



AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure : 150 ft Monopole
ATC Site Name : Woods Chapel, MO
ATC Asset Number : 306042
Engineering Number : 13683130_C3_03
Proposed Carrier : DISH WIRELESS L.L.C.
Carrier Site Name : Woods Chapel
Carrier Site Number : KCMCI00155B
Site Location : 1204 N.e. Woods Chapel Road
Lees Summit, MO 64064-1989
38.983200,-94.350100
County : Jackson
Date : June 25, 2021
Max Usage : 100%
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 DISH WIRELESS L.L.C..

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 / 2012 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
	3	Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB			
	3	Alcatel-Lucent RRH4X25-WCS			
	6	CCI TPA65R-BU8D			
	3	Commscope JAH4-65C-R4			
	3	Nokia AHLBBA			
	3	Powerwave Allgon TT08-19DB111-001			
	1	Raycap DC6-48-60-18-8F(32.8 lbs)			
	1	Raycap DC6-48-60-18-8C			
	1	Raycap DC6-48-60-0-8C			
	3	Nokia AirScale RRH 4T4R B5 160W AHCA			
140.0	6	Commscope NHH-65C-R2B	Triangular Low Platform with Handrails	(2) 1 1/4" Hybriflex Cable (12) 1 5/8" Coax	VERIZON WIRELESS
	3	Antel BXA-80063/8CF			
	2	Raycap RRFDC-3315-PF-48			
	3	Ericsson AIR 6449 B77D/ C-Band			
	3	Ericsson 8843 Rev 2			
	3	Ericsson Radio 4449 - B13&B5			
	6	Powerwave Allgon LGP 13901			
126.0	6	Andrew TMBXX-6516-A2M with actuator	Triangular Platform with Handrails	(6) 1 5/8" Coax (1) 1.46" (37.1mm) Hybrid (6) 7/8" Coax	T-MOBILE
	3	Commscope FFHH-65C-R3			
	3	Andrew ETW190VS12UB			
	1	Raycap ASU9338TYP01			
	3	Nokia FHFB			
	3	Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA			
	3	Nokia FRIG w/o Solar Shield			
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	Andrew Microwaves VHLP2.5			
	2	DragonWave Horizon DUO (Radio)			
	3	Argus LLPX310R			

**Equipment to be Removed**

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
No loading was considered as removed as part of this analysis.					

Proposed Equipment

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
105.0	1	Commscope RDIDC-9181-PF-48	Triangular Platform with Handrails	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	3	Fujitsu TA08025-B604			
	3	Fujitsu TA08025-B605			
	3	JMA Wireless MX08FRO665-21			

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	100%	Pass
Shaft	54%	Pass
Base Plate	16%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3,913.6	64%
Axial (Kips)	67.9	3%
Shear (Kips)	36.6	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) (°)
115.0	Andrew Microwaves VHLP2.5	CLEARWIRE CORPORATION	0.846	0.864
105.0	Commscope RDIDC-9181-PF-48	DISH WIRELESS L.L.C.	0.702	0.790
	Fujitsu TA08025-B604			
	Fujitsu TA08025-B605			
	JMA Wireless MX08FRO665-21			

*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:

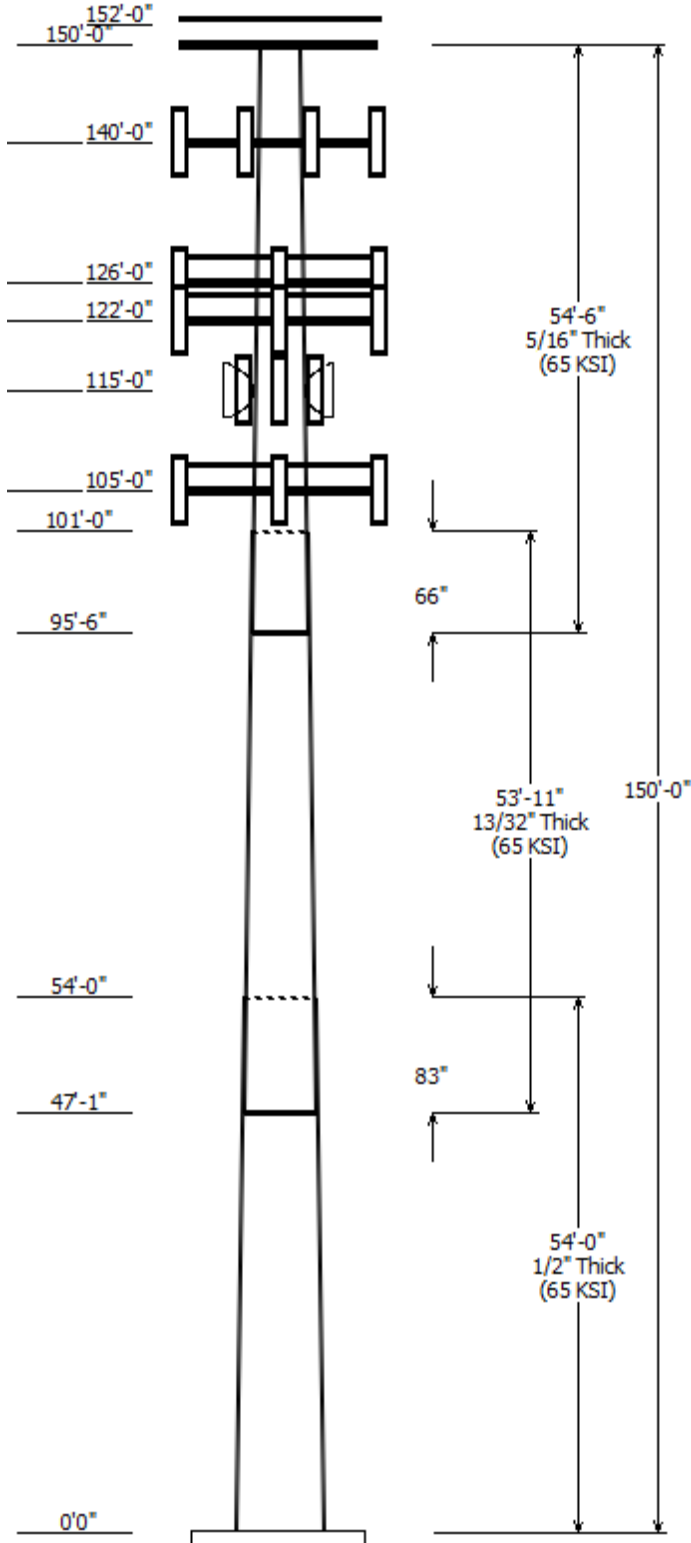
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services

