

Date: **September 12, 2021**



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

Subject: **Structural Analysis Report**

Carrier Designation: **DISH Network Co-Locate**
Site Number: DNDEN00239A
Site Name: CO-CCI-T-855759

Crown Castle Designation: **BU Number:** 855759
Site Name: CORRAL BLUFFS
JDE Job Number: 685680
Work Order Number: 2017294
Order Number: 585761 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number:** 2017294

Site Data: **2160 N BLANEY RD, COLORADO SPRINGS, EL PASO County, CO**
Latitude 38° 52' 0.2", Longitude -104° 34' 34.5"
288 Foot - Guyed Tower

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

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

LC7: Proposed Equipment Configuration

Sufficient Capacity

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Didi Rossmiller

09/12/21

Respectfully submitted by:

Truc Lac, P.E., S.E.
Senior Project Engineer



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1) INTRODUCTION

This tower is a 288 ft Guyed tower designed by Wireless Construction Services.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 130 mph
Exposure Category: C
Topographic Factor: 1
Service Wind Speed: 60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
218.0	218.0	1	fujitsu	TA08025-B604	1	1-3/4
		2	fujitsu	TA08025-B604		
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Sabre C10837002C-32788 (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)
274.0	276.0	3	powerwave technologies	P65-15-XLH-RR w/ Mount Pipe	2 1 2 4 6	conduit 1/4 3/8 3/4 1-5/8
	275.0	3	alcatel lucent	B25 RRH4X30-4R		
		6	cci antennas	TPA65R-BU8D w/ Mount Pipe		
		3	nokia	AHCA		
		3	nokia	AHLBA		
		3	powerwave technologies	TT19-08BP111-001		
		2	raycap	DC6-48-60-18-8F		
	274.0	1	tower mounts	Sector Mount [SM 201-3]		
157.0	157.0	1	andrew	VHLP4-107	2	3/8
		1	tower mounts	Pipe Mount [PM 601-1]		
117.0	117.0	1	andrew	VHLP4-107	2	3/8
		1	tower mounts	Pipe Mount [PM 601-1]		
70.0	70.0	1	commscope	USX6-6W-6GR	2	elliptical
		1	tower mounts	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4302832	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4721252	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4726685	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P _{allow} (K)	% Capacity	Pass / Fail
T1	288 - 268	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	3	-38.80	60.37	64.3	Pass
T2	268 - 248	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	31	-37.86	60.37	62.7	Pass
T3	248 - 228	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	60	-26.02	60.37	43.1	Pass
T4	228 - 208	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	87	-26.94	60.37	44.6	Pass
T5	208 - 188	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	114	-25.60	60.37	42.4	Pass
T6	188 - 168	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	141	-42.77	60.37	70.8	Pass
T7	168 - 148	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	168	-39.21	60.37	64.9	Pass
T8	148 - 128	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	194	-30.60	60.37	50.7	Pass
T9	128 - 108	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	221	-31.99	60.37	53.0	Pass
T10	108 - 88	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	249	-38.35	60.37	63.5	Pass
T11	88 - 68	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	276	-40.07	60.37	66.4	Pass
T12	68 - 48	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	303	-37.13	60.37	61.5	Pass
T13	48 - 28	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	330	-38.80	60.37	64.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T14	28 - 8	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	357	-39.88	60.82	65.6	Pass
T15	8 - 0	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	386	-39.35	73.01	53.9	Pass
T1	288 - 268	Diagonal	L2x2x3/16	28	-4.00	18.60	21.5 68.1 (b)	Pass
T2	268 - 248	Diagonal	L2x2x3/16	35	-2.17	18.60	11.7 32.4 (b)	Pass
T3	248 - 228	Diagonal	L2x2x3/16	62	-3.38	18.60	18.2 51.3 (b)	Pass
T4	228 - 208	Diagonal	L2x2x3/16	108	-2.37	18.60	12.8 33.9 (b)	Pass
T5	208 - 188	Diagonal	L2x2x3/16	115	2.33	20.48	11.4 37.5 (b)	Pass
T6	188 - 168	Diagonal	L2x2x3/16	148	-3.60	18.60	19.3 47.1 (b)	Pass
T7	168 - 148	Diagonal	L2x2x3/16	189	2.32	20.48	11.3 37.5 (b)	Pass
T8	148 - 128	Diagonal	L2x2x3/16	218	-0.77	18.60	4.1 13.4 (b)	Pass
T9	128 - 108	Diagonal	L2x2x3/16	227	-2.47	18.60	13.3 28.0 (b)	Pass
T10	108 - 88	Diagonal	L2x2x3/16	272	2.02	20.48	9.8 32.5 (b)	Pass
T11	88 - 68	Diagonal	L2x2x3/16	280	1.15	20.48	5.6 18.6 (b)	Pass
T12	68 - 48	Diagonal	L2x2x3/16	312	-2.98	18.60	16.0 38.3 (b)	Pass
T13	48 - 28	Diagonal	L2x2x3/16	350	2.31	20.48	11.3 37.3 (b)	Pass
T14	28 - 8	Diagonal	L2x2x3/16	363	-2.55	18.73	13.6 28.9 (b)	Pass
T15	8 - 0	Horizontal	L2x2x3/16	389	4.18	20.48	20.4 67.5 (b)	Pass
T14	28 - 8	Bottom Girt	L2x2x3/16	359	2.26	20.48	11.0 36.4 (b)	Pass
T15	8 - 0	Bottom Girt	12x7/8	393	-1.79	354.78	9.4	Pass
T1	288 - 268	Guy A@288	1/2 (ECP-23000)	418	9.47	16.95	55.9	Pass
T4	228 - 208	Guy A@228	5/8 (ECP - 23000)	429	16.01	26.71	60.0	Pass
T6	188 - 168	Guy A@173	5/8 (ECP - 23000)	435	14.95	26.71	56.0	Pass
T9	128 - 108	Guy A@113	1/2 (ECP - 23000)	441	9.10	16.95	53.7	Pass
T12	68 - 48	Guy A@53	9/16 (ECP - 23000)	447	9.00	22.05	40.8	Pass
T1	288 - 268	Guy B@288	1/2 (ECP-23000)	413	9.45	16.95	55.8	Pass
T4	228 - 208	Guy B@228	5/8 (ECP - 23000)	428	15.81	26.71	59.2	Pass
T6	188 - 168	Guy B@173	5/8 (ECP - 23000)	434	14.67	26.71	54.9	Pass
T9	128 - 108	Guy B@113	1/2 (ECP - 23000)	440	8.80	16.95	51.9	Pass
T12	68 - 48	Guy B@53	9/16 (ECP - 23000)	446	8.55	22.05	38.8	Pass
T1	288 - 268	Guy C@288	1/2 (ECP-23000)	403	9.33	16.95	55.0	Pass
T4	228 - 208	Guy C@228	5/8 (ECP - 23000)	424	16.02	26.71	60.0	Pass
T6	188 - 168	Guy C@173	5/8 (ECP - 23000)	430	14.71	26.71	55.1	Pass
T9	128 - 108	Guy C@113	1/2 (ECP - 23000)	436	8.98	16.95	53.0	Pass
T12	68 - 48	Guy C@53	9/16 (ECP - 23000)	442	8.87	22.05	40.2	Pass
T1	288 - 268	Top Guy Pull-Off@288	2L2x2x3/16	4	5.60	40.96	13.7 45.2 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P _{allow} (K)	% Capacity	Pass / Fail
T4	228 - 208	Top Guy Pull-Off@228	2L2x2x3/16x1/4	426	6.33	40.95	15.5 51.0 (b)	Pass
T6	188 - 168	Top Guy Pull-Off@173	2L2x2x3/16x1/4	432	6.07	40.95	14.8 48.9 (b)	Pass
T9	128 - 108	Top Guy Pull-Off@113	2L2x2x3/16x1/4	438	4.98	40.95	12.2 40.2 (b)	Pass
T12	68 - 48	Top Guy Pull-Off@53	2L2x2x3/16x1/4	444	5.45	40.95	13.3 44.0 (b)	Pass
T1	288 - 268	Bottom Guy Pull-Off@288	2L2x2x3/16	409	-1.69	44.61	3.8 9.6 (b)	Pass
T1	288 - 268	Torque Arm Top@288	2L3x2x3/16x3/4	406	9.96	61.24	16.3 27.1 (b)	Pass
T1	288 - 268	Torque Arm Bottom@288	2L3x2x3/16x3/4	422	-12.89	30.90	41.7	Pass
							Summary	
						Leg (T6)	70.8	Pass
						Diagonal (T1)	68.1	Pass
						Horizontal (T15)	67.5	Pass
						Bottom Girt (T14)	36.4	Pass
						Guy A (T4)	60.0	Pass
						Guy B (T4)	59.2	Pass
						Guy C (T4)	60.0	Pass
						Top Guy Pull-Off (T4)	51.0	Pass
						Bottom Guy Pull-Off (T1)	9.6	Pass
						Torque Arm Top (T1)	27.1	Pass
						Torque Arm Bottom (T1)	41.7	Pass
						Bolt Checks	64.8	Pass
						Rating =	70.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation (Structure)	0	3.6	Pass
1	Base Foundation (Soil Interaction)	0	86.4	Pass
1	Guy Anchor Foundation Structural	0	5.4	Pass
1	Guy Anchor Foundation Soil Interaction	0	32.3	Pass

Structure Rating (max from all components) =	86.4%
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Notes:

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

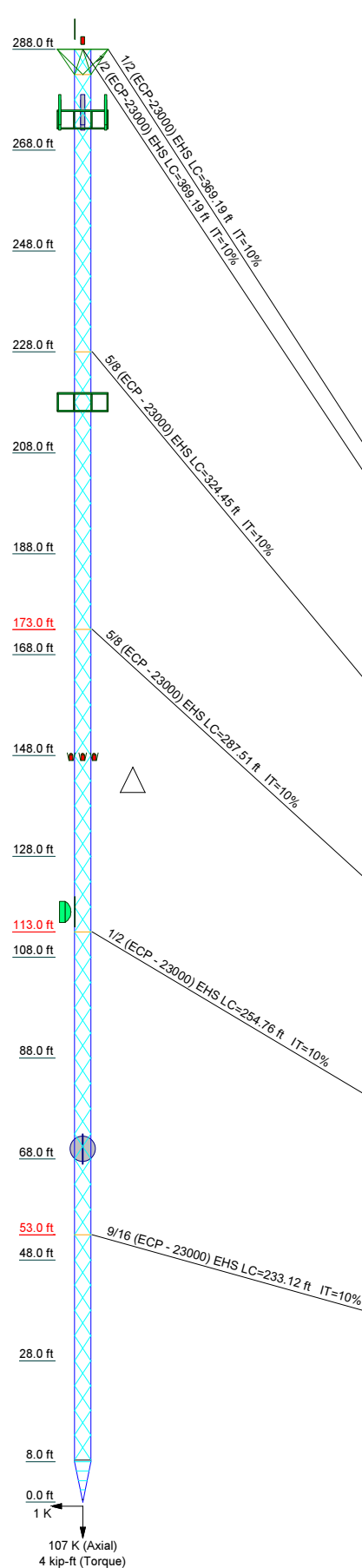
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Legs															
Leg Grade	BV_Double Bent Plate (3.25x2.375x0.25)														
Diagonals	A36														
Bottom Girts	L2x2x3/16														
Horizontals	N.A.														
Top Guy Pull-Offs	N.A.														
Bot Guy Pull-Offs	N.A.														
Face Width (ft)	N.A.														
# Panels @ (ft)	52 @ 5														
Weight (K)	B 4 @ 4.91667														
	13.0 0.3														

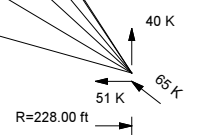



SYMBOL LIST			
MARK	SIZE	MARK	SIZE
A	L2x2x3/16	B	4 @ 1.875

MATERIAL STRENGTH					
GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

- TOWER DESIGN NOTES**
1. Tower is located in El Paso County, Colorado.
 2. Tower designed for Exposure C to the TIA-222-H Standard.
 3. Tower designed for a 130 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: 70.8%

ALL REACTIONS ARE FACTORED





CROWN CASTLE
The Pathway to Possible

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

Job: BU# 855759		
Project:		
Client: Crown Castle	Drawn by: DRossmiller	App'd:
Code: TIA-222-H	Date: 09/12/21	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 288.00 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 3.83 ft at the top and tapered at the base.

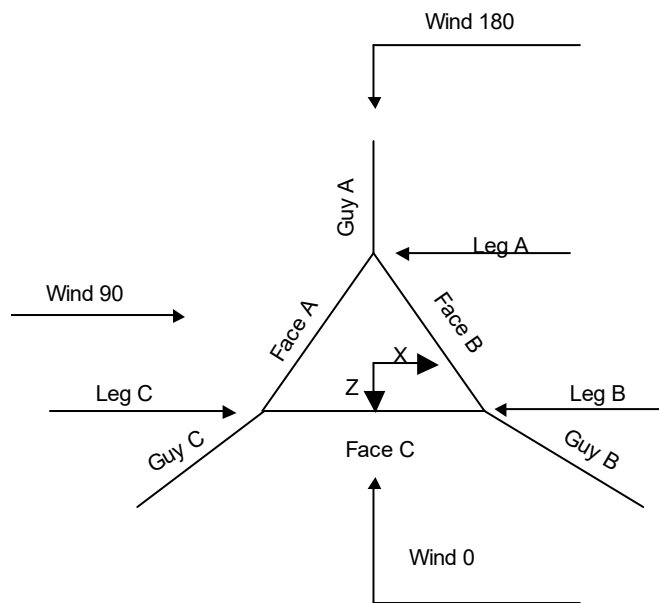
This tower is designed using the TIA-222-H standard.

The following design criteria apply:

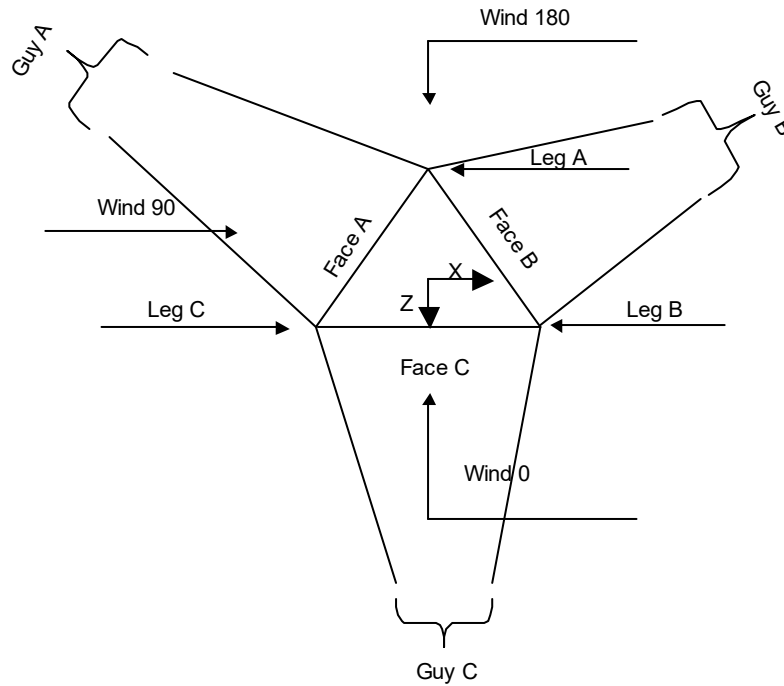
- Tower is located in El Paso County, Colorado.
- Tower base elevation above sea level: 6644.00 ft.
- Basic wind speed of 130 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 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.
- Safety factor used in guy 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.
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Exemption
√ Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-H Tension Splice
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Poles
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Include Shear-Torsion Interaction
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Always Use Sub-Critical Flow
		Use Top Mounted Sockets
		Pole Without Linear Attachments
		Pole With Shroud Or No
		Appurtenances
		Outside and Inside Corner Radii Are
		Known



