



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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VIA ELECTRONIC MAIL

May 16, 2024

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

RE: **EM-VER-089-230920** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 167 Cocomo Circle, New Britain, Connecticut.
Request for Project Change.

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated May 7, 2024 and the associated Structural Analysis dated October 25, 2023, regarding a project change for the above-referenced exempt modification request acknowledged by the Council on October 16, 2023.

Pursuant to Condition No. 1 of the Council's October 16, 2023 exempt modification approval, the request to increase the number of Kaelus interference mitigation filters to be installed from one to two is hereby approved.

This approval applies only to the project change in the correspondence dated May 7, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/ANM/laf

c: The Honorable Erin Stewart, Mayor, City of New Britain (Mayor@NewBritainCT.gov)

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Sent: Tuesday, May 7, 2024 4:10 PM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: EM-VER-089-230920 - 167 Coccoimo Cir New Britain CT - 803175

Good afternoon,

Would the CSC please update the approval for EM-VER-089-230920 to include a total of 2 filters?

The original SA submitted with the application and dated 8/3/2023 stated only 1 filter and should have stated 2 filters.

Please see updated SA stating 2 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

Date: **October 25, 2023**



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

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 5000382471
Site Name: NEW BRITAIN 3 CT

Crown Castle Designation: **BU Number:** 803175
Site Name: CT NEW BRITAIN 3 CAC 803175
JDE Job Number: 2103578
Work Order Number: 2265487
Order Number: 658886 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number:** 2265487

Site Data: **167 Cocco, New Britain, Hartford County, CT**
Latitude 41° 41' 11.8", Longitude -72° 45' 27.8"
188 Foot - Monopole Tower

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

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

LC7: Proposed Equipment Configuration **Sufficient Capacity - 89.9%**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 118 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Didi Rossmiller

Respectfully submitted by:

Rohit Soni, P.E.
Senior Project Engineer

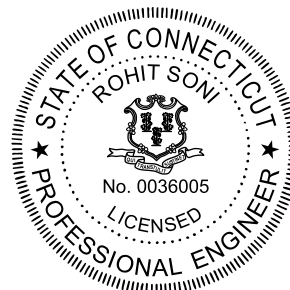


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1) INTRODUCTION

This tower is a 188 ft Monopole tower designed by SUMMIT.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 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)
144.0	146.0	3	samsung telecom.	MT6407-77A w/ Mount Pipe	8	1-5/8
		3	samsung telecom.	RFV01U-D2A		
	145.0	3	amphenol	BXA-80063-6BF-EDIN-4		
		6	andrew	SBNHH-1D65B w/ Mount Pipe		
		2	kaelus	BSF0020F3V1		
		2	raycap	RRFDC-3315-PF-48		
		3	samsung telecom.	RFV01U-D1A		
	144.0	1	tower mounts	Platform Mount [LP 602-1_KCKR]		
143.0	3	samsung telecom.	CBRS w/ Mount Pipe			

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
189.0	190.0	1	cci antennas_cfd	DMP65R-BU4D w/ Mount Pipe	3 6 3	3/8 13/16 7/8
		2	cci antennas_cfd	DMP65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 4415 B25		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson_cfd	AIR 6419 B77G w/ Mount Pipe		
		3	ericsson_cfd	AIR 6449 N77 w/ Mount Pipe		
		1	quintel technology	QD4616-7 w/ Mount Pipe		
		2	quintel technology	QD6616-7 w/ Mount Pipe		
		3	raycap	DC9-48-60-24-8C-EV		
	189.0	3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 32 B66		
		1	tower mounts	Platform Mount [LP 1201-1_KCKR-HR-1]		
	171.0	173.0	3	fujitsu		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	fujitsu	TA08025-B605		
		3	jma wireless_cfd	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
	171.0	tower mounts	Commscope MC-PK8-DSH			
162.0	162.0	1	tower mounts	Platform Mount [LP 602-1_KCKR]	1 2	1-1/2 1-5/8
	161.0	3	ericsson	RADIO 4449 B12/B71		
		3	ericsson	RRUS 4415 B25		
		3	ericsson_cfd	AIR -32 B2A/B66AA		
		3	ericsson_cfd	AIR 3246 B66 w/ Mount Pipe		
		3	ericsson_cfd	AIR 6454 B41 w/ Mount Pipe		
		3	rfs celwave_cfd	APXVAARR24_43-U-NA20		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	679661	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	679660	CCISITES
4-TOWER MANUFACTURER DRAWINGS	679659	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.4.0), 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	188 - 137	Pole	TP32.711x22x0.25	1	-19.27	1538.67	65.8	Pass
L2	137 - 90.25	Pole	TP42.03x31.3184x0.3125	2	-29.26	2474.49	89.9	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.3023x0.375	3	-42.70	3602.47	87.9	Pass
L4	44.5 - 0	Pole	TP59.61x48.8988x0.5	4	-65.28	5762.13	68.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
							Summary	
						Pole (L2)	89.9	Pass
						Rating =	89.9	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	77.4	Pass
1	Base Plate	0	73.3	Pass
1	Base Foundation (Structure)	0	55.9	Pass
1	Base Foundation (Soil Interaction)	0	89.7	Pass

Structure Rating (max from all components) =	89.9%
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Notes:

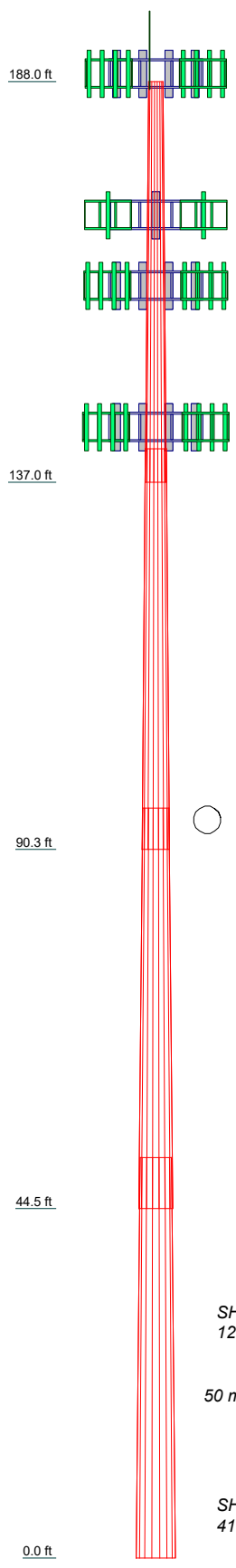
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	Grade	Weight (K)
Length (ft)	51.00	51.00	51.00	51.00	A607-65	34.1
Number of Sides	18	18	18	18		
Thickness (in)	0.2500	0.3125	0.3750	0.5000		
Socket Length (ft)	4.25	5.25	6.50			
Top Dia (in)	22.0000	31.3184	40.3023	48.8988		
Bot Dia (in)	32.7110	42.0300	51.0140	59.6100		
Grade						
Weight (K)	3.7	6.3	9.4	14.8		



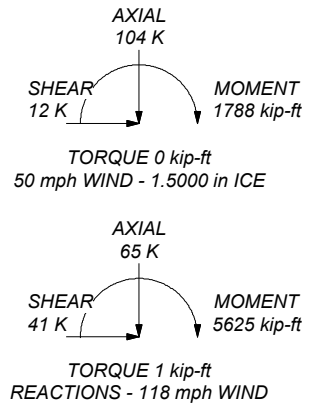
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 89.9%

