

Date: **May 22, 2021**



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

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **DISH Network Co-Locate**  
**Site Number:** BOBDL00036A  
**Site Name:** CT-CCI-T-801486

**Crown Castle Designation:** **BU Number:** 801486  
**Site Name:** CT SUFFIELD 2 CAC 801486  
**JDE Job Number:** 650034  
**Work Order Number:** 1962728  
**Order Number:** 556646 Rev. 0

**Engineering Firm Designation:** **Crown Castle Project Number:** 1962728

**Site Data:** **44 FFyler Place, Suffield, Hartford County, CT**  
**Latitude 41° 58' 49.7", Longitude -72° 39' 26.2"**  
**109 Foot - Monopole Tower**

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

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

LC5: Proposed Equipment Configuration

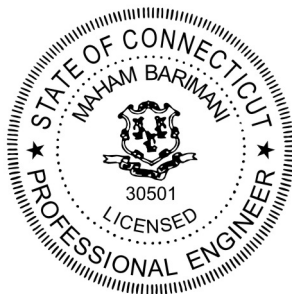
**Sufficient Capacity – 65%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Derek L. Tordella

Respectfully submitted by:

Maham Barimani, P.E.  
Senior Project Engineer



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## 1) INTRODUCTION

This tower is a 109 ft Monopole tower designed by FWT INC.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	120 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	2 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
101.0	101.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
109.0	111.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	2 6 12 2	3/8 3/4 1-5/8 Conduit
		3	cci antennas	HPA65R-BU8A w/ Mount Pipe		
		3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	800 10121 w/ Mount Pipe		
		3	kathrein	80010966 w/ Mount Pipe		
		3	raycap	DC6-48-60-18-8F		
	6	powerwave technologies	TT19-08BP111-001			
	1	tower mounts	Platform Mount [LP 714-1]			
92.0	92.0	1	tower mounts	Platform Mount [LP 715-1]	12 2	1-1/4 1-1/2
	91.0	3	alcatel lucent	B13 RRH 4X30		
		3	alcatel lucent	PCS B25 RRH4X30		
		3	alcatel lucent	RRH2X60-AWS		
		2	antel	LPA-80080-4CF-EDIN-0 w/ Mount Pipe		
		2	commscope	RC2DC-3315-PF-48		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		4	swedcom	SC 9012 REV2 w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
80.0	81.0	12	decibel	DB844H90-XY w/ Mount Pipe	12	7/8
	80.0	1	tower mounts	Platform Mount [LP 1201-1]		
74.0	75.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	-	-
	74.0	1	tower mounts	Side Arm Mount [SO 102-3]		
	72.0	3	alcatel lucent	800MHZ 2X50W RRH W/FILTER		
69.0	72.0	3	alcatel lucent	TD-RRH8X20-25	3	5/8 1-1/4
	71.0	2	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe		
		1	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
69.0	1	tower mounts	Platform Mount [LP 1201-1]			
62.0	62.0	3	rfs celwave	APX18-206516L	6	1-5/8
		1	tower mounts	Pipe Mount [PM 602-3]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2294830	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	821489	CCISITES
4-TOWER MANUFACTURER DRAWINGS	823124	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

#### 3.2) Assumptions

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

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

### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	109 - 95	Pole	TP26.715x23.476x0.1875	1	-8.02	969.73	25.6	Pass
L2	95 - 48.08	Pole	TP37.573x26.715x0.3125	2	-26.36	2200.76	54.4	Pass
L3	48.08 - 0	Pole	TP48.075x35.8094x0.375	3	-41.69	3487.40	65.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
							Summary	
						Pole (L3)	65.0	Pass
						Rating =	65.0	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	95	17.8	Pass
1	Flange Plates		6.5	Pass
1	Anchor Rods	0	53.2	Pass
1	Base Plate		29.6	Pass
1	Base Foundation (Structure)		61.1	Pass
1	Base Foundation (Soil Interaction)		43.8	Pass

<b>Structure Rating (max from all components) =</b>	<b>65%</b>
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Notes:

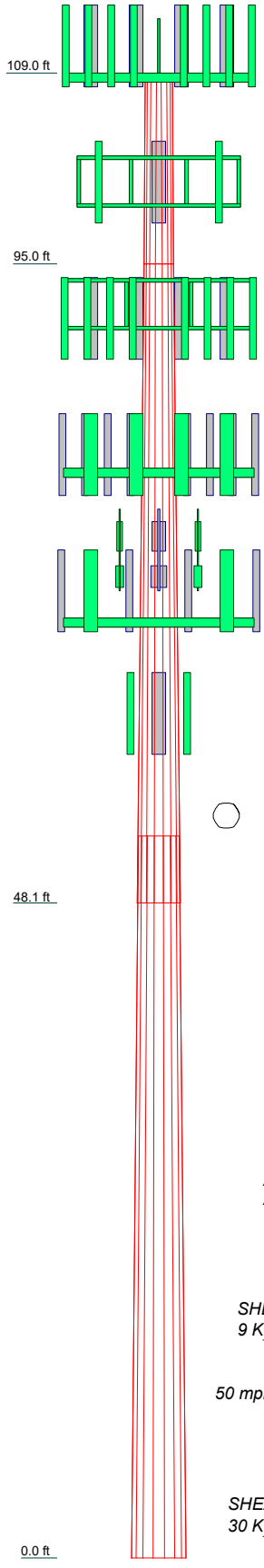
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

#### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3
Length (ft)	14.00	46.92	53.00
Number of Sides	18	18	18
Thickness (in)	0.1875	0.3125	0.3750
Socket Length (ft)		4.92	
Top Dia (in)	23.4760	26.7150	35.8094
Bot Dia (in)	26.7150	37.5730	48.0750
Grade		A572-65	
Weight (K)	0.7	5.0	8.9

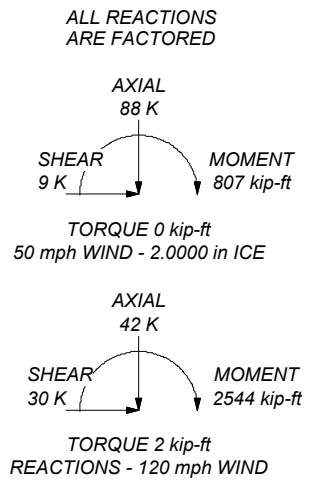


### MATERIAL STRENGTH

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

### TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 65%



**CROWN CASTLE**  
The Pathway to Possible

**Crown Castle**  
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Phone: (724) 416-2000  
FAX:

Job: <b>BU# 801486</b>		
Project:		
Client: Crown Castle	Drawn by: DTordella	App'd:
Code: TIA-222-H	Date: 05/22/21	Scale: NTS
Path:	Dwg No. E-1	

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## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- Tower base elevation above sea level: 132.00 ft.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 2.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 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.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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## Tapered Pole Section Geometry



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
L1	109.00-95.00	14.00	0.00	18	23.4760	26.7150	0.1875	0.7500	A572-65 (65 ksi)
L2	95.00-48.08	46.92	4.92	18	26.7150	37.5730	0.3125	1.2500	A572-65 (65 ksi)
L3	48.08-0.00	53.00		18	35.8094	48.0750	0.3750	1.5000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	23.8092	13.8596	949.6645	8.2674	11.9258	79.6310	1900.5786	6.9311	3.8018	20.276
	27.0982	15.7872	1403.5717	9.4173	13.5712	103.4227	2808.9903	7.8951	4.3718	23.316
L2	27.0789	26.1880	2306.3730	9.3729	13.5712	169.9459	4615.7808	13.0965	4.1518	13.286
	38.1044	36.9578	6482.4687	13.2275	19.0871	339.6259	12973.4672	18.4824	6.0628	19.401
L3	37.4602	42.1758	6690.4028	12.5792	18.1912	367.7825	13389.6089	21.0919	5.6425	15.047
	48.7588	56.7749	16320.3992	16.9335	24.4221	668.2635	32662.2732	28.3929	7.8012	20.803