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 : DISH WIRELESS L.L.C.
Pole : 306042 Code: ANSI/TIA-222-H
Location : Woods Chapel, MO
Description : 150 ft Valmont Monopole
Shape : 12 Sides
Height : 150.00 (ft)
Base Elev (ft): 0.00
Taper: 0.24798(in/ft)

Risk Category : II
Exposure : C
Topo Method : Method 1
Topographic Category : 1

Sections Properties

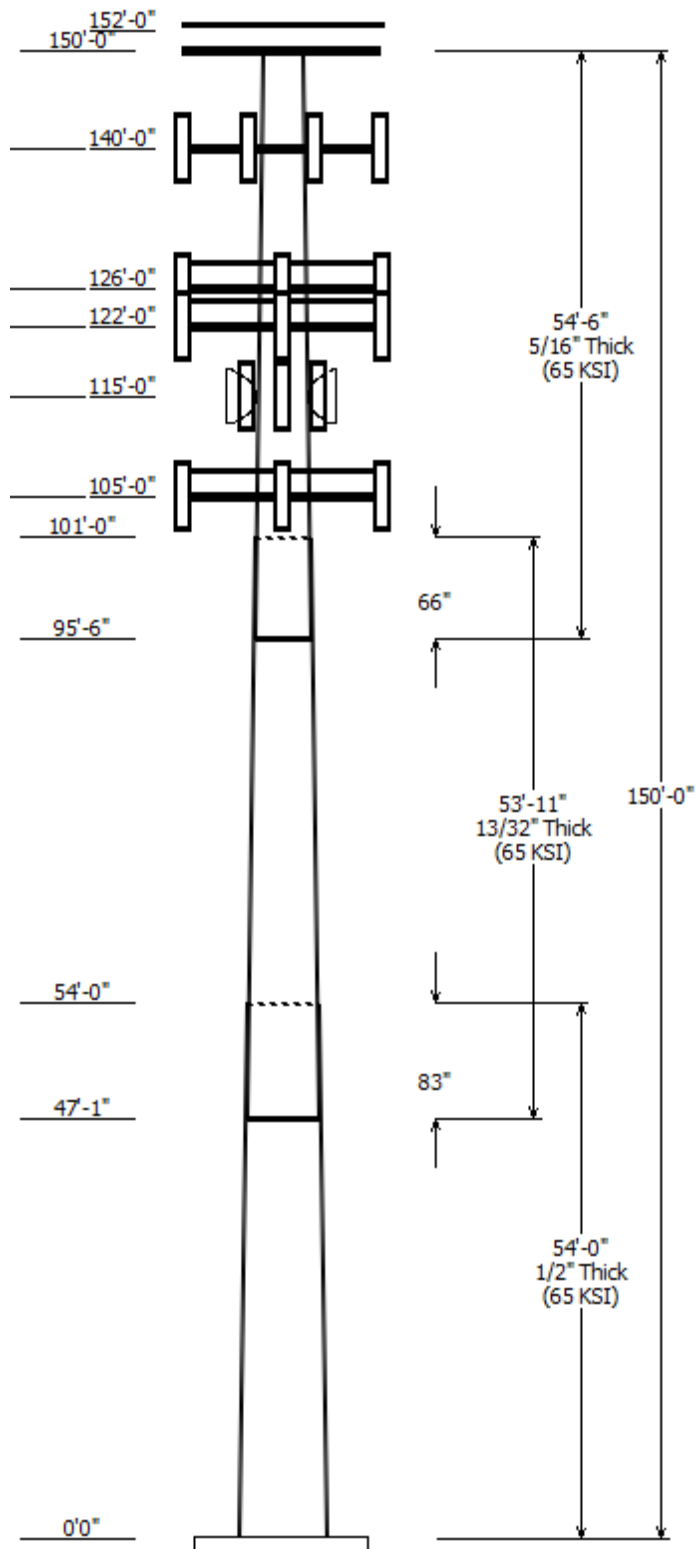
Shaft Section	Length (ft)	Diameter (in)		Thick (in)	Joint Type	Overlap Length (in)	Steel Grade
		Across Flats Top	Across Flats Bottom				
1	54.000	47.10	60.50	0.500		0.000	12 Sides 65
2	53.917	36.26	49.63	0.406	Slip Joint	83.000	12 Sides 65
3	54.500	24.74	38.25	0.313	Slip Joint	66.000	12 Sides 65

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 DC6-48-60-18-8F(32.8 lb
152.000	152.000	3	Powerwave Allgon TT08-
152.000	152.000	3	Nokia AirScale RRH 4T4R B5 160
152.000	152.000	1	Raycap DC6-48-60-18-8C
150.000	150.000	1	Generic Round Platform with
140.000	140.000	1	Generic Round Low Profile
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	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
126.000	126.000	1	Generic Round Platform with
126.000	126.000	3	Commscope FFHH-65C-R3
126.000	126.000	6	Andrew TMBXX-6516-A2M
126.000	126.000	3	Nokia FHFB
126.000	126.000	3	Nokia FRIG w/o Solar Shield
126.000	126.000	3	Nokia AirScale Dual RRH 4T4R B
126.000	126.000	1	Raycap ASU9338TYP01
126.000	126.000	3	Andrew ETW190VS12UB
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	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	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
105.000	105.000	1	Generic Round Platform with

Linear Appurtenance

Elev (ft)	From	To	Description	Exposed To Wind
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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	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

