



AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure : 150 ft Monopole
ATC Site Name : Woods Chapel, MO
ATC Asset Number : 306042
Engineering Number : 13694528_C3_02
Proposed Carrier : T-MOBILE
Carrier Site Name : Woods Chapel ATC
Carrier Site Number : A5C0406A
Site Location : 1204 N.e. Woods Chapel Road
Lees Summit, MO 64064-1989
38.983200,-94.350100
County : Jackson
Date : July 23, 2021
Max Usage : 101%
Result : Pass



Prepared By:
Rebecca Malz
Structural Engineer

Reviewed By:

COA: 2006031326



Table of Contents

Introduction	1
Supporting Documents	1
Analysis	1
Conclusion.....	1
Existing and Reserved Equipment.....	2
Equipment to be Removed.....	3
Proposed Equipment	3
Structure Usages	4
Foundations	4
Deflection and Sway	4
Standard Conditions	5
Calculations	Attached



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 T-MOBILE.

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/ 1.5" radial ice concurrent
Code:	ANSI/TIA-222-H / 2018 IBC
Exposure Category:	C
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Crest Height (H):	0 ft
Spectral Response:	$S_s = 0.10$, $S_1 = 0.07$
Site Class:	D - Stiff Soil

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	3	Nokia AEQK AirScale MAA 64T64R 192AE n77 200W	Triangular 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
	6	CCI TPA65R-BU8D			
	3	Alcatel-Lucent RRH4X25-WCS			
	3	Nokia AHLBBA			
	1	Raycap DC6-48-60-0-8C			
	1	Raycap DC6-48-60-18-8C			
	1	Raycap DC6-48-60-18-8F(32.8 lbs)			
	3	Nokia AirScale RRH 4T4R B5 160W AHCA			
	3	Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB			
	3	Commscope JAH4-65C-R4			
	3	Powerwave Allgon TT08-19DB111-001			
140.0	6	Powerwave Allgon LGP 13901	Triangular Platform with Handrails	(2) 1 1/4" Hybriflex Cable (12) 1 5/8" Coax	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			
126.0	3	Commscope FFHH-65C-R3	Triangular Platform with Handrails	(5) 1 5/8" Coax (1) 1.46" (37.1mm) Hybrid (6) 7/8" Coax	T-MOBILE
	3	Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA			
	1	Raycap ASU9338TYP01			
122.0	9	Generic 48" x 12" Panel	Triangular Platform with Handrails	(9) 1 1/4" Coax	SPRINT NEXTEL
115.0	3	Samsung 2.5GHz nRRHv2	Flush	(2) 1/2" Coax (1) 2" conduit	CLEARWIRE CORPORATION
	2	DragonWave Horizon DUO (Radio)			
	3	Argus LLPX310R			
	2	Andrew Microwaves VHLP2.5			
105.0	3	JMA Wireless MX08FRO665-21	Triangular Platform with Handrails	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	3	Fujitsu TA08025-B604			
	3	Fujitsu TA08025-B605			
	1	Commscope RDIDC-9181-PF-48			



Equipment to be Removed

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
126.0	3	Andrew ETW190VS12UB	-	(1) 1 5/8" Coax	T-MOBILE
	6	Andrew TMBXX-6516-A2M with actuator			
	3	Nokia FHFB			
	3	Nokia FRIG w/o Solar Shield			

Proposed Equipment

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
126.0	1	Commscope HELIAX FiberFeed 12 RRU Pendant Connect	Triangular Platform with Handrails	(1) 1.46" (37.1mm) Hybrid	T-MOBILE
	3	Nokia AHFIG 70.55 lbs			
	3	Nokia AEHC			

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

Install proposed coax inside the pole shaft.

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)	3,934.1	64%
Axial (Kips)	69.0	3%
Shear (Kips)	36.7	57%

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) (°)
126.0	Commscope HELIAX FiberFeed 12 RRU Pendant Connect	T-MOBILE	1.027	0.936
	Nokia AHFIG 70.55 lbs			
	Nokia AEHC			
115.0	Andrew Microwaves VHLP2.5	CLEARWIRE CORPORATION	0.852	0.872

*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 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:

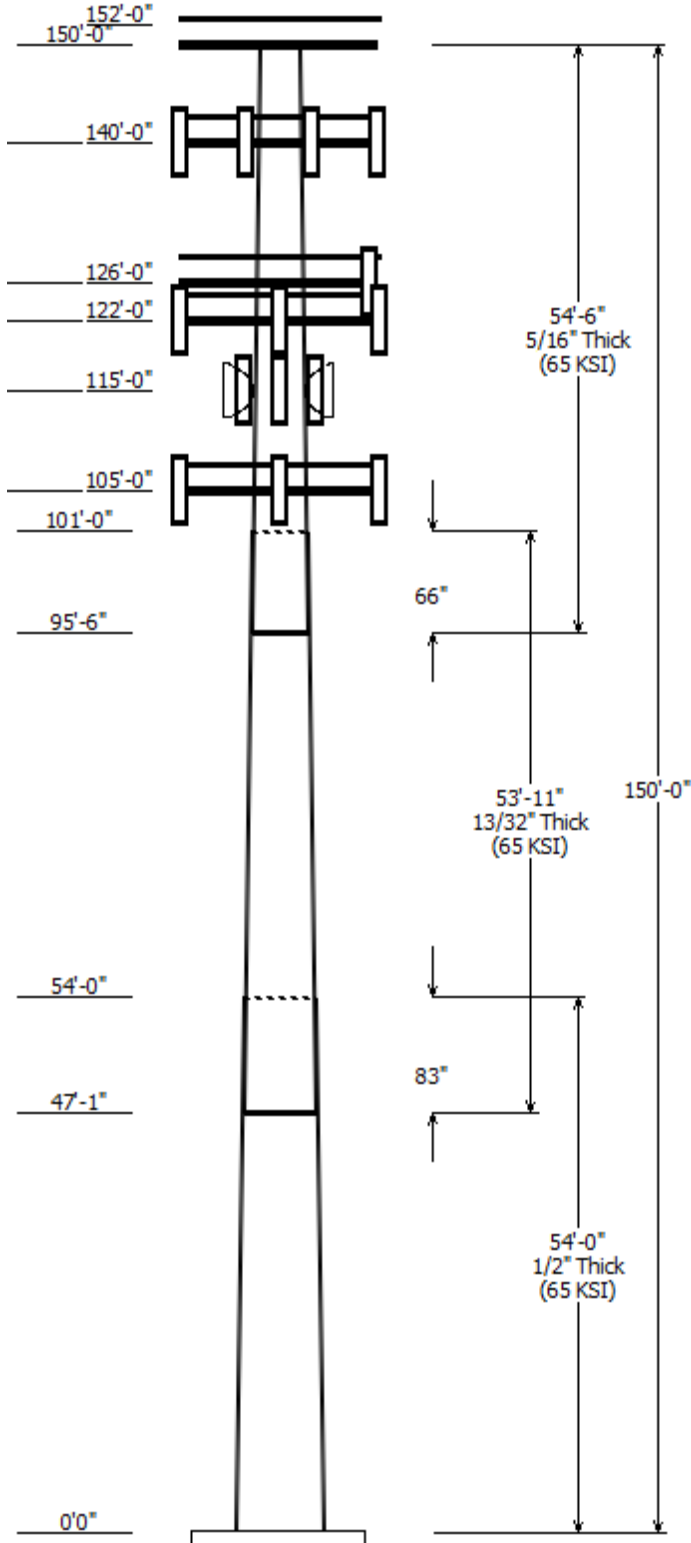
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services

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.



Job Information

Client : T-MOBILE
 Pole : 306042 Code: ANSI/TIA-222-H
 Location : Woods Chapel, MO
 Description : 150 ft Valmont Monopole
 Shape : 12 Sides Risk Category : II
 Height : 150.00 (ft) Exposure : C
 Base Elev (ft): 0.00 Topo Method : Method 1
 Taper: 0.24798(in/ft) Topographic Category : 1

Sections Properties

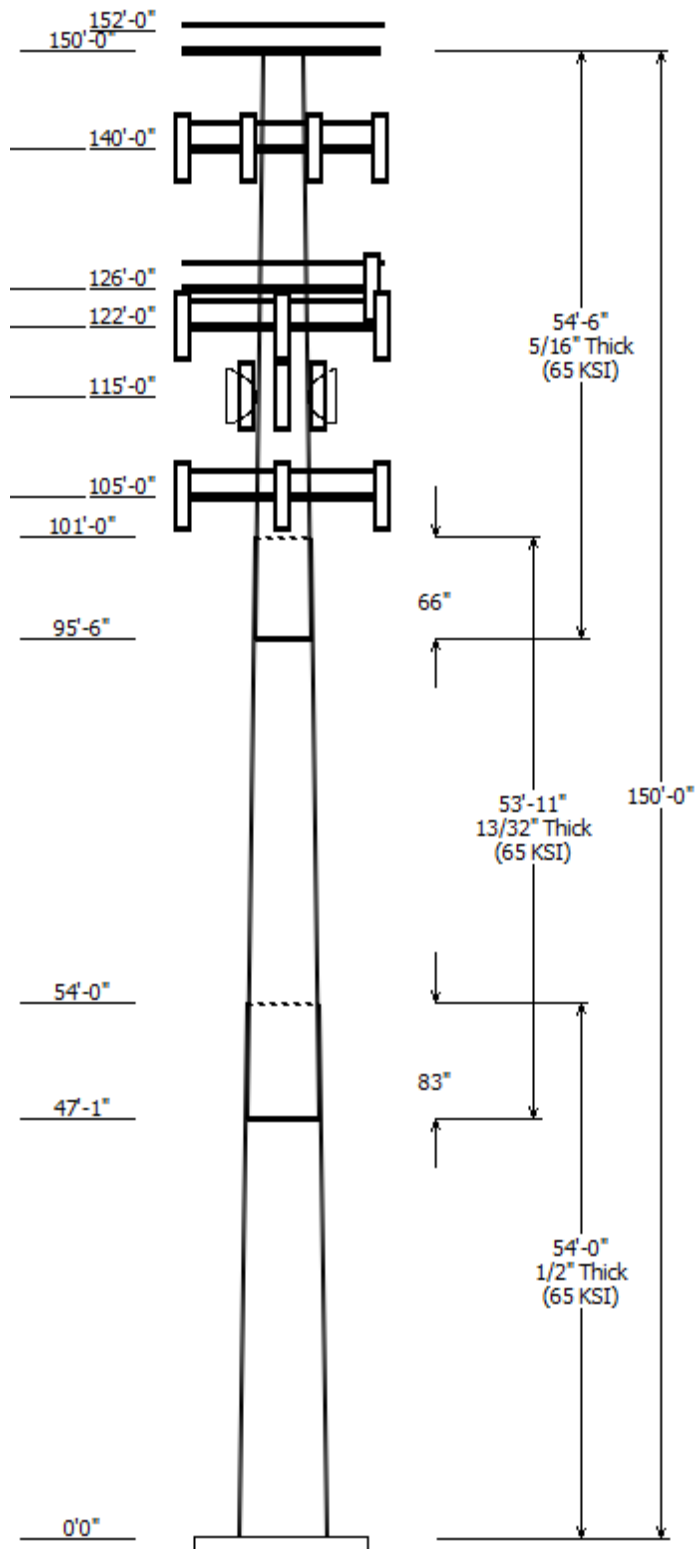
Shaft Section	Length (ft)	Diameter (in)		Thick (in)	Joint Type	Overlap Length (in)	Steel Grade
		Across Flats Top	Across Flats Bottom				
1	54.000	47.10	60.50	0.500		0.000	12 Sides 65
2	53.917	36.26	49.63	0.406	Slip Joint	83.000	12 Sides 65
3	54.500	24.74	38.25	0.313	Slip Joint	66.000	12 Sides 65

