



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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E-Mail: siting.council@ct.gov
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VIA ELECTRONIC MAIL

May 8, 2024

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

RE: **EM-VER-076-240409** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 258 Ridge Road, Madison, Connecticut.
Acknowledgement of Complete Request.

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of your correspondence of May 7, 2024 submitted in response to the Council's May 6, 2024 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Melanie Bachman".

Melanie Bachman
Executive Director

MAB/ANM/lm

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Sent: Tuesday, May 7, 2024 1:58 PM
To: Fontaine, Lisa <Lisa.Fontaine@ct.gov>
Subject: RE: Council Incomplete Letter - EM-VER-076-240409 (Ridge Road) Madison

Good afternoon,

Please see attached updated SA to include the 2022 code.

A hard copy is being overnighted to your office for 5/8/24 delivery

Thanks,

Jeffrey Barbadora
Permitting Specialist
781-970-0053

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

Date: **January 16, 2024**



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

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 5000392974
Site Name: MADISON 3 CT

Crown Castle Designation: **BU Number:** 5800059
Site Name: Ridge Road, Madison
JDE Job Number: 2101359
Work Order Number: 2278086
Order Number: 656561 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number** 2278086

Site Data: **258 Ridge Road, Madison, New Haven County, CT**
Latitude: 41° 18' 33.3" Longitude: -72° 36' 51.57"
150 ft - 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

This analysis utilizes an ultimate 3-second gust wind speed of 123 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 – "Analysis Criteria".

Structural analysis prepared by: Steven Hu

Respectfully submitted by:

Sudarshan C Kasera, P.E.
Senior Project Engineer

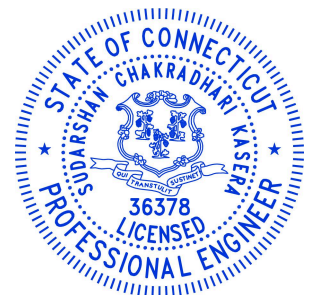


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1) INTRODUCTION

This tower is a 150 ft Monopole Tower designed by Valmont.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	123 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.00 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)
130	130	1	tower mounts	Platform Mount [LP 301-1]	13	1-5/8
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		6	decibel	DB846F65ZAXY w/ Mount Pipe		
		2	kaelus	KA-6030		
		1	raycap	RVZDC-6627-PF-48		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		

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)
148	159	1	dbspectra	DS4C06F36D-D	2 12	7/8 1-5/8
	150	3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	AIR6449 B41		
		3	ericsson	ERICSSON AIR 21 B2P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20_T-MOBILE w/ Mount Pipe		
	148	1	tower mounts	Platform Mount [LP 303-1_KCKR-HR-1]	12 2	1-5/8 13/16
140	142	3	ericsson	AIR 6449 B77D_CCVI2		
	140	3	cci antennas	OPA65R-BU6D w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		6	cci antennas	TPA65R-BU6D_CCIV2 w/ Mount Pipe	3	3/8
		3	ericsson	RRUS 32 B2	4	7/8
		3	ericsson	RRUS 4426 B66		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14_CCIV2		
		3	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 304-1_HR-1]		
	138	3	ericsson	AIR 6419 B77G_CCIV3		
124	124	1	kathrein	800 10251 w/ Mount Pipe	2	11/32
		1	radiowaves	HP2-4.7NS	1	7/8
		1	tower mounts	Side Arm Mount [SO 701-1]		
113	113	3	kathrein	800 10252	3	7/8
		1	tower mounts	T-Arm Mount [TA 601-1]		
95	95	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Valmont SNP8HR-396		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2354009	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	2354010	CCISITES
4-TOWER MANUFACTURER DRAWINGS	2354011	CCISITES

3.1) Analysis Method

tnxTower (version 8.2.2.0), 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	150 - 110	Pole	TP39.633x28.4x0.25	1	-17.943	1847.695	27.5	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-22.040	2288.202	34.3	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-39.246	3952.473	38.7	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-62.957	5823.394	39.5	Pass
							Summary	
						Pole (L4)	39.5	Pass
						RATING =	39.5	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	33.7	Pass
1	Base Plate	0	28.7	Pass
1	Base Foundation (Structural)	0	41.8	Pass
1	Base Foundation (Soil)	0	28.4	Pass

Structure Rating (max from all components) =	41.8%
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Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed

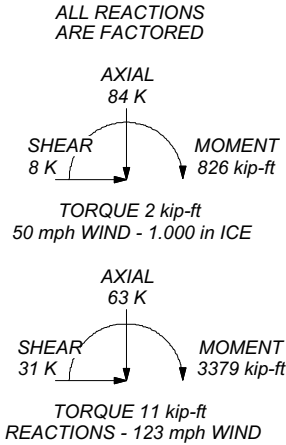
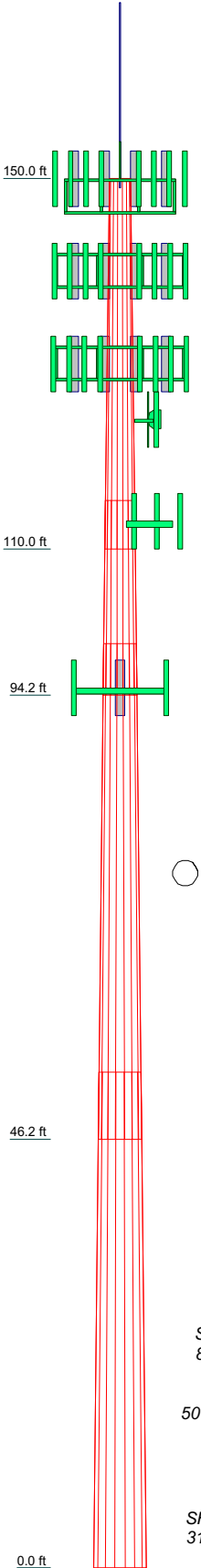
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	
Length (ft)	40,000	21,000	53,500	53,500	
Number of Sides	18	18	18	18	
Thickness (in)	0.250	0.281	0.375	0.438	
Socket Length (ft)	5,250	5,500	7,250		
Top Dia (in)	28,400	37,659	41,449	53,686	
Bot Dia (in)	39,633	43,566	56,472	68,710	
Grade	A572-65				
Weight (K)	3.6	2.6	10.5	15.4	32.1




MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 123 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 0.000 ft
8. TOWER RATING: 39.5%



CROWN CASTLE
The Pathway to Possible

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

Job: **5800059**

Project:	Client: Crown Castle	Drawn by: SHu	App'd:
Code: TIA-222-H	Date: 01/12/24	Scale: NTS	
Path: C:\SAPI Work Area\5800059\WO 2278086 - SAPIProd\5800059.dwg			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: 133.000 ft.

