

Date: **January 17, 2024**



Black & Veatch Corp.
11401 Lamar Avenue
Overland Park, KS 66211
(913) 458-6963

Subject: **Structural Analysis Report**

Carrier Designation: **AT&T Mobility Co-Locate**
Site Number: 15826568
Site Name: Lake City Mall
FA Number: 15826568

Crown Castle Designation: **BU Number:** 809328
Site Name: LAKE CITY W J-FL-012-058
JDE Job Number: 2101471
Work Order Number: 2278050
Order Number: 655092 Rev. 0

Engineering Firm Designation: **Black & Veatch Corp. Project Number:** 406642

Site Data: **555 Hackney Lane, Lake City, Columbia County, FL**
Latitude 30° 10' 56.44", Longitude -82° 39' 38.01"
250 Foot - Self Support Tower

Black & Veatch Corp. is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

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

LC5: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 119 mph as required by the 2023 Florida Building Code, 8th Edition. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Wuttipat Thonphothong

Respectfully submitted by:

Ping Jiang, P.E.
Professional Engineer

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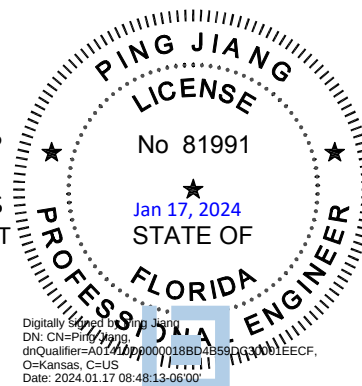


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1) INTRODUCTION

This tower is a 250 ft Self Support tower designed by Rohn Industries, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	119 mph
Exposure Category:	C
Topographic Factor:	1
Seismic Ss:	0.13
Seismic S1:	0.059
Service Wind Speed:	60 mph
Seismic Loading:	Does not control per engineering judgment

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)
220.0	220.0	6	commscope	NNH4-65B-R6H4 w/ Mount Pipe	6 3	7/8 3/8
		3	ericsson	4490 B5/B12		
		3	ericsson	AIR 6419 B77G_CCIV2 w/ Mount Pipe		
		3	ericsson	AIR6449_B77D w/ Mount Pipe		
		3	ericsson	RADIO 4478 B14		
		3	ericsson	RADIO 4890HP B2/B25 B66		
		3	ericsson	RRUS 4415 B30		
		3	raycap	DC9-48-60-24-8C-EV_CCIV2		
		1	sabre	(3) C10841002C [SM 502-3]		

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)
250.0	250.0	1	cci tower mounts (v2.1)	Sector Mount [SM 505-3]	9	1-5/8
		3	commscope	FFVV-65C-R3-V1_TMO w/ Mount Pipe		
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	ericsson	Radio 4480_TMOV2		
231.0	231.0	3	ericsson	AIR 6449 w/ Mount Pipe	3	1-5/8
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		6	jma wireless	MX06FRO860-02 w/ Mount Pipe		
		3	raycap	RVZDC-6627-PF-48_CCIV2		
		3	sitepro1	VFA12-HD 12' Heavy Duty V-Frame		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	121904	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	121914	CCISITES
4-TOWER MANUFACTURER DRAWINGS	13075	CCISITES

3.1) Analysis Method

tnxTower (version 8.2.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Self Support Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	250 - 240	Leg	ROHN 2.5 STD	1	-4.13	60.05	6.9	Pass
T2	240 - 220	Leg	ROHN 3 STD	28	-20.49	74.53	27.5	Pass
T3	220 - 200	Leg	ROHN 4 X-STR	67	-59.29	168.03	35.3	Pass
T4	200 - 180	Leg	ROHN 5 EH	108	-95.70	251.35	38.1	Pass
T5	180 - 160	Leg	ROHN 6 EH	147	-124.30	360.24	34.5	Pass
T6	160 - 140	Leg	ROHN 8 EHS	186	-146.03	413.33	35.3	Pass
T7	140 - 120	Leg	ROHN 8 EHS	213	-169.76	413.28	41.1	Pass
T8	120 - 100	Leg	ROHN 8 X-STR	240	-192.21	530.71	36.2	Pass
T9	100 - 80	Leg	ROHN 8 X-STR	267	-213.94	530.66	40.3	Pass
T10	80 - 60	Leg	ROHN 10 EH	294	-235.72	701.99	33.6	Pass
T11	60 - 40	Leg	ROHN 10 X-STR	321	-245.10	701.99	34.9	Pass
T12	40 - 20	Leg	ROHN 10 X-STR	354	-267.15	701.99	38.1	Pass
T13	20 - 0	Leg	ROHN 10 EH	387	-290.05	701.99	41.3	Pass
T1	250 - 240	Diagonal	ROHN 2 STD	14	-2.34	25.36	9.2	Pass
T2	240 - 220	Diagonal	ROHN 2 STD	38	-6.95	18.63	37.3	Pass
T3	220 - 200	Diagonal	ROHN 2 EH	77	-10.85	24.62	44.1	Pass
T4	200 - 180	Diagonal	ROHN 2 EH	111	-7.38	21.21	34.8	Pass
T5	180 - 160	Diagonal	ROHN 2 EH	150	-7.14	18.08	39.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T6	160 - 140	Diagonal	ROHN 2.5 X-STR	189	-9.04	22.18	40.8	Pass
T7	140 - 120	Diagonal	ROHN 3 STD	216	-8.53	30.33	28.1	Pass
T8	120 - 100	Diagonal	ROHN 3 STD	243	-8.97	26.47	33.9	Pass
T9	100 - 80	Diagonal	ROHN 3 STD	270	-8.98	22.99	39.1	Pass
T10	80 - 60	Diagonal	ROHN 3 STD	297	-10.14	20.50	49.5	Pass
T11	60 - 40	Diagonal	ROHN 3 STD	326	-15.62	33.46	46.7	Pass
T12	40 - 20	Diagonal	ROHN 3 STD	359	-15.90	31.53	50.4	Pass
T13	20 - 0	Diagonal	ROHN 3 STD	392	-15.90	29.67	53.6	Pass
T1	250 - 240	Horizontal	ROHN 1.5 STD	13	1.51	22.34	6.8	Pass
T2	240 - 220	Horizontal	ROHN 1.5 STD	37	3.76	22.34	16.8	Pass
T3	220 - 200	Horizontal	ROHN 1.5 STD	76	5.92	22.34	26.5	Pass
T4	200 - 180	Horizontal	ROHN 1.5 STD	109	-4.58	20.11	22.7	Pass
T5	180 - 160	Horizontal	ROHN 2 STD	148	-4.88	28.49	17.1	Pass
T6	160 - 140	Horizontal	ROHN 2 STD	187	-5.35	23.88	22.4	Pass
T7	140 - 120	Horizontal	ROHN 2 STD	214	-5.49	17.80	30.9	Pass
T8	120 - 100	Horizontal	ROHN 2.5 STD	241	-6.15	30.40	20.2	Pass
T9	100 - 80	Horizontal	ROHN 2.5 STD	268	-6.45	23.33	27.7	Pass
T10	80 - 60	Horizontal	ROHN 2.5 STD	295	-7.54	18.74	40.2	Pass
T11	60 - 40	Horizontal	ROHN 3 STD	322	-8.21	33.29	24.7	Pass
T12	40 - 20	Horizontal	ROHN 3 STD	355	-8.79	27.40	32.1	Pass
T13	20 - 0	Horizontal	ROHN 3 STD	388	-9.33	22.94	40.7	Pass
T1	250 - 240	Top Girt	ROHN 1.5 STD	6	-1.34	23.77	5.7	Pass
T11	60 - 40	Redund Horz 1 Bracing	ROHN 1.5 STD	334	-4.25	14.74	28.9	Pass
T12	40 - 20	Redund Horz 1 Bracing	ROHN 1.5 STD	367	-4.64	12.04	38.5	Pass
T13	20 - 0	Redund Horz 1 Bracing	ROHN 1.5 STD	400	-5.03	10.03	50.2	Pass
T11	60 - 40	Redund Diag 1 Bracing	ROHN 1.5 STD	335	-3.87	4.53	85.4	Pass
T12	40 - 20	Redund Diag 1 Bracing	ROHN 2.25 TUBE	368	-3.95	4.52	87.3	Pass
T13	20 - 0	Redund Diag 1 Bracing	ROHN 2.25 TUBE	401	-4.05	4.21	96.2	Pass
T11	60 - 40	Redund Hip 1 Bracing	ROHN 1.5 STD	347	-0.02	12.73	0.2	Pass
T12	40 - 20	Redund Hip 1 Bracing	ROHN 1.5 STD	380	-0.02	10.54	0.2	Pass
T13	20 - 0	Redund Hip 1 Bracing	ROHN 1.5 STD	413	-0.02	8.88	0.2	Pass
T11	60 - 40	Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	348	-0.07	11.01	0.6	Pass
T12	40 - 20	Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	381	-0.06	9.90	0.6	Pass
T13	20 - 0	Redund Hip Diagonal 1 Bracing	ROHN 3 STD	414	-0.07	17.59	0.4	Pass
T1	250 - 240	Inner Bracing	L2x2x1/8	18	-0.00	8.80	0.1	Pass
T2	240 - 220	Inner Bracing	L2x2x1/8	40	-0.00	8.65	0.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T3	220 - 200	Inner Bracing	L2x2x1/8	79	-0.01	8.48	0.1	Pass
T4	200 - 180	Inner Bracing	L2x2x1/8	118	-0.00	6.27	0.1	Pass
T5	180 - 160	Inner Bracing	L2x2x1/8	158	-0.01	4.28	0.1	Pass
T6	160 - 140	Inner Bracing	L2x2x1/8	197	-0.01	3.24	0.2	Pass
T7	140 - 120	Inner Bracing	L2 1/2x2 1/2x3/16	225	-0.01	6.84	0.2	Pass
T8	120 - 100	Inner Bracing	L3x3x3/16	252	-0.01	9.02	0.2	Pass
T9	100 - 80	Inner Bracing	L3 1/2x3 1/2x1/4	279	-0.01	14.69	0.2	Pass
T10	80 - 60	Inner Bracing	L3 1/2x3 1/2x1/4	306	-0.01	11.72	0.2	Pass
T11	60 - 40	Inner Bracing	ROHN 3 STD	349	-0.01	30.98	0.2	Pass
T12	40 - 20	Inner Bracing	ROHN 3 STD	382	-0.01	25.66	0.3	Pass
T13	20 - 0	Inner Bracing	ROHN 3 STD	415	-0.01	21.61	0.3	Pass
							Summary	
						Leg (T13)	41.3	Pass
						Diagonal (T13)	53.6	Pass
						Horizontal (T13)	40.7	Pass
						Top Girt (T1)	5.7	Pass
						Redund Horz 1 Bracing (T13)	50.2	Pass
						Redund Diag 1 Bracing (T13)	96.2	Pass
						Redund Hip 1 Bracing (T13)	0.2	Pass
						Redund Hip Diagonal 1 Bracing (T12)	0.6	Pass
						Inner Bracing (T13)	0.3	Pass
						Bolt Checks	49.6	Pass
						Rating =	96.2	Pass

Table 5 - Tower Component Stresses vs. Capacity (Self Support Tower) - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	39.5	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	44.7	Pass
Structure Rating (max from all components) =				96.2%

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

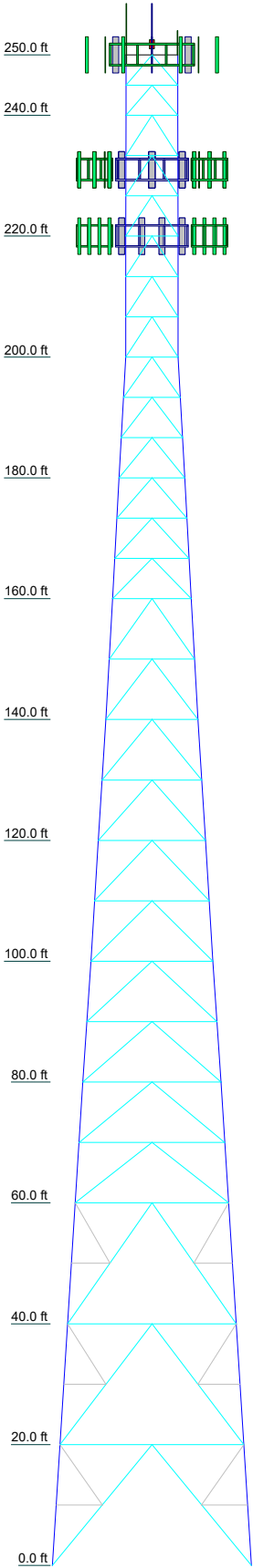
4.1) Recommendations

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	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 10 EH	ROHN 10 X-STR		ROHN 10 EH	ROHN 8 X-STR			ROHN 8 EHS	ROHN 6 EH	ROHN 5 EH	ROHN 4 X-STR	ROHN 3 STD	A
Leg Grade							A572-50						
Diagonals							A572-50						
Diagonal Grade							A572-50						
Top Girts							N.A.						
Horizontals		ROHN 3 STD			ROHN 2.5 STD			ROHN 2 STD			ROHN 1.5 STD		
Red. Horizontals		ROHN 1.5 STD						N.A.					
Red. Diagonals		ROHN 2.25 TUBE	ROHN 1.5 STD					N.A.					
Red. Hips			ROHN 1.5 STD					N.A.					
Inner Bracing													
Face Width (ft)	32.8333	30.3333	27.8333	25.3333	20.1771	17.6771	15.1771	12.9271	10.7917	8.70833	8.625	8.54167	8.5
# Panels @ (ft)		3 @ 20			10 @ 10					12 @ 6.66667			2 @ 5
Weight (K)	52.6	6.5	6.3	6.2	5.3	5.0	3.9	3.7	3.2	2.4	2.0	1.3	0.7

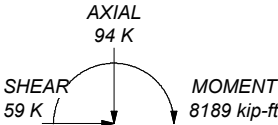


ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 311 K
SHEAR: 36 K

UPLIFT: -260 K
SHEAR: 32 K



TORQUE 75 kip-ft
REACTIONS - 119 mph WIND

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	ROHN 2.5 STD	B	ROHN 1.5 STD

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower is located in Columbia County, Florida.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
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: 96.2%



BLACK & VEATCH

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Black & Veatch Corp.

Job: LAKE CITY W J-FL-012-058 (BU# 809328)		
Project: 406642 (809328.2278050)		
Client: Crown Castle	Drawn by: Wuttipat Thonphothong	App'd:
Code: TIA-222-H	Date: 01/17/24	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 250.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 8.50 ft at the top and 32.83 ft at the base.

