

Report Date: March 31, 2025

Client: Wireless Edge
ATTN: David Campbell
38 West market Street
Rhinebeck, NY, 12572
Phone: (914) 712-0000
Email: campbell@wirelessedge.com

Structure: 120ft Monopole
Site Name: Wappingers
Site Reference #: WEC-NY-22
Site Address: 30 Soccerfield Dr
City, County, State: Wappinger's Falls, Dutchess, NY
Latitude, Longitude: 41.579856, -73.8536

PJF Project Number: 23825-0001.002.7805

Paul J. Ford and Company is pleased to submit this **Structural Analysis Report** to determine the tower stress level.

Analysis Criteria:

This analysis has been performed in accordance with the 2020 New York State Uniform Code (2018 International Building Code) based upon an ultimate 3-second gust wind speed of 113 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Proposed Appurtenance Loads:

The structure was analyzed with the proposed loading configuration shown in Table 1 combined with the other considered equipment shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure:	Pass	91.0%
Existing Foundation:	Pass	73.3%

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Wireless Edge. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully Submitted By:

Paul J. Ford and Company



m

RMF



250 E Broad St, Suite 600
Columbus, OH 43215
Phone 614.221.6679

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Additional Calculations

1) INTRODUCTION

This is a 120ft Monopole designed by SCI in November of 2018.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	113 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Ice Wind Speed:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
104.0	104.0	1	Sitepro1	RMVDQ8-3-2120	4	6x24
		4	ericsson	4460 B25/B66		
		4	ericsson	4480 B71/B85		
		4	ericsson	840590966 w/ Mount Pipe		
		4	ericsson	AIR 6419 B41 w/ Mount Pipe		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
119.0	129.0	4	generic	Whip 20' x 3"	4	7/8
	119.0	4	tower mount	5' T-Arm EPA - 2.69 ft^2 (75 lbs)		
114.0	114.0	3	tower mount	12' T-Arm EPA - 6.6 ft^2 (184 lbs)	2	1.25
		6	andrew	SBNHH-1D65C w/ Mount Pipe		
		1	raycap	RRFDC-3315-PF-48		
		3	samsung telecommunications	B2/B66A RRH-BR049		
		3	samsung telecommunications	B5/B13 RRH-BR04C		
		3	samsung telecommunications	L-SUB6 w/ Mount Pipe		
94.0	94.0	3	tower mount	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	24	1-5/8
		12	alcatel lucent	RRH 2x40 - 700		
		12	swedcom	SC2x6014 w/ mount pipe		
84.0	84.0	3	tower mount	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	24	1-5/8
		12	alcatel lucent	RRH 2x40 - 700		
		12	swedcom	SC2x6014 w/ mount pipe		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference
Manufacturer & Foundation Drawings	SCI, U1085-151-181, 11/09/2018
Geotechnical Report	Tectonic, 5506.19, 11/13/2015
Design Calculations	SCI, U1085-151-181, 11/09/2018
Co-location App	Wireless Edge, WEC-NY-22, 11/12/2024
CD Drawings	NB+C, UP50068A REV 2, 03/05/2025
Mount Analysis	NB+C, UP50068A REV 0, 03/5/2025

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) All coaxial cables are assumed to run internal to the monopole shaft.
- 4) The existing, in-place tree branch configuration (areas and weights) was assumed using the original manufacturer calculations.
- 5) At the time of analysis, the manufacturer drawings had documentation on (2) different types of foundations, a spread footing, and a caisson. Both foundations were analyzed with the worst-case scenario reported in Table 5 of this report

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P _{allow} (K)	% Capacity	Pass / Fail
L1	120 - 71	Pole	TP32.76x21x0.25	1	-21.36	1531.92	89.7	Pass
L2	71 - 45	Pole	TP38.5x31.18x0.375	2	-34.35	2695.24	91.0	Pass
L3	45 - 1.5	Pole	TP48.19x36.49x0.5	3	-55.60	4648.90	90.3	Pass
							Summary	
						Pole (L2)	91.0	Pass
						RATING =	91.0	Pass

Table 5 - Tower Component Stresses vs Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	89.8	Pass
1	Base Plate	0	84.8	Pass
1,2	Base Foundation Structural Steel	0	73.3	Pass
1,2	Base Foundation Soil Interaction	0	71.1	Pass

Structure Rating (max from all components) =	91.0%
---	--------------

Notes:

- All structural ratings are per TIA-222-H Section 15.5
- 1) additional documentation in "Appendix B – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) See assumption #5.

4.1) Recommendations

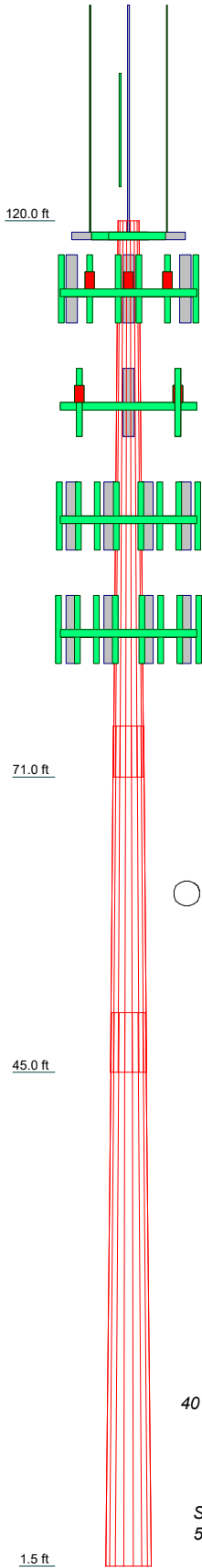
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON
EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

- 1) Paul J. Ford and Company has not made a field inspection to verify the monopole dimensions or the antenna/coax loading. If the existing conditions are not as represented on these sketches, we should be contacted immediately to reevaluate any conclusions stated in this report.
- 2) No allowance was made for any damaged, missing, or rusted materials. The analysis of this structure assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the structural members have the same load carrying capacity as the day the tower was erected.
- 3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing structure. The structural analysis provided by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

APPENDIX A
TNXTOWER OUTPUT

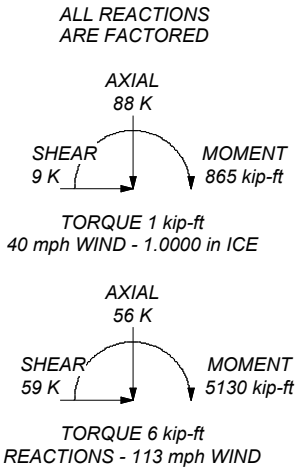
Section	1	2	3	
Length (ft)	49.0000	30.5000	48.7500	
Number of Sides	18	18	18	
Thickness (in)	0.2500	0.3750	0.5000	
Socket Length (ft)	4.5000	5.2500	36.4900	
Top Dia (in)	21.0000	31.1800	48.1900	
Bot Dia (in)	32.7600	38.5000		
Grade		A572-65		
Weight (K)	3.5	4.3	11.0	18.8



MATERIAL STRENGTH					
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Dutchess County, New York.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 113 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 91%



 Paul J. Ford and Company 250 East Broad Street, STE 600 Columbus, Ohio Phone: 614-221-6679 FAX:	Job: 120' Monopole Wappinger's		
	Project: PJF# 23825-0001.002.7805		
	Client: Wireless Edge	Drawn by: jacuna	App'd:
	Code: TIA-222-H	Date: 03/28/25	Scale: NTS
	Path:	Dwg No. E-1	

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower is located in Dutchess County, New York.

Tower base elevation above sea level: 238.0900 ft.

Basic wind speed of 113 mph.

Risk Category II.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.0000 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56.00 pcf.

A wind speed of 40 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.05.

