



**AMERICAN TOWER®**  
CORPORATION

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## Structural Analysis Report

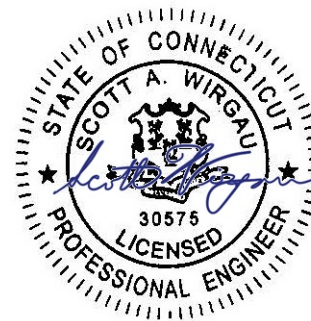
**Structure** : 149 ft Monopole  
**ATC Site Name** : WEST HAVEN & RT 162 CT,CT  
**ATC Site Number** : 243036  
**Engineering Number** : 13682841\_C3\_03  
**Proposed Carrier** : AT&T MOBILITY  
**Carrier Site Name** : MRCTB051490  
**Carrier Site Number** : N/A  
**Site Location** : 668 Jones Hill Road  
West Haven, CT 06516-6311  
41.2564, -72.9724  
**County** : New Haven  
**Date** : November 23, 2021  
**Max Usage** : 99%  
**Result** : Pass

Prepared By:

Sarah Kramer  
Structural Engineer

*Sarah D. Kramer*

Reviewed By:



**COA : PEC.0001553**



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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 149 ft Monopole to reflect the change in loading by AT&T MOBILITY.

## Supporting Documents

<b>Tower Drawings</b>	Sabre Job #06-08204, dated August 19, 2005
<b>Foundation Drawing</b>	Sabre Job #06-10095, dated October 12, 2005
<b>Geotechnical Report</b>	EBI Project #61051509, dated July 12, 2005

## 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.

<b>Basic Wind Speed:</b>	120 mph (3-second gust)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-second gust) w/ 1.00" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-H / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	B
<b>Risk Category:</b>	II
<b>Topographic Factor Procedure:</b>	Method 1
<b>Topographic Category:</b>	1
<b>Crest Height (H):</b>	0 ft
<b>Crest Length (L):</b>	0 ft
<b>Spectral Response:</b>	$S_s = 0.20, S_i = 0.05$
<b>Site Class:</b>	D - Stiff Soil - Default

**\*\*Wind load and Ice thickness have been reduced by applicable existing structure load modification factors in accordance with TIA-222-H, Annex S.**

## 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](mailto: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**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
151.0	3	DragonWave Horizon Compact	Collar	(4) 1/2" Coax (1) 2" conduit	CLEARWIRE CORPORATION
	2	DragonWave A-ANT-11G-2-C			
	1	DragonWave A-ANT-23G-1-C			
	3	Argus LLPX310R			
	3	Alcatel-Lucent 1900 MHz 4X45 RRH			
149.0	3	RFS APXVAARR24_43-U-NA20	Triangular Platform with Handrails	(5) 1 1/4" (1.25"-31.8mm) Fiber	T-MOBILE
	3	Ericsson Air 3246 B66			
	3	Ericsson AIR32 B66Aa/B2a			
	3	Ericsson Air6449 B41			
	3	Ericsson Radio 4449 B71 B85A			
	3	Ericsson RRUS 4415 B25			
134.0	3	Samsung B2/B66A RRH-BR049	Triangular Low Profile Platform	(2) 1 5/8" (1.63"-41.3mm) Fiber (1) 1 5/8" Coax	VERIZON WIRELESS
	1	Raycap RCMDC-6627-PF-48			
	6	JMA Wireless MX06FRO660-03			
	3	Andrew DB854DG65ESX			
	3	Samsung B5/B13 RRH-BR04C			
	3	Samsung MT6407-77A			
125.0	3	Ericsson RRUS 8843 B2, B66A	Triangular Platform with Handrails with Kickers	(2) 2" conduit	AT&T MOBILITY
	3	Ericsson RRUS 4449 B5, B12			
	3	Ericsson Radio 4415 B30			
	6	Kathrein Scala 80010966			
	1	Commscope WCS-IMFQ-AMT			
	3	Ericsson RRUS 4478 B14			
115.0	3	RFS APXV18-206517S-C	Flush	(6) 1 5/8" Coax	METRO PCS INC
105.0	3	Fujitsu TA08025-B605	Triangular Platform with Handrails	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	3	Fujitsu TA08025-B604			
	3	JMA Wireless MX08FRO665-21			
	1	Commscope RDIDC-9181-PF-48			

**Equipment to be Removed**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
129.5	3	CCI CCI-HPA-65R-BUU-H8	-	(2) 0.39" (10mm) Fiber Trunk (3) 0.39" (9.8mm) Cable (4) 0.78" (19.7mm) 8 AWG 6	AT&T MOBILITY
125.0	2	Raycap DC6-48-60-0-8F (24" Height)			
	1	Raycap DC6-48-60-0-8F			



**Proposed Equipment**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
127.0	3	Ericsson AIR 6449 n77D	Triangular Platform with Handrails and Kickers with Modifications	(2) 0.40" (10.3mm) Fiber (2) 0.82" (20.8mm) 8 AWG 6 (4) 1.15" (29.2mm) Cable (1) 2" conduit	AT&T MOBILITY
125.0	2	Raycap DC6-48-60-18-8F			
	1	Raycap DC9-48-60-24-8C-EV			
	3	Ericsson RRUS E2 B29			
	3	Quintel QD8616-7			
123.0	3	Ericsson AIR 6419 N77G			

<sup>1</sup> Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed lines inside the pole shaft.

### Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	66%	Pass
Shaft	99%	Pass
Base Plate	52%	Pass

### Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3112.3	85%
Axial (Kips)	49.9	63%
Shear (Kips)	26.7	74%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

### Deflection and Sway\*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
152.3	DragonWave A-ANT-11G-2-C	CLEARWIRE CORPORATION	2.413	1.850
152.2	DragonWave A-ANT-23G-1-C		2.413	1.850
127.0	Ericsson AIR 6449 n77D	AT&T MOBILITY	1.719	1.720
125.0	Raycap DC6-48-60-18-8F		1.659	1.690
	Raycap DC9-48-60-24-8C-EV			
	Ericsson RRUS E2 B29			
	Quintel QD8616-7			
123.0	Ericsson AIR 6419 N77G		1.601	1.660

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

## **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

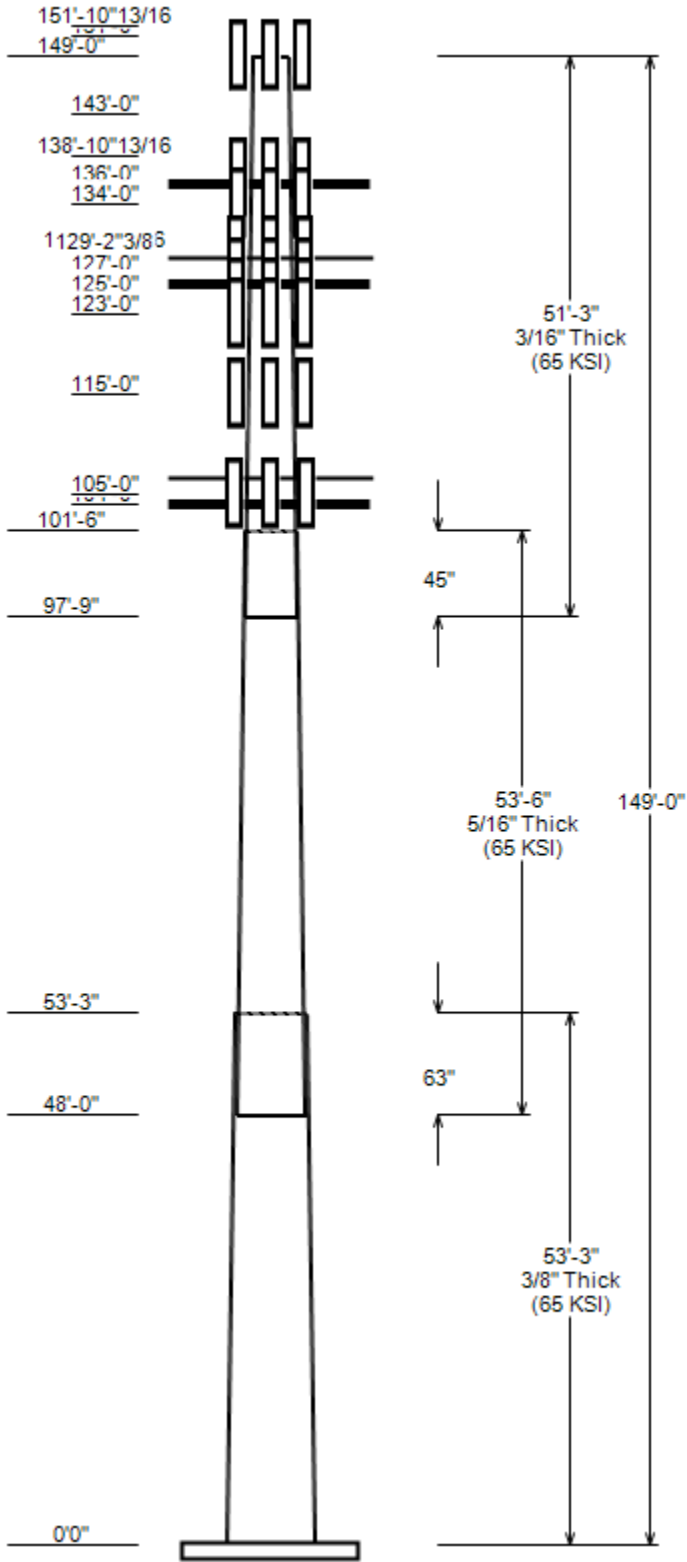
Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

JOB INFORMATION

Asset : 243036, WEST HAVEN & RT 162 CT  
 Client : AT&T MOBILITY  
 Code : ANSI/TIA-222-H

Height : 149 ft  
 Base Width : 52.01  
 Shape : 18 Sides



SITE PARAMETERS

Base Elev (ft): 0.00 Structure Class: II  
 Taper : 0.23500 (In/ft) Exposure : B  
 Topographic Category : 1 Topographic Feature:  
 Topo Method : Method 1

SECTION PROPERTIES

Shaft Section	Length (ft)	Diameter (in)		Thick (in)	Overlap Length (in)	Steel Grade (ksi)
		Across Flats Top	Across Flats Bottom			
1	53.250	39.50	52.01	0.375	0.000	65
2	53.500	28.79	41.36	0.312	63.000	65
3	51.250	18.00	30.04	0.188	45.000	65

DISCRETE APPURTENANCE

Attach Elev (ft)	Force Elev (ft)	Qty	Description
152.4	149.4	3	DragonWave Horizon Compact
152.3	149.3	2	DragonWave A-ANT-11G-2-C
152.2	149.2	1	DragonWave A-ANT-23G-1-C
151.9	151.9	3	Alcatel-Lucent 1900 MHz 4X45 R
151.9	151.9	3	Argus LLPX310R
151.0	151.0	1	Clearwire Side Arm
149.0	149.0	3	Ericsson Radio 4449 B71 B85A
149.0	149.0	3	Ericsson RRUS 4415 B25
149.0	149.0	3	Ericsson Air6449 B41
149.0	149.0	3	Ericsson AIR32 B66Aa/B2a
149.0	149.0	3	Ericsson Air 3246 B66
149.0	149.0	3	RFS APXVAARR24_43-U-NA20
143.0	143.0	1	Platform with SitePro1 HRK12-3
139.2	139.2	3	Samsung B2/B66A RRH-BR049
138.9	138.9	1	Raycap RCMDC-6627-PF-48
136.0	136.0	1	Generic Round Low Profile Plat
134.0	134.0	3	Samsung B5/B13 RRH-BR04C
134.0	134.0	3	Samsung MT6407-77A
134.0	137.0	3	Andrew DB854DG65ESX
134.0	134.0	6	JMA Wireless MX06FRO660-03
129.7	129.7	3	Ericsson RRUS 8843 B2, B66A
129.4	129.4	3	Ericsson Radio 4415 B30
129.4	129.4	3	Ericsson RRUS 4449 B5, B12
129.2	129.2	6	Kathrein Scala 80010966
127.0	127.0	3	Ericsson AIR 6449 n77D
126.0	126.0	1	Generic Mount Reinforcement
126.0	126.0	1	Generic Round Platform with Ha
125.0	125.0	1	Commscope WCS-IMFQ-AMT
125.0	125.0	2	Raycap DC6-48-60-18-8F
125.0	125.0	3	Ericsson RRUS 4478 B14
125.0	125.0	3	Ericsson RRUS E2 B29
125.0	125.0	1	Raycap DC9-48-60-24-8C-EV
125.0	125.0	1	Mount Reinforcement SitePro1
125.0	125.0	3	Quintel QD8616-7
123.0	123.0	3	Ericsson AIR 6419 N77G
115.0	115.0	3	RFS APXV18-206517S-C
105.0	105.0	1	Commscope RDIDC-9181-PF-48
105.0	105.0	3	Fujitsu TA08025-B604
105.0	105.0	3	Fujitsu TA08025-B605
105.0	105.0	3	JMA Wireless MX08FRO665-21
104.0	104.0	1	Generic Flat Platform with Han



