as per the supplied/available data, and to have been properly installed.

Any conditions discovered which deviate from the information contained in this letter may invalidate these results and should be presented to NSI for further review.

This report has been prepared for the sole purpose of providing structural evaluation of this tower for the loading conditions indicated. It is intended for the exclusive use of C Spire and their authorized agents. The information, assumptions, and recommendations contained in this report should not be used by others for any purpose without the express written authorization from NSI. If conditions differ from those contained in this report, NSI should be contacted to evaluate this information.

ATTACHMENTS:

- RF Data sheet dated 01/29/2020
- Tower Elevation
- Feedline View
- tnxTower Output
- Foundation Analysis

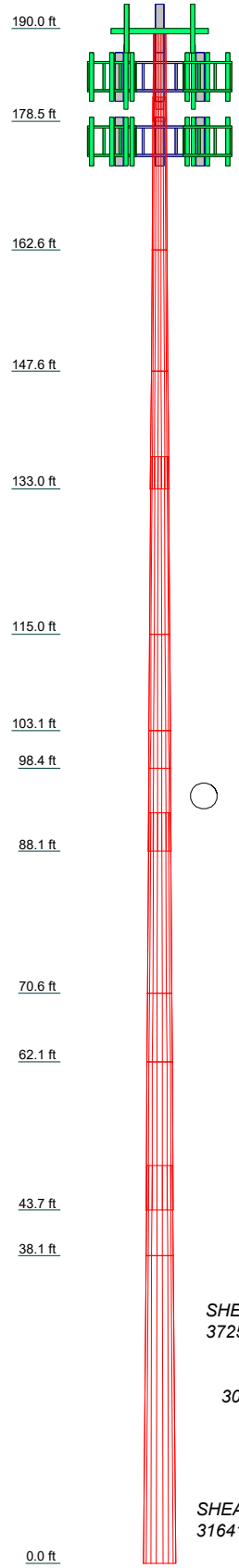
Project: 4G5G - RF Data Sheet (Rev-0)- 01/29/2020

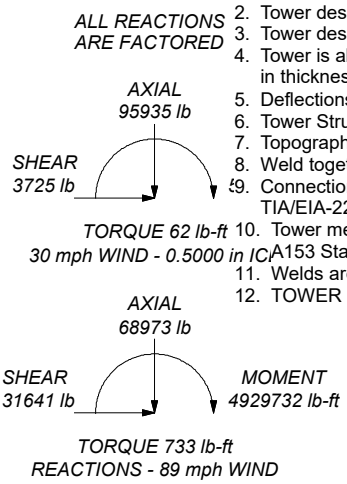
Site Name	Cooper Road		**Street Address**	731 Cooper Road		**CDMA Ven.**	Lucent	
Site ID	MS0831		**City/State/Zip**	Jackson	MS 39212	**CDMA Cab.**	1900 MHz	Compact 4.0b
Latitude	32.253528		**LTE Antennas**	3	**Total Antennas** 6	**Enclosure:**	Cabinet	**Card:** CMU-V
Longitude	-90.246139		**CDMA Antennas**	3		**CDMA V. Car.**	As Shown in RFWeb	2
County	Hinds		**Frequency Band/s**	700 A, 1900, AWS	**m. ERP** 500 W	**CDMA DO Car.**	As shown in RFWeb	2
Area	J		**700 MHz Call Sign/s**	WQIZ432		**LTE Vendor**	Lucent	
Site Config.	c.f. CONFIG. Tab		**llular/PCS Call Sign/s**	KNLH539, KNLF890, KNLH361, WPOJ820, WPTK625, KNKQ257		**LTE Cabinet - 1**		9929
RF Engineer	Britt Fugler & Bailee Bellevue		**AWS Call Sign/s**			**eNodeB -1**	PCS/700MHz	**CULs** 128
Approval Date	1/29/2020		**B41 Call Sign/s**	WLX744, WLX748, WLX421, WLX420		**eNodeB -2**		**CULs**
B41 Cluster	Jackson, MS					**eNodeB-3**		**CULs**
			TDD Frequency/s	WLX744, WLX748, WLX421, WLX420		**New LTE Cabinet - 2**		
			FDD Frequency(s)	RX 698-704, TX 728-734 | RX 1865-1870 TX 1945-1950 | RX 1885-1915, TX 1965-1995		**eNodeB -1**		**CULs**
Structure Owner	City of Jackson	**FAA File Height (ft)**				**eNodeB-2**		**CULs**
Structure Type	Monopole	**Tower Height (ft)** 184				**Total New SAU Licenses**		
Controller and Modem	**TDD Modem**		**TDD Controller**		**FDD Modem** bCEM (3)	**FDD Controller**	eCCM2	

	Sector A				**Sector B**				**Sector C**			
Transmitter	Cooper Road			TX 1	Cooper Road			TX 2	Cooper Road			TX 3
Ex. CDMA Ant.	7220.42 (65)		**Qty**	1	7220.42 (65)		**Qty**	1	7220.42 (65)		**Qty**	1
Ex. CDMA Coax	Eupen	1 5/8"	**Qty**	2	Eupen	1 5/8"	**Qty**	2	Eupen	1 5/8"	**Qty**	2
Ex. CDMA RAD (ft)	184	***Exist. Az°***	60		184	***Exist. Az°***	180		184	***Exist. Az°***	300	
LTE PCS Ant.	HBXX-6517DS-A2M		**Qty**	1	HBXX-6517DS-A2M		**Qty**	1	HBXX-6517DS-A2M		**Qty**	1
LTE 700 Ant.	#N/A		**Qty**		#N/A		**Qty**		#N/A		**Qty**	
LTE B41 Ant.	#N/A		**Qty**		#N/A		**Qty**		#N/A		**Qty**	
LTE 850 Ant.	#N/A		**Qty**		#N/A		**Qty**		#N/A		**Qty**	
CDMA Ant(change)			**Qty**				**Qty**				**Qty**	
CDMA ET°(change)		***MT° (if chg)***				***MT° (if chg)***				***MT° (if chg)***		
CDMA RET(change)												
	LTE PCS	**LTE 600/700**	**LTE 850**	**LTE B41**	**LTE PCS**	**LTE 600/700**	**LTE 850**	**LTE B41**	**LTE PCS**	**LTE 600/700**	**LTE 850**	**LTE B41**
RAD (ft)	184	184	184	184	184	184	184	184	184	184	184	184
Azimuth (°)	60	60	60	60	180	180	180	180	300	300	300	300
Electrical Tilt (°)												
Mechanical Tilt (°)												
Di/Triplexer Top												
Di/Triplexer Bottom												
IBC Make/Model												
Miscellaneous												
RRH Vendor/Model	AHFIG (4T4R) B25	ALU-RRH2x40-07L-AT		FZHJ RRH (8T8R)	AHFIG (4T4R) B25	ALU-RRH2x40-07L-AT		FZHJ RRH (8T8R)	AHFIG (4T4R) B25	ALU-RRH2x40-07L-AT		FZHJ RRH (8T8R)
RRH Configuration	4T4R	2T2R		8T8R	4T4R	2T2R			4T4R	2T2R		
RRH Bandwidth	20 MHz	5 MHz		20+20+20 MHz	20 MHz	5 MHz			20 MHz	5 MHz		
RRH Power	4x40W	2x40W		8x20W	4x40W	2x40W			4x40W	2x40W		
RRH Location	Top	Top		Top	Top	Top			Top	Top		
RRH Weight (lb)	77.2	52	#N/A	50.7	77.2	52	#N/A	50.7	77.2	52	#N/A	50.7
RRH LxWxD (in)	27.36" x 12.13" x 5.15"	24.8" x11.5" x 5.7"	#N/A	8.7"x 17.37" x14"	27.36" x 12.13" x 5.15"	24.8" x11.5" x 5.7"	#N/A	8.7"x 17.37" x14"	27.36" x 12.13" x 5.15"	24.8" x11.5" x 5.7"	#N/A	8.7"x 17.37" x14"
# of RRH's	1	1	1	1	1	1			1	1		
RET	YES	YES	YES	YES	YES	YES			YES	YES		
PCS/700/850 Fiber / DC Cable												
B41 Fiber / DC Cable												
B41 Calibration Cable												
Fixed Wireless	**Alpha**	**Alpha**	**Beta**	**Beta**	**Gamma**	**Gamma**	**Delta**	**Delta**	**Epsilon**	**Epsilon**	**Zeta**	**Zeta**
Band	**B41 FW**	**5.8G FW**	**B41 FW**	**5.8G FW**	**B41 FW**	**5.8G FW**	**B41 FW**	**5.8G FW**	**B41 FW**	**5.8G FW**	**B41 FW**	**5.8G FW**
RAD (ft)												
Azimuth (°)												
Electrical Tilt (°)												
FW Antenna												
RRH Vendor/Model												
RRH Bandwidth												
RRH Power												
RRH Dimensions (in.)												
RRH Weight (lbs)												
Fixed Wireless Cables	Outdoor Cat 6											
Comments	01242020: Swap 4X40 to AHFIG											

Section	1	2	3	4	5	6	7	8	9	10	11	12	13
Length (ft)	11.50	18.92	15.00	14.54	21.96	11.92	4.67	10.29	22.30	8.50	18.37	11.21	38.08
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.5231	0.6542	0.7236	0.6951	1.0203	0.6780	0.6479	0.6356	0.7813	0.6758	0.6598
Socket Length (ft)	3.00			3.92				4.75			5.58		
Top Dia (in)	18.0000	19.0515	22.1777	24.6566	25.1037	29.5360	31.5025	32.2725	31.8302	36.1110	37.5119	38.0578	40.7188
Bot Dia (in)	19.9300	22.1777	24.6566	27.0600	29.5360	31.5025	32.2725	33.9700	36.1110	37.5119	40.5400	40.7188	47.0000
Grade	A572-65		43.399624ksi		43.568521ksi	44.499222ksi	44.690429ksi	44.756011ksi	50.925196ksi		44.573299ksi		50.925196ksi 51.501597ksi
Weight (lb)	437.3	1040.2	1759.8	2345.6	4149.2	2453.4	1406.6	2282.8	4907.0	2000.4	5539.6	3031.7	12047.4

Section Weight (lb): 43400.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HPA-65R-BUU-H6-K w. Mount Pipe	194	Sabre Saf T-Boom 10'6" Sector Mounts	184
HPA-65R-BUU-H6-K w. Mount Pipe	194	Sabre Saf T-Boom 10'6" Sector Mounts	184
HPA-65R-BUU-H6-K w. Mount Pipe	194	HBXX-6517DS-VTM w/ mount pipe	184
TPA-65R-LCUUUU-H8-K w. Mount Pipe	194	HBXX-6517DS-VTM w/ mount pipe	184
TPA-65R-LCUUUU-H8-K w. Mount Pipe	194	HBXX-6517DS-VTM w/ mount pipe	184
TPA-65R-LCUUUU-H8-K w. Mount Pipe	194	HBX-6517DS-VTM w/ mount pipe	184
RRUS-11	194	HBX-6517DS-VTM w/ mount pipe	184
RRUS-11	194	HBX-6517DS-VTM w/ mount pipe	184
RRUS-11	194	Fiber Distribution Unit EVO-1009-EN	184
RRUS 32	194	RRU 9442 RRH2X	184
RRUS 32	194	RRU 9442 RRH2X	184
RRUS 32	194	RRU 9442 RRH2X	184
RRUS-12-RRU	194	AHFIG RRH	184
RRUS-12-RRU	194	AHFIG RRH	184
RRUS-12-RRU	194	AHFIG RRH	184
Ericsson A2 Module	194	X7C-865-VR2 w/ mount pipe	184
Ericsson A2 Module	194	X7C-865-VR2 w/ mount pipe	184
Ericsson A2 Module	194	X7C-865-VR2 w/ mount pipe	184
(4) 860-10025	194	Mi-Mub XR Base Unit	180
(4) 860-10025	194	800/900 MHz Dbi ominDIRECTIONAL	180
(4) 860-10025	194	Chain Mount (single sector)	180
DC6-48-60-18-8F	194	CommScope MTC3752MC Mount	176
DC6-48-60-18-8F	194	CommScope MTC3752MC Mount	176
DC6-48-60-18-8F	194	CommScope MTC3752MC Mount	176
RRUS-B14 4478	194	LNX-6515DS-A1M w. mount pipe	176
RRUS-B14 4478	194	LNX-6515DS-A1M w. mount pipe	176
RRUS-B14 4478	194	LNX-6515DS-A1M w. mount pipe	176
RRUS-4426 B66	194	(2) SBNHH-1D65C w. mount pipe	176
RRUS-4426 B66	194	(2) SBNHH-1D65C w. mount pipe	176
RRUS-4426 B66	194	(2) SBNHH-1D65C w. mount pipe	176
RRUS-4478 B5	194	B66A-RRH4x45	176
RRUS-4478 B5	194	B66A-RRH4x45	176
RRUS-4478 B5	194	B66A-RRH4x45	176
RRUS-4478 B5	194	B13RRH 4x30	176
Platform Mount [LP 601-1]	190	B13RRH 4x30	176
Generic Lightning Rod 4' copper	190	B13RRH 4x30	176
Sabre Saf T-Boom 10'6" Sector Mounts	184	Raycap RCMDC-6627-PF-48	176