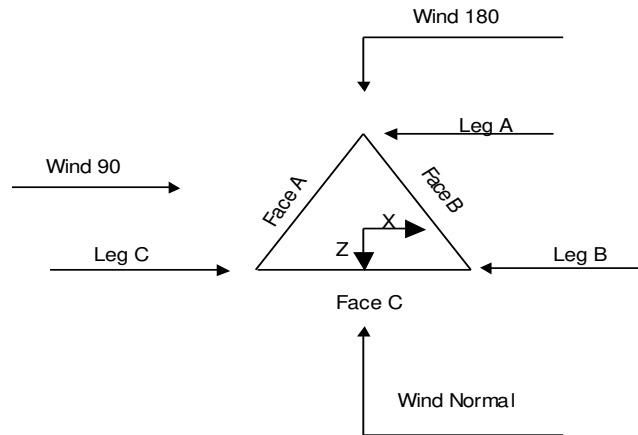
This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Columbia County, Florida.
- Tower base elevation above sea level: 166.00 ft.
- Basic wind speed of 119 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.
- 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: $K_{es} (F_w) = 0.95$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	250.00-240.00			8.50	1	10.00
T2	240.00-220.00			8.54	1	20.00
T3	220.00-200.00			8.63	1	20.00
T4	200.00-180.00			8.71	1	20.00
T5	180.00-160.00			10.79	1	20.00
T6	160.00-140.00			12.93	1	20.00
T7	140.00-120.00			15.18	1	20.00
T8	120.00-100.00			17.68	1	20.00
T9	100.00-80.00			20.18	1	20.00
T10	80.00-60.00			22.83	1	20.00
T11	60.00-40.00			25.33	1	20.00
T12	40.00-20.00			27.83	1	20.00
T13	20.00-0.00			30.33	1	20.00

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	250.00-240.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	240.00-220.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	220.00-200.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	200.00-180.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T6	160.00-140.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	140.00-120.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T10	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

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
T11	60.00-40.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T12	40.00-20.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T13	20.00-0.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 250.00-240.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 240.00-220.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 220.00-200.00	Pipe	ROHN 4 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T4 200.00-180.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T5 180.00-160.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T6 160.00-140.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)
T7 140.00-120.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T8 120.00-100.00	Pipe	ROHN 8 X-STR	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 100.00-80.00	Pipe	ROHN 8 X-STR	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 80.00-60.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T11 60.00-40.00	Pipe	ROHN 10 X-STR	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 40.00-20.00	Pipe	ROHN 10 X-STR	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T13 20.00-0.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 250.00-240.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 240.00-220.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 220.00-200.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T4 200.00-180.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T5 180.00-160.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 160.00-140.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T7 140.00-120.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T8 120.00-100.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T9 100.00-80.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T10 80.00-60.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T11 60.00-40.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 40.00-20.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T13 20.00-0.00	None	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 250.00-240.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 240.00-220.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 220.00-200.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 200.00-180.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T5 180.00-160.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T6 160.00-140.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T7 140.00-120.00	Pipe		A618-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 120.00-100.00	Pipe		A618-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T9 100.00-80.00	Pipe		A618-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T10 80.00-60.00	Pipe		A618-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 60.00-40.00	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 40.00-20.00	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T13 20.00-0.00	Pipe		A618-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Redundant Bracing Grade	Redundant Type	Redundant Size	K Factor
T11 60.00-40.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD
		Diagonal (1)	Pipe	ROHN 1.5 STD
	A572-50 (50 ksi)	Hip (1)	Pipe	ROHN 1.5 STD
		Hip Diagonal (1)	Pipe	ROHN 2.5 STD
	A572-50 (50 ksi)			
T12 40.00-20.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD
		Diagonal (1)	Pipe	ROHN 2.25 TUBE
	A572-50 (50 ksi)	Hip (1)	Pipe	ROHN 1.5 STD
		Hip Diagonal (1)	Pipe	ROHN 2.5 STD
	A572-50 (50 ksi)			

Tower Elevation	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
ft					
T13 20.00- 0.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 2.25 TUBE	1
	A572-50 (50 ksi)	Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal (1)	Pipe	ROHN 3 STD	1
	A572-50 (50 ksi)				
	A572-50 (50 ksi)				

Tower Section Geometry (cont'd)

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 in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft ²	in							
T1 250.00-240.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T2 240.00-220.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T3 220.00-200.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T4 200.00-180.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T5 180.00-160.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T6 160.00-140.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T7 140.00-120.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T8 120.00-100.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T9 100.00-80.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T10 80.00-60.00	0.00	0.2500	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T11 60.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T12 40.00-20.00	0.00	0.3750	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000
T13 20.00-0.00	0.00	0.3750	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000	36.0000

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
ft				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1 250.00-240.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 240.00-220.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 220.00-200.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 200.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T6 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T10 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T11 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T12 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T13 20.00-0.00	Yes	Yes	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 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
T1 250.00-240.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T2 240.00-220.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T3 220.00-200.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T4 200.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T7 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T8 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T9 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T11 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T12 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T13 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1

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 250.00- 240.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T2 240.00- 220.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T3 220.00- 200.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T4 200.00- 180.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T5 180.00- 160.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T6 160.00- 140.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T7 140.00- 120.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T8 120.00- 100.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)

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
T9 100.00- 80.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T10 80.00- 60.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T11 60.00- 40.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T12 40.00- 20.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
T13 20.00- 0.00	0.0000	0.75 (1)	0.0000	0.75 (1)	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75 (1)	0.0000	0.75 (1)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)
	0.0000	0.75 (2)	0.0000	0.75 (2)							0.0000	0.75 (2)	0.0000	0.75 (2)
	0.0000	0.75 (3)	0.0000	0.75 (3)							0.0000	0.75 (3)	0.0000	0.75 (3)
	0.0000	0.75 (4)	0.0000	0.75 (4)							0.0000	0.75 (4)	0.0000	0.75 (4)

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 250.00- 240.00	Flange	0.7500 A325N	4	0.6250 A325N	3	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	2	0.0000 A325N	0
T2 240.00- 220.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	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.
T3 220.00- 200.00	Flange	1.0000	4	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4 200.00- 180.00	Flange	1.0000	6	0.6250	3	0.0000	0	0.0000	0	0.6250	0	0.6250	2	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5 180.00- 160.00	Flange	1.0000	8	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6 160.00- 140.00	Flange	1.0000	8	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 140.00- 120.00	Flange	1.0000	8	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T8 120.00- 100.00	Flange	1.0000	8	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9 100.00- 80.00	Flange	1.0000	12	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10 80.00- 60.00	Flange	1.0000	12	0.6250	3	0.0000	0	0.0000	0	0.0000	0	0.6250	2	0.0000	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11 60.00- 40.00	Flange	1.0000	12	0.7500	3	0.0000	0	0.0000	0	0.0000	0	0.7500	2	0.6250	1
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T12 40.00- 20.00	Flange	1.0000	12	0.7500	3	0.0000	0	0.0000	0	0.0000	0	0.7500	2	0.6250	1
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T13 20.00- 0.00	Flange	1.0000	0	0.7500	3	0.0000	0	0.0000	0	0.7500	0	0.7500	2	0.6250	1
		A354-BC		A325N		A325N		A325N		A325N		A325N		A325N	

Tower Section Geometry (cont'd)

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub- Diagonal		Redundant Sub- Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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 250.00- 240.00	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
T2 240.00- 220.00	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
	A325N		A325N								A325N		A325N	
	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 220.00- 200.00	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
T4 200.00- 180.00	A325N		A325N								A325N		A325N	
	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
	A325N		A325N								A325N		A325N	

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub- Diagonal		Redundant Sub- Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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.
T5 180.00- 160.00	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
T6 160.00- 140.00	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
	A325N		A325N								A325N		A325N	
	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 140.00- 120.00	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
T8 120.00- 100.00	A325N		A325N								A325N		A325N	
	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
T9 100.00- 80.00	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
	A325N		A325N								A325N		A325N	
	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
	A325N		A325N								A325N		A325N	
	0.6250	0 (1)	0.6250	0 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	0 (1)	0.6250	0 (1)
T10 80.00- 60.00	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	0 (2)	0.6250	0 (2)							0.6250	0 (2)	0.6250	0 (2)
	A325N		A325N								A325N		A325N	
	0.6250	0 (3)	0.6250	0 (3)							0.6250	0 (3)	0.6250	0 (3)
	A325N		A325N								A325N		A325N	
T11 60.00- 40.00	0.6250	0 (4)	0.6250	0 (4)							0.6250	0 (4)	0.6250	0 (4)
	A325N		A325N								A325N		A325N	
	0.6250	1 (1)	0.6250	1 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	1 (1)	0.6250	1 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
	0.6250	1 (2)	0.6250	1 (2)							0.6250	1 (2)	0.6250	1 (2)
T12 40.00- 20.00	A325N		A325N								A325N		A325N	
	0.6250	1 (3)	0.6250	1 (3)							0.6250	1 (3)	0.6250	1 (3)
	A325N		A325N								A325N		A325N	
	0.6250	1 (4)	0.6250	1 (4)							0.6250	1 (4)	0.6250	1 (4)
	A325N		A325N								A325N		A325N	
T13 20.00- 0.00	0.6250	1 (1)	0.6250	1 (1)	0.6250	0	0.6250	0	0.6250	0	0.6250	1 (1)	0.6250	1 (1)
	A325N		A325N		A325N		A325N		A325N		A325N		A325N	

0.6250 A325N	1 (2)	0.6250 A325N	1 (2)				0.6250 A325N	1 (2)	0.6250 A325N	1 (2)
0.6250 A325N	1 (3)	0.6250 A325N	1 (3)				0.6250 A325N	1 (3)	0.6250 A325N	1 (3)
0.6250 A325N	1 (4)	0.6250 A325N	1 (4)				0.6250 A325N	1 (4)	0.6250 A325N	1 (4)

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 plf
Safety Line 3/8 ***	C	No	No	Ar (CaAa)	250.00 - 0.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	A	No	No	Af (CaAa)	250.00 - 0.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	220.00 - 0.00	0.0000	0.45	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af)	C	No	No	Af (CaAa)	250.00 - 0.00	0.0000	0.45	1	1	3.0000	3.0000		8.40
HB158- 21U6S24- xxM_TMO(1- 5/8)	C	No	No	Ar (CaAa)	250.00 - 0.00	0.0000	0.43	3	2	0.5000	1.9960		2.50
LDF7-50A(1- 5/8) ***	C	No	No	Ar (CaAa)	250.00 - 0.00	0.0000	0.46	6	6	0.5000	1.9800		0.82
Feedline Ladder (Af)	C	No	No	Af (CaAa)	231.00 - 0.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
MLE HYBRID 9POWER/18 FIBER RL 2(1-5/8) ***	C	No	No	Ar (CaAa)	231.00 - 0.00	0.0000	-0.45	3	2	0.5000	1.6250		1.07
Feedline Ladder (Af)	B	No	No	Af (CaAa)	220.00 - 0.00	0.0000	0.45	1	1	3.0000	3.0000		8.40
FB-L98B- 235- XXX(3/8)	B	No	No	Ar (CaAa)	220.00 - 0.00	0.0000	0.45	3	3	0.3900	0.3900		0.06
WR- VG66ST- BRD(7/8) ***	B	No	No	Ar (CaAa)	220.00 - 0.00	0.0000	0.43	6	6	0.5000	0.9570		0.91

Feed Line/Linear Appurtenances - Entered As Area

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

1/8" Detuning Wire	A	No	No	CaAa (Out Of Face)	213.00 - 0.00	1	No Ice	0.01	0.07
1/8" Detuning Wire	B	No	No	CaAa (Out Of Face)	213.00 - 0.00	1	No Ice	0.01	0.07
1/8" Detuning Wire	C	No	No	CaAa (Out Of Face)	213.00 - 0.00	1	No Ice	0.01	0.07

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	250.00-240.00	A	0.000	0.000	5.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	23.243	0.000	0.21
T2	240.00-220.00	A	0.000	0.000	10.000	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	57.348	0.000	0.55
T3	220.00-200.00	A	0.000	0.000	20.000	0.163	0.34
		B	0.000	0.000	23.824	0.163	0.28
		C	0.000	0.000	66.236	0.163	0.65
T4	200.00-180.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T5	180.00-160.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T6	160.00-140.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T7	140.00-120.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T8	120.00-100.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T9	100.00-80.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T10	80.00-60.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T11	60.00-40.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T12	40.00-20.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65
T13	20.00-0.00	A	0.000	0.000	20.000	0.250	0.34
		B	0.000	0.000	23.824	0.250	0.28
		C	0.000	0.000	66.236	0.250	0.65

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
T1	250.00-240.00	-19.8350	9.3940	-19.8350	9.3940
T2	240.00-220.00	-15.3271	11.4427	-15.2355	11.3626
T3	220.00-200.00	-5.0710	10.5661	-4.9508	10.2930
T4	200.00-180.00	-5.4644	11.3122	-5.1987	10.7162
T5	180.00-160.00	-6.2137	12.7425	-5.7424	11.7033
T6	160.00-140.00	-6.8554	13.9419	-6.2189	12.5587
T7	140.00-120.00	-7.5433	15.2403	-6.8484	13.7461
T8	120.00-100.00	-8.2941	16.6750	-7.5467	15.0802
T9	100.00-80.00	-9.0984	18.2253	-8.2754	16.4792
T10	80.00-60.00	-9.3562	18.6226	-8.4172	16.6538
T11	60.00-40.00	-10.5571	21.0236	-9.4085	18.6125
T12	40.00-20.00	-11.2277	22.3059	-10.0110	19.7615
T13	20.00-0.00	-11.9378	23.6737	-10.6411	20.9700

