AMERICAN TOWER®
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ENGINEERING SOLUTIONS

Structural Analysis Report

Structure	:	**155 ft Self Supported Tower**
ATC Site Name	:	**Wshn - West Haven, CT**
ATC Site Number	:	**302505**
Engineering Number	:	**64127821**
Proposed Carrier	:	**AT&T Mobility**
Carrier Site Name	:	**BANM Westhaven**
Carrier Site Number	:	**CTL02064/FA#10035024**
Site Location	:	**204 Burwell Street** **West Haven, CT** **41.295300, -72.973300**
County	:	**New Haven**
Date	:	**November 13, 2015**
Max Usage	:	**79%**
Result	:	**Pass**

Mitchell Gocke
SES Structural Engineer

STATE OF CONNECTICUT
THOMAS L TAYLOR
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LICENSED
PROFESSIONAL ENGINEER
11.13.15

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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 155 ft self supported tower to reflect the change in loading by AT&T Mobility.

Supporting Documents

Tower Drawings	Stainless Report #2940-3, dated August 14, 1981
Foundation Drawing	Mapping by TEP Project #03290, dated July 28, 2003
Geotechnical Report	GEOServices Project #21-07254, dated November 28, 2007
Modifications	SpectraSite Dwg #CT-0041-E1, dated August 08, 2003 ATC Project #53874032, dated July 23, 2013

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	100 mph (3-Second Gust)
Basic Wind Speed w/ Ice:	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
Code:	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2013 CT Amendment
Structure Class:	II
Exposure Category:	B
Topographic Category:	3
Crest Height:	112 ft

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
154.0	154.0	6	KMW AM-X-CD-16-65-00T-RET	Sector Frames	(4) 0.78" 8 AWG 6 (12) 1 5/8" Coax (2) 3" Conduit (2) 0.39" Fiber Trunk	AT&T Mobility
		3	Powerwave 7770.00			
		6	Ericsson RRUS 12			
		3	Ericsson RRUS-32			
		6	Ericsson RRUS A2 Module			
		3	Raycap DC6-48-60-18-8F			
		3	Diplexer / Coupler			
		3	Ericsson RRUS-11			
140.0	139.0	4	Andrew 844G45VTZASX	Sector Frames	(12) 1 1/4" Coax	Sprint Nextel
		8	Decibel DB844H90E-XY			
123.0	123.0	-	-	Empty Sector Frames	-	-
120.0	120.0	2	Andrew VHLP2-26-1GR	Pole Mount	(2) 0.41" CNT-400	City Of West Haven, Dept Of Police
103.0	103.0	-	-	-	(1) 1 1/4" Coax	
102.0	106.0	2	Lone Star Electronics LS-230	Standoff	(1) 7/8" Coax	
90.0	95.0	1	RFI Antennas BA80-67	Standoff	(1) 7/8" Coax	
80.0	92.0	1	Andrew DB224	Side Arm	(1) 7/8" Coax	S. Conecticut Gas
	86.0	1	Antel BCD-87010 ___		(1) 1/2" Coax	USA Mobility
70.0	73.0	2	Andrew ASPR766P	Leg	(1) 1/2" Coax (1) 7/8" Coax	S. Conecticut Gas

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
154.0	154.0	3	CCI HPA-65R-BUU-H6	-	(1) 0.39" Cable	AT&T Mobility
		12	KMW AWS Twin Dual 700 Bypass			
		3	Ericsson RRUS E2 B29			

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
154.0	154.0	3	CCI OPA-65R-LCUU-H6	Sector Frames	-	AT&T Mobility
	153.0	12	Powerwave LGP21401			

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Legs	79%	Pass
Diagonals	77%	Pass
Horizontals	49%	Pass
Anchor Bolts	20%	Pass
Leg Bolts	57%	Pass

Foundations

Reaction Component	Original Design Reactions	Factored Design Reactions*	Analysis Reactions	% of Design
Uplift (Kips)	190.0	256.5	206.5	80%
Axial (Kips)	223.0	301.1	237.6	79%
Shear (Kips)	23.0	31.1	23.8	77%

*** The design reactions are factored by 1.35 per ANSI/TIA-222-G, Sec. 15.5.1**

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings, therefore no modification or reinforcement of the foundation will be required.

Deflection, Twist and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Twist (°)	Sway (Rotation) (°)
154.0	CCI OPA-65R-LCUU-H6	AT&T Mobility	0.253	0.006	0.169
	Powerwave LGP21401		0.253	0.006	0.169
120.0	Andrew Microwaves VHLP2-26-1GR	City of West Haven, Dept of Police	0.142	0.008	0.149

***Deflection, Twist and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

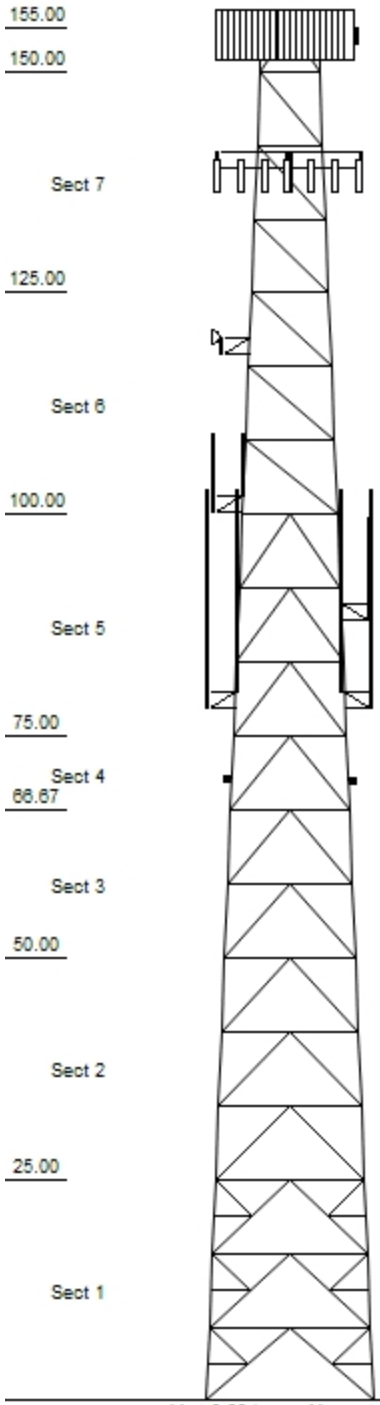
-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.



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Loads: 100 mph no ice
50 mph w / 3/4" radial ice
60 mph Serviceability

Job Information

Tower : 302505	Location : Wshn - West Haven, CT	
Code: ANSI/TIA-222-G	Shape : Triangle	Base Width : 19.00 ft
Client : AT&T MOBILITY		Top Width : 7.00 ft

Sections Properties

Section	Leg Members		Diagonal Members	Horizontal Members
1 - 2	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 3" OD X0.25"	DAL 36 ksi 3X2.5X0.25
3	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 2.75" OD	SAE 36 ksi 3X3X0.25
4	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 2.75" OD	DAL 36 ksi 3X2.5X0.25
5	PSP 50 ksi	5" OD x .300"	PSP 36 ksi STLSS 2.75" OD	DAL 36 ksi 3X2.5X0.25
6	PSP 50 ksi	STLSS 5" OD	PSP 36 ksi STLSS 3" OD X0.25"	DAL 36 ksi 3X2.5X0.25
7	PSP 50 ksi	STLSS 5" OD	PSP 36 ksi STLSS 2.75" OD	SAE 36 ksi 3X3X0.25
8	PSP 50 ksi	STLSS 5" OD	DAL 36 ksi 2.5X2X0.1875	CHN 36 ksi C4 x 5.4