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
152.000	152.000	6	CCI TPA65R-BU8D
152.000	152.000	3	Commscope JAH4-65C-R4
152.000	152.000	3	Nokia AEQK AirScale MAA
152.000	152.000	3	Nokia AirScale Dual RRH 4T4R B
152.000	152.000	3	Alcatel-Lucent RRH4X25-WCS
152.000	152.000	3	Nokia AHLBBA
152.000	152.000	1	Raycap DC6-48-60-0-8C
152.000	152.000	1	Raycap DC6-48-60-18-8C
152.000	152.000	1	Raycap DC6-48-60-18-8F(32.8 lb
152.000	152.000	3	Nokia AirScale RRH 4T4R B5 160
152.000	152.000	3	Powerwave Allgon TT08-
150.000	150.000	1	Generic Mount Reinforcement
150.000	150.000	1	Generic Round Platform with
140.000	140.000	6	Commscope NHH-65C-R2B
140.000	140.000	3	Antel BXA-80063/8CF
140.000	140.000	3	Ericsson AIR 6449 B77D/ C-
140.000	140.000	2	Raycap RRFDC-3315-PF-48
140.000	140.000	3	Ericsson 8843 Rev 2
140.000	140.000	3	Ericsson Radio 4449 - B13&B5
140.000	140.000	6	Powerwave Allgon LGP 13901
140.000	140.000	1	Generic Round Platform with
126.000	126.000	3	Nokia AEHC
126.000	126.000	1	Raycap ASU9338TYP01
126.000	126.000	3	Nokia AHFIG 70.55 lbs
126.000	126.000	3	Nokia AirScale Dual RRH 4T4R B
126.000	126.000	1	Commscope HELIAX
126.000	126.000	1	Generic Round Platform with
126.000	126.000	3	Commscope FFHH-65C-R3
122.000	122.000	1	Generic Flat Platform with Han
122.000	122.000	9	Generic 48" x 12" Panel
115.000	115.000	1	Collar/Side Arms
115.000	115.000	2	Andrew Microwaves VHLP2.5
115.000	115.000	3	Argus LLPX310R
115.000	115.000	3	Samsung 2.5GHz nRRHv2
115.000	115.000	2	DragonWave Horizon DUO
105.000	105.000	1	Generic Round Platform with
105.000	105.000	3	JMA Wireless MX08FRO665-21
105.000	105.000	3	Fujitsu TA08025-B605
105.000	105.000	3	Fujitsu TA08025-B604
105.000	105.000	1	Commscope RDIDC-9181-PF-48

Linear Appurtenance

Elev (ft)	Description		Exposed To Wind
From	To		



5.000	115.0	2" conduit	Yes
5.000	140.0	1 1/4" Hybriflex	Yes
5.000	140.0	1 5/8" Coax	No
5.000	140.0	1 5/8" Coax	Yes
5.000	152.0	0.78" (19.7mm) 8	No
5.000	152.0	1 5/8" Coax	No
5.000	152.0	2" conduit	No
0.000	105.0	1.60" (40.6mm)	No
0.000	115.0	1/2" Coax	Yes
0.000	152.0	0.39" (10mm)	No
0.000	152.0	3/8" (0.38"-	No
0.000	122.0	1 1/4" Coax	No
0.000	126.0	1 5/8" Coax	Yes
0.000	126.0	1 5/8" Coax	Yes
0.000	126.0	1 5/8" Coax	Yes
0.000	126.0	1.46" (37.1mm)	Yes
0.000	126.0	1.46" (37.1mm)	Yes
0.000	126.0	7/8" Coax	Yes

Load Cases

1.2D + 1.0W	109 mph with No Ice
0.9D + 1.0W	109 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph with 1.50 in Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	Serviceability 60 mph

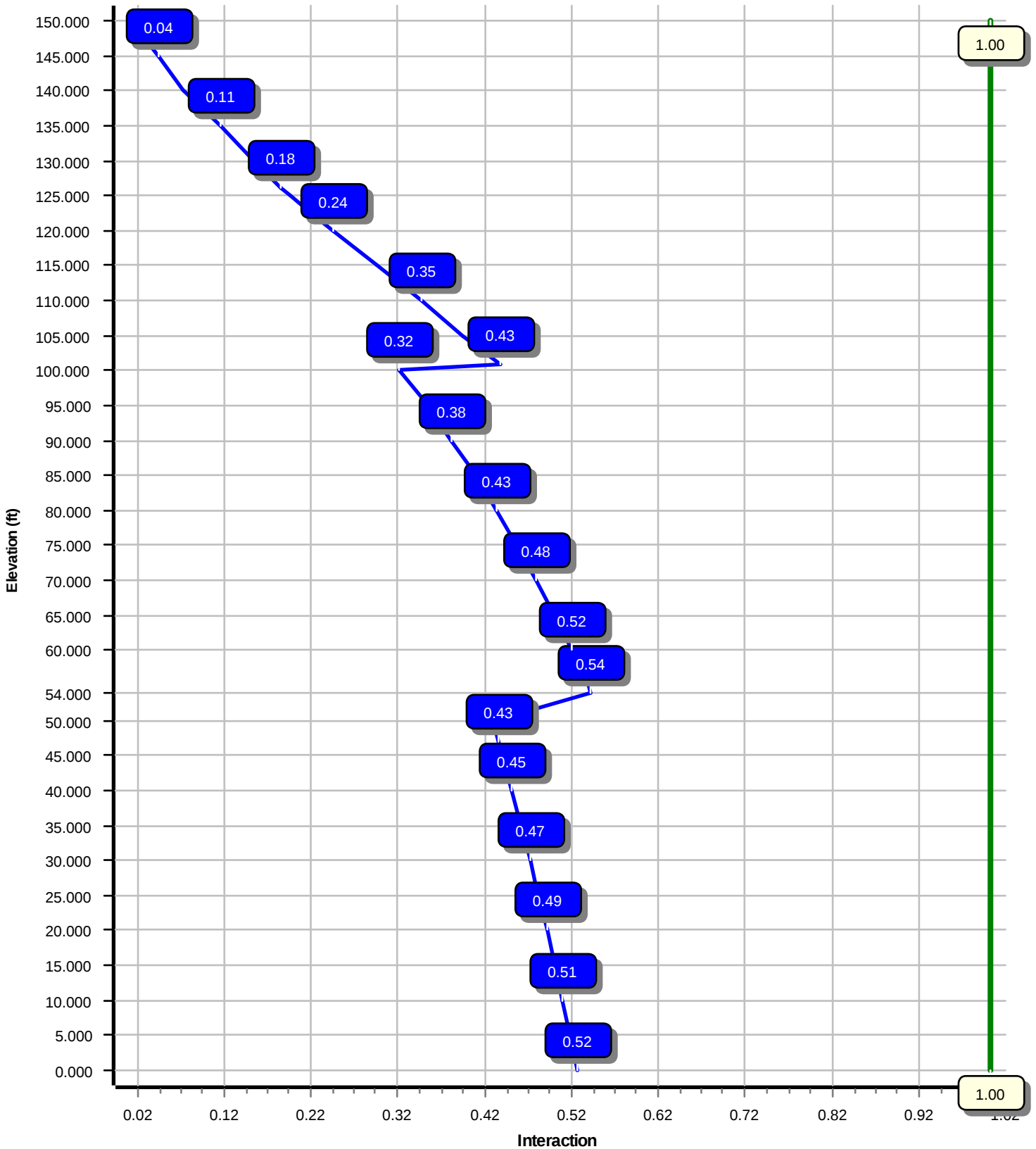
Reactions

Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.0W	3934.10	36.68	69.05
0.9D + 1.0W	3894.37	36.66	51.78
1.2D + 1.0Di + 1.0Wi	776.39	6.93	108.76
1.2D + 1.0Ev + 1.0Eh	232.16	1.87	68.21
0.9D - 1.0Ev + 1.0Eh	229.49	1.87	49.10
1.0D + 1.0W	1059.92	9.94	57.58

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	115.00	10.230	0.872

Max Ratio 53.98% at 54.0 ft



Site Number: 306042**Code: ANSI/TIA-222-H**

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO**Engineering Number:13694528_C3_02****7/23/2021 5:19:29 PM****Customer: T-MOBILE**

Analysis Parameters

Location :	Jackson County, MO	Height (ft) :	150
Code :	ANSI/TIA-222-H	Base Diameter (in) :	60.50
Shape :	12 Sides	Top Diameter (in) :	24.74
Pole Type :	Taper	Taper (in/ft) :	0.248
Pole Manufacturer :	Valmont	Rotation (deg) :	0.00
Kd (non-service) :	0.95	Ke :	0.97

Ice & Wind Parameters

Exposure Category:	C	Design Wind Speed Without Ice:	109 mph
Risk Category:	II	Design Wind Speed With Ice:	40 mph
Topographic Factor Procedure:	Method 1	Operational Wind Speed:	60 mph
Topographic Category:	1	Design Ice Thickness:	1.50 in
Crest Height:	0 ft	HMSL:	980.00 ft

Seismic Parameters

Analysis Method:	Equivalent Lateral Force Method		
Site Class:	D - Stiff Soil		
Period Based on Rayleigh Method (sec):	2.24		
T_L (sec):	12	p:	1
S_s :	0.099	S_1 :	0.068
F_a :	1.600	F_v :	2.400
S_{ds} :	0.106	S_{d1} :	0.109
		C_s :	0.032
		C_s Max:	0.032
		C_s Min:	0.030

Load Cases

1.2D + 1.0W	109 mph with No Ice
0.9D + 1.0W	109 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph with 1.50 in Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	Serviceability 60 mph

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:29 PM

Customer: T-MOBILE

Shaft Section Properties

Slip							Bottom						Top						
Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	54.000	0.5000	65		0.00	15,769	60.50	0.00	96.60	44388.0	29.74	121.00	47.10	54.00	75.04	20807.7	22.57	94.22	0.247980
2-12	53.917	0.4060	65	Slip	83.00	10,204	49.63	47.08	64.36	19909.7	30.08	122.26	36.26	101.00	46.88	7694.8	21.26	89.33	0.247980
3-12	54.500	0.3125	65	Slip	66.00	5,819	38.25	95.50	38.18	7015.6	30.12	122.42	24.74	150.00	24.58	1872.1	18.53	79.17	0.247980
Shaft Weight						31,793													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	Weight (lb)	No Ice EPAa (sf)	Orientation Factor	Weight (lb)	Ice EPAa (sf)	Orientation Factor
152.00	Powerwave Allgon TT08-	3	0.75	0.000	22.00	0.793	0.50	48.57	1.429	0.50
152.00	Nokia AirScale RRH 4T4R B5	3	0.75	0.000	36.80	1.286	0.50	76.09	1.322	0.50
152.00	Raycap DC6-48-60-18-8F(32.8	1	0.75	0.000	32.80	1.470	1.00	94.52	2.169	1.00
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	Raycap DC6-48-60-0-8C	1	0.75	0.000	16.00	2.030	1.00	65.04	2.790	1.00
152.00	Nokia AHLBBA	3	0.75	0.000	94.80	2.820	0.50	172.03	3.956	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 AirScale Dual RRH 4T4R	3	0.75	0.000	88.20	3.683	0.50	191.28	4.995	0.50
152.00	Nokia AEQK AirScale MAA	3	0.75	0.000	99.20	4.351	0.67	215.34	5.752	0.67
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	CCI TPA65R-BU8D	6	0.75	0.000	82.50	18.089	0.63	427.41	21.783	0.63
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	1	1.00	0.000	2,500.00	27.200	1.00	4,120.32	51.653	1.00
140.00	Powerwave Allgon LGP 13901	6	0.75	0.000	9.90	0.503	0.50	24.53	0.985	0.50
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	Ericsson 8843 Rev 2	3	0.75	0.000	75.00	1.650	0.50	136.66	2.494	0.50
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 AIR 6449 B77D/ C-Band	3	0.75	0.000	81.60	4.028	0.70	197.31	5.391	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	Commscope NHH-65C-R2B	6	0.75	0.000	51.60	11.389	0.70	278.60	14.597	0.70
140.00	Generic Round Platform with	1	1.00	0.000	2,500.00	27.200	1.00	4,108.99	51.482	1.00
126.00	Commscope HELIAX FiberFeed	1	0.75	0.000	20.00	0.944	1.00	48.16	1.647	1.00
126.00	Nokia AirScale Dual RRH 4T4R	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	Raycap ASU9338TYP01	1	0.75	0.000	14.90	3.213	1.00	88.40	4.365	1.00
126.00	Nokia AEHC	3	0.75	0.000	103.60	6.844	0.62	255.78	8.581	0.62
126.00	Commscope FFHH-65C-R3	3	0.75	0.000	125.70	21.138	0.63	534.37	24.805	0.63
126.00	Generic Round Platform with	1	1.00	0.000	2,500.00	27.200	1.00	4,094.36	51.262	1.00
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	1	1.00	0.000	2,500.00	42.400	1.00	4,242.28	62.969	1.00
115.00	DragonWave Horizon DUO	2	1.00	0.000	7.00	0.200	1.00	19.73	0.454	1.00
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	Argus LLPX310R	3	1.00	0.000	28.60	4.292	0.63	116.34	5.902	0.63
115.00	Andrew Microwaves VHLP2.5	2	1.00	0.000	47.60	8.430	1.00	215.39	10.088	1.00
115.00	Collar/Side Arms	1	1.00	0.000	560.00	8.500	1.00	939.84	14.265	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
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	1	1.00	0.000	2,500.00	27.200	1.00	4,063.17	50.791	1.00
Totals	Num Loadings:40	106			18,924.50			40,030.96		

