



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

May 2, 2024

Jeffrey Barbadora
Permitting Specialist
Crown Castle
1800 West Park Drive
Westborough, MA 01581
Jeff.Barbadora@crowncastle.com

RE: **EM-VER-108-230913** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 85 Quaker Farms Road, Oxford, Connecticut.
Request for Project Change.

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated April 30, 2024 and the associated Structural Analysis dated October 20, 2023, regarding a project change for the above-referenced exempt modification request acknowledged by the Council on October 10, 2023.

Pursuant to Condition No. 1 of the Council's October 10, 2023 exempt modification approval, the request to increase the number of Kaelus interference mitigation filters to be installed from two to four is hereby approved.

This approval applies only to the project change in the correspondence dated April 24, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/ANM/laf

c: The Honorable George R. Temple, First Selectperson, Town of Oxford
(selectman@oxford-ct.gov)

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Sent: Tuesday, April 30, 2024 10:21 AM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: EM-VER-108-230913 - 85 Quaker Farms Road Oxford CT - 845455

Good morning,

Would the CSC please update the approval for EM-VER-108-230913 to include a total of 4 filters?

The original SA submitted with the application and dated 7/31/2023 stated only 2 filters and should have stated 4 filters.

Please see updated SA stating a total of 4 filters and let me know if you have any questions.

Thanks,

Jeffrey Barbadora
Permitting Specialist
781-970-0053

Crown Castle
1800 W. Park Drive, Suite 250
Westborough, MA 01581



MORRISON HERSHFIELD

Date: **October 20, 2023**

Morrison Hershfield
p1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 5000385883
Site Name: Seymour West CT

Crown Castle Designation: **BU Number:** 845455
Site Name: Oxford-Quaker Farms
JDE Job Number: 2103497
Work Order Number: 2265253
Order Number: 658818 Rev. 0

Engineering Firm Designation: **Morrison Hershfield Project Number:** CN12-841/ 2300001

Site Data: **85 Quaker Farms Road, Oxford, New Haven County, CT 06478**
Latitude 41° 23' 2.36", Longitude -73° 8' 14.54"
149 Foot - Summit Monopole Tower

Morrison Hershfield 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:

LC5: Proposed Equipment Configuration **Sufficient Capacity – 97.0%**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 – Analysis Criteria.

Respectfully submitted by:

G. Lance Cooke, P.E. (CT Licence No.PEN.0028133)
Senior Engineer

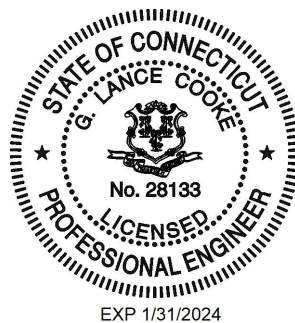


TABLE OF CONTENTS

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 – LC5

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 149 ft summit monopole tower designed by Paul J Ford.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 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)
122.0	123.0	2	raycap	RRFDC-3315-PF-48	2	1-1/4
118.0	120.0	3	antel	BXA-80080/6CF w/ Mount Pipe	18	1-5/8
		6	jma wireless	MX06FRO660-03 w/ Mount Pipe		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RF4439D-25A		
		3	samsung telecommunications	RF4440D-13A		
	4	kaelus	BSF0020F3V1			
	118.0	1	-	5.33' integrated mount w/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)
149.0	153.0	1	telewave	ANT150D	6 3 1 1	1-5/8 3/4 1/2 3/8
	150.0	3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		6	powerwave technologies	LGP21401		
		1	raycap	DC9-48-60-24-PC16-EV		
	149.0	1	-	Pipe Mount [PM 501-3]		
		1	-	T-Arm Mount [TA 702-3]		
	148.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe		
		3	commscope	NNH4-65B-R6 w/ Mount Pipe		
144.0	148.0	3	ericsson	RRUS 12 B2	2	3/4
	145.0	3	ericsson	RRUS 11 B12	1 1	3/8 2C

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
144.0	144.0	1	raycap	DC6-48-60-18-8F	-	-
		1	-	Pipe Mount [PM 601-3]		
135.0	140.0	6	powerwave technologies	LGP13519	6	1-5/8
	135.0	3	powerwave technologies	RA21.7770.00 w/ Mount Pipe		
		1	-	Side Arm Mount [SO 104-3]		
127.0	132.0	3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe	8 1	1-5/8 1-1/4
		3	rfs/celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
	127.0	3	rfs/celwave	APXVAALL24_43-U-NA20 w/ Mount Pipe		
		1	-	Platform Mount [LP 303-1_KCKR-HR-1]		
111.0	111.0	3	jma wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	fujitsu	TA08025-B604		
		3	fujitsu	TA08025-B605		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		
81.0	86.0	1	Telewave	ANT150D	3	1/2
	81.0	1	Pctel	PCTEL MPRC2449		
		1	-	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4546778	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5113091	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5110795	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 built and maintained in accordance with the manufacturer's specifications.
- 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. Morrison Hershfield 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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-11.72	1047.35	43.6	Pass	
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-20.54	1466.49	95.6	Pass	
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-28.53	2187.66	97.0	Pass	
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-42.09	3438.05	83.0	Pass	
							Summary		
							Pole (L3)	97.0	Pass
							Rating =	97.0	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	90.8	Pass
1	Base Plate		68.4	Pass
1	Base Foundation (Structure)	0	41.8	Pass
1	Base Foundation (Soil Interaction)		78.2	Pass

Structure Rating (max from all components) =	97.0%*
-----------------------------------------------------	---------------

Notes:

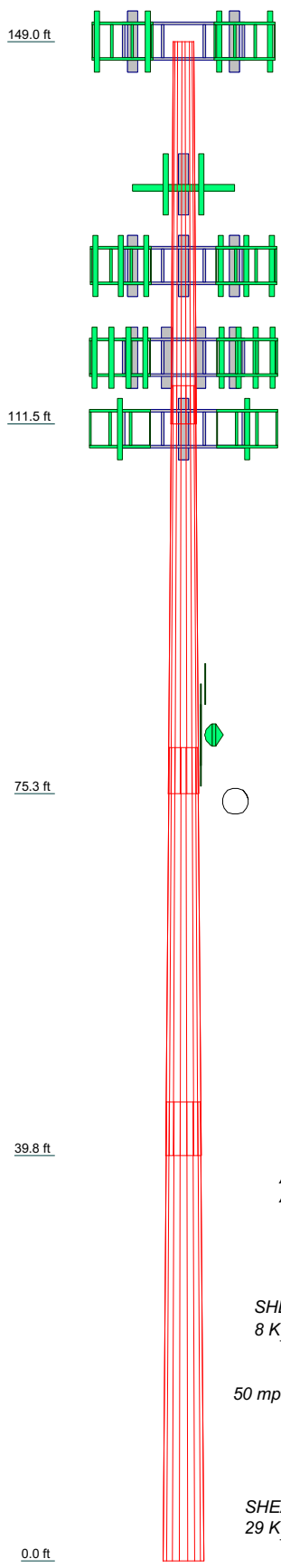
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) *Rating per TIA-222-H, Section 15.5

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	17.4
Length (ft)	37.50	40.00	40.00	45.00	17.4
Number of Sides	18	18	18	18	17.4
Thickness (in)	0.1875	0.2188	0.2813	0.3750	17.4
Socket Length (ft)	3.75	4.50	5.25	39.6154	17.4
Top Dia (in)	23.0000	28.4633	34.1670	47.4000	17.4
Bot Dia (in)	29.4870	35.3830	41.0860	47.4000	17.4
Grade			A607-65		17.4
Weight (K)	2.0	3.0	4.5	7.9	17.4



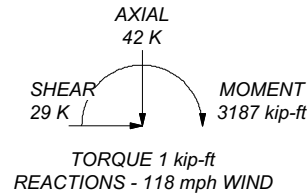
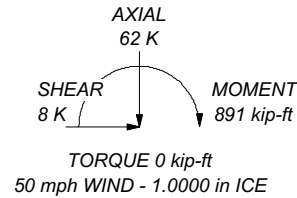
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 118 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: 97%