Basic wind speed of 123 mph.

Risk Category II.

Exposure Category B.

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

Topographic Category: 1.

Crest Height: 0.000 ft.

Nominal ice thickness of 1.000 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °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	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Horizontals	✓ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Consider Moments - Diagonals	✓ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
Use Moment Magnification	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
✓ Use Code Stress Ratios	Retension Guys To Initial Tension	Offset Girt At Foundation
✓ Use Code Safety Factors - Guys	✓ Bypass Mast Stability Checks	✓ Consider Feed Line Torque
Escalate Ice	✓ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Always Use Max Kz	✓ Project Wind Area of Appurtenances	Use TIA-222-H Bracing Resist. Exemption
Use Special Wind Profile	Alternative Appurt. EPA Calculation	Use TIA-222-H Tension Splice Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	✓ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	✓ Pole Without Linear Attachments
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole With Shroud Or No Appurtenances
Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules	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	150.000-110.000	40.000	5.250	18	28.400	39.633	0.250	1.000	A572-65 (65 ksi)
L2	110.000-94.250	21.000	5.500	18	37.659	43.556	0.281	1.125	A572-65 (65 ksi)
L3	94.250-46.250	53.500	7.250	18	41.449	56.472	0.375	1.500	A572-65 (65 ksi)
L4	46.250-0.000	53.500		18	53.686	68.710	0.438	1.750	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	28.800	22.337	2236.246	9.993	14.427	155.002	4475.435	11.171	4.558	18.234
	40.206	31.250	6123.656	13.981	20.134	304.152	12255.369	15.628	6.535	26.142
L2	39.693	33.366	5889.316	13.269	19.131	307.848	11786.381	16.686	6.133	21.806
	44.185	38.631	9139.882	15.363	22.126	413.075	18291.791	19.319	7.171	25.496
L3	43.599	48.888	10420.184	14.581	21.056	494.878	20854.080	24.449	6.635	17.693
	57.285	66.769	26545.722	19.914	28.688	925.332	53126.374	33.391	9.279	24.744
L4	56.514	73.942	26487.970	18.903	27.273	971.231	53010.794	36.978	8.679	19.837
	69.702	94.805	55829.000	24.237	34.905	1599.470	111731.461	47.411	11.323	25.881

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 Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.000-110.000				1	1	1			
L2 110.000-94.250				1	1	1			
L3 94.250-46.250				1	1	1			
L4 46.250-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*											
*											

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight klf
-------------	-------------------	-----------------	--	-------------------	-----------------	-----------------	--	---------------

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight klf
LDF5-50A(7/8)	A	No	No	Inside Pole	148.000 - 0.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HCS 6X12 4AWG(1-5/8)	A	No	No	Inside Pole	148.000 - 0.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	A	No	No	Inside Pole	148.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
LCF158-50A(1-5/8)	A	No	No	Inside Pole	148.000 - 0.000	8	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
AVA7-50(1-5/8)	C	No	No	Inside Pole	140.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
PWRT-608-S(13/16")	C	No	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
RFFT-36SM-001-XXM(3/8)	C	No	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
RFFT-36SM-001-XXM(3/8)	C	No	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
PWRT-606-S(7/8)	C	No	No	Inside Pole	140.000 - 0.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
2" Rigid Conduit	C	No	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
*									
AVA7-50(1-5/8)	B	No	No	Inside Pole	130.000 - 0.000	13	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
LDF5-50A(7/8)	C	No	No	Inside Pole	124.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
7921A(11/32)	C	No	No	Inside Pole	124.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
LDF5-50A(7/8)	C	No	No	Inside Pole	113.000 - 0.000	3	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
*									
CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	95.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
*									
*									

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	150.000-110.000	A	0.000	0.000	0.000	0.000	0.583
		B	0.000	0.000	0.000	0.000	0.182
		C	0.000	0.000	0.000	0.000	0.510
L2	110.000-94.250	A	0.000	0.000	0.000	0.000	0.241
		B	0.000	0.000	0.000	0.000	0.145
		C	0.000	0.000	0.000	0.000	0.293
L3	94.250-46.250	A	0.000	0.000	0.000	0.000	0.736
		B	0.000	0.000	0.000	0.000	0.550
		C	0.000	0.000	0.000	0.000	0.892
L4	46.250-0.000	A	0.000	0.000	0.000	0.000	0.709
		B	0.000	0.000	0.000	0.000	0.530
		C	0.000	0.000	0.000	0.000	0.860

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	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	150.000-110.000	A	0.974	0.000	0.000	0.000	0.000	0.583
		B		0.000	0.000	0.000	0.000	0.182
		C		0.000	0.000	0.000	0.000	0.510
L2	110.000-94.250	A	0.952	0.000	0.000	0.000	0.000	0.241
		B		0.000	0.000	0.000	0.000	0.145
		C		0.000	0.000	0.000	0.000	0.293
L3	94.250-46.250	A	0.916	0.000	0.000	0.000	0.000	0.736
		B		0.000	0.000	0.000	0.000	0.550
		C		0.000	0.000	0.000	0.000	0.892
L4	46.250-0.000	A	0.818	0.000	0.000	0.000	0.000	0.709
		B		0.000	0.000	0.000	0.000	0.530
		C		0.000	0.000	0.000	0.000	0.860

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	150.000-110.000	0.000	0.000	0.000	0.000
L2	110.000-94.250	0.000	0.000	0.000	0.000
L3	94.250-46.250	0.000	0.000	0.000	0.000
L4	46.250-0.000	0.000	0.000	0.000	0.000

