Washoe County

BLACK & VEATCH Corporation
6800 W. 115th St., Suite 2292
Overland Park, KS 66211

July 11, 2017

STRUCTURAL ANALYSIS REPORT

Washoe County Designation:	Site Name:	Slide Mountain
Site Information:	Address:	Atop Slide Mountain, off Rt. 431, Approx. 6 miles west of New Washoe City, Washoe County, NV 89704
	Description:	120' Self Support Tower
Applicable Codes:		TIA-222-G 2012 IBC 2012 Northern Nevada Amendments

Black & Veatch is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

A **Rigorous Structural Analysis** was performed. Based on the analysis, the tower **does not comply** with TIA-222-G standards for antenna supporting structures. Therefore, the existing tower is deemed **insufficient** for the proposed loads.

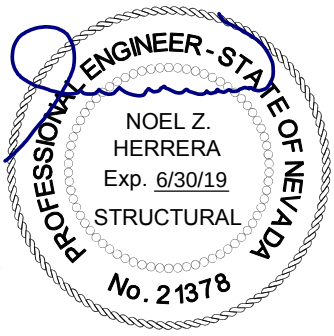
We at Black & Veatch appreciate the opportunity to provide our professional services to Washoe County. If you have any questions or need further assistance please contact us.

Analysis Results

Tower Stress Level with Proposed Equipment:	**123.2%**	**Fail**
Foundation Ratio with Proposed Equipment:	**80.1%**	**Pass**

***The results of this analysis are only valid if the county continues to monitor and inspect the leg thicknesses yearly. The leg thicknesses shall not be less than 1/16" less than the original design thickness.**

Sincerely,
Black & Veatch Corporation



Analysis Prepared by: Jumpon Uea-areevorakul / Josh Riley

Analysis Reviewed by: Noel Z. Herrera, S.E.

Digitally signed by Herrera, Noel
Date: 2017.09.15 12:55:13-05'00'

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TOWER LOADING

Existing loading

Antenna					Mount		Coax and Lines	
Carrier	Mount Height (ft)	RAD CL (ft)	Quantity	Model / Description	Quantity	Type	Quantity	Size
Washoe County	120.0	126.0	1	12' Omni	1	Pipe Mount	2 2	7/8" 1/2"
		125.0	1	10' Omni	1	Pipe Mount		
		122.0	1	4' Omni	1	Pipe Mount		
	118.0	118.0	1	12"x6" TMA	-	-	-	-
	112.0	112.0	1	Andrew 4' HP Dish	1	Pipe Mount	1	1-1/4"
	100.0	104.0	2	8' Omni	3	Stand Off	3	1-5/8"
		102.0	1	4' Omni				
	86.0	88.0	1	Ice Shield	1	Pipe Mount	1	1-1/4"
		84.0	1	6' Dish w/Radome				
	76.5	79.0	1	Ice Shield	1	Pipe Mount	1	E60
		74.0	1	RFS UXA8-59B				
	60.0	66.0	1	12' Omni	3	Stand Off	3	7/8"
		64.0	1	8' Omni				
		62.5	1	5' Omni				
	48.5	51.0	1	Ice Shield	1	Pipe Mount	1	E60
		46.0	1	RFS UXA8-59B				
	37.0	39.0	1	Ice Shield	1	Pipe Mount	1	E60
		35.0	1	RFS PAD6-65				
	31.5	33.0	1	Ice Shield	1	Pipe Mount	1	1-1/4"
		30.0	1	RFS 4' HP Dish				
	17.0	20.0	1	Ice Shield	1	Pipe Mount	1 1	1/4" 3/8"
		17.0	1	Yagi				
		14.0	1	2' Dish w/Radome				

MATERIAL STRENGTH

Capacity of the structural members is based on theoretical values obtained from the design structural and shown in the table below:

Member Type	Yield Strength
Legs	35 ksi
Diagonals/Horizontals	36 ksi
Bolts	A325X
Anchor Bolts	36 ksi

REFERENCE DOCUMENTS

Existing tower, foundation information and site loading information are based on the following table.

Document Title	Description
Structural Analysis by CLS Group, dated 05/27/2016	Previous Structural Analysis and Loading Data
Tower Mapping Report by Black & Veatch, dated 06/30/2017	Loading Data
Tower Drawing by Tower Structures, dated 05/18/2000	Tower Geometry Data
Foundation Drawing by Tower Structures, dated 05/18/2000	Foundation and Geotechnical Data

ASSUMPTIONS, DISCLAIMERS, AND NOTES

1. This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, existing appurtenance loading, tower/foundation details, and geotechnical data. If this information is not current and correct, this report should be considered obsolete and further analysis will be required.
2. This analysis assumes that the tower structural components and mounts, including all steel sections and attachment hardware, are in good working order and in their original state, free of rust or other forms of corrosion. Furthermore, it is assumed that the tower and the tower foundation have been properly maintained and monitored since the time of construction. This report should be considered obsolete and further analysis will be required if the tower and/or foundation does not meet all of the above specifications.
3. This analysis assumes that all existing and/or proposed equipment's mounts on the tower will have adequate capacity to support the existing and proposed equipment loading.
4. The existing tower has been analyzed with applicable seismic loading taken into consideration. Seismic loading considerations are based on the codes criteria for this tower's jurisdiction.

RECOMMENDATIONS/COMMENTS

The tower does not have sufficient capacity to carry the proposed load configuration. Modifications will be required to bring the tower into compliance with the TIA-222-G standard for the proposed loading configuration. The following components require modifications:

a) Tower diagonal bolts from 0' to 40' and 100' to 120'
b) Tower horizontal bolts from 0' to 20' and 40' to 60'
c) Tighten all loose diagonal hardware on face C at 16' and 34'
d) Repair the crack to tower leg A at 82'

Further engineering and detailing is required to design the necessary modifications. Anchor rods and foundation are sufficient.

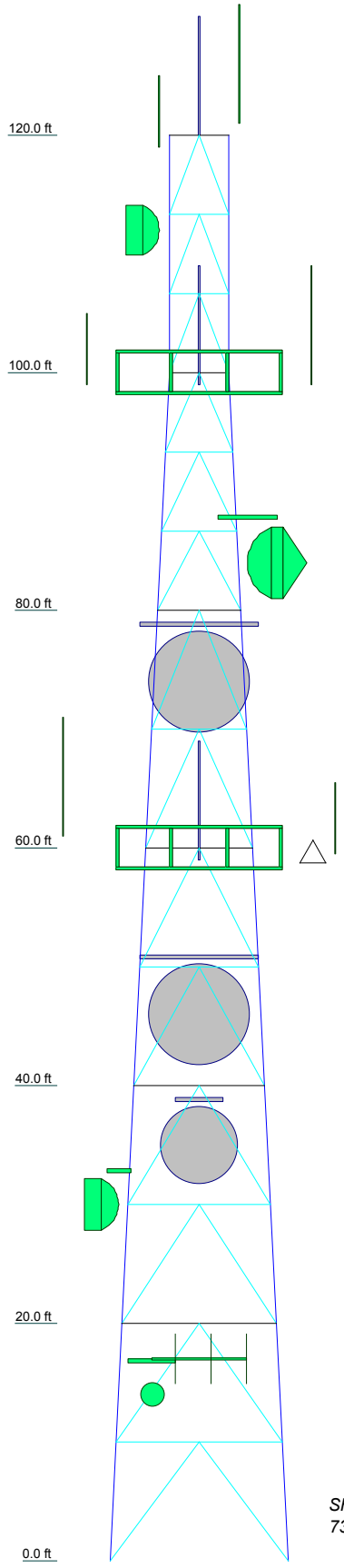
The existing leg crack is most likely caused from ice formation inside of the tower leg. Water inside the tower legs may also cause rust and potentially reduce the effective pipe leg wall thickness. The severity of the rust damage to the tower legs is unknown at this time. To account for a potential reduction in tower leg thickness due to corrosion, a separate trail was run with reduced leg thicknesses (1/16" reduction). The results from this trail run are shown below and are compared to the original design wall thickness.

Design Pipe Leg Thickness		
Elevation (ft)	% Capacity	Pass / Fail
120 - 100	29.6	Pass
100 - 80	69.5	Pass
80 - 60	60.4	Pass
60 - 40	64.3	Pass
40 - 20	64.1	Pass
20 - 0	68.1	Pass

Reduced Pipe Leg Thickness		
Elevation (ft)	% Capacity	Pass / Fail
120 - 100	40.9	Pass
100 - 80	93.7	Pass
80 - 60	88.2	Pass
60 - 40	78.9	Pass
40 - 20	76.6	Pass
20 - 0	81	Pass

We recommend the leg thicknesses for the entire tower are determined by ultrasonic corrosion mapping so the damage to the tower legs can be determined at this point in time.
It may be extremely difficult if not impossible to remedy the continually on going rust and water issue this tower faces. With the ongoing rust and water issue not being able to be corrected, the legs will no doubt continuously deteriorate. Even if the leg thicknesses are determined at this current point in time, they will most likely need to be monitored and inspected yearly.