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	288.00-268.00			3.83	1	20.00
T2	268.00-248.00			3.83	1	20.00
T3	248.00-228.00			3.83	1	20.00
T4	228.00-208.00			3.83	1	20.00
T5	208.00-188.00			3.83	1	20.00
T6	188.00-168.00			3.83	1	20.00
T7	168.00-148.00			3.83	1	20.00
T8	148.00-128.00			3.83	1	20.00
T9	128.00-108.00			3.83	1	20.00
T10	108.00-88.00			3.83	1	20.00
T11	88.00-68.00			3.83	1	20.00
T12	68.00-48.00			3.83	1	20.00
T13	48.00-28.00			3.83	1	20.00
T14	28.00-8.00			3.83	1	20.00
T15	8.00-0.00			3.83	1	8.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	288.00-268.00	5.00	X Brace	No	No	0.0000	0.0000
T2	268.00-248.00	5.00	X Brace	No	No	0.0000	0.0000
T3	248.00-228.00	5.00	X Brace	No	No	0.0000	0.0000
T4	228.00-208.00	5.00	X Brace	No	No	0.0000	0.0000
T5	208.00-188.00	5.00	X Brace	No	No	0.0000	0.0000
T6	188.00-168.00	5.00	X Brace	No	No	0.0000	0.0000
T7	168.00-148.00	5.00	X Brace	No	No	0.0000	0.0000
T8	148.00-128.00	5.00	X Brace	No	No	0.0000	0.0000
T9	128.00-108.00	5.00	X Brace	No	No	0.0000	0.0000
T10	108.00-88.00	5.00	X Brace	No	No	0.0000	0.0000
T11	88.00-68.00	5.00	X Brace	No	No	0.0000	0.0000
T12	68.00-48.00	5.00	X Brace	No	No	0.0000	0.0000
T13	48.00-28.00	5.00	X Brace	No	No	0.0000	0.0000
T14	28.00-8.00	4.92	X Brace	No	No	0.0000	4.0000
T15	8.00-0.00	1.88	X Brace	No	Yes	0.0000	6.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 288.00-268.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T2 268.00-248.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 248.00-228.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 228.00-208.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T5 208.00-188.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T6 188.00-168.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T7 168.00-148.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T8 148.00-128.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T9 128.00-108.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T10 108.00-88.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T11 88.00-68.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T12 68.00-48.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T13 48.00-28.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T14 28.00-8.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T15 8.00-0.00	Arbitrary Shape	BV_Double Bent Plate (3.25x2.375x0.25)	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 288.00-268.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T14 28.00-8.00	Flat Bar		A36	Equal Angle	L2x2x3/16	A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T15 8.00-0.00	Flat Bar		(36 ksi) A36 (36 ksi)	Flat Bar	12x7/8	(36 ksi) A36 (36 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
T15 8.00-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 288.00-268.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T2 268.00-248.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T3 248.00-228.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T4 228.00-208.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T5 208.00-188.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T6 188.00-168.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T7 168.00-148.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T8 148.00-128.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T9 128.00-108.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T10 108.00-88.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T11 88.00-68.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T12 68.00-48.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T13 48.00-28.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T14 28.00-8.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000
T15 8.00-0.00	0.00	0.0000	A36 (36 ksi)	1.03	1	1.03	36.0000	36.0000	36.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹						
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1 288.00-268.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 268.00-248.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 248.00-228.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 228.00-208.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 208.00-188.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 188.00-168.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 168.00-148.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 148.00-128.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 128.00-108.00	Yes	Yes	1	1	1	1	1	1	1	1
T10 108.00-88.00	Yes	Yes	1	1	1	1	1	1	1	1
T11 88.00-68.00	Yes	Yes	1	1	1	1	1	1	1	1
T12 68.00-48.00	Yes	Yes	1	1	1	1	1	1	1	1
T13 48.00-28.00	Yes	Yes	1	1	1	1	1	1	1	1
T14 28.00-8.00	Yes	Yes	1	1	1	1	1	1	1	1
T15 8.00-0.00	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 288.00-268.00	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
T2 268.00-248.00	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
T3 248.00-228.00	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
T4 228.00-208.00	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 208.00-188.00	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 188.00-168.00	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
T7 168.00-148.00	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
T8 148.00-128.00	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
T9 128.00-108.00	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 108.00-88.00	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

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
T11 88.00-68.00	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
T12 68.00-48.00	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
T13 48.00-28.00	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
T14 28.00-8.00	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
T15 8.00-0.00	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

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 288.00-268.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 268.00-248.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 248.00-228.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 228.00-208.00	0.0000	0.75	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 208.00-188.00	0.0000	0.75	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 188.00-168.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 168.00-148.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 148.00-128.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 128.00-108.00	0.0000	0.75	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 108.00-88.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 88.00-68.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 68.00-48.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 48.00-28.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 28.00-8.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 8.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 288.00-268.00	Flange	1.2500 A325N	0	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 268.00-248.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	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 248.00- 228.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 228.00- 208.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 208.00- 188.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 188.00- 168.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 168.00- 148.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 148.00- 128.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 128.00- 108.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 108.00- 88.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 88.00- 68.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T12 68.00- 48.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T13 48.00- 28.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T14 28.00- 8.00	Flange	1.2500 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T15 8.00-0.00	Flange	1.2500 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	3	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade	Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L _u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
288	EHS	A 1/2 (ECP- B 23000) C 1/2 (ECP- 23000)	2.69 2.69 2.69	10% 10% 10%	23000 23000 23000	0.517 0.517 0.517	368.92 361.83 361.83	228.00 228.00 228.00	0.0000 0.0000 0.0000	-5.00 4.00 4.00	100% 100% 100%
228	EHS	1/2 (ECP- 23000) A 5/8 (ECP - B 23000) C 5/8 (ECP - 23000) 5/8 (ECP - 23000)	4.24 4.24 4.24	10% 10% 10%	23000 23000 23000	0.813 0.813 0.813	324.22 317.82 317.82	228.00 228.00 228.00	0.0000 0.0000 0.0000	-5.00 4.00 4.00	100% 100% 100%
173	EHS	A 5/8 (ECP - B 23000) C 5/8 (ECP - 23000) 5/8 (ECP - 23000)	4.24 4.24 4.24	10% 10% 10%	23000 23000 23000	0.813 0.813 0.813	287.31 281.83 281.83	228.00 228.00 228.00	0.0000 0.0000 0.0000	-5.00 4.00 4.00	100% 100% 100%
113	EHS	A 1/2 (ECP - B 23000) C 1/2 (ECP - 23000) 1/2 (ECP - 23000)	2.69 2.69 2.69	10% 10% 10%	23000 23000 23000	0.517 0.517 0.517	254.58 250.54 250.54	228.00 228.00 228.00	0.0000 0.0000 0.0000	-5.00 4.00 4.00	100% 100% 100%
53	EHS	A 9/16 (ECP - B 23000) C 9/16 (ECP - 23000) 9/16 (ECP - 23000)	3.50 3.50 3.50	10% 10% 10%	23000 23000 23000	0.671 0.671 0.671	232.95 230.88 230.88	228.00 228.00 228.00	0.0000 0.0000 0.0000	-5.00 4.00 4.00	100% 100% 100%

Guy Data(cont'd)

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
288	Torque Arm	12.00	30.0000	Bat Ear	A36 (36 ksi)	Double Angle	2L3x2x3/16x3/4
228	Corner						
173	Corner						
113	Corner						
53	Corner						

Guy Data (cont'd)

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
288.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Angle	2L2x2x3/16
228.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Angle	2L2x2x3/16x1/4
173.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Angle	2L2x2x3/16x1/4
113.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Angle	2L2x2x3/16x1/4
53.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Angle	2L2x2x3/16x1/4

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
288	0.19	0.19	0.19		12.73 6.2 sec/pulse	12.26 6.0 sec/pulse	12.26 6.0 sec/pulse	
228	0.26	0.26	0.26		9.87 5.4 sec/pulse	9.49 5.3 sec/pulse	9.49 5.3 sec/pulse	
173	0.23	0.23	0.23		7.79 4.8 sec/pulse	7.50 4.7 sec/pulse	7.50 4.7 sec/pulse	
113	0.13	0.13	0.13		6.16 4.3 sec/pulse	5.98 4.2 sec/pulse	5.98 4.2 sec/pulse	
53	0.16	0.15	0.15		5.18 3.9 sec/pulse	5.09 3.9 sec/pulse	5.09 3.9 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm		Pull Off		Diagonal	
			K _x	K _y	K _x	K _y	K _x	K _y
288	No	No	1	1	1	1	1	1
228	No	No			1	1	1	1
173	No	No			1	1	1	1
113	No	No			1	1	1	1
53	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
288	0.5000 A325N	3	0.0000	1	0.5000 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
228	0.6250 A325N	0	0.0000	0.75	0.5000 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
173	0.6250 A325N	0	0.0000	0.75	0.5000 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
113	0.6250 A325N	0	0.0000	0.75	0.5000 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
53	0.6250 A325N	0	0.0000	0.75	0.5000 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q _z psf	q _z Ice psf	Ice Thickness in
288	A	141.50	37		
	B	146.00	38		
	C	146.00	38		
228	A	111.50	36		
	B	116.00	36		
	C	116.00	36		
173	A	84.00	34		
	B	88.50	34		
	C	88.50	34		
113	A	54.00	31		
	B	58.50	31		
	C	58.50	31		
53	A	24.00	26		
	B	28.50	27		
	C	28.50	27		

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F _x K	F _y K	F _z K	M _x kip-ft	M _y kip-ft	M _z kip-ft
288	A	52.5259	2.84 2.69	-0.04	2.29	-1.68	-7.93	10.24	-13.74
	A	52.5259	2.84 2.69	0.04	2.29	-1.68	-7.93	-10.24	13.74
	B	51.6595	2.84	1.51	2.26	0.82	15.66	10.44	0.00

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
228	B	51.6595	2.69						
			2.84	1.46	2.26	0.90	-7.83	-10.44	-13.56
	C	51.6595	2.69						
			2.84	-1.46	2.26	0.90	-7.83	10.44	13.56
	C	51.6595	2.69						
			2.84	-1.51	2.26	0.82	15.66	-10.44	0.00
	A	45.9007	2.69						
			Sum:	0.00	13.62	0.06	-0.20	0.00	0.00
			4.43	0.00	3.24	-3.02	-7.18	0.00	0.00
			4.24						
173	B	44.7724	4.42	2.66	3.18	1.54	3.52	0.00	-6.09
			4.24						
	C	44.7724	4.42	-2.66	3.18	1.54	3.52	-0.00	6.09
			4.24						
	A	38.2506	Sum:	0.00	9.60	0.06	-0.14	0.00	0.00
			4.38	0.00	2.79	-3.39	-6.17	0.00	0.00
			4.24						
			4.38	2.99	2.70	1.72	2.98	0.00	-5.17
	C	36.8146	4.24						
			4.38	-2.99	2.70	1.72	2.98	-0.00	5.17
113	A	27.5923	4.24						
			Sum:	0.00	8.18	0.06	-0.20	0.00	0.00
			2.75	0.00	1.33	-2.41	-2.93	0.00	0.00
	B	25.7692	2.69						
			2.75	2.12	1.25	1.22	1.38	0.00	-2.39
	C	25.7692	2.69						
			2.75	-2.12	1.25	1.22	1.38	-0.00	2.39
	A	14.4066	2.69						
			Sum:	0.00	3.82	0.04	-0.18	0.00	0.00
			3.54	0.00	0.95	-3.41	-2.11	0.00	0.00
			3.50						
53	B	12.2444	3.53	2.98	0.82	1.72	0.91	0.00	-1.58
			3.50						
	C	12.2444	3.53	-2.98	0.82	1.72	0.91	-0.00	1.58
			3.50						
	Sum:		Sum:	0.00	2.60	0.03	-0.29	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
288	A	52.5259	2.84	-0.04	2.29	-1.68	-7.93	10.24	-13.74
			2.69						
	A	52.5259	2.84	0.04	2.29	-1.68	-7.93	-10.24	13.74
			2.69						
	B	51.6595	2.84	1.51	2.26	0.82	15.66	10.44	0.00
			2.69						
	B	51.6595	2.84	1.46	2.26	0.90	-7.83	-10.44	-13.56
			2.69						
	C	51.6595	2.84	-1.46	2.26	0.90	-7.83	10.44	13.56
			2.69						
228	C	51.6595	2.84	-1.51	2.26	0.82	15.66	-10.44	0.00
			2.69						
	A	45.9007	Sum:	0.00	13.62	0.06	-0.20	0.00	0.00
			4.43	0.00	3.24	-3.02	-7.18	0.00	0.00
			4.24						
			4.42	2.66	3.18	1.54	3.52	0.00	-6.09
	C	44.7724	4.24						
			4.42	-2.66	3.18	1.54	3.52	-0.00	6.09
	Sum:		Sum:	0.00	2.60	0.03	-0.29	0.00	0.00

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom	F _x	F _y	F _z	M _x	M _y	M _z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
173	A	38.2506	Sum:	0.00	9.60	0.06	-0.14	0.00	0.00
			4.38	0.00	2.79	-3.39	-6.17	0.00	0.00
			4.24						
	B	36.8146	4.38	2.99	2.70	1.72	2.98	0.00	-5.17
			4.24						
			4.38	-2.99	2.70	1.72	2.98	-0.00	5.17
	C	36.8146	4.24						
			Sum:	0.00	8.18	0.06	-0.20	0.00	0.00
			2.75	0.00	1.33	-2.41	-2.93	0.00	0.00
	A	27.5923	2.69						
			2.75	2.12	1.25	1.22	1.38	0.00	-2.39
			2.69						
	B	25.7692	2.75	-2.12	1.25	1.22	1.38	-0.00	2.39
			2.69						
			Sum:	0.00	3.82	0.04	-0.18	0.00	0.00
53	A	14.4066	3.54	0.00	0.95	-3.41	-2.11	0.00	0.00
			3.50						
			3.53	2.98	0.82	1.72	0.91	0.00	-1.58
	B	12.2444	3.50						
			3.53	-2.98	0.82	1.72	0.91	-0.00	1.58
			3.50						
	C	12.2444	Sum:	0.00	2.60	0.03	-0.29	0.00	0.00

Guy-Tensioning Information

Temperature At Time Of Tensioning																
Guy Elevation ft	H ft	V ft	0 F		20 F		40 F		60 F		80 F		100 F		120 F	
			Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft
288	A	224.62	3.124	11.00	2.977	11.53	2.832	12.11	2.690	12.73	2.552	13.41	2.417	14.13	2.286	14.92
	B	224.62	284.00	3.141	10.53	2.988	11.06	2.837	11.64	2.690	12.26	2.546	12.93	2.406	13.66	2.271
	C	224.62	284.00	3.141	10.53	2.988	11.06	2.837	11.64	2.690	12.26	2.546	12.93	2.406	13.66	2.271
228	A	225.79	233.00	5.139	8.17	4.833	8.68	4.532	9.24	4.240	9.87	3.957	10.56	3.684	11.32	3.424
	B	225.79	224.00	5.177	7.80	4.857	8.30	4.545	8.86	4.240	9.49	3.945	10.18	3.663	10.95	3.394
	C	225.79	224.00	5.177	7.80	4.857	8.30	4.545	8.86	4.240	9.49	3.945	10.18	3.663	10.95	3.394
173	A	225.79	178.00	5.391	6.15	4.997	6.62	4.612	7.17	4.240	7.79	3.883	8.49	3.544	9.29	3.226
	B	225.79	169.00	5.437	5.87	5.027	6.34	4.627	6.88	4.240	7.50	3.869	8.21	3.518	9.01	3.191
	C	225.79	169.00	5.437	5.87	5.027	6.34	4.627	6.88	4.240	7.50	3.869	8.21	3.518	9.01	3.191
113	A	225.79	118.00	3.628	4.58	3.305	5.03	2.992	5.55	2.690	6.16	2.404	6.89	2.138	7.74	1.897
	B	225.79	109.00	3.660	4.40	3.326	4.84	3.002	5.36	2.690	5.98	2.395	6.70	2.122	7.56	1.875
	C	225.79	109.00	3.660	4.40	3.326	4.84	3.002	5.36	2.690	5.98	2.395	6.70	2.122	7.56	1.875
53	A	225.79	58.00	4.964	3.65	4.459	4.07	3.969	4.57	3.500	5.18	3.060	5.92	2.660	6.81	2.308
	B	225.79	49.00	4.992	3.57	4.477	3.98	3.978	4.48	3.500	5.09	3.053	5.83	2.646	6.73	2.292
	C	225.79	49.00	4.992	3.57	4.477	3.98	3.978	4.48	3.500	5.09	3.053	5.83	2.646	6.73	2.292

