TOWER ANALYSIS REPORT

T-Mobile

A5C0028, Lee's Summit Fire Station

SSC # MO-0552-B

November 20, 2015

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serve solve communicate

TABLE OF CONTENTS

General Information 2
Introduction 3
Source of Data 3
Antenna and Transmission Lines 4
Structural Analysis of Tower Results 5
Foundation Analysis Results..... 5
Recommendations 6
General Conditions ..... Appendix A
Structural Calculations and Diagrams ..... Appendix B

GENERAL TOWER INFORMATION

Date:	November 20, 2015
Site Name:	Lee's Summit Fire Station
Site Location:	Lee's Summit, Jackson County, MO
Site Number:	A5C0028
Proposed Carrier:	T-Mobile
Tower Height:	180'
Tower Type:	Monopole
Tower Manufacturer:	EEI
Design Standard:	IBC 2012, TIA-222-G
Structural Classification:	II
Wind Loading:	89 mph w/o ice
Wind and Ice Loading:	30 mph w/ 1.0" ice
Serviceability Criteria:	60 mph w/o ice
Exposure Category:	C
Topographic Category:	1
Seismic Criteria:	$S_s = 0.58$
SSC Project Number:	MO-0552-B

Introduction

Selective Site Consultants, Inc. (SSC) has performed a rigorous structural analysis for the referenced existing communication tower. The purpose of this analysis is to determine the overall stability and structural adequacy of the existing structure to accommodate the proposed changed condition in accordance with TIA-222-G.

Source of Data

Our analysis is based on information provided in the table below.

Document	Remarks	Date
Tower Geometry	American Tower (Site # A5C0028A)	09/25/2007
Foundation Geometry	Engineered Endeavors Inc. Project #KS 1774	07/31/1996
Geotechnical Values	Kaw Valley Engineering Project #96-40,200	07/19/1996
Proposed Loading	T-Mobile RFDS	10/13/2015
Existing Loading	Crown Castle Structural Analysis (BU #877803)	03/19/2015

This analysis assumes the monopole is fabricated from 65 ksi steel and the base plate is fabricated from 60 ksi steel. All other steel assumed to be 36 ksi. Anchor Bolts are assumed as A615-GR75.

A rigorous structural analysis was performed utilizing tnxTower Version 6.1 software. The calculations were performed in accordance with TIA-222-G 'Structural Standard for Antenna Supporting Structures and Antennas'. The tower was analyzed for TIA-222-G specified load combinations, with the specified loads, as reproduced in General Tower Information of this report. Structural Classification, Exposure Category, and Topographic Category are also listed General Tower Information of this report. Topographic Category and the height of topographic features were estimated from USGS Quadrangle maps. This analysis considers wind from all specified directions. See the Appendix B for structural calculations.

Antenna and Transmission Line Loading

Our understanding of the antenna and transmission line loading conditions is shown below.

Antenna Status	Qty	Antenna Vender	Antenna Type	CL Elev. Ant./Mount	Mount	Azimuth	Feed Line
Existing (Sprint)	6	RFS	APXVSPP18-C w/ (9) RRUs	180'/180'	13' Low Profile Platform	Sectored	(3) 1-1/2" Coax
Existing (unknown)	3	Telewave	ANT150D6-9	170'/160'	13' Low Profile Platform w/ (3) Side Arms	N/A	(5) 1/2" Coax
	1	Teletronics	15-216				
	1	Teletronics	15-216	164'/160'			
Existing (T-Mobile)	3	Andrew	TMBXX-6517-A2M	160'/160'		Sectored	(6) 1-5/8" & (12) 7/8" Coax
	3	Andrew	TMBX-6517-A1M w/ (6) TMAs				
Proposed (T-Mobile)	3	Andrew	SBNHH-1D65C w/ (5) RRUs and (1) COVP				
Existing (unknown)	2	Telewave	ANT150D6-9	142'/134'	13' Low Profile Platform w/ (3) Side Arms	N/A	(6) 1/2" (3) 5/16", and (1) 7/8" Coax
Existing (Clearwire)	3	Argus	LLPX310R-V1 w/ (3) RRUs and (1) Junction Box	136'/134'		Sectored	
	2	Andrew	VHLP1-23 w/ (2) DUOs			Unknown	
	2	Andrew	VHLP2-18 w/ (2) DUOs				
Existing (unknown)	1	RFS	PD220	111'/100'	(3) Side Arms	N/A	(2) 7/8"
	1	Sinclair	SRL235-2	109'/100'		N/A	
Existing (unknown)	1	Kathrein	OGB4-900D	100'/98'	(1) Side Arm	N/A	(1) 1/2"
Existing (unknown)	1	Astron Wireless	918-2	70'/69'	(1) Side Arm	N/A	(1) 1/2"
Existing (unknown)	1	Kathrein	OGB4-900D	47'/45'	(1) Side Arm	N/A	(1) 1/2"
Existing (unknown)	1	Decibel	DB230-J	44'/45'	(1) Side Arm	N/A	(1) 1/2"
Existing (unknown)	1	Astron Wireless	VG-1060	44'/42'	(1) Side Arm	N/A	(1) 1/2"
Existing (unknown)	1	Sinclair	SRL224NM*5	35'/29'	(1) Side Arm	N/A	(1) 1/2"

Notes:

1. In addition to above listed antennas, the tower was analyzed with a lightning rod at elevation 180'.

Structural Analysis of Tower Results

The analysis of the existing tower with the proposed loadings installed indicates member overstressing according to TIA-222-G standards. Results of the analysis are shown in the following table and calculations may be found in Appendix B:

Tower Section	Max % Allowable Stress
Pole Steel (180'-149.648')	30.2
Pole Steel (149.648'-106.755')	67.5
Pole Steel (106.755'-76.407')	72.5
Pole Steel (76.407'-35.929')	77.1
Pole Steel (35.929'-0')	77.6
Base Plate	70.6
Anchor Bolts	70.7

Foundation Analysis Results

Reactions corresponding to the proposed factored loading were investigated and compared to the foundation design service reactions provided in previously referenced documents multiplied by 1.35. Reactions are duplicated in the following table.

Base Reaction	EEI Design Service Load x 1.35	Max Proposed Factored Load Case	% design value
Moment, kip-ft	6677	5682	85
Shear, kips	57	49	86
Axial, kips	63	61	97

Reactions corresponding to the proposed factored loading are less than the original design reactions of the tower foundation multiplied by 1.35. Assuming the original foundations were properly the existing foundation can be considered adequate for the proposed loading condition.

Recommendations

It is our conclusion that the tower as analyzed **does comply** with TIA-222-G Structural Standard under the proposed changed loading condition.

If the existing loading conditions are different or change from those analyzed, this report shall be deemed obsolete and further investigation will be required.

If you have any questions or comments, please do not hesitate to call.

Sincerely,

Joe Fitzsimmons, E.I.T.
Joe Fitzsimmons, E.I.T.

APPENDIX A

General Conditions

Please note that SSC makes no warranties, expressed or implied in connection with this report and disclaims any liability arising from original design, material, fabrication and erection deficiencies for this tower.

It is the responsibility of the Client to ensure that information provided by the Client to SSC and used in this analysis is correct. This information is assumed correct unless notified otherwise by the Client.

This analysis assumes the tower steel is in its original state with no deterioration due to improper erection procedures or field modifications and does not consider fabrication quality. The recommendations, conclusions, and opinions contained in this report pertain only to the analysis of the tower structure and the load carrying capacity of its members.

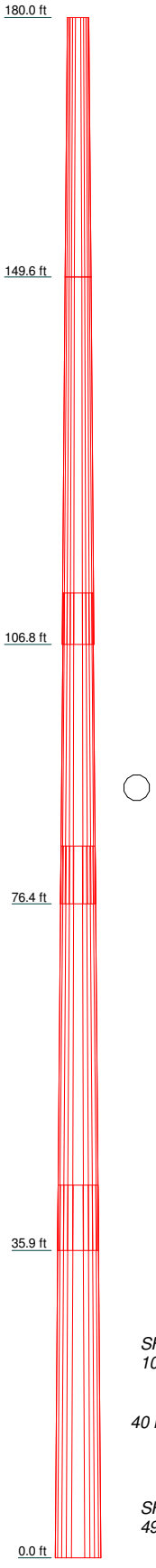
This analysis assumes any suggested modifications are installed as recommended and is not intended to address temporary conditions of the tower as modifications are being performed. It is strongly recommended that the Installer of any tower modification thoroughly assess installation procedures and how temporary conditions present while modifications are being performed influence tower members. Installer is responsible for sequence of operation and any required temporary bracing or strengthening of tower during modification operations. SSC is not responsible for the conclusions, opinion, or recommendations made by others based on the information we supply.