APPENDIX
TNX TOWER OUTPUT & ADDITIONAL CALCULATIONS



Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	P2.5x.203	A53-B-35	L3x3x3/16	A36	L2x2x3/16	L2x2x3/16	5	6 @ 6.66667	1.0
T2	P3.5x.226		L3x3x1/4		L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16			1.4
T3	P6x.28		2L3x3x1/4x3/8		L3x3x3/16	L3x3x3/16	7		2.7
T4	P8x.322						9		3.4
T5	P10x.365				L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4	11	8 @ 10	4.4
T6	P12x.375						13		5.1
							15		18.1

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Pipe Mount [PM 601-3] (Washoe County - Existing)	120	UXA8-59B (Washoe County - Existing)	76.5
3" Dia 10' Omni (Washoe County - Existing)	120	4" Dia 12' Omni (Washoe County - Existing)	60
3" Dia 12' Omni (Washoe County - Existing)	120	3" Dia 8' Omni (Washoe County - Existing)	60
3" Dia 4' Omni (Washoe County - Existing)	120	3" Dia 5' Omni (Washoe County - Existing)	60
6' x 4-1/2" Horizontal Pipe (Existing)	118	Side Arm Mount [8' SO 308-3] (Washoe County - Existing)	60
12"x6" TMA (Washoe County - Existing)	118	MD-S8 (for 8' MW) : Ice Shield (Washoe County - Existing)	48.5
6' x 4-1/2" Horizontal Pipe (Existing)	115	Pipe Mount [PM 602-1] (Washoe County - Existing)	48.5
6' x 4-1/2" Horizontal Pipe (Existing)	112	UXA8-59B (Washoe County - Existing)	48.5
Pipe Mount [PM 601-1] (Washoe County - Existing)	112	12' x 4-1/2" Horizontal Pipe (Existing)	38
Andrew 4' HP Dish (Washoe County - Existing)	112	12' x 4-1/2" Horizontal Pipe (Existing)	38
Side Arm Mount [8' SO 308-3] (Washoe County - Existing)	100	Pipe Mount [PM 602-1] (Washoe County - Existing)	37
3" Dia 8' Omni (Washoe County - Existing)	100	MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	37
3" Dia 8' Omni (Washoe County - Existing)	100	PAD6-65 (Washoe County - Existing)	37
3" Dia 4' Omni (Washoe County - Existing)	100	Pipe Mount [PM 602-1] (Washoe County - Existing)	31.5
Pipe Mount [PM 602-1] (Washoe County - Existing)	86	MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	31.5
MD-S6 (for 6' MW) : Ice Shield (Washoe County - Existing)	86	RFS 4' HP Dish (Washoe County - Existing)	31.5
6' Dish w/Radome (Washoe County - Existing)	86	MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	17
Pipe Mount [PM 602-1] (Washoe County - Existing)	76.5	Yagi (small) (Washoe County - Existing)	17
MD-S8 (for 8' MW) : Ice Shield (Washoe County - Existing)	76.5	Pipe Mount [PM 602-1] (Washoe County - Existing)	17
		2' Dish w/Radome (Washoe County - Existing)	17

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	A36	36 ksi	58 ksi

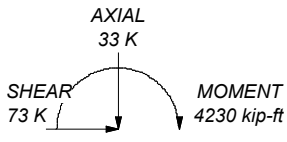
TOWER DESIGN NOTES

1. Tower is located in Washoe County, Nevada.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 108 mph basic wind in accordance with the TIA-222-G Standard.
4. Deflections are based upon a 60 mph wind.
5. Risk Category III.
6. Topographic Category 5 with Crest Height of 3896.00 ft
7. TOWER RATING: 123.2%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 336 K
SHEAR: 42 K

UPLIFT: -304 K
SHEAR: 39 K



TORQUE 35 kip-ft
REACTIONS - 108 mph WIND

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Job: SLIDE MOUNTAIN			
Project: SLIDE MOUNTAIN			
Client: Washoe County	Drawn by: Josh Riley	App'd:	
Code: TIA-222-G	Date: 07/11/17	Scale: NTS	
Path: C:\Users\vl68982\Desktop\1Slide Mountain Washoe County (VER)\Slide Mountain Structural Analysis.eri		Dwg No. E-1	

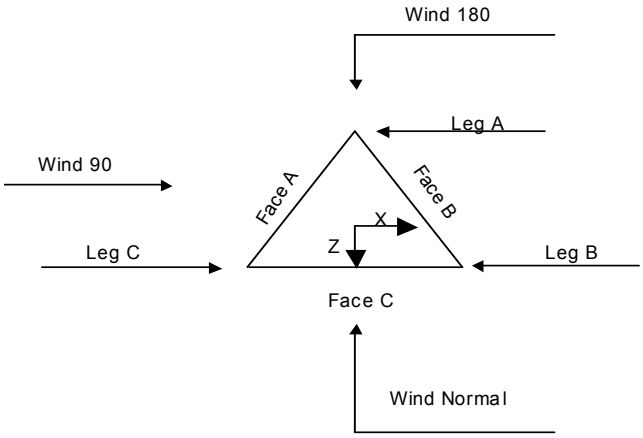
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 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 5.00 ft at the top and 15.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Washoe County, Nevada.
Basic wind speed of 108 mph.
Risk Category III.
Exposure Category C.
Topographic Category 5.
Crest Height 3896.00 ft.
SEAW RSM-03 procedures for wind speed-up calculations are used.
Topographic Feature: Hill.
Slope Distance L: 11932.80 ft.
Distance from Crest x: 490.00 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.
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-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	120.00-100.00			5.00	1	20.00
T2	100.00-80.00			5.00	1	20.00
T3	80.00-60.00			7.00	1	20.00
T4	60.00-40.00			9.00	1	20.00
T5	40.00-20.00			11.00	1	20.00
T6	20.00-0.00			13.00	1	20.00

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	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	100.00-80.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T4	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	20.00-0.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-100.00	Pipe	P2.5x.203	A53-B-35 (35 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T2 100.00-80.00	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T3 80.00-60.00	Pipe	P6x.28	A53-B-35 (35 ksi)	Double Equal Angle	2L3x3x1/4x3/8	A36 (36 ksi)
T4 60.00-40.00	Pipe	P8x.322	A53-B-35 (35 ksi)	Double Equal Angle	2L3x3x1/4x3/8	A36 (36 ksi)
T5 40.00-20.00	Pipe	P10x.365	A53-B-35 (35 ksi)	Double Equal Angle	2L3x3x1/4x3/8	A36 (36 ksi)
T6 20.00-0.00	Pipe	P12x.375	A53-B-35 (35 ksi)	Double Equal Angle	2L3x3x1/4x3/8	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 120.00-100.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 100.00-80.00	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 80.00-60.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T4 60.00-40.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T5 40.00-20.00	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T6 20.00-0.00	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Equal Angle		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
T1 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T2 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T4 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T5 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T6 20.00-0.00	None	Flat Bar		A36	Equal Angle	L3 1/2x3 1/2x1/4	A36