ALL REACTIONS
ARE FACTORED



Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 379-8500
FAX: (770) 379-8501

Job: **CN12-841 / 2300001**

Project: **845455 / Oxford-Quaker Farms**

Client: Crown Castle USA	Drawn by: MG	App'd:
Code: TIA-222-H	Date: 10/20/23	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 New Haven County, Connecticut.
 Tower base elevation above sea level: 607.00 ft.
 Basic wind speed of 118 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

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile
 Include Bolts In Member Capacity
 Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt.
 Autocalc Torque Arm Areas
 Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption
 <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets 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	149.00-111.50	37.50	3.75	18	23.0000	29.4870	0.1875	0.7500	A607-65 (65 ksi)
L2	111.50-75.25	40.00	4.50	18	28.4633	35.3830	0.2188	0.8750	A607-65 (65 ksi)
L3	75.25-39.75	40.00	5.25	18	34.1670	41.0860	0.2813	1.1250	A607-65 (65 ksi)
L4	39.75-0.00	45.00		18	39.6154	47.4000	0.3750	1.5000	A607-65 (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	23.3259	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	29.9130	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L2	29.5274	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	35.8951	24.4150	3814.1390	12.4833	17.9746	212.1965	7633.2967	12.2098	5.8424	26.708
L3	35.4411	30.2494	4388.2314	12.0295	17.3569	252.8241	8782.2369	15.1276	5.5184	19.621
	41.6764	36.4259	7662.4750	14.4857	20.8717	367.1229	15335.032	18.2164	6.7361	23.951
L4	41.0909	46.7059	9086.0569	13.9303	20.1246	451.4897	18184.069	23.3574	6.3123	16.833
	48.0734	55.9715	15637.310	16.6939	24.0792	649.4115	31295.196	27.9911	7.6824	20.486

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 Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 149.00-111.50				1	1	1			
L2 111.50-75.25				1	1	1			
L3 75.25-39.75				1	1	1			
L4 39.75-0.00				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 plf
***** Safety Line 3/8	B	No	Surface Ar (CaAa)	149.00 - 0.00	1	1	-0.450 -0.350	0.3750		0.22
Climbing Pegs	B	No	Surface Ar (CaAa)	149.00 - 0.00	1	1	-0.400 -0.400	0.7050		1.80
HCS 6X12 4AWG(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 8.00	2	2	0.460 0.500	1.6600		2.40
HB114-U6S12-XXX-LI(1-1/4) *****	B	No	Surface Ar (CaAa)	127.00 - 8.00	1	1	0.400 0.420	1.5400		1.70
HFT1208-24S26(1-1/4)	C	No	Surface Ar (CaAa)	122.00 - 8.00	2	2	-0.150 -0.050	1.3000		1.17
LDF7-50A(1-5/8) *****	C	No	Surface Ar (CaAa)	118.00 - 8.00	6	6	-0.500 -0.350	1.9800		0.82

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 plf

LDF4-50A(1/2)	C	No	No	Inside Pole	149.00 - 8.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	149.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	149.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	149.00 - 8.00	3	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58

FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	144.00 - 8.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
2" Rigid Conduit	C	No	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80

LDF7-50A(1-5/8)	C	No	No	Inside Pole	135.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82

LDF7-50A(1-5/8)	B	No	No	Inside Pole	127.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82

LDF7-50A(1-5/8)	B	No	No	Inside Pole	118.00 - 8.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82

CU12PSM9P6XXX (1-1/2)	A	No	No	Inside Pole	111.00 - 8.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35

LDF4-50A(1/2)	A	No	No	Inside Pole	81.00 - 8.00	3	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	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	149.00-111.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	11.583	0.000	0.32
		C	0.000	0.000	10.452	0.000	0.56
L2	111.50-75.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	21.532	0.000	0.84
		C	0.000	0.000	52.490	0.000	0.84
L3	75.25-39.75	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	21.087	0.000	0.83
		C	0.000	0.000	51.404	0.000	0.82
L4	39.75-0.00	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	19.724	0.000	0.76

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
		C	0.000	0.000	45.974	0.000	0.73

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	149.00-111.50	A	0.975	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	34.287	0.000	0.57
		C		0.000	0.000	17.207	0.000	0.68
L2	111.50-75.25	A	0.943	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	54.572	0.000	1.25
		C		0.000	0.000	83.277	0.000	1.43
L3	75.25-39.75	A	0.898	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	52.481	0.000	1.21
		C		0.000	0.000	80.989	0.000	1.39
L4	39.75-0.00	A	0.809	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	49.474	0.000	1.10
		C		0.000	0.000	71.727	0.000	1.21

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	149.00-111.50	2.5850	1.3173	2.4043	0.2817
L2	111.50-75.25	6.0816	4.6602	4.8931	3.1441
L3	75.25-39.75	6.5347	5.0059	5.3527	3.4534
L4	39.75-0.00	5.9633	4.4333	5.0589	3.0019

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	2	Safety Line 3/8	111.50 - 149.00	1.0000	1.0000
L1	3	Climbing Pegs	111.50 - 149.00	1.0000	1.0000
L1	17	HCS 6X12 4AWG(1-5/8)	111.50 - 127.00	1.0000	1.0000
L1	18	HB114-U6S12-XXX-LI(1-1/4)	111.50 - 127.00	1.0000	1.0000
L1	20	HFT1208-24S26(1-1/4)	111.50 - 122.00	1.0000	1.0000
L1	23	LDF7-50A(1-5/8)	111.50 - 118.00	1.0000	1.0000
L2	2	Safety Line 3/8	75.25 - 111.50	1.0000	1.0000
L2	3	Climbing Pegs	75.25 - 111.50	1.0000	1.0000
L2	17	HCS 6X12 4AWG(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	18	HB114-U6S12-XXX-LI(1-1/4)	75.25 - 111.50	1.0000	1.0000
L2	20	HFT1208-24S26(1-1/4)	75.25 - 111.50	1.0000	1.0000
L2	23	LDF7-50A(1-5/8)	75.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L3	2	Safety Line 3/8	111.50 39.75 - 75.25	1.0000	1.0000
L3	3	Climbing Pegs	39.75 - 75.25	1.0000	1.0000
L3	17	HCS 6X12 4AWG(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	18	HB114-U6S12-XXX-LI(1-1/4)	39.75 - 75.25	1.0000	1.0000
L3	20	HFT1208-24S26(1-1/4)	39.75 - 75.25	1.0000	1.0000
L3	23	LDF7-50A(1-5/8)	39.75 - 75.25	1.0000	1.0000
L4	2	Safety Line 3/8	0.00 - 39.75	1.0000	1.0000
L4	3	Climbing Pegs	0.00 - 39.75	1.0000	1.0000
L4	17	HCS 6X12 4AWG(1-5/8)	8.00 - 39.75	1.0000	1.0000
L4	18	HB114-U6S12-XXX-LI(1-1/4)	8.00 - 39.75	1.0000	1.0000
L4	20	HFT1208-24S26(1-1/4)	8.00 - 39.75	1.0000	1.0000
L4	23	LDF7-50A(1-5/8)	8.00 - 39.75	1.0000	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	

DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	11.96	5.97	0.11
			0.00			1/2"	12.70	6.63	0.20
			-1.00			Ice	13.46	7.30	0.30
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	11.96	5.97	0.11
			0.00			1/2"	12.70	6.63	0.20
			-1.00			Ice	13.46	7.30	0.30
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	No Ice	11.96	5.97	0.11
			0.00			1/2"	12.70	6.63	0.20
			-1.00			Ice	13.46	7.30	0.30
NNH4-65B-R6 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	7.55	4.23	0.12
			0.00			1/2"	8.04	4.67	0.21
			-1.00			Ice	8.53	5.12	0.30
NNH4-65B-R6 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	7.55	4.23	0.12
			0.00			1/2"	8.04	4.67	0.21
			-1.00			Ice	8.53	5.12	0.30
NNH4-65B-R6 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	No Ice	7.55	4.23	0.12
			0.00			1/2"	8.04	4.67	0.21
			-1.00			Ice	8.53	5.12	0.30
ANT150D	C	From Leg	4.00	0.0000	149.00	No Ice	0.80	0.80	0.01
			0.00			1/2"	1.44	1.44	0.01
			4.00			Ice	2.08	2.08	0.01
(2) LGP21401	A	From Leg	4.00	0.0000	149.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
(2) LGP21401	B	From Leg	4.00	0.0000	149.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
(2) LGP21401	C	From Leg	4.00	0.0000	149.00	1" Ice				
			0.00			No Ice	1.10	0.21	0.01	
			1.00			1/2"	1.24	0.27	0.02	
RADIO 4415 B30	A	From Leg	4.00	0.0000	149.00	Ice	1.38	0.35	0.03	
			0.00			1" Ice				
			1.00			No Ice	1.64	0.64	0.04	
RADIO 4415 B30	B	From Leg	4.00	0.0000	149.00	1/2"	1.80	0.75	0.05	
			0.00			Ice	1.97	0.87	0.07	
			1.00			1" Ice				
RADIO 4415 B30	C	From Leg	4.00	0.0000	149.00	No Ice	1.64	0.64	0.04	
			0.00			1/2"	1.80	0.75	0.05	
			1.00			Ice	1.97	0.87	0.07	
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	149.00	1" Ice				
			0.00			No Ice	1.64	1.35	0.07	
			1.00			1/2"	1.80	1.50	0.09	
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	149.00	Ice	1.97	1.65	0.11	
			0.00			1" Ice				
			1.00			No Ice	1.64	1.35	0.07	
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	149.00	1/2"	1.80	1.50	0.09	
			0.00			Ice	1.97	1.65	0.11	
			1.00			1" Ice				
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	149.00	No Ice	1.64	1.35	0.07	
			0.00			1/2"	1.80	1.50	0.09	
			1.00			Ice	1.97	1.65	0.11	
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	149.00	1" Ice				
			0.00			No Ice	1.97	1.41	0.07	
			1.00			1/2"	2.14	1.56	0.09	
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	149.00	Ice	2.33	1.73	0.11	
			0.00			1" Ice				
			1.00			No Ice	1.97	1.41	0.07	
DC9-48-60-24-PC16-EV	A	From Leg	4.00	0.0000	149.00	1/2"	2.14	1.56	0.09	
			0.00			Ice	2.33	1.73	0.11	
			1.00			1" Ice				
T-Arm Mount [TA 702-3]	A	None		0.0000	149.00	No Ice	1.97	1.41	0.07	
						1/2"	2.14	1.56	0.09	
						Ice	2.33	1.73	0.11	
Pipe Mount [PM 501-3]	A	None		0.0000	149.00	1" Ice				
						No Ice	4.75	4.75	0.34	
						1/2"	5.82	5.82	0.43	
*****	A	From Leg	1.00	0.0000	144.00	Ice	6.98	6.98	0.55	
			0.00			1" Ice				
			1.00			No Ice	4.46	4.46	0.16	
RRUS 11 B12	B	From Leg	1.00	0.0000	144.00	1/2"	5.52	5.52	0.21	
			0.00			Ice	6.66	6.66	0.29	
			1.00			1" Ice				
RRUS 11 B12	C	From Leg	1.00	0.0000	144.00	No Ice	2.83	1.18	0.05	
			0.00			1/2"	3.04	1.33	0.07	
			1.00			Ice	3.26	1.48	0.10	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RRUS 12 B2	A	From Leg	1.00	0.0000	144.00	1" Ice			
			0.00			No Ice	3.14	1.28	0.05
			4.00			1/2"	3.36	1.43	0.07
RRUS 12 B2	B	From Leg	1.00	0.0000	144.00	Ice	3.59	1.60	0.10
			0.00			1" Ice			
			4.00			No Ice	3.14	1.28	0.05
RRUS 12 B2	C	From Leg	1.00	0.0000	144.00	1/2"	3.36	1.43	0.07
			0.00			Ice	3.59	1.60	0.10
			4.00			1" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	144.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.64	1.64	0.06
Pipe Mount [PM 601-3]	A	None		0.0000	144.00	1" Ice			
						No Ice	3.17	3.17	0.20
						1/2"	3.79	3.79	0.23
***** RA21.7770.00 w/ Mount Pipe	A	From Leg	1.00	0.0000	135.00	Ice	4.42	4.42	0.28
			0.00			1" Ice			
			0.00			No Ice	4.14	2.46	0.06
RA21.7770.00 w/ Mount Pipe	B	From Leg	1.00	0.0000	135.00	1/2"	4.57	2.87	0.11
			0.00			Ice	5.01	3.29	0.17
			0.00			1" Ice			
RA21.7770.00 w/ Mount Pipe	C	From Leg	1.00	0.0000	135.00	No Ice	4.14	2.46	0.06
			0.00			1/2"	4.57	2.87	0.11
			0.00			Ice	5.01	3.29	0.17
(2) LGP13519	A	From Leg	1.00	0.0000	135.00	1" Ice			
			0.00			No Ice	0.29	0.18	0.01
			5.00			1/2"	0.36	0.24	0.01
(2) LGP13519	B	From Leg	1.00	0.0000	135.00	Ice	0.44	0.31	0.01
			0.00			1" Ice			
			5.00			No Ice	0.29	0.18	0.01
(2) LGP13519	C	From Leg	1.00	0.0000	135.00	1/2"	0.36	0.24	0.01
			0.00			Ice	0.44	0.31	0.01
			5.00			1" Ice			
4.5' x 2" Mount Pipe	A	From Leg	0.50	0.0000	135.00	No Ice	1.02	1.02	0.00
			0.00			1/2"	1.30	1.30	0.01
			0.00			Ice	1.58	1.58	0.02
4.5' x 2" Mount Pipe	B	From Leg	0.50	0.0000	135.00	1" Ice			
			0.00			No Ice	1.02	1.02	0.00
			0.00			1/2"	1.30	1.30	0.01
4.5' x 2" Mount Pipe	C	From Leg	0.50	0.0000	135.00	Ice	1.58	1.58	0.02
			0.00			1" Ice			
			0.00			No Ice	1.02	1.02	0.00
Side Arm Mount [SO 104-3]	A	None		0.0000	135.00	1/2"	3.30	3.30	0.41
						Ice	3.98	3.98	0.53
						1" Ice			
***** APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	127.00	No Ice	6.29	2.76	0.06
			0.00			1/2"	6.86	3.27	0.11