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 Vert ft ft ft	Azimuth Adjustment °	Placement ft
Lightning Rod 5/8" x 4'	C	None		0.000	152.000
*					
DS4C06F36D-D	A	From Leg	2.000 0.000 11.000	0.000	148.000
Pipe Mount [PM 601-1]	A	From Leg	2.000 0.000 4.000	0.000	148.000
10' x 2" Mount Pipe	A	From Leg	2.000 0.000 -2.000	0.000	148.000
*					
ERICSSON AIR 21 B2P w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	148.000
ERICSSON AIR 21 B2P w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	148.000
ERICSSON AIR 21 B2P w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	148.000
APXVAARR24_43-U-NA20_T- MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	148.000
APXVAARR24_43-U-NA20_T- MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	148.000
APXVAARR24_43-U-NA20_T- MOBILE w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	148.000
AIR6449 B41	A	From Leg	4.000 0.000 2.000	0.000	148.000
AIR6449 B41	B	From Leg	4.000 0.000 2.000	0.000	148.000
AIR6449 B41	C	From Leg	4.000 0.000 2.000	0.000	148.000
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	148.000
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	148.000
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	148.000
RRUS 4415 B25	A	From Leg	4.000 0.000 2.000	0.000	148.000
RRUS 4415 B25	B	From Leg	4.000 0.000 2.000	0.000	148.000
RRUS 4415 B25	C	From Leg	4.000 0.000 2.000	0.000	148.000
(2) KRY 112 144/1	A	From Leg	4.000	0.000	148.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.000		
KRY 112 144/1	B	From Leg	2.000		
			4.000	0.000	148.000
			0.000		
			2.000		
RADIO 4449 B71 B85A_T- MOBILE	A	From Leg	4.000	0.000	148.000
			0.000		
			2.000		
RADIO 4449 B71 B85A_T- MOBILE	B	From Leg	4.000	0.000	148.000
			0.000		
			2.000		
RADIO 4449 B71 B85A_T- MOBILE	C	From Leg	4.000	0.000	148.000
			0.000		
			2.000		
8' x 2" Mount Pipe	A	From Leg	4.000	0.000	148.000
			0.000		
			0.000		
8' x 2" Mount Pipe	B	From Leg	4.000	0.000	148.000
			0.000		
			0.000		
8' x 2" Mount Pipe	C	From Leg	4.000	0.000	148.000
			0.000		
			0.000		
Platform Mount [LP 303- 1_KCKR-HR-1] *	C	None		0.000	148.000
RRUS 32 B2	A	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
RRUS 32 B2	B	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
RRUS 32 B2	C	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
DC6-48-60-18-8F	A	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
(2) TPA65R-BU6D_CCIV2 w/ Mount Pipe	A	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
(2) TPA65R-BU6D_CCIV2 w/ Mount Pipe	B	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
(2) TPA65R-BU6D_CCIV2 w/ Mount Pipe	C	From Leg	4.000	0.000	140.000
			0.000		
			0.000		
AIR 6449 B77D_CCIV12	A	From Leg	4.000	0.000	140.000
			0.000		
			2.000		
AIR 6449 B77D_CCIV12	B	From Leg	4.000	0.000	140.000
			0.000		
			2.000		
AIR 6449 B77D_CCIV12	C	From Leg	4.000	0.000	140.000
			0.000		
			2.000		
AIR 6419 B77G_CCIV3	A	From Leg	4.000	0.000	140.000
			0.000		

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
AIR 6419 B77G_CCIV3	B	From Leg	-2.000 4.000 0.000	0.000	140.000
AIR 6419 B77G_CCIV3	C	From Leg	-2.000 4.000 0.000	0.000	140.000
OPA65R-BU6D w/ Mount Pipe	A	From Leg	-2.000 4.000 0.000	0.000	140.000
OPA65R-BU6D w/ Mount Pipe	B	From Leg	0.000 4.000 0.000	0.000	140.000
OPA65R-BU6D w/ Mount Pipe	C	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4478 B14_CCIV2	A	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4478 B14_CCIV2	B	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4478 B14_CCIV2	C	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4426 B66	A	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4426 B66	B	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4426 B66	C	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4449 B5/B12	A	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4449 B5/B12	B	From Leg	0.000 4.000 0.000	0.000	140.000
RRUS 4449 B5/B12	C	From Leg	0.000 4.000 0.000	0.000	140.000
DC6-48-60-18-8F	A	From Leg	0.000 4.000 0.000	0.000	140.000
DC6-48-60-18-8F	C	From Leg	0.000 4.000 0.000	0.000	140.000
9' x 2" Pipe Mount	A	From Leg	0.000 4.000 0.000	0.000	140.000
9' x 2" Pipe Mount	B	From Leg	0.000 4.000 0.000	0.000	140.000
9' x 2" Pipe Mount	C	From Leg	0.000 4.000 0.000	0.000	140.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
Side Arm Mount [SO 102-3]	C	None		0.000	140.000
Platform Mount [LP 304- 1_HR-1] *	C	None		0.000	140.000
MT6407-77A w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
MT6407-77A w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
MT6407-77A w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
(2) KA-6030	B	From Leg	4.000 0.000 0.000	0.000	130.000
RVZDC-6627-PF-48	A	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D1A	A	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D1A	B	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D1A	C	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D2A	A	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D2A	B	From Leg	4.000 0.000 0.000	0.000	130.000
RFV01U-D2A	C	From Leg	4.000 0.000 0.000	0.000	130.000
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
Platform Mount [LP 301-1] BSAMNT-SBS-1-2 *	C	None		0.000	130.000
	C	None		0.000	130.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
800 10251 w/ Mount Pipe	B	From Leg	3.000 0.000 0.000	0.000	124.000
4' x 2" Pipe Mount	B	From Leg	2.000 0.000 0.000	0.000	124.000
Side Arm Mount [SO 102-3]	C	None		0.000	124.000
Side Arm Mount [SO 701-1]	B	From Leg	1.500 0.000 0.000	0.000	124.000
*					
(3) 800 10252	B	From Leg	3.000 0.000 0.000	0.000	113.000
(3) 6' x 2" Mount Pipe	B	From Leg	3.000 0.000 0.000	0.000	113.000
T-Arm Mount [TA 601-1]	B	From Leg	2.000 0.000 0.000	0.000	113.000
*					
*					
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	95.000
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	95.000
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B604	A	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B604	B	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	95.000
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	95.000
RDIDC-9181-PF-48	A	From Leg	4.000 0.000 0.000	0.000	95.000
Valmont SNP8HR-396	C	None		0.000	95.000
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	95.000
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000	0.000	95.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) 8' x 2" Mount Pipe	C	From Leg	0.000 4.000 0.000 0.000	0.000	95.000
**					

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
HP2-4.7NS	B	Paraboloid w/Shroud (HP)	From Leg	2.000 0.000 0.000	-11.000		124.000	2.042	No Ice 1/2" Ice 1" Ice	3.274 3.547 3.819
*										

