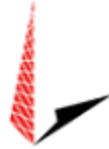




AMERICAN TOWER®
CORPORATION

This report was prepared for American Tower Corporation by



**TOWER
ENGINEERING
PROFESSIONALS**

Structural Analysis Report

Structure : 150 ft Monopole
ATC Site Name : Woods Chapel,MO
ATC Site Number : 306042
Engineering Number : 13681558_C3_04
Proposed Carrier : VERIZON WIRELESS
Carrier Site Name : WOODS CHAPEL
Carrier Site Number : 140737
Site Location : 1204 N.e. Woods Chapel Road
Lees Summit, MO 64064-1989
38.9832, -94.3501
County : Jackson
Date : October 12, 2021
Max Usage : 101%
Result : Pass

Prepared By:
Cameron Tokay
TEP

Reviewed By:



10/13/2021

COA : 2006031326



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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 150 ft Monopole to reflect the change in loading by VERIZON WIRELESS.

Supporting Documents

Tower Drawings	Valmont Drawing #DC2215Z, dated March 3, 1995
Foundation Drawing	Valmont Drawing #2721, dated March 8, 1995
Geotechnical Report	Terracon Project #02955036, dated February 24, 1995

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:	109 mph (3-second gust)
Basic Wind Speed w/ Ice:	40 mph (3-second gust) w/ 1.50" radial ice concurrent
Code:	ANSI/TIA-222-H / 2009 IBC
Exposure Category:	C
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Spectral Response:	$S_s = 0.10$, $S_i = 0.07$
Site Class:	D - Stiff Soil - Default

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

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
152.0	1	Raycap DC6-48-60-18-8C	Platform with Handrails	(2) 0.39" (10mm) Fiber Trunk (6) 0.78" (19.7mm) 8 AWG 6 (9) 1 5/8" Coax (2) 2" conduit (1) 3/8" (0.38"- 9.5mm) RET Control Cable	AT&T MOBILITY
	1	Raycap DC6-48-60-0-8C			
	1	Raycap DC6-48-60-18-8F(32.8 lbs)			
	3	Nokia AirScale RRH 4T4R B5 160W AHCA			
	3	Powerwave Allgon TT08-19DB111-001			
	6	CCI TPA65R-BU8D			
	3	Alcatel-Lucent RRH4X25-WCS			
	3	Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB			
	3	Nokia AEQK AirScale MAA 64T64R 192AE n77 200W			
	3	Commscope JAH4-65C-R4			
3	Nokia AHLBBA				
140.0	-	-	Low Profile Platform	(2) 1 1/4" Hybriflex Cable (12) 1 5/8" Coax	VERIZON WIRELESS
126.0	1	Commscope HELIAX FiberFeed 12 RRU Pendant Connect	Platform with Handrails	(5) 1 5/8" Coax (2) 1.46" (37.1mm) Hybrid (6) 7/8" Coax	T-MOBILE
	3	Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA			
	3	Nokia AHFIG 70.55 lbs			
	1	Raycap ASU9338TYP01			
	3	Nokia AEHC			
	3	Commscope FFHH-65C-R3			
122.0	9	Generic 48" x 12" Panel	Platform with Handrails	(9) 1 1/4" Coax	SPRINT NEXTEL
115.0	2	DragonWave Horizon DUO (Radio)	Flush	(2) 1/2" Coax (1) 2" conduit	CLEARWIRE CORPORATION
	2	Andrew Microwaves VHLP2.5			
	3	Argus LLPX310R			
	3	Samsung 2.5GHz nRRHv2			
105.0	3	Fujitsu TA08025-B605	Platform with Handrails	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	3	Fujitsu TA08025-B604			
	1	Commscope RDIDC-9181-PF-48			
	3	JMA Wireless MX08FRO665-21			

Equipment to be Removed

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
140.0	3	Commscope CBC78-DF-2X	-	-	VERIZON WIRELESS
	3	Commscope TMA-T-DB78-DD-A			
	2	RFS DB-B1-6C-12AB-OZ			
	6	Andrew LNX-6515DS-A1M			
	3	Ericsson AIR 32 (57" Height)			
	3	Kathrein Scala 800 10510V01			
	3	Ericsson RRUS B13 w/ RRUS A2			



Proposed Equipment

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
140.0	6	Powerwave Allgon LGP 13901	Low Profile Platform	-	VERIZON WIRELESS
	3	Ericsson Radio 4449 - B13&B5			
	3	Ericsson 8843 Rev 2			
	2	Raycap RRFDC-3315-PF-48			
	3	Ericsson AIR 6449 B77D/ C-Band			
	3	Antel BXA-80063/8CF			
	6	Commscope NHH-65C-R2B			

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

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	101%	Pass
Shaft	54%	Pass
Base Plate	16%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3945.6	64%
Axial (Kips)	69.3	6%
Shear (Kips)	36.7	47%

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, Twist and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
140.0	Powerwave Allgon LGP 13901	VERIZON WIRELESS	1.269	0.990
	Ericsson Radio 4449 - B13&B5			
	Ericsson 8843 Rev 2			
	Raycap RRFDC-3315-PF-48			
	Ericsson AIR 6449 B77D/ C-Band			
	Antel BXA-80063/8CF			
	Commscope NHH-65C-R2B			
115.0	Andrew Microwaves VHLP2.5	CLEARWIRE CORPORATION	0.857	0.880

*Deflection, Twist 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 ATC Tower Services 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 ATC Tower Services

It is the responsibility of the client to ensure that the information provided to ATC Tower Services and used in the performance of our engineering services is correct and complete.

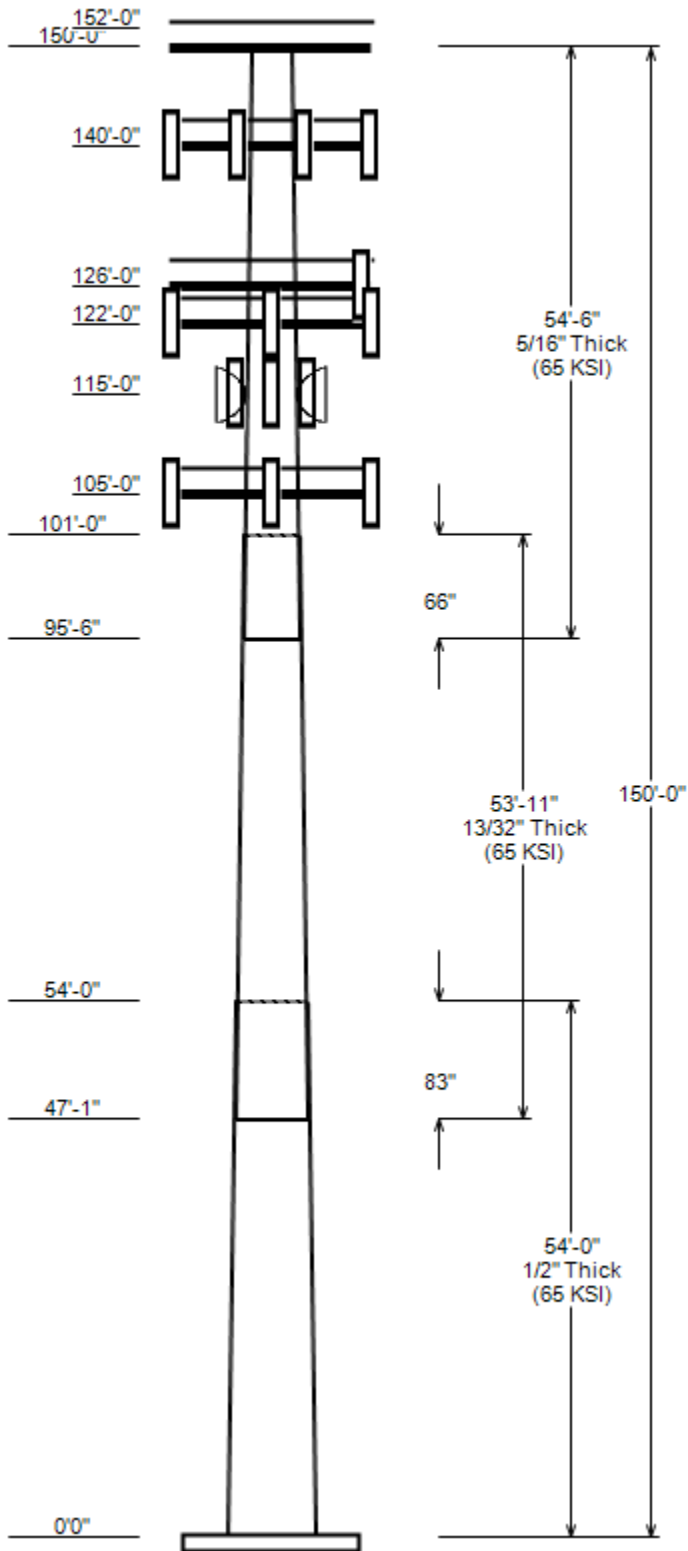
All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with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

Unless explicitly agreed by both the client and ATC Tower Services, 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. ATC Tower Services is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

Asset : 306042, Woods Chapel
 Client : VERIZON WIRELESS
 Code : ANSI/TIA-222-H

Height : 150 ft
 Base Width : 60.5
 Shape : 12 Sides



SITE PARAMETERS

Base Elev (ft): 0.00 Structure Class: II
 Taper : 0.24800 (In/ft) Exposure : C
 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	54.000	47.11	60.50	0.500	0.000	65
2	53.917	36.27	49.64	0.406	83.000	65
3	54.500	24.74	38.26	0.312	66.000	65

DISCRETE APPURTENANCE

Attach Elev (ft)	Force Elev (ft)	Qty	Description
152.0	152.0	3	Powerwave Allgon TT08-19DB111-
152.0	152.0	3	Nokia AirScale RRH 4T4R B5 160
152.0	152.0	1	Raycap DC6-48-60-18-8F(32.8 lb
152.0	152.0	1	Raycap DC6-48-60-0-8C
152.0	152.0	1	Raycap DC6-48-60-18-8C
152.0	152.0	3	Nokia AHLBBA
152.0	152.0	3	Alcatel-Lucent RRH4X25-WCS
152.0	152.0	3	Nokia AirScale Dual RRH 4T4R B
152.0	152.0	3	Nokia AEQK AirScale MAA 64T64R
152.0	152.0	3	Commscope JAH4-65C-R4
152.0	152.0	6	CCI TPA65R-BU8D
150.0	150.0	1	Generic Mount Reinforcement
150.0	150.0	1	Generic Round Platform with Ha
140.0	140.0	6	Powerwave Allgon LGP 13901
140.0	140.0	3	Ericsson Radio 4449 - B13&B5
140.0	140.0	3	Ericsson 8843 Rev 2
140.0	140.0	2	Raycap RRFDC-3315-PF-48
140.0	140.0	3	Ericsson AIR 6449 B77D/ C-Band
140.0	140.0	1	Generic Mount Reinforcement
140.0	140.0	3	Antel BXA-80063/8CF
140.0	140.0	6	Commscope NHH-65C-R2B
140.0	140.0	1	Generic Round Platform with Ha
126.0	126.0	1	Commscope HELIAX FiberFeed 12
126.0	126.0	3	Nokia AirScale Dual RRH 4T4R B
126.0	126.0	3	Nokia AHFIG 70.55 lbs
126.0	126.0	1	Raycap ASU9338TYP01
126.0	126.0	3	Nokia AEHC
126.0	126.0	3	Commscope FFHH-65C-R3
126.0	126.0	1	Generic Round Platform with Ha
122.0	122.0	9	Generic 48" x 12" Panel
122.0	122.0	1	Generic Flat Platform with Han
115.0	115.0	2	DragonWave Horizon DUO (Radio)
115.0	115.0	3	Samsung 2.5GHz nRRHv2
115.0	115.0	3	Argus LLPX310R
115.0	115.0	2	Andrew Microwaves VHLP2.5
115.0	115.0	1	Side Arms
105.0	105.0	1	Commscope RDIDC-9181-PF-48
105.0	105.0	3	Fujitsu TA08025-B605
105.0	105.0	3	Fujitsu TA08025-B604
105.0	105.0	3	JMA Wireless MX08FRO665-21
105.0	105.0	1	Generic Round Platform with Ha