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 109.00-95.00				1	1	1			
L2 95.00-48.08				1	1	1			
L3 48.08-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
***										
***										
CU12PSM9P6XXX(1-1/2)	C	No	Surface Ar (CaAa)	101.00 - 0.00	1	1	0.200 - 0.210	1.6000		2.35
LDf6-50A(1-1/4")	A	No	Surface Ar (CaAa)	92.00 - 0.00	6	6	0.350 - 0.500	1.5500		0.66
***										
CR 50 1873(1-5/8)	C	No	Surface Ar (CaAa)	62.00 - 0.00	6	6	-0.100 - 0.100	1.9800		0.83
***										
***										

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
-------------	-------------	--------------	---------------------------------	----------------	-----------------	--------------	--	---------------

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
***									
***									
***									
LDF7-50A(1-5/8)	B	No	No	Inside Pole	109.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-002-75000(3/8)	B	No	No	Inside Pole	109.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	109.00 - 0.00	6	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
2" Rigid Conduit	B	No	No	Inside Pole	109.00 - 0.00	2	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
							2" Ice	0.00	2.80
***									
LDF6-50A(1-1/4")	A	No	No	Inside Pole	92.00 - 0.00	6	No Ice	0.00	0.66
							1/2" Ice	0.00	0.66
							1" Ice	0.00	0.66
							2" Ice	0.00	0.66
MLC HYBRID 6X12 LI(1-1/2)	A	No	No	Inside Pole	92.00 - 0.00	2	No Ice	0.00	1.85
							1/2" Ice	0.00	1.85
							1" Ice	0.00	1.85
							2" Ice	0.00	1.85
***									
LDF5-50A(7/8)	A	No	No	Inside Pole	80.00 - 0.00	12	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
***									
HB058-M12-XXXF(5/8)	C	No	No	Inside Pole	69.00 - 0.00	1	No Ice	0.00	0.24
							1/2" Ice	0.00	0.24
							1" Ice	0.00	0.24
							2" Ice	0.00	0.24
HB114-1-08U4-M5J(1-1/4)	C	No	No	Inside Pole	69.00 - 0.00	3	No Ice	0.00	1.08
							1/2" Ice	0.00	1.08
							1" Ice	0.00	1.08
							2" Ice	0.00	1.08
***									
***									

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	109.00-95.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.27
		C	0.000	0.000	0.960	0.000	0.01
L2	95.00-48.08	A	0.000	0.000	40.846	0.000	0.64
		B	0.000	0.000	0.000	0.000	0.89
		C	0.000	0.000	24.044	0.000	0.25
L3	48.08-0.00	A	0.000	0.000	44.714	0.000	0.75
		B	0.000	0.000	0.000	0.000	0.92
		C	0.000	0.000	64.812	0.000	0.52

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L1	109.00-95.00	A	1.903	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.27
		C		0.000	0.000	3.243	0.000	0.06
L2	95.00-48.08	A	1.834	0.000	0.000	71.199	0.000	1.50
		B		0.000	0.000	0.000	0.000	0.89
		C		0.000	0.000	51.776	0.000	0.95
L3	48.08-0.00	A	1.647	0.000	0.000	77.942	0.000	1.69
		B		0.000	0.000	0.000	0.000	0.92
		C		0.000	0.000	118.781	0.000	2.06

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	109.00-95.00	-0.2438	0.5325	-0.4218	0.9213
L2	95.00-48.08	-1.0226	-1.6323	-1.0953	-0.9181
L3	48.08-0.00	-0.9538	1.9182	-1.0331	1.8362

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L1	9	CU12PSM9P6XXX(1-1/2)	95.00 - 101.00	1.0000	1.0000
L2	9	CU12PSM9P6XXX(1-1/2)	48.08 - 95.00	1.0000	1.0000
L2	12	LDF6-50A(1-1/4")	48.08 - 92.00	1.0000	1.0000
L2	20	CR 50 1873(1-5/8)	48.08 - 62.00	1.0000	1.0000
L3	9	CU12PSM9P6XXX(1-1/2)	0.00 - 48.08	1.0000	1.0000
L3	12	LDF6-50A(1-1/4")	0.00 - 48.08	1.0000	1.0000
L3	20	CR 50 1873(1-5/8)	0.00 - 48.08	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	$C_A A_A$ Front ft <sup>2</sup>	$C_A A_A$ Side ft <sup>2</sup>	Weight K	
Lighting Rod 3/4" x 4'	C	None		0.0000	111.00	No Ice	0.30	0.30	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
						1/2"	0.71	0.71	0.03
						Ice	1.00	1.00	0.04
						1" Ice	1.52	1.52	0.06
						2" Ice			
**									
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.00 4.42 5.29	2.95 3.34 3.74 4.59	0.07 0.11 0.17 0.30
800 10121 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.00 4.42 5.29	2.95 3.34 3.74 4.59	0.07 0.11 0.17 0.30
800 10121 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.00 4.42 5.29	2.95 3.34 3.74 4.59	0.07 0.11 0.17 0.30
80010966 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.61 15.47 16.35 18.14	6.84 7.63 8.42 10.06	0.16 0.27 0.39 0.68
80010966 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.61 15.47 16.35 18.14	6.84 7.63 8.42 10.06	0.16 0.27 0.39 0.68
80010966 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.61 15.47 16.35 18.14	6.84 7.63 8.42 10.06	0.16 0.27 0.39 0.68
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
HPA65R-BU8A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.10 8.86 9.64 11.24	6.94 7.69 8.45 10.03	0.09 0.17 0.27 0.50
HPA65R-BU8A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.10 8.86 9.64 11.24	6.94 7.69 8.45 10.03	0.09 0.17 0.27 0.50
HPA65R-BU8A w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.10 8.86 9.64 11.24	6.94 7.69 8.45 10.03	0.09 0.17 0.27 0.50