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	44.756011ksi	45 ksi	60 ksi
43.399624ksi	43 ksi	58 ksi	50.925196ksi	51 ksi	66 ksi
43.568521ksi	44 ksi	59 ksi	44.573299ksi	45 ksi	60 ksi
44.499222ksi	44 ksi	59 ksi	51.501597ksi	52 ksi	67 ksi
44.690429ksi	45 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hinds County, Mississippi.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 30 mph basic wind with 0.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Weld together tower sections have flange connections.
9. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
10. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
11. Welds are fabricated with ER-70S-6 electrodes.
12. TOWER RATING: 94.8%

Neel-Schaffer, Inc.
1022 Highland Colony Parkway, Suite 301
Ridgeland, MS 39157
Solutions you can build upon
Phone: 601-898-3358
FAX: 601-898-8485

Job: ***MS0831 Cooper Road***			
Project: ***15584.000***			
Client: C Spire	Drawn by: Brittany Morales	App'd:	
Code: TIA-222-G	Date: 09/04/20	Scale: NTS	
Path: Y:\Projects\0015000\0015500\15584 C-Spire 4G - 5G_SA\MS0831 Cooper Road\tnxTower\MS0831 Cooper Road.ERI		Dwg No. E-1	

Section	1	2	3	4	5	6	7	8	9	10	11	12	13
Length (ft)	11.50	18.92	15.00	14.54	21.96	11.92	4.67	10.29	22.30	8.50	18.37	11.21	38.08
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.5231	0.6542	0.7236	0.6951	1.0203	0.6780	0.6479	0.6356	0.7813	0.6758	0.6598
Socket Length (ft)	3.00			3.92				4.75			5.58		
Top Dia (in)	18.0000	19.0515	22.1777	24.6566	25.1037	29.5360	31.5025	32.2725	31.8302	36.1110	37.5119	38.0578	40.7188
Bot Dia (in)	19.9300	22.1777	24.6566	27.0600	29.5360	31.5025	32.2725	33.9700	36.1110	37.5119	40.5400	40.7188	47.0000
Grade	A572-65		43.399624ksi		43.568521ksi	44.499222ksi	44.690429ksi	44.756011ksi	50.925196ksi		44.573299ksi		50.925196ksi 51.501597ksi
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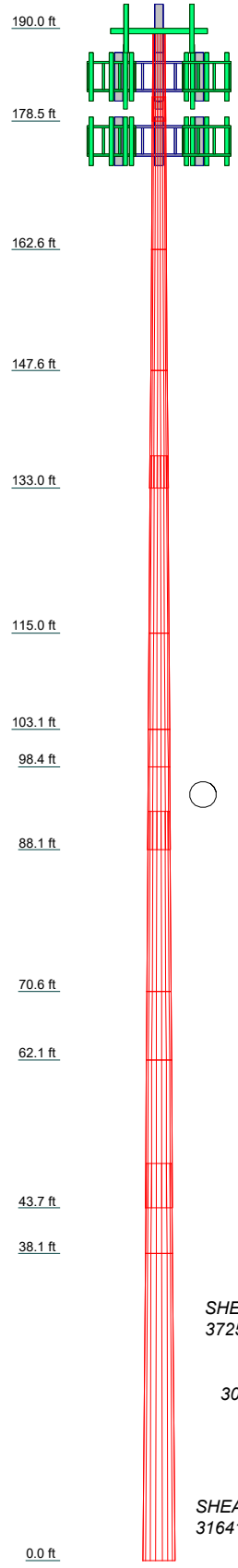
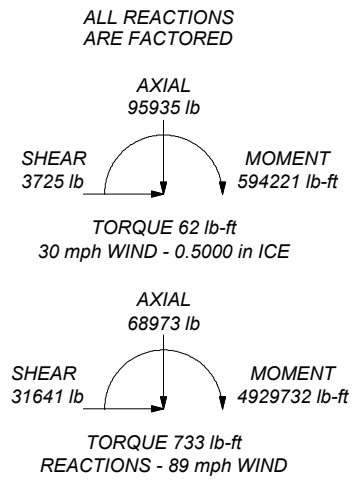
Section	43400.9





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43.399624ksi	43 ksi	58 ksi	50.925196ksi	51 ksi	66 ksi
43.568521ksi	44 ksi	59 ksi	44.573299ksi	45 ksi	60 ksi
44.499222ksi	44 ksi	59 ksi	51.501597ksi	52 ksi	67 ksi
44.690429ksi	45 ksi	60 ksi			

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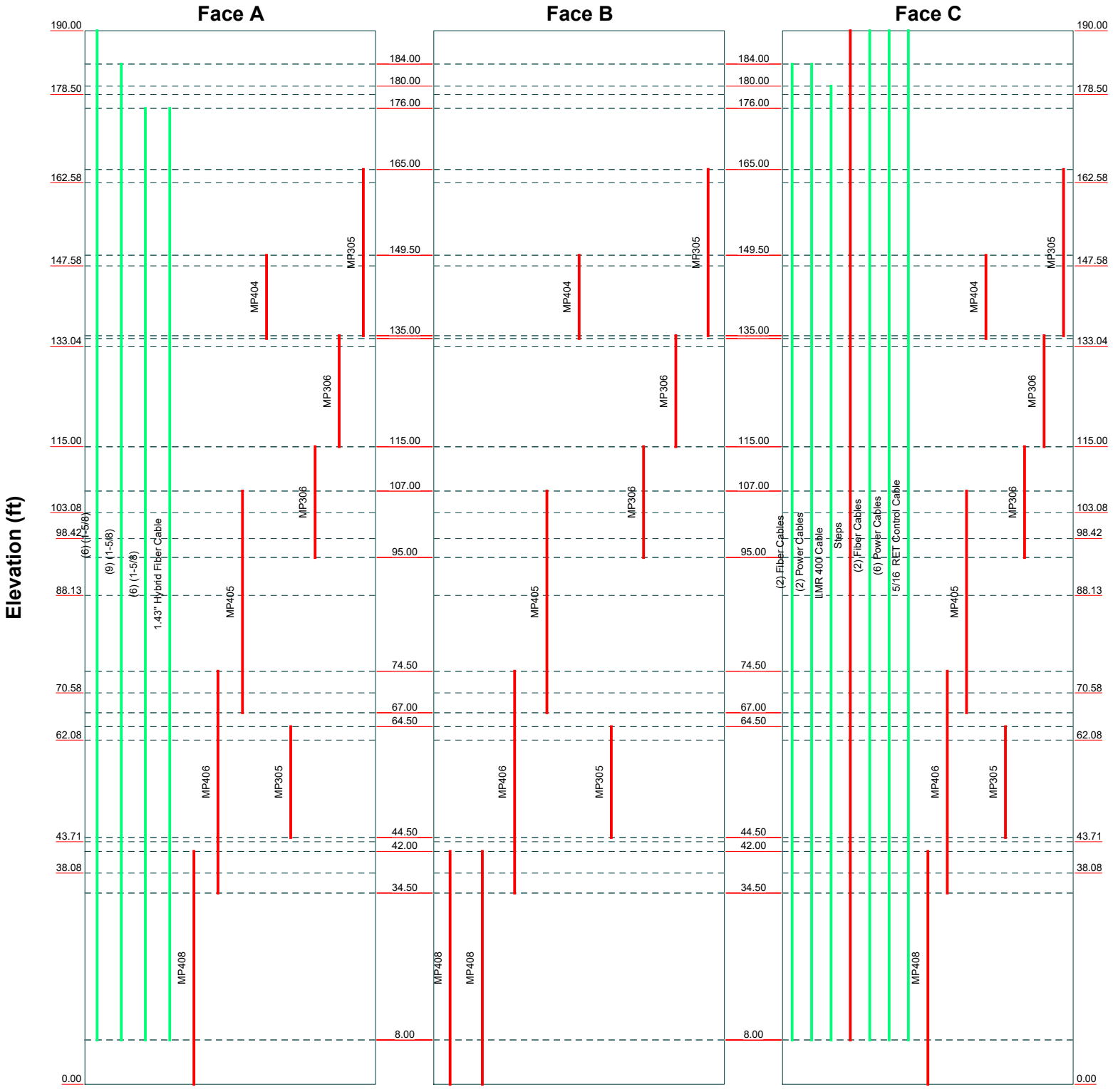
Client: C Spire	Drawn by: Brittany Morales	App'd:	
Code: TIA-222-G	Date: 09/04/20	Scale: NTS	
Path: Y:\Projects\0015000\0015500\15584 C-Spire 4G - 5G_SA\MS0831 Cooper Road\tnxTower\MS0831 Cooper Road.ERI		Dwg No. E-1	

Feed Line Distribution Chart
0' - 190'

Round | Flat | App In Face | App Out Face | Truss Leg



Neel-Schaffer, Inc.
1022 Highland Colony Parkway, Suite 301
Ridgeland, MS 39157
Solutions you can build upon
Phone: 601-898-3358
FAX: 601-898-8485

Job: ***MS0831 Cooper Road***			
Project: ***15584.000***			
Client: C Spire	Drawn by: Brittany Morales		App'd:
Code: TIA-222-G	Date: 09/04/20		Scale: NTS
Path: Y:\Projects\001500\001500\15584 C-Spire 4G - 5G_SA\MS0831 Cooper Road\tnxTower\MS0831 Cooper Road.ERI			Dwg No. E-7

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hinds County, Mississippi.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 89 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 30 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	190.00-178.50	11.50	3.00	18	18.0000	19.9300	0.1875	0.7500	A572-65 (65 ksi)
L2	178.50-162.58	18.92	0.00	18	19.0515	22.1777	0.2500	1.0000	A572-65 (65 ksi)
L3	162.58-147.58	15.00	0.00	18	22.1777	24.6566	0.5231	2.0924	43.399624ksi (43 ksi)
L4	147.58-133.04	14.54	3.92	18	24.6566	27.0600	0.6542	2.6169	43.568521ksi (44 ksi)
L5	133.04-115.00	21.96	0.00	18	25.1037	29.5360	0.7236	2.8943	44.499222ksi (44 ksi)
L6	115.00-103.08	11.92	0.00	18	29.5360	31.5025	0.6951	2.7804	44.690429ksi (45 ksi)
L7	103.08-98.42	4.67	0.00	18	31.5025	32.2725	1.0203	4.0811	44.756011ksi (45 ksi)
L8	98.42-88.13	10.29	4.75	18	32.2725	33.9700	0.6780	2.7119	50.925196ksi (51 ksi)
L9	88.13-70.58	22.30	0.00	18	31.8302	36.1110	0.6479	2.5917	50.925196ksi (51 ksi)
L10	70.58-62.08	8.50	0.00	18	36.1110	37.5119	0.6356	2.5422	50.925196ksi (51 ksi)
L11	62.08-43.71	18.37	5.58	18	37.5119	40.5400	0.7813	3.1252	44.573299ksi (45 ksi)
L12	43.71-38.08	11.21	0.00	18	38.0578	40.7188	0.6758	2.7032	51.501597ksi (52 ksi)
L13	38.08-0.00	38.08		18	40.7188	47.0000	0.6598	2.6390	50.925196ksi (51 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.2488	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	20.2085	11.7493	578.5649	7.0086	10.1244	57.1454	1157.8911	5.8757	3.1777	16.948
L2	19.8103	14.9190	666.2901	6.6745	9.6782	68.8446	1333.4570	7.4609	2.9131	11.652
	22.4813	17.3997	1056.9777	7.7843	11.2663	93.8177	2115.3462	8.7015	3.4633	13.853
L3	22.4392	35.9534	2129.9995	7.6874	11.2663	189.0595	4262.8018	17.9801	2.9826	5.702
	24.9563	40.0691	2948.4198	8.5674	12.5256	235.3921	5900.7192	20.0384	3.4189	6.536
L4	24.9361	49.8409	3627.7166	8.5209	12.5256	289.6249	7260.2066	24.9252	3.1881	4.873
	27.3765	54.8315	4830.2077	9.3741	13.7465	351.3778	9666.7711	27.4210	3.6111	5.52
L5	26.1828	55.9915	4204.6853	8.6550	12.7527	329.7094	8414.9033	28.0011	3.1448	4.346
	29.8800	66.1706	6940.0357	10.2284	15.0043	462.5372	13889.2032	33.0916	3.9249	5.424
L6	29.8844	63.6305	6686.8220	10.2385	15.0043	445.6611	13382.4428	31.8213	3.9749	5.718
	31.8812	67.9692	8150.0316	10.9366	16.0033	509.2731	16310.7872	33.9911	4.3211	6.216
L7	31.8311	98.7110	11587.6825	10.8212	16.0033	724.0824	23190.6125	49.3649	3.7488	3.674
	32.6129	101.2045	12488.1542	11.0945	16.3944	761.7324	24992.7407	50.6118	3.8843	3.807
L8	32.6657	67.9875	8574.1086	11.2160	16.3944	522.9897	17159.4992	34.0002	4.4867	6.618
	34.3895	71.6403	10031.7265	11.8187	17.2568	581.3215	20076.6529	35.8270	4.7855	7.059
L9	33.1473	64.1263	7877.5251	11.0697	16.1698	487.1765	15765.4157	32.0692	4.4618	6.886
	36.5681	72.9296	11587.6184	12.5894	18.3444	631.6712	23190.4842	36.4717	5.2152	8.049
L10	36.5700	71.5635	11378.4906	12.5938	18.3444	620.2711	22771.9532	35.7886	5.2369	8.24
	37.9925	74.3896	12780.4155	13.0911	19.0560	670.6751	25577.6478	37.2018	5.4835	8.628
L11	37.9701	91.0854	15525.3924	13.0394	19.0560	814.7227	31071.2136	45.5514	5.2270	6.69
	41.0449	98.5946	19690.4237	14.1143	20.5943	956.1094	39406.7567	49.3067	5.7600	7.372