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:29 PM

Customer: T-MOBILE

Linear Appurtenance Properties

Load Case Azimuth (deg) : 65

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Dia (in)	Coax Wt (lb/ft)	Max Coax / Flat	Dist Between Rows	Dist Between Cols (in)	Azimuth (deg)	Dist From Face (in)	Exposed To Wind	Carrier
0.00	152.00	2	0.39" (10mm) Fiber	0.39	0.06	N	0	0.00	0	0.00	N	AT&T MOBILITY
0.00	152.00	1	3/8" (0.38"- 9.5mm)	0.38	0.23	N	0	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	6	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	9	1 5/8" Coax	1.98	0.82	N	0	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	2	2" conduit	2.38	3.65	N	0	0.00	0	0.00	N	AT&T MOBILITY
5.00	140.00	2	1 1/4" Hybriflex Cable	1.54	1.00	N	2	0.50	0.50	140	Y	VERIZON WIRELESS
5.00	140.00	9	1 5/8" Coax	1.98	0.82	N	0	0.00	0	0.00	N	VERIZON WIRELESS
5.00	140.00	3	1 5/8" Coax	1.98	0.82	N	3	0.50	0.50	120	Y	VERIZON WIRELESS
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.50	0.50	17	Y	T-MOBILE
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	0.50	29	Y	T-MOBILE
0.00	126.00	1	1 5/8" Coax	1.98	0.82	N	1	0.50	0.50	8	Y	T-MOBILE
0.00	126.00	1	1.46" (37.1mm) Hybrid	1.46	1.70	N	1	0.50	0.50	25	Y	T-MOBILE
0.00	126.00	1	1.46" (37.1mm) Hybrid	1.46	1.70	N	1	0.50	0.50	25	Y	T-MOBILE
0.00	126.00	6	7/8" Coax	1.09	0.33	N	3	0.50	3.25	17	Y	T-MOBILE
0.00	122.00	9	1 1/4" Coax	1.55	0.63	N	0	0.00	0.00	0	N	SPRINT NEXTEL
0.00	115.00	2	1/2" Coax	0.63	0.15	N	2	0.50	0.50	240	Y	CLEARWIRE
5.00	115.00	1	2" conduit	2.38	3.65	N	1	0.50	0.50	245	Y	CLEARWIRE
0.00	105.00	1	1.60" (40.6mm) Hybrid	1.60	2.34	N	0	0.00	0.00	0	N	DISH WIRELESS

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:29 PM

Customer: T-MOBILE

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	44,388.0	29.74	121.00	72.3	1417.	0.0	0.0
5.00		0.5000	59.260	94.604	41,692.6	29.08	118.52	73.0	1359.	0.0	1,626.6
10.00		0.5000	58.020	92.608	39,108.7	28.41	116.04	73.7	1302.	0.0	1,592.6
15.00		0.5000	56.780	90.611	36,633.7	27.75	113.56	74.5	1246.	0.0	1,558.6
20.00		0.5000	55.540	88.615	34,265.5	27.08	111.08	75.2	1191.	0.0	1,524.7
25.00		0.5000	54.300	86.619	32,001.5	26.42	108.60	75.9	1138.	0.0	1,490.7
30.00		0.5000	53.061	84.623	29,839.6	25.76	106.12	76.6	1086.	0.0	1,456.7
35.00		0.5000	51.821	82.626	27,777.3	25.09	103.64	77.3	1035.	0.0	1,422.8
40.00		0.5000	50.581	80.630	25,812.2	24.43	101.16	78.1	985.9	0.0	1,388.8
45.00		0.5000	49.341	78.634	23,942.1	23.76	98.68	78.8	937.4	0.0	1,354.8
47.08	Bot - Section 2	0.5000	48.824	77.802	23,190.4	23.49	97.65	79.1	917.6	0.0	554.5
50.00		0.5000	48.101	76.638	22,164.6	23.10	96.20	79.5	890.2	0.0	1,400.5
54.00	Top - Section 1	0.4060	47.921	62.117	17,900.4	28.95	118.03	73.1	721.6	0.0	1,886.6
55.00		0.4060	47.673	61.793	17,621.6	28.78	117.42	73.3	714.1	0.0	210.8
60.00		0.4060	46.433	60.172	16,270.9	27.97	114.37	74.2	677.0	0.0	1,037.6
65.00		0.4060	45.193	58.551	14,991.1	27.15	111.31	75.1	640.8	0.0	1,010.0
70.00		0.4060	43.953	56.930	13,780.2	26.33	108.26	76.0	605.7	0.0	982.4
75.00		0.4060	42.714	55.309	12,636.3	25.51	105.21	76.9	571.5	0.0	954.8
80.00		0.4060	41.474	53.688	11,557.6	24.69	102.15	77.8	538.4	0.0	927.2
85.00		0.4060	40.234	52.068	10,542.0	23.87	99.10	78.7	506.2	0.0	899.7
90.00		0.4060	38.994	50.447	9,587.8	23.06	96.04	79.6	475.0	0.0	872.1
95.00		0.4060	37.754	48.826	8,692.9	22.24	92.99	80.5	444.8	0.0	844.5
95.50	Bot - Section 3	0.4060	37.630	48.664	8,606.6	22.16	92.68	80.6	441.8	0.0	82.9
100.0		0.4060	36.514	47.205	7,855.6	21.42	89.94	81.4	415.6	0.0	1,310.0
101.0	Top - Section 2	0.3125	36.891	36.807	6,285.9	28.95	118.05	73.1	329.2	0.0	285.7
105.0		0.3125	35.899	35.809	5,788.3	28.10	114.88	74.1	311.5	0.0	494.2
110.0		0.3125	34.659	34.561	5,204.1	27.04	110.91	75.2	290.1	0.0	598.6
115.0		0.3125	33.419	33.314	4,660.6	25.98	106.94	76.4	269.4	0.0	577.4
120.0		0.3125	32.179	32.066	4,156.3	24.91	102.97	77.5	249.5	0.0	556.2
122.0		0.3125	31.683	31.567	3,965.3	24.49	101.39	78.0	241.8	0.0	216.5
125.0		0.3125	30.940	30.818	3,689.8	23.85	99.01	78.7	230.4	0.0	318.4
126.0		0.3125	30.692	30.569	3,600.9	23.64	98.21	78.9	226.7	0.0	104.4
130.0		0.3125	29.700	29.571	3,259.6	22.79	95.04	79.9	212.0	0.0	409.3
135.0		0.3125	28.460	28.323	2,864.2	21.72	91.07	81.0	194.4	0.0	492.5
140.0		0.3125	27.220	27.075	2,502.1	20.66	87.10	81.9	177.6	0.0	471.3
145.0		0.3125	25.980	25.828	2,171.9	19.60	83.14	81.9	161.5	0.0	450.0
150.0		0.3125	24.740	24.580	1,872.1	18.53	79.17	81.9	146.2	0.0	428.8
											31,793.3

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:29 PM

Customer: T-MOBILE

Load Case: 1.2D + 1.0W**109 mph with No Ice****21 Iterations**

Gust Response Factor :1.10

Dead Load Factor :1.20

Wind Load Factor :1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion			
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		319.9	0.0					0.0	0.0	319.9	0.0	0.0	0.0
5.00		633.2	1,951.9					0.0	108.8	633.2	2,060.7	0.0	0.0
10.00		620.0	1,911.1					0.0	311.1	620.0	2,222.2	0.0	0.0
15.00		616.2	1,870.4					0.0	311.1	616.2	2,181.5	0.0	0.0
20.00		628.7	1,829.6					0.0	311.1	628.7	2,140.7	0.0	0.0
25.00		644.6	1,788.8					0.0	311.1	644.6	2,099.9	0.0	0.0
30.00		654.7	1,748.1					0.0	311.1	654.7	2,059.2	0.0	0.0
35.00		660.6	1,707.3					0.0	311.1	660.6	2,018.4	0.0	0.0
40.00		663.2	1,666.6					0.0	311.1	663.2	1,977.7	0.0	0.0
45.00		470.1	1,625.8					0.0	311.1	470.1	1,936.9	0.0	0.0
47.08	Bot - Section 2	334.6	665.4					0.0	129.6	334.6	795.0	0.0	0.0
50.00		464.9	1,680.5					0.0	181.5	464.9	1,862.0	0.0	0.0
54.00	Top - Section 1	335.4	2,263.9					0.0	248.9	335.4	2,512.8	0.0	0.0
55.00		400.1	253.0					0.0	62.2	400.1	315.2	0.0	0.0
60.00		663.3	1,245.1					0.0	311.1	663.3	1,556.2	0.0	0.0
65.00		656.5	1,212.0					0.0	311.1	656.5	1,523.1	0.0	0.0
70.00		648.6	1,178.9					0.0	311.1	648.6	1,490.0	0.0	0.0
75.00		639.5	1,145.8					0.0	311.1	639.5	1,456.9	0.0	0.0
80.00		629.5	1,112.7					0.0	311.1	629.5	1,423.8	0.0	0.0
85.00		618.5	1,079.6					0.0	311.1	618.5	1,390.7	0.0	0.0
90.00		610.7	1,046.5					0.0	311.1	610.7	1,357.6	0.0	0.0
95.00		334.7	1,013.4					0.0	311.1	334.7	1,324.5	0.0	0.0
95.50	Bot - Section 3	308.4	99.5					0.0	31.1	308.4	130.6	0.0	0.0
100.00		339.7	1,572.0					0.0	280.0	339.7	1,852.0	0.0	0.0
101.00	Top - Section 2	305.8	342.9					0.0	62.2	305.8	405.1	0.0	0.0
105.00	Appurtenance(s)	548.4	593.0	2,000.4	0.0	0.0	3,758.5	0.0	248.9	2,548.8	4,600.4	0.0	0.0
110.00		607.8	718.4					0.0	297.1	607.8	1,015.4	0.0	0.0
115.00	Appurtenance(s)	606.0	692.9	1,554.9	0.0	0.0	1,088.5	0.0	297.1	2,161.0	2,078.5	0.0	0.0
120.00		423.3	667.4					0.0	273.4	423.3	940.8	0.0	0.0
122.00	Appurtenance(s)	301.5	259.8	2,630.4	0.0	0.0	3,324.0	0.0	109.3	2,931.9	3,693.2	0.0	0.0
125.00		241.0	382.1					0.0	143.6	241.0	525.7	0.0	0.0
126.00	Appurtenance(s)	262.6	125.3	3,152.3	0.0	0.0	4,423.2	0.0	47.9	3,414.9	4,596.4	0.0	0.0
130.00		447.9	491.1					0.0	146.0	447.9	637.1	0.0	0.0
135.00		482.3	591.0					0.0	182.5	482.3	773.5	0.0	0.0
140.00	Appurtenance(s)	464.8	565.5	3,849.8	0.0	0.0	4,409.5	0.0	182.5	4,314.6	5,157.5	0.0	0.0
145.00		446.9	540.1					0.0	111.4	446.9	651.5	0.0	0.0
150.00	Appurtenance(s)	218.9	514.6	1,467.3	0.0	0.0	3,240.0	0.0	111.4	1,686.2	3,866.0	0.0	0.0
Totals:										32,907.8	66,628.6	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:33 PM

