Date: **January 04, 2023**

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
724-416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Site Number:	CTL05069
	Site Name:	BENNETT POND
	FA Number:	10070924
Crown Castle Designation:	**BU Number:**	842857
	Site Name:	BENNETT POND
	JDE Job Number:	715649
	Work Order Number:	2190023
	Order Number:	614859 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	2190023
Site Data:	**66 SUGAR HOLLOW ROAD, DANBURY, FAIRFIELD County, CT** **Latitude *41° 20' 10"*, Longitude *-73° 28' 14.4"*** **106 Foot - Monopole Tower**	

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity – 84.3%**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code (2021 IBC) based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Didi Rossmiller

Respectfully submitted by:

STATE OF CONNECTICUT
TERRY P. STYRAN
31522
LICENSED
PROFESSIONAL ENGINEER

Terry P Styran
2023.01.05
09:42:27 -05'00'

Terry P. Styran, P.E.
Senior Project Engineer

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 - LC7
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 106 ft Monopole tower designed by Summit Manufacturing and mapped by Paul J. Ford and Company.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 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)
106.0	108.0	3	cci antennas	OPA65R-BU6D w/ Mount Pipe	1 2 1 6	3/8 13/16 7/8 1-5/8
		3	cci antennas	TPA65R-BU6DA-K		
		1	raycap	DC9-48-60-24-8C-EV_CCIV2		
	106.0	1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1201-1_HR-1]		
		1	tower mounts	Mount modifications		

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)
88.0	90.0	3	alcatel lucent	1900MHz RRH	1 3	7/8 1-1/4
		3	alcatel lucent	800MHZ RRH		
		3	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	DT465B-2XR w/ Mount Pipe		
		3	rfs celwave	APXVSPP18-C-A20		
	88.0	1	tower mounts	Platform Mount [LP 602-1]		
		1	tower mounts	Side Arm Mount [SO 102-3]		
75.0	75.0	1	gps	GPS_A	1	1/2
		1	tower mounts	Side Arm Mount [SO 701-1]		
59.0	59.0	3	fujitsu	TA08025-B604	1	1-3/8
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5110642	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5110641	CCISITES
4-GEOTECHNICAL REPORTS	5300808	CCISITES

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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

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.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	106 - 72.25	Pole	TP27.529x22.3x0.1875	1	-8.63	979.66	37.3	Pass
L2	72.25 - 35.75	Pole	TP32.809x26.6117x0.2188	2	-15.90	1362.14	68.6	Pass
L3	35.75 - 0	Pole	TP37.91x31.7129x0.25	3	-22.20	1835.58	84.3	Pass
							Summary	
						Pole (L3)	84.3	Pass
						Rating =	84.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	67.6	Pass
1	Base Plate	0	59.5	Pass
1	Base Foundation (Structure)	0	13.1	Pass
1	Base Foundation (Soil Interaction)	0	74.5	Pass

Structure Rating (max from all components) =	84.3%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	33.75	40.00	40.00
Number of Sides	18	18	18
Thickness (in)	0.1875	0.2188	0.2500
Socket Length (ft)	3.50	4.25	
Top Dia (in)	22.3000	26.6117	31.7129
Bot Dia (in)	27.5290	32.8090	37.9100
Grade		A572-65	
Weight (K)	1.7	2.8	3.7

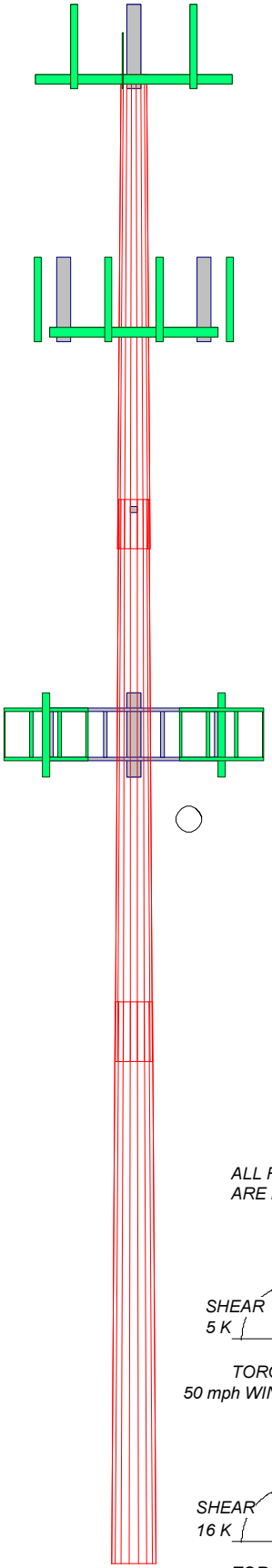
106.0 ft

72.3 ft

35.8 ft

0.0 ft

8.2



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 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 0.00 ft
8. TOWER RATING: 84.3%

ALL REACTIONS ARE FACTORED

AXIAL 33 K

SHEAR 5 K

MOMENT 389 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 22 K

SHEAR 16 K

MOMENT 1291 kip-ft

TORQUE 1 kip-ft
REACTIONS - 115 mph WIND

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job: *842857*			
Project:			
Client: Crown Castle	Drawn by: DRossmiller		App'd:
Code: TIA-222-H	Date: 01/04/23		Scale: NTS
Path: C:\Users\drossmiller\OneDrive - Crown Castle USA Inc\Desktop\temporary\842857\WO 2190023 - SA\Prod\842857.eri			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 Fairfield County, Connecticut.
- Tower base elevation above sea level: 528.00 ft.
- Basic wind speed of 115 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 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.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio 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		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	106.00-72.25	33.75	3.50	18	22.3000	27.5290	0.1875	0.7500	A572-65 (65 ksi)
L2	72.25-35.75	40.00	4.25	18	26.6117	32.8090	0.2188	0.8752	A572-65 (65 ksi)
L3	35.75-0.00	40.00		18	31.7129	37.9100	0.2500	1.0000	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	22.6151	13.1597	812.9413	7.8499	11.3284	71.7614	1626.9523	6.5811	3.5948	19.172
	27.9248	16.2716	1536.7834	9.7062	13.9847	109.8901	3075.5889	8.1374	4.5151	24.081
L2	27.5391	18.3291	1613.0754	9.3695	13.5188	119.3212	3228.2732	9.1663	4.2986	19.646
	33.2814	22.6330	3037.0558	11.5695	16.6670	182.2200	6078.1078	11.3186	5.3893	24.631
L3	32.8322	24.9658	3122.3551	11.1693	16.1102	193.8126	6248.8186	12.4853	5.1415	20.566
	38.4563	29.8832	5354.5790	13.3693	19.2583	278.0404	10716.2036	14.9444	6.2322	24.929

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 106.00-72.25				1	1	1			
L2 72.25-35.75				1	1	1			
L3 35.75-0.00				1	1	1			

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
** Safety Line **									
Safety Line 3/8	C	No	No	CaAa (Out Of Face)	106.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
5/8 rod/step	C	No	No	CaAa (Out Of Face)	106.00 - 0.00	1	No Ice	0.02	0.27
							1/2" Ice	0.12	0.70
							1" Ice	0.22	1.74
** 106 **									
PWRT-606-S(7/8)	C	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.89
							1/2" Ice	0.00	0.89
							1" Ice	0.00	0.89
RFFT-48SM-001-XXX(3/8)	C	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
LDF7-50A(1-5/8)	C	No	No	Inside Pole	106.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
PWRT-608-S(13/16)	C	No	No	Inside Pole	106.00 - 0.00	2	No Ice	0.00	0.62
							1/2" Ice	0.00	0.62
							1" Ice	0.00	0.62
2" Rigid Conduit	A	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
** 88 **									

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5F(1-1/4)	B	No	No	Inside Pole	88.00 - 0.00	3	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
HB114-08U3M12-XXXF(7/8)	B	No	No	Inside Pole	88.00 - 0.00	1	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
** 75 **									
LDF4-50A(1/2)	B	No	No	Inside Pole	75.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
*****									
CU12PSM9P8XXX (1-3/8)	B	No	No	Inside Pole	59.00 - 0.00	1	No Ice	0.00	1.66
							1/2" Ice	0.00	1.66
							1" Ice	0.00	1.66

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 K
L1	106.00-72.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	1.941	0.26
L2	72.25-35.75	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	2.099	0.28
L3	35.75-0.00	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	2.056	0.27

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 K
L1	106.00-72.25	A	0.938	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	14.608	0.34
L2	72.25-35.75	A	0.892	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	15.799	0.36
L3	35.75-0.00	A	0.800	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.23
		C		0.000	0.000	0.000	14.818	0.35

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	106.00-72.25	-0.4482	0.2587	-1.5985	0.9229
L2	72.25-35.75	-0.4513	0.2606	-1.6605	0.9587
L3	35.75-0.00	-0.4536	0.2619	-1.6474	0.9511

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

Discrete Tower Loads

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 K
** Lightning Rod **									
Lighting Rod 5/8" x 4'	C	From Leg	0.00 0.00 0.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.03 0.03 0.04
** 106 **									
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
TPA65R-BU6DA-K w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
TPA65R-BU6DA-K w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
TPA65R-BU6DA-K w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
DC9-48-60-24-8C-EV_CCIV2	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	2.74 2.96 3.20	0.02 0.04 0.07
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	0.85 1.36 1.53	0.85 1.36 1.53	0.02 0.04 0.06
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	A	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05

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 K
						1" Ice			
6' x 2" Mount Pipe	C	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Top Hat 14" Diameter x 2' 3" Tall	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	3.67 3.95 4.22	3.67 3.95 4.22	0.10 0.13 0.17
Side Arm Mount [SO 102-3]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	3.60 4.18 4.75	3.60 4.18 4.75	0.07 0.11 0.14
Platform Mount [LP 1201-1_HR-1]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	26.39 31.40 36.20	26.39 31.40 36.20	2.36 3.06 3.86
** 88 **									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
DT465B-2XR w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
1900MHz RRH	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
800MHZ RRH	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10

