

Date: **September 17, 2021**



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

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 467575
Site Name: WESTFORD CT

Crown Castle Designation: **BU Number:** 876345
Site Name: SKY HILL
JDE Job Number: 685814
Work Order Number: 2019498
Order Number: 585797 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number:** 2019498

Site Data: **33 Janowski Road, Ashford, WINDHAM County, CT**
Latitude 41° 57' 7.7", Longitude -72° 11' 43.9"
192 Foot - Self Support 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 - 86.2%

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Melanie Atilis

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

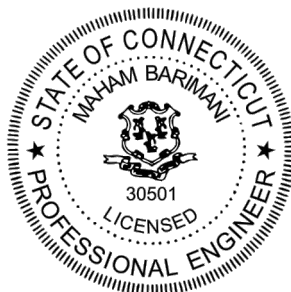


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1) INTRODUCTION

This tower is a 192 ft Self Support tower designed by ROHN.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 130 mph
Exposure Category: B
Topographic Factor: 1
Ice Thickness: 2 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)
180.0	184.0	2	antel	LPA-80080/4CF	8 1	1-5/8 1/2
		1	symmetricom	58532A		
	183.0	3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
	181.0	4	antel	LPA-80080/4CF		
		6	commscope	JAHH-65B-R3B		
		2	raycap	RC3DC-3315-PF-48		
		3	rfs celwave	FDJ85020Q7-S1		
		3	samsung telecommunications	CBRS w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
	3	samsung telecommunications	RFV01U-D2A			
180.0	1	tower mounts	Sector Mount [SM 304-3]			

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)
190.0	192.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	4 1	1-1/4 1/2
		6	alcatel lucent	RRH2X50-800		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	FZHN		
	3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
190.0	1	tower mounts	Sector Mount [SM 506-3]			
171.0	172.0	9	allgon	7130.16.33.00 w/ Mount Pipe	9	1-5/8
	171.0	1	tower mounts	Sector Mount [SM 502-3]		
162.0	162.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	6	1-5/8
		1	tower mounts	Sector Mount [SM 104-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
156.0	159.0	3	ericsson	RADIO 4449 B12/B71	3	1-5/8
		3	ericsson	RRUS 4415 B25		
	158.0	3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	156.0	3	ericsson	RADIO 4415 B66A		
140.0	140.0	1	tower mounts	Sector Mount [SM 502-3]	14 2 2 1	7/8 3/8 3/4 Conduit
		4	cci antennas	TPA65R-BU4D w/ Mount Pipe		
		2	commscope	NNHH-65B-R4 w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
		1	raycap	DC6-48-60-0-8C-EV		
		1	raycap	DC6-48-60-18-8F		
130.0	130.0	1	tower mounts	Sector Mount [SM 504-3]	1	1-1/2
		3	fujitsu	TA08025-B604		
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
98.0	102.0	1	symmetricom	58532A	1	1/2
	98.0	1	tower mounts	Side Arm Mount [SO 301-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2189896	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1631622	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1631630	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	192 - 180	Leg	ROHN 2.5 STD	1	-6.544	66.738	9.8	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	27	-37.477	59.996	62.5	Pass
T3	160 - 140	Leg	ROHN 3 EH	56	-73.093	99.054	73.8	Pass
T4	140 - 120	Leg	ROHN 4 EH	77	-115.374	167.894	68.7	Pass
T5	120 - 100	Leg	ROHN 5 EH	98	-155.991	251.347	62.1	Pass
T6	100 - 80	Leg	ROHN 6 EHS	119	-190.928	256.249	74.5	Pass
T7	80 - 60	Leg	ROHN 6 EH	134	-228.768	318.945	71.7	Pass
T8	60 - 40	Leg	ROHN 8 EHS	148	-264.351	405.672	65.2	Pass
T9	40 - 20	Leg	ROHN 8 EHS	163	-300.008	405.729	73.9	Pass
T10	20 - 0	Leg	ROHN 8 EHS	178	-335.562	405.717	82.7	Pass
T1	192 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.445	11.895	12.1	Pass
T2	180 - 160	Diagonal	L2x2x3/16	36	-4.274	10.392	41.1	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-6.177	16.480	37.5	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	81	-8.000	12.587	63.6	Pass
T5	120 - 100	Diagonal	L3x3x1/4	102	-8.376	17.432	48.0	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	123	-9.752	19.016	51.3	Pass
T7	80 - 60	Diagonal	L4x4x1/4	138	-10.675	24.136	44.2	Pass
T8	60 - 40	Diagonal	L4x4x5/16	153	-10.210	24.922	41.0	Pass
T9	40 - 20	Diagonal	L4x4x5/16	168	-12.104	21.484	56.3	Pass
T10	20 - 0	Diagonal	L4x4x3/8	183	-12.724	21.926	58.0	Pass
T1	192 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.090	4.122	2.2	Pass
T2	180 - 160	Top Girt	L2x2x3/16	28	-0.907	6.245	14.5	Pass
							Summary	
							Leg (T10)	82.7 Pass
							Diagonal (T4)	63.6 Pass
							Top Girt (T2)	14.5 Pass
							Bolt Checks	86.2 Pass
							Rating =	86.2 Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	48.3	Pass
1	Base Foundation (Structure)	0	15.3	Pass
1	Base Foundation (Soil Interaction)	0	46.6	Pass
Structure Rating (max from all components) =				86.2%

Notes:

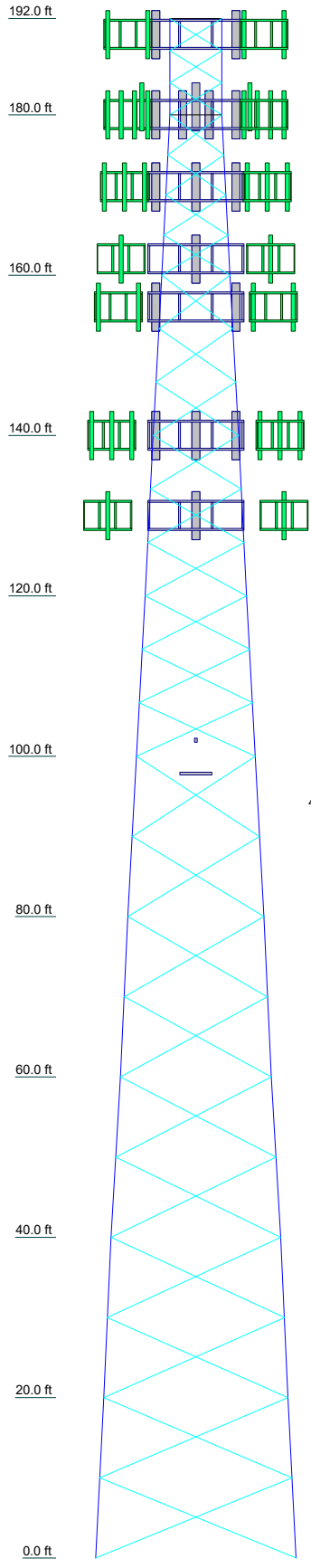
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

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	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Legs	ROHN 2.5 STD	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS			
Leg Grade					A572-50					
Diagonals					L3 1/2x3 1/2x1/4	L4x4x1/4	L4x4x5/16	L4x4x3/8		
Diagonal Grade					A36					
Top Girts						N.A.				
Face Width (ft)	6.58	8.54	10.61	12.74	14.83	16.92	18.98	21.13	23.05	25.05
# Panels @ (ft)	3 @ 4	4 @ 5	9 @ 6.66667				10 @ 10			
Weight (K)	0.6	1.0	1.5	2.0	2.7	2.8	3.5	4.4	4.6	5.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

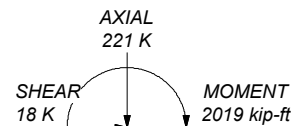
1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness 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: 86.2%

ALL REACTIONS
ARE FACTORED

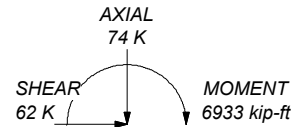
MAX. CORNER REACTIONS AT BASE:

DOWN: 344 K
SHEAR: 39 K

UPLIFT: -288 K
SHEAR: 33 K



TORQUE 12 kip-ft
50 mph WIND - 2.000 in ICE



TORQUE 54 kip-ft
REACTIONS - 130 mph WIND

<p align="center">Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 The Pathway to Possible Phone: (724) 416-2000 FAX:</p>		Job: BU 876345	
		Project:	
Client: Crown Castle	Drawn by: MATiles	App'd:	
Code: TIA-222-H	Date: 09/17/21	Scale: NTS	
Path:	Dwg No. E-1		

Tower Input Data

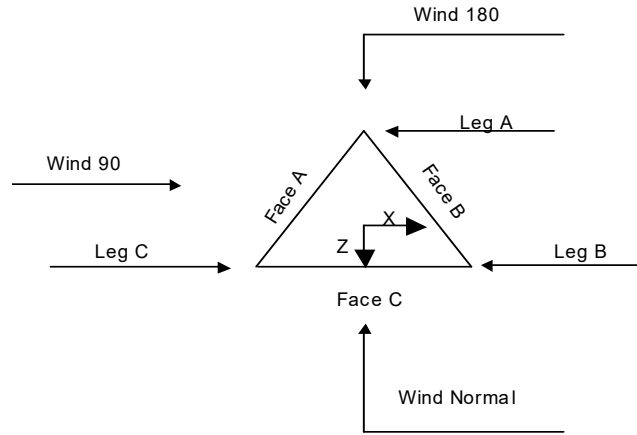
The main tower is a 3x free standing tower with an overall height of 192.000 ft above the ground line.
 The base of the tower is set at an elevation of 0.000 ft above the ground line.
 The face width of the tower is 6.580 ft at the top and 25.050 ft at the base.
 This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Windham County, Connecticut.
- Tower base elevation above sea level: 1068.000 ft.
- Basic wind speed of 130 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 2.000 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.
- Pressures are calculated at each section.
- Stress ratio used in tower member 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 Redundant Bracing Forces Ignore Redundant Members in FEA ✓ SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque ✓ Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <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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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	192.000-180.000			6.580	1	12.000
T2	180.000-160.000			6.580	1	20.000
T3	160.000-140.000			8.540	1	20.000
T4	140.000-120.000			10.610	1	20.000
T5	120.000-100.000			12.740	1	20.000
T6	100.000-80.000			14.830	1	20.000
T7	80.000-60.000			16.920	1	20.000
T8	60.000-40.000			18.880	1	20.000
T9	40.000-20.000			21.130	1	20.000
T10	20.000-0.000			23.050	1	20.000