Customer: T-MOBILE

Load Case: 1.2D + 1.0W

109 mph 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	-69.05	-36.68	0.00	-3,934.10	0.00	3,934.10	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.523
5.00	-66.92	-36.18	0.00	-3,750.73	0.00	3,750.73	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.515
10.00	-64.62	-35.70	0.00	-3,569.81	0.00	3,569.81	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.25	0.507
15.00	-62.36	-35.21	0.00	-3,391.32	0.00	3,391.32	6,071.43	1,590.23	8,442.89	6,959.61	0.59	-0.37	0.498
20.00	-60.15	-34.70	0.00	-3,215.28	0.00	3,215.28	5,995.47	1,555.19	8,075.09	6,719.80	1.05	-0.50	0.489
25.00	-57.98	-34.17	0.00	-3,041.78	0.00	3,041.78	5,916.91	1,520.16	7,715.48	6,481.00	1.65	-0.63	0.480
30.00	-55.85	-33.62	0.00	-2,870.94	0.00	2,870.94	5,835.74	1,485.13	7,364.06	6,243.42	2.38	-0.76	0.470
35.00	-53.76	-33.05	0.00	-2,702.87	0.00	2,702.87	5,751.97	1,450.09	7,020.84	6,007.26	3.26	-0.90	0.460
40.00	-51.72	-32.48	0.00	-2,537.61	0.00	2,537.61	5,665.59	1,415.06	6,685.80	5,772.72	4.27	-1.03	0.449
45.00	-49.74	-32.05	0.00	-2,375.23	0.00	2,375.23	5,576.61	1,380.02	6,358.95	5,539.99	5.42	-1.17	0.438
47.08	-48.91	-31.76	0.00	-2,308.45	0.00	2,308.45	5,538.76	1,365.43	6,225.18	5,443.60	5.94	-1.22	0.433
50.00	-47.01	-31.33	0.00	-2,215.81	0.00	2,215.81	5,485.02	1,344.99	6,040.30	5,309.27	6.72	-1.31	0.426
54.00	-44.47	-30.99	0.00	-2,090.47	0.00	2,090.47	4,089.14	1,090.16	4,886.38	3,958.64	7.86	-1.42	0.540
55.00	-44.11	-30.66	0.00	-2,059.48	0.00	2,059.48	4,077.72	1,084.47	4,835.52	3,926.82	8.16	-1.44	0.536
60.00	-42.49	-30.07	0.00	-1,906.19	0.00	1,906.19	4,019.09	1,056.02	4,585.23	3,767.96	9.76	-1.60	0.517
65.00	-40.90	-29.49	0.00	-1,755.83	0.00	1,755.83	3,957.85	1,027.58	4,341.60	3,609.72	11.52	-1.76	0.498
70.00	-39.35	-28.90	0.00	-1,608.40	0.00	1,608.40	3,894.01	999.13	4,104.61	3,452.29	13.46	-1.92	0.477
75.00	-37.84	-28.31	0.00	-1,463.90	0.00	1,463.90	3,827.57	970.68	3,874.27	3,295.88	15.56	-2.08	0.455
80.00	-36.37	-27.73	0.00	-1,322.33	0.00	1,322.33	3,758.52	942.23	3,650.59	3,140.67	17.83	-2.24	0.432
85.00	-34.93	-27.15	0.00	-1,183.69	0.00	1,183.69	3,686.86	913.79	3,433.55	2,986.87	20.26	-2.39	0.407
90.00	-33.53	-26.57	0.00	-1,047.95	0.00	1,047.95	3,612.61	885.34	3,223.17	2,834.68	22.84	-2.54	0.380
95.00	-32.19	-26.22	0.00	-915.11	0.00	915.11	3,535.75	856.89	3,019.43	2,684.29	25.59	-2.69	0.351
95.50	-32.04	-25.94	0.00	-902.00	0.00	902.00	3,527.92	854.05	2,999.43	2,669.36	25.87	-2.70	0.348
100.00	-30.17	-25.55	0.00	-785.27	0.00	785.27	3,456.28	828.44	2,822.35	2,535.92	28.48	-2.83	0.319
101.00	-29.76	-25.26	0.00	-759.71	0.00	759.71	2,422.80	645.97	2,228.95	1,805.62	29.08	-2.86	0.435
105.00	-25.24	-22.54	0.00	-658.67	0.00	658.67	2,386.99	628.45	2,109.74	1,730.29	31.52	-2.96	0.393
110.00	-24.20	-21.94	0.00	-545.97	0.00	545.97	2,339.89	606.55	1,965.33	1,636.54	34.70	-3.11	0.345
115.00	-22.21	-19.71	0.00	-436.28	0.00	436.28	2,290.19	584.66	1,826.04	1,543.43	38.03	-3.25	0.294
120.00	-21.26	-19.27	0.00	-337.71	0.00	337.71	2,237.88	562.76	1,691.86	1,451.17	41.50	-3.36	0.243
122.00	-17.74	-16.14	0.00	-299.17	0.00	299.17	2,216.23	554.00	1,639.63	1,414.54	42.91	-3.41	0.220
125.00	-17.22	-15.88	0.00	-250.76	0.00	250.76	2,182.97	540.86	1,562.81	1,359.95	45.07	-3.47	0.193
126.00	-12.83	-12.20	0.00	-234.88	0.00	234.88	2,171.68	536.48	1,537.61	1,341.85	45.80	-3.49	0.181
130.00	-12.20	-11.73	0.00	-186.09	0.00	186.09	2,125.45	518.97	1,438.88	1,269.97	48.75	-3.55	0.153
135.00	-11.45	-11.21	0.00	-127.45	0.00	127.45	2,065.33	497.07	1,320.06	1,181.43	52.51	-3.62	0.114
140.00	-6.57	-6.58	0.00	-71.40	0.00	71.40	1,995.73	475.17	1,206.37	1,090.78	56.33	-3.67	0.069
145.00	-5.95	-6.10	0.00	-38.50	0.00	38.50	1,903.77	453.28	1,097.79	992.02	60.18	-3.70	0.042
150.00	0.00	-5.70	0.00	-8.02	0.00	8.02	1,811.80	431.38	994.33	897.94	64.07	-3.72	0.009

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:33 PM

Customer: T-MOBILE

Load Case: 0.9D + 1.0W

109 mph with No Ice (Reduced DL)

21 Iterations

Gust Response Factor :1.10

Dead Load Factor :0.90

Wind Load Factor :1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion			
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		319.9	0.0					0.0	0.0	319.9	0.0	0.0	0.0
5.00		633.2	1,463.9					0.0	81.6	633.2	1,545.5	0.0	0.0
10.00		620.0	1,433.3					0.0	233.3	620.0	1,666.7	0.0	0.0
15.00		616.2	1,402.8					0.0	233.3	616.2	1,636.1	0.0	0.0
20.00		628.7	1,372.2					0.0	233.3	628.7	1,605.5	0.0	0.0
25.00		644.6	1,341.6					0.0	233.3	644.6	1,575.0	0.0	0.0
30.00		654.7	1,311.1					0.0	233.3	654.7	1,544.4	0.0	0.0
35.00		660.6	1,280.5					0.0	233.3	660.6	1,513.8	0.0	0.0
40.00		663.2	1,249.9					0.0	233.3	663.2	1,483.3	0.0	0.0
45.00		470.1	1,219.4					0.0	233.3	470.1	1,452.7	0.0	0.0
47.08	Bot - Section 2	334.6	499.0					0.0	97.2	334.6	596.3	0.0	0.0
50.00		464.9	1,260.4					0.0	136.1	464.9	1,396.5	0.0	0.0
54.00	Top - Section 1	335.4	1,697.9					0.0	186.7	335.4	1,884.6	0.0	0.0
55.00		400.1	189.7					0.0	46.7	400.1	236.4	0.0	0.0
60.00		663.3	933.8					0.0	233.3	663.3	1,167.1	0.0	0.0
65.00		656.5	909.0					0.0	233.3	656.5	1,142.3	0.0	0.0
70.00		648.6	884.2					0.0	233.3	648.6	1,117.5	0.0	0.0
75.00		639.5	859.3					0.0	233.3	639.5	1,092.7	0.0	0.0
80.00		629.5	834.5					0.0	233.3	629.5	1,067.8	0.0	0.0
85.00		618.5	809.7					0.0	233.3	618.5	1,043.0	0.0	0.0
90.00		610.7	784.9					0.0	233.3	610.7	1,018.2	0.0	0.0
95.00		334.7	760.1					0.0	233.3	334.7	993.4	0.0	0.0
95.50	Bot - Section 3	308.4	74.6					0.0	23.3	308.4	98.0	0.0	0.0
100.00		339.7	1,179.0					0.0	210.0	339.7	1,389.0	0.0	0.0
101.00	Top - Section 2	305.8	257.2					0.0	46.7	305.8	303.8	0.0	0.0
105.00	Appurtenance(s)	548.4	444.8	2,000.4	0.0	0.0	2,818.9	0.0	186.7	2,548.8	3,450.3	0.0	0.0
110.00		607.8	538.8					0.0	222.8	607.8	761.6	0.0	0.0
115.00	Appurtenance(s)	606.0	519.7	1,554.9	0.0	0.0	816.4	0.0	222.8	2,161.0	1,558.9	0.0	0.0
120.00		423.3	500.6					0.0	205.0	423.3	705.6	0.0	0.0
122.00	Appurtenance(s)	301.5	194.9	2,630.4	0.0	0.0	2,493.0	0.0	82.0	2,931.9	2,769.9	0.0	0.0
125.00		241.0	286.6					0.0	107.7	241.0	394.3	0.0	0.0
126.00	Appurtenance(s)	262.6	94.0	3,152.3	0.0	0.0	3,317.4	0.0	35.9	3,414.9	3,447.3	0.0	0.0
130.00		447.9	368.4					0.0	109.5	447.9	477.8	0.0	0.0
135.00		482.3	443.3					0.0	136.8	482.3	580.1	0.0	0.0
140.00	Appurtenance(s)	464.8	424.1	3,849.8	0.0	0.0	3,307.1	0.0	136.8	4,314.6	3,868.1	0.0	0.0
145.00		446.9	405.0					0.0	83.6	446.9	488.6	0.0	0.0
150.00	Appurtenance(s)	218.9	385.9	1,467.3	0.0	0.0	2,430.0	0.0	83.6	1,686.2	2,899.5	0.0	0.0
Totals:										32,907.8	49,971.4	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:37 PM

Customer: T-MOBILE

Load Case: 0.9D + 1.0W

109 mph with No Ice (Reduced DL)

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	-51.78	-36.66	0.00	-3,894.37	0.00	3,894.37	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.516
5.00	-50.16	-36.13	0.00	-3,711.09	0.00	3,711.09	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.507
10.00	-48.42	-35.61	0.00	-3,530.46	0.00	3,530.46	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.25	0.499
15.00	-46.71	-35.09	0.00	-3,352.42	0.00	3,352.42	6,071.43	1,590.23	8,442.89	6,959.61	0.58	-0.37	0.490
20.00	-45.03	-34.55	0.00	-3,177.00	0.00	3,177.00	5,995.47	1,555.19	8,075.09	6,719.80	1.04	-0.50	0.481
25.00	-43.38	-33.98	0.00	-3,004.27	0.00	3,004.27	5,916.91	1,520.16	7,715.48	6,481.00	1.63	-0.63	0.471
30.00	-41.77	-33.40	0.00	-2,834.36	0.00	2,834.36	5,835.74	1,485.13	7,364.06	6,243.42	2.36	-0.76	0.462
35.00	-40.19	-32.82	0.00	-2,667.34	0.00	2,667.34	5,751.97	1,450.09	7,020.84	6,007.26	3.22	-0.89	0.452
40.00	-38.65	-32.22	0.00	-2,503.27	0.00	2,503.27	5,665.59	1,415.06	6,685.80	5,772.72	4.22	-1.02	0.441
45.00	-37.15	-31.78	0.00	-2,342.18	0.00	2,342.18	5,576.61	1,380.02	6,358.95	5,539.99	5.36	-1.15	0.430
47.08	-36.52	-31.48	0.00	-2,275.98	0.00	2,275.98	5,538.76	1,365.43	6,225.18	5,443.60	5.87	-1.21	0.425
50.00	-35.09	-31.04	0.00	-2,184.17	0.00	2,184.17	5,485.02	1,344.99	6,040.30	5,309.27	6.64	-1.29	0.418
54.00	-33.17	-30.70	0.00	-2,060.01	0.00	2,060.01	4,089.14	1,090.16	4,886.38	3,958.64	7.77	-1.40	0.529
55.00	-32.90	-30.35	0.00	-2,029.31	0.00	2,029.31	4,077.72	1,084.47	4,835.52	3,926.82	8.06	-1.43	0.526
60.00	-31.67	-29.74	0.00	-1,877.56	0.00	1,877.56	4,019.09	1,056.02	4,585.23	3,767.96	9.64	-1.58	0.507
65.00	-30.46	-29.14	0.00	-1,728.86	0.00	1,728.86	3,957.85	1,027.58	4,341.60	3,609.72	11.39	-1.74	0.487
70.00	-29.29	-28.53	0.00	-1,583.18	0.00	1,583.18	3,894.01	999.13	4,104.61	3,452.29	13.30	-1.90	0.467
75.00	-28.14	-27.93	0.00	-1,440.51	0.00	1,440.51	3,827.57	970.68	3,874.27	3,295.88	15.37	-2.05	0.445
80.00	-27.03	-27.34	0.00	-1,300.85	0.00	1,300.85	3,758.52	942.23	3,650.59	3,140.67	17.60	-2.21	0.422
85.00	-25.94	-26.74	0.00	-1,164.17	0.00	1,164.17	3,686.86	913.79	3,433.55	2,986.87	20.00	-2.36	0.398
90.00	-24.88	-26.15	0.00	-1,030.45	0.00	1,030.45	3,612.61	885.34	3,223.17	2,834.68	22.55	-2.51	0.371
95.00	-23.87	-25.81	0.00	-899.68	0.00	899.68	3,535.75	856.89	3,019.43	2,684.29	25.26	-2.65	0.343
95.50	-23.75	-25.52	0.00	-886.78	0.00	886.78	3,527.92	854.05	2,999.43	2,669.36	25.54	-2.67	0.340
100.00	-22.35	-25.15	0.00	-771.92	0.00	771.92	3,456.28	828.44	2,822.35	2,535.92	28.11	-2.79	0.312
101.00	-22.03	-24.85	0.00	-746.78	0.00	746.78	2,422.80	645.97	2,228.95	1,805.62	28.70	-2.82	0.424
105.00	-18.67	-22.18	0.00	-647.37	0.00	647.37	2,386.99	628.45	2,109.74	1,730.29	31.10	-2.92	0.383
110.00	-17.89	-21.57	0.00	-536.49	0.00	536.49	2,339.89	606.55	1,965.33	1,636.54	34.24	-3.07	0.337
115.00	-16.41	-19.36	0.00	-428.64	0.00	428.64	2,290.19	584.66	1,826.04	1,543.43	37.52	-3.20	0.286
120.00	-15.70	-18.92	0.00	-331.82	0.00	331.82	2,237.88	562.76	1,691.86	1,451.17	40.94	-3.31	0.237
122.00	-13.09	-15.85	0.00	-293.97	0.00	293.97	2,216.23	554.00	1,639.63	1,414.54	42.34	-3.36	0.215
125.00	-12.70	-15.59	0.00	-246.43	0.00	246.43	2,182.97	540.86	1,562.81	1,359.95	44.46	-3.42	0.188
126.00	-9.46	-11.98	0.00	-230.84	0.00	230.84	2,171.68	536.48	1,537.61	1,341.85	45.18	-3.43	0.177
130.00	-8.99	-11.52	0.00	-182.91	0.00	182.91	2,125.45	518.97	1,438.88	1,269.97	48.08	-3.50	0.149
135.00	-8.43	-11.01	0.00	-125.33	0.00	125.33	2,065.33	497.07	1,320.06	1,181.43	51.79	-3.57	0.111
140.00	-4.84	-6.46	0.00	-70.28	0.00	70.28	1,995.73	475.17	1,206.37	1,090.78	55.55	-3.61	0.067
145.00	-4.38	-5.99	0.00	-37.96	0.00	37.96	1,903.77	453.28	1,097.79	992.02	59.35	-3.65	0.041
150.00	0.00	-5.70	0.00	-8.02	0.00	8.02	1,811.80	431.38	994.33	897.94	63.17	-3.66	0.009