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

Comb. No.	Description
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	150 - 110	Pole	Max Tension	2	0.000	0.000	-0.000
			Max. Compression	26	-30.321	-1.422	1.452
			Max. Mx	8	-17.945	-414.062	0.425
			Max. My	2	-17.955	-0.352	413.634
			Max. Vy	20	-17.765	412.650	0.956
			Max. Vx	14	17.684	-1.281	-412.501
			Max. Torque	12			7.721
L2	110 - 94.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.877	-4.861	-0.502
			Max. Mx	8	-22.051	-714.931	-0.862
			Max. My	14	-22.071	-3.503	-707.712
			Max. Vy	20	-20.135	710.816	0.572
			Max. Vx	14	19.734	-3.503	-707.712
			Max. Torque	13			10.020
L3	94.25 - 46.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.312	-4.861	-0.141
			Max. Mx	8	-39.253	-1830.923	-1.931
			Max. My	14	-39.264	-5.576	-1807.550
			Max. Vy	20	-26.349	1828.406	2.203
			Max. Vx	14	25.972	-5.576	-1807.550
			Max. Torque	13			10.899
L4	46.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-84.419	-4.861	-0.141
			Max. Mx	8	-62.957	-3353.815	-3.240
			Max. My	14	-62.957	-7.859	-3312.319
			Max. Vy	20	-30.591	3353.184	3.973
			Max. Vx	14	30.221	-7.859	-3312.319
			Max. Torque	13			10.892

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	84.419	-0.000	0.000
	Max. H _x	20	62.968	30.568	0.033
	Max. H _z	2	62.968	0.058	30.197
	Max. M _x	2	3311.699	0.058	30.197
	Max. M _z	8	3353.815	-30.532	-0.024
	Max. Torsion	13	10.889	-15.338	-26.453
	Min. Vert	17	47.226	15.014	-25.953
	Min. H _x	8	62.968	-30.532	-0.024
	Min. H _z	14	62.968	-0.042	-30.199
	Min. M _x	14	-3312.319	-0.042	-30.199
	Min. M _z	20	-3353.184	30.568	0.033
	Min. Torsion	25	-10.858	15.363	26.468

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	52.473	0.000	0.000	0.172	-2.046	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	62.968	-0.058	-30.197	-3311.699	4.793	3.680
0.9 Dead+1.0 Wind 0 deg - No Ice	47.226	-0.058	-30.197	-3289.794	5.408	3.685
1.2 Dead+1.0 Wind 30 deg - No Ice	62.968	15.021	-25.954	-2844.369	-1649.613	-4.437
0.9 Dead+1.0 Wind 30 deg - No Ice	47.226	15.021	-25.954	-2825.555	-1638.018	-4.429
1.2 Dead+1.0 Wind 60 deg - No Ice	62.968	26.144	-15.025	-1646.479	-2869.952	1.782
0.9 Dead+1.0 Wind 60 deg - No Ice	47.226	26.144	-15.025	-1635.614	-2850.273	1.792
1.2 Dead+1.0 Wind 90 deg - No Ice	62.968	30.532	0.024	3.239	-3353.815	7.604
0.9 Dead+1.0 Wind 90 deg - No Ice	47.226	30.532	0.024	3.170	-3330.945	7.612
1.2 Dead+1.0 Wind 120 deg - No Ice	62.968	26.631	15.362	1687.116	-2927.341	-1.928
0.9 Dead+1.0 Wind 120 deg - No Ice	47.226	26.631	15.362	1675.888	-2907.303	-1.924
1.2 Dead+1.0 Wind 150 deg - No Ice	62.968	15.338	26.453	2903.810	-1687.203	-10.888
0.9 Dead+1.0 Wind 150 deg - No Ice	47.226	15.338	26.453	2884.513	-1675.381	-10.889
1.2 Dead+1.0 Wind 180 deg - No Ice	62.968	0.042	30.199	3312.319	-7.858	-3.735
0.9 Dead+1.0 Wind 180 deg - No Ice	47.226	0.042	30.199	3290.305	-7.159	-3.740
1.2 Dead+1.0 Wind 210 deg - No Ice	62.968	-15.014	25.953	2844.716	1643.528	4.464
0.9 Dead+1.0 Wind 210 deg - No Ice	47.226	-15.014	25.953	2825.791	1633.277	4.456
1.2 Dead+1.0 Wind 240 deg - No Ice	62.968	-26.172	15.015	1645.633	2868.387	-1.770
0.9 Dead+1.0 Wind 240 deg - No Ice	47.226	-26.172	15.015	1634.669	2850.014	-1.779
1.2 Dead+1.0 Wind 270 deg - No Ice	62.968	-30.568	-0.033	-3.974	3353.184	-7.617

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
No Ice						
0.9 Dead+1.0 Wind 270 deg - No Ice	47.226	-30.568	-0.033	-3.994	3331.614	-7.625
1.2 Dead+1.0 Wind 300 deg - No Ice	62.968	-26.664	-15.374	-1688.184	2926.416	1.891
0.9 Dead+1.0 Wind 300 deg - No Ice	47.226	-26.664	-15.374	-1677.055	2907.680	1.887
1.2 Dead+1.0 Wind 330 deg - No Ice	62.968	-15.363	-26.468	-2905.287	1685.399	10.857
0.9 Dead+1.0 Wind 330 deg - No Ice	47.226	-15.363	-26.468	-2886.092	1674.874	10.858
1.2 Dead+1.0 Ice+1.0 Temp	84.419	0.000	-0.000	0.141	-4.861	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	84.419	-0.011	-7.621	-809.769	-3.625	0.796
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	84.419	3.797	-6.565	-696.978	-408.461	-0.674
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	84.419	6.599	-3.797	-403.051	-706.385	0.311
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	84.419	7.681	0.005	0.739	-822.085	1.229
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	84.419	6.686	3.857	410.675	-716.691	-0.491
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	84.419	3.854	6.653	707.893	-415.284	-2.068
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	84.419	0.008	7.621	810.102	-6.089	-0.807
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	84.419	-3.796	6.565	697.255	398.164	0.679
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	84.419	-6.605	3.795	403.099	696.964	-0.309
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	84.419	-7.688	-0.006	-0.665	812.847	-1.232
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	84.419	-6.692	-3.860	-410.672	707.396	0.483
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	84.419	-3.859	-6.656	-707.972	405.812	2.062
Dead+Wind 0 deg - Service	52.473	-0.013	-6.771	-739.402	-0.486	0.822
Dead+Wind 30 deg - Service	52.473	3.368	-5.819	-635.044	-369.924	-1.004
Dead+Wind 60 deg - Service	52.473	5.862	-3.369	-367.545	-642.439	0.392
Dead+Wind 90 deg - Service	52.473	6.846	0.005	0.855	-750.491	1.701
Dead+Wind 120 deg - Service	52.473	5.971	3.444	376.876	-655.256	-0.437
Dead+Wind 150 deg - Service	52.473	3.439	5.931	648.573	-378.325	-2.446
Dead+Wind 180 deg - Service	52.473	0.009	6.771	739.798	-3.310	-0.835
Dead+Wind 210 deg - Service	52.473	-3.366	5.819	635.376	365.461	1.010
Dead+Wind 240 deg - Service	52.473	-5.868	3.367	367.614	638.980	-0.389
Dead+Wind 270 deg - Service	52.473	-6.854	-0.007	-0.754	747.241	-1.704
Dead+Wind 300 deg - Service	52.473	-5.978	-3.447	-376.859	651.940	0.429
Dead+Wind 330 deg - Service	52.473	-3.445	-5.934	-648.650	374.805	2.438