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	192.000-180.000	4.000	X Brace	No	No	0.000	0.000
T2	180.000-160.000	5.000	X Brace	No	No	0.000	0.000
T3	160.000-140.000	6.667	X Brace	No	No	0.000	0.000
T4	140.000-120.000	6.667	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	120.000-100.000	6.667	X Brace	No	No	0.000	0.000
T6	100.000-80.000	10.000	X Brace	No	No	0.000	0.000
T7	80.000-60.000	10.000	X Brace	No	No	0.000	0.000
T8	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T9	40.000-20.000	10.000	X Brace	No	No	0.000	0.000
T10	20.000-0.000	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 192.000-180.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.000-160.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 160.000-140.000	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.000-120.000	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 120.000-100.000	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.000-80.000	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.000-60.000	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A572-50 (50 ksi)
T8 60.000-40.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.000-20.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.000-0.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 192.000-180.000	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 180.000-160.000	Equal Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

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
T1 192.000-180.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T2 180.000-160.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T3 160.000-	0.000	0.250	A36	1.05	1	1.05	0.000	0.000	36.000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
140.000-120.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
120.000-100.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
100.000-80.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
80.000-60.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
60.000-40.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
40.000-20.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000
20.000-0.000	0.000	0.250	(36 ksi) A36	1.05	1	1.05	0.000	0.000	36.000

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹							
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
				X Y	X Y	X Y	X Y	X Y	X Y	X Y	
T1 192.000-180.000	Yes	No	1	1	1	1	1	1	1	1	1
T2 180.000-160.000	Yes	No	1	1	1	1	1	1	1	1	1
T3 160.000-140.000	Yes	No	1	1	1	1	1	1	1	1	1
T4 140.000-120.000	Yes	No	1	1	1	1	1	1	1	1	1
T5 120.000-100.000	Yes	No	1	1	1	1	1	1	1	1	1
T6 100.000-80.000	Yes	No	1	1	1	1	1	1	1	1	1
T7 80.000-60.000	Yes	No	1	1	1	1	1	1	1	1	1
T8 60.000-40.000	Yes	No	1	1	1	1	1	1	1	1	1
T9 40.000-20.000	Yes	No	1	1	1	1	1	1	1	1	1
T10 20.000-0.000	Yes	No	1	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U
ft	Deduct		Deduct		Deduct		Deduct		Deduct		Deduct		Deduct	
	in		in		in		in		in		in		in	
T1 192.000-180.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T3 160.000-140.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 192.000-180.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180.000-160.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160.000-140.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.000-120.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.000-100.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.000-80.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.000-60.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.000-40.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.000-20.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.000-0.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 192.000-180.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T2 180.000-160.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T3 160.000-140.000	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T4 140.000-120.000	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T5 120.000-100.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T6 100.000-80.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T7 80.000-60.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T8 60.000-40.000	Flange	1.000 A325N	8	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T9 40.000-20.000	Flange	1.000 A325N	8	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T10 20.000-0.000	Flange	1.000 A354-BC	10	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Thin Flat Bar Climbing Ladder	A	No	No	Af (CaAa)	192.000 - 0.000	-6.000	0.45	1	1	2.000	2.000		0.004
Safety Line 3/8 ***	A	No	No	Ar (CaAa)	192.000 - 0.000	-6.000	0.45	1	1	0.375	0.375		0.000
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	190.000 - 0.000	0.000	-0.4	1	1	0.630	0.630		0.000
HB114-1-0813U4-M5J(1-1/4)	A	No	No	Ar (CaAa)	190.000 - 0.000	0.000	-0.45	4	4	0.850	1.540		0.001
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	190.000 - 0.000	0.000	-0.45	1	1	3.000	3.000		0.008
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	180.000 - 98.000	0.000	0.48	1	1	0.630	0.630		0.000
LDF7-50A(1-5/8)	A	No	No	Ar (CaAa)	180.000 - 0.000	0.000	0.4	8	8	0.850	1.980		0.001
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	98.000 - 0.000	0.000	0.48	2	2	0.630	0.630		0.000
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	180.000 - 0.000	0.000	0.4	1	1	3.000	3.000		0.008
LDF7-50A(1-5/8)	B	No	No	Ar (CaAa)	171.000 - 0.000	0.000	-0.4	9	9	0.850	1.980		0.001
Feedline Ladder (Af) ***	B	No	No	Af (CaAa)	170.000 - 0.000	0.000	-0.4	1	1	3.000	3.000		0.008
FXL 1873 PE(1-5/8)	B	No	No	Ar (CaAa)	162.000 - 0.000	-2.000	0.45	6	3	0.850 0.750	1.980		0.001
Feedline Ladder (Af) ***	B	No	No	Af (CaAa)	160.000 - 0.000	-0.500	0.45	1	1	3.000	3.000		0.008
FLC 78-50J(7/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.4	14	12	0.850 0.750	1.112		0.000
FB-L98B-002-75000(3/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	1.500	-0.42	1	1	0.394	0.394		0.000
FB-L98B-034-XXX(3/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.32	1	1	0.394	0.000		0.000
WR-	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.32	2	2	0.795	0.000		0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
VG86ST-BRD(3/4) 2" Flex Conduit	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.32	1	1	2.000	2.000		0.000
Feedline Ladder (Af) ***	C	No	No	Af (CaAa)	140.000 - 0.000	0.000	-0.4	1	1	3.000	3.000		0.008
HCS 6X12 4AWG(1-5/8) Feedline Ladder (Af) *****	C	No	No	Ar (CaAa)	156.000 - 0.000	0.000	0.4	3	3	0.850	1.660		0.002
	C	No	No	Af (CaAa)	150.000 - 0.000	0.000	0.4	1	1	3.000	3.000		0.008
CU12PSM9P 6XXX(1-1/2) ***	C	No	No	Ar (CaAa)	130.000 - 0.000	0.000	0.48	1	1	1.600	1.600		0.002

Feed Line/Linear Appurtenances - Entered As Area

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	CAAA In Face ft ²	CAAA Out Face ft ²	Weight K
T1	192.000-180.000	A	0.000	0.000	16.240	0.000	0.184
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	26.978	0.000	0.173
		C	0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	12.968	0.000	0.199
T4	140.000-120.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	67.484	0.000	0.648
T5	120.000-100.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T6	100.000-80.000	A	0.000	0.000	75.071	0.000	0.656
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T7	80.000-60.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T8	60.000-40.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T9	40.000-20.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T10	20.000-0.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564

Tower Section n	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
		C	0.000	0.000	69.084	0.000	0.672

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
T1	192.000-180.000	A	2.021	0.000	0.000	45.264	0.000	0.844
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	2.003	0.000	0.000	178.888	0.000	3.269
		B		0.000	0.000	52.854	0.000	0.966
		C		0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	1.978	0.000	0.000	177.977	0.000	3.228
		B		0.000	0.000	144.978	0.000	2.788
		C		0.000	0.000	33.011	0.000	0.638
T4	140.000-120.000	A	1.950	0.000	0.000	176.949	0.000	3.183
		B		0.000	0.000	144.391	0.000	2.754
		C		0.000	0.000	183.089	0.000	3.164
T5	120.000-100.000	A	1.918	0.000	0.000	175.768	0.000	3.131
		B		0.000	0.000	143.716	0.000	2.716
		C		0.000	0.000	187.171	0.000	3.218
T6	100.000-80.000	A	1.879	0.000	0.000	182.571	0.000	3.109
		B		0.000	0.000	142.920	0.000	2.671
		C		0.000	0.000	185.500	0.000	3.154
T7	80.000-60.000	A	1.833	0.000	0.000	181.638	0.000	3.039
		B		0.000	0.000	141.946	0.000	2.617
		C		0.000	0.000	183.455	0.000	3.077
T8	60.000-40.000	A	1.772	0.000	0.000	179.242	0.000	2.944
		B		0.000	0.000	140.680	0.000	2.547
		C		0.000	0.000	180.797	0.000	2.978
T9	40.000-20.000	A	1.684	0.000	0.000	175.758	0.000	2.808
		B		0.000	0.000	138.840	0.000	2.446
		C		0.000	0.000	176.932	0.000	2.837
T10	20.000-0.000	A	1.509	0.000	0.000	168.855	0.000	2.548
		B		0.000	0.000	135.193	0.000	2.252
		C		0.000	0.000	169.268	0.000	2.568

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	192.000-180.000	-5.049	1.075	-5.835	-0.371
T2	180.000-160.000	-4.744	-15.872	-6.205	-15.537
T3	160.000-140.000	-1.685	-15.245	-4.063	-14.853
T4	140.000-120.000	5.593	-11.877	6.132	-7.909
T5	120.000-100.000	5.503	-12.425	6.044	-8.381
T6	100.000-80.000	6.295	-14.596	6.929	-10.430
T7	80.000-60.000	6.527	-15.335	7.480	-11.499
T8	60.000-40.000	6.933	-16.332	8.026	-12.476
T9	40.000-20.000	7.359	-17.415	8.689	-13.710
T10	20.000-0.000	7.740	-18.389	9.398	-15.168