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Safety Line 3/8	240.00 - 250.00	0.6000	0.6000
T1	7	Feedline Ladder (Af)	240.00 - 250.00	0.6000	0.6000
T1	10	Feedline Ladder (Af)	240.00 - 250.00	0.6000	0.6000
T1	11	HB158-21U6S24-xxM_TMO(1-5/8)	240.00 - 250.00	0.6000	0.6000
T1	12	LDF7-50A(1-5/8)	240.00 - 250.00	0.6000	0.6000
T2	1	Safety Line 3/8	220.00 - 240.00	0.6000	0.6000
T2	7	Feedline Ladder (Af)	220.00 - 240.00	0.6000	0.6000
T2	10	Feedline Ladder (Af)	220.00 - 240.00	0.6000	0.6000
T2	11	HB158-21U6S24-xxM_TMO(1-5/8)	220.00 - 240.00	0.6000	0.6000
T2	12	LDF7-50A(1-5/8)	220.00 - 240.00	0.6000	0.6000
T2	14	Feedline Ladder (Af)	220.00 - 231.00	0.6000	0.6000
T2	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	220.00 - 231.00	0.6000	0.6000
T3	1	Safety Line 3/8	200.00 - 220.00	0.6000	0.6000
T3	7	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	8	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	10	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	11	HB158-21U6S24-xxM_TMO(1-5/8)	200.00 - 220.00	0.6000	0.6000
T3	12	LDF7-50A(1-5/8)	200.00 - 220.00	0.6000	0.6000
T3	14	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	15	MLE HYBRID	200.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
		9POWER/18FIBER RL 2(1-5/8)	220.00		
T3	17	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	18	FB-L98B-235-XXX(3/8)	200.00 - 220.00	0.6000	0.6000
T3	19	WR-VG66ST-BRD(7/8)	200.00 - 220.00	0.6000	0.6000
T4	1	Safety Line 3/8	180.00 - 200.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	8	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	10	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	11	HB158-21U6S24- xxM_TMO(1-5/8)	180.00 - 200.00	0.6000	0.6000
T4	12	LDF7-50A(1-5/8)	180.00 - 200.00	0.6000	0.6000
T4	14	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	180.00 - 200.00	0.6000	0.6000
T4	17	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	18	FB-L98B-235-XXX(3/8)	180.00 - 200.00	0.6000	0.6000
T4	19	WR-VG66ST-BRD(7/8)	180.00 - 200.00	0.6000	0.6000
T5	1	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	8	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	10	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	11	HB158-21U6S24- xxM_TMO(1-5/8)	160.00 - 180.00	0.6000	0.6000
T5	12	LDF7-50A(1-5/8)	160.00 - 180.00	0.6000	0.6000
T5	14	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	160.00 - 180.00	0.6000	0.6000
T5	17	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	18	FB-L98B-235-XXX(3/8)	160.00 - 180.00	0.6000	0.6000
T5	19	WR-VG66ST-BRD(7/8)	160.00 - 180.00	0.6000	0.6000
T6	1	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	8	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	10	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	11	HB158-21U6S24- xxM_TMO(1-5/8)	140.00 - 160.00	0.6000	0.6000
T6	12	LDF7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T6	14	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	15	MLE HYBRID	140.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
		9POWER/18FIBER RL 2(1-5/8)	160.00		
T6	17	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	18	FB-L98B-235-XXX(3/8)	140.00 - 160.00	0.6000	0.6000
T6	19	WR-VG66ST-BRD(7/8)	140.00 - 160.00	0.6000	0.6000
T7	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	8	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	10	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	11	HB158-21U6S24- xxM_TMO(1-5/8)	120.00 - 140.00	0.6000	0.6000
T7	12	LDF7-50A(1-5/8)	120.00 - 140.00	0.6000	0.6000
T7	14	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	120.00 - 140.00	0.6000	0.6000
T7	17	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	18	FB-L98B-235-XXX(3/8)	120.00 - 140.00	0.6000	0.6000
T7	19	WR-VG66ST-BRD(7/8)	120.00 - 140.00	0.6000	0.6000
T8	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T8	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	8	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	10	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	11	HB158-21U6S24- xxM_TMO(1-5/8)	100.00 - 120.00	0.6000	0.6000
T8	12	LDF7-50A(1-5/8)	100.00 - 120.00	0.6000	0.6000
T8	14	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	100.00 - 120.00	0.6000	0.6000
T8	17	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	18	FB-L98B-235-XXX(3/8)	100.00 - 120.00	0.6000	0.6000
T8	19	WR-VG66ST-BRD(7/8)	100.00 - 120.00	0.6000	0.6000
T9	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	8	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	10	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	11	HB158-21U6S24- xxM_TMO(1-5/8)	80.00 - 100.00	0.6000	0.6000
T9	12	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T9	14	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	15	MLE HYBRID	80.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
		9POWER/18FIBER RL 2(1-5/8)	100.00		
T9	17	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	18	FB-L98B-235-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T9	19	WR-VG66ST-BRD(7/8)	80.00 - 100.00	0.6000	0.6000
T10	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T10	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	8	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	10	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	11	HB158-21U6S24- xxM_TMO(1-5/8)	60.00 - 80.00	0.6000	0.6000
T10	12	LDF7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T10	14	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	60.00 - 80.00	0.6000	0.6000
T10	17	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	18	FB-L98B-235-XXX(3/8)	60.00 - 80.00	0.6000	0.6000
T10	19	WR-VG66ST-BRD(7/8)	60.00 - 80.00	0.6000	0.6000
T11	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	8	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	10	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	11	HB158-21U6S24- xxM_TMO(1-5/8)	40.00 - 60.00	0.6000	0.6000
T11	12	LDF7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T11	14	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	15	MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	40.00 - 60.00	0.6000	0.6000
T11	17	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	18	FB-L98B-235-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T11	19	WR-VG66ST-BRD(7/8)	40.00 - 60.00	0.6000	0.6000
T12	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	8	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	10	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	11	HB158-21U6S24- xxM_TMO(1-5/8)	20.00 - 40.00	0.6000	0.6000
T12	12	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T12	14	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	15	MLE HYBRID	20.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
		9POWER/18FIBER RL 2(1-5/8)	40.00		
T12	17	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	18	FB-L98B-235-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T12	19	WR-VG66ST-BRD(7/8)	20.00 - 40.00	0.6000	0.6000
T13	1	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T13	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	8	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	10	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	11	HB158-21U6S24-xxM_TMO(1-5/8)	0.00 - 20.00	0.6000	0.6000
T13	12	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T13	14	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	15	MLE HYBRID	0.00 - 20.00	0.6000	0.6000
		9POWER/18FIBER RL 2(1-5/8)			
T13	17	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	18	FB-L98B-235-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T13	19	WR-VG66ST-BRD(7/8)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Flash Beacon Lighting	A	From Leg	0.00 0.00 1.00	0.00	250.00	No Ice	2.70	2.70	0.05
7'x2" Mount Pipe	A	From Leg	0.00 0.00 3.50	0.00	250.00	No Ice	1.66	1.66	0.03
Lightning Rod 5/8"x4'	B	From Leg	0.00 0.00 2.00	0.00	250.00	No Ice	0.25	0.25	0.00
7'x2" Mount Pipe	C	From Leg	0.00 0.00 3.50	0.00	250.00	No Ice	1.66	1.66	0.03

Sector Mount [SM 505-3]	C	None		0.00	250.00	No Ice	31.66	31.66	1.73
4'x2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	250.00	No Ice	0.87	0.87	0.01
4'x2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	250.00	No Ice	0.87	0.87	0.01
4'x2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	250.00	No Ice	0.87	0.87	0.01
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 -6.00 0.00	0.00	250.00	No Ice	5.19	2.71	0.13
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 -6.00 0.00	0.00	250.00	No Ice	5.19	2.71	0.13
AIR6449 B41_T-MOBILE	C	From Leg	4.00	0.00	250.00	No Ice	5.19	2.71	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
w/ Mount Pipe			-6.00						
FFVV-65C-R3-V1_TMO w/ Mount Pipe	A	From Leg	0.00 4.00 6.00 0.00	0.00	250.00	No Ice	12.97	6.20	0.16
FFVV-65C-R3-V1_TMO w/ Mount Pipe	B	From Leg	0.00 4.00 6.00 0.00	0.00	250.00	No Ice	12.97	6.20	0.16
FFVV-65C-R3-V1_TMO w/ Mount Pipe	C	From Leg	0.00 4.00 6.00 0.00	0.00	250.00	No Ice	12.97	6.20	0.16
Radio 4480_TMOV2	A	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.88	1.40	0.08
Radio 4480_TMOV2	B	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.88	1.40	0.08
Radio 4480_TMOV2	C	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.88	1.40	0.08
RADIO 4460 B2/B25 B66_TMO	A	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	B	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	C	From Leg	0.00 4.00 0.00 0.00	0.00	250.00	No Ice	2.14	1.69	0.11

Site Pro 1 VFA12-HD 12' Heavy Duty V-Frame	A	From Leg	0.00 2.00 0.00 0.00	0.00	231.00	No Ice	13.20	9.20	0.66
Site Pro 1 VFA12-HD 12' Heavy Duty V-Frame	B	From Leg	0.00 2.00 0.00 0.00	0.00	231.00	No Ice	13.20	9.20	0.66
Site Pro 1 VFA12-HD 12' Heavy Duty V-Frame	C	From Leg	0.00 2.00 0.00 0.00	0.00	231.00	No Ice	13.20	9.20	0.66
8'x2" Mount Pipe	A	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	1.90	1.90	0.03
8'x2" Mount Pipe	B	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	1.90	1.90	0.03
8'x2" Mount Pipe	C	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	1.90	1.90	0.03
4'x2" Mount Pipe	A	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	0.87	0.87	0.01
4'x2" Mount Pipe	B	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	0.87	0.87	0.01
4'x2" Mount Pipe	C	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	0.87	0.87	0.01
(2) MX06FRO860-02 w/ Mount Pipe	A	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	8.84	7.49	0.11
(2) MX06FRO860-02 w/ Mount Pipe	B	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	8.84	7.49	0.11
(2) MX06FRO860-02 w/ Mount Pipe	C	From Leg	0.00 4.00 0.00 0.00	0.00	231.00	No Ice	8.84	7.49	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
AIR 6449 w/ Mount Pipe	A	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	5.18	2.72	0.12
AIR 6449 w/ Mount Pipe	B	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	5.18	2.72	0.12
AIR 6449 w/ Mount Pipe	C	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	5.18	2.72	0.12
RRUS 4449 B5/B12	A	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.97	1.41	0.07
RRUS 4449 B5/B12	B	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.97	1.41	0.07
RRUS 4449 B5/B12	C	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.97	1.41	0.07
RRUS 8843 B2/B66A	A	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.64	1.35	0.07
RRUS 8843 B2/B66A	B	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.64	1.35	0.07
RRUS 8843 B2/B66A	C	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	1.64	1.35	0.07
RVZDC-6627-PF-48_CCIV2	A	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	4.06	3.10	0.03
RVZDC-6627-PF-48_CCIV2	B	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	4.06	3.10	0.03
RVZDC-6627-PF-48_CCIV2	C	From Leg	0.00 4.00 0.00	0.00	231.00	No Ice	4.06	3.10	0.03

Sabre (3) C10841002C [SM 502-3]	C	None		0.00	220.00	No Ice	29.82	29.82	1.67
AIR 6419 B77G_CCIV2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	4.48	2.82	0.08
AIR 6419 B77G_CCIV2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	4.48	2.82	0.08
AIR 6419 B77G_CCIV2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	4.48	2.82	0.08
(2) NNH4-65B-R6H4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	7.55	4.23	0.12
(2) NNH4-65B-R6H4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	7.55	4.23	0.12
(2) NNH4-65B-R6H4 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	7.55	4.23	0.12
AIR6449_B77D w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	5.11	4.40	0.11
AIR6449_B77D w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	5.11	4.40	0.11
AIR6449_B77D w/ Mount	C	From Leg	4.00 0.00 0.00	0.00	220.00	No Ice	5.11	4.40	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Pipe			0.00						
RRUS 4415 B30	A	From Leg	0.00 4.00	0.00	220.00	No Ice	1.84	0.82	0.05
RRUS 4415 B30	B	From Leg	0.00 4.00	0.00	220.00	No Ice	1.84	0.82	0.05
RRUS 4415 B30	C	From Leg	0.00 4.00	0.00	220.00	No Ice	1.84	0.82	0.05
RADIO 4478 B14	A	From Leg	0.00 4.00	0.00	220.00	No Ice	2.02	1.25	0.06
RADIO 4478 B14	B	From Leg	0.00 4.00	0.00	220.00	No Ice	2.02	1.25	0.06
RADIO 4478 B14	C	From Leg	0.00 4.00	0.00	220.00	No Ice	2.02	1.25	0.06
DC9-48-60-24-8C- EV_CCIV2	A	From Leg	0.00 1.00	0.00	220.00	No Ice	2.74	2.74	0.02
DC9-48-60-24-8C- EV_CCIV2	B	From Leg	0.00 1.00	0.00	220.00	No Ice	2.74	2.74	0.02
DC9-48-60-24-8C- EV_CCIV2	C	From Leg	0.00 1.00	0.00	220.00	No Ice	2.74	2.74	0.02
RADIO 4890HP B2/B25 B66	A	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	1.01	0.07
RADIO 4890HP B2/B25 B66	B	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	1.01	0.07
RADIO 4890HP B2/B25 B66	C	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	1.01	0.07
4490 B5/B12	A	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	0.85	0.02
4490 B5/B12	B	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	0.85	0.02
4490 B5/B12	C	From Leg	0.00 4.00	0.00	220.00	No Ice	2.20	0.85	0.02
***			0.00						

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

Comb. No.	Description
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	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	250 - 240	Leg	Max Tension	23	1.30	0.11	0.03
			Max. Compression	18	-4.13	-0.11	0.01
			Max. Mx	6	0.59	0.11	-0.01
			Max. My	2	-0.24	0.06	0.12
			Max. Vy	6	-1.13	0.00	0.00
			Max. Vx	8	1.15	-0.00	-0.00
		Diagonal	Max Tension	5	2.27	0.00	0.00
			Max. Compression	4	-2.34	0.00	0.00
			Max. Mx	2	1.63	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
			Max Tension	4	1.51	-0.01	-0.00
			Max. Compression	5	-1.47	-0.01	-0.00
		Horizontal	Max. Mx	22	-0.05	-0.01	-0.00
			Max. My	14	-0.00	-0.01	-0.00
			Max. Vy	22	-0.01	-0.01	-0.00
			Max. Vx	14	-0.00	0.00	0.00
		Top Girt	Max Tension	15	1.34	0.00	0.00
			Max. Compression	2	-1.34	-0.01	-0.00
			Max. Mx	22	-0.65	-0.01	-0.00
			Max. My	10	0.64	-0.01	0.00
			Max. Vy	22	-0.01	-0.01	-0.00
			Max. Vx	2	-0.00	-0.01	0.00
		Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	14	-0.00	0.00	0.00
			Max. Mx	2	-0.00	-0.00	0.00
			Max. Vy	2	0.00	0.00	0.00
T2	240 - 220	Leg	Max Tension	15	13.89	0.13	-0.04
			Max. Compression	18	-20.49	-0.13	0.02
			Max. Mx	6	6.66	1.25	-0.01
			Max. My	24	-2.33	-0.00	-1.28