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	0.000	-52.473	0.000	0.000	52.473	0.000	0.000%
2	-0.058	-62.968	-30.197	0.058	62.968	30.197	0.000%
3	-0.058	-47.226	-30.197	0.058	47.226	30.197	0.000%
4	15.021	-62.968	-25.954	-15.021	62.968	25.954	0.000%
5	15.021	-47.226	-25.954	-15.021	47.226	25.954	0.000%
6	26.144	-62.968	-15.025	-26.144	62.968	15.025	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
7	26.144	-47.226	-15.025	-26.144	47.226	15.025	0.000%
8	30.532	-62.968	0.024	-30.532	62.968	-0.024	0.000%
9	30.532	-47.226	0.024	-30.532	47.226	-0.024	0.000%
10	26.631	-62.968	15.362	-26.631	62.968	-15.362	0.000%
11	26.631	-47.226	15.362	-26.631	47.226	-15.362	0.000%
12	15.338	-62.968	26.453	-15.338	62.968	-26.453	0.000%
13	15.338	-47.226	26.453	-15.338	47.226	-26.453	0.000%
14	0.042	-62.968	30.199	-0.042	62.968	-30.199	0.000%
15	0.042	-47.226	30.199	-0.042	47.226	-30.199	0.000%
16	-15.014	-62.968	25.953	15.014	62.968	-25.953	0.000%
17	-15.014	-47.226	25.953	15.014	47.226	-25.953	0.000%
18	-26.172	-62.968	15.015	26.172	62.968	-15.015	0.000%
19	-26.172	-47.226	15.015	26.172	47.226	-15.015	0.000%
20	-30.568	-62.968	-0.033	30.568	62.968	0.033	0.000%
21	-30.568	-47.226	-0.033	30.568	47.226	0.033	0.000%
22	-26.664	-62.968	-15.374	26.664	62.968	15.374	0.000%
23	-26.664	-47.226	-15.374	26.664	47.226	15.374	0.000%
24	-15.363	-62.968	-26.468	15.363	62.968	26.468	0.000%
25	-15.363	-47.226	-26.468	15.363	47.226	26.468	0.000%
26	0.000	-84.419	0.000	-0.000	84.419	0.000	0.000%
27	-0.011	-84.419	-7.621	0.011	84.419	7.621	0.000%
28	3.797	-84.419	-6.565	-3.797	84.419	6.565	0.000%
29	6.599	-84.419	-3.797	-6.599	84.419	3.797	0.000%
30	7.681	-84.419	0.005	-7.681	84.419	-0.005	0.000%
31	6.686	-84.419	3.857	-6.686	84.419	-3.857	0.000%
32	3.854	-84.419	6.653	-3.854	84.419	-6.653	0.000%
33	0.008	-84.419	7.621	-0.008	84.419	-7.621	0.000%
34	-3.796	-84.419	6.565	3.796	84.419	-6.565	0.000%
35	-6.605	-84.419	3.795	6.605	84.419	-3.795	0.000%
36	-7.688	-84.419	-0.006	7.688	84.419	0.006	0.000%
37	-6.692	-84.419	-3.860	6.692	84.419	3.860	0.000%
38	-3.859	-84.419	-6.656	3.859	84.419	6.656	0.000%
39	-0.013	-52.473	-6.771	0.013	52.473	6.771	0.000%
40	3.368	-52.473	-5.819	-3.368	52.473	5.819	0.000%
41	5.862	-52.473	-3.369	-5.862	52.473	3.369	0.000%
42	6.846	-52.473	0.005	-6.846	52.473	-0.005	0.000%
43	5.971	-52.473	3.444	-5.971	52.473	-3.444	0.000%
44	3.439	-52.473	5.931	-3.439	52.473	-5.931	0.000%
45	0.009	-52.473	6.771	-0.009	52.473	-6.771	0.000%
46	-3.366	-52.473	5.819	3.366	52.473	-5.819	0.000%
47	-5.868	-52.473	3.367	5.868	52.473	-3.367	0.000%
48	-6.854	-52.473	-0.007	6.854	52.473	0.007	0.000%
49	-5.978	-52.473	-3.447	5.978	52.473	3.447	0.000%
50	-3.445	-52.473	-5.934	3.445	52.473	5.934	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	4	0.00000001	0.00071461
3	Yes	4	0.00000001	0.00048179
4	Yes	5	0.00000001	0.00009899
5	Yes	5	0.00000001	0.00004811
6	Yes	5	0.00000001	0.00010547
7	Yes	5	0.00000001	0.00005128
8	Yes	5	0.00000001	0.00005092
9	Yes	5	0.00000001	0.00002565