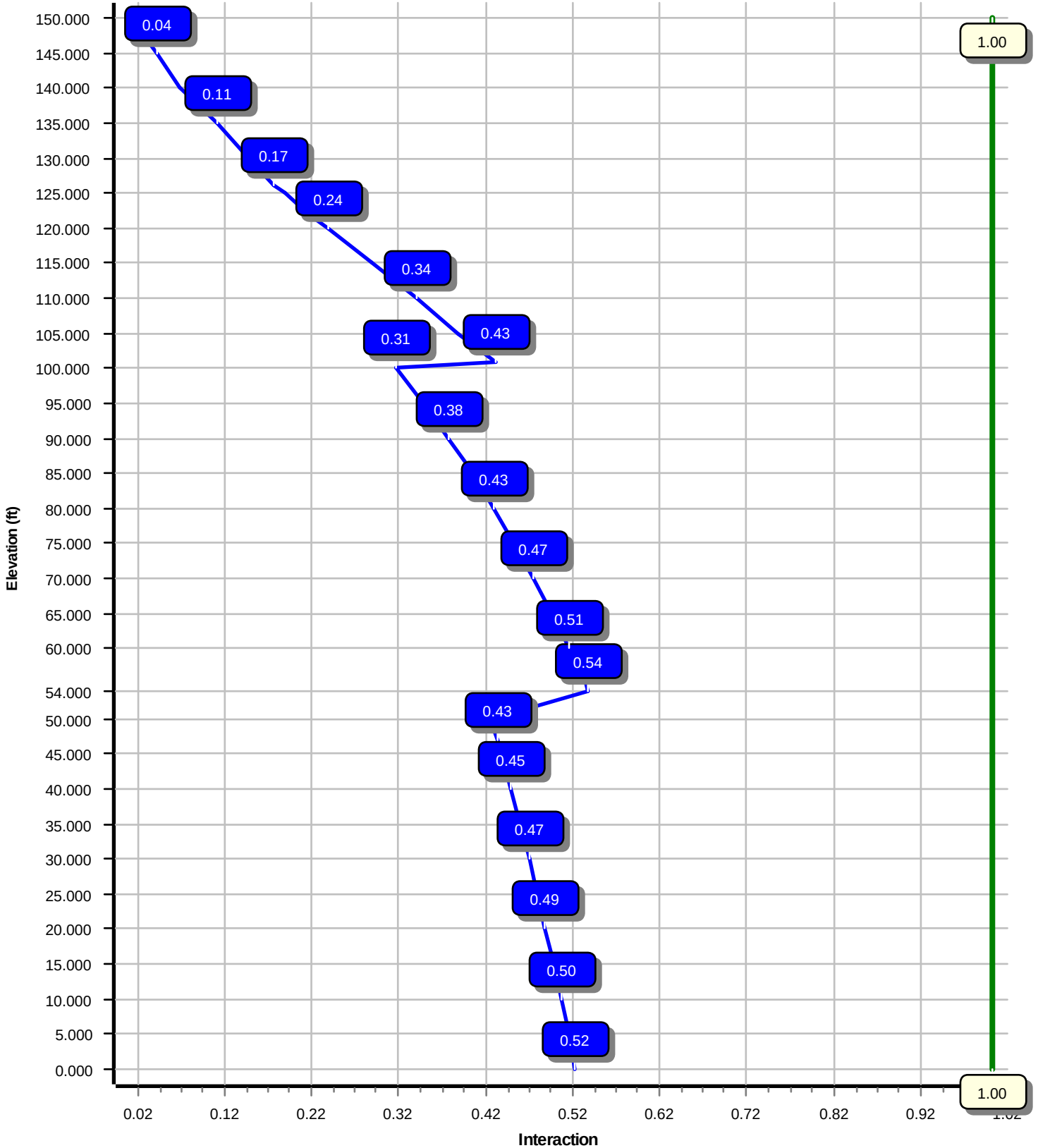
Reactions

Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.0W	3913.60	36.62	67.94
0.9D + 1.0W	3875.51	36.60	50.94
1.2D + 1.0Di + 1.0Wi	766.23	6.89	107.64
1.2D + 1.0Ev + 1.0Eh	231.17	1.88	67.08
0.9D - 1.0Ev + 1.0Eh	228.61	1.88	48.28
1.0D + 1.0W	1054.64	9.92	56.65

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	115.00	10.157	0.864

Load Case : 1.2D + 1.0W
Max Ratio 53.53% at 54.0 ft



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

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Site Name: Woods Chapel, MO**Engineering Number:13683130_C3_03****6/25/2021 11:34:34 AM****Customer: DISH WIRELESS L.L.C.**

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):	2.19		
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 :	0.033
		C_s Max:	0.033
		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

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:34 AM

Customer: DISH WIRELESS L.L.C.

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 DC6-48-60-0-8C	1	0.75	0.000	16.00	2.030	1.00	65.04	2.790	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	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 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	0.80	0.000	9.90	0.503	0.50	24.53	0.985	0.50
140.00	Ericsson Radio 4449 - B13&B5	3	0.80	0.000	70.00	1.650	0.50	125.95	2.492	0.50
140.00	Ericsson 8843 Rev 2	3	0.80	0.000	75.00	1.650	0.50	136.66	2.494	0.50
140.00	Raycap RRFDC-3315-PF-48	2	0.80	0.000	26.90	2.512	0.67	106.04	3.546	0.67
140.00	Ericsson AIR 6449 B77D/ C-Band	3	0.80	0.000	81.60	4.028	0.70	197.31	5.391	0.70
140.00	Antel BXA-80063/8CF	3	0.80	0.000	24.00	10.660	0.65	208.87	13.810	0.65
140.00	Commscope NHH-65C-R2B	6	0.80	0.000	51.60	11.389	0.70	278.60	14.597	0.70
140.00	Generic Round Low Profile	1	1.00	0.000	1,875.00	21.700	1.00	2,679.49	40.772	1.00
126.00	Andrew ETW190VS12UB	3	0.75	0.000	11.00	0.654	0.50	29.18	1.194	0.50
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 FRIG w/o Solar Shield	3	0.75	0.000	54.00	2.293	0.50	111.25	3.273	0.50
126.00	Nokia FHFB	3	0.75	0.000	48.50	2.415	0.50	116.48	3.460	0.50
126.00	Raycap ASU9338TYP01	1	0.75	0.000	14.90	3.213	1.00	88.40	4.365	1.00
126.00	Andrew TMBXX-6516-A2M with	6	0.75	0.000	34.60	6.160	0.67	165.93	8.745	0.67
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	0.80	0.000	7.00	0.200	1.00	19.73	0.454	1.00
115.00	Samsung 2.5GHz nRRHv2	3	0.80	0.000	50.70	2.496	0.67	120.20	3.530	0.67
115.00	Argus LLPX310R	3	0.80	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	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	113			18,105.00			38,753.13		

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:34 AM

Customer: DISH WIRELESS L.L.C.