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 K
						1" Ice			
TD-RRH8X20-25	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
TD-RRH8X20-25	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
TD-RRH8X20-25	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
RRH2X50-800	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
RRH2X50-800	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
RRH2X50-800	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Side Arm Mount [SO 102-3]	C	None		0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.60 4.18 4.75	3.60 4.18 4.75	0.07 0.11 0.14
Platform Mount [LP 602-1]	C	None		0.0000	88.00	No Ice 1/2" Ice 1" Ice	31.07 34.82 38.48	31.07 34.82 38.48	1.34 1.97 2.67
** 75 ** GPS_A	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	From Leg	2.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
****** MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	59.00	No Ice 1/2" Ice 1" Ice	8.01 8.52 9.04	4.23 4.69 5.16	0.11 0.19 0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	59.00	No Ice 1/2" Ice 1" Ice	8.01 8.52 9.04	4.23 4.69 5.16	0.11 0.19 0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	59.00	No Ice	8.01 8.52	4.23 4.69	0.11 0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	9.04	5.16	0.29
							1" Ice			
TA08025-B604	A	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B605	A	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
RDIDC-9181-PF-48	A	From Leg	4.00		0.0000	59.00	No Ice	2.01	1.17	0.02
			0.00				1/2" Ice	2.19	1.31	0.04
			0.00				1" Ice	2.37	1.46	0.06
(2) 8' x 2" Mount Pipe	A	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(2) 8' x 2" Mount Pipe	B	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(2) 8' x 2" Mount Pipe	C	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
Commscope MC-PK8-DSH	C	None			0.0000	59.00	No Ice	34.24	34.24	1.75
							1/2" Ice	62.95	62.95	2.10
							1" Ice	91.66	91.66	2.45
***										

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

Comb. No.	Description
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
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 Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	106 - 72.25	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-16.00	-0.13	0.16
			Max. Mx	8	-8.63	-219.40	0.03
			Max. My	2	-8.63	-0.05	219.36
			Max. Vy	8	10.00	-219.40	0.03
			Max. Vx	2	-10.00	-0.05	219.36
			Max. Torque	22			-0.49
L2	72.25 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.15	-0.02	0.77
			Max. Mx	8	-15.90	-667.23	0.41
			Max. My	2	-15.91	-0.04	666.87
			Max. Vy	8	14.73	-667.23	0.41
			Max. Vx	2	-14.72	-0.04	666.87
			Max. Torque	21			-0.85
L3	35.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.48	0.12	0.69

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-22.20	-1291.30	0.40
			Max. My	2	-22.20	-0.01	1290.63
			Max. Vy	8	16.34	-1291.30	0.40
			Max. Vx	2	-16.33	-0.01	1290.63
			Max. Torque	21			-0.82

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	33.48	0.00	-0.00
	Max. H_x	20	22.22	16.32	0.00
	Max. H_z	3	16.67	0.00	16.31
	Max. M_x	2	1290.63	0.00	16.31
	Max. M_z	8	1291.30	-16.32	0.00
	Max. Torsion	9	0.78	-16.32	0.00
	Min. Vert	9	16.67	-16.32	0.00
	Min. H_x	8	22.22	-16.32	0.00
	Min. H_z	15	16.67	0.00	-16.31
	Min. M_x	14	-1289.82	0.00	-16.31
	Min. M_z	20	-1291.28	16.32	0.00
	Min. Torsion	21	-0.78	16.32	0.00

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	18.52	0.00	-0.00	-0.31	-0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	22.22	-0.00	-16.31	-1290.63	-0.01	-0.08
0.9 Dead+1.0 Wind 0 deg - No Ice	16.67	-0.00	-16.31	-1274.52	-0.01	-0.08
1.2 Dead+1.0 Wind 30 deg - No Ice	22.22	8.16	-14.13	-1117.90	-645.69	-0.46
0.9 Dead+1.0 Wind 30 deg - No Ice	16.67	8.16	-14.13	-1103.89	-637.65	-0.46
1.2 Dead+1.0 Wind 60 deg - No Ice	22.22	14.13	-8.16	-645.59	-1118.35	-0.71
0.9 Dead+1.0 Wind 60 deg - No Ice	16.67	14.13	-8.16	-637.45	-1104.44	-0.71
1.2 Dead+1.0 Wind 90 deg - No Ice	22.22	16.32	-0.00	-0.40	-1291.30	-0.78
0.9 Dead+1.0 Wind 90 deg - No Ice	16.67	16.32	-0.00	-0.29	-1275.20	-0.78
1.2 Dead+1.0 Wind 120 deg - No Ice	22.22	14.13	8.16	644.78	-1118.35	-0.63
0.9 Dead+1.0 Wind 120 deg - No Ice	16.67	14.13	8.16	636.86	-1104.43	-0.63
1.2 Dead+1.0 Wind 150 deg - No Ice	22.22	8.16	14.13	1117.09	-645.68	-0.32
0.9 Dead+1.0 Wind 150 deg - No Ice	16.67	8.16	14.13	1103.30	-637.65	-0.32
1.2 Dead+1.0 Wind 180 deg - No Ice	22.22	-0.00	16.31	1289.82	-0.01	0.08
0.9 Dead+1.0 Wind 180 deg - No Ice	16.67	-0.00	16.31	1273.93	-0.01	0.08
1.2 Dead+1.0 Wind 210 deg - No Ice	22.22	-8.16	14.13	1117.09	645.67	0.46

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 210 deg - No Ice	16.67	-8.16	14.13	1103.30	637.64	0.46
1.2 Dead+1.0 Wind 240 deg - No Ice	22.22	-14.13	8.16	644.78	1118.33	0.71
0.9 Dead+1.0 Wind 240 deg - No Ice	16.67	-14.13	8.16	636.86	1104.42	0.71
1.2 Dead+1.0 Wind 270 deg - No Ice	22.22	-16.32	-0.00	-0.40	1291.28	0.78
0.9 Dead+1.0 Wind 270 deg - No Ice	16.67	-16.32	-0.00	-0.29	1275.18	0.78
1.2 Dead+1.0 Wind 300 deg - No Ice	22.22	-14.13	-8.16	-645.59	1118.34	0.63
0.9 Dead+1.0 Wind 300 deg - No Ice	16.67	-14.13	-8.16	-637.45	1104.43	0.63
1.2 Dead+1.0 Wind 330 deg - No Ice	22.22	-8.16	-14.13	-1117.90	645.67	0.32
0.9 Dead+1.0 Wind 330 deg - No Ice	16.67	-8.16	-14.13	-1103.89	637.64	0.32
1.2 Dead+1.0 Ice+1.0 Temp	33.48	-0.00	0.00	-0.69	0.12	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	33.48	-0.00	-5.08	-388.62	0.12	-0.27
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	33.48	2.54	-4.40	-336.66	-194.10	-0.25
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	33.48	4.41	-2.54	-194.71	-336.27	-0.16
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	33.48	5.09	0.00	-0.79	-388.31	-0.03
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	33.48	4.41	2.54	193.12	-336.27	0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	33.48	2.54	4.40	335.08	-194.10	0.22
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	33.48	-0.00	5.08	387.04	0.12	0.27
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	33.48	-2.54	4.40	335.08	194.33	0.25
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	33.48	-4.41	2.54	193.12	336.50	0.16
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	33.48	-5.09	0.00	-0.79	388.54	0.03
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	33.48	-4.41	-2.54	-194.71	336.50	-0.11
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	33.48	-2.54	-4.40	-336.66	194.33	-0.22
Dead+Wind 0 deg - Service	18.52	-0.00	-4.18	-328.88	-0.01	-0.02
Dead+Wind 30 deg - Service	18.52	2.09	-3.62	-284.86	-164.40	-0.11
Dead+Wind 60 deg - Service	18.52	3.62	-2.09	-164.61	-284.75	-0.18
Dead+Wind 90 deg - Service	18.52	4.18	0.00	-0.34	-328.80	-0.20
Dead+Wind 120 deg - Service	18.52	3.62	2.09	163.94	-284.75	-0.16
Dead+Wind 150 deg - Service	18.52	2.09	3.62	284.19	-164.40	-0.09
Dead+Wind 180 deg - Service	18.52	-0.00	4.18	328.21	-0.01	0.02
Dead+Wind 210 deg - Service	18.52	-2.09	3.62	284.19	164.39	0.11
Dead+Wind 240 deg - Service	18.52	-3.62	2.09	163.94	284.73	0.18
Dead+Wind 270 deg - Service	18.52	-4.18	0.00	-0.34	328.78	0.20
Dead+Wind 300 deg - Service	18.52	-3.62	-2.09	-164.61	284.73	0.16
Dead+Wind 330 deg - Service	18.52	-2.09	-3.62	-284.86	164.39	0.09