Discrete Appurtenance

Elev (ft)	Type	Qty	Description
154.00	Panel	3	CCI OPA-65R-LCUU-H6
154.00	Panel	6	KMW AM-X-CD-16-65-00T-RET
154.00	Panel	3	Powerwave 7770.00
154.00	Panel	12	Powerwave LGP21401
154.00	Panel	6	Ericsson RRUS 12
154.00	Panel	3	Ericsson RRUS-32
154.00	Panel	6	Ericsson RRUS A2 Module
154.00	Panel	3	Raycap DC6-48-60-18-8F
154.00	Panel	3	Diplexer / Coupler
154.00	Panel	3	Ericsson RRUS-11
154.00	Mounting Frame	3	Flat Light Sector Frame
140.00	Panel	4	Andrew 844G45VTZASX
140.00	Panel	8	Decibel DB844H90E-XY
140.00	Mounting Frame	3	Flat Light Sector Frame
123.00	Mounting Frame	3	Empty Round Sector Frame
120.00	Straight Arm	1	Pole Mount
120.00	Dish	2	Andrew Microwaves VHLP2-26-1GR
103.00	Straight Arm	1	Stand-Off
102.00	Straight Arm	1	Standoff
102.00	Whip	2	Lone Star Electronics LS-230
90.00	Straight Arm	1	Standoff
90.00	Whip	1	RFI Antennas BA80-67
80.00	Whip	1	Antel BCD-87010 ___
80.00	Straight Arm	1	Round Side Arm
80.00	Straight Arm	1	Flat Side Arm
80.00	Whip	1	Andrew DB224
70.00	Yagi	2	Andrew ASPR766P

Linear Appurtenance

Elev (ft) From	To	Qty	Description
0.000	155.00	1	Climbing Ladder
5.000	154.00	1	Waveguide
5.000	154.00	2	3" Conduit
5.000	154.00	12	1 5/8" Coax
5.000	154.00	4	0.78" 8 AWG 6
5.000	154.00	2	0.39" Fiber Trunk
100.000	140.00	1	Waveguide
100.000	140.00	12	1 1/4" Coax
50.000	120.00	2	0.41" CNT-400
5.000	103.00	1	1 1/4" Coax
5.000	102.00	1	7/8" Coax
5.000	100.00	1	Waveguide
5.000	90.000	1	7/8" Coax
5.000	80.000	1	7/8" Coax
5.000	80.000	1	1/2" Coax
5.000	70.000	1	7/8" Coax
5.000	70.000	1	1/2" Coax

Vert 0.00 k	Moment 3,668.99 k	Moment Ice	1,132.87 k-ft
Horiz 0.00 k	Tot Down 43.87 k	Tot Down Ice	113.66 k
	Tot Shear 40.81 k	Tot Shear Ice	12.76 k

Site Number:	**302505**	**Code:**	**ANSI/TIA-222-G**	*© 2007 - 2015 by ATC IP LLC. All rights reserved.*
Site Name:	**Wshn - West Haven, CT**	**Engineering Number:**	**64127821**	11/13/2015 1:45:02 PM
Customer:	**AT&T MOBILITY**			

Analysis Parameters

Location:	**New Haven County, CT**		
Code:	**ANSI/TIA-222-G**	**Height (ft):**	**155**
Shape:	**Triangle**	**Base Elevation (ft):**	**0.00**
Tower Manufacturer:	**Stainless Inc.**	**Bottom Face Width (ft):**	**19.00**
Tower Type:	**Self Support**	**Top Face Width (ft):**	**7.00**

Ice & Wind Parameters

Structure Class:	**II**	**Design Windspeed Without Ice:**	**100 mph**
Exposure Category:	**B**	**Design Windspeed With Ice:**	**50 mph**
Topographic Catagory:	**3**	**Operational Windspeed:**	**60 mph**
Crest Height:	**111.6 ft**	**Design Ice Thickness:**	**0.75 in**

Load Cases

1.2D + 1.6W Normal	**100 mph Normal to Face with No Ice**
1.2D + 1.6W 60 deg	**100 mph 60 degree with No Ice**
1.2D + 1.6W 90 deg	**100 mph 90 degree with No Ice**
0.9D + 1.6W Normal	**100 mph Normal to Face with No Ice (Reduced DL)**
0.9D + 1.6W 60 deg	**100 mph 60 deg with No Ice (Reduced DL)**
0.9D + 1.6W 90 deg	**100 mph 90 deg with No Ice (Reduced DL)**
1.2D + 1.0Di + 1.0Wi Normal	**50 mph Normal with 0.75 in Radial Ice**
1.2D + 1.0Di + 1.0Wi 60 deg	**50 mph 60 degree with 0.75 in Radial Ice**
1.2D + 1.0Di + 1.0Wi 90 deg	**50 mph 90 degree with 0.75 in Radial Ice**
1.0D + 1.0W Service Normal	**Serviceability - 60 mph Wind Normal**
1.0D + 1.0W Service 60 deg	**Serviceability - 60 mph Wind 60 degree**
1.0D + 1.0W Service 90 deg	**Serviceability - 60 mph Wind 90 degree**

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Tower Loading

Discrete Appurtenance Properties 1.2D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	25.82	643	315
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	25.82	29	22
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.4	0.80	0.67	0.0	0.0	25.82	356	432
154.0	Ericsson RRUS A2	6	22	2.1	1.1	15.0	3.4	0.80	0.50	0.0	0.0	25.82	174	190
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	25.82	214	238
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	25.82	187	333
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.82	1061	1728
154.0	KMW AM-X-CD-16-	6	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	25.82	1068	419
154.0	Powerwave 7770.00	3	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	25.82	358	151
154.0	Powerwave	12	14	1.1	1.2	9.2	2.6	0.80	0.50	-1.0	185.3	25.80	185	244
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	0.50	0.0	0.0	25.82	54	137
140.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	-1.0	554.4	25.53	554	86
140.0	Decibel DB844H90E-	8	14	3.6	4.0	8.0	6.5	0.80	0.92	-1.0	738.0	25.53	738	161
140.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.55	1049	1728
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.28	835	1296
120.0	Andrew Microwaves	2	31	4.7	2.0	0.0	0.0	1.00	1.00	0.0	0.0	25.24	321	89
120.0	Pole Mount	1	40	1.6	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.24	56	58
103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.08	85	108
102.0	Lone Star	2	11	1.6	7.0	3.0	3.0	1.00	1.00	4.0	439.6	25.10	110	32
102.0	Standoff	1	126	5.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.07	170	181
90.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	20.0	1.00	1.00	5.0	570.3	25.04	114	25
90.00	Standoff	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.02	214	216
80.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	12.0	2471.1	25.03	206	55
80.00	Antel BCD-87010 ___	1	27	2.9	11.2	2.6	2.6	1.00	1.00	6.0	592.1	25.02	99	38
80.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.03	214	216
80.00	Round Side Arm	1	150	4.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.03	136	216
70.00	Andrew ASPR766P	2	2	0.9	1.0	30.0	0.0	1.00	1.00	3.0	190.1	25.05	63	5
	Totals	84	6055	421.9										

Discrete Appurtenance Properties 0.9D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	25.82	643	177
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	25.82	29	12
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.4	0.80	0.67	0.0	0.0	25.82	356	243
154.0	Ericsson RRUS A2	6	22	2.1	1.1	15.0	3.4	0.80	0.50	0.0	0.0	25.82	174	107
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	25.82	214	134
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	25.82	187	187
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.82	1061	972
154.0	KMW AM-X-CD-16-	6	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	25.82	1068	236
154.0	Powerwave 7770.00	3	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	25.82	358	85
154.0	Powerwave	12	14	1.1	1.2	9.2	2.6	0.80	0.50	-1.0	185.3	25.80	185	137
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	0.50	0.0	0.0	25.82	54	77
140.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	-1.0	554.4	25.53	554	49
140.0	Decibel DB844H90E-	8	14	3.6	4.0	8.0	6.5	0.80	0.92	-1.0	738.0	25.53	738	91
140.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.55	1049	972
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.28	835	729
120.0	Andrew Microwaves	2	31	4.7	2.0	0.0	0.0	1.00	1.00	0.0	0.0	25.24	321	50
120.0	Pole Mount	1	40	1.6	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.24	56	32
103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.08	85	61
102.0	Lone Star	2	11	1.6	7.0	3.0	3.0	1.00	1.00	4.0	439.6	25.10	110	18

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Tower Loading

102.0	Standoff	1	126	5.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.07	170	102
90.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	20.0	1.00	1.00	5.0	570.3	25.04	114	14
90.00	Standoff	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.02	214	122
80.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	12.0	2471.1	25.03	206	31
80.00	Antel BCD-87010 ___	1	27	2.9	11.2	2.6	2.6	1.00	1.00	6.0	592.1	25.02	99	21
80.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.03	214	122
80.00	Round Side Arm	1	150	4.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.03	136	122
70.00	Andrew ASPR766P	2	2	0.9	1.0	30.0	0.0	1.00	1.00	3.0	190.1	25.05	63	3
	Totals	84	6055	421.9										