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
				(36 ksi)			(36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 120.00-100.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	31.0000	Mid-Pt	Mid-Pt
T4 60.00-40.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	32.0000	Mid-Pt	Mid-Pt
T5 40.00-20.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	33.5000	Mid-Pt	Mid-Pt
T6 20.00-0.00	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	35.0000	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T6 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: 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 120.00-100.00	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 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 80.00-60.00	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 60.00-40.00	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 40.00-20.00	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 20.00-0.00	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 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 120.00-100.00	Flange	0.6250 A325X	4	0.6250 A325X	1	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	1	0.6250 A325N	0
T2 100.00-80.00	Flange	0.6250 A325X	4	0.7500 A325X	1	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.7500 A325X	1	0.6250 A325N	0
T3 80.00-60.00	Flange	0.8750 A325X	4	0.8750 A325X	1	0.8750 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.8750 A325X	1	0.6250 A325N	0
T4 60.00-40.00	Flange	0.8750 A325X	6	0.8750 A325X	1	0.8750 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.8750 A325X	1	0.6250 A325N	0
T5 40.00-20.00	Flange	1.1250 A325X	6	0.8750 A325X	1	0.8750 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.8750 A325X	1	0.6250 A325N	0
T6 20.00-0.00	Flange	1.7500 A36	0	0.8750 A325X	1	0.8750 A325X	1	0.6250 A325X	0	0.6250 A325N	0	0.8750 A325X	1	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder (Af) (Existing)	A	No	Af (CaAa)	120.00 - 0.00	0.0000	0	1	1	3.0000	3.0000		8.40
Safety Line 3/8 (Existing)	A	No	Ar (CaAa)	120.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af) (Existing) ***	C	No	Af (CaAa)	120.00 - 0.00	-1.5000	0	2	1	3.0000	3.0000		8.40
(2) (7/8) + (2) (1/2) (Washoe County -	C	No	Ar (CaAa)	120.00 - 8.00	1.0000	0.1	4	2	0.5000	1.0300		0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Existing) ***												
LDF6-50A(1-1/4") (Washoe County - Existing) ***	C	No	Ar (CaAa)	112.00 - 8.00	0.0000	0	1	1	0.5000	1.5500		0.66
LDF7-50A(1-5/8") (Washoe County - Existing)	C	No	Ar (CaAa)	100.00 - 8.00	0.0000	0.05	2	2	0.5000	1.9800		0.82
LDF7-50A(1-5/8") (Washoe County - Existing) ***	C	No	Ar (CaAa)	100.00 - 8.00	0.0000	0.05	1	1	0.5000	1.9800		0.82
LDF6-50A(1-1/4") (Washoe County - Existing)	C	No	Ar (CaAa)	86.00 - 31.50	1.0000	0.05	1	1	0.5000	1.5500		0.66
LDF6-50A(1-1/4") (Washoe County - Existing) ***	C	No	Ar (CaAa)	31.50 - 8.00	1.5000	0.05	2	2	0.5000	1.5500		0.66
E60 (Washoe County - Existing) ***	C	No	Ar (CaAa)	76.50 - 8.00	1.0000	0.08	1	1	0.5000	2.2000		1.10
LDF5-50A(7/8") (Washoe County - Existing) ***	C	No	Ar (CaAa)	60.00 - 8.00	0.0000	0	3	3	0.5000	1.0900		0.33
E60 (Washoe County - Existing)	C	No	Ar (CaAa)	48.50 - 37.00	-1.0000	0.1	1	1	0.5000	2.2000		1.10
E60 (Washoe County - Existing) ***	C	No	Ar (CaAa)	37.00 - 8.00	-1.0000	0.1	2	2	0.5000	2.2000		1.10
(1) (1/4") + (1) (3/8) (Washoe County - Existing)	C	No	Ar (CaAa)	17.00 - 8.00	0.0000	0.4	2	2	0.4400	0.4400		0.08

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-100.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	30.100	0.000	0.37
T2	100.00-80.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	44.150	0.000	0.43
T3	80.00-60.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	49.950	0.000	0.46
T4	60.00-40.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	59.130	0.000	0.49
T5	40.00-20.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	67.183	0.000	0.53
T6	20.00-0.00	A	0.000	0.000	10.750	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	50.288	0.000	0.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120.00-100.00	-0.8048	1.5783	-1.4012	1.3356
T2	100.00-80.00	-0.8675	2.3162	-1.3811	2.1561
T3	80.00-60.00	-1.0563	2.9894	-1.6052	2.8068
T4	60.00-40.00	-1.1722	3.7846	-1.7265	3.6012
T5	40.00-20.00	-1.3866	4.4695	-1.9494	4.2783
T6	20.00-0.00	-1.4494	3.8685	-2.1227	3.5314

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)	100.00 - 120.00	0.6000	0.6000
T1	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T1	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T1	5	(2) (7/8) + (2) (1/2)	100.00 - 120.00	0.6000	0.6000
T1	8	LDF6-50A(1-1/4")	100.00 - 112.00	0.6000	0.6000
T2	1	Climbing Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T2	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T2	3	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T2	5	(2) (7/8) + (2) (1/2)	80.00 - 100.00	0.6000	0.6000
T2	8	LDF6-50A(1-1/4")	80.00 - 100.00	0.6000	0.6000
T2	10	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	11	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T2	13	LDF6-50A(1-1/4")	80.00 - 86.00	0.6000	0.6000
T3	1	Climbing Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T3	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T3	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T3	5	(2) (7/8) + (2) (1/2)	60.00 - 80.00	0.6000	0.6000
T3	8	LDF6-50A(1-1/4")	60.00 - 80.00	0.6000	0.6000
T3	10	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T3	11	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T3	13	LDF6-50A(1-1/4")	60.00 - 80.00	0.6000	0.6000
T3	16	E60	60.00 - 76.50	0.6000	0.6000
T4	1	Climbing Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T4	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T4	3	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T4	5	(2) (7/8) + (2) (1/2)	40.00 - 60.00	0.6000	0.6000
T4	8	LDF6-50A(1-1/4")	40.00 - 60.00	0.6000	0.6000
T4	10	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T4	11	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T4	13	LDF6-50A(1-1/4")	40.00 - 60.00	0.6000	0.6000
T4	16	E60	40.00 - 60.00	0.6000	0.6000