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-18.52	0.00	0.00	18.52	0.00	0.000%
2	0.00	-22.22	-16.31	0.00	22.22	16.31	0.006%
3	0.00	-16.67	-16.31	0.00	16.67	16.31	0.005%
4	8.16	-22.22	-14.13	-8.16	22.22	14.13	0.000%
5	8.16	-16.67	-14.13	-8.16	16.67	14.13	0.000%
6	14.13	-22.22	-8.16	-14.13	22.22	8.16	0.000%
7	14.13	-16.67	-8.16	-14.13	16.67	8.16	0.000%
8	16.32	-22.22	0.00	-16.32	22.22	0.00	0.002%
9	16.32	-16.67	0.00	-16.32	16.67	0.00	0.005%
10	14.13	-22.22	8.16	-14.13	22.22	-8.16	0.000%
11	14.13	-16.67	8.16	-14.13	16.67	-8.16	0.000%
12	8.16	-22.22	14.13	-8.16	22.22	-14.13	0.000%
13	8.16	-16.67	14.13	-8.16	16.67	-14.13	0.000%
14	0.00	-22.22	16.31	0.00	22.22	-16.31	0.006%
15	0.00	-16.67	16.31	0.00	16.67	-16.31	0.005%
16	-8.16	-22.22	14.13	8.16	22.22	-14.13	0.000%
17	-8.16	-16.67	14.13	8.16	16.67	-14.13	0.000%
18	-14.13	-22.22	8.16	14.13	22.22	-8.16	0.000%
19	-14.13	-16.67	8.16	14.13	16.67	-8.16	0.000%
20	-16.32	-22.22	0.00	16.32	22.22	0.00	0.002%
21	-16.32	-16.67	0.00	16.32	16.67	0.00	0.005%
22	-14.13	-22.22	-8.16	14.13	22.22	8.16	0.000%
23	-14.13	-16.67	-8.16	14.13	16.67	8.16	0.000%
24	-8.16	-22.22	-14.13	8.16	22.22	14.13	0.000%
25	-8.16	-16.67	-14.13	8.16	16.67	14.13	0.000%
26	0.00	-33.48	0.00	0.00	33.48	-0.00	0.000%
27	0.00	-33.48	-5.08	0.00	33.48	5.08	0.001%
28	2.54	-33.48	-4.40	-2.54	33.48	4.40	0.001%
29	4.41	-33.48	-2.54	-4.41	33.48	2.54	0.001%
30	5.09	-33.48	0.00	-5.09	33.48	-0.00	0.001%
31	4.41	-33.48	2.54	-4.41	33.48	-2.54	0.001%
32	2.54	-33.48	4.40	-2.54	33.48	-4.40	0.001%
33	0.00	-33.48	5.08	0.00	33.48	-5.08	0.001%
34	-2.54	-33.48	4.40	2.54	33.48	-4.40	0.001%
35	-4.41	-33.48	2.54	4.41	33.48	-2.54	0.001%
36	-5.09	-33.48	0.00	5.09	33.48	-0.00	0.001%
37	-4.41	-33.48	-2.54	4.41	33.48	2.54	0.001%
38	-2.54	-33.48	-4.40	2.54	33.48	4.40	0.001%
39	0.00	-18.52	-4.18	0.00	18.52	4.18	0.005%
40	2.09	-18.52	-3.62	-2.09	18.52	3.62	0.005%
41	3.62	-18.52	-2.09	-3.62	18.52	2.09	0.005%
42	4.18	-18.52	0.00	-4.18	18.52	-0.00	0.005%
43	3.62	-18.52	2.09	-3.62	18.52	-2.09	0.005%
44	2.09	-18.52	3.62	-2.09	18.52	-3.62	0.005%
45	0.00	-18.52	4.18	0.00	18.52	-4.18	0.005%
46	-2.09	-18.52	3.62	2.09	18.52	-3.62	0.005%
47	-3.62	-18.52	2.09	3.62	18.52	-2.09	0.005%
48	-4.18	-18.52	0.00	4.18	18.52	-0.00	0.005%
49	-3.62	-18.52	-2.09	3.62	18.52	2.09	0.005%
50	-2.09	-18.52	-3.62	2.09	18.52	3.62	0.005%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00007309	0.00009733
3	Yes	14	0.00004808	0.00007927
4	Yes	18	0.00000001	0.00006607
5	Yes	17	0.00000001	0.00011796
6	Yes	18	0.00000001	0.00006859
7	Yes	17	0.00000001	0.00012263
8	Yes	15	0.00000001	0.00006552
9	Yes	14	0.00004808	0.00012151
10	Yes	18	0.00000001	0.00006517
11	Yes	17	0.00000001	0.00011638
12	Yes	18	0.00000001	0.00006780
13	Yes	17	0.00000001	0.00012125
14	Yes	14	0.00007310	0.00009723
15	Yes	14	0.00004808	0.00007922
16	Yes	18	0.00000001	0.00006762
17	Yes	17	0.00000001	0.00012094
18	Yes	18	0.00000001	0.00006523
19	Yes	17	0.00000001	0.00011649
20	Yes	15	0.00000001	0.00006552
21	Yes	14	0.00004808	0.00012150
22	Yes	18	0.00000001	0.00006866
23	Yes	17	0.00000001	0.00012276
24	Yes	18	0.00000001	0.00006590
25	Yes	17	0.00000001	0.00011767
26	Yes	6	0.00000001	0.00000001
27	Yes	15	0.00000001	0.00006071
28	Yes	15	0.00000001	0.00009706
29	Yes	15	0.00000001	0.00009935
30	Yes	15	0.00000001	0.00006054
31	Yes	15	0.00000001	0.00009695
32	Yes	15	0.00000001	0.00009673
33	Yes	15	0.00000001	0.00006026
34	Yes	15	0.00000001	0.00009831
35	Yes	15	0.00000001	0.00009608
36	Yes	15	0.00000001	0.00006052
37	Yes	15	0.00000001	0.00009827
38	Yes	15	0.00000001	0.00009846
39	Yes	13	0.00000001	0.00007307
40	Yes	13	0.00000001	0.00008224
41	Yes	13	0.00000001	0.00009668
42	Yes	13	0.00000001	0.00007567
43	Yes	13	0.00000001	0.00007776
44	Yes	13	0.00000001	0.00009259
45	Yes	13	0.00000001	0.00007282
46	Yes	13	0.00000001	0.00009099
47	Yes	13	0.00000001	0.00007824
48	Yes	13	0.00000001	0.00007564
49	Yes	13	0.00000001	0.00009753
50	Yes	13	0.00000001	0.00008101

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	106 - 72.25	17.405	40	1.2850	0.0030
L2	75.75 - 35.75	9.642	40	1.1136	0.0018
L3	40 - 0	2.859	40	0.6409	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	Lighting Rod 5/8" x 4'	40	17.405	1.2850	0.0030	38397
106.00	OPA65R-BU6D w/ Mount Pipe	40	17.405	1.2850	0.0030	38397
88.00	APXVSPP18-C-A20 w/ Mount Pipe	40	12.674	1.2026	0.0023	10665
75.00	GPS_A	40	9.464	1.1067	0.0018	6180
59.00	MX08FRO665-21 w/ Mount Pipe	40	5.980	0.9218	0.0012	4013

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	106 - 72.25	68.347	8	5.0498	0.0119
L2	75.75 - 35.75	37.872	8	4.3767	0.0071
L3	40 - 0	11.229	8	2.5187	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	Lighting Rod 5/8" x 4'	8	68.347	5.0498	0.0119	9911
106.00	OPA65R-BU6D w/ Mount Pipe	8	68.347	5.0498	0.0119	9911
88.00	APXVSPP18-C-A20 w/ Mount Pipe	8	49.779	4.7265	0.0089	2751
75.00	GPS_A	8	37.174	4.3497	0.0070	1591
59.00	MX08FRO665-21 w/ Mount Pipe	8	23.490	3.6229	0.0048	1029

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	33.75	0.00	0.0	15.9489	-8.63	933.01	0.009
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	40.00	0.00	0.0	22.1757	-15.90	1297.28	0.012
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	40.00	0.00	0.0	29.8832	-22.20	1748.17	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	219.42	575.10	0.382	0.00	575.10	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	667.29	944.73	0.706	0.00	944.73	0.000
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	1291.32	1481.51	0.872	0.00	1481.51	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	10.00	279.90	0.036	0.34	656.92	0.001
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	14.73	389.18	0.038	0.71	1088.32	0.001
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	16.34	524.45	0.031	0.71	1729.68	0.000

Pole Interaction Design Data

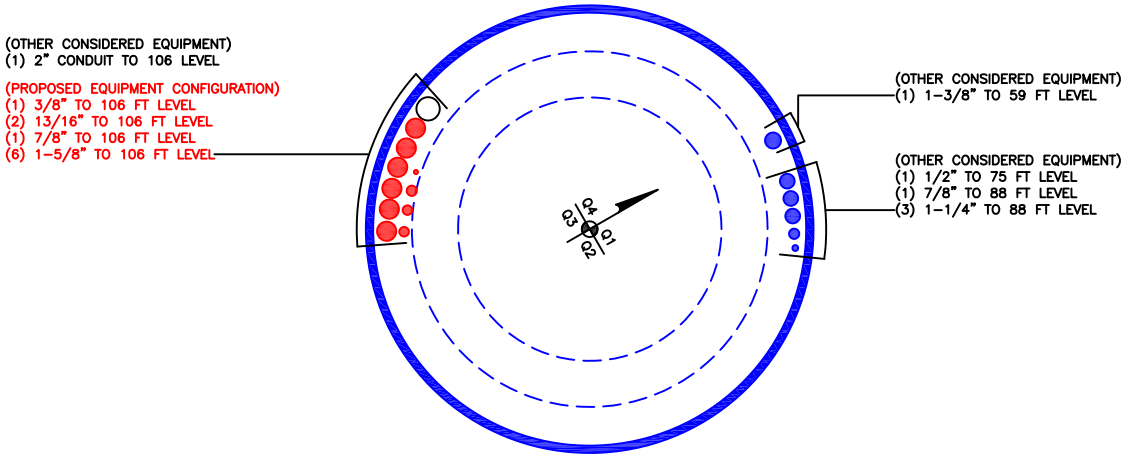
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	106 - 72.25 (1)	0.009	0.382	0.000	0.036	0.001	0.392	1.050	4.8.2
L2	72.25 - 35.75 (2)	0.012	0.706	0.000	0.038	0.001	0.720	1.050	4.8.2
L3	35.75 - 0 (3)	0.013	0.872	0.000	0.031	0.000	0.885	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	106 - 72.25	Pole	TP27.529x22.3x0.1875	1	-8.63	979.66	37.3	Pass
L2	72.25 - 35.75	Pole	TP32.809x26.6117x0.2188	2	-15.90	1362.14	68.6	Pass
L3	35.75 - 0	Pole	TP37.91x31.7129x0.25	3	-22.20	1835.58	84.3	Pass
							Summary	
						Pole (L3)	84.3	Pass
						RATING =	**84.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(1) 2" CONDUIT TO 106 LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 3/8" TO 106 FT LEVEL
(2) 13/16" TO 106 FT LEVEL
(1) 7/8" TO 106 FT LEVEL
(6) 1-5/8" TO 106 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-3/8" TO 59 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 75 FT LEVEL
(1) 7/8" TO 88 FT LEVEL
(3) 1-1/4" TO 88 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