Discrete Appurtenance Properties 1.2D + 1.0Di + 1.0Wi

Elevation (ft)	Description	Qty	Ice Wt (lb)	Ice EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	125	16.6	6.0	14.8	7.4	0.80	0.79	0.0	0.0	6.45	172	503
154.0	Diplexer / Coupler	3	30	1.0	1.0	6.0	3.0	0.80	0.50	0.0	0.0	6.45	6	111
154.0	Ericsson RRUS 12	6	148	3.9	1.7	18.5	7.4	0.80	0.67	0.0	0.0	6.45	69	1135
154.0	Ericsson RRUS A2	6	70	2.1	1.1	15.0	3.4	0.80	0.50	0.0	0.0	6.45	28	532
154.0	Ericsson RRUS-11	3	163	4.6	2.1	18.2	6.7	0.80	0.67	0.0	0.0	6.45	41	627
154.0	Ericsson RRUS-32	3	194	4.1	2.5	13.3	9.5	0.80	0.67	0.0	0.0	6.45	36	753
154.0	Flat Light Sector	3	709	33.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.45	309	2839
154.0	KMW AM-X-CD-16-	6	243	9.3	6.0	11.8	5.9	0.80	0.79	0.0	0.0	6.45	194	1817
154.0	Powerwave 7770.00	3	174	6.6	4.6	11.0	5.0	0.80	0.77	0.0	0.0	6.45	67	652
154.0	Powerwave	12	49	1.6	1.2	9.2	2.6	0.80	0.50	-1.0	41.5	6.45	41	744
154.0	Raycap DC6-48-60-	3	127	2.9	2.0	11.0	11.0	0.80	0.50	0.0	0.0	6.45	19	482
140.0	Andrew	4	191	7.2	4.0	15.0	8.5	0.80	0.81	-1.0	101.6	6.38	102	929
140.0	Decibel DB844H90E-	8	127	4.5	4.0	8.0	6.5	0.80	0.92	-1.0	144.6	6.38	145	1249
140.0	Flat Light Sector	3	707	33.3	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.39	305	2835
123.0	Empty Round Sector	3	674	31.2	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.32	283	2642
120.0	Andrew Microwaves	2	185	6.1	2.0	0.0	0.0	1.00	1.00	0.0	0.0	6.31	65	459
120.0	Pole Mount	1	88	2.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.31	15	115
103.0	Stand-Off	1	112	3.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.27	20	153
102.0	Lone Star	2	108	3.7	7.0	3.0	3.0	1.00	1.00	4.0	159.7	6.27	40	264
102.0	Standoff	1	215	8.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.27	45	288
90.00	RFI Antennas BA80-	1	378	5.3	9.8	2.0	20.0	1.00	1.00	5.0	140.8	6.26	28	458
90.00	Standoff	1	224	8.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.26	47	305
80.00	Andrew DB224	1	344	15.2	23.0	3.0	3.0	1.00	1.00	12.0	971.4	6.26	81	422
80.00	Antel BCD-87010 ___	1	165	6.7	11.2	2.6	2.6	1.00	1.00	6.0	213.6	6.25	36	204
80.00	Flat Side Arm	1	224	8.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.26	47	305
80.00	Round Side Arm	1	224	6.1	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.26	33	305
70.00	Andrew ASPR766P	2	42	2.7	1.0	30.0	0.0	1.00	1.00	3.0	86.8	6.26	29	102
	Totals	84	16480	668.3										

Discrete Appurtenance Properties 1.0D + 1.0W Service

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	9.29	145	219
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	9.29	7	15
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.4	0.80	0.67	0.0	0.0	9.29	80	300
154.0	Ericsson RRUS A2	6	22	2.1	1.1	15.0	3.4	0.80	0.50	0.0	0.0	9.29	39	132
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	9.29	48	165
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	9.29	42	231
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.29	239	1200

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Tower Loading

154.0	KMW AM-X-CD-16-	6	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	9.29	240	291
154.0	Powerwave 7770.00	3	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	9.29	80	105
154.0	Powerwave	12	14	1.1	1.2	9.2	2.6	0.80	0.50	-1.0	41.7	9.29	42	169
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	0.50	0.0	0.0	9.29	12	95
140.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	-1.0	124.7	9.19	125	60
140.0	Decibel DB844H90E-	8	14	3.6	4.0	8.0	6.5	0.80	0.92	-1.0	166.0	9.19	166	112
140.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.20	236	1200
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.10	188	900
120.0	Andrew Microwaves	2	31	4.7	2.0	0.0	0.0	1.00	1.00	0.0	0.0	9.09	72	62
120.0	Pole Mount	1	40	1.6	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.09	13	40
103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.03	19	75
102.0	Lone Star	2	11	1.6	7.0	3.0	3.0	1.00	1.00	4.0	98.9	9.04	25	22
102.0	Standoff	1	126	5.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.03	38	126
90.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	20.0	1.00	1.00	5.0	128.3	9.01	26	18
90.00	Standoff	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.01	48	150
80.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	12.0	556.0	9.01	46	38
80.00	Antel BCD-87010 ___	1	27	2.9	11.2	2.6	2.6	1.00	1.00	6.0	133.2	9.01	22	27
80.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.01	48	150
80.00	Round Side Arm	1	150	4.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.01	31	150
70.00	Andrew ASPR766P	2	2	0.9	1.0	30.0	0.0	1.00	1.00	3.0	42.8	9.02	14	4
	Totals	84	6055	421.9										

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Tower Loading

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out Of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	155.0	Climbing Ladder	1	1.00	6.90	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	0.39" Fiber Trunk	2	0.39	0.06	0	3	Individual	0.00	N	1.00	1.00	0.01
5.00	154.0	0.78" 8 AWG 6	4	0.78	0.59	0	3	Individual	0.00	N	1.00	1.00	0.01
5.00	154.0	1 5/8" Coax	12	1.98	0.82	75	3	Block	0.00	N	1.00	1.00	0.00
5.00	154.0	3" Conduit	2	3.50	7.58	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	Waveguide	1	1.00	6.00	0	3	Individual	0.00	N	1.00	1.00	0.00
100.0	140.0	1 1/4" Coax	12	1.55	0.63	100	3	Individual	0.00	N	1.00	1.00	0.00
100.0	140.0	Waveguide	1	1.00	6.00	0	3	Individual	0.00	N	1.00	1.00	0.00
50.00	120.0	0.41" CNT-400	2	0.41	0.07	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	103.0	1 1/4" Coax	1	1.55	0.63	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	102.0	7/8" Coax	1	1.09	0.33	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	100.0	Waveguide	1	1.00	6.00	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	90.00	7/8" Coax	1	1.09	0.33	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	80.00	1/2" Coax	1	0.63	0.15	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	80.00	7/8" Coax	1	1.09	0.33	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	70.00	1/2" Coax	1	0.63	0.15	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	70.00	7/8" Coax	1	1.09	0.33	0	3	Individual	0.00	N	1.00	1.00	0.00

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Section Forces

LoadCase 1.2D + 1.6W Normal — 100 mph Normal to Face with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	1.00	1.00	0.0	6.68	12.30	0.00	802	0	582	284	866
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	1.00	1.00	0.0	20.04	100.88	0.00	3255	0	1898	2375	4273
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	1.00	1.00	0.0	22.40	119.14	0.00	4367	0	2144	2806	4950
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	1.00	1.00	0.0	26.22	87.75	0.00	5629	0	2512	2022	4534
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	1.00	1.00	0.0	9.16	30.98	0.00	2227	0	889	718	1607
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	1.00	1.00	0.0	18.96	63.40	0.00	3960	0	1860	1475	3335
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	1.00	1.00	0.0	30.91	93.40	0.00	7763	0	3049	2170	5219
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	1.00	1.00	0.0	40.87	75.13	0.00	8602	0	4534	2213	6747
														36604	0			31531