**JOB INFORMATION**

Asset : 243036, WEST HAVEN & RT 162 CT  
 Client : AT&T MOBILITY  
 Code : ANSI/TIA-222-H

Height : 149 ft  
 Base Width : 52.01  
 Shape : 18 Sides

**LINEAR APPURTENANCE**

Elev From (ft)	Elev To (ft)	Description	Exp To Wind
4.0	152.0	1/2" Coax	No
0.0	152.0	2" conduit	No
0.0	149.0	1 1/4" (1.25"- 31.8mm) Fiber	Yes
4.0	134.0	1 5/8" Coax	No
4.0	134.0	1 5/8" (1.63"-41.3mm) Fiber	No
0.0	125.0	2" conduit	No
0.0	125.0	2" conduit	No
0.0	125.0	1.15" (29.2mm) Cable	No
0.0	125.0	0.82" (20.8mm) 8 AWG 6	No
0.0	125.0	0.40" (10.3mm) Fiber	No
4.0	115.0	1 5/8" Coax	No
0.0	105.0	1.60" (40.6mm) Hybrid	Yes

**LOAD CASES**

1.2D + 1.0W	116.96 mph wind with no ice
0.9D + 1.0W	116.96 mph wind with no ice
1.2D + 1.0Di + 1.0Wi	48.73 mph wind with 0.850" radial
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice

**REACTIONS**

Load Case	Moment (kip-ft)	Shear (Kip)	Axial (Kip)
1.2D + 1.0W	3112.31	26.68	49.88
0.9D + 1.0W	3051.51	26.66	37.40
1.2D + 1.0Di + 1.0Wi	802.30	6.89	68.48
1.2D + 1.0Ev + 1.0Eh	165.69	1.25	50.23
0.9D - 1.0Ev + 1.0Eh	161.49	1.25	34.66
1.0D + 1.0W	724.74	6.28	41.60

**DISH DEFLECTIONS**

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	149.00	28.948	1.852
1.0D + 1.0W	149.00	28.948	1.852

ASSET: 243036, WEST HAVEN & RT 162 CT  
CUSTOMER: AT&T MOBILITY

CODE: ANSI/TIA-222-H  
ENG NO: 13682841\_C3\_03

### ANALYSIS PARAMETERS

<b>Location:</b>	New Haven County,CT	<b>Height:</b>	149 ft
<b>Type and Shape:</b>	Taper, 18 Sides	<b>Base Diameter:</b>	52.01 in
<b>Manufacturer:</b>	Sabre	<b>Top Diameter:</b>	18.00 in
<b>K<sub>d</sub> (non-service):</b>	0.95	<b>Taper:</b>	0.2350 in/ft
<b>K<sub>e</sub>:</b>	1.00	<b>Rotation:</b>	0.000°

### ICE & WIND PARAMETERS

<b>Exposure Category:</b>	B	<b>Design Wind Speed w/o Ice:</b>	117 mph
<b>Risk Category:</b>	II	<b>Design Wind Speed w/Ice:</b>	49 mph
<b>Topo Factor Procedure:</b>	Method 1	<b>Operational Wind Speed:</b>	60 mph
<b>Topographic Category:</b>	1	<b>Design Ice Thickness:</b>	0.85 in
<b>Crest Height:</b>	0 ft	<b>HMSL:</b>	135.00 ft

### SEISMIC PARAMETERS

<b>Analysis Method:</b>	Equivalent Lateral Force Method		
<b>Site Class:</b>	D - Stiff Soil	<b>Period Based on Rayleigh Method (sec):</b>	3.05
<b>T<sub>L</sub> (sec):</b>	6	<b>P:</b>	1
<b>S<sub>s</sub>:</b>	0.200	<b>S<sub>1</sub>:</b>	0.053
<b>F<sub>a</sub>:</b>	1.600	<b>F<sub>v</sub>:</b>	2.400
<b>S<sub>ds</sub>:</b>	0.213	<b>S<sub>dt</sub>:</b>	0.085
		<b>C<sub>s</sub>:</b>	0.030
		<b>C<sub>s</sub> Max:</b>	0.030
		<b>C<sub>s</sub> Min:</b>	0.030

### LOAD CASES

1.2D + 1.0W	116.96 mph wind with no ice
0.9D + 1.0W	116.96 mph wind with no ice
1.2D + 1.0Di + 1.0Wi	48.73 mph wind with 0.850" radial ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice

**SHAFT SECTION PROPERTIES**

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint len (in)	Weight (lb)	Bottom						Top						
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)
1-18	53.25	0.3750	65		0.00	9,787	52.01	0.000	61.46	20,701.8	22.69	138.69	39.50	53.25	46.56	9,004.8	16.81	105.33	0.2350
2-18	53.50	0.3125	65	Slip	63.00	6,276	41.36	48.000	40.71	8,664.6	21.57	132.34	28.79	101.50	28.24	2,892.8	14.48	92.12	0.2350
3-18	51.25	0.1875	65	Slip	45.00	2,473	30.04	97.750	17.77	2,000.7	26.49	160.22	18.00	149.00	10.60	424.9	15.16	96.00	0.2350
Shaft Weight						18,536													

**DISCRETE APPURTENANCE PROPERTIES**

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	No Ice			Ice											
					Weight (lb)	EPAa (sf)	Orientation Factor	Weight (lb)	EPAa (sf)	Orientation Factor									
152.40	DragonWave Horizon Compact	3	0.80	-3.000	10.60	0.721	0.50	23.34	1.043	0.50									
152.30	DragonWave A-ANT-11G-2-C	2	1.00	-3.000	27.00	4.688	0.99	82.23	5.410	0.99									
152.20	DragonWave A-ANT-23G-1-C	1	1.00	-3.000	15.00	1.610	0.79	35.02	2.039	0.79									
151.90	Argus LLPX310R	3	1.00	0.000	28.60	4.292	0.63	79.67	5.229	0.63									
151.90	Alcatel-Lucent 1900 MHz 4X45 R	3	0.80	0.000	60.00	2.322	0.50	105.67	2.934	0.50									
151.00	Clearwire Side Arm	1	1.00	0.000	560.00	8.500	1.00	781.08	11.856	1.00									
149.00	Ericsson Air 3246 B66	3	0.75	0.000	180.00	7.939	0.69	1712.36	9.224	0.69									
149.00	Ericsson AIR32 B66Aa/B2a	3	0.75	0.000	132.20	6.510	0.71	222.65	7.751	0.71									
149.00	Ericsson Air6449 B41	3	0.75	0.000	104.00	5.682	0.63	181.23	6.582	0.63									
149.00	Ericsson RRUS 4415 B25	3	0.75	0.000	46.00	1.842	0.50	73.78	2.350	0.50									
149.00	Ericsson Radio 4449 B71 B85A	3	0.75	0.000	75.00	1.650	0.50	109.08	2.131	0.50									
149.00	RFS APXVAARR24_43-U-NA20	3	0.75	0.000	127.90	20.243	0.63	350.37	22.345	0.63									
143.00	Platform with SitePro1 HRK12-3	1	1.00	0.000	2350.00	34.800	1.00	3274.21	48.486	1.00									
139.20	Samsung B2/B66A RRH-BR049	3	0.80	0.000	84.40	1.875	0.50	120.35	2.384	0.50									
138.90	Raycap RCMDC-6627-PF-48	1	0.80	0.000	32.00	4.056	0.50	103.54	4.824	0.50									
136.00	Generic Round Low Profile Plat	1	1.00	0.000	1875.00	21.700	1.00	2330.21	32.492	1.00									
134.00	JMA Wireless MX06FRO660-03	6	0.80	0.000	60.00	9.872	0.71	194.41	11.410	0.71									
134.00	Andrew DB854DG65ESX	3	0.80	3.000	18.50	5.248	0.65	85.93	5.788	0.65									
134.00	Samsung MT6407-77A	3	0.80	0.000	81.60	4.709	0.61	138.74	5.561	0.61									
134.00	Samsung B5/B13 RRH-BR04C	3	0.80	0.000	70.30	1.875	0.50	102.37	2.381	0.50									
129.70	Ericsson RRUS 8843 B2, B66A	3	0.75	0.000	72.00	1.639	0.50	106.30	2.112	0.50									
129.40	Ericsson Radio 4415 B30	3	0.75	0.000	43.00	1.650	0.50	66.58	2.125	0.50									
129.40	Ericsson RRUS 4449 B5, B12	3	0.75	0.000	71.00	1.969	0.50	107.06	2.491	0.50									
129.20	Kathrein Scala 80010966	6	0.75	0.000	114.60	17.363	0.63	294.08	19.425	0.63									
127.00	Ericsson AIR 6449 n77D	3	0.75	0.000	81.60	4.028	0.65	139.20	4.794	0.65									
126.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	3403.47	40.835	1.00									
126.00	Generic Mount Reinforcement	1	1.00	0.000	200.00	7.500	1.00	307.95	11.676	1.00									
125.00	Quintel QD8616-7	3	0.75	0.000	150.00	18.815	0.65	362.15	20.874	0.65									
125.00	Mount Reinforcement SitePro1	1	1.00	0.000	587.70	7.500	1.00	815.80	10.411	1.00									
125.00	Raycap DC9-48-60-24-8C-EV	1	0.75	0.000	16.00	4.788	1.00	87.92	5.608	1.00									
125.00	Ericsson RRUS E2 B29	3	0.75	0.000	60.00	3.145	0.62	105.06	3.791	0.62									
125.00	Ericsson RRUS 4478 B14	3	0.75	0.000	59.90	1.842	0.50	90.70	2.342	0.50									
125.00	Commscope WCS-IMFQ-AMT	1	0.75	0.000	29.50	0.989	0.50	48.27	1.357	0.50									
125.00	Raycap DC6-48-60-18-8F	2	0.75	0.000	20.00	1.260	1.00	49.33	1.627	1.00									
123.00	Ericsson AIR 6419 N77G	3	0.75	0.000	70.00	3.925	0.57	122.14	4.679	0.57									
115.00	RFS APXV18-206517S-C	3	1.00	0.000	26.40	5.160	0.68	77.52	6.465	0.68									
105.00	JMA Wireless MX08FRO665-21	3	0.75	0.000	64.50	12.489	0.64	205.27	14.028	0.64									
105.00	Commscope RDIDC-9181-PF-48	1	0.75	0.000	21.90	1.867	0.50	53.07	2.360	0.50									
105.00	Fujitsu TA08025-B605	3	0.75	0.000	75.00	1.962	0.50	109.31	2.466	0.50									
105.00	Fujitsu TA08025-B604	3	0.75	0.000	63.90	1.962	0.50	95.84	2.466	0.50									
104.00	Generic Flat Platform with Han	1	1.00	0.000	2500.00	42.400	1.00	3471.28	53.866	1.00									
Totals	Num Loadings: 41				103			17,397.90			32,583.89								

**LINEAR APPURTENANCE PROPERTIES**

Load Case Azimuth (deg) : 0.00\_

Elev From (ft)	Elev To (ft)	Qty	Coax Dia (in)	Coax Wt (lb/ft)	Max Flat	Dist Coax/ Row	Dist Between Rows(in)	Dist Between Cols(in)	Azimuth (deg)	Dist From Face (in)	Exposed To Wind	Carrier
4.00	152.00	4	1/2"	0.63	0.15	N	0	0	0	0	N	CLEARWIRE COR
0.00	152.00	1	2" conduit	2.38	3.65	N	0	0	0	0	N	CLEARWIRE COR
0.00	149.00	5	1 1/4" (1.25"- 31.8mm)	1.25	1.05	N	1	0.5	0.5	140	Y	T-MOBILE
4.00	134.00	11	1 5/8" Coax	1.98	0.82	N	0	0	0	0	N	VERIZON WIREL
4.00	134.00	2	1 5/8" (1.63"-41.3mm)	1.63	1.61	N	0	0	0	0	N	VERIZON WIREL

ASSET: 243036, WEST HAVEN & RT 162 CT  
 CUSTOMER: AT&T MOBILITY

CODE: ANSI/TIA-222-H  
 ENG NO: 13682841\_C3\_03

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Dia (in)	Coax Wt (lb/ft)	Flat	Max Coax/ Row	Dist Between Rows(in)	Dist Between Cols(in)	Azimuth (deg)	Dist From Face (in)	Exposed To Wind	Carrier
0.00	125.00	4	1.15" (29.2mm) Cable	1.15	0.66	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	125.00	2	2" conduit	2.38	3.65	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	125.00	2	0.40" (10.3mm) Fiber	0.4	0.09	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	125.00	2	0.82" (20.8mm) 8 AWG	0.82	0.62	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	125.00	1	2" conduit	2.38	3.65	N	0	0	0	0	0	N	AT&T MOBILITY
4.00	115.00	6	1 5/8" Coax	1.98	0.82	N	0	0	0	0	0	N	METRO PCS INC
0.00	105.00	1	1.60" (40.6mm) Hybrid	1.6	2.34	N	1	0.5	0.5	270	0.5	Y	DISH WIRELESS