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacin g in	Width or Diameter in	Perimete r in	Weight plf
Climbing Ladder (Af)	C	No	No	Af (CaAa)	288.00 - 7.50	-	-0.3	1	1	3.0000	3.0000		8.40
Safety Line 3/8 ***	C	No	No	Ar (CaAa)	288.00 - 7.00	-	-0.3	1	1	0.3750	0.3750		0.22
LDF7-50A(1- 5/8)	A	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.2	4	2	0.5000	1.9800		0.82
LDF7-50A(1- 5/8)	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	-0.2	2	2	0.5000	1.9800		0.82

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
2" Rigid Steel Conduit	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.35	2	2	0.5000	2.3750		3.32
FB-L98-002- XXX(3/8)	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.35	1	1	0.3937	0.0000		0.06
WR- VG86T(3/4)	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.35	2	2	0.5000	0.0000		0.53
FB-L98-002- XXX(3/8)	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.275	1	1	0.3937	0.3937		0.06
WR- VG86T(3/4)	B	No	No	Ar (CaAa)	274.00 - 3.00	0.0000	0.275	2	2	0.5000	0.7560		0.53
LDF1- 50A(1/4)	B	No	No	Ar (CaAa)	274.00 - 3.00	- 1.0000	0.35	1	1	0.3450	0.3450		0.06

12 PAIR(3/8)	C	No	No	Ar (CaAa)	157.00 - 3.00	0.0000	-0.35	2	2	0.4000	0.4000		0.08

1/2 Tower Lighting	A	No	No	Ar (CaAa)	288.00 - 3.00	0.0000	0.49	2	2	0.5000	0.6300		0.15
3/8 Tower Lighting	C	No	No	Ar (CaAa)	288.00 - 146.00	0.0000	0.49	1	1	0.4400	0.4400		0.08
3/8 Tower Lighting	C	No	No	Ar (CaAa)	146.00 - 3.00	0.0000	0.49	2	2	0.4400	0.4400		0.08

EW63(ELLIP TICAL)	B	No	No	Ar (CaAa)	70.00 - 0.00	0.0000	-0.35	2	2	1.0000 2.0100	2.0100		0.51
LDF2-50(3/8)	A	No	No	Ar (CaAa)	117.00 - 0.00	5.0000	0.2	2	2	0.4400	0.4400		0.08
CU12PSM6P 4XXX(1-3/4)	B	No	No	Ar (CaAa)	218.00 - 0.00	0.0000	-0.47	1	1	1.0000	1.7500		2.72

Feed Line/Linear Appurtenances - Entered As Area

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	CAAA In Face ft ²	CAAA Out Face ft ²	Weight K
T1	288.00-268.00	A	0.000	0.000	7.272	0.000	0.03
		B	0.000	0.000	6.576	0.000	0.06
		C	0.000	0.000	11.630	0.000	0.17
T2	268.00-248.00	A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	21.921	0.000	0.21
		C	0.000	0.000	11.630	0.000	0.17
T3	248.00-228.00	A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	21.921	0.000	0.21
		C	0.000	0.000	11.630	0.000	0.17
T4	228.00-208.00	A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	23.671	0.000	0.24
		C	0.000	0.000	11.630	0.000	0.17
T5	208.00-188.00	A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27

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
T6	188.00-168.00	C	0.000	0.000	11.630	0.000	0.17
		A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27
T7	168.00-148.00	C	0.000	0.000	11.630	0.000	0.17
		A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27
T8	148.00-128.00	C	0.000	0.000	12.350	0.000	0.18
		A	0.000	0.000	18.360	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27
T9	128.00-108.00	C	0.000	0.000	14.022	0.000	0.18
		A	0.000	0.000	19.152	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27
T10	108.00-88.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	20.120	0.000	0.07
		B	0.000	0.000	25.421	0.000	0.27
T11	88.00-68.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	20.120	0.000	0.07
		B	0.000	0.000	26.225	0.000	0.27
T12	68.00-48.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	20.120	0.000	0.07
		B	0.000	0.000	33.461	0.000	0.29
T13	48.00-28.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	20.120	0.000	0.07
		B	0.000	0.000	33.461	0.000	0.29
T14	28.00-8.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	20.120	0.000	0.07
		B	0.000	0.000	33.461	0.000	0.29
T15	8.00-0.00	C	0.000	0.000	14.110	0.000	0.18
		A	0.000	0.000	5.294	0.000	0.02
		B	0.000	0.000	10.096	0.000	0.08
		C	0.000	0.000	1.127	0.000	0.01

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	288.00-268.00	1.5040	-0.5441	1.5040	-0.5441
T2	268.00-248.00	2.4066	-1.7957	2.4066	-1.7957
T3	248.00-228.00	2.4066	-1.7957	2.4066	-1.7957
T4	228.00-208.00	2.3569	-2.1470	2.3569	-2.1470
T5	208.00-188.00	2.3785	-2.5449	2.3785	-2.5449
T6	188.00-168.00	2.3438	-2.5112	2.3438	-2.5112
T7	168.00-148.00	2.4606	-2.4809	2.4606	-2.4809
T8	148.00-128.00	2.3967	-2.3755	2.3967	-2.3755
T9	128.00-108.00	2.2627	-2.4432	2.2627	-2.4432
T10	108.00-88.00	2.1948	-2.5994	2.1948	-2.5994
T11	88.00-68.00	2.2066	-2.7276	2.2066	-2.7276
T12	68.00-48.00	2.2763	-3.7602	2.2763	-3.7602
T13	48.00-28.00	2.3071	-3.8062	2.3071	-3.8062
T14	28.00-8.00	2.2804	-3.7665	2.2804	-3.7665
T15	8.00-0.00	1.3887	-3.4751	1.3887	-3.4751

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Climbing Ladder (Af)	268.00 - 288.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	2	Safety Line 3/8	268.00 - 288.00	0.6000	0.6000
T1	4	LDF7-50A(1-5/8)	268.00 - 274.00	0.6000	0.6000
T1	5	LDF7-50A(1-5/8)	268.00 - 274.00	0.6000	0.6000
T1	6	2" Rigid Steel Conduit	268.00 - 274.00	0.6000	0.6000
T1	7	FB-L98-002-XXX(3/8)	268.00 - 274.00	0.6000	0.6000
T1	8	WR-VG86T(3/4)	268.00 - 274.00	0.6000	0.6000
T1	9	FB-L98-002-XXX(3/8)	268.00 - 274.00	0.6000	0.6000
T1	10	WR-VG86T(3/4)	268.00 - 274.00	0.6000	0.6000
T1	11	LDF1-50A(1/4)	268.00 - 274.00	0.6000	0.6000
T1	15	1/2 Tower Lighting	268.00 - 288.00	0.6000	0.6000
T1	16	3/8 Tower Lighting	268.00 - 288.00	0.6000	0.6000
T2	1	Climbing Ladder (Af)	248.00 - 268.00	0.6000	0.6000
T2	2	Safety Line 3/8	248.00 - 268.00	0.6000	0.6000
T2	4	LDF7-50A(1-5/8)	248.00 - 268.00	0.6000	0.6000
T2	5	LDF7-50A(1-5/8)	248.00 - 268.00	0.6000	0.6000
T2	6	2" Rigid Steel Conduit	248.00 - 268.00	0.6000	0.6000
T2	7	FB-L98-002-XXX(3/8)	248.00 - 268.00	0.6000	0.6000
T2	8	WR-VG86T(3/4)	248.00 - 268.00	0.6000	0.6000
T2	9	FB-L98-002-XXX(3/8)	248.00 - 268.00	0.6000	0.6000
T2	10	WR-VG86T(3/4)	248.00 - 268.00	0.6000	0.6000
T2	11	LDF1-50A(1/4)	248.00 - 268.00	0.6000	0.6000
T2	15	1/2 Tower Lighting	248.00 - 268.00	0.6000	0.6000
T2	16	3/8 Tower Lighting	248.00 - 268.00	0.6000	0.6000
T3	1	Climbing Ladder (Af)	228.00 - 248.00	0.6000	0.6000
T3	2	Safety Line 3/8	228.00 - 248.00	0.6000	0.6000
T3	4	LDF7-50A(1-5/8)	228.00 - 248.00	0.6000	0.6000
T3	5	LDF7-50A(1-5/8)	228.00 - 248.00	0.6000	0.6000
T3	6	2" Rigid Steel Conduit	228.00 - 248.00	0.6000	0.6000
T3	7	FB-L98-002-XXX(3/8)	228.00 - 248.00	0.6000	0.6000
T3	8	WR-VG86T(3/4)	228.00 - 248.00	0.6000	0.6000
T3	9	FB-L98-002-XXX(3/8)	228.00 - 248.00	0.6000	0.6000
T3	10	WR-VG86T(3/4)	228.00 - 248.00	0.6000	0.6000
T3	11	LDF1-50A(1/4)	228.00 - 248.00	0.6000	0.6000
T3	15	1/2 Tower Lighting	228.00 - 248.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T3	16	3/8 Tower Lighting	228.00 - 248.00	0.6000	0.6000
T4	1	Climbing Ladder (Af)	208.00 - 228.00	0.6000	0.6000
T4	2	Safety Line 3/8	208.00 - 228.00	0.6000	0.6000
T4	4	LDF7-50A(1-5/8)	208.00 - 228.00	0.6000	0.6000
T4	5	LDF7-50A(1-5/8)	208.00 - 228.00	0.6000	0.6000
T4	6	2" Rigid Steel Conduit	208.00 - 228.00	0.6000	0.6000
T4	7	FB-L98-002-XXX(3/8)	208.00 - 228.00	0.6000	0.6000
T4	8	WR-VG86T(3/4)	208.00 - 228.00	0.6000	0.6000
T4	9	FB-L98-002-XXX(3/8)	208.00 - 228.00	0.6000	0.6000
T4	10	WR-VG86T(3/4)	208.00 - 228.00	0.6000	0.6000
T4	11	LDF1-50A(1/4)	208.00 - 228.00	0.6000	0.6000
T4	15	1/2 Tower Lighting	208.00 - 228.00	0.6000	0.6000
T4	16	3/8 Tower Lighting	208.00 - 228.00	0.6000	0.6000
T4	21	CU12PSM6P4XXX(1-3/4)	208.00 - 218.00	0.6000	0.6000
T5	1	Climbing Ladder (Af)	188.00 - 208.00	0.6000	0.6000
T5	2	Safety Line 3/8	188.00 - 208.00	0.6000	0.6000
T5	4	LDF7-50A(1-5/8)	188.00 - 208.00	0.6000	0.6000
T5	5	LDF7-50A(1-5/8)	188.00 - 208.00	0.6000	0.6000
T5	6	2" Rigid Steel Conduit	188.00 - 208.00	0.6000	0.6000
T5	7	FB-L98-002-XXX(3/8)	188.00 - 208.00	0.6000	0.6000
T5	8	WR-VG86T(3/4)	188.00 - 208.00	0.6000	0.6000
T5	9	FB-L98-002-XXX(3/8)	188.00 - 208.00	0.6000	0.6000
T5	10	WR-VG86T(3/4)	188.00 - 208.00	0.6000	0.6000
T5	11	LDF1-50A(1/4)	188.00 - 208.00	0.6000	0.6000
T5	15	1/2 Tower Lighting	188.00 - 208.00	0.6000	0.6000
T5	16	3/8 Tower Lighting	188.00 - 208.00	0.6000	0.6000
T5	21	CU12PSM6P4XXX(1-3/4)	188.00 - 208.00	0.6000	0.6000
T6	1	Climbing Ladder (Af)	168.00 - 188.00	0.6000	0.6000
T6	2	Safety Line 3/8	168.00 - 188.00	0.6000	0.6000
T6	4	LDF7-50A(1-5/8)	168.00 - 188.00	0.6000	0.6000
T6	5	LDF7-50A(1-5/8)	168.00 - 188.00	0.6000	0.6000
T6	6	2" Rigid Steel Conduit	168.00 - 188.00	0.6000	0.6000
T6	7	FB-L98-002-XXX(3/8)	168.00 - 188.00	0.6000	0.6000
T6	8	WR-VG86T(3/4)	168.00 - 188.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T6	9	FB-L98-002-XXX(3/8)	168.00 - 188.00	0.6000	0.6000
T6	10	WR-VG86T(3/4)	168.00 - 188.00	0.6000	0.6000
T6	11	LDF1-50A(1/4)	168.00 - 188.00	0.6000	0.6000
T6	15	1/2 Tower Lighting	168.00 - 188.00	0.6000	0.6000
T6	16	3/8 Tower Lighting	168.00 - 188.00	0.6000	0.6000
T6	21	CU12PSM6P4XXX(1-3/4)	168.00 - 188.00	0.6000	0.6000
T7	1	Climbing Ladder (Af)	148.00 - 168.00	0.6000	0.6000
T7	2	Safety Line 3/8	148.00 - 168.00	0.6000	0.6000
T7	4	LDF7-50A(1-5/8)	148.00 - 168.00	0.6000	0.6000
T7	5	LDF7-50A(1-5/8)	148.00 - 168.00	0.6000	0.6000
T7	6	2" Rigid Steel Conduit	148.00 - 168.00	0.6000	0.6000
T7	7	FB-L98-002-XXX(3/8)	148.00 - 168.00	0.6000	0.6000
T7	8	WR-VG86T(3/4)	148.00 - 168.00	0.6000	0.6000
T7	9	FB-L98-002-XXX(3/8)	148.00 - 168.00	0.6000	0.6000
T7	10	WR-VG86T(3/4)	148.00 - 168.00	0.6000	0.6000
T7	11	LDF1-50A(1/4)	148.00 - 168.00	0.6000	0.6000
T7	13	12 PAIR(3/8)	148.00 - 157.00	0.6000	0.6000
T7	15	1/2 Tower Lighting	148.00 - 168.00	0.6000	0.6000
T7	16	3/8 Tower Lighting	148.00 - 168.00	0.6000	0.6000
T7	21	CU12PSM6P4XXX(1-3/4)	148.00 - 168.00	0.6000	0.6000
T8	1	Climbing Ladder (Af)	128.00 - 148.00	0.6000	0.6000
T8	2	Safety Line 3/8	128.00 - 148.00	0.6000	0.6000
T8	4	LDF7-50A(1-5/8)	128.00 - 148.00	0.6000	0.6000
T8	5	LDF7-50A(1-5/8)	128.00 - 148.00	0.6000	0.6000
T8	6	2" Rigid Steel Conduit	128.00 - 148.00	0.6000	0.6000
T8	7	FB-L98-002-XXX(3/8)	128.00 - 148.00	0.6000	0.6000
T8	8	WR-VG86T(3/4)	128.00 - 148.00	0.6000	0.6000
T8	9	FB-L98-002-XXX(3/8)	128.00 - 148.00	0.6000	0.6000
T8	10	WR-VG86T(3/4)	128.00 - 148.00	0.6000	0.6000
T8	11	LDF1-50A(1/4)	128.00 - 148.00	0.6000	0.6000
T8	13	12 PAIR(3/8)	128.00 - 148.00	0.6000	0.6000
T8	15	1/2 Tower Lighting	128.00 - 148.00	0.6000	0.6000
T8	16	3/8 Tower Lighting	146.00 - 148.00	0.6000	0.6000
T8	17	3/8 Tower Lighting	128.00 - 146.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T8	21	CU12PSM6P4XXX(1-3/4)	128.00 - 148.00	0.6000	0.6000
T9	1	Climbing Ladder (Af)	108.00 - 128.00	0.6000	0.6000
T9	2	Safety Line 3/8	108.00 - 128.00	0.6000	0.6000
T9	4	LDF7-50A(1-5/8)	108.00 - 128.00	0.6000	0.6000
T9	5	LDF7-50A(1-5/8)	108.00 - 128.00	0.6000	0.6000
T9	6	2" Rigid Steel Conduit	108.00 - 128.00	0.6000	0.6000
T9	7	FB-L98-002-XXX(3/8)	108.00 - 128.00	0.6000	0.6000
T9	8	WR-VG86T(3/4)	108.00 - 128.00	0.6000	0.6000
T9	9	FB-L98-002-XXX(3/8)	108.00 - 128.00	0.6000	0.6000
T9	10	WR-VG86T(3/4)	108.00 - 128.00	0.6000	0.6000
T9	11	LDF1-50A(1/4)	108.00 - 128.00	0.6000	0.6000
T9	13	12 PAIR(3/8)	108.00 - 128.00	0.6000	0.6000
T9	15	1/2 Tower Lighting	108.00 - 128.00	0.6000	0.6000
T9	17	3/8 Tower Lighting	108.00 - 128.00	0.6000	0.6000
T9	20	LDF2-50(3/8)	108.00 - 117.00	0.6000	0.6000
T9	21	CU12PSM6P4XXX(1-3/4)	108.00 - 128.00	0.6000	0.6000
T10	1	Climbing Ladder (Af)	88.00 - 108.00	0.6000	0.6000
T10	2	Safety Line 3/8	88.00 - 108.00	0.6000	0.6000
T10	4	LDF7-50A(1-5/8)	88.00 - 108.00	0.6000	0.6000
T10	5	LDF7-50A(1-5/8)	88.00 - 108.00	0.6000	0.6000
T10	6	2" Rigid Steel Conduit	88.00 - 108.00	0.6000	0.6000
T10	7	FB-L98-002-XXX(3/8)	88.00 - 108.00	0.6000	0.6000
T10	8	WR-VG86T(3/4)	88.00 - 108.00	0.6000	0.6000
T10	9	FB-L98-002-XXX(3/8)	88.00 - 108.00	0.6000	0.6000
T10	10	WR-VG86T(3/4)	88.00 - 108.00	0.6000	0.6000
T10	11	LDF1-50A(1/4)	88.00 - 108.00	0.6000	0.6000
T10	13	12 PAIR(3/8)	88.00 - 108.00	0.6000	0.6000
T10	15	1/2 Tower Lighting	88.00 - 108.00	0.6000	0.6000
T10	17	3/8 Tower Lighting	88.00 - 108.00	0.6000	0.6000
T10	20	LDF2-50(3/8)	88.00 - 108.00	0.6000	0.6000
T10	21	CU12PSM6P4XXX(1-3/4)	88.00 - 108.00	0.6000	0.6000
T11	1	Climbing Ladder (Af)	68.00 - 88.00	0.6000	0.6000
T11	2	Safety Line 3/8	68.00 - 88.00	0.6000	0.6000
T11	4	LDF7-50A(1-5/8)	68.00 - 88.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T11	5	LDF7-50A(1-5/8)	68.00 - 88.00	0.6000	0.6000
T11	6	2" Rigid Steel Conduit	68.00 - 88.00	0.6000	0.6000
T11	7	FB-L98-002-XXX(3/8)	68.00 - 88.00	0.6000	0.6000
T11	8	WR-VG86T(3/4)	68.00 - 88.00	0.6000	0.6000
T11	9	FB-L98-002-XXX(3/8)	68.00 - 88.00	0.6000	0.6000
T11	10	WR-VG86T(3/4)	68.00 - 88.00	0.6000	0.6000
T11	11	LDF1-50A(1/4)	68.00 - 88.00	0.6000	0.6000
T11	13	12 PAIR(3/8)	68.00 - 88.00	0.6000	0.6000
T11	15	1/2 Tower Lighting	68.00 - 88.00	0.6000	0.6000
T11	17	3/8 Tower Lighting	68.00 - 88.00	0.6000	0.6000
T11	19	EW63(ELLIPTICAL)	68.00 - 70.00	0.6000	0.6000
T11	20	LDF2-50(3/8)	68.00 - 88.00	0.6000	0.6000
T11	21	CU12PSM6P4XXX(1-3/4)	68.00 - 88.00	0.6000	0.6000
T12	1	Climbing Ladder (Af)	48.00 - 68.00	0.6000	0.6000
T12	2	Safety Line 3/8	48.00 - 68.00	0.6000	0.6000
T12	4	LDF7-50A(1-5/8)	48.00 - 68.00	0.6000	0.6000
T12	5	LDF7-50A(1-5/8)	48.00 - 68.00	0.6000	0.6000
T12	6	2" Rigid Steel Conduit	48.00 - 68.00	0.6000	0.6000
T12	7	FB-L98-002-XXX(3/8)	48.00 - 68.00	0.6000	0.6000
T12	8	WR-VG86T(3/4)	48.00 - 68.00	0.6000	0.6000
T12	9	FB-L98-002-XXX(3/8)	48.00 - 68.00	0.6000	0.6000
T12	10	WR-VG86T(3/4)	48.00 - 68.00	0.6000	0.6000
T12	11	LDF1-50A(1/4)	48.00 - 68.00	0.6000	0.6000
T12	13	12 PAIR(3/8)	48.00 - 68.00	0.6000	0.6000
T12	15	1/2 Tower Lighting	48.00 - 68.00	0.6000	0.6000
T12	17	3/8 Tower Lighting	48.00 - 68.00	0.6000	0.6000
T12	19	EW63(ELLIPTICAL)	48.00 - 68.00	0.6000	0.6000
T12	20	LDF2-50(3/8)	48.00 - 68.00	0.6000	0.6000
T12	21	CU12PSM6P4XXX(1-3/4)	48.00 - 68.00	0.6000	0.6000
T13	1	Climbing Ladder (Af)	28.00 - 48.00	0.6000	0.6000
T13	2	Safety Line 3/8	28.00 - 48.00	0.6000	0.6000
T13	4	LDF7-50A(1-5/8)	28.00 - 48.00	0.6000	0.6000
T13	5	LDF7-50A(1-5/8)	28.00 - 48.00	0.6000	0.6000
T13	6	2" Rigid Steel Conduit	28.00 - 48.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T13	7	FB-L98-002-XXX(3/8)	28.00 - 48.00	0.6000	0.6000
T13	8	WR-VG86T(3/4)	28.00 - 48.00	0.6000	0.6000
T13	9	FB-L98-002-XXX(3/8)	28.00 - 48.00	0.6000	0.6000
T13	10	WR-VG86T(3/4)	28.00 - 48.00	0.6000	0.6000
T13	11	LDF1-50A(1/4)	28.00 - 48.00	0.6000	0.6000
T13	13	12 PAIR(3/8)	28.00 - 48.00	0.6000	0.6000
T13	15	1/2 Tower Lighting	28.00 - 48.00	0.6000	0.6000
T13	17	3/8 Tower Lighting	28.00 - 48.00	0.6000	0.6000
T13	19	EW63(ELLIPTICAL)	28.00 - 48.00	0.6000	0.6000
T13	20	LDF2-50(3/8)	28.00 - 48.00	0.6000	0.6000
T13	21	CU12PSM6P4XXX(1-3/4)	28.00 - 48.00	0.6000	0.6000
T14	1	Climbing Ladder (Af)	8.00 - 28.00	0.6000	0.6000
T14	2	Safety Line 3/8	8.00 - 28.00	0.6000	0.6000
T14	4	LDF7-50A(1-5/8)	8.00 - 28.00	0.6000	0.6000
T14	5	LDF7-50A(1-5/8)	8.00 - 28.00	0.6000	0.6000
T14	6	2" Rigid Steel Conduit	8.00 - 28.00	0.6000	0.6000
T14	7	FB-L98-002-XXX(3/8)	8.00 - 28.00	0.6000	0.6000
T14	8	WR-VG86T(3/4)	8.00 - 28.00	0.6000	0.6000
T14	9	FB-L98-002-XXX(3/8)	8.00 - 28.00	0.6000	0.6000
T14	10	WR-VG86T(3/4)	8.00 - 28.00	0.6000	0.6000
T14	11	LDF1-50A(1/4)	8.00 - 28.00	0.6000	0.6000
T14	13	12 PAIR(3/8)	8.00 - 28.00	0.6000	0.6000
T14	15	1/2 Tower Lighting	8.00 - 28.00	0.6000	0.6000
T14	17	3/8 Tower Lighting	8.00 - 28.00	0.6000	0.6000
T14	19	EW63(ELLIPTICAL)	8.00 - 28.00	0.6000	0.6000
T14	20	LDF2-50(3/8)	8.00 - 28.00	0.6000	0.6000
T14	21	CU12PSM6P4XXX(1-3/4)	8.00 - 28.00	0.6000	0.6000
T15	1	Climbing Ladder (Af)	7.50 - 8.00	0.6000	0.6000
T15	2	Safety Line 3/8	7.00 - 8.00	0.6000	0.6000
T15	4	LDF7-50A(1-5/8)	3.00 - 8.00	0.6000	0.6000
T15	5	LDF7-50A(1-5/8)	3.00 - 8.00	0.6000	0.6000
T15	6	2" Rigid Steel Conduit	3.00 - 8.00	0.6000	0.6000
T15	7	FB-L98-002-XXX(3/8)	3.00 - 8.00	0.6000	0.6000
T15	8	WR-VG86T(3/4)	3.00 - 8.00	0.6000	0.6000
T15	9	FB-L98-002-XXX(3/8)	3.00 - 8.00	0.6000	0.6000
T15	10	WR-VG86T(3/4)	3.00 - 8.00	0.6000	0.6000
T15	11	LDF1-50A(1/4)	3.00 - 8.00	0.6000	0.6000
T15	13	12 PAIR(3/8)	3.00 - 8.00	0.6000	0.6000
T15	15	1/2 Tower Lighting	3.00 - 8.00	0.6000	0.6000
T15	17	3/8 Tower Lighting	3.00 - 8.00	0.6000	0.6000
T15	19	EW63(ELLIPTICAL)	0.00 - 8.00	0.6000	0.6000
T15	20	LDF2-50(3/8)	0.00 - 8.00	0.6000	0.6000
T15	21	CU12PSM6P4XXX(1-3/4)	0.00 - 8.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
Lightning Rod 5/8"x6'	C	From Leg	0.00 0.00 3.00	0.0000	289.00
Flash Beacon Lighting	C	None		0.0000	289.00
Beacon side markers	A	From Leg	1.00 0.00 0.00	0.0000	147.00
Beacon side markers	B	From Leg	1.00 0.00 0.00	0.0000	147.00
Beacon side markers	C	From Leg	1.00 0.00 0.00	0.0000	147.00
12"x10"x4" Junction Box	B	From Face	0.00 1.50 0.00	0.0000	145.00