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	140	0.50	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	120	0.50	Y	VERIZON WIRELESS
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	5	0.50	Y	T-MOBILE
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	17	0.50	Y	T-MOBILE
0.00	126.00	2	1 5/8" Coax	1.98	0.82	N	2	0.88	29	0.50	Y	T-MOBILE
0.00	126.00	1	1.46" (37.1mm) Hybrid	1.46	1.70	N	1	0.50	25	2.60	Y	T-MOBILE
0.00	126.00	6	7/8" Coax	1.09	0.33	N	3	0.50	17	0.50	Y	T-MOBILE
0.00	122.00	9	1 1/4" Coax	1.55	0.63	N	0	0.00	0	0.00	N	SPRINT NEXTEL
0.00	115.00	2	1/2" Coax	0.63	0.15	N	2	0.50	240	0.50	Y	CLEARWIRE
5.00	115.00	1	2" conduit	2.38	3.65	N	1	0.50	245	0.50	Y	CLEARWIRE
0.00	105.00	1	1.60" (40.6mm) Hybrid	1.60	2.34	N	0	0.00	0	0.00	N	DISH WIRELESS

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:34 AM

Customer: DISH WIRELESS L.L.C.

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

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:34 AM

Customer: DISH WIRELESS L.L.C.

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	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		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	103.6	633.2	2,055.4	0.0	0.0
10.00		620.0	1,911.1					0.0	305.8	620.0	2,216.9	0.0	0.0
15.00		616.2	1,870.4					0.0	305.8	616.2	2,176.2	0.0	0.0
20.00		628.7	1,829.6					0.0	305.8	628.7	2,135.4	0.0	0.0
25.00		644.6	1,788.8					0.0	305.8	644.6	2,094.7	0.0	0.0
30.00		654.7	1,748.1					0.0	305.8	654.7	2,053.9	0.0	0.0
35.00		660.6	1,707.3					0.0	305.8	660.6	2,013.2	0.0	0.0
40.00		663.2	1,666.6					0.0	305.8	663.2	1,972.4	0.0	0.0
45.00		470.1	1,625.8					0.0	305.8	470.1	1,931.6	0.0	0.0
47.08	Bot - Section 2	334.6	665.4					0.0	127.4	334.6	792.8	0.0	0.0
50.00		464.9	1,680.5					0.0	178.4	464.9	1,858.9	0.0	0.0
54.00	Top - Section 1	335.4	2,263.9					0.0	244.7	335.4	2,508.5	0.0	0.0
55.00		400.1	253.0					0.0	61.2	400.1	314.1	0.0	0.0
60.00		663.3	1,245.1					0.0	305.8	663.3	1,550.9	0.0	0.0
65.00		656.5	1,212.0					0.0	305.8	656.5	1,517.8	0.0	0.0
70.00		648.6	1,178.9					0.0	305.8	648.6	1,484.7	0.0	0.0
75.00		639.5	1,145.8					0.0	305.8	639.5	1,451.6	0.0	0.0
80.00		629.5	1,112.7					0.0	305.8	629.5	1,418.5	0.0	0.0
85.00		618.5	1,079.6					0.0	305.8	618.5	1,385.4	0.0	0.0
90.00		610.7	1,046.5					0.0	305.8	610.7	1,352.3	0.0	0.0
95.00		334.7	1,013.4					0.0	305.8	334.7	1,319.2	0.0	0.0
95.50	Bot - Section 3	308.4	99.5					0.0	30.6	308.4	130.1	0.0	0.0
100.00		339.7	1,572.0					0.0	275.2	339.7	1,847.3	0.0	0.0
101.00	Top - Section 2	305.8	342.9					0.0	61.2	305.8	404.1	0.0	0.0
105.00	Appurtenance(s)	548.4	593.0	2,000.4	0.0	0.0	3,758.5	0.0	244.7	2,548.8	4,596.2	0.0	0.0
110.00		607.8	718.4					0.0	291.8	607.8	1,010.1	0.0	0.0
115.00	Appurtenance(s)	606.0	692.9	1,446.7	0.0	0.0	1,088.5	0.0	291.8	2,052.8	2,073.2	0.0	0.0
120.00		423.3	667.4					0.0	268.1	423.3	935.5	0.0	0.0
122.00	Appurtenance(s)	301.5	259.8	2,630.4	0.0	0.0	3,324.0	0.0	107.2	2,931.9	3,691.1	0.0	0.0
125.00		241.0	382.1					0.0	140.4	241.0	522.5	0.0	0.0
126.00	Appurtenance(s)	262.6	125.3	3,567.4	0.0	0.0	4,429.8	0.0	46.8	3,830.0	4,601.9	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	3,801.7	0.0	0.0	3,659.5	0.0	182.5	4,266.5	4,407.5	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	1,150.1	0.0	0.0	3,000.0	0.0	111.4	1,369.1	3,626.0	0.0	0.0
Totals:										32,849.4	65,512.1	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:38 AM

Customer: DISH WIRELESS L.L.C.