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft ²	ft ²	K	
					5.00		Ice	7.45	3.79	0.16	
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg			4.00	0.0000	127.00	1" Ice	6.29	2.76	0.06
					0.00			No Ice	6.86	3.27	0.11
					5.00			1/2"	7.45	3.79	0.16
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg			4.00	0.0000	127.00	1" Ice	6.29	2.76	0.06
					0.00			No Ice	6.86	3.27	0.11
					5.00			1/2"	7.45	3.79	0.16
APXVAALL24_43-U-NA20 w/ Mount Pipe	A	From Leg			4.00	0.0000	127.00	1" Ice	14.69	6.87	0.18
					0.00			No Ice	15.46	7.55	0.31
					0.00			1/2"	16.23	8.25	0.45
APXVAALL24_43-U-NA20 w/ Mount Pipe	B	From Leg			4.00	0.0000	127.00	1" Ice	14.69	6.87	0.18
					0.00			No Ice	15.46	7.55	0.31
					0.00			1/2"	16.23	8.25	0.45
APXVAALL24_43-U-NA20 w/ Mount Pipe	C	From Leg			4.00	0.0000	127.00	1" Ice	14.69	6.87	0.18
					0.00			No Ice	15.46	7.55	0.31
					0.00			1/2"	16.23	8.25	0.45
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg			4.00	0.0000	127.00	1" Ice	5.19	2.71	0.13
					0.00			No Ice	5.59	3.04	0.17
					5.00			1/2"	6.02	3.38	0.23
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg			4.00	0.0000	127.00	1" Ice	5.19	2.71	0.13
					0.00			No Ice	5.59	3.04	0.17
					5.00			1/2"	6.02	3.38	0.23
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg			4.00	0.0000	127.00	1" Ice	5.19	2.71	0.13
					0.00			No Ice	5.59	3.04	0.17
					5.00			1/2"	6.02	3.38	0.23
RADIO 4415 B66A_CCIV3	A	From Leg			4.00	0.0000	127.00	1" Ice	1.64	0.68	0.05
					0.00			No Ice	1.80	0.79	0.06
					5.00			1/2"	1.97	0.91	0.07
RADIO 4415 B66A_CCIV3	B	From Leg			4.00	0.0000	127.00	1" Ice	1.64	0.68	0.05
					0.00			No Ice	1.80	0.79	0.06
					5.00			1/2"	1.97	0.91	0.07
RADIO 4415 B66A_CCIV3	C	From Leg			4.00	0.0000	127.00	1" Ice	1.64	0.68	0.05
					0.00			No Ice	1.80	0.79	0.06
					5.00			1/2"	1.97	0.91	0.07
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg			4.00	0.0000	127.00	1" Ice	1.97	1.59	0.07
					0.00			No Ice	2.15	1.75	0.09
					5.00			1/2"	2.33	1.92	0.12
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg			4.00	0.0000	127.00	1" Ice	1.97	1.59	0.07
					0.00			No Ice	2.15	1.75	0.09
					5.00			1/2"	2.33	1.92	0.12
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg			4.00	0.0000	127.00	1" Ice	1.97	1.59	0.07
					0.00			No Ice	2.15	1.75	0.09
					5.00			1/2"	2.33	1.92	0.12
RADIO 4424 B25_TMO	A	From Leg			4.00	0.0000	127.00	1" Ice	2.05	1.61	0.09
					0.00			No Ice	2.23	1.77	0.11
					5.00			1/2"	2.42	1.94	0.13
RADIO 4424 B25_TMO	B	From Leg			4.00	0.0000	127.00	1" Ice	2.05	1.61	0.09
					0.00			No Ice	2.23	1.77	0.11
					5.00			1/2"	2.42	1.94	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RADIO 4424 B25_TMO	C	From Leg	4.00 0.00 5.00	0.0000	127.00	1" Ice No Ice 1/2" Ice 2.05 2.23 2.42	1.61 1.77 1.94	0.09 0.11 0.13
8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	127.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	127.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	127.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
Platform Mount [LP 303-1_KCKR-HR-1]	A	None		0.0000	127.00	1" Ice No Ice 1/2" Ice 28.31 35.69 43.11	28.31 35.69 43.11	1.77 2.30 2.94

RRFDC-3315-PF-48	A	From Leg	0.50 0.00 1.00	0.0000	122.00	1" Ice No Ice 1/2" Ice 3.79 4.04 4.30	2.51 2.73 2.95	0.03 0.06 0.10
RRFDC-3315-PF-48	B	From Leg	0.50 0.00 1.00	0.0000	122.00	1" Ice No Ice 1/2" Ice 3.79 4.04 4.30	2.51 2.73 2.95	0.03 0.06 0.10

BXA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.56 8.32 9.10	4.82 5.54 6.28	0.05 0.10 0.17
BXA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.56 8.32 9.10	4.82 5.54 6.28	0.05 0.10 0.17
BXA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.56 8.32 9.10	4.82 5.54 6.28	0.05 0.10 0.17
7'x2" Antenna Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
5.33' integrated mount w/modifications	A	None		0.0000	118.00	1" Ice No Ice 1/2" Ice 15.10 21.00 26.70	15.10 21.00 26.70	0.73 0.94 1.21

(2) MX06FRO660-03 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 6.54 7.06 7.60	5.55 6.05 6.57	0.10 0.18 0.28
(2) MX06FRO660-03 w/	B	From Leg	4.00	0.0000	118.00	1" Ice No Ice 6.54	5.55	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Mount Pipe			0.00 2.00			1/2" Ice 7.06 7.60	6.05 6.57	0.18 0.28
(2) MX06FRO660-03 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.06 7.60	5.55 6.05 6.57	0.10 0.18 0.28
MT6407-77A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.02	3.10 3.55 4.02	0.10 0.13 0.18
MT6407-77A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.02	3.10 3.55 4.02	0.10 0.13 0.18
MT6407-77A w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 7.02	3.10 3.55 4.02	0.10 0.13 0.18
(3) BSF0020F3V1	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 1.22	0.29 0.36 0.45	0.02 0.02 0.03
BSF0020F3V1	B	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 1.22	0.29 0.36 0.45	0.02 0.02 0.03
RF4439D-25A	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	B	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	C	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4440D-13A	A	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	B	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	C	From Leg	4.00 0.00 2.00	0.0000	118.00	1" Ice No Ice 1/2" Ice 2.21	1.13 1.27 1.41	0.07 0.09 0.11
*****						1" Ice		
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 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	111.00	1" Ice No Ice 1/2" Ice 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 0.00	0.0000	111.00	1" Ice No Ice 1/2" Ice 9.04	4.23 4.69 5.16	0.11 0.19 0.29
TA08025-B604	A	From Leg	4.00	0.0000	111.00	No Ice	0.98	0.06

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
			0.00			1" Ice			
TA08025-B604	B	From Leg	4.00	0.0000	111.00	No Ice	1.96	0.98	0.06
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
			0.00			1" Ice			
TA08025-B604	C	From Leg	4.00	0.0000	111.00	No Ice	1.96	0.98	0.06
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
			0.00			1" Ice			
TA08025-B605	A	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
			0.00			1" Ice			
TA08025-B605	B	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
			0.00			1" Ice			
TA08025-B605	C	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
			0.00			1" Ice			
RDIDC-9181-PF-48	A	From Leg	4.00	0.0000	111.00	No Ice	2.01	1.17	0.02
			0.00			1/2"	2.19	1.31	0.04
			0.00			Ice	2.37	1.46	0.06
			0.00			1" Ice			
(2) 8' x 2" Mount Pipe	A	From Leg	4.00	0.0000	111.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
			0.00			1" Ice			
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.0000	111.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
			0.00			1" Ice			
(2) 8' x 2" Mount Pipe	C	From Leg	4.00	0.0000	111.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
			0.00			1" Ice			
Commscope MC-PK8-DSH	A	None		0.0000	111.00	No Ice	34.24	34.24	1.75
						1/2"	62.95	62.95	2.10
						Ice	91.66	91.66	2.45
						1" Ice			

ANT150D	B	From Leg	1.00	0.0000	81.00	No Ice	0.80	0.80	0.01
			0.00			1/2"	1.44	1.44	0.01
			5.00			Ice	2.08	2.08	0.01
			0.00			1" Ice			
8' x 2" Mount Pipe	B	From Leg	0.50	0.0000	81.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
			0.00			1" Ice			
6' x 2" Mount Pipe	B	From Leg	0.50	0.0000	81.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
			0.00			1" Ice			
Pipe Mount [PM 601-1]	B	From Leg	0.50	0.0000	81.00	No Ice	1.32	1.32	0.07
			0.00			1/2"	1.58	1.58	0.08
			0.00			Ice	1.84	1.84	0.09
			0.00			1" Ice			

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	

PCTEL MPRC2449	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	-20.0000		81.00	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	0.04 0.06 0.08