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Thin Flat Bar Climbing Ladder	180.00 - 192.00	0.6000	0.5487
T1	2	Safety Line 3/8	180.00 - 192.00	0.6000	0.5487
T1	4	LDF4-50A(1/2)	180.00 - 190.00	0.6000	0.5487
T1	5	HB114-1-0813U4-M5J(1-1/4)	180.00 - 190.00	0.6000	0.5487
T1	7	Feedline Ladder (Af)	180.00 - 190.00	0.6000	0.5487
T2	1	Thin Flat Bar Climbing Ladder	160.00 - 180.00	0.6000	0.6000
T2	2	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T2	4	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.6000
T2	5	HB114-1-0813U4-M5J(1-1/4)	160.00 - 180.00	0.6000	0.6000
T2	7	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	9	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.6000
T2	10	LDF7-50A(1-5/8)	160.00 - 180.00	0.6000	0.6000
T2	12	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	14	LDF7-50A(1-5/8)	160.00 - 171.00	0.6000	0.6000
T2	15	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T2	17	FXL 1873 PE(1-5/8)	160.00 - 162.00	0.6000	0.6000
T3	1	Thin Flat Bar Climbing Ladder	140.00 - 160.00	0.6000	0.6000
T3	2	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T3	4	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	5	HB114-1-0813U4-M5J(1-1/4)	140.00 - 160.00	0.6000	0.6000
T3	7	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	9	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	10	LDF7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	14	LDF7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	15	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	17	FXL 1873 PE(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	18	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	28	HCS 6X12 4AWG(1-5/8)	140.00 - 156.00	0.6000	0.6000
T3	29	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.6000
T4	1	Thin Flat Bar Climbing Ladder	120.00 - 140.00	0.6000	0.6000
T4	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	4	LDF4-50A(1/2)	120.00 - 140.00	0.6000	0.6000
T4	5	HB114-1-0813U4-M5J(1-1/4)	120.00 - 140.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			140.00		
T4	9	LDF4-50A(1/2)	120.00 -	0.6000	0.6000
			140.00		
T4	10	LDF7-50A(1-5/8)	120.00 -	0.6000	0.6000
			140.00		
T4	12	Feedline Ladder (Af)	120.00 -	0.6000	0.6000
			140.00		
T4	14	LDF7-50A(1-5/8)	120.00 -	0.6000	0.6000
			140.00		
T4	15	Feedline Ladder (Af)	120.00 -	0.6000	0.6000
			140.00		
T4	17	FXL 1873 PE(1-5/8)	120.00 -	0.6000	0.6000
			140.00		
T4	18	Feedline Ladder (Af)	120.00 -	0.6000	0.6000
			140.00		
T4	20	FLC 78-50J(7/8)	120.00 -	0.6000	0.6000
			140.00		
T4	21	FB-L98B-002-75000(3/8)	120.00 -	0.6000	0.6000
			140.00		
T4	22	FB-L98B-034-XXX(3/8)	120.00 -	0.6000	0.6000
			140.00		
T4	24	WR-VG86ST-BRD(3/4)	120.00 -	0.6000	0.6000
			140.00		
T4	25	2" Flex Conduit	120.00 -	0.6000	0.6000
			140.00		
T4	26	Feedline Ladder (Af)	120.00 -	0.6000	0.6000
			140.00		
T4	28	HCS 6X12 4AWG(1-5/8)	120.00 -	0.6000	0.6000
			140.00		
T4	29	Feedline Ladder (Af)	120.00 -	0.6000	0.6000
			140.00		
T4	31	CU12PSM9P6XXX(1-1/2)	120.00 -	0.6000	0.6000
			130.00		
T5	1	Thin Flat Bar Climbing Ladder	100.00 -	0.6000	0.6000
			120.00		
T5	2	Safety Line 3/8	100.00 -	0.6000	0.6000
			120.00		
T5	4	LDF4-50A(1/2)	100.00 -	0.6000	0.6000
			120.00		
T5	5	HB114-1-0813U4-M5J(1-1/4)	100.00 -	0.6000	0.6000
			120.00		
T5	7	Feedline Ladder (Af)	100.00 -	0.6000	0.6000
			120.00		
T5	9	LDF4-50A(1/2)	100.00 -	0.6000	0.6000
			120.00		
T5	10	LDF7-50A(1-5/8)	100.00 -	0.6000	0.6000
			120.00		
T5	12	Feedline Ladder (Af)	100.00 -	0.6000	0.6000
			120.00		
T5	14	LDF7-50A(1-5/8)	100.00 -	0.6000	0.6000
			120.00		
T5	15	Feedline Ladder (Af)	100.00 -	0.6000	0.6000
			120.00		
T5	17	FXL 1873 PE(1-5/8)	100.00 -	0.6000	0.6000
			120.00		
T5	18	Feedline Ladder (Af)	100.00 -	0.6000	0.6000
			120.00		
T5	20	FLC 78-50J(7/8)	100.00 -	0.6000	0.6000
			120.00		
T5	21	FB-L98B-002-75000(3/8)	100.00 -	0.6000	0.6000
			120.00		
T5	22	FB-L98B-034-XXX(3/8)	100.00 -	0.6000	0.6000
			120.00		
T5	24	WR-VG86ST-BRD(3/4)	100.00 -	0.6000	0.6000
			120.00		
T5	25	2" Flex Conduit	100.00 -	0.6000	0.6000
			120.00		
T5	26	Feedline Ladder (Af)	100.00 -	0.6000	0.6000
			120.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T5	28	HCS 6X12 4AWG(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	29	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	31	CU12PSM9P6XXX(1-1/2)	100.00 - 120.00	0.6000	0.6000
T6	1	Thin Flat Bar Climbing Ladder	80.00 - 100.00	0.6000	0.6000
T6	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	4	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T6	5	HB114-1-0813U4-M5J(1-1/4)	80.00 - 100.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	9	LDF4-50A(1/2)	98.00 - 100.00	0.6000	0.6000
T6	10	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	11	LDF4-50A(1/2)	80.00 - 98.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	14	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	15	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	17	FXL 1873 PE(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	18	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	20	FLC 78-50J(7/8)	80.00 - 100.00	0.6000	0.6000
T6	21	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.6000	0.6000
T6	22	FB-L98B-034-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T6	24	WR-VG86ST-BRD(3/4)	80.00 - 100.00	0.6000	0.6000
T6	25	2" Flex Conduit	80.00 - 100.00	0.6000	0.6000
T6	26	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	28	HCS 6X12 4AWG(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	29	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	31	CU12PSM9P6XXX(1-1/2)	80.00 - 100.00	0.6000	0.6000
T7	1	Thin Flat Bar Climbing Ladder	60.00 - 80.00	0.6000	0.6000
T7	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	4	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	5	HB114-1-0813U4-M5J(1-1/4)	60.00 - 80.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	10	LDF7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	11	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	14	LDF7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	15	Feedline Ladder (Af)	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			80.00		
T7	17	FXL 1873 PE(1-5/8)	60.00 -	0.6000	0.6000
			80.00		
T7	18	Feedline Ladder (Af)	60.00 -	0.6000	0.6000
			80.00		
T7	20	FLC 78-50J(7/8)	60.00 -	0.6000	0.6000
			80.00		
T7	21	FB-L98B-002-75000(3/8)	60.00 -	0.6000	0.6000
			80.00		
T7	22	FB-L98B-034-XXX(3/8)	60.00 -	0.6000	0.6000
			80.00		
T7	24	WR-VG86ST-BRD(3/4)	60.00 -	0.6000	0.6000
			80.00		
T7	25	2" Flex Conduit	60.00 -	0.6000	0.6000
			80.00		
T7	26	Feedline Ladder (Af)	60.00 -	0.6000	0.6000
			80.00		
T7	28	HCS 6X12 4AWG(1-5/8)	60.00 -	0.6000	0.6000
			80.00		
T7	29	Feedline Ladder (Af)	60.00 -	0.6000	0.6000
			80.00		
T7	31	CU12PSM9P6XXX(1-1/2)	60.00 -	0.6000	0.6000
			80.00		
T8	1	Thin Flat Bar Climbing Ladder	40.00 -	0.6000	0.6000
			60.00		
T8	2	Safety Line 3/8	40.00 -	0.6000	0.6000
			60.00		
T8	4	LDF4-50A(1/2)	40.00 -	0.6000	0.6000
			60.00		
T8	5	HB114-1-0813U4-M5J(1-1/4)	40.00 -	0.6000	0.6000
			60.00		
T8	7	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	10	LDF7-50A(1-5/8)	40.00 -	0.6000	0.6000
			60.00		
T8	11	LDF4-50A(1/2)	40.00 -	0.6000	0.6000
			60.00		
T8	12	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	14	LDF7-50A(1-5/8)	40.00 -	0.6000	0.6000
			60.00		
T8	15	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	17	FXL 1873 PE(1-5/8)	40.00 -	0.6000	0.6000
			60.00		
T8	18	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	20	FLC 78-50J(7/8)	40.00 -	0.6000	0.6000
			60.00		
T8	21	FB-L98B-002-75000(3/8)	40.00 -	0.6000	0.6000
			60.00		
T8	22	FB-L98B-034-XXX(3/8)	40.00 -	0.6000	0.6000
			60.00		
T8	24	WR-VG86ST-BRD(3/4)	40.00 -	0.6000	0.6000
			60.00		
T8	25	2" Flex Conduit	40.00 -	0.6000	0.6000
			60.00		
T8	26	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	28	HCS 6X12 4AWG(1-5/8)	40.00 -	0.6000	0.6000
			60.00		
T8	29	Feedline Ladder (Af)	40.00 -	0.6000	0.6000
			60.00		
T8	31	CU12PSM9P6XXX(1-1/2)	40.00 -	0.6000	0.6000
			60.00		
T9	1	Thin Flat Bar Climbing Ladder	20.00 -	0.6000	0.6000
			40.00		
T9	2	Safety Line 3/8	20.00 -	0.6000	0.6000
			40.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	4	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	5	HB114-1-0813U4-M5J(1-1/4)	20.00 - 40.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	10	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	11	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	14	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	15	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	17	FXL 1873 PE(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	18	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	20	FLC 78-50J(7/8)	20.00 - 40.00	0.6000	0.6000
T9	21	FB-L98B-002-75000(3/8)	20.00 - 40.00	0.6000	0.6000
T9	22	FB-L98B-034-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T9	24	WR-VG86ST-BRD(3/4)	20.00 - 40.00	0.6000	0.6000
T9	25	2" Flex Conduit	20.00 - 40.00	0.6000	0.6000
T9	26	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	28	HCS 6X12 4AWG(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	29	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	31	CU12PSM9P6XXX(1-1/2)	20.00 - 40.00	0.6000	0.6000
T10	1	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T10	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T10	4	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	5	HB114-1-0813U4-M5J(1-1/4)	0.00 - 20.00	0.6000	0.6000
T10	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	10	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	11	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	14	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	15	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	17	FXL 1873 PE(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	18	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	20	FLC 78-50J(7/8)	0.00 - 20.00	0.6000	0.6000
T10	21	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.6000	0.6000
T10	22	FB-L98B-034-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T10	24	WR-VG86ST-BRD(3/4)	0.00 - 20.00	0.6000	0.6000
T10	25	2" Flex Conduit	0.00 - 20.00	0.6000	0.6000
T10	26	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	28	HCS 6X12 4AWG(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	29	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	31	CU12PSM9P6XXX(1-1/2)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement
			Horz	Lateral	Vert		
			ft	ft	ft	°	ft
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
FZHN	A	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
FZHN	B	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
FZHN	C	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
(2) RRH2X50-800	A	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
(2) RRH2X50-800	B	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
(2) RRH2X50-800	C	From Leg	4.000	0.000	190.000	0.000	190.000
			0.000				
			2.000				
Sector Mount [SM 506-3] ***	C	None				0.000	190.000
MT6407-77A w/ Mount Pipe	A	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				
			3.000				
MT6407-77A w/ Mount Pipe	B	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				
			3.000				
MT6407-77A w/ Mount Pipe	C	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				
			3.000				
(2) LPA-80080/4CF	A	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				
			1.000				
(2) LPA-80080/4CF	B	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				
			1.000				
(2) LPA-80080/4CF	C	From Leg	4.000	0.000	180.000	0.000	180.000
			0.000				