SEGMENT PROPERTIES

(Max Len: 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	F <sub>y</sub> (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.3750	52.010	61.456	20,701.80	22.69	138.69	74.7	784.0	0.0	0.0
5.00		0.3750	50.835	60.058	19,320.60	22.14	135.56	75.4	748.6	0.0	1,033.7
10.00		0.3750	49.660	58.660	18,002.30	21.59	132.43	76	714.0	0.0	1,009.9
15.00		0.3750	48.486	57.261	16,745.40	21.03	129.29	76.7	680.2	0.0	986.1
20.00		0.3750	47.311	55.863	15,548.40	20.48	126.16	77.3	647.3	0.0	962.3
25.00		0.3750	46.136	54.465	14,409.80	19.93	123.03	78	615.2	0.0	938.6
30.00		0.3750	44.961	53.067	13,328.20	19.38	119.90	78.6	583.9	0.0	914.8
35.00		0.3750	43.786	51.668	12,302.10	18.83	116.76	79.3	553.4	0.0	891.0
40.00		0.3750	42.611	50.270	11,330.10	18.27	113.63	79.9	523.7	0.0	867.2
45.00		0.3750	41.437	48.872	10,410.70	17.72	110.50	80.6	494.9	0.0	843.4
48.00	Bot - Section 2	0.3750	40.732	48.033	9,883.70	17.39	108.62	80.9	477.9	0.0	494.6
50.00		0.3750	40.262	47.473	9,542.40	17.17	107.36	81.2	466.8	0.0	600.4
53.25	Top - Section 1	0.3125	40.123	39.486	7,906.60	20.88	128.39	76.8	388.1	0.0	960.8
55.00		0.3125	39.712	39.078	7,664.10	20.64	127.08	77.1	380.1	0.0	233.9
60.00		0.3125	38.537	37.913	6,998.70	19.98	123.32	77.9	357.7	0.0	655.0
65.00		0.3125	37.362	36.747	6,373.10	19.32	119.56	78.7	336.0	0.0	635.1
70.00		0.3125	36.187	35.582	5,785.80	18.66	115.80	79.5	314.9	0.0	615.3
75.00		0.3125	35.013	34.417	5,235.80	17.99	112.04	80.2	294.5	0.0	595.5
80.00		0.3125	33.838	33.252	4,721.80	17.33	108.28	81	274.8	0.0	575.7
85.00		0.3125	32.663	32.086	4,242.60	16.67	104.52	81.8	255.8	0.0	555.8
90.00		0.3125	31.488	30.921	3,797.00	16.00	100.76	82.6	237.5	0.0	536.0
95.00		0.3125	30.313	29.756	3,383.70	15.34	97.00	82.6	219.9	0.0	516.2
97.75	Bot - Section 3	0.3125	29.667	29.115	3,169.70	14.98	94.93	82.6	210.4	0.0	275.4
100.00		0.3125	29.138	28.591	3,001.50	14.68	93.24	82.6	202.9	0.0	355.7
101.50	Top - Section 2	0.1875	29.161	17.242	1,828.70	25.66	155.52	71.2	123.5	0.0	233.6
104.00		0.1875	28.573	16.893	1,719.70	25.11	152.39	71.9	118.5	0.0	145.2
105.00		0.1875	28.339	16.753	1,677.40	24.89	151.14	72.1	116.6	0.0	57.2
110.00		0.1875	27.164	16.054	1,476.00	23.78	144.87	73.4	107.0	0.0	279.1
115.00		0.1875	25.989	15.354	1,291.40	22.68	138.61	74.7	97.9	0.0	267.2
120.00		0.1875	24.814	14.655	1,122.90	21.57	132.34	76	89.1	0.0	255.3
123.00		0.1875	24.109	14.236	1,029.20	20.91	128.58	76.8	84.1	0.0	147.5
125.00		0.1875	23.639	13.956	969.80	20.47	126.08	77.3	80.8	0.0	95.9
126.00		0.1875	23.404	13.816	940.90	20.25	124.82	77.6	79.2	0.0	47.3
127.00		0.1875	23.169	13.677	912.60	20.03	123.57	77.8	77.6	0.0	46.8
129.20		0.1875	22.652	13.369	852.40	19.54	120.81	78.4	74.1	0.0	101.2
129.40		0.1875	22.605	13.341	847.10	19.50	120.56	78.5	73.8	0.0	9.1
129.70		0.1875	22.535	13.299	839.10	19.43	120.19	78.5	73.3	0.0	13.6
130.00		0.1875	22.464	13.257	831.20	19.36	119.81	78.6	72.9	0.0	13.6
134.00		0.1875	21.524	12.698	730.40	18.48	114.80	79.7	66.8	0.0	176.6
135.00		0.1875	21.290	12.558	706.50	18.26	113.54	79.9	65.4	0.0	43.0
136.00		0.1875	21.055	12.418	683.20	18.04	112.29	80.2	63.9	0.0	42.5
138.90		0.1875	20.373	12.013	618.40	17.40	108.66	80.9	59.8	0.0	120.5
139.20		0.1875	20.303	11.971	612.00	17.33	108.28	81	59.4	0.0	12.2
140.00		0.1875	20.115	11.859	595.00	17.15	107.28	81.2	58.3	0.0	32.4
143.00		0.1875	19.410	11.439	534.00	16.49	103.52	82	54.2	0.0	118.9
145.00		0.1875	18.940	11.160	495.80	16.05	101.01	82.5	51.6	0.0	76.9
149.00		0.1875	18.000	10.600	424.90	15.16	96.00	82.6	46.5	0.0	148.1

Totals: 18,536.1

Load Case: 1.2D + 1.0W	116.96 mph wind with no ice	28 Iterations
Gust Response Factor:	1.10	
Dead load Factor:	1.20	
Wind Load Factor:	1.00	

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-49.88	-26.68	0.00	-3,112.3	0.00	3,112.31	4,132.30	1,078.56	5,030.10	4,392.86	0	0	0.721
5.00	-48.36	-26.46	0.00	-2,978.9	0.00	2,978.90	4,073.40	1,054.02	4,803.83	4,231.01	0.11	-0.21	0.717
10.00	-46.79	-26.24	0.00	-2,846.6	0.00	2,846.61	4,012.86	1,029.48	4,582.77	4,070.37	0.45	-0.42	0.712
15.00	-45.24	-26.02	0.00	-2,715.4	0.00	2,715.43	3,950.69	1,004.94	4,366.92	3,911.06	1.01	-0.64	0.706
20.00	-43.73	-25.80	0.00	-2,585.3	0.00	2,585.34	3,886.88	980.40	4,156.27	3,753.20	1.8	-0.87	0.701
25.00	-42.24	-25.59	0.00	-2,456.3	0.00	2,456.34	3,821.44	955.86	3,950.83	3,596.91	2.84	-1.1	0.695
30.00	-40.78	-25.37	0.00	-2,328.4	0.00	2,328.41	3,754.36	931.32	3,750.60	3,442.32	4.11	-1.34	0.688
35.00	-39.35	-25.14	0.00	-2,201.6	0.00	2,201.57	3,685.65	906.78	3,555.57	3,289.53	5.64	-1.58	0.681
40.00	-37.95	-24.91	0.00	-2,075.9	0.00	2,075.86	3,615.30	882.24	3,365.75	3,138.66	7.43	-1.82	0.673
45.00	-36.60	-24.70	0.00	-1,951.3	0.00	1,951.33	3,543.31	857.70	3,181.14	2,989.85	9.47	-2.08	0.664
48.00	-35.80	-24.57	0.00	-1,877.2	0.00	1,877.23	3,499.34	842.97	3,072.87	2,901.60	10.83	-2.23	0.658
50.00	-34.92	-24.43	0.00	-1,828.1	0.00	1,828.09	3,469.70	833.16	3,001.73	2,843.21	11.79	-2.34	0.654
53.25	-33.55	-24.26	0.00	-1,748.7	0.00	1,748.71	2,730.91	692.97	2,491.79	2,236.98	13.44	-2.51	0.795
55.00	-33.10	-24.11	0.00	-1,706.3	0.00	1,706.26	2,712.30	685.82	2,440.58	2,198.61	14.38	-2.61	0.790
60.00	-31.94	-23.86	0.00	-1,585.7	0.00	1,585.72	2,658.03	665.37	2,297.22	2,089.87	17.28	-2.92	0.772
65.00	-30.81	-23.61	0.00	-1,466.4	0.00	1,466.42	2,602.12	644.92	2,158.20	1,982.52	20.49	-3.23	0.753
70.00	-29.70	-23.35	0.00	-1,348.4	0.00	1,348.40	2,544.57	624.47	2,023.51	1,876.69	24.04	-3.54	0.732
75.00	-28.62	-23.08	0.00	-1,231.7	0.00	1,231.67	2,485.39	604.02	1,893.17	1,772.49	27.91	-3.86	0.708
80.00	-27.56	-22.82	0.00	-1,116.3	0.00	1,116.26	2,424.58	583.57	1,767.16	1,670.06	32.12	-4.18	0.681
85.00	-26.54	-22.54	0.00	-1,002.2	0.00	1,002.19	2,362.13	563.12	1,645.50	1,569.50	36.66	-4.49	0.651
90.00	-25.54	-22.27	0.00	-889.5	0.00	889.47	2,297.28	542.67	1,528.17	1,470.45	41.54	-4.81	0.618
95.00	-24.59	-22.04	0.00	-778.1	0.00	778.12	2,210.71	522.22	1,415.18	1,361.18	46.74	-5.12	0.585
97.75	-24.07	-21.89	0.00	-717.5	0.00	717.52	2,163.10	510.97	1,354.88	1,302.88	49.74	-5.3	0.564
100.00	-23.50	-21.76	0.00	-668.3	0.00	668.27	2,124.14	501.77	1,306.53	1,256.13	52.26	-5.44	0.545
101.50	-23.10	-21.65	0.00	-635.6	0.00	635.62	1,105.19	302.60	791.86	659.76	53.99	-5.53	0.989
104.00	-19.93	-19.72	0.00	-581.5	0.00	581.50	1,092.66	296.47	760.08	638.98	56.92	-5.68	0.933
105.00	-19.07	-18.69	0.00	-561.8	0.00	561.79	1,087.54	294.01	747.55	630.68	58.12	-5.77	0.912
110.00	-18.39	-18.46	0.00	-468.3	0.00	468.32	1,060.92	281.74	686.46	589.40	64.39	-6.21	0.816
115.00	-17.68	-17.81	0.00	-376.0	0.00	376.05	1,032.68	269.47	627.98	548.55	71.11	-6.62	0.707
120.00	-17.11	-17.59	0.00	-287.0	0.00	287.02	1,002.79	257.20	572.10	508.25	78.22	-6.98	0.586
123.00	-16.54	-17.23	0.00	-234.2	0.00	234.25	984.08	249.84	539.82	484.38	82.67	-7.18	0.505
125.00	-14.79	-15.12	0.00	-199.8	0.00	199.79	971.28	244.93	518.82	468.61	85.69	-7.3	0.445
126.00	-11.66	-13.32	0.00	-184.7	0.00	184.68	964.78	242.48	508.48	460.77	87.23	-7.36	0.416
127.00	-11.31	-12.98	0.00	-171.4	0.00	171.35	958.21	240.02	498.24	452.97	88.77	-7.41	0.393
129.20	-10.56	-10.90	0.00	-142.8	0.00	142.80	943.54	234.62	476.08	435.92	92.2	-7.52	0.341
129.40	-10.16	-10.68	0.00	-140.6	0.00	140.62	942.19	234.13	474.09	434.38	92.52	-7.53	0.337
129.70	-9.89	-10.56	0.00	-137.4	0.00	137.42	940.16	233.40	471.11	432.07	92.99	-7.54	0.331
130.00	-9.86	-10.45	0.00	-134.2	0.00	134.25	938.12	232.66	468.15	429.76	93.46	-7.56	0.325
134.00	-8.78	-8.17	0.00	-91.5	0.00	91.47	910.42	222.85	429.48	399.33	99.84	-7.71	0.240
135.00	-8.72	-8.12	0.00	-83.3	0.00	83.30	903.34	220.39	420.08	391.82	101.46	-7.75	0.224
136.00	-6.55	-6.87	0.00	-75.2	0.00	75.18	896.18	217.94	410.77	384.35	103.08	-7.78	0.204
138.90	-6.36	-6.70	0.00	-55.3	0.00	55.26	875.07	210.82	384.39	362.93	107.82	-7.86	0.161
139.20	-6.05	-6.54	0.00	-53.3	0.00	53.26	872.85	210.08	381.71	360.73	108.31	-7.86	0.156
140.00	-6.01	-6.44	0.00	-48.0	0.00	48.03	866.91	208.12	374.61	354.90	109.62	-7.88	0.143
143.00	-3.25	-4.54	0.00	-28.7	0.00	28.70	844.27	200.76	348.58	333.29	114.58	-7.94	0.090
145.00	-3.15	-4.38	0.00	-19.6	0.00	19.63	828.85	195.85	331.75	319.13	117.9	-7.96	0.066
149.00	0.00	-3.90	0.00	-2.1	0.00	2.11	787.55	186.03	299.33	287.88	124.56	-7.99	0.008