APPENDIX B

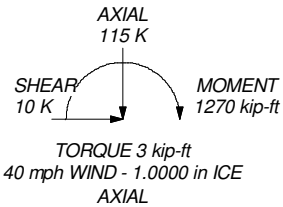
Structural Calculations and Diagrams

Existing Tower with Proposed Loading

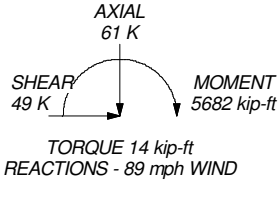
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	30.35	12	0.2500		29.0000	35.2490		2.8
2	42.89	12	0.2810	6.03	35.2490	44.0810		5.5
3	36.38	12	0.3440	6.73	42.2773	49.7680	A572-65	6.6
4	47.21	12	0.4060	7.68	47.6943	57.4140		11.5
5	43.61	12	0.4690		55.0208	64.0000		13.9
								40.2



ALL REACTIONS ARE FACTORED



TORQUE 3 kip-ft
40 mph WIND - 1.0000 in ICE



TORQUE 14 kip-ft
REACTIONS - 89 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod	180	15-216	160
Platform Mount [LP 602-1]	180	15-216	160
(2) APXVSPP18-C w/ Mount Pipe	180	Platform Mount [LP 713-1]	134
(2) APXVSPP18-C w/ Mount Pipe	180	Side Arm Mount [SO 301-3]	134
(2) APXVSPP18-C w/ Mount Pipe	180	LLPX310R-V1 w/ Mount Pipe	134
(6) ACU-A20-N	180	LLPX310R-V1 w/ Mount Pipe	134
(6) ACU-A20-N	180	LLPX310R-V1 w/ Mount Pipe	134
(6) ACU-A20-N	180	HORIZON DUO	134
RRUS 11	180	HORIZON DUO	134
RRUS 11	180	HORIZON DUO	134
RRUS 11	180	HORIZON DUO	134
(2) RRUS 31 B25	180	nRRHv2	134
(2) RRUS 31 B25	180	nRRHv2	134
(2) RRUS 31 B25	180	nRRHv2	134
Platform Mount (LP 101-1)	160	JUNCTION BOX	134
Side Arm Mount [SO 301-3]	160	ANT150D6-9	134
TMBXX-6517-A2M	160	ANT150D6-9	134
TMBX-6517-A1M	160	VHLP2-18	134
SBNHH-1D65C	160	VHLP1-23	134
(2) ETT19V2S12UB	160	VHLP2-18	134
FRIG	160	VHLP1-23	134
FXFB	160	Side Arm Mount [SO 702-3]	100
TMBXX-6517-A2M	160	PD220	100
TMBX-6517-A1M	160	SRL235-2	100
(2) ETT19V2S12UB	160	OGB4-900D	98
SBNHH-1D65C	160	Side Arm Mount [SO 701-1]	98
FRIG	160	Side Arm Mount [SO 701-1]	69
FXFB	160	918-2	69
TMBXX-6517-A2M	160	Side Arm Mount [SO 701-1]	45
TMBX-6517-A1M	160	DB230-J	45
(2) ETT19V2S12UB	160	OGB4-900D	45
SBNHH-1D65C	160	Side Arm Mount [SO 701-1]	45
FRIG	160	Side Arm Mount [SO 701-1]	42
NSN COVP	160	VG-1060	42
ANT150D6-9	160	Side Arm Mount [SO 701-1]	29
ANT150D6-9	160	SRL224NM*5	29
ANT150D6-9	160		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Jackson County, Missouri.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 77.6%

Selective Site Consultants INC.
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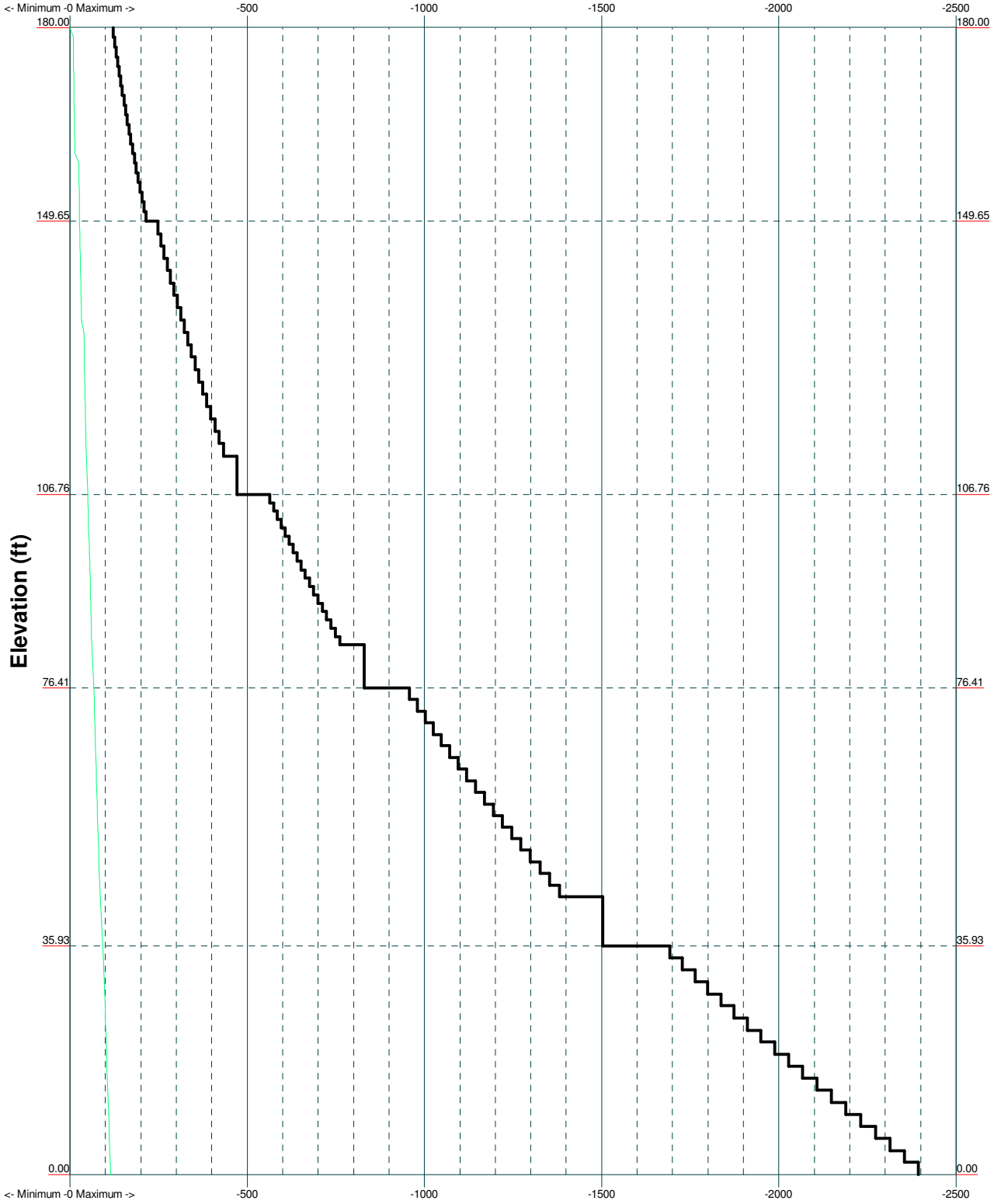
Job: ***MO-0552-B***			
Project: ***A5C0028, Lee's Summit Fire Station***			
Client: T-Mobile	Drawn by: rschmidt	App'd:	
Code: TIA-222-G	Date: 11/20/15	Scale: NTS	
Path: O:\Tower Analysis\MO-0552\MO-0552-B\TNX Analysis\MO-0552-A (G).eri		Dwg No. E-1	

TIA-222-G - 89 mph/40 mph 1.0000 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