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-H Bracing Resist.
		Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice
		Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	
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	120.0000- 71.0000	49.0000	4.50	18	21.0000	32.7600	0.2500	1.0000	A572-65 (65 ksi)
L2	71.0000- 45.0000	30.5000	5.25	18	31.1800	38.5000	0.3750	1.5000	A572-65 (65 ksi)
L3	45.0000- 1.5000	48.7500		18	36.4900	48.1900	0.5000	2.0000	A572-65 (65 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	21.2854	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	33.2268	25.7967	3444.5722	11.5411	16.6421	206.9797	6893.6768	12.9008	5.3258	21.303
L2	32.6998	36.6657	4395.8137	10.9358	15.8394	277.5233	8797.4116	18.3363	4.8277	12.874
	39.0361	45.3783	8333.0732	13.5344	19.5580	426.0698	16677.111	22.6935	6.1160	16.309
L3	38.2552	57.1161	9346.7347	12.7765	18.5369	504.2226	18705.768	28.5635	5.5422	11.084
	48.8563	75.6840	21746.849	16.9300	24.4805	888.3328	43522.313	37.8492	7.6014	15.203

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	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 120.0000- 71.0000				1	1	1			
L2 71.0000- 45.0000				1	1	1			
L3 45.0000- 1.5000				1	1	1			

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 klf

6/24 Hybrid Cable (1.763" dia)	C	No	Surface Ar (CaAa)	104.0000 - 1.5000	4	4	0.000 0.000	1.7630		0.00
Feedline Ladder (Af)	C	No	Surface Af (CaAa)	104.0000 - 1.5000	1	1	0.000 0.000	3.0000	12.0000	0.01

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight klf
LDF5-50A (7/8" foam)	C	No	No	Inside Pole	119.0000 - 1.5000	4	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.00 0.00 0.00

HCS 6X12 6AWG(1-3/8")	C	No	No	Inside Pole	114.0000 - 1.5000	2	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.00 0.00 0.00

LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	94.0000 - 1.5000	24	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.00 0.00 0.00

LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	84.0000 - 1.5000	24	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.00 0.00 0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	120.0000-71.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	39.772	0.000	1.60
L2	71.0000-45.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	31.335	0.000	1.74
L3	45.0000-1.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	52.426	0.000	2.91

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	120.0000-71.0000	A	1.110	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	62.079	0.000	2.13
L2	71.0000-45.0000	A	1.057	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	48.911	0.000	2.16
L3	45.0000-1.5000	A	0.966	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	80.792	0.000	3.58

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	120.0000-71.0000	0.0000	5.1065	0.0000	4.3212
L2	71.0000-45.0000	0.0000	6.6993	0.0000	5.7278
L3	45.0000-1.5000	0.0000	7.0730	0.0000	6.0924

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	5	6/24 Hybrid Cable (1.763" dia)	71.00 - 104.00	1.0000	1.0000
L1	6	Feedline Ladder (Af)	71.00 - 104.00	1.0000	1.0000
L2	5	6/24 Hybrid Cable (1.763" dia)	45.00 - 71.00	1.0000	1.0000
L2	6	Feedline Ladder (Af)	45.00 - 71.00	1.0000	1.0000
L3	5	6/24 Hybrid Cable (1.763" dia)	1.50 - 45.00	1.0000	1.0000
L3	6	Feedline Ladder (Af)	1.50 - 45.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L1	6	Feedline Ladder (Af)	71.00 - 104.00	Manual	1.0000
L2	6	Feedline Ladder (Af)	45.00 - 71.00	Manual	1.0000
L3	6	Feedline Ladder (Af)	1.50 - 45.00	Manual	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Lightning Rod 2" x 8'	C	From Leg	0.0000 0.00 4.00	0.0000	124.0000	No Ice 1/2" Ice 1" Ice	1.6000 2.4200 3.2400	1.6000 2.4200 3.2400	0.07 0.08 0.09

5' T-Arm EPA - 2.69 ft^2 (75 lbs)	A	From Leg	0.0000 0.00 0.00	0.0000	119.0000	No Ice 1/2" Ice 1" Ice	2.6900 3.1000 3.5100	1.2400 1.6400 2.0400	0.07 0.18 0.28
5' T-Arm EPA - 2.69 ft^2 (75 lbs)	B	From Leg	0.0000 0.00 0.00	-30.0000	119.0000	No Ice 1/2" Ice 1" Ice	2.6900 3.1000 3.5100	1.2400 1.6400 2.0400	0.07 0.18 0.28
5' T-Arm EPA - 2.69 ft^2 (75 lbs)	C	From Leg	0.0000 0.00 0.00	-60.0000	119.0000	No Ice 1/2" Ice 1" Ice	2.6900 3.1000 3.5100	1.2400 1.6400 2.0400	0.07 0.18 0.28
5' T-Arm EPA - 2.69 ft^2 (75 lbs)	C	From Leg	0.0000 0.00 0.00	30.0000	119.0000	No Ice 1/2" Ice 1" Ice	2.6900 3.1000 3.5100	1.2400 1.6400 2.0400	0.07 0.18 0.28
Whip 20' x 3"	A	From Leg	3.0000 0.00 10.00	0.0000	119.0000	No Ice 1/2" Ice 1" Ice	5.7900 8.0300 10.2700	5.7900 8.0300 10.2700	0.13 0.17 0.21
Whip 20' x 3"	B	From Leg	3.0000 0.00 10.00	-30.0000	119.0000	No Ice 1/2" Ice 1" Ice	5.7900 8.0300 10.2700	5.7900 8.0300 10.2700	0.13 0.17 0.21
Whip 20' x 3"	C	From Leg	3.0000 0.00 10.00	-60.0000	119.0000	No Ice 1/2" Ice 1" Ice	5.7900 8.0300 10.2700	5.7900 8.0300 10.2700	0.13 0.17 0.21
Whip 20' x 3"	C	From Leg	3.0000 0.00 10.00	30.0000	119.0000	No Ice 1/2" Ice 1" Ice	5.7900 8.0300 10.2700	5.7900 8.0300 10.2700	0.13 0.17 0.21

12' T-Arm EPA - 6.6 ft^2 (184 lbs)	A	None		0.0000	114.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12' T-Arm EPA - 6.6 ft^2 (184 lbs)	B	None		0.0000	114.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12' T-Arm EPA - 6.6 ft^2 (184 lbs)	C	None		0.0000	114.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
(2) SBNHH-1D65C_TIA w/ Mount Pipe	A	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	11.7110 12.4336 13.1656	9.8662 11.3929 12.9438	0.08 0.17 0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) SBNHH-1D65C_TIA w/ Mount Pipe	B	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	11.7110 12.4336 13.1656	9.8662 11.3929 12.9438	0.08 0.17 0.27
(2) SBNHH-1D65C_TIA w/ Mount Pipe	C	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	11.7110 12.4336 13.1656	9.8662 11.3929 12.9438	0.08 0.17 0.27
L-SUB6 w/ Mount Pipe	A	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	5.9051 6.7183 7.4404	3.7440 4.7949 5.6974	0.12 0.17 0.22
L-SUB6 w/ Mount Pipe	B	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	5.9051 6.7183 7.4404	3.7440 4.7949 5.6974	0.12 0.17 0.22
L-SUB6 w/ Mount Pipe	C	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	5.9051 6.7183 7.4404	3.7440 4.7949 5.6974	0.12 0.17 0.22
B2/B66A RRH-BR049	A	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.2500 1.3926 1.5426	0.07 0.09 0.11
B2/B66A RRH-BR049	B	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.2500 1.3926 1.5426	0.07 0.09 0.11
B2/B66A RRH-BR049	C	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.2500 1.3926 1.5426	0.07 0.09 0.11
B5/B13 RRH-BR04C	A	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.0125 1.1445 1.2840	0.07 0.09 0.11
B5/B13 RRH-BR04C	B	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.0125 1.1445 1.2840	0.07 0.09 0.11
B5/B13 RRH-BR04C	C	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	1.8750 2.0454 2.2231	1.0125 1.1445 1.2840	0.07 0.09 0.11
RRFDC-3315-PF-48	A	From Leg	3.0000 0.00 0.00	0.0000	114.0000	No Ice 1/2" Ice 1" Ice	3.3636 3.5972 3.8383	2.1921 2.3950 2.6056	0.03 0.06 0.09
*** RMVDQ8-3-2120	C	None		0.0000	104.0000	No Ice 1/2" Ice 1" Ice	18.5600 22.5600 26.5800	20.3900 23.0900 27.3400	2.34 2.67 3.08
840590966 w/ Mount Pipe	A	From Leg	4.0000 0.00	10.0000	104.0000	No Ice 1" Ice	19.8820 20.5277	9.5454 10.9631	0.13 0.26