JOB INFORMATION

Asset : 306042, Woods Chapel
 Client : VERIZON WIRELESS
 Code : ANSI/TIA-222-H

Height : 150 ft
 Base Width : 60.5
 Shape : 12 Sides

LINEAR APPURTENANCE

Elev From (ft)	Elev To (ft)	Description	Exp To Wind
5.0	152.0	2" conduit	No
5.0	152.0	1 5/8" Coax	No
5.0	152.0	0.78" (19.7mm) 8 AWG 6	No
0.0	152.0	3/8" (0.38"- 9.5mm) RET Control Cable	No
0.0	152.0	0.39" (10mm) Fiber Trunk	No
5.0	140.0	1 5/8" Coax	No
5.0	140.0	1 5/8" Coax	Yes
5.0	140.0	1 1/4" Hybriflex Cable	Yes
0.0	126.0	7/8" Coax	Yes
0.0	126.0	1.46" (37.1mm) Hybrid	Yes
0.0	126.0	1 5/8" Coax	Yes
0.0	126.0	1 5/8" Coax	Yes
0.0	126.0	1 5/8" Coax	Yes
0.0	122.0	1 1/4" Coax	No
5.0	115.0	2" conduit	Yes
0.0	115.0	1/2" Coax	Yes
0.0	105.0	1.60" (40.6mm) Hybrid	No

LOAD CASES

1.2D + 1.0W Normal	109 mph wind with no ice
0.9D + 1.0W Normal	109 mph wind with no ice
1.2D + 1.0Di + 1.0Wi Nor	40 mph wind with 1.5" radial ice
1.2D + 1.0Ev + 1.0Eh Nor	Seismic
0.9D - 1.0Ev + 1.0Eh Nor	Seismic (Reduced DL)
1.0D + 1.0W Service Norm	60 mph Wind with No Ice

REACTIONS

Load Case	Moment (kip-ft)	Shear (Kip)	Axial (Kip)
1.2D + 1.0W Normal	3945.61	36.69	69.29
0.9D + 1.0W Normal	3905.37	36.67	51.96
1.2D + 1.0Di + 1.0Wi Normal	799.94	7.10	109.55
1.2D + 1.0Ev + 1.0Eh Normal	372.76	3.00	68.62
0.9D - 1.0Ev + 1.0Eh Normal	368.36	3.00	49.10
1.0D + 1.0W Service Normal	1062.96	9.94	57.78

DISH DEFLECTIONS

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W Service Normal	115.00	10.278	0.878

ASSET: 306042, Woods Chapel
CUSTOMER: VERIZON WIRELESS

CODE: ANSI/TIA-222-H
ENG NO:

ANALYSIS PARAMETERS

Location:	Jackson County,MO	Height:	150 ft
Type and Shape:	Taper, 12 Sides	Base Diameter:	60.50 in
Manufacturer:	Valmont	Top Diameter:	24.74 in
K _d (non-service):	0.95	Taper:	0.2480 in/ft
K _e :	0.97	Rotation:	0.000°

ICE & WIND PARAMETERS

Exposure Category:	C	Design Wind Speed w/o Ice:	109 mph
Risk Category:	II	Design Wind Speed w/Ice:	40 mph
Topo Factor Procedure:	Method 1	Operational Wind Speed:	60 mph
Topographic Category:	1	Design Ice Thickness:	1.50 in
Crest Height:	0 ft	HMSL:	973.00 ft

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method				
Site Class:	D - Stiff Soil	Period Based on Rayleigh Method (sec):	2.25		
T _L (sec):	12	P:	1	C _s :	0.052
S _s :	0.113	S ₁ :	0.110	C _s Max:	0.052
F _a :	1.600	F _v :	2.380	C _s Min:	0.030
S _{ds} :	0.121	S _{d1} :	0.175		

LOAD CASES

1.2D + 1.0W Normal	109 mph wind with no ice
0.9D + 1.0W Normal	109 mph wind with no ice
1.2D + 1.0Di + 1.0Wi Normal	40 mph wind with 1.5" radial ice
1.2D + 1.0Ev + 1.0Eh Normal	Seismic
0.9D - 1.0Ev + 1.0Eh Normal	Seismic (Reduced DL)
1.0D + 1.0W Service Normal	60 mph Wind with No Ice

ASSET: 306042, Woods Chapel
 CUSTOMER: VERIZON WIRELESS

CODE: ANSI/TIA-222-H
 ENG NO:

SHAFT SECTION PROPERTIES

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint len (in)	Bottom							Top						
						Weight (lb)	Dia (in)	Elev (ft)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Dia (in)	Elev (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	54.00	0.5000	65		0.00	15,769	60.50	0.000	96.60	44,388.0	29.74	121.00	47.11	54.00	75.04	20,807.7	22.57	94.22	0.2480
2-12	53.92	0.4060	65	Slip	83.00	10,204	49.64	47.083	64.36	19,909.7	30.08	122.26	36.27	101.00	46.88	7,694.8	21.26	89.33	0.2480
3-12	54.50	0.3125	65	Slip	66.00	5,819	38.26	95.500	38.18	7,015.6	30.12	122.42	24.74	150.00	24.58	1,872.1	18.53	79.17	0.2480

Shaft Weight 31,792

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
152.00	Commscope JAH4-65C-R4	3	0.75	0.000	87.30	12.862	0.67	352.02	16.609	0.67
152.00	Nokia AEQK AirScale MAA 64T64R	3	0.75	0.000	99.20	4.351	0.67	215.34	5.752	0.67
152.00	Nokia AirScale Dual RRH 4T4R B	3	0.75	0.000	88.20	3.683	0.50	191.28	4.995	0.50
152.00	Alcatel-Lucent RRH4X25-WCS	3	0.75	0.000	70.00	3.165	0.50	161.42	4.464	0.50
152.00	Nokia AHLBBA	3	0.75	0.000	94.80	2.820	0.50	172.03	3.956	0.50
152.00	Raycap DC6-48-60-18-8C	1	0.75	0.000	16.00	2.030	1.00	74.24	2.790	1.00
152.00	CCI TPA65R-BU8D	6	0.75	0.000	82.50	18.089	0.63	427.41	21.783	0.63
152.00	Raycap DC6-48-60-18-8F(32.8 lb	1	0.75	0.000	32.80	1.470	1.00	94.52	2.169	1.00
152.00	Nokia AirScale RRH 4T4R B5 160	3	0.75	0.000	36.80	1.286	0.50	76.09	1.322	0.50
152.00	Powerwave Allgon TT08-19DB111-	3	0.75	0.000	22.00	0.793	0.50	48.57	1.429	0.50
152.00	Raycap DC6-48-60-0-8C	1	0.75	0.000	16.00	2.030	1.00	65.04	2.790	1.00
150.00	Generic Mount Reinforcement	1	1.00	0.000	200.00	7.500	1.00	393.60	14.990	1.00
150.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	4120.32	51.653	1.00
140.00	Ericsson Radio 4449 - B13&B5	3	0.75	0.000	70.00	1.650	0.50	125.95	2.492	0.50
140.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	4108.99	51.482	1.00
140.00	Commscope NHH-65C-R2B	6	0.75	0.000	51.60	11.389	0.70	278.60	14.597	0.70
140.00	Antel BXA-80063/8CF	3	0.75	0.000	24.00	10.660	0.65	208.87	13.810	0.65
140.00	Generic Mount Reinforcement	1	1.00	0.000	200.00	7.500	1.00	392.25	14.938	1.00
140.00	Ericsson AIR 6449 B77D/ C-Band	3	0.75	0.000	81.60	4.028	0.70	197.31	5.391	0.70
140.00	Raycap RRFDC-3315-PF-48	2	0.75	0.000	26.90	2.512	0.67	106.04	3.546	0.67
140.00	Ericsson 8843 Rev 2	3	0.75	0.000	75.00	1.650	0.50	136.66	2.494	0.50
140.00	Powerwave Allgon LGP 13901	6	0.75	0.000	9.90	0.503	0.50	24.53	0.985	0.50
126.00	Nokia AEHC	3	0.75	0.000	103.60	6.844	0.62	255.78	8.581	0.62
126.00	Commscope HELIAX FiberFeed 12	1	0.75	0.000	20.00	0.944	1.00	48.16	1.647	1.00
126.00	Raycap ASU9338TYP01	1	0.75	0.000	14.90	3.213	1.00	88.40	4.365	1.00
126.00	Nokia AirScale Dual RRH 4T4R B	3	0.75	0.000	83.80	2.218	0.67	146.50	3.219	0.67
126.00	Nokia AHFIG 70.55 lbs	3	0.75	0.000	70.60	2.763	0.67	135.18	3.919	0.67
126.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	4094.36	51.262	1.00
126.00	Commscope FFHH-65C-R3	3	0.75	0.000	125.70	21.138	0.63	534.37	24.805	0.63
122.00	Generic 48" x 12" Panel	9	0.75	0.000	30.00	5.067	0.66	141.03	6.902	0.66
122.00	Generic Flat Platform with Han	1	1.00	0.000	2500.00	42.400	1.00	4242.28	62.968	1.00
115.00	Argus LLPX310R	3	1.00	0.000	28.60	4.292	0.63	116.34	5.902	0.63
115.00	Samsung 2.5GHz nRRHv2	3	1.00	0.000	50.70	2.496	0.67	120.20	3.530	0.67
115.00	Side Arms	1	1.00	0.000	560.00	8.500	1.00	939.84	14.265	1.00
115.00	DragonWave Horizon DUO (Radio)	2	1.00	0.000	7.00	0.200	1.00	19.73	0.454	1.00
115.00	Andrew Microwaves VHLP2.5	2	1.00	0.000	47.60	8.430	1.00	215.39	10.088	1.00
105.00	Fujitsu TA08025-B604	3	0.75	0.000	63.90	1.962	0.50	120.18	2.850	0.50
105.00	Fujitsu TA08025-B605	3	0.75	0.000	75.00	1.962	0.50	135.46	2.850	0.50
105.00	JMA Wireless MX08FRO665-21	3	0.75	0.000	64.50	12.489	0.64	312.55	15.201	0.64
105.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	4063.17	50.791	1.00
105.00	Commscope RDIDC-9181-PF-48	1	0.75	0.000	21.90	1.867	1.00	76.82	2.736	1.00