ALL REACTIONS ARE FACTORED



Crown Castle
 2000 Corporate Drive
 Canonsburg PA 15317
 Phone: (724) 416-2000
 FAX: (724) 416-4623

Job: BU 803175		
Project:	Client: Crown Castle	App'd:
Code: TIA-222-H	Drawn by: Didi Rossmiller	Scale: NTS
Path:	Date: 10/25/23	Dwg No. E-1

C:\Users\DRossmiller\Desktop\Temporary\803175\WO 2265487 - SAIProd\803175.dwg

Tower Input Data

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

- Tower base elevation above sea level: 88.00 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 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs 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	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	Use ASCE 10 X-Brace Ly Rules Calculate Forces in Supporting Bracing Members 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 <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ 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
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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	188.00-137.00	51.00	4.25	18	22.0000	32.7110	0.2500	1.0000	A607-65 (65 ksi)
L2	137.00-90.25	51.00	5.25	18	31.3184	42.0300	0.3125	1.2500	A607-65 (65 ksi)

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
L3	90.25-44.50	51.00	6.50	18	40.3023	51.0140	0.3750	1.5000	A607-65 (65 ksi)
L4	44.50-0.00	51.00		18	48.8988	59.6100	0.5000	2.0000	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	22.3008	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	33.1771	25.7578	3429.0204	11.5237	16.6172	206.3538	6862.5527	12.8813	5.3171	21.269
L2	32.6597	30.7540	3735.3226	11.0071	15.9098	234.7819	7475.5603	15.3799	4.9620	15.879
	42.6302	41.3785	9098.0688	14.8097	21.3512	426.1143	18208.109	20.6932	6.8473	21.911
L3	41.9859	47.5235	9571.6471	14.1742	20.4736	467.5120	19155.888	23.7663	6.4332	17.155
	51.7431	60.2731	19526.796	17.9768	25.9151	753.4907	39079.287	30.1423	8.3185	22.183
L4	50.9622	76.8089	22730.963	17.1816	24.8406	915.0736	45491.836	38.4117	7.7262	15.452
	60.4524	93.8076	41409.239	20.9841	30.2819	1367.4593	82872.966	46.9127	9.6114	19.223

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 188.00- 137.00				1	1	1			
L2 137.00- 90.25				1	1	1			
L3 90.25- 44.50				1	1	1			
L4 44.50-0.00				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 r in	Weight plf
*** Safety Line 3/8	C	No	Surface Ar (CaAa)	188.00 - 0.00	1	1	0.500 0.500	0.3750		0.22
*** 3/8-in Detuner Wire	A	No	Surface Ar (CaAa)	133.00 - 0.00	1	1	0.000 0.000	0.3750		0.10
3/8-in Detuner Wire	B	No	Surface Ar (CaAa)	133.00 - 0.00	1	1	0.000 0.000	0.3750		0.10
3/8-in Detuner Wire	C	No	Surface Ar (CaAa)	133.00 - 0.00	1	1	0.000 0.000	0.3750		0.10

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
189									
PWRT-606-S(7/8)	B	No	No	Inside Pole	188.00 - 0.00	3	No Ice	0.00	0.89
							1/2" Ice	0.00	0.89
							1" Ice	0.00	0.89
							2" Ice	0.00	0.89
PWRT-608-S(13/16)	B	No	No	Inside Pole	188.00 - 0.00	6	No Ice	0.00	0.62
							1/2" Ice	0.00	0.62
							1" Ice	0.00	0.62
							2" Ice	0.00	0.62
FB-L98B-235-XXX(3/8)	B	No	No	Inside Pole	188.00 - 0.00	3	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
171									
CU12PSM6P4XXX(1-3/4)	C	No	No	Inside Pole	171.00 - 0.00	1	No Ice	0.00	2.72
							1/2" Ice	0.00	2.72
							1" Ice	0.00	2.72
							2" Ice	0.00	2.72
162									
LCF158-50J(1-5/8)	C	No	No	Inside Pole	162.00 - 0.00	6	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
							2" Ice	0.00	0.92
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	No	Inside Pole	162.00 - 0.00	1	No Ice	0.00	1.07
							1/2" Ice	0.00	1.07
							1" Ice	0.00	1.07
							2" Ice	0.00	1.07
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	162.00 - 0.00	3	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
144									
HB158-1-08U8-S8J18(1-5/8)	B	No	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
LCF158-50J(1-5/8)	B	No	No	Inside Pole	144.00 - 0.00	6	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
							2" Ice	0.00	0.92

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	188.00-137.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	1.912	0.000	0.45
L2	137.00-90.25	A	0.000	0.000	1.603	0.000	0.00
		B	0.000	0.000	1.603	0.000	0.69
		C	0.000	0.000	3.356	0.000	0.79
L3	90.25-44.50	A	0.000	0.000	1.716	0.000	0.00
		B	0.000	0.000	1.716	0.000	0.68
		C	0.000	0.000	3.431	0.000	0.77
L4	44.50-0.00	A	0.000	0.000	1.669	0.000	0.00
		B	0.000	0.000	1.669	0.000	0.66
		C	0.000	0.000	3.337	0.000	0.75

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	188.00-137.00	A	1.494	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	17.151	0.000	0.62
L2	137.00-90.25	A	1.442	0.000	0.000	14.377	0.000	0.15
		B		0.000	0.000	14.377	0.000	0.84
		C		0.000	0.000	30.099	0.000	1.09
L3	90.25-44.50	A	1.369	0.000	0.000	14.908	0.000	0.15
		B		0.000	0.000	14.908	0.000	0.82
		C		0.000	0.000	29.816	0.000	1.06
L4	44.50-0.00	A	1.227	0.000	0.000	13.849	0.000	0.13
		B		0.000	0.000	13.849	0.000	0.79
		C		0.000	0.000	27.698	0.000	1.01

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	188.00-137.00	-0.2610	0.1507	-1.1846	0.6839
L2	137.00-90.25	-0.2505	0.1446	-1.0280	0.5935
L3	90.25-44.50	-0.2521	0.1455	-1.0494	0.6059
L4	44.50-0.00	-0.2538	0.1465	-1.0556	0.6095