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	220 - 200	Diagonal	Max. Vy	6	-0.86	-0.72	-0.01
			Max. Vx	24	0.91	-0.00	0.76
			Max Tension	5	6.88	0.00	0.00
			Max. Compression	4	-6.95	0.00	0.00
		Horizontal	Max. Mx	2	4.95	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
			Max Tension	4	3.76	-0.01	-0.00
			Max. Compression	5	-3.73	-0.01	-0.00
		Inner Bracing	Max. Mx	14	-0.83	-0.02	-0.01
			Max. My	14	-0.09	-0.02	-0.01
			Max. Vy	14	0.01	-0.02	-0.01
			Max. Vx	14	0.00	-0.02	-0.01
		Leg	Max Tension	3	0.00	0.00	0.00
			Max. Compression	14	-0.00	0.00	0.00
			Max. Mx	2	-0.00	-0.00	0.00
			Max. Vy	2	0.00	0.00	0.00
		Diagonal	Max Tension	15	49.07	-0.13	-0.01
			Max. Compression	18	-59.29	0.44	0.09
			Max. Mx	2	-59.15	0.44	0.07
			Max. My	12	-7.20	0.02	-0.44
		Horizontal	Max. Vy	6	-1.22	0.13	-0.02
			Max. Vx	24	1.26	0.00	-0.08
			Max Tension	5	10.76	0.00	0.00
			Max. Compression	4	-10.85	0.00	0.00
		Inner Bracing	Max. Mx	2	8.14	0.03	0.00
			Max. Vy	2	-0.01	0.00	0.00
			Max Tension	4	5.92	-0.01	-0.00
			Max. Compression	5	-5.88	-0.01	-0.00
T4	200 - 180	Leg	Max. Mx	14	0.28	-0.03	-0.01
			Max. My	14	0.28	-0.03	-0.01
			Max. Vy	14	0.01	-0.03	-0.01
			Max. Vx	14	-0.00	0.00	0.00
		Inner Bracing	Max Tension	3	0.01	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.00	-0.00	0.00
			Max. Vy	2	0.00	0.00	0.00
		Leg	Max Tension	15	83.39	-0.41	-0.02
			Max. Compression	2	-95.70	0.39	0.03
			Max. Mx	2	-74.75	0.44	0.07
			Max. My	12	-8.76	-0.01	-0.47
		Diagonal	Max. Vy	6	-0.07	-0.40	-0.09
			Max. Vx	24	-0.10	-0.01	0.46
			Max Tension	8	7.53	0.00	0.00
			Max. Compression	8	-7.63	0.00	0.00
		Horizontal	Max. Mx	2	5.19	0.04	0.00
			Max. Vy	2	0.02	0.00	0.00
			Max Tension	15	4.63	0.00	0.00
			Max. Compression	2	-5.03	-0.02	-0.01
		Inner Bracing	Max. Mx	14	-0.73	-0.03	-0.01
			Max. My	2	1.66	0.00	0.01
			Max. Vy	14	-0.01	-0.03	-0.01
			Max. Vx	2	-0.00	0.00	0.01
T5	180 - 160	Leg	Max Tension	3	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.00	-0.01	0.00
			Max. Vy	2	0.01	0.00	0.00
		Diagonal	Max Tension	15	109.23	-0.42	-0.00
			Max. Compression	2	-124.30	1.18	0.06
			Max. Mx	14	106.96	-1.20	-0.06
			Max. My	12	-10.54	-0.01	-1.22
		Horizontal	Max. Vy	6	0.18	-1.17	-0.08
			Max. Vx	12	0.20	-0.01	-1.22
			Max Tension	9	7.17	0.00	0.00
			Max. Compression	8	-7.30	0.00	0.00
		Inner Bracing	Max. Mx	2	5.02	0.05	0.00
			Max. Vy	2	-0.02	0.00	0.00
			Max Tension	8	4.93	0.00	0.00
			Max. Compression	9	-4.88	0.00	0.00
		Leg	Max. Mx	14	-0.68	-0.04	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	160 - 140	Inner Bracing	Max. My	2	-0.22	-0.00	0.01
			Max. Vy	14	0.02	-0.04	-0.01
			Max. Vx	2	0.00	-0.00	0.01
			Max Tension	3	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.00	-0.01	0.00
		Leg	Max. Vy	2	0.01	0.00	0.00
			Max Tension	15	128.22	-1.10	-0.03
			Max. Compression	2	-146.03	1.27	0.04
			Max. Mx	14	125.46	-1.30	-0.05
			Max. My	12	-12.39	-0.01	-1.25
			Max. Vy	6	0.14	-1.26	-0.08
		Diagonal	Max. Vx	24	-0.17	-0.01	1.24
			Max Tension	9	8.83	0.00	0.00
			Max. Compression	8	-9.04	0.00	0.00
			Max. Mx	2	6.32	0.12	0.00
			Max. Vy	2	-0.04	0.00	0.00
		Horizontal	Max Tension	8	5.38	0.00	0.00
			Max. Compression	9	-5.35	0.00	0.00
			Max. Mx	14	-0.92	-0.05	-0.01
			Max. My	2	-0.08	-0.01	0.01
			Max. Vy	14	0.02	-0.05	-0.01
			Max. Vx	2	0.00	0.00	0.00
T7	140 - 120	Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.00	-0.01	0.00
			Max. Vy	2	0.01	0.00	0.00
			Max Tension	15	148.61	-1.11	-0.02
			Max. Compression	2	-169.76	1.00	0.06
		Leg	Max. Mx	14	136.38	-1.30	-0.05
			Max. My	12	-12.91	-0.01	-1.25
			Max. Vy	6	-0.14	-1.26	-0.08
			Max. Vx	24	0.17	-0.01	1.24
		Diagonal	Max Tension	9	8.27	0.00	0.00
			Max. Compression	8	-8.53	0.00	0.00
			Max. Mx	2	5.87	0.14	0.00
			Max. Vy	2	-0.04	0.00	0.00
		Horizontal	Max Tension	8	5.56	0.00	0.00
			Max. Compression	9	-5.49	0.00	0.00
			Max. Mx	14	-0.92	-0.06	-0.01
			Max. My	2	0.13	-0.02	0.01
			Max. Vy	14	-0.03	-0.06	-0.01
			Max. Vx	2	0.00	-0.02	0.01
T8	120 - 100	Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.01	-0.03	0.00
			Max. Vy	2	0.02	0.00	0.00
			Max Tension	15	167.11	-1.02	-0.02
			Max. Compression	2	-192.21	1.09	0.03
		Leg	Max. Mx	14	163.20	-1.14	-0.03
			Max. My	12	-15.05	-0.03	-1.17
			Max. Vy	6	0.14	-1.11	-0.06
			Max. Vx	24	0.16	-0.03	1.16
		Diagonal	Max Tension	9	8.62	0.00	0.00
			Max. Compression	8	-8.97	0.00	0.00
			Max. Mx	2	6.19	0.17	0.00
			Max. Vy	2	-0.05	0.00	0.00
		Horizontal	Max Tension	8	6.27	0.00	0.00
			Max. Compression	9	-6.15	0.00	0.00
			Max. Mx	14	-0.91	-0.11	-0.01
			Max. My	2	0.98	-0.05	0.01
			Max. Vy	14	-0.05	-0.11	-0.01
			Max. Vx	2	0.00	-0.05	0.01
T9	100 - 80	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.01	-0.05	0.00
			Max. Vy	2	0.02	0.00	0.00
			Max Tension	15	184.54	-1.06	-0.02
			Max. Compression	2	-213.94	0.56	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	80 - 60	Diagonal	Max. Mx	14	172.42	-1.14	-0.03
			Max. My	12	-17.63	-0.02	-1.10
			Max. Vy	6	-0.16	-1.05	-0.05
			Max. Vx	12	-0.16	-0.03	-1.04
			Max Tension	9	8.54	0.00	0.00
			Max. Compression	8	-8.98	0.00	0.00
		Horizontal	Max. Mx	2	6.09	0.21	0.00
			Max. Vy	2	-0.05	0.00	0.00
			Max Tension	8	6.64	0.00	0.00
			Max. Compression	9	-6.45	0.00	0.00
			Max. Mx	14	-0.87	-0.13	-0.01
			Max. My	2	0.12	-0.07	0.01
		Inner Bracing	Max. Vy	14	-0.05	-0.13	-0.01
			Max. Vx	2	0.00	-0.07	0.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.01	-0.10	0.00
			Max. Vy	2	0.04	0.00	0.00
		Leg	Max Tension	15	201.45	-2.21	0.02
			Max. Compression	2	-235.72	-2.64	0.20
			Max. Mx	18	-232.39	-2.67	0.30
			Max. My	12	-22.64	-0.84	-4.55
			Max. Vy	2	0.60	2.38	-0.03
			Max. Vx	24	-0.52	-0.84	4.53
T11	60 - 40	Diagonal	Max Tension	9	9.63	0.00	0.00
			Max. Compression	8	-10.14	0.00	0.00
			Max. Mx	2	7.13	0.24	0.00
			Max. Vy	2	-0.06	0.00	0.00
		Horizontal	Max Tension	8	7.90	0.00	0.00
			Max. Compression	9	-7.54	0.00	0.00
			Max. Mx	14	-0.35	-0.15	-0.01
			Max. My	14	-0.62	-0.14	-0.01
			Max. Vy	14	-0.06	-0.15	-0.01
			Max. Vx	14	0.00	-0.14	-0.01
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	2	-0.01	-0.13	0.00
			Max. Vy	2	0.04	0.00	0.00
		Leg	Max Tension	15	208.04	1.33	-0.20
			Max. Compression	2	-245.10	-7.31	0.43
			Max. Mx	2	-244.74	9.53	-0.40
			Max. My	24	-24.87	-1.62	6.15
			Max. Vy	2	1.77	9.53	-0.40
			Max. Vx	24	-1.09	-1.62	6.15
		Diagonal	Max Tension	9	14.51	-0.11	0.07
			Max. Compression	8	-15.62	0.00	0.00
			Max. Mx	22	9.14	-0.16	0.04
			Max. My	20	-14.69	-0.05	-0.08
			Max. Vy	22	-0.05	-0.16	0.04
			Max. Vx	20	-0.01	-0.05	-0.08
		Horizontal	Max Tension	8	8.27	0.00	0.00
			Max. Compression	9	-8.21	0.00	0.00
			Max. Mx	14	-0.11	-0.25	-0.02
			Max. My	2	1.39	-0.15	0.02
			Max. Vy	14	0.08	-0.25	-0.02
			Max. Vx	2	0.00	-0.15	0.02
		Redund Horz 1 Bracing	Max Tension	20	2.27	0.00	0.00
			Max. Compression	21	-1.79	0.00	0.00
			Max. Mx	2	0.46	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	9	1.76	0.00	0.00
			Max. Compression	8	-1.96	0.00	0.00
			Max. Mx	2	-1.55	0.03	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	21	0.01	0.00	0.00
			Max. Compression	8	-0.02	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T12	40 - 20	Redund Hip Diagonal 1 Bracing	Max. Mx	2	-0.02	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
			Max Tension	10	0.06	0.00	0.00
			Max. Compression	22	-0.07	0.00	0.00
		Inner Bracing	Max. Mx	2	0.05	0.16	0.00
			Max. Vy	2	-0.04	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-0.01	0.00	0.00
		Leg	Max. Mx	2	-0.01	0.19	0.00
			Max. Vy	2	-0.06	0.00	0.00
			Max Tension	15	225.22	4.83	-0.40
			Max. Compression	2	-267.15	-7.22	0.41
		Diagonal	Max. Mx	2	-266.59	9.92	-0.37
			Max. My	24	-26.34	-1.62	6.15
			Max. Vy	2	-1.80	9.92	-0.37
			Max. Vx	24	1.04	-1.62	6.15
		Horizontal	Max Tension	9	14.67	-0.11	0.06
			Max. Compression	8	-15.90	0.00	0.00
			Max. Mx	22	9.19	-0.16	0.03
			Max. My	20	-14.85	-0.07	-0.07
		Redund Horiz 1 Bracing	Max. Vy	22	-0.05	-0.16	0.03
			Max. Vx	20	-0.01	0.00	0.00
			Max Tension	9	8.78	0.00	0.00
			Max. Compression	8	-8.79	0.00	0.00
		Redund Diag 1 Bracing	Max. Mx	14	-1.49	-0.29	-0.02
			Max. My	2	0.20	-0.19	0.02
			Max. Vy	14	-0.09	-0.29	-0.02
			Max. Vx	2	0.00	-0.19	0.02
		Redund Hip 1 Bracing	Max Tension	20	2.59	0.00	0.00
			Max. Compression	21	-2.01	0.00	0.00
			Max. Mx	2	0.45	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	9	1.83	0.00	0.00
			Max. Compression	8	-2.09	0.00	0.00
			Max. Mx	2	-1.71	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
T13	20 - 0	Redund Hip 1 Bracing	Max Tension	21	0.01	0.00	0.00
			Max. Compression	8	-0.02	0.00	0.00
			Max. Mx	2	-0.02	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	10	0.06	0.00	0.00
			Max. Compression	22	-0.06	0.00	0.00
			Max. Mx	2	0.05	0.18	0.00
			Max. Vy	2	-0.05	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-0.01	0.00	0.00
			Max. Mx	2	-0.01	0.23	0.00
			Max. Vy	2	-0.07	0.00	0.00
		Leg	Max Tension	15	242.65	4.64	-0.37
			Max. Compression	2	-290.05	0.00	-0.00
			Max. Mx	2	-289.66	8.93	-0.37
			Max. My	24	-29.66	-1.67	6.12
		Diagonal	Max. Vy	2	-1.68	8.93	-0.37
			Max. Vx	24	1.02	-1.67	6.12
			Max Tension	9	14.76	-0.12	0.06
			Max. Compression	8	-15.90	0.00	0.00
		Horizontal	Max. Mx	22	10.27	-0.18	0.03
			Max. My	20	-15.04	-0.08	-0.07
			Max. Vy	22	-0.05	-0.18	0.03
			Max. Vx	20	0.01	-0.08	-0.07
		Redund Horiz 1 Bracing	Max Tension	21	9.30	-0.21	0.00
			Max. Compression	8	-9.33	0.00	0.00
			Max. Mx	14	-0.34	-0.32	-0.02
			Max. My	2	1.63	-0.24	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	14	0.09	-0.32	-0.02
			Max. Vx	2	-0.00	-0.24	0.02
		Redund Horz 1 Bracing	Max Tension	20	1.81	0.00	0.00
			Max. Compression	21	-1.42	0.00	0.00
			Max. Mx	2	1.61	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	8	1.29	0.00	0.00
			Max. Compression	8	-1.33	0.00	0.00
			Max. Mx	2	-1.11	0.03	0.00
			Max. Vy	2	0.01	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	21	0.01	0.00	0.00
			Max. Compression	8	-0.02	0.00	0.00
			Max. Mx	2	-0.02	0.02	0.00
			Max. Vy	2	-0.01	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	10	0.06	0.00	0.00
			Max. Compression	22	-0.07	0.00	0.00
			Max. Mx	2	0.06	0.27	0.00
			Max. Vy	2	-0.06	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-0.01	0.00	0.00
			Max. Mx	2	-0.01	0.27	0.00
			Max. Vy	2	-0.07	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	306.67	31.20	-16.87
	Max. H _x	18	306.67	31.20	-16.87
	Max. H _z	5	-223.25	-22.85	15.63
	Min. Vert	7	-249.53	-27.04	14.52
	Min. H _x	7	-249.53	-27.04	14.52
	Min. H _z	16	280.39	27.02	-17.98
Leg B	Max. Vert	10	301.88	-30.77	-16.46
	Max. H _x	23	-246.10	26.62	14.14
	Max. H _z	25	-216.46	22.52	14.14
	Min. Vert	23	-246.10	26.62	14.14
	Min. H _x	10	301.88	-30.77	-16.46
	Min. H _z	12	272.25	-26.67	-16.47
Leg A	Max. Vert	2	311.36	-0.63	36.35
	Max. H _x	21	21.98	3.35	2.01
	Max. H _z	2	311.36	-0.63	36.35
	Min. Vert	15	-260.07	0.62	-31.67
	Min. H _x	8	29.30	-3.36	2.67
	Min. H _z	15	-260.07	0.62	-31.67