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
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	149 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.59	-0.79	1.11
			Max. Mx	8	-11.76	-280.40	0.32
			Max. My	2	-11.72	-0.11	282.98
			Max. Vy	8	16.73	-280.40	0.32
			Max. Vx	2	-16.87	-0.11	282.98
L2	111.5 - 75.25	Pole	Max. Torque	8			0.42
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.57	-2.46	0.48
			Max. Mx	8	-20.62	-1032.70	-1.05
			Max. My	2	-20.60	0.34	1040.34
			Max. Vy	20	-23.30	1030.45	1.80
L3	75.25 - 39.75	Pole	Max. Vx	2	-23.42	0.34	1040.34
			Max. Torque	9			0.64
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.34	-3.61	-0.35
			Max. Mx	8	-28.59	-1888.86	-2.22
			Max. My	2	-28.57	1.75	1900.75
L4	39.75 - 0	Pole	Max. Vy	20	-25.89	1886.64	2.77
			Max. Vx	2	-26.00	1.75	1900.75
			Max. Torque	13			0.63
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.95	-4.88	-1.26
			Max. Mx	8	-42.09	-3118.39	-3.66
			Max. My	2	-42.09	3.57	3135.59
			Max. Vy	20	-28.53	3116.27	4.00
			Max. Vx	2	-28.64	3.57	3135.59
			Max. Torque	13			0.63

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	61.95	-7.98	-0.00
	Max. H _x	20	42.12	28.49	0.03
	Max. H _z	3	31.59	0.05	28.59
	Max. M _x	2	3135.59	0.05	28.59
	Max. M _z	8	3118.39	-28.46	-0.03
	Max. Torsion	13	0.63	-14.24	-24.77
	Min. Vert	7	31.59	-24.61	14.27
	Min. H _x	8	42.12	-28.46	-0.03
	Min. H _z	14	42.12	-0.02	-28.58
	Min. M _x	14	-3134.52	-0.02	-28.58
	Min. M _z	20	-3116.27	28.49	0.03
	Min. Torsion	25	-0.61	14.27	24.81

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	35.10	0.00	0.00	0.06	-1.86	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	42.12	-0.05	-28.59	-3135.59	3.57	0.49

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
0.9 Dead+1.0 Wind 0 deg - No Ice	31.59	-0.05	-28.59	-3084.03	4.11	0.49
1.2 Dead+1.0 Wind 30 deg - No Ice	42.12	14.54	-25.37	-2765.58	-1584.62	0.26
0.9 Dead+1.0 Wind 30 deg - No Ice	31.59	14.54	-25.37	-2720.35	-1558.13	0.26
1.2 Dead+1.0 Wind 60 deg - No Ice	42.12	24.61	-14.27	-1564.26	-2697.27	-0.03
0.9 Dead+1.0 Wind 60 deg - No Ice	31.59	24.61	-14.27	-1538.55	-2652.36	-0.03
1.2 Dead+1.0 Wind 90 deg - No Ice	42.12	28.46	0.03	3.66	-3118.39	-0.30
0.9 Dead+1.0 Wind 90 deg - No Ice	31.59	28.46	0.03	3.59	-3066.57	-0.30
1.2 Dead+1.0 Wind 120 deg - No Ice	42.12	24.66	14.34	1572.61	-2702.50	-0.55
0.9 Dead+1.0 Wind 120 deg - No Ice	31.59	24.66	14.34	1546.75	-2657.52	-0.56
1.2 Dead+1.0 Wind 150 deg - No Ice	42.12	14.24	24.77	2717.10	-1562.45	-0.62
0.9 Dead+1.0 Wind 150 deg - No Ice	31.59	14.24	24.77	2672.42	-1536.19	-0.63
1.2 Dead+1.0 Wind 180 deg - No Ice	42.12	0.02	28.58	3134.52	-5.10	-0.53
0.9 Dead+1.0 Wind 180 deg - No Ice	31.59	0.02	28.58	3082.97	-4.42	-0.53
1.2 Dead+1.0 Wind 210 deg - No Ice	42.12	-14.58	25.38	2766.29	1583.24	-0.28
0.9 Dead+1.0 Wind 210 deg - No Ice	31.59	-14.58	25.38	2721.04	1557.97	-0.29
1.2 Dead+1.0 Wind 240 deg - No Ice	42.12	-24.66	14.29	1566.17	2696.21	-0.01
0.9 Dead+1.0 Wind 240 deg - No Ice	31.59	-24.66	14.29	1540.42	2652.51	-0.02
1.2 Dead+1.0 Wind 270 deg - No Ice	42.12	-28.49	-0.03	-4.00	3116.27	0.31
0.9 Dead+1.0 Wind 270 deg - No Ice	31.59	-28.49	-0.03	-3.94	3065.67	0.30
1.2 Dead+1.0 Wind 300 deg - No Ice	42.12	-24.69	-14.35	-1573.90	2700.43	0.51
0.9 Dead+1.0 Wind 300 deg - No Ice	31.59	-24.69	-14.35	-1548.04	2656.66	0.51
1.2 Dead+1.0 Wind 330 deg - No Ice	42.12	-14.27	-24.81	-2720.27	1560.50	0.61
0.9 Dead+1.0 Wind 330 deg - No Ice	31.59	-14.27	-24.81	-2675.57	1535.46	0.61
1.2 Dead+1.0 Ice+1.0 Temp	61.95	0.00	-0.00	1.26	-4.88	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	61.95	-0.01	-8.00	-886.47	-3.78	0.09
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	61.95	3.98	-6.93	-766.99	-445.58	0.05
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	61.95	6.90	-4.00	-441.88	-769.57	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	61.95	7.98	0.00	2.02	-888.69	-0.05
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	61.95	6.91	4.01	446.14	-770.65	-0.10
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	61.95	3.99	6.93	770.42	-447.29	-0.12
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	61.95	0.00	8.00	888.78	-5.56	-0.10
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	61.95	-3.99	6.93	769.69	436.27	-0.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	61.95	-6.91	4.00	444.83	760.33	-0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	61.95	-7.98	-0.01	0.46	879.23	0.05
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	61.95	-6.92	-4.01	-443.87	761.19	0.09

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
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	61.95	-4.00	-6.94	-768.55	437.86	0.11
Dead+Wind 0 deg - Service	35.10	-0.01	-6.96	-757.29	-0.53	0.12
Dead+Wind 30 deg - Service	35.10	3.54	-6.18	-667.99	-384.16	0.06
Dead+Wind 60 deg - Service	35.10	5.99	-3.47	-377.77	-652.84	-0.01
Dead+Wind 90 deg - Service	35.10	6.93	0.01	0.91	-754.54	-0.08
Dead+Wind 120 deg - Service	35.10	6.01	3.49	379.85	-654.12	-0.14
Dead+Wind 150 deg - Service	35.10	3.47	6.03	656.29	-378.77	-0.16
Dead+Wind 180 deg - Service	35.10	0.00	6.96	757.10	-2.62	-0.13
Dead+Wind 210 deg - Service	35.10	-3.55	6.18	668.23	381.04	-0.07
Dead+Wind 240 deg - Service	35.10	-6.00	3.48	378.29	649.80	-0.00
Dead+Wind 270 deg - Service	35.10	-6.94	-0.01	-0.93	751.24	0.08
Dead+Wind 300 deg - Service	35.10	-6.01	-3.50	-380.10	650.83	0.13
Dead+Wind 330 deg - Service	35.10	-3.48	-6.04	-656.99	375.52	0.15