Totals Num Loadings: 41 107 19,124.50 40,423.12

LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg) : 0.00_

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Dia (in)	Coax Wt (lb/ft)	Max Coax/ Row	Dist Between Rows(in)	Dist Between Cols(in)	Azimuth (deg)	Dist From Face (in)	Exposed To Wind	Carrier
5.00	152.00	9	1 5/8" Coax	1.98	0.82	N	0	0	0	0	N	AT&T MOBILITY
5.00	152.00	6	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0	0	0	N	AT&T MOBILITY
0.00	152.00	2	0.39" (10mm) Fiber Tr	0.39	0.06	N	0	0	0	0	N	AT&T MOBILITY
5.00	152.00	2	2" conduit	2.38	3.65	N	0	0	0	0	N	AT&T MOBILITY
0.00	152.00	1	3/8" (9.5mm) R	0.38	0.23	N	0	0	0	0	N	AT&T MOBILITY
5.00	140.00	9	1 5/8" Coax	1.98	0.82	N	0	0	0	0	N	VERIZON WIREL

ASSET: 306042, Woods Chapel
 CUSTOMER: VERIZON WIRELESS

CODE: ANSI/TIA-222-H
 ENG NO:

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
5.00	140.00	3	1 5/8" Coax	1.98	0.82	N	3	0.5	0.5	120	0.5	Y	VERIZON WIREL
5.00	140.00	2	1 1/4" Hybriflex Cabl	1.54	1	N	2	0.5	0.5	140	0.5	Y	VERIZON WIREL
0.00	126.00	6	7/8" Coax	1.09	0.33	N	3	0.5	3.25	17	0.5	Y	T-MOBILE
0.00	126.00	2	1.46" (37.1mm) Hybrid	1.46	1.7	N	1	0.5	0.5	25	2.6	Y	T-MOBILE
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	0.5	17	0.5	Y	T-MOBILE
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	0.5	29	0.5	Y	T-MOBILE
0.00	126.00	1	1 5/8" Coax	1.98	0.82	N	1	0.88	0.5	5	0.5	Y	T-MOBILE
0.00	122.00	9	1 1/4" Coax	1.55	0.63	N	0	0	0	0	0	N	SPRINT NEXTEL
0.00	115.00	2	1/2" Coax	0.63	0.15	N	2	0.5	0.5	240	0.5	Y	CLEARWIRE COR
5.00	115.00	1	2" conduit	2.38	3.65	N	1	0.5	0.5	245	0.5	Y	CLEARWIRE COR
0.00	105.00	1	1.60" (40.6mm) Hybrid	1.6	2.34	N	0	0	0	0	0	N	DISH WIRELESS

SEGMENT PROPERTIES

(Max Len: 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	F'y (ksi)	S (in ³)	Z (in ³)	Weight (lb)
0.00		0.5000	60.500	96.600	44,388.00	29.74	121.00	72.3	1417.4	0.0	0.0
5.00		0.5000	59.260	94.604	41,692.60	29.08	118.52	73	1359.2	0.0	1,626.6
10.00		0.5000	58.020	92.608	39,108.70	28.41	116.04	73.7	1302.2	0.0	1,592.6
15.00		0.5000	56.780	90.611	36,633.70	27.75	113.56	74.5	1246.4	0.0	1,558.6
20.00		0.5000	55.540	88.615	34,265.50	27.08	111.08	75.2	1191.8	0.0	1,524.7
25.00		0.5000	54.301	86.619	32,001.50	26.42	108.60	75.9	1138.5	0.0	1,490.7
30.00		0.5000	53.061	84.623	29,839.60	25.76	106.12	76.6	1086.4	0.0	1,456.7
35.00		0.5000	51.821	82.626	27,777.30	25.09	103.64	77.3	1035.5	0.0	1,422.8
40.00		0.5000	50.581	80.630	25,812.20	24.43	101.16	78.1	985.9	0.0	1,388.8
45.00		0.5000	49.341	78.634	23,942.10	23.76	98.68	78.8	937.4	0.0	1,354.8
47.08	Bot - Section 2	0.5000	48.824	77.802	23,190.40	23.49	97.65	79.1	917.6	0.0	554.5
50.00		0.5000	48.101	76.638	22,164.60	23.10	96.20	79.5	890.2	0.0	1,400.5
54.00	Top - Section 1	0.4060	47.921	62.117	17,900.40	28.95	118.03	73.1	721.6	0.0	1,886.6
55.00		0.4060	47.673	61.793	17,621.60	28.78	117.42	73.3	714.1	0.0	210.8
60.00		0.4060	46.433	60.172	16,270.90	27.97	114.37	74.2	677.0	0.0	1,037.6
65.00		0.4060	45.193	58.551	14,991.10	27.15	111.31	75.1	640.8	0.0	1,010.0
70.00		0.4060	43.953	56.930	13,780.20	26.33	108.26	76	605.7	0.0	982.4
75.00		0.4060	42.714	55.309	12,636.30	25.51	105.21	76.9	571.5	0.0	954.8
80.00		0.4060	41.474	53.688	11,557.60	24.69	102.15	77.8	538.4	0.0	927.2
85.00		0.4060	40.234	52.068	10,542.00	23.87	99.10	78.7	506.2	0.0	899.7
90.00		0.4060	38.994	50.447	9,587.80	23.06	96.04	79.6	475.0	0.0	872.1
95.00		0.4060	37.754	48.826	8,692.90	22.24	92.99	80.5	444.8	0.0	844.5
95.50	Bot - Section 3	0.4060	37.630	48.664	8,606.60	22.16	92.68	80.6	441.8	0.0	82.9
100.00		0.4060	36.514	47.205	7,855.60	21.42	89.94	81.4	415.6	0.0	1,310.0
101.00	Top - Section 2	0.3125	36.891	36.807	6,285.90	28.95	118.05	73.1	329.2	0.0	285.8
105.00		0.3125	35.899	35.809	5,788.30	28.10	114.88	74.1	311.5	0.0	494.2
110.00		0.3125	34.659	34.561	5,204.10	27.04	110.91	75.2	290.1	0.0	598.6
115.00		0.3125	33.419	33.314	4,660.60	25.98	106.94	76.4	269.4	0.0	577.4
120.00		0.3125	32.179	32.066	4,156.30	24.91	102.97	77.5	249.5	0.0	556.2
122.00		0.3125	31.683	31.567	3,965.30	24.49	101.39	78	241.8	0.0	216.5
125.00		0.3125	30.940	30.818	3,689.80	23.85	99.01	78.7	230.4	0.0	318.4
126.00		0.3125	30.692	30.569	3,600.90	23.64	98.21	78.9	226.7	0.0	104.4
130.00		0.3125	29.700	29.571	3,259.60	22.79	95.04	79.9	212.0	0.0	409.3
135.00		0.3125	28.460	28.323	2,864.20	21.72	91.07	81	194.4	0.0	492.5
140.00		0.3125	27.220	27.075	2,502.10	20.66	87.10	81.9	177.6	0.0	471.3
145.00		0.3125	25.980	25.828	2,171.90	19.60	83.14	81.9	161.5	0.0	450.0
150.00		0.3125	24.740	24.580	1,872.10	18.53	79.17	81.9	146.2	0.0	428.8

Totals: 31,793.3

Load Case: 1.2D + 1.0W Normal	109 mph wind with no ice	21 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	-69.29	-36.69	0.00	-3,945.6	0.00	3,945.61	6,283.69	1,695.33	9,595.43	7,683.17	0	0	0.525
5.00	-67.16	-36.20	0.00	-3,762.2	0.00	3,762.17	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.517
10.00	-64.86	-35.72	0.00	-3,581.2	0.00	3,581.18	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.25	0.508
15.00	-62.60	-35.23	0.00	-3,402.6	0.00	3,402.61	6,071.43	1,590.23	8,442.89	6,959.61	0.59	-0.38	0.500
20.00	-60.39	-34.72	0.00	-3,226.5	0.00	3,226.48	5,995.47	1,555.19	8,075.09	6,719.80	1.06	-0.5	0.491
25.00	-58.21	-34.19	0.00	-3,052.9	0.00	3,052.89	5,916.91	1,520.16	7,715.48	6,481.00	1.65	-0.63	0.481
30.00	-56.09	-33.64	0.00	-2,882.0	0.00	2,881.97	5,835.74	1,485.13	7,364.06	6,243.42	2.39	-0.77	0.472
35.00	-54.00	-33.07	0.00	-2,713.8	0.00	2,713.80	5,751.97	1,450.09	7,020.83	6,007.26	3.27	-0.9	0.462
40.00	-51.96	-32.50	0.00	-2,548.4	0.00	2,548.44	5,665.59	1,415.06	6,685.80	5,772.72	4.28	-1.03	0.451
45.00	-49.98	-32.07	0.00	-2,386.0	0.00	2,385.95	5,576.61	1,380.02	6,358.95	5,539.99	5.44	-1.17	0.440
47.08	-49.15	-31.78	0.00	-2,319.1	0.00	2,319.13	5,538.76	1,365.43	6,225.18	5,443.60	5.96	-1.23	0.435
50.00	-47.24	-31.36	0.00	-2,226.4	0.00	2,226.43	5,485.02	1,344.99	6,040.30	5,309.27	6.74	-1.31	0.429
54.00	-44.70	-31.02	0.00	-2,101.0	0.00	2,101.01	4,089.14	1,090.16	4,886.38	3,958.64	7.89	-1.42	0.542
55.00	-44.35	-30.68	0.00	-2,070.0	0.00	2,069.99	4,077.72	1,084.47	4,835.52	3,926.82	8.19	-1.45	0.539
60.00	-42.72	-30.10	0.00	-1,916.6	0.00	1,916.59	4,019.09	1,056.02	4,585.23	3,767.96	9.79	-1.61	0.520
65.00	-41.14	-29.51	0.00	-1,766.1	0.00	1,766.10	3,957.85	1,027.58	4,341.60	3,609.72	11.57	-1.77	0.500
70.00	-39.59	-28.93	0.00	-1,618.6	0.00	1,618.55	3,894.01	999.13	4,104.61	3,452.29	13.51	-1.93	0.480
75.00	-38.08	-28.34	0.00	-1,473.9	0.00	1,473.92	3,827.57	970.68	3,874.27	3,295.88	15.62	-2.09	0.458
80.00	-36.60	-27.76	0.00	-1,332.2	0.00	1,332.22	3,758.52	942.23	3,650.59	3,140.67	17.9	-2.25	0.435
85.00	-35.17	-27.18	0.00	-1,193.4	0.00	1,193.44	3,686.86	913.79	3,433.55	2,986.87	20.34	-2.41	0.410
90.00	-33.77	-26.60	0.00	-1,057.6	0.00	1,057.55	3,612.61	885.34	3,223.17	2,834.68	22.94	-2.56	0.383
95.00	-32.42	-26.26	0.00	-924.6	0.00	924.55	3,535.75	856.89	3,019.43	2,684.29	25.7	-2.7	0.355
95.50	-32.27	-25.99	0.00	-911.4	0.00	911.42	3,527.92	854.05	2,999.42	2,669.36	25.98	-2.72	0.352
100.00	-30.41	-25.62	0.00	-794.5	0.00	794.46	3,456.28	828.44	2,822.35	2,535.92	28.6	-2.85	0.323
101.00	-29.99	-25.34	0.00	-768.8	0.00	768.85	2,422.80	645.97	2,228.95	1,805.62	29.2	-2.87	0.440
105.00	-25.47	-22.65	0.00	-667.5	0.00	667.49	2,386.99	628.45	2,109.74	1,730.29	31.66	-2.98	0.398
110.00	-24.43	-22.09	0.00	-554.3	0.00	554.27	2,339.89	606.55	1,965.33	1,636.54	34.86	-3.13	0.350
115.00	-22.43	-19.93	0.00	-443.8	0.00	443.82	2,290.19	584.66	1,826.04	1,543.43	38.22	-3.27	0.299
120.00	-21.48	-19.53	0.00	-344.2	0.00	344.19	2,237.88	562.76	1,691.86	1,451.17	41.7	-3.39	0.248
122.00	-17.95	-16.43	0.00	-305.1	0.00	305.14	2,216.23	554.00	1,639.63	1,414.54	43.13	-3.43	0.225
125.00	-17.43	-16.21	0.00	-255.8	0.00	255.84	2,182.97	540.86	1,562.81	1,359.95	45.31	-3.49	0.197
126.00	-13.04	-12.54	0.00	-239.6	0.00	239.64	2,171.67	536.48	1,537.61	1,341.85	46.04	-3.51	0.185
130.00	-12.42	-12.06	0.00	-189.5	0.00	189.50	2,125.45	518.97	1,438.88	1,269.97	49.01	-3.58	0.156
135.00	-11.66	-11.55	0.00	-129.2	0.00	129.18	2,065.33	497.07	1,320.06	1,181.43	52.8	-3.65	0.116
140.00	-6.57	-6.59	0.00	-71.4	0.00	71.45	1,995.73	475.17	1,206.37	1,090.78	56.65	-3.7	0.069
145.00	-5.95	-6.10	0.00	-38.5	0.00	38.52	1,903.77	453.28	1,097.79	992.02	60.54	-3.73	0.042
150.00	0.00	-5.70	0.00	-8.0	0.00	8.02	1,811.80	431.38	994.33	897.94	64.45	-3.75	0.009