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
			0.00			1/2" Ice	21.1803	12.2329	0.39
840590966 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	-20.0000	104.0000	1" Ice No Ice	19.8820 20.5277	9.5454 10.9631	0.13 0.26
						1/2" Ice	21.1803	12.2329	0.39
840590966 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	70.0000	104.0000	1" Ice No Ice	19.8820 20.5277	9.5454 10.9631	0.13 0.26
						1/2" Ice	21.1803	12.2329	0.39
840590966 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	40.0000	104.0000	1" Ice No Ice	19.8820 20.5277	9.5454 10.9631	0.13 0.26
						1/2" Ice	21.1803	12.2329	0.39
AIR 6419 B41_TMO_TIA w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	10.0000	104.0000	1" Ice No Ice	6.5335 6.9159	3.7502 4.2429	0.11 0.17
						1/2" Ice	7.3081	4.7519	0.23
AIR 6419 B41_TMO_TIA w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	-20.0000	104.0000	1" Ice No Ice	6.5335 6.9159	3.7502 4.2429	0.11 0.17
						1/2" Ice	7.3081	4.7519	0.23
AIR 6419 B41_TMO_TIA w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	70.0000	104.0000	1" Ice No Ice	6.5335 6.9159	3.7502 4.2429	0.11 0.17
						1/2" Ice	7.3081	4.7519	0.23
AIR 6419 B41_TMO_TIA w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	40.0000	104.0000	1" Ice No Ice	6.5335 6.9159	3.7502 4.2429	0.11 0.17
						1/2" Ice	7.3081	4.7519	0.23
4480 B71/B85	A	From Leg	4.0000 0.00 0.00	10.0000	104.0000	1" Ice No Ice	2.4537 2.6497	1.2675 1.4229	0.09 0.11
						1/2" Ice	2.8530	1.5856	0.13
4480 B71/B85	B	From Leg	4.0000 0.00 0.00	-20.0000	104.0000	1" Ice No Ice	2.4537 2.6497	1.2675 1.4229	0.09 0.11
						1/2" Ice	2.8530	1.5856	0.13
4480 B71/B85	B	From Leg	4.0000 0.00 0.00	70.0000	104.0000	1" Ice No Ice	2.4537 2.6497	1.2675 1.4229	0.09 0.11
						1/2" Ice	2.8530	1.5856	0.13
4480 B71/B85	C	From Leg	4.0000 0.00 0.00	40.0000	104.0000	1" Ice No Ice	2.4537 2.6497	1.2675 1.4229	0.09 0.11
						1/2" Ice	2.8530	1.5856	0.13
4460 B25/B66	A	From Leg	4.0000 0.00 0.00	10.0000	104.0000	1" Ice No Ice	2.5686 2.7685	1.9717 2.1513	0.11 0.13
						1/2" Ice	2.9758	2.3383	0.16
4460 B25/B66	B	From Leg	4.0000 0.00 0.00	-20.0000	104.0000	1" Ice No Ice	2.5686 2.7685	1.9717 2.1513	0.11 0.13
						1/2" Ice	2.9758	2.3383	0.16
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
4460 B25/B66	B	From Leg	4.0000 0.00 0.00	70.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5686 2.7685 2.9758	1.9717 2.1513 2.3383	0.11 0.13 0.16
4460 B25/B66	C	From Leg	4.0000 0.00 0.00	40.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5686 2.7685 2.9758	1.9717 2.1513 2.3383	0.11 0.13 0.16
2.875" x 9' mount pipe	A	From Leg	4.0000 0.00 0.00	10.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5875 3.5198 4.2672	2.5875 3.5198 4.2672	0.05 0.07 0.10
2.875" x 9' mount pipe	B	From Leg	4.0000 0.00 0.00	-20.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5875 3.5198 4.2672	2.5875 3.5198 4.2672	0.05 0.07 0.10
2.875" x 9' mount pipe	B	From Leg	4.0000 0.00 0.00	70.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5875 3.5198 4.2672	2.5875 3.5198 4.2672	0.05 0.07 0.10
2.875" x 9' mount pipe	C	From Leg	4.0000 0.00 0.00	40.0000	104.0000	No Ice 1/2" Ice 1" Ice	2.5875 3.5198 4.2672	2.5875 3.5198 4.2672	0.05 0.07 0.10

12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	A	None		0.0000	94.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	B	None		0.0000	94.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	C	None		0.0000	94.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
(4) SC2x6014 w/ mount pipe	A	From Leg	3.0000 0.00 0.00	0.0000	94.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) SC2x6014 w/ mount pipe	B	From Leg	3.0000 0.00 0.00	0.0000	94.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) SC2x6014 w/ mount pipe	C	From Leg	3.0000 0.00 0.00	0.0000	94.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) RRH 2x40 - 700	A	From Leg	3.0000 0.00 0.00	0.0000	94.0000	No Ice 1/2" Ice 1" Ice	1.8160 1.9926 2.1767	1.5204 1.6875 1.8619	0.06 0.08 0.10
(4) RRH 2x40 - 700	B	From Leg	3.0000 0.00	0.0000	94.0000	No Ice	1.8160 1.9926	1.5204 1.6875	0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.00			1/2" Ice	2.1767	1.8619	0.10
(4) RRH 2x40 - 700	C	From Leg	3.0000 0.00 0.00	0.0000	94.0000	1" Ice No Ice	1.8160 1.9926 2.1767	1.5204 1.6875 1.8619	0.06 0.08 0.10

12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	A	None		0.0000	84.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	B	None		0.0000	84.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	C	None		0.0000	84.0000	No Ice 1/2" Ice 1" Ice	6.6000 7.5600 8.5200	1.5800 2.1000 2.6200	0.18 0.75 1.32
(4) SC2x6014 w/ mount pipe	A	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) SC2x6014 w/ mount pipe	B	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) SC2x6014 w/ mount pipe	C	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	12.8856 13.5249 14.1551	11.6248 13.0098 14.2300	0.08 0.19 0.30
(4) RRH 2x40 - 700	A	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	1.8160 1.9926 2.1767	1.5204 1.6875 1.8619	0.06 0.08 0.10
(4) RRH 2x40 - 700	B	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	1.8160 1.9926 2.1767	1.5204 1.6875 1.8619	0.06 0.08 0.10
(4) RRH 2x40 - 700	C	From Leg	3.0000 0.00 0.00	0.0000	84.0000	No Ice 1/2" Ice 1" Ice	1.8160 1.9926 2.1767	1.5204 1.6875 1.8619	0.06 0.08 0.10