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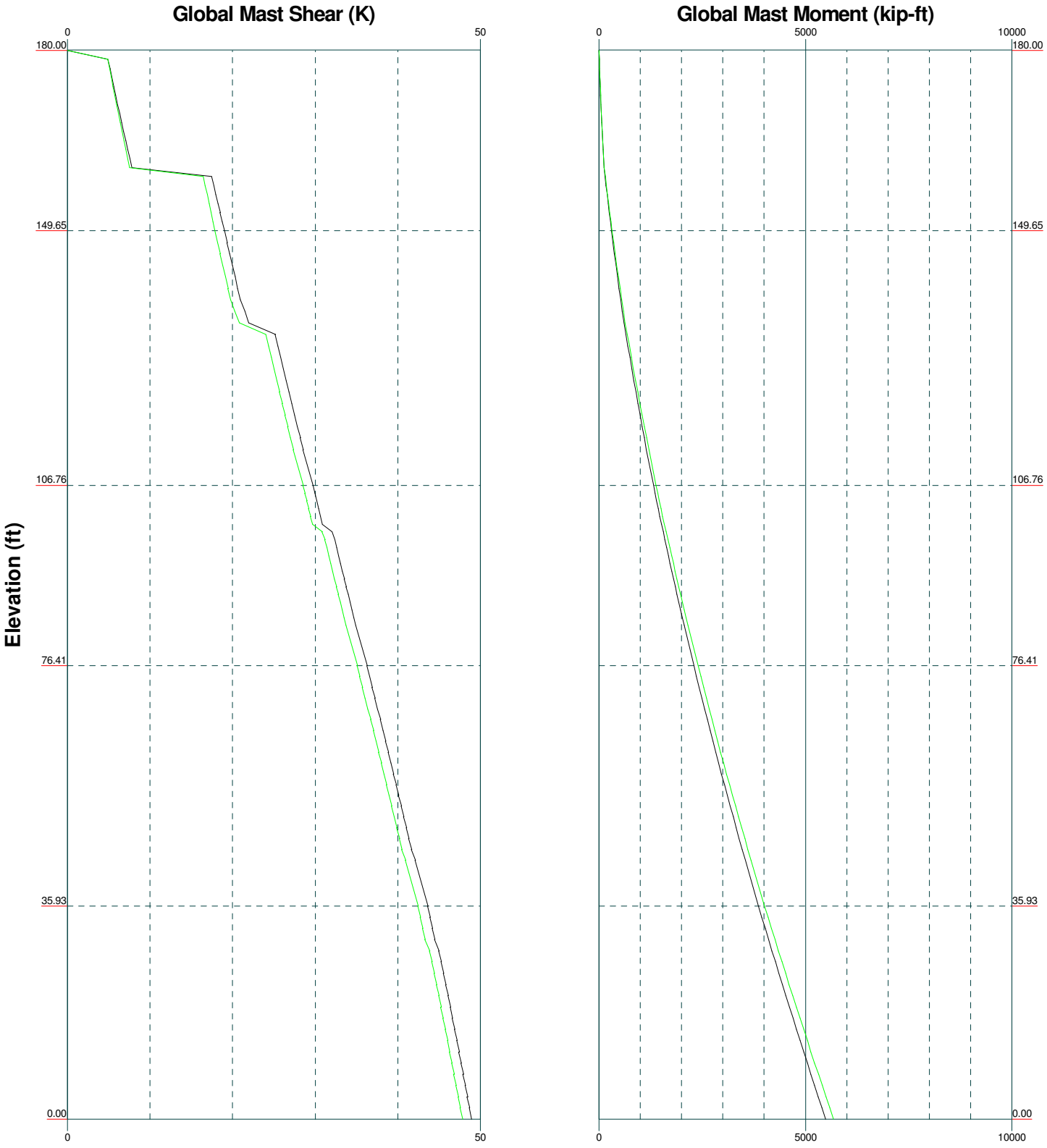
TIA-222-G - 89 mph/40 mph 1.0000 in Ice Exposure C

Vx Vz

Maximum Values

Mx Mz



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Project: ***A5C0028, Lee's Summit Fire Station***		
Client: T-Mobile	Drawn by: rschmidt	App'd:
Code: TIA-222-G	Date: 11/20/15	Scale: NTS
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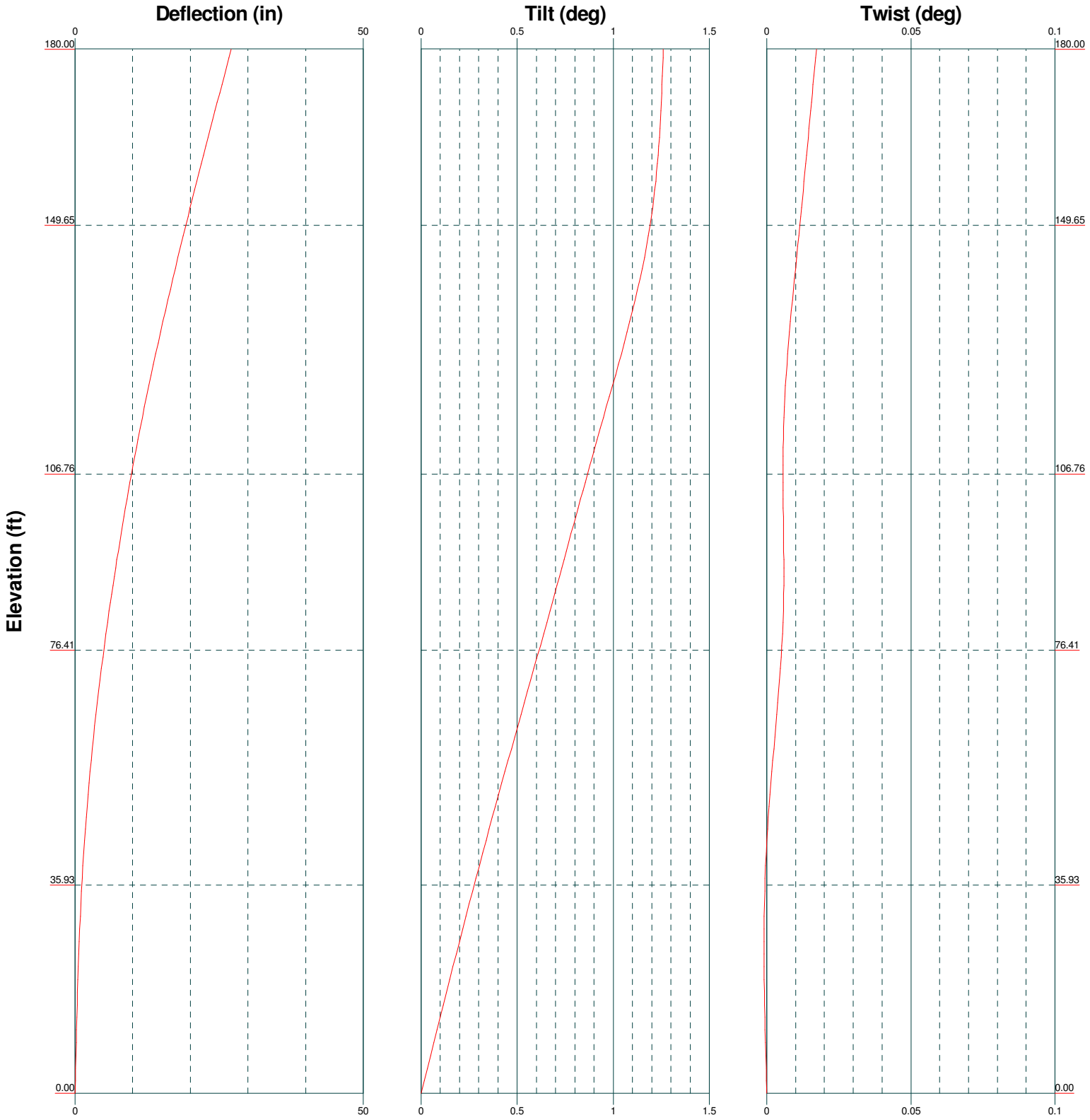
TIA-222-G - Service - 60 mph