Load Case: 0.9D + 1.0W Normal	109 mph wind with no ice	21 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	-51.96	-36.67	0.00	-3,905.4	0.00	3,905.37	6,283.69	1,695.33	9,595.43	7,683.17	0	0	0.517
5.00	-50.34	-36.14	0.00	-3,722.0	0.00	3,722.02	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.509
10.00	-48.60	-35.62	0.00	-3,541.3	0.00	3,541.31	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.25	0.500
15.00	-46.89	-35.10	0.00	-3,363.2	0.00	3,363.20	6,071.43	1,590.23	8,442.89	6,959.61	0.59	-0.37	0.491
20.00	-45.21	-34.56	0.00	-3,187.7	0.00	3,187.70	5,995.47	1,555.19	8,075.09	6,719.80	1.04	-0.5	0.482
25.00	-43.56	-34.00	0.00	-3,014.9	0.00	3,014.89	5,916.91	1,520.16	7,715.48	6,481.00	1.64	-0.63	0.473
30.00	-41.95	-33.42	0.00	-2,844.9	0.00	2,844.90	5,835.74	1,485.13	7,364.06	6,243.42	2.36	-0.76	0.463
35.00	-40.37	-32.83	0.00	-2,677.8	0.00	2,677.79	5,751.97	1,450.09	7,020.83	6,007.26	3.23	-0.89	0.453
40.00	-38.82	-32.24	0.00	-2,513.6	0.00	2,513.63	5,665.59	1,415.06	6,685.80	5,772.72	4.23	-1.02	0.443
45.00	-37.33	-31.80	0.00	-2,352.4	0.00	2,352.45	5,576.61	1,380.02	6,358.95	5,539.99	5.38	-1.16	0.432
47.08	-36.70	-31.50	0.00	-2,286.2	0.00	2,286.21	5,538.76	1,365.43	6,225.18	5,443.60	5.89	-1.21	0.427
50.00	-35.26	-31.06	0.00	-2,194.3	0.00	2,194.34	5,485.02	1,344.99	6,040.30	5,309.27	6.66	-1.29	0.420
54.00	-33.35	-30.72	0.00	-2,070.1	0.00	2,070.10	4,089.14	1,090.16	4,886.38	3,958.64	7.79	-1.4	0.532
55.00	-33.07	-30.37	0.00	-2,039.4	0.00	2,039.38	4,077.72	1,084.47	4,835.52	3,926.82	8.09	-1.43	0.528
60.00	-31.84	-29.76	0.00	-1,887.5	0.00	1,887.54	4,019.09	1,056.02	4,585.23	3,767.96	9.68	-1.59	0.510
65.00	-30.64	-29.16	0.00	-1,738.7	0.00	1,738.73	3,957.85	1,027.58	4,341.60	3,609.72	11.43	-1.75	0.490
70.00	-29.46	-28.56	0.00	-1,592.9	0.00	1,592.94	3,894.01	999.13	4,104.61	3,452.29	13.34	-1.91	0.470
75.00	-28.32	-27.96	0.00	-1,450.2	0.00	1,450.17	3,827.57	970.68	3,874.27	3,295.88	15.42	-2.06	0.448
80.00	-27.20	-27.36	0.00	-1,310.4	0.00	1,310.40	3,758.52	942.23	3,650.59	3,140.67	17.67	-2.22	0.425
85.00	-26.11	-26.77	0.00	-1,173.6	0.00	1,173.60	3,686.86	913.79	3,433.55	2,986.87	20.08	-2.37	0.401
90.00	-25.05	-26.18	0.00	-1,039.8	0.00	1,039.76	3,612.61	885.34	3,223.17	2,834.68	22.64	-2.52	0.375
95.00	-24.04	-25.84	0.00	-908.8	0.00	908.85	3,535.75	856.89	3,019.43	2,684.29	25.36	-2.67	0.346
95.50	-23.93	-25.57	0.00	-895.9	0.00	895.93	3,527.92	854.05	2,999.42	2,669.36	25.64	-2.68	0.343
100.00	-22.52	-25.20	0.00	-780.9	0.00	780.88	3,456.28	828.44	2,822.35	2,535.92	28.23	-2.81	0.315
101.00	-22.20	-24.92	0.00	-755.7	0.00	755.67	2,422.80	645.97	2,228.95	1,805.62	28.82	-2.83	0.429
105.00	-18.83	-22.28	0.00	-656.0	0.00	655.98	2,386.99	628.45	2,109.74	1,730.29	31.24	-2.94	0.388
110.00	-18.05	-21.72	0.00	-544.6	0.00	544.61	2,339.89	606.55	1,965.33	1,636.54	34.4	-3.09	0.342
115.00	-16.57	-19.57	0.00	-436.0	0.00	436.02	2,290.19	584.66	1,826.04	1,543.43	37.7	-3.22	0.291
120.00	-15.86	-19.18	0.00	-338.2	0.00	338.18	2,237.88	562.76	1,691.86	1,451.17	41.14	-3.34	0.241
122.00	-13.25	-16.14	0.00	-299.8	0.00	299.83	2,216.23	554.00	1,639.63	1,414.54	42.54	-3.38	0.219
125.00	-12.86	-15.91	0.00	-251.4	0.00	251.42	2,182.97	540.86	1,562.81	1,359.95	44.69	-3.44	0.192
126.00	-9.61	-12.31	0.00	-235.5	0.00	235.51	2,171.67	536.48	1,537.61	1,341.85	45.41	-3.46	0.180
130.00	-9.15	-11.85	0.00	-186.2	0.00	186.25	2,125.45	518.97	1,438.88	1,269.97	48.34	-3.53	0.151
135.00	-8.59	-11.34	0.00	-127.0	0.00	127.02	2,065.33	497.07	1,320.06	1,181.43	52.07	-3.59	0.112
140.00	-4.83	-6.47	0.00	-70.3	0.00	70.32	1,995.73	475.17	1,206.37	1,090.78	55.86	-3.64	0.067
145.00	-4.37	-5.99	0.00	-38.0	0.00	37.98	1,903.77	453.28	1,097.79	992.02	59.69	-3.67	0.041
150.00	0.00	-5.70	0.00	-8.0	0.00	8.02	1,811.80	431.38	994.33	897.94	63.54	-3.69	0.009