(12) 2-ft Antenna Branches	C	None		0.0000	114.0000	No Ice 1/2" Ice 1" Ice	0.0100 0.0100 0.0100	0.0100 0.0100 0.0100	0.01 0.01 0.01
Top Crown Branches	C	None		0.0000	122.5000	No Ice 1/2" Ice	19.9000 19.9000 19.9000	19.9000 19.9000 19.9000	0.11 0.11 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(35) 6-ft Branches	C	None		0.0000	113.7000	1" Ice No Ice 1/2" Ice	88.6000 88.6000 88.6000 88.6000	88.6000 88.6000 88.6000 88.6000	1.39 1.39 1.39 1.39
(35) 6-ft Branches	C	None		0.0000	101.1000	1" Ice No Ice 1/2" Ice	89.4000 89.4000 89.4000 89.4000	89.4000 89.4000 89.4000 89.4000	1.39 1.39 1.39 1.39
(39) 8-ft Branches	C	None		0.0000	86.7000	1" Ice No Ice 1/2" Ice	129.1000 129.1000 129.1000 129.1000	129.1000 129.1000 129.1000 129.1000	1.97 1.97 1.97 1.97
(39) 8-ft Branches	C	None		0.0000	73.6000	1" Ice No Ice 1/2" Ice	130.1000 130.1000 130.1000 130.1000	130.1000 130.1000 130.1000 130.1000	1.97 1.97 1.97 1.97
(23) 10-ft Branches	C	None		0.0000	62.4000	1" Ice No Ice 1/2" Ice	93.9000 93.9000 93.9000 93.9000	93.9000 93.9000 93.9000 93.9000	1.52 1.52 1.52 1.52
(23) 10-ft Branches	C	None		0.0000	54.1000	1" Ice No Ice 1/2" Ice 1" Ice	94.2000 94.2000 94.2000 94.2000 94.2000	94.2000 94.2000 94.2000 94.2000 94.2000	1.52 1.52 1.52 1.52 1.52

Tower Pressures - No Ice

$$G_H = 1.100$$

Section Elevation ft	z ft	K _Z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000- 71.0000	94.0395	1.249	0.038	111.296	A	0.000	111.296	111.296	100.00	0.000	0.000
					B	0.000	111.296		100.00	0.000	0.000
					C	0.000	111.296		100.00	39.772	0.000
L2 71.0000- 45.0000	57.6179	1.127	0.035	77.714	A	0.000	77.714	77.714	100.00	0.000	0.000
					B	0.000	77.714		100.00	0.000	0.000
					C	0.000	77.714		100.00	31.335	0.000
L3 45.0000- 1.5000	23.2916	0.931	0.028	157.890	A	0.000	157.890	157.890	100.00	0.000	0.000
					B	0.000	157.890		100.00	0.000	0.000
					C	0.000	157.890		100.00	52.426	0.000

Tower Pressure - With Ice

$$G_H = 1.100$$

Section Elevation ft	z ft	K _z	q _z ksf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000- 71.0000	94.0395	1.249	0.005	1.1104	120.364	A	0.000	120.364	120.364	100.00	0.000	0.000
						B	0.000	120.364		100.00	0.000	0.000
						C	0.000	120.364		100.00	62.079	0.000
L2 71.0000- 45.0000	57.6179	1.127	0.004	1.0573	82.526	A	0.000	82.526	82.526	100.00	0.000	0.000
						B	0.000	82.526		100.00	0.000	0.000
						C	0.000	82.526		100.00	48.911	0.000
L3 45.0000- 1.5000	23.2916	0.931	0.004	0.9658	165.555	A	0.000	165.555	165.555	100.00	0.000	0.000
						B	0.000	165.555		100.00	0.000	0.000
						C	0.000	165.555		100.00	80.792	0.000

Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation ft	z ft	K _z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 120.0000- 71.0000	94.0395	1.249	0.010	111.296	A	0.000	111.296	111.296	100.00	0.000	0.000
					B	0.000	111.296		100.00	0.000	0.000
					C	0.000	111.296		100.00	39.772	0.000
L2 71.0000- 45.0000	57.6179	1.127	0.009	77.714	A	0.000	77.714	77.714	100.00	0.000	0.000
					B	0.000	77.714		100.00	0.000	0.000
					C	0.000	77.714		100.00	31.335	0.000
L3 45.0000- 1.5000	23.2916	0.931	0.007	157.89 0	A	0.000	157.890	157.890	100.00	0.000	0.000
					B	0.000	157.890		100.00	0.000	0.000
					C	0.000	157.890		100.00	52.426	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice

<i>Comb. No.</i>	<i>Description</i>
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 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 Reactions

<i>Location</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Vertical K</i>	<i>Horizontal, X K</i>	<i>Horizontal, Z K</i>
Pole	Max. Vert	26	88.27	0.00	0.00
	Max. H _x	21	41.76	59.04	-0.00
	Max. H _z	3	41.76	-0.00	58.59
	Max. M _x	2	5095.04	-0.00	58.59
	Max. M _z	8	5129.61	-59.04	-0.00
	Max. Torsion	18	5.83	50.70	-29.29
	Min. Vert	9	41.76	-59.04	-0.00
	Min. H _x	9	41.76	-59.04	-0.00
	Min. H _z	15	41.76	-0.00	-58.59
	Min. M _x	14	-5106.06	-0.00	-58.59
	Min. M _z	20	-5125.51	59.04	-0.00
	Min. Torsion	6	-5.83	-50.70	29.29

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	46.40	-0.00	-0.00	4.47	-1.64	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	55.68	0.00	-58.59	-5095.04	-2.03	3.38
0.9 Dead+1.0 Wind 0 deg - No Ice	41.76	0.00	-58.59	-5048.44	-1.49	3.36
1.2 Dead+1.0 Wind 30 deg - No Ice	55.68	29.27	-50.74	-4411.75	-2549.90	5.32
0.9 Dead+1.0 Wind 30 deg - No Ice	41.76	29.27	-50.74	-4371.56	-2525.37	5.30
1.2 Dead+1.0 Wind 60 deg - No Ice	55.68	50.70	-29.29	-2544.82	-4415.09	5.83
0.9 Dead+1.0 Wind 60 deg - No Ice	41.76	50.70	-29.29	-2522.22	-4372.99	5.82
1.2 Dead+1.0 Wind 90 deg - No Ice	55.68	59.04	0.00	5.49	-5129.61	4.78
0.9 Dead+1.0 Wind 90 deg - No Ice	41.76	59.04	0.00	4.06	-5080.84	4.77
1.2 Dead+1.0 Wind 120 deg - No Ice	55.68	50.70	29.29	2555.80	-4415.11	2.45
0.9 Dead+1.0 Wind 120 deg - No Ice	41.76	50.70	29.29	2530.35	-4373.00	2.45
1.2 Dead+1.0 Wind 150 deg - No Ice	55.68	29.27	50.74	4422.75	-2549.92	-0.54
0.9 Dead+1.0 Wind 150 deg - No Ice	41.76	29.27	50.74	4379.71	-2525.38	-0.53
1.2 Dead+1.0 Wind 180 deg - No Ice	55.68	0.00	58.59	5106.06	-2.03	-3.38
0.9 Dead+1.0 Wind 180 deg - No Ice	41.76	0.00	58.59	5056.60	-1.49	-3.36
1.2 Dead+1.0 Wind 210 deg - No Ice	55.68	-29.27	50.74	4422.74	2545.85	-5.32
0.9 Dead+1.0 Wind 210 deg - No Ice	41.76	-29.27	50.74	4379.70	2522.39	-5.30
1.2 Dead+1.0 Wind 240 deg - No Ice	55.68	-50.70	29.29	2555.79	4411.02	-5.83
0.9 Dead+1.0 Wind 240 deg - No Ice	41.76	-50.70	29.29	2530.34	4370.00	-5.82
1.2 Dead+1.0 Wind 270 deg - No Ice	55.68	-59.04	0.00	5.49	5125.51	-4.78
0.9 Dead+1.0 Wind 270 deg - No Ice	41.76	-59.04	0.00	4.06	5077.82	-4.77
1.2 Dead+1.0 Wind 300 deg - No Ice	55.68	-50.70	-29.29	-2544.80	4411.00	-2.45
0.9 Dead+1.0 Wind 300 deg - No Ice	41.76	-50.70	-29.29	-2522.20	4369.98	-2.45
1.2 Dead+1.0 Wind 330 deg - No Ice	55.68	-29.27	-50.74	-4411.73	2545.83	0.54
0.9 Dead+1.0 Wind 330 deg - No Ice	41.76	-29.27	-50.74	-4371.55	2522.37	0.53
1.2 Dead+1.0 Ice+1.0 Temp	88.27	-0.00	-0.00	10.16	-4.47	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	88.27	-0.00	-9.49	-843.12	-4.63	0.44
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	88.27	4.74	-8.22	-728.76	-430.99	0.73
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	88.27	8.21	-4.75	-416.34	-743.11	0.82
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	88.27	9.48	-0.00	10.44	-857.35	0.69