T4	18	LDF5-50A(7/8")	40.00 - 60.00	0.6000	0.6000
T4	20	E60	40.00 - 48.50	0.6000	0.6000
T5	1	Climbing Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T5	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T5	3	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T5	5	(2) (7/8) + (2) (1/2)	20.00 - 40.00	0.6000	0.6000
T5	8	LDF6-50A(1-1/4")	20.00 - 40.00	0.6000	0.6000
T5	10	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T5	11	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T5	13	LDF6-50A(1-1/4")	31.50 - 40.00	0.6000	0.6000
T5	14	LDF6-50A(1-1/4")	20.00 - 31.50	0.6000	0.6000
T5	16	E60	20.00 - 40.00	0.6000	0.6000
T5	18	LDF5-50A(7/8")	20.00 - 40.00	0.6000	0.6000
T5	20	E60	37.00 - 40.00	0.6000	0.6000
T5	21	E60	20.00 - 37.00	0.6000	0.6000
T6	1	Climbing Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T6	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T6	3	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T6	5	(2) (7/8) + (2) (1/2)	8.00 - 20.00	0.6000	0.6000
T6	8	LDF6-50A(1-1/4")	8.00 - 20.00	0.6000	0.6000
T6	10	LDF7-50A(1-5/8")	8.00 - 20.00	0.6000	0.6000
T6	11	LDF7-50A(1-5/8")	8.00 - 20.00	0.6000	0.6000
T6	14	LDF6-50A(1-1/4")	8.00 - 20.00	0.6000	0.6000
T6	16	E60	8.00 - 20.00	0.6000	0.6000
T6	18	LDF5-50A(7/8")	8.00 - 20.00	0.6000	0.6000
T6	21	E60	8.00 - 20.00	0.6000	0.6000
T6	23	(1) (1/4") + (1) (3/8)	8.00 - 17.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6' x 4-1/2" Horizontal Pipe (Existing)	A	From Face	0.00 0.00 0.00	0.0000	118.00	No Ice	1.35	0.02	0.04
6' x 4-1/2" Horizontal Pipe (Existing)	A	From Face	0.00 0.00 0.00	0.0000	115.00	No Ice	1.35	0.02	0.04
6' x 4-1/2" Horizontal Pipe (Existing)	A	From Face	0.00 0.00 0.00	0.0000	112.00	No Ice	1.35	0.02	0.04
12' x 4-1/2" Horizontal Pipe (Existing)	A	From Face	0.00 0.00 0.00	0.0000	38.00	No Ice	3.00	0.02	0.08
12' x 4-1/2" Horizontal Pipe (Existing)	B	From Face	0.00 0.00 0.00	0.0000	38.00	No Ice	3.00	0.02	0.08
***									
Pipe Mount [PM 601-3] (Washoe County - Existing)	C	None		0.0000	120.00	No Ice	4.39	4.39	0.20
3" Dia 10' Omni (Washoe County - Existing)	A	From Leg	1.00 0.00 5.00	0.0000	120.00	No Ice	2.24	2.24	0.04
3" Dia 12' Omni (Washoe County - Existing)	B	From Leg	1.00 0.00 6.00	0.0000	120.00	No Ice	2.52	2.52	0.02
3" Dia 4' Omni (Washoe County - Existing)	C	From Leg	1.00 0.00 2.00	0.0000	120.00	No Ice	0.80	0.80	0.02
***									
12"x6" TMA (Washoe County - Existing)	A	From Leg	0.00 0.00 0.00	0.0000	118.00	No Ice	0.60	0.41	0.01
***									
Pipe Mount [PM 601-1] (Washoe County - Existing)	C	From Leg	0.00 0.00 0.00	0.0000	112.00	No Ice	3.00	0.90	0.07
***									
Side Arm Mount [8' SO 308-3] (Washoe County - Existing)	C	None		0.0000	100.00	No Ice	6.01	6.01	0.21
3" Dia 8' Omni (Washoe County - Existing)	A	From Leg	8.00 0.00 4.00	0.0000	100.00	No Ice	1.82	1.82	0.03
3" Dia 8' Omni (Washoe County - Existing)	B	From Leg	8.00 0.00 4.00	0.0000	100.00	No Ice	1.82	1.82	0.03
3" Dia 4' Omni (Washoe County - Existing)	C	From Leg	8.00 0.00 2.00	0.0000	100.00	No Ice	0.81	0.81	0.02
***									
Pipe Mount [PM 602-1] (Washoe County - Existing)	B	From Leg	0.00 0.00 0.00	0.0000	86.00	No Ice	5.25	1.58	0.09
MD-S6 (for 6' MW) : Ice Shield (Washoe County - Existing)	B	From Leg	1.00 0.00 2.00	0.0000	86.00	No Ice	1.67	0.80	0.44
***									
Pipe Mount [PM 602-1]	A	From Leg	0.00	0.0000	76.50	No Ice	5.25	1.58	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Washoe County - Existing)			0.00 0.00						
MD-S8 (for 8' MW) : Ice Shield (Washoe County - Existing)	A	From Leg	1.00 0.00 2.50	11.7000	76.50	No Ice	3.80	2.40	0.57
***									
Side Arm Mount [8' SO 308-3] (Washoe County - Existing)	C	None		0.0000	60.00	No Ice	6.01	6.01	0.21
4" Dia 12' Omni (Washoe County - Existing)	C	From Leg	8.00 0.00 6.00	0.0000	60.00	No Ice	2.87	2.87	0.05
3" Dia 8' Omni (Washoe County - Existing)	A	From Leg	8.00 0.00 4.00	0.0000	60.00	No Ice	1.91	1.91	0.03
3" Dia 5' Omni (Washoe County - Existing)	B	From Leg	8.00 0.00 2.50	0.0000	60.00	No Ice	1.12	1.12	0.02
***									
Pipe Mount [PM 602-1] (Washoe County - Existing)	A	From Leg	0.00 0.00 0.00	0.0000	48.50	No Ice	5.25	1.58	0.09
MD-S8 (for 8' MW) : Ice Shield (Washoe County - Existing)	A	From Leg	1.00 0.00 2.50	11.7000	48.50	No Ice	3.80	2.40	0.57
***									
Pipe Mount [PM 602-1] (Washoe County - Existing)	A	From Leg	0.00 0.00 0.00	0.0000	37.00	No Ice	5.25	1.58	0.09
MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	A	From Leg	1.00 0.00 2.00	0.0000	37.00	No Ice	0.80	0.80	0.13
***									
Pipe Mount [PM 602-1] (Washoe County - Existing)	C	From Leg	0.00 0.00 0.00	0.0000	31.50	No Ice	5.25	1.58	0.09
MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	C	From Leg	1.00 0.00 1.50	0.0000	31.50	No Ice	0.80	0.80	0.13
***									
Pipe Mount [PM 602-1] (Washoe County - Existing)	C	From Face	0.00 4.00 3.00	0.0000	17.00	No Ice	5.25	1.58	0.09
MD-SQ4 (4ft sq) : Ice Shield (Washoe County - Existing)	C	From Face	1.00 4.00 0.00	0.0000	17.00	No Ice	0.80	0.80	0.13
Yagi (small) (Washoe County - Existing)	C	From Face	1.00 4.00 0.00	0.0000	17.00	No Ice	0.97	0.97	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		Aperture Area ft^2	Weight K
Andrew 4' HP Dish (Washoe County - Existing)	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	-60.0000		112.00	4.23	No Ice	14.08	0.10
6' Dish w/Radome (Washoe County - Existing)	B	Paraboloid w/Radome	From Leg	1.00 0.00 -2.00	0.0000		86.00	6.00	No Ice	34.04	0.19
UXA8-59B (Washoe County - Existing)	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 -2.50	11.7000		76.50	8.62	No Ice	58.31	0.40
UXA8-59B (Washoe County - Existing)	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 -2.50	11.7000		48.50	8.62	No Ice	58.31	0.40
PAD6-65 (Washoe County - Existing)	A	Paraboloid w/Radome	From Leg	1.00 0.00 -2.00	0.0000		37.00	6.58	No Ice	34.04	0.19
RFS 4' HP Dish (Washoe County - Existing)	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 -1.50	60.0000		31.50	4.31	No Ice	14.58	0.09
2' Dish w/Radome (Washoe County - Existing)	C	Paraboloid w/Radome	From Face	1.00 4.00 -3.00	0.0000		17.00	2.00	No Ice	3.14	0.07