Sector Mount [SM 201-3]	C	None		0.0000	274.00
Pipe Mount [PM 601-3]	C	None		0.0000	274.00
(2) TPA65R-BU8D w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	274.00
(2) TPA65R-BU8D w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	274.00
(2) TPA65R-BU8D w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	274.00
P65-15-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	274.00
P65-15-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	274.00
P65-15-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	274.00
AHCA	A	From Leg	4.00 0.00 1.00	0.0000	274.00
AHCA	B	From Leg	4.00 0.00 1.00	0.0000	274.00
AHCA	C	From Leg	4.00 0.00 1.00	0.0000	274.00
AHLBA	A	From Leg	4.00 0.00 1.00	0.0000	274.00
AHLBA	B	From Leg	4.00 0.00 1.00	0.0000	274.00
AHLBA	C	From Leg	4.00 0.00 1.00	0.0000	274.00
DC6-48-60-18-8F	C	From Leg	1.00 1.00 0.00	0.0000	274.00
DC6-48-60-18-8F	B	From Leg	1.00 0.00 1.00	0.0000	274.00
B25 RRH4X30-4R	A	From Leg	4.00 0.00 1.00	0.0000	274.00
B25 RRH4X30-4R	B	From Leg	4.00	0.0000	274.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.00		
B25 RRH4X30-4R	C	From Leg	1.00 4.00	0.0000	274.00
			0.00		
TT19-08BP111-001	A	From Leg	1.00 4.00	0.0000	274.00
			0.00		
TT19-08BP111-001	B	From Leg	1.00 4.00	0.0000	274.00
			0.00		
TT19-08BP111-001	C	From Leg	1.00 4.00	0.0000	274.00
			0.00		
***			1.00		

Pipe Mount [PM 601-1]	C	From Leg	0.00	0.0000	117.00
			0.00		
***			0.00		
Pipe Mount [PM 601-1]	A	From Leg	0.00	0.0000	70.00
			0.00		
**			0.00		
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	218.00
			0.00		
MX08FRO665-21 w/ Mount Pipe	B	From Leg	0.00 4.00	0.0000	218.00
			0.00		
MX08FRO665-21 w/ Mount Pipe	C	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B604	A	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B604	B	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B604	C	From Leg	0.00 4.00	0.0000	218.00
			0.00		
RDIDC-9181-PF-48	A	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B605	A	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B605	B	From Leg	0.00 4.00	0.0000	218.00
			0.00		
TA08025-B605	C	From Leg	0.00 4.00	0.0000	218.00
			0.00		
Sabre C10837002C-32788 (3)	C	None	0.00	0.0000	218.00
(3) 8' x 2" Mount Pipe	A	From Leg	4.00	0.0000	218.00
			0.00		
(3) 8' x 2" Mount Pipe	B	From Leg	0.00 4.00	0.0000	218.00
			0.00		
(3) 8' x 2" Mount Pipe	C	From Leg	0.00 4.00	0.0000	218.00
			0.00		
***			0.00		

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft
*** VHLP4-107	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	0.0000		117.00	4.09
*** USX6-6W-6GR	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	20.0000		70.00	6.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.0 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.0 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.0 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.0 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.0 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.0 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.0 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.0 Wind 330 deg - No Ice+1.0 Guy
14	Dead+Wind 0 deg - Service+Guy
15	Dead+Wind 30 deg - Service+Guy
16	Dead+Wind 60 deg - Service+Guy
17	Dead+Wind 90 deg - Service+Guy
18	Dead+Wind 120 deg - Service+Guy
19	Dead+Wind 150 deg - Service+Guy
20	Dead+Wind 180 deg - Service+Guy
21	Dead+Wind 210 deg - Service+Guy
22	Dead+Wind 240 deg - Service+Guy
23	Dead+Wind 270 deg - Service+Guy
24	Dead+Wind 300 deg - Service+Guy
25	Dead+Wind 330 deg - Service+Guy

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	288 - 268	Leg	Max Tension	10	22.53	0.45	0.01
			Max. Compression	8	-38.80	0.15	0.00
			Max. Mx	8	-37.56	0.77	0.00
			Max. My	9	-9.82	-0.06	-1.12
			Max. Vy	2	-1.18	0.45	-0.01
			Max. Vx	9	-1.14	0.05	0.02
		Diagonal	Max Tension	6	4.22	0.00	0.00
			Max. Compression	7	-4.00	0.00	0.00
			Max. Mx	12	3.10	0.05	0.01

Section n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	268 - 248	Guy A	Max. My	6	-3.34	-0.03	-0.02
			Max. Vy	12	-0.02	0.05	0.01
			Max. Vx	6	-0.00	0.00	0.00
			Bottom Tension	8	9.32		
			Top Tension	8	9.47		
			Top Cable Vert	8	7.64		
			Top Cable Norm	8	5.59		
			Top Cable Tan	8	0.01		
			Bot Cable Vert	8	-7.23		
			Bot Cable Norm	8	5.88		
		Guy B	Bot Cable Tan	8	0.01		
			Bottom Tension	12	9.31		
			Top Tension	12	9.45		
			Top Cable Vert	12	7.54		
			Top Cable Norm	12	5.70		
			Top Cable Tan	12	0.01		
			Bot Cable Vert	12	-7.14		
			Bot Cable Norm	12	5.98		
			Bot Cable Tan	12	0.01		
		Guy C	Bottom Tension	4	9.18		
			Top Tension	4	9.33		
			Top Cable Vert	4	7.45		
			Top Cable Norm	4	5.62		
			Top Cable Tan	4	0.01		
			Bot Cable Vert	4	-7.04		
			Bot Cable Norm	4	5.90		
			Bot Cable Tan	4	0.01		
		Top Guy Pull-Off	Max Tension	8	5.60	0.00	0.00
			Max. Compression	10	-2.76	0.00	0.00
		Bottom Guy Pull-Off	Max. Mx	4	5.59	0.01	0.00
			Max. My	11	1.72	0.00	0.00
			Max. Vy	4	-0.01	0.00	0.00
			Max. Vx	11	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-1.69	0.00	0.00
			Max. Mx	4	-0.76	0.01	0.00
			Max. My	11	-1.15	0.00	0.00
			Max. Vy	4	-0.01	0.00	0.00
			Max. Vx	11	-0.00	0.00	0.00
T3	248 - 228	Torque Arm Top	Max Tension	5	9.96	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	6	7.84	0.04	0.00
			Max. My	6	9.87	0.00	-0.00
			Max. Vy	6	-0.02	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Torque Arm Bottom	Max Tension	1	0.00	0.00	0.00
			Max. Compression	12	-12.89	0.00	0.00
			Max. Mx	10	-9.69	0.05	0.00
			Max. My	5	-1.19	0.00	0.00
			Max. Vy	10	-0.02	0.00	0.00
			Max. Vx	5	-0.00	0.00	0.00
		Leg	Max Tension	10	21.36	-0.23	0.00
			Max. Compression	4	-37.86	0.03	-0.00
			Max. Mx	10	21.36	-0.23	0.00
			Max. My	5	-12.34	0.03	-0.33
			Max. Vy	6	-0.09	0.01	0.01
			Max. Vx	6	-0.06	0.02	-0.18
		Diagonal	Max Tension	12	2.01	0.00	0.00
			Max. Compression	5	-2.17	0.03	-0.01
			Max. Mx	12	0.46	0.04	0.01
			Max. My	6	-0.53	-0.02	-0.01
			Max. Vy	12	-0.02	0.04	0.01
			Max. Vx	6	-0.00	0.00	0.00
		Leg	Max Tension	10	10.32	-0.02	0.00
			Max. Compression	9	-26.02	-0.01	0.09
			Max. Mx	2	-8.53	0.17	-0.01
			Max. My	5	-13.99	0.02	-0.20