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L12	39.8860	80.1827	14156.0695	13.2706	19.3333	732.2102	28330.7659	40.0990	5.5088	8.152
	41.2427	85.8905	17399.4466	14.2153	20.6851	841.1569	34821.7878	42.9534	5.9771	8.845
L13	41.2451	83.8856	17006.9130	14.2210	20.6851	822.1803	34036.2041	41.9508	6.0053	9.102
	47.6233	97.0388	26326.8876	16.4508	23.8760	1102.6507	52688.4168	48.5286	7.1108	10.778

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 190.00-178.50				1	1	1			
L2 178.50-162.58				1	1	1			
L3 162.58-147.58				1	1	0.907022			
L4 147.58-133.04				1	1	0.905639			
L5 133.04-115.00				1	1	0.909052			
L6 115.00-103.08				1	1	0.919476			
L7 103.08-98.42				1	1	0.886292			
L8 98.42-88.13				1	1	0.934098			
L9 88.13-70.58				1	1	0.943775			
L10 70.58-62.08				1	1	0.947695			
L11 62.08-43.71				1	1	0.934263			
L12 43.71-38.08				1	1	0.957401			
L13 38.08-0.00				1	1	1.02769			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Steps	C	No	Surface Ar (CaAa)	190.00 - 8.00	1	1	0.000 0.000	0.7500		1.50
**										
MP408	A	No	Surface Af (CaAa)	42.00 - 0.00	1	1	-0.200 -0.200	5.0000	13.5000	0.00
MP408	B	No	Surface Af (CaAa)	42.00 - 0.00	1	1	0.350 0.350	5.0000	13.5000	0.00
MP408	B	No	Surface Af (CaAa)	42.00 - 0.00	1	1	0.300 0.300	5.0000	13.5000	0.00
MP408	C	No	Surface Af (CaAa)	42.00 - 0.00	1	1	0.150 0.150	5.0000	13.5000	0.00
MP406	A	No	Surface Af (CaAa)	74.50 - 34.50	1	1	0.000 0.000	4.8750	12.2500	0.00
MP406	B	No	Surface Af (CaAa)	74.50 - 34.50	1	1	0.000 0.000	4.8750	12.2500	0.00
MP406	C	No	Surface Af (CaAa)	74.50 - 34.50	1	1	0.000 0.000	4.8750	12.2500	0.00

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
MP405	A	No	Surface Af (CaAa)	107.00 - 67.00	1	1	0.350 0.350	4.8750	11.7500	0.00
MP405	B	No	Surface Af (CaAa)	107.00 - 67.00	1	1	0.350 0.350	4.8750	11.7500	0.00
MP405	C	No	Surface Af (CaAa)	107.00 - 67.00	1	1	0.350 0.350	4.8750	11.7500	0.00
MP404	A	No	Surface Af (CaAa)	149.50 - 134.50	1	1	0.350 0.350	4.7500	11.0000	0.00
MP404	B	No	Surface Af (CaAa)	149.50 - 134.50	1	1	0.350 0.350	4.7500	11.0000	0.00
MP404	C	No	Surface Af (CaAa)	149.50 - 134.50	1	1	0.350 0.350	4.7500	11.0000	0.00
**										
MP305	A	No	Surface Af (CaAa)	64.50 - 44.50	1	1	-0.500 -0.500	5.3300	14.8400	0.00
MP305	B	No	Surface Af (CaAa)	64.50 - 44.50	1	1	-0.500 -0.500	5.3300	14.8400	0.00
MP305	C	No	Surface Af (CaAa)	64.50 - 44.50	1	1	-0.500 -0.500	5.3300	14.8400	0.00
***										
MP306	A	No	Surface Af (CaAa)	115.00 - 95.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
MP306	B	No	Surface Af (CaAa)	115.00 - 95.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
MP306	C	No	Surface Af (CaAa)	115.00 - 95.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
***										
MP306	A	No	Surface Af (CaAa)	135.00 - 115.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
MP306	B	No	Surface Af (CaAa)	135.00 - 115.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
MP306	C	No	Surface Af (CaAa)	135.00 - 115.00	1	1	-0.500 -0.500	6.8900	19.0000	0.00
***										
MP305	A	No	Surface Af (CaAa)	165.00 - 135.00	1	1	-0.500 -0.500	5.3300	14.8400	0.00
MP305	B	No	Surface Af (CaAa)	165.00 - 135.00	1	1	-0.500 -0.500	5.3300	14.8400	0.00
MP305	C	No	Surface Af (CaAa)	165.00 - 135.00	1	1	-0.500 -0.500	5.3300	14.8400	0.00
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(1-5/8)	A	No	No	Inside Pole	190.00 - 8.00	6	No Ice	0.00	0.83
							1/2" Ice	0.00	0.83
(1-5/8)	A	No	No	Inside Pole	184.00 - 8.00	9	No Ice	0.00	0.83
							1/2" Ice	0.00	0.83
(1-5/8)	A	No	No	Inside Pole	176.00 - 8.00	6	No Ice	0.00	0.83
							1/2" Ice	0.00	0.83
Fiber Cables	C	No	No	Inside Pole	184.00 - 8.00	2	No Ice	0.00	0.03
							1/2" Ice	0.00	0.03
Power Cables	C	No	No	Inside Pole	184.00 - 8.00	2	No Ice	0.00	1.21

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1/2" Ice	0.00	1.21
1.43" Hybrid Fiber Cable	A	No	No	Inside Pole	176.00 - 8.00	1	No Ice	0.00	1.63
							1/2" Ice	0.00	1.63
LMR 400 Cable	C	No	No	Inside Pole	180.00 - 8.00	1	No Ice	0.00	0.07
							1/2" Ice	0.00	0.07
Fiber Cables	C	No	No	Inside Pole	190.00 - 8.00	2	No Ice	0.00	0.03
							1/2" Ice	0.00	0.03
Power Cables	C	No	No	Inside Pole	190.00 - 8.00	6	No Ice	0.00	1.21
							1/2" Ice	0.00	1.21
5/16 RET Control Cable ***	C	No	No	Inside Pole	190.00 - 8.00	1	No Ice	0.00	1.00
							1/2" Ice	0.00	1.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	190.00-178.50	A	0.000	0.000	0.000	0.000	98.3550
		B	0.000	0.000	0.000	0.000	0.0000
		C	0.000	0.000	0.862	0.000	126.3760
L2	178.50-162.58	A	0.000	0.000	2.147	0.000	286.8128
		B	0.000	0.000	2.147	0.000	0.0000
		C	0.000	0.000	3.341	0.000	196.3521
L3	162.58-147.58	A	0.000	0.000	14.843	0.000	285.8550
		B	0.000	0.000	14.843	0.000	0.0000
		C	0.000	0.000	15.968	0.000	185.0400
L4	147.58-133.04	A	0.000	0.000	23.786	0.000	277.1460
		B	0.000	0.000	23.786	0.000	0.0000
		C	0.000	0.000	24.877	0.000	179.4024
L5	133.04-115.00	A	0.000	0.000	20.716	0.000	343.7883
		B	0.000	0.000	20.716	0.000	0.0000
		C	0.000	0.000	22.069	0.000	222.5414
L6	115.00-103.08	A	0.000	0.000	16.867	0.000	227.1023
		B	0.000	0.000	16.867	0.000	0.0000
		C	0.000	0.000	17.761	0.000	147.0081
L7	103.08-98.42	A	0.000	0.000	9.149	0.000	88.9200
		B	0.000	0.000	9.149	0.000	0.0000
		C	0.000	0.000	9.499	0.000	57.5598
L8	98.42-88.13	A	0.000	0.000	12.282	0.000	196.0394
		B	0.000	0.000	12.282	0.000	0.0000
		C	0.000	0.000	13.054	0.000	126.9004
L9	88.13-70.58	A	0.000	0.000	17.439	0.000	334.3932
		B	0.000	0.000	17.439	0.000	0.0000
		C	0.000	0.000	18.756	0.000	216.4598
L10	70.58-62.08	A	0.000	0.000	11.965	0.000	161.9845
		B	0.000	0.000	11.965	0.000	0.0000
		C	0.000	0.000	12.602	0.000	104.8560
L11	62.08-43.71	A	0.000	0.000	30.548	0.000	350.1343
		B	0.000	0.000	30.548	0.000	0.0000
		C	0.000	0.000	31.926	0.000	226.6493
L12	43.71-38.08	A	0.000	0.000	7.836	0.000	107.2337
		B	0.000	0.000	11.100	0.000	0.0000
		C	0.000	0.000	8.258	0.000	69.4147

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L13	38.08-0.00	A	0.000	0.000	34.647	0.000	573.2917
		B	0.000	0.000	66.383	0.000	0.0000
		C	0.000	0.000	36.903	0.000	371.1039

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	190.00-178.50	A	1.188	0.000	0.000	0.000	0.000	98.3550
		B		0.000	0.000	0.000	0.000	0.0000
		C		0.000	0.000	3.594	0.000	158.7057
L2	178.50-162.58	A	1.178	0.000	0.000	2.721	0.000	308.3964
		B		0.000	0.000	2.721	0.000	21.5836
		C		0.000	0.000	7.696	0.000	262.6828
L3	162.58-147.58	A	1.167	0.000	0.000	18.792	0.000	430.4040
		B		0.000	0.000	18.792	0.000	144.5490
		C		0.000	0.000	23.419	0.000	370.6015
L4	147.58-133.04	A	1.156	0.000	0.000	30.171	0.000	496.7919
		B		0.000	0.000	30.171	0.000	219.6460
		C		0.000	0.000	34.623	0.000	438.1770
L5	133.04-115.00	A	1.141	0.000	0.000	24.885	0.000	533.2967
		B		0.000	0.000	24.885	0.000	189.5085
		C		0.000	0.000	30.408	0.000	460.5873
L6	115.00-103.08	A	1.127	0.000	0.000	20.436	0.000	376.0987
		B		0.000	0.000	20.436	0.000	148.9964
		C		0.000	0.000	24.016	0.000	326.7984
L7	103.08-98.42	A	1.118	0.000	0.000	11.236	0.000	168.4787
		B		0.000	0.000	11.236	0.000	79.5588
		C		0.000	0.000	12.629	0.000	149.0250
L8	98.42-88.13	A	1.109	0.000	0.000	15.323	0.000	301.0314
		B		0.000	0.000	15.323	0.000	104.9921
		C		0.000	0.000	18.377	0.000	257.8194
L9	88.13-70.58	A	1.092	0.000	0.000	22.202	0.000	482.9421
		B		0.000	0.000	22.202	0.000	148.5489
		C		0.000	0.000	27.412	0.000	409.2333
L10	70.58-62.08	A	1.072	0.000	0.000	15.074	0.000	262.4585
		B		0.000	0.000	15.074	0.000	100.4740
		C		0.000	0.000	17.534	0.000	225.6214
L11	62.08-43.71	A	1.048	0.000	0.000	38.085	0.000	606.3642
		B		0.000	0.000	38.085	0.000	256.2299
		C		0.000	0.000	43.314	0.000	525.1810
L12	43.71-38.08	A	1.022	0.000	0.000	9.837	0.000	172.3150
		B		0.000	0.000	13.922	0.000	92.9682
		C		0.000	0.000	11.438	0.000	147.4515
L13	38.08-0.00	A	0.947	0.000	0.000	42.542	0.000	833.9296
		B		0.000	0.000	81.493	0.000	500.3708
		C		0.000	0.000	50.498	0.000	690.8436