Load Case: 1.2D + 1.0Di + 1.0Wi Normal		40 mph wind with 1.5" radial ice		20 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	-109.55	-7.10	0.00	-799.9	0.00	799.94	6,283.69	1,695.33	9,595.43	7,683.17	0	0	0.122
5.00	-106.85	-7.04	0.00	-764.4	0.00	764.42	6,215.54	1,660.30	9,203.06	7,441.50	0.01	-0.03	0.120
10.00	-103.84	-6.97	0.00	-729.2	0.00	729.22	6,144.79	1,625.26	8,818.88	7,200.24	0.05	-0.05	0.118
15.00	-100.85	-6.91	0.00	-694.4	0.00	694.36	6,071.43	1,590.23	8,442.89	6,959.61	0.12	-0.08	0.116
20.00	-97.88	-6.83	0.00	-659.8	0.00	659.83	5,995.47	1,555.19	8,075.09	6,719.80	0.21	-0.1	0.115
25.00	-94.94	-6.76	0.00	-625.7	0.00	625.66	5,916.91	1,520.16	7,715.48	6,481.00	0.34	-0.13	0.113
30.00	-92.04	-6.68	0.00	-591.9	0.00	591.87	5,835.74	1,485.13	7,364.06	6,243.42	0.49	-0.16	0.111
35.00	-89.17	-6.59	0.00	-558.5	0.00	558.48	5,751.97	1,450.09	7,020.83	6,007.26	0.67	-0.18	0.108
40.00	-86.34	-6.51	0.00	-525.5	0.00	525.52	5,665.59	1,415.06	6,685.80	5,772.72	0.87	-0.21	0.106
45.00	-83.56	-6.44	0.00	-493.0	0.00	493.00	5,576.61	1,380.02	6,358.95	5,539.99	1.11	-0.24	0.104
47.08	-82.41	-6.39	0.00	-479.6	0.00	479.58	5,538.76	1,365.43	6,225.18	5,443.60	1.22	-0.25	0.103
50.00	-80.05	-6.33	0.00	-460.9	0.00	460.93	5,485.02	1,344.99	6,040.30	5,309.27	1.38	-0.27	0.101
54.00	-76.86	-6.27	0.00	-435.6	0.00	435.62	4,089.14	1,090.16	4,886.38	3,958.64	1.61	-0.29	0.129
55.00	-76.37	-6.22	0.00	-429.4	0.00	429.35	4,077.72	1,084.47	4,835.52	3,926.82	1.67	-0.3	0.128
60.00	-73.97	-6.13	0.00	-398.2	0.00	398.24	4,019.09	1,056.02	4,585.23	3,767.96	2	-0.33	0.124
65.00	-71.60	-6.04	0.00	-367.6	0.00	367.59	3,957.85	1,027.58	4,341.60	3,609.72	2.37	-0.36	0.120
70.00	-69.28	-5.95	0.00	-337.4	0.00	337.39	3,894.01	999.13	4,104.61	3,452.29	2.77	-0.4	0.116
75.00	-66.99	-5.85	0.00	-307.7	0.00	307.66	3,827.57	970.68	3,874.27	3,295.88	3.2	-0.43	0.111
80.00	-64.75	-5.76	0.00	-278.4	0.00	278.40	3,758.52	942.23	3,650.59	3,140.67	3.67	-0.46	0.106
85.00	-62.54	-5.66	0.00	-249.6	0.00	249.62	3,686.86	913.79	3,433.55	2,986.87	4.18	-0.5	0.101
90.00	-60.38	-5.56	0.00	-221.3	0.00	221.32	3,612.61	885.34	3,223.17	2,834.68	4.71	-0.53	0.095
95.00	-58.26	-5.50	0.00	-193.5	0.00	193.52	3,535.75	856.89	3,019.43	2,684.29	5.28	-0.56	0.089
95.50	-58.05	-5.46	0.00	-190.8	0.00	190.77	3,527.92	854.05	2,999.42	2,669.36	5.34	-0.56	0.088
100.00	-55.49	-5.37	0.00	-166.2	0.00	166.22	3,456.28	828.44	2,822.35	2,535.92	5.88	-0.59	0.082
101.00	-54.92	-5.32	0.00	-160.8	0.00	160.85	2,422.80	645.97	2,228.95	1,805.62	6.01	-0.59	0.112
105.00	-47.39	-4.73	0.00	-139.6	0.00	139.55	2,386.99	628.45	2,109.74	1,730.29	6.52	-0.62	0.101
110.00	-45.60	-4.62	0.00	-115.9	0.00	115.90	2,339.89	606.55	1,965.33	1,636.54	7.18	-0.65	0.090
115.00	-41.73	-4.19	0.00	-92.8	0.00	92.81	2,290.19	584.66	1,826.04	1,543.43	7.88	-0.68	0.078
120.00	-40.08	-4.09	0.00	-71.9	0.00	71.87	2,237.88	562.76	1,691.86	1,451.17	8.6	-0.7	0.067
122.00	-33.77	-3.46	0.00	-63.7	0.00	63.68	2,216.23	554.00	1,639.63	1,414.54	8.89	-0.71	0.060
125.00	-32.82	-3.40	0.00	-53.3	0.00	53.31	2,182.97	540.86	1,562.81	1,359.95	9.35	-0.72	0.054
126.00	-24.88	-2.63	0.00	-49.9	0.00	49.91	2,171.67	536.48	1,537.61	1,341.85	9.5	-0.73	0.049
130.00	-23.89	-2.54	0.00	-39.4	0.00	39.39	2,125.45	518.97	1,438.88	1,269.97	10.11	-0.74	0.042
135.00	-22.69	-2.44	0.00	-26.7	0.00	26.69	2,065.33	497.07	1,320.06	1,181.43	10.9	-0.76	0.034
140.00	-12.89	-1.36	0.00	-14.5	0.00	14.51	1,995.73	475.17	1,206.37	1,090.78	11.7	-0.77	0.020
145.00	-11.93	-1.27	0.00	-7.7	0.00	7.69	1,903.77	453.28	1,097.79	992.02	12.5	-0.77	0.014
150.00	0.00	-1.10	0.00	-1.4	0.00	1.36	1,811.80	431.38	994.33	897.94	13.32	-0.78	0.002

Load Case: 1.0D + 1.0W Service Normal	60 mph Wind with No Ice	20 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	-57.78	-9.94	0.00	-1,063.0	0.00	1,062.96	6,283.69	1,695.33	9,595.43	7,683.17	0	0	0.148
5.00	-56.05	-9.80	0.00	-1,013.2	0.00	1,013.24	6,215.54	1,660.30	9,203.06	7,441.50	0.02	-0.03	0.145
10.00	-54.20	-9.67	0.00	-964.2	0.00	964.23	6,144.79	1,625.26	8,818.88	7,200.24	0.07	-0.07	0.143
15.00	-52.37	-9.53	0.00	-915.9	0.00	915.90	6,071.43	1,590.23	8,442.89	6,959.61	0.16	-0.1	0.140
20.00	-50.58	-9.38	0.00	-868.3	0.00	868.26	5,995.47	1,555.19	8,075.09	6,719.80	0.28	-0.14	0.138
25.00	-48.83	-9.23	0.00	-821.3	0.00	821.34	5,916.91	1,520.16	7,715.48	6,481.00	0.45	-0.17	0.135
30.00	-47.11	-9.08	0.00	-775.2	0.00	775.17	5,835.74	1,485.13	7,364.06	6,243.42	0.64	-0.21	0.132
35.00	-45.42	-8.92	0.00	-729.8	0.00	729.77	5,751.97	1,450.09	7,020.83	6,007.26	0.88	-0.24	0.129
40.00	-43.77	-8.76	0.00	-685.2	0.00	685.15	5,665.59	1,415.06	6,685.80	5,772.72	1.15	-0.28	0.126
45.00	-42.15	-8.65	0.00	-641.3	0.00	641.33	5,576.61	1,380.02	6,358.95	5,539.99	1.46	-0.32	0.123
47.08	-41.48	-8.57	0.00	-623.3	0.00	623.31	5,538.76	1,365.43	6,225.18	5,443.60	1.61	-0.33	0.122
50.00	-39.93	-8.45	0.00	-598.3	0.00	598.33	5,485.02	1,344.99	6,040.30	5,309.27	1.81	-0.35	0.120
54.00	-37.83	-8.36	0.00	-564.5	0.00	564.53	4,089.14	1,090.16	4,886.38	3,958.64	2.12	-0.38	0.152
55.00	-37.57	-8.26	0.00	-556.2	0.00	556.17	4,077.72	1,084.47	4,835.52	3,926.82	2.2	-0.39	0.151
60.00	-36.27	-8.10	0.00	-514.9	0.00	514.86	4,019.09	1,056.02	4,585.23	3,767.96	2.64	-0.43	0.146
65.00	-34.99	-7.94	0.00	-474.4	0.00	474.35	3,957.85	1,027.58	4,341.60	3,609.72	3.11	-0.48	0.140
70.00	-33.75	-7.78	0.00	-434.6	0.00	434.65	3,894.01	999.13	4,104.61	3,452.29	3.64	-0.52	0.135
75.00	-32.53	-7.62	0.00	-395.8	0.00	395.75	3,827.57	970.68	3,874.27	3,295.88	4.2	-0.56	0.129
80.00	-31.34	-7.46	0.00	-357.7	0.00	357.66	3,758.52	942.23	3,650.59	3,140.67	4.81	-0.6	0.122
85.00	-30.18	-7.30	0.00	-320.4	0.00	320.37	3,686.86	913.79	3,433.55	2,986.87	5.47	-0.65	0.116
90.00	-29.04	-7.14	0.00	-283.9	0.00	283.87	3,612.61	885.34	3,223.17	2,834.68	6.17	-0.69	0.108
95.00	-27.94	-7.05	0.00	-248.2	0.00	248.16	3,535.75	856.89	3,019.43	2,684.29	6.91	-0.73	0.100
95.50	-27.83	-6.98	0.00	-244.6	0.00	244.63	3,527.92	854.05	2,999.42	2,669.36	6.99	-0.73	0.100
100.00	-26.28	-6.88	0.00	-213.2	0.00	213.24	3,456.28	828.44	2,822.35	2,535.92	7.69	-0.76	0.092
101.00	-25.94	-6.80	0.00	-206.4	0.00	206.36	2,422.80	645.97	2,228.95	1,805.62	7.86	-0.77	0.125
105.00	-22.12	-6.08	0.00	-179.2	0.00	179.15	2,386.99	628.45	2,109.74	1,730.29	8.52	-0.8	0.113
110.00	-21.27	-5.93	0.00	-148.8	0.00	148.75	2,339.89	606.55	1,965.33	1,636.54	9.38	-0.84	0.100
115.00	-19.54	-5.35	0.00	-119.1	0.00	119.10	2,290.19	584.66	1,826.04	1,543.43	10.28	-0.88	0.086
120.00	-18.76	-5.24	0.00	-92.4	0.00	92.38	2,237.88	562.76	1,691.86	1,451.17	11.22	-0.91	0.072
122.00	-15.69	-4.41	0.00	-81.9	0.00	81.90	2,216.23	554.00	1,639.63	1,414.54	11.6	-0.92	0.065
125.00	-15.25	-4.35	0.00	-68.7	0.00	68.68	2,182.97	540.86	1,562.81	1,359.95	12.19	-0.94	0.058
126.00	-11.44	-3.36	0.00	-64.3	0.00	64.33	2,171.67	536.48	1,537.61	1,341.85	12.38	-0.94	0.053
130.00	-10.91	-3.24	0.00	-50.9	0.00	50.87	2,125.45	518.97	1,438.88	1,269.97	13.18	-0.96	0.045
135.00	-10.27	-3.10	0.00	-34.7	0.00	34.69	2,065.33	497.07	1,320.06	1,181.43	14.2	-0.98	0.034
140.00	-5.79	-1.77	0.00	-19.2	0.00	19.20	1,995.73	475.17	1,206.37	1,090.78	15.23	-0.99	0.021
145.00	-5.25	-1.64	0.00	-10.4	0.00	10.36	1,903.77	453.28	1,097.79	992.02	16.28	-1	0.013
150.00	0.00	-1.54	0.00	-2.2	0.00	2.18	1,811.80	431.38	994.33	897.94	17.33	-1.01	0.002

EQUIVALENT LATERAL FORCES METHOD ANALYSIS
 (Based on ASCE7-16 Chapters 11, 12 and 15)