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	78.20	0.00	0.00	46.79	10.60	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	93.83	0.00	-57.51	-7963.84	12.72	-35.57
0.9 Dead+1.0 Wind 0 deg - No Ice	70.38	0.00	-57.51	-7977.88	9.54	-35.57

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 30 deg - No Ice	93.83	29.26	-50.68	-6988.16	-4054.31	16.59
0.9 Dead+1.0 Wind 30 deg - No Ice	70.38	29.26	-50.68	-7002.19	-4057.49	16.59
1.2 Dead+1.0 Wind 60 deg - No Ice	93.83	48.41	-27.95	-3839.62	-6734.96	54.74
0.9 Dead+1.0 Wind 60 deg - No Ice	70.38	48.41	-27.95	-3853.66	-6738.14	54.74
1.2 Dead+1.0 Wind 90 deg - No Ice	93.83	54.06	0.00	56.15	-7538.82	58.07
0.9 Dead+1.0 Wind 90 deg - No Ice	70.38	54.06	0.00	42.11	-7542.00	58.07
1.2 Dead+1.0 Wind 120 deg - No Ice	93.83	47.54	27.45	3894.89	-6636.17	62.19
0.9 Dead+1.0 Wind 120 deg - No Ice	70.38	47.54	27.45	3880.86	-6639.35	62.19
1.2 Dead+1.0 Wind 150 deg - No Ice	93.83	28.20	48.84	6890.86	-3933.30	74.70
0.9 Dead+1.0 Wind 150 deg - No Ice	70.38	28.20	48.84	6876.83	-3936.48	74.70
1.2 Dead+1.0 Wind 180 deg - No Ice	93.83	0.00	57.51	8076.15	12.72	35.57
0.9 Dead+1.0 Wind 180 deg - No Ice	70.38	0.00	57.51	8062.11	9.54	35.57
1.2 Dead+1.0 Wind 210 deg - No Ice	93.83	-29.26	50.68	7100.46	4079.76	-16.59
0.9 Dead+1.0 Wind 210 deg - No Ice	70.38	-29.26	50.68	7086.42	4076.58	-16.59
1.2 Dead+1.0 Wind 240 deg - No Ice	93.83	-48.41	27.95	3951.93	6760.41	-54.74
0.9 Dead+1.0 Wind 240 deg - No Ice	70.38	-48.41	27.95	3937.89	6757.23	-54.74
1.2 Dead+1.0 Wind 270 deg - No Ice	93.83	-54.06	0.00	56.15	7564.27	-58.07
0.9 Dead+1.0 Wind 270 deg - No Ice	70.38	-54.06	0.00	42.11	7561.09	-58.07
1.2 Dead+1.0 Wind 300 deg - No Ice	93.83	-47.54	-27.45	-3782.59	6661.62	-62.19
0.9 Dead+1.0 Wind 300 deg - No Ice	70.38	-47.54	-27.45	-3796.63	6658.44	-62.19
1.2 Dead+1.0 Wind 330 deg - No Ice	93.83	-28.20	-48.84	-6778.56	3958.75	-74.70
0.9 Dead+1.0 Wind 330 deg - No Ice	70.38	-28.20	-48.84	-6792.60	3955.57	-74.70
Dead+Wind 0 deg - Service	78.20	-0.00	-16.17	-2176.69	10.60	-9.52
Dead+Wind 30 deg - Service	78.20	8.22	-14.23	-1905.24	-1116.40	4.44
Dead+Wind 60 deg - Service	78.20	13.62	-7.87	-1034.38	-1862.05	14.65
Dead+Wind 90 deg - Service	78.20	15.24	0.00	46.79	-2087.52	15.54
Dead+Wind 120 deg - Service	78.20	13.39	7.73	1112.71	-1835.61	16.64
Dead+Wind 150 deg - Service	78.20	7.93	13.74	1942.73	-1084.02	19.99
Dead+Wind 180 deg - Service	78.20	0.00	16.17	2270.28	10.60	9.52
Dead+Wind 210 deg - Service	78.20	-8.22	14.23	1998.82	1137.61	-4.44
Dead+Wind 240 deg - Service	78.20	-13.62	7.87	1127.97	1883.26	-14.65
Dead+Wind 270 deg - Service	78.20	-15.24	0.00	46.79	2108.73	-15.54
Dead+Wind 300 deg - Service	78.20	-13.39	-7.73	-1019.12	1856.82	-16.64
Dead+Wind 330 deg - Service	78.20	-7.93	-13.74	-1849.15	1105.23	-19.99

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	-78.20	0.00	0.00	78.20	0.00	0.000%
2	0.00	-93.83	-57.51	0.00	93.83	57.51	0.000%
3	0.00	-70.38	-57.51	0.00	70.38	57.51	0.000%
4	29.26	-93.83	-50.68	-29.26	93.83	50.68	0.000%
5	29.26	-70.38	-50.68	-29.26	70.38	50.68	0.000%
6	48.41	-93.83	-27.95	-48.41	93.83	27.95	0.000%
7	48.41	-70.38	-27.95	-48.41	70.38	27.95	0.000%
8	54.06	-93.83	0.00	-54.06	93.83	0.00	0.000%
9	54.06	-70.38	0.00	-54.06	70.38	0.00	0.000%
10	47.54	-93.83	27.45	-47.54	93.83	-27.45	0.000%
11	47.54	-70.38	27.45	-47.54	70.38	-27.45	0.000%
12	28.20	-93.83	48.84	-28.20	93.83	-48.84	0.000%
13	28.20	-70.38	48.84	-28.20	70.38	-48.84	0.000%
14	0.00	-93.83	57.51	0.00	93.83	-57.51	0.000%
15	0.00	-70.38	57.51	0.00	70.38	-57.51	0.000%
16	-29.26	-93.83	50.68	29.26	93.83	-50.68	0.000%
17	-29.26	-70.38	50.68	29.26	70.38	-50.68	0.000%
18	-48.41	-93.83	27.95	48.41	93.83	-27.95	0.000%
19	-48.41	-70.38	27.95	48.41	70.38	-27.95	0.000%
20	-54.06	-93.83	0.00	54.06	93.83	0.00	0.000%
21	-54.06	-70.38	0.00	54.06	70.38	0.00	0.000%
22	-47.54	-93.83	-27.45	47.54	93.83	27.45	0.000%
23	-47.54	-70.38	-27.45	47.54	70.38	27.45	0.000%
24	-28.20	-93.83	-48.84	28.20	93.83	48.84	0.000%
25	-28.20	-70.38	-48.84	28.20	70.38	48.84	0.000%
26	0.00	-78.20	-16.17	0.00	78.20	16.17	0.000%
27	8.22	-78.20	-14.23	-8.22	78.20	14.23	0.000%
28	13.62	-78.20	-7.87	-13.62	78.20	7.87	0.000%
29	15.24	-78.20	0.00	-15.24	78.20	0.00	0.000%
30	13.39	-78.20	7.73	-13.39	78.20	-7.73	0.000%
31	7.93	-78.20	13.74	-7.93	78.20	-13.74	0.000%
32	0.00	-78.20	16.17	0.00	78.20	-16.17	0.000%
33	-8.22	-78.20	14.23	8.22	78.20	-14.23	0.000%
34	-13.62	-78.20	7.87	13.62	78.20	-7.87	0.000%
35	-15.24	-78.20	0.00	15.24	78.20	0.00	0.000%
36	-13.39	-78.20	-7.73	13.39	78.20	7.73	0.000%
37	-7.93	-78.20	-13.74	7.93	78.20	13.74	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	4.4632	33	0.18	0.06
T2	240 - 220	4.0849	33	0.18	0.06
T3	220 - 200	3.3406	33	0.17	0.06
T4	200 - 180	2.6504	33	0.15	0.05
T5	180 - 160	2.0721	33	0.12	0.04
T6	160 - 140	1.5864	33	0.10	0.03
T7	140 - 120	1.1887	33	0.08	0.03
T8	120 - 100	0.8661	33	0.07	0.02
T9	100 - 80	0.6059	33	0.05	0.02
T10	80 - 60	0.4002	33	0.04	0.01
T11	60 - 40	0.2350	33	0.03	0.01
T12	40 - 20	0.1173	27	0.02	0.01
T13	20 - 0	0.0396	27	0.01	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Flash Beacon Lighting	33	4.4632	0.18	0.06	819350
231.00	Site Pro 1 VFA12-HD 12' Heavy Duty V-Frame	33	3.7467	0.17	0.06	184472
220.00	Sabre (3) C10841002C [SM 502- 3]	33	3.3406	0.17	0.06	102323

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	16.0803	16	0.64	0.24
T2	240 - 220	14.7170	16	0.64	0.24
T3	220 - 200	12.0291	16	0.60	0.21
T4	200 - 180	9.5317	16	0.53	0.18
T5	180 - 160	7.4409	16	0.44	0.14
T6	160 - 140	5.6882	16	0.37	0.12
T7	140 - 120	4.2567	16	0.30	0.09
T8	120 - 100	3.0978	16	0.24	0.08
T9	100 - 80	2.1651	16	0.19	0.06
T10	80 - 60	1.4290	16	0.14	0.05
T11	60 - 40	0.8387	16	0.11	0.04
T12	40 - 20	0.4154	4	0.07	0.02
T13	20 - 0	0.1372	4	0.04	0.01

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Flash Beacon Lighting	16	16.0803	0.64	0.24	302274
231.00	Site Pro 1 VFA12-HD 12' Heavy Duty V-Frame	16	13.4965	0.63	0.23	56657
220.00	Sabre (3) C10841002C [SM 502- 3]	16	12.0291	0.60	0.21	29274

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	250	Leg	A325N	0.7500	4	0.34	30.10	0.011	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	0.78	13.81	0.057	1.05	Bolt Shear
		Horizontal	A325N	0.6250	2	0.76	13.81	0.055	1.05	Bolt Shear
T2	240	Leg	A325N	0.8750	4	3.47	41.56	0.084	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.32	13.81	0.168	1.05	Bolt Shear
		Horizontal	A325N	0.6250	2	1.88	13.81	0.136	1.05	Bolt Shear
T3	220	Leg	A325N	1.0000	4	12.27	54.52	0.225	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	3.62	13.81	0.262	1.05	Bolt Shear
		Horizontal	A325N	0.6250	2	2.96	13.81	0.214	1.05	Bolt Shear
T4	200	Leg	A325N	1.0000	6	13.90	54.52	0.255	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.54	13.81	0.184	1.05	Bolt Shear