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	88.27	8.21	4.75	437.22	-743.11	0.38
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	88.27	4.74	8.22	749.65	-430.99	-0.04
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	88.27	-0.00	9.49	864.00	-4.63	-0.44
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	88.27	-4.74	8.22	749.65	421.73	-0.73
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	88.27	-8.21	4.75	437.22	733.85	-0.82
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	88.27	-9.48	-0.00	10.44	848.09	-0.69
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	88.27	-8.21	-4.75	-416.34	733.85	-0.38
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	88.27	-4.74	-8.22	-728.76	421.73	0.04
Dead+Wind 0 deg - Service	46.40	-0.00	-14.78	-1276.39	-1.71	0.86
Dead+Wind 30 deg - Service	46.40	7.38	-12.80	-1104.85	-641.64	1.36
Dead+Wind 60 deg - Service	46.40	12.79	-7.39	-635.95	-1110.10	1.49
Dead+Wind 90 deg - Service	46.40	14.89	-0.00	4.59	-1289.50	1.22
Dead+Wind 120 deg - Service	46.40	12.79	7.39	645.14	-1110.10	0.63
Dead+Wind 150 deg - Service	46.40	7.38	12.80	1114.04	-641.64	-0.14
Dead+Wind 180 deg - Service	46.40	-0.00	14.78	1285.57	-1.71	-0.86
Dead+Wind 210 deg - Service	46.40	-7.38	12.80	1114.04	638.23	-1.36
Dead+Wind 240 deg - Service	46.40	-12.79	7.39	645.14	1106.69	-1.49
Dead+Wind 270 deg - Service	46.40	-14.89	-0.00	4.59	1286.08	-1.23
Dead+Wind 300 deg - Service	46.40	-12.79	-7.39	-635.95	1106.69	-0.63
Dead+Wind 330 deg - Service	46.40	-7.38	-12.80	-1104.85	638.22	0.14

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-46.40	0.00	0.00	46.40	0.00	0.001%
2	0.00	-55.68	-58.59	-0.00	55.68	58.59	0.000%
3	0.00	-41.76	-58.59	-0.00	41.76	58.59	0.000%
4	29.27	-55.68	-50.74	-29.27	55.68	50.74	0.000%
5	29.27	-41.76	-50.74	-29.27	41.76	50.74	0.000%
6	50.70	-55.68	-29.29	-50.70	55.68	29.29	0.000%
7	50.70	-41.76	-29.29	-50.70	41.76	29.29	0.000%
8	59.04	-55.68	0.00	-59.04	55.68	-0.00	0.000%
9	59.04	-41.76	0.00	-59.04	41.76	-0.00	0.000%
10	50.70	-55.68	29.29	-50.70	55.68	-29.29	0.000%
11	50.70	-41.76	29.29	-50.70	41.76	-29.29	0.000%
12	29.27	-55.68	50.74	-29.27	55.68	-50.74	0.000%
13	29.27	-41.76	50.74	-29.27	41.76	-50.74	0.000%
14	0.00	-55.68	58.59	-0.00	55.68	-58.59	0.000%
15	0.00	-41.76	58.59	-0.00	41.76	-58.59	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
16	-29.27	-55.68	50.74	29.27	55.68	-50.74	0.000%
17	-29.27	-41.76	50.74	29.27	41.76	-50.74	0.000%
18	-50.70	-55.68	29.29	50.70	55.68	-29.29	0.000%
19	-50.70	-41.76	29.29	50.70	41.76	-29.29	0.000%
20	-59.04	-55.68	0.00	59.04	55.68	-0.00	0.000%
21	-59.04	-41.76	0.00	59.04	41.76	-0.00	0.000%
22	-50.70	-55.68	-29.29	50.70	55.68	29.29	0.000%
23	-50.70	-41.76	-29.29	50.70	41.76	29.29	0.000%
24	-29.27	-55.68	-50.74	29.27	55.68	50.74	0.000%
25	-29.27	-41.76	-50.74	29.27	41.76	50.74	0.000%
26	0.00	-88.27	0.00	0.00	88.27	0.00	0.002%
27	0.00	-88.27	-9.49	0.00	88.27	9.49	0.000%
28	4.74	-88.27	-8.22	-4.74	88.27	8.22	0.000%
29	8.21	-88.27	-4.75	-8.21	88.27	4.75	0.000%
30	9.48	-88.27	0.00	-9.48	88.27	0.00	0.000%
31	8.21	-88.27	4.75	-8.21	88.27	-4.75	0.000%
32	4.74	-88.27	8.22	-4.74	88.27	-8.22	0.000%
33	0.00	-88.27	9.49	0.00	88.27	-9.49	0.000%
34	-4.74	-88.27	8.22	4.74	88.27	-8.22	0.000%
35	-8.21	-88.27	4.75	8.21	88.27	-4.75	0.000%
36	-9.48	-88.27	0.00	9.48	88.27	0.00	0.000%
37	-8.21	-88.27	-4.75	8.21	88.27	4.75	0.000%
38	-4.74	-88.27	-8.22	4.74	88.27	8.22	0.000%
39	0.00	-46.40	-14.78	0.00	46.40	14.78	0.003%
40	7.38	-46.40	-12.80	-7.38	46.40	12.80	0.001%
41	12.79	-46.40	-7.39	-12.79	46.40	7.39	0.001%
42	14.89	-46.40	0.00	-14.89	46.40	0.00	0.003%
43	12.79	-46.40	7.39	-12.79	46.40	-7.39	0.001%
44	7.38	-46.40	12.80	-7.38	46.40	-12.80	0.001%
45	0.00	-46.40	14.78	0.00	46.40	-14.78	0.003%
46	-7.38	-46.40	12.80	7.38	46.40	-12.80	0.001%
47	-12.79	-46.40	7.39	12.79	46.40	-7.39	0.001%
48	-14.89	-46.40	0.00	14.89	46.40	0.00	0.003%
49	-12.79	-46.40	-7.39	12.79	46.40	7.39	0.001%
50	-7.38	-46.40	-12.80	7.38	46.40	12.80	0.001%

Non-Linear Convergence Results

<i>Load Combination</i>	<i>Converged?</i>	<i>Number of Cycles</i>	<i>Displacement Tolerance</i>	<i>Force Tolerance</i>
1	Yes	6	0.00000001	0.00001646
2	Yes	12	0.00000001	0.00006674
3	Yes	12	0.00000001	0.00004753
4	Yes	14	0.00000001	0.00008032
5	Yes	14	0.00000001	0.00005159
6	Yes	14	0.00000001	0.00007363
7	Yes	14	0.00000001	0.00004713
8	Yes	12	0.00000001	0.00009529
9	Yes	12	0.00000001	0.00006779
10	Yes	14	0.00000001	0.00007882
11	Yes	14	0.00000001	0.00005051
12	Yes	14	0.00000001	0.00007761
13	Yes	14	0.00000001	0.00004969
14	Yes	12	0.00000001	0.00006690
15	Yes	12	0.00000001	0.00004761
16	Yes	14	0.00000001	0.00007409
17	Yes	14	0.00000001	0.00004740
18	Yes	14	0.00000001	0.00008084
19	Yes	14	0.00000001	0.00005191
20	Yes	12	0.00000001	0.00009516
21	Yes	12	0.00000001	0.00006772
22	Yes	14	0.00000001	0.00007521
23	Yes	14	0.00000001	0.00004821
24	Yes	14	0.00000001	0.00007637
25	Yes	14	0.00000001	0.00004898
26	Yes	7	0.00000001	0.00005477
27	Yes	12	0.00000001	0.00009676
28	Yes	12	0.00000001	0.00011468
29	Yes	12	0.00000001	0.00011382
30	Yes	12	0.00000001	0.00009985
31	Yes	12	0.00000001	0.00011825
32	Yes	12	0.00000001	0.00011801
33	Yes	12	0.00000001	0.00010040
34	Yes	12	0.00000001	0.00011521
35	Yes	12	0.00000001	0.00011610
36	Yes	12	0.00000001	0.00009742
37	Yes	12	0.00000001	0.00011140
38	Yes	12	0.00000001	0.00011161
39	Yes	10	0.00000001	0.00010293
40	Yes	11	0.00000001	0.00013782
41	Yes	11	0.00000001	0.00010195
42	Yes	10	0.00000001	0.00012795
43	Yes	11	0.00000001	0.00012814
44	Yes	11	0.00000001	0.00012079
45	Yes	10	0.00000001	0.00010406
46	Yes	11	0.00000001	0.00010382
47	Yes	11	0.00000001	0.00014125
48	Yes	10	0.00000001	0.00012716
49	Yes	11	0.00000001	0.00010756
50	Yes	11	0.00000001	0.00011346