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	19	Safety Line 3/8	137.00 - 188.00	1.0000	1.0000
L2	19	Safety Line 3/8	90.25 - 137.00	1.0000	1.0000
L2	21	3/8-in Detuner Wire	90.25 - 133.00	1.0000	1.0000
L2	22	3/8-in Detuner Wire	90.25 - 133.00	1.0000	1.0000
L2	23	3/8-in Detuner Wire	90.25 - 133.00	1.0000	1.0000
L3	19	Safety Line 3/8	44.50 - 90.25	1.0000	1.0000
L3	21	3/8-in Detuner Wire	44.50 - 90.25	1.0000	1.0000
L3	22	3/8-in Detuner Wire	44.50 - 90.25	1.0000	1.0000
L3	23	3/8-in Detuner Wire	44.50 - 90.25	1.0000	1.0000
L4	19	Safety Line 3/8	0.00 - 44.50	1.0000	1.0000
L4	21	3/8-in Detuner Wire	0.00 - 44.50	1.0000	1.0000
L4	22	3/8-in Detuner Wire	0.00 - 44.50	1.0000	1.0000
L4	23	3/8-in Detuner Wire	0.00 - 44.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
3/4" x 8-ft Lightning Rod	C	From Leg	0.00 0.00 4.00	0.0000	188.00
189					
AIR 6419 B77G w/ Mount Pipe	A	From Centroid-Face	4.00 -7.00 1.00	20.0000	189.00
AIR 6419 B77G w/ Mount Pipe	B	From Centroid-Face	4.00 -7.00 1.00	10.0000	189.00
AIR 6419 B77G w/ Mount Pipe	C	From Centroid-Face	4.00 -7.00 1.00	20.0000	189.00
DMP65R-BU6D w/ Mount Pipe	A	From Centroid-Face	4.00 2.50 1.00	20.0000	189.00
DMP65R-BU6D w/ Mount Pipe	B	From Centroid-Face	4.00 -2.50 1.00	10.0000	189.00
DMP65R-BU4D w/ Mount Pipe	C	From Centroid-Face	4.00 2.50 1.00	20.0000	189.00
QD4616-7 w/ Mount Pipe	A	From Centroid-Face	4.00 -2.50 1.00	20.0000	189.00
QD6616-7 w/ Mount Pipe	B	From Centroid-Face	4.00 2.50 1.00	10.0000	189.00
QD6616-7 w/ Mount Pipe	C	From Centroid-Face	4.00 -2.50 1.00	20.0000	189.00
AIR 6449 N77 w/ Mount Pipe	A	From Centroid-Face	4.00 7.00 1.00	20.0000	189.00
AIR 6449 N77 w/ Mount Pipe	B	From Centroid-Face	4.00 7.00 1.00	10.0000	189.00
AIR 6449 N77 w/ Mount Pipe	C	From Centroid-Face	4.00 7.00 1.00	20.0000	189.00
DC9-48-60-24-8C-EV	A	From Centroid-Face	4.00 7.00 1.00	20.0000	189.00
DC9-48-60-24-8C-EV	B	From Centroid-Face	4.00 -7.00 1.00	10.0000	189.00
DC9-48-60-24-8C-EV	C	From Centroid-Face	4.00 7.00 1.00	20.0000	189.00
RRUS 32 B30	A	From Centroid-Face	4.00 -2.50 0.00	20.0000	189.00
RRUS 32 B30	B	From Centroid-Face	4.00 -2.50 0.00	10.0000	189.00
RRUS 32 B30	C	From Centroid-Face	4.00 2.50 0.00	20.0000	189.00
RRUS 4478 B14	A	From Centroid-Face	4.00 -2.50 1.00	20.0000	189.00

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement
			Horz	Lateral		
			ft	ft	°	ft
RRUS 4478 B14	B	From Centroid-Face	4.00		10.0000	189.00
			-2.50			
			1.00			
RRUS 4478 B14	C	From Centroid-Face	4.00		20.0000	189.00
			-2.50			
			1.00			
RRUS 4449 B5/B12	A	From Centroid-Face	4.00		20.0000	189.00
			2.50			
			1.00			
RRUS 4449 B5/B12	B	From Centroid-Face	4.00		10.0000	189.00
			2.50			
			1.00			
RRUS 4449 B5/B12	C	From Centroid-Face	4.00		20.0000	189.00
			2.50			
			1.00			
RRUS 32 B66	A	From Centroid-Face	4.00		20.0000	189.00
			2.50			
			0.00			
RRUS 32 B66	B	From Centroid-Face	4.00		10.0000	189.00
			2.50			
			0.00			
RRUS 32 B66	C	From Centroid-Face	4.00		20.0000	189.00
			-2.50			
			0.00			
RRUS 4415 B25	A	From Centroid-Face	4.00		20.0000	189.00
			-7.00			
			1.00			
RRUS 4415 B25	B	From Centroid-Face	4.00		10.0000	189.00
			7.00			
			1.00			
RRUS 4415 B25	C	From Centroid-Face	4.00		20.0000	189.00
			-7.00			
			1.00			
2.4" Dia. x 6-ft	A	From Centroid-Leg	2.00		0.0000	189.00
			0.00			
			0.00			
2.4" Dia. x 6-ft	B	From Centroid-Leg	2.00		0.0000	189.00
			0.00			
			0.00			
2.4" Dia. x 6-ft	C	From Centroid-Leg	2.00		0.0000	189.00
			0.00			
			0.00			
Platform Mount [LP 1201-1_KCKR-HR-1] ***171***	C	None			0.0000	189.00
MX08FRO665-21 w/ Mount Pipe	A	From Centroid-Leg	4.00		0.0000	171.00
			0.00			
			2.00			
MX08FRO665-21 w/ Mount Pipe	B	From Centroid-Leg	4.00		-10.0000	171.00
			0.00			
			2.00			
MX08FRO665-21 w/ Mount Pipe	C	From Centroid-Leg	4.00		0.0000	171.00
			0.00			
			2.00			
TA08025-B604	A	From Centroid-Leg	4.00		0.0000	171.00
			0.00			
			2.00			
TA08025-B604	B	From Centroid-Leg	4.00		-10.0000	171.00
			0.00			
			2.00			
TA08025-B604	C	From Centroid-Leg	4.00		0.0000	171.00
			0.00			
			2.00			
TA08025-B605	A	From Centroid-Leg	4.00		0.0000	171.00
			0.00			
			2.00			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft	Azimuth Adjustment °	Placement ft
TA08025-B605	B	From Centroid-Leg	4.00 0.00 2.00	-10.0000	171.00
TA08025-B605	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	171.00
RDIDC-9181-PF-48	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	171.00
(2) 2.4" Dia x 8-ft Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	171.00
(2) 2.4" Dia x 8-ft Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	171.00
(2) 2.4" Dia x 8-ft Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	171.00
Commscope MC-PK8-DSH **162**	C	None		0.0000	171.00
AIR 6454 B41 w/ Mount Pipe	A	From Centroid-Face	4.00 -6.00 -1.00	0.0000	162.00
AIR 6454 B41 w/ Mount Pipe	B	From Centroid-Face	4.00 -6.00 -1.00	-15.0000	162.00
AIR 6454 B41 w/ Mount Pipe	C	From Centroid-Face	4.00 -6.00 -1.00	-10.0000	162.00
AIR 3246 B66 w/ Mount Pipe	A	From Centroid-Face	4.00 -2.00 -1.00	0.0000	162.00
AIR 3246 B66 w/ Mount Pipe	B	From Centroid-Face	4.00 -2.00 -1.00	-15.0000	162.00
AIR 3246 B66 w/ Mount Pipe	C	From Centroid-Face	4.00 -2.00 -1.00	-10.0000	162.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Centroid-Face	4.00 2.00 -1.00	0.0000	162.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Centroid-Face	4.00 2.00 -1.00	-15.0000	162.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Centroid-Face	4.00 2.00 -1.00	-10.0000	162.00
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Centroid-Face	4.00 6.00 -1.00	0.0000	162.00
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Centroid-Face	4.00 6.00 -1.00	-15.0000	162.00
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Centroid-Face	4.00 6.00 -1.00	-10.0000	162.00
RADIO 4449 B12/B71	A	From Centroid-Face	4.00 -6.00 -1.00	0.0000	162.00
RADIO 4449 B12/B71	B	From Centroid-Face	4.00 -6.00 -1.00	-15.0000	162.00
RADIO 4449 B12/B71	C	From Centroid-Face	4.00 -6.00 -1.00	-10.0000	162.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft	Azimuth Adjustment °	Placement ft
RRUS 4415 B25	A	From Centroid-Face	4.00 6.00 -1.00	0.0000	162.00
RRUS 4415 B25	B	From Centroid-Face	4.00 6.00 -1.00	-15.0000	162.00
RRUS 4415 B25	C	From Centroid-Face	4.00 6.00 -1.00	-10.0000	162.00
Platform Mount [LP 602-1_KCKR] **144**	C	None		0.0000	162.00
(2) BSF0020F3V1	B	From Leg	4.00 0.00 1.00	0.0000	144.00
BXA-80063-6BF-EDIN-4 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	144.00
BXA-80063-6BF-EDIN-4 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	144.00
BXA-80063-6BF-EDIN-4 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	144.00
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	144.00
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	144.00
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	144.00
CBRS w/ Mount Pipe	A	From Leg	4.00 0.00 -1.00	0.0000	144.00
CBRS w/ Mount Pipe	B	From Leg	4.00 0.00 -1.00	0.0000	144.00
CBRS w/ Mount Pipe	C	From Leg	4.00 0.00 -1.00	0.0000	144.00
MT6407-77A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	144.00
MT6407-77A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	144.00
MT6407-77A w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	144.00
(2) RRFDC-3315-PF-48	A	From Leg	4.00 0.00 1.00	0.0000	144.00
RFV01U-D1A	A	From Leg	4.00 0.00 1.00	0.0000	144.00
RFV01U-D1A	B	From Leg	4.00 0.00 1.00	0.0000	144.00
RFV01U-D1A	C	From Leg	4.00 0.00 1.00	0.0000	144.00
(3) RFV01U-D2A	A	From Leg	4.00 0.00 2.00	0.0000	144.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
Platform Mount [LP 602-1_KCKR] **Detuner**	C	None		0.0000	144.00
Side Arm Mount [SO 701-3] **	C	None		0.0000	133.00
1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	100.00
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	100.00
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	100.00
** 1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	70.00
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	70.00
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	70.00
** 1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	40.00
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	40.00
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	40.00
** 1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	10.00
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	10.00
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	10.00
**					