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(2) TT19-08BP111-001	A	From Leg	4.00		0.0000	109.00	No Ice	0.55	0.44	0.02
			0.00				1/2"	0.64	0.53	0.02
			0.00				Ice	0.74	0.63	0.03
							1" Ice	0.97	0.84	0.05
							2" Ice			
(2) TT19-08BP111-001	B	From Leg	4.00		0.0000	109.00	No Ice	0.55	0.44	0.02
			0.00				1/2"	0.64	0.53	0.02
			0.00				Ice	0.74	0.63	0.03
							1" Ice	0.97	0.84	0.05
							2" Ice			
(2) TT19-08BP111-001	C	From Leg	4.00		0.0000	109.00	No Ice	0.55	0.44	0.02
			0.00				1/2"	0.64	0.53	0.02
			0.00				Ice	0.74	0.63	0.03
							1" Ice	0.97	0.84	0.05
							2" Ice			
RADIO 4415 B30	A	From Leg	4.00		0.0000	109.00	No Ice	1.64	0.64	0.04
			0.00				1/2"	1.80	0.75	0.05
			2.00				Ice	1.97	0.87	0.07
							1" Ice	2.33	1.13	0.11
							2" Ice			
RADIO 4415 B30	B	From Leg	4.00		0.0000	109.00	No Ice	1.64	0.64	0.04
			0.00				1/2"	1.80	0.75	0.05
			2.00				Ice	1.97	0.87	0.07
							1" Ice	2.33	1.13	0.11
							2" Ice			
RADIO 4415 B30	C	From Leg	4.00		0.0000	109.00	No Ice	1.64	0.64	0.04
			0.00				1/2"	1.80	0.75	0.05
			2.00				Ice	1.97	0.87	0.07
							1" Ice	2.33	1.13	0.11
							2" Ice			
RRUS 8843 B2/B66A	A	From Leg	4.00		0.0000	109.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			2.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
RRUS 8843 B2/B66A	B	From Leg	4.00		0.0000	109.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			2.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
RRUS 8843 B2/B66A	C	From Leg	4.00		0.0000	109.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			2.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
DC6-48-60-18-8F	A	From Leg	4.00		0.0000	109.00	No Ice	1.21	1.21	0.02
			0.00				1/2"	1.89	1.89	0.04
			2.00				Ice	2.11	2.11	0.07
							1" Ice	2.57	2.57	0.13
							2" Ice			
DC6-48-60-18-8F	B	From Leg	4.00		0.0000	109.00	No Ice	1.21	1.21	0.02
			0.00				1/2"	1.89	1.89	0.04
			2.00				Ice	2.11	2.11	0.07
							1" Ice	2.57	2.57	0.13
							2" Ice			
DC6-48-60-18-8F	C	From Leg	4.00		0.0000	109.00	No Ice	1.21	1.21	0.02
			0.00				1/2"	1.89	1.89	0.04
			2.00				Ice	2.11	2.11	0.07
							1" Ice	2.57	2.57	0.13
							2" Ice			
RRUS 4449 B5/B12	A	From Leg	4.00		0.0000	109.00	No Ice	1.97	1.41	0.07
			0.00				1/2"	2.14	1.56	0.09
			2.00				Ice	2.33	1.73	0.11
							1" Ice	2.72	2.07	0.16
							2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
RRUS 4449 B5/B12	B	From Leg	4.00		0.0000	109.00	No Ice	1.97	1.41	0.07
			0.00				1/2"	2.14	1.56	0.09
			2.00				Ice	2.33	1.73	0.11
							1" Ice	2.72	2.07	0.16
							2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00		0.0000	109.00	No Ice	1.97	1.41	0.07
			0.00				1/2"	2.14	1.56	0.09
			2.00				Ice	2.33	1.73	0.11
							1" Ice	2.72	2.07	0.16
							2" Ice			
6' x 2" Mount Pipe	A	From Leg	1.00		0.0000	109.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			2.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
6' x 2" Mount Pipe	B	From Leg	1.00		0.0000	109.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			2.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
6' x 2" Mount Pipe	C	From Leg	1.00		0.0000	109.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			2.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
Platform Mount [LP 714-1]	C	None			0.0000	109.00	No Ice	37.51	37.51	1.60
							1/2"	41.70	41.70	2.50
							Ice	45.89	45.89	3.46
							1" Ice	54.29	54.29	5.58
							2" Ice			
**										
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00		0.0000	101.00	No Ice	8.01	4.23	0.11
			0.00				1/2"	8.52	4.69	0.19
			0.00				Ice	9.04	5.16	0.29
							1" Ice	10.11	6.12	0.52
							2" Ice			
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00		0.0000	101.00	No Ice	8.01	4.23	0.11
			0.00				1/2"	8.52	4.69	0.19
			0.00				Ice	9.04	5.16	0.29
							1" Ice	10.11	6.12	0.52
							2" Ice			
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00		0.0000	101.00	No Ice	8.01	4.23	0.11
			0.00				1/2"	8.52	4.69	0.19
			0.00				Ice	9.04	5.16	0.29
							1" Ice	10.11	6.12	0.52
							2" Ice			
TA08025-B605	A	From Leg	4.00		0.0000	101.00	No Ice	1.96	1.13	0.08
			0.00				1/2"	2.14	1.27	0.09
			0.00				Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
							2" Ice			
TA08025-B605	B	From Leg	4.00		0.0000	101.00	No Ice	1.96	1.13	0.08
			0.00				1/2"	2.14	1.27	0.09
			0.00				Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
							2" Ice			
TA08025-B605	C	From Leg	4.00		0.0000	101.00	No Ice	1.96	1.13	0.08
			0.00				1/2"	2.14	1.27	0.09
			0.00				Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
							2" Ice			
TA08025-B604	A	From Leg	4.00		0.0000	101.00	No Ice	1.96	0.98	0.06
			0.00				1/2"	2.14	1.11	0.08
			0.00				Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
							2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral Vert						ft
TA08025-B604	B	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B604	C	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
RDIDC-9181-PF-48	A	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	2.31	1.29	0.02
							1/2"	2.50	1.45	0.04
							Ice	2.70	1.61	0.06
							1" Ice	3.12	1.96	0.12
(2) 8' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	101.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
Commscope MC-PK8-DSH	C	None			0.0000	101.00	2" Ice			
							No Ice	34.24	34.24	1.75
							1/2"	62.95	62.95	2.10
							Ice	91.66	91.66	2.45
							1" Ice	149.08	149.08	3.15
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	2.86	6.57	0.03
							1/2"	3.22	7.19	0.08
							Ice	3.59	7.84	0.13
							1" Ice	4.34	9.17	0.25
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	4.09	3.30	0.07
							1/2"	4.49	3.68	0.13
							Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	4.09	3.30	0.07
							1/2"	4.49	3.68	0.13
							Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	4.09	3.30	0.07
							1/2"	4.49	3.68	0.13
							Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
(2) SC 9012 REV2 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	2.91	4.22	0.03
							1/2"	3.25	4.78	0.06
							Ice	3.59	5.35	0.10
							1" Ice	4.29	6.55	0.21
(2) SC 9012 REV2 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	92.00	2" Ice			
							No Ice	2.91	4.22	0.03
							1/2"	3.25	4.78	0.06
							Ice	3.59	5.35	0.10
							1" Ice	4.29	6.55	0.21

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
B13 RRH 4X30	A	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	4.29	6.55	0.21
								2" Ice	2.06	1.32	0.06
								No Ice	2.24	1.48	0.07
								1/2" Ice	2.43	1.64	0.09
								1" Ice	2.84	2.00	0.14
B13 RRH 4X30	B	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	2.06	1.32	0.06
								2" Ice	2.24	1.48	0.07
								No Ice	2.43	1.64	0.09
								1/2" Ice	2.84	2.00	0.14
								1" Ice	2.06	1.32	0.06
B13 RRH 4X30	C	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	2.24	1.48	0.07
								2" Ice	2.43	1.64	0.09
								No Ice	2.84	2.00	0.14
								1/2" Ice	2.06	1.32	0.06
								1" Ice	2.24	1.48	0.07
RRH2X60-AWS	A	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	3.50	1.82	0.06
								2" Ice	3.76	2.05	0.08
								No Ice	4.03	2.29	0.11
								1/2" Ice	4.58	2.79	0.17
								1" Ice	3.50	1.82	0.06
RRH2X60-AWS	B	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	3.76	2.05	0.08
								2" Ice	4.03	2.29	0.11
								No Ice	4.58	2.79	0.17
								1/2" Ice	3.50	1.82	0.06
								1" Ice	3.76	2.05	0.08
RRH2X60-AWS	C	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	4.03	2.29	0.11
								2" Ice	4.58	2.79	0.17
								No Ice	3.50	1.82	0.06
								1/2" Ice	3.76	2.05	0.08
								1" Ice	4.03	2.29	0.11
(2) RC2DC-3315-PF-48	A	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	3.79	2.51	0.03
								2" Ice	4.04	2.72	0.06
								No Ice	4.30	2.94	0.10
								1/2" Ice	4.84	3.41	0.18
								1" Ice	2.20	1.74	0.06
PCS B25 RRH4X30	A	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	2.39	1.92	0.08
								2" Ice	2.59	2.11	0.10
								No Ice	3.01	2.50	0.16
								1/2" Ice	2.20	1.74	0.06
								1" Ice	2.39	1.92	0.08
PCS B25 RRH4X30	B	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	2.59	2.11	0.10
								2" Ice	3.01	2.50	0.16
								No Ice	2.20	1.74	0.06
								1/2" Ice	2.39	1.92	0.08
								1" Ice	2.59	2.11	0.10
PCS B25 RRH4X30	C	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	3.01	2.50	0.16
								2" Ice	2.20	1.74	0.06
								No Ice	2.39	1.92	0.08
								1/2" Ice	2.59	2.11	0.10
								1" Ice	3.01	2.50	0.16
8' x 2" Mount Pipe	A	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	1.90	1.90	0.03
								2" Ice	2.73	2.73	0.04
								No Ice	3.40	3.40	0.06
								1/2" Ice	4.40	4.40	0.12
								1" Ice	1.90	1.90	0.03
8' x 2" Mount Pipe	B	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	2.73	2.73	0.04
								2" Ice	3.40	3.40	0.06
								No Ice	4.40	4.40	0.12
								1/2" Ice	1.90	1.90	0.03
								1" Ice	2.73	2.73	0.04
8' x 2" Mount Pipe	C	From Leg	4.00	0.00	-1.00	0.0000	92.00	1" Ice	3.40	3.40	0.06
								2" Ice	1.90	1.90	0.03
								No Ice	2.73	2.73	0.04
								1/2" Ice	3.40	3.40	0.06
								1" Ice	1.90	1.90	0.03