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 71	25.18	42	1.7798	0.0109
L2	75.5 - 45	10.06	42	1.2861	0.0039
L3	50.25 - 1.5	4.36	42	0.8235	0.0018

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	Lightning Rod 2" x 8'	42	25.18	1.7798	0.0109	26519
122.5000	Top Crown Branches	42	25.18	1.7798	0.0109	26519
119.0000	5' T-Arm EPA - 2.69 ft^2 (75 lbs)	42	24.81	1.7711	0.0108	26519
114.0000	12' T-Arm EPA - 6.6 ft^2 (184 lbs)	42	22.96	1.7274	0.0099	22099
113.7000	(35) 6-ft Branches	42	22.85	1.7248	0.0098	21046
104.0000	RMVDQ8-3-2120	42	19.33	1.6359	0.0081	8286
101.1000	(35) 6-ft Branches	42	18.30	1.6074	0.0077	7015
94.0000	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	42	15.84	1.5326	0.0065	5099
86.7000	(39) 8-ft Branches	42	13.43	1.4460	0.0054	3980
84.0000	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	42	12.58	1.4107	0.0050	3682
73.6000	(39) 8-ft Branches	42	9.54	1.2551	0.0037	2942
62.4000	(23) 10-ft Branches	42	6.75	1.0546	0.0026	2696
54.1000	(23) 10-ft Branches	42	5.04	0.8964	0.0020	2542

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 71	99.95	8	7.0598	0.0430
L2	75.5 - 45	40.01	8	5.1159	0.0154
L3	50.25 - 1.5	17.33	8	3.2768	0.0069

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	Lightning Rod 2" x 8'	8	99.95	7.0598	0.0430	6904
122.5000	Top Crown Branches	8	99.95	7.0598	0.0430	6904
119.0000	5' T-Arm EPA - 2.69 ft^2 (75 lbs)	8	98.48	7.0260	0.0423	6904
114.0000	12' T-Arm EPA - 6.6 ft^2 (184 lbs)	8	91.17	6.8561	0.0388	5753
113.7000	(35) 6-ft Branches	8	90.74	6.8458	0.0386	5479
104.0000	RMVDQ8-3-2120	8	76.76	6.4989	0.0319	2155
101.1000	(35) 6-ft Branches	8	72.67	6.3877	0.0300	1823
94.0000	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	8	62.92	6.0937	0.0255	1323
86.7000	(39) 8-ft Branches	8	53.37	5.7503	0.0212	1031

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
84.0000	12'-0" T-Arm EPA - 6.6 ft^2 (184 lbs)	8	50.00	5.6105	0.0197	953
73.6000	(39) 8-ft Branches	8	37.92	4.9929	0.0146	758
62.4000	(23) 10-ft Branches	8	26.84	4.1959	0.0103	687
54.1000	(23) 10-ft Branches	8	20.05	3.5668	0.0079	643

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio P _u / φP _n
	ft		ft	ft		in ²	K	K	
L1	120 - 71 (1)	TP32.76x21x0.25	49.000 0	0.0000	0.0	24.939 7	-21.36	1458.97	0.015
L2	71 - 45 (2)	TP38.5x31.18x0.375	30.500 0	0.0000	0.0	43.878 6	-34.35	2566.90	0.013
L3	45 - 1.5 (3)	TP48.19x36.49x0.5	48.750 0	0.0000	0.0	75.684 0	-55.60	4427.52	0.013

Pole Bending Design Data

Section No.	Elevation	Size	M _{ux}	φM _{nx}	Ratio M _{ux} / φM _{nx}	M _{uy}	φM _{ny}	Ratio M _{uy} / φM _{ny}
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	120 - 71 (1)	TP32.76x21x0.25	1013.57	1105.37	0.917	0.00	1105.37	0.000
L2	71 - 45 (2)	TP38.5x31.18x0.375	2290.88	2445.54	0.937	0.00	2445.54	0.000
L3	45 - 1.5 (3)	TP48.19x36.49x0.5	5129.61	5495.51	0.933	0.00	5495.51	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V _u	φV _n	Ratio V _u / φV _n	Actual T _u	φT _n	Ratio T _u / φT _n
	ft		K	K		kip-ft	kip-ft	
L1	120 - 71 (1)	TP32.76x21x0.25	42.27	437.69	0.097	4.81	1204.74	0.004
L2	71 - 45 (2)	TP38.5x31.18x0.375	56.91	770.07	0.074	4.79	2486.13	0.002
L3	45 - 1.5 (3)	TP48.19x36.49x0.5	59.12	1328.25	0.045	4.78	5547.39	0.001

Pole Interaction Design Data

Section No.	Elevation	Ratio P _u / φP _n	Ratio M _{ux} / φM _{nx}	Ratio M _{uy} / φM _{ny}	Ratio V _u / φV _n	Ratio T _u / φT _n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft								
L1	120 - 71 (1)	0.015	0.917	0.000	0.097	0.004	0.942	1.050	4.8.2
L2	71 - 45 (2)	0.013	0.937	0.000	0.074	0.002	0.956	1.050	4.8.2
L3	45 - 1.5 (3)	0.013	0.933	0.000	0.045	0.001	0.948	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 71	Pole	TP32.76x21x0.25	1	-21.36	1531.92	89.7	Pass
L2	71 - 45	Pole	TP38.5x31.18x0.375	2	-34.35	2695.24	91.0	Pass
L3	45 - 1.5	Pole	TP48.19x36.49x0.5	3	-55.60	4648.90	90.3	Pass
							Summary	
							Pole (L2)	91.0 Pass
							RATING =	91.0 Pass

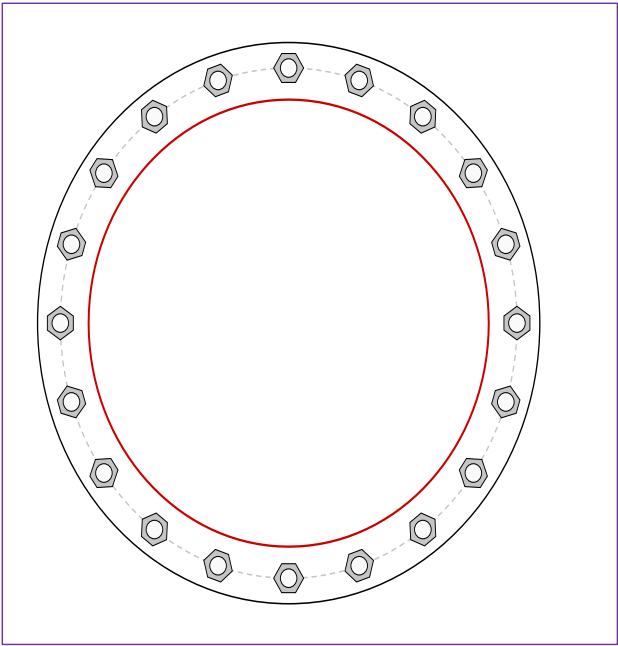
APPENDIX B
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	2