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
T5	180	Horizontal	A325N	0.6250	2	2.51	13.81	0.182	1.05	Bolt Shear
		Leg	A325N	1.0000	8	13.65	54.52	0.250	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.43	13.81	0.176	1.05	Bolt Shear
T6	160	Horizontal	A325N	0.6250	2	2.46	13.81	0.179	1.05	Bolt Shear
		Leg	A325N	1.0000	8	16.03	54.52	0.294	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	3.01	13.81	0.218	1.05	Bolt Shear
T7	140	Horizontal	A325N	0.6250	2	2.69	13.81	0.195	1.05	Bolt Shear
		Leg	A325N	1.0000	8	18.58	54.52	0.341	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.84	13.81	0.206	1.05	Bolt Shear
T8	120	Horizontal	A325N	0.6250	2	2.78	13.81	0.201	1.05	Bolt Shear
		Leg	A325N	1.0000	8	20.89	54.52	0.383	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.99	13.81	0.217	1.05	Bolt Shear
T9	100	Horizontal	A325N	0.6250	2	3.13	13.81	0.227	1.05	Bolt Shear
		Leg	A325N	1.0000	12	15.38	54.52	0.282	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	2.99	13.81	0.217	1.05	Bolt Shear
T10	80	Horizontal	A325N	0.6250	2	3.32	13.81	0.241	1.05	Bolt Shear
		Leg	A325N	1.0000	12	16.79	54.52	0.308	1.05	Bolt Tension
		Diagonal	A325N	0.6250	3	3.38	13.81	0.245	1.05	Bolt Shear
T11	60	Horizontal	A325N	0.6250	2	3.95	13.81	0.286	1.05	Bolt Shear
		Leg	A325N	1.0000	12	17.29	54.52	0.317	1.05	Bolt Tension
		Diagonal	A325N	0.7500	3	5.21	19.88	0.262	1.05	Bolt Shear
		Horizontal	A325N	0.7500	2	4.13	19.88	0.208	1.05	Bolt Shear
		Redund Horiz 1	A325N	0.6250	1	4.25	13.57	0.313	1.05	Member Bearing
		Bracing								
		Redund Diag 1	A325N	0.6250	1	3.87	13.57	0.285	1.05	Member Bearing
		Bracing								
		Redund Hip 1	A325N	0.6250	1	0.02	13.81	0.002	1.05	Bolt Shear
		Bracing								
T12	40	Redund Hip	A325N	0.6250	1	0.07	13.81	0.005	1.05	Bolt Shear
		Diagonal 1								
		Bracing								
		Leg	A325N	1.0000	12	18.72	54.52	0.343	1.05	Bolt Tension
		Diagonal	A325N	0.7500	3	5.30	19.88	0.267	1.05	Bolt Shear
		Horizontal	A325N	0.7500	2	4.40	19.88	0.221	1.05	Bolt Shear
		Redund Horiz 1	A325N	0.6250	1	4.64	13.57	0.342	1.05	Member Bearing
		Bracing								
		Redund Diag 1	A325N	0.6250	1	3.95	7.77	0.508	1.05	Member Bearing
		Bracing								
T13	20	Redund Hip 1	A325N	0.6250	1	0.02	13.81	0.001	1.05	Bolt Shear
		Bracing								
		Redund Hip	A325N	0.6250	1	0.06	13.81	0.004	1.05	Bolt Shear
		Diagonal 1								
		Bracing								
		Diagonal	A325N	0.7500	3	5.30	19.88	0.267	1.05	Bolt Shear
		Horizontal	A325N	0.7500	2	4.66	19.88	0.235	1.05	Bolt Shear
		Redund Horiz 1	A325N	0.6250	1	5.03	13.57	0.371	1.05	Member Bearing
		Bracing								
		Redund Diag 1	A325N	0.6250	1	4.05	7.77	0.521	1.05	Member Bearing
		Bracing								
		Redund Hip 1	A325N	0.6250	1	0.02	13.81	0.001	1.05	Bolt Shear
		Bracing								
		Redund Hip	A325N	0.6250	1	0.07	13.81	0.005	1.05	Bolt Shear
		Diagonal 1								
		Bracing								

Compression Checks

Leg 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	250 - 240	ROHN 2.5 STD	10.00	5.00	63.3 K=1.00	1.7040	-4.13	57.19	0.072 ¹
T2	240 - 220	ROHN 3 STD	20.00	6.67	68.8 K=1.00	2.2285	-20.49	70.98	0.289 ¹
T3	220 - 200	ROHN 4 X-STR	20.00	6.67	54.2 K=1.00	4.4074	-59.29	160.03	0.370 ¹
T4	200 - 180	ROHN 5 EH	20.04	6.68	43.6 K=1.00	6.1120	-95.70	239.38	0.400 ¹
T5	180 - 160	ROHN 6 EH	20.04	6.68	36.5 K=1.00	8.4049	-124.30	343.08	0.362 ¹
T6	160 - 140	ROHN 8 EHS	20.04	10.02	40.6 K=1.00	9.8666	-146.03	393.65	0.371 ¹
T7	140 - 120	ROHN 8 EHS	20.05	10.03	40.6 K=1.00	9.8666	-169.76	393.60	0.431 ¹
T8	120 - 100	ROHN 8 X-STR	20.05	10.03	41.8 K=1.00	12.762 7	-192.21	505.43	0.380 ¹
T9	100 - 80	ROHN 8 X-STR	20.06	10.03	41.8 K=1.00	12.762 7	-213.94	505.39	0.423 ¹
T10	80 - 60	ROHN 10 EH	20.05	10.03	33.2 K=1.00	16.100 7	-235.72	668.56	0.353 ¹
T11	60 - 40	ROHN 10 X-STR	20.05	10.03	33.2 K=1.00	16.100 7	-245.10	668.56	0.367 ¹
T12	40 - 20	ROHN 10 X-STR	20.05	10.03	33.2 K=1.00	16.100 7	-267.15	668.56	0.400 ¹
T13	20 - 0	ROHN 10 EH	20.05	10.03	33.2 K=1.00	16.100 7	-290.05	668.56	0.434 ¹

¹ P_u / φP_n controls

Diagonal 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	250 - 240	ROHN 2 STD	6.58	6.39	97.4 K=1.00	1.0745	-2.34	24.15	0.097 ¹
T2	240 - 220	ROHN 2 STD	7.94	7.67	117.0 K=1.00	1.0745	-6.95	17.75	0.392 ¹
T3	220 - 200	ROHN 2 EH	7.96	7.62	119.3 K=1.00	1.4773	-10.85	23.45	0.463 ¹
T4	200 - 180	ROHN 2 EH	8.58	8.21	128.5 K=1.00	1.4773	-7.38	20.20	0.365 ¹
T5	180 - 160	ROHN 2 EH	9.29	8.89	139.2 K=1.00	1.4773	-7.14	17.22	0.415 ¹
T6	160 - 140	ROHN 2.5 X-STR	12.56	11.95	155.2 K=1.00	2.2535	-9.04	21.12	0.428 ¹
T7	140 - 120	ROHN 3 STD	13.35	12.80	132.0 K=1.00	2.2285	-8.53	28.89	0.295 ¹
T8	120 - 100	ROHN 3 STD	14.21	13.70	141.3 K=1.00	2.2285	-8.97	25.21	0.356 ¹
T9	100 - 80	ROHN 3 STD	15.18	14.70	151.6 K=1.00	2.2285	-8.98	21.89	0.410 ¹
T10	80 - 60	ROHN 3 STD	16.14	15.57	160.6 K=1.00	2.2285	-10.14	19.52	0.520 ¹
T11	60 - 40	ROHN 3 STD	24.38	12.19	125.7 K=1.00	2.2285	-15.62	31.86	0.490 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T12	40 - 20	ROHN 3 STD	25.11	12.56	129.5 K=1.00	2.2285	-15.90	30.03	0.530 ¹
T13	20 - 0	ROHN 3 STD	25.88	12.94	133.5 K=1.00	2.2285	-15.90	28.26	0.563 ¹

¹ P_u / φP_n controls

Horizontal 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 $\frac{P_u}{\phi P_n}$
T1	250 - 240	ROHN 1.5 STD	8.52	4.14	79.8 K=1.00	0.7995	-1.47	22.58	0.065 ¹
T2	240 - 220	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	0.7995	-3.73	22.52	0.166 ¹
T3	220 - 200	ROHN 1.5 STD	8.68	4.15	80.0 K=1.00	0.7995	-5.88	22.52	0.261 ¹
T4	200 - 180	ROHN 1.5 STD	10.10	4.82	92.8 K=1.00	0.7995	-4.58	19.16	0.239 ¹
T5	180 - 160	ROHN 2 STD	12.22	5.83	88.9 K=1.00	1.0745	-4.88	27.13	0.180 ¹
T6	160 - 140	ROHN 2 STD	14.05	6.66	101.6 K=1.00	1.0745	-5.35	22.75	0.235 ¹
T7	140 - 120	ROHN 2 STD	16.43	7.85	119.7 K=1.00	1.0745	-5.49	16.95	0.324 ¹
T8	120 - 100	ROHN 2.5 STD	18.93	9.10	115.3 K=1.00	1.7040	-6.15	28.95	0.212 ¹
T9	100 - 80	ROHN 2.5 STD	21.51	10.39	131.6 K=1.00	1.7040	-6.45	22.21	0.290 ¹
T10	80 - 60	ROHN 2.5 STD	24.08	11.59	146.8 K=1.00	1.7040	-7.54	17.85	0.422 ¹
T11	60 - 40	ROHN 3 STD	25.33	12.22	126.0 K=1.00	2.2285	-8.21	31.70	0.259 ¹
T12	40 - 20	ROHN 3 STD	27.83	13.47	138.9 K=1.00	2.2285	-8.79	26.09	0.337 ¹
T13	20 - 0	ROHN 3 STD	30.33	14.72	151.8 K=1.00	2.2285	-9.33	21.85	0.427 ¹

¹ P_u / φP_n controls

Top Girt 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 $\frac{P_u}{\phi P_n}$
T1	250 - 240	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	0.7995	-1.34	22.63	0.059 ¹

¹ P_u / φP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	6.33	5.89	113.4 K=1.00	0.7995	-4.25	14.04	0.303 ¹
T12	40 - 20	ROHN 1.5 STD	6.96	6.51	125.5 K=1.00	0.7995	-4.64	11.47	0.404 ¹
T13	20 - 0	ROHN 1.5 STD	7.58	7.14	137.5 K=1.00	0.7995	-5.03	9.55	0.527 ¹

¹ P_u / φP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	11.52	10.62	204.7 K=1.00	0.7995	-3.87	4.31	0.897 ¹
T12	40 - 20	ROHN 2.25 TUBE	11.84	11.01	172.3 K=1.00	0.5651	-3.95	4.30	0.917 ¹
T13	20 - 0	ROHN 2.25 TUBE	12.19	11.40	178.5 K=1.00	0.5651	-4.05	4.01	1.010 ¹

¹ P_u / φP_n controls

Redundant Hip (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	6.33	6.33	122.1 K=1.00	0.7995	-0.02	12.12	0.002 ¹
T12	40 - 20	ROHN 1.5 STD	6.96	6.96	134.1 K=1.00	0.7995	-0.02	10.04	0.002 ¹
T13	20 - 0	ROHN 1.5 STD	7.58	7.58	146.2 K=1.00	0.7995	-0.02	8.45	0.002 ¹

¹ P_u / φP_n controls

Redundant Hip Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 2.5 STD	15.13	15.13	191.6 K=1.00	1.7040	-0.07	10.49	0.006 ¹
T12	40 - 20	ROHN 2.5 STD	15.95	15.95	202.1 K=1.00	1.7040	-0.06	9.43	0.007 ¹
T13	20 - 0	ROHN 3 STD	16.81	16.81	173.3 K=1.00	2.2285	-0.07	16.75	0.004 ¹

¹ P_u / φP_n controls

Inner Bracing 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	250 - 240	L2x2x1/8	4.25	4.25	128.3 K=1.00	0.4844	-0.00	8.42	0.000 ¹
T2	240 - 220	L2x2x1/8	4.30	4.30	129.8 K=1.00	0.4844	-0.00	8.23	0.001 ¹
T3	220 - 200	L2x2x1/8	4.34	4.34	131.0 K=1.00	0.4844	-0.01	8.08	0.001 ¹
T4	200 - 180	L2x2x1/8	4.35	4.35	131.4 K=1.00	0.4844	-0.01	8.03	0.001 ¹
T5	180 - 160	L2x2x1/8	6.11	6.11	184.4 K=1.00	0.4844	-0.01	4.08	0.001 ¹
T6	160 - 140	L2x2x1/8	7.03	7.03	212.1 K=1.00	0.4844	-0.01	3.08	0.002 ¹
T7	140 - 120	L2 1/2x2 1/2x3/16	8.21	8.21	199.1 K=1.00	0.9020	-0.01	6.51	0.001 ¹
T8	120 - 100	L3x3x3/16	9.46	9.46	190.5 K=1.00	1.0900	-0.01	8.59	0.001 ¹
T9	100 - 80	L3 1/2x3 1/2x1/4	10.75	10.75	185.9 K=1.00	1.6900	-0.01	13.99	0.001 ¹
T10	80 - 60	L3 1/2x3 1/2x1/4	12.04	12.04	208.2 K=1.00	1.6900	-0.01	11.16	0.001 ¹
T11	60 - 40	ROHN 3 STD	12.67	12.67	130.6 K=1.00	2.2285	-0.01	29.50	0.000 ¹
T12	40 - 20	ROHN 3 STD	13.92	13.92	143.5 K=1.00	2.2285	-0.01	24.44	0.001 ¹
T13	20 - 0	ROHN 3 STD	15.17	15.17	156.4 K=1.00	2.2285	-0.01	20.58	0.001 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	250 - 240	ROHN 2.5 STD	10.00	5.00	63.3	1.7040	1.30	76.68	0.017 ¹
T2	240 - 220	ROHN 3 STD	20.00	6.67	68.8	2.2285	13.89	100.28	0.138 ¹
T3	220 - 200	ROHN 4 X-STR	20.00	6.67	54.2	4.4074	49.07	198.34	0.247 ¹
T4	200 - 180	ROHN 5 EH	20.04	6.68	43.6	6.1120	83.39	275.04	0.303 ¹
T5	180 - 160	ROHN 6 EH	20.04	6.68	36.5	8.4049	109.23	378.22	0.289 ¹
T6	160 - 140	ROHN 8 EHS	20.04	10.02	40.6	9.8666	128.22	444.00	0.289 ¹
T7	140 - 120	ROHN 8 EHS	20.05	10.03	40.6	9.8666	148.61	444.00	0.335 ¹
T8	120 - 100	ROHN 8 X-STR	20.05	10.03	41.8	12.762 ₇	167.11	574.32	0.291 ¹
T9	100 - 80	ROHN 8 X-STR	20.06	10.03	41.8	12.762 ₇	184.54	574.32	0.321 ¹
T10	80 - 60	ROHN 10 EH	20.05	10.03	33.2	16.100 ₇	201.45	724.53	0.278 ¹
T11	60 - 40	ROHN 10 X-STR	20.05	10.03	33.2	16.100 ₇	208.04	724.53	0.287 ¹
T12	40 - 20	ROHN 10 X-STR	20.05	10.03	33.2	16.100 ₇	225.22	724.53	0.311 ¹
T13	20 - 0	ROHN 10 EH	20.05	10.03	33.2	16.100 ₇	242.66	724.53	0.335 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 $\frac{P_u}{\phi P_n}$
T1	250 - 240	ROHN 2 STD	6.58	6.39	97.4	0.6326	2.27	30.84	0.074 ¹
T2	240 - 220	ROHN 2 STD	7.94	7.67	117.0	0.6326	6.88	30.84	0.223 ¹
T3	220 - 200	ROHN 2 EH	7.96	7.62	119.3	0.8627	10.76	42.06	0.256 ¹
T4	200 - 180	ROHN 2 EH	8.16	7.79	122.0	0.8627	7.53	42.06	0.179 ¹
T5	180 - 160	ROHN 2 EH	9.04	8.65	135.4	0.8627	7.17	42.06	0.170 ¹
T6	160 - 140	ROHN 2.5 X-STR	12.56	11.95	155.2	1.3797	8.83	67.26	0.131 ¹
T7	140 - 120	ROHN 3 STD	13.35	12.80	132.0	1.4283	8.27	69.63	0.119 ¹
T8	120 - 100	ROHN 3 STD	14.21	13.70	141.3	1.4283	8.62	69.63	0.124 ¹
T9	100 - 80	ROHN 3 STD	15.18	14.70	151.6	1.4283	8.54	69.63	0.123 ¹
T10	80 - 60	ROHN 3 STD	16.14	15.57	160.6	1.4283	9.63	69.63	0.138 ¹
T11	60 - 40	ROHN 3 STD	24.38	12.19	125.7	1.3879	14.51	67.66	0.215 ¹
T12	40 - 20	ROHN 3 STD	25.11	12.56	129.5	1.3879	14.67	67.66	0.217 ¹
T13	20 - 0	ROHN 3 STD	25.88	12.94	133.5	1.3879	14.76	67.66	0.218 ¹