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

Comb. No.	Description
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	188 - 137	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-47.14	-1.57	4.11
			Max. Mx	8	-19.39	-736.54	8.63
			Max. My	2	-19.27	-7.77	746.72
			Max. Vy	8	27.16	-736.54	8.63
			Max. Vx	2	-27.68	-7.77	746.72
			Max. Torque	4			-1.50
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.21	-1.74	4.25
			Max. Mx	8	-29.33	-2085.55	13.33
L2	137 - 90.25	Pole	Max. My	2	-29.25	-12.48	2119.25
			Max. Vy	8	31.69	-2085.55	13.33
			Max. Vx	2	-32.20	-12.48	2119.25
			Max. Torque	24			-1.31
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.00	-1.74	3.96
			Max. Mx	8	-42.74	-3593.29	17.64
			Max. My	2	-42.70	-16.80	3649.55
			Max. Vy	8	35.96	-3593.29	17.64
			Max. Vx	2	-36.46	-16.80	3649.55
L3	90.25 - 44.5	Pole	Max. Torque	24			-1.30

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	44.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-103.85	-1.74	3.59
			Max. Mx	8	-65.28	-5543.67	22.27
			Max. My	2	-65.28	-21.45	5624.93
			Max. Vy	8	40.19	-5543.67	22.27
			Max. Vx	2	-40.66	-21.45	5624.93
			Max. Torque	24			-1.30

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K	
Pole	Max. Vert	27	103.85	-0.02	12.14	
	Max. H _x	20	65.31	40.14	-0.09	
	Max. H _z	2	65.31	-0.09	40.61	
	Max. M _x	2	5624.93	-0.09	40.61	
	Max. M _z	8	5543.67	-40.14	0.09	
	Max. Torsion	12	1.26	-19.99	-35.13	
	Min. Vert	7	48.98	-34.80	20.38	
	Min. H _x	8	65.31	-40.14	0.09	
	Min. H _z	14	65.31	0.09	-40.61	
	Min. M _x	14	-5621.95	0.09	-40.61	
	Min. M _z	20	-5542.24	40.14	-0.09	
	Min. Torsion	24		-1.30	19.99	35.13

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _z kip-ft	Torque kip-ft
Dead Only	54.43	0.00	0.00	-1.12	-0.53	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	65.31	0.09	-40.61	-5624.93	-21.45	1.23
0.9 Dead+1.0 Wind 0 deg - No Ice	48.98	0.09	-40.61	-5527.76	-20.77	1.21
1.2 Dead+1.0 Wind 30 deg - No Ice	65.31	20.14	-35.22	-4881.90	-2789.84	0.81
0.9 Dead+1.0 Wind 30 deg - No Ice	48.98	20.14	-35.22	-4797.44	-2741.57	0.80
1.2 Dead+1.0 Wind 60 deg - No Ice	65.31	34.80	-20.38	-2831.34	-4811.14	0.17
0.9 Dead+1.0 Wind 60 deg - No Ice	48.98	34.80	-20.38	-2782.12	-4728.15	0.18
1.2 Dead+1.0 Wind 90 deg - No Ice	65.31	40.14	-0.09	-22.27	-5543.67	-0.50
0.9 Dead+1.0 Wind 90 deg - No Ice	48.98	40.14	-0.09	-21.37	-5448.12	-0.49
1.2 Dead+1.0 Wind 120 deg - No Ice	65.31	34.71	20.23	2792.57	-4790.72	-1.02
0.9 Dead+1.0 Wind 120 deg - No Ice	48.98	34.71	20.23	2744.98	-4708.17	-1.00
1.2 Dead+1.0 Wind 150 deg - No Ice	65.31	19.99	35.13	4858.48	-2754.08	-1.26
0.9 Dead+1.0 Wind 150 deg - No Ice	48.98	19.99	35.13	4775.29	-2706.63	-1.24
1.2 Dead+1.0 Wind 180 deg - No Ice	65.31	-0.09	40.61	5621.95	20.07	-1.17
0.9 Dead+1.0 Wind 180 deg - No Ice	48.98	-0.09	40.61	5525.60	19.78	-1.16