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	-67.94	-36.62	0.00	-3,913.60	0.00	3,913.60	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.521
5.00	-65.81	-36.12	0.00	-3,730.52	0.00	3,730.52	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.512
10.00	-63.51	-35.63	0.00	-3,549.92	0.00	3,549.92	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.25	0.504
15.00	-61.26	-35.14	0.00	-3,371.76	0.00	3,371.76	6,071.43	1,590.23	8,442.89	6,959.61	0.59	-0.37	0.495
20.00	-59.05	-34.63	0.00	-3,196.06	0.00	3,196.06	5,995.47	1,555.19	8,075.09	6,719.80	1.05	-0.50	0.486
25.00	-56.89	-34.09	0.00	-3,022.93	0.00	3,022.93	5,916.91	1,520.16	7,715.48	6,481.00	1.64	-0.63	0.477
30.00	-54.77	-33.54	0.00	-2,852.47	0.00	2,852.47	5,835.74	1,485.13	7,364.06	6,243.42	2.37	-0.76	0.467
35.00	-52.69	-32.97	0.00	-2,684.78	0.00	2,684.78	5,751.97	1,450.09	7,020.84	6,007.26	3.24	-0.89	0.457
40.00	-50.65	-32.39	0.00	-2,519.94	0.00	2,519.94	5,665.59	1,415.06	6,685.80	5,772.72	4.24	-1.03	0.446
45.00	-48.67	-31.97	0.00	-2,357.98	0.00	2,357.98	5,576.61	1,380.02	6,358.95	5,539.99	5.39	-1.16	0.435
47.08	-47.85	-31.67	0.00	-2,291.38	0.00	2,291.38	5,538.76	1,365.43	6,225.18	5,443.60	5.91	-1.22	0.430
50.00	-45.95	-31.24	0.00	-2,199.00	0.00	2,199.00	5,485.02	1,344.99	6,040.30	5,309.27	6.68	-1.30	0.423
54.00	-43.41	-30.90	0.00	-2,074.03	0.00	2,074.03	4,089.14	1,090.16	4,886.38	3,958.64	7.81	-1.41	0.535
55.00	-43.06	-30.57	0.00	-2,043.13	0.00	2,043.13	4,077.72	1,084.47	4,835.52	3,926.82	8.11	-1.44	0.532
60.00	-41.44	-29.98	0.00	-1,890.31	0.00	1,890.31	4,019.09	1,056.02	4,585.23	3,767.96	9.70	-1.59	0.513
65.00	-39.86	-29.39	0.00	-1,740.43	0.00	1,740.43	3,957.85	1,027.58	4,341.60	3,609.72	11.45	-1.75	0.493
70.00	-38.32	-28.80	0.00	-1,593.50	0.00	1,593.50	3,894.01	999.13	4,104.61	3,452.29	13.37	-1.91	0.472
75.00	-36.82	-28.21	0.00	-1,449.53	0.00	1,449.53	3,827.57	970.68	3,874.27	3,295.88	15.46	-2.07	0.450
80.00	-35.35	-27.62	0.00	-1,308.50	0.00	1,308.50	3,758.52	942.23	3,650.59	3,140.67	17.71	-2.22	0.427
85.00	-33.92	-27.04	0.00	-1,170.41	0.00	1,170.41	3,686.86	913.79	3,433.55	2,986.87	20.12	-2.38	0.402
90.00	-32.53	-26.45	0.00	-1,035.23	0.00	1,035.23	3,612.61	885.34	3,223.17	2,834.68	22.69	-2.52	0.375
95.00	-31.19	-26.10	0.00	-902.98	0.00	902.98	3,535.75	856.89	3,019.43	2,684.29	25.41	-2.67	0.346
95.50	-31.04	-25.82	0.00	-889.94	0.00	889.94	3,527.92	854.05	2,999.43	2,669.36	25.69	-2.68	0.343
100.00	-29.18	-25.43	0.00	-773.74	0.00	773.74	3,456.28	828.44	2,822.35	2,535.92	28.28	-2.81	0.314
101.00	-28.76	-25.14	0.00	-748.30	0.00	748.30	2,422.80	645.97	2,228.95	1,805.62	28.87	-2.83	0.428
105.00	-24.25	-22.42	0.00	-647.74	0.00	647.74	2,386.99	628.45	2,109.74	1,730.29	31.29	-2.94	0.386
110.00	-23.22	-21.81	0.00	-535.66	0.00	535.66	2,339.89	606.55	1,965.33	1,636.54	34.45	-3.08	0.339
115.00	-21.22	-19.69	0.00	-426.60	0.00	426.60	2,290.19	584.66	1,826.04	1,543.43	37.75	-3.21	0.287
120.00	-20.29	-19.25	0.00	-328.13	0.00	328.13	2,237.88	562.76	1,691.86	1,451.17	41.18	-3.33	0.236
122.00	-16.76	-16.12	0.00	-289.64	0.00	289.64	2,216.23	554.00	1,639.63	1,414.54	42.58	-3.37	0.213
125.00	-16.24	-15.86	0.00	-241.28	0.00	241.28	2,182.97	540.86	1,562.81	1,359.95	44.72	-3.43	0.186
126.00	-11.87	-11.77	0.00	-225.43	0.00	225.43	2,171.68	536.48	1,537.61	1,341.85	45.44	-3.45	0.174
130.00	-11.25	-11.29	0.00	-178.37	0.00	178.37	2,125.45	518.97	1,438.88	1,269.97	48.35	-3.51	0.146
135.00	-10.49	-10.77	0.00	-121.90	0.00	121.90	2,065.33	497.07	1,320.06	1,181.43	52.07	-3.58	0.109
140.00	-6.36	-6.24	0.00	-68.03	0.00	68.03	1,995.73	475.17	1,206.37	1,090.78	55.84	-3.62	0.066
145.00	-5.74	-5.76	0.00	-36.81	0.00	36.81	1,903.77	453.28	1,097.79	992.02	59.65	-3.65	0.040
150.00	0.00	-5.38	0.00	-8.02	0.00	8.02	1,811.80	431.38	994.33	897.94	63.48	-3.67	0.009

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:38 AM

Customer: DISH WIRELESS L.L.C.