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T4	228 - 208	Diagonal	Max. Vy	6	-0.08	0.17	0.01
			Max. Vx	6	-0.08	0.06	0.17
			Max Tension	5	3.18	0.00	0.00
			Max. Compression	5	-3.38	0.00	0.00
			Max. Mx	5	-0.09	0.03	-0.00
			Max. My	5	-2.90	-0.01	-0.01
		Leg	Max. Vy	5	-0.01	0.03	-0.00
			Max. Vx	5	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-26.94	0.03	-0.11
			Max. Mx	2	-10.59	0.17	-0.01
			Max. My	5	-20.81	0.08	-0.25
		Diagonal	Max. Vy	2	0.72	0.07	-0.01
			Max. Vx	5	0.66	0.08	-0.25
			Max Tension	12	2.10	0.00	0.00
			Max. Compression	12	-2.37	0.00	0.00
			Max. Mx	6	1.81	0.04	-0.01
			Max. My	12	-1.36	-0.02	0.01
		Guy A	Max. Vy	6	-0.02	0.04	-0.01
			Max. Vx	12	0.00	0.00	0.00
			Bottom Tension	9	15.83		
			Top Tension	9	16.01		
			Top Cable Vert	9	11.64		
			Top Cable Norm	9	11.00		
		Guy B	Top Cable Tan	9	0.08		
			Bot Cable Vert	9	-11.17		
			Bot Cable Norm	9	11.21		
			Bot Cable Tan	9	0.16		
			Bottom Tension	12	15.63		
			Top Tension	12	15.81		
		Guy C	Top Cable Vert	12	11.28		
			Top Cable Norm	12	11.08		
			Top Cable Tan	12	0.00		
			Bot Cable Vert	12	-10.81		
			Bot Cable Norm	12	11.29		
			Bot Cable Tan	12	0.00		
T5	208 - 188	Top Guy Pull-Off	Bottom Tension	4	15.84		
			Top Tension	4	16.02		
			Top Cable Vert	4	11.43		
			Top Cable Norm	4	11.23		
			Top Cable Tan	4	0.00		
			Bot Cable Vert	4	-10.96		
		Leg	Bot Cable Norm	4	11.44		
			Bot Cable Tan	4	0.00		
			Max Tension	10	6.33	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	6	6.25	0.01	0.00
			Max. My	5	3.60	0.00	-0.00
		Diagonal	Max. Vy	6	-0.01	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-25.60	-0.01	-0.03
			Max. Mx	8	-13.70	-0.08	0.01
			Max. My	8	-21.41	-0.04	0.14
T6	188 - 168	Leg	Max. Vy	6	0.05	0.06	0.01
			Max. Vx	6	-0.07	-0.07	0.12
			Max Tension	5	2.33	0.00	0.00
			Max. Compression	5	-2.05	0.00	0.00
			Max. Mx	6	-0.27	0.03	-0.00
			Max. My	5	-2.01	-0.03	-0.01
		Diagonal	Max. Vy	6	-0.01	0.03	-0.00
			Max. Vx	5	-0.00	0.00	0.00
			Max Tension	4	3.21	-0.14	0.01
			Max. Compression	2	-42.77	-0.15	0.00
		Leg	Max. Mx	10	-41.44	0.35	-0.00
			Max. My	3	-21.93	-0.12	-0.44
			Max. Vy	10	0.13	0.35	-0.00
			Max. Vx	5	-0.14	-0.12	0.44
		Diagonal	Max Tension	5	2.92	-0.02	-0.01

Section n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	168 - 148	Guy A	Max. Compression	10	-3.60	0.00	0.00
			Max. Mx	6	1.48	-0.07	0.00
			Max. My	5	-2.42	-0.04	-0.01
			Max. Vy	6	-0.02	0.00	0.00
			Max. Vx	5	-0.00	0.00	0.00
			Bottom Tension	9	14.81		
			Top Tension	9	14.95		
			Top Cable Vert	9	9.38		
			Top Cable Norm	9	11.64		
			Top Cable Tan	9	0.06		
			Bot Cable Vert	9	-8.99		
			Bot Cable Norm	9	11.76		
			Bot Cable Tan	9	0.13		
		Guy B	Bottom Tension	11	14.53		
			Top Tension	11	14.67		
			Top Cable Vert	11	8.92		
			Top Cable Norm	11	11.64		
			Top Cable Tan	11	0.06		
			Bot Cable Vert	11	-8.54		
			Bot Cable Norm	11	11.76		
			Bot Cable Tan	11	0.12		
		Guy C	Bottom Tension	3	14.58		
			Top Tension	3	14.71		
			Top Cable Vert	3	8.95		
			Top Cable Norm	3	11.68		
			Top Cable Tan	3	0.06		
			Bot Cable Vert	3	-8.56		
			Bot Cable Norm	3	11.79		
			Bot Cable Tan	3	0.12		
		Top Guy Pull-Off	Max Tension	10	6.07	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
		Leg	Max. Mx	10	6.07	0.01	0.00
			Max. My	6	3.95	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-39.21	0.20	-0.01
			Max. Mx	2	-39.21	0.20	-0.01
			Max. My	3	-26.51	-0.15	-0.36
			Max. Vy	10	-0.10	0.20	-0.00
			Max. Vx	5	0.11	-0.15	0.36
T8	148 - 128	Diagonal	Max Tension	6	2.32	0.00	0.00
			Max. Compression	6	-2.01	0.00	0.00
			Max. Mx	6	-1.45	0.06	-0.01
			Max. My	6	-1.46	-0.01	-0.01
			Max. Vy	6	-0.02	0.06	-0.01
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-30.60	-0.12	0.00
			Max. Mx	6	-30.23	-0.12	-0.01
			Max. My	10	-29.89	0.08	0.06
		Leg	Max. Vy	4	-0.08	-0.10	0.00
			Max. Vx	3	-0.06	-0.07	-0.03
			Max Tension	4	0.83	0.00	0.00
			Max. Compression	10	-0.77	0.00	0.00
			Max. Mx	6	0.16	0.04	-0.00
			Max. My	5	-0.56	-0.02	-0.00
			Max. Vy	6	-0.02	0.04	-0.00
			Max. Vx	5	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-31.99	-0.21	0.03
T9	128 - 108	Leg	Max. Mx	10	-31.32	0.33	-0.00
			Max. My	7	-24.80	-0.18	-0.18
			Max. Vy	4	-0.24	-0.24	-0.00
			Max. Vx	7	-0.23	-0.18	-0.18
		Diagonal	Max Tension	7	1.50	0.00	0.00
			Max. Compression	10	-2.47	0.01	0.00
			Max. Mx	6	0.76	0.06	0.00
			Max. My	8	-0.70	0.01	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	108 - 88	Guy A	Max. Vy	6	-0.02	0.06	0.00
			Max. Vx	8	-0.00	0.01	0.00
			Bottom Tension	9	9.04		
			Top Tension	9	9.10		
			Top Cable Vert	9	4.29		
			Top Cable Norm	9	8.02		
			Top Cable Tan	9	0.04		
			Bot Cable Vert	9	-4.09		
			Bot Cable Norm	9	8.06		
			Bot Cable Tan	9	0.07		
		Guy B	Bottom Tension	11	8.75		
			Top Tension	11	8.80		
			Top Cable Vert	11	3.91		
			Top Cable Norm	11	7.89		
			Top Cable Tan	11	0.04		
			Bot Cable Vert	11	-3.71		
			Bot Cable Norm	11	7.92		
			Bot Cable Tan	11	0.07		
		Guy C	Bottom Tension	3	8.93		
			Top Tension	3	8.98		
			Top Cable Vert	3	3.98		
			Top Cable Norm	3	8.05		
			Top Cable Tan	3	0.04		
			Bot Cable Vert	3	-3.78		
			Bot Cable Norm	3	8.08		
			Bot Cable Tan	3	0.07		
		Top Guy Pull-Off	Max Tension	10	4.98	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
T11	88 - 68	Leg	Max. Mx	6	4.75	0.01	0.00
			Max. My	6	2.87	0.00	0.00
			Max. Vy	6	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-38.35	-0.08	0.08
			Max. Mx	10	-28.52	-0.21	-0.00
			Max. My	10	-37.18	0.11	-0.12
			Max. Vy	10	-0.11	0.18	0.00
			Max. Vx	5	0.06	-0.20	0.07
		Diagonal	Max Tension	3	2.02	0.00	0.00
			Max. Compression	9	-1.65	0.00	0.00
			Max. Mx	6	1.50	0.06	0.00
			Max. My	3	-1.24	0.05	-0.00
			Max. Vy	6	-0.02	0.06	0.00
			Max. Vx	3	0.00	0.05	-0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	9	-40.07	-0.05	0.06
			Max. Mx	10	-21.43	-0.32	-0.10
			Max. My	5	-28.14	-0.09	-0.55
T12	68 - 48	Leg	Max. Vy	8	0.27	-0.25	-0.05
			Max. Vx	5	-0.37	-0.09	0.16
			Max Tension	7	1.15	0.00	0.00
			Max. Compression	2	-0.87	0.00	0.00
			Max. Mx	5	-0.07	0.05	0.00
			Max. My	3	-0.55	0.05	-0.00
			Max. Vy	5	-0.02	0.05	0.00
			Max. Vx	3	0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-37.13	0.20	0.08
		Diagonal	Max. Mx	10	-33.94	0.32	-0.01
			Max. My	5	-27.69	-0.09	0.16
			Max. Vy	6	-0.13	0.32	0.01
			Max. Vx	5	0.08	-0.09	0.16
			Max Tension	6	2.37	0.00	0.00
			Max. Compression	6	-2.98	0.00	0.00
			Max. Mx	6	1.52	0.07	0.00
			Max. My	5	-1.72	0.06	0.01
			Max. Vy	6	-0.02	0.07	0.00
			Max. Vx	5	-0.00	0.06	0.01
		Guy A	Bottom Tension	9	8.96		

Section n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T13	48 - 28	Guy B	Top Tension	9	9.00		
			Top Cable Vert	9	2.32		
			Top Cable Norm	9	8.69		
			Top Cable Tan	9	0.03		
			Bot Cable Vert	9	-2.14		
			Bot Cable Norm	9	8.70		
			Bot Cable Tan	9	0.05		
			Bottom Tension	12	8.52		
			Top Tension	12	8.55		
			Top Cable Vert	12	1.89		
			Top Cable Norm	12	8.34		
			Top Cable Tan	12	0.00		
			Bot Cable Vert	12	-1.72		
			Bot Cable Norm	12	8.34		
			Bot Cable Tan	12	0.00		
		Guy C	Bottom Tension	4	8.84		
			Top Tension	4	8.87		
			Top Cable Vert	4	1.96		
			Top Cable Norm	4	8.65		
			Top Cable Tan	4	0.00		
			Bot Cable Vert	4	-1.79		
			Bot Cable Norm	4	8.65		
			Bot Cable Tan	4	0.00		
		Top Guy Pull-Off	Max Tension	10	5.45	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
		Leg	Max. Mx	12	2.20	0.01	0.00
			Max. My	6	3.24	0.00	-0.00
			Max. Vy	12	-0.01	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-38.80	0.02	0.05
			Max. Mx	10	-36.03	-0.21	0.03
			Max. My	5	-31.68	-0.20	0.09
			Max. Vy	10	-0.10	0.17	-0.00
			Max. Vx	5	0.06	-0.20	0.09
		Diagonal	Max Tension	5	2.31	0.00	0.00
			Max. Compression	5	-2.03	0.00	0.00
			Max. Mx	6	0.99	0.06	0.00
			Max. My	5	-1.21	0.06	0.01
			Max. Vy	6	-0.02	0.06	0.00
			Max. Vx	5	-0.00	0.06	0.01
T14	28 - 8	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-39.88	-0.08	0.06
			Max. Mx	11	-36.39	-0.66	0.80
			Max. My	5	-32.77	0.34	-1.10
			Max. Vy	9	3.24	-0.66	-0.15
			Max. Vx	5	-0.78	-0.51	-0.84
		Diagonal	Max Tension	12	1.60	0.00	0.00
			Max. Compression	6	-2.55	0.00	0.00
			Max. Mx	6	0.36	0.07	0.01
			Max. My	12	-2.47	0.06	-0.01
			Max. Vy	6	-0.02	0.07	0.01
			Max. Vx	12	0.00	0.06	-0.01
		Bottom Girt	Max Tension	10	2.26	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	6	2.24	-0.01	0.00
			Max. My	6	2.10	0.00	-0.00
			Max. Vy	6	0.01	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-39.35	-0.04	-0.40
			Max. Mx	10	-35.46	-0.80	0.31
			Max. My	5	-34.46	0.62	1.75
			Max. Vy	10	-2.84	0.67	-0.69
			Max. Vx	5	-5.57	0.58	1.75
T15	8 - 0	Horizontal	Max Tension	10	4.18	-0.02	0.06
			Max. Compression	6	-0.11	-0.06	-0.06
			Max. Mx	12	-0.02	0.14	-0.01
			Max. My	5	3.57	-0.07	0.14

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Bottom Girt	Max. Vy	12	0.23	0.14	-0.01
			Max. Vx	5	-0.07	0.02	0.10
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	9	-1.79	-0.27	0.01
			Max. Mx	5	-1.55	-2.98	-0.02
			Max. My	10	-1.48	-1.43	0.06
			Max. Vy	5	20.16	-2.98	-0.02
			Max. Vx	6	-0.41	1.99	-0.04

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	10	107.41	0.75	-0.40
	Max. H _x	11	99.79	0.94	0.18
	Max. H _z	2	105.01	0.06	0.85
	Max. M _x	1	0.00	0.02	-0.01
	Max. M _z	1	0.00	0.02	-0.01
	Max. Torsion	5	3.72	-0.87	0.15
	Min. Vert	1	64.26	0.02	-0.01
	Min. H _x	4	93.42	-0.91	0.53
	Min. H _z	8	93.90	-0.00	-1.04
	Min. M _x	1	0.00	0.02	-0.01
	Min. M _z	1	0.00	0.02	-0.01
	Min. Torsion	12	-3.60	0.93	0.54
	Max. Vert	10	-1.97	-1.71	0.99
Guy C @ 228 ft Elev 4 ft Azimuth 240 deg	Max. H _x	10	-1.97	-1.71	0.99
	Max. H _z	3	-38.58	-43.94	26.17
	Min. Vert	4	-38.95	-44.59	25.75
	Min. H _x	4	-38.95	-44.59	25.75
	Min. H _z	10	-1.97	-1.71	0.99
	Max. Vert	6	-1.99	1.77	1.02
Guy B @ 228 ft Elev 4 ft Azimuth 120 deg	Max. H _x	11	-38.35	44.22	24.74
	Max. H _z	12	-38.30	43.63	25.21
	Min. Vert	11	-38.35	44.22	24.74
	Min. H _x	6	-1.99	1.77	1.02
	Min. H _z	6	-1.99	1.77	1.02
	Max. Vert	2	-2.24	0.00	-2.10
Guy A @ 228 ft Elev -5 ft Azimuth 0 deg	Max. H _x	11	-22.38	1.59	-27.98
	Max. H _z	2	-2.24	0.00	-2.10
	Min. Vert	9	-40.33	0.71	-51.06
	Min. H _x	5	-22.09	-1.59	-27.19
	Min. H _z	9	-40.33	0.71	-51.06