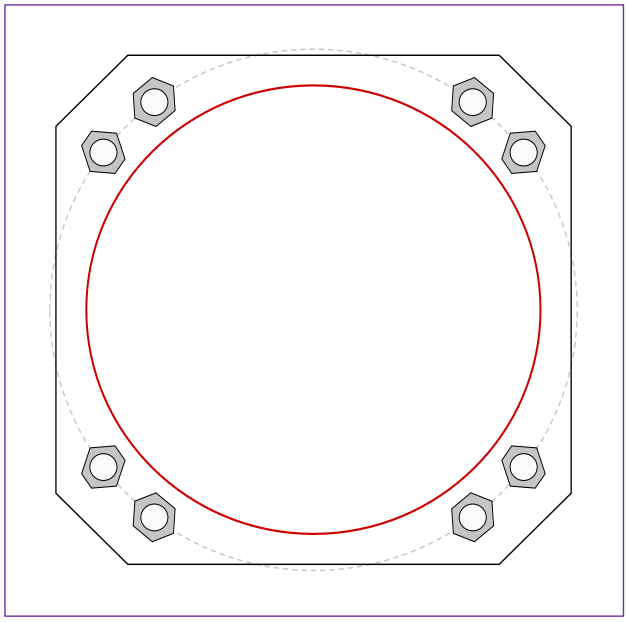
Monopole Base Plate Connection

Site Info	
BU #	842857
Site Name	Bennet Pond
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	1291.32
Axial Force (kips)	22.20
Shear Force (kips)	16.34

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 44" BC

Anchor Spacing: 6 in

Base Plate Data

43" W x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

37.91" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 173.13	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.04	ϕVn = 149.1	**67.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	28.1	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**59.5%**	**Pass**

Pier and Pad Foundation

BU # :	842857
Site Name:	Bennet Pond
App. Number:	

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☑
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	22.22	kips
Base Shear, Vu_comp:	16.32	kips
Moment, M_u:	1291.31	ft-kips
Tower Height, **H**:	106	ft
BP Dist. Above Fdn, bp_{dist}:	3	in
Bolt Circle / Bearing Plate Width, **BC**:	44	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	157.80	16.32	**9.8%**	**Pass**
Bearing Pressure (ksf)	23.04	5.21	**22.6%**	**Pass**
*Overturning (kip*ft)*	1870.32	1393.31	**74.5%**	**Pass**
*Pad Flexure (kip*ft)*	4965.62	683.88	**13.1%**	**Pass**
Pad Shear - 1-way (kips)	1098.05	39.19	**3.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.001	**0.4%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	9931.24	0.00	**0.0%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**13.1%**
Soil Rating*:	**74.5%**

Pad Properties		
Depth, **D**:	5.5	ft
Pad Width, W_1:	16.5	ft
Pad Thickness, **T**:	6	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	21	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δc:	150	pcf

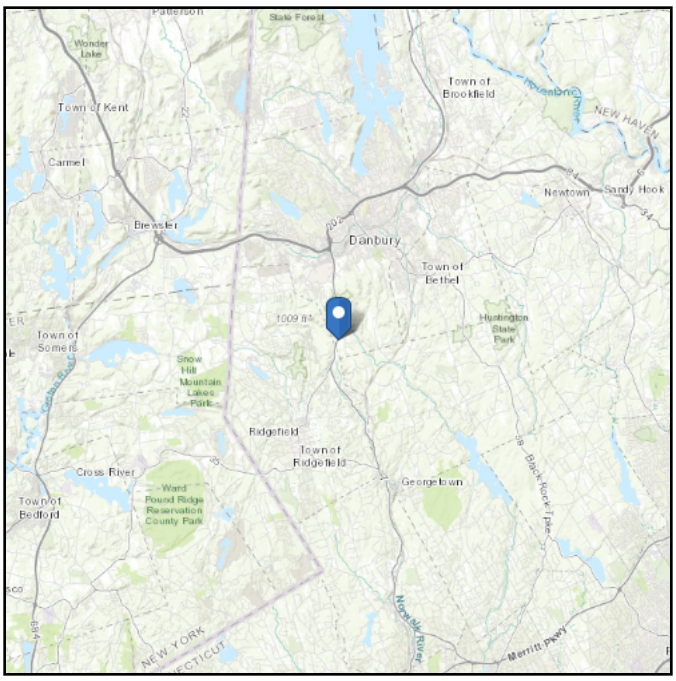
Soil Properties		
Total Soil Unit Weight, γ:	130	pcf
Ultimate Net Bearing, Qnet:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	42	degrees
SPT Blow Count, N_{blows}:	50	
Base Friction, μ:	0.45	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.336111
Risk Category:	II	**Longitude:**	-73.470667
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	527.6 ft (NAVD 88)



Wind

Results:

Wind Speed	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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: Sat Dec 17 2022

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 in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Seismic

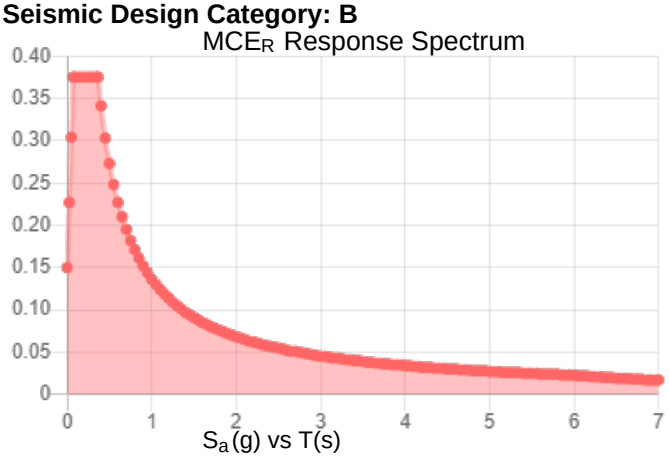
D - Default (see Section 11.4.3)

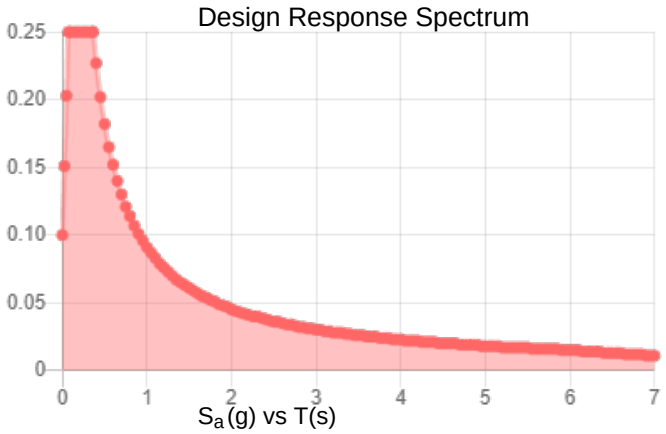
Site Soil Class:

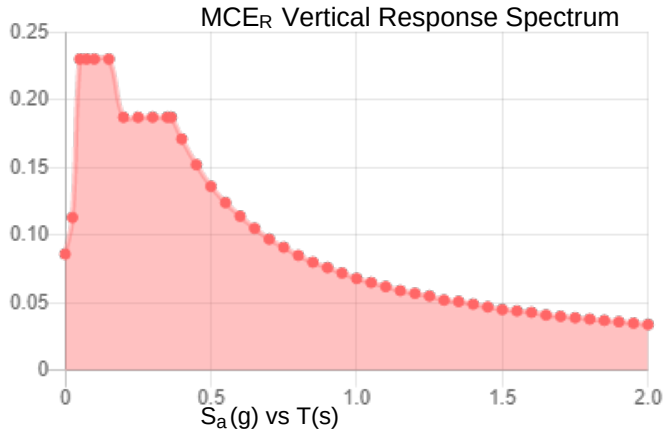
Results:

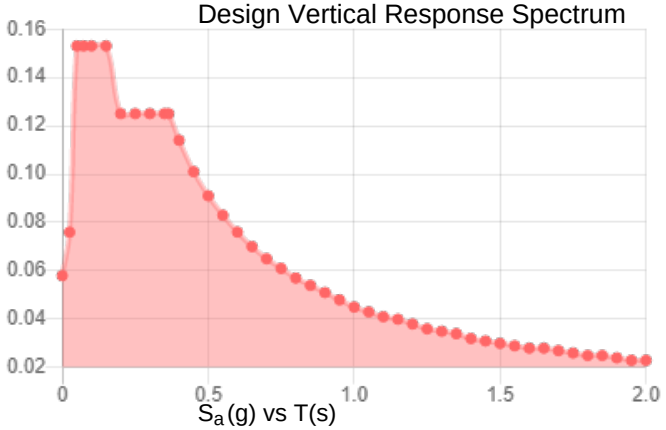
S_S :	0.234	S_{D1} :	0.091
S_1 :	0.057	T_L :	6
F_a :	1.6	PGA :	0.137
F_v :	2.4	PGA_M :	0.209
S_{MS} :	0.375	F_{PGA} :	1.527
S_{M1} :	0.136	I_e :	1
S_{DS} :	0.25	C_v :	0.768

Seismic Design Category: B









Data Accessed: **Sat Dec 17 2022**

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	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Sat Dec 17 2022

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.