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service

Comb. No.	Description
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	120 - 100	Leg	Max Tension	15	9.20	0.15	-0.21
			Max. Compression	2	-11.01	0.04	0.15
			Max. Mx	4	-2.42	0.55	0.36
			Max. My	2	0.80	0.14	-0.84
			Max. Vy	4	-0.71	-0.38	0.36
			Max. Vx	2	1.14	0.14	0.66
		Diagonal	Max Tension	5	8.72	0.00	0.00
			Max. Compression	4	-8.77	0.00	0.00
			Max. Mx	2	-4.39	-0.01	0.00
			Max. Vy	2	0.01	0.00	0.00
		Horizontal	Max Tension	4	3.06	0.01	0.00
			Max. Compression	2	-3.21	0.01	0.00
			Max. Mx	14	0.13	0.02	0.00
			Max. My	19	0.69	-0.00	-0.00
			Max. Vy	14	-0.01	0.02	0.00
			Max. Vx	19	0.00	0.00	0.00
		Top Girt	Max Tension	23	0.56	0.00	0.00
			Max. Compression	10	-0.57	0.00	0.00
			Max. Mx	22	-0.34	0.00	0.00
			Max. My	19	0.23	0.00	-0.00
			Max. Vy	22	-0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T2	100 - 80	Leg	Max Tension	15	42.11	-1.32	0.31
			Max. Compression	2	-48.79	1.39	-0.47
			Max. Mx	22	39.84	-1.40	-0.48
			Max. My	17	-3.63	0.01	1.69
			Max. Vy	22	-0.73	-0.63	0.14
			Max. Vx	5	-0.84	-0.06	-0.76
		Diagonal	Max Tension	20	10.25	0.00	0.00
			Max. Compression	20	-10.33	0.00	0.00
			Max. Mx	2	8.00	-0.02	0.00
			Max. My	2	-0.41	0.00	0.00
			Max. Vy	2	0.01	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Horizontal	Max Tension	20	4.84	0.01	0.00
			Max. Compression	8	-4.82	0.00	0.00
			Max. Mx	14	0.40	0.07	0.00
			Max. My	14	-0.63	0.07	0.00
			Max. Vy	14	0.03	0.07	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	5	3.28	0.01	0.00
			Max. Compression	2	-3.67	0.03	0.00
			Max. Mx	14	-0.46	0.06	0.00
			Max. My	2	1.52	-0.05	0.00
			Max. Vy	14	-0.03	0.06	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	0.00	0.00	0.00
T3	80 - 60	Leg	Max Tension	23	78.05	-2.21	-1.70
			Max. Compression	2	-91.68	0.32	-0.15
			Max. Mx	14	52.55	3.82	-0.74
			Max. My	9	-1.25	0.36	-5.19
			Max. Vy	14	1.90	-3.37	-0.74
			Max. Vx	8	-2.33	0.34	3.78
		Diagonal	Max Tension	16	20.55	0.00	0.00
			Max. Compression	16	-20.72	0.00	0.00
			Max. Mx	2	17.15	0.08	0.00
			Max. My	2	0.12	0.00	-0.01
			Max. Vy	2	-0.03	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Horizontal	Max Tension	16	8.69	0.00	0.00
			Max. Compression	18	-8.46	0.00	0.00
			Max. Mx	22	0.85	0.11	0.01
			Max. My	2	1.67	-0.08	0.01
			Max. Vy	22	-0.04	0.11	0.01
			Max. Vx	2	0.00	0.00	0.00
		Top Girt	Max Tension	13	5.88	0.01	0.01
			Max. Compression	24	-6.13	0.00	0.00
			Max. Mx	14	-1.56	0.10	0.01
			Max. My	14	-0.82	0.10	0.01
			Max. Vy	14	0.04	0.10	0.01
			Max. Vx	2	-0.00	0.00	0.00
T4	60 - 40	Leg	Max Tension	15	134.78	-3.62	-0.43
			Max. Compression	2	-156.19	3.68	0.28
			Max. Mx	14	132.10	-4.09	-0.56
			Max. My	9	-6.63	0.28	4.43
			Max. Vy	14	-1.70	-3.63	-0.43
			Max. Vx	8	1.88	0.29	3.52
		Diagonal	Max Tension	16	23.10	0.00	0.00
			Max. Compression	16	-23.29	0.00	0.00
			Max. Mx	2	18.43	0.10	0.00
			Max. My	2	-0.15	0.00	-0.01
			Max. Vy	2	-0.03	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Horizontal	Max Tension	16	11.38	0.00	0.00
			Max. Compression	16	-11.07	0.00	0.00
			Max. Mx	14	-1.73	0.09	0.01
			Max. My	2	1.50	-0.05	0.01
			Max. Vy	14	-0.03	0.09	0.01
			Max. Vx	2	0.00	0.00	0.00
		Top Girt	Max Tension	16	8.37	0.00	0.00
			Max. Compression	17	-8.46	0.00	0.00
			Max. Mx	14	-0.60	0.08	0.01
			Max. My	18	0.21	-0.05	0.01
			Max. Vy	14	-0.03	0.08	0.01
			Max. Vx	2	0.00	0.00	0.00
T5	40 - 20	Leg	Max Tension	15	200.86	-3.68	0.12
			Max. Compression	2	-227.56	3.22	0.07
			Max. Mx	14	164.39	-4.09	-0.56
			Max. My	9	-8.59	0.28	4.43
			Max. Vy	14	-0.89	-4.09	-0.56
			Max. Vx	13	-1.24	0.17	-3.05
		Diagonal	Max Tension	17	27.33	0.00	0.00
			Max. Compression	16	-27.56	0.00	0.00
			Max. Mx	2	20.35	0.12	0.00
			Max. My	2	-1.11	0.00	-0.01
			Max. Vy	2	-0.04	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Horizontal	Max Tension	16	14.98	0.00	0.00
			Max. Compression	16	-15.09	0.00	0.00
			Max. Mx	14	-1.86	0.14	0.02
			Max. My	18	1.61	-0.07	0.02
			Max. Vy	14	-0.05	0.14	0.02
			Max. Vx	2	0.00	0.00	0.00
		Top Girt	Max Tension	16	13.70	0.00	0.00
			Max. Compression	16	-13.46	0.00	0.00
			Max. Mx	14	-1.49	0.14	0.01
			Max. My	6	-1.90	0.13	0.01
			Max. Vy	14	0.04	0.14	0.01
			Max. Vx	14	0.00	0.00	0.00
T6	20 - 0	Leg	Max Tension	15	270.14	-6.35	-0.16
			Max. Compression	2	-300.74	0.00	0.00
			Max. Mx	3	-297.56	6.60	0.05
			Max. My	13	-32.94	0.52	-5.75
			Max. Vy	3	1.02	6.60	0.05
			Max. Vx	13	-0.95	0.52	-5.75
		Diagonal	Max Tension	17	27.10	0.00	0.00
			Max. Compression	16	-27.36	0.00	0.00
			Max. Mx	2	20.98	0.14	0.00
			Max. My	2	-1.16	0.00	-0.01
			Max. Vy	2	-0.05	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Horizontal	Max Tension	16	16.49	0.00	0.00
			Max. Compression	16	-16.45	0.00	0.00
			Max. Mx	14	2.67	0.13	0.02
			Max. My	18	0.72	-0.03	0.02
			Max. Vy	14	-0.04	0.13	0.02
			Max. Vx	8	0.00	0.00	0.00
		Top Girt	Max Tension	16	15.10	0.00	0.00
			Max. Compression	17	-15.03	0.00	0.00
			Max. Mx	14	0.08	0.13	0.02
			Max. My	18	1.19	-0.04	0.02
			Max. Vy	14	-0.04	0.13	0.02
			Max. Vx	14	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	326.64	34.38	-21.64
	Max. H_x	18	326.64	34.38	-21.64
	Max. H_z	5	-245.59	-24.75	20.13
	Min. Vert	7	-275.97	-29.86	19.10
	Min. H_x	7	-275.97	-29.86	19.10
	Min. H_z	18	326.64	34.38	-21.64
Leg B	Max. Vert	10	315.28	-33.66	-20.32
	Max. H_x	23	-281.74	30.38	18.87
	Max. H_z	25	-247.11	25.29	18.94
	Min. Vert	23	-281.74	30.38	18.87
	Min. H_x	10	315.28	-33.66	-20.32
	Min. H_z	10	315.28	-33.66	-20.32
Leg A	Max. Vert	2	336.43	-0.69	41.57
	Max. H_x	21	-2.20	8.08	-0.74
	Max. H_z	2	336.43	-0.69	41.57

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	15	-304.00	0.99	-39.08
	Min. H_x	8	18.91	-8.20	1.61
	Min. H_z	15	-304.00	0.99	-39.08

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	27.09	0.00	0.00	-5.77	4.17	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	32.50	0.17	-72.77	-4229.63	-4.65	-17.44
0.9 Dead+1.6 Wind 0 deg - No Ice	24.38	0.17	-72.77	-4227.90	-5.90	-17.44
1.2 Dead+1.6 Wind 30 deg - No Ice	32.50	31.23	-60.28	-3519.60	-1773.43	-32.57
0.9 Dead+1.6 Wind 30 deg - No Ice	24.38	31.23	-60.28	-3517.87	-1774.68	-32.57
1.2 Dead+1.6 Wind 60 deg - No Ice	32.50	53.13	-36.39	-2164.03	-3011.79	-31.58
0.9 Dead+1.6 Wind 60 deg - No Ice	24.38	53.13	-36.39	-2162.30	-3013.04	-31.58
1.2 Dead+1.6 Wind 90 deg - No Ice	32.50	64.18	-1.52	-104.85	-3697.42	-35.35
0.9 Dead+1.6 Wind 90 deg - No Ice	24.38	64.18	-1.52	-103.12	-3698.67	-35.35
1.2 Dead+1.6 Wind 120 deg - No Ice	32.50	57.05	39.00	2264.35	-3259.40	-7.52
0.9 Dead+1.6 Wind 120 deg - No Ice	24.38	57.05	39.00	2266.08	-3260.66	-7.52
1.2 Dead+1.6 Wind 150 deg - No Ice	32.50	30.10	63.57	3677.43	-1695.76	15.96
0.9 Dead+1.6 Wind 150 deg - No Ice	24.38	30.10	63.57	3679.16	-1697.01	15.96
1.2 Dead+1.6 Wind 180 deg - No Ice	32.50	-0.87	70.70	4052.88	75.52	24.16
0.9 Dead+1.6 Wind 180 deg - No Ice	24.38	-0.87	70.70	4054.61	74.27	24.16
1.2 Dead+1.6 Wind 210 deg - No Ice	32.50	-33.22	62.67	3612.52	1902.32	26.73
0.9 Dead+1.6 Wind 210 deg - No Ice	24.38	-33.22	62.67	3614.25	1901.07	26.73
1.2 Dead+1.6 Wind 240 deg - No Ice	32.50	-58.37	41.18	2397.69	3352.83	24.48
0.9 Dead+1.6 Wind 240 deg - No Ice	24.38	-58.37	41.18	2399.42	3351.58	24.48
1.2 Dead+1.6 Wind 270 deg - No Ice	32.50	-64.46	2.25	132.38	3753.28	32.84
0.9 Dead+1.6 Wind 270 deg - No Ice	24.38	-64.46	2.25	134.11	3752.03	32.84
1.2 Dead+1.6 Wind 300 deg - No Ice	32.50	-53.97	-35.92	-2139.36	3115.07	21.15
0.9 Dead+1.6 Wind 300 deg - No Ice	24.38	-53.97	-35.92	-2137.63	3113.81	21.15
1.2 Dead+1.6 Wind 330 deg - No Ice	32.50	-30.13	-61.58	-3626.72	1736.92	-4.83
0.9 Dead+1.6 Wind 330 deg -	24.38	-30.13	-61.58	-3624.99	1735.67	-4.83