Applied Loads	
Moment (kip-ft)	5129.61
Axial Force (kips)	55.60
Shear Force (kips)	59.12

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary (units of kips, kip-in)	
(20) 2" $\varnothing$ bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 55" BC		$Pu_t = 220.94$	$\phi Pn_t = 234.38$ Stress Rating
		$Vu = 2.96$	$\phi Vn = 147.26$ 89.8%
		$Mu = n/a$	$\phi Mn = n/a$ Pass
Base Plate Data		Base Plate Summary	
60.5" OD x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)		Max Stress (ksi):	40.05 (Flexural)
Stiffener Data		Allowable Stress (ksi):	45
N/A		Stress Rating:	84.8% Pass
Pole Data			
48.19" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)			

Project Number:	23825-0001.002.7805
Engineer:	JAB
Date:	3/28/2025
Site Name:	Wappingers
Site Number:	WEC-NY-22
Client Project:	
Client Project 1:	

PAD AND PIER FOUNDATION

(Version v5.4 - Effective Date 10/26/2022)

STRUCTURE SETTINGS

TIA Standard:	TIA-222-H	
Capacity Normalization:	Yes	(TIA-222-H Section 15.5)
Foundation Type:	Pad and Pier	
Structure Type:	Pole	
Structure Height:	120.00	ft
BP Dist. Above Fnd.:	12.00	in
Bolt Circle/Bearing Plate Width:	455.00	in

PAD PROPERTIES

Pad Width (B):	26.50	ft
Pad Length (L):	26.50	ft (Square)
Pad Thickness (T):	3.00	ft
Depth to Top of Pad:	3.00	ft
Depth to Bottom of Pad (D):	6.00	ft
Top & Btm Pad Steel Different?	No	
	Dir.1	Dir.2
Pad Clear Cover (Top) (C2):	3.00	in
Pad Rebar Size (Top):	10	# bar
Pad Rebar Quantity (Top):	40	
Pad Rebar Length:	26.00	- ft
Pad Clear Cover (Bottom) (C3):		in
Pad Rebar Size (Bottom):		
Pad Rebar Quantity (Bottom):		
Pad Rebar Length:	26.00	- ft

FACTORED FOUNDATION LOADS

Load Combo 1 = LC1 = 1.2D + 1.0W _o			
Load Combo 2 = LC2 = 0.9D + 1.0W _o			
	Global	LC1 (+C)	LC2 (-T)
Applied Axial:	55.60		kip
Applied Shear:	59.12		kip
Applied Moment:	5129.61		kip-ft
Load Offset (Dir.1) (eB):	0.00		ft
Load Offset (Dir.2) (eL):	0.00		ft

PIER PROPERTIES

Pier Shape:	Round	
Diameter (W1):	7.00	ft
Height Above Grade (E):	0.50	ft
Total Pier Height:	3.50	ft
Pier Clear Cover (C1):	3.00	in
Pier Rebar Layout:	Round	
Pier Rebar Size:	10	# bar
Pier Rebar Quantity:	36	
Pier Reinf. Type:	Spiral	
Pier Spiral Size:	4	# bar
Pier Spiral Spacing (S1):	6.00	in

MATERIAL PROPERTIES

Concrete Strength, F' _c :	4.00	ksi
Concrete Density, γ _c :	150	pcf
Long. Rebar Strength, F _y :	60	ksi
Tie Rebar Strength, F _y :	60	ksi

SOIL PROPERTIES

Layer	Thickness (ft)	Soil Density (pcf)	Cohesion (ksf)	Friction Angle (deg)	Ultimate Gross Bearing (ksf)	Depth (ft)
1	6.00	115.00		32.00	6.00	6.00
2						
3						
4						

Base Friction, μ:	0.30	
Groundwater Depth:	10.00	ft
Neglected Depth:	5.00	ft

RESULTS

		Demand	Capacity	Rating	
Pad Shear - 1-Way	(kip)	360.68	938.08	36.6%	Pass
Pad Shear - 2-Way (Comp)	(ksi)	0.061	0.190	30.6%	Pass
Flexural 2-Way (Comp)	(kip-ft)	3237.39	8177.45	37.7%	Pass
Pad Flexural	(kip-ft)	2540.05	6786.10	35.6%	Pass
Pad Shear - 2-Way (Uplift)	(ksi)	N/A	N/A	N/A	
Flexural 2-Way (Tension)	(kip-ft)	N/A	N/A	N/A	

		Demand	Capacity	Rating	
Lateral	(kip)	59.12	164.75	34.2%	Pass
Overturning		-	-	STABLE	Pass
Bearing Pressure	(ksf)	3.36	4.50	71.1%	Pass
Uplift	(kip)	N/A	N/A	N/A	

Structural Rating*:	70.8%	Pass
Soil Rating*:	71.1%	Pass

*Rating per TIA-222-H Section 15.5

Pier Shear	(kip)	59.12	737.11	7.6%	Pass
Pier Compression	(kip)	79.85	12750.71	0.6%	Pass
Pier Flexural (Comp)	(kip-ft)	5395.65	7311.20	70.3%	Pass
Pier Flexural (Tension)	(kip-ft)	5395.65	7262.24	70.8%	Pass

ANALYSIS ASSUMPTIONS

1. PASSIVE PRESSURE: INCLUDED ON PAD AND PIER

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-H

Factored Base Reactions from tnxTower

	Comp. (+)	Tension (-)	
Moment, Mu =	5129.6		k-ft
Shear, Vu =	59.1		kips
Axial Load, Pu1 =	55.6		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	41.7	0.0	kips (from 0.9D + 1.6W)**
OTMu =	5159.2	0.0	k-ft @ Ground

*Pu1 will be used for Soil Analysis.
**Pu2 will be used for Steel Analysis.

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
Tower Face Width =	
ACI Code =	ACI 318-14
Seismic Design Category =	D
Risk Category =	II
Reference Standard =	TIA-222-H
Utilize Shear-Friction Methodology?	Yes
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	32.5	ft
fc' =	4	ksi
ϵ_c =	0.003	in/in
L / D Ratio =	4.71	
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-H

- (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing
+ (0.75) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. $\geq$ Comp.
- (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. $\geq$ Uplift

Steel Parameters

	Rebar	Ties
Number of Bars =	36	
Size =	#10	#4
Fy =	60	60
MOE =	29000	29000
Side Clear Cover to Ties =		4
Top/Bot Clear Cover to Ties =		4
Tie Upper Spacing =		6
Tie Lower Spacing =		20
Upper Tie Spacing Depth =		19.5

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%
Apply 1.05 Normalization =	Yes

Soil Parameters

Water Table Depth =	10.00	ft
Depth to Ignore Soil =	5.00	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	
Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)		
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)		

Consider Expansive Soils? ☐

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	5	115	0	0					5
2	3	120	0	32	Sand				8
3	26	120	0	34	Sand	15000			34
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	22.78	ft, from Grade
Shear, Vu =	59.12	kips
Resisting Shear, ΦV_n =	145.08	kips
Bending Moment, Mu =	6505.72	k-ft, from COR
Resisting Moment, ΦM_n =	15964.94	k-ft, from COR

MOMENT/Shear RATIO = 38.8% OK

Soil Results: Uplift & Compression

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦT_n =	122.82	kips
UPLIFT RATIO =	0.0%	OK
Compression, Cu =	55.60	kips
Comp. Capacity, ΦC_n =	340.51	kips
COMPRESSION RATIO =	15.6%	OK