Spectral Response Acceleration for Short Period (S_S):	0.113
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.110
Long-Period Transition Period (T_L – Seconds):	12
Importance Factor (I_a):	1.000
Site Coefficient F_a :	1.600
Site Coefficient F_v :	2.380
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.121
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.175
Seismic Response Coefficient (C_s):	0.052
Upper Limit C_s :	0.052
Lower Limit C_s :	0.030
Period based on Rayleigh Method (sec):	2.250
Redundancy Factor (ρ):	1.000
Seismic Force Distribution Exponent (k):	1.870
Total Unfactored Dead Load:	57.780 k
Seismic Base Shear (E):	2.990 k

1.2D + 1.0Ev + 1.0Eh Normal Seismic

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
36	147.5	522	6,046	0.021	62	639
35	142.5	543	5,899	0.020	61	665
34	137.5	623	6,334	0.022	65	763
33	132.5	645	6,110	0.021	63	789
32	128	531	4,718	0.016	48	650
31	125.5	144	1,236	0.004	13	177
30	123.5	438	3,640	0.012	37	536
29	121	308	2,460	0.008	25	377
28	117.5	784	5,934	0.020	61	960
27	112.5	825	5,756	0.020	59	1,010
26	107.5	846	5,422	0.019	56	1,036
25	103	702	4,149	0.014	43	859
24	100.5	338	1,907	0.006	20	413
23	97.75	1,543	8,274	0.028	85	1,889
22	95.25	109	556	0.002	6	133
21	92.5	1,104	5,336	0.018	55	1,351
20	87.5	1,131	4,929	0.017	51	1,385
19	82.5	1,159	4,522	0.016	46	1,419
18	77.5	1,186	4,117	0.014	42	1,452
17	72.5	1,214	3,718	0.013	38	1,486
16	67.5	1,242	3,326	0.011	34	1,520
15	62.5	1,269	2,943	0.010	30	1,554
14	57.5	1,297	2,572	0.009	26	1,587
13	54.5	263	471	0.002	5	322
12	52	2,094	3,440	0.012	35	2,563
11	48.5417	1,552	2,241	0.008	23	1,899
10	46.0417	663	867	0.003	9	811
9	42.5	1,614	1,817	0.006	19	1,976
8	37.5	1,648	1,467	0.005	15	2,017
7	32.5	1,682	1,145	0.004	12	2,059
6	27.5	1,716	854	0.003	9	2,101
5	22.5	1,750	598	0.002	6	2,142
4	17.5	1,784	381	0.001	4	2,184
3	12.5	1,818	207	0.001	2	2,225

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
2	7.5	1,852	81	0.000	1	2,267
1	2.5	1,717	10	0.000	0	2,102
Powerwave Allgon TT08-19DB111-001	150	66	789	0.003	8	81
Nokia AirScale RRH 4T4R B5 160W AHCA	150	110	1,321	0.004	14	135
Raycap DC6-48-60-18-8F(32.8 lbs)	150	33	392	0.001	4	40
Raycap DC6-48-60-0-8C	150	16	191	0.001	2	20
Raycap DC6-48-60-18-8C	150	16	191	0.001	2	20
Nokia AHLBBA	150	284	3,402	0.012	35	348
Alcatel-Lucent RRH4X25-WCS	150	210	2,512	0.009	26	257
Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB	150	265	3,165	0.011	33	324
Nokia AEQK AirScale MAA 64T64R 192AE n77 200W	150	298	3,560	0.012	37	364
Commscope JAH4-65C-R4	150	262	3,133	0.011	32	321
CCI TPA65R-BU8D	150	495	5,921	0.020	61	606
Generic Mount Reinforcement	150	200	2,392	0.008	25	245
Generic Mount Reinforcement	140	200	2,102	0.007	22	245
Generic Round Platform with Handrails	150	2,500	29,903	0.103	307	3,060
Generic Round Platform with Handrails	140	2,500	26,276	0.090	270	3,060
Generic Round Platform with Handrails	126	2,500	21,569	0.074	222	3,060
Generic Round Platform with Handrails	105	2,500	15,327	0.053	157	3,060
Powerwave Allgon LGP 13901	140	59	624	0.002	6	73
Ericsson Radio 4449 - B13&B5	140	210	2,207	0.008	23	257
Ericsson 8843 Rev 2	140	225	2,365	0.008	24	275
Raycap RRFDC-3315-PF-48	140	54	565	0.002	6	66
Ericsson AIR 6449 B77D/ C-Band	140	245	2,573	0.009	26	300
Antel BX-A-80063/8CF	140	72	757	0.003	8	88
Commscope NHH-65C-R2B	140	310	3,254	0.011	33	379
Commscope HELIAX FiberFeed 12 RRU Pendant Connect	126	20	173	0.001	2	24
Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA	126	251	2,169	0.007	22	308
Nokia AHFIG 70.55 lbs	126	212	1,827	0.006	19	259
Raycap ASU9338TYP01	126	15	129	0.000	1	18
Nokia AEHC	126	311	2,681	0.009	28	380
Commscope FFHH-65C-R3	126	377	3,253	0.011	33	462
Generic 48" x 12" Panel	122	270	2,193	0.008	23	331
Generic Flat Platform with Handrails	122	2,500	20,303	0.070	209	3,060
DragonWave Horizon DUO (Radio)	115	14	102	0.000	1	17
Samsung 2.5GHz nRRHv2	115	152	1,106	0.004	11	186
Argus LLPX310R	115	86	624	0.002	6	105
Andrew Microwaves VHLP2.5	115	95	692	0.002	7	117
Side Arms	115	560	4,071	0.014	42	685
Commscope RDIDC-9181-PF-48	105	22	134	0.000	1	27
Fujitsu TA08025-B604	105	192	1,175	0.004	12	235
Fujitsu TA08025-B605	105	225	1,379	0.005	14	275
JMA Wireless MX08FRO665-21	105	194	1,186	0.004	12	237
		57,779	291,173	0.999	2,991	70,727

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

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
36	147.5	522	6,046	0.021	62	457
35	142.5	543	5,899	0.020	61	476
34	137.5	623	6,334	0.022	65	546
33	132.5	645	6,110	0.021	63	565
32	128	531	4,718	0.016	48	465
31	125.5	144	1,236	0.004	13	126
30	123.5	438	3,640	0.012	37	384
29	121	308	2,460	0.008	25	269
28	117.5	784	5,934	0.020	61	687
27	112.5	825	5,756	0.020	59	723

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
26	107.5	846	5,422	0.019	56	741
25	103	702	4,149	0.014	43	615
24	100.5	338	1,907	0.006	20	296
23	97.75	1,543	8,274	0.028	85	1,352
22	95.25	109	556	0.002	6	95
21	92.5	1,104	5,336	0.018	55	967
20	87.5	1,131	4,929	0.017	51	991
19	82.5	1,159	4,522	0.016	46	1,015
18	77.5	1,186	4,117	0.014	42	1,039
17	72.5	1,214	3,718	0.013	38	1,063
16	67.5	1,242	3,326	0.011	34	1,088
15	62.5	1,269	2,943	0.010	30	1,112
14	57.5	1,297	2,572	0.009	26	1,136
13	54.5	263	471	0.002	5	230
12	52	2,094	3,440	0.012	35	1,834
11	48.5417	1,552	2,241	0.008	23	1,359
10	46.0417	663	867	0.003	9	580
9	42.5	1,614	1,817	0.006	19	1,414
8	37.5	1,648	1,467	0.005	15	1,444
7	32.5	1,682	1,145	0.004	12	1,473
6	27.5	1,716	854	0.003	9	1,503
5	22.5	1,750	598	0.002	6	1,533
4	17.5	1,784	381	0.001	4	1,563
3	12.5	1,818	207	0.001	2	1,592
2	7.5	1,852	81	0.000	1	1,622
1	2.5	1,717	10	0.000	0	1,504
Powerwave Allgon TT08-19DB111-001	150	66	789	0.003	8	58
Nokia AirScale RRH 4T4R B5 160W AHCA	150	110	1,321	0.004	14	97
Raycap DC6-48-60-18-8F(32.8 lbs)	150	33	392	0.001	4	29
Raycap DC6-48-60-0-8C	150	16	191	0.001	2	14
Raycap DC6-48-60-18-8C	150	16	191	0.001	2	14
Nokia AHLBBA	150	284	3,402	0.012	35	249
Alcatel-Lucent RRH4X25-WCS	150	210	2,512	0.009	26	184
Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB	150	265	3,165	0.011	33	232
Nokia AEQK AirScale MAA 64T64R 192AE n77 200W	150	298	3,560	0.012	37	261
Commscope JAH4-65C-R4	150	262	3,133	0.011	32	229
CCI TPA65R-BU8D	150	495	5,921	0.020	61	434
Generic Mount Reinforcement	150	200	2,392	0.008	25	175
Generic Mount Reinforcement	140	200	2,102	0.007	22	175
Generic Round Platform with Handrails	150	2,500	29,903	0.103	307	2,190
Generic Round Platform with Handrails	140	2,500	26,276	0.090	270	2,190
Generic Round Platform with Handrails	126	2,500	21,569	0.074	222	2,190
Generic Round Platform with Handrails	105	2,500	15,327	0.053	157	2,190
Powerwave Allgon LGP 13901	140	59	624	0.002	6	52
Ericsson Radio 4449 - B13&B5	140	210	2,207	0.008	23	184
Ericsson 8843 Rev 2	140	225	2,365	0.008	24	197
Raycap RRFDC-3315-PF-48	140	54	565	0.002	6	47
Ericsson AIR 6449 B77D/ C-Band	140	245	2,573	0.009	26	214
Antel BXA-80063/8CF	140	72	757	0.003	8	63
Commscope NHH-65C-R2B	140	310	3,254	0.011	33	271
Commscope HELIAX FiberFeed 12 RRU Pendant Connect	126	20	173	0.001	2	18
Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA	126	251	2,169	0.007	22	220
Nokia AHFIG 70.55 lbs	126	212	1,827	0.006	19	186
Raycap ASU9338TYP01	126	15	129	0.000	1	13
Nokia AEHC	126	311	2,681	0.009	28	272
Commscope FFHH-65C-R3	126	377	3,253	0.011	33	330
Generic 48" x 12" Panel	122	270	2,193	0.008	23	236
Generic Flat Platform with Handrails	122	2,500	20,303	0.070	209	2,190
DragonWave Horizon DUO (Radio)	115	14	102	0.000	1	12
Samsung 2.5GHz nRRHv2	115	152	1,106	0.004	11	133
Argus LLPX310R	115	86	624	0.002	6	75
Andrew Microwaves VHLP2.5	115	95	692	0.002	7	83
Side Arms	115	560	4,071	0.014	42	491
Commscope RDIDC-9181-PF-48	105	22	134	0.000	1	19
Fujitsu TA08025-B604	105	192	1,175	0.004	12	168
Fujitsu TA08025-B605	105	225	1,379	0.005	14	197

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
JMA Wireless MX08FRO665-21	105	194	1,186	0.004	12	169
		57,779	291,173	0.999	2,991	50,608