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice						
Dead+Wind 0 deg - Service	27.09	0.03	-14.04	-820.33	2.31	-3.36
Dead+Wind 30 deg - Service	27.09	6.02	-11.63	-683.37	-338.89	-6.28
Dead+Wind 60 deg - Service	27.09	10.25	-7.02	-421.88	-577.77	-6.09
Dead+Wind 90 deg - Service	27.09	12.38	-0.29	-24.66	-710.03	-6.82
Dead+Wind 120 deg - Service	27.09	11.01	7.52	432.37	-625.54	-1.45
Dead+Wind 150 deg - Service	27.09	5.81	12.26	704.95	-323.91	3.08
Dead+Wind 180 deg - Service	27.09	-0.17	13.64	777.37	17.77	4.66
Dead+Wind 210 deg - Service	27.09	-6.41	12.09	692.43	370.17	5.16
Dead+Wind 240 deg - Service	27.09	-11.26	7.94	458.09	649.97	4.72
Dead+Wind 270 deg - Service	27.09	-12.43	0.43	21.11	727.22	6.33
Dead+Wind 300 deg - Service	27.09	-10.41	-6.93	-417.12	604.11	4.08
Dead+Wind 330 deg - Service	27.09	-5.81	-11.88	-704.03	338.26	-0.93

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-27.09	0.00	0.00	27.09	0.00	0.000%
2	0.17	-32.50	-72.77	-0.17	32.50	72.77	0.000%
3	0.17	-24.38	-72.77	-0.17	24.38	72.77	0.000%
4	31.23	-32.50	-60.28	-31.23	32.50	60.28	0.000%
5	31.23	-24.38	-60.28	-31.23	24.38	60.28	0.000%
6	53.13	-32.50	-36.39	-53.13	32.50	36.39	0.000%
7	53.13	-24.38	-36.39	-53.13	24.38	36.39	0.000%
8	64.18	-32.50	-1.52	-64.18	32.50	1.52	0.000%
9	64.18	-24.38	-1.52	-64.18	24.38	1.52	0.000%
10	57.05	-32.50	39.00	-57.05	32.50	-39.00	0.000%
11	57.05	-24.38	39.00	-57.05	24.38	-39.00	0.000%
12	30.10	-32.50	63.57	-30.10	32.50	-63.57	0.000%
13	30.10	-24.38	63.57	-30.10	24.38	-63.57	0.000%
14	-0.87	-32.50	70.70	0.87	32.50	-70.70	0.000%
15	-0.87	-24.38	70.70	0.87	24.38	-70.70	0.000%
16	-33.22	-32.50	62.67	33.22	32.50	-62.67	0.000%
17	-33.22	-24.38	62.67	33.22	24.38	-62.67	0.000%
18	-58.37	-32.50	41.18	58.37	32.50	-41.18	0.000%
19	-58.37	-24.38	41.18	58.37	24.38	-41.18	0.000%
20	-64.46	-32.50	2.25	64.46	32.50	-2.25	0.000%
21	-64.46	-24.38	2.25	64.46	24.38	-2.25	0.000%
22	-53.97	-32.50	-35.92	53.97	32.50	35.92	0.000%
23	-53.97	-24.38	-35.92	53.97	24.38	35.92	0.000%
24	-30.13	-32.50	-61.58	30.13	32.50	61.58	0.000%
25	-30.13	-24.38	-61.58	30.13	24.38	61.58	0.000%
26	0.03	-27.09	-14.04	-0.03	27.09	14.04	0.000%
27	6.02	-27.09	-11.63	-6.02	27.09	11.63	0.000%
28	10.25	-27.09	-7.02	-10.25	27.09	7.02	0.000%
29	12.38	-27.09	-0.29	-12.38	27.09	0.29	0.000%
30	11.01	-27.09	7.52	-11.01	27.09	-7.52	0.000%
31	5.81	-27.09	12.26	-5.81	27.09	-12.26	0.000%
32	-0.17	-27.09	13.64	0.17	27.09	-13.64	0.000%
33	-6.41	-27.09	12.09	6.41	27.09	-12.09	0.000%
34	-11.26	-27.09	7.94	11.26	27.09	-7.94	0.000%
35	-12.43	-27.09	0.43	12.43	27.09	-0.43	0.000%
36	-10.41	-27.09	-6.93	10.41	27.09	6.93	0.000%
37	-5.81	-27.09	-11.88	5.81	27.09	11.88	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 100	1.56	26	0.1116	0.0390
T2	100 - 80	1.08	26	0.1049	0.0249
T3	80 - 60	0.69	26	0.0782	0.0257
T4	60 - 40	0.39	26	0.0565	0.0213
T5	40 - 20	0.19	26	0.0355	0.0144
T6	20 - 0	0.06	26	0.0172	0.0051

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	Pipe Mount [PM 601-3]	26	1.56	0.1116	0.0390	200143
118.00	6' x 4-1/2" Horizontal Pipe	26	1.51	0.1115	0.0374	200143
115.00	6' x 4-1/2" Horizontal Pipe	26	1.44	0.1113	0.0349	200143
112.00	Andrew 4' HP Dish	26	1.37	0.1108	0.0325	125090
100.00	Side Arm Mount [8' SO 308-3]	26	1.08	0.1049	0.0249	52052
86.00	Pipe Mount [PM 602-1]	26	0.79	0.0868	0.0239	45390
84.00	6' Dish w/Radome	26	0.76	0.0838	0.0247	44103
76.50	Pipe Mount [PM 602-1]	26	0.63	0.0738	0.0259	44253
74.00	UXA8-59B	26	0.59	0.0709	0.0257	46008
60.00	Side Arm Mount [8' SO 308-3]	26	0.39	0.0565	0.0213	55690
48.50	Pipe Mount [PM 602-1]	26	0.26	0.0443	0.0175	61818
46.00	UXA8-59B	26	0.24	0.0417	0.0167	63236
38.00	12' x 4-1/2" Horizontal Pipe	26	0.17	0.0335	0.0135	65009
37.00	Pipe Mount [PM 602-1]	26	0.16	0.0325	0.0131	64393
35.00	PAD6-65	26	0.15	0.0306	0.0121	62928
31.50	Pipe Mount [PM 602-1]	26	0.12	0.0274	0.0104	60403
30.00	RFS 4' HP Dish	26	0.11	0.0260	0.0097	59383
17.00	Pipe Mount [PM 602-1]	26	0.05	0.0146	0.0040	63025
14.00	2' Dish w/Radome	26	0.03	0.0120	0.0031	76242

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 100	8.04	2	0.5784	0.2024
T2	100 - 80	5.57	2	0.5425	0.1292
T3	80 - 60	3.52	2	0.4000	0.1334
T4	60 - 40	2.02	2	0.2882	0.1104
T5	40 - 20	0.96	2	0.1812	0.0746
T6	20 - 0	0.30	3	0.0882	0.0265

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	Pipe Mount [PM 601-3]	2	8.04	0.5784	0.2024	39396
118.00	6' x 4-1/2" Horizontal Pipe	2	7.78	0.5779	0.1939	39396
115.00	6' x 4-1/2" Horizontal Pipe	2	7.40	0.5767	0.1811	39396
112.00	Andrew 4' HP Dish	2	7.02	0.5744	0.1686	24622
100.00	Side Arm Mount [8' SO 308-3]	2	5.57	0.5425	0.1292	10188
86.00	Pipe Mount [PM 602-1]	2	4.08	0.4453	0.1238	8631
84.00	6' Dish w/Radome	2	3.89	0.4297	0.1280	8483
76.50	Pipe Mount [PM 602-1]	2	3.22	0.3768	0.1343	8587
74.00	UXA8-59B	2	3.01	0.3617	0.1331	8881
60.00	Side Arm Mount [8' SO 308-3]	2	2.02	0.2882	0.1104	10939
48.50	Pipe Mount [PM 602-1]	2	1.36	0.2264	0.0908	12235
46.00	UXA8-59B	2	1.24	0.2128	0.0864	12537
38.00	12' x 4-1/2" Horizontal Pipe	2	0.88	0.1711	0.0701	12899
37.00	Pipe Mount [PM 602-1]	2	0.84	0.1662	0.0677	12761
35.00	PAD6-65	2	0.76	0.1564	0.0628	12435
31.50	Pipe Mount [PM 602-1]	2	0.63	0.1399	0.0540	11880
30.00	RFS 4' HP Dish	2	0.58	0.1329	0.0501	11657
17.00	Pipe Mount [PM 602-1]	3	0.23	0.0749	0.0210	12235
14.00	2' Dish w/Radome	3	0.18	0.0617	0.0162	14800