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) JAHH-65B-R3B	A	From Leg	4.000 4.000 0.000 1.000	0.000	180.000
(2) JAHH-65B-R3B	B	From Leg	4.000 0.000 1.000	0.000	180.000
(2) JAHH-65B-R3B	C	From Leg	4.000 0.000 1.000	0.000	180.000
CBRS w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	180.000
CBRS w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	180.000
CBRS w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	180.000
58532A	C	From Leg	4.000 0.000 4.000	0.000	180.000
FDJ85020Q7-S1	A	From Leg	4.000 0.000 1.000	0.000	180.000
FDJ85020Q7-S1	B	From Leg	4.000 0.000 1.000	0.000	180.000
FDJ85020Q7-S1	C	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D1A	A	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D1A	B	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D1A	C	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D2A	A	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D2A	B	From Leg	4.000 0.000 1.000	0.000	180.000
RFV01U-D2A	C	From Leg	4.000 0.000 1.000	0.000	180.000
(2) RC3DC-3315-PF-48	A	From Leg	4.000 0.000 1.000	0.000	180.000
Sector Mount [SM 304-3]	C	None		0.000	180.000
Mount Reinforcement Specifications ***	C	None		0.000	180.000
(3) 7130.16.33.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	171.000
(3) 7130.16.33.00 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	171.000
(3) 7130.16.33.00 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	171.000
Sector Mount [SM 502-3]	C	None		0.000	171.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft

HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	162.000
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	162.000
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	162.000
Sector Mount [SM 104-3] ***	C	None		0.000	162.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000
RADIO 4415 B66A	A	From Leg	4.000 0.000 0.000	0.000	156.000
RADIO 4415 B66A	B	From Leg	4.000 0.000 0.000	0.000	156.000
RADIO 4415 B66A	C	From Leg	4.000 0.000 0.000	0.000	156.000
RRUS 4415 B25	A	From Leg	4.000 0.000 3.000	0.000	156.000
RRUS 4415 B25	B	From Leg	4.000 0.000 3.000	0.000	156.000
RRUS 4415 B25	C	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	B	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	C	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	A	From Leg	4.000 0.000	0.000	156.000

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft
			Horz Lateral ft	Vert ft		
8' x 2" Mount Pipe	A	From Leg	3.000		0.000	156.000
			4.000			
			0.000			
8' x 2" Mount Pipe	B	From Leg	2.000		0.000	156.000
			4.000			
			0.000			
8' x 2" Mount Pipe	C	From Leg	2.000		0.000	156.000
			4.000			
			0.000			
Sector Mount [SM 502-3] ***	C	None			0.000	156.000
7770.00 w/ Mount Pipe	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
7770.00 w/ Mount Pipe	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
7770.00 w/ Mount Pipe	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
(2) TPA65R-BU4D w/ Mount Pipe	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
(2) TPA65R-BU4D w/ Mount Pipe	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
TT19-08BP111-001	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
TT19-08BP111-001	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
TT19-08BP111-001	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4478 B14	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4478 B14	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4478 B14	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4449 B5/B12	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4449 B5/B12	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 4449 B5/B12	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 8843 B2/B66A	A	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 8843 B2/B66A	B	From Leg	4.000		0.000	140.000
			0.000			
			0.000			
RRUS 8843 B2/B66A	C	From Leg	4.000		0.000	140.000
			0.000			
			0.000			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
DC6-48-60-18-8F	A	From Leg	0.000 4.000 0.000	0.000	140.000
DC6-48-60-0-8C-EV	B	From Leg	0.000 4.000 0.000 0.000	0.000	140.000
Sector Mount [SM 504-3] ***	C	None		0.000	140.000
58532A	A	From Leg	3.000 0.000 4.000	0.000	98.000
Side Arm Mount [SO 301-1]	A	From Leg	1.500 0.000 0.000	0.000	98.000

MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	A	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	B	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	130.000
RDIDC-9181-PF-48	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
Commscope MTC3975083 (3) ***	C	None		0.000	130.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
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
T1	192 - 180	Leg	Max Tension	23	3.974	-0.061	-0.044
			Max. Compression	18	-6.544	0.023	-0.036
			Max. Mx	20	-1.229	-0.725	0.002
			Max. My	2	-0.889	-0.025	-0.724
			Max. Vy	20	-0.536	0.349	-0.031
			Max. Vx	2	-0.542	-0.006	0.368
		Diagonal	Max Tension	21	1.391	0.000	0.000
			Max. Compression	20	-1.445	0.000	0.000
			Max. Mx	36	0.142	0.026	0.000
			Max. My	16	1.369	0.005	-0.002

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	180 - 160	Top Girt	Max. Vy	36	-0.029	0.026	0.000
			Max. Vx	16	-0.000	0.004	-0.002
			Max Tension	14	0.101	0.000	0.000
			Max. Compression	3	-0.090	0.000	0.000
		Leg	Max. Mx	26	0.001	-0.074	0.000
			Max. Vy	26	0.045	0.000	0.000
			Max Tension	23	28.833	-0.019	-0.017
			Max. Compression	2	-37.477	0.597	0.010
			Max. Mx	14	26.330	-0.654	-0.010
			Max. My	20	-5.238	-0.032	-0.650
			Max. Vy	14	-1.561	-0.006	-0.007
			Max. Vx	8	1.586	0.013	-0.045
		Diagonal	Max Tension	16	4.341	0.000	0.000
			Max. Compression	16	-4.379	0.000	0.000
			Max. Mx	27	1.271	0.049	-0.005
			Max. My	28	-1.503	0.023	0.006
			Max. Vy	27	-0.040	0.049	-0.005
			Max. Vx	28	-0.002	0.000	0.000
			Max Tension	3	0.875	0.000	0.000
			Max. Compression	14	-0.907	0.000	0.000
T3	160 - 140	Leg	Max. Mx	26	-0.063	-0.081	0.000
			Max. My	26	-0.059	0.000	0.002
			Max. Vy	26	0.049	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000
			Max Tension	23	59.972	0.006	-0.035
			Max. Compression	10	-73.093	0.184	0.031
			Max. Mx	14	34.827	0.900	-0.010
			Max. My	8	-5.228	-0.032	-0.927
		Diagonal	Max. Vy	14	0.583	-0.610	-0.005
			Max. Vx	20	0.608	-0.048	-0.591
			Max Tension	16	6.259	0.000	0.000
			Max. Compression	16	-6.198	0.000	0.000
			Max. Mx	27	1.374	0.094	-0.011
			Max. My	36	1.523	0.090	-0.012
			Max. Vy	27	-0.062	0.094	-0.011
			Max. Vx	36	0.004	0.000	0.000
T4	140 - 120	Leg	Max Tension	23	94.742	-0.572	-0.022
			Max. Compression	10	-115.374	0.264	0.026
			Max. Mx	22	92.204	-0.583	-0.023
			Max. My	20	-9.779	-0.022	-0.630
			Max. Vy	14	-0.966	-0.175	-0.001
			Max. Vx	20	-0.924	-0.003	-0.104
		Diagonal	Max Tension	12	7.909	0.000	0.000
			Max. Compression	12	-8.000	0.000	0.000
			Max. Mx	27	1.851	0.112	-0.014
			Max. My	30	-1.847	0.092	0.015
			Max. Vy	37	0.072	0.105	0.013
			Max. Vx	30	-0.004	0.000	0.000
T5	120 - 100	Leg	Max Tension	23	130.765	-0.346	-0.010
			Max. Compression	10	-155.991	0.809	0.052
			Max. Mx	10	-155.991	0.809	0.052
			Max. My	20	-13.108	0.006	-0.709
			Max. Vy	11	-0.126	0.808	0.052
			Max. Vx	20	0.154	0.006	-0.709
		Diagonal	Max Tension	12	8.414	0.000	0.000
			Max. Compression	12	-8.376	0.000	0.000
			Max. Mx	27	2.329	0.157	-0.019
			Max. My	30	-1.471	0.141	0.021
			Max. Vy	37	0.095	0.152	-0.020
			Max. Vx	30	-0.005	0.000	0.000
T6	100 - 80	Leg	Max Tension	23	161.382	-0.657	-0.046
			Max. Compression	10	-190.928	0.975	0.050
			Max. Mx	10	-190.928	0.975	0.050
			Max. My	20	-14.562	-0.065	-1.165
			Max. Vy	10	-0.135	0.975	0.050
			Max. Vx	20	-0.200	-0.065	-1.165
		Diagonal	Max Tension	12	9.710	0.000	0.000
			Max. Compression	12	-9.752	0.000	0.000
			Max. Mx	27	2.494	0.255	-0.033