¹ P_u / φP_n controls

Horizontal 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	250 - 240	ROHN 1.5 STD	8.52	4.14	79.8	0.4365	1.51	21.28	0.071 ¹
T2	240 - 220	ROHN 1.5 STD	8.60	4.15	80.0	0.4365	3.76	21.28	0.177 ¹
T3	220 - 200	ROHN 1.5 STD	8.68	4.15	80.0	0.4365	5.92	21.28	0.278 ¹
T4	200 - 180	ROHN 1.5 STD	8.71	4.12	79.5	0.4365	4.63	21.28	0.218 ¹
T5	180 - 160	ROHN 2 STD	12.22	5.83	88.9	0.6326	4.93	30.84	0.160 ¹
T6	160 - 140	ROHN 2 STD	14.05	6.66	101.6	0.6326	5.38	30.84	0.175 ¹
T7	140 - 120	ROHN 2 STD	16.43	7.85	119.7	0.6326	5.56	30.84	0.180 ¹
T8	120 - 100	ROHN 2.5 STD	18.93	9.10	115.3	1.0497	6.27	51.17	0.122 ¹
T9	100 - 80	ROHN 2.5 STD	21.51	10.39	131.6	1.0497	6.64	51.17	0.130 ¹
T10	80 - 60	ROHN 2.5 STD	24.08	11.59	146.8	1.0497	7.90	51.17	0.154 ¹
T11	60 - 40	ROHN 3 STD	25.33	12.22	126.0	1.3879	8.27	67.66	0.122 ¹
T12	40 - 20	ROHN 3 STD	27.83	13.47	138.9	1.3879	8.78	67.66	0.130 ¹
T13	20 - 0	ROHN 3 STD	30.33	14.72	151.8	1.3879	9.30	67.66	0.137 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 $\frac{P_u}{\phi P_n}$
T1	250 - 240	ROHN 1.5 STD	8.50	4.13	79.6	0.5996	1.34	29.23	0.046 ¹

¹ P_u / φP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	6.33	5.89	113.4	0.4365	4.25	21.28	0.200 ¹
T12	40 - 20	ROHN 1.5 STD	6.96	6.51	125.5	0.4365	4.64	21.28	0.218 ¹
T13	20 - 0	ROHN 1.5 STD	7.58	7.14	137.5	0.4365	5.03	21.28	0.237 ¹

¹ P_u / φP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	11.52	10.62	204.7	0.4365	3.87	21.28	0.182 ¹
T12	40 - 20	ROHN 2.25 TUBE	11.84	11.01	172.3	0.3304	3.95	16.11	0.245 ¹
T13	20 - 0	ROHN 2.25 TUBE	12.19	11.40	178.5	0.3304	4.05	16.11	0.251 ¹

¹ P_u / φP_n controls

Redundant Hip (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 1.5 STD	6.33	6.33	122.1	0.4365	0.01	21.28	0.000 ¹
T12	40 - 20	ROHN 1.5 STD	6.96	6.96	134.1	0.4365	0.01	21.28	0.000 ¹
T13	20 - 0	ROHN 1.5 STD	7.58	7.58	146.2	0.4365	0.01	21.28	0.000 ¹

¹ P_u / φP_n controls

Redundant Hip Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	ROHN 2.5 STD	15.13	15.13	191.6	1.0497	0.06	51.17	0.001 ¹
T12	40 - 20	ROHN 2.5 STD	15.95	15.95	202.1	1.0497	0.06	51.17	0.001 ¹
T13	20 - 0	ROHN 3 STD	16.81	16.81	173.3	1.4283	0.06	69.63	0.001 ¹

¹ P_u / φP_n controls

Inner Bracing 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	250 - 240	L2x2x1/8	4.25	4.25	81.4	0.4844	0.00	15.69	0.000 ¹
T2	240 - 220	L2x2x1/8	4.30	4.30	82.4	0.4844	0.00	15.69	0.000 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T3	220 - 200	L2x2x1/8	4.34	4.34	83.2	0.4844	0.01	15.69	0.000 ¹
T4	200 - 180	L2x2x1/8	4.35	4.35	83.4	0.4844	0.00	15.69	0.000 ¹
T5	180 - 160	L2x2x1/8	5.40	5.40	103.4	0.4844	0.00	15.69	0.000 ¹
T6	160 - 140	L2x2x1/8	6.46	6.46	123.9	0.4844	0.00	15.69	0.000 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	250 - 240	Leg	ROHN 2.5 STD	1	-4.13	60.05	6.9	Pass
T2	240 - 220	Leg	ROHN 3 STD	28	-20.49	74.53	27.5	Pass
T3	220 - 200	Leg	ROHN 4 X-STR	67	-59.29	168.03	35.3	Pass
T4	200 - 180	Leg	ROHN 5 EH	108	-95.70	251.35	38.1	Pass
T5	180 - 160	Leg	ROHN 6 EH	147	-124.30	360.24	34.5	Pass
T6	160 - 140	Leg	ROHN 8 EHS	186	-146.03	413.33	35.3	Pass
T7	140 - 120	Leg	ROHN 8 EHS	213	-169.76	413.28	41.1	Pass
T8	120 - 100	Leg	ROHN 8 X-STR	240	-192.21	530.71	36.2	Pass
T9	100 - 80	Leg	ROHN 8 X-STR	267	-213.94	530.66	40.3	Pass
T10	80 - 60	Leg	ROHN 10 EH	294	-235.72	701.99	33.6	Pass
T11	60 - 40	Leg	ROHN 10 X-STR	321	-245.10	701.99	34.9	Pass
T12	40 - 20	Leg	ROHN 10 X-STR	354	-267.15	701.99	38.1	Pass
T13	20 - 0	Leg	ROHN 10 EH	387	-290.05	701.99	41.3	Pass
T1	250 - 240	Diagonal	ROHN 2 STD	14	-2.34	25.36	9.2	Pass
T2	240 - 220	Diagonal	ROHN 2 STD	38	-6.95	18.63	37.3	Pass
T3	220 - 200	Diagonal	ROHN 2 EH	77	-10.85	24.62	44.1	Pass
T4	200 - 180	Diagonal	ROHN 2 EH	111	-7.38	21.21	34.8	Pass
T5	180 - 160	Diagonal	ROHN 2 EH	150	-7.14	18.08	39.5	Pass
T6	160 - 140	Diagonal	ROHN 2.5 X-STR	189	-9.04	22.18	40.8	Pass
T7	140 - 120	Diagonal	ROHN 3 STD	216	-8.53	30.33	28.1	Pass
T8	120 - 100	Diagonal	ROHN 3 STD	243	-8.97	26.47	33.9	Pass
T9	100 - 80	Diagonal	ROHN 3 STD	270	-8.98	22.99	39.1	Pass
T10	80 - 60	Diagonal	ROHN 3 STD	297	-10.14	20.50	49.5	Pass
T11	60 - 40	Diagonal	ROHN 3 STD	326	-15.62	33.46	46.7	Pass
T12	40 - 20	Diagonal	ROHN 3 STD	359	-15.90	31.53	50.4	Pass
T13	20 - 0	Diagonal	ROHN 3 STD	392	-15.90	29.67	53.6	Pass
T1	250 - 240	Horizontal	ROHN 1.5 STD	13	1.51	22.34	6.8	Pass
T2	240 - 220	Horizontal	ROHN 1.5 STD	37	3.76	22.34	16.8	Pass
T3	220 - 200	Horizontal	ROHN 1.5 STD	76	5.92	22.34	26.5	Pass
T4	200 - 180	Horizontal	ROHN 1.5 STD	109	-4.58	20.11	22.7	Pass
T5	180 - 160	Horizontal	ROHN 2 STD	148	-4.88	28.49	17.1	Pass
T6	160 - 140	Horizontal	ROHN 2 STD	187	-5.35	23.88	22.4	Pass
T7	140 - 120	Horizontal	ROHN 2 STD	214	-5.49	17.80	30.9	Pass
T8	120 - 100	Horizontal	ROHN 2.5 STD	241	-6.15	30.40	20.2	Pass
T9	100 - 80	Horizontal	ROHN 2.5 STD	268	-6.45	23.33	27.7	Pass
T10	80 - 60	Horizontal	ROHN 2.5 STD	295	-7.54	18.74	40.2	Pass
T11	60 - 40	Horizontal	ROHN 3 STD	322	-8.21	33.29	24.7	Pass
T12	40 - 20	Horizontal	ROHN 3 STD	355	-8.79	27.40	32.1	Pass
T13	20 - 0	Horizontal	ROHN 3 STD	388	-9.33	22.94	40.7	Pass
T1	250 - 240	Top Girt	ROHN 1.5 STD	6	-1.34	23.77	5.7	Pass
T11	60 - 40	Redund Horiz 1 Bracing	ROHN 1.5 STD	334	-4.25	14.74	28.9	Pass
T12	40 - 20	Redund Horiz 1 Bracing	ROHN 1.5 STD	367	-4.64	12.04	38.5	Pass
T13	20 - 0	Redund Horiz 1 Bracing	ROHN 1.5 STD	400	-5.03	10.03	50.2	Pass
T11	60 - 40	Redund Diag 1 Bracing	ROHN 1.5 STD	335	-3.87	4.53	85.4	Pass
T12	40 - 20	Redund Diag 1 Bracing	ROHN 2.25 TUBE	368	-3.95	4.52	87.3	Pass
T13	20 - 0	Redund Diag 1 Bracing	ROHN 2.25 TUBE	401	-4.05	4.21	96.2	Pass
T11	60 - 40	Redund Hip 1	ROHN 1.5 STD	347	-0.02	12.73	0.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T12	40 - 20	Bracing Redund Hip 1	ROHN 1.5 STD	380	-0.02	10.54	0.2	Pass
T13	20 - 0	Bracing Redund Hip 1	ROHN 1.5 STD	413	-0.02	8.88	0.2	Pass
T11	60 - 40	Bracing Redund Hip	ROHN 2.5 STD	348	-0.07	11.01	0.6	Pass
T12	40 - 20	Diagonal 1 Bracing Redund Hip	ROHN 2.5 STD	381	-0.06	9.90	0.6	Pass
T13	20 - 0	Diagonal 1 Bracing Redund Hip	ROHN 3 STD	414	-0.07	17.59	0.4	Pass
T1	250 - 240	Inner Bracing	L2x2x1/8	18	-0.00	8.80	0.1	Pass
T2	240 - 220	Inner Bracing	L2x2x1/8	40	-0.00	8.65	0.1	Pass
T3	220 - 200	Inner Bracing	L2x2x1/8	79	-0.01	8.48	0.1	Pass
T4	200 - 180	Inner Bracing	L2x2x1/8	118	-0.00	6.27	0.1	Pass
T5	180 - 160	Inner Bracing	L2x2x1/8	158	-0.01	4.28	0.1	Pass
T6	160 - 140	Inner Bracing	L2x2x1/8	197	-0.01	3.24	0.2	Pass
T7	140 - 120	Inner Bracing	L2 1/2x2 1/2x3/16	225	-0.01	6.84	0.2	Pass
T8	120 - 100	Inner Bracing	L3x3x3/16	252	-0.01	9.02	0.2	Pass
T9	100 - 80	Inner Bracing	L3 1/2x3 1/2x1/4	279	-0.01	14.69	0.2	Pass
T10	80 - 60	Inner Bracing	L3 1/2x3 1/2x1/4	306	-0.01	11.72	0.2	Pass
T11	60 - 40	Inner Bracing	ROHN 3 STD	349	-0.01	30.98	0.2	Pass
T12	40 - 20	Inner Bracing	ROHN 3 STD	382	-0.01	25.66	0.3	Pass
T13	20 - 0	Inner Bracing	ROHN 3 STD	415	-0.01	21.61	0.3	Pass
							Summary	
							Leg (T13)	41.3 Pass
							Diagonal (T13)	53.6 Pass
							Horizontal (T13)	40.7 Pass
							Top Girt (T1)	5.7 Pass
							Redund Horz 1 Bracing (T13)	50.2 Pass
							Redund Diag 1 Bracing (T13)	96.2 Pass
							Redund Hip 1 Bracing (T13)	0.2 Pass
							Redund Hip Diagonal 1 Bracing (T12)	0.6 Pass
							Inner Bracing (T13)	0.3 Pass
							Bolt Checks	49.6 Pass
							RATING =	96.2 Pass