Load Case: 0.9D + 1.0W	116.96 mph wind with no ice	28 Iterations
Gust Response Factor: 1.10		
Dead load Factor: 0.90		
Wind Load Factor: 1.00		

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-37.40	-26.66	0.00	-3,051.5	0.00	3,051.51	4,132.30	1,078.56	5,030.10	4,392.86	0	0	0.704
5.00	-36.24	-26.39	0.00	-2,918.2	0.00	2,918.23	4,073.40	1,054.02	4,803.83	4,231.01	0.11	-0.21	0.699
10.00	-35.04	-26.12	0.00	-2,786.3	0.00	2,786.29	4,012.86	1,029.48	4,582.77	4,070.37	0.44	-0.42	0.694
15.00	-33.86	-25.86	0.00	-2,655.7	0.00	2,655.69	3,950.69	1,004.94	4,366.92	3,911.06	0.99	-0.63	0.688
20.00	-32.70	-25.60	0.00	-2,526.4	0.00	2,526.40	3,886.88	980.40	4,156.27	3,753.20	1.77	-0.85	0.682
25.00	-31.56	-25.34	0.00	-2,398.4	0.00	2,398.41	3,821.44	955.86	3,950.83	3,596.91	2.78	-1.08	0.676
30.00	-30.45	-25.09	0.00	-2,271.7	0.00	2,271.70	3,754.36	931.32	3,750.60	3,442.32	4.03	-1.31	0.669
35.00	-29.35	-24.83	0.00	-2,146.3	0.00	2,146.26	3,685.65	906.78	3,555.57	3,289.53	5.52	-1.54	0.661
40.00	-28.28	-24.55	0.00	-2,022.1	0.00	2,022.13	3,615.30	882.24	3,365.75	3,138.66	7.26	-1.78	0.653
45.00	-27.25	-24.32	0.00	-1,899.4	0.00	1,899.36	3,543.31	857.70	3,181.14	2,989.85	9.26	-2.03	0.644
48.00	-26.64	-24.18	0.00	-1,826.4	0.00	1,826.40	3,499.34	842.97	3,072.87	2,901.60	10.59	-2.18	0.638
50.00	-25.97	-24.02	0.00	-1,778.0	0.00	1,778.04	3,469.70	833.16	3,001.73	2,843.21	11.52	-2.29	0.634
53.25	-24.93	-23.85	0.00	-1,700.0	0.00	1,699.99	2,730.91	692.97	2,491.79	2,236.98	13.14	-2.45	0.770
55.00	-24.58	-23.67	0.00	-1,658.3	0.00	1,658.26	2,712.30	685.82	2,440.58	2,198.61	14.05	-2.55	0.764
60.00	-23.69	-23.38	0.00	-1,539.9	0.00	1,539.92	2,658.03	665.37	2,297.22	2,089.87	16.88	-2.84	0.747
65.00	-22.82	-23.10	0.00	-1,423.0	0.00	1,423.00	2,602.12	644.92	2,158.20	1,982.52	20.02	-3.14	0.728
70.00	-21.97	-22.81	0.00	-1,307.5	0.00	1,307.52	2,544.57	624.47	2,023.51	1,876.69	23.47	-3.45	0.707
75.00	-21.14	-22.52	0.00	-1,193.5	0.00	1,193.49	2,485.39	604.02	1,893.17	1,772.49	27.25	-3.76	0.683
80.00	-20.33	-22.22	0.00	-1,080.9	0.00	1,080.92	2,424.58	583.57	1,767.16	1,670.06	31.35	-4.07	0.657
85.00	-19.54	-21.93	0.00	-969.8	0.00	969.81	2,362.13	563.12	1,645.50	1,569.50	35.77	-4.37	0.628
90.00	-18.77	-21.63	0.00	-860.2	0.00	860.17	2,297.28	542.67	1,528.17	1,470.45	40.51	-4.68	0.595
95.00	-18.05	-21.39	0.00	-752.0	0.00	752.01	2,210.71	522.22	1,415.18	1,361.18	45.57	-4.98	0.562
97.75	-17.65	-21.24	0.00	-693.2	0.00	693.20	2,163.10	510.97	1,354.88	1,302.88	48.49	-5.15	0.542
100.00	-17.21	-21.11	0.00	-645.4	0.00	645.41	2,124.14	501.77	1,306.53	1,256.13	50.95	-5.29	0.524
101.50	-16.91	-20.99	0.00	-613.8	0.00	613.75	1,105.19	302.60	791.86	659.76	52.62	-5.38	0.950
104.00	-14.56	-19.13	0.00	-561.3	0.00	561.28	1,092.66	296.47	760.08	638.98	55.47	-5.52	0.896
105.00	-13.92	-18.10	0.00	-542.2	0.00	542.15	1,087.54	294.01	747.55	630.68	56.64	-5.61	0.876
110.00	-13.39	-17.84	0.00	-451.6	0.00	451.63	1,060.92	281.74	686.46	589.40	62.73	-6.03	0.783
115.00	-12.86	-17.18	0.00	-362.4	0.00	362.41	1,032.68	269.47	627.98	548.55	69.25	-6.42	0.677
120.00	-12.42	-16.95	0.00	-276.5	0.00	276.52	1,002.79	257.20	572.10	508.25	76.16	-6.78	0.561
123.00	-12.00	-16.60	0.00	-225.7	0.00	225.66	984.08	249.84	539.82	484.38	80.48	-6.97	0.482
125.00	-10.73	-14.55	0.00	-192.5	0.00	192.46	971.28	244.93	518.82	468.61	83.41	-7.08	0.425
126.00	-8.42	-12.86	0.00	-177.9	0.00	177.92	964.78	242.48	508.48	460.77	84.9	-7.14	0.398
127.00	-8.16	-12.53	0.00	-165.0	0.00	165.05	958.21	240.02	498.24	452.97	86.4	-7.19	0.376
129.20	-7.65	-10.48	0.00	-137.5	0.00	137.49	943.54	234.62	476.08	435.92	89.73	-7.29	0.326
129.40	-7.36	-10.27	0.00	-135.4	0.00	135.40	942.19	234.13	474.09	434.38	90.03	-7.3	0.321
129.70	-7.15	-10.16	0.00	-132.3	0.00	132.32	940.16	233.40	471.11	432.07	90.49	-7.32	0.316
130.00	-7.14	-10.05	0.00	-129.3	0.00	129.27	938.12	232.66	468.15	429.76	90.95	-7.33	0.310
134.00	-6.39	-7.82	0.00	-88.1	0.00	88.08	910.42	222.85	429.48	399.33	97.14	-7.48	0.229
135.00	-6.34	-7.76	0.00	-80.3	0.00	80.27	903.34	220.39	420.08	391.82	98.71	-7.51	0.213
136.00	-4.74	-6.59	0.00	-72.5	0.00	72.50	896.18	217.94	410.77	384.35	100.28	-7.54	0.195
138.90	-4.60	-6.43	0.00	-53.4	0.00	53.38	875.07	210.82	384.39	362.93	104.87	-7.62	0.153
139.20	-4.37	-6.28	0.00	-51.4	0.00	51.45	872.85	210.08	381.71	360.73	105.35	-7.63	0.149
140.00	-4.34	-6.19	0.00	-46.4	0.00	46.42	866.91	208.12	374.61	354.90	106.62	-7.64	0.137
143.00	-2.32	-4.39	0.00	-27.9	0.00	27.86	844.27	200.76	348.58	333.29	111.43	-7.7	0.087
145.00	-2.25	-4.24	0.00	-19.1	0.00	19.07	828.85	195.85	331.75	319.13	114.65	-7.72	0.063
149.00	0.00	-3.90	0.00	-2.1	0.00	2.11	787.55	186.03	299.33	287.88	121.12	-7.75	0.008

Load Case: 1.2D + 1.0Di + 1.0Wi	48.73 mph wind with 0.850" radial ice		27 Iterations
Gust Response Factor: 1.10	Ice Dead Load Factor	1.00	
Dead load Factor: 1.20			Ice Importance Factor 1.00
Wind Load Factor: 1.00			

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-68.48	-6.89	0.00	-802.3	0.00	802.30	4,132.30	1,078.56	5,030.10	4,392.86	0	0	0.199
5.00	-66.80	-6.83	0.00	-767.9	0.00	767.87	4,073.40	1,054.02	4,803.83	4,231.01	0.03	-0.05	0.198
10.00	-65.05	-6.78	0.00	-733.7	0.00	733.70	4,012.86	1,029.48	4,582.77	4,070.37	0.12	-0.11	0.197
15.00	-63.31	-6.73	0.00	-699.8	0.00	699.81	3,950.69	1,004.94	4,366.92	3,911.06	0.26	-0.17	0.195
20.00	-61.61	-6.67	0.00	-666.2	0.00	666.18	3,886.88	980.40	4,156.27	3,753.20	0.46	-0.22	0.193
25.00	-59.92	-6.62	0.00	-632.8	0.00	632.82	3,821.44	955.86	3,950.83	3,596.91	0.73	-0.28	0.192
30.00	-58.27	-6.56	0.00	-599.7	0.00	599.73	3,754.36	931.32	3,750.60	3,442.32	1.06	-0.34	0.190
35.00	-56.65	-6.50	0.00	-566.9	0.00	566.94	3,685.65	906.78	3,555.57	3,289.53	1.45	-0.41	0.188
40.00	-55.06	-6.43	0.00	-534.4	0.00	534.45	3,615.30	882.24	3,365.75	3,138.66	1.91	-0.47	0.186
45.00	-53.50	-6.38	0.00	-502.3	0.00	502.28	3,543.31	857.70	3,181.14	2,989.85	2.44	-0.54	0.183
48.00	-52.58	-6.34	0.00	-483.2	0.00	483.15	3,499.34	842.97	3,072.87	2,901.60	2.79	-0.58	0.182
50.00	-51.64	-6.30	0.00	-470.5	0.00	470.48	3,469.70	833.16	3,001.73	2,843.21	3.04	-0.6	0.180
53.25	-50.13	-6.25	0.00	-450.0	0.00	450.00	2,730.91	692.97	2,491.79	2,236.98	3.46	-0.65	0.220
55.00	-49.66	-6.22	0.00	-439.1	0.00	439.06	2,712.30	685.82	2,440.58	2,198.61	3.71	-0.67	0.218
60.00	-48.33	-6.15	0.00	-408.0	0.00	407.98	2,658.03	665.37	2,297.22	2,089.87	4.45	-0.75	0.213
65.00	-47.03	-6.08	0.00	-377.2	0.00	377.24	2,602.12	644.92	2,158.20	1,982.52	5.28	-0.83	0.208
70.00	-45.76	-6.00	0.00	-346.9	0.00	346.86	2,544.57	624.47	2,023.51	1,876.69	6.19	-0.91	0.203
75.00	-44.52	-5.93	0.00	-316.8	0.00	316.84	2,485.39	604.02	1,893.17	1,772.49	7.19	-0.99	0.197
80.00	-43.31	-5.85	0.00	-287.2	0.00	287.19	2,424.58	583.57	1,767.16	1,670.06	8.28	-1.08	0.190
85.00	-42.13	-5.78	0.00	-257.9	0.00	257.93	2,362.13	563.12	1,645.50	1,569.50	9.45	-1.16	0.182
90.00	-40.97	-5.69	0.00	-229.0	0.00	229.05	2,297.28	542.67	1,528.17	1,470.45	10.7	-1.24	0.174
95.00	-39.85	-5.62	0.00	-200.6	0.00	200.58	2,210.71	522.22	1,415.18	1,361.18	12.04	-1.32	0.166
97.75	-39.25	-5.58	0.00	-185.1	0.00	185.12	2,163.10	510.97	1,354.88	1,302.88	12.82	-1.36	0.160
100.00	-38.59	-5.54	0.00	-172.6	0.00	172.57	2,124.14	501.77	1,306.53	1,256.13	13.47	-1.4	0.156
101.50	-38.16	-5.51	0.00	-164.3	0.00	164.26	1,105.19	302.60	791.86	659.76	13.91	-1.42	0.284
104.00	-34.04	-5.04	0.00	-150.5	0.00	150.49	1,092.66	296.47	760.08	638.98	14.67	-1.46	0.267
105.00	-32.63	-4.82	0.00	-145.4	0.00	145.45	1,087.54	294.01	747.55	630.68	14.98	-1.49	0.261
110.00	-31.83	-4.75	0.00	-121.4	0.00	121.38	1,060.92	281.74	686.46	589.40	16.6	-1.6	0.236
115.00	-30.84	-4.58	0.00	-97.6	0.00	97.65	1,032.68	269.47	627.98	548.55	18.33	-1.71	0.208
120.00	-30.11	-4.51	0.00	-74.8	0.00	74.76	1,002.79	257.20	572.10	508.25	20.17	-1.8	0.177
123.00	-29.31	-4.41	0.00	-61.2	0.00	61.24	984.08	249.84	539.82	484.38	21.32	-1.85	0.157
125.00	-26.34	-3.92	0.00	-52.4	0.00	52.42	971.28	244.93	518.82	468.61	22.1	-1.88	0.139
126.00	-22.24	-3.42	0.00	-48.5	0.00	48.50	964.78	242.48	508.48	460.77	22.5	-1.9	0.129
127.00	-21.70	-3.33	0.00	-45.1	0.00	45.09	958.21	240.02	498.24	452.97	22.9	-1.91	0.122
129.20	-19.83	-2.87	0.00	-37.8	0.00	37.76	943.54	234.62	476.08	435.92	23.79	-1.94	0.108
129.40	-19.26	-2.82	0.00	-37.2	0.00	37.19	942.19	234.13	474.09	434.38	23.87	-1.94	0.106
129.70	-18.89	-2.78	0.00	-36.3	0.00	36.34	940.16	233.40	471.11	432.07	23.99	-1.95	0.104
130.00	-18.86	-2.75	0.00	-35.5	0.00	35.51	938.12	232.66	468.15	429.76	24.11	-1.95	0.103
134.00	-16.37	-2.22	0.00	-24.3	0.00	24.31	910.42	222.85	429.48	399.33	25.76	-1.99	0.079
135.00	-16.27	-2.20	0.00	-22.1	0.00	22.09	903.34	220.39	420.08	391.82	26.18	-2	0.074
136.00	-13.59	-1.85	0.00	-19.9	0.00	19.90	896.18	217.94	410.77	384.35	26.6	-2.01	0.067
138.90	-13.22	-1.79	0.00	-14.5	0.00	14.53	875.07	210.82	384.39	362.93	27.83	-2.03	0.055
139.20	-12.81	-1.75	0.00	-14.0	0.00	13.99	872.85	210.08	381.71	360.73	27.96	-2.03	0.054
140.00	-12.73	-1.72	0.00	-12.6	0.00	12.59	866.91	208.12	374.61	354.90	28.3	-2.04	0.050
143.00	-8.96	-1.20	0.00	-7.4	0.00	7.44	844.27	200.76	348.58	333.29	29.58	-2.05	0.033
145.00	-8.78	-1.14	0.00	-5.0	0.00	5.04	828.85	195.85	331.75	319.13	30.44	-2.06	0.026
149.00	0.00	-0.83	0.00	-0.5	0.00	0.47	787.55	186.03	299.33	287.88	32.17	-2.06	0.002