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	120	Leg	A325X	0.6250	4	2.30	20.71	0.111	1	Bolt Tension
		Diagonal	A325X	0.6250	1	8.72	7.83	**1.114**	1	Member Bearing
		Horizontal	A325X	0.6250	1	3.06	6.83	0.448	1	Member Block Shear
		Top Girt	A325X	0.6250	1	0.56	6.83	0.082	1	Member Block Shear
T2	100	Leg	A325X	0.6250	4	10.53	20.71	0.508	1	Bolt Tension
		Diagonal	A325X	0.7500	1	10.25	12.62	0.813	1	Member Bearing
		Horizontal	A325X	0.7500	1	4.84	8.97	0.540	1	Member Block Shear
		Top Girt	A325X	0.7500	1	3.28	8.97	0.366	1	Member Block Shear
T3	80	Leg	A325X	0.8750	4	19.51	40.59	0.481	1	Bolt Tension
		Diagonal	A325X	0.8750	1	20.55	22.18	0.926	1	Gusset Bearing
		Horizontal	A325X	0.8750	1	8.69	10.09	0.861	1	Member Block Shear
		Top Girt	A325X	0.8750	1	5.88	10.09	0.583	1	Member Block Shear
T4	60	Leg	A325X	0.8750	6	22.46	40.59	0.553	1	Bolt Tension
		Diagonal	A325X	0.8750	1	23.10	22.18	**1.041**	1	Gusset Bearing
		Horizontal	A325X	0.8750	1	11.38	10.09	**1.127**	1	Member Block Shear
		Top Girt	A325X	0.8750	1	8.37	10.09	0.829	1	Member Block Shear
T5	40	Leg	A325X	1.1250	6	33.48	67.10	0.499	1	Bolt Tension
		Diagonal	A325X	0.8750	1	27.33	22.18	**1.232**	1	Gusset Bearing
		Horizontal	A325X	0.8750	1	14.98	14.79	**1.013**	1	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T6	20	Top Girt	A325X	0.8750	1	13.70	14.79	0.927	1	Member Bearing
		Diagonal	A325X	0.8750	1	27.10	22.18	**1.221**	1	Gusset Bearing
		Horizontal	A325X	0.8750	1	16.49	14.79	**1.115**	1	Member Bearing
		Top Girt	A325X	0.8750	1	15.10	14.79	**1.021**	1	Member Bearing

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	120 - 100	P2.5x.203	20.00	6.67	84.4 K=1.00	1.7040	-11.01	37.27	0.296 [1]
T2	100 - 80	P3.5x.226	20.03	6.68	59.9 K=1.00	2.6795	-48.79	70.22	0.695 [1]
T3	80 - 60	P6x.28	20.03	10.02	53.5 K=1.00	5.5813	-91.68	151.83	0.604 [1]
T4	60 - 40	P8x.322	20.03	10.02	40.9 K=1.00	8.3993	-156.19	242.85	0.643 [1]
T5	40 - 20	P10x.365	20.03	10.02	32.7 K=1.00	11.9083	-227.56	355.11	0.641 [1]
T6	20 - 0	P12x.375	20.03	10.02	27.5 K=1.00	14.5790	-300.75	441.85	0.681 [1]

[1] $P_u / \phi P_n$ 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	120 - 100	L3x3x3/16	7.12	6.54	131.7 K=1.00	1.0900	-8.77	14.13	0.621 [1]
T2	100 - 80	L3x3x1/4	7.53	6.90	139.9 K=1.00	1.4400	-10.33	16.61	0.622 [1]
T3	80 - 60	2L3x3x1/4x3/8	10.97	10.00	129.0 K=1.00	2.8800	-20.72	38.87	0.533 [1]
T4	60 - 40	2L3x3x1/4x3/8	11.42	10.37	133.8 K=1.00	2.8800	-23.29	36.34	0.641 [1]
T5	40 - 20	2L3x3x1/4x3/8	11.93	10.81	139.4 K=1.00	2.8800	-27.56	33.46	0.824 [1]
T6	20 - 0	2L3x3x1/4x3/8	12.50	11.32	146.0 K=1.00	2.8800	-27.36	30.52	0.896 [1]

[1] $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T1	120 - 100	L2x2x3/16	5.00	2.26	94.4 K=1.37	0.7150	-3.21	14.49	0.221 [1]
T2	100 - 80	L2 1/2x2 1/2x3/16	6.33	2.86	94.7 K=1.36	0.9020	-4.82	18.22	0.265 [1]
T3	80 - 60	L3x3x3/16	8.00	3.57	96.0 K=1.33	1.0900	-8.46	21.36	0.396 [1]
T4	60 - 40	L3x3x3/16	10.00	4.49	105.2 K=1.16	1.0900	-11.07	19.43	0.569 [1]
T5	40 - 20	L3 1/2x3 1/2x1/4	12.00	5.40	106.7 K=1.14	1.6900	-15.09	30.07	0.502 [1]
T6	20 - 0	L3 1/2x3 1/2x1/4	14.00	6.32	114.6 K=1.05	1.6900	-16.45	27.42	0.600 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	L2x2x3/16	5.00	2.26	94.4 K=1.37	0.7150	-0.57	14.49	0.039 [1]
T2	100 - 80	L2 1/2x2 1/2x3/16	5.00	2.24	87.2 K=1.60	0.9020	-3.67	19.58	0.188 [1]
T3	80 - 60	L3x3x3/16	7.00	3.18	92.0 K=1.44	1.0900	-6.13	22.18	0.276 [1]
T4	60 - 40	L3x3x3/16	9.00	4.07	101.0 K=1.23	1.0900	-8.46	20.31	0.417 [1]
T5	40 - 20	L3 1/2x3 1/2x1/4	11.00	4.99	103.1 K=1.20	1.6900	-13.46	31.28	0.430 [1]
T6	20 - 0	L3 1/2x3 1/2x1/4	13.00	5.90	111.0 K=1.09	1.6900	-15.03	28.62	0.525 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	P2.5x.203	20.00	6.67	84.4	1.7040	9.20	53.68	0.171 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	100 - 80	P3.5x.226	20.03	6.68	59.9	2.6795	42.11	84.41	0.499 [1]
T3	80 - 60	P6x.28	20.03	10.02	53.5	5.5813	78.05	175.81	0.444 [1]
T4	60 - 40	P8x.322	20.03	10.02	40.9	8.3993	134.78	264.58	0.509 [1]
T5	40 - 20	P10x.365	20.03	10.02	32.7	11.9083	200.89	375.11	0.536 [1]
T6	20 - 0	P12x.375	20.03	10.02	27.5	14.5790	270.14	459.24	0.588 [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	120 - 100	L3x3x3/16	7.12	6.54	86.6	0.7120	8.72	30.97	0.282 [1]
T2	100 - 80	L3x3x1/4	7.53	6.90	92.6	0.9159	10.25	39.84	0.257 [1]
T3	80 - 60	2L3x3x1/4x3/8	10.97	10.00	132.9	1.7850	20.55	77.65	0.265 [1]
T4	60 - 40	2L3x3x1/4x3/8	11.42	10.37	137.7	1.7850	23.10	77.65	0.297 [1]
T5	40 - 20	2L3x3x1/4x3/8	11.93	10.81	143.3	1.7850	27.33	77.65	0.352 [1]
T6	20 - 0	2L3x3x1/4x3/8	12.50	11.32	149.9	1.7850	27.10	77.65	0.349 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	L2x2x3/16	5.00	2.26	69.4	0.4308	3.06	18.74	0.163 [1]
T2	100 - 80	L2 1/2x2 1/2x3/16	6.33	2.86	69.4	0.5535	4.84	24.08	0.201 [1]
T3	80 - 60	L3x3x3/16	8.00	3.57	71.4	0.6769	8.69	29.44	0.295 [1]
T4	60 - 40	L3x3x3/16	10.00	4.49	89.0	0.6769	11.38	29.44	0.386 [1]
T5	40 - 20	L3 1/2x3 1/2x1/4	12.00	5.40	91.7	1.0800	14.98	46.98	0.319 [1]
T6	20 - 0	L3 1/2x3 1/2x1/4	14.00	6.32	106.8	1.0800	16.49	46.98	0.351 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 100	L2x2x3/16	5.00	2.26	69.4	0.4308	0.56	18.74	0.030 [1]
T2	100 - 80	L2 1/2x2 1/2x3/16	5.00	2.24	55.1	0.5535	3.28	24.08	0.136 [1]
T3	80 - 60	L3x3x3/16	7.00	3.18	63.9	0.6769	5.88	29.44	0.200 [1]
T4	60 - 40	L3x3x3/16	9.00	4.07	81.0	0.6769	8.37	29.44	0.284 [1]
T5	40 - 20	L3 1/2x3 1/2x1/4	11.00	4.99	84.9	1.0800	13.70	46.98	0.292 [1]
T6	20 - 0	L3 1/2x3 1/2x1/4	13.00	5.90	99.9	1.0800	15.10	46.98	0.321 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	120 - 100	Leg	P2.5x.203	3	-11.01	37.27	29.6	Pass
T2	100 - 80	Leg	P3.5x.226	33	-48.79	70.22	69.5	Pass
T3	80 - 60	Leg	P6x.28	63	-91.68	151.83	60.4	Pass
T4	60 - 40	Leg	P8x.322	84	-156.19	242.85	64.3	Pass
T5	40 - 20	Leg	P10x.365	105	-227.56	355.11	64.1	Pass
T6	20 - 0	Leg	P12x.375	126	-300.75	441.85	68.1	Pass
T1	120 - 100	Diagonal	L3x3x3/16	14	-8.77	14.13	62.1 111.4 (b)	Fail
T2	100 - 80	Diagonal	L3x3x1/4	38	-10.33	16.61	62.2 81.3 (b)	Pass
T3	80 - 60	Diagonal	2L3x3x1/4x3/8	75	-20.72	38.87	53.3 92.6 (b)	Pass
T4	60 - 40	Diagonal	2L3x3x1/4x3/8	96	-23.29	36.34	64.1 104.1 (b)	Acceptable
T5	40 - 20	Diagonal	2L3x3x1/4x3/8	117	-27.56	33.46	82.4 123.2 (b)	Fail
T6	20 - 0	Diagonal	2L3x3x1/4x3/8	138	-27.36	30.52	89.6 122.1 (b)	Fail
T1	120 - 100	Horizontal	L2x2x3/16	13	-3.21	14.49	22.1 44.8 (b)	Pass
T2	100 - 80	Horizontal	L2 1/2x2 1/2x3/16	37	-4.82	18.22	26.5 54.0 (b)	Pass
T3	80 - 60	Horizontal	L3x3x3/16	73	-8.46	21.36	39.6 86.1 (b)	Pass
T4	60 - 40	Horizontal	L3x3x3/16	94	-11.07	19.43	56.9 112.7 (b)	Fail
T5	40 - 20	Horizontal	L3 1/2x3 1/2x1/4	115	-15.09	30.07	50.2 101.3 (b)	Acceptable
T6	20 - 0	Horizontal	L3 1/2x3 1/2x1/4	136	-16.45	27.42	60.0 111.5 (b)	Fail
T1	120 - 100	Top Girt	L2x2x3/16	5	-0.57	14.49	3.9 8.2 (b)	Pass
T2	100 - 80	Top Girt	L2 1/2x2 1/2x3/16	36	-3.67	19.58	18.8 36.6 (b)	Pass
T3	80 - 60	Top Girt	L3x3x3/16	65	-6.13	22.18	27.6 58.3 (b)	Pass
T4	60 - 40	Top Girt	L3x3x3/16	87	-8.46	20.31	41.7 82.9 (b)	Pass
T5	40 - 20	Top Girt	L3 1/2x3 1/2x1/4	108	-13.46	31.28	43.0 92.7 (b)	Pass
T6	20 - 0	Top Girt	L3 1/2x3 1/2x1/4	129	-15.03	28.62	52.5 102.1 (b)	Acceptable
						Summary		
						Leg (T2)	69.5	Pass
						Diagonal (T5)	123.2	Fail
						Horizontal (T4)	112.7	Fail
						Top Girt	102.1	Acceptable