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	190.00-178.50	0.0000	0.6621	0.0000	1.2458
L2	178.50-162.58	0.0000	0.4987	0.0000	1.0634
L3	162.58-147.58	0.0000	0.2094	0.0000	0.5588
L4	147.58-133.04	0.0000	0.1559	0.0000	0.4343
L5	133.04-115.00	0.0000	0.2119	0.0000	0.5828
L6	115.00-103.08	0.0000	0.1956	0.0000	0.5362
L7	103.08-98.42	0.0000	0.1589	0.0000	0.4443
L8	98.42-88.13	0.0000	0.2321	0.0000	0.6029
L9	88.13-70.58	0.0000	0.2668	0.0000	0.6697
L10	70.58-62.08	0.0000	0.2230	0.0000	0.5691
L11	62.08-43.71	0.0000	0.2071	0.0000	0.5308
L12	43.71-38.08	0.2704	4.8610	0.2263	4.4372
L13	38.08-0.00	0.4859	8.6702	0.3905	7.2928

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	9	Steps	178.50 - 190.00	1.0000	1.0000
L2	9	Steps	162.58 - 178.50	1.0000	1.0000
L2	40	MP305	162.58 - 165.00	1.0000	1.0000
L2	41	MP305	162.58 - 165.00	1.0000	1.0000
L2	42	MP305	162.58 - 165.00	1.0000	1.0000
L3	9	Steps	147.58 - 162.58	1.0000	1.0000
L3	24	MP404	147.58 - 149.50	1.0000	1.0000
L3	25	MP404	147.58 - 149.50	1.0000	1.0000
L3	26	MP404	147.58 - 149.50	1.0000	1.0000
L3	40	MP305	147.58 - 162.58	1.0000	1.0000
L3	41	MP305	147.58 - 162.58	1.0000	1.0000
L3	42	MP305	147.58 - 162.58	1.0000	1.0000
L4	9	Steps	133.04 - 147.58	1.0000	1.0000
L4	24	MP404	134.50 - 147.58	1.0000	1.0000
L4	25	MP404	134.50 - 147.58	1.0000	1.0000
L4	26	MP404	134.50 - 147.58	1.0000	1.0000
L4	36	MP306	133.04 - 135.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L4	37	MP306	133.04 - 135.00	1.0000	1.0000
L4	38	MP306	133.04 - 135.00	1.0000	1.0000
L4	40	MP305	135.00 - 147.58	1.0000	1.0000
L4	41	MP305	135.00 - 147.58	1.0000	1.0000
L4	42	MP305	135.00 - 147.58	1.0000	1.0000
L5	9	Steps	115.00 - 133.04	1.0000	1.0000
L5	36	MP306	115.00 - 133.04	1.0000	1.0000
L5	37	MP306	115.00 - 133.04	1.0000	1.0000
L5	38	MP306	115.00 - 133.04	1.0000	1.0000
L6	9	Steps	103.08 - 115.00	1.0000	1.0000
L6	21	MP405	103.08 - 107.00	1.0000	1.0000
L6	22	MP405	103.08 - 107.00	1.0000	1.0000
L6	23	MP405	103.08 - 107.00	1.0000	1.0000
L6	32	MP306	103.08 - 115.00	1.0000	1.0000
L6	33	MP306	103.08 - 115.00	1.0000	1.0000
L6	34	MP306	103.08 - 115.00	1.0000	1.0000
L7	9	Steps	98.42 - 103.08	1.0000	1.0000
L7	21	MP405	98.42 - 103.08	1.0000	1.0000
L7	22	MP405	98.42 - 103.08	1.0000	1.0000
L7	23	MP405	98.42 - 103.08	1.0000	1.0000
L7	32	MP306	98.42 - 103.08	1.0000	1.0000
L7	33	MP306	98.42 - 103.08	1.0000	1.0000
L7	34	MP306	98.42 - 103.08	1.0000	1.0000
L8	9	Steps	88.13 - 98.42	1.0000	1.0000
L8	21	MP405	88.13 - 98.42	1.0000	1.0000
L8	22	MP405	88.13 - 98.42	1.0000	1.0000
L8	23	MP405	88.13 - 98.42	1.0000	1.0000
L8	32	MP306	95.00 - 98.42	1.0000	1.0000
L8	33	MP306	95.00 - 98.42	1.0000	1.0000
L8	34	MP306	95.00 - 98.42	1.0000	1.0000
L9	9	Steps	70.58 - 88.13	1.0000	1.0000
L9	18	MP406	70.58 - 74.50	1.0000	1.0000
L9	19	MP406	70.58 - 74.50	1.0000	1.0000
L9	20	MP406	70.58 - 74.50	1.0000	1.0000
L9	21	MP405	70.58 - 88.13	1.0000	1.0000
L9	22	MP405	70.58 - 88.13	1.0000	1.0000
L9	23	MP405	70.58 - 88.13	1.0000	1.0000
L10	9	Steps	62.08 - 70.58	1.0000	1.0000
L10	18	MP406	62.08 - 70.58	1.0000	1.0000
L10	19	MP406	62.08 - 70.58	1.0000	1.0000
L10	20	MP406	62.08 - 70.58	1.0000	1.0000
L10	21	MP405	67.00 - 70.58	1.0000	1.0000
L10	22	MP405	67.00 - 70.58	1.0000	1.0000
L10	23	MP405	67.00 - 70.58	1.0000	1.0000
L10	28	MP305	62.08 - 64.50	1.0000	1.0000
L10	29	MP305	62.08 - 64.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L10	30	MP305	62.08 - 64.50	1.0000	1.0000
L11	9	Steps	43.71 - 62.08	1.0000	1.0000
L11	18	MP406	43.71 - 62.08	1.0000	1.0000
L11	19	MP406	43.71 - 62.08	1.0000	1.0000
L11	20	MP406	43.71 - 62.08	1.0000	1.0000
L11	28	MP305	44.50 - 62.08	1.0000	1.0000
L11	29	MP305	44.50 - 62.08	1.0000	1.0000
L11	30	MP305	44.50 - 62.08	1.0000	1.0000
L12	9	Steps	38.08 - 43.71	1.0000	1.0000
L12	14	MP408	38.08 - 42.00	1.0000	1.0000
L12	15	MP408	38.08 - 42.00	1.0000	1.0000
L12	16	MP408	38.08 - 42.00	1.0000	1.0000
L12	17	MP408	38.08 - 42.00	1.0000	1.0000
L12	18	MP406	38.08 - 43.71	1.0000	1.0000
L12	19	MP406	38.08 - 43.71	1.0000	1.0000
L12	20	MP406	38.08 - 43.71	1.0000	1.0000
L13	9	Steps	8.00 - 38.08	1.0000	1.0000
L13	14	MP408	0.00 - 38.08	1.0000	1.0000
L13	15	MP408	0.00 - 38.08	1.0000	1.0000
L13	16	MP408	0.00 - 38.08	1.0000	1.0000
L13	17	MP408	0.00 - 38.08	1.0000	1.0000
L13	18	MP406	34.50 - 38.08	1.0000	1.0000
L13	19	MP406	34.50 - 38.08	1.0000	1.0000
L13	20	MP406	34.50 - 38.08	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Generic Lightning Rod 4' copper	A	None		0.0000	190.00	No Ice 1/2" Ice	0.50 1.00	0.50 1.00	0.0000 0.0000
Platform Mount [LP 601-1]	C	None		0.0000	190.00	No Ice 1/2" Ice	28.47 33.59	28.47 33.59	1122.0000 1513.6560
HPA-65R-BUU-H6-K w. Mount Pipe	A	From Leg	4.00 0.00 -4.00	0.0000	194.00	No Ice 1/2" Ice	10.61 11.49	8.82 10.32	90.0000 176.7970
HPA-65R-BUU-H6-K w. Mount Pipe	B	From Leg	4.00 0.00 -4.00	0.0000	194.00	No Ice 1/2" Ice	10.61 11.49	8.82 10.32	90.0000 176.7970
HPA-65R-BUU-H6-K w. Mount Pipe	C	From Leg	4.00 0.00 -4.00	0.0000	194.00	No Ice 1/2" Ice	10.61 11.49	8.82 10.32	90.0000 176.7970
TPA-65R-LCUUUU-H8-K w. Mount Pipe	A	From Leg	4.00 0.00 -4.00	0.0000	194.00	No Ice 1/2" Ice	13.77 14.58	11.20 12.82	110.0000 217.2680
TPA-65R-LCUUUU-H8-K w. Mount Pipe	B	From Leg	4.00 0.00 -4.00	0.0000	194.00	No Ice 1/2" Ice	13.77 14.58	11.20 12.82	110.0000 217.2680
TPA-65R-LCUUUU-H8-K w. Mount Pipe	C	From Leg	4.00 0.00	0.0000	194.00	No Ice 1/2" Ice	13.77 14.58	11.20 12.82	110.0000 217.2680