Load Case: 1.0D + 1.0W	60 mph Wind with No Ice	26 Iterations
Gust Response Factor: 1.10		
Dead load Factor: 1.00		
Wind Load Factor: 1.00		

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-41.60	-6.28	0.00	-724.7	0.00	724.74	4,132.30	1,078.56	5,030.10	4,392.86	0	0	0.175
5.00	-40.42	-6.22	0.00	-693.4	0.00	693.35	4,073.40	1,054.02	4,803.83	4,231.01	0.03	-0.05	0.174
10.00	-39.18	-6.16	0.00	-662.3	0.00	662.26	4,012.86	1,029.48	4,582.77	4,070.37	0.1	-0.1	0.173
15.00	-37.97	-6.10	0.00	-631.5	0.00	631.47	3,950.69	1,004.94	4,366.92	3,911.06	0.23	-0.15	0.171
20.00	-36.78	-6.04	0.00	-601.0	0.00	600.97	3,886.88	980.40	4,156.27	3,753.20	0.42	-0.2	0.170
25.00	-35.62	-5.99	0.00	-570.8	0.00	570.75	3,821.44	955.86	3,950.83	3,596.91	0.66	-0.26	0.168
30.00	-34.48	-5.93	0.00	-540.8	0.00	540.82	3,754.36	931.32	3,750.60	3,442.32	0.96	-0.31	0.166
35.00	-33.36	-5.87	0.00	-511.2	0.00	511.17	3,685.65	906.78	3,555.57	3,289.53	1.31	-0.37	0.164
40.00	-32.27	-5.81	0.00	-481.8	0.00	481.81	3,615.30	882.24	3,365.75	3,138.66	1.73	-0.42	0.162
45.00	-31.20	-5.76	0.00	-452.8	0.00	452.76	3,543.31	857.70	3,181.14	2,989.85	2.2	-0.48	0.160
48.00	-30.57	-5.73	0.00	-435.5	0.00	435.48	3,499.34	842.97	3,072.87	2,901.60	2.52	-0.52	0.159
50.00	-29.88	-5.69	0.00	-424.0	0.00	424.03	3,469.70	833.16	3,001.73	2,843.21	2.74	-0.54	0.158
53.25	-28.77	-5.65	0.00	-405.5	0.00	405.53	2,730.91	692.97	2,491.79	2,236.98	3.13	-0.58	0.192
55.00	-28.46	-5.61	0.00	-395.6	0.00	395.64	2,712.30	685.82	2,440.58	2,198.61	3.34	-0.61	0.191
60.00	-27.58	-5.55	0.00	-367.6	0.00	367.58	2,658.03	665.37	2,297.22	2,089.87	4.02	-0.68	0.186
65.00	-26.72	-5.49	0.00	-339.8	0.00	339.83	2,602.12	644.92	2,158.20	1,982.52	4.76	-0.75	0.182
70.00	-25.88	-5.42	0.00	-312.4	0.00	312.41	2,544.57	624.47	2,023.51	1,876.69	5.59	-0.82	0.177
75.00	-25.06	-5.36	0.00	-285.3	0.00	285.30	2,485.39	604.02	1,893.17	1,772.49	6.49	-0.9	0.171
80.00	-24.25	-5.29	0.00	-258.5	0.00	258.51	2,424.58	583.57	1,767.16	1,670.06	7.47	-0.97	0.165
85.00	-23.47	-5.23	0.00	-232.1	0.00	232.06	2,362.13	563.12	1,645.50	1,569.50	8.52	-1.04	0.158
90.00	-22.71	-5.16	0.00	-205.9	0.00	205.93	2,297.28	542.67	1,528.17	1,470.45	9.65	-1.12	0.150
95.00	-21.97	-5.10	0.00	-180.1	0.00	180.13	2,210.71	522.22	1,415.18	1,361.18	10.86	-1.19	0.142
97.75	-21.57	-5.07	0.00	-166.1	0.00	166.09	2,163.10	510.97	1,354.88	1,302.88	11.56	-1.23	0.138
100.00	-21.12	-5.04	0.00	-154.7	0.00	154.68	2,124.14	501.77	1,306.53	1,256.13	12.14	-1.26	0.133
101.50	-20.82	-5.01	0.00	-147.1	0.00	147.12	1,105.19	302.60	791.86	659.76	12.54	-1.28	0.242
104.00	-18.07	-4.57	0.00	-134.6	0.00	134.58	1,092.66	296.47	760.08	638.98	13.23	-1.32	0.227
105.00	-17.34	-4.33	0.00	-130.0	0.00	130.01	1,087.54	294.01	747.55	630.68	13.5	-1.34	0.222
110.00	-16.84	-4.27	0.00	-108.4	0.00	108.37	1,060.92	281.74	686.46	589.40	14.96	-1.44	0.200
115.00	-16.29	-4.12	0.00	-87.0	0.00	87.01	1,032.68	269.47	627.98	548.55	16.52	-1.53	0.175
120.00	-15.84	-4.07	0.00	-66.4	0.00	66.41	1,002.79	257.20	572.10	508.25	18.18	-1.62	0.147
123.00	-15.38	-3.99	0.00	-54.2	0.00	54.21	984.08	249.84	539.82	484.38	19.21	-1.66	0.128
125.00	-13.74	-3.49	0.00	-46.2	0.00	46.24	971.28	244.93	518.82	468.61	19.91	-1.69	0.113
126.00	-10.98	-3.09	0.00	-42.8	0.00	42.75	964.78	242.48	508.48	460.77	20.27	-1.71	0.104
127.00	-10.67	-3.01	0.00	-39.7	0.00	39.66	958.21	240.02	498.24	452.97	20.63	-1.72	0.099
129.20	-9.84	-2.52	0.00	-33.0	0.00	33.04	943.54	234.62	476.08	435.92	21.42	-1.74	0.086
129.40	-9.49	-2.47	0.00	-32.5	0.00	32.54	942.19	234.13	474.09	434.38	21.5	-1.75	0.085
129.70	-9.25	-2.44	0.00	-31.8	0.00	31.80	940.16	233.40	471.11	432.07	21.61	-1.75	0.084
130.00	-9.23	-2.42	0.00	-31.1	0.00	31.07	938.12	232.66	468.15	429.76	21.72	-1.75	0.082
134.00	-8.11	-1.88	0.00	-21.2	0.00	21.17	910.42	222.85	429.48	399.33	23.2	-1.79	0.062
135.00	-8.06	-1.87	0.00	-19.3	0.00	19.29	903.34	220.39	420.08	391.82	23.58	-1.8	0.058
136.00	-6.14	-1.59	0.00	-17.4	0.00	17.42	896.18	217.94	410.77	384.35	23.95	-1.8	0.052
138.90	-5.96	-1.55	0.00	-12.8	0.00	12.82	875.07	210.82	384.39	362.93	25.05	-1.82	0.042
139.20	-5.70	-1.51	0.00	-12.4	0.00	12.35	872.85	210.08	381.71	360.73	25.17	-1.82	0.041
140.00	-5.66	-1.49	0.00	-11.2	0.00	11.15	866.91	208.12	374.61	354.90	25.47	-1.83	0.038
143.00	-3.17	-1.05	0.00	-6.7	0.00	6.68	844.27	200.76	348.58	333.29	26.63	-1.84	0.024
145.00	-3.08	-1.02	0.00	-4.6	0.00	4.57	828.85	195.85	331.75	319.13	27.4	-1.85	0.018
149.00	0.00	-0.92	0.00	-0.5	0.00	0.50	787.55	186.03	299.33	287.88	28.95	-1.85	0.002

**EQUIVALENT LATERAL FORCES METHOD ANALYSIS**

(Based on ASCE7-16 Chapters 11, 12 and 15)

Spectral Response Acceleration for Short Period ( $S_S$ ):	0.200
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.053
Long-Period Transition Period ( $T_L$ – Seconds):	6
Importance Factor ( $I_e$ ):	1.000
Site Coefficient $F_a$ :	1.600
Site Coefficient $F_v$ :	2.400
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.213
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.085
Seismic Response Coefficient ( $C_s$ ):	0.030
Upper Limit $C_s$ :	0.030
Lower Limit $C_s$ :	0.030
Period based on Rayleigh Method (sec):	3.050
Redundancy Factor ( $\rho$ ):	1.000
Seismic Force Distribution Exponent ( $k$ ):	2.000
Total Unfactored Dead Load:	41.610 k
Seismic Base Shear (E):	1.250 k

**1.2D + 1.0Ev + 1.0Eh Seismic**

Segment	Height Above Base (ft)	Weight (lb)	$W_z$ (lb-ft)	$C_{vx}$	Horizontal Force (lb)	Vertical Force (lb)
46	147	186	4,021	0.010	12	231
45	144	96	1,989	0.005	6	119
44	141.5	147	2,952	0.007	9	183
43	139.6	40	780	0.002	2	50
42	139.05	15	292	0.001	1	19
41	137.45	148	2,798	0.007	8	184
40	135.5	52	955	0.002	3	65
39	134.5	52	949	0.002	3	65
38	132	264	4,593	0.011	14	328
37	129.85	20	339	0.001	1	25
36	129.55	20	338	0.001	1	25
35	129.3	13	225	0.000	1	17
34	128.1	149	2,446	0.006	7	185
33	126.5	69	1,096	0.003	3	85
32	125.5	69	1,087	0.003	3	86
31	124	169	2,605	0.006	8	211
30	121.5	258	3,804	0.009	12	320
29	117.5	439	6,062	0.015	18	546
28	112.5	476	6,019	0.015	18	591
27	107.5	487	5,633	0.014	17	606
26	104.5	101	1,106	0.003	3	126
25	102.75	255	2,694	0.006	8	317
24	100.75	300	3,041	0.007	9	372
23	98.875	455	4,446	0.011	13	565
22	96.375	396	3,683	0.009	11	493
21	92.5	736	6,299	0.015	19	915
20	87.5	756	5,789	0.014	18	940
19	82.5	776	5,281	0.013	16	964
18	77.5	796	4,779	0.012	14	989
17	72.5	816	4,287	0.010	13	1,013
16	67.5	835	3,806	0.009	12	1,038
15	62.5	855	3,341	0.008	10	1,063
14	57.5	875	2,893	0.007	9	1,087
13	54.125	311	911	0.002	3	386