10	Yes	5	0.00000001	0.00011036
11	Yes	5	0.00000001	0.00005347
12	Yes	5	0.00000001	0.00016491
13	Yes	5	0.00000001	0.00008166
14	Yes	4	0.00000001	0.00075482
15	Yes	4	0.00000001	0.00050892
16	Yes	5	0.00000001	0.00012713
17	Yes	5	0.00000001	0.00006264
18	Yes	5	0.00000001	0.00011603
19	Yes	5	0.00000001	0.00005684
20	Yes	5	0.00000001	0.00005035
21	Yes	5	0.00000001	0.00002538
22	Yes	5	0.00000001	0.00012270
23	Yes	5	0.00000001	0.00005988
24	Yes	5	0.00000001	0.00010290
25	Yes	5	0.00000001	0.00005037
26	Yes	4	0.00000001	0.00000963
27	Yes	5	0.00000001	0.00006087
28	Yes	5	0.00000001	0.00006499
29	Yes	5	0.00000001	0.00006540
30	Yes	5	0.00000001	0.00006228
31	Yes	5	0.00000001	0.00006642
32	Yes	5	0.00000001	0.00006725
33	Yes	5	0.00000001	0.00006083
34	Yes	5	0.00000001	0.00006403
35	Yes	5	0.00000001	0.00006399
36	Yes	5	0.00000001	0.00006078
37	Yes	5	0.00000001	0.00006519
38	Yes	5	0.00000001	0.00006542
39	Yes	4	0.00000001	0.00004276
40	Yes	4	0.00000001	0.00006202
41	Yes	4	0.00000001	0.00005471
42	Yes	4	0.00000001	0.00007990
43	Yes	4	0.00000001	0.00005708
44	Yes	4	0.00000001	0.00014096
45	Yes	4	0.00000001	0.00004353
46	Yes	4	0.00000001	0.00008347
47	Yes	4	0.00000001	0.00006387
48	Yes	4	0.00000001	0.00007902
49	Yes	4	0.00000001	0.00006812
50	Yes	4	0.00000001	0.00010592

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	9.774	43	0.570	0.009
L2	115.25 - 94.25	5.813	43	0.489	0.005
L3	99.75 - 46.25	4.319	43	0.421	0.004
L4	53.5 - 0	1.208	43	0.208	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
-----------------	--------------	-----------------------	------------------	-----------	------------	------------------------------

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
152.000	Lightning Rod 5/8" x 4'	43	9.774	0.570	0.009	90133
148.000	DS4C06F36D-D	43	9.536	0.567	0.009	90133
140.000	RRUS 32 B2	43	8.586	0.553	0.008	45067
130.000	MT6407-77A w/ Mount Pipe	43	7.423	0.532	0.007	22533
124.000	HP2-4.7NS	43	6.750	0.517	0.006	17333
113.000	(3) 800 10252	43	5.583	0.480	0.005	13185
95.000	MX08FRO665-21 w/ Mount Pipe	43	3.904	0.399	0.003	13342

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	150 - 110	43.649	10	2.547	0.041
L2	115.25 - 94.25	25.967	10	2.180	0.023
L3	99.75 - 46.25	19.300	10	1.880	0.016
L4	53.5 - 0	5.401	10	0.929	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
152.000	Lightning Rod 5/8" x 4'	10	43.649	2.547	0.041	20342
148.000	DS4C06F36D-D	10	42.584	2.532	0.040	20342
140.000	RRUS 32 B2	10	38.343	2.469	0.036	10171
130.000	MT6407-77A w/ Mount Pipe	10	33.154	2.376	0.030	5084
124.000	HP2-4.7NS	10	30.147	2.307	0.027	3910
113.000	(3) 800 10252	10	24.939	2.142	0.022	2968
95.000	MX08FRO665-21 w/ Mount Pipe	10	17.446	1.781	0.014	3008

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	KI/r	A	P _u	φP _n	Ratio P _u φP _n
	ft		ft	ft		in ²	K	K	
L1	150 - 110 (1)	TP39.633x28.4x0.25	40.000	0.000	0.0	30.080	-17.943	1759.710	0.010
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	21.000	0.000	0.0	37.252	-22.040	2179.240	0.010
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	53.500	0.000	0.0	64.346	-39.246	3764.260	0.010
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	53.500	0.000	0.0	94.805	-62.957	5546.090	0.011

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	150 - 110 (1)	TP39.633x28.4x0.25	414.202	1496.850	0.277	0.000	1496.850	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	718.429	2059.733	0.349	0.000	2059.733	0.000
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	1844.350	4664.408	0.395	0.000	4664.408	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	3378.708	8388.250	0.403	0.000	8388.250	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	150 - 110 (1)	TP39.633x28.4x0.25	17.784	527.913	0.034	7.689	1752.592	0.004
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	20.312	653.773	0.031	1.722	2389.225	0.001
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	26.530	1129.280	0.023	1.929	5346.458	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	30.767	1663.830	0.018	1.928	9947.917	0.000

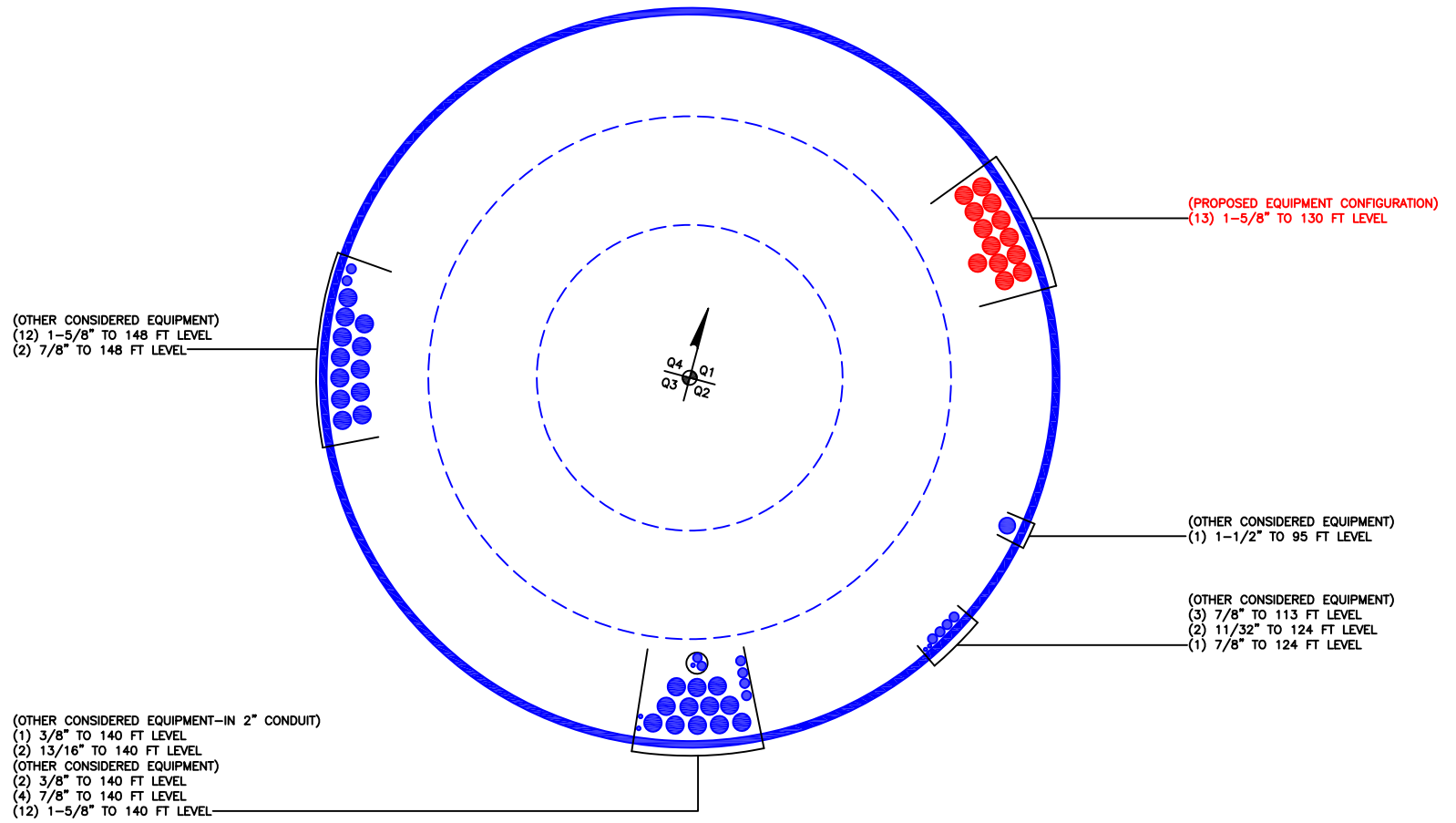
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110 (1)	ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n	0.288	1.050	
L2	110 - 94.25 (2)	0.010	0.277	0.000	0.034	0.004	0.360	1.050	
L3	94.25 - 46.25 (3)	0.010	0.349	0.000	0.031	0.001	0.406	1.050	
L4	46.25 - 0 (4)	0.010	0.395	0.000	0.023	0.000	0.414	1.050	