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 - LC7
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 106 ft Monopole tower designed by Summit Manufacturing and mapped by Paul J. Ford and Company.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 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)
106.0	108.0	3	cci antennas	OPA65R-BU6D w/ Mount Pipe	1 2 1 6	3/8 13/16 7/8 1-5/8
		3	cci antennas	TPA65R-BU6DA-K		
		1	raycap	DC9-48-60-24-8C-EV_CCIV2		
	106.0	1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1201-1_HR-1]		
		1	tower mounts	Mount modifications		

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)
88.0	90.0	3	alcatel lucent	1900MHz RRH	1 3	7/8 1-1/4
		3	alcatel lucent	800MHZ RRH		
		3	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	DT465B-2XR w/ Mount Pipe		
		3	rfs celwave	APXVSPP18-C-A20		
	88.0	1	tower mounts	Platform Mount [LP 602-1]		
		1	tower mounts	Side Arm Mount [SO 102-3]		
75.0	75.0	1	gps	GPS_A	1	1/2
		1	tower mounts	Side Arm Mount [SO 701-1]		
59.0	59.0	3	fujitsu	TA08025-B604	1	1-3/8
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5110642	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5110641	CCISITES
4-GEOTECHNICAL REPORTS	5300808	CCISITES

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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

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.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	106 - 72.25	Pole	TP27.529x22.3x0.1875	1	-8.63	979.66	37.3	Pass
L2	72.25 - 35.75	Pole	TP32.809x26.6117x0.2188	2	-15.90	1362.14	68.6	Pass
L3	35.75 - 0	Pole	TP37.91x31.7129x0.25	3	-22.20	1835.58	84.3	Pass
							Summary	
						Pole (L3)	84.3	Pass
						Rating =	84.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	67.6	Pass
1	Base Plate	0	59.5	Pass
1	Base Foundation (Structure)	0	13.1	Pass
1	Base Foundation (Soil Interaction)	0	74.5	Pass

Structure Rating (max from all components) =	84.3%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	33.75	40.00	40.00
Number of Sides	18	18	18
Thickness (in)	0.1875	0.2188	0.2500
Socket Length (ft)	3.50	4.25	
Top Dia (in)	22.3000	26.6117	31.7129
Bot Dia (in)	27.5290	32.8090	37.9100
Grade		A572-65	
Weight (K)	1.7	2.8	3.7

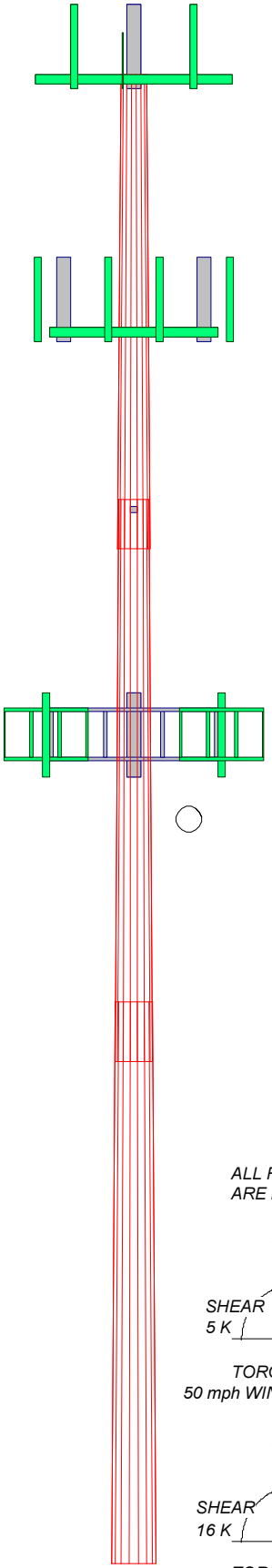
106.0 ft

72.3 ft

35.8 ft

0.0 ft

8.2



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 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 0.00 ft
8. TOWER RATING: 84.3%

ALL REACTIONS ARE FACTORED

AXIAL 33 K

SHEAR 5 K

MOMENT 389 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 22 K

SHEAR 16 K

MOMENT 1291 kip-ft

TORQUE 1 kip-ft
REACTIONS - 115 mph WIND

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job: *842857*			
Project:			
Client: Crown Castle	Drawn by: DRossmiller		App'd:
Code: TIA-222-H	Date: 01/04/23		Scale: NTS
Path: C:\Users\drossmiller\OneDrive - Crown Castle USA Inc\Desktop\temporary\842857\WO 2190023 - SA\Prod\842857.eri			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 Fairfield County, Connecticut.
- Tower base elevation above sea level: 528.00 ft.
- Basic wind speed of 115 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 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.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio 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		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	106.00-72.25	33.75	3.50	18	22.3000	27.5290	0.1875	0.7500	A572-65 (65 ksi)
L2	72.25-35.75	40.00	4.25	18	26.6117	32.8090	0.2188	0.8752	A572-65 (65 ksi)
L3	35.75-0.00	40.00		18	31.7129	37.9100	0.2500	1.0000	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	22.6151	13.1597	812.9413	7.8499	11.3284	71.7614	1626.9523	6.5811	3.5948	19.172
	27.9248	16.2716	1536.7834	9.7062	13.9847	109.8901	3075.5889	8.1374	4.5151	24.081
L2	27.5391	18.3291	1613.0754	9.3695	13.5188	119.3212	3228.2732	9.1663	4.2986	19.646
	33.2814	22.6330	3037.0558	11.5695	16.6670	182.2200	6078.1078	11.3186	5.3893	24.631
L3	32.8322	24.9658	3122.3551	11.1693	16.1102	193.8126	6248.8186	12.4853	5.1415	20.566
	38.4563	29.8832	5354.5790	13.3693	19.2583	278.0404	10716.2036	14.9444	6.2322	24.929

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 106.00-72.25				1	1	1			
L2 72.25-35.75				1	1	1			
L3 35.75-0.00				1	1	1			

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
** Safety Line **									
Safety Line 3/8	C	No	No	CaAa (Out Of Face)	106.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
5/8 rod/step	C	No	No	CaAa (Out Of Face)	106.00 - 0.00	1	No Ice	0.02	0.27
							1/2" Ice	0.12	0.70
							1" Ice	0.22	1.74
** 106 **									
PWRT-606-S(7/8)	C	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.89
							1/2" Ice	0.00	0.89
							1" Ice	0.00	0.89
RFFT-48SM-001-XXX(3/8)	C	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
LDF7-50A(1-5/8)	C	No	No	Inside Pole	106.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
PWRT-608-S(13/16)	C	No	No	Inside Pole	106.00 - 0.00	2	No Ice	0.00	0.62
							1/2" Ice	0.00	0.62
							1" Ice	0.00	0.62
2" Rigid Conduit	A	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
** 88 **									

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5F(1-1/4)	B	No	No	Inside Pole	88.00 - 0.00	3	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
HB114-08U3M12-XXXF(7/8)	B	No	No	Inside Pole	88.00 - 0.00	1	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
** 75 **									
LDF4-50A(1/2)	B	No	No	Inside Pole	75.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
*****									
CU12PSM9P8XXX (1-3/8)	B	No	No	Inside Pole	59.00 - 0.00	1	No Ice	0.00	1.66
							1/2" Ice	0.00	1.66
							1" Ice	0.00	1.66

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 K
L1	106.00-72.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	1.941	0.26
L2	72.25-35.75	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	2.099	0.28
L3	35.75-0.00	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	2.056	0.27

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 K
L1	106.00-72.25	A	0.938	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	14.608	0.34
L2	72.25-35.75	A	0.892	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	15.799	0.36
L3	35.75-0.00	A	0.800	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.23
		C		0.000	0.000	0.000	14.818	0.35

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	106.00-72.25	-0.4482	0.2587	-1.5985	0.9229
L2	72.25-35.75	-0.4513	0.2606	-1.6605	0.9587
L3	35.75-0.00	-0.4536	0.2619	-1.6474	0.9511

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

Discrete Tower Loads

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 K
** Lightning Rod **									
Lighting Rod 5/8" x 4'	C	From Leg	0.00 0.00 0.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.03 0.03 0.04
** 106 **									
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.25 13.00 13.76	6.05 6.71 7.39	0.09 0.18 0.27
TPA65R-BU6DA-K w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
TPA65R-BU6DA-K w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
TPA65R-BU6DA-K w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	12.87 13.67 14.49	6.39 7.10 7.82	0.09 0.18 0.28
DC9-48-60-24-8C-EV_CCIV2	A	From Leg	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	2.74 2.96 3.20	0.02 0.04 0.07
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	0.85 1.36 1.53	0.85 1.36 1.53	0.02 0.04 0.06
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	A	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05

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 K
						1" Ice			
6' x 2" Mount Pipe	C	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Top Hat 14" Diameter x 2' 3" Tall	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	3.67 3.95 4.22	3.67 3.95 4.22	0.10 0.13 0.17
Side Arm Mount [SO 102-3]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	3.60 4.18 4.75	3.60 4.18 4.75	0.07 0.11 0.14
Platform Mount [LP 1201-1_HR-1]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice	26.39 31.40 36.20	26.39 31.40 36.20	2.36 3.06 3.86
** 88 **									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.10 0.16 0.23
DT465B-2XR w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
1900MHz RRH	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
800MHZ RRH	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10