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	77.7	633.2	1,541.6	0.0	0.0
10.00		620.0	1,433.3					0.0	229.4	620.0	1,662.7	0.0	0.0
15.00		616.2	1,402.8					0.0	229.4	616.2	1,632.1	0.0	0.0
20.00		628.7	1,372.2					0.0	229.4	628.7	1,601.6	0.0	0.0
25.00		644.6	1,341.6					0.0	229.4	644.6	1,571.0	0.0	0.0
30.00		654.7	1,311.1					0.0	229.4	654.7	1,540.4	0.0	0.0
35.00		660.6	1,280.5					0.0	229.4	660.6	1,509.9	0.0	0.0
40.00		663.2	1,249.9					0.0	229.4	663.2	1,479.3	0.0	0.0
45.00		470.1	1,219.4					0.0	229.4	470.1	1,448.7	0.0	0.0
47.08	Bot - Section 2	334.6	499.0					0.0	95.6	334.6	594.6	0.0	0.0
50.00		464.9	1,260.4					0.0	133.8	464.9	1,394.2	0.0	0.0
54.00	Top - Section 1	335.4	1,697.9					0.0	183.5	335.4	1,881.4	0.0	0.0
55.00		400.1	189.7					0.0	45.9	400.1	235.6	0.0	0.0
60.00		663.3	933.8					0.0	229.4	663.3	1,163.2	0.0	0.0
65.00		656.5	909.0					0.0	229.4	656.5	1,138.3	0.0	0.0
70.00		648.6	884.2					0.0	229.4	648.6	1,113.5	0.0	0.0
75.00		639.5	859.3					0.0	229.4	639.5	1,088.7	0.0	0.0
80.00		629.5	834.5					0.0	229.4	629.5	1,063.9	0.0	0.0
85.00		618.5	809.7					0.0	229.4	618.5	1,039.1	0.0	0.0
90.00		610.7	784.9					0.0	229.4	610.7	1,014.2	0.0	0.0
95.00		334.7	760.1					0.0	229.4	334.7	989.4	0.0	0.0
95.50	Bot - Section 3	308.4	74.6					0.0	22.9	308.4	97.6	0.0	0.0
100.00		339.7	1,179.0					0.0	206.4	339.7	1,385.4	0.0	0.0
101.00	Top - Section 2	305.8	257.2					0.0	45.9	305.8	303.0	0.0	0.0
105.00	Appurtenance(s)	548.4	444.8	2,000.4	0.0	0.0	2,818.9	0.0	183.5	2,548.8	3,447.2	0.0	0.0
110.00		607.8	538.8					0.0	218.8	607.8	757.6	0.0	0.0
115.00	Appurtenance(s)	606.0	519.7	1,446.7	0.0	0.0	816.4	0.0	218.8	2,052.8	1,554.9	0.0	0.0
120.00		423.3	500.6					0.0	201.1	423.3	701.6	0.0	0.0
122.00	Appurtenance(s)	301.5	194.9	2,630.4	0.0	0.0	2,493.0	0.0	80.4	2,931.9	2,768.3	0.0	0.0
125.00		241.0	286.6					0.0	105.3	241.0	391.9	0.0	0.0
126.00	Appurtenance(s)	262.6	94.0	3,567.4	0.0	0.0	3,322.3	0.0	35.1	3,830.0	3,451.5	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	3,801.7	0.0	0.0	2,744.6	0.0	136.8	4,266.5	3,305.6	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	1,150.1	0.0	0.0	2,250.0	0.0	83.6	1,369.1	2,719.5	0.0	0.0
Totals:										32,849.4	49,134.1	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:42 AM

Customer: DISH WIRELESS L.L.C.

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	-50.94	-36.60	0.00	-3,875.51	0.00	3,875.51	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.513
5.00	-49.33	-36.07	0.00	-3,692.53	0.00	3,692.53	6,215.54	1,660.30	9,203.06	7,441.50	0.07	-0.12	0.505
10.00	-47.59	-35.54	0.00	-3,512.20	0.00	3,512.20	6,144.79	1,625.26	8,818.88	7,200.24	0.26	-0.24	0.496
15.00	-45.88	-35.02	0.00	-3,334.49	0.00	3,334.49	6,071.43	1,590.23	8,442.89	6,959.61	0.58	-0.37	0.487
20.00	-44.21	-34.48	0.00	-3,159.39	0.00	3,159.39	5,995.47	1,555.19	8,075.09	6,719.80	1.04	-0.49	0.478
25.00	-42.57	-33.91	0.00	-2,987.01	0.00	2,987.01	5,916.91	1,520.16	7,715.48	6,481.00	1.62	-0.62	0.469
30.00	-40.96	-33.33	0.00	-2,817.46	0.00	2,817.46	5,835.74	1,485.13	7,364.06	6,243.42	2.35	-0.75	0.459
35.00	-39.39	-32.74	0.00	-2,650.80	0.00	2,650.80	5,751.97	1,450.09	7,020.84	6,007.26	3.20	-0.88	0.449
40.00	-37.84	-32.14	0.00	-2,487.11	0.00	2,487.11	5,665.59	1,415.06	6,685.80	5,772.72	4.20	-1.01	0.438
45.00	-36.35	-31.70	0.00	-2,326.41	0.00	2,326.41	5,576.61	1,380.02	6,358.95	5,539.99	5.33	-1.15	0.427
47.08	-35.73	-31.40	0.00	-2,260.37	0.00	2,260.37	5,538.76	1,365.43	6,225.18	5,443.60	5.84	-1.20	0.422
50.00	-34.29	-30.96	0.00	-2,168.79	0.00	2,168.79	5,485.02	1,344.99	6,040.30	5,309.27	6.60	-1.28	0.415
54.00	-32.38	-30.62	0.00	-2,044.96	0.00	2,044.96	4,089.14	1,090.16	4,886.38	3,958.64	7.72	-1.39	0.525
55.00	-32.11	-30.26	0.00	-2,014.34	0.00	2,014.34	4,077.72	1,084.47	4,835.52	3,926.82	8.02	-1.42	0.522
60.00	-30.88	-29.66	0.00	-1,863.02	0.00	1,863.02	4,019.09	1,056.02	4,585.23	3,767.96	9.59	-1.57	0.503
65.00	-29.69	-29.05	0.00	-1,714.75	0.00	1,714.75	3,957.85	1,027.58	4,341.60	3,609.72	11.32	-1.73	0.483
70.00	-28.52	-28.44	0.00	-1,569.51	0.00	1,569.51	3,894.01	999.13	4,104.61	3,452.29	13.22	-1.89	0.463
75.00	-27.38	-27.84	0.00	-1,427.31	0.00	1,427.31	3,827.57	970.68	3,874.27	3,295.88	15.28	-2.04	0.441
80.00	-26.26	-27.24	0.00	-1,288.12	0.00	1,288.12	3,758.52	942.23	3,650.59	3,140.67	17.50	-2.19	0.418
85.00	-25.18	-26.65	0.00	-1,151.92	0.00	1,151.92	3,686.86	913.79	3,433.55	2,986.87	19.88	-2.34	0.393
90.00	-24.13	-26.05	0.00	-1,018.70	0.00	1,018.70	3,612.61	885.34	3,223.17	2,834.68	22.41	-2.49	0.367
95.00	-23.12	-25.71	0.00	-888.43	0.00	888.43	3,535.75	856.89	3,019.43	2,684.29	25.10	-2.63	0.338
95.50	-23.01	-25.42	0.00	-875.58	0.00	875.58	3,527.92	854.05	2,999.43	2,669.36	25.37	-2.65	0.335
100.00	-21.61	-25.04	0.00	-761.19	0.00	761.19	3,456.28	828.44	2,822.35	2,535.92	27.93	-2.77	0.307
101.00	-21.29	-24.75	0.00	-736.14	0.00	736.14	2,422.80	645.97	2,228.95	1,805.62	28.51	-2.80	0.418
105.00	-17.93	-22.07	0.00	-637.15	0.00	637.15	2,386.99	628.45	2,109.74	1,730.29	30.90	-2.90	0.377
110.00	-17.15	-21.46	0.00	-526.80	0.00	526.80	2,339.89	606.55	1,965.33	1,636.54	34.01	-3.04	0.330
115.00	-15.67	-19.36	0.00	-419.48	0.00	419.48	2,290.19	584.66	1,826.04	1,543.43	37.26	-3.17	0.280
120.00	-14.97	-18.92	0.00	-322.67	0.00	322.67	2,237.88	562.76	1,691.86	1,451.17	40.64	-3.28	0.230
122.00	-12.36	-15.84	0.00	-284.83	0.00	284.83	2,216.23	554.00	1,639.63	1,414.54	42.03	-3.32	0.208
125.00	-11.97	-15.59	0.00	-237.29	0.00	237.29	2,182.97	540.86	1,562.81	1,359.95	44.14	-3.38	0.181
126.00	-8.74	-11.57	0.00	-221.70	0.00	221.70	2,171.68	536.48	1,537.61	1,341.85	44.85	-3.40	0.170
130.00	-8.28	-11.10	0.00	-175.43	0.00	175.43	2,125.45	518.97	1,438.88	1,269.97	47.72	-3.46	0.142
135.00	-7.72	-10.59	0.00	-119.93	0.00	119.93	2,065.33	497.07	1,320.06	1,181.43	51.38	-3.53	0.106
140.00	-4.68	-6.13	0.00	-66.97	0.00	66.97	1,995.73	475.17	1,206.37	1,090.78	55.10	-3.57	0.064
145.00	-4.22	-5.66	0.00	-36.31	0.00	36.31	1,903.77	453.28	1,097.79	992.02	58.85	-3.60	0.039
150.00	0.00	-5.38	0.00	-8.02	0.00	8.02	1,811.80	431.38	994.33	897.94	62.63	-3.62	0.009