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-4.00						
RRUS-11	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	14.72	40.0000
			0.00			1/2" Ice	2.10	15.40	133.0720
			-4.00						
RRUS-11	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	14.72	40.0000
			0.00			1/2" Ice	2.10	15.40	133.0720
			-4.00						
RRUS-11	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	14.72	40.0000
			0.00			1/2" Ice	2.10	15.40	133.0720
			-4.00						
RRUS 32	A	From Leg	4.00	0.0000	194.00	No Ice	2.00	1.67	50.0000
			0.00			1/2" Ice	2.96	1.86	74.1140
			-4.00						
RRUS 32	B	From Leg	4.00	0.0000	194.00	No Ice	2.00	1.67	50.0000
			0.00			1/2" Ice	2.96	1.86	74.1140
			-4.00						
RRUS 32	C	From Leg	4.00	0.0000	194.00	No Ice	2.00	1.67	50.0000
			0.00			1/2" Ice	2.96	1.86	74.1140
			-4.00						
RRUS-12-RRU	A	From Leg	4.00	0.0000	194.00	No Ice	1.50	1.26	50.0000
			0.00			1/2" Ice	3.30	1.41	71.8720
			-4.00						
RRUS-12-RRU	B	From Leg	4.00	0.0000	194.00	No Ice	1.50	1.26	50.0000
			0.00			1/2" Ice	3.30	1.41	71.8720
			-4.00						
RRUS-12-RRU	C	From Leg	4.00	0.0000	194.00	No Ice	1.50	1.26	50.0000
			0.00			1/2" Ice	3.30	1.41	71.8720
			-4.00						
Ericsson A2 Module	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	0.42	20.0000
			0.00			1/2" Ice	2.05	0.53	31.5290
			-4.00						
Ericsson A2 Module	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	0.42	20.0000
			0.00			1/2" Ice	2.05	0.53	31.5290
			-4.00						
Ericsson A2 Module	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	0.42	20.0000
			0.00			1/2" Ice	2.05	0.53	31.5290
			-4.00						
(4) 860-10025	A	From Leg	4.00	0.0000	194.00	No Ice	0.00	0.30	1.1600
			0.00			1/2" Ice	0.40	0.37	4.6280
			-4.00						
(4) 860-10025	B	From Leg	4.00	0.0000	194.00	No Ice	0.00	0.30	1.1600
			0.00			1/2" Ice	0.40	0.37	4.6280
			-4.00						
(4) 860-10025	C	From Leg	4.00	0.0000	194.00	No Ice	0.00	0.30	1.1600
			0.00			1/2" Ice	0.40	0.37	4.6280
			-4.00						
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	2.20	20.0000
			0.00			1/2" Ice	2.40	2.40	41.4560
			-4.00						
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	2.20	20.0000
			0.00			1/2" Ice	2.40	2.40	41.4560
			-4.00						
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	2.20	20.0000
			0.00			1/2" Ice	2.40	2.40	41.4560
			-4.00						
RRUS-B14 4478	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-4.00						
RRUS-B14 4478	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130
			-4.00						
RRUS-B14 4478	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130
			-4.00						
RRUS-4426 B66	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130
			-4.00						
RRUS-4426 B66	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130
			-4.00						
RRUS-4426 B66	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.25	60.0000
			0.00			1/2" Ice	2.20	1.40	77.0130
			-4.00						
RRUS-4478 B5	A	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.06	60.0000
			0.00			1/2" Ice	2.01	1.20	75.7770
			-4.00						
RRUS-4478 B5	B	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.06	60.0000
			0.00			1/2" Ice	2.01	1.20	75.7770
			-4.00						
RRUS-4478 B5	C	From Leg	4.00	0.0000	194.00	No Ice	1.00	1.06	60.0000
			0.00			1/2" Ice	2.01	1.20	75.7770
			-4.00						
********** **********									
Sabre Saf T-Boom 10'6" Sector Mounts	A	From Leg	0.00	0.0000	184.00	No Ice	16.28	10.62	329.0000
			0.00			1/2" Ice	21.50	15.16	485.0000
			0.00						
Sabre Saf T-Boom 10'6" Sector Mounts	B	From Leg	0.00	0.0000	184.00	No Ice	16.28	10.62	329.0000
			0.00			1/2" Ice	21.50	15.16	485.0000
			0.00						
Sabre Saf T-Boom 10'6" Sector Mounts	C	From Leg	0.00	0.0000	184.00	No Ice	16.28	10.62	329.0000
			0.00			1/2" Ice	21.50	15.16	485.0000
			0.00						
HBXX-6517DS-VTM w/ mount pipe	A	From Leg	4.00	0.0000	184.00	No Ice	9.03	7.54	90.0000
			0.00			1/2" Ice	9.69	8.84	162.4810
			0.00						
HBXX-6517DS-VTM w/ mount pipe	B	From Leg	4.00	0.0000	184.00	No Ice	9.03	7.54	90.0000
			0.00			1/2" Ice	9.69	8.84	162.4810
			0.00						
HBXX-6517DS-VTM w/ mount pipe	C	From Leg	4.00	0.0000	184.00	No Ice	9.03	7.54	90.0000
			0.00			1/2" Ice	9.69	8.84	162.4810
			0.00						
HBX-6517DS-VTM w/ mount pipe	A	From Leg	4.00	0.0000	184.00	No Ice	5.75	5.60	60.0000
			0.00			1/2" Ice	6.40	6.88	111.6490
			0.00						
HBX-6517DS-VTM w/ mount pipe	B	From Leg	4.00	0.0000	184.00	No Ice	5.75	5.60	60.0000
			0.00			1/2" Ice	6.40	6.88	111.6490
			0.00						
HBX-6517DS-VTM w/ mount pipe	C	From Leg	4.00	0.0000	184.00	No Ice	5.75	5.60	60.0000
			0.00			1/2" Ice	6.40	6.88	111.6490
			0.00						
Fiber Distribution Unit EVO-1009-EN	C	From Leg	0.00	0.0000	184.00	No Ice	0.27	0.62	6.3700
			0.00			1/2" Ice	0.40	0.83	13.0490
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
RRU 9442 RRH2X	A	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	1.00 1.95	1.81 2.16	61.9500 85.6380
RRU 9442 RRH2X	B	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	1.00 1.95	1.81 2.16	61.9500 85.6380
RRU 9442 RRH2X	C	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	1.00 1.95	1.81 2.16	61.9500 85.6380
AHFIG RRH	A	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	3.08 3.32	1.47 1.66	70.0000 92.0870
AHFIG RRH	B	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	3.08 3.32	1.47 1.66	70.0000 92.0870
AHFIG RRH	C	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	3.08 3.32	1.47 1.66	70.0000 92.0870
X7C-865-VR2 w/ mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	12.43 13.26	10.53 12.15	120.0000 214.7410
X7C-865-VR2 w/ mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	12.43 13.26	10.53 12.15	120.0000 214.7410
X7C-865-VR2 w/ mount pipe	C	From Leg	4.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice	12.43 13.26	10.53 12.15	120.0000 214.7410
********** **********									
Mi-Mub XR Base Unit	C	From Leg	1.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	14.25 15.02	8.93 9.68	25.0000 95.1820
800/900 MHz Dbi ominDIRECTIONAL	C	From Leg	1.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.15 0.29	0.15 0.29	6.0000 7.6050
Chain Mount (single sector)	C	From Leg	0.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.30 0.51	0.00 0.02	50.0000 52.0140
********** **********									
CommScope MTC3752MC Mount	A	From Leg	0.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	15.90 22.00	14.00 20.81	710.0000 923.0000
CommScope MTC3752MC Mount	B	From Leg	0.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	15.90 22.00	14.00 20.81	710.0000 923.0000
CommScope MTC3752MC Mount	C	From Leg	0.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	15.90 22.00	14.00 20.81	710.0000 923.0000
LNX-6515DS-A1M w. mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.45 12.06	9.60 11.02	80.0000 166.4660
LNX-6515DS-A1M w. mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.45 12.06	9.60 11.02	80.0000 166.4660
LNX-6515DS-A1M w. mount pipe	C	From Leg	4.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.45 12.06	9.60 11.02	80.0000 166.4660

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00						
(2) SBNHH-1D65C w. mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.96 12.79	10.53 12.15	110.0000 204.1170
(2) SBNHH-1D65C w. mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.96 12.79	10.53 12.15	110.0000 204.1170
(2) SBNHH-1D65C w. mount pipe	C	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	11.96 12.79	10.53 12.15	110.0000 204.1170
B66A-RRH4x45	A	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.79	1.63 1.81	60.0000 78.4700
B66A-RRH4x45	B	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.79	1.63 1.81	60.0000 78.4700
B66A-RRH4x45	C	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.79	1.63 1.81	60.0000 78.4700
B13RRH 4x30	A	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.35	1.62 1.79	60.0000 77.6130
B13RRH 4x30	B	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.35	1.62 1.79	60.0000 77.6130
B13RRH 4x30	C	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 2.35	1.62 1.79	60.0000 77.6130
Raycap RCMDC-6627-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	1.00 4.32	3.10 3.34	30.0000 68.4890

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice

Comb. No.	Description
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	190 - 178.5	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-14451.2088	19.9043	-43.6893
			Max. Mx	20	-4152.5218	76635.3170	-21.3930
			Max. My	14	-4182.6520	26.3351	-76613.0907
			Max. Vy	8	13036.5775	-76626.8038	2.5537
			Max. Vx	14	13035.1521	26.3351	-76613.0907
			Max. Torque	13			-574.8164
L2	178.5 - 162.583	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-25779.6235	430.3919	279.8773
			Max. Mx	20	-9318.8096	434814.2406	-2045.6125
			Max. My	2	-9407.0361	-2053.0940	430894.876

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
							5
			Max. Vy	8	21474.4455	-434624.2433	2108.7416
			Max. Vx	14	21228.0540	2100.9240	-430797.0248
			Max. Torque	13			-804.1144
L3	162.583 - 147.583	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-29462.4011	430.4048	211.3860
			Max. Mx	20	-12202.1750	765660.3286	-3873.6841
			Max. My	14	-12292.4470	3928.9873	-757564.1838
			Max. Vy	8	22661.2019	-765494.4199	3896.4122
			Max. Vx	14	22355.3968	3928.9873	-757564.1838
			Max. Torque	5			750.5964
L4	147.583 - 133.04	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-32811.4082	430.4162	158.4935
			Max. Mx	20	-14768.9786	1011076.7994	-5180.5567
			Max. My	14	-14859.0737	5229.2666	-999607.6545
			Max. Vy	8	23567.4340	-1010933.5479	5167.4357
			Max. Vx	14	23228.7857	5229.2666	-999607.6545
			Max. Torque	5			748.0433
L5	133.04 - 115	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-41251.8598	430.4422	42.8811
			Max. Mx	20	-21667.0289	1551550.6373	-7923.0229
			Max. My	14	-21756.7931	7948.5878	-1531782.6346
			Max. Vy	8	25567.7787	-1551464.3391	7825.3029
			Max. Vx	14	25136.5808	7948.5878	-1531782.6346
			Max. Torque	5			745.9244
L6	115 - 103.083	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-45647.2200	430.4573	-25.1977
			Max. Mx	20	-25292.4436	1861693.3405	-9421.7119
			Max. My	14	-25376.6296	9428.0584	-1836689.9595
			Max. Vy	8	26519.4909	-1861643.3222	9269.6312
			Max. Vx	14	26059.2985	9428.0584	-1836689.9595
			Max. Torque	5			742.7274
L7	103.083 - 98.417	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-47974.0458	430.4628	-52.8147
			Max. Mx	20	-27212.362	1986385.72	-10012.505

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
					9	02	4
			Max. My	14	-27295.2348	10010.4691	-1959240.8813
			Max. Vy	8	26966.9156	-1986350.7015	9838.2166
			Max. Vx	14	26496.0097	10010.4691	-1959240.8813
			Max. Torque	5			740.7831
L8	98.417 - 88.13	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-50082.3017	430.4700	-86.5815
			Max. Mx	20	-28995.9792	2136716.6863	-10710.6749
			Max. My	14	-29074.4213	10697.7483	-2107000.6336
			Max. Vy	8	27375.1960	-2136699.8709	10508.1012
			Max. Vx	14	26903.7755	10697.7483	-2107000.6336
			Max. Torque	5			740.2478
L9	88.13 - 70.583	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-60030.2953	430.4973	-226.6812
			Max. Mx	8	-37536.3508	-2766067.5692	13209.8088
			Max. My	14	-37596.2588	13468.4683	-2725915.3087
			Max. Vy	8	28929.0224	-2766067.5692	13209.8088
			Max. Vx	14	28458.0204	13468.4683	-2725915.3087
			Max. Torque	5			739.0113
L10	70.583 - 62.083	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-63498.8331	430.5074	-282.3942
			Max. Mx	8	-40501.6537	-3013680.9302	14224.4842
			Max. My	14	-40553.4248	14510.1779	-2969572.8797
			Max. Vy	8	29385.9121	-3013680.9302	14224.4842
			Max. Vx	14	28917.6303	14510.1779	-2969572.8797
			Max. Torque	5			736.4566
L11	62.083 - 43.71	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-69781.6307	430.5223	-369.3898
			Max. Mx	8	-45856.5445	-3394187.2593	15735.6037
			Max. My	14	-45898.6196	16063.4978	-3344140.4078
			Max. Vy	8	30150.1838	-3394187.2593	15735.6037
			Max. Vx	14	29681.3178	16063.4978	-3344140.4078
			Max. Torque	5			735.4927
L12	43.71 - 38.083	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-77268.5429	381.2511	-491.0454
			Max. Mx	8	-52217.721	-3736699.1	17050.0296

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
					4	283	
			Max. My	14	-52252.5126	17414.9768	-3681434.9679
			Max. Vy	8	30880.6773	-3736699.1283	17050.0296
			Max. Vx	14	30412.4242	17414.9768	-3681434.9679
			Max. Torque	5			734.2905
L13	38.083 - 0	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-95934.9090	-78.9732	-1115.6934
			Max. Mx	8	-68944.4046	-4929685.9787	21340.7690
			Max. My	14	-68945.4305	21807.3477	-4857387.3391
			Max. Vy	8	31702.1059	-4929685.9787	21340.7690
			Max. Vx	14	31270.3031	21807.3477	-4857387.3391
			Max. Torque	5			733.8700

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	26	95934.9090	0.0011	-0.0013
	Max. H_x	21	51729.0352	31637.7599	-110.5377
	Max. H_z	3	51729.0581	-110.5333	31204.6242
	Max. M_x	2	4855770.5251	-110.5318	31204.1364
	Max. M_z	8	4929685.9790	-31640.6906	110.5562
	Max. Torsion	5	732.6706	-15814.0218	27081.7142
	Min. Vert	21	51729.0352	31637.7599	-110.5377
	Min. H_x	9	51729.3498	-31641.0900	110.5582
	Min. H_z	15	51729.5677	110.5683	-31210.0993
	Min. M_x	14	-4857387.3399	110.5665	-31209.7883
	Min. M_z	20	-4929371.2025	31637.2666	-110.5356
	Min. Torsion	17	-732.7405	15814.0222	-27081.7140

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	57477.7320	-0.0000	0.0000	276.6635	88.7338	0.0000
1.2 Dead+1.6 Wind 0 deg - No Ice	68972.3034	110.5318	-31204.1364	-4855770.5251	-21610.4021	-672.8736
0.9 Dead+1.6 Wind 0 deg - No Ice	51729.0581	110.5333	-31204.6242	-4746688.8668	-21116.5848	-677.2447
1.2 Dead+1.6 Wind 30 deg - No Ice	68973.2556	15814.0051	-27081.6834	-4216983.0336	-2469597.9977	-727.6685
0.9 Dead+1.6 Wind 30 deg - No Ice	51729.9399	15814.0218	-27081.7142	-4122193.8683	-2414011.2047	-732.6706