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 110	Pole	TP39.633x28.4x0.25	1	-17.943	1847.695	27.5	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-22.040	2288.202	34.3	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-39.246	3952.473	38.7	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-62.957	5823.394	39.5	Pass
							Summary	
							Pole (L4)	Pass
							RATING = 39.5	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

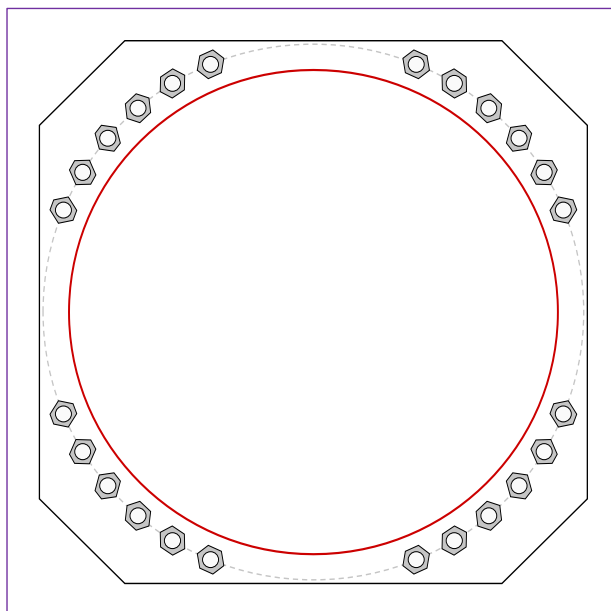


Site Info	
BU #	5800059
Site Name	Ridge Road, Madison, C
Order #	656561 REV. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2.25

Applied Loads	
Moment (kip-ft)	3378.71
Axial Force (kips)	62.96
Shear Force (kips)	30.77

*TIA-222-H Section 15.5 Applied



Connection Properties

Anchor Rod Data

(24) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 76" BC
Anchor Spacing: 6 in

Base Plate Data

77" W x 3" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi); Clip: 12 in

Stiffener Data

N/A

Pole Data

68.71" x 0.4375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Analysis Results

Anchor Rod Summary

(units of kips, kip-in)

$Pu_t = 86.26$	$\phi Pn_t = 243.75$	Stress Rating
$Vu = 1.28$	$\phi Vn = 149.1$	33.7%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	13.54	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	28.7%	Pass

Drilled Pier Foundation

BU # :	5800059
Site Name:	Ridge Road, Madison, CT
Order Number:	656561 REV. 0
TIA-222 Revision:	H
Tower Type:	Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	3378.71	
Axial Force (kips)	62.97	
Shear Force (kips)	30.74	

Material Properties		
Concrete Strength, f _c :	4	ksi
Rebar Strength, F _y :	60	ksi
Tie Yield Strength, F _y :	40	ksi

Pier Design Data		
Depth	39	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 39' below grade		
Pier Diameter	8	ft
Rebar Quantity	28	
Rebar Size	11	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	12	in

[Rebar & Pier Options](#)

[Embedded Pole Inputs](#)

[Belled Pier Inputs](#)

Analysis Results		
Soil Lateral Check		
D _{v=0} (ft from TOC)	9.88	-
Soil Safety Factor	7.01	-
Max Moment (kip-ft)	3649.99	-
Rating*	18.1%	-
Soil Vertical Check		
Skin Friction (kips)	688.42	-
End Bearing (kips)	317.36	-
Weight of Concrete (kips)	236.89	-
Total Capacity (kips)	1005.77	-
Axial (kips)	299.86	-
Rating*	28.4%	-
Reinforced Concrete Flexure		
Critical Depth (ft from TOC)	9.46	-
Critical Moment (kip-ft)	3649.38	-
Critical Moment Capacity	8318.94	-
Rating*	41.8%	-
Reinforced Concrete Shear		
Critical Depth (ft from TOC)	28.44	-
Critical Shear (kip)	265.26	-
Critical Shear Capacity	786.20	-
Rating*	32.1%	-
Structural Foundation Rating*	41.8%	
Soil Interaction Rating*	28.4%	

*Rating per TIA-222-H Section 15.5



Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>
Design Options	
Input Effective Depths (else Actual):	<input type="checkbox"/>
Consider non-tapered moment capacity:	<input type="checkbox"/>
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>
Utilize Shear-Friction Methodology:	<input type="checkbox"/>
Override Critical Depth:	<input type="checkbox"/>

[Go to Soil Calculations](#)