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
12	51.625	1,104	2,942	0.007	9	1,372
11	49	688	1,653	0.004	5	856
10	46.5	627	1,355	0.003	4	779
9	42.5	1,063	1,921	0.005	6	1,322
8	37.5	1,087	1,529	0.004	5	1,351
7	32.5	1,111	1,174	0.003	4	1,381
6	27.5	1,135	858	0.002	3	1,410
5	22.5	1,159	587	0.001	2	1,440
4	17.5	1,182	362	0.001	1	1,469
3	12.5	1,206	188	0.000	1	1,499
2	7.5	1,230	69	0.000	0	1,528
1	2.5	1,183	7	0.000	0	1,470
DragonWave Horizon Compact	149	32	706	0.002	2	40
DragonWave A-ANT-11G-2-C	149	54	1,199	0.003	4	67
DragonWave A-ANT-23G-1-C	149	15	333	0.001	1	19
Alcatel-Lucent 1900 MHz 4X45 RRH	149	180	3,996	0.010	12	224
Argus LLPX310R	149	86	1,905	0.005	6	107
Clearwire Side Arm	149	560	12,433	0.030	38	696
Ericsson Radio 4449 B71 B85A	149	225	4,995	0.012	15	280
Ericsson RRUS 4415 B25	149	138	3,064	0.007	9	171
Ericsson Air6449 B41	149	312	6,927	0.017	21	388
Ericsson AIR32 B66Aa/B2a	149	397	8,805	0.021	27	493
Ericsson Air 3246 B66	149	540	11,989	0.029	36	671
RFS APXVAARR24_43-U-NA20	149	384	8,519	0.021	26	477
Platform with SitePro1 HRK12-3HD Handrail Kit	143	2,350	48,055	0.117	146	2,920
Samsung B2/B66A RRH-BR049	139.2	253	4,906	0.012	15	315
Raycap RCMDC-6627-PF-48	138.9	32	617	0.002	2	40
Generic Round Low Profile Platform	136	1,875	34,680	0.084	105	2,330
Samsung B5/B13 RRH-BR04C	134	211	3,787	0.009	11	262
Samsung MT6407-77A	134	245	4,396	0.011	13	304
Andrew DB854DG65ESX	134	56	997	0.002	3	69
JMA Wireless MX06FRO660-03	134	360	6,464	0.016	20	447
Ericsson RRUS 8843 B2, B66A	129.7	216	3,634	0.009	11	268
Ericsson Radio 4415 B30	129.4	129	2,160	0.005	7	160
Ericsson RRUS 4449 B5, B12	129.4	213	3,567	0.009	11	265
Kathrein Scala 80010966	129.2	688	11,478	0.028	35	854
Ericsson AIR 6449 n77D	127	245	3,948	0.010	12	304
Generic Mount Reinforcement	126	200	3,175	0.008	10	249
Generic Round Platform with Handrails	126	2,500	39,690	0.096	120	3,107
Commscope WCS-IMFQ-AMT	125	30	461	0.001	1	37
Raycap DC6-48-60-18-8F	125	40	625	0.002	2	50
Ericsson RRUS 4478 B14	125	180	2,808	0.007	9	223
Ericsson RRUS E2 B29	125	180	2,812	0.007	9	224
Raycap DC9-48-60-24-8C-EV	125	16	250	0.001	1	20
Mount Reinforcement SitePro1 V Stabilizer (PRK-SFS)	125	588	9,183	0.022	28	730
Quintel QD8616-7	125	450	7,031	0.017	21	559
Ericsson AIR 6419 N77G	123	210	3,177	0.008	10	261
RFS APXV18-206517S-C	115	79	1,047	0.002	3	98
Commscope RDIDC-9181-PF-48	105	22	241	0.001	1	27
Fujitsu TA08025-B605	105	225	2,481	0.006	8	280
Fujitsu TA08025-B604	105	192	2,113	0.005	6	238
JMA Wireless MX08FRO665-21	105	194	2,133	0.005	6	240
Generic Flat Platform with Handrails	104	2,500	27,040	0.066	82	3,107
		41,606	411,806	1.000	1,248	51,703

**0.9D - 1.0Ev + 1.0Eh Seismic (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
46	147	186	4,021	0.010	12	160
45	144	96	1,989	0.005	6	82
44	141.5	147	2,952	0.007	9	126

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
43	139.6	40	780	0.002	2	34
42	139.05	15	292	0.001	1	13
41	137.45	148	2,798	0.007	8	127
40	135.5	52	955	0.002	3	45
39	134.5	52	949	0.002	3	45
38	132	264	4,593	0.011	14	226
37	129.85	20	339	0.001	1	17
36	129.55	20	338	0.001	1	17
35	129.3	13	225	0.000	1	12
34	128.1	149	2,446	0.006	7	128
33	126.5	69	1,096	0.003	3	59
32	125.5	69	1,087	0.003	3	59
31	124	169	2,605	0.006	8	145
30	121.5	258	3,804	0.009	12	221
29	117.5	439	6,062	0.015	18	376
28	112.5	476	6,019	0.015	18	408
27	107.5	487	5,633	0.014	17	418
26	104.5	101	1,106	0.003	3	87
25	102.75	255	2,694	0.006	8	219
24	100.75	300	3,041	0.007	9	257
23	98.875	455	4,446	0.011	13	390
22	96.375	396	3,683	0.009	11	340
21	92.5	736	6,299	0.015	19	631
20	87.5	756	5,789	0.014	18	648
19	82.5	776	5,281	0.013	16	665
18	77.5	796	4,779	0.012	14	682
17	72.5	816	4,287	0.010	13	699
16	67.5	835	3,806	0.009	12	716
15	62.5	855	3,341	0.008	10	733
14	57.5	875	2,893	0.007	9	750
13	54.125	311	911	0.002	3	267
12	51.625	1,104	2,942	0.007	9	946
11	49	688	1,653	0.004	5	590
10	46.5	627	1,355	0.003	4	537
9	42.5	1,063	1,921	0.005	6	912
8	37.5	1,087	1,529	0.004	5	932
7	32.5	1,111	1,174	0.003	4	953
6	27.5	1,135	858	0.002	3	973
5	22.5	1,159	587	0.001	2	993
4	17.5	1,182	362	0.001	1	1,014
3	12.5	1,206	188	0.000	1	1,034
2	7.5	1,230	69	0.000	0	1,054
1	2.5	1,183	7	0.000	0	1,014
DragonWave Horizon Compact	149	32	706	0.002	2	27
DragonWave A-ANT-11G-2-C	149	54	1,199	0.003	4	46
DragonWave A-ANT-23G-1-C	149	15	333	0.001	1	13
Alcatel-Lucent 1900 MHz 4X45 RRH	149	180	3,996	0.010	12	154
Argus LLPX310R	149	86	1,905	0.005	6	74
Clearwire Side Arm	149	560	12,433	0.030	38	480
Ericsson Radio 4449 B71 B85A	149	225	4,995	0.012	15	193
Ericsson RRUS 4415 B25	149	138	3,064	0.007	9	118
Ericsson Air6449 B41	149	312	6,927	0.017	21	267
Ericsson AIR32 B66Aa/B2a	149	397	8,805	0.021	27	340
Ericsson Air 3246 B66	149	540	11,989	0.029	36	463
RFS APXVAARR24_43-U-NA20	149	384	8,519	0.021	26	329
Platform with SitePro1 HRK12-3HD Handrail Kit	143	2,350	48,055	0.117	146	2,015
Samsung B2/B66A RRH-BR049	139.2	253	4,906	0.012	15	217
Raycap RCMDC-6627-PF-48	138.9	32	617	0.002	2	27
Generic Round Low Profile Platform	136	1,875	34,680	0.084	105	1,608
Samsung B5/B13 RRH-BR04C	134	211	3,787	0.009	11	181
Samsung MT6407-77A	134	245	4,396	0.011	13	210
Andrew DB854DG65ESX	134	56	997	0.002	3	48
JMA Wireless MX06FRO660-03	134	360	6,464	0.016	20	309
Ericsson RRUS 8843 B2, B66A	129.7	216	3,634	0.009	11	185
Ericsson Radio 4415 B30	129.4	129	2,160	0.005	7	111
Ericsson RRUS 4449 B5, B12	129.4	213	3,567	0.009	11	183
Kathrein Scala 80010966	129.2	688	11,478	0.028	35	590
Ericsson AIR 6449 n77D	127	245	3,948	0.010	12	210
Generic Mount Reinforcement	126	200	3,175	0.008	10	171
Generic Round Platform with Handrails	126	2,500	39,690	0.096	120	2,143

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
Commscope WCS-IMFQ-AMT	125	30	461	0.001	1	25
Raycap DC6-48-60-18-8F	125	40	625	0.002	2	34
Ericsson RRUS 4478 B14	125	180	2,808	0.007	9	154
Ericsson RRUS E2 B29	125	180	2,812	0.007	9	154
Raycap DC9-48-60-24-8C-EV	125	16	250	0.001	1	14
Mount Reinforcement SitePro1 V Stabilizer (PRK-SFS)	125	588	9,183	0.022	28	504
Quintel QD8616-7	125	450	7,031	0.017	21	386
Ericsson AIR 6419 N77G	123	210	3,177	0.008	10	180
RFS APXV18-206517S-C	115	79	1,047	0.002	3	68
Commscope RDIDC-9181-PF-48	105	22	241	0.001	1	19
Fujitsu TA08025-B605	105	225	2,481	0.006	8	193
Fujitsu TA08025-B604	105	192	2,113	0.005	6	164
JMA Wireless MX08FRO665-21	105	194	2,133	0.005	6	166
Generic Flat Platform with Handrails	104	2,500	27,040	0.066	82	2,143
		41,606	411,806	1.000	1,248	35,671