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:37 PM

Customer: T-MOBILE

Load Case: 1.2D + 1.0Di + 1.0Wi

40 mph with 1.50 in 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

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion		Moment	
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		56.5	0.0					0.0	0.0	56.5	0.0	0.0	0.0
5.00		112.0	2,405.4					0.0	292.2	112.0	2,697.6	0.0	0.0
10.00		110.1	2,408.0					0.0	601.5	110.1	3,009.5	0.0	0.0
15.00		109.8	2,383.0					0.0	590.3	109.8	2,973.3	0.0	0.0
20.00		112.3	2,348.8					0.0	601.3	112.3	2,950.1	0.0	0.0
25.00		115.3	2,310.0					0.0	609.9	115.3	2,919.9	0.0	0.0
30.00		117.4	2,268.3					0.0	616.9	117.4	2,885.2	0.0	0.0
35.00		118.7	2,224.5					0.0	622.9	118.7	2,847.4	0.0	0.0
40.00		119.4	2,179.2					0.0	628.2	119.4	2,807.4	0.0	0.0
45.00		84.8	2,132.7					0.0	632.9	84.8	2,765.6	0.0	0.0
47.08	Bot - Section 2	60.4	876.2					0.0	265.0	60.4	1,141.2	0.0	0.0
50.00		84.0	1,977.8					0.0	372.2	84.0	2,349.9	0.0	0.0
54.00	Top - Section 1	60.6	2,666.3					0.0	512.6	60.6	3,178.9	0.0	0.0
55.00		72.5	353.6					0.0	128.5	72.5	482.1	0.0	0.0
60.00		120.3	1,738.1					0.0	644.7	120.3	2,382.8	0.0	0.0
65.00		119.3	1,696.4					0.0	648.0	119.3	2,344.4	0.0	0.0
70.00		118.2	1,654.2					0.0	651.1	118.2	2,305.3	0.0	0.0
75.00		116.8	1,611.6					0.0	654.1	116.8	2,265.7	0.0	0.0
80.00		115.3	1,568.6					0.0	656.5	115.3	2,225.1	0.0	0.0
85.00		113.5	1,525.2					0.0	658.8	113.5	2,184.0	0.0	0.0
90.00		111.7	1,481.6					0.0	660.9	111.7	2,142.5	0.0	0.0
95.00		60.8	1,437.7					0.0	663.0	60.8	2,100.6	0.0	0.0
95.50	Bot - Section 3	55.1	141.9					0.0	66.4	55.1	208.3	0.0	0.0
100.00		60.5	1,950.0					0.0	598.5	60.5	2,548.6	0.0	0.0
101.00	Top - Section 2	54.1	426.6					0.0	133.2	54.1	559.8	0.0	0.0
105.00	Appurtenance(s)	96.1	920.1	428.6	0.0	0.0	6,067.5	0.0	533.6	524.8	7,521.2	0.0	0.0
110.00		104.7	1,115.4					0.0	654.6	104.7	1,770.0	0.0	0.0
115.00	Appurtenance(s)	102.3	1,078.2	288.6	0.0	0.0	2,122.4	0.0	656.3	390.9	3,856.9	0.0	0.0
120.00		70.4	1,040.8					0.0	595.2	70.4	1,636.0	0.0	0.0
122.00	Appurtenance(s)	49.2	407.5	510.9	0.0	0.0	5,664.3	0.0	238.5	560.2	6,310.3	0.0	0.0
125.00		39.1	599.1					0.0	337.7	39.1	936.8	0.0	0.0
126.00	Appurtenance(s)	47.9	197.2	623.9	0.0	0.0	7,635.2	0.0	112.7	671.8	7,945.1	0.0	0.0
130.00		84.8	770.5					0.0	221.0	84.8	991.5	0.0	0.0
135.00		91.7	927.6					0.0	276.7	91.7	1,204.2	0.0	0.0
140.00	Appurtenance(s)	88.8	889.5	771.9	0.0	0.0	8,235.0	0.0	277.0	860.7	9,401.6	0.0	0.0
145.00		85.9	851.3					0.0	111.4	85.9	962.7	0.0	0.0
150.00	Appurtenance(s)	42.2	813.0	379.5	0.0	0.0	4,793.6	0.0	111.4	421.7	5,718.1	0.0	0.0
Totals:										6,285.78	102,529.	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:41 PM

Customer: T-MOBILE

Load Case: 1.2D + 1.0Di + 1.0Wi

40 mph with 1.50 in 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	-108.76	-6.93	0.00	-776.39	0.00	776.39	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.118
5.00	-106.06	-6.87	0.00	-741.71	0.00	741.71	6,215.54	1,660.30	9,203.06	7,441.50	0.01	-0.02	0.117
10.00	-103.04	-6.80	0.00	-707.38	0.00	707.38	6,144.79	1,625.26	8,818.88	7,200.24	0.05	-0.05	0.115
15.00	-100.07	-6.73	0.00	-673.37	0.00	673.37	6,071.43	1,590.23	8,442.89	6,959.61	0.12	-0.07	0.113
20.00	-97.12	-6.66	0.00	-639.72	0.00	639.72	5,995.47	1,555.19	8,075.09	6,719.80	0.21	-0.10	0.111
25.00	-94.19	-6.58	0.00	-606.43	0.00	606.43	5,916.91	1,520.16	7,715.48	6,481.00	0.33	-0.13	0.110
30.00	-91.30	-6.50	0.00	-573.53	0.00	573.53	5,835.74	1,485.13	7,364.06	6,243.42	0.47	-0.15	0.108
35.00	-88.45	-6.41	0.00	-541.04	0.00	541.04	5,751.97	1,450.09	7,020.84	6,007.26	0.65	-0.18	0.105
40.00	-85.64	-6.32	0.00	-508.98	0.00	508.98	5,665.59	1,415.06	6,685.80	5,772.72	0.85	-0.21	0.103
45.00	-82.88	-6.26	0.00	-477.36	0.00	477.36	5,576.61	1,380.02	6,358.95	5,539.99	1.08	-0.23	0.101
47.08	-81.74	-6.21	0.00	-464.33	0.00	464.33	5,538.76	1,365.43	6,225.18	5,443.60	1.18	-0.24	0.100
50.00	-79.38	-6.14	0.00	-446.21	0.00	446.21	5,485.02	1,344.99	6,040.30	5,309.27	1.33	-0.26	0.099
54.00	-76.20	-6.09	0.00	-421.64	0.00	421.64	4,089.14	1,090.16	4,886.38	3,958.64	1.56	-0.28	0.125
55.00	-75.72	-6.04	0.00	-415.55	0.00	415.55	4,077.72	1,084.47	4,835.52	3,926.82	1.62	-0.29	0.124
60.00	-73.33	-5.95	0.00	-385.37	0.00	385.37	4,019.09	1,056.02	4,585.23	3,767.96	1.94	-0.32	0.121
65.00	-70.99	-5.85	0.00	-355.64	0.00	355.64	3,957.85	1,027.58	4,341.60	3,609.72	2.30	-0.35	0.116
70.00	-68.68	-5.76	0.00	-326.38	0.00	326.38	3,894.01	999.13	4,104.61	3,452.29	2.68	-0.39	0.112
75.00	-66.41	-5.66	0.00	-297.59	0.00	297.59	3,827.57	970.68	3,874.27	3,295.88	3.10	-0.42	0.108
80.00	-64.18	-5.57	0.00	-269.28	0.00	269.28	3,758.52	942.23	3,650.59	3,140.67	3.56	-0.45	0.103
85.00	-62.00	-5.47	0.00	-241.45	0.00	241.45	3,686.86	913.79	3,433.55	2,986.87	4.05	-0.48	0.098
90.00	-59.85	-5.37	0.00	-214.11	0.00	214.11	3,612.61	885.34	3,223.17	2,834.68	4.57	-0.51	0.092
95.00	-57.75	-5.31	0.00	-187.26	0.00	187.26	3,535.75	856.89	3,019.43	2,684.29	5.12	-0.54	0.086
95.50	-57.54	-5.26	0.00	-184.60	0.00	184.60	3,527.92	854.05	2,999.43	2,669.36	5.18	-0.54	0.086
100.00	-54.99	-5.19	0.00	-160.92	0.00	160.92	3,456.28	828.44	2,822.35	2,535.92	5.70	-0.57	0.079
101.00	-54.43	-5.15	0.00	-155.73	0.00	155.73	2,422.80	645.97	2,228.95	1,805.62	5.82	-0.58	0.109
105.00	-46.92	-4.57	0.00	-135.14	0.00	135.14	2,386.99	628.45	2,109.74	1,730.29	6.31	-0.60	0.098
110.00	-45.14	-4.47	0.00	-112.31	0.00	112.31	2,339.89	606.55	1,965.33	1,636.54	6.96	-0.63	0.088
115.00	-41.29	-4.05	0.00	-89.98	0.00	89.98	2,290.19	584.66	1,826.04	1,543.43	7.63	-0.66	0.076
120.00	-39.65	-3.97	0.00	-69.73	0.00	69.73	2,237.88	562.76	1,691.86	1,451.17	8.33	-0.68	0.066
122.00	-33.35	-3.34	0.00	-61.79	0.00	61.79	2,216.23	554.00	1,639.63	1,414.54	8.62	-0.69	0.059
125.00	-32.41	-3.30	0.00	-51.76	0.00	51.76	2,182.97	540.86	1,562.81	1,359.95	9.05	-0.70	0.053
126.00	-24.48	-2.53	0.00	-48.47	0.00	48.47	2,171.68	536.48	1,537.61	1,341.85	9.20	-0.70	0.047
130.00	-23.49	-2.44	0.00	-38.34	0.00	38.34	2,125.45	518.97	1,438.88	1,269.97	9.80	-0.72	0.041
135.00	-22.28	-2.34	0.00	-26.14	0.00	26.14	2,065.33	497.07	1,320.06	1,181.43	10.56	-0.73	0.033
140.00	-12.89	-1.36	0.00	-14.45	0.00	14.45	1,995.73	475.17	1,206.37	1,090.78	11.33	-0.74	0.020
145.00	-11.93	-1.26	0.00	-7.67	0.00	7.67	1,903.77	453.28	1,097.79	992.02	12.11	-0.75	0.014
150.00	0.00	-1.10	0.00	-1.36	0.00	1.36	1,811.80	431.38	994.33	897.94	12.90	-0.75	0.002