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	64.26	-0.02	0.01	0.00	0.00	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy	105.01	-0.06	-0.85	0.00	0.00	1.67
1.2 Dead+1.0 Wind 30 deg - No Ice+1.0 Guy	99.17	0.55	-0.70	0.00	0.00	0.68

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 60 deg - No Ice+1.0 Guy	93.42	0.91	-0.53	0.00	0.00	-1.64
1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy	99.64	0.87	-0.15	0.00	0.00	-3.72
1.2 Dead+1.0 Wind 120 deg - No Ice+1.0 Guy	106.16	0.67	0.42	0.00	0.00	-3.42
1.2 Dead+1.0 Wind 150 deg - No Ice+1.0 Guy	98.56	0.26	0.79	0.00	0.00	-1.62
1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy	93.90	0.00	1.04	0.00	0.00	-1.41
1.2 Dead+1.0 Wind 210 deg - No Ice+1.0 Guy	100.46	-0.31	0.85	0.00	0.00	-0.64
1.2 Dead+1.0 Wind 240 deg - No Ice+1.0 Guy	107.41	-0.75	0.40	0.00	0.00	1.44
1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy	99.79	-0.94	-0.18	0.00	0.00	3.45
1.2 Dead+1.0 Wind 300 deg - No Ice+1.0 Guy	92.97	-0.93	-0.54	0.00	0.00	3.60
1.2 Dead+1.0 Wind 330 deg - No Ice+1.0 Guy	97.54	-0.58	-0.67	0.00	0.00	1.98
Dead+Wind 0 deg - Service+Guy	65.15	-0.03	-0.31	0.00	0.00	0.39
Dead+Wind 30 deg - Service+Guy	65.14	0.13	-0.25	0.00	0.00	0.16
Dead+Wind 60 deg - Service+Guy	65.20	0.23	-0.14	0.00	0.00	-0.38
Dead+Wind 90 deg - Service+Guy	65.20	0.28	0.01	0.00	0.00	-0.86
Dead+Wind 120 deg - Service+Guy	65.26	0.25	0.17	0.00	0.00	-0.81
Dead+Wind 150 deg - Service+Guy	65.20	0.12	0.25	0.00	0.00	-0.36
Dead+Wind 180 deg - Service+Guy	65.26	-0.02	0.30	0.00	0.00	-0.31
Dead+Wind 210 deg - Service+Guy	65.24	-0.17	0.27	0.00	0.00	-0.15
Dead+Wind 240 deg - Service+Guy	65.29	-0.31	0.18	0.00	0.00	0.34
Dead+Wind 270 deg - Service+Guy	65.20	-0.33	0.01	0.00	0.00	0.80
Dead+Wind 300 deg - Service+Guy	65.18	-0.27	-0.14	0.00	0.00	0.81
Dead+Wind 330 deg - Service+Guy	65.11	-0.16	-0.23	0.00	0.00	0.45

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	-29.92	0.00	0.00	29.92	0.00	0.005%
2	0.41	-35.51	-45.81	-0.41	35.51	45.81	0.004%
3	21.90	-35.18	-37.76	-21.90	35.18	37.75	0.006%
4	36.87	-34.85	-21.70	-36.87	34.85	21.70	0.001%
5	43.50	-35.21	-0.42	-43.50	35.21	0.42	0.004%
6	39.49	-35.56	22.68	-39.49	35.56	-22.68	0.005%
7	20.33	-35.23	36.33	-20.33	35.23	-36.33	0.004%
8	-0.37	-34.90	41.98	0.37	34.90	-41.98	0.004%
9	-21.90	-35.23	37.88	21.90	35.23	-37.88	0.004%
10	-40.35	-35.56	23.81	40.35	35.56	-23.80	0.005%
11	-43.40	-35.21	0.50	43.39	35.21	-0.50	0.004%
12	-35.95	-34.85	-20.80	35.95	34.85	20.81	0.003%
13	-20.47	-35.18	-36.12	20.47	35.18	36.12	0.006%
14	0.09	-29.98	-10.27	-0.09	29.98	10.27	0.004%
15	4.91	-29.91	-8.47	-4.91	29.91	8.47	0.007%
16	8.27	-29.84	-4.87	-8.27	29.84	4.87	0.007%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
17	9.76	-29.92	-0.09	-9.75	29.92	0.10	0.008%
18	8.86	-29.99	5.09	-8.86	29.99	-5.09	0.005%
19	4.56	-29.92	8.15	-4.56	29.92	-8.15	0.007%
20	-0.08	-29.85	9.42	0.08	29.85	-9.42	0.003%
21	-4.91	-29.92	8.50	4.91	29.92	-8.49	0.008%
22	-9.05	-29.99	5.34	9.05	29.99	-5.34	0.005%
23	-9.73	-29.92	0.11	9.73	29.92	-0.11	0.008%
24	-8.06	-29.84	-4.67	8.06	29.84	4.67	0.007%
25	-4.59	-29.91	-8.10	4.59	29.91	8.10	0.006%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00009492
2	Yes	20	0.00005131	0.00005529
3	Yes	19	0.00009504	0.00008132
4	Yes	14	0.00000001	0.00006063
5	Yes	20	0.00006232	0.00005262
6	Yes	20	0.00006637	0.00007104
7	Yes	20	0.00005988	0.00005047
8	Yes	15	0.00006483	0.00005065
9	Yes	20	0.00006041	0.00005283
10	Yes	20	0.00006606	0.00007185
11	Yes	20	0.00006121	0.00005214
12	Yes	15	0.00000001	0.00003080
13	Yes	19	0.00009205	0.00007660
14	Yes	12	0.00000001	0.00004069
15	Yes	11	0.00000001	0.00006199
16	Yes	10	0.00000001	0.00008964
17	Yes	11	0.00000001	0.00007438
18	Yes	12	0.00000001	0.00004822
19	Yes	11	0.00000001	0.00006645
20	Yes	11	0.00000001	0.00004365
21	Yes	11	0.00000001	0.00007361
22	Yes	12	0.00000001	0.00005232
23	Yes	11	0.00000001	0.00007384
24	Yes	10	0.00000001	0.00008901
25	Yes	11	0.00000001	0.00005552

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	288 - 268	2.127	20	0.1001	0.0871
T2	268 - 248	2.306	20	0.0595	0.1037
T3	248 - 228	2.273	20	0.0271	0.1247
T4	228 - 208	2.106	20	0.0402	0.1438
T5	208 - 188	1.980	22	0.0522	0.1605
T6	188 - 168	1.807	22	0.0561	0.1740
T7	168 - 148	1.658	22	0.0313	0.1849
T8	148 - 128	1.596	22	0.0223	0.1939
T9	128 - 108	1.507	22	0.0273	0.2006
T10	108 - 88	1.393	22	0.0256	0.2057
T11	88 - 68	1.270	22	0.0393	0.2097
T12	68 - 48	1.056	22	0.0614	0.2101
T13	48 - 28	0.778	22	0.0651	0.1953
T14	28 - 8	0.494	22	0.0744	0.1783
T15	8 - 0	0.151	22	0.0870	0.1538

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
289.00	Lightning Rod 5/8"x6'	20	2.127	0.1001	0.0871	61664
288.00	Guy	20	2.127	0.1001	0.0871	61664
274.00	Sector Mount [SM 201-3]	20	2.269	0.0740	0.0982	22023
228.00	Guy	20	2.106	0.0402	0.1438	223280
218.00	MX08FRO665-21 w/ Mount Pipe	22	2.031	0.0461	0.1525	71213
173.00	Guy	22	1.686	0.0377	0.1824	37900
147.00	Beacon side markers	22	1.593	0.0224	0.1943	76511
145.00	12"x10"x4" Junction Box	22	1.586	0.0227	0.1951	76238
117.00	VHLP4-107	22	1.444	0.0263	0.2036	335647
113.00	Guy	22	1.421	0.0256	0.2045	229326
70.00	USX6-6W-6GR	22	1.082	0.0599	0.2103	60865
53.00	Guy	22	0.849	0.0647	0.2023	462356

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	288 - 268	20.625	10	0.2232	0.4660
T2	268 - 248	21.331	10	0.0591	0.5354
T3	248 - 228	20.945	10	0.2563	0.6190
T4	228 - 208	19.757	10	0.3337	0.6888
T5	208 - 188	18.306	10	0.4205	0.7521
T6	188 - 168	16.462	10	0.4606	0.7969
T7	168 - 148	14.779	10	0.3449	0.8284
T8	148 - 128	13.575	10	0.3043	0.8535
T9	128 - 108	12.303	10	0.3286	0.8744
T10	108 - 88	10.944	10	0.3166	0.8946
T11	88 - 68	9.536	10	0.3837	0.9131
T12	68 - 48	7.700	10	0.4863	0.9153
T13	48 - 28	5.570	10	0.5010	0.8505
T14	28 - 8	3.429	10	0.5410	0.7777
T15	8 - 0	1.025	10	0.5973	0.6719

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
289.00	Lightning Rod 5/8"x6'	10	20.625	0.2232	0.4660	13458
288.00	Guy	10	20.625	0.2232	0.4660	13458
274.00	Sector Mount [SM 201-3]	10	21.204	0.0585	0.5129	4807
228.00	Guy	10	19.757	0.3337	0.6888	35890
218.00	MX08FRO665-21 w/ Mount Pipe	10	19.073	0.3718	0.7218	14494
173.00	Guy	10	15.151	0.3756	0.8211	7485
147.00	Beacon side markers	10	13.516	0.3051	0.8544	20934
145.00	12"x10"x4" Junction Box	10	13.397	0.3072	0.8559	20540
117.00	VHLP4-107	10	11.555	0.3205	0.8857	41534
113.00	Guy	10	11.282	0.3168	0.8897	32817
70.00	USX6-6W-6GR	10	7.903	0.4783	0.9164	13320
53.00	Guy	10	6.107	0.5096	0.8811	42301

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	288	Diagonal	A325N	0.5000	1	4.22	6.20	0.681	1.05	Member Bearing
		Top Guy Pull-Off@288	A325N	0.5000	1	5.60	12.40	0.452	1.05	Member Bearing
		Bottom Guy Pull-Off@288	A325N	0.5000	1	1.69	17.67	0.096	1.05	Bolt Shear
		Torque Arm Top@288	A325N	0.5000	3	3.32	12.23	0.271	1.05	Member Block Shear
		Torque Arm Bottom@288	A325N	0.5000	3	4.30	17.67	0.243	1.05	Bolt Shear
T2	268	Leg	A325N	1.2500	1	21.36	87.22	0.245	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.01	6.20	0.324	1.05	Member Bearing
T3	248	Leg	A325N	1.2500	1	10.32	87.22	0.118	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	3.18	6.20	0.513	1.05	Member Bearing
T4	228	Leg	A325N	1.2500	1	7.47	87.22	0.086	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.10	6.20	0.339	1.05	Member Bearing
		Top Guy Pull-Off@228	A325N	0.5000	1	6.33	12.40	0.510	1.05	Member Bearing
T5	208	Leg	A325N	1.2500	1	8.53	87.22	0.098	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.33	6.20	0.375	1.05	Member Bearing
T6	188	Leg	A325N	1.2500	1	9.29	87.22	0.106	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.92	6.20	0.471	1.05	Member Bearing
		Top Guy Pull-Off@173	A325N	0.5000	1	6.07	12.40	0.489	1.05	Member Bearing
T7	168	Leg	A325N	1.2500	1	13.07	87.22	0.150	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.32	6.20	0.375	1.05	Member Bearing
T8	148	Leg	A325N	1.2500	1	9.85	87.22	0.113	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	0.83	6.20	0.134	1.05	Member Bearing
T9	128	Leg	A325N	1.2500	1	9.76	87.22	0.112	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.47	8.84	0.280	1.05	Bolt Shear
		Top Guy Pull-Off@113	A325N	0.5000	1	4.98	12.40	0.402	1.05	Member Bearing
T10	108	Leg	A325N	1.2500	1	11.33	87.22	0.130	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.02	6.20	0.325	1.05	Member Bearing
T11	88	Leg	A325N	1.2500	1	13.21	87.22	0.151	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	1.15	6.20	0.186	1.05	Member Bearing
T12	68	Leg	A325N	1.2500	1	12.38	87.22	0.142	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.37	6.20	0.383	1.05	Member Bearing
		Top Guy Pull-Off@53	A325N	0.5000	1	5.45	12.40	0.440	1.05	Member Bearing
T13	48	Leg	A325N	1.2500	1	12.15	87.22	0.139	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.31	6.20	0.373	1.05	Member Bearing
T14	28	Leg	A325N	1.2500	1	13.29	87.22	0.152	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	2.55	8.84	0.289	1.05	Bolt Shear
		Bottom Girt	A325N	0.5000	1	2.26	6.20	0.364	1.05	Member Bearing
T15	8	Leg	A325N	1.2500	1	13.06	87.22	0.150	1.05	Bolt Tension
		Horizontal	A325N	0.5000	1	4.18	6.20	0.675	1.05	Member Bearing
		Bottom Girt	A325N	0.5000	3	0.60	8.84	0.068	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
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Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
T1	288.00 (A) (418)	1/2 (ECP-23000) EHS	2.69	26.90	9.47	16.95	0.952	1.705
	288.00 (A) (419)	1/2 (ECP-23000) EHS	2.69	26.90	9.23	16.95	0.952	1.750
	288.00 (B) (412)	1/2 (ECP-23000) EHS	2.69	26.90	8.97	16.95	0.952	1.799
	288.00 (B) (413)	1/2 (ECP-23000) EHS	2.69	26.90	9.45	16.95	0.952	1.707
	288.00 (C) (403)	1/2 (ECP-23000) EHS	2.69	26.90	9.33	16.95	0.952	1.731
	288.00 (C) (404)	1/2 (ECP-23000) EHS	2.69	26.90	9.18	16.95	0.952	1.759
T4	228.00 (A) (429)	5/8 (ECP - 23000) EHS	4.24	42.40	16.01	26.71	0.952	1.589
	228.00 (B) (428)	5/8 (ECP - 23000) EHS	4.24	42.40	15.81	26.71	0.952	1.609
	228.00 (C) (424)	5/8 (ECP - 23000) EHS	4.24	42.40	16.02	26.71	0.952	1.588
T6	173.00 (A) (435)	5/8 (ECP - 23000) EHS	4.24	42.40	14.95	26.71	0.952	1.702
	173.00 (B) (434)	5/8 (ECP - 23000) EHS	4.24	42.40	14.67	26.71	0.952	1.734
	173.00 (C) (430)	5/8 (ECP - 23000) EHS	4.24	42.40	14.71	26.71	0.952	1.729
T9	113.00 (A) (441)	1/2 (ECP - 23000) EHS	2.69	26.90	9.10	16.95	0.952	1.774
	113.00 (B) (440)	1/2 (ECP - 23000) EHS	2.69	26.90	8.80	16.95	0.952	1.833
	113.00 (C) (436)	1/2 (ECP - 23000) EHS	2.69	26.90	8.98	16.95	0.952	1.797
T12	53.00 (A) (447)	9/16 (ECP - 23000) EHS	3.50	35.00	9.00	22.05	0.952	2.334
	53.00 (B) (446)	9/16 (ECP - 23000) EHS	3.50	35.00	8.55	22.05	0.952	2.456
	53.00 (C) (442)	9/16 (ECP - 23000) EHS	3.50	35.00	8.87	22.05	0.952	2.368