LoadCase 1.2D + 1.6W 60 deg — 100 mph 60 degree with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	0.80	1.00	0.0	5.77	12.30	0.00	802	0	503	284	787
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	0.80	1.00	0.0	18.96	100.88	0.00	3255	0	1795	2375	4170
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	0.80	1.00	0.0	21.01	119.14	0.00	4367	0	2011	2806	4817
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	0.80	1.00	0.0	24.57	87.75	0.00	5629	0	2353	2022	4376
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	0.80	1.00	0.0	8.54	30.98	0.00	2227	0	829	718	1547
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	0.80	1.00	0.0	17.63	63.40	0.00	3960	0	1729	1475	3204
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	0.80	1.00	0.0	28.66	93.40	0.00	7763	0	2827	2170	4997
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	0.80	1.00	0.0	38.32	75.13	0.00	8602	0	4251	2213	6464
														36604	0			30362

LoadCase 1.2D + 1.6W 90 deg — 100 mph 90 degree with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	0.85	1.00	0.0	6.00	12.30	0.00	802	0	523	284	807
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	0.85	1.00	0.0	19.23	100.88	0.00	3255	0	1821	2375	4196
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	0.85	1.00	0.0	21.36	119.14	0.00	4367	0	2044	2806	4850
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	0.85	1.00	0.0	24.98	87.75	0.00	5629	0	2393	2022	4415
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	0.85	1.00	0.0	8.69	30.98	0.00	2227	0	844	718	1562
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	0.85	1.00	0.0	17.96	63.40	0.00	3960	0	1762	1475	3237
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	0.85	1.00	0.0	29.22	93.40	0.00	7763	0	2883	2170	5052
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	0.85	1.00	0.0	38.95	75.13	0.00	8602	0	4322	2213	6535
														36604	0			30654

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Section Forces

LoadCase 0.9D + 1.6W Normal — 100 mph Normal to Face with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	1.00	1.00	0.0	6.68	12.30	0.00	601	0	582	284	866
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	1.00	1.00	0.0	20.04	100.88	0.00	2441	0	1898	2375	4273
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	1.00	1.00	0.0	22.40	119.14	0.00	3276	0	2144	2806	4950
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	1.00	1.00	0.0	26.22	87.75	0.00	4222	0	2512	2022	4534
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	1.00	1.00	0.0	9.16	30.98	0.00	1670	0	889	718	1607
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	1.00	1.00	0.0	18.96	63.40	0.00	2970	0	1860	1475	3335
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	1.00	1.00	0.0	30.91	93.40	0.00	5822	0	3049	2170	5219
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	1.00	1.00	0.0	40.87	75.13	0.00	6451	0	4534	2213	6747
														27453	0			31531

LoadCase 0.9D + 1.6W 60 deg — 100 mph 60 deg with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	0.80	1.00	0.0	5.77	12.30	0.00	601	0	503	284	787
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	0.80	1.00	0.0	18.96	100.88	0.00	2441	0	1795	2375	4170
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	0.80	1.00	0.0	21.01	119.14	0.00	3276	0	2011	2806	4817
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	0.80	1.00	0.0	24.57	87.75	0.00	4222	0	2353	2022	4376
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	0.80	1.00	0.0	8.54	30.98	0.00	1670	0	829	718	1547
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	0.80	1.00	0.0	17.63	63.40	0.00	2970	0	1729	1475	3204
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	0.80	1.00	0.0	28.66	93.40	0.00	5822	0	2827	2170	4997
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	0.80	1.00	0.0	38.32	75.13	0.00	6451	0	4251	2213	6464
														27453	0			30362

LoadCase 0.9D + 1.6W 90 deg — 100 mph 90 deg with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	25.79	4.54	4.17	0.00	0.23	2.48	0.85	1.00	0.0	6.00	12.30	0.00	601	0	523	284	807
7	137.5	25.50	5.44	28.52	0.00	0.16	2.73	0.85	1.00	0.0	19.23	100.88	0.00	2441	0	1821	2375	4196
6	112.5	25.16	6.94	30.31	0.00	0.14	2.80	0.85	1.00	0.0	21.36	119.14	0.00	3276	0	2044	2806	4850
5	87.50	25.02	8.27	34.67	0.00	0.14	2.81	0.85	1.00	0.0	24.98	87.75	0.00	4222	0	2393	2022	4415
4	70.83	25.06	3.09	11.74	0.00	0.13	2.85	0.85	1.00	0.0	8.69	30.98	0.00	1670	0	844	718	1562
3	58.33	25.14	6.68	23.79	0.00	0.12	2.87	0.85	1.00	0.0	17.96	63.40	0.00	2970	0	1762	1475	3237
2	37.50	25.13	11.25	37.86	0.00	0.12	2.89	0.85	1.00	0.0	29.22	93.40	0.00	5822	0	2883	2170	5052
1	12.50	29.06	12.75	51.90	0.00	0.14	2.81	0.85	1.00	0.0	38.95	75.13	0.00	6451	0	4322	2213	6535
														27453	0			30654

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Section Forces

LoadCase 1.2D + 1.0Di + 1.0Wi Normal — 50 mph Normal with 0.75 in Radial Ice

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 0.00

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	6.45	4.54	12.86	8.69	0.45	1.97	1.00	1.00	1.8	13.02	15.37	11.01	2381	1580	141	78	219
7	137.5	6.38	5.44	60.46	31.94	0.30	2.29	1.00	1.00	1.8	41.87	124.44	120.08	10411	7156	519	925	1444
6	112.5	6.29	6.94	65.17	34.86	0.27	2.38	1.00	1.00	1.8	45.57	145.57	168.19	13517	9150	580	1269	1849
5	87.50	6.26	8.27	78.05	43.38	0.27	2.37	1.00	1.00	1.8	54.62	114.13	103.08	14883	9254	690	811	1500
4	70.83	6.27	3.09	26.84	15.10	0.26	2.42	1.00	1.00	1.8	18.92	39.78	41.26	5571	3344	244	315	558
3	58.33	6.28	6.68	54.99	31.20	0.25	2.45	1.00	1.00	1.8	38.97	81.01	88.50	10219	6258	510	672	1181
2	37.50	6.28	11.25	87.14	49.28	0.24	2.48	1.00	1.00	1.8	62.22	119.81	117.99	18611	10848	825	935	1759
1	12.50	7.27	12.75	102.36	50.46	0.25	2.45	1.00	1.00	1.7	72.83	95.63	92.44	20375	11774	1101	852	1954
														95968	59364			10465

LoadCase 1.2D + 1.0Di + 1.0Wi 60 deg — 50 mph 60 degree with 0.75 in Radial Ice

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 0.00

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	6.45	4.54	12.86	8.69	0.45	1.97	0.80	1.00	1.8	12.12	15.37	11.01	2381	1580	131	78	209
7	137.5	6.38	5.44	60.46	31.94	0.30	2.29	0.80	1.00	1.8	40.78	124.44	120.08	10411	7156	506	925	1431
6	112.5	6.29	6.94	65.17	34.86	0.27	2.38	0.80	1.00	1.8	44.18	145.57	168.19	13517	9150	562	1269	1831
5	87.50	6.26	8.27	78.05	43.38	0.27	2.37	0.80	1.00	1.8	52.97	114.13	103.08	14883	9254	669	811	1480
4	70.83	6.27	3.09	26.84	15.10	0.26	2.42	0.80	1.00	1.8	18.30	39.78	41.26	5571	3344	236	315	550
3	58.33	6.28	6.68	54.99	31.20	0.25	2.45	0.80	1.00	1.8	37.63	81.01	88.50	10219	6258	492	672	1164
2	37.50	6.28	11.25	87.14	49.28	0.24	2.48	0.80	1.00	1.8	59.97	119.81	117.99	18611	10848	795	935	1729
1	12.50	7.27	12.75	102.36	50.46	0.25	2.45	0.80	1.00	1.7	70.28	95.63	92.44	20375	11774	1063	852	1915
														95968	59364			10309