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:41 PM

Customer: T-MOBILE

Load Case: 1.0D + 1.0W

Serviceability 60 mph

20 Iterations

Gust Response Factor :1.10

Dead Load Factor :1.00

Wind Load Factor :1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion			
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		86.7	0.0					0.0	0.0	86.7	0.0	0.0	0.0
5.00		171.7	1,626.6					0.0	90.7	171.7	1,717.3	0.0	0.0
10.00		168.1	1,592.6					0.0	259.3	168.1	1,851.8	0.0	0.0
15.00		167.1	1,558.6					0.0	259.3	167.1	1,817.9	0.0	0.0
20.00		170.4	1,524.7					0.0	259.3	170.4	1,783.9	0.0	0.0
25.00		174.7	1,490.7					0.0	259.3	174.7	1,750.0	0.0	0.0
30.00		177.5	1,456.7					0.0	259.3	177.5	1,716.0	0.0	0.0
35.00		179.1	1,422.8					0.0	259.3	179.1	1,682.0	0.0	0.0
40.00		179.8	1,388.8					0.0	259.3	179.8	1,648.1	0.0	0.0
45.00		127.4	1,354.8					0.0	259.3	127.4	1,614.1	0.0	0.0
47.08	Bot - Section 2	90.7	554.5					0.0	108.0	90.7	662.5	0.0	0.0
50.00		126.0	1,400.5					0.0	151.2	126.0	1,551.7	0.0	0.0
54.00	Top - Section 1	90.9	1,886.6					0.0	207.4	90.9	2,094.0	0.0	0.0
55.00		108.5	210.8					0.0	51.9	108.5	262.7	0.0	0.0
60.00		179.8	1,037.6					0.0	259.3	179.8	1,296.8	0.0	0.0
65.00		178.0	1,010.0					0.0	259.3	178.0	1,269.2	0.0	0.0
70.00		175.8	982.4					0.0	259.3	175.8	1,241.6	0.0	0.0
75.00		173.4	954.8					0.0	259.3	173.4	1,214.1	0.0	0.0
80.00		170.7	927.2					0.0	259.3	170.7	1,186.5	0.0	0.0
85.00		167.7	899.7					0.0	259.3	167.7	1,158.9	0.0	0.0
90.00		165.6	872.1					0.0	259.3	165.6	1,131.3	0.0	0.0
95.00		90.7	844.5					0.0	259.3	90.7	1,103.8	0.0	0.0
95.50	Bot - Section 3	83.6	82.9					0.0	25.9	83.6	108.9	0.0	0.0
100.00		92.1	1,310.0					0.0	233.3	92.1	1,543.3	0.0	0.0
101.00	Top - Section 2	82.9	285.7					0.0	51.9	82.9	337.6	0.0	0.0
105.00	Appurtenance(s)	148.7	494.2	542.3	0.0	0.0	3,132.1	0.0	207.4	691.0	3,833.7	0.0	0.0
110.00		164.8	598.6					0.0	247.6	164.8	846.2	0.0	0.0
115.00	Appurtenance(s)	164.3	577.4	421.6	0.0	0.0	907.1	0.0	247.6	585.9	1,732.1	0.0	0.0
120.00		114.8	556.2					0.0	227.8	114.8	784.0	0.0	0.0
122.00	Appurtenance(s)	81.8	216.5	713.1	0.0	0.0	2,770.0	0.0	91.1	794.9	3,077.6	0.0	0.0
125.00		65.3	318.4					0.0	119.7	65.3	438.1	0.0	0.0
126.00	Appurtenance(s)	71.2	104.4	854.6	0.0	0.0	3,686.0	0.0	39.9	925.8	3,830.3	0.0	0.0
130.00		121.4	409.3					0.0	121.6	121.4	530.9	0.0	0.0
135.00		130.7	492.5					0.0	152.1	130.7	644.6	0.0	0.0
140.00	Appurtenance(s)	126.0	471.3	1,043.7	0.0	0.0	3,674.6	0.0	152.1	1,169.7	4,297.9	0.0	0.0
145.00		121.2	450.0					0.0	92.9	121.2	542.9	0.0	0.0
150.00	Appurtenance(s)	59.4	428.8	397.8	0.0	0.0	2,700.0	0.0	92.9	457.1	3,221.7	0.0	0.0
Totals:										8,921.63	55,523.8	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

Load Case: 1.0D + 1.0W

Serviceability 60 mph

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	-57.58	-9.94	0.00	-1,059.92	0.00	1,059.92	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.147
5.00	-55.85	-9.80	0.00	-1,010.23	0.00	1,010.23	6,215.54	1,660.30	9,203.06	7,441.50	0.02	-0.03	0.145
10.00	-54.00	-9.66	0.00	-961.23	0.00	961.23	6,144.79	1,625.26	8,818.88	7,200.24	0.07	-0.07	0.142
15.00	-52.17	-9.52	0.00	-912.92	0.00	912.92	6,071.43	1,590.23	8,442.89	6,959.61	0.16	-0.10	0.140
20.00	-50.38	-9.38	0.00	-865.31	0.00	865.31	5,995.47	1,555.19	8,075.09	6,719.80	0.28	-0.14	0.137
25.00	-48.63	-9.23	0.00	-818.41	0.00	818.41	5,916.91	1,520.16	7,715.48	6,481.00	0.44	-0.17	0.135
30.00	-46.91	-9.08	0.00	-772.26	0.00	772.26	5,835.74	1,485.13	7,364.06	6,243.42	0.64	-0.21	0.132
35.00	-45.22	-8.92	0.00	-726.88	0.00	726.88	5,751.97	1,450.09	7,020.84	6,007.26	0.88	-0.24	0.129
40.00	-43.57	-8.76	0.00	-682.29	0.00	682.29	5,665.59	1,415.06	6,685.80	5,772.72	1.15	-0.28	0.126
45.00	-41.95	-8.64	0.00	-638.49	0.00	638.49	5,576.61	1,380.02	6,358.95	5,539.99	1.46	-0.31	0.123
47.08	-41.28	-8.56	0.00	-620.49	0.00	620.49	5,538.76	1,365.43	6,225.18	5,443.60	1.60	-0.33	0.121
50.00	-39.73	-8.44	0.00	-595.52	0.00	595.52	5,485.02	1,344.99	6,040.30	5,309.27	1.81	-0.35	0.119
54.00	-37.63	-8.35	0.00	-561.74	0.00	561.74	4,089.14	1,090.16	4,886.38	3,958.64	2.12	-0.38	0.151
55.00	-37.37	-8.26	0.00	-553.39	0.00	553.39	4,077.72	1,084.47	4,835.52	3,926.82	2.20	-0.39	0.150
60.00	-36.07	-8.10	0.00	-512.10	0.00	512.10	4,019.09	1,056.02	4,585.23	3,767.96	2.63	-0.43	0.145
65.00	-34.79	-7.93	0.00	-471.62	0.00	471.62	3,957.85	1,027.58	4,341.60	3,609.72	3.10	-0.47	0.140
70.00	-33.55	-7.77	0.00	-431.95	0.00	431.95	3,894.01	999.13	4,104.61	3,452.29	3.62	-0.52	0.134
75.00	-32.33	-7.61	0.00	-393.09	0.00	393.09	3,827.57	970.68	3,874.27	3,295.88	4.19	-0.56	0.128
80.00	-31.14	-7.45	0.00	-355.03	0.00	355.03	3,758.52	942.23	3,650.59	3,140.67	4.80	-0.60	0.121
85.00	-29.98	-7.29	0.00	-317.77	0.00	317.77	3,686.86	913.79	3,433.55	2,986.87	5.45	-0.64	0.115
90.00	-28.84	-7.13	0.00	-281.31	0.00	281.31	3,612.61	885.34	3,223.17	2,834.68	6.15	-0.68	0.107
95.00	-27.74	-7.04	0.00	-245.64	0.00	245.64	3,535.75	856.89	3,019.43	2,684.29	6.88	-0.72	0.099
95.50	-27.63	-6.96	0.00	-242.12	0.00	242.12	3,527.92	854.05	2,999.43	2,669.36	6.96	-0.73	0.099
100.00	-26.08	-6.86	0.00	-210.78	0.00	210.78	3,456.28	828.44	2,822.35	2,535.92	7.66	-0.76	0.091
101.00	-25.74	-6.78	0.00	-203.92	0.00	203.92	2,422.80	645.97	2,228.95	1,805.62	7.82	-0.77	0.124
105.00	-21.92	-6.05	0.00	-176.79	0.00	176.79	2,386.99	628.45	2,109.74	1,730.29	8.48	-0.80	0.111
110.00	-21.07	-5.89	0.00	-146.53	0.00	146.53	2,339.89	606.55	1,965.33	1,636.54	9.33	-0.84	0.099
115.00	-19.34	-5.29	0.00	-117.08	0.00	117.08	2,290.19	584.66	1,826.04	1,543.43	10.23	-0.87	0.084
120.00	-18.56	-5.17	0.00	-90.64	0.00	90.64	2,237.88	562.76	1,691.86	1,451.17	11.16	-0.90	0.071
122.00	-15.49	-4.33	0.00	-80.30	0.00	80.30	2,216.23	554.00	1,639.63	1,414.54	11.54	-0.92	0.064
125.00	-15.06	-4.26	0.00	-67.31	0.00	67.31	2,182.97	540.86	1,562.81	1,359.95	12.12	-0.93	0.056
126.00	-11.24	-3.27	0.00	-63.05	0.00	63.05	2,171.68	536.48	1,537.61	1,341.85	12.32	-0.94	0.052
130.00	-10.71	-3.15	0.00	-49.96	0.00	49.96	2,125.45	518.97	1,438.88	1,269.97	13.11	-0.95	0.044
135.00	-10.07	-3.01	0.00	-34.23	0.00	34.23	2,065.33	497.07	1,320.06	1,181.43	14.12	-0.97	0.034
140.00	-5.79	-1.77	0.00	-19.19	0.00	19.19	1,995.73	475.17	1,206.37	1,090.78	15.15	-0.99	0.021
145.00	-5.25	-1.64	0.00	-10.36	0.00	10.36	1,903.77	453.28	1,097.79	992.02	16.19	-0.99	0.013
150.00	0.00	-1.54	0.00	-2.17	0.00	2.17	1,811.80	431.38	994.33	897.94	17.23	-1.00	0.002

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

Equivalent Lateral Forces Method Analysis

Spectral Response Acceleration for Short Period (S_s):	0.10
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.07
Long-Period Transition Period (T_L):	12
Importance Factor (I_E):	1.00
Site Coefficient F_a :	1.60
Site Coefficient F_v :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.11
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.11
Seismic Response Coefficient (C_s):	0.03
Upper Limit C_s	0.03
Lower Limit C_s	0.03
Period based on Rayleigh Method (sec):	2.24
Redundancy Factor (p):	1.00
Seismic Force Distribution Exponent (k):	1.87
Total Unfactored Dead Load:	57.58 k
Seismic Base Shear (E):	1.87 k

Load Case 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)
36	147.50	522	5,890	0.021	39	637
35	142.50	543	5,747	0.020	38	663
34	137.50	623	6,173	0.022	41	761
33	132.50	645	5,956	0.021	39	787
32	128.00	531	4,599	0.016	30	648
31	125.50	144	1,205	0.004	8	176
30	123.50	438	3,550	0.013	23	535
29	121.00	308	2,399	0.009	16	376
28	117.50	784	5,788	0.021	38	957
27	112.50	825	5,615	0.020	37	1,007
26	107.50	846	5,290	0.019	35	1,033
25	103.00	702	4,050	0.014	27	857
24	100.50	338	1,861	0.007	12	412
23	97.75	1,543	8,078	0.029	53	1,885
22	95.25	109	543	0.002	4	133
21	92.50	1,104	5,211	0.018	34	1,348
20	87.50	1,131	4,815	0.017	32	1,381
19	82.50	1,159	4,418	0.016	29	1,415
18	77.50	1,186	4,025	0.014	27	1,449
17	72.50	1,214	3,636	0.013	24	1,483
16	67.50	1,242	3,254	0.012	22	1,516
15	62.50	1,269	2,880	0.010	19	1,550
14	57.50	1,297	2,518	0.009	17	1,584
13	54.50	263	461	0.002	3	321
12	52.00	2,094	3,370	0.012	22	2,557

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

11	48.54	1,552	2,196	0.008	15	1,895
10	46.04	663	849	0.003	6	809
9	42.50	1,614	1,782	0.006	12	1,971
8	37.50	1,648	1,440	0.005	10	2,012
7	32.50	1,682	1,125	0.004	7	2,054
6	27.50	1,716	840	0.003	6	2,095
5	22.50	1,750	589	0.002	4	2,137
4	17.50	1,784	375	0.001	2	2,178
3	12.50	1,818	204	0.001	1	2,220
2	7.50	1,852	80	0.000	1	2,261
1	2.50	1,717	10	0.000	0	2,097
Powerwave Allgon TT0	150.00	66	769	0.003	5	81
Nokia AirScale RRH 4	150.00	110	1,286	0.005	9	135
Raycap DC6-48-60-18-	150.00	33	382	0.001	3	40
Raycap DC6-48-60-18-	150.00	16	186	0.001	1	20
Raycap DC6-48-60-0-8	150.00	16	186	0.001	1	20
Nokia AHLBBA	150.00	284	3,314	0.012	22	347
Alcatel-Lucent RRH4X	150.00	210	2,447	0.009	16	256
Nokia AirScale Dual	150.00	265	3,083	0.011	20	323
Nokia AEQK AirScale	150.00	298	3,468	0.012	23	363
Commscope JAH4-65C-R	150.00	262	3,052	0.011	20	320
CCI TPA65R-BU8D	150.00	495	5,768	0.020	38	604
Generic Mount Reinfo	150.00	200	2,330	0.008	15	244
Generic Round Platfo	150.00	2,500	29,129	0.103	193	3,053
Powerwave Allgon LGP	140.00	59	608	0.002	4	73
Ericsson Radio 4449	140.00	210	2,151	0.008	14	256
Ericsson 8843 Rev 2	140.00	225	2,305	0.008	15	275
Raycap RRFDC-3315-PF	140.00	54	551	0.002	4	66
Ericsson AIR 6449 B7	140.00	245	2,507	0.009	17	299
Antel BXA-80063/8CF	140.00	72	737	0.003	5	88
Commscope NHH-65C-R2	140.00	310	3,171	0.011	21	378
Generic Round Platfo	140.00	2,500	25,606	0.091	170	3,053
Commscope HELIAX Fib	126.00	20	168	0.001	1	24
Nokia AirScale Dual	126.00	251	2,115	0.007	14	307
Nokia AHFIG 70.55 lb	126.00	212	1,782	0.006	12	259
Raycap ASU9338TYP01	126.00	15	125	0.000	1	18
Nokia AEHC	126.00	311	2,614	0.009	17	380
Commscope FFHH-65C-R	126.00	377	3,172	0.011	21	460
Generic Round Platfo	126.00	2,500	21,029	0.075	139	3,053
Generic 48" x 12" Pa	122.00	270	2,138	0.008	14	330
Generic Flat Platfor	122.00	2,500	19,799	0.070	131	3,053
DragonWave Horizon D	115.00	14	99	0.000	1	17
Samsung 2.5GHz nRRHv	115.00	152	1,079	0.004	7	186
Argus LLPX310R	115.00	86	608	0.002	4	105
Andrew Microwaves VH	115.00	95	675	0.002	4	116
Collar/Side Arms	115.00	560	3,971	0.014	26	684
Commscope RDIDC-9181	105.00	22	131	0.000	1	27
Fujitsu TA08025-B604	105.00	192	1,147	0.004	8	234
Fujitsu TA08025-B605	105.00	225	1,346	0.005	9	275
JMA Wireless MX08FRO	105.00	193	1,158	0.004	8	236
Generic Round Platfo	105.00	2,500	14,958	0.053	99	3,053
		57,579	281,973	1.000	1,867	70,310