Maximum Values



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Job: ***MO-0552-B***			
Project: ***A5C0028, Lee's Summit Fire Station***			
Client: T-Mobile	Drawn by: rschmidt	App'd:	
Code: TIA-222-G	Date: 11/20/15	Scale: NTS	
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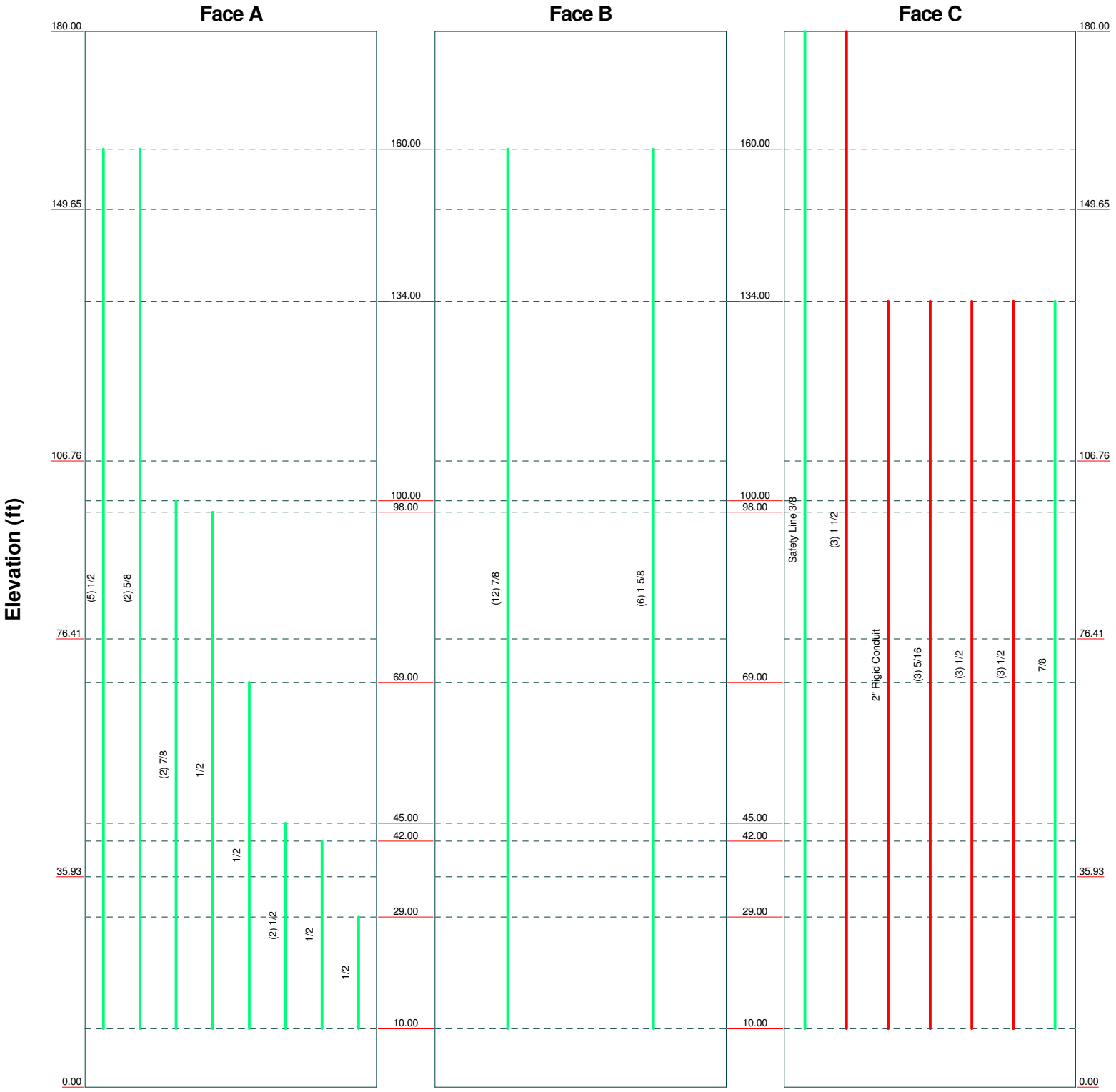
Feed Line Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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Client: T-Mobile	Drawn by: rschmidt	App'd:	
Code: TIA-222-G	Date: 11/20/15	Scale: NTS	
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Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Jackson County, Missouri.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 89 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals		Assume Rigid Index Plate	√	Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension	√	All Leg Panels Have Same Allowable
	Escalate Ice		Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Poles
√	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends		Include Shear-Torsion Interaction
√	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)	√	Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	180.00-149.65	30.35	0.00	12	29.0000	35.2490	0.2500	1.0000	A572-65 (65 ksi)
L2	149.65-106.76	42.89	6.03	12	35.2490	44.0810	0.2810	1.1240	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	106.76-76.41	36.38	6.73	12	42.2773	49.7680	0.3440	1.3760	(65 ksi) A572-65 (65 ksi)
L4	76.41-35.93	47.21	7.68	12	47.6943	57.4140	0.4060	1.6240	A572-65 (65 ksi)
L5	35.93-0.00	43.61		12	55.0208	64.0000	0.4690	1.8760	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	30.0230	23.1438	2441.7173	10.2925	15.0220	162.5428	4947.5812	11.3906	7.1020	28.408
	36.4925	28.1742	4405.0287	12.5296	18.2590	241.2527	8925.7823	13.8665	8.7767	35.107
L2	36.4925	31.6397	4938.1073	12.5185	18.2590	270.4481	10005.9442	15.5721	8.6937	30.938
	45.6360	39.6311	9704.4399	15.6804	22.8340	425.0003	19663.8262	19.5052	11.0606	39.362
L3	45.0541	46.4487	10425.0460	15.0121	21.8997	476.0371	21123.9695	22.8606	10.4084	30.257
	51.5236	54.7460	17069.2303	17.6938	25.7798	662.1159	34586.8882	26.9443	12.4159	36.093
L4	50.8113	61.8209	17645.2808	16.9292	24.7056	714.2207	35754.1228	30.4264	11.6940	28.803
	59.4393	74.5277	30915.4285	20.4089	29.7405	1039.5077	62643.0397	36.6803	14.2989	35.219
L5	58.5988	82.3830	31292.5421	19.5295	28.5008	1097.9550	63407.1742	40.5464	13.4886	28.76
	66.2577	95.9432	49427.8521	22.7441	33.1520	1490.9463	100154.2289	47.2203	15.8951	33.891

Tower Elevation ft	Gusset Area (per face) ft^2	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
L1 180.00-149.65				1	1	1.05		
L2 149.65-106.76				1	1	1.05		
L3 106.76-76.41				1	1	1.05		
L4 76.41-35.93				1	1	1.05		
L5 35.93-0.00				1	1	1.05		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
180									
1 1/2	C	Surface Ar (CaAa)	180.00 - 10.00	3	2	0.000 0.000	1.9800		1.04
134									
2" Rigid Conduit	C	Surface Ar (CaAa)	134.00 - 10.00	1	1	-0.280 -0.280	2.0000		0.95
5/16	C	Surface Ar (CaAa)	134.00 - 10.00	3	3	-0.280 -0.280	0.0000		0.40
1/2	C	Surface Ar	134.00 - 10.00	3	3	-0.280	0.0000		0.25

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
1/2	C	(CaAa) Surface Ar (CaAa)	134.00 - 10.00	3	3	-0.280 -0.270 -0.250	0.5800		0.25

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Safety Line 3/8	C	No	CaAa (Out Of Face)	180.00 - 10.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
160								
7/8	B	No	Inside Pole	160.00 - 10.00	12	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1/2	A	No	Inside Pole	160.00 - 10.00	5	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 5/8	B	No	Inside Pole	160.00 - 10.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
5/8	A	No	Inside Pole	160.00 - 10.00	2	No Ice	0.00	0.40
						1/2" Ice	0.00	0.40
						1" Ice	0.00	0.40
7/8	C	No	Inside Pole	134.00 - 10.00	1	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
***								
7/8	A	No	Inside Pole	100.00 - 10.00	2	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1/2	A	No	Inside Pole	98.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	A	No	Inside Pole	69.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	A	No	Inside Pole	45.00 - 10.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	A	No	Inside Pole	42.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	A	No	Inside Pole	29.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25

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
L1	180.00-149.65	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.13

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
		C	0.000	0.000	12.019	1.138	0.10
L2	149.65-106.76	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.55
		C	0.000	0.000	27.174	1.608	0.26
L3	106.76-76.41	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	23.369	1.138	0.23
L4	76.41-35.93	A	0.000	0.000	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.51
		C	0.000	0.000	31.168	1.518	0.30
L5	35.93-0.00	A	0.000	0.000	0.000	0.000	0.12
		B	0.000	0.000	0.000	0.000	0.33
		C	0.000	0.000	19.965	0.972	0.20

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.00-149.65	A	2.348	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	32.844	15.394	0.77
L2	149.65-106.76	A	2.290	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.55
		C		0.000	0.000	116.413	21.249	2.12
L3	106.76-76.41	A	2.214	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	111.082	15.036	1.93
L4	76.41-35.93	A	2.109	0.000	0.000	0.000	0.000	0.15
		B		0.000	0.000	0.000	0.000	0.51
		C		0.000	0.000	144.499	19.445	2.46
L5	35.93-0.00	A	1.884	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	89.273	11.908	1.48

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	1 1/2	149.65 - 180.00	1.0000	1.0000
L2	3	1 1/2	106.76 - 149.65	1.0000	1.0000
L2	10	2" Rigid Conduit	106.76 - 134.00	1.0000	1.0000
L2	11	5/16	106.76 - 134.00	1.0000	1.0000
L2	12	1/2	106.76 - 134.00	1.0000	1.0000
L2	13	1/2	106.76 - 134.00	1.0000	1.0000
L3	3	1 1/2	76.41 - 106.76	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L3	10	2" Rigid Conduit	76.41 - 106.76	1.0000	1.0000
L3	11	5/16	76.41 - 106.76	1.0000	1.0000
L3	12	1/2	76.41 - 106.76	1.0000	1.0000
L3	13	1/2	76.41 - 106.76	1.0000	1.0000
L4	3	1 1/2	35.93 - 76.41	1.0000	1.0000
L4	10	2" Rigid Conduit	35.93 - 76.41	1.0000	1.0000
L4	11	5/16	35.93 - 76.41	1.0000	1.0000
L4	12	1/2	35.93 - 76.41	1.0000	1.0000
L4	13	1/2	35.93 - 76.41	1.0000	1.0000

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
Lighting Rod	C	None		0.0000	180.00	No Ice	3.00	3.00	0.03
						1/2" Ice	4.03	4.03	0.05
						1" Ice	5.03	5.03	0.08
180									
Platform Mount [LP 602-1]	C	None		0.0000	180.00	No Ice	32.03	32.03	1.34
						1/2" Ice	38.71	38.71	1.80
						1" Ice	45.39	45.39	2.26
(2) APXVSPP18-C w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
(2) APXVSPP18-C w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
(2) APXVSPP18-C w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
(6) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	0.08	0.14	0.00
						1/2" Ice	0.12	0.19	0.00
						1" Ice	0.17	0.25	0.00
(6) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	0.08	0.14	0.00
						1/2" Ice	0.12	0.19	0.00
						1" Ice	0.17	0.25	0.00
(6) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	0.08	0.14	0.00
						1/2" Ice	0.12	0.19	0.00
						1" Ice	0.17	0.25	0.00
RRUS 11	A	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.10
RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.10
RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.10
(2) RRUS 31 B25	A	From Leg	4.00 0.00	0.0000	180.00	No Ice	1.89	1.49	0.06
						1/2" Ice	2.08	1.66	0.07