LoadCase 1.2D + 1.0Di + 1.0Wi 90 deg — 50 mph 90 degree with 0.75 in Radial Ice

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 0.00

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	6.45	4.54	12.86	8.69	0.45	1.97	0.85	1.00	1.8	12.34	15.37	11.01	2381	1580	133	78	211
7	137.5	6.38	5.44	60.46	31.94	0.30	2.29	0.85	1.00	1.8	41.05	124.44	120.08	10411	7156	509	925	1434
6	112.5	6.29	6.94	65.17	34.86	0.27	2.38	0.85	1.00	1.8	44.53	145.57	168.19	13517	9150	567	1269	1836
5	87.50	6.26	8.27	78.05	43.38	0.27	2.37	0.85	1.00	1.8	53.38	114.13	103.08	14883	9254	674	811	1485
4	70.83	6.27	3.09	26.84	15.10	0.26	2.42	0.85	1.00	1.8	18.45	39.78	41.26	5571	3344	238	315	552
3	58.33	6.28	6.68	54.99	31.20	0.25	2.45	0.85	1.00	1.8	37.96	81.01	88.50	10219	6258	497	672	1168
2	37.50	6.28	11.25	87.14	49.28	0.24	2.48	0.85	1.00	1.8	60.54	119.81	117.99	18611	10848	802	935	1737
1	12.50	7.27	12.75	102.36	50.46	0.25	2.45	0.85	1.00	1.7	70.92	95.63	92.44	20375	11774	1073	852	1925
														95968	59364			10348

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Section Forces

LoadCase 1.0D + 1.0W Service Normal — Serviceability - 60 mph Wind Normal

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	9.28	4.54	4.17	0.00	0.23	2.48	1.00	1.00	0.0	6.96	12.30	0.00	668	0	136	64	200
7	137.5	9.18	5.44	28.52	0.00	0.16	2.73	1.00	1.00	0.0	21.82	100.88	0.00	2712	0	465	534	999
6	112.5	9.06	6.94	30.31	0.00	0.14	2.80	1.00	1.00	0.0	24.30	119.14	0.00	3639	0	523	631	1155
5	87.50	9.01	8.27	34.67	0.00	0.14	2.81	1.00	1.00	0.0	28.16	87.75	0.00	4691	0	607	455	1062
4	70.83	9.02	3.09	11.74	0.00	0.13	2.85	1.00	1.00	0.0	9.82	30.98	0.00	1856	0	214	161	376
3	58.33	9.05	6.68	23.79	0.00	0.12	2.87	1.00	1.00	0.0	20.29	63.40	0.00	3300	0	448	332	780
2	37.50	9.05	11.25	37.86	0.00	0.12	2.89	1.00	1.00	0.0	32.93	93.40	0.00	6469	0	731	488	1219
1	12.50	10.46	12.75	51.90	0.00	0.14	2.81	1.00	1.00	0.0	42.44	75.13	0.00	7168	0	1060	454	1514
														30504	0			7305

LoadCase 1.0D + 1.0W Service 60 deg — Serviceability - 60 mph Wind 60 degree

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	9.28	4.54	4.17	0.00	0.23	2.48	0.80	1.00	0.0	6.05	12.30	0.00	668	0	119	64	183
7	137.5	9.18	5.44	28.52	0.00	0.16	2.73	0.80	1.00	0.0	20.73	100.88	0.00	2712	0	442	534	976
6	112.5	9.06	6.94	30.31	0.00	0.14	2.80	0.80	1.00	0.0	22.91	119.14	0.00	3639	0	493	631	1125
5	87.50	9.01	8.27	34.67	0.00	0.14	2.81	0.80	1.00	0.0	26.50	87.75	0.00	4691	0	571	455	1026
4	70.83	9.02	3.09	11.74	0.00	0.13	2.85	0.80	1.00	0.0	9.20	30.98	0.00	1856	0	201	161	362
3	58.33	9.05	6.68	23.79	0.00	0.12	2.87	0.80	1.00	0.0	18.96	63.40	0.00	3300	0	418	332	750
2	37.50	9.05	11.25	37.86	0.00	0.12	2.89	0.80	1.00	0.0	30.68	93.40	0.00	6469	0	681	488	1169
1	12.50	10.46	12.75	51.90	0.00	0.14	2.81	0.80	1.00	0.0	39.89	75.13	0.00	7168	0	996	454	1450
														30504	0			7042

LoadCase 1.0D + 1.0W Service 90 deg — Serviceability - 60 mph Wind 90 degree

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 0.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
8	152.5	9.28	4.54	4.17	0.00	0.23	2.48	0.85	1.00	0.0	6.28	12.30	0.00	668	0	123	64	187
7	137.5	9.18	5.44	28.52	0.00	0.16	2.73	0.85	1.00	0.0	21.00	100.88	0.00	2712	0	448	534	982
6	112.5	9.06	6.94	30.31	0.00	0.14	2.80	0.85	1.00	0.0	23.26	119.14	0.00	3639	0	501	631	1132
5	87.50	9.01	8.27	34.67	0.00	0.14	2.81	0.85	1.00	0.0	26.92	87.75	0.00	4691	0	580	455	1035
4	70.83	9.02	3.09	11.74	0.00	0.13	2.85	0.85	1.00	0.0	9.35	30.98	0.00	1856	0	204	161	366
3	58.33	9.05	6.68	23.79	0.00	0.12	2.87	0.85	1.00	0.0	19.29	63.40	0.00	3300	0	426	332	758
2	37.50	9.05	11.25	37.86	0.00	0.12	2.89	0.85	1.00	0.0	31.24	93.40	0.00	6469	0	693	488	1182
1	12.50	10.46	12.75	51.90	0.00	0.14	2.81	0.85	1.00	0.0	40.53	75.13	0.00	7168	0	1012	454	1466
														30504	0			7108

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Force/Stress Summary

Section: 1 1 Bot Elev (ft): 0.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-224.22	1.2D + 1.6W	8.34	50	50	50	31.3	50.0	296.21	0	0	0.00	0.00	75	Member X
HORIZ DAL - 3X2.5X0.25	-7.84	1.2D + 1.6W 90	9.167	100	150	50	179.4	36.0	18.47	4	2	49.72	69.60	42	Member Y
DIAG PSP - STLSS 3" OD X0	-11.26	1.2D + 1.6W 90	12.63	50	100	50	155.4	36.0	20.21	1	0	0.00	27.84	55	Member Y

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	194.88	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	61	Member
HORIZ DAL - 3X2.5X0.25	7.99	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	16	Bolt Shear
DIAG PSP - STLSS 3" OD X0	10.71	0.9D + 1.6W 90	36	58	69.98	1	0	0.00	16.97	63	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	170.94	0.9D + 1.6W 60	0.00	0	0	
Top Compression	196.59	1.2D + 1.6W	0.00	0		
Bot Tension	207.52	0.9D + 1.6W 60	1025.70	20	6	1 3/4 A325
Bot Compression	238.02	1.2D + 1.6W	0.00	0		

Section: 2 2 Bot Elev (ft): 25.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-183.67	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	76	Member X
HORIZ DAL - 3X2.5X0.25	-6.89	1.2D + 1.6W 90	8.167	100	150	50	159.8	36.0	23.27	4	2	49.72	69.60	29	Member Y
DIAG PSP - STLSS 3" OD X0	-10.48	1.2D + 1.6W 90	11.90	100	100	100	146.4	36.0	22.78	1	0	0.00	27.84	46	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	159.83	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	50	Member
HORIZ DAL - 3X2.5X0.25	7.07	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	14	Bolt Shear
DIAG PSP - STLSS 3" OD X0	9.86	1.2D + 1.6W 90	36	58	69.98	1	0	0.00	16.97	58	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	136.11	0.9D + 1.6W 60	0.00	0	0	
Top Compression	156.21	1.2D + 1.6W	0.00	0		
Bot Tension	170.94	0.9D + 1.6W 60	436.16	39	8	1 A325
Bot Compression	196.59	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 3 3 (bot 2 bays) Bot Elev (ft): 50.00 Height (ft): 16.667

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Bracing % Y	Bracing % Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-143.32	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	59	Member X
HORIZ SAE - 3X3X0.25	-6.09	1.2D + 1.6W 90	7.167	100	150	100	145.3	36.0	15.42	2	1	24.86	34.80	39	Member Z
DIAG PSP - STLSS 2.75" OD	-9.83	1.2D + 1.6W 90	11.21	100	100	100	147.9	36.0	14.98	1	0	0.00	20.04	65	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	124.85	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	39	Member
HORIZ SAE - 3X3X0.25	6.21	1.2D + 1.6W 90	36	58	40.86	2	1	24.86	27.84	24	Bolt Shear
DIAG PSP - STLSS 2.75" OD	9.42	0.9D + 1.6W 90	36	58	46.98	1	0	0.00	12.21	77	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	112.56	0.9D + 1.6W 60	0.00	0	0	
Top Compression	129.52	1.2D + 1.6W	0.00	0		
Bot Tension	136.11	0.9D + 1.6W 60	240.80	57	8	3/4 A325
Bot Compression	156.21	1.2D + 1.6W	0.00	0		