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft		
T7	80 - 60	Leg	Max. My	36	2.827	0.249	-0.034		
			Max. Vy	37	0.121	0.243	0.032		
			Max. Vx	36	0.007	0.000	0.000		
			Max Tension	23	194.023	-0.622	-0.035		
			Max. Compression	10	-228.768	1.304	0.060		
		T8	60 - 40	Leg	Max. Mx	10	-228.768	1.304	0.060
					Max. My	20	-16.938	0.039	-1.144
					Max. Vy	10	-0.168	1.304	0.060
					Max. Vx	20	0.169	-0.068	-0.921
					Max Tension	12	10.530	0.000	0.000
T9	40 - 20			Diagonal	Max. Compression	12	-10.675	0.000	0.000
					Max. Mx	27	2.639	0.327	-0.040
					Max. My	36	2.541	0.314	-0.041
					Max. Vy	29	0.148	0.316	-0.038
					Max. Vx	36	0.008	0.000	0.000
		T10	20 - 0	Leg	Max Tension	23	223.413	-1.413	-0.029
					Max. Compression	18	-264.351	1.210	-0.011
					Max. Mx	37	11.061	-2.022	-0.023
					Max. My	20	-19.035	-0.072	-1.379
					Max. Vy	33	0.304	-2.007	0.013
T10	20 - 0			Diagonal	Max. Vx	20	0.170	-0.072	-1.379
					Max Tension	12	10.218	0.000	0.000
					Max. Compression	12	-10.210	0.000	0.000
					Max. Mx	29	2.535	0.391	0.056
					Max. My	30	-1.348	0.366	0.058
		T10	20 - 0	Leg	Max. Vy	29	0.173	0.391	0.056
					Max. Vx	30	-0.010	0.000	0.000
					Max Tension	23	252.789	-1.263	-0.024
					Max. Compression	18	-300.008	2.045	-0.027
					Max. Mx	37	13.080	-4.029	-0.015
T10	20 - 0			Diagonal	Max. My	20	-20.782	-0.124	-1.699
					Max. Vy	33	0.656	-4.004	0.012
					Max. Vx	20	-0.236	-0.124	-1.699
					Max Tension	12	11.808	0.000	0.000
					Max. Compression	12	-12.104	0.000	0.000
		T10	20 - 0	Leg	Max. Mx	27	2.275	0.463	-0.050
					Max. My	30	3.914	0.413	0.055
					Max. Vy	29	0.179	0.414	-0.053
					Max. Vx	30	-0.009	0.000	0.000
					Max Tension	23	281.325	-1.318	-0.033
T10	20 - 0			Diagonal	Max. Compression	18	-335.562	0.000	0.000
					Max. Mx	35	-149.218	4.060	0.017
					Max. My	20	-24.293	-0.212	-3.079
					Max. Vy	33	-0.780	-4.004	0.012
					Max. Vx	20	-0.438	-0.212	-3.079
		T10	20 - 0	Leg	Max Tension	12	12.212	0.000	0.000
					Max. Compression	10	-12.724	0.000	0.000
					Max. Mx	29	-0.247	0.589	0.059
					Max. My	30	5.364	0.419	0.069
					Max. Vy	29	0.198	0.589	0.059
T10	20 - 0			Diagonal	Max. Vx	30	-0.010	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	344.410	33.609	-19.898
	Max. H _x	18	344.410	33.609	-19.898
	Max. H _z	7	-287.865	-28.853	17.132
	Min. Vert	7	-287.865	-28.853	17.132
	Min. H _x	7	-287.865	-28.853	17.132
Leg B	Min. H _z	18	344.410	33.609	-19.898
	Max. Vert	10	343.810	-33.386	-20.047
	Max. H _x	23	-288.305	28.640	17.299

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Max. H _z	23	-288.305	28.640	17.299
	Min. Vert	23	-288.305	28.640	17.299
	Min. H _x	10	343.810	-33.386	-20.047
	Min. H _z	10	343.810	-33.386	-20.047
	Max. Vert	2	337.922	0.391	38.241
	Max. H _x	21	19.003	5.611	1.576
	Max. H _z	2	337.922	0.391	38.241
	Min. Vert	15	-280.776	-0.402	-32.727
	Min. H _x	8	25.161	-5.622	2.085
Min. H _z	15	-280.776	-0.402	-32.727	

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	62.024	0.000	0.000	-7.718	6.204	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	74.429	-0.011	-60.909	-6792.636	9.089	17.214
0.9 Dead+1.0 Wind 0 deg - No Ice	55.822	-0.011	-60.909	-6790.320	7.228	17.214
1.2 Dead+1.0 Wind 30 deg - No Ice	74.429	29.313	-50.789	-5700.317	-3275.027	18.230
0.9 Dead+1.0 Wind 30 deg - No Ice	55.822	29.313	-50.789	-5698.002	-3276.889	18.230
1.2 Dead+1.0 Wind 60 deg - No Ice	74.429	51.156	-29.532	-3335.257	-5750.991	-18.192
0.9 Dead+1.0 Wind 60 deg - No Ice	55.822	51.156	-29.532	-3332.942	-5752.853	-18.192
1.2 Dead+1.0 Wind 90 deg - No Ice	74.429	60.670	0.011	-7.616	-6830.379	-54.029
0.9 Dead+1.0 Wind 90 deg - No Ice	55.822	60.670	0.011	-5.301	-6832.240	-54.029
1.2 Dead+1.0 Wind 120 deg - No Ice	74.429	53.764	31.050	3458.904	-5993.947	-28.868
0.9 Dead+1.0 Wind 120 deg - No Ice	55.822	53.764	31.050	3461.220	-5995.808	-28.868
1.2 Dead+1.0 Wind 150 deg - No Ice	74.429	29.521	51.127	5742.482	-3311.965	-11.407
0.9 Dead+1.0 Wind 150 deg - No Ice	55.822	29.521	51.127	5744.798	-3313.826	-11.407
1.2 Dead+1.0 Wind 180 deg - No Ice	74.429	0.011	57.673	6492.497	5.800	-17.214
0.9 Dead+1.0 Wind 180 deg - No Ice	55.822	0.011	57.673	6494.812	3.938	-17.214
1.2 Dead+1.0 Wind 210 deg - No Ice	74.429	-29.313	50.789	5681.794	3289.916	-18.230
0.9 Dead+1.0 Wind 210 deg - No Ice	55.822	-29.313	50.789	5684.110	3288.055	-18.230
1.2 Dead+1.0 Wind 240 deg - No Ice	74.429	-53.958	31.150	3457.543	6009.767	18.192
0.9 Dead+1.0 Wind 240 deg - No Ice	55.822	-53.958	31.150	3459.858	6007.906	18.192
1.2 Dead+1.0 Wind 270 deg - No Ice	74.429	-60.670	-0.011	-10.906	6845.268	54.029
0.9 Dead+1.0 Wind 270 deg - No Ice	55.822	-60.670	-0.011	-8.591	6843.407	54.029
1.2 Dead+1.0 Wind 300 deg - No Ice	74.429	-50.961	-29.432	-3336.619	5764.950	28.868
0.9 Dead+1.0 Wind 300 deg - No Ice	55.822	-50.961	-29.432	-3334.304	5763.088	28.868
1.2 Dead+1.0 Wind 330 deg - No Ice	74.429	-29.521	-51.127	-5761.005	3326.854	11.407
0.9 Dead+1.0 Wind 330 deg - No Ice	55.822	-29.521	-51.127	-5758.690	3324.993	11.407

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Ice+1.0 Temp	220.895	0.000	0.000	-71.508	-28.929	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	220.895	-0.002	-17.194	-2018.813	-28.655	5.112
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	220.895	8.445	-14.628	-1737.422	-990.375	3.627
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	220.895	14.696	-8.483	-1042.220	-1710.157	-6.382
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	220.895	17.247	0.002	-71.235	-2003.428	-12.055
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	220.895	15.199	8.775	927.947	-1759.397	-6.945
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	220.895	8.533	14.776	1613.863	-1001.925	-2.600
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	220.895	0.002	16.784	1841.407	-29.202	-5.112
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	220.895	-8.445	14.628	1594.405	932.518	-3.627
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	220.895	-15.051	8.688	916.397	1682.082	6.382
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	220.895	-17.247	-0.002	-71.782	1945.571	12.055
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	220.895	-14.844	-8.570	-1053.770	1671.759	6.945
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	220.895	-8.533	-14.776	-1756.880	944.068	2.600
Dead+Wind 0 deg - Service	62.024	-0.002	-13.958	-1545.840	6.573	3.872
Dead+Wind 30 deg - Service	62.024	6.723	-11.648	-1298.620	-738.368	4.095
Dead+Wind 60 deg - Service	62.024	11.731	-6.772	-762.049	-1299.807	-4.078
Dead+Wind 90 deg - Service	62.024	13.904	0.002	-7.349	-1544.127	-12.120
Dead+Wind 120 deg - Service	62.024	12.315	7.113	778.492	-1354.285	-6.483
Dead+Wind 150 deg - Service	62.024	6.770	11.724	1296.793	-746.650	-2.570
Dead+Wind 180 deg - Service	62.024	0.002	13.232	1467.258	5.835	-3.872
Dead+Wind 210 deg - Service	62.024	-6.723	11.648	1283.185	750.775	-4.095
Dead+Wind 240 deg - Service	62.024	-12.359	7.135	778.187	1366.901	4.078
Dead+Wind 270 deg - Service	62.024	-13.904	-0.002	-8.087	1556.535	12.120
Dead+Wind 300 deg - Service	62.024	-11.687	-6.750	-762.354	1312.006	6.483
Dead+Wind 330 deg - Service	62.024	-6.770	-11.724	-1312.228	759.058	2.570