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
						1" Ice 2" Ice No Ice	4.40 4.40	0.12	
Platform Mount [LP 715-1]	C	None		0.0000	92.00	46.77 50.25 53.97 62.22	46.77 50.25 53.97 62.22	1.77 2.88 4.09 6.81	
**						1" Ice 2" Ice			
(4) DB844H90-XY w/ Mount Pipe	A	From Face	4.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.24 2.61 2.99 3.78	3.34 3.73 4.13 4.97	0.04 0.07 0.12 0.23
(4) DB844H90-XY w/ Mount Pipe	B	From Face	4.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.24 2.61 2.99 3.78	3.34 3.73 4.13 4.97	0.04 0.07 0.12 0.23
(4) DB844H90-XY w/ Mount Pipe	C	From Face	4.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.24 2.61 2.99 3.78	3.34 3.73 4.13 4.97	0.04 0.07 0.12 0.23
Platform Mount [LP 1201-1]	C	None		0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	18.38 22.11 25.87 33.47	18.38 22.11 25.87 33.47	2.10 2.65 3.26 4.66
***level 74***									
800MHZ 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 -2.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
800MHZ 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 -2.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
800MHZ 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 -2.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
PCS 1900MHZ 4X45W- 65MHZ	A	From Leg	2.00 0.00 1.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHZ 4X45W- 65MHZ	B	From Leg	2.00 0.00 1.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHZ 4X45W- 65MHZ	C	From Leg	2.00 0.00 1.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
(2) 5'x2 1/2" Pipe Mount	A	From Leg	2.00 0.00 0.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.33 1.63 1.95 2.60	1.33 1.63 1.95 2.60	0.03 0.04 0.05 0.09
(2) 5'x2 1/2" Pipe Mount	B	From Leg	2.00	0.0000	74.00	No Ice	1.33	1.33	0.03

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight
			Horz	Lateral					
			0.00			1/2"	1.63	1.63	0.04
			0.00			Ice	1.95	1.95	0.05
						1" Ice	2.60	2.60	0.09
						2" Ice			
(2) 5'x2 1/2" Pipe Mount	C	From Leg	2.00	0.0000	74.00	No Ice	1.33	1.33	0.03
			0.00			1/2"	1.63	1.63	0.04
			0.00			Ice	1.95	1.95	0.05
						1" Ice	2.60	2.60	0.09
						2" Ice			
Side Arm Mount [SO 102-3]	C	None		0.0000	74.00	No Ice	3.60	3.60	0.07
						1/2"	4.18	4.18	0.11
						Ice	4.75	4.75	0.14
						1" Ice	5.90	5.90	0.20
						2" Ice			
**									
APXVMTM14-C-120 w/ Mount Pipe	A	From Face	4.00	0.0000	69.00	No Ice	4.09	2.86	0.08
			0.00			1/2"	4.48	3.23	0.13
			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVMTM14-C-120 w/ Mount Pipe	B	From Face	4.00	0.0000	69.00	No Ice	4.09	2.86	0.08
			0.00			1/2"	4.48	3.23	0.13
			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVMTM14-C-120 w/ Mount Pipe	C	From Face	4.00	0.0000	69.00	No Ice	4.09	2.86	0.08
			0.00			1/2"	4.48	3.23	0.13
			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Face	4.00	0.0000	69.00	No Ice	4.60	4.01	0.10
			0.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Face	4.00	0.0000	69.00	No Ice	4.60	4.01	0.10
			0.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	B	From Face	4.00	0.0000	69.00	No Ice	4.60	4.01	0.10
			0.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
TD-RRH8X20-25	A	From Face	4.00	0.0000	69.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			3.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8X20-25	B	From Face	4.00	0.0000	69.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			3.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8X20-25	C	From Face	4.00	0.0000	69.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			3.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
6' x 2" Mount Pipe	A	From Face	4.00	0.0000	69.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			2.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
6' x 2" Mount Pipe	B	From Face	4.00		0.0000	69.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			2.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
6' x 2" Mount Pipe	C	From Face	4.00		0.0000	69.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			2.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
Platform Mount [LP 1201-1]	C	None			0.0000	69.00	No Ice	18.38	18.38	2.10
							1/2"	22.11	22.11	2.65
							Ice	25.87	25.87	3.26
							1" Ice	33.47	33.47	4.66
							2" Ice			
**										
APX18-206516L	A	From Leg	1.00		0.0000	62.00	No Ice	2.56	1.21	0.03
			0.00				1/2"	3.00	1.63	0.05
			0.00				Ice	3.45	2.05	0.07
							1" Ice	4.41	2.95	0.13
							2" Ice			
APX18-206516L	B	From Leg	1.00		0.0000	62.00	No Ice	2.56	1.21	0.03
			0.00				1/2"	3.00	1.63	0.05
			0.00				Ice	3.45	2.05	0.07
							1" Ice	4.41	2.95	0.13
							2" Ice			
APX18-206516L	C	From Leg	1.00		0.0000	62.00	No Ice	2.56	1.21	0.03
			0.00				1/2"	3.00	1.63	0.05
			0.00				Ice	3.45	2.05	0.07
							1" Ice	4.41	2.95	0.13
							2" Ice			
Pipe Mount [PM 602-3]	C	None			0.0000	62.00	No Ice	6.67	6.67	0.28
							1/2"	7.70	7.70	0.34
							Ice	8.74	8.74	0.42
							1" Ice	10.90	10.90	0.63
							2" Ice			
***										

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice

Comb. No.	Description
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	109 - 95	Pole	Max Tension	26	0.00	-0.00	-0.00
			Max. Compression	26	-23.13	0.02	0.56
			Max. Mx	20	-8.03	145.71	0.11
			Max. My	2	-8.02	0.00	146.03
			Max. Vy	20	-12.04	145.71	0.11
			Max. Vx	2	-12.07	0.00	146.03
			Max. Torque	20			-0.25
L2	95 - 48.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.82	1.28	2.44
			Max. Mx	20	-26.36	1043.33	0.30
			Max. My	2	-26.36	0.24	1042.08
			Max. Vy	20	-26.38	1043.33	0.30
			Max. Vx	2	-26.33	0.24	1042.08
			Max. Torque	9			2.04
L3	48.08 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.89	3.29	-0.18
			Max. Mx	20	-41.69	2544.21	-0.27
			Max. My	14	-41.69	0.64	-2540.13
			Max. Vy	20	-30.03	2544.21	-0.27
			Max. Vx	14	29.98	0.64	-2540.13
			Max. Torque	9			2.04

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	87.89	8.99	0.00
	Max. H <sub>x</sub>	21	31.29	29.99	0.00
	Max. H <sub>z</sub>	2	41.72	0.00	29.94
	Max. M <sub>x</sub>	2	2539.61	0.00	29.94
	Max. M <sub>z</sub>	8	2542.93	-29.99	0.00
	Max. Torsion	9	2.03	-29.99	0.00
	Min. Vert	5	31.29	-14.99	25.93
	Min. H <sub>x</sub>	9	31.29	-29.99	0.00
	Min. H <sub>z</sub>	14	41.72	0.00	-29.94
	Min. M <sub>x</sub>	14	-2540.13	0.00	-29.94
	Min. M <sub>z</sub>	20	-2544.21	29.99	0.00
	Min. Torsion	21	-2.03	29.99	0.00