1.2D + 1.0Ev + 1.0Eh Normal 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	-68.62	-3.00	0.00	-372.76	0.00	372.76	6,283.69	1,695.33	9,595	7,683.17	0.00	0.00	0.06
5.00	-66.36	-3.01	0.00	-357.78	0.00	357.78	6,215.54	1,660.30	9,203	7,441.50	0.01	-0.01	0.06
10.00	-64.13	-3.02	0.00	-342.73	0.00	342.73	6,144.79	1,625.26	8,819	7,200.24	0.02	-0.02	0.06
15.00	-61.95	-3.03	0.00	-327.63	0.00	327.63	6,071.43	1,590.23	8,443	6,959.61	0.06	-0.04	0.06
20.00	-59.80	-3.03	0.00	-312.48	0.00	312.48	5,995.47	1,555.19	8,075	6,719.80	0.10	-0.05	0.06
25.00	-57.70	-3.04	0.00	-297.31	0.00	297.31	5,916.91	1,520.16	7,715	6,481.00	0.16	-0.06	0.06
30.00	-55.64	-3.03	0.00	-282.13	0.00	282.13	5,835.74	1,485.13	7,364	6,243.42	0.23	-0.07	0.06
35.00	-53.63	-3.03	0.00	-266.96	0.00	266.96	5,751.97	1,450.09	7,021	6,007.26	0.31	-0.09	0.05
40.00	-51.65	-3.02	0.00	-251.81	0.00	251.81	5,665.59	1,415.06	6,686	5,772.72	0.41	-0.10	0.05
45.00	-50.84	-3.02	0.00	-236.71	0.00	236.71	5,576.61	1,380.02	6,359	5,539.99	0.52	-0.11	0.05
47.08	-48.94	-3.00	0.00	-230.43	0.00	230.43	5,538.76	1,365.43	6,225	5,443.60	0.57	-0.12	0.05
50.00	-46.37	-2.96	0.00	-221.69	0.00	221.69	5,485.02	1,344.99	6,040	5,309.27	0.65	-0.13	0.05
54.00	-46.05	-2.96	0.00	-209.83	0.00	209.83	4,089.14	1,090.16	4,886	3,958.64	0.76	-0.14	0.06
55.00	-44.46	-2.94	0.00	-206.87	0.00	206.87	4,077.72	1,084.47	4,836	3,926.82	0.79	-0.14	0.06
60.00	-42.91	-2.92	0.00	-192.17	0.00	192.17	4,019.09	1,056.02	4,585	3,767.96	0.95	-0.16	0.06
65.00	-41.39	-2.89	0.00	-177.58	0.00	177.58	3,957.85	1,027.58	4,342	3,609.72	1.12	-0.17	0.06
70.00	-39.90	-2.86	0.00	-163.12	0.00	163.12	3,894.01	999.13	4,105	3,452.29	1.31	-0.19	0.06
75.00	-38.45	-2.82	0.00	-148.82	0.00	148.82	3,827.57	970.68	3,874	3,295.88	1.52	-0.21	0.06
80.00	-37.03	-2.78	0.00	-134.70	0.00	134.70	3,758.52	942.23	3,651	3,140.67	1.74	-0.22	0.05
85.00	-35.64	-2.74	0.00	-120.80	0.00	120.80	3,686.86	913.79	3,434	2,986.87	1.99	-0.24	0.05
90.00	-34.29	-2.68	0.00	-107.12	0.00	107.12	3,612.61	885.34	3,223	2,834.68	2.24	-0.25	0.05
95.00	-34.16	-2.68	0.00	-93.70	0.00	93.70	3,535.75	856.89	3,019	2,684.29	2.52	-0.27	0.05
95.50	-32.27	-2.59	0.00	-92.36	0.00	92.36	3,527.92	854.05	2,999	2,669.36	2.54	-0.27	0.04
100.00	-31.86	-2.58	0.00	-80.69	0.00	80.69	3,456.28	828.44	2,822	2,535.92	2.80	-0.28	0.04
101.00	-31.00	-2.53	0.00	-78.12	0.00	78.12	2,422.80	645.97	2,229	1,805.62	2.86	-0.29	0.06
105.00	-26.13	-2.26	0.00	-67.99	0.00	67.99	2,386.99	628.45	2,110	1,730.29	3.11	-0.30	0.05
110.00	-25.12	-2.20	0.00	-56.69	0.00	56.69	2,339.89	606.55	1,965	1,636.54	3.43	-0.31	0.05
115.00	-23.05	-2.07	0.00	-45.67	0.00	45.67	2,290.19	584.66	1,826	1,543.43	3.76	-0.33	0.04
120.00	-22.67	-2.04	0.00	-35.33	0.00	35.33	2,237.88	562.76	1,692	1,451.17	4.11	-0.34	0.03
122.00	-18.75	-1.75	0.00	-31.25	0.00	31.25	2,216.23	554.00	1,640	1,414.54	4.25	-0.34	0.03
125.00	-18.57	-1.74	0.00	-25.99	0.00	25.99	2,182.97	540.86	1,563	1,359.95	4.47	-0.35	0.03
126.00	-13.41	-1.34	0.00	-24.24	0.00	24.24	2,171.67	536.48	1,538	1,341.85	4.54	-0.35	0.02
130.00	-12.62	-1.27	0.00	-18.90	0.00	18.90	2,125.45	518.97	1,439	1,269.97	4.84	-0.36	0.02
135.00	-11.86	-1.20	0.00	-12.55	0.00	12.55	2,065.33	497.07	1,320	1,181.43	5.21	-0.36	0.02
140.00	-6.45	-0.69	0.00	-6.55	0.00	6.55	1,995.73	475.17	1,206	1,090.78	5.60	-0.37	0.01
145.00	-5.82	-0.62	0.00	-3.11	0.00	3.11	1,903.77	453.28	1,098	992.02	5.99	-0.37	0.01
150.00	0.00	-0.58	0.00	0.00	0.00	0.00	1,811.80	431.38	994	897.94	6.38	-0.37	0.00

0.9D - 1.0Ev + 1.0Eh Normal 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	-49.10	-3.00	0.00	-368.36	0.00	368.36	6,283.69	1,695.33	9,595	7,683.17	0.00	0.00	0.06
5.00	-47.48	-3.00	0.00	-353.38	0.00	353.38	6,215.54	1,660.30	9,203	7,441.50	0.01	-0.01	0.06
10.00	-45.89	-3.01	0.00	-338.36	0.00	338.36	6,144.79	1,625.26	8,819	7,200.24	0.02	-0.02	0.05
15.00	-44.32	-3.02	0.00	-323.31	0.00	323.31	6,071.43	1,590.23	8,443	6,959.61	0.06	-0.04	0.05
20.00	-42.79	-3.02	0.00	-308.23	0.00	308.23	5,995.47	1,555.19	8,075	6,719.80	0.10	-0.05	0.05
25.00	-41.29	-3.02	0.00	-293.14	0.00	293.14	5,916.91	1,520.16	7,715	6,481.00	0.16	-0.06	0.05
30.00	-39.81	-3.01	0.00	-278.06	0.00	278.06	5,835.74	1,485.13	7,364	6,243.42	0.23	-0.07	0.05
35.00	-38.37	-3.00	0.00	-263.00	0.00	263.00	5,751.97	1,450.09	7,021	6,007.26	0.31	-0.09	0.05
40.00	-36.96	-2.99	0.00	-247.98	0.00	247.98	5,665.59	1,415.06	6,686	5,772.72	0.41	-0.10	0.05
45.00	-36.37	-2.99	0.00	-233.03	0.00	233.03	5,576.61	1,380.02	6,359	5,539.99	0.52	-0.11	0.05

ASSET: 306042, Woods Chapel
 CUSTOMER: VERIZON WIRELESS

CODE: ANSI/TIA-222-H
 ENG NO:

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
47.08	-35.01	-2.97	0.00	-226.81	0.00	226.81	5,538.76	1,365.43	6,225	5,443.60	0.57	-0.12	0.05
50.00	-33.18	-2.93	0.00	-218.16	0.00	218.16	5,485.02	1,344.99	6,040	5,309.27	0.64	-0.13	0.05
54.00	-32.95	-2.93	0.00	-206.43	0.00	206.43	4,089.14	1,090.16	4,886	3,958.64	0.75	-0.14	0.06
55.00	-31.81	-2.91	0.00	-203.50	0.00	203.50	4,077.72	1,084.47	4,836	3,926.82	0.78	-0.14	0.06
60.00	-30.70	-2.88	0.00	-188.97	0.00	188.97	4,019.09	1,056.02	4,585	3,767.96	0.93	-0.16	0.06
65.00	-29.61	-2.85	0.00	-174.56	0.00	174.56	3,957.85	1,027.58	4,342	3,609.72	1.11	-0.17	0.06
70.00	-28.55	-2.82	0.00	-160.30	0.00	160.30	3,894.01	999.13	4,105	3,452.29	1.29	-0.19	0.05
75.00	-27.51	-2.78	0.00	-146.20	0.00	146.20	3,827.57	970.68	3,874	3,295.88	1.50	-0.20	0.05
80.00	-26.49	-2.74	0.00	-132.30	0.00	132.30	3,758.52	942.23	3,651	3,140.67	1.72	-0.22	0.05
85.00	-25.50	-2.69	0.00	-118.61	0.00	118.61	3,686.86	913.79	3,434	2,986.87	1.96	-0.23	0.05
90.00	-24.53	-2.64	0.00	-105.16	0.00	105.16	3,612.61	885.34	3,223	2,834.68	2.21	-0.25	0.04
95.00	-24.44	-2.63	0.00	-91.97	0.00	91.97	3,535.75	856.89	3,019	2,684.29	2.48	-0.26	0.04
95.50	-23.09	-2.55	0.00	-90.65	0.00	90.65	3,527.92	854.05	2,999	2,669.36	2.51	-0.27	0.04
100.00	-22.79	-2.53	0.00	-79.19	0.00	79.19	3,456.28	828.44	2,822	2,535.92	2.76	-0.28	0.04
101.00	-22.18	-2.49	0.00	-76.66	0.00	76.66	2,422.80	645.97	2,229	1,805.62	2.82	-0.28	0.05
105.00	-18.69	-2.22	0.00	-66.72	0.00	66.72	2,386.99	628.45	2,110	1,730.29	3.06	-0.29	0.05
110.00	-17.97	-2.16	0.00	-55.62	0.00	55.62	2,339.89	606.55	1,965	1,636.54	3.37	-0.31	0.04
115.00	-16.49	-2.03	0.00	-44.82	0.00	44.82	2,290.19	584.66	1,826	1,543.43	3.70	-0.32	0.04
120.00	-16.22	-2.00	0.00	-34.67	0.00	34.67	2,237.88	562.76	1,692	1,451.17	4.04	-0.33	0.03
122.00	-13.41	-1.72	0.00	-30.67	0.00	30.67	2,216.23	554.00	1,640	1,414.54	4.19	-0.34	0.03
125.00	-13.28	-1.71	0.00	-25.51	0.00	25.51	2,182.97	540.86	1,563	1,359.95	4.40	-0.34	0.03
126.00	-9.59	-1.31	0.00	-23.80	0.00	23.80	2,171.67	536.48	1,538	1,341.85	4.47	-0.34	0.02
130.00	-9.03	-1.25	0.00	-18.55	0.00	18.55	2,125.45	518.97	1,439	1,269.97	4.76	-0.35	0.02
135.00	-8.48	-1.18	0.00	-12.32	0.00	12.32	2,065.33	497.07	1,320	1,181.43	5.13	-0.36	0.02
140.00	-4.62	-0.68	0.00	-6.43	0.00	6.43	1,995.73	475.17	1,206	1,090.78	5.51	-0.36	0.01
145.00	-4.16	-0.61	0.00	-3.05	0.00	3.05	1,903.77	453.28	1,098	992.02	5.89	-0.37	0.01
150.00	0.00	-0.58	0.00	0.00	0.00	0.00	1,811.80	431.38	994	897.94	6.28	-0.37	0.00