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.6 Wind 60 deg - No Ice	68973.2554	27280.0603	-15699.4730	-2446920.7335	-4255583.0450	-587.8784
0.9 Dead+1.6 Wind 60 deg - No Ice	51729.9398	27280.0914	-15699.4894	-2391948.2581	-4159830.4314	-592.1079
1.2 Dead+1.6 Wind 90 deg - No Ice	68972.6119	31640.6906	-110.5562	-21340.6917	-4929685.9790	-290.3358
0.9 Dead+1.6 Wind 90 deg - No Ice	51729.3498	31641.0900	-110.5582	-20916.8711	-4818962.4591	-292.6860
1.2 Dead+1.6 Wind 120 deg - No Ice	68973.2634	27169.5504	15507.9775	2410268.6246	-4234262.6703	85.5057
0.9 Dead+1.6 Wind 120 deg - No Ice	51729.9400	27169.5094	15507.9564	2355980.2841	-4138985.5935	85.6485
1.2 Dead+1.6 Wind 150 deg - No Ice	68973.2635	15622.5105	26971.1727	4196380.4313	-2432210.2710	438.7189
0.9 Dead+1.6 Wind 150 deg - No Ice	51729.9401	15622.4890	26971.1321	4101877.2431	-2377501.3986	441.2376
1.2 Dead+1.6 Wind 180 deg - No Ice	68972.8455	-110.5665	31209.7883	4857387.3399	21807.1708	673.9899
0.9 Dead+1.6 Wind 180 deg - No Ice	51729.5677	-110.5683	31210.0993	4748063.1467	21260.1604	678.2538
1.2 Dead+1.6 Wind 210 deg - No Ice	68973.2556	-15814.0055	27081.6831	4217714.8097	2469789.4133	727.8358
0.9 Dead+1.6 Wind 210 deg - No Ice	51729.9399	-15814.0222	27081.7140	4122733.0454	2414149.6041	732.7405
1.2 Dead+1.6 Wind 240 deg - No Ice	68973.2554	-27280.0605	15699.4726	2447665.4571	4255797.5464	586.6532
0.9 Dead+1.6 Wind 240 deg - No Ice	51729.9398	-27280.0916	15699.4891	2392496.6005	4159985.3137	590.9324
1.2 Dead+1.6 Wind 270 deg - No Ice	68972.2786	-31637.2666	110.5356	22068.3549	4929371.2025	289.0594
0.9 Dead+1.6 Wind 270 deg - No Ice	51729.0352	-31637.7599	110.5377	21452.1986	4818614.2730	291.5280
1.2 Dead+1.6 Wind 300 deg - No Ice	68973.2634	-27169.5504	-15507.9775	-2409564.6278	4234500.0567	-85.4682
0.9 Dead+1.6 Wind 300 deg - No Ice	51729.9400	-27169.5094	-15507.9564	-2355461.0131	4139156.6700	-85.5097
1.2 Dead+1.6 Wind 330 deg - No Ice	68973.2635	-15622.5106	-26971.1726	-4195689.4104	2432424.5532	-437.7347
0.9 Dead+1.6 Wind 330 deg - No Ice	51729.9401	-15622.4892	-26971.1319	-4101367.1523	2377655.9878	-440.3005
1.2 Dead+1.0 Ice+1.0 Temp	95934.9090	-0.0011	0.0013	1115.6934	-78.9732	0.0000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	95934.8939	8.3462	-3712.8515	-589863.0755	-1722.8656	-58.7061
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	95934.8938	1866.7393	-3219.5963	-511562.6715	-297675.2353	-61.5694
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	95934.8938	3224.9409	-1863.6530	-295871.1099	-513852.1417	-47.9385
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	95934.8938	3719.0228	-8.3449	-582.5199	-592329.8328	-21.4647
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	95934.8939	3216.5968	1849.1991	295181.0760	-512080.3775	10.7587
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	95934.8939	1852.2869	3211.2506	512169.8773	-294606.0094	40.0981
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	95934.8938	-8.3420	3712.8499	592241.7403	1821.2809	58.6941
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	95934.8937	-1866.7351	3219.5947	513941.7386	297773.6184	61.5623
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	95934.8937	-3224.9366	1863.6514	298250.3978	513950.8549	47.9319
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	95934.8937	-3719.0185	8.3433	2961.6262	592428.9084	21.4564

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	95934.8939	-3216.5925	-1849.2006	-292802.3721	512179.4852	-10.7705
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	95934.8939	-1852.2826	-3211.2521	-509791.3941	294704.7871	-40.1131
Dead+Wind 0 deg - Service	57477.6521	28.0890	-7929.9352	-1221133.7277	-5356.5019	-179.3381
Dead+Wind 30 deg - Service	57477.7082	4018.7328	-6882.1352	-1060512.0307	-621105.7668	-193.9196
Dead+Wind 60 deg - Service	57477.7079	6932.5457	-3989.6286	-615312.6940	-1070396.7882	-156.5250
Dead+Wind 90 deg - Service	57477.6498	8039.9968	-28.0899	-5164.4048	-1239895.9522	-77.1556
Dead+Wind 120 deg - Service	57477.7083	6904.4453	3940.9570	606446.2382	-1064943.9441	22.8787
Dead+Wind 150 deg - Service	57477.7085	3970.0617	6854.0344	1055643.3441	-611654.3888	116.7571
Dead+Wind 180 deg - Service	57477.6521	-28.0892	7929.9341	1221716.9064	5556.9166	179.3313
Dead+Wind 210 deg - Service	57477.7081	-4018.7329	6882.1347	1061096.7453	621306.1781	193.8463
Dead+Wind 240 deg - Service	57477.7079	-6932.5455	3989.6280	615898.0923	1070598.4208	156.4446
Dead+Wind 270 deg - Service	57477.6497	-8039.9957	28.0883	5748.8975	1240098.6700	77.1592
Dead+Wind 300 deg - Service	57477.7083	-6904.4450	-3940.9573	-605862.9977	1065146.7837	-22.7957
Dead+Wind 330 deg - Service	57477.7085	-3970.0616	-6854.0345	-1055060.7872	611856.0071	-116.6919

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.0000	-57477.7320	0.0000	0.0000	57477.7320	-0.0000	0.000%
2	110.5821	-68973.2784	-31214.2997	-110.5318	68972.3034	31204.1364	0.013%
3	110.5821	-51729.9588	-31214.2997	-110.5333	51729.0581	31204.6242	0.016%
4	15814.1171	-68973.2784	-27081.8932	-15814.0051	68973.2556	27081.6834	0.000%
5	15814.1171	-51729.9588	-27081.8932	-15814.0218	51729.9399	27081.7142	0.000%
6	27280.2721	-68973.2784	-15699.5829	-27280.0603	68973.2554	15699.4730	0.000%
7	27280.2721	-51729.9588	-15699.5829	-27280.0914	51729.9398	15699.4894	0.000%
8	31647.5375	-68973.2784	-110.5821	-31640.6906	68972.6119	110.5562	0.009%
9	31647.5375	-51729.9588	-110.5821	-31641.0900	51729.3498	110.5582	0.011%
10	27169.6900	-68973.2784	15508.0491	-27169.5504	68973.2634	-15507.9775	0.000%
11	27169.6900	-51729.9588	15508.0491	-27169.5094	51729.9400	-15507.9564	0.000%
12	15622.5832	-68973.2784	26971.3110	-15622.5105	68973.2635	-26971.1727	0.000%
13	15622.5832	-51729.9588	26971.3110	-15622.4890	51729.9401	-26971.1321	0.000%
14	-110.5821	-68973.2784	31214.2997	110.5665	68972.8455	-31209.7883	0.006%
15	-110.5821	-51729.9588	31214.2997	110.5683	51729.5677	-31210.0993	0.007%
16	-15814.1171	-68973.2784	27081.8932	15814.0055	68973.2556	-27081.6831	0.000%
17	-15814.1171	-51729.9588	27081.8932	15814.0222	51729.9399	-27081.7140	0.000%
18	-27280.2721	-68973.2784	15699.5829	27280.0605	68973.2554	-15699.4726	0.000%
19	-27280.2721	-51729.9588	15699.5829	27280.0916	51729.9398	-15699.4891	0.000%
20	-31647.5375	-68973.2784	110.5821	31637.2666	68972.2786	-110.5356	0.014%
21	-31647.5375	-51729.9588	110.5821	31637.7599	51729.0352	-110.5377	0.016%
22	-27169.6900	-68973.2784	-15508.0491	27169.5504	68973.2634	15507.9775	0.000%
23	-27169.6900	-51729.9588	-15508.0491	27169.5094	51729.9400	15507.9564	0.000%
24	-15622.5832	-68973.2784	-26971.3110	15622.5106	68973.2635	26971.1726	0.000%
25	-15622.5832	-51729.9588	-26971.3110	15622.4892	51729.9401	26971.1319	0.000%
26	0.0000	-95934.9090	0.0000	0.0011	95934.9090	-0.0013	0.000%
27	8.3480	-95934.9090	-3714.0338	-8.3462	95934.8939	3712.8515	0.001%
28	1867.3329	-95934.9090	-3220.6217	-1866.7393	95934.8938	3219.5963	0.001%
29	3225.9675	-95934.9090	-1864.2465	-3224.9409	95934.8938	1863.6530	0.001%
30	3720.2067	-95934.9090	-8.3480	-3719.0228	95934.8938	8.3449	0.001%
31	3217.6195	-95934.9090	1849.7874	-3216.5968	95934.8939	-1849.1991	0.001%
32	1852.8738	-95934.9090	3212.2737	-1852.2869	95934.8939	-3211.2506	0.001%
33	-8.3480	-95934.9090	3714.0338	8.3420	95934.8938	-3712.8499	0.001%
34	-1867.3329	-95934.9090	3220.6217	1866.7351	95934.8937	-3219.5947	0.001%
35	-3225.9675	-95934.9090	1864.2465	3224.9366	95934.8937	-1863.6514	0.001%
36	-3720.2067	-95934.9090	8.3480	3719.0185	95934.8937	-8.3433	0.001%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
37	-3217.6195	-95934.9090	-1849.7874	3216.5925	95934.8939	1849.2006	0.001%
38	-1852.8738	-95934.9090	-3212.2737	1852.2826	95934.8939	3211.2521	0.001%
39	28.1050	-57477.7320	-7933.2551	-28.0890	57477.6521	7929.9352	0.006%
40	4019.2292	-57477.7320	-6882.9854	-4018.7328	57477.7082	6882.1352	0.002%
41	6933.4043	-57477.7320	-3990.1199	-6932.5457	57477.7079	3989.6286	0.002%
42	8043.3645	-57477.7320	-28.1050	-8039.9968	57477.6498	28.0899	0.006%
43	6905.2993	-57477.7320	3941.4407	-6904.4453	57477.7083	-3940.9570	0.002%
44	3970.5500	-57477.7320	6854.8804	-3970.0617	57477.7085	-6854.0344	0.002%
45	-28.1050	-57477.7320	7933.2551	28.0892	57477.6521	-7929.9341	0.006%
46	-4019.2292	-57477.7320	6882.9854	4018.7329	57477.7081	-6882.1347	0.002%
47	-6933.4043	-57477.7320	3990.1199	6932.5455	57477.7079	-3989.6280	0.002%
48	-8043.3645	-57477.7320	28.1050	8039.9957	57477.6497	-28.0883	0.006%
49	-6905.2993	-57477.7320	-3941.4407	6904.4450	57477.7083	3940.9573	0.002%
50	-3970.5500	-57477.7320	-6854.8804	3970.0616	57477.7085	6854.0345	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	23	0.00010500	0.00009132
3	Yes	22	0.00010068	0.00010683
4	Yes	32	0.00000001	0.00000000
5	Yes	31	0.00000001	0.00000000
6	Yes	32	0.00000001	0.00000000
7	Yes	31	0.00000001	0.00000000
8	Yes	24	0.00006998	0.00012984
9	Yes	23	0.00006641	0.00014584
10	Yes	33	0.00000001	0.00000000
11	Yes	31	0.00000001	0.00000000
12	Yes	33	0.00000001	0.00000000
13	Yes	31	0.00000001	0.00000000
14	Yes	25	0.00004694	0.00010839
15	Yes	24	0.00004407	0.00012080
16	Yes	32	0.00000001	0.00000000
17	Yes	31	0.00000001	0.00000000
18	Yes	32	0.00000001	0.00000000
19	Yes	31	0.00000001	0.00000000
20	Yes	23	0.00010456	0.00013059
21	Yes	22	0.00010026	0.00014724
22	Yes	33	0.00000001	0.00000000
23	Yes	31	0.00000001	0.00000000
24	Yes	33	0.00000001	0.00000000
25	Yes	31	0.00000001	0.00000000
26	Yes	6	0.00000001	0.00000001
27	Yes	26	0.00011534	0.00006923
28	Yes	26	0.00011525	0.00008285
29	Yes	26	0.00011523	0.00008304
30	Yes	26	0.00011528	0.00006932
31	Yes	26	0.00011520	0.00008239
32	Yes	26	0.00011520	0.00008226
33	Yes	26	0.00011528	0.00006933
34	Yes	26	0.00011524	0.00008338
35	Yes	26	0.00011527	0.00008334
36	Yes	26	0.00011535	0.00006957
37	Yes	26	0.00011529	0.00008254