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 K
						1" Ice			
TD-RRH8X20-25	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
TD-RRH8X20-25	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
TD-RRH8X20-25	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
RRH2X50-800	A	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
RRH2X50-800	B	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
RRH2X50-800	C	From Leg	4.00 0.00 2.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Side Arm Mount [SO 102-3]	C	None		0.0000	88.00	No Ice 1/2" Ice 1" Ice	3.60 4.18 4.75	3.60 4.18 4.75	0.07 0.11 0.14
Platform Mount [LP 602-1]	C	None		0.0000	88.00	No Ice 1/2" Ice 1" Ice	31.07 34.82 38.48	31.07 34.82 38.48	1.34 1.97 2.67
** 75 ** GPS_A	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	From Leg	2.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
****** MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	59.00	No Ice 1/2" Ice 1" Ice	8.01 8.52 9.04	4.23 4.69 5.16	0.11 0.19 0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	59.00	No Ice 1/2" Ice 1" Ice	8.01 8.52 9.04	4.23 4.69 5.16	0.11 0.19 0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	59.00	No Ice	8.01 8.52	4.23 4.69	0.11 0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	9.04	5.16	0.29
							1" Ice			
TA08025-B604	A	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00		0.0000	59.00	No Ice	1.96	0.98	0.06
			0.00				1/2" Ice	2.14	1.11	0.08
			0.00				1" Ice	2.32	1.25	0.10
TA08025-B605	A	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00		0.0000	59.00	No Ice	1.96	1.13	0.08
			0.00				1/2" Ice	2.14	1.27	0.09
			0.00				1" Ice	2.32	1.41	0.11
RDIDC-9181-PF-48	A	From Leg	4.00		0.0000	59.00	No Ice	2.01	1.17	0.02
			0.00				1/2" Ice	2.19	1.31	0.04
			0.00				1" Ice	2.37	1.46	0.06
(2) 8' x 2" Mount Pipe	A	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(2) 8' x 2" Mount Pipe	B	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(2) 8' x 2" Mount Pipe	C	From Leg	4.00		0.0000	59.00	No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
Commscope MC-PK8-DSH	C	None			0.0000	59.00	No Ice	34.24	34.24	1.75
							1/2" Ice	62.95	62.95	2.10
							1" Ice	91.66	91.66	2.45
***										

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

Comb. No.	Description
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
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 Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	106 - 72.25	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-16.00	-0.13	0.16
			Max. Mx	8	-8.63	-219.40	0.03
			Max. My	2	-8.63	-0.05	219.36
			Max. Vy	8	10.00	-219.40	0.03
			Max. Vx	2	-10.00	-0.05	219.36
			Max. Torque	22			-0.49
L2	72.25 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.15	-0.02	0.77
			Max. Mx	8	-15.90	-667.23	0.41
			Max. My	2	-15.91	-0.04	666.87
			Max. Vy	8	14.73	-667.23	0.41
			Max. Vx	2	-14.72	-0.04	666.87
			Max. Torque	21			-0.85
L3	35.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.48	0.12	0.69

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-22.20	-1291.30	0.40
			Max. My	2	-22.20	-0.01	1290.63
			Max. Vy	8	16.34	-1291.30	0.40
			Max. Vx	2	-16.33	-0.01	1290.63
			Max. Torque	21			-0.82

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	33.48	0.00	-0.00
	Max. H_x	20	22.22	16.32	0.00
	Max. H_z	3	16.67	0.00	16.31
	Max. M_x	2	1290.63	0.00	16.31
	Max. M_z	8	1291.30	-16.32	0.00
	Max. Torsion	9	0.78	-16.32	0.00
	Min. Vert	9	16.67	-16.32	0.00
	Min. H_x	8	22.22	-16.32	0.00
	Min. H_z	15	16.67	0.00	-16.31
	Min. M_x	14	-1289.82	0.00	-16.31
	Min. M_z	20	-1291.28	16.32	0.00
	Min. Torsion	21	-0.78	16.32	0.00

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	18.52	0.00	-0.00	-0.31	-0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	22.22	-0.00	-16.31	-1290.63	-0.01	-0.08
0.9 Dead+1.0 Wind 0 deg - No Ice	16.67	-0.00	-16.31	-1274.52	-0.01	-0.08
1.2 Dead+1.0 Wind 30 deg - No Ice	22.22	8.16	-14.13	-1117.90	-645.69	-0.46
0.9 Dead+1.0 Wind 30 deg - No Ice	16.67	8.16	-14.13	-1103.89	-637.65	-0.46
1.2 Dead+1.0 Wind 60 deg - No Ice	22.22	14.13	-8.16	-645.59	-1118.35	-0.71
0.9 Dead+1.0 Wind 60 deg - No Ice	16.67	14.13	-8.16	-637.45	-1104.44	-0.71
1.2 Dead+1.0 Wind 90 deg - No Ice	22.22	16.32	-0.00	-0.40	-1291.30	-0.78
0.9 Dead+1.0 Wind 90 deg - No Ice	16.67	16.32	-0.00	-0.29	-1275.20	-0.78
1.2 Dead+1.0 Wind 120 deg - No Ice	22.22	14.13	8.16	644.78	-1118.35	-0.63
0.9 Dead+1.0 Wind 120 deg - No Ice	16.67	14.13	8.16	636.86	-1104.43	-0.63
1.2 Dead+1.0 Wind 150 deg - No Ice	22.22	8.16	14.13	1117.09	-645.68	-0.32
0.9 Dead+1.0 Wind 150 deg - No Ice	16.67	8.16	14.13	1103.30	-637.65	-0.32
1.2 Dead+1.0 Wind 180 deg - No Ice	22.22	-0.00	16.31	1289.82	-0.01	0.08
0.9 Dead+1.0 Wind 180 deg - No Ice	16.67	-0.00	16.31	1273.93	-0.01	0.08
1.2 Dead+1.0 Wind 210 deg - No Ice	22.22	-8.16	14.13	1117.09	645.67	0.46

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 210 deg - No Ice	16.67	-8.16	14.13	1103.30	637.64	0.46
1.2 Dead+1.0 Wind 240 deg - No Ice	22.22	-14.13	8.16	644.78	1118.33	0.71
0.9 Dead+1.0 Wind 240 deg - No Ice	16.67	-14.13	8.16	636.86	1104.42	0.71
1.2 Dead+1.0 Wind 270 deg - No Ice	22.22	-16.32	-0.00	-0.40	1291.28	0.78
0.9 Dead+1.0 Wind 270 deg - No Ice	16.67	-16.32	-0.00	-0.29	1275.18	0.78
1.2 Dead+1.0 Wind 300 deg - No Ice	22.22	-14.13	-8.16	-645.59	1118.34	0.63
0.9 Dead+1.0 Wind 300 deg - No Ice	16.67	-14.13	-8.16	-637.45	1104.43	0.63
1.2 Dead+1.0 Wind 330 deg - No Ice	22.22	-8.16	-14.13	-1117.90	645.67	0.32
0.9 Dead+1.0 Wind 330 deg - No Ice	16.67	-8.16	-14.13	-1103.89	637.64	0.32
1.2 Dead+1.0 Ice+1.0 Temp	33.48	-0.00	0.00	-0.69	0.12	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	33.48	-0.00	-5.08	-388.62	0.12	-0.27
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	33.48	2.54	-4.40	-336.66	-194.10	-0.25
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	33.48	4.41	-2.54	-194.71	-336.27	-0.16
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	33.48	5.09	0.00	-0.79	-388.31	-0.03
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	33.48	4.41	2.54	193.12	-336.27	0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	33.48	2.54	4.40	335.08	-194.10	0.22
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	33.48	-0.00	5.08	387.04	0.12	0.27
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	33.48	-2.54	4.40	335.08	194.33	0.25
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	33.48	-4.41	2.54	193.12	336.50	0.16
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	33.48	-5.09	0.00	-0.79	388.54	0.03
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	33.48	-4.41	-2.54	-194.71	336.50	-0.11
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	33.48	-2.54	-4.40	-336.66	194.33	-0.22
Dead+Wind 0 deg - Service	18.52	-0.00	-4.18	-328.88	-0.01	-0.02
Dead+Wind 30 deg - Service	18.52	2.09	-3.62	-284.86	-164.40	-0.11
Dead+Wind 60 deg - Service	18.52	3.62	-2.09	-164.61	-284.75	-0.18
Dead+Wind 90 deg - Service	18.52	4.18	0.00	-0.34	-328.80	-0.20
Dead+Wind 120 deg - Service	18.52	3.62	2.09	163.94	-284.75	-0.16
Dead+Wind 150 deg - Service	18.52	2.09	3.62	284.19	-164.40	-0.09
Dead+Wind 180 deg - Service	18.52	-0.00	4.18	328.21	-0.01	0.02
Dead+Wind 210 deg - Service	18.52	-2.09	3.62	284.19	164.39	0.11
Dead+Wind 240 deg - Service	18.52	-3.62	2.09	163.94	284.73	0.18
Dead+Wind 270 deg - Service	18.52	-4.18	0.00	-0.34	328.78	0.20
Dead+Wind 300 deg - Service	18.52	-3.62	-2.09	-164.61	284.73	0.16
Dead+Wind 330 deg - Service	18.52	-2.09	-3.62	-284.86	164.39	0.09