ASSET: 306042, Woods Chapel
 CUSTOMER: VERIZON WIRELESS

CODE: ANSI/TIA-222-H
 ENG NO:

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 Normal	36.69	0.00	69.29	0.00	0.00	3945.61	54.00	0.54
0.9D + 1.0W Normal	36.67	0.00	51.96	0.00	0.00	3905.37	54.00	0.53
1.2D + 1.0Di + 1.0Wi Normal	7.10	0.00	109.55	0.00	0.00	799.94	54.00	0.13
1.2D + 1.0Ev + 1.0Eh Normal	3.04	0.00	68.62	0.00	0.00	372.76	54.00	0.06
0.9D - 1.0Ev + 1.0Eh Normal	3.02	0.00	49.10	0.00	0.00	368.36	54.00	0.06
1.0D + 1.0W Service Normal	9.94	0.00	57.78	0.00	0.00	1062.96	54.00	0.15



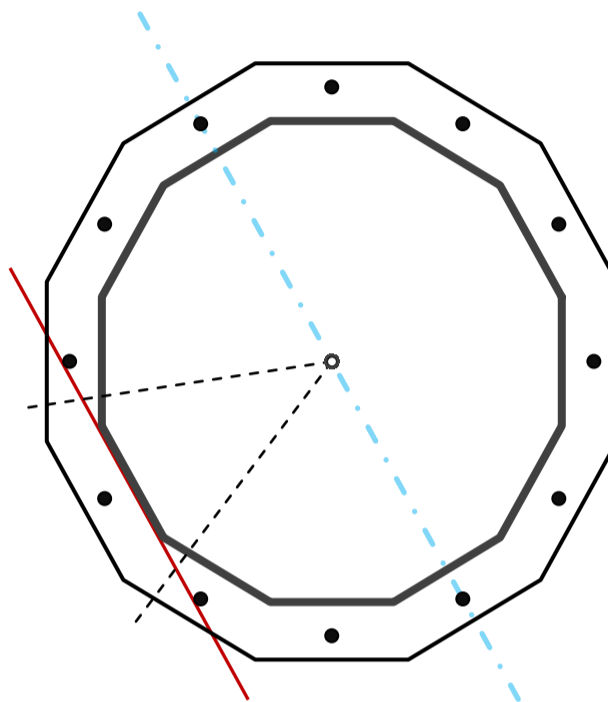
Base Plate & Anchor Rod Analysis

Pole Dimensions		
Number of Sides	12	-
Diameter	60.5	in
Thickness	1/2	in
Orientation Offset	15	°

Base Reactions		
Moment, Mu	3,945.6	k-ft
Axial, Pu	69.3	k
Shear, Vu	36.7	k
Neutral Axis	120	°

Report Capacities		
Component	Capacity	Result
Base Plate	16%	Pass
Anchor Rods	101%	Pass
Dwyidag	-	-

Base Plate		
Number of Sides	12	-
Diameter, ϕ	75.14	in
Thickness	2 5/8	in
Grade	A871-60	
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	75	ksi
Clip	N/A	in
Orientation Offset	15	°
Anchor Rod Detail	c	$\eta=0.55$
Clear Distance	N/A	in
Applied Moment, Mu	743.1	k
Bending Stress, ϕMn	4733.9	k



Original Anchor Rods		
Arrangement	Radial	-
Quantity	12	-
Diameter, ϕ	2 1/4	in
Bolt Circle	69.14	in
Grade	A615-75	
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Spacing	18.1	in
Orientation Offset	0	°
Applied Force, Pu	242.1	k
Anchor Rods, ϕPn	243.6	k

Calculations for Monopole Base Plate & Anchor Rod Analysis

Reaction Distribution

Reaction	Shear Vu	Moment Mu	Factor
-	k	k-ft	-
Base Forces	36.7	3945.6	1.00
Anchor Rod Forces	36.7	3945.6	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 ²	in ²	in ⁴	#	in ⁴
Pole	93.1749	7.7646	0.6497		41936.48
Bolt	3.9761	3.2477	0.8393	4.5	21725.25
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	12	-	
Width, W	75.14	in	
Thickness, t	2.625	in	
Yield Strength, Fy	60	ksi	
Tensile Strength, Fu	75	ksi	
Base Plate Chord	44.562	in	
Detail Type	c	-	
Detail Factor	0.55	-	
Clear Distance	N/A	-	

Anchor Rods			
Anchor Rod Quantity, N	12	-	
Rod Diameter, d	2.25	in	
Bolt Circle, BC	69.14	in	
Yield Strength, Fy	75	ksi	
Tensile Strength, Fu	100	ksi	
Applied Axial, Pu	242.1	k	
Applied Shear, Vu	2.5	k	
Compressive Capacity, ϕP_n	243.6	k	
Tensile Capacity, ϕR_n	0.994	OK	
Interaction Capacity	1.012	OK	

External Base Plate			
Chord Length AA	45.639	in	
Additional AA	5.250	in	
Section Modulus, Z	87.664	in ³	
Applied Moment, Mu	743.1	k-ft	
Bending Capacity, ϕM_n	4733.9	k-ft	
Capacity, Mu/ ϕM_n	0.157	OK	
Chord Length AB	43.500	in	
Additional AB	5.250	in	
Section Modulus, Z	83.980	in ³	
Applied Moment, Mu	484.3	k-ft	
Bending Capacity, ϕM_n	4534.9	k-ft	
Capacity, Mu/ ϕM_n	0.107	OK	
Bend Line Length	163.294	in	
Additional Bend Line	0.000	in	
Section Modulus, Z	281.299	in ³	
Applied Moment, Mu	743.1	k-ft	
Bending Capacity, ϕM_n	15190.1	k-ft	
Capacity, Mu/ ϕM_n	0.049	OK	

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

Pier Foundation Analysis (ANSI/TIA-222-H)

Foundation Analysis Parameters

Pier Diameter	<i>D</i>	8.00	ft
Pier Embedment	<i>L-h</i>	33.0	ft
Pier Height above Ground	<i>H</i>	0.50	ft
Water Table Depth [BGL]	<i>GW</i>	18	ft
Pullout Angle	Θ	30	°
Unit Weight of Concrete		150	pcf
Uplift Skin Friction Factor		1.000	

Reactions

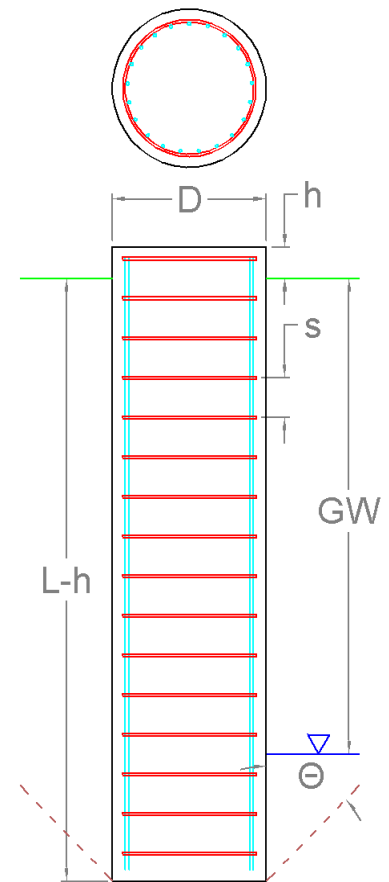
Moment, M_u	3,945.6	k-ft
Shear, V_u	39.7	k
Axial, P_u	69.3	k
Uplift, T_u	0.0	k

Soil Properties

Layer Depth (ft)		Unit Weight	Cohesion	Friction Angle	Ultimate Skin Friction	Ultimate Bearing Pressure
TOP	BTM	pcf	psf	°	psf	psf
0.0	1.0	105	0	0	0	0
1.0	4.0	123	250	0	0	0
4.0	10.5	125	250	0	134	0
10.5	18.0	135	4,913	0	2,232	0
18.0	27.0	135	5,241	0	2,358	0
27.0	30.0	135	5,269	0	2,371	0
30.0	35.0	135	5,295	0	2,383	20,434

Soil Strength Capacities

Volume of Concrete	1,683.9	ft ³
Weight of Concrete [Buoyancy Considered]	205.5	k
Average Soil Unit Weight	102.7	pcf
Skin Friction Resistance	1,334.4	k
Compressive Bearing Resistance	1,027.1	k
Pullout Weight [Minus Concrete Weight]	2,099.0	k
Compressive Force, P_u	107.0	k
Nominal Compressive Capacity, $\phi_s P_n$	1,771.2	k
$P_u / \phi_s P_n$	6.0%	
Total Lateral Resistance	7,604.0	k
Inflection Point [BGL]	22.1	ft
Moment at Inflection Point, M_D	4,842.4	k-ft
Nominal Moment Capacity, $\phi_s M_n$	33,232.8	k-ft
$M_D / \phi_s M_n$	14.6%	



Pier Strength Capacities

Concrete Compressive Strength, f'_c	3,000	psi
Rebar Size #	9	
Rebar Area (Single)	1.00	in ²
Rebar Quantity	32	
Rebar Yield Strength, F_y	60	ksi
Vertical Rebar Clear Cover	3	in
Tie Rebar Size #	4	
Tie Rebar Area (Single)	0.20	in ²
Tie Rebar Spacing	12.0	in
Tie Rebar Yield Strength, F_y	60	ksi
Rebar Cage Diameter	87.87	in
Strength Bending/Tension Reduction Factor, ϕ_B	0.90	
Strength Shear Reduction Factor, ϕ_V	0.75	
Strength Compression Reduction Factor, ϕ_C	0.65	
Steel Elastic Modulus	29,000	ksi
Design Moment, M_u	3,967.2	k-ft
Moment Capacity, $\phi_B M_n$	6,190.9	k-ft
$M_u / \phi_B M_n$	64.1%	
Design Shear, V_u	336.4	k
Shear Capacity, $\phi_V V_n$	712.7	k
$V_u / \phi_V V_n$	47.2%	
Design Compression, P_u	107.0	k
Compression Capacity, $\phi_P P_n$	10,553.9	k
$P_u / \phi_P P_n$	1.0%	
Bending Reinforcement Ratio	0.004	