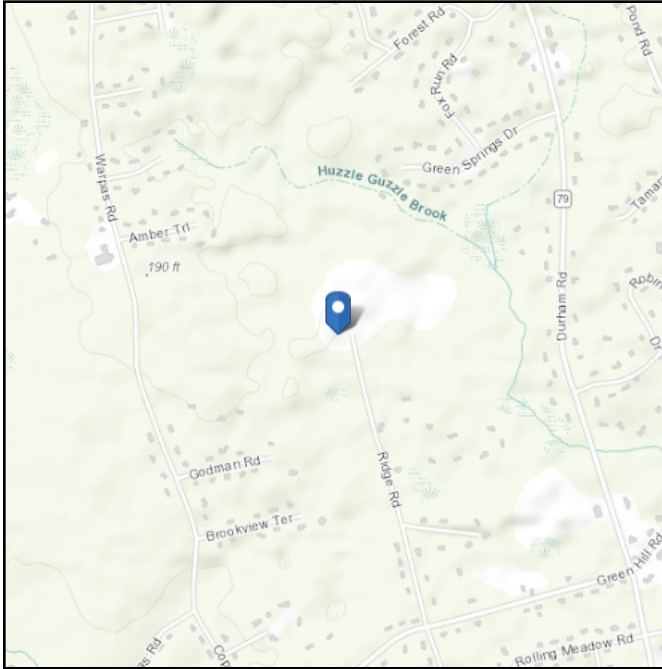
Soil Profile														
Groundwater Depth		7	# of Layers		5									
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	Y _{soil} (pcf)	Y _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4	4	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	4	7	3	100	150	0.1	22	0.181	0.181					Silty
3	7	12	5	37.6	87.6	0.1	22	0.257	0.257					Silty
4	12	20	8	42.6	87.6	0.4	27	1.016	1.016				70	Cohesionless
5	20	39	19	62.6	87.6	0.2	31	1.398	1.398			6	85	Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Latitude: 41.30925
Longitude: -72.614325
Elevation: 0 ft (NAVD 88)



Wind

Results:

Wind Speed	123 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	94 Vmph
100-year MRI	100 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: Mon Mar 06 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).

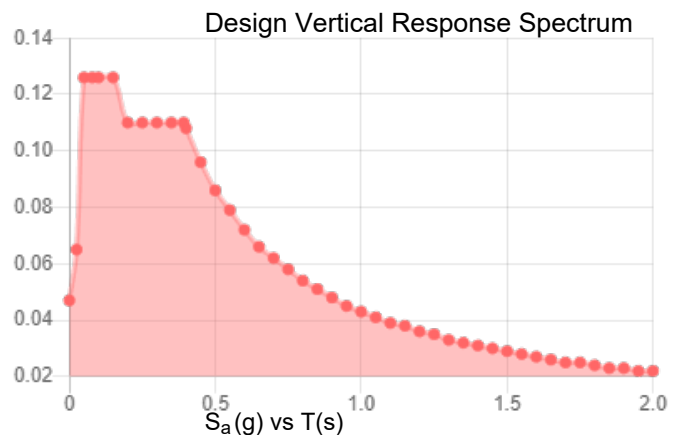
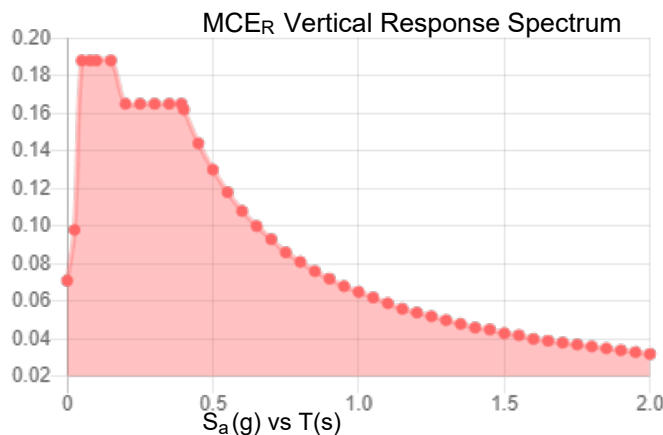
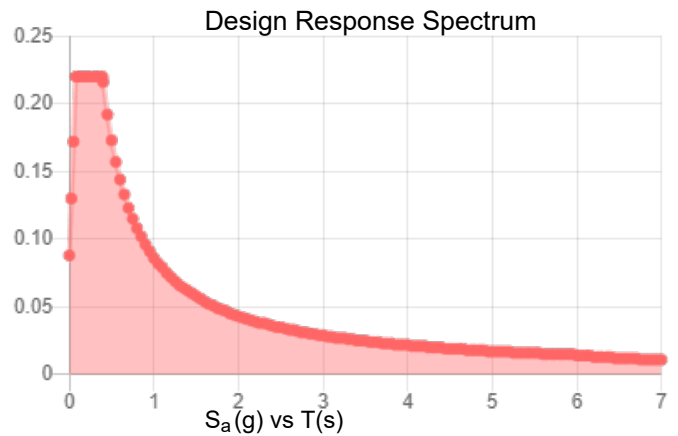
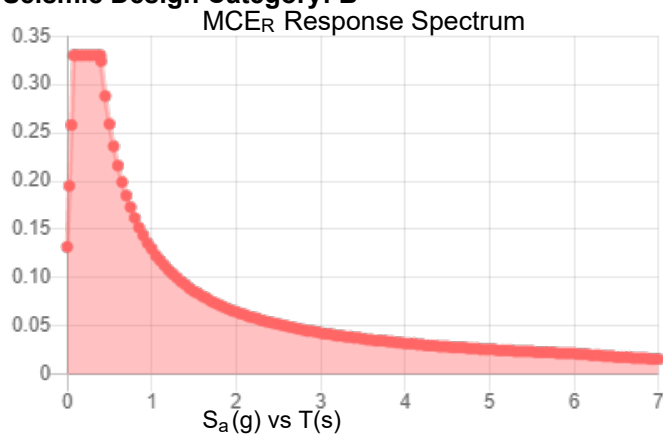
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class:

Results:

S_S :	0.206	S_{D1} :	0.086
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.116
F_v :	2.4	PGA _M :	0.181
S_{MS} :	0.33	F_{PGA} :	1.569
S_{M1} :	0.13	I_e :	1
S_{DS} :	0.22	C_v :	0.713

Seismic Design Category: B



Data Accessed:

Mon Mar 06 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.

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: Mon Mar 06 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.

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