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 210 deg - No Ice	65.31	-20.14	35.22	4878.89	2788.46	-0.80
0.9 Dead+1.0 Wind 210 deg - No Ice	48.98	-20.14	35.22	4795.26	2740.58	-0.79
1.2 Dead+1.0 Wind 240 deg - No Ice	65.31	-34.80	20.38	2828.32	4809.74	-0.21
0.9 Dead+1.0 Wind 240 deg - No Ice	48.98	-34.80	20.38	2779.92	4727.13	-0.21
1.2 Dead+1.0 Wind 270 deg - No Ice	65.31	-40.14	0.09	19.25	5542.24	0.44
0.9 Dead+1.0 Wind 270 deg - No Ice	48.98	-40.14	0.09	19.19	5447.08	0.43
1.2 Dead+1.0 Wind 300 deg - No Ice	65.31	-34.71	-20.23	-2795.56	4789.29	1.00
0.9 Dead+1.0 Wind 300 deg - No Ice	48.98	-34.71	-20.23	-2747.15	4707.14	0.98
1.2 Dead+1.0 Wind 330 deg - No Ice	65.31	-19.99	-35.13	-4861.45	2752.68	1.30
0.9 Dead+1.0 Wind 330 deg - No Ice	48.98	-19.99	-35.13	-4777.45	2705.62	1.27
1.2 Dead+1.0 Ice+1.0 Temp	103.85	0.00	-0.00	-3.59	-1.74	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	103.85	0.02	-12.14	-1788.32	-6.17	0.26
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	103.85	6.04	-10.52	-1551.40	-889.28	0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	103.85	10.44	-6.08	-899.83	-1534.61	-0.14
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	103.85	12.04	-0.02	-8.18	-1769.24	-0.31
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	103.85	10.42	6.05	884.64	-1530.30	-0.40
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	103.85	6.01	10.50	1539.39	-881.80	-0.38
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	103.85	-0.02	12.14	1780.61	2.47	-0.26
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	103.85	-6.04	10.52	1543.70	885.58	-0.07
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	103.85	-10.44	6.08	892.12	1530.91	0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	103.85	-12.04	0.02	0.47	1765.54	0.31
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	103.85	-10.42	-6.05	-892.35	1526.59	0.40
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	103.85	-6.01	-10.50	-1547.09	878.10	0.38
Dead+Wind 0 deg - Service	54.43	0.02	-9.89	-1360.10	-5.59	0.29
Dead+Wind 30 deg - Service	54.43	4.91	-8.58	-1180.58	-674.58	0.18
Dead+Wind 60 deg - Service	54.43	8.48	-4.97	-685.02	-1162.99	0.03
Dead+Wind 90 deg - Service	54.43	9.78	-0.02	-6.24	-1339.90	-0.14
Dead+Wind 120 deg - Service	54.43	8.46	4.93	673.88	-1157.99	-0.26
Dead+Wind 150 deg - Service	54.43	4.87	8.56	1173.10	-665.92	-0.31
Dead+Wind 180 deg - Service	54.43	-0.02	9.89	1357.62	4.41	-0.28
Dead+Wind 210 deg - Service	54.43	-4.91	8.58	1178.10	673.40	-0.18
Dead+Wind 240 deg - Service	54.43	-8.48	4.97	682.54	1161.80	-0.03
Dead+Wind 270 deg - Service	54.43	-9.78	0.02	3.76	1338.71	0.13
Dead+Wind 300 deg - Service	54.43	-8.46	-4.93	-676.36	1156.81	0.26
Dead+Wind 330 deg - Service	54.43	-4.87	-8.56	-1175.58	664.74	0.32

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	-54.43	0.00	0.00	54.43	0.00	0.000%
2	0.09	-65.31	-40.61	-0.09	65.31	40.61	0.000%
3	0.09	-48.98	-40.61	-0.09	48.98	40.61	0.000%
4	20.14	-65.31	-35.22	-20.14	65.31	35.22	0.000%
5	20.14	-48.98	-35.22	-20.14	48.98	35.22	0.000%
6	34.80	-65.31	-20.38	-34.80	65.31	20.38	0.000%
7	34.80	-48.98	-20.38	-34.80	48.98	20.38	0.000%
8	40.14	-65.31	-0.09	-40.14	65.31	0.09	0.000%
9	40.14	-48.98	-0.09	-40.14	48.98	0.09	0.000%
10	34.71	-65.31	20.23	-34.71	65.31	-20.23	0.000%
11	34.71	-48.98	20.23	-34.71	48.98	-20.23	0.000%
12	19.99	-65.31	35.13	-19.99	65.31	-35.13	0.000%
13	19.99	-48.98	35.13	-19.99	48.98	-35.13	0.000%
14	-0.09	-65.31	40.61	0.09	65.31	-40.61	0.000%
15	-0.09	-48.98	40.61	0.09	48.98	-40.61	0.000%
16	-20.14	-65.31	35.22	20.14	65.31	-35.22	0.000%
17	-20.14	-48.98	35.22	20.14	48.98	-35.22	0.000%
18	-34.80	-65.31	20.38	34.80	65.31	-20.38	0.000%
19	-34.80	-48.98	20.38	34.80	48.98	-20.38	0.000%
20	-40.14	-65.31	0.09	40.14	65.31	-0.09	0.000%
21	-40.14	-48.98	0.09	40.14	48.98	-0.09	0.000%
22	-34.71	-65.31	-20.23	34.71	65.31	20.23	0.000%
23	-34.71	-48.98	-20.23	34.71	48.98	20.23	0.000%
24	-19.99	-65.31	-35.13	19.99	65.31	35.13	0.000%
25	-19.99	-48.98	-35.13	19.99	48.98	35.13	0.000%
26	0.00	-103.85	0.00	-0.00	103.85	0.00	0.000%
27	0.02	-103.85	-12.14	-0.02	103.85	12.14	0.000%
28	6.04	-103.85	-10.52	-6.04	103.85	10.52	0.000%
29	10.44	-103.85	-6.08	-10.44	103.85	6.08	0.000%
30	12.04	-103.85	-0.02	-12.04	103.85	0.02	0.000%
31	10.42	-103.85	6.05	-10.42	103.85	-6.05	0.000%
32	6.01	-103.85	10.50	-6.01	103.85	-10.50	0.000%
33	-0.02	-103.85	12.14	0.02	103.85	-12.14	0.000%
34	-6.04	-103.85	10.52	6.04	103.85	-10.52	0.000%
35	-10.44	-103.85	6.08	10.44	103.85	-6.08	0.000%
36	-12.04	-103.85	0.02	12.04	103.85	-0.02	0.000%
37	-10.42	-103.85	-6.05	10.42	103.85	6.05	0.000%
38	-6.01	-103.85	-10.50	6.01	103.85	10.50	0.000%
39	0.02	-54.43	-9.89	-0.02	54.43	9.89	0.000%
40	4.91	-54.43	-8.58	-4.91	54.43	8.58	0.000%
41	8.48	-54.43	-4.97	-8.48	54.43	4.97	0.000%
42	9.78	-54.43	-0.02	-9.78	54.43	0.02	0.000%
43	8.46	-54.43	4.93	-8.46	54.43	-4.93	0.000%
44	4.87	-54.43	8.56	-4.87	54.43	-8.56	0.000%
45	-0.02	-54.43	9.89	0.02	54.43	-9.89	0.000%
46	-4.91	-54.43	8.58	4.91	54.43	-8.58	0.000%
47	-8.48	-54.43	4.97	8.48	54.43	-4.97	0.000%
48	-9.78	-54.43	0.02	9.78	54.43	-0.02	0.000%
49	-8.46	-54.43	-4.93	8.46	54.43	4.93	0.000%
50	-4.87	-54.43	-8.56	4.87	54.43	8.56	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	0.00026536
3	Yes	5	0.00000001	0.00011739
4	Yes	6	0.00000001	0.00068538
5	Yes	6	0.00000001	0.00020361
6	Yes	6	0.00000001	0.00067609
7	Yes	6	0.00000001	0.00020055
8	Yes	5	0.00000001	0.00015779
9	Yes	5	0.00000001	0.00006784
10	Yes	6	0.00000001	0.00066321
11	Yes	6	0.00000001	0.00019810
12	Yes	6	0.00000001	0.00067648
13	Yes	6	0.00000001	0.00020253
14	Yes	5	0.00000001	0.00006145
15	Yes	5	0.00000001	0.00002606
16	Yes	6	0.00000001	0.00067257
17	Yes	6	0.00000001	0.00019930
18	Yes	6	0.00000001	0.00067926
19	Yes	6	0.00000001	0.00020201
20	Yes	5	0.00000001	0.00009057
21	Yes	5	0.00000001	0.00003926
22	Yes	6	0.00000001	0.00067311
23	Yes	6	0.00000001	0.00020155
24	Yes	6	0.00000001	0.00066239
25	Yes	6	0.00000001	0.00019743
26	Yes	4	0.00000001	0.00005017
27	Yes	6	0.00000001	0.00030798
28	Yes	6	0.00000001	0.00063031
29	Yes	6	0.00000001	0.00062885
30	Yes	6	0.00000001	0.00030439
31	Yes	6	0.00000001	0.00060323
32	Yes	6	0.00000001	0.00061489
33	Yes	6	0.00000001	0.00030466
34	Yes	6	0.00000001	0.00061364
35	Yes	6	0.00000001	0.00061156
36	Yes	6	0.00000001	0.00030260
37	Yes	6	0.00000001	0.00061825
38	Yes	6	0.00000001	0.00060998
39	Yes	4	0.00000001	0.00033446
40	Yes	5	0.00000001	0.00017084
41	Yes	5	0.00000001	0.00016516
42	Yes	4	0.00000001	0.00029791
43	Yes	5	0.00000001	0.00015632
44	Yes	5	0.00000001	0.00016558
45	Yes	4	0.00000001	0.00031420
46	Yes	5	0.00000001	0.00016192
47	Yes	5	0.00000001	0.00016526
48	Yes	4	0.00000001	0.00029064
49	Yes	5	0.00000001	0.00016365
50	Yes	5	0.00000001	0.00015661