38	Yes	26	0.00011529	0.00008252
39	Yes	22	0.00013490	0.00003541
40	Yes	25	0.00004021	0.00010918
41	Yes	25	0.00004020	0.00011303
42	Yes	22	0.00013483	0.00003628
43	Yes	25	0.00004021	0.00010846
44	Yes	25	0.00004021	0.00010656
45	Yes	22	0.00013489	0.00003768
46	Yes	25	0.00004021	0.00011290
47	Yes	25	0.00004020	0.00011023
48	Yes	22	0.00013484	0.00003531
49	Yes	25	0.00004021	0.00010800
50	Yes	25	0.00004022	0.00010876

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	190 - 178.5 (1)	TP19.93x18x0.1875	11.50	0.00	0.0	11.4496	-4156.9199	845219.0000	0.005
L2	178.5 - 162.583 (2)	TP22.1777x19.0515x0.25	18.92	0.00	0.0	17.3997	-9318.7803	1292710.0000	0.007
L3	162.583 - 147.583 (3)	TP24.6566x22.1777x0.5231	15.00	0.00	0.0	40.0691	-12212.4004	1987660.0000	0.006
L4	147.583 - 133.04 (4)	TP27.06x24.6566x0.6542	14.54	0.00	0.0	53.4863	-14783.7998	2663560.0000	0.006
L5	133.04 - 115 (5)	TP29.536x25.1037x0.7236	21.96	0.00	0.0	66.1706	-21667.0000	3365610.0000	0.006
L6	115 - 103.083 (6)	TP31.5025x29.536x0.6951	11.92	0.00	0.0	67.9692	-25292.4004	3471950.0000	0.007
L7	103.083 - 98.417 (7)	TP32.2725x31.5025x1.0203	4.67	0.00	0.0	101.2040	-27212.4004	5177230.0000	0.005
L8	98.417 - 88.13 (8)	TP33.97x32.2725x0.678	10.29	0.00	0.0	69.9536	-28996.0000	4071830.0000	0.007
L9	88.13 - 70.583 (9)	TP36.111x31.8302x0.6479	22.30	0.00	0.0	68.0393	-33393.1016	3960400.0000	0.008
L10	70.583 - 62.083 (10)	TP37.5119x36.111x0.6356	8.50	0.00	0.0	74.3895	-40501.6992	4330030.0000	0.009
L11	62.083 - 43.71 (11)	TP40.54x37.5119x0.7813	18.37	0.00	0.0	96.3140	-45856.5000	4906940.0000	0.009
L12	43.71 - 38.083 (12)	TP40.7188x38.0578x0.6758	11.21	0.00	0.0	83.0247	-50016.1992	4887360.0000	0.010
L13	38.083 - 0 (13)	TP47x40.7188x0.6598	38.08	0.00	0.0	83.8856	-52268.1992	4882770.0000	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	190 - 178.5 (1)	TP19.93x18x0.1875	76636.9167	333758.3333	0.230	0.0000	333758.3333	0.000

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L2	178.5 - 162.583 (2)	TP22.1777x19.0515x0.25	435525.8333	580849.1667	0.750	0.0000	580849.1667	0.000
L3	162.583 - 147.583 (3)	TP24.6566x22.1777x0.5231	766581.6667	973066.6667	0.788	0.0000	973066.6667	0.000
L4	147.583 - 133.04 (4)	TP27.06x24.6566x0.6542	1011700.0000	1386666.6667	0.730	0.0000	1386666.6667	0.000
L5	133.04 - 115 (5)	TP29.536x25.1037x0.7236	1551575.0000	1960491.6667	0.791	0.0000	1960491.6667	0.000
L6	115 - 103.083 (6)	TP31.5025x29.536x0.6951	1861716.6667	2167858.3333	0.859	0.0000	2167858.3333	0.000
L7	103.083 - 98.417 (7)	TP32.2725x31.5025x1.0203	1986408.3333	3247275.0000	0.612	0.0000	3247275.0000	0.000
L8	98.417 - 88.13 (8)	TP33.97x32.2725x0.678	2136741.6667	2687266.6667	0.795	0.0000	2687266.6667	0.000
L9	88.13 - 70.583 (9)	TP36.111x31.8302x0.6479	2412575.0000	2663425.0000	0.906	0.0000	2663425.0000	0.000
L10	70.583 - 62.083 (10)	TP37.5119x36.111x0.6356	3013716.6667	3253191.6667	0.926	0.0000	3253191.6667	0.000
L11	62.083 - 43.71 (11)	TP40.54x37.5119x0.7813	3394225.0000	3871883.3333	0.877	0.0000	3871883.3333	0.000
L12	43.71 - 38.083 (12)	TP40.7188x38.0578x0.6758	3563758.3333	3853341.6667	0.925	0.0000	3853341.6667	0.000
L13	38.083 - 0 (13)	TP47x40.7188x0.6598	3736733.3333	3988091.6667	0.937	0.0000	3988091.6667	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	190 - 178.5 (1)	TP19.93x18x0.1875	13041.4004	422609.0000	0.031	0.1337	669315.0000	0.000
L2	178.5 - 162.583 (2)	TP22.1777x19.0515x0.25	21525.0000	646354.0000	0.033	601.2608	1165116.6667	0.001
L3	162.583 - 147.583 (3)	TP24.6566x22.1777x0.5231	22675.4004	993830.0000	0.023	599.0667	1954816.6667	0.000
L4	147.583 - 133.04 (4)	TP27.06x24.6566x0.6542	23555.0000	1331780.0000	0.018	597.6483	2787216.6667	0.000
L5	133.04 - 115 (5)	TP29.536x25.1037x0.7236	25566.5000	1682810.0000	0.015	293.5875	3940433.3333	0.000
L6	115 - 103.083 (6)	TP31.5025x29.536x0.6951	26517.9004	1735970.0000	0.015	292.6958	4355616.6667	0.000
L7	103.083 - 98.417 (7)	TP32.2725x31.5025x1.0203	26965.1992	2588610.0000	0.010	292.4542	6533866.6667	0.000
L8	98.417 - 88.13 (8)	TP33.97x32.2725x0.678	27373.5000	2035910.0000	0.013	292.0800	5397858.3333	0.000
L9	88.13 - 70.583 (9)	TP36.111x31.8302x0.6479	28266.5000	1992060.0000	0.014	292.4217	5348975.0000	0.000
L10	70.583 - 62.083 (10)	TP37.5119x36.111x0.6356	29386.1992	2165020.0000	0.014	291.4833	6531158.0000	0.000
L11	62.083 - 43.71 (11)	TP40.54x37.5119x0.7813	30150.4004	2453470.0000	0.012	291.0950	7776533.3333	0.000
L12	43.71 - 38.083 (12)	TP40.7188x38.0578x0.6758	30712.8008	2460550.0000	0.012	290.9817	7736283.3333	0.000
L13	38.083 - 0 (13)	TP47x40.7188x0.6598	30965.5996	2460530.0000	0.013	290.7983	8005633.3333	0.000

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	190 - 178.5 (1)	0.005	0.230	0.000	0.031	0.000	0.235 ✔	1.000	4.8.2 ✔
L2	178.5 - 162.583 (2)	0.007	0.750	0.000	0.033	0.001	0.758 ✔	1.000	4.8.2 ✔
L3	162.583 - 147.583 (3)	0.006	0.788	0.000	0.023	0.000	0.794 ✔	1.000	4.8.2 ✔
L4	147.583 - 133.04 (4)	0.006	0.730	0.000	0.018	0.000	0.735 ✔	1.000	4.8.2 ✔
L5	133.04 - 115 (5)	0.006	0.791	0.000	0.015	0.000	0.798 ✔	1.000	4.8.2 ✔
L6	115 - 103.083 (6)	0.007	0.859	0.000	0.015	0.000	0.866 ✔	1.000	4.8.2 ✔
L7	103.083 - 98.417 (7)	0.005	0.612	0.000	0.010	0.000	0.617 ✔	1.000	4.8.2 ✔
L8	98.417 - 88.13 (8)	0.007	0.795	0.000	0.013	0.000	0.802 ✔	1.000	4.8.2 ✔
L9	88.13 - 70.583 (9)	0.008	0.906	0.000	0.014	0.000	0.914 ✔	1.000	4.8.2 ✔
L10	70.583 - 62.083 (10)	0.009	0.926	0.000	0.014	0.000	0.936 ✔	1.000	4.8.2 ✔
L11	62.083 - 43.71 (11)	0.009	0.877	0.000	0.012	0.000	0.886 ✔	1.000	4.8.2 ✔
L12	43.71 - 38.083 (12)	0.010	0.925	0.000	0.012	0.000	0.935 ✔	1.000	4.8.2 ✔
L13	38.083 - 0 (13)	0.011	0.937	0.000	0.013	0.000	0.948 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	190 - 178.5	Pole	TP19.93x18x0.1875	1	-4156.9199	845219.0000	23.5	Pass
L2	178.5 - 162.583	Pole	TP22.1777x19.0515x0.25	2	-9318.7803	1292710.0000	75.8	Pass
L3	162.583 - 147.583	Pole	TP24.6566x22.1777x0.5231	3	-12212.4004	1987660.0000	79.4	Pass
L4	147.583 - 133.04	Pole	TP27.06x24.6566x0.6542	4	-14783.7998	2663560.00	73.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L5	133.04 - 115	Pole	TP29.536x25.1037x0.7236	5	-21667.0000	3365610.0000	79.8	Pass
L6	115 - 103.083	Pole	TP31.5025x29.536x0.6951	6	-25292.4004	3471950.0000	86.6	Pass
L7	103.083 - 98.417	Pole	TP32.2725x31.5025x1.0203	7	-27212.4004	5177230.0000	61.7	Pass
L8	98.417 - 88.13	Pole	TP33.97x32.2725x0.678	8	-28996.0000	4071830.0000	80.2	Pass
L9	88.13 - 70.583	Pole	TP36.111x31.8302x0.6479	9	-33393.1016	3960400.0000	91.4	Pass
L10	70.583 - 62.083	Pole	TP37.5119x36.111x0.6356	10	-40501.6992	4330030.0000	93.6	Pass
L11	62.083 - 43.71	Pole	TP40.54x37.5119x0.7813	11	-45856.5000	4906940.0000	88.6	Pass
L12	43.71 - 38.083	Pole	TP40.7188x38.0578x0.6758	12	-50016.1992	4887360.0000	93.5	Pass
L13	38.083 - 0	Pole	TP47x40.7188x0.6598	13	-52268.1992	4882770.0000	94.8	Pass
							Summary	
						Pole (L13)	94.8	Pass
						RATING =	**94.8**	**Pass**

```
*****************************************************************************************************
*                                                                                                   *
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*                                                                                                   *
*****************************************************************************************************

Project Title : Cooper Rd.
Project Notes : max moment  check
Project File  : Y:\Projects\0015000\0015500\15584 C-Spire 4G - 5G\_SA\MS0831 Cooper Road\Foundation\Cooper Rd
Date run      : 11:11:44 AM Friday, September 11, 2020
by            : CAISSON Version 15.50
Licensed to   : Neel-Schaffer Inc

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Input Data
-----------------------------------------------------------------------------------------------------

Calculation Options
---------------------
Calculation method    : Full 8CD
Bearing transfer      :     0.25 (ft)
Minimum steel percent :     0.32 (%)

Pier Properties
---------------
Diameter           :     6.50 (ft)
Embedded depth     :     N.A. (calculated - see load case results)
Steel area percent :     N.A. (calculated - see load case results)
Reveal             :     1.00 (ft)
Concrete strength  :     4.00 (ksi)
Steel yield        :    60.00 (ksi)
```