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:42 AM

Customer: DISH WIRELESS L.L.C.

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	288.7	112.0	2,694.1	0.0	0.0
10.00		110.1	2,408.0					0.0	597.0	110.1	3,005.0	0.0	0.0
15.00		109.8	2,383.0					0.0	599.8	109.8	2,982.7	0.0	0.0
20.00		112.3	2,348.8					0.0	611.1	112.3	2,960.0	0.0	0.0
25.00		115.3	2,310.0					0.0	620.0	115.3	2,930.0	0.0	0.0
30.00		117.4	2,268.3					0.0	627.3	117.4	2,895.5	0.0	0.0
35.00		118.7	2,224.5					0.0	633.5	118.7	2,858.0	0.0	0.0
40.00		119.4	2,179.2					0.0	639.0	119.4	2,818.1	0.0	0.0
45.00		84.8	2,132.7					0.0	643.9	84.8	2,776.5	0.0	0.0
47.08	Bot - Section 2	60.4	876.2					0.0	269.6	60.4	1,145.8	0.0	0.0
50.00		84.0	1,977.8					0.0	378.7	84.0	2,356.4	0.0	0.0
54.00	Top - Section 1	60.6	2,666.3					0.0	521.5	60.6	3,187.8	0.0	0.0
55.00		72.5	353.6					0.0	130.8	72.5	484.3	0.0	0.0
60.00		120.3	1,738.1					0.0	656.0	120.3	2,394.1	0.0	0.0
65.00		119.3	1,696.4					0.0	659.5	119.3	2,355.8	0.0	0.0
70.00		118.2	1,654.2					0.0	662.7	118.2	2,316.9	0.0	0.0
75.00		116.8	1,611.6					0.0	665.7	116.8	2,277.3	0.0	0.0
80.00		115.3	1,568.6					0.0	668.3	115.3	2,236.8	0.0	0.0
85.00		113.5	1,525.2					0.0	670.6	113.5	2,195.9	0.0	0.0
90.00		111.7	1,481.6					0.0	672.8	111.7	2,154.4	0.0	0.0
95.00		60.8	1,437.7					0.0	675.0	60.8	2,112.6	0.0	0.0
95.50	Bot - Section 3	55.1	141.9					0.0	67.6	55.1	209.6	0.0	0.0
100.00		60.5	1,950.0					0.0	609.4	60.5	2,559.4	0.0	0.0
101.00	Top - Section 2	54.1	426.6					0.0	135.6	54.1	562.2	0.0	0.0
105.00	Appurtenance(s)	96.1	920.1	428.6	0.0	0.0	6,067.5	0.0	543.3	524.8	7,530.9	0.0	0.0
110.00		104.7	1,115.4					0.0	666.8	104.7	1,782.2	0.0	0.0
115.00	Appurtenance(s)	102.3	1,078.2	268.0	0.0	0.0	2,122.4	0.0	668.6	370.3	3,869.1	0.0	0.0
120.00		70.4	1,040.8					0.0	607.5	70.4	1,648.4	0.0	0.0
122.00	Appurtenance(s)	49.2	407.5	510.9	0.0	0.0	5,664.3	0.0	243.4	560.2	6,315.2	0.0	0.0
125.00		39.1	599.1					0.0	345.1	39.1	944.2	0.0	0.0
126.00	Appurtenance(s)	47.9	197.2	712.7	0.0	0.0	8,102.9	0.0	115.2	760.6	8,415.3	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	744.0	0.0	0.0	6,796.7	0.0	277.0	832.8	7,963.3	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	294.1	0.0	0.0	4,387.8	0.0	111.4	336.3	5,312.2	0.0	0.0
Totals:										6,240.64	101,408.	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:46 AM

Customer: DISH WIRELESS L.L.C.