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
			0.00			1" Ice	2.28	1.84	0.09
(2) RRUS 31 B25	B	From Leg	4.00	0.0000	180.00	No Ice	1.89	1.49	0.06
			0.00			1/2" Ice	2.08	1.66	0.07
			0.00			1" Ice	2.28	1.84	0.09
(2) RRUS 31 B25	C	From Leg	4.00	0.0000	180.00	No Ice	1.89	1.49	0.06
			0.00			1/2" Ice	2.08	1.66	0.07
			0.00			1" Ice	2.28	1.84	0.09
160									
Platform Mount (LP 101-1)	C	None		0.0000	160.00	No Ice	36.21	36.21	1.50
						1/2" Ice	42.82	42.82	2.30
						1" Ice	49.43	49.43	3.10
Side Arm Mount [SO 301-3]	C	From Face	4.00	0.0000	160.00	No Ice	2.14	2.14	0.07
			0.00			1/2" Ice	3.16	3.16	0.10
			0.00			1" Ice	4.18	4.18	0.13
TMBXX-6517-A2M	A	From Leg	4.00	0.0000	160.00	No Ice	8.74	5.24	0.04
			0.00			1/2" Ice	9.31	5.71	0.09
			0.00			1" Ice	9.88	6.18	0.15
TMBX-6517-A1M	A	From Leg	4.00	0.0000	160.00	No Ice	5.30	3.30	0.02
			0.00			1/2" Ice	5.77	3.75	0.04
			0.00			1" Ice	6.25	4.21	0.08
SBNHH-1D65C	A	From Leg	4.00	0.0000	160.00	No Ice	11.39	7.66	0.05
			0.00			1/2" Ice	12.01	8.25	0.12
			0.00			1" Ice	12.63	8.84	0.19
(2) ETT19V2S12UB	A	From Leg	4.00	0.0000	160.00	No Ice	0.67	0.32	0.01
			0.00			1/2" Ice	0.78	0.41	0.02
			0.00			1" Ice	0.90	0.50	0.02
FRIG	A	From Leg	4.00	0.0000	160.00	No Ice	2.79	1.10	0.06
			0.00			1/2" Ice	3.02	1.27	0.07
			0.00			1" Ice	3.25	1.44	0.09
FXFB	A	From Leg	4.00	0.0000	160.00	No Ice	0.99	1.12	0.06
			0.00			1/2" Ice	1.15	1.30	0.08
			0.00			1" Ice	1.32	1.49	0.10
TMBXX-6517-A2M	B	From Leg	4.00	0.0000	160.00	No Ice	8.74	5.24	0.04
			0.00			1/2" Ice	9.31	5.71	0.09
			0.00			1" Ice	9.88	6.18	0.15
TMBX-6517-A1M	B	From Leg	4.00	0.0000	160.00	No Ice	5.30	3.30	0.02
			0.00			1/2" Ice	5.77	3.75	0.04
			0.00			1" Ice	6.25	4.21	0.08
(2) ETT19V2S12UB	B	From Leg	4.00	0.0000	160.00	No Ice	0.67	0.32	0.01
			0.00			1/2" Ice	0.78	0.41	0.02
			0.00			1" Ice	0.90	0.50	0.02
SBNHH-1D65C	B	From Leg	4.00	0.0000	160.00	No Ice	11.39	7.66	0.05
			0.00			1/2" Ice	12.01	8.25	0.12
			0.00			1" Ice	12.63	8.84	0.19
FRIG	B	From Leg	4.00	0.0000	160.00	No Ice	2.79	1.10	0.06
			0.00			1/2" Ice	3.02	1.27	0.07
			0.00			1" Ice	3.25	1.44	0.09
FXFB	B	From Leg	4.00	0.0000	160.00	No Ice	0.99	1.12	0.06
			0.00			1/2" Ice	1.15	1.30	0.08
			0.00			1" Ice	1.32	1.49	0.10
TMBXX-6517-A2M	C	From Leg	4.00	0.0000	160.00	No Ice	8.74	5.24	0.04
			0.00			1/2" Ice	9.31	5.71	0.09
			0.00			1" Ice	9.88	6.18	0.15
TMBX-6517-A1M	C	From Leg	4.00	0.0000	160.00	No Ice	5.30	3.30	0.02
			0.00			1/2" Ice	5.77	3.75	0.04
			0.00			1" Ice	6.25	4.21	0.08
(2) ETT19V2S12UB	C	From Leg	4.00	0.0000	160.00	No Ice	0.67	0.32	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.78	0.41	0.02
			0.00			1" Ice	0.90	0.50	0.02
SBNHH-1D65C	C	From Leg	4.00	0.0000	160.00	No Ice	11.39	7.66	0.05
			0.00			1/2" Ice	12.01	8.25	0.12
			0.00			1" Ice	12.63	8.84	0.19
FRIG	C	From Leg	4.00	0.0000	160.00	No Ice	2.79	1.10	0.06
			0.00			1/2" Ice	3.02	1.27	0.07
			0.00			1" Ice	3.25	1.44	0.09
NSN COVP	C	From Leg	4.00	0.0000	160.00	No Ice	0.83	0.46	0.01
			0.00			1/2" Ice	0.96	0.56	0.02
			0.00			1" Ice	1.09	0.66	0.03
ANT150D6-9	A	From Leg	4.00	0.0000	160.00	No Ice	3.96	3.96	0.03
			0.00			1/2" Ice	5.61	5.61	0.06
			10.00			1" Ice	7.26	7.26	0.09
ANT150D6-9	B	From Leg	4.00	0.0000	160.00	No Ice	3.96	3.96	0.03
			0.00			1/2" Ice	5.61	5.61	0.06
			10.00			1" Ice	7.26	7.26	0.09
ANT150D6-9	C	From Leg	4.00	0.0000	160.00	No Ice	3.96	3.96	0.03
			0.00			1/2" Ice	5.61	5.61	0.06
			10.00			1" Ice	7.26	7.26	0.09
15-216	C	From Leg	4.00	0.0000	160.00	No Ice	2.25	0.74	0.01
			0.00			1/2" Ice	2.52	1.07	0.03
			10.00			1" Ice	2.79	1.40	0.05
15-216	C	From Leg	4.00	0.0000	160.00	No Ice	2.25	0.74	0.01
			0.00			1/2" Ice	2.52	1.07	0.03
			4.00			1" Ice	2.79	1.40	0.05
134 Platform Mount [LP 713-1]	C	None		0.0000	134.00	No Ice	31.27	31.27	1.51
						1/2" Ice	39.68	39.68	1.93
						1" Ice	48.09	48.09	2.35
Side Arm Mount [SO 301-3]	C	From Face	4.00	0.0000	134.00	No Ice	2.14	2.14	0.07
			0.00			1/2" Ice	3.16	3.16	0.10
			0.00			1" Ice	4.18	4.18	0.13
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00	0.0000	134.00	No Ice	5.07	2.98	0.04
			0.00			1/2" Ice	5.48	3.53	0.08
			2.00			1" Ice	5.91	4.09	0.13
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00	0.0000	134.00	No Ice	5.07	2.98	0.04
			0.00			1/2" Ice	5.48	3.53	0.08
			2.00			1" Ice	5.91	4.09	0.13
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00	0.0000	134.00	No Ice	5.07	2.98	0.04
			0.00			1/2" Ice	5.48	3.53	0.08
			2.00			1" Ice	5.91	4.09	0.13
HORIZON DUO	A	From Leg	4.00	0.0000	134.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			2.00			1" Ice	0.76	0.52	0.02
HORIZON DUO	A	From Leg	4.00	0.0000	134.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			2.00			1" Ice	0.76	0.52	0.02
HORIZON DUO	B	From Leg	4.00	0.0000	134.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			2.00			1" Ice	0.76	0.52	0.02
HORIZON DUO	C	From Leg	4.00	0.0000	134.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			2.00			1" Ice	0.76	0.52	0.02
nRRHv2	A	From Leg	4.00	0.0000	134.00	No Ice	2.90	1.72	0.06
			0.00			1/2" Ice	3.13	1.92	0.08
			2.00			1" Ice	3.38	2.12	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
nRRHv2	B	From Leg	4.00	0.0000	134.00	No Ice	2.90	1.72	0.06
			0.00			1/2" Ice	3.13	1.92	0.08
			2.00			1" Ice	3.38	2.12	0.10
nRRHv2	C	From Leg	4.00	0.0000	134.00	No Ice	2.90	1.72	0.06
			0.00			1/2" Ice	3.13	1.92	0.08
			2.00			1" Ice	3.38	2.12	0.10
JUNCTION BOX	A	From Leg	4.00	0.0000	134.00	No Ice	0.62	0.31	0.00
			0.00			1/2" Ice	0.73	0.39	0.01
			2.00			1" Ice	0.85	0.48	0.01
ANT150D6-9	A	From Leg	4.00	0.0000	134.00	No Ice	3.96	3.96	0.03
			0.00			1/2" Ice	5.61	5.61	0.06
			8.00			1" Ice	7.26	7.26	0.09
ANT150D6-9	B	From Leg	4.00	0.0000	134.00	No Ice	3.96	3.96	0.03
			0.00			1/2" Ice	5.61	5.61	0.06
			8.00			1" Ice	7.26	7.26	0.09
100									
Side Arm Mount [SO 702-3]	C	None		0.0000	100.00	No Ice	3.22	3.22	0.08
						1/2" Ice	4.15	4.15	0.11
						1" Ice	5.08	5.08	0.15
PD220	B	From Leg	4.00	0.0000	100.00	No Ice	3.56	3.56	0.02
			0.00			1/2" Ice	7.13	7.13	0.05
			11.00			1" Ice	10.70	10.70	0.07
SRL235-2	A	From Leg	4.00	0.0000	100.00	No Ice	13.63	13.63	0.05
			0.00			1/2" Ice	15.63	15.63	0.14
			9.00			1" Ice	17.63	17.63	0.22
98									
Side Arm Mount [SO 701-1]	C	From Leg	2.00	0.0000	98.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
OGB4-900D	C	From Leg	4.00	0.0000	98.00	No Ice	0.79	0.79	0.01
			0.00			1/2" Ice	1.03	1.03	0.02
			2.00			1" Ice	1.28	1.28	0.03
69									
Side Arm Mount [SO 701-1]	C	From Leg	2.00	0.0000	69.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
918-2	C	From Leg	4.00	0.0000	69.00	No Ice	0.12	0.03	0.00
			0.00			1/2" Ice	0.28	0.11	0.00
			1.00			1" Ice	0.44	0.19	0.00
45									
Side Arm Mount [SO 701-1]	A	From Leg	2.00	0.0000	45.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
Side Arm Mount [SO 701-1]	C	From Leg	2.00	0.0000	45.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
DB230-J	A	From Leg	4.00	0.0000	45.00	No Ice	0.25	0.25	0.01
			0.00			1/2" Ice	0.45	0.45	0.01
			-1.00			1" Ice	0.65	0.65	0.02
OGB4-900D	C	From Leg	4.00	0.0000	45.00	No Ice	0.79	0.79	0.01
			0.00			1/2" Ice	1.03	1.03	0.02
			2.00			1" Ice	1.28	1.28	0.03
42									
Side Arm Mount [SO 701-1]	B	From Leg	2.00	0.0000	42.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
VG-1060	B	From Leg	4.00	0.0000	42.00	No Ice	0.13	0.13	0.00