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

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
36	147.50	522	5,890	0.021	39	458
35	142.50	543	5,747	0.020	38	477
34	137.50	623	6,173	0.022	41	548
33	132.50	645	5,956	0.021	39	566

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

32	128.00	531	4,599	0.016	30	467
31	125.50	144	1,205	0.004	8	127
30	123.50	438	3,550	0.013	23	385
29	121.00	308	2,399	0.009	16	270
28	117.50	784	5,788	0.021	38	689
27	112.50	825	5,615	0.020	37	725
26	107.50	846	5,290	0.019	35	744
25	103.00	702	4,050	0.014	27	617
24	100.50	338	1,861	0.007	12	297
23	97.75	1,543	8,078	0.029	53	1,356
22	95.25	109	543	0.002	4	96
21	92.50	1,104	5,211	0.018	34	970
20	87.50	1,131	4,815	0.017	32	994
19	82.50	1,159	4,418	0.016	29	1,019
18	77.50	1,186	4,025	0.014	27	1,043
17	72.50	1,214	3,636	0.013	24	1,067
16	67.50	1,242	3,254	0.012	22	1,091
15	62.50	1,269	2,880	0.010	19	1,115
14	57.50	1,297	2,518	0.009	17	1,140
13	54.50	263	461	0.002	3	231
12	52.00	2,094	3,370	0.012	22	1,840
11	48.54	1,552	2,196	0.008	15	1,364
10	46.04	663	849	0.003	6	582
9	42.50	1,614	1,782	0.006	12	1,419
8	37.50	1,648	1,440	0.005	10	1,448
7	32.50	1,682	1,125	0.004	7	1,478
6	27.50	1,716	840	0.003	6	1,508
5	22.50	1,750	589	0.002	4	1,538
4	17.50	1,784	375	0.001	2	1,568
3	12.50	1,818	204	0.001	1	1,598
2	7.50	1,852	80	0.000	1	1,628
1	2.50	1,717	10	0.000	0	1,509
Powerwave Allgon TT0	150.00	66	769	0.003	5	58
Nokia AirScale RRH 4	150.00	110	1,286	0.005	9	97
Raycap DC6-48-60-18-	150.00	33	382	0.001	3	29
Raycap DC6-48-60-18-	150.00	16	186	0.001	1	14
Raycap DC6-48-60-0-8	150.00	16	186	0.001	1	14
Nokia AHLBBA	150.00	284	3,314	0.012	22	250
Alcatel-Lucent RRH4X	150.00	210	2,447	0.009	16	185
Nokia AirScale Dual	150.00	265	3,083	0.011	20	233
Nokia AEQK AirScale	150.00	298	3,468	0.012	23	262
Commscope JAH4-65C-R	150.00	262	3,052	0.011	20	230
CCI TPA65R-BU8D	150.00	495	5,768	0.020	38	435
Generic Mount Reinfo	150.00	200	2,330	0.008	15	176
Generic Round Platfo	150.00	2,500	29,129	0.103	193	2,197
Powerwave Allgon LGP	140.00	59	608	0.002	4	52
Ericsson Radio 4449	140.00	210	2,151	0.008	14	185
Ericsson 8843 Rev 2	140.00	225	2,305	0.008	15	198
Raycap RRFDC-3315-PF	140.00	54	551	0.002	4	47
Ericsson AIR 6449 B7	140.00	245	2,507	0.009	17	215
Antel BXA-80063/8CF	140.00	72	737	0.003	5	63
Commscope NHH-65C-R2	140.00	310	3,171	0.011	21	272
Generic Round Platfo	140.00	2,500	25,606	0.091	170	2,197
Commscope HELIAX Fib	126.00	20	168	0.001	1	18
Nokia AirScale Dual	126.00	251	2,115	0.007	14	221
Nokia AHFIG 70.55 lb	126.00	212	1,782	0.006	12	186
Raycap ASU9338TYP01	126.00	15	125	0.000	1	13
Nokia AEHC	126.00	311	2,614	0.009	17	273
Commscope FFHH-65C-R	126.00	377	3,172	0.011	21	331
Generic Round Platfo	126.00	2,500	21,029	0.075	139	2,197
Generic 48" x 12" Pa	122.00	270	2,138	0.008	14	237
Generic Flat Platfor	122.00	2,500	19,799	0.070	131	2,197
DragonWave Horizon D	115.00	14	99	0.000	1	12
Samsung 2.5GHz nRRHv	115.00	152	1,079	0.004	7	134

Site Number: 306042**Code: ANSI/TIA-222-H**

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO**Engineering Number:13694528_C3_02****7/23/2021 5:19:45 PM****Customer: T-MOBILE**

Argus LLPX310R	115.00	86	608	0.002	4	75
Andrew Microwaves VH	115.00	95	675	0.002	4	84
Collar/Side Arms	115.00	560	3,971	0.014	26	492
Commscope RDIDC-9181	105.00	22	131	0.000	1	19
Fujitsu TA08025-B604	105.00	192	1,147	0.004	8	168
Fujitsu TA08025-B605	105.00	225	1,346	0.005	9	198
JMA Wireless MX08FRO	105.00	193	1,158	0.004	8	170
Generic Round Platfo	105.00	2,500	14,958	0.053	99	2,197
		57,579	281,973	1.000	1,867	50,605

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

Load Case 1.2D + 1.0Ev + 1.0Eh

Seismic

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	-68.21	-1.87	0.00	-232.16	0.00	232.16	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.041
5.00	-65.95	-1.88	0.00	-222.81	0.00	222.81	6,215.54	1,660.30	9,203.06	7,441.50	0.00	-0.01	0.041
10.00	-63.73	-1.89	0.00	-213.42	0.00	213.42	6,144.79	1,625.26	8,818.88	7,200.24	0.02	-0.01	0.040
15.00	-61.55	-1.89	0.00	-203.99	0.00	203.99	6,071.43	1,590.23	8,442.89	6,959.61	0.04	-0.02	0.039
20.00	-59.42	-1.89	0.00	-194.54	0.00	194.54	5,995.47	1,555.19	8,075.09	6,719.80	0.06	-0.03	0.039
25.00	-57.32	-1.89	0.00	-185.08	0.00	185.08	5,916.91	1,520.16	7,715.48	6,481.00	0.10	-0.04	0.038
30.00	-55.27	-1.89	0.00	-175.60	0.00	175.60	5,835.74	1,485.13	7,364.06	6,243.42	0.14	-0.05	0.038
35.00	-53.25	-1.89	0.00	-166.14	0.00	166.14	5,751.97	1,450.09	7,020.84	6,007.26	0.19	-0.05	0.037
40.00	-51.28	-1.88	0.00	-156.69	0.00	156.69	5,665.59	1,415.06	6,685.80	5,772.72	0.26	-0.06	0.036
45.00	-50.47	-1.88	0.00	-147.27	0.00	147.27	5,576.61	1,380.02	6,358.95	5,539.99	0.33	-0.07	0.036
47.08	-48.58	-1.87	0.00	-143.35	0.00	143.35	5,538.76	1,365.43	6,225.18	5,443.60	0.36	-0.07	0.035
50.00	-46.02	-1.85	0.00	-137.90	0.00	137.90	5,485.02	1,344.99	6,040.30	5,309.27	0.40	-0.08	0.034
54.00	-45.70	-1.85	0.00	-130.51	0.00	130.51	4,089.14	1,090.16	4,886.38	3,958.64	0.47	-0.09	0.044
55.00	-44.12	-1.83	0.00	-128.66	0.00	128.66	4,077.72	1,084.47	4,835.52	3,926.82	0.49	-0.09	0.044
60.00	-42.57	-1.82	0.00	-119.50	0.00	119.50	4,019.09	1,056.02	4,585.23	3,767.96	0.59	-0.10	0.042
65.00	-41.05	-1.80	0.00	-110.40	0.00	110.40	3,957.85	1,027.58	4,341.60	3,609.72	0.70	-0.11	0.041
70.00	-39.57	-1.78	0.00	-101.39	0.00	101.39	3,894.01	999.13	4,104.61	3,452.29	0.82	-0.12	0.040
75.00	-38.12	-1.76	0.00	-92.48	0.00	92.48	3,827.57	970.68	3,874.27	3,295.88	0.95	-0.13	0.038
80.00	-36.70	-1.73	0.00	-83.69	0.00	83.69	3,758.52	942.23	3,650.59	3,140.67	1.09	-0.14	0.036
85.00	-35.32	-1.70	0.00	-75.03	0.00	75.03	3,686.86	913.79	3,433.55	2,986.87	1.24	-0.15	0.035
90.00	-33.97	-1.67	0.00	-66.51	0.00	66.51	3,612.61	885.34	3,223.17	2,834.68	1.40	-0.16	0.033
95.00	-33.84	-1.67	0.00	-58.16	0.00	58.16	3,535.75	856.89	3,019.43	2,684.29	1.57	-0.17	0.031
95.50	-31.95	-1.61	0.00	-57.32	0.00	57.32	3,527.92	854.05	2,999.43	2,669.36	1.58	-0.17	0.031
100.00	-31.54	-1.60	0.00	-50.06	0.00	50.06	3,456.28	828.44	2,822.35	2,535.92	1.74	-0.18	0.029
101.00	-30.69	-1.58	0.00	-48.46	0.00	48.46	2,422.80	645.97	2,228.95	1,805.62	1.78	-0.18	0.040
105.00	-25.83	-1.40	0.00	-42.16	0.00	42.16	2,386.99	628.45	2,109.74	1,730.29	1.93	-0.18	0.035
110.00	-24.82	-1.37	0.00	-35.14	0.00	35.14	2,339.89	606.55	1,965.33	1,636.54	2.13	-0.19	0.032
115.00	-22.76	-1.28	0.00	-28.30	0.00	28.30	2,290.19	584.66	1,826.04	1,543.43	2.34	-0.20	0.028
120.00	-22.38	-1.27	0.00	-21.88	0.00	21.88	2,237.88	562.76	1,691.86	1,451.17	2.56	-0.21	0.025
122.00	-18.46	-1.09	0.00	-19.34	0.00	19.34	2,216.23	554.00	1,639.63	1,414.54	2.64	-0.21	0.022
125.00	-18.29	-1.08	0.00	-16.09	0.00	16.09	2,182.97	540.86	1,562.81	1,359.95	2.78	-0.22	0.020
126.00	-13.14	-0.82	0.00	-15.01	0.00	15.01	2,171.68	536.48	1,537.61	1,341.85	2.82	-0.22	0.017
130.00	-12.35	-0.78	0.00	-11.71	0.00	11.71	2,125.45	518.97	1,438.88	1,269.97	3.01	-0.22	0.015
135.00	-11.59	-0.74	0.00	-7.80	0.00	7.80	2,065.33	497.07	1,320.06	1,181.43	3.24	-0.23	0.012
140.00	-6.44	-0.43	0.00	-4.11	0.00	4.11	1,995.73	475.17	1,206.37	1,090.78	3.48	-0.23	0.007
145.00	-5.80	-0.39	0.00	-1.95	0.00	1.95	1,903.77	453.28	1,097.79	992.02	3.72	-0.23	0.005
150.00	0.00	-0.37	0.00	0.00	0.00	0.00	1,811.80	431.38	994.33	897.94	3.97	-0.23	0.000