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	-62.024	0.000	0.000	62.024	-0.000	0.000%
2	-0.011	-74.429	-60.909	0.011	74.429	60.909	0.000%
3	-0.011	-55.822	-60.909	0.011	55.822	60.909	0.000%
4	29.313	-74.429	-50.789	-29.313	74.429	50.789	0.000%
5	29.313	-55.822	-50.789	-29.313	55.822	50.789	0.000%
6	51.156	-74.429	-29.532	-51.156	74.429	29.532	0.000%
7	51.156	-55.822	-29.532	-51.156	55.822	29.532	0.000%
8	60.670	-74.429	0.011	-60.670	74.429	-0.011	0.000%
9	60.670	-55.822	0.011	-60.670	55.822	-0.011	0.000%
10	53.764	-74.429	31.050	-53.764	74.429	-31.050	0.000%
11	53.764	-55.822	31.050	-53.764	55.822	-31.050	0.000%
12	29.521	-74.429	51.127	-29.521	74.429	-51.127	0.000%
13	29.521	-55.822	51.127	-29.521	55.822	-51.127	0.000%
14	0.011	-74.429	57.673	-0.011	74.429	-57.673	0.000%
15	0.011	-55.822	57.673	-0.011	55.822	-57.673	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
16	-29.313	-74.429	50.789	29.313	74.429	-50.789	0.000%
17	-29.313	-55.822	50.789	29.313	55.822	-50.789	0.000%
18	-53.958	-74.429	31.150	53.958	74.429	-31.150	0.000%
19	-53.958	-55.822	31.150	53.958	55.822	-31.150	0.000%
20	-60.670	-74.429	-0.011	60.670	74.429	0.011	0.000%
21	-60.670	-55.822	-0.011	60.670	55.822	0.011	0.000%
22	-50.961	-74.429	-29.432	50.961	74.429	29.432	0.000%
23	-50.961	-55.822	-29.432	50.961	55.822	29.432	0.000%
24	-29.521	-74.429	-51.127	29.521	74.429	51.127	0.000%
25	-29.521	-55.822	-51.127	29.521	55.822	51.127	0.000%
26	0.000	-220.895	0.000	-0.000	220.895	-0.000	0.000%
27	-0.002	-220.895	-17.194	0.002	220.895	17.194	0.000%
28	8.445	-220.895	-14.628	-8.445	220.895	14.628	0.000%
29	14.696	-220.895	-8.483	-14.696	220.895	8.483	0.000%
30	17.247	-220.895	0.002	-17.247	220.895	-0.002	0.000%
31	15.199	-220.895	8.775	-15.199	220.895	-8.775	0.000%
32	8.533	-220.895	14.776	-8.533	220.895	-14.776	0.000%
33	0.002	-220.895	16.784	-0.002	220.895	-16.784	0.000%
34	-8.445	-220.895	14.628	8.445	220.895	-14.628	0.000%
35	-15.051	-220.895	8.688	15.051	220.895	-8.688	0.000%
36	-17.247	-220.895	-0.002	17.247	220.895	0.002	0.000%
37	-14.844	-220.895	-8.570	14.844	220.895	8.570	0.000%
38	-8.533	-220.895	-14.776	8.533	220.895	14.776	0.000%
39	-0.002	-62.024	-13.958	0.002	62.024	13.958	0.000%
40	6.723	-62.024	-11.648	-6.723	62.024	11.648	0.000%
41	11.731	-62.024	-6.772	-11.731	62.024	6.772	0.000%
42	13.904	-62.024	0.002	-13.904	62.024	-0.002	0.000%
43	12.315	-62.024	7.113	-12.315	62.024	-7.113	0.000%
44	6.770	-62.024	11.724	-6.770	62.024	-11.724	0.000%
45	0.002	-62.024	13.232	-0.002	62.024	-13.232	0.000%
46	-6.723	-62.024	11.648	6.723	62.024	-11.648	0.000%
47	-12.359	-62.024	7.135	12.359	62.024	-7.135	0.000%
48	-13.904	-62.024	-0.002	13.904	62.024	0.002	0.000%
49	-11.687	-62.024	-6.750	11.687	62.024	6.750	0.000%
50	-6.770	-62.024	-11.724	6.770	62.024	11.724	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	192 - 180	4.283	48	0.204	0.025
T2	180 - 160	3.768	48	0.202	0.025
T3	160 - 140	2.944	47	0.178	0.021
T4	140 - 120	2.236	47	0.150	0.018
T5	120 - 100	1.634	47	0.124	0.014
T6	100 - 80	1.135	47	0.101	0.011
T7	80 - 60	0.737	47	0.077	0.008
T8	60 - 40	0.431	47	0.057	0.006
T9	40 - 20	0.210	47	0.039	0.004
T10	20 - 0	0.063	47	0.020	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	APXVTM14-ALU-I20 w/ Mount Pipe	48	4.197	0.204	0.025	777453
180.000	MT6407-77A w/ Mount Pipe	48	3.768	0.202	0.025	247987
171.000	(3) 7130.16.33.00 w/ Mount Pipe	47	3.387	0.194	0.024	64048

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
162.000	HBX-6516DS-VTM w/ Mount Pipe	47	3.022	0.181	0.022	35977
156.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	47	2.793	0.172	0.021	34662
140.000	7770.00 w/ Mount Pipe	47	2.236	0.150	0.018	47439
130.000	MX08FRO665-21 w/ Mount Pipe	47	1.923	0.137	0.016	46764
98.000	58532A	47	1.091	0.099	0.010	46732

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	192 - 180	19.005	11	0.902	0.110
T2	180 - 160	16.727	11	0.892	0.110
T3	160 - 140	13.064	11	0.789	0.095
T4	140 - 120	9.909	11	0.666	0.080
T5	120 - 100	7.230	18	0.550	0.063
T6	100 - 80	5.016	18	0.447	0.047
T7	80 - 60	3.254	18	0.343	0.035
T8	60 - 40	1.900	18	0.253	0.025
T9	40 - 20	0.924	18	0.171	0.016
T10	20 - 0	0.276	18	0.087	0.007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	APXVTM14-ALU-I20 w/ Mount Pipe	11	18.625	0.902	0.110	202735
180.000	MT6407-77A w/ Mount Pipe	11	16.727	0.892	0.110	61992
171.000	(3) 7130.16.33.00 w/ Mount Pipe	11	15.037	0.856	0.105	14907
162.000	HBX-6516DS-VTM w/ Mount Pipe	11	13.411	0.802	0.097	8276
156.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	11	12.388	0.764	0.092	7962
140.000	7770.00 w/ Mount Pipe	11	9.909	0.666	0.080	10766
130.000	MX08FRO665-21 w/ Mount Pipe	11	8.513	0.606	0.072	10575
98.000	58532A	18	4.820	0.437	0.046	10528

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	192	Leg	A325N	0.625	4	0.993	20.340	0.049	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	1.391	7.116	0.196	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.101	7.116	0.014	1.05	Member Block Shear
T2	180	Leg	A325N	0.625	4	7.208	20.340	0.354	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	4.341	8.135	0.534	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.875	8.135	0.108	1.05	Member Block

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T3	160	Leg	A325N	0.875	4	14.993	41.556	0.361	1.05	Shear
		Diagonal	A325N	0.625	1	6.259	11.310	0.553	1.05	Bolt Tension Member Bearing
T4	140	Leg	A325N	1.000	4	23.686	54.517	0.434	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.909	11.310	0.699	1.05	Member Bearing
T5	120	Leg	A325N	1.000	6	21.794	54.517	0.400	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	8.414	13.485	0.624	1.05	Gusset Bearing
T6	100	Leg	A325N	1.000	6	26.897	54.517	0.493	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.710	13.485	0.720	1.05	Gusset Bearing
T7	80	Leg	A325N	1.000	8	24.253	54.517	0.445	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	10.530	13.485	0.781	1.05	Gusset Bearing
T8	60	Leg	A325N	1.000	8	27.927	54.517	0.512	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	10.218	13.485	0.758	1.05	Gusset Bearing
T9	40	Leg	A325N	1.000	8	31.599	54.517	0.580	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	11.808	13.485	0.876	1.05	Gusset Bearing
T10	20	Leg	A354-BC	1.000	10	28.133	56.788	0.495	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	12.212	13.485	0.906	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

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
T1	192 - 180	ROHN 2.5 STD	12.000	4.000	50.7 K=1.00	1.704	-6.544	63.560	0.103 ¹
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4 K=1.00	1.704	-37.477	57.139	0.656 ¹
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5 K=1.00	3.016	-73.093	94.337	0.775 ¹
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3 K=1.00	4.407	-115.374	159.899	0.722 ¹
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6 K=1.00	6.112	-155.991	239.378	0.652 ¹
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0 K=1.00	6.713	-190.928	244.047	0.782 ¹
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8 K=1.00	8.405	-228.768	303.757	0.753 ¹
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2 K=1.00	9.719	-264.351	386.354	0.684 ¹
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2 K=1.00	9.719	-300.008	386.409	0.776 ¹
T10	20 - 0	ROHN 8 EHS	20.033	10.017	41.2 K=1.00	9.719	-335.562	386.397	0.868 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