**1.2D + 1.0Ev + 1.0Eh Seismic**

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-50.23	-1.25	0.00	-165.69	0.00	165.69	4,132.30	1,078.56	5,030	4,392.86	0.00	0.00	0.05
5.00	-48.70	-1.26	0.00	-159.43	0.00	159.43	4,073.40	1,054.02	4,804	4,231.01	0.01	-0.01	0.05
10.00	-47.21	-1.27	0.00	-153.12	0.00	153.12	4,012.86	1,029.48	4,583	4,070.37	0.02	-0.02	0.05
15.00	-45.74	-1.28	0.00	-146.77	0.00	146.77	3,950.69	1,004.94	4,367	3,911.06	0.05	-0.03	0.05
20.00	-44.30	-1.28	0.00	-140.38	0.00	140.38	3,886.88	980.40	4,156	3,753.20	0.10	-0.05	0.05
25.00	-42.89	-1.29	0.00	-133.96	0.00	133.96	3,821.44	955.86	3,951	3,596.91	0.15	-0.06	0.05
30.00	-41.50	-1.29	0.00	-127.51	0.00	127.51	3,754.36	931.32	3,751	3,442.32	0.22	-0.07	0.05
35.00	-40.15	-1.30	0.00	-121.03	0.00	121.03	3,685.65	906.78	3,556	3,289.53	0.30	-0.09	0.05
40.00	-38.83	-1.30	0.00	-114.55	0.00	114.55	3,615.30	882.24	3,366	3,138.66	0.40	-0.10	0.05
45.00	-38.05	-1.30	0.00	-108.05	0.00	108.05	3,543.31	857.70	3,181	2,989.85	0.51	-0.11	0.05
48.00	-37.20	-1.30	0.00	-104.15	0.00	104.15	3,499.34	842.97	3,073	2,901.60	0.59	-0.12	0.05
50.00	-35.82	-1.29	0.00	-101.55	0.00	101.55	3,469.70	833.16	3,002	2,843.21	0.64	-0.13	0.05
53.25	-35.44	-1.29	0.00	-97.35	0.00	97.35	2,730.91	692.97	2,492	2,236.98	0.73	-0.14	0.06
55.00	-34.35	-1.29	0.00	-95.09	0.00	95.09	2,712.30	685.82	2,441	2,198.61	0.78	-0.14	0.06
60.00	-33.29	-1.29	0.00	-88.65	0.00	88.65	2,658.03	665.37	2,297	2,089.87	0.94	-0.16	0.06
65.00	-32.25	-1.28	0.00	-82.22	0.00	82.22	2,602.12	644.92	2,158	1,982.52	1.11	-0.18	0.05
70.00	-31.24	-1.27	0.00	-75.82	0.00	75.82	2,544.57	624.47	2,024	1,876.69	1.31	-0.19	0.05
75.00	-30.25	-1.27	0.00	-69.45	0.00	69.45	2,485.39	604.02	1,893	1,772.49	1.52	-0.21	0.05
80.00	-29.28	-1.25	0.00	-63.13	0.00	63.13	2,424.58	583.57	1,767	1,670.06	1.76	-0.23	0.05
85.00	-28.34	-1.24	0.00	-56.85	0.00	56.85	2,362.13	563.12	1,646	1,569.50	2.01	-0.25	0.05
90.00	-27.43	-1.23	0.00	-50.64	0.00	50.64	2,297.28	542.67	1,528	1,470.45	2.28	-0.27	0.05
95.00	-26.93	-1.22	0.00	-44.50	0.00	44.50	2,210.71	522.22	1,415	1,361.18	2.57	-0.28	0.05
97.75	-26.37	-1.21	0.00	-41.15	0.00	41.15	2,163.10	510.97	1,355	1,302.88	2.73	-0.29	0.04
100.00	-26.00	-1.20	0.00	-38.43	0.00	38.43	2,124.14	501.77	1,307	1,256.13	2.87	-0.30	0.04
101.50	-25.68	-1.19	0.00	-36.63	0.00	36.63	1,105.19	302.60	792	659.76	2.97	-0.31	0.08
104.00	-22.45	-1.09	0.00	-33.64	0.00	33.64	1,092.66	296.47	760	638.98	3.13	-0.32	0.07
105.00	-21.06	-1.05	0.00	-32.55	0.00	32.55	1,087.54	294.01	748	630.68	3.20	-0.32	0.07
110.00	-20.46	-1.04	0.00	-27.28	0.00	27.28	1,060.92	281.74	686	589.40	3.55	-0.35	0.07
115.00	-19.82	-1.02	0.00	-22.08	0.00	22.08	1,032.68	269.47	628	548.55	3.93	-0.37	0.06
120.00	-19.50	-1.01	0.00	-16.97	0.00	16.97	1,002.79	257.20	572	508.25	4.33	-0.39	0.05
123.00	-19.03	-1.00	0.00	-13.92	0.00	13.92	984.08	249.84	540	484.38	4.58	-0.40	0.05
125.00	-17.10	-0.91	0.00	-11.93	0.00	11.93	971.28	244.93	519	468.61	4.75	-0.41	0.04
126.00	-13.66	-0.75	0.00	-11.02	0.00	11.02	964.78	242.48	508	460.77	4.84	-0.41	0.04
127.00	-13.17	-0.73	0.00	-10.26	0.00	10.26	958.21	240.02	498	452.97	4.92	-0.42	0.04
129.20	-12.30	-0.69	0.00	-8.65	0.00	8.65	943.54	234.62	476	435.92	5.12	-0.42	0.03
129.40	-11.85	-0.67	0.00	-8.51	0.00	8.51	942.19	234.13	474	434.38	5.13	-0.43	0.03
129.70	-11.56	-0.66	0.00	-8.31	0.00	8.31	940.16	233.40	471	432.07	5.16	-0.43	0.03
130.00	-11.23	-0.64	0.00	-8.11	0.00	8.11	938.12	232.66	468	429.76	5.19	-0.43	0.03
134.00	-10.08	-0.58	0.00	-5.55	0.00	5.55	910.42	222.85	429	399.33	5.55	-0.44	0.03
135.00	-10.02	-0.58	0.00	-4.97	0.00	4.97	903.34	220.39	420	391.82	5.64	-0.44	0.02
136.00	-7.50	-0.45	0.00	-4.39	0.00	4.39	896.18	217.94	411	384.35	5.73	-0.44	0.02
138.90	-7.45	-0.44	0.00	-3.09	0.00	3.09	875.07	210.82	384	362.93	6.00	-0.44	0.02

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
139.20	-7.08	-0.42	0.00	-2.96	0.00	2.96	872.85	210.08	382	360.73	6.03	-0.44	0.02
140.00	-6.90	-0.41	0.00	-2.62	0.00	2.62	866.91	208.12	375	354.90	6.11	-0.45	0.02
143.00	-3.86	-0.24	0.00	-1.38	0.00	1.38	844.27	200.76	349	333.29	6.39	-0.45	0.01
145.00	-3.63	-0.23	0.00	-0.90	0.00	0.90	828.85	195.85	332	319.13	6.57	-0.45	0.01
149.00	0.00	-0.20	0.00	0.00	0.00	0.00	787.55	186.03	299	287.88	6.95	-0.45	0.00

**0.9D - 1.0Ev + 1.0Eh Seismic (Reduced DL)**

**CALCULATED FORCES**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-34.66	-1.25	0.00	-161.49	0.00	161.49	4,132.30	1,078.56	5,030	4,392.86	0.00	0.00	0.05
5.00	-33.60	-1.26	0.00	-155.24	0.00	155.24	4,073.40	1,054.02	4,804	4,231.01	0.01	-0.01	0.05
10.00	-32.57	-1.26	0.00	-148.95	0.00	148.95	4,012.86	1,029.48	4,583	4,070.37	0.02	-0.02	0.05
15.00	-31.55	-1.27	0.00	-142.64	0.00	142.64	3,950.69	1,004.94	4,367	3,911.06	0.05	-0.03	0.04
20.00	-30.56	-1.27	0.00	-136.30	0.00	136.30	3,886.88	980.40	4,156	3,753.20	0.09	-0.05	0.04
25.00	-29.59	-1.27	0.00	-129.95	0.00	129.95	3,821.44	955.86	3,951	3,596.91	0.15	-0.06	0.04
30.00	-28.63	-1.28	0.00	-123.58	0.00	123.58	3,754.36	931.32	3,751	3,442.32	0.22	-0.07	0.04
35.00	-27.70	-1.28	0.00	-117.20	0.00	117.20	3,685.65	906.78	3,556	3,289.53	0.30	-0.08	0.04
40.00	-26.79	-1.28	0.00	-110.81	0.00	110.81	3,615.30	882.24	3,366	3,138.66	0.39	-0.10	0.04
45.00	-26.25	-1.28	0.00	-104.44	0.00	104.44	3,543.31	857.70	3,181	2,989.85	0.50	-0.11	0.04
48.00	-25.66	-1.27	0.00	-100.61	0.00	100.61	3,499.34	842.97	3,073	2,901.60	0.57	-0.12	0.04
50.00	-24.72	-1.26	0.00	-98.07	0.00	98.07	3,469.70	833.16	3,002	2,843.21	0.62	-0.12	0.04
53.25	-24.45	-1.26	0.00	-93.96	0.00	93.96	2,730.91	692.97	2,492	2,236.98	0.71	-0.13	0.05
55.00	-23.70	-1.26	0.00	-91.75	0.00	91.75	2,712.30	685.82	2,441	2,198.61	0.76	-0.14	0.05
60.00	-22.96	-1.25	0.00	-85.46	0.00	85.46	2,658.03	665.37	2,297	2,089.87	0.91	-0.15	0.05
65.00	-22.25	-1.25	0.00	-79.19	0.00	79.19	2,602.12	644.92	2,158	1,982.52	1.08	-0.17	0.05
70.00	-21.55	-1.24	0.00	-72.96	0.00	72.96	2,544.57	624.47	2,024	1,876.69	1.27	-0.19	0.05
75.00	-20.87	-1.23	0.00	-66.78	0.00	66.78	2,485.39	604.02	1,893	1,772.49	1.48	-0.21	0.05
80.00	-20.20	-1.21	0.00	-60.64	0.00	60.64	2,424.58	583.57	1,767	1,670.06	1.70	-0.22	0.05
85.00	-19.55	-1.20	0.00	-54.57	0.00	54.57	2,362.13	563.12	1,646	1,569.50	1.94	-0.24	0.04
90.00	-18.92	-1.18	0.00	-48.57	0.00	48.57	2,297.28	542.67	1,528	1,470.45	2.21	-0.26	0.04
95.00	-18.58	-1.18	0.00	-42.65	0.00	42.65	2,210.71	522.22	1,415	1,361.18	2.48	-0.27	0.04
97.75	-18.19	-1.16	0.00	-39.42	0.00	39.42	2,163.10	510.97	1,355	1,302.88	2.65	-0.28	0.04
100.00	-17.93	-1.15	0.00	-36.81	0.00	36.81	2,124.14	501.77	1,307	1,256.13	2.78	-0.29	0.04
101.50	-17.71	-1.15	0.00	-35.08	0.00	35.08	1,105.19	302.60	792	659.76	2.87	-0.30	0.07
104.00	-15.48	-1.05	0.00	-32.21	0.00	32.21	1,092.66	296.47	760	638.98	3.03	-0.31	0.07
105.00	-14.52	-1.01	0.00	-31.16	0.00	31.16	1,087.54	294.01	748	630.68	3.10	-0.31	0.06
110.00	-14.12	-1.00	0.00	-26.09	0.00	26.09	1,060.92	281.74	686	589.40	3.43	-0.33	0.06
115.00	-13.67	-0.98	0.00	-21.11	0.00	21.11	1,032.68	269.47	628	548.55	3.80	-0.36	0.05
120.00	-13.45	-0.97	0.00	-16.21	0.00	16.21	1,002.79	257.20	572	508.25	4.18	-0.38	0.05
123.00	-13.13	-0.95	0.00	-13.31	0.00	13.31	984.08	249.84	540	484.38	4.42	-0.39	0.04
125.00	-11.80	-0.87	0.00	-11.40	0.00	11.40	971.28	244.93	519	468.61	4.59	-0.40	0.04
126.00	-9.42	-0.72	0.00	-10.53	0.00	10.53	964.78	242.48	508	460.77	4.67	-0.40	0.03
127.00	-9.09	-0.70	0.00	-9.81	0.00	9.81	958.21	240.02	498	452.97	4.76	-0.40	0.03
129.20	-8.48	-0.66	0.00	-8.27	0.00	8.27	943.54	234.62	476	435.92	4.94	-0.41	0.03
129.40	-8.17	-0.64	0.00	-8.14	0.00	8.14	942.19	234.13	474	434.38	4.96	-0.41	0.03
129.70	-7.97	-0.63	0.00	-7.95	0.00	7.95	940.16	233.40	471	432.07	4.99	-0.41	0.03
130.00	-7.75	-0.61	0.00	-7.76	0.00	7.76	938.12	232.66	468	429.76	5.01	-0.41	0.03
134.00	-6.95	-0.56	0.00	-5.31	0.00	5.31	910.42	222.85	429	399.33	5.36	-0.42	0.02
135.00	-6.91	-0.55	0.00	-4.75	0.00	4.75	903.34	220.39	420	391.82	5.45	-0.42	0.02
136.00	-5.18	-0.43	0.00	-4.20	0.00	4.20	896.18	217.94	411	384.35	5.54	-0.42	0.02
138.90	-5.14	-0.42	0.00	-2.96	0.00	2.96	875.07	210.82	384	362.93	5.80	-0.43	0.01
139.20	-4.89	-0.41	0.00	-2.83	0.00	2.83	872.85	210.08	382	360.73	5.82	-0.43	0.01
140.00	-4.76	-0.40	0.00	-2.51	0.00	2.51	866.91	208.12	375	354.90	5.89	-0.43	0.01
143.00	-2.66	-0.23	0.00	-1.32	0.00	1.32	844.27	200.76	349	333.29	6.17	-0.43	0.01
145.00	-2.50	-0.22	0.00	-0.86	0.00	0.86	828.85	195.85	332	319.13	6.35	-0.43	0.01
149.00	0.00	-0.20	0.00	0.00	0.00	0.00	787.55	186.03	299	287.88	6.71	-0.43	0.00

ANALYSIS SUMMARY

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.0W	26.68	0.00	49.88	0.00	0.00	3112.31	101.50	0.99
0.9D + 1.0W	26.66	0.00	37.40	0.00	0.00	3051.51	101.50	0.95
1.2D + 1.0Di + 1.0Wi	6.89	0.00	68.48	0.00	0.00	802.30	101.50	0.28
1.2D + 1.0Ev + 1.0Eh	1.30	0.00	50.23	0.00	0.00	165.69	101.50	0.08
0.9D - 1.0Ev + 1.0Eh	1.28	0.00	34.66	0.00	0.00	161.49	101.50	0.07
1.0D + 1.0W	6.28	0.00	41.60	0.00	0.00	724.74	101.50	0.24