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	-35.10	0.00	0.00	35.10	0.00	0.000%
2	-0.05	-42.12	-28.59	0.05	42.12	28.59	0.000%
3	-0.05	-31.59	-28.59	0.05	31.59	28.59	0.000%
4	14.54	-42.12	-25.37	-14.54	42.12	25.37	0.000%
5	14.54	-31.59	-25.37	-14.54	31.59	25.37	0.000%
6	24.61	-42.12	-14.27	-24.61	42.12	14.27	0.000%
7	24.61	-31.59	-14.27	-24.61	31.59	14.27	0.000%
8	28.46	-42.12	0.03	-28.46	42.12	-0.03	0.000%
9	28.46	-31.59	0.03	-28.46	31.59	-0.03	0.000%
10	24.66	-42.12	14.34	-24.66	42.12	-14.34	0.000%
11	24.66	-31.59	14.34	-24.66	31.59	-14.34	0.000%
12	14.24	-42.12	24.77	-14.24	42.12	-24.77	0.000%
13	14.24	-31.59	24.77	-14.24	31.59	-24.77	0.000%
14	0.02	-42.12	28.58	-0.02	42.12	-28.58	0.000%
15	0.02	-31.59	28.58	-0.02	31.59	-28.58	0.000%
16	-14.58	-42.12	25.38	14.58	42.12	-25.38	0.000%
17	-14.58	-31.59	25.38	14.58	31.59	-25.38	0.000%
18	-24.66	-42.12	14.29	24.66	42.12	-14.29	0.000%
19	-24.66	-31.59	14.29	24.66	31.59	-14.29	0.000%
20	-28.49	-42.12	-0.03	28.49	42.12	0.03	0.000%
21	-28.49	-31.59	-0.03	28.49	31.59	0.03	0.000%
22	-24.69	-42.12	-14.35	24.69	42.12	14.35	0.000%
23	-24.69	-31.59	-14.35	24.69	31.59	14.35	0.000%
24	-14.27	-42.12	-24.81	14.27	42.12	24.81	0.000%
25	-14.27	-31.59	-24.81	14.27	31.59	24.81	0.000%
26	0.00	-61.95	0.00	-0.00	61.95	0.00	0.000%
27	-0.01	-61.95	-8.00	0.01	61.95	8.00	0.000%
28	3.98	-61.95	-6.93	-3.98	61.95	6.93	0.000%
29	6.90	-61.95	-4.00	-6.90	61.95	4.00	0.000%
30	7.98	-61.95	0.00	-7.98	61.95	-0.00	0.000%
31	6.91	-61.95	4.01	-6.91	61.95	-4.01	0.000%
32	3.99	-61.95	6.93	-3.99	61.95	-6.93	0.000%
33	0.00	-61.95	8.00	-0.00	61.95	-8.00	0.000%
34	-3.99	-61.95	6.93	3.99	61.95	-6.93	0.000%
35	-6.91	-61.95	4.00	6.91	61.95	-4.00	0.000%
36	-7.98	-61.95	-0.01	7.98	61.95	0.01	0.000%
37	-6.92	-61.95	-4.01	6.92	61.95	4.01	0.000%
38	-4.00	-61.95	-6.94	4.00	61.95	6.94	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
39	-0.01	-35.10	-6.96	0.01	35.10	6.96	0.000%
40	3.54	-35.10	-6.18	-3.54	35.10	6.18	0.000%
41	5.99	-35.10	-3.47	-5.99	35.10	3.47	0.000%
42	6.93	-35.10	0.01	-6.93	35.10	-0.01	0.000%
43	6.01	-35.10	3.49	-6.01	35.10	-3.49	0.000%
44	3.47	-35.10	6.03	-3.47	35.10	-6.03	0.000%
45	0.00	-35.10	6.96	-0.00	35.10	-6.96	0.000%
46	-3.55	-35.10	6.18	3.55	35.10	-6.18	0.000%
47	-6.00	-35.10	3.48	6.00	35.10	-3.48	0.000%
48	-6.94	-35.10	-0.01	6.94	35.10	0.01	0.000%
49	-6.01	-35.10	-3.50	6.01	35.10	3.50	0.000%
50	-3.48	-35.10	-6.04	3.48	35.10	6.04	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006035
3	Yes	4	0.00000001	0.00098833
4	Yes	6	0.00000001	0.00062588
5	Yes	6	0.00000001	0.00018793
6	Yes	6	0.00000001	0.00061700
7	Yes	6	0.00000001	0.00018672
8	Yes	5	0.00000001	0.00008237
9	Yes	5	0.00000001	0.00003568
10	Yes	6	0.00000001	0.00061267
11	Yes	6	0.00000001	0.00018478
12	Yes	6	0.00000001	0.00062218
13	Yes	6	0.00000001	0.00018810
14	Yes	5	0.00000001	0.00011183
15	Yes	5	0.00000001	0.00004755
16	Yes	6	0.00000001	0.00062455
17	Yes	6	0.00000001	0.00018771
18	Yes	6	0.00000001	0.00061161
19	Yes	6	0.00000001	0.00018501
20	Yes	5	0.00000001	0.00013280
21	Yes	5	0.00000001	0.00005886
22	Yes	6	0.00000001	0.00062141
23	Yes	6	0.00000001	0.00018802
24	Yes	6	0.00000001	0.00061323
25	Yes	6	0.00000001	0.00018495
26	Yes	4	0.00000001	0.00005368
27	Yes	5	0.00000001	0.00099491
28	Yes	6	0.00000001	0.00024376
29	Yes	6	0.00000001	0.00024359
30	Yes	5	0.00000001	0.00099562
31	Yes	6	0.00000001	0.00024290
32	Yes	6	0.00000001	0.00024503
33	Yes	5	0.00000001	0.00099373
34	Yes	6	0.00000001	0.00023843
35	Yes	6	0.00000001	0.00023821
36	Yes	5	0.00000001	0.00098284
37	Yes	6	0.00000001	0.00024088
38	Yes	6	0.00000001	0.00023935
39	Yes	4	0.00000001	0.00023032
40	Yes	5	0.00000001	0.00016655
41	Yes	5	0.00000001	0.00016211
42	Yes	4	0.00000001	0.00023710
43	Yes	5	0.00000001	0.00015767
44	Yes	5	0.00000001	0.00016488
45	Yes	4	0.00000001	0.00023521
46	Yes	5	0.00000001	0.00016376
47	Yes	5	0.00000001	0.00015656
48	Yes	4	0.00000001	0.00024038
49	Yes	5	0.00000001	0.00016355
50	Yes	5	0.00000001	0.00015736

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	34.033	40	1.9023	0.0015
L2	115.25 - 75.25	20.954	40	1.7404	0.0010
L3	79.75 - 39.75	9.752	40	1.1956	0.0005
L4	45 - 0	3.017	40	0.6144	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DMP65R-BU6D w/ Mount Pipe	40	34.033	1.9023	0.0015	37137
144.00	RRUS 11 B12	40	32.036	1.8911	0.0014	37137
135.00	RA21.7770.00 w/ Mount Pipe	40	28.465	1.8654	0.0013	13262
127.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	40	25.352	1.8298	0.0012	8439
122.00	RRFDC-3315-PF-48	40	23.450	1.7982	0.0011	6876
118.00	BXA-80080/6CF w/ Mount Pipe	40	21.960	1.7663	0.0011	5994
111.00	MX08FRO665-21 w/ Mount Pipe	40	19.431	1.6937	0.0010	5090
81.00	PCTEL MPRC2449	40	10.079	1.2178	0.0005	3334

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	140.473	4	7.8727	0.0059
L2	115.25 - 75.25	86.591	4	7.2068	0.0040
L3	79.75 - 39.75	40.347	4	4.9532	0.0020
L4	45 - 0	12.486	4	2.5442	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DMP65R-BU6D w/ Mount Pipe	4	140.473	7.8727	0.0059	9314
144.00	RRUS 11 B12	4	132.246	7.8271	0.0056	9314
135.00	RA21.7770.00 w/ Mount Pipe	4	117.544	7.7222	0.0051	3324
127.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	4	104.719	7.5758	0.0048	2113
122.00	RRFDC-3315-PF-48	4	96.882	7.4454	0.0046	1720
118.00	BXA-80080/6CF w/ Mount Pipe	4	90.739	7.3136	0.0045	1497
111.00	MX08FRO665-21 w/ Mount Pipe	4	80.312	7.0141	0.0041	1267
81.00	PCTEL MPRC2449	4	41.698	5.0450	0.0022	819

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	149 - 111.5 (1)	TP29.487x23x0.1875	37.50	0.00	0.0	17.050 8	-11.72	997.47	0.012
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	40.00	0.00	0.0	23.874 5	-20.54	1396.66	0.015
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	40.00	0.00	0.0	35.615 2	-28.53	2083.49	0.014
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	45.00	0.00	0.0	55.971 5	-42.09	3274.33	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	149 - 111.5 (1)	TP29.487x23x0.1875	282.98	639.10	0.443	0.00	639.10	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	1044.81	1060.37	0.985	0.00	1060.37	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	1922.69	1917.64	1.003	0.00	1917.64	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	3187.38	3714.79	0.858	0.00	3714.79	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	149 - 111.5 (1)	TP29.487x23x0.1875	16.87	299.24	0.056	0.01	750.83	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	23.76	419.00	0.057	0.32	1261.74	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	26.63	625.05	0.043	0.26	2183.88	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	29.28	982.30	0.030	0.26	4045.32	0.000