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	45.053	40	2.2567	0.0037
L2	141.25 - 90.25	24.479	40	1.8282	0.0014
L3	95.5 - 44.5	10.197	39	1.1036	0.0005
L4	51 - 0	2.675	39	0.4877	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
189.00	AIR 6419 B77G w/ Mount Pipe	40	45.053	2.2567	0.0040	33456
188.00	3/4" x 8-ft Lightning Rod	40	45.053	2.2567	0.0040	33456
171.00	MX08FRO665-21 w/ Mount Pipe	40	37.185	2.1286	0.0029	9839
162.00	AIR 6454 B41 w/ Mount Pipe	40	33.140	2.0521	0.0023	6432
144.00	(2) BSF0020F3V1	40	25.557	1.8628	0.0015	3806
133.00	Side Arm Mount [SO 701-3]	40	21.394	1.7141	0.0012	3609
100.00	1" Dia x 3.5-ft	39	11.301	1.1771	0.0006	3749
70.00	1" Dia x 3.5-ft	39	5.149	0.7250	0.0003	3957
40.00	1" Dia x 3.5-ft	39	1.716	0.3680	0.0001	5239
10.00	1" Dia x 3.5-ft	39	0.286	0.0866	0.0000	20953

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	185.928	2	9.3423	0.0144
L2	141.25 - 90.25	101.214	2	7.5694	0.0054
L3	95.5 - 44.5	42.207	2	4.5710	0.0021
L4	51 - 0	11.071	2	2.0191	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
189.00	AIR 6419 B77G w/ Mount Pipe	2	185.928	9.3423	0.0187	8514
188.00	3/4" x 8-ft Lightning Rod	2	185.928	9.3423	0.0187	8514
171.00	MX08FRO665-21 w/ Mount Pipe	2	153.550	8.8122	0.0134	2500
162.00	AIR 6454 B41 w/ Mount Pipe	2	136.899	8.4958	0.0109	1631
144.00	(2) BSF0020F3V1	2	105.661	7.7127	0.0066	959
133.00	Side Arm Mount [SO 701-3]	2	88.488	7.0973	0.0051	903
100.00	1" Dia x 3.5-ft	2	46.772	4.8756	0.0025	918
70.00	1" Dia x 3.5-ft	2	21.312	3.0026	0.0012	960
40.00	1" Dia x 3.5-ft	2	7.101	1.5231	0.0005	1266
10.00	1" Dia x 3.5-ft	2	1.182	0.3581	0.0001	5061

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	188 - 137 (1)	TP32.711x22x0.25	51.00	0.00	0.0	25.049	-19.27	1465.40	0.013
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	51.00	0.00	0.0	40.284	-29.26	2356.66	0.012
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	51.00	0.00	0.0	58.648	-42.70	3430.92	0.012
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	51.00	0.00	0.0	93.807	-65.28	5487.74	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux}	ϕM_{nx}	Ratio	M_{uy}	ϕM_{ny}	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{nx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ny}}$
L1	188 - 137 (1)	TP32.711x22x0.25	750.65	1113.48	0.674	0.00	1113.48	0.000
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	2121.28	2281.22	0.930	0.00	2281.22	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	3649.67	4013.65	0.909	0.00	4013.65	0.000
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	5624.97	7974.63	0.705	0.00	7974.63	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u	ϕV_n	Ratio	Actual T_u	ϕT_n	Ratio
			K	K	$\frac{V_u}{\phi V_n}$	kip-ft	kip-ft	$\frac{T_u}{\phi T_n}$
L1	188 - 137 (1)	TP32.711x22x0.25	27.64	439.62	0.063	0.83	1215.38	0.001
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	32.16	707.00	0.045	0.82	2514.68	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	36.41	1029.27	0.035	0.81	4441.48	0.000
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	40.66	1646.32	0.025	1.23	8522.25	0.000