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	3.30	0.00	92.0	100.0		
2	Clay	3.70	3.30	110.0	852.0		
3	Clay	15.00	7.00	110.0	1015.0		
4	Clay	13.00	22.00	115.0	3756.0		

Loads at Top of Pier

Load Case	Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Soil Strength Factor
	4929.7	69.0	31.60	0.750

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Analysis Results
-----------------------------------------------------------------------------------------------------
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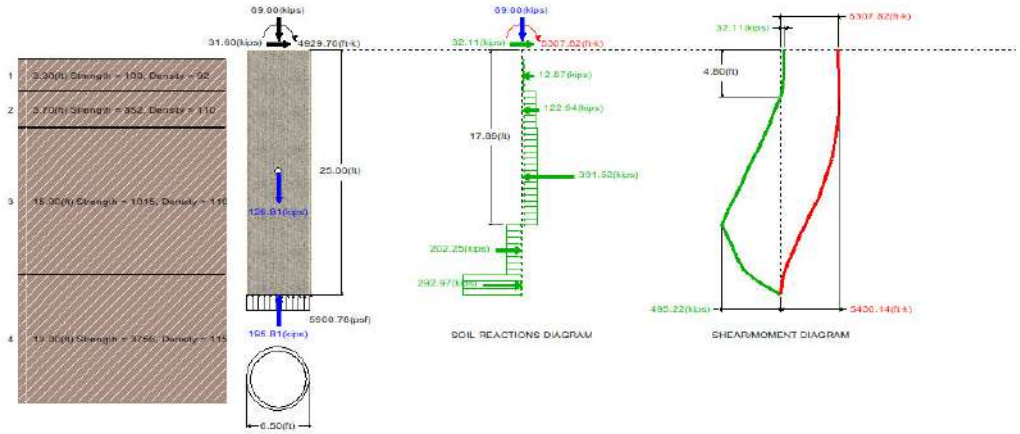
Load Case Results

Load Case	Diameter (ft)	Embedment Depth (ft)	Length (ft)	Minimum Steel Percent (%)	Minimum Steel Area (in^2)	Weight (kips)	Moment Capacity (ft-k)	Axial Capacity (kips)	Axial Load Pressure (ksf)	Weight Pressure (ksf)	End Bearing Pressure (ksf)	Maximum Pier Moment (ft-k)	Maximum Pier Shear (kips)	Total Soil Moment (ft-k)	Total Soil Shear (kips)	Soil Bearing Strength (ksf)	Status
	6.50	24.000	25.000	0.840	40.14	126.806	5540.0	69.5	2.08	3.82	5.90	5430.1	495.2	5307.82	32.11	22.54	OK

The controlling load case is ""



Ultimate Resisting Forces Along Pier for Load Case ""

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	1.00	3.30	92.0	100.0		12.87	2.65
Clay	4.30	3.70	110.0	852.0		122.94	6.15
Clay	8.00	9.89	110.0	1015.0		391.52	12.95
Clay	17.89	5.11	110.0	1015.0		-202.25	20.45
Clay	23.00	2.00	115.0	3756.0		-292.97	24.00

Shear and Moments Along Pier for Load Case ""

Distance below Top of Pier (ft)	Shear (kips)	Moment (ft-k)
0.00	32.1	5307.8
1.00	32.1	5339.9
1.25	31.1	5347.8
2.50	26.3	5383.7
3.75	21.4	5413.5
4.80	0.0	5430.1
5.00	-4.0	5430.0
6.25	-45.6	5399.0
7.50	-87.1	5316.1
8.75	-133.4	5179.5
10.00	-182.9	4981.8
11.25	-232.4	4722.3
12.50	-281.8	4401.0
13.75	-331.3	4017.7
15.00	-380.8	3572.7
16.25	-430.3	3065.7
17.50	-479.8	2497.0
17.89	-495.2	2306.5
18.75	-461.2	1895.6
20.00	-411.7	1350.0
21.25	-362.2	866.3
22.50	-312.8	444.4
23.75	-183.1	114.4
25.00	0.0	0.0

25/29 = 86.2%

Rebar Options for Load Case "" (select one of the following):

US Standard Rebar

Quantity	Name	Area (in^2)	Diameter (in)	Spacing (in)
201	US #4	0.20	0.500	1.06
130	US #5	0.31	0.625	1.64
92	US #6	0.44	0.750	2.32
67	US #7	0.60	0.875	3.19
51	US #8	0.79	1.000	4.19
41	US #9	1.00	1.128	5.21
32	US #10	1.27	1.270	6.68
26	US #11	1.56	1.410	8.22
18	US #14	2.25	1.693	11.87
11	US #18	4.00	2.257	19.42
10	US #18J	4.29	2.337	21.36

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

Site#:	*MS0831*
Site Name:	*Cooper Road*
Proj#:	*15584*
Pole Manufacturer:	*Other*

Reactions		
Mu:	4929.7	ft-kips
Axial, Pu:	68.973	kips
Shear, Vu:	31.641	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	56	in

Plate Data		
Diam:	62	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.32	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.5	in
Grade:	60	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	47	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Base Plate Results Flexural Check

Base Plate Stress:	47.4 ksi	
Allowable Plate Stress:	54.0 ksi	
Base Plate Stress Ratio:	87.7%	Pass

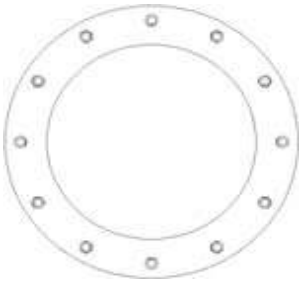
Stiffened
AISC LRFD
φ*Fy
Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	66.3%	Pass
Vertical Weld:	60.6%	Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.9%	Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	67.7%	Pass
Plate Comp. (AISC Bracket):	70.1%	Pass

Pole Results

Pole Punching Shear Check:	17.5%	Pass



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

Site#:	*MS0831*
Site Name:	*Cooper Road*
Proj#:	*15584*
Pole Manufacturer:	*Other*

Reactions		
Mu:	4170.4314	ft-kips
Axial, Pu:	68.973	kips
Shear, Vu:	31.641	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	56	in

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	231.7 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	89.1% **Pass**	

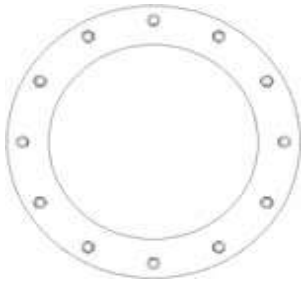
Original Anchors

Moment used for original anchor analysis in modification design dated 07/20/2015.

Plate Data		
Diam:	62	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.32	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.5	in
Grade:	60	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	47	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

Site#: *MS0831*
Site Name: *Cooper Road*
Proj#: *15584*

Pole Manufacturer:	*Other*

Reactions		
Mu:	759.301	ft-kips
Axial, Pu:	0	kips
Shear, Vu:	0	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	3	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	58.5	in

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	207.7 Kips	Non-Rigid
Allowable Axial, Φ*Fu*Anet:	325.0 Kips	AISC LRFD
Anchor Rod Stress Ratio:	63.9% **Pass**	φ*Tn

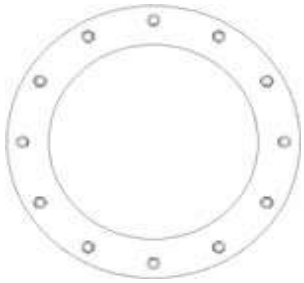
Plate Data		
Diam:	62	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	25.25	in

Additional anchors installed in Modification Analysis dated 07/20/2015

Additional moment in analysis carried by modified anchors.

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.5	in
Grade:	60	ksi
Weld str.:	55	ksi

Pole Data		
Diam:	47	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Pier Moment check at 13'

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

Site#: *MS0831*
Site Name: *Cooper rd.*
Proj#: *15584*

Loads Already Factored		
For M (WL)	1.3	<----Disregard
For P (DL)	1.3	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	3.86	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.64	ft
Vert. Cage Diameter =	67.62	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	20	
As Total=	31.2	in^2
A s/ Aconc, Rho:	0.0065	0.65%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 0.65% **OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	7268.18	kips
at Mu=(ϕ=0.65)Mn=	4071.47	ft-kips
Max Tu, (φ=0.9) Tn =	1684.8	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	4247.7	ft-kips **(* Note)**
Max. Factored Shaft Pu:	69	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.00	Mu:	4247.7	ft-kips
1.00	Pu:	69	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2002	

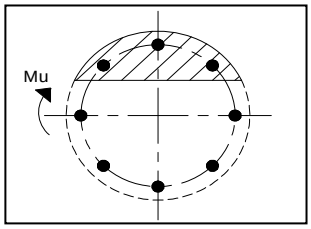
Seismic Properties

Seismic Design Category =	D	
Seismic Risk =	**High**	

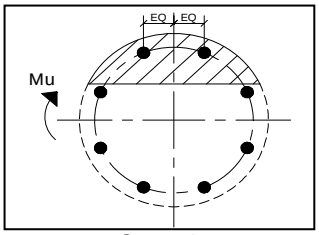
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.82**	in
Extreme Steel Strain, εt:	**0.0128**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	69.00	kips
Drilled Shaft Moment Capacity, φMn:	**4552.77**	ft-kips
Drilled Shaft Superimposed Mu:	**4247.70**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**93.3%**

Pier Moment check at 12.8'

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

Site#: *MS0831*
Site Name: *Cooper rd.*
Proj#: *15584*

Loads Already Factored		
For M (WL)	1.3	<----Disregard
For P (DL)	1.3	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	10.70	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	4.50	ft
Vert. Cage Diameter =	53.94	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	27.7	
As Total=	43.212	in^2
A s/ Aconc, Rho:	0.0090	0.90%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.90%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9719.96	kips
at Mu=(ϕ=0.65)Mn=	4995.55	ft-kips
Max Tu, (φ=0.9) Tn =	2333.448	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	4401	ft-kips **(* Note)**
Max. Factored Shaft Pu:	69	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.00	Mu:	4401	ft-kips
1.00	Pu:	69	kips

Material Properties

Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2002

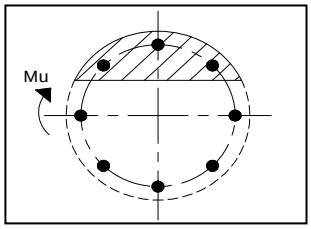
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

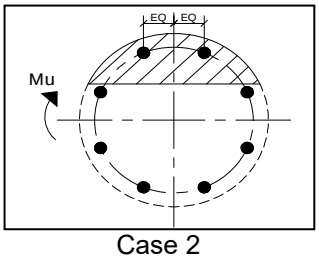
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**15.95**	in
Extreme Steel Strain, ϵt:	**0.0094**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	69.00	kips
Drilled Shaft Moment Capacity, φMn:	**5774.67**	ft-kips
Drilled Shaft Superimposed Mu:	**4401.00**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**76.2%**

Max Moment Check

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

Site#: *MS0831*
Site Name: *Cooper rd.*
Proj#: *15584*

Loads Already Factored		
For M (WL)	1.3	<----Disregard
For P (DL)	1.3	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	12.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	4.28	ft
Vert. Cage Diameter =	51.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	30.69	
As Total=	47.8764	in^2
A s/ Aconc, Rho:	0.0100	1.00%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 1.00% **OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9857.24	kips
at Mu=(ϕ=0.65)Mn=	4981.57	ft-kips
Max Tu, (φ=0.9) Tn =	2585.326	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	5430.1	ft-kips **(* Note)**
Max. Factored Shaft Pu:	69	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.00	Mu:	5430.1	ft-kips
1.00	Pu:	69	kips

Material Properties

Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2002	

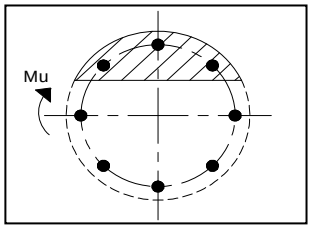
Seismic Properties

Seismic Design Category =	D	
Seismic Risk =	**High**	

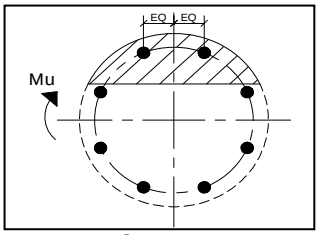
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**17.00**	in
Extreme Steel Strain, ϵt:	**0.0084**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	69.00	kips
Drilled Shaft Moment Capacity, φMn:	**6199.97**	ft-kips
Drilled Shaft Superimposed Mu:	**5430.10**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**87.6%**