Section: 4 3 (top bay) Bot Elev (ft): 66.67 Height (ft): 8.333

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Bracing % Y	Bracing % Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-116.58	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	48	Member X
HORIZ DAL - 3X2.5X0.25	-5.61	1.2D + 1.6W 90	6.500	100	150	50	127.2	36.0	36.36	4	2	49.72	69.60	15	Member Y
DIAG PSP - STLSS 2.75" OD	-9.60	1.2D + 1.6W 90	10.77	100	100	100	142.1	36.0	16.22	1	0	0.00	20.04	59	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	99.39	1.2D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	31	Member
HORIZ DAL - 3X2.5X0.25	5.73	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	11	Bolt Shear
DIAG PSP - STLSS 2.75" OD	9.17	0.9D + 1.6W 90	36	58	46.98	1	0	0.00	12.21	75	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	100.67	0.9D + 1.6W 60	0.00	0	0	
Top Compression	116.18	1.2D + 1.6W	0.00	0		
Bot Tension	112.56	0.9D + 1.6W 60	0.00	0		
Bot Compression	129.52	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 5 4 Bot Elev (ft): 75.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .300"	-102.84	1.2D + 1.6W	8.34	100	100	100	60.1	50.0	153.05	0	0	0.00	0.00	67	Member X
HORIZ DAL - 3X2.5X0.25	-8.14	1.2D + 1.6W	5.500	100	150	50	107.6	36.0	46.31	4	2	49.72	69.60	17	Member Y
DIAG PSP - STLSS 2.75" OD	-9.36	1.2D + 1.6W 90	10.57	100	100	100	139.4	36.0	16.86	1	0	0.00	20.04	55	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .300"	89.06	0.9D + 1.6W 60	50	65	199.35	0	0	0.00	0.00	44	Member
HORIZ DAL - 3X2.5X0.25	8.90	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	17	Bolt Shear
DIAG PSP - STLSS 2.75" OD	8.95	1.2D + 1.6W 90	36	58	46.98	1	0	0.00	12.21	73	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	65.50	0.9D + 1.6W 60	0.00	0	0	
Top Compression	75.83	1.2D + 1.6W	0.00	0		
Bot Tension	100.67	0.9D + 1.6W 60	240.80	42	8	3/4 A325
Bot Compression	116.18	1.2D + 1.6W	0.00	0		

Section: 6 5 Bot Elev (ft): 100.0 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-69.60	1.2D + 1.6W	8.34	100	100	100	58.6	50.0	87.89	0	0	0.00	0.00	79	Member X
HORIZ DAL - 3X2.5X0.25	-7.84	1.2D + 1.6W	10.33	100	100	50	160.7	36.0	23.00	4	2	49.72	69.60	34	Member Y
DIAG PSP - STLSS 3" OD X0	-11.27	1.2D + 1.6W 90	13.53	100	100	100	166.4	36.0	17.61	1	0	0.00	27.84	64	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	60.11	0.9D + 1.6W 60	50	65	112.95	0	0	0.00	0.00	53	Member
HORIZ DAL - 3X2.5X0.25	8.59	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	17	Bolt Shear
DIAG PSP - STLSS 3" OD X0	9.94	1.2D + 1.6W	36	58	69.98	1	0	0.00	16.97	58	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	30.79	0.9D + 1.6W 60	0.00	0	0	
Top Compression	37.88	1.2D + 1.6W	0.00	0		
Bot Tension	65.50	0.9D + 1.6W 60	120.40	54	4	3/4 A325
Bot Compression	75.83	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 7 6 Bot Elev (ft): 125.0 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-31.77	1.2D + 1.6W	8.34	100	100	100	58.6	50.0	87.89	0	0	0.00	0.00	36	Member X
HORIZ SAE - 3X3X0.25	-5.66	1.2D + 1.6W	8.333	100	100	100	168.9	36.0	11.40	2	1	24.86	34.80	49	Member Z
DIAG PSP - STLSS 2.75" OD	-8.99	1.2D + 1.6W 90	12.02	100	100	100	158.6	36.0	13.03	1	0	0.00	20.04	69	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	26.25	0.9D + 1.6W 60	50	65	112.95	0	0	0.00	0.00	23	Member
HORIZ SAE - 3X3X0.25	6.28	1.2D + 1.6W 90	36	58	40.86	2	1	24.86	27.84	25	Bolt Shear
DIAG PSP - STLSS 2.75" OD	7.96	1.2D + 1.6W	36	58	46.98	1	0	0.00	12.21	65	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	2.83	0.9D + 1.6W 60	0.00	0	0	
Top Compression	6.00	1.2D + 1.6W	0.00	0		
Bot Tension	30.79	0.9D + 1.6W 60	120.40	26	4	3/4 A325
Bot Compression	37.88	1.2D + 1.6W	0.00	0		

Section: 8 7 Bot Elev (ft): 150.0 Height (ft): 5.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-3.23	1.2D + 1.0Di +	5.00	100	100	100	35.1	50.0	103.22	0	0	0.00	0.00	3	Member X
HORIZ CHN - C4 x 5.4	-1.86	1.2D + 1.6W	3.500	100	100	100	100.2	36.0	30.38	2	2	24.86	44.36	7	Bolt Shear
DIAG DAL - 2.5X2X0.1875	-3.11	1.2D + 1.6W 90	6.103	100	100	50	116.8	36.0	25.58	2	2	24.86	26.10	12	Bolt Shear

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG	0.00		0	0	0.00	0	0	0.00	0.00	0	
HORIZ CHN - C4 x 5.4	1.84	1.2D + 1.6W 60	36	58	36.28	2	2	24.86	35.49	7	Bolt Shear
DIAG DAL - 2.5X2X0.1875	2.95	1.2D + 1.6W 90	36	58	43.68	2	2	24.86	15.66	18	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	0.00		0.00	0	0	
Top Compression	3.23	1.2D + 1.0Di +	0.00	0		
Bot Tension	2.83	0.9D + 1.6W 60	120.40	2	4	3/4 A325
Bot Compression	6.00	1.2D + 1.6W	0.00	0		

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Support Forces Summary

Load Case	Node	FX (kip)	FY (kip)	FZ (kip)
0.9D + 1.6W 60 deg	1b	-18.59	-206.45	-10.73
	1a	-12.09	119.55	2.76
	1	-3.65	119.80	-11.85
0.9D + 1.6W 90 deg	1b	-17.21	-178.34	-7.41
	1a	-18.42	200.28	8.20
	1	-4.30	10.97	-0.79
0.9D + 1.6W Normal	1b	-7.28	-100.39	-8.66
	1a	7.28	-100.39	-8.66
	1	0.00	233.68	-23.50
1.0D + 1.0W Service 60 deg	1b	-3.66	-37.80	-2.11
	1a	-3.38	37.15	0.98
	1	-0.85	37.21	-3.42
1.0D + 1.0W Service 90 deg	1b	-3.34	-31.34	-1.36
	1a	-4.85	55.71	2.23
	1	-0.99	12.19	-0.87
1.0D + 1.0W Service Normal	1b	-1.08	-13.40	-1.63
	1a	1.08	-13.40	-1.63
	1	0.00	63.37	-6.11
1.2D + 1.0Di + 1.0Wi 60 deg	1b	-3.89	-30.04	-2.24
	1a	-5.84	71.79	2.02
	1	-1.17	71.91	-6.07
1.2D + 1.0Di + 1.0Wi 90 deg	1b	-3.44	-21.17	-1.19
	1a	-7.84	96.94	3.74
	1	-1.36	37.89	-2.55
1.2D + 1.0Di + 1.0Wi Normal	1b	-0.28	3.46	-1.54
	1a	0.28	3.46	-1.54
	1	0.00	106.73	-9.67
1.2D + 1.6W 60 deg	1b	-18.37	-203.05	-10.60
	1a	-12.32	123.33	2.90
	1	-3.65	123.59	-12.12
1.2D + 1.6W 90 deg	1b	-16.99	-174.91	-7.28
	1a	-18.65	204.15	8.34
	1	-4.30	14.62	-1.05
1.2D + 1.6W Normal	1b	-7.06	-96.87	-8.52
	1a	7.06	-96.87	-8.52
	1	0.00	237.60	-23.77