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-18.52	0.00	0.00	18.52	0.00	0.000%
2	0.00	-22.22	-16.31	0.00	22.22	16.31	0.006%
3	0.00	-16.67	-16.31	0.00	16.67	16.31	0.005%
4	8.16	-22.22	-14.13	-8.16	22.22	14.13	0.000%
5	8.16	-16.67	-14.13	-8.16	16.67	14.13	0.000%
6	14.13	-22.22	-8.16	-14.13	22.22	8.16	0.000%
7	14.13	-16.67	-8.16	-14.13	16.67	8.16	0.000%
8	16.32	-22.22	0.00	-16.32	22.22	0.00	0.002%
9	16.32	-16.67	0.00	-16.32	16.67	0.00	0.005%
10	14.13	-22.22	8.16	-14.13	22.22	-8.16	0.000%
11	14.13	-16.67	8.16	-14.13	16.67	-8.16	0.000%
12	8.16	-22.22	14.13	-8.16	22.22	-14.13	0.000%
13	8.16	-16.67	14.13	-8.16	16.67	-14.13	0.000%
14	0.00	-22.22	16.31	0.00	22.22	-16.31	0.006%
15	0.00	-16.67	16.31	0.00	16.67	-16.31	0.005%
16	-8.16	-22.22	14.13	8.16	22.22	-14.13	0.000%
17	-8.16	-16.67	14.13	8.16	16.67	-14.13	0.000%
18	-14.13	-22.22	8.16	14.13	22.22	-8.16	0.000%
19	-14.13	-16.67	8.16	14.13	16.67	-8.16	0.000%
20	-16.32	-22.22	0.00	16.32	22.22	0.00	0.002%
21	-16.32	-16.67	0.00	16.32	16.67	0.00	0.005%
22	-14.13	-22.22	-8.16	14.13	22.22	8.16	0.000%
23	-14.13	-16.67	-8.16	14.13	16.67	8.16	0.000%
24	-8.16	-22.22	-14.13	8.16	22.22	14.13	0.000%
25	-8.16	-16.67	-14.13	8.16	16.67	14.13	0.000%
26	0.00	-33.48	0.00	0.00	33.48	-0.00	0.000%
27	0.00	-33.48	-5.08	0.00	33.48	5.08	0.001%
28	2.54	-33.48	-4.40	-2.54	33.48	4.40	0.001%
29	4.41	-33.48	-2.54	-4.41	33.48	2.54	0.001%
30	5.09	-33.48	0.00	-5.09	33.48	-0.00	0.001%
31	4.41	-33.48	2.54	-4.41	33.48	-2.54	0.001%
32	2.54	-33.48	4.40	-2.54	33.48	-4.40	0.001%
33	0.00	-33.48	5.08	0.00	33.48	-5.08	0.001%
34	-2.54	-33.48	4.40	2.54	33.48	-4.40	0.001%
35	-4.41	-33.48	2.54	4.41	33.48	-2.54	0.001%
36	-5.09	-33.48	0.00	5.09	33.48	-0.00	0.001%
37	-4.41	-33.48	-2.54	4.41	33.48	2.54	0.001%
38	-2.54	-33.48	-4.40	2.54	33.48	4.40	0.001%
39	0.00	-18.52	-4.18	0.00	18.52	4.18	0.005%
40	2.09	-18.52	-3.62	-2.09	18.52	3.62	0.005%
41	3.62	-18.52	-2.09	-3.62	18.52	2.09	0.005%
42	4.18	-18.52	0.00	-4.18	18.52	-0.00	0.005%
43	3.62	-18.52	2.09	-3.62	18.52	-2.09	0.005%
44	2.09	-18.52	3.62	-2.09	18.52	-3.62	0.005%
45	0.00	-18.52	4.18	0.00	18.52	-4.18	0.005%
46	-2.09	-18.52	3.62	2.09	18.52	-3.62	0.005%
47	-3.62	-18.52	2.09	3.62	18.52	-2.09	0.005%
48	-4.18	-18.52	0.00	4.18	18.52	-0.00	0.005%
49	-3.62	-18.52	-2.09	3.62	18.52	2.09	0.005%
50	-2.09	-18.52	-3.62	2.09	18.52	3.62	0.005%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00007309	0.00009733
3	Yes	14	0.00004808	0.00007927
4	Yes	18	0.00000001	0.00006607
5	Yes	17	0.00000001	0.00011796
6	Yes	18	0.00000001	0.00006859
7	Yes	17	0.00000001	0.00012263
8	Yes	15	0.00000001	0.00006552
9	Yes	14	0.00004808	0.00012151
10	Yes	18	0.00000001	0.00006517
11	Yes	17	0.00000001	0.00011638
12	Yes	18	0.00000001	0.00006780
13	Yes	17	0.00000001	0.00012125
14	Yes	14	0.00007310	0.00009723
15	Yes	14	0.00004808	0.00007922
16	Yes	18	0.00000001	0.00006762
17	Yes	17	0.00000001	0.00012094
18	Yes	18	0.00000001	0.00006523
19	Yes	17	0.00000001	0.00011649
20	Yes	15	0.00000001	0.00006552
21	Yes	14	0.00004808	0.00012150
22	Yes	18	0.00000001	0.00006866
23	Yes	17	0.00000001	0.00012276
24	Yes	18	0.00000001	0.00006590
25	Yes	17	0.00000001	0.00011767
26	Yes	6	0.00000001	0.00000001
27	Yes	15	0.00000001	0.00006071
28	Yes	15	0.00000001	0.00009706
29	Yes	15	0.00000001	0.00009935
30	Yes	15	0.00000001	0.00006054
31	Yes	15	0.00000001	0.00009695
32	Yes	15	0.00000001	0.00009673
33	Yes	15	0.00000001	0.00006026
34	Yes	15	0.00000001	0.00009831
35	Yes	15	0.00000001	0.00009608
36	Yes	15	0.00000001	0.00006052
37	Yes	15	0.00000001	0.00009827
38	Yes	15	0.00000001	0.00009846
39	Yes	13	0.00000001	0.00007307
40	Yes	13	0.00000001	0.00008224
41	Yes	13	0.00000001	0.00009668
42	Yes	13	0.00000001	0.00007567
43	Yes	13	0.00000001	0.00007776
44	Yes	13	0.00000001	0.00009259
45	Yes	13	0.00000001	0.00007282
46	Yes	13	0.00000001	0.00009099
47	Yes	13	0.00000001	0.00007824
48	Yes	13	0.00000001	0.00007564
49	Yes	13	0.00000001	0.00009753
50	Yes	13	0.00000001	0.00008101

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	106 - 72.25	17.405	40	1.2850	0.0030
L2	75.75 - 35.75	9.642	40	1.1136	0.0018
L3	40 - 0	2.859	40	0.6409	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	Lighting Rod 5/8" x 4'	40	17.405	1.2850	0.0030	38397
106.00	OPA65R-BU6D w/ Mount Pipe	40	17.405	1.2850	0.0030	38397
88.00	APXVSPP18-C-A20 w/ Mount Pipe	40	12.674	1.2026	0.0023	10665
75.00	GPS_A	40	9.464	1.1067	0.0018	6180
59.00	MX08FRO665-21 w/ Mount Pipe	40	5.980	0.9218	0.0012	4013

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	106 - 72.25	68.347	8	5.0498	0.0119
L2	75.75 - 35.75	37.872	8	4.3767	0.0071
L3	40 - 0	11.229	8	2.5187	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	Lighting Rod 5/8" x 4'	8	68.347	5.0498	0.0119	9911
106.00	OPA65R-BU6D w/ Mount Pipe	8	68.347	5.0498	0.0119	9911
88.00	APXVSPP18-C-A20 w/ Mount Pipe	8	49.779	4.7265	0.0089	2751
75.00	GPS_A	8	37.174	4.3497	0.0070	1591
59.00	MX08FRO665-21 w/ Mount Pipe	8	23.490	3.6229	0.0048	1029

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	33.75	0.00	0.0	15.9489	-8.63	933.01	0.009
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	40.00	0.00	0.0	22.1757	-15.90	1297.28	0.012
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	40.00	0.00	0.0	29.8832	-22.20	1748.17	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	219.42	575.10	0.382	0.00	575.10	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	667.29	944.73	0.706	0.00	944.73	0.000
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	1291.32	1481.51	0.872	0.00	1481.51	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	106 - 72.25 (1)	TP27.529x22.3x0.1875	10.00	279.90	0.036	0.34	656.92	0.001
L2	72.25 - 35.75 (2)	TP32.809x26.6117x0.2188	14.73	389.18	0.038	0.71	1088.32	0.001
L3	35.75 - 0 (3)	TP37.91x31.7129x0.25	16.34	524.45	0.031	0.71	1729.68	0.000

Pole Interaction Design Data

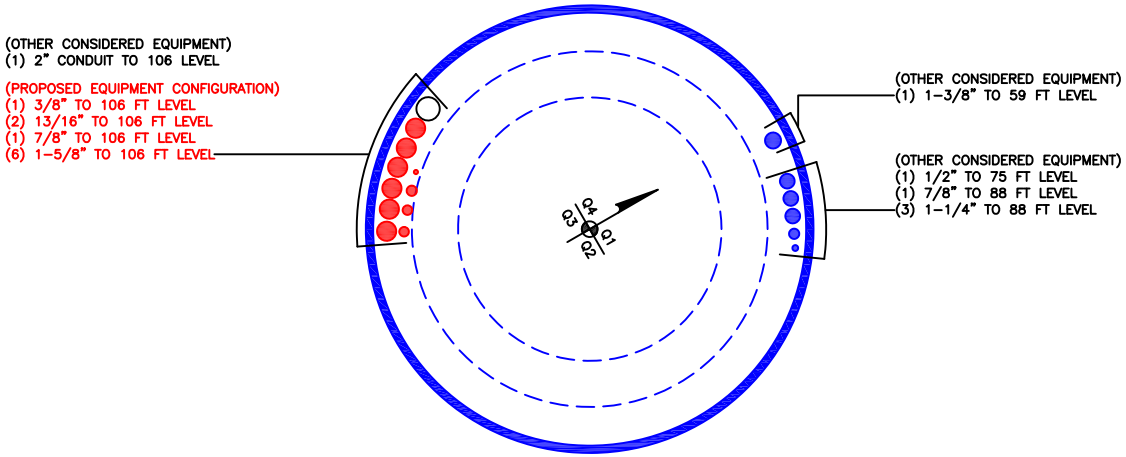
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	106 - 72.25 (1)	0.009	0.382	0.000	0.036	0.001	0.392	1.050	4.8.2
L2	72.25 - 35.75 (2)	0.012	0.706	0.000	0.038	0.001	0.720	1.050	4.8.2
L3	35.75 - 0 (3)	0.013	0.872	0.000	0.031	0.000	0.885	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	106 - 72.25	Pole	TP27.529x22.3x0.1875	1	-8.63	979.66	37.3	Pass
L2	72.25 - 35.75	Pole	TP32.809x26.6117x0.2188	2	-15.90	1362.14	68.6	Pass
L3	35.75 - 0	Pole	TP37.91x31.7129x0.25	3	-22.20	1835.58	84.3	Pass
							Summary	
						Pole (L3)	84.3	Pass
						RATING =	**84.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(1) 2" CONDUIT TO 106 LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 3/8" TO 106 FT LEVEL
(2) 13/16" TO 106 FT LEVEL
(1) 7/8" TO 106 FT LEVEL
(6) 1-5/8" TO 106 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-3/8" TO 59 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 75 FT LEVEL
(1) 7/8" TO 88 FT LEVEL
(3) 1-1/4" TO 88 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