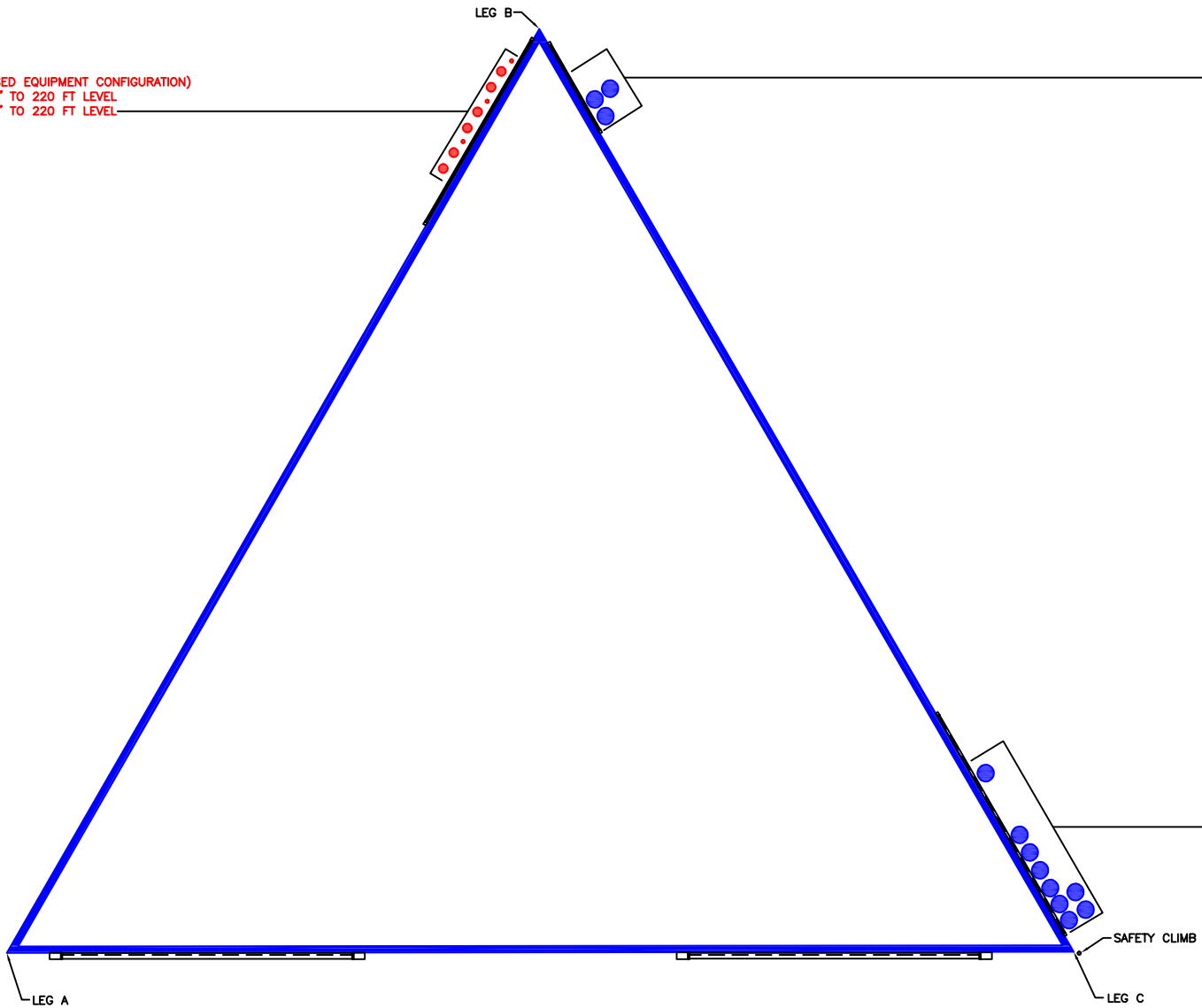
APPENDIX B
BASE LEVEL DRAWING



(PROPOSED EQUIPMENT CONFIGURATION)
(3) 3/8" TO 220 FT LEVEL
(6) 7/8" TO 220 FT LEVEL

LEG B

(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 231 FT LEVEL



APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity



Site Info		
BU #	809328	
Site Name	KE CITY W J-FL-012-0	
Order #	655092 Rev. 0	

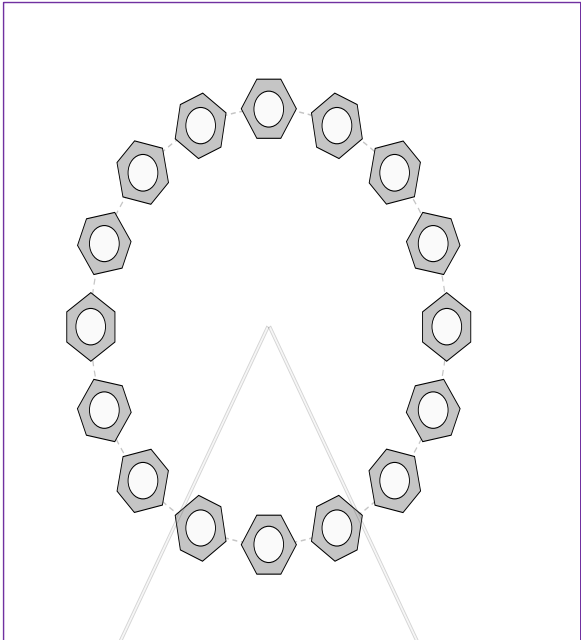
Analysis Considerations		
TIA-222 Revision	H	
Grout Considered:	No	
l_{ar} (in)	1.75	

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	311.36	260.07
Shear Force (kips)	36.36	31.68

*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		Anchor Rod Summary (units of kips, kip-in)	
(16) 1" ϕ bolts (A354-BC N; $F_y=109$ ksi, $F_u=125$ ksi)		$Pu_c = 19.46$	$\phi Pn_c = 77.05$
l_{ar} (in): 1.75		$Vu = 2.27$	$\phi Vn = 34.67$
		$Mu = 2.58$	$\phi Mn = 16.35$
			Stress Rating
			39.5%
			Pass

 BLACK & VEATCH Building a world of difference. 11401 Lamar Avenue Overland Park, KS 66211 Phone: (913) 458-6909	Client:	Crown Castle	Design:	WTG
	Project:	406642 (809328.2278050)	Date:	1/17/2024
	Site:	LAKE CITY W J-FL-012-058	Verify:	
	Title:	Foundation Design Reaction Comparison	Date:	
			Code:	TIA-222-H

Template Version 2.2.2

FOUNDATION ANALYSIS:

Original Tower Design Reactions:

Caisson:

Uplift:	662.04	Kip
Shear:	135.14	Kip
Compression:	747.23	Kip
Shear:	135.14	Kip

Note: Design reactions are multiplied by 1.35 for comparison as allowed by TIA-222-H Section 15.6.2.

TnxTower Reactions:

Caisson:

Uplift:	311.00	Kip
Shear:	59.00	Kip
Compression:	260.00	Kip
Shear:	59.00	Kip

Stress Ratio:

Caisson:

Uplift:	44.7%
Shear:	41.6%
Compression:	33.1%
Shear:	41.6%

Note: Ratings per TIA-222-H Section 15.5.

Conclusion:

When the calculated reactions are compared to the original design reactions, the existing foundation is considered to have been designed and constructed with adequate capacity to support the existing and proposed loads.

Controlling Foundation Stress Ratio:

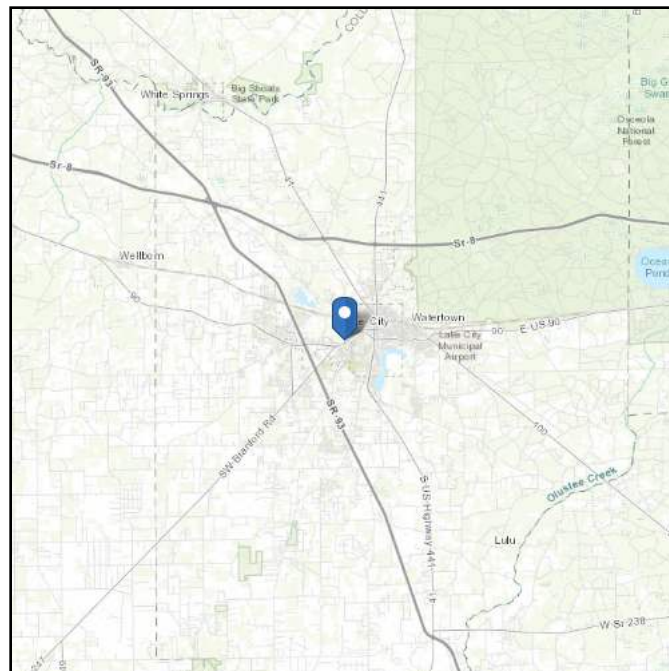
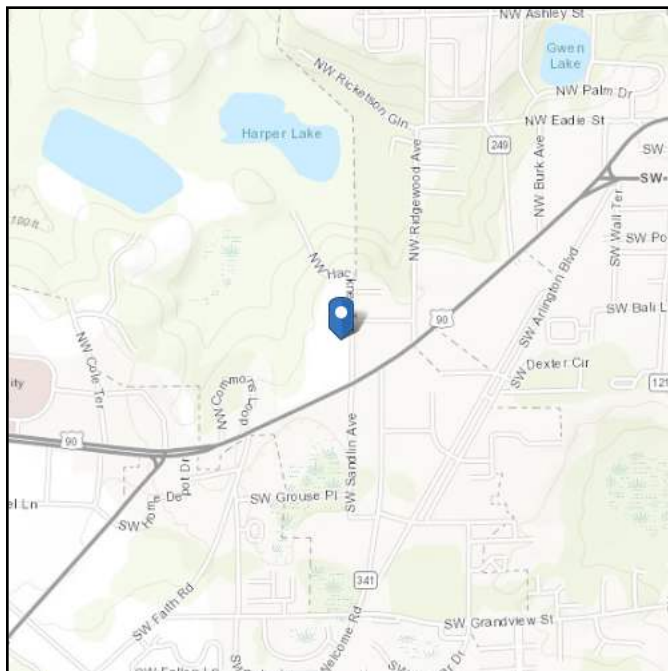
44.7%

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 30.182344
Longitude: -82.660558
Elevation: 166.37006676413068 ft (NAVD 88)



Wind

Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	83 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph
300-year MRI	109 Vmph
700-year MRI	119 Vmph
1,700-year MRI	128 Vmph
3,000-year MRI	133 Vmph
10,000-year MRI	143 Vmph
100,000-year MRI	153 Vmph
1,000,000-year MRI	167 Vmph

Data Source: ASCE/SEI 7-22, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Jan 17 2024



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 7-22 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years). Values for 10-year MRI, 25-year MRI, 50-year MRI and 100-year MRI are Service Level wind speeds, all other wind speeds are Ultimate wind speeds.

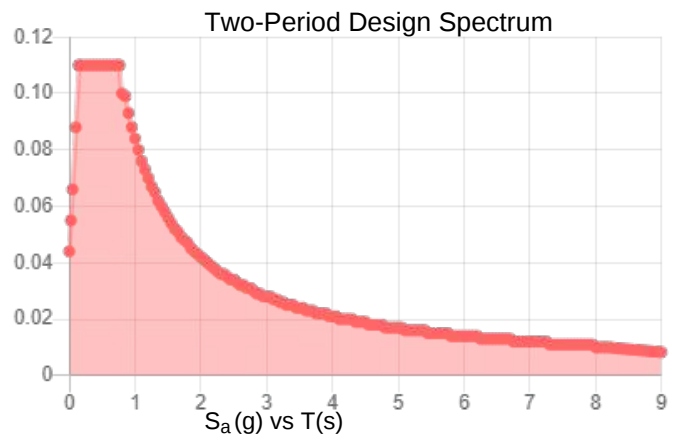
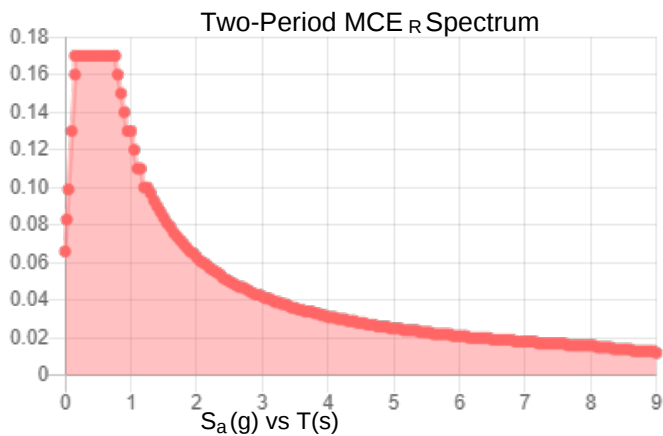
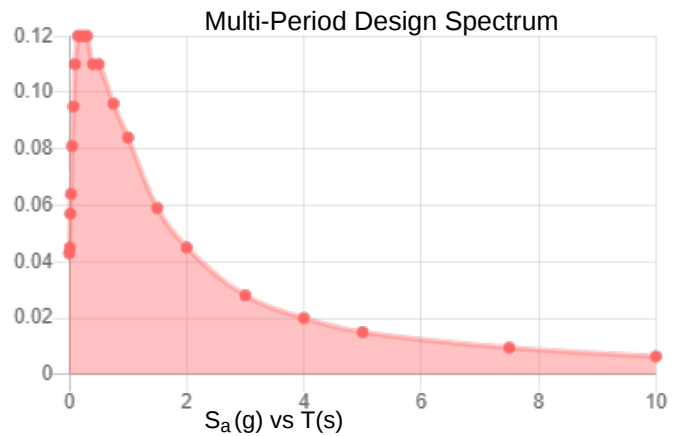
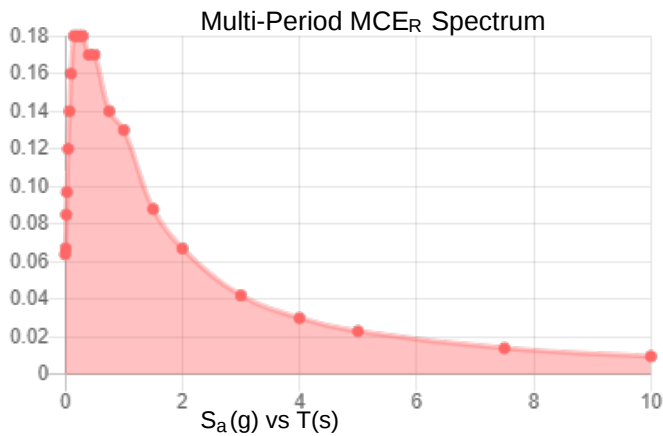
Site is in a hurricane-prone region as defined in ASCE/SEI 7-22 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

PGA _M :	0.059	T _L :	8
S _{MS} :	0.17	S _S :	0.13
S _{M1} :	0.13	S ₁ :	0.059
S _{DS} :	0.11	V _{S30} :	260
S _{D1} :	0.084		

Seismic Design Category: B



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Wed Jan 17 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

Results:

Ice Thickness:	N/A
Concurrent Temperature:	N/A
3-s Gust Speed	N/A

Data Source: Standard ASCE/SEI 7-22, Figs. 10-2 through 10-8

Date Accessed: Wed Jan 17 2024

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 for 250, 500, 1,000, and 1,400-year mean recurrence intervals along with concurrent 3-s gust speeds and concurrent air temperatures. The shading indicates special icing regions, with elevations above 2,100 ft (640 m) in the east, 6,000 ft (1829 m) in the west, and 1,600 ft (488 m) in Alaska, with sparse weather station data for determining design ice loads. In these regions, as well as in regions with complex terrain causing unusual icing conditions and regions where snow or in-cloud icing results in larger loads, the mapped values should be adjusted based on a combination of local historical records and experience, reanalysis data, and numerical weather prediction systems.

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