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overtuning Moment, M <sub>x</sub> kip-ft	Overtuning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	34.76	0.00	0.00	0.22	0.52	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	41.72	0.00	-29.94	-2539.61	0.64	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	31.29	0.00	-29.94	-2517.42	0.48	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	41.72	14.99	-25.93	-2199.33	-1271.15	-1.02
0.9 Dead+1.0 Wind 30 deg - No Ice	31.29	14.99	-25.93	-2180.12	-1260.17	-1.02
1.2 Dead+1.0 Wind 60 deg - No Ice	41.72	25.97	-14.97	-1269.67	-2202.16	-1.76
0.9 Dead+1.0 Wind 60 deg - No Ice	31.29	25.97	-14.97	-1258.61	-2183.02	-1.76
1.2 Dead+1.0 Wind 90 deg - No Ice	41.72	29.99	-0.00	0.27	-2542.93	-2.03
0.9 Dead+1.0 Wind 90 deg - No Ice	31.29	29.99	-0.00	0.21	-2520.81	-2.03
1.2 Dead+1.0 Wind 120 deg - No Ice	41.72	25.97	14.97	1270.21	-2202.15	-1.76
0.9 Dead+1.0 Wind 120 deg - No Ice	31.29	25.97	14.97	1259.01	-2183.02	-1.76
1.2 Dead+1.0 Wind 150 deg - No Ice	41.72	14.99	25.93	2199.86	-1271.14	-1.02
0.9 Dead+1.0 Wind 150 deg - No Ice	31.29	14.99	25.93	2180.52	-1260.16	-1.02
1.2 Dead+1.0 Wind 180 deg - No Ice	41.72	0.00	29.94	2540.13	0.64	-0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	31.29	0.00	29.94	2517.82	0.48	-0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	41.72	-14.99	25.93	2199.86	1272.42	1.02
0.9 Dead+1.0 Wind 210 deg - No Ice	31.29	-14.99	25.93	2180.52	1261.12	1.02
1.2 Dead+1.0 Wind 240 deg - No Ice	41.72	-25.97	14.97	1270.21	2203.43	1.76
0.9 Dead+1.0 Wind 240 deg - No Ice	31.29	-25.97	14.97	1259.01	2183.97	1.76
1.2 Dead+1.0 Wind 270 deg - No Ice	41.72	-29.99	-0.00	0.27	2544.21	2.03
0.9 Dead+1.0 Wind 270 deg - No Ice	31.29	-29.99	-0.00	0.21	2521.76	2.03
1.2 Dead+1.0 Wind 300 deg - No Ice	41.72	-25.97	-14.97	-1269.67	2203.44	1.76
0.9 Dead+1.0 Wind 300 deg - No Ice	31.29	-25.97	-14.97	-1258.60	2183.97	1.76
1.2 Dead+1.0 Wind 330 deg - No Ice	41.72	-14.99	-25.93	-2199.33	1272.43	1.02

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturing Moment, M <sub>x</sub>	Overturing Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 330 deg - No Ice	31.29	-14.99	-25.93	-2180.12	1261.12	1.02
1.2 Dead+1.0 Ice+1.0Temp	87.89	-0.00	-0.00	0.18	3.29	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0Temp	87.89	-0.00	-8.98	-802.37	3.47	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0Temp	87.89	4.49	-7.78	-694.86	-398.07	-0.22
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0Temp	87.89	7.78	-4.49	-401.14	-692.01	-0.38
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0Temp	87.89	8.99	-0.00	0.09	-799.60	-0.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0Temp	87.89	7.78	4.49	401.32	-692.01	-0.38
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0Temp	87.89	4.49	7.78	695.03	-398.06	-0.22
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0Temp	87.89	-0.00	8.98	802.54	3.47	-0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0Temp	87.89	-4.49	7.78	695.03	405.00	0.22
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0Temp	87.89	-7.78	4.49	401.31	698.94	0.38
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0Temp	87.89	-8.99	-0.00	0.09	806.53	0.44
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0Temp	87.89	-7.78	-4.49	-401.14	698.94	0.38
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0Temp	87.89	-4.49	-7.78	-694.86	405.00	0.22
Dead+Wind 0 deg - Service	34.76	0.00	-7.05	-595.31	0.53	0.00
Dead+Wind 30 deg - Service	34.76	3.53	-6.11	-515.52	-297.67	-0.24
Dead+Wind 60 deg - Service	34.76	6.12	-3.53	-297.54	-515.96	-0.42
Dead+Wind 90 deg - Service	34.76	7.07	-0.00	0.22	-595.86	-0.48
Dead+Wind 120 deg - Service	34.76	6.12	3.53	297.98	-515.96	-0.42
Dead+Wind 150 deg - Service	34.76	3.53	6.11	515.96	-297.67	-0.24
Dead+Wind 180 deg - Service	34.76	0.00	7.05	595.74	0.53	-0.00
Dead+Wind 210 deg - Service	34.76	-3.53	6.11	515.96	298.73	0.24
Dead+Wind 240 deg - Service	34.76	-6.12	3.53	297.98	517.02	0.42
Dead+Wind 270 deg - Service	34.76	-7.07	-0.00	0.22	596.92	0.48
Dead+Wind 300 deg - Service	34.76	-6.12	-3.53	-297.54	517.02	0.42
Dead+Wind 330 deg - Service	34.76	-3.53	-6.11	-515.52	298.73	0.24