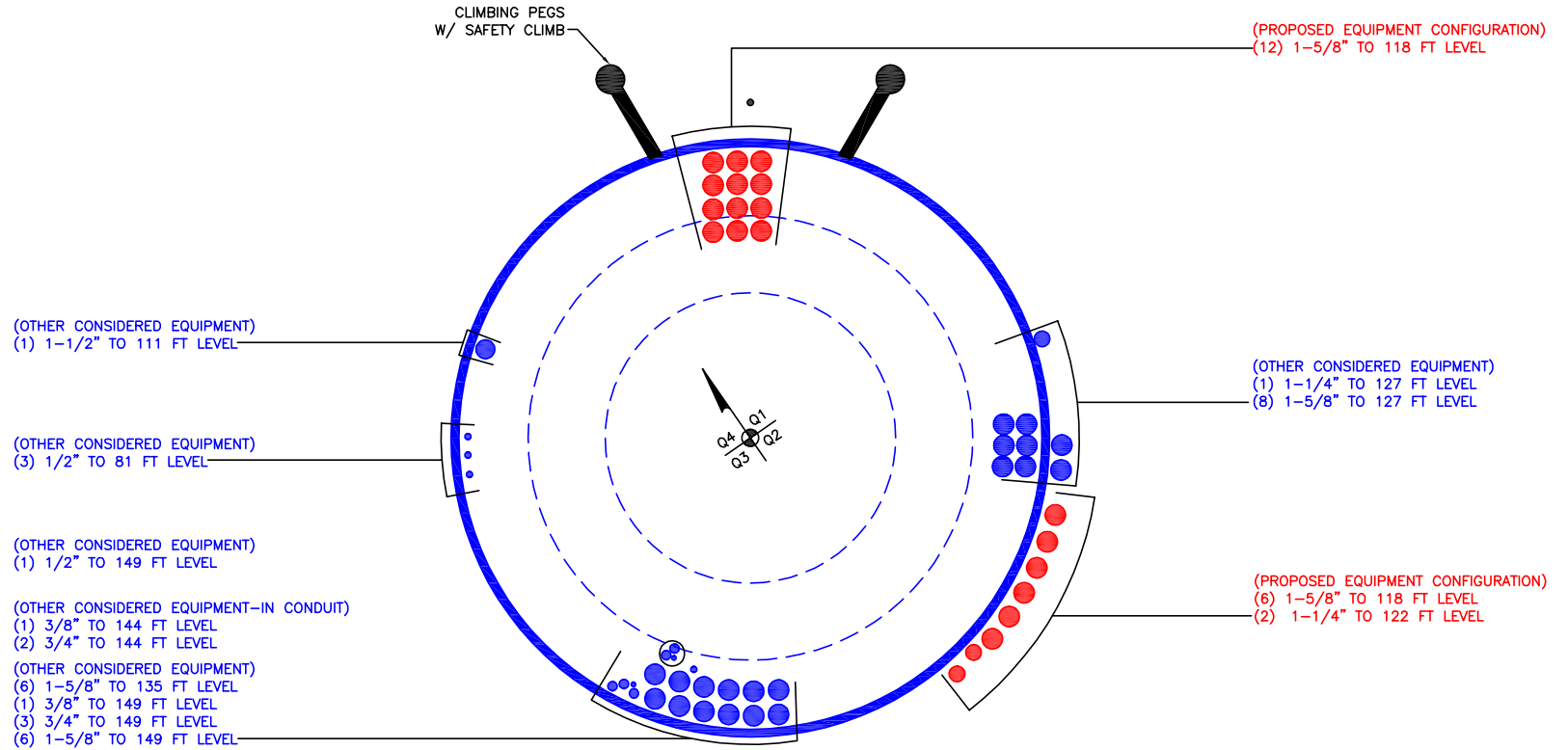
Pole Interaction Design Data

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	149 - 111.5 (1)	0.012	0.443	0.000	0.056	0.000	0.458	1.050	4.8.2
L2	111.5 - 75.25 (2)	0.015	0.985	0.000	0.057	0.000	1.003	1.050	4.8.2
L3	75.25 - 39.75 (3)	0.014	1.003	0.000	0.043	0.000	1.018	1.050	4.8.2
L4	39.75 - 0 (4)	0.013	0.858	0.000	0.030	0.000	0.872	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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-11.72	1047.35	43.6	Pass	
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-20.54	1466.49	95.6	Pass	
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-28.53	2187.66	97.0	Pass	
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-42.09	3438.05	83.0	Pass	
							Summary		
							Pole (L3)	97.0	Pass
							RATING =	97.0	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

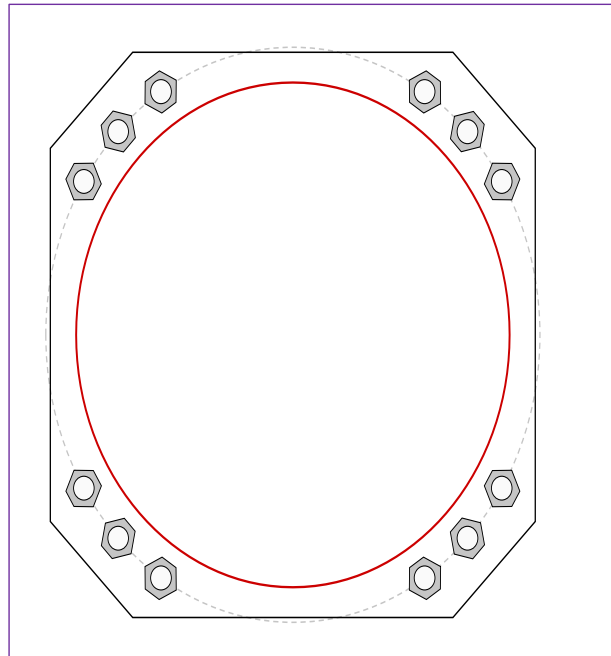


Site Info	
BU #	845455
Site Name	Oxford-Quaker Farms
Order #	658818 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	0.625

Applied Loads	
Moment (kip-ft)	3187.39
Axial Force (kips)	42.09
Shear Force (kips)	29.28

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(12) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 54" BC <i>Anchor Spacing: 6 in</i>
Base Plate Data
53" W x 2.75" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi); Clip: 9 in
Stiffener Data
N/A
Pole Data
47.4" x 0.375" 18-sided pole (A607-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary	<i>(units of kips, kip-in)</i>	
$P_{u,t} = 232.43$	$\phi P_{n,t} = 243.75$	Stress Rating
$V_u = 2.44$	$\phi V_n = 149.1$	90.8%
$M_u = n/a$	$\phi M_n = n/a$	Pass
Base Plate Summary		
Max Stress (ksi):	38.79	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	68.4%	Pass

Pier and Pad Foundation



BU #: 845455
 Site Name: Oxford-Quaker Far
 App. Number: 658818 Rev. 0

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	42.12	kips
Base Shear, V_u_{comp} :	29.24	kips
Moment, M_u :	3187.39	ft-kips
Tower Height, H :	149	ft
BP Dist. Above Fdn, bp_{dist} :	2.875	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	286.43	29.24	9.7%	Pass
<i>Bearing Pressure (ksf)</i>	22.50	4.75	21.1%	Pass
<i>Overturning (kip*ft)</i>	4381.63	3428.32	78.2%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	7557.10	3318.97	41.8%	Pass
<i>Pier Compression (kip)</i>	23390.64	81.81	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	4295.05	1609.48	35.7%	Pass
<i>Pad Shear - 1-way (kips)</i>	731.44	310.74	40.5%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.000	0.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	7386.86	1991.38	25.7%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, S_c :	11	
Pier Rebar Quantity, mc :	32	
Pier Tie/Spiral Size, St :	5	
Pier Tie/Spiral Quantity, mt :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Structural Rating*:	41.8%
Soil Rating*:	78.2%