Site Number: 306042

Code: ANSI/TIA-222-H

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO

Engineering Number:13694528_C3_02

7/23/2021 5:19:45 PM

Customer: T-MOBILE

Load Case 0.9D - 1.0Ev + 1.0EhSeismic (Reduced DL)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	-49.10	-1.87	0.00	-229.49	0.00	229.49	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.038
5.00	-47.47	-1.87	0.00	-220.14	0.00	220.14	6,215.54	1,660.30	9,203.06	7,441.50	0.00	-0.01	0.037
10.00	-45.87	-1.88	0.00	-210.77	0.00	210.77	6,144.79	1,625.26	8,818.88	7,200.24	0.02	-0.01	0.037
15.00	-44.30	-1.88	0.00	-201.37	0.00	201.37	6,071.43	1,590.23	8,442.89	6,959.61	0.03	-0.02	0.036
20.00	-42.76	-1.88	0.00	-191.96	0.00	191.96	5,995.47	1,555.19	8,075.09	6,719.80	0.06	-0.03	0.036
25.00	-41.25	-1.88	0.00	-182.55	0.00	182.55	5,916.91	1,520.16	7,715.48	6,481.00	0.10	-0.04	0.035
30.00	-39.78	-1.88	0.00	-173.14	0.00	173.14	5,835.74	1,485.13	7,364.06	6,243.42	0.14	-0.05	0.035
35.00	-38.33	-1.87	0.00	-163.74	0.00	163.74	5,751.97	1,450.09	7,020.84	6,007.26	0.19	-0.05	0.034
40.00	-36.91	-1.87	0.00	-154.37	0.00	154.37	5,665.59	1,415.06	6,685.80	5,772.72	0.25	-0.06	0.033
45.00	-36.33	-1.86	0.00	-145.04	0.00	145.04	5,576.61	1,380.02	6,358.95	5,539.99	0.32	-0.07	0.033
47.08	-34.96	-1.85	0.00	-141.16	0.00	141.16	5,538.76	1,365.43	6,225.18	5,443.60	0.35	-0.07	0.032
50.00	-33.12	-1.83	0.00	-135.76	0.00	135.76	5,485.02	1,344.99	6,040.30	5,309.27	0.40	-0.08	0.032
54.00	-32.89	-1.83	0.00	-128.45	0.00	128.45	4,089.14	1,090.16	4,886.38	3,958.64	0.47	-0.09	0.040
55.00	-31.75	-1.81	0.00	-126.62	0.00	126.62	4,077.72	1,084.47	4,835.52	3,926.82	0.49	-0.09	0.040
60.00	-30.64	-1.80	0.00	-117.56	0.00	117.56	4,019.09	1,056.02	4,585.23	3,767.96	0.58	-0.10	0.039
65.00	-29.54	-1.78	0.00	-108.58	0.00	108.58	3,957.85	1,027.58	4,341.60	3,609.72	0.69	-0.11	0.038
70.00	-28.48	-1.76	0.00	-99.68	0.00	99.68	3,894.01	999.13	4,104.61	3,452.29	0.81	-0.12	0.036
75.00	-27.43	-1.73	0.00	-90.90	0.00	90.90	3,827.57	970.68	3,874.27	3,295.88	0.93	-0.13	0.035
80.00	-26.41	-1.71	0.00	-82.23	0.00	82.23	3,758.52	942.23	3,650.59	3,140.67	1.07	-0.14	0.033
85.00	-25.42	-1.68	0.00	-73.70	0.00	73.70	3,686.86	913.79	3,433.55	2,986.87	1.22	-0.15	0.032
90.00	-24.45	-1.64	0.00	-65.32	0.00	65.32	3,612.61	885.34	3,223.17	2,834.68	1.38	-0.15	0.030
95.00	-24.35	-1.64	0.00	-57.11	0.00	57.11	3,535.75	856.89	3,019.43	2,684.29	1.54	-0.16	0.028
95.50	-23.00	-1.59	0.00	-56.29	0.00	56.29	3,527.92	854.05	2,999.43	2,669.36	1.56	-0.17	0.028
100.00	-22.70	-1.57	0.00	-49.15	0.00	49.15	3,456.28	828.44	2,822.35	2,535.92	1.72	-0.17	0.026
101.00	-22.08	-1.55	0.00	-47.58	0.00	47.58	2,422.80	645.97	2,228.95	1,805.62	1.76	-0.17	0.035
105.00	-18.59	-1.38	0.00	-41.39	0.00	41.39	2,386.99	628.45	2,109.74	1,730.29	1.91	-0.18	0.032
110.00	-17.86	-1.34	0.00	-34.49	0.00	34.49	2,339.89	606.55	1,965.33	1,636.54	2.10	-0.19	0.029
115.00	-16.38	-1.26	0.00	-27.78	0.00	27.78	2,290.19	584.66	1,826.04	1,543.43	2.30	-0.20	0.025
120.00	-16.11	-1.24	0.00	-21.48	0.00	21.48	2,237.88	562.76	1,691.86	1,451.17	2.52	-0.21	0.022
122.00	-13.29	-1.07	0.00	-18.99	0.00	18.99	2,216.23	554.00	1,639.63	1,414.54	2.60	-0.21	0.019
125.00	-13.16	-1.06	0.00	-15.80	0.00	15.80	2,182.97	540.86	1,562.81	1,359.95	2.74	-0.21	0.018
126.00	-9.46	-0.81	0.00	-14.74	0.00	14.74	2,171.68	536.48	1,537.61	1,341.85	2.78	-0.21	0.015
130.00	-8.89	-0.77	0.00	-11.50	0.00	11.50	2,125.45	518.97	1,438.88	1,269.97	2.96	-0.22	0.013
135.00	-8.34	-0.73	0.00	-7.66	0.00	7.66	2,065.33	497.07	1,320.06	1,181.43	3.19	-0.22	0.011
140.00	-4.64	-0.42	0.00	-4.04	0.00	4.04	1,995.73	475.17	1,206.37	1,090.78	3.43	-0.23	0.006
145.00	-4.18	-0.38	0.00	-1.92	0.00	1.92	1,903.77	453.28	1,097.79	992.02	3.67	-0.23	0.004
150.00	0.00	-0.37	0.00	0.00	0.00	0.00	1,811.80	431.38	994.33	897.94	3.90	-0.23	0.000

Site Number: 306042**Code: ANSI/TIA-222-H**

© 2007 - 2021 by ATC IP LLC. All rights reserved.

Site Name: Woods Chapel, MO**Engineering Number:13694528_C3_02****7/23/2021 5:19:45 PM****Customer: T-MOBILE**

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	36.68	0.00	69.05	0.00	0.00	3934.10	54.00	0.54
0.9D + 1.0W	36.66	0.00	51.78	0.00	0.00	3894.37	54.00	0.53
1.2D + 1.0Di + 1.0Wi	6.93	0.00	108.76	0.00	0.00	776.39	54.00	0.13
1.2D + 1.0Ev + 1.0Eh	1.87	0.00	68.21	0.00	0.00	232.16	54.00	0.04
0.9D - 1.0Ev + 1.0Eh	1.87	0.00	49.10	0.00	0.00	229.49	54.00	0.04
1.0D + 1.0W	9.94	0.00	57.58	0.00	0.00	1059.92	54.00	0.15



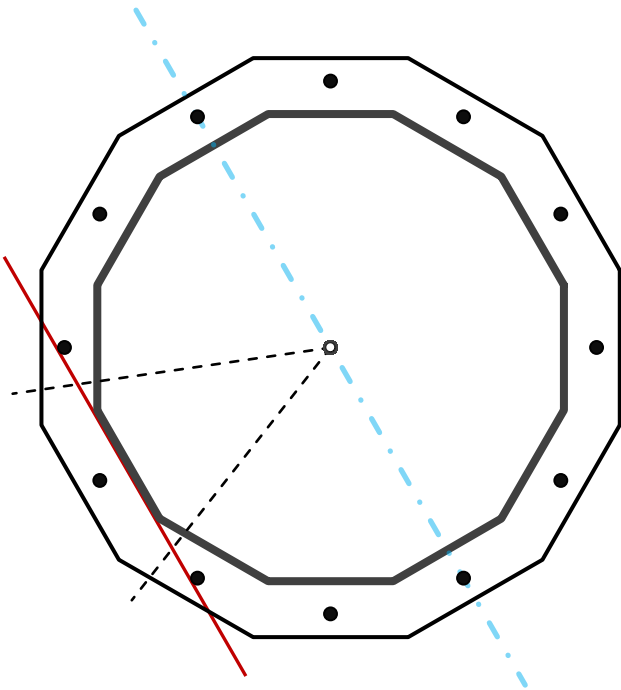
Base Plate & Anchor Rod Analysis

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

Base Reactions		
Moment, Mu	3,934.1	k-ft
Axial, Pu	69.1	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, ø	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	η=0.55
Clear Distance	N/A	in
Applied Moment, Mu	740.9	k
Bending Stress, φMn	4733.9	k



Original Anchor Rods		
Arrangement	Radial	-
Quantity	12	-
Diameter, ø	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	241.3	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	3934.1	1.00
Anchor Rod Forces	36.7	3934.1	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	241.3	k
Applied Shear, Vu	2.5	k
Compressive Capacity, ϕP_n	243.6	k
Tensile Capacity, ϕR_{nt}	0.991	OK
Interaction Capacity	1.009	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	740.9	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	482.9	k-ft
Bending Capacity, ϕM_n	4534.9	k-ft
Capacity, Mu/ ϕM_n	0.106	OK

Bend Line Length	163.294	in
Additional Bend Line	0.000	in
Section Modulus, Z	281.299	in ³
Applied Moment, Mu	740.9	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	D	8.00	ft
Pier Embedment	$L-h$	33.0	ft
Pier Height above Ground	H	0.50	ft
Water Table Depth [BGL]	GW	18	ft
Pullout Angle	Θ	30	°
Unit Weight of Concrete		150	pcf
Uplift Skin Friction Factor		1.000	

Reactions

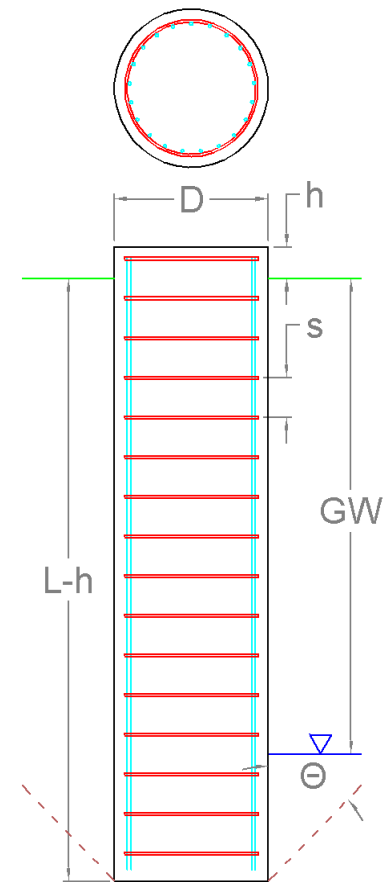
Moment, M_u	3,934.1	k-ft
Shear, V_u	36.7	k
Axial, P_u	69.0	k
Uplift, T_u	0.0	k

Soil Properties

Layer Depth (ft)		Unit Weight	Cohesion	Friction Angle	Ultimate Skin Friction	Ultimate Bearing Pressure
TOP	BTM	pcf	psf	°	psf	psf
0.0	2.0	105	0	0	0	0
2.0	7.0	123	250	0	0	0
7.0	10.5	125	250	0	134	0
10.5	12.0	136	5,986	0	2,693	0
12.0	18.0	136	6,198	0	2,789	0
18.0	18.5	100	1,598	0	7,194	0
18.5	34.0	100	17,611	0	7,925	41,530

Soil Strength Capacities

Volume of Concrete	1,683.9	ft ³
Weight of Concrete [Buoyancy Considered]	205.5	k
Average Soil Unit Weight	86.3	pcf
Skin Friction Resistance	3,512.4	k
Compressive Bearing Resistance	2,087.5	k
Pullout Weight [Minus Concrete Weight]	1,763.6	k
Compressive Force, P_u	139.5	k
Nominal Compressive Capacity, $\phi_s P_n$	4,199.9	k
$P_u / \phi_s P_n$	3.3%	
Total Lateral Resistance	17,222.2	k
Inflection Point [BGL]	24.5	ft
Moment at Inflection Point, M_D	4,852.2	k-ft
Nominal Moment Capacity, $\phi_s M_n$	62,703.5	k-ft
$M_D / \phi_s M_n$	7.7%	



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	3,953.3	k-ft
Moment Capacity, $\phi_B M_n$	6,190.9	k-ft
$M_u / \phi_B M_n$	63.9%	
Design Shear, V_u	406.0	k
Shear Capacity, $\phi_V V_n$	712.7	k
$V_u / \phi_V V_n$	57.0%	
Design Compression, P_u	139.5	k
Compression Capacity, $\phi_P P_n$	10,553.9	k
$P_u / \phi_P P_n$	1.3%	
Bending Reinforcement Ratio	0.004	