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-34.76	0.00	0.00	34.76	0.00	0.000%
2	0.00	-41.72	-29.94	0.00	41.72	29.94	0.000%
3	0.00	-31.29	-29.94	0.00	31.29	29.94	0.000%
4	14.99	-41.72	-25.93	-14.99	41.72	25.93	0.000%
5	14.99	-31.29	-25.93	-14.99	31.29	25.93	0.000%
6	25.97	-41.72	-14.97	-25.97	41.72	14.97	0.000%
7	25.97	-31.29	-14.97	-25.97	31.29	14.97	0.000%
8	29.99	-41.72	0.00	-29.99	41.72	0.00	0.000%
9	29.99	-31.29	0.00	-29.99	31.29	0.00	0.000%
10	25.97	-41.72	14.97	-25.97	41.72	-14.97	0.000%
11	25.97	-31.29	14.97	-25.97	31.29	-14.97	0.000%
12	14.99	-41.72	25.93	-14.99	41.72	-25.93	0.000%
13	14.99	-31.29	25.93	-14.99	31.29	-25.93	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
14	0.00	-41.72	29.94	0.00	41.72	-29.94	0.000%
15	0.00	-31.29	29.94	0.00	31.29	-29.94	0.000%
16	-14.99	-41.72	25.93	14.99	41.72	-25.93	0.000%
17	-14.99	-31.29	25.93	14.99	31.29	-25.93	0.000%
18	-25.97	-41.72	14.97	25.97	41.72	-14.97	0.000%
19	-25.97	-31.29	14.97	25.97	31.29	-14.97	0.000%
20	-29.99	-41.72	0.00	29.99	41.72	0.00	0.000%
21	-29.99	-31.29	0.00	29.99	31.29	0.00	0.000%
22	-25.97	-41.72	-14.97	25.97	41.72	14.97	0.000%
23	-25.97	-31.29	-14.97	25.97	31.29	14.97	0.000%
24	-14.99	-41.72	-25.93	14.99	41.72	25.93	0.000%
25	-14.99	-31.29	-25.93	14.99	31.29	25.93	0.000%
26	0.00	-87.89	0.00	0.00	87.89	0.00	0.000%
27	0.00	-87.89	-8.98	0.00	87.89	8.98	0.000%
28	4.49	-87.89	-7.78	-4.49	87.89	7.78	0.000%
29	7.78	-87.89	-4.49	-7.78	87.89	4.49	0.000%
30	8.99	-87.89	0.00	-8.99	87.89	0.00	0.000%
31	7.78	-87.89	4.49	-7.78	87.89	-4.49	0.000%
32	4.49	-87.89	7.78	-4.49	87.89	-7.78	0.000%
33	0.00	-87.89	8.98	0.00	87.89	-8.98	0.000%
34	-4.49	-87.89	7.78	4.49	87.89	-7.78	0.000%
35	-7.78	-87.89	4.49	7.78	87.89	-4.49	0.000%
36	-8.99	-87.89	0.00	8.99	87.89	0.00	0.000%
37	-7.78	-87.89	-4.49	7.78	87.89	4.49	0.000%
38	-4.49	-87.89	-7.78	4.49	87.89	7.78	0.000%
39	0.00	-34.76	-7.05	0.00	34.76	7.05	0.000%
40	3.53	-34.76	-6.11	-3.53	34.76	6.11	0.000%
41	6.12	-34.76	-3.53	-6.12	34.76	3.53	0.000%
42	7.07	-34.76	0.00	-7.07	34.76	0.00	0.000%
43	6.12	-34.76	3.53	-6.12	34.76	-3.53	0.000%
44	3.53	-34.76	6.11	-3.53	34.76	-6.11	0.000%
45	0.00	-34.76	7.05	0.00	34.76	-7.05	0.000%
46	-3.53	-34.76	6.11	3.53	34.76	-6.11	0.000%
47	-6.12	-34.76	3.53	6.12	34.76	-3.53	0.000%
48	-7.07	-34.76	0.00	7.07	34.76	0.00	0.000%
49	-6.12	-34.76	-3.53	6.12	34.76	3.53	0.000%
50	-3.53	-34.76	-6.11	3.53	34.76	6.11	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	4	0.00000001	0.00009474
3	Yes	4	0.00000001	0.00003832
4	Yes	5	0.00000001	0.00043419
5	Yes	5	0.00000001	0.00019415
6	Yes	5	0.00000001	0.00046854
7	Yes	5	0.00000001	0.00021083
8	Yes	5	0.00000001	0.00004574
9	Yes	4	0.00000001	0.00072252
10	Yes	5	0.00000001	0.00042588
11	Yes	5	0.00000001	0.00019017
12	Yes	5	0.00000001	0.00045816
13	Yes	5	0.00000001	0.00020587
14	Yes	4	0.00000001	0.00009473
15	Yes	4	0.00000001	0.00003832
16	Yes	5	0.00000001	0.00045859
17	Yes	5	0.00000001	0.00020600
18	Yes	5	0.00000001	0.00042620
19	Yes	5	0.00000001	0.00019028
20	Yes	5	0.00000001	0.00004575
21	Yes	4	0.00000001	0.00072273
22	Yes	5	0.00000001	0.00046892
23	Yes	5	0.00000001	0.00021095

24	Yes	5	0.00000001	0.00043465
25	Yes	5	0.00000001	0.00019429
26	Yes	4	0.00000001	0.00001429
27	Yes	5	0.00000001	0.00028149
28	Yes	5	0.00000001	0.00041047
29	Yes	5	0.00000001	0.00041946
30	Yes	5	0.00000001	0.00028099
31	Yes	5	0.00000001	0.00040343
32	Yes	5	0.00000001	0.00041039
33	Yes	5	0.00000001	0.00027878
34	Yes	5	0.00000001	0.00041491
35	Yes	5	0.00000001	0.00040704
36	Yes	5	0.00000001	0.00028329
37	Yes	5	0.00000001	0.00042339
38	Yes	5	0.00000001	0.00041511
39	Yes	4	0.00000001	0.00001914
40	Yes	4	0.00000001	0.00017634
41	Yes	4	0.00000001	0.00022588
42	Yes	4	0.00000001	0.00007478
43	Yes	4	0.00000001	0.00016992
44	Yes	4	0.00000001	0.00020837
45	Yes	4	0.00000001	0.00001912
46	Yes	4	0.00000001	0.00020906
47	Yes	4	0.00000001	0.00017035
48	Yes	4	0.00000001	0.00007491
49	Yes	4	0.00000001	0.00022658
50	Yes	4	0.00000001	0.00017716

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 95	12.567	48	0.9666	0.0028
L2	95 - 48.08	9.793	48	0.9120	0.0027
L3	53 - 0	3.146	48	0.5459	0.0008

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
111.00	Lighting Rod 3/4" x 4'	48	12.567	0.9666	0.0028	31687
109.00	800 10121 w/ Mount Pipe	48	12.567	0.9666	0.0028	31687
101.00	MX08FRO665-21 w/ Mount Pipe	48	10.969	0.9387	0.0028	19804
92.00	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	48	9.218	0.8955	0.0026	10092
80.00	(4) DB844H90-XY w/ Mount Pipe	48	7.037	0.8094	0.0022	7008
74.00	800MHZ 2X50W RRH W/FILTER	48	6.035	0.7567	0.0019	6081
69.00	APXVTM14-C-120 w/ Mount Pipe	48	5.253	0.7094	0.0016	5476
62.00	APX18-206516L	48	4.251	0.6393	0.0013	4806

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 95	53.589	20	4.1223	0.0118
L2	95 - 48.08	41.764	20	3.8900	0.0114



Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	53 - 0	13.417	20	2.3290	0.0036

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
111.00	Lighting Rod 3/4" x 4'	20	53.589	4.1223	0.0118	7550
109.00	800 10121 w/ Mount Pipe	20	53.589	4.1223	0.0118	7550
101.00	MX08FRO665-21 w/ Mount Pipe	20	46.776	4.0036	0.0117	4718
92.00	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	20	39.313	3.8197	0.0111	2399
80.00	(4) DB844H90-XY w/ Mount Pipe	20	30.015	3.4531	0.0092	1658
74.00	800MHZ 2X50W RRH W/FILTER	20	25.738	3.2288	0.0080	1436
69.00	APXVTM14-C-120 w/ Mount Pipe	20	22.404	3.0267	0.0069	1291
62.00	APX18-206516L	20	18.132	2.7276	0.0054	1131

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	109 - 95 (1)	TP26.715x23.476x0.1875	14.00	0.00	0.0	15.787	-8.02	923.55	0.009
L2	95 - 48.08 (2)	TP37.573x26.715x0.3125	46.92	0.00	0.0	35.828	-26.36	2095.96	0.013
L3	48.08 - 0 (3)	TP48.075x35.8094x0.375	53.00	0.00	0.0	56.774	-41.69	3321.33	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>rx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M <sub>uy</sub> kip-ft	φM <sub>ry</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L1	109 - 95 (1)	TP26.715x23.476x0.1875	146.03	565.78	0.258	0.00	565.78	0.000
L2	95 - 48.08 (2)	TP37.573x26.715x0.3125	1043.33	1873.95	0.557	0.00	1873.95	0.000
L3	48.08 - 0 (3)	TP48.075x35.8094x0.375	2544.21	3803.96	0.669	0.00	3803.96	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	109 - 95 (1)	TP26.715x23.476x0.1875	12.07	277.07	0.044	0.00	643.66	0.000
L2	95 - 48.08 (2)	TP37.573x26.715x0.3125	26.38	628.79	0.042	2.04	1989.10	0.001
L3	48.08 - 0 (3)	TP48.075x35.8094x0.375	30.03	996.40	0.030	2.03	4162.29	0.000