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
			0.00			1/2" Ice	0.22	0.22	0.00
			2.00			1" Ice	0.31	0.31	0.01
29									
Side Arm Mount [SO 701-1]	C	From Leg	2.00	0.0000	29.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
SRL224NM*5	C	From Leg	4.00	0.0000	29.00	No Ice	5.22	5.22	0.04
			0.00			1/2" Ice	7.02	7.02	0.07
			6.00			1" Ice	8.82	8.82	0.11

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	A	Paraboloid w/o Radome	From Leg	1.00	0.0000		134.00	2.00	No Ice	3.14	0.03
				0.00					1/2" Ice	3.41	0.04
				2.00					1" Ice	3.68	0.06
VHLP1-23	B	Paraboloid w/o Radome	From Leg	1.00	0.0000		134.00	1.27	No Ice	0.79	0.01
				0.00					1/2" Ice	0.92	0.02
				2.00					1" Ice	1.06	0.02
VHLP2-18	B	Paraboloid w/o Radome	From Leg	1.00	0.0000		134.00	2.00	No Ice	3.14	0.03
				0.00					1/2" Ice	3.41	0.04
				4.00					1" Ice	3.68	0.06
VHLP1-23	C	Paraboloid w/o Radome	From Leg	1.00	0.0000		134.00	1.27	No Ice	0.79	0.01
				0.00					1/2" Ice	0.92	0.02
				2.00					1" Ice	1.06	0.02

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	40.21					
Bracing Weight	0.00					
Total Member Self-Weight	40.21			0.84	0.52	
Total Weight	51.12			0.84	0.52	
Wind 0 deg - No Ice		-0.47	-29.88	-3337.05	70.91	7.61
Wind 30 deg - No Ice		14.81	-25.61	-2851.10	-1653.01	8.42
Wind 60 deg - No Ice		26.00	-14.59	-1616.15	-2915.74	7.02
Wind 90 deg - No Ice		30.53	0.34	52.21	-3445.58	3.73
Wind 120 deg - No Ice		26.37	15.32	1726.87	-2971.69	-0.61
Wind 150 deg - No Ice		15.39	26.08	2921.74	-1740.86	-4.80
Wind 180 deg - No Ice		0.37	29.87	3337.09	-55.00	-7.70
Wind 210 deg - No Ice		-14.75	25.69	2862.90	1645.44	-8.52

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 240 deg - No Ice		-26.08	14.61	1619.58	2927.70	-7.00
Wind 270 deg - No Ice		-30.57	-0.44	-65.59	3452.70	-3.60
Wind 300 deg - No Ice		-26.42	-15.26	-1716.47	2979.50	0.69
Wind 330 deg - No Ice		-15.53	-26.00	-2910.42	1761.83	4.77
Member Ice	23.54					
Total Weight Ice	101.53			0.79	1.53	
Wind 0 deg - Ice		-0.04	-9.44	-1094.55	6.25	2.61
Wind 30 deg - Ice		4.70	-8.14	-944.25	-544.91	3.08
Wind 60 deg - Ice		8.96	-5.17	-588.19	-1018.65	2.73
Wind 90 deg - Ice		9.88	0.00	-0.04	-1152.94	1.65
Wind 120 deg - Ice		8.15	4.75	551.16	-945.16	0.11
Wind 150 deg - Ice		4.70	8.18	950.14	-543.26	-1.46
Wind 180 deg - Ice		0.01	9.43	1095.46	1.00	-2.64
Wind 210 deg - Ice		-4.68	8.16	948.67	545.32	-3.10
Wind 240 deg - Ice		-8.98	5.17	590.00	1024.92	-2.72
Wind 270 deg - Ice		-9.90	-0.04	-3.01	1157.71	-1.61
Wind 300 deg - Ice		-8.17	-4.73	-547.40	950.00	-0.09
Wind 330 deg - Ice		-4.74	-8.16	-945.85	552.17	1.45
Total Weight	51.12			0.84	0.52	
Wind 0 deg - Service		-0.19	-12.15	-1356.50	29.15	3.09
Wind 30 deg - Service		6.02	-10.41	-1158.89	-671.88	3.42
Wind 60 deg - Service		10.57	-5.93	-656.71	-1185.37	2.85
Wind 90 deg - Service		12.41	0.14	21.73	-1400.83	1.52
Wind 120 deg - Service		10.72	6.23	702.72	-1208.12	-0.25
Wind 150 deg - Service		6.26	10.60	1188.61	-707.61	-1.95
Wind 180 deg - Service		0.15	12.14	1357.52	-22.06	-3.13
Wind 210 deg - Service		-6.00	10.45	1164.69	669.42	-3.47
Wind 240 deg - Service		-10.60	5.94	659.10	1190.85	-2.84
Wind 270 deg - Service		-12.43	-0.18	-26.18	1404.34	-1.46
Wind 300 deg - Service		-10.74	-6.20	-697.50	1211.92	0.28
Wind 330 deg - Service		-6.32	-10.57	-1183.02	716.75	1.94

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

Comb. No.	Description
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	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 149.648	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.24	0.32	-1.35
			Max. Mx	8	-7.82	-318.38	-5.06
			Max. My	14	-7.97	-4.66	-304.39
			Max. Vy	20	-19.02	318.04	5.44
			Max. Vx	2	-17.87	5.88	303.66
			Max. Torque	5			-14.85
L2	149.648 - 106.757	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.01	-0.78	-1.52
			Max. Mx	20	-16.51	1206.75	28.57
			Max. My	14	-16.65	-25.64	-1150.41
			Max. Vy	20	-28.55	1206.75	28.57
			Max. Vx	2	-27.36	30.15	1149.67
			Max. Torque	16			15.69
L3	106.757 - 76.407	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.53	-0.64	0.29
			Max. Mx	20	-25.12	2158.44	49.25
			Max. My	14	-25.24	-42.63	-2065.92
			Max. Vy	20	-34.93	2158.44	49.25
			Max. Vx	2	-33.75	52.43	2065.84
			Max. Torque	16			15.67

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	76.407 - 35.929	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.92	0.68	0.29
			Max. Mx	20	-40.06	3682.88	77.66
			Max. My	2	-40.13	83.20	3543.25
			Max. Vy	20	-42.13	3682.88	77.66
			Max. Vx	2	-40.96	83.20	3543.25
			Max. Torque	16			14.53
L5	35.929 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-114.68	1.64	-0.96
			Max. Mx	20	-61.31	5681.08	108.58
			Max. My	2	-61.31	116.84	5491.04
			Max. Vy	20	-48.95	5681.08	108.58
			Max. Vx	2	-47.84	116.84	5491.04
			Max. Torque	16			14.27

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	35	114.68	8.98	-5.18
	Max. H_x	20	61.34	48.92	0.71
	Max. H_z	2	61.34	0.76	47.80
	Max. M_x	2	5491.04	0.76	47.80
	Max. M_z	8	5669.84	-48.85	-0.54
	Max. Torsion	16	13.53	23.60	-41.10
	Min. Vert	5	46.00	-23.70	40.98
	Min. H_x	8	61.34	-48.85	-0.54
	Min. H_z	14	61.34	-0.58	-47.79
	Min. M_x	14	-5490.45	-0.58	-47.79
	Min. M_z	20	-5681.08	48.92	0.71
	Min. Torsion	4	-13.38	-23.70	40.98