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	288 - 268	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-38.80	57.50	0.675 ¹
T2	268 - 248	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-37.86	57.50	0.658 ¹
T3	248 - 228	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-26.02	57.50	0.452 ¹
T4	228 - 208	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-26.94	57.50	0.469 ¹
T5	208 - 188	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-25.60	57.50	0.445 ¹
T6	188 - 168	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-42.77	57.50	0.744 ¹
T7	168 - 148	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-39.21	57.50	0.682 ¹
T8	148 - 128	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-30.60	57.50	0.532 ¹
T9	128 - 108	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-31.99	57.50	0.556 ¹
T10	108 - 88	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-38.35	57.50	0.667 ¹
T11	88 - 68	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-40.07	57.50	0.697 ¹
T12	68 - 48	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-37.13	57.50	0.646 ¹
T13	48 - 28	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2 K=1.00	2.2200	-38.80	57.50	0.675 ¹
T14	28 - 8	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	4.92	64.1 K=1.00	2.2200	-39.88	57.93	0.688 ¹
T15	8 - 0	BV_Double Bent Plate (3.25x2.375x0.25)	8.30	1.95	25.4 K=1.00	2.2200	-39.35	69.53	0.566 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	288 - 268	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-4.00	17.71	0.226 ¹
T2	268 - 248	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.17	17.71	0.123 ¹
T3	248 - 228	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-3.38	17.71	0.191 ¹
T4	228 - 208	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.37	17.71	0.134 ¹
T5	208 - 188	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.05	17.71	0.116 ¹
T6	188 - 168	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-3.60	17.71	0.203 ¹
T7	168 - 148	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.01	17.71	0.113 ¹
T8	148 - 128	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-0.77	17.71	0.043 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T9	128 - 108	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.47	17.71	0.139 ¹
T10	108 - 88	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-1.65	17.71	0.093 ¹
T11	88 - 68	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-0.87	17.71	0.049 ¹
T12	68 - 48	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.98	17.71	0.168 ¹
T13	48 - 28	L2x2x3/16	6.30	3.05	99.6 K=1.07	0.7150	-2.03	17.71	0.114 ¹
T14	28 - 8	L2x2x3/16	6.23	3.01	98.8 K=1.08	0.7150	-2.55	17.84	0.143 ¹

¹ P_u / φP_n controls

Horizontal 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 $\frac{P_u}{\phi P_n}$
T15	8 - 0	L2x2x3/16	3.83	3.62	115.2 K=1.04	0.7150	-0.70	15.00	0.047 ¹

¹ P_u / φP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T14	28 - 8	L2x2x3/16	3.83	3.62	115.2 K=1.04	0.7150	-0.69	15.00	0.046 ¹
T15	8 - 0	12x7/8	0.24	0.24	11.4 K=1.00	10.500 0	-1.79	337.89	0.005 ¹

¹ P_u / φP_n controls

Top Guy Pull-Off 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	288 - 268	2L2x2x3/16	3.83	3.83	74.6 K=1.00	1.4300	-2.76	42.48	0.065 ¹

¹ P_u / φP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	288 - 268	2L2x2x3/16	0.00	1.54	0.000	0.00	2.04	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	288 - 268	2L2x2x3/16	0.065	0.000	0.000	0.065 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Bottom Guy Pull-Off 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	288 - 268	2L2x2x3/16	3.83	3.83	74.6 K=1.00	1.4300	-1.69	42.48	0.040 ¹

¹ $P_u / \phi P_n$ controls

Bottom Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	288 - 268	2L2x2x3/16	0.00	1.54	0.000	0.00	2.04	0.000

Bottom Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	288 - 268	2L2x2x3/16	0.040	0.000	0.000	0.040 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	288 - 268 (407)	2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.66	29.43	0.430 ¹
T1	288 - 268 (408)	2L 'a' > 32.3516 in - 407 2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.49	29.43	0.424 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	288 - 268 (416)	2L 'a' > 32.3516 in - 408 2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.06	29.43	0.410 ¹
T1	288 - 268 (417)	2L 'a' > 32.3516 in - 416 2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.39	29.43	0.421 ¹
T1	288 - 268 (422)	2L 'a' > 32.3516 in - 417 2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.89	29.43	0.438 ¹
T1	288 - 268 (423)	2L 'a' > 32.3516 in - 422 2L3x2x3/16x3/4	7.91	7.91	123.4 K=1.00	1.8000	-12.86	29.43	0.437 ¹
		2L 'a' > 32.3516 in - 423							

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	288 - 268	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2	2.2200	22.53	71.93	0.313 ¹
T2	268 - 248	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2	2.2200	21.36	71.93	0.297 ¹
T3	248 - 228	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2	2.2200	10.32	71.93	0.143 ¹
T6	188 - 168	BV_Double Bent Plate (3.25x2.375x0.25)	20.00	5.00	65.2	2.2200	3.21	71.93	0.045 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	288 - 268	L2x2x3/16	6.30	3.05	61.3	0.4484	4.22	19.50	0.216 ¹
T2	268 - 248	L2x2x3/16	6.30	3.05	61.3	0.4484	2.01	19.50	0.103 ¹
T3	248 - 228	L2x2x3/16	6.30	3.05	61.3	0.4484	3.18	19.50	0.163 ¹
T4	228 - 208	L2x2x3/16	6.30	3.05	61.3	0.4484	2.10	19.50	0.108 ¹
T5	208 - 188	L2x2x3/16	6.30	3.05	61.3	0.4484	2.33	19.50	0.119 ¹
T6	188 - 168	L2x2x3/16	6.30	3.05	61.3	0.4484	2.92	19.50	0.150 ¹
T7	168 - 148	L2x2x3/16	6.30	3.05	61.3	0.4484	2.32	19.50	0.119 ¹
T8	148 - 128	L2x2x3/16	6.30	3.05	61.3	0.4484	0.83	19.50	0.043 ¹
T9	128 - 108	L2x2x3/16	6.30	3.05	61.3	0.4484	1.50	19.50	0.077 ¹
T10	108 - 88	L2x2x3/16	6.30	3.05	61.3	0.4484	2.02	19.50	0.103 ¹
T11	88 - 68	L2x2x3/16	6.30	3.05	61.3	0.4484	1.15	19.50	0.059 ¹
T12	68 - 48	L2x2x3/16	6.30	3.05	61.3	0.4484	2.37	19.50	0.122 ¹
T13	48 - 28	L2x2x3/16	6.30	3.05	61.3	0.4484	2.31	19.50	0.119 ¹
T14	28 - 8	L2x2x3/16	6.23	3.01	60.6	0.4484	1.60	19.50	0.082 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 $\frac{P_u}{\phi P_n}$
T15	8 - 0	L2x2x3/16	3.83	3.62	74.6	0.4484	4.18	19.50	0.214 ¹

¹ P_u / φP_n controls

Bottom 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 $\frac{P_u}{\phi P_n}$
T14	28 - 8	L2x2x3/16	3.83	3.62	74.6	0.4484	2.26	19.50	0.116 ¹

¹ P_u / φP_n controls

Top Guy Pull-Off 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	288 - 268	2L2x2x3/16	3.83	3.83	74.6	0.8967	5.60	39.01	0.144 ¹
T4	228 - 208	2L2x2x3/16x1/4	3.83	3.83	74.5	0.8965	6.33	39.00	0.162 ¹
T6	188 - 168	2L 'a' > 22.0073 in - 426 2L2x2x3/16x1/4	3.83	3.83	74.5	0.8965	6.07	39.00	0.156 ¹
T9	128 - 108	2L 'a' > 22.0073 in - 432 2L2x2x3/16x1/4	3.83	3.83	74.5	0.8965	4.98	39.00	0.128 ¹
T12	68 - 48	2L 'a' > 22.0073 in - 438 2L2x2x3/16x1/4	3.83	3.83	74.5	0.8965	5.45	39.00	0.140 ¹
		2L 'a' > 22.0073 in - 444							

¹ P_u / φP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	288 - 268	2L2x2x3/16	0.00	1.54	0.000	0.00	2.04	0.000
T4	228 - 208	2L2x2x3/16x1/4	0.00	1.54	0.000	0.00	2.35	0.000
T6	188 - 168	2L2x2x3/16x1/4	0.00	1.54	0.000	0.00	2.35	0.000
T9	128 - 108	2L2x2x3/16x1/4	0.00	1.54	0.000	0.00	2.35	0.000
T12	68 - 48	2L2x2x3/16x1/4	0.00	1.54	0.000	0.00	2.35	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	288 - 268	2L2x2x3/16	0.144	0.000	0.000	0.144 ¹	1.050	4.8.1
T4	228 - 208	2L2x2x3/16x1/4	0.162	0.000	0.000	0.162 ¹	1.050	4.8.1
T6	188 - 168	2L2x2x3/16x1/4	0.156	0.000	0.000	0.156 ¹	1.050	4.8.1
T9	128 - 108	2L2x2x3/16x1/4	0.128	0.000	0.000	0.128 ¹	1.050	4.8.1
T12	68 - 48	2L2x2x3/16x1/4	0.140	0.000	0.000	0.140 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio P_u ϕP_n
T1	288 - 268 (405)	2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.49	58.32	0.163 ¹
T1	288 - 268 (406)	2L 'a' > 25.0681 in - 405 2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.96	58.32	0.171 ¹
T1	288 - 268 (414)	2L 'a' > 25.0681 in - 406 2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.47	58.32	0.162 ¹
T1	288 - 268 (415)	2L 'a' > 25.0681 in - 414 2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.76	58.32	0.167 ¹
T1	288 - 268 (420)	2L 'a' > 25.0681 in - 415 2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.72	58.32	0.167 ¹
T1	288 - 268 (421)	2L 'a' > 25.0681 in - 420 2L3x2x3/16x3/4	6.13	6.13	76.1	1.8000	9.90	58.32	0.170 ¹
		2L 'a' > 25.0681 in - 421							

¹ $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	288 - 268	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	3	-38.80	60.37	64.3	Pass
T2	268 - 248	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	31	-37.86	60.37	62.7	Pass
T3	248 - 228	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	60	-26.02	60.37	43.1	Pass
T4	228 - 208	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	87	-26.94	60.37	44.6	Pass
T5	208 - 188	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	114	-25.60	60.37	42.4	Pass
T6	188 - 168	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	141	-42.77	60.37	70.8	Pass
T7	168 - 148	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	168	-39.21	60.37	64.9	Pass
T8	148 - 128	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	194	-30.60	60.37	50.7	Pass
T9	128 - 108	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	221	-31.99	60.37	53.0	Pass
T10	108 - 88	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	249	-38.35	60.37	63.5	Pass
T11	88 - 68	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	276	-40.07	60.37	66.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T12	68 - 48	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	303	-37.13	60.37	61.5	Pass
T13	48 - 28	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	330	-38.80	60.37	64.3	Pass
T14	28 - 8	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	357	-39.88	60.82	65.6	Pass
T15	8 - 0	Leg	BV_Double Bent Plate (3.25x2.375x0.25)	386	-39.35	73.01	53.9	Pass
T1	288 - 268	Diagonal	L2x2x3/16	28	-4.00	18.60	21.5	Pass
T2	268 - 248	Diagonal	L2x2x3/16	35	-2.17	18.60	68.1 (b) 11.7	Pass
T3	248 - 228	Diagonal	L2x2x3/16	62	-3.38	18.60	32.4 (b) 18.2	Pass
T4	228 - 208	Diagonal	L2x2x3/16	108	-2.37	18.60	51.3 (b) 12.8	Pass
T5	208 - 188	Diagonal	L2x2x3/16	115	2.33	20.48	33.9 (b) 11.4	Pass
T6	188 - 168	Diagonal	L2x2x3/16	148	-3.60	18.60	37.5 (b) 19.3	Pass
T7	168 - 148	Diagonal	L2x2x3/16	189	2.32	20.48	47.1 (b) 11.3	Pass
T8	148 - 128	Diagonal	L2x2x3/16	218	-0.77	18.60	37.5 (b) 4.1	Pass
T9	128 - 108	Diagonal	L2x2x3/16	227	-2.47	18.60	13.4 (b) 13.3	Pass
T10	108 - 88	Diagonal	L2x2x3/16	272	2.02	20.48	28.0 (b) 9.8	Pass
T11	88 - 68	Diagonal	L2x2x3/16	280	1.15	20.48	32.5 (b) 5.6	Pass
T12	68 - 48	Diagonal	L2x2x3/16	312	-2.98	18.60	18.6 (b) 16.0	Pass
T13	48 - 28	Diagonal	L2x2x3/16	350	2.31	20.48	38.3 (b) 11.3	Pass
T14	28 - 8	Diagonal	L2x2x3/16	363	-2.55	18.73	37.3 (b) 13.6	Pass
T15	8 - 0	Horizontal	L2x2x3/16	389	4.18	20.48	28.9 (b) 20.4	Pass
T14	28 - 8	Bottom Girt	L2x2x3/16	359	2.26	20.48	67.5 (b) 11.0	Pass
T15	8 - 0	Bottom Girt	12x7/8	393	-1.79	354.78	36.4 (b) 9.4	Pass
T1	288 - 268	Guy A@288	1/2 (ECP-23000)	418	9.47	16.95	55.9	Pass
T4	228 - 208	Guy A@228	5/8 (ECP - 23000)	429	16.01	26.71	60.0	Pass
T6	188 - 168	Guy A@173	5/8 (ECP - 23000)	435	14.95	26.71	56.0	Pass
T9	128 - 108	Guy A@113	1/2 (ECP - 23000)	441	9.10	16.95	53.7	Pass
T12	68 - 48	Guy A@53	9/16 (ECP - 23000)	447	9.00	22.05	40.8	Pass
T1	288 - 268	Guy B@288	1/2 (ECP-23000)	413	9.45	16.95	55.8	Pass
T4	228 - 208	Guy B@228	5/8 (ECP - 23000)	428	15.81	26.71	59.2	Pass
T6	188 - 168	Guy B@173	5/8 (ECP - 23000)	434	14.67	26.71	54.9	Pass
T9	128 - 108	Guy B@113	1/2 (ECP - 23000)	440	8.80	16.95	51.9	Pass
T12	68 - 48	Guy B@53	9/16 (ECP - 23000)	446	8.55	22.05	38.8	Pass
T1	288 - 268	Guy C@288	1/2 (ECP-23000)	403	9.33	16.95	55.0	Pass
T4	228 - 208	Guy C@228	5/8 (ECP - 23000)	424	16.02	26.71	60.0	Pass
T6	188 - 168	Guy C@173	5/8 (ECP - 23000)	430	14.71	26.71	55.1	Pass
T9	128 - 108	Guy C@113	1/2 (ECP - 23000)	436	8.98	16.95	53.0	Pass
T12	68 - 48	Guy C@53	9/16 (ECP - 23000)	442	8.87	22.05	40.2	Pass
T1	288 - 268	Top Guy Pull-Off@288	2L2x2x3/16	4	5.60	40.96	13.7	Pass
T4	228 - 208	Top Guy Pull-Off@228	2L2x2x3/16x1/4	426	6.33	40.95	45.2 (b) 15.5	Pass
T6	188 - 168	Top Guy Pull-Off@173	2L2x2x3/16x1/4	432	6.07	40.95	51.0 (b) 14.8	Pass
T9	128 - 108	Top Guy Pull-Off@113	2L2x2x3/16x1/4	438	4.98	40.95	48.9 (b) 12.2	Pass
T12	68 - 48	Top Guy Pull-Off@53	2L2x2x3/16x1/4	444	5.45	40.95	40.2 (b) 13.3	Pass
T1	288 - 268	Bottom Guy Pull-Off@288	2L2x2x3/16	409	-1.69	44.61	44.0 (b) 3.8	Pass
T1	288 - 268	Torque Arm Top@288	2L3x2x3/16x3/4	406	9.96	61.24	9.6 (b) 16.3	Pass
							27.1 (b)	

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	288 - 268	Torque Arm Bottom@288	2L3x2x3/16x3/4	422	-12.89	30.90	41.7	Pass
Summary								
						Leg (T6)	70.8	Pass
						Diagonal (T1)	68.1	Pass
						Horizontal (T15)	67.5	Pass
						Bottom Girt (T14)	36.4	Pass
						Guy A (T4)	60.0	Pass
						Guy B (T4)	59.2	Pass
						Guy C (T4)	60.0	Pass
						Top Guy Pull-Off (T4)	51.0	Pass
						Bottom Guy Pull-Off (T1)	9.6	Pass
						Torque Arm Top (T1)	27.1	Pass
						Torque Arm Bottom (T1)	41.7	Pass
						Bolt	64.8	Pass
						Checks		
						RATING =	70.8	Pass

APPENDIX B
BASE LEVEL DRAWING



(OTHER CONSIDERED EQUIPMENT)
(2) 1/2" TO 291 FT TOWER LIGHTING

(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-3/4" TO 218 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(2) ELLIPTICAL TO 70 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(4) 1-5/8" TO 274 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(2) 1-5/8" TO 274 FT LEVEL

(OTHER CONSIDERED EQUIPMENT - IN CONDUIT)
(1) 3/8" TO 274 FT LEVEL
(2) 3/4" TO 274 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/4" TO 274 FT LEVEL
(1) 3/8" TO 274 FT LEVEL
(2) 3/4" TO 274 FT LEVEL