Steel Results (ACI 318-14): Shear

Shear, Vu =	483.63	kips
Shear, ΦV_n =	2880.36	kips
Shear RATIO =	16.0%	OK

Steel Results (ACI 318-14): Moment/Axial

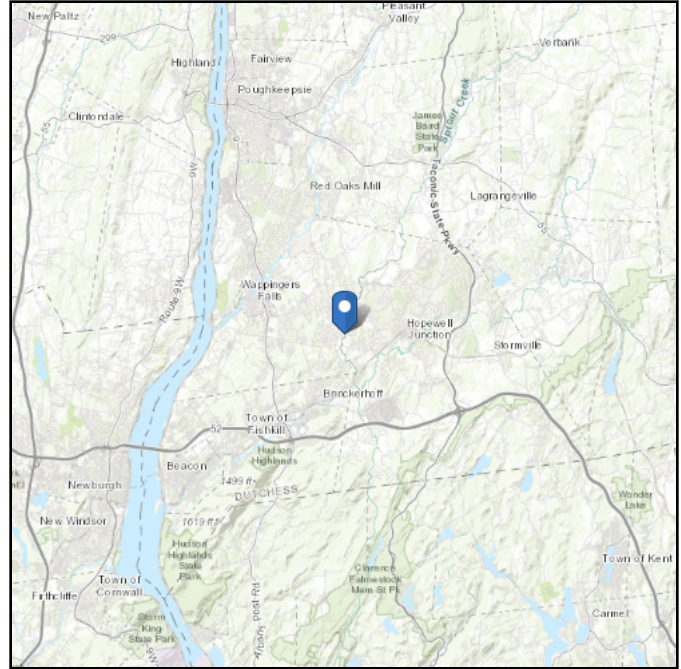
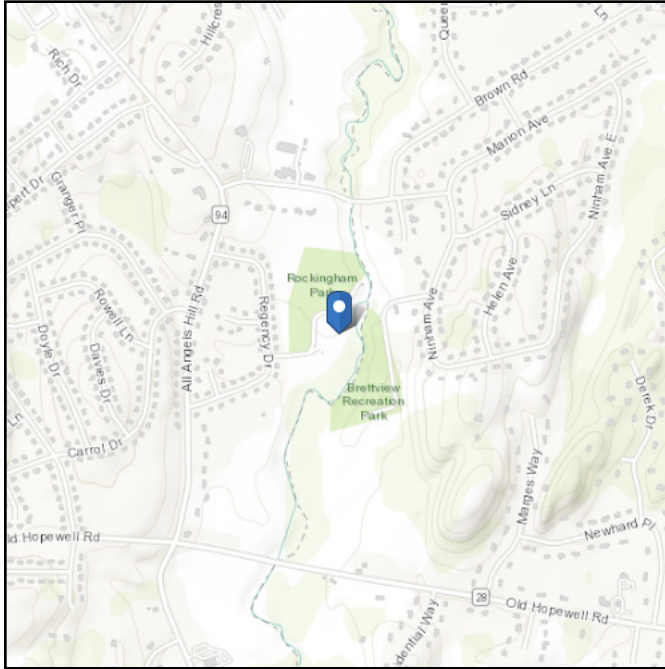
Axial Load, Pu =	85.86	kips @ 8.00 ft Below Grade
Moment, Mu =	5566.80	k-ft @ 8.00 ft Below Grade
Moment, ΦM_n =	7233.54	k-ft
MOMENT RATIO =	73.3%	OK

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 41.579856
Longitude: -73.8536
Elevation: 236.5109126372466 ft (NAVD 88)



Wind

Results:

Wind Speed	113 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	95 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Jan 21 2025

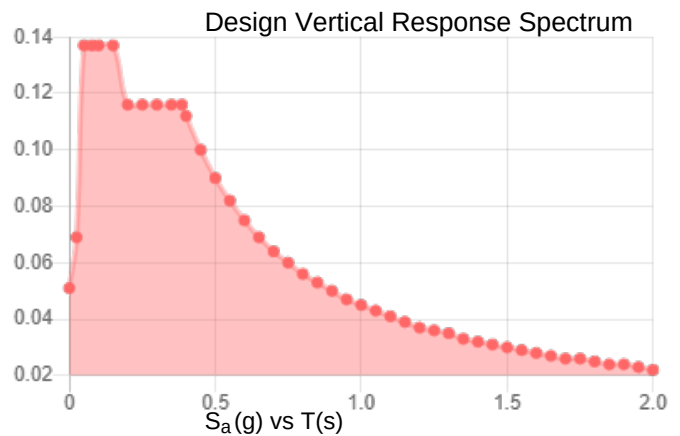
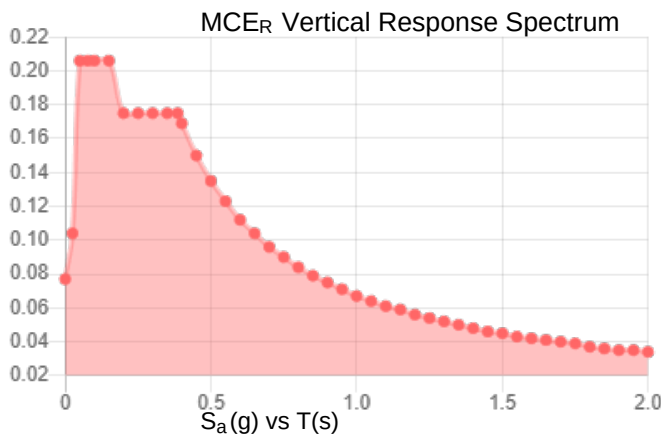
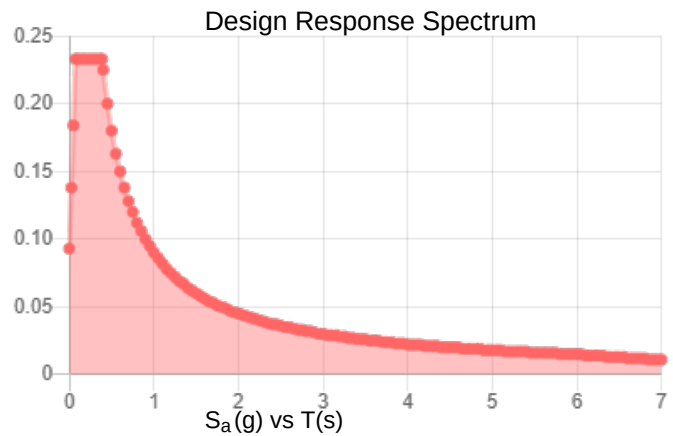
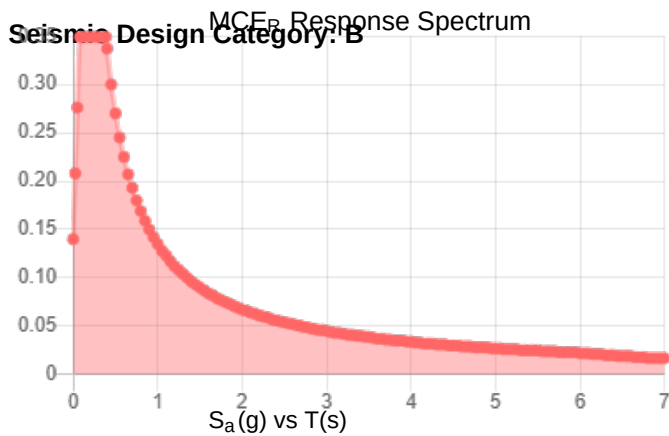
Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	0.218	S_{D1} :	0.09
S_1 :	0.056	T_L :	6
F_a :	1.6	PGA :	0.125
F_v :	2.4	PGA _M :	0.193
S_{MS} :	0.349	F_{PGA} :	1.551
S_{M1} :	0.135	I_e :	1
S_{DS} :	0.233	C_v :	0.737



Data Accessed: Tue Jan 21 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 15 F
Gust Speed 40 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Tue Jan 21 2025

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.