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	51.12	0.00	0.00	0.84	0.52	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	61.34	-0.76	-47.80	-5491.04	116.84	12.09
0.9 Dead+1.6 Wind 0 deg - No Ice	46.00	-0.76	-47.80	-5451.14	115.73	12.09
1.2 Dead+1.6 Wind 30 deg - No Ice	61.34	23.70	-40.98	-4691.48	-2720.06	13.38
0.9 Dead+1.6 Wind 30 deg - No Ice	46.00	23.70	-40.98	-4657.46	-2700.33	13.37
1.2 Dead+1.6 Wind 60 deg - No Ice	61.34	41.60	-23.35	-2659.32	-4798.00	11.13
0.9 Dead+1.6 Wind 60 deg - No Ice	46.00	41.60	-23.35	-2640.18	-4762.98	11.13
1.2 Dead+1.6 Wind 90 deg - No	61.34	48.85	0.54	85.83	-5669.84	5.91

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
Ice						
0.9 Dead+1.6 Wind 90 deg - No Ice	46.00	48.85	0.54	84.87	-5628.32	5.90
1.2 Dead+1.6 Wind 120 deg - No Ice	61.34	42.19	24.51	2841.08	-4890.02	-0.97
0.9 Dead+1.6 Wind 120 deg - No Ice	46.00	42.19	24.51	2819.97	-4854.26	-0.97
1.2 Dead+1.6 Wind 150 deg - No Ice	61.34	24.62	41.72	4806.99	-2864.94	-7.61
0.9 Dead+1.6 Wind 150 deg - No Ice	46.00	24.62	41.72	4771.53	-2844.02	-7.61
1.2 Dead+1.6 Wind 180 deg - No Ice	61.34	0.58	47.79	5490.45	-90.94	-12.22
0.9 Dead+1.6 Wind 180 deg - No Ice	46.00	0.58	47.79	5450.03	-90.37	-12.21
1.2 Dead+1.6 Wind 210 deg - No Ice	61.34	-23.60	41.10	4710.15	2707.28	-13.53
0.9 Dead+1.6 Wind 210 deg - No Ice	46.00	-23.60	41.10	4675.48	2687.31	-13.53
1.2 Dead+1.6 Wind 240 deg - No Ice	61.34	-41.72	23.37	2664.15	4817.25	-11.12
0.9 Dead+1.6 Wind 240 deg - No Ice	46.00	-41.72	23.37	2644.49	4781.77	-11.12
1.2 Dead+1.6 Wind 270 deg - No Ice	61.34	-48.92	-0.71	-108.59	5681.08	-5.72
0.9 Dead+1.6 Wind 270 deg - No Ice	46.00	-48.92	-0.71	-107.96	5639.17	-5.72
1.2 Dead+1.6 Wind 300 deg - No Ice	61.34	-42.27	-24.41	-2824.62	4902.42	1.08
0.9 Dead+1.6 Wind 300 deg - No Ice	46.00	-42.27	-24.41	-2804.16	4866.26	1.08
1.2 Dead+1.6 Wind 330 deg - No Ice	61.34	-24.85	-41.61	-4788.96	2899.09	7.59
0.9 Dead+1.6 Wind 330 deg - No Ice	46.00	-24.85	-41.61	-4754.17	2877.58	7.58
1.2 Dead+1.0 Ice+1.0 Temp	114.68	0.00	0.00	0.96	1.64	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	114.68	-0.04	-9.44	-1176.49	6.68	2.63
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	114.68	4.70	-8.14	-1014.94	-585.87	3.09
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	114.68	8.96	-5.17	-631.34	-1093.71	2.73
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	114.68	9.88	0.00	0.11	-1239.39	1.64
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	114.68	8.15	4.75	592.68	-1016.11	0.10
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	114.68	4.70	8.18	1021.62	-584.02	-1.48
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	114.68	0.01	9.43	1177.87	1.13	-2.65
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	114.68	-4.68	8.16	1020.08	586.32	-3.12
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	114.68	-8.98	5.18	633.66	1100.44	-2.73
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	114.68	-9.90	-0.04	-2.99	1244.52	-1.61
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	114.68	-8.17	-4.73	-588.24	1021.31	-0.08
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	114.68	-4.74	-8.16	-1016.61	593.60	1.47
Dead+Wind 0 deg - Service	51.12	-0.19	-12.15	-1389.44	29.92	3.10

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	51.12	6.02	-10.41	-1187.00	-688.21	3.43
Dead+Wind 60 deg - Service	51.12	10.57	-5.93	-672.59	-1214.24	2.86
Dead+Wind 90 deg - Service	51.12	12.41	0.14	22.33	-1435.03	1.52
Dead+Wind 120 deg - Service	51.12	10.72	6.23	719.85	-1237.60	-0.25
Dead+Wind 150 deg - Service	51.12	6.26	10.60	1217.52	-724.91	-1.95
Dead+Wind 180 deg - Service	51.12	0.15	12.14	1390.50	-22.67	-3.13
Dead+Wind 210 deg - Service	51.12	-6.00	10.45	1192.95	685.67	-3.47
Dead+Wind 240 deg - Service	51.12	-10.60	5.94	675.05	1219.83	-2.85
Dead+Wind 270 deg - Service	51.12	-12.43	-0.18	-26.87	1438.61	-1.47
Dead+Wind 300 deg - Service	51.12	-10.74	-6.20	-714.49	1241.47	0.28
Dead+Wind 330 deg - Service	51.12	-6.32	-10.57	-1211.77	734.27	1.94

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-51.12	0.00	0.00	51.12	0.00	0.000%
2	-0.76	-61.34	-47.80	0.76	61.34	47.80	0.000%
3	-0.76	-46.00	-47.80	0.76	46.00	47.80	0.000%
4	23.70	-61.34	-40.98	-23.70	61.34	40.98	0.000%
5	23.70	-46.00	-40.98	-23.70	46.00	40.98	0.000%
6	41.60	-61.34	-23.35	-41.60	61.34	23.35	0.000%
7	41.60	-46.00	-23.35	-41.60	46.00	23.35	0.000%
8	48.85	-61.34	0.54	-48.85	61.34	-0.54	0.000%
9	48.85	-46.00	0.54	-48.85	46.00	-0.54	0.000%
10	42.19	-61.34	24.51	-42.19	61.34	-24.51	0.000%
11	42.19	-46.00	24.51	-42.19	46.00	-24.51	0.000%
12	24.62	-61.34	41.72	-24.62	61.34	-41.72	0.000%
13	24.62	-46.00	41.72	-24.62	46.00	-41.72	0.000%
14	0.58	-61.34	47.79	-0.58	61.34	-47.79	0.000%
15	0.58	-46.00	47.79	-0.58	46.00	-47.79	0.000%
16	-23.60	-61.34	41.10	23.60	61.34	-41.10	0.000%
17	-23.60	-46.00	41.10	23.60	46.00	-41.10	0.000%
18	-41.72	-61.34	23.37	41.72	61.34	-23.37	0.000%
19	-41.72	-46.00	23.37	41.72	46.00	-23.37	0.000%
20	-48.92	-61.34	-0.71	48.92	61.34	0.71	0.000%
21	-48.92	-46.00	-0.71	48.92	46.00	0.71	0.000%
22	-42.27	-61.34	-24.41	42.27	61.34	24.41	0.000%
23	-42.27	-46.00	-24.41	42.27	46.00	24.41	0.000%
24	-24.85	-61.34	-41.61	24.85	61.34	41.61	0.000%
25	-24.85	-46.00	-41.61	24.85	46.00	41.61	0.000%
26	0.00	-114.68	0.00	0.00	114.68	0.00	0.000%
27	-0.04	-114.68	-9.44	0.04	114.68	9.44	0.000%
28	4.70	-114.68	-8.14	-4.70	114.68	8.14	0.000%
29	8.96	-114.68	-5.17	-8.96	114.68	5.17	0.000%
30	9.88	-114.68	0.00	-9.88	114.68	-0.00	0.000%
31	8.15	-114.68	4.75	-8.15	114.68	-4.75	0.000%
32	4.70	-114.68	8.18	-4.70	114.68	-8.18	0.000%
33	0.01	-114.68	9.43	-0.01	114.68	-9.43	0.000%
34	-4.68	-114.68	8.16	4.68	114.68	-8.16	0.000%
35	-8.98	-114.68	5.17	8.98	114.68	-5.18	0.000%
36	-9.90	-114.68	-0.04	9.90	114.68	0.04	0.000%
37	-8.17	-114.68	-4.73	8.17	114.68	4.73	0.000%
38	-4.74	-114.68	-8.16	4.74	114.68	8.16	0.000%
39	-0.19	-51.12	-12.15	0.19	51.12	12.15	0.000%
40	6.02	-51.12	-10.41	-6.02	51.12	10.41	0.000%
41	10.57	-51.12	-5.93	-10.57	51.12	5.93	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
42	12.41	-51.12	0.14	-12.41	51.12	-0.14	0.000%
43	10.72	-51.12	6.23	-10.72	51.12	-6.23	0.000%
44	6.26	-51.12	10.60	-6.26	51.12	-10.60	0.000%
45	0.15	-51.12	12.14	-0.15	51.12	-12.14	0.000%
46	-6.00	-51.12	10.45	6.00	51.12	-10.45	0.000%
47	-10.60	-51.12	5.94	10.60	51.12	-5.94	0.000%
48	-12.43	-51.12	-0.18	12.43	51.12	0.18	0.000%
49	-10.74	-51.12	-6.20	10.74	51.12	6.20	0.000%
50	-6.32	-51.12	-10.57	6.32	51.12	10.57	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00015415
3	Yes	5	0.00000001	0.00006959
4	Yes	5	0.00000001	0.00071804
5	Yes	5	0.00000001	0.00031377
6	Yes	5	0.00000001	0.00051007
7	Yes	5	0.00000001	0.00021573
8	Yes	5	0.00000001	0.00011810
9	Yes	5	0.00000001	0.00005215
10	Yes	5	0.00000001	0.00062506
11	Yes	5	0.00000001	0.00026268
12	Yes	5	0.00000001	0.00069846
13	Yes	5	0.00000001	0.00029839
14	Yes	5	0.00000001	0.00021671
15	Yes	5	0.00000001	0.00009719
16	Yes	5	0.00000001	0.00050773
17	Yes	5	0.00000001	0.00021564
18	Yes	5	0.00000001	0.00070392
19	Yes	5	0.00000001	0.00030550
20	Yes	5	0.00000001	0.00005830
21	Yes	5	0.00000001	0.00002599
22	Yes	5	0.00000001	0.00064357
23	Yes	5	0.00000001	0.00027161
24	Yes	5	0.00000001	0.00058213
25	Yes	5	0.00000001	0.00024370
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00044043
28	Yes	5	0.00000001	0.00051757
29	Yes	5	0.00000001	0.00052835
30	Yes	5	0.00000001	0.00045440
31	Yes	5	0.00000001	0.00049545
32	Yes	5	0.00000001	0.00050420
33	Yes	5	0.00000001	0.00044184
34	Yes	5	0.00000001	0.00049914
35	Yes	5	0.00000001	0.00055050
36	Yes	5	0.00000001	0.00045462
37	Yes	5	0.00000001	0.00049455
38	Yes	5	0.00000001	0.00049294
39	Yes	4	0.00000001	0.00043195
40	Yes	4	0.00000001	0.00076495
41	Yes	4	0.00000001	0.00042235
42	Yes	4	0.00000001	0.00024950