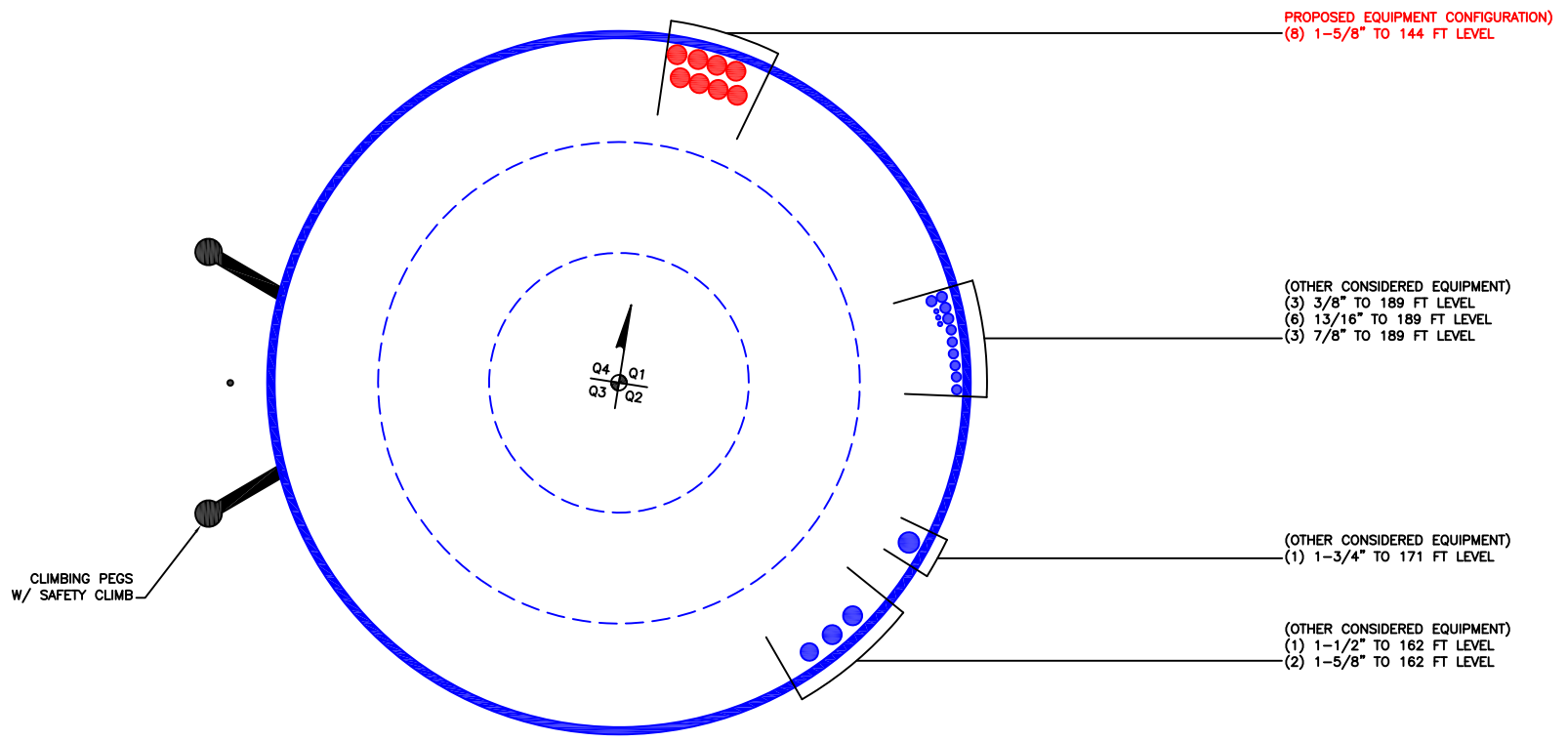
Pole Interaction Design Data

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
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	188 - 137 (1)	0.013	0.674	0.000	0.063	0.001	0.691	1.050	4.8.2
L2	137 - 90.25 (2)	0.012	0.930	0.000	0.045	0.000	0.944	1.050	4.8.2
L3	90.25 - 44.5 (3)	0.012	0.909	0.000	0.035	0.000	0.923	1.050	4.8.2
L4	44.5 - 0 (4)	0.012	0.705	0.000	0.025	0.000	0.718	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	188 - 137	Pole	TP32.711x22x0.25	1	-19.27	1538.67	65.8	Pass
L2	137 - 90.25	Pole	TP42.03x31.3184x0.3125	2	-29.26	2474.49	89.9	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.3023x0.375	3	-42.70	3602.47	87.9	Pass
L4	44.5 - 0	Pole	TP59.61x48.8988x0.5	4	-65.28	5762.13	68.4	Pass
Summary								
Pole (L2)							89.9	Pass
RATING =							89.9	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

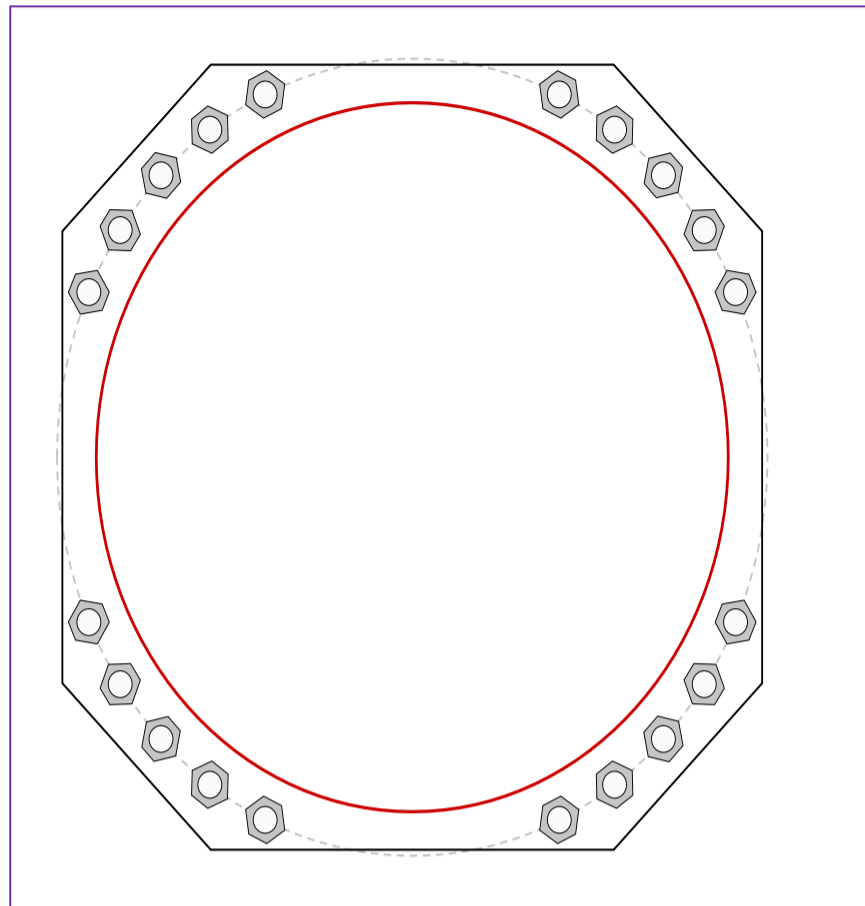


Site Info	
BU #	803175
Site Name	EW BRITAIN 3 CAC 80
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.25

Applied Loads	
Moment (kip-ft)	5624.97
Axial Force (kips)	65.28
Shear Force (kips)	40.66

*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data

(20) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 67" BC
 Anchor Spacing: 6 in

Base Plate Data

66" W x 3" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi); Clip: 14 in

Stiffener Data

N/A

Pole Data

59.61" x 0.5" 18-sided pole (A607-65; $F_y=65$ ksi, $F_u=80$ ksi)

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

$P_{u,t} = 198.13$	$\phi P_{n,t} = 243.75$	Stress Rating
$V_u = 2.03$	$\phi V_n = 149.1$	77.4%
$M_u = n/a$	$\phi M_n = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	34.63	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	73.3%	Pass

Pier and Pad Foundation



BU #: 803175
 Site Name: CT NEW BRITAIN
 App. Number:

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	65.31	kips
Base Shear, V_u_{comp} :	40.61	kips
Moment, M_u :	5624.97	ft-kips
Tower Height, H :	188	ft
BP Dist. Above Fdn, bp_{dist} :	3.5	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	222.93	40.61	17.3%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	4.48	49.8%	Pass
<i>Overturning (kip*ft)</i>	6601.38	5921.22	89.7%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	9867.08	5787.54	55.9%	Pass
<i>Pier Compression (kip)</i>	30551.04	111.43	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	6473.47	3053.28	44.9%	Pass
<i>Pad Shear - 1-way (kips)</i>	766.05	416.80	51.8%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.000	0.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	8464.14	3472.53	39.1%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	8	ft
Ext. Above Grade, E :	1.0833	ft
Pier Rebar Size, Sc :	11	
Pier Rebar Quantity, mc :	36	
Pier Tie/Spiral Size, St :	5	
Pier Tie/Spiral Quantity, mt :	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	4	in

*Rating per TIA-222-H Section 15.5

Structural Rating*:	55.9%
Soil Rating*:	89.7%

Pad Properties		
Depth, D :	5.92	ft
Pad Width, W_1 :	26	ft
Pad Thickness, T :	3	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	11	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	33	
Pad Clear Cover, cc_{pad} :	4	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 :	110	pcf
Ultimate Gross Bearing, Q_{ult} :	12.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	30	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :		
Neglected Depth, N :	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