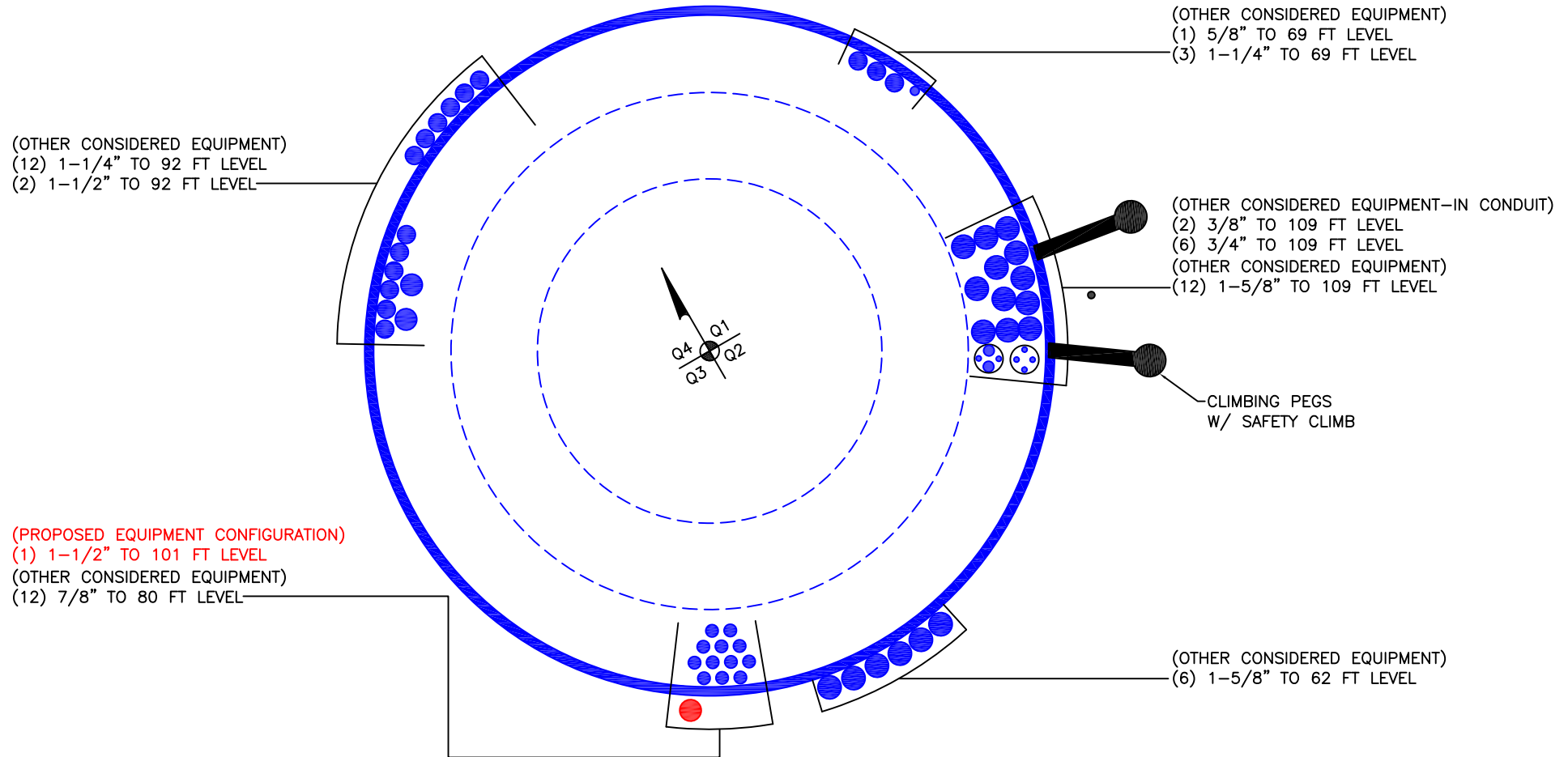
### Pole Interaction Design Data

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	109 - 95 (1)	0.009	0.258	0.000	0.044	0.000	0.269	1.050	4.8.2
L2	95 - 48.08 (2)	0.013	0.557	0.000	0.042	0.001	0.571	1.050	4.8.2
L3	48.08 - 0 (3)	0.013	0.669	0.000	0.030	0.000	0.682	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	109 - 95	Pole	TP26.715x23.476x0.1875	1	-8.02	969.73	25.6	Pass	
L2	95 - 48.08	Pole	TP37.573x26.715x0.3125	2	-26.36	2200.76	54.4	Pass	
L3	48.08 - 0	Pole	TP48.075x35.8094x0.375	3	-41.69	3487.40	65.0	Pass	
							Summary		
							Pole (L3)	65.0	Pass
							<b>RATING =</b>	<b>65.0</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Monopole Flange Plate Connection

Elevation = 95 ft.

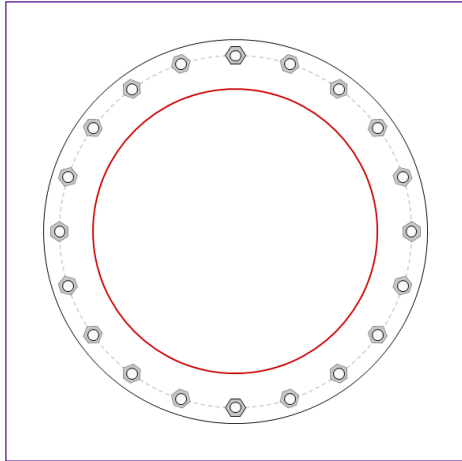


BU #	801486
Site Name	SUFFIELD 2 CAC 8014
Order #	556646 Rev. 0
TIA-222 Revision	H

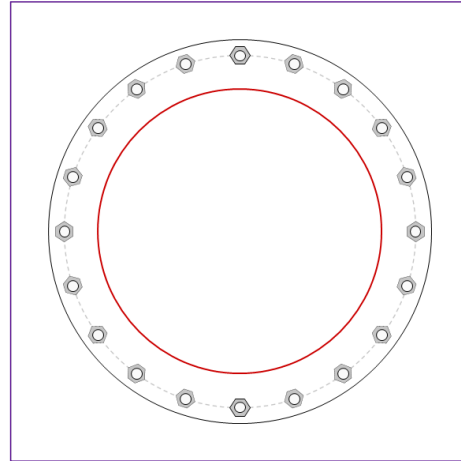
Applied Loads	
Moment (kip-ft)	146.03
Axial Force (kips)	8.02
Shear Force (kips)	12.07

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



### Connection Properties

#### Bolt Data

(20) 1"  $\emptyset$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 33" BC

#### Top Plate Data

36" OD x 2.25" Plate (A633 Gr. E; Fy=60 ksi, Fu=70 ksi)

#### Top Stiffener Data

N/A

#### Top Pole Data

26.715" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

#### Bottom Plate Data

36" OD x 2.25" Plate (A633 Gr. E; Fy=60 ksi, Fu=70 ksi)

#### Bottom Stiffener Data

N/A

#### Bottom Pole Data

26.715" x 0.3125" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

### Analysis Results

#### Bolt Capacity

Max Load (kips)	10.22
Allowable (kips)	54.53
Stress Rating:	<b>17.8% Pass</b>

#### Top Plate Capacity

Max Stress (ksi):	3.69	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.5%</b>	<b>Pass</b>
Tension Side Stress Rating:	<b>4.4%</b>	<b>Pass</b>

#### Bottom Plate Capacity

Max Stress (ksi):	3.69	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.5%</b>	<b>Pass</b>
Tension Side Stress Rating:	<b>4.4%</b>	<b>Pass</b>