Pad Properties		
Depth, D :	7.5	ft
Pad Width, W_1 :	20	ft
Pad Thickness, T :	3.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	10	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	21	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Gross Bearing, Q_{ult} :	30.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	36	degrees
SPT Blow Count, N_{blows} :	41	
Base Friction, μ :		
Neglected Depth, N :	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

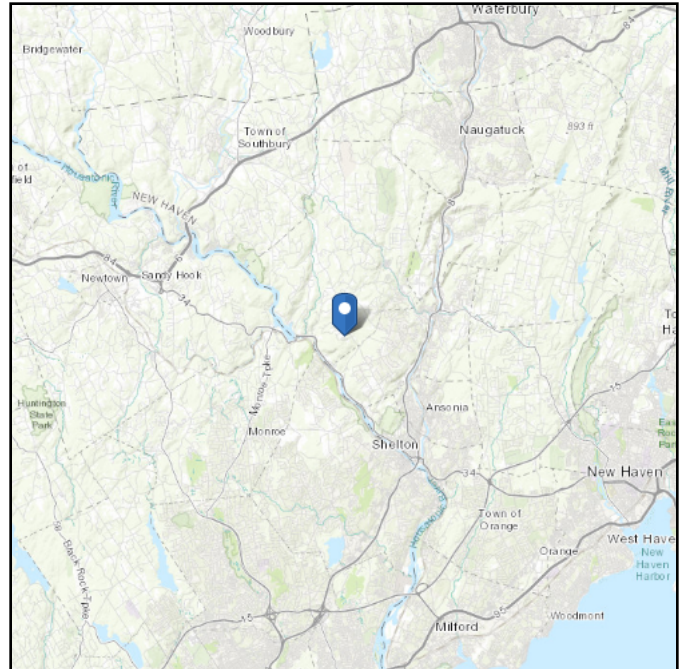
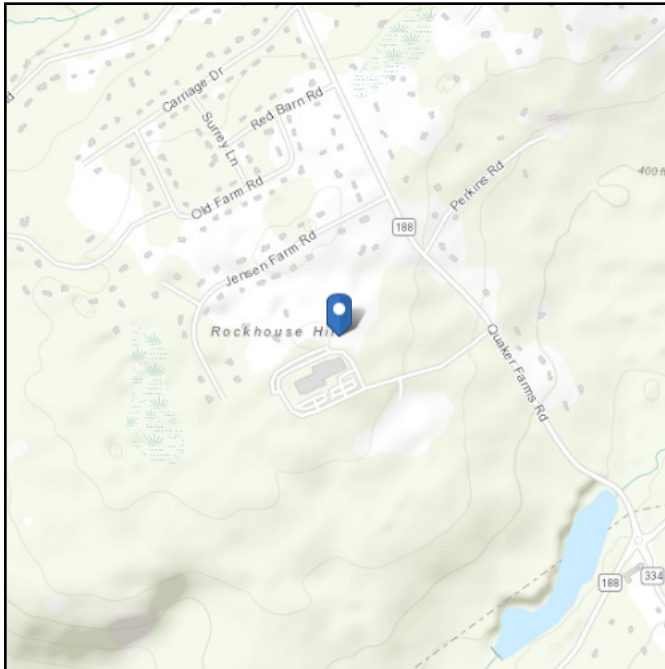
<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 41.383989
Longitude: -73.137372
Elevation: 606.865789655925 ft (NAVD 88)



Wind

Results:

Wind Speed	118 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 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: Fri Oct 20 2023

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).

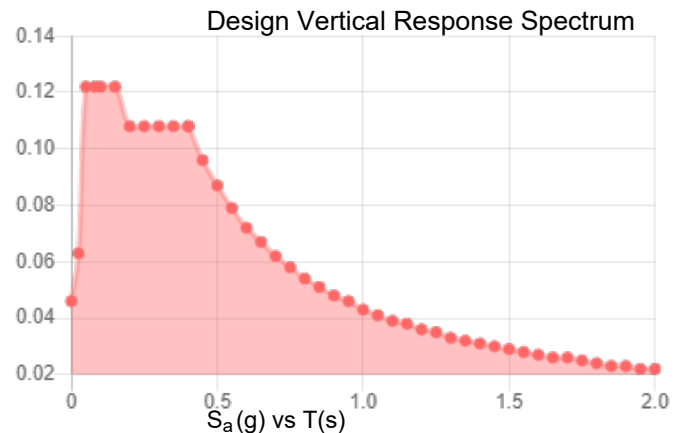
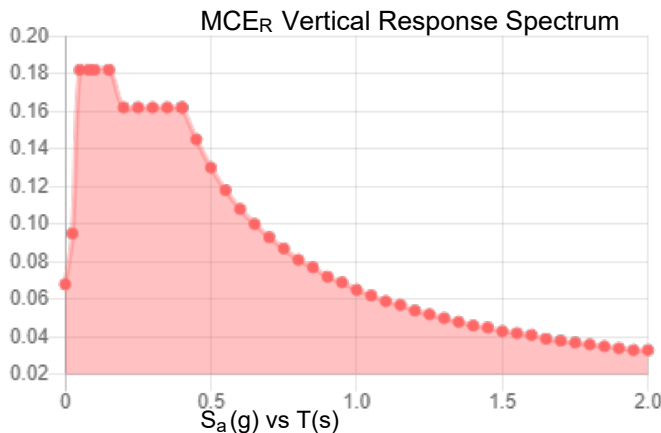
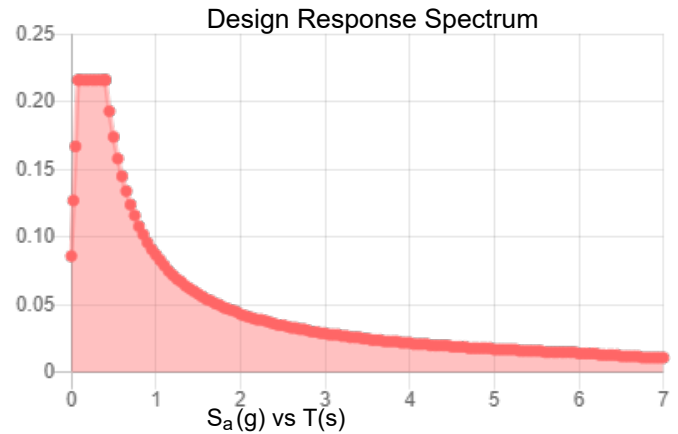
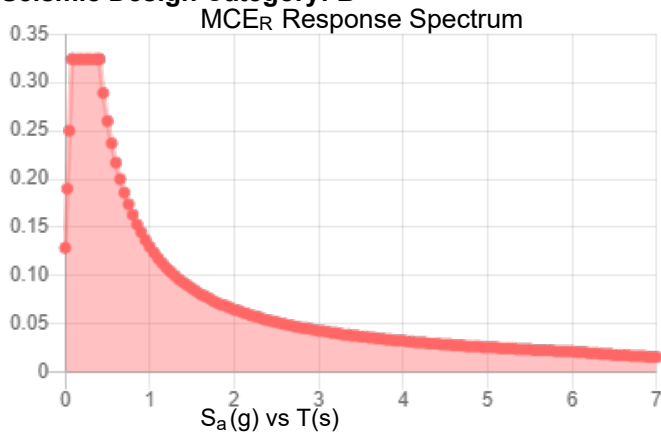
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class:

Results:

S_s :	0.202	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.113
F_v :	2.4	PGA _M :	0.179
S_{MS} :	0.324	F_{PGA} :	1.573
S_{M1} :	0.13	I_e :	1
S_{DS} :	0.216	C_v :	0.705

Seismic Design Category: B



Data Accessed:

Fri Oct 20 2023

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: Fri Oct 20 2023

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 7 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 7 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 7 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 7 Hazard Tool.