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						(T6) Bolt Checks	123.2	Fail
						RATING =	**123.2**	**Fail**

Anchor Rod Check for Self Supporting Towers

TIA-222-G, Section 4.9.9 Rev. 6.1

Site Data	
BU#:	
Site Name:	**Slide Mountain**
App #:	

Anchor Rod Data		
Qty:	**6**	
Diam:	**1.75**	in
Rod Material:	**A36**	
Strength (Fu):	58	ksi
Yield (Fy):	36	ksi

* Rod Circle:		in
* e:		in
* # of Rods		1 or 2

Mu= Pu x e:		ft-kips

** Only enter rod circle, offset (e) and number of anchor rods at the extreme fiber to consider if eccentric load due to leg reinforcement exist.*

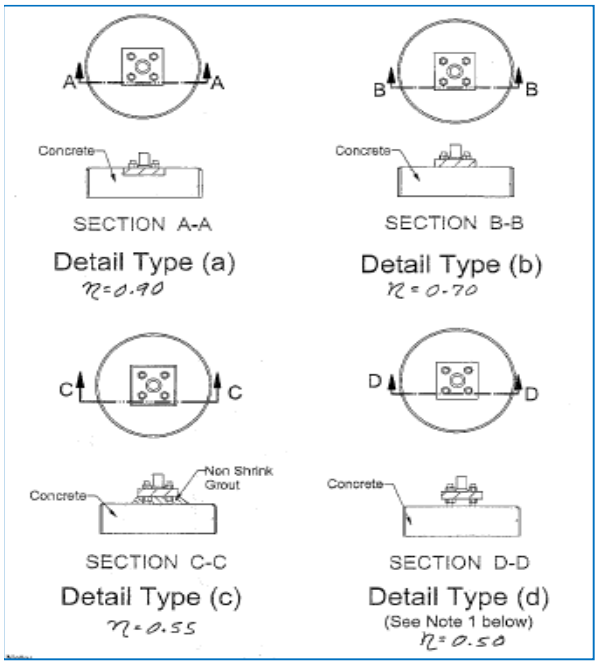


Figure 4-4 of TIA-222-G

Reactions		
Eta Factor, η	**0.55**	Detail Type
Uplift, Pu:	**304**	kips
Shear, Vu:	**39**	kips

l_{ar}:		in
Mu = 0.65*l_{ar}*V_u		ft-kips

Anchor Rod Results:

Max Rod (Cu+ Vu/ή):	62.5	Kips
Design Axial, Φ*Fu*Anet:	88.2	Kips
Anchor Rod Stress Ratio:	70.9%	

If Applicable;

Anchor Rod Results with Bending Considered:

When the clear distance from the top of concrete to the bottom of level nut excceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied (see Figure 4-4 of Rev. G):

$$(V_u/\phi R_{nv})^2 + [(P_u/\phi R_{nt}) + (M_u/\phi R_{nm})]^2 <= 1$$

$\phi R_{nv}=\phi*0.45*F_{ub}*A_b=$		kips
$\phi R_{nt}=\phi*F_u*A_{net}=$		kips
$\phi R_{nm}=\phi*F_y*Z=$		ft-kips

Maximum Acceptable Ratio:	**105**	%
Governing Stress Ratio:	**70.9%**	**Pass**

SST Unit Base Foundation

BU # :	
Site Name:	Slide Mountain
App. Number:	

TIA-222 Revision:	G

Tower Centroid Offset?:	☐
Block Foundation?:	☑

Superstructure Analysis Reactions		
Global Moment, **M**:	4230	ft-kips
Global Axial, **P**:	33	kips
Global Shear, **V**:	73	kips
Leg Compression, $\mathbf{P_{comp}}$:	336	kips
Leg Comp. Shear, $\mathbf{V_{u\_comp}}$:	42	kips
Leg Uplift, $\mathbf{P_{uplift}}$:	304	kips
Leg Uplift. Shear, $\mathbf{V_{u\_uplift}}$:	39	kips
Tower Height, **H**:	120	ft
Base Face Width, **BW**:	15	ft
BP Dist. Above Fdn, $\mathbf{bp_{dist}}$:	3	in
Anchor Bolt Circle, **BC**:	16	in

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	111.77	73.00	**65.3%**	**Pass**
Bearing Pressure (ksf)	11.25	2.38	**21.2%**	**Pass**
*Overturning (kip*ft)*	5665.97	4540.25	**80.1%**	**Pass**
*Pad Flexure (kip*ft)*	6259.65	1707.86	**27.3%**	**Pass**
Pad Shear - 1-way (kips)	1195.53	238.22	**19.9%**	**Pass**
Pad Shear - 2-way (kips)	1325.91	336.00	**25.3%**	**Pass**

Soil Rating:	**80.1%**
Structural Rating:	**27.3%**

Pad Properties		
Depth, **D**:	3.5	ft
Pad Width, **W**:	28.0	ft
Pad Thickness, **T**:	4.0	ft
Pad Rebar Size (Bottom), **Sp**:	9	
Pad Rebar Quantity (Bottom), **mp**:	33	
Pad Clear Cover, $\mathbf{cc_{pad}}$:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	3000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	110	pcf
Ultimate Gross Bearing, Qult:	15.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	0	degrees
SPT Blow Count, $\mathbf{N_{blows}}$:		
Base Friction, μ:	0.3	
Neglected Depth, **N**:	1.7	ft
Groundwater Depth, **gw**:	None	ft

<-- Toggle between Gross and Net