(-) = Uplift (+) = Down

Max Uplift:	206.45 (kip)	Moment:	3,668.99 (kip-ft)	1.2D + 1.6W Normal
Max Down:	237.60 (kip)	Total Down:	43.87 (kip)	
Max Shear:	23.77 (kip)	Total Shear:	40.81 (kip)	

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Deflections and Rotations

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
100 mph 60 deg with No Ice (Reduced DL)	66.67	0.2010	0.0534	0.3285
	83.33	0.3061	0.0678	0.3849
	91.67	0.3676	0.0666	0.4457
	100.00	0.4355	0.0617	0.4909
	116.67	0.6016	0.0409	0.6273
	125.00	0.6968	0.0300	0.6759
	141.67	0.9047	0.0219	0.7447
	155.00	1.0753	0.0213	0.7313
100 mph 60 degree with No Ice	66.67	0.2013	0.0533	0.3291
	83.33	0.3065	0.0677	0.3856
	91.67	0.3682	0.0665	0.4466
	100.00	0.4362	0.0616	0.4913
	116.67	0.6030	0.0407	0.6295
	125.00	0.6985	0.0297	0.6780
	141.67	0.9069	0.0217	0.7466
	155.00	1.0780	0.0211	0.7328
100 mph 90 deg with No Ice (Reduced DL)	66.67	0.2020	0.0362	0.3281
	83.33	0.3076	0.0457	0.3713
	91.67	0.3693	0.0464	0.4484
	100.00	0.4374	0.0456	0.4899
	116.67	0.6052	0.0396	0.6288
	125.00	0.7008	0.0358	0.6806
	141.67	0.9099	0.0282	0.7584
	155.00	1.0809	0.0271	0.7370
100 mph 90 degree with No Ice	66.67	0.2023	0.0362	0.3286
	83.33	0.3080	0.0456	0.3720
	91.67	0.3699	0.0463	0.4492
	100.00	0.4381	0.0455	0.4904
	116.67	0.6066	0.0394	0.6312
	125.00	0.7025	0.0356	0.6830
	141.67	0.9122	0.0280	0.7597
	155.00	1.0837	0.0269	0.7385
100 mph Normal to Face with No Ice (Reduced DL)	66.67	0.2058	0.0342	0.3422
	83.33	0.3132	0.0442	0.4379
	91.67	0.3762	0.0417	0.4521
	100.00	0.4458	0.0355	0.5155
	116.67	0.6162	0.0128	0.6410
	125.00	0.7130	0.0019	0.6901
	141.67	0.9244	0.0209	0.7250
	155.00	1.0969	0.0234	0.7347
100 mph Normal to Face with No Ice	66.67	0.2060	0.0341	0.3427
	83.33	0.3136	0.0441	0.4386
	91.67	0.3767	0.0415	0.4528
	100.00	0.4464	0.0354	0.5169
	116.67	0.6176	0.0125	0.6433
	125.00	0.7146	0.0016	0.6924
	141.67	0.9267	0.0208	0.7265
	155.00	1.0995	0.0232	0.7363
50 mph 60 degree with 0.75 in Radial Ice	66.67	0.0640	0.0203	0.1017
	83.33	0.0962	0.0259	0.1171
	91.67	0.1149	0.0259	0.1375

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	100.00	0.1355	0.0245	0.1518
	116.67	0.1875	0.0194	0.1970
	125.00	0.2172	0.0170	0.2080
	141.67	0.2802	0.0129	0.2202
	155.00	0.3303	0.0122	0.2126
50 mph 90 degree with 0.75 in Radial Ice	66.67	0.0641	0.0140	0.1011
	83.33	0.0964	0.0177	0.1111
	91.67	0.1152	0.0181	0.1379
	100.00	0.1357	0.0176	0.1527
	116.67	0.1894	0.0157	0.1987
	125.00	0.2194	0.0148	0.2104
	141.67	0.2829	0.0130	0.2231
	155.00	0.3332	0.0128	0.2144
50 mph Normal with 0.75 in Radial Ice	66.67	0.0642	0.0160	0.1055
	83.33	0.0969	0.0206	0.1362
	91.67	0.1159	0.0202	0.1371
	100.00	0.1369	0.0183	0.1614
	116.67	0.1913	0.0120	0.2008
	125.00	0.2212	0.0093	0.2121
	141.67	0.2848	0.0047	0.2173
	155.00	0.3351	0.0041	0.2134
Serviceability - 60 mph Wind 60 degree	66.67	0.0462	0.0105	0.0756
	83.33	0.0703	0.0133	0.0885
	91.67	0.0844	0.0130	0.1026
	100.00	0.1000	0.0120	0.1129
	116.67	0.1391	0.0077	0.1464
	125.00	0.1612	0.0055	0.1570
	141.67	0.2093	0.0055	0.1716
	155.00	0.2484	0.0054	0.1671
Serviceability - 60 mph Wind 90 degree	66.67	0.0464	0.0076	0.0755
	83.33	0.0706	0.0096	0.0854
	91.67	0.0848	0.0097	0.1030
	100.00	0.1005	0.0094	0.1135
	116.67	0.1400	0.0077	0.1472
	125.00	0.1623	0.0068	0.1585
	141.67	0.2107	0.0050	0.1745
	155.00	0.2499	0.0047	0.1685
Serviceability - 60 mph Wind Normal	66.67	0.0473	0.0070	0.0786
	83.33	0.0719	0.0091	0.1003
	91.67	0.0864	0.0085	0.1037
	100.00	0.1023	0.0069	0.1194
	116.67	0.1423	0.0014	0.1494
	125.00	0.1648	0.0006	0.1602
	141.67	0.2137	0.0050	0.1668
	155.00	0.2532	0.0055	0.1680

American Tower Corporation (Updated on 02/23/2012)

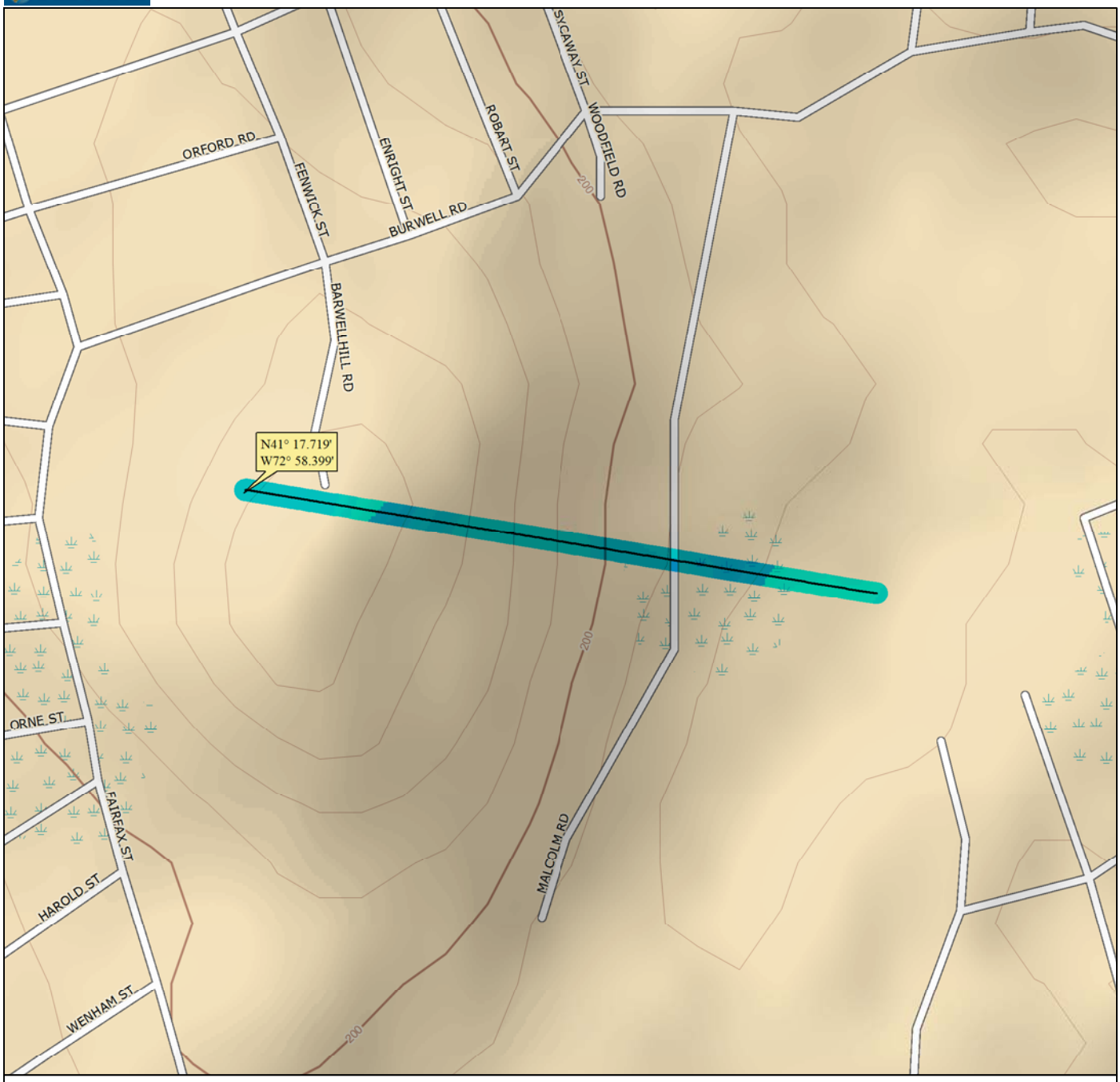
Crest Height Or Wind Speed Calculation Based on the Moment Comparisons at the Base