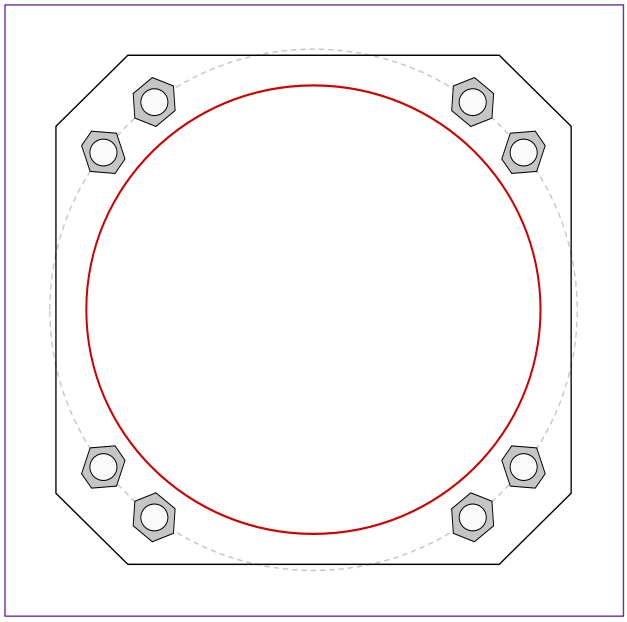
Monopole Base Plate Connection

Site Info	
BU #	842857
Site Name	Bennet Pond
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	1291.32
Axial Force (kips)	22.20
Shear Force (kips)	16.34

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 44" BC

Anchor Spacing: 6 in

Base Plate Data

43" W x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

37.91" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 173.13	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.04	ϕVn = 149.1	**67.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	28.1	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**59.5%**	**Pass**

Pier and Pad Foundation

BU # :	842857
Site Name:	Bennet Pond
App. Number:	

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☑
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	22.22	kips
Base Shear, Vu_comp:	16.32	kips
Moment, M_u:	1291.31	ft-kips
Tower Height, **H**:	106	ft
BP Dist. Above Fdn, bp_{dist}:	3	in
Bolt Circle / Bearing Plate Width, **BC**:	44	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	157.80	16.32	**9.8%**	**Pass**
Bearing Pressure (ksf)	23.04	5.21	**22.6%**	**Pass**
*Overturning (kip*ft)*	1870.32	1393.31	**74.5%**	**Pass**
*Pad Flexure (kip*ft)*	4965.62	683.88	**13.1%**	**Pass**
Pad Shear - 1-way (kips)	1098.05	39.19	**3.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.001	**0.4%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	9931.24	0.00	**0.0%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**13.1%**
Soil Rating*:	**74.5%**

Pad Properties		
Depth, **D**:	5.5	ft
Pad Width, W_1:	16.5	ft
Pad Thickness, **T**:	6	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	21	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δc:	150	pcf

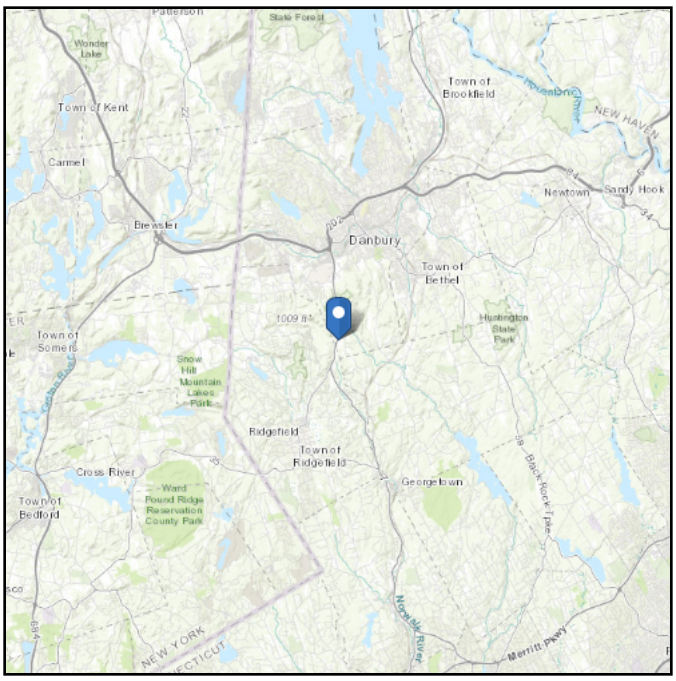
Soil Properties		
Total Soil Unit Weight, γ:	130	pcf
Ultimate Net Bearing, Qnet:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	42	degrees
SPT Blow Count, N_{blows}:	50	
Base Friction, μ:	0.45	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.336111
Risk Category:	II	**Longitude:**	-73.470667
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	527.6 ft (NAVD 88)



Wind

Results:

Wind Speed	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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: Sat Dec 17 2022

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 in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Seismic

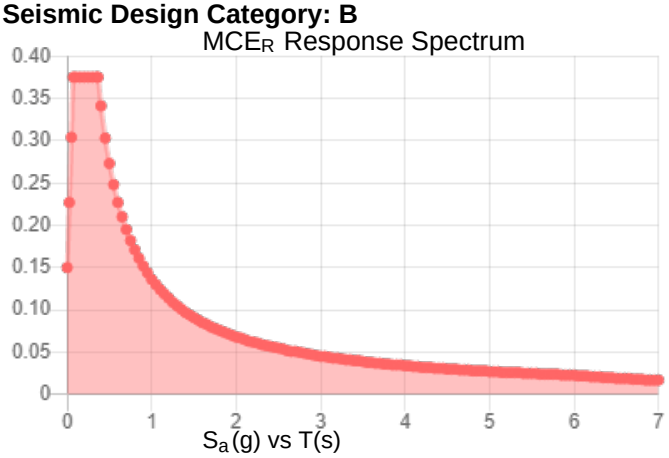
D - Default (see Section 11.4.3)

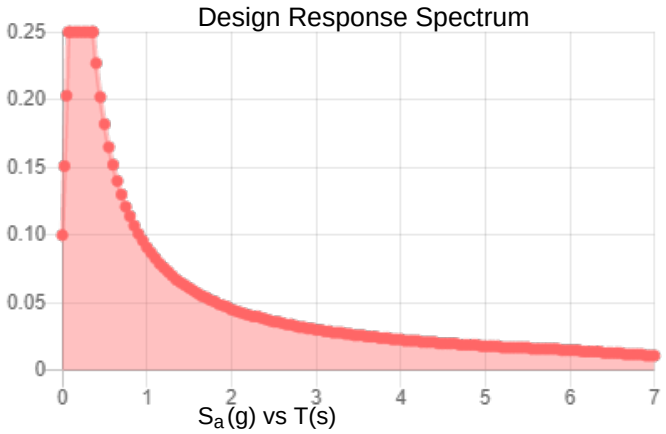
Site Soil Class:

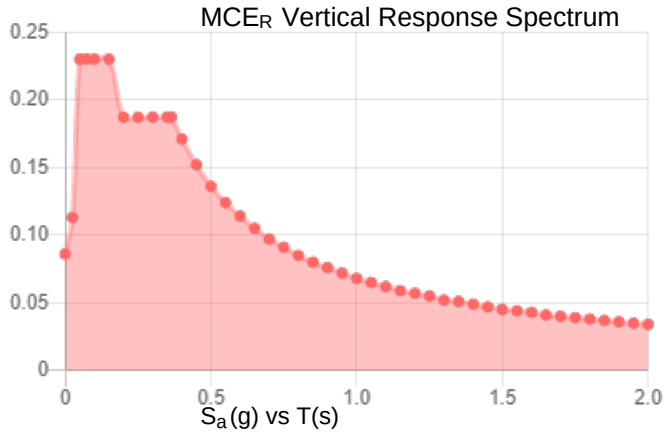
Results:

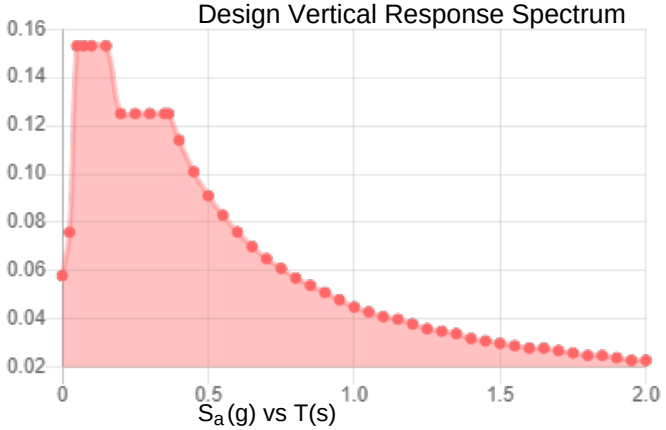
S_S :	0.234	S_{D1} :	0.091
S_1 :	0.057	T_L :	6
F_a :	1.6	PGA :	0.137
F_v :	2.4	PGA_M :	0.209
S_{MS} :	0.375	F_{PGA} :	1.527
S_{M1} :	0.136	I_e :	1
S_{DS} :	0.25	C_v :	0.768

Seismic Design Category: B









Data Accessed: **Sat Dec 17 2022**

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	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Sat Dec 17 2022

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.