43	Yes	4	0.00000001	0.00044777
44	Yes	4	0.00000001	0.00063839
45	Yes	4	0.00000001	0.00047296
46	Yes	4	0.00000001	0.00048277
47	Yes	4	0.00000001	0.00071459
48	Yes	4	0.00000001	0.00020924
49	Yes	4	0.00000001	0.00048591
50	Yes	4	0.00000001	0.00042914

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 149.648	27.094	48	1.2607	0.0177
L2	149.648 - 106.757	19.211	48	1.1944	0.0141
L3	112.787 - 76.407	10.932	48	0.9189	0.0062
L4	83.137 - 35.929	5.917	48	0.6694	0.0034
L5	43.609 - 0	1.645	48	0.3360	0.0013

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lighting Rod	48	27.094	1.2607	0.0178	68435
160.00	Platform Mount (LP 101-1)	48	21.839	1.2309	0.0158	17108
138.00	VHLP2-18	48	16.389	1.1256	0.0118	9154
136.00	VHLP2-18	48	15.921	1.1113	0.0113	8868
134.00	Platform Mount [LP 713-1]	48	15.459	1.0964	0.0109	8599
100.00	Side Arm Mount [SO 702-3]	48	8.581	0.8105	0.0047	6840
98.00	Side Arm Mount [SO 701-1]	48	8.240	0.7938	0.0045	6895
69.00	Side Arm Mount [SO 701-1]	48	4.054	0.5492	0.0026	6590
45.00	Side Arm Mount [SO 701-1]	48	1.743	0.3473	0.0013	5682
42.00	Side Arm Mount [SO 701-1]	48	1.537	0.3229	0.0012	5842
29.00	Side Arm Mount [SO 701-1]	48	0.841	0.2199	0.0008	8394

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 149.648	107.037	20	4.9855	0.0690
L2	149.648 - 106.757	75.902	20	4.7228	0.0551
L3	112.787 - 76.407	43.195	20	3.6331	0.0243
L4	83.137 - 35.929	23.380	20	2.6459	0.0132
L5	43.609 - 0	6.498	20	1.3274	0.0049

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lighting Rod	20	107.037	4.9855	0.0699	17578
160.00	Platform Mount (LP 101-1)	20	86.281	4.8675	0.0621	4392
138.00	VHLP2-18	20	64.753	4.4507	0.0463	2344
136.00	VHLP2-18	20	62.905	4.3941	0.0445	2270
134.00	Platform Mount [LP 713-1]	20	61.079	4.3354	0.0426	2201
100.00	Side Arm Mount [SO 702-3]	20	33.906	3.2042	0.0182	1740
98.00	Side Arm Mount [SO 701-1]	20	32.557	3.1379	0.0175	1753
69.00	Side Arm Mount [SO 701-1]	20	16.016	2.1706	0.0101	1671
45.00	Side Arm Mount [SO 701-1]	20	6.885	1.3723	0.0052	1439
42.00	Side Arm Mount [SO 701-1]	20	6.070	1.2758	0.0047	1479
29.00	Side Arm Mount [SO 701-1]	20	3.322	0.8687	0.0029	2125

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 149.648 (1)	TP35.249x29x0.25	30.35	180.00	172.4	28.1742	-7.82	214.17	0.037
L2	149.648 - 106.757 (2)	TP44.081x35.249x0.281	42.89	180.00	141.8	38.5076	-16.51	432.83	0.038
L3	106.757 - 76.407 (3)	TP49.768x42.2773x0.344	36.38	180.00	125.6	53.2110	-25.12	762.04	0.033
L4	76.407 - 35.929 (4)	TP57.414x47.6943x0.406	47.21	180.00	108.9	72.4605	-40.06	1381.46	0.029
L5	35.929 - 0 (5)	TP64x55.0208x0.469	43.61	180.00	95.0	95.9432	-61.31	2393.83	0.026

Pole 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 $\frac{M_{uy}}{\phi M_{ny}}$
L1	180 - 149.648 (1)	TP35.249x29x0.25	318.42	1201.90	0.265	0.00	1201.90	0.000
L2	149.648 - 106.757 (2)	TP44.081x35.249x0.281	1207.08	1897.83	0.636	0.00	1897.83	0.000
L3	106.757 - 76.407 (3)	TP49.768x42.2773x0.344	2159.00	3120.39	0.692	0.00	3120.39	0.000
L4	76.407 - 35.929 (4)	TP57.414x47.6943x0.406	3683.69	4969.32	0.741	0.00	4969.32	0.000
L5	35.929 - 0 (5)	TP64x55.0208x0.469	5682.12	7575.98	0.750	0.00	7575.98	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 149.648 (1)	TP35.249x29x0.25	19.03	842.17	0.023	7.89	2437.07	0.003
L2	149.648 - 106.757 (2)	TP44.081x35.249x0.281	28.55	1093.02	0.026	7.75	3848.21	0.002
L3	106.757 - 76.407 (3)	TP49.768x42.2773x0.344	34.94	1593.00	0.022	4.80	6327.18	0.001
L4	76.407 - 35.929 (4)	TP57.414x47.6943x0.406	42.14	2199.08	0.019	4.95	10076.25	0.000
L5	35.929 - 0 (5)	TP64x55.0208x0.469	48.96	2925.11	0.017	5.72	15361.75	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 149.648 (1)	0.037	0.265	0.000	0.023	0.003	0.302 ✔	1.000	4.8.2 ✔
L2	149.648 - 106.757 (2)	0.038	0.636	0.000	0.026	0.002	0.675 ✔	1.000	4.8.2 ✔
L3	106.757 - 76.407 (3)	0.033	0.692	0.000	0.022	0.001	0.725 ✔	1.000	4.8.2 ✔
L4	76.407 - 35.929 (4)	0.029	0.741	0.000	0.019	0.000	0.771 ✔	1.000	4.8.2 ✔
L5	35.929 - 0 (5)	0.026	0.750	0.000	0.017	0.000	0.776 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 149.648	Pole	TP35.249x29x0.25	1	-7.82	214.17	30.2	Pass
L2	149.648 - 106.757	Pole	TP44.081x35.249x0.281	2	-16.51	432.83	67.5	Pass
L3	106.757 - 76.407	Pole	TP49.768x42.2773x0.344	3	-25.12	762.04	72.5	Pass
L4	76.407 - 35.929	Pole	TP57.414x47.6943x0.406	4	-40.06	1381.46	77.1	Pass
L5	35.929 - 0	Pole	TP64x55.0208x0.469	5	-61.31	2393.83	77.6	Pass
						Summary		
						Pole (L5)	77.6	Pass
						RATING =	**77.6**	**Pass**

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