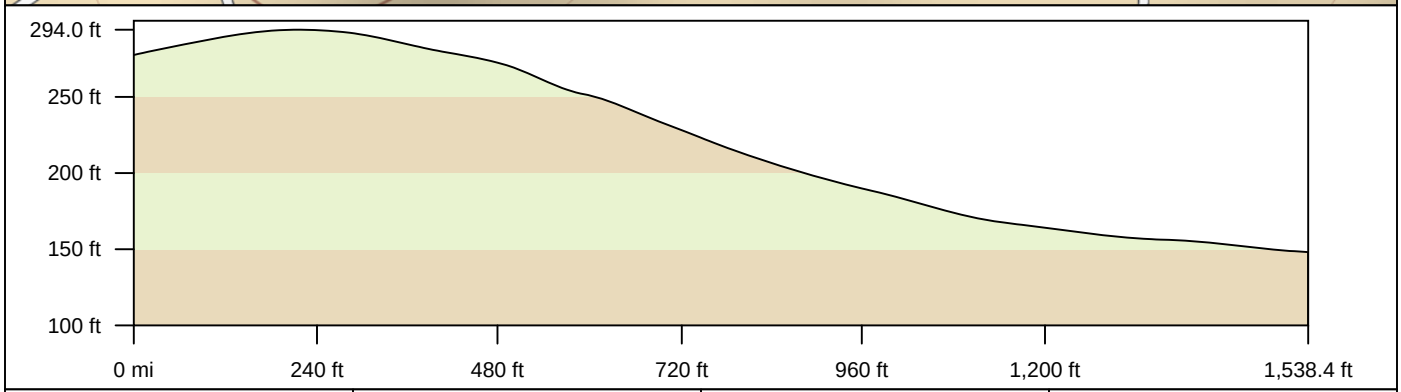
Wind Pressure and Load Comparison

Date:	11/13/15	Site No:	302505	Engineer:	MTG	
Tower Type:			SST			
Structure Class:			II			
Tower Height:			155	ft		
Exposure w/ K_{zt} = 1.0:			B			
Windspeed w/ K_{zt} = 1.0: (Effective Windspeed)			108.9	mph	Equivalent (Fastest Mile) Wind Speed:	93.7 mph
Windspeed w/ K_{zt} > 1.0:			100	mph	Moment Ratio (G K_{zt} > 1 / ASCE7 K_{zt} > 1):	**1.000** Equal to 1 F
Category:			3		Moment Ratio (G K_{zt} > 1 / G K_{zt} = 1):	**1.000** Both Values
Crest Height, per ASCE7:			145		Moment Ratio (ASCE7 K_{zt} > 1 / G K_{zt} = 1):	**1.000** Equal to 1 F
Specific Distance from Crest (x):			210	ft	Wind Direction Probability Factor:	0.85
Distance Upwind / Downwind of Crest (L_h):			539	ft	Importance Factor:	1.00
Structure Upwind / Downwind:			D		Windpressure w/ K_{zt} = 1.0:	25.78 psf
Enter Crest Height, per TIA-222-G (H):			111.6	ft	Windpressure w/ K_{zt} > 1.0:	21.76 psf

Velocity Pressure Coefficient Factor and Uniform Distributed Load:

	TIA-222-G						ASCE7-10			Moment at the Base		
Elevation	K_{zt} = 1 K_z	K_{zt} > 1 K_z	K_{zt} = 1 Q_z (psf)	K_{zt} > 1 Q_z (psf)	K_{zt} = 1 WS (mph)	K_{zt} > 1 WS (mph)	K_{zt} > 1 K_z	K_{zt} > 1 Q_z (psf)	K_{zt} > 1 WS (mph)	G K_{zt} > 1 lb-ft/ft	A7 K_{zt} > 1 lb-ft/ft	G K_{zt} = 1 lb-ft/ft
3.7	0.700	1.46	18.05	31.87	91.1	121.0	0.981	21.36	99.1	118	79	67
11.1	0.700	1.35	18.05	29.48	91.1	116.4	0.965	21.00	98.2	326	233	200
18.5	0.700	1.26	18.05	27.46	91.1	112.3	0.950	20.67	97.5	507	381	333
25.8	0.700	1.18	18.05	25.75	91.1	108.8	0.936	20.36	96.7	665	526	466
33.2	0.721	1.15	18.60	25.04	92.4	107.3	0.950	20.68	97.5	832	687	618
40.6	0.764	1.16	19.69	25.17	95.1	107.5	0.993	21.60	99.6	1022	877	800
48.0	0.801	1.16	20.66	25.19	97.4	107.6	1.028	22.36	101.4	1208	1073	991
55.4	0.835	1.16	21.52	25.16	99.4	107.5	1.057	23.00	102.8	1393	1273	1191
62.7	0.865	1.15	22.30	25.11	101.2	107.4	1.083	23.56	104.1	1575	1478	1399
70.1	0.893	1.15	23.02	25.07	102.9	107.3	1.105	24.04	105.1	1758	1686	1614
77.5	0.919	1.15	23.69	25.04	104.3	107.3	1.125	24.48	106.1	1940	1897	1836
84.9	0.943	1.15	24.31	25.02	105.7	107.2	1.143	24.86	106.9	2124	2110	2064
92.3	0.966	1.15	24.90	25.03	107.0	107.3	1.159	25.22	107.6	2309	2326	2297
99.6	0.987	1.15	25.45	25.06	108.2	107.3	1.174	25.54	108.3	2497	2545	2536
107.0	1.008	1.15	25.98	25.11	109.3	107.4	1.187	25.83	109.0	2687	2765	2780
114.4	1.027	1.16	26.48	25.18	110.3	107.6	1.200	26.11	109.5	2880	2987	3029
121.8	1.045	1.16	26.96	25.26	111.3	107.8	1.212	26.37	110.1	3077	3211	3283
129.2	1.063	1.17	27.41	25.37	112.2	108.0	1.223	26.61	110.6	3277	3438	3541
136.5	1.080	1.17	27.85	25.49	113.1	108.2	1.234	26.84	111.1	3480	3666	3803
143.9	1.097	1.18	28.27	25.62	114.0	108.5	1.244	27.07	111.5	3688	3895	4070
151.3	1.112	1.18	28.68	25.77	114.8	108.8	1.254	27.28	112.0	3899	4127	4340





Lin Dist: 1,527.3 ft	Terr Dist: 1,538.4 ft	Elev Gain: -129.3 ft	Avg Grade: 10
Climb Elev: 16.6 ft	Desc Elev: 145.9 ft	Max. Elev: 294.0 ft	Min. Elev: 148.1 ft
Climb Dist: 214.6 ft	Desc Dist: 1,323.8 ft		

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TN
MN (13.5°W)

Scale 1 : 4,400
1" = 366.7 ft
Data Zoom 15-5