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
T1	192 - 180	L1 3/4x1 3/4x3/16	7.700	3.585	125.3 K=1.00	0.621	-1.445	11.328	0.128 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160	L2x2x3/16	9.686	4.721	143.8 K=1.00	0.715	-4.274	9.897	0.432 ¹
T3	160 - 140	L2 1/2x2 1/2x1/4	12.241	6.028	147.3 K=1.00	1.190	-6.177	15.695	0.394 ¹
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.897	168.6 K=1.00	1.190	-8.000	11.987	0.667 ¹
T5	120 - 100	L3x3x1/4	15.944	7.773	157.6 K=1.00	1.440	-8.376	16.602	0.505 ¹
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.452	163.4 K=1.00	1.690	-9.752	18.110	0.538 ¹
T7	80 - 60	L4x4x1/4	20.935	10.297	155.4 K=1.00	1.940	-10.675	22.986	0.464 ¹
T8	60 - 40	L4x4x5/16	22.872	11.214	170.1 K=1.00	2.400	-10.210	23.735	0.430 ¹
T9	40 - 20	L4x4x5/16	24.688	12.078	183.2 K=1.00	2.400	-12.104	20.461	0.592 ¹
T10	20 - 0	L4x4x3/8	26.510	13.002	198.0 K=1.00	2.860	-12.724	20.882	0.609 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	L1 3/4x1 3/4x3/16	6.580	6.090	212.8 K=1.00	0.621	-0.090	3.926	0.023 ¹
T2	180 - 160	KL/R > 200 (C) - 4 L2x2x3/16	6.580	6.090	185.5 K=1.00	0.715	-0.907	5.948	0.153 ¹

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	ROHN 2.5 STD	12.000	4.000	50.7	1.704	3.974	76.682	0.052 ¹
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4	1.704	28.833	76.682	0.376 ¹
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5	3.016	59.972	135.717	0.442 ¹
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3	4.407	94.742	198.335	0.478 ¹
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6	6.112	130.765	275.039	0.475 ¹
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0	6.713	161.382	302.097	0.534 ¹
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8	8.405	194.023	378.222	0.513 ¹
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2	9.719	223.413	437.369	0.511 ¹
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2	9.719	252.789	437.369	0.578 ¹
T10	20 - 0	ROHN 8 EHS	20.033	10.017	41.2	9.719	281.325	437.369	0.643 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T1	192 - 180	L1 3/4x1 3/4x3/16	7.700	3.585	82.9	0.360	1.391	15.675	0.089 ¹
T2	180 - 160	L2x2x3/16	9.686	4.721	94.3	0.431	4.341	18.739	0.232 ¹
T3	160 - 140	L2 1/2x2 1/2x1/4	11.669	5.746	91.6	0.752	6.259	32.707	0.191 ¹
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.897	109.6	0.752	7.909	32.707	0.242 ¹
T5	120 - 100	L3x3x1/4	15.944	7.773	102.0	0.916	8.414	44.652	0.188 ¹
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.452	105.5	1.103	9.710	53.793	0.181 ¹
T7	80 - 60	L4x4x1/4	20.935	10.297	100.1	1.291	10.530	62.933	0.167 ¹
T8	60 - 40	L4x4x5/16	22.872	11.214	109.8	1.595	10.218	77.752	0.131 ¹
T9	40 - 20	L4x4x5/16	24.688	12.078	118.2	1.595	11.808	77.752	0.152 ¹
T10	20 - 0	L4x4x3/8	26.510	13.002	128.2	1.899	12.212	92.572	0.132 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T1	192 - 180	L1 3/4x1 3/4x3/16	6.580	6.090	141.7	0.360	0.101	15.675	0.006 ¹
T2	180 - 160	L2x2x3/16	6.580	6.090	123.3	0.431	0.875	18.739	0.047 ¹

¹ P_u / φP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail	
T1	192 - 180	Leg	ROHN 2.5 STD	1	-6.544	66.738	9.8	Pass	
T2	180 - 160	Leg	ROHN 2.5 STD	27	-37.477	59.996	62.5	Pass	
T3	160 - 140	Leg	ROHN 3 EH	56	-73.093	99.054	73.8	Pass	
T4	140 - 120	Leg	ROHN 4 EH	77	-115.374	167.894	68.7	Pass	
T5	120 - 100	Leg	ROHN 5 EH	98	-155.991	251.347	62.1	Pass	
T6	100 - 80	Leg	ROHN 6 EHS	119	-190.928	256.249	74.5	Pass	
T7	80 - 60	Leg	ROHN 6 EH	134	-228.768	318.945	71.7	Pass	
T8	60 - 40	Leg	ROHN 8 EHS	148	-264.351	405.672	65.2	Pass	
T9	40 - 20	Leg	ROHN 8 EHS	163	-300.008	405.729	73.9	Pass	
T10	20 - 0	Leg	ROHN 8 EHS	178	-335.562	405.717	82.7	Pass	
T1	192 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.445	11.895	12.1	Pass	
T2	180 - 160	Diagonal	L2x2x3/16	36	-4.274	10.392	41.1	Pass	
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-6.177	16.480	37.5	Pass	
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	81	-8.000	12.587	63.6	Pass	
T5	120 - 100	Diagonal	L3x3x1/4	102	-8.376	17.432	48.0	Pass	
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	123	-9.752	19.016	51.3	Pass	
T7	80 - 60	Diagonal	L4x4x1/4	138	-10.675	24.136	44.2	Pass	
T8	60 - 40	Diagonal	L4x4x5/16	153	-10.210	24.922	41.0	Pass	
T9	40 - 20	Diagonal	L4x4x5/16	168	-12.104	21.484	56.3	Pass	
T10	20 - 0	Diagonal	L4x4x3/8	183	-12.724	21.926	58.0	Pass	
T1	192 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.090	4.122	2.2	Pass	
T2	180 - 160	Top Girt	L2x2x3/16	28	-0.907	6.245	14.5	Pass	
							Summary		
							Leg (T10)	82.7	Pass
							Diagonal (T4)	63.6	Pass
							Top Girt (T2)	14.5	Pass
							Bolt	86.2	Pass
							Checks		
							RATING =	86.2	Pass

APPENDIX B
BASE LEVEL DRAWING



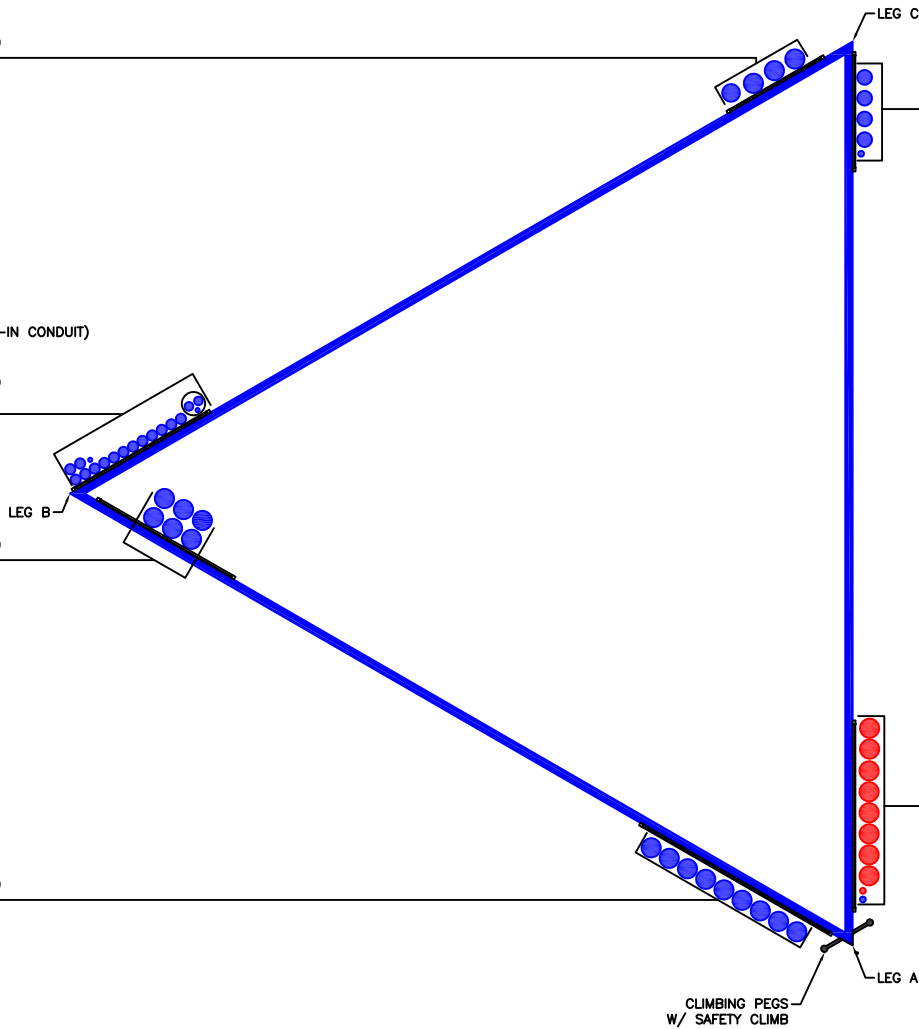
(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/2" TO 130 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 156 FT LEVEL

(OTHER CONSIDERED EQUIPMENT--IN CONDUIT)
(1) 3/8" TO 140 FT LEVEL
(2) 3/4" TO 140 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 140 FT LEVEL
(14) 7/8" TO 140 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 162 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(9) 1-5/8" TO 171 FT LEVEL



(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 190 FT LEVEL
(4) 1-1/4" TO 190 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1/2" TO 180 FT LEVEL
(8) 1-5/8" TO 180 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 98 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity



Site Info	
BU #	876345
Site Name	SKY HILL
Order #	585797, Rev. 0

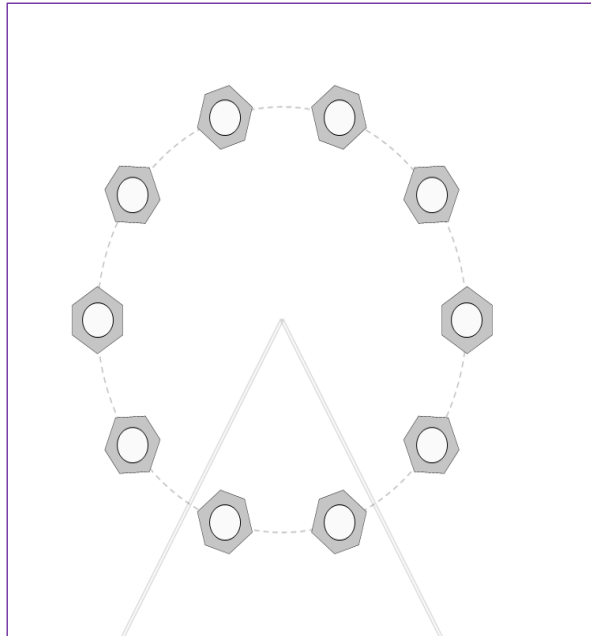
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	1.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	344.41	288.31
Shear Force (kips)	39.06	33.46

*TIA-222-H Section 15.5 Applied

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

*Anchor Rod Eccentricity Applied



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

Anchor Rod Data
(10) 1" ϕ bolts (A354-BC N; $F_y=109$ ksi, $F_u=125$ ksi)
l_{ar} (in): 1.5

Anchor Rod Summary		(units of kips, kip-in)
$Pu_t = 28.83$	$\phi Pn_t = 56.81$	Stress Rating
$Vu = 3.35$	$\phi Vn = 36.82$	48.3%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Drilled Pier Foundation

BU # :	876345
Site Name:	SKY HILL
Order Number:	585797, Rev. 0
TIA-222 Revison:	H
Tower Type:	Self Support



Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	0	0
Axial Force (kips)	344.41	288.3
Shear Force (kips)	39.06	33.46

Material Properties	
Concrete Strength, f _c :	3 ksi
Rebar Strength, F _y :	60 ksi
Tie Yield Strength, F _y :	40 ksi

Pier Design Data	
Depth	26 ft
Ext. Above Grade	0.5 ft
Pier Section 1	
<i>From 0.5' above grade to 26' below grade</i>	
Pier Diameter	5 ft
Rebar Quantity	18
Rebar Size	9
Rebar Cage Diameter	54 in
Tie Size	5
Tie Spacing	in

Rebar & Pier Options
Embedded Pole Inputs
Belled Pier Inputs

Analysis Results		
Soil Lateral Check	Compression	Uplift
D _{v=0} (ft from TOC)	11.53	11.53
Soil Safety Factor	36.00	42.02
Max Moment (kip-ft)	311.37	266.73
Rating*	3.5%	3.0%
Soil Vertical Check	Compression	Uplift
Skin Friction (kips)	519.54	519.54
End Bearing (kips)	375.00	-
Weight of Concrete (kips)	93.66	70.24
Total Capacity (kips)	894.54	589.78
Axial (kips)	438.07	288.30
Rating*	46.6%	46.6%
Reinforced Concrete Flexure	Compression	Uplift
Critical Depth (ft from TOC)	11.85	10.72
Critical Moment (kip-ft)	311.09	265.18
Critical Moment Capacity	2438.95	1667.43
Rating*	12.1%	15.1%
Reinforced Concrete Shear	Compression	Uplift
Critical Depth (ft from TOC)	19.01	0.00
Critical Shear (kip)	41.59	33.46
Critical Shear Capacity	425.54	208.06
Rating*	9.3%	15.3%

Structural Foundation Rating*	15.3%
Soil Interaction Rating*	46.6%

*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"/>
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	<input type="checkbox"/>
Shear Design Options	
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](#)

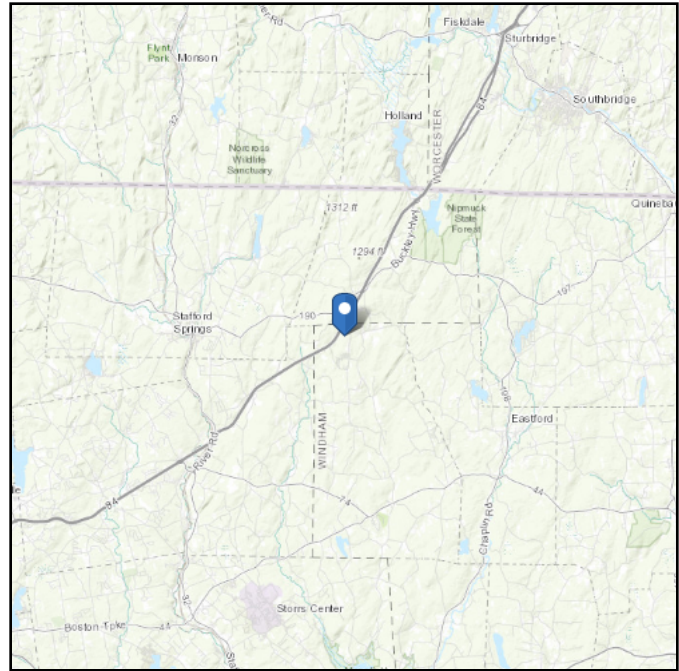
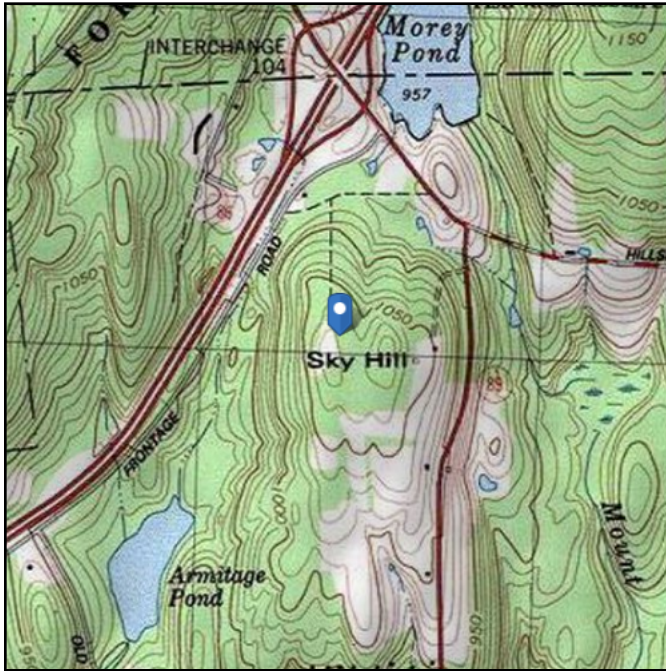
Soil Profile														
Groundwater Depth	N/A			# of Layers	4									
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ _{soil} (pcf)	γ _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	120	150			0.000	0.000					Cohesionless
2	2	3.33	1.33	130	150			0.000	0.000					Cohesionless
3	3.33	5	1.67	130	150	3		1.650	1.650	0.00	0.00			Cohesive
4	5	26	21	135	150	5		2.321	2.321	2.10	2.10	25.46479		Cohesive

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 1068.03 ft (NAVD 88)
Latitude: 41.952139
Longitude: -72.195528



Wind

Results:

Wind Speed:	125 Vmph	130 mph per jurisdiction
10-year MRI	77 Vmph	
25-year MRI	87 Vmph	
50-year MRI	94 Vmph	
100-year MRI	101 Vmph	

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Mon Aug 31 2020

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 7-10 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 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

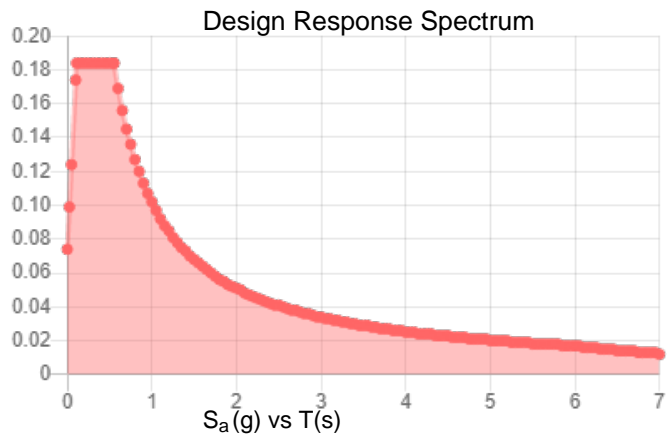
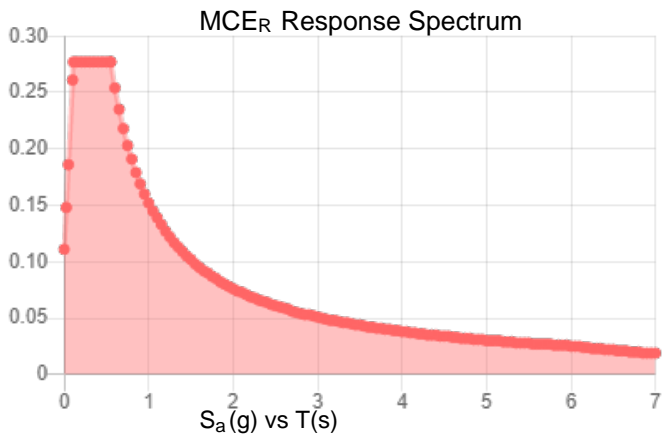
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.173	S_{DS} :	0.184
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.277	PGA _M :	0.136
S_{M1} :	0.152	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Mon Aug 31 2020

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 5 F
Gust Speed: 50 mph

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

Date Accessed: Mon Aug 31 2020

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 50-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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