# Monopole Base Plate Connection

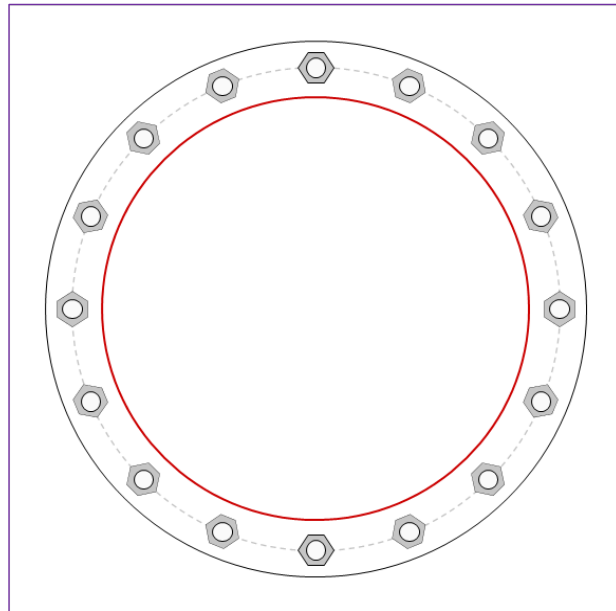


Site Info	
BU #	801486
Site Name	SUFFIELD 2 CAC 80144
Order #	556646 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.75

Applied Loads	
Moment (kip-ft)	2544.21
Axial Force (kips)	41.69
Shear Force (kips)	30.03

\*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
(16) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 55" BC
Base Plate Data
61" OD x 2.75" Plate (A633 Gr. E; $F_y=60$ ksi, $F_u=70$ ksi)
Stiffener Data
N/A
Pole Data
48.075" x 0.375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>	
$Pu_t = 136.07$	$\phi Pn_t = 243.75$	<b>Stress Rating</b>	
$Vu = 1.88$	$\phi Vn = 149.1$		<b>53.2%</b>
$Mu = n/a$	$\phi Mn = n/a$		<b>Pass</b>
Base Plate Summary			
Max Stress (ksi):	16.77		(Flexural)
Allowable Stress (ksi):	54		
Stress Rating:	<b>29.6%</b>		<b>Pass</b>

# Pier and Pad Foundation



**BU # :** 801486  
**Site Name:** CT SUFFIELD 2 C.  
**App. Number:** 556646 Rev. 0

**TIA-222 Revision:** H  
**Tower Type:** Monopole

**Top & Bot. Pad Rein. Different?:**   
**Block Foundation?:**   
**Rectangular Pad?:**

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	41.72	kips
Base Shear, $V_{u\_comp}$ :	29.99	kips
Moment, $M_u$ :	2544.21	ft-kips
Tower Height, $H$ :	109	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	733.50	29.99	3.9%	Pass
<i>Bearing Pressure (ksf)</i>	6.00	1.73	27.5%	Pass
<i>Overtuning (kip*ft)</i>	6302.20	2761.64	43.8%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	4653.47	2679.17	54.8%	Pass
<i>Pier Compression (kip)</i>	15840.27	68.60	0.4%	Pass
<i>Pad Flexure (kip*ft)</i>	2373.87	965.72	38.7%	Pass
<i>Pad Shear - 1-way (kips)</i>	635.91	147.53	22.1%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.043	25.1%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	2507.27	1607.50	61.1%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$ :	6.5	ft
Ext. Above Grade, $E$ :	0.5	ft
Pier Rebar Size, $Sc$ :	9	
Pier Rebar Quantity, $mc$ :	32	
Pier Tie/Spiral Size, $St$ :	5	
Pier Tie/Spiral Quantity, $mt$ :	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Soil Rating*:	43.8%
Structural Rating*:	61.1%

Pad Properties		
Depth, $D$ :	6.5	ft
Pad Width, $W_1$ :	26	ft
Pad Thickness, $T$ :	2.5	ft
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	9	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	22	
Pad Clear Cover, $cc_{pad}$ :	3.5	in

Material Properties		
Rebar Grade, $F_y$ :	60	ksi
Concrete Compressive Strength, $F'_c$ :	3	ksi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	115	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	8.000	ksf
Cohesion, $C_u$ :	1.150	ksf
Friction Angle, $\phi$ :	0	degrees
SPT Blow Count, $N_{blows}$ :		
Base Friction, $\mu$ :		
Neglected Depth, $N$ :	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	N/A	ft

<-- Toggle between Gross and Net

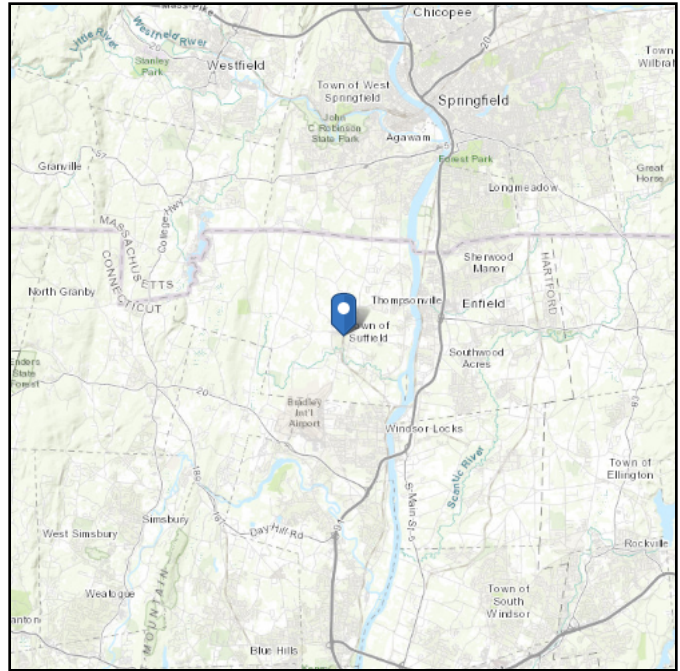


# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 132.2 ft (NAVD 88)  
**Latitude:** 41.980472  
**Longitude:** -72.657278



## Wind

### Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

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

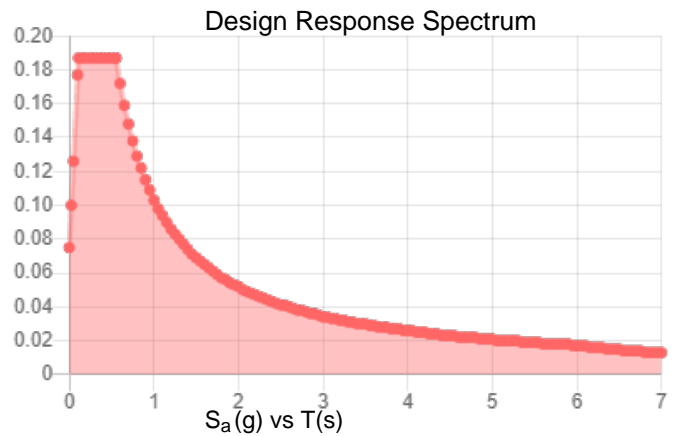
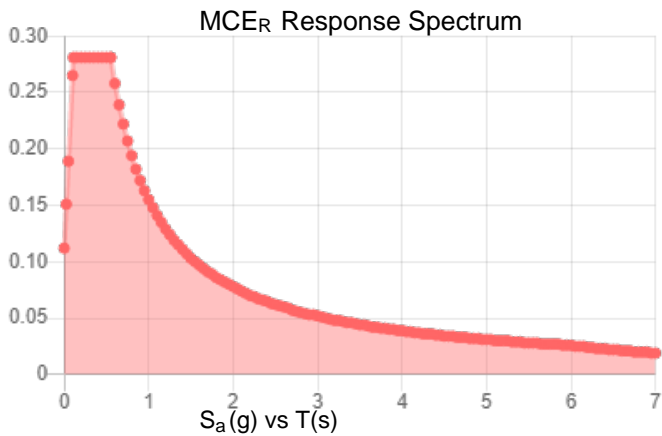
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_S$ :	0.176	$S_{DS}$ :	0.187
$S_1$ :	0.065	$S_{D1}$ :	0.103
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.086
$S_{MS}$ :	0.281	PGA <sub>M</sub> :	0.138
$S_{M1}$ :	0.155	F <sub>PGA</sub> :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Thu Apr 29 2021

**Date Source:**

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

## Ice

---

**Results:**

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

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

**Date Accessed:** Thu Apr 29 2021

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

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

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