CLIMBING LADDER

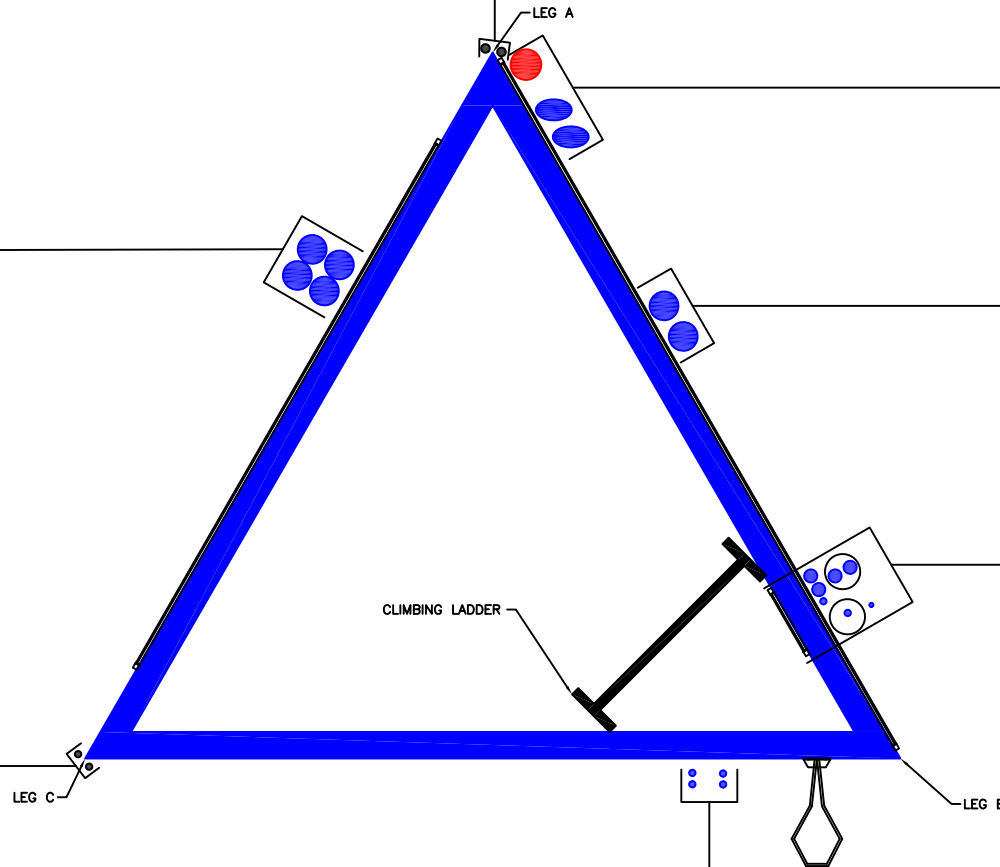
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 146 FT TOWER LIGHTING
(1) 3/8" TO 288 FT TOWER LIGHTING

LEG C

LEG B

(OTHER CONSIDERED EQUIPMENT)
(2) 3/8" TO 117 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(2) 3/8" TO 157 FT LEVEL



APPENDIX C

ADDITIONAL CALCULATIONS

Pier and Pad Foundation



BU #: 855759
 Site Name: CORRAL BLUFFS
 App. Number:

TIA-222 Revision: H
 Tower Type: Guyed

Top & Bot. Pad Rein. Different?:	<input type="checkbox"/>
Block Foundation?:	<input checked="" type="checkbox"/>
Rectangular Pad?:	<input type="checkbox"/>

Superstructure Analysis Reactions		
Compression, P_{comp} :	107.41	kips
Base Shear, V_{u_comp} :	0.85	kips
Moment, M_u :	0	ft-kips
Tower Height, H :	288	ft
BP Dist. Above Fdn, bp_{dist} :	1.917	in
Bolt Circle / Bearing Plate Width, BC :	72	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	44.41	0.85	1.8%	Pass
Bearing Pressure (ksf)	4.50	4.08	86.4%	Pass
Overturning (kip*ft)	76.29	4.81	6.3%	Pass
Pad Flexure (kip*ft)	2171.68	82.69	3.6%	Pass
Pad Shear - 1-way (kips)	417.37	0.00	0.0%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.190	0.000	0.0%	Pass
Flexural 2-way (Comp) (kip*ft)	4343.35	0.00	0.0%	Pass

*Rating per TIA-222-H Section 15.5

Structural Rating*:	3.6%
Soil Rating*:	86.4%

Pad Properties		
Depth, D :	5.0833	ft
Pad Width, W_1 :	5.98	ft
Pad Thickness, T :	5.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	8	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	115	pcf
Ultimate Gross Bearing, Q_{ult} :	7.500	ksf
Cohesion, C_u :	1.500	ksf
Friction Angle, ϕ :		degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.35	
Neglected Depth, N :	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	20	ft

<-- Toggle between Gross and Net

Guyed Anchor Block Foundation

Checks capacity of anchor blocks for a guyed tower.



BU#:	855759
Site Name:	CORRAL BLUFFS
Order Number:	
Location:	Guy A @ 228 ft (Elev -5 ft)

TIA-222 Revision: H

Design Reactions		
Shear, S:	51.06	kips
Uplift, Ua:	40.33	kips
Resultant Force, Rf:	65.07	kips
Tower Height, H:	288.00	ft
Guy Anchor Radius, R:	228.00	ft
Resultant Angle to Horizontal, θ:	38.3	deg

Guy Anchor Properties		
Depth to Bottom of Deadman, Da:	8.5	ft
Anchor Width, Wa:	5	ft
Anchor Thickness, Ta:	4	ft
Anchor Length, La:	11	ft
Concrete Volume, Vc:	8.1	yd ³
Toe Width, toe:	0	ft
Guyed Anchor Top Rebar Size, Sat:	9	
No. of Bars in Top of Block:	6	
Guyed Anchor Front Rebar Size, Saf:	9	
No. of Bars in Front of Block:	5	
Stirrup Size:	4	

Material Properties		
Rebar Grade, Fy:	60	ksi
Concrete Strength, Fc:	4	ksi
Wt. Avg. Concrete Density, δx:	0.150	kcf
Clear Cover, cc:	3	in

Design Checks				
	Capacity	Demand	Rating*	Check
Lateral Capacity (kips):	177.12	51.06	27.5%	Pass
Uplift Capacity (kips):	118.94	40.33	32.3%	Pass
Lateral Flexural Capacity (ft*kips):	1237.88	70.21	5.4%	Pass
Uplift Flexural Capacity (ft*kips):	1162.45	55.45	4.5%	Pass

*Rating per TIA-222-H Section 15.5

Anchor Shaft Rating:	N/A
Structural Rating:	5.4%
Soil Rating:	32.3%

Neglect Depth, Neg:	3.33	ft
Groundwater Level, gw:	20	ft

Soil Properties:		No. of Soil Layers:		2		
Layer	φ, deg	cu, ksf	δ, pcf		Ultimate fs (ksf)	N (blows/ft)
1	0	0.000	115	3.33	0.000	
2	0	1.500	115	8.50		

*key: φ = Internal Angle of Friction

cu = Cohesion / Undrained Shear Strength

δ = Buoyant Soil Unit Weight

d = Depth to Bottom of Layer

Ultimate fs = Geotechnical Report-provided skin friction / adhesion

N = SPT Blow Count

Guyed Anchor Block Foundation

Checks capacity of anchor blocks for a guyed tower.



BU#:	855759
Site Name:	CORRAL BLUFFS
Order Number:	
Location:	Guy B @ 228 ft (Elev 4 ft)

TIA-222 Revision: H

Design Reactions		
Shear, S:	50.67	kips
Uplift, Ua:	38.35	kips
Resultant Force, Rf:	63.55	kips
Tower Height, H:	288.00	ft
Guy Anchor Radius, R:	228.00	ft
Resultant Angle to Horizontal, θ:	37.1	deg

Guy Anchor Properties		
Depth to Bottom of Deadman, Da:	8.5	ft
Anchor Width, Wa:	5	ft
Anchor Thickness, Ta:	4	ft
Anchor Length, La:	11	ft
Concrete Volume, Vc:	8.1	yd ³
Toe Width, toe:	0	ft
Guyed Anchor Top Rebar Size, Sat:	9	
No. of Bars in Top of Block:	6	
Guyed Anchor Front Rebar Size, Saf:	9	
No. of Bars in Front of Block:	5	
Stirrup Size:	4	

Material Properties		
Rebar Grade, Fy:	60	ksi
Concrete Strength, Fc:	4	ksi
Wt. Avg. Concrete Density, δx:	0.150	kcf
Clear Cover, cc:	3	in

Design Checks				
	Capacity	Demand	Rating*	Check
Lateral Capacity (kips):	177.43	50.67	27.2%	Pass
Uplift Capacity (kips):	118.54	38.35	30.8%	Pass
Lateral Flexural Capacity (ft*kips):	1237.88	69.67	5.4%	Pass
Uplift Flexural Capacity (ft*kips):	1162.45	52.73	4.3%	Pass

*Rating per TIA-222-H Section 15.5

Anchor Shaft Rating:	N/A
Structural Rating:	5.4%
Soil Rating:	30.8%

Neglect Depth, Neg:	3.33	ft
Groundwater Level, gw:	20	ft

Soil Properties:		No. of Soil Layers:		2		
Layer	φ, deg	cu, ksf	δ, pcf		Ultimate fs (ksf)	N (blows/ft)
1	0	0.000	115	3.33	0.000	
2	0	1.500	115	8.50		

*key: φ = Internal Angle of Friction

cu = Cohesion / Undrained Shear Strength

δ = Buoyant Soil Unit Weight

d = Depth to Bottom of Layer

Ultimate fs = Geotechnical Report-provided skin friction / adhesion

N = SPT Blow Count

Guyed Anchor Block Foundation

Checks capacity of anchor blocks for a guyed tower.



BU#:	855759
Site Name:	CORRAL BLUFFS
Order Number:	
Location:	Guy C @ 228 ft (Elev 4 ft)

TIA-222 Revision: H

Design Reactions		
Shear, S:	51.49	kips
Uplift, Ua:	38.95	kips
Resultant Force, Rf:	64.56	kips
Tower Height, H:	288.00	ft
Guy Anchor Radius, R:	228.00	ft
Resultant Angle to Horizontal, θ:	37.1	deg

Guy Anchor Properties		
Depth to Bottom of Deadman, Da:	8.5	ft
Anchor Width, Wa:	5	ft
Anchor Thickness, Ta:	4	ft
Anchor Length, La:	11	ft
Concrete Volume, Vc:	8.1	yd ³
Toe Width, toe:	0	ft
Guyed Anchor Top Rebar Size, Sat:	9	
No. of Bars in Top of Block:	6	
Guyed Anchor Front Rebar Size, Saf:	9	
No. of Bars in Front of Block:	5	
Stirrup Size:	4	

Material Properties		
Rebar Grade, Fy:	60	ksi
Concrete Strength, Fc:	4	ksi
Wt. Avg. Concrete Density, δx:	0.150	kcf
Clear Cover, cc:	3	in

Design Checks				
	Capacity	Demand	Rating*	Check
Lateral Capacity (kips):	177.44	51.49	27.6%	Pass
Uplift Capacity (kips):	118.53	38.95	31.3%	Pass
Lateral Flexural Capacity (ft*kips):	1237.88	70.80	5.4%	Pass
Uplift Flexural Capacity (ft*kips):	1162.45	53.56	4.4%	Pass

*Rating per TIA-222-H Section 15.5

Anchor Shaft Rating:	N/A
Structural Rating:	5.4%
Soil Rating:	31.3%

Neglect Depth, Neg:	3.33	ft
Groundwater Level, gw:	20	ft

Soil Properties:		No. of Soil Layers:		2		
Layer	φ, deg	cu, ksf	δ, pcf		Ultimate fs (ksf)	N (blows/ft)
1	0	0.000	115	3.33	0.000	
2	0	1.500	115	8.50		

*key: φ = Internal Angle of Friction

cu = Cohesion / Undrained Shear Strength

δ = Buoyant Soil Unit Weight

d = Depth to Bottom of Layer

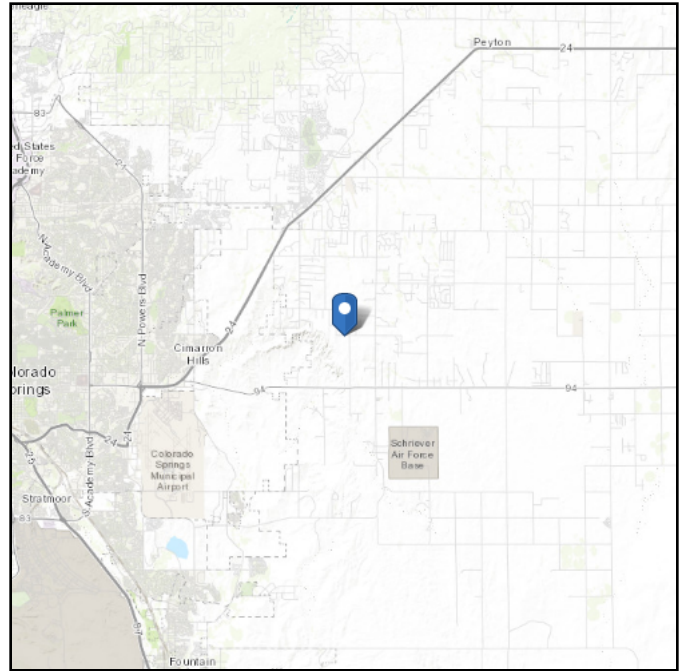
Ultimate fs = Geotechnical Report-provided skin friction / adhesion

N = SPT Blow Count

ASCE 7 Hazards Report

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

Elevation: 6643.5 ft (NAVD 88)
Latitude: 38.866722
Longitude: -104.57625



Wind

Results:

Wind Speed:	130 Vmph per jurisdictional requirements
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

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

Date Accessed: Tue Sep 29 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

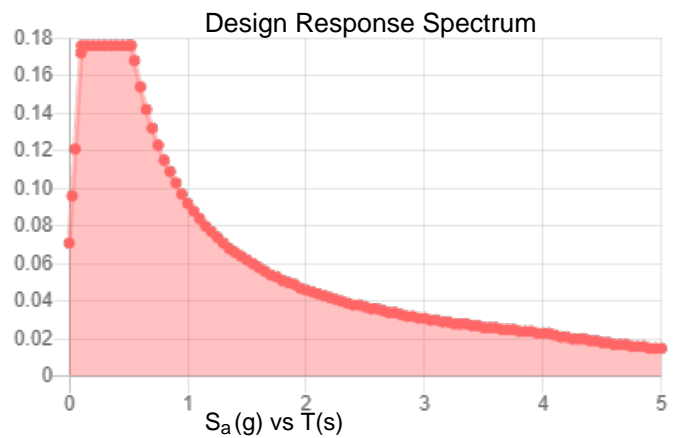
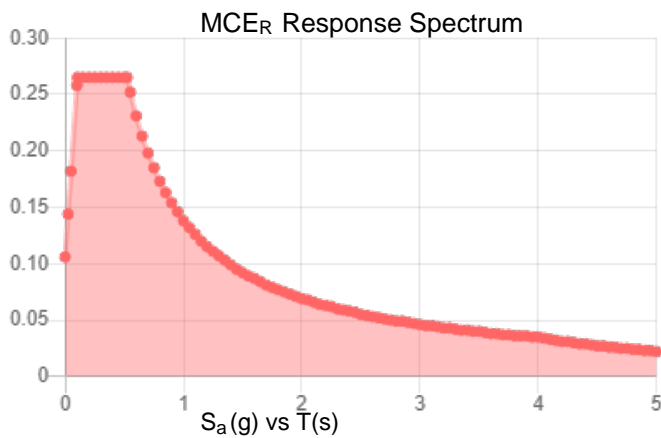
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.165	S_{DS} :	0.176
S_1 :	0.058	S_{D1} :	0.092
F_a :	1.6	T_L :	4
F_v :	2.4	PGA :	0.082
S_{MS} :	0.265	PGA_M :	0.131
S_{M1} :	0.138	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Sep 29 2020

Date Source:

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

Results:

Ice Thickness: 0.00 in.
Concurrent Temperature: 5 F
Gust Speed: 50 mph

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

Date Accessed: Tue Sep 29 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

In the mountain west, ice thicknesses may exceed the mapped values in the foothills and passes. However, at elevations above 5,000 ft, freezing rain is unlikely.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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