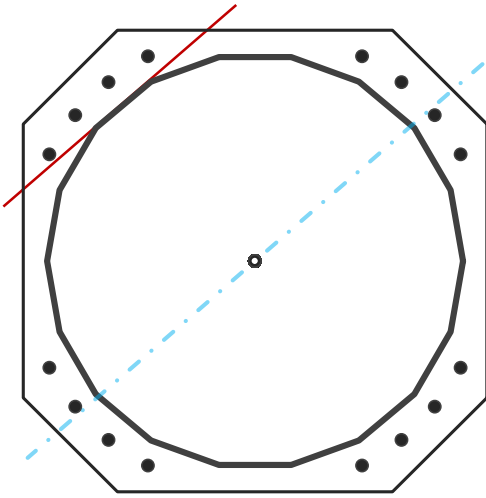
## Base Plate & Anchor Rod Analysis

Pole Dimensions		
Number of Sides	18	-
Diameter	52.01	in
Thickness	3/8	in
Orientation Offset	0	°

Base Reactions		
Moment, Mu	3112.3	k-ft
Axial, Pu	49.9	k
Shear, Vu	26.7	k
Neutral Axis	41	°

Report Capacities		
Component	Capacity	Result
Base Plate	52%	Pass
Anchor Rods	66%	Pass
Dwyidag	-	-

Base Plate		
Shape	Square	-
Width	59	in
Thickness	2 3/4	in
Grade	A633 Gr. E	
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	80	ksi
Clip	12	in
Orientation Offset	0	°
Anchor Rod Detail	d	$\eta=0.5$
Clear Distance	3	in
Applied Moment, Mu	1646.7	k
Bending Stress, $\phi Mn$	3195.9	k



Original Anchor Rods		
Arrangement	Cluster	-
Quantity	16	-
Diameter, $\phi$	2 1/4	in
Bolt Circle	59	in
Grade	A615-75	
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Spacing	6.0	in
Orientation Offset	0	°
Applied Force, Pu	161.2	k
Anchor Rods, $\phi Pn$	243.6	k



# Calculations for Monopole Base Plate & Anchor Rod Analysis

## Reaction Distribution

Reaction	Shear Vu	Moment Mu	Factor
-	k	k-ft	-
Base Forces	26.7	3112.3	1.00
Anchor Rod Forces	26.7	3112.3	1.00
Additional Bolt (Grp1) Forces	0.0	0.0	0.00
Additional Bolt (Grp2) Forces	0.0	0.0	0.00
Dywidag Forces	0.0	0.0	0.00
Stiffener Forces	0.0	0.0	0.00

## Geometric Properties

Section	Gross Area	Net Area	Individual Inertia	Threads per Inch	Moment of Inertia
-	in <sup>2</sup>	in <sup>2</sup>	in <sup>4</sup>	#	in <sup>4</sup>
Pole	60.5227	3.3624	0.1582		20173.34
Bolt	3.9761	3.2477	0.8393	4.5	22623.84
Bolt1	0.0000	0.0000	0.0000	0	0.00
Bolt2	0.0000	0.0000	0.0000	0	0.00
Dywidag	0.0000	0.0000	0.0000		0.00
Stiffener	0.0000	0.0000	0.0000		0.00

Base Plate		
Shape	Square	-
Width, W	59	in
Thickness, t	2.75	in
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	80	ksi
Base Plate Chord	27.856	in
Detail Type	d	-
Detail Factor	0.50	-
Clear Distance	3	-

Anchor Rods		
Anchor Rod Quantity, N	16	-
Rod Diameter, d	2.25	in
Bolt Circle, BC	59	in
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Applied Axial, Pu	161.2	k
Applied Shear, Vu	0.1	k
Compressive Capacity, φPn	243.6	k
Tensile Capacity, φRnt	0.662	OK
Interaction Capacity	0.663	OK

External Base Plate		
Chord Length AA	31.304	in
Additional AA	0.000	in
Section Modulus, Z	59.183	in <sup>3</sup>
Applied Moment, Mu	1646.7	k-ft
Bending Capacity, φMn	3195.9	k-ft
Capacity, Mu/φMn	0.515	OK
Chord Length AB	30.499	in
Additional AB	0.000	in
Section Modulus, Z	57.663	in <sup>3</sup>
Applied Moment, Mu	1394.5	k-ft
Bending Capacity, φMn	3113.8	k-ft
Capacity, Mu/φMn	0.448	OK
Bend Line Length	0.000	in
Additional Bend Line	0.000	in
Section Modulus, Z	0.000	in <sup>3</sup>
Applied Moment, Mu	0.0	k-ft
Bending Capacity, φMn	0.0	k-ft
Capacity, Mu/φMn		

Internal Base Plate		
Arc Length	0.000	in
Section Modulus, Z	0.000	in <sup>3</sup>
Moment Arm	0.000	in
Applied Moment, Mu	0.0	k-ft
Bending Capacity, φMn	0.0	k-ft
Capacity, Mu/φMn		

**Site Name:** West Haven & RT 162, CT  
**Site Number:** 243036  
**Tower Type:** MP  
**Design Loads (Factored) - Analysis per TIA-222-H Standards**

## Monolithic Mat & Pier Foundation Analysis

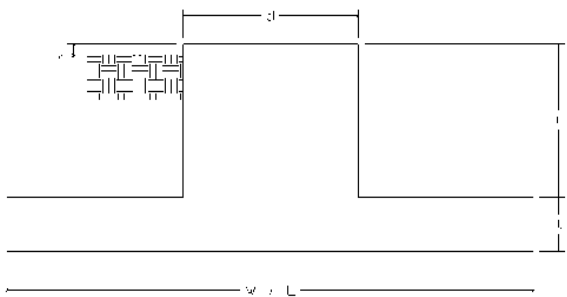
Foundation Analysis Parameters		
Design / Analysis / Mapping:	Analysis	-
Compression/Leg:	49.9	k
Uplift/Leg:	0.0	k
Total Shear:	26.7	k
Moment:	3,112.3	k-ft
Tower + Appurtenance Weight:	49.9	k
Depth to Base of Foundation (l + t - h):	5.5	ft
Diameter of Pier (d):	7	ft
Length of Pier (l):	4.5	ft
Height of Pier above Ground (h):	1	ft
Width of Pad (W):	22.5	ft
Length of Pad (L):	22.5	ft
Thickness of Pad (t):	2	ft
Tower Leg Center to Center:	0	ft
Number of Tower Legs:	1	-
Tower Center from Mat Center:	0	ft
Depth Below Ground Surface to Water Table:	5	ft
Unit Weight of Concrete:	150	pcf
Unit Weight of Soil Above Water Table:	125	pcf
Unit Weight of Water:	62.4	pcf
Unit Weight of Soil Below Water Table:	62.6	pcf
Friction Angle of Uplift:	15	°
Coefficient of Shear Friction:	0.45	-
Ultimate Compressive Bearing Pressure:	15,000	psf
Ultimate Passive Pressure on Pad Face:	1,800	psf
$f_{\text{Soil and Concrete Weight}}$ :	0.9	-
$f_{\text{Soil}}$ :	0.75	-

Overturning Moment Usage		
Design OTM:	3285.7	k-ft
OTM Resistance:	4333.0	k-ft
Design OTM / OTM Resistance:	76%	Pass

Soil Bearing Pressure Usage		
Net Bearing Pressure:	7113	psf
Factored Nominal Bearing Pressure:	11250	psf
Factored Nominal (Net) Bearing Pressure:	63%	Pass
Load Direction Controlling Design Bearing Pressure:	Diagonal to Pad Edge	

Sliding Factor of Safety		
Ultimate Friction Resistance:	183.7	k
Ultimate Passive Pressure Resistance:	60.8	k
Total Factored Sliding Resistance:	183.4	k
Sliding Design / Sliding Resistance:	15%	Pass

Foundation Steel Parameters		
Shear/Leg (Compression):	17.8	k
Shear/Leg (Uplift):	14.7	k
Concrete Strength ( $f'_c$ ):	4,000	psi
Pad Tension Steel Depth:	20.50	in
Dead Load Factor:	0.9	-
$f_{\text{Shear}}$ :	0.75	-
$f_{\text{Flexure / Tension}}$ :	0.9	-
$f_{\text{Compression}}$ :	0.65	-
b:	0.85	-
Bottom Pad Rebar Size #:	8	-
# of Bottom Pad Rebar:	38	-
Pad Bottom Steel Area:	30.02	in <sup>2</sup>
Pad Steel $F_y$ :	60,000	psi
Top Pad Rebar Size #:	8	-
# of Top Pad Rebar:	38	-
Pad Top Steel Area:	30.02	in <sup>2</sup>
Pier Rebar Size #:	8	-
Pier Steel Area (Single Bar):	0.79	in <sup>2</sup>
# of Pier Rebar:	36	-
Pier Steel $F_y$ :	60,000	psi
Pier Cage Diameter:	76.0	in
Rebar Strain Limit:	0.008	-
Steel Elastic Modulus:	29,000	ksi
Tie Rebar Size #:	4	-
Tie Steel Area (Single Bar):	0.20	in <sup>2</sup>
Tie Spacing:	12	in
Tie Steel $F_y$ :	60,000	psi
Clear Cover:	3	in



Pad Strength Capacity			
Factored One Way Shear ( $V_u$ ):	391.0	k	
One Way Shear Capacity ( $fV_n$ ):	525.1	k	ACI 318-14 25.5.5.1
$V_u / fV_n$ :	74%	Pass	
Load Direction Controlling Shear Capacity:	Parallel to Pad Edge		
Lower Steel Pad Factored Moment ( $M_u$ ):	2263.1	k-ft	
Lower Steel Pad Moment Capacity ( $fM_n$ ):	2656.7	k-ft	ACI 318-14 22.3.1.1
$M_u / fM_n$ :	85%	Pass	
Load Direction Controlling Flexural Capacity:	Parallel to Pad Edge		
Upper Steel Pad Factored Moment ( $M_u$ ):	477.2	k-ft	
Upper Steel Pad Moment Capacity ( $fM_n$ ):	2656.7	k-ft	
$M_u / fM_n$ :	18%	Pass	
Lower Pad Flexural Reinforcement Ratio:	0.0054		OK - ACI 318-14 7.6.1.1 & 8.6.1.1
Upper Pad Flexural Reinforcement Ratio:	0.0054		OK - ACI 318-14 7.6.1.1 & 8.6.1.1
Pad Shrinkage Reinforcement Ratio:	0.0108		OK - ACI 318-14 24.4.3.2
Lower Pad Reinforcement Spacing:	7.1	in	OK - ACI 318-14 7.7.2.3, 8.7.2.2, & 24.4.3.3
Upper Pad Reinforcement Spacing:	7.1	in	OK - ACI 318-14 7.7.2.3, 8.7.2.2, & 24.4.3.3
Ultimate Punching Shear Stress, $v_u$ :	75.10	psi	ACI 318-14 R8.4.4.2.3
Nominal Punching Shear Capacity ( $f_c v_c$ ):	189.7	psi	ACI 318-14 22.6.5.2
$v_u / f_c v_c$ :	40%	Pass	
Pier Moment Pad Flexure Transfer Ratio, $\gamma_f$ :	0.60		TIA-222-H 9.4.2
Moment Transfer Effective Flexural Width, $B_{eff}$ :	13.00	ft	TIA-222-H 9.4.2
Moment Transfer Through Pad Flexure:	23272.74	k-in	TIA-222-H 9.4.2
Moment Transfer Flexural Capacity ( $fM_{sc,f}$ ):	19181.16	k-in	
$g_f M_{sc} / fM_{sc,f}$ :	0%	Pass	

Pier Strength Capacity			
Factored Moment in Pier ( $M_u$ ):	3232.3	k-ft	
Pier Moment Capacity ( $fM_n$ ):	4756.5	k-ft	
$M_u / fM_n$ :	68%	Pass	
Factored Shear in Pier ( $V_u$ ):	26.7	k	
Pier Shear Capacity ( $fV_n$ ):	628.9	k	ACI 318-14 22.5.1.1
$V_u / fV_n$ :	4%	Pass	
Pier Shear Reinforcement Ratio:	0.0004		OK - No Ties Necessary for Shear - ACI11.5.6.1
Factored Tension in Pier ( $T_u$ ):	0.0	k	
Pier Tension Capacity ( $fT_n$ ):	1535.8	k	
$T_u / fT_n$ :	0%	Pass	
Factored Compression in Pier ( $P_u$ ):	49.9	k	
Pier Compression Capacity ( $fP_n$ ):	9772.2	k	ACI 318-14 22.4.2.1
$P_u / fP_n$ :	1%	Pass	
Pier Compression Reinforcement Ratio:	0.005		OK - TIA-222-H 9.4.1
Minimum Depth to Develop Vertical Rebar:	29	in	ACI 318-14 25.4.2.3
Minimum Hook Development Length:	19	in	ACI 318-14 25.4.3.1
Minimum Mat Thickness / Edge Distance from Pier:	22.0	in	
Minimum Foundation Depth:	4.02	ft	
$M_u / f_B M_n + T_u / f_T T_n$ :	68%	Pass	