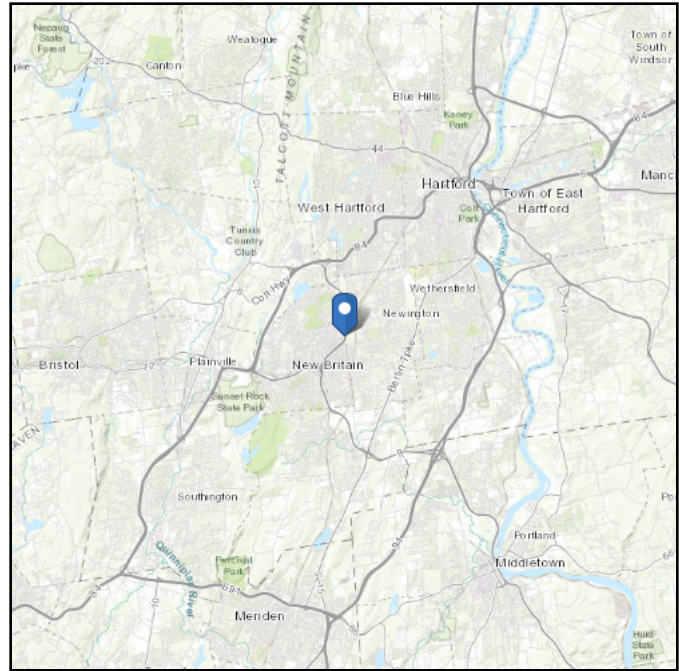
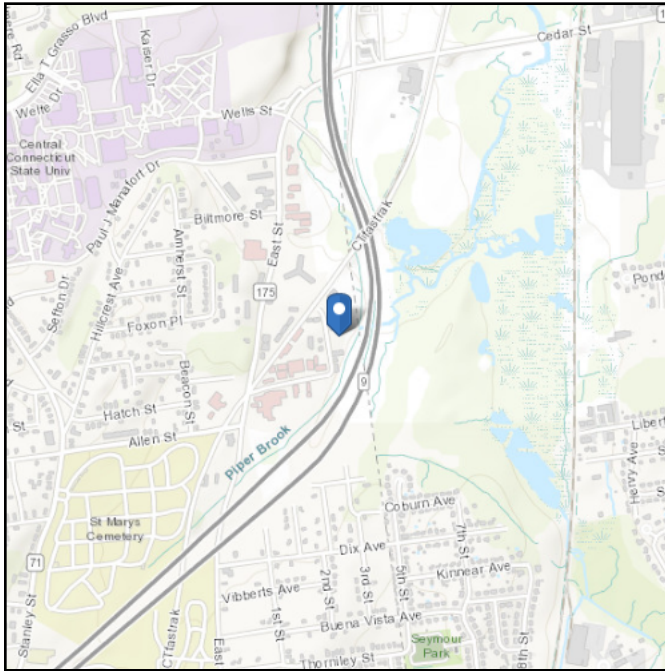
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ASCE 7 Hazards Report

Address:
No Address at This Location

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

Latitude: 41.686611
Longitude: -72.757722
Elevation: 90.44077429174249 ft (NAVD 88)



Wind

Results:

Wind Speed	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 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: Thu Aug 03 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).

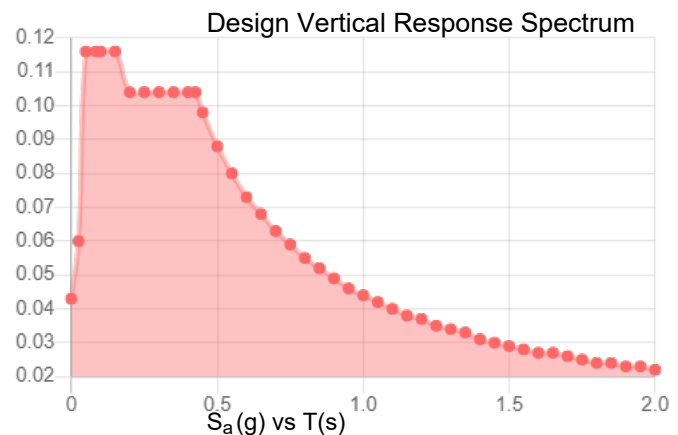
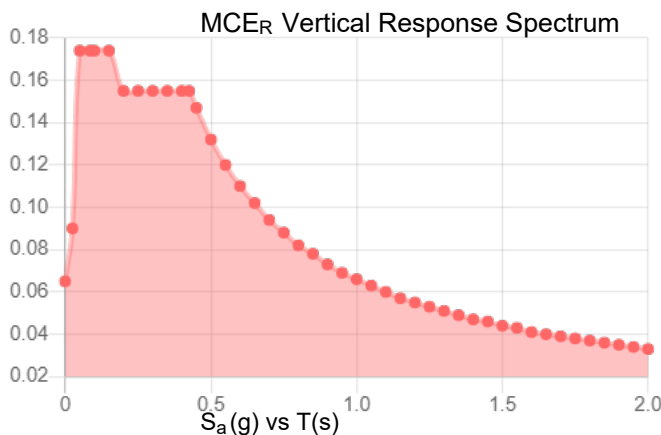
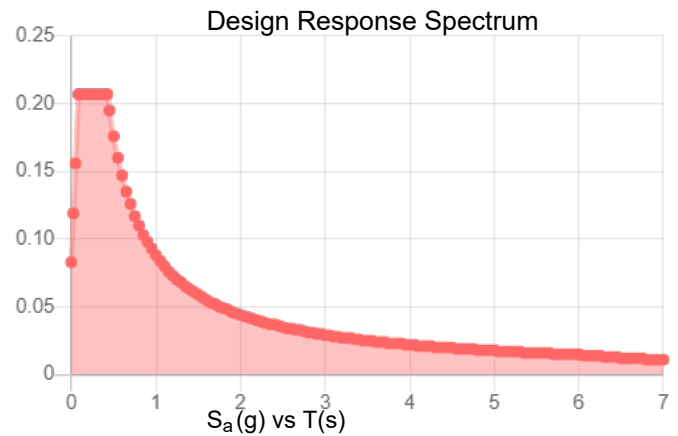
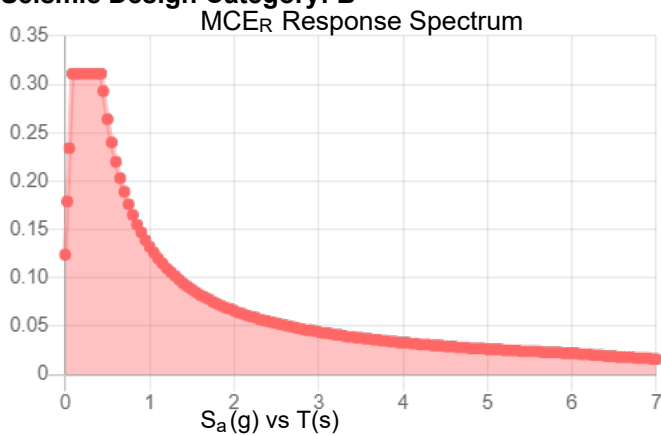
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class:

Results:

S_s :	0.194	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.106
F_v :	2.4	PGA _M :	0.168
S_{MS} :	0.311	F_{PGA} :	1.589
S_{M1} :	0.132	I_e :	1
S_{DS} :	0.207	C_v :	0.7

Seismic Design Category: B



Data Accessed:

Thu Aug 03 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: 1.50 in.
Concurrent Temperature: 15 F
Gust Speed 50 mph

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

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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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