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	-107.64	-6.89	0.00	-766.23	0.00	766.23	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.117
5.00	-104.94	-6.82	0.00	-731.78	0.00	731.78	6,215.54	1,660.30	9,203.06	7,441.50	0.01	-0.02	0.115
10.00	-101.93	-6.75	0.00	-697.68	0.00	697.68	6,144.79	1,625.26	8,818.88	7,200.24	0.05	-0.05	0.114
15.00	-98.95	-6.68	0.00	-663.92	0.00	663.92	6,071.43	1,590.23	8,442.89	6,959.61	0.12	-0.07	0.112
20.00	-95.98	-6.61	0.00	-630.50	0.00	630.50	5,995.47	1,555.19	8,075.09	6,719.80	0.21	-0.10	0.110
25.00	-93.05	-6.53	0.00	-597.46	0.00	597.46	5,916.91	1,520.16	7,715.48	6,481.00	0.32	-0.12	0.108
30.00	-90.15	-6.45	0.00	-564.82	0.00	564.82	5,835.74	1,485.13	7,364.06	6,243.42	0.47	-0.15	0.106
35.00	-87.29	-6.36	0.00	-532.59	0.00	532.59	5,751.97	1,450.09	7,020.84	6,007.26	0.64	-0.18	0.104
40.00	-84.47	-6.27	0.00	-500.80	0.00	500.80	5,665.59	1,415.06	6,685.80	5,772.72	0.83	-0.20	0.102
45.00	-81.69	-6.20	0.00	-469.45	0.00	469.45	5,576.61	1,380.02	6,358.95	5,539.99	1.06	-0.23	0.099
47.08	-80.55	-6.16	0.00	-456.53	0.00	456.53	5,538.76	1,365.43	6,225.18	5,443.60	1.16	-0.24	0.098
50.00	-78.19	-6.09	0.00	-438.58	0.00	438.58	5,485.02	1,344.99	6,040.30	5,309.27	1.32	-0.26	0.097
54.00	-75.00	-6.03	0.00	-414.23	0.00	414.23	4,089.14	1,090.16	4,886.38	3,958.64	1.54	-0.28	0.123
55.00	-74.51	-5.98	0.00	-408.20	0.00	408.20	4,077.72	1,084.47	4,835.52	3,926.82	1.60	-0.28	0.122
60.00	-72.12	-5.89	0.00	-378.30	0.00	378.30	4,019.09	1,056.02	4,585.23	3,767.96	1.91	-0.32	0.118
65.00	-69.76	-5.79	0.00	-348.87	0.00	348.87	3,957.85	1,027.58	4,341.60	3,609.72	2.26	-0.35	0.114
70.00	-67.44	-5.70	0.00	-319.91	0.00	319.91	3,894.01	999.13	4,104.61	3,452.29	2.64	-0.38	0.110
75.00	-65.16	-5.60	0.00	-291.43	0.00	291.43	3,827.57	970.68	3,874.27	3,295.88	3.06	-0.41	0.105
80.00	-62.92	-5.50	0.00	-263.43	0.00	263.43	3,758.52	942.23	3,650.59	3,140.67	3.50	-0.44	0.101
85.00	-60.72	-5.40	0.00	-235.92	0.00	235.92	3,686.86	913.79	3,433.55	2,986.87	3.98	-0.47	0.095
90.00	-58.57	-5.30	0.00	-208.90	0.00	208.90	3,612.61	885.34	3,223.17	2,834.68	4.50	-0.50	0.090
95.00	-56.45	-5.24	0.00	-182.39	0.00	182.39	3,535.75	856.89	3,019.43	2,684.29	5.04	-0.53	0.084
95.50	-56.24	-5.20	0.00	-179.77	0.00	179.77	3,527.92	854.05	2,999.43	2,669.36	5.09	-0.53	0.083
100.00	-53.68	-5.13	0.00	-156.39	0.00	156.39	3,456.28	828.44	2,822.35	2,535.92	5.61	-0.56	0.077
101.00	-53.12	-5.08	0.00	-151.26	0.00	151.26	2,422.80	645.97	2,228.95	1,805.62	5.73	-0.57	0.106
105.00	-45.59	-4.50	0.00	-130.95	0.00	130.95	2,386.99	628.45	2,109.74	1,730.29	6.21	-0.59	0.095
110.00	-43.81	-4.40	0.00	-108.47	0.00	108.47	2,339.89	606.55	1,965.33	1,636.54	6.84	-0.62	0.085
115.00	-39.94	-4.00	0.00	-86.49	0.00	86.49	2,290.19	584.66	1,826.04	1,543.43	7.50	-0.64	0.074
120.00	-38.29	-3.92	0.00	-66.49	0.00	66.49	2,237.88	562.76	1,691.86	1,451.17	8.19	-0.67	0.063
122.00	-31.99	-3.29	0.00	-58.65	0.00	58.65	2,216.23	554.00	1,639.63	1,414.54	8.47	-0.67	0.056
125.00	-31.04	-3.25	0.00	-48.77	0.00	48.77	2,182.97	540.86	1,562.81	1,359.95	8.89	-0.69	0.050
126.00	-22.64	-2.39	0.00	-45.52	0.00	45.52	2,171.68	536.48	1,537.61	1,341.85	9.04	-0.69	0.044
130.00	-21.64	-2.30	0.00	-35.97	0.00	35.97	2,125.45	518.97	1,438.88	1,269.97	9.62	-0.70	0.039
135.00	-20.44	-2.19	0.00	-24.48	0.00	24.48	2,065.33	497.07	1,320.06	1,181.43	10.36	-0.72	0.031
140.00	-12.49	-1.26	0.00	-13.51	0.00	13.51	1,995.73	475.17	1,206.37	1,090.78	11.12	-0.72	0.019
145.00	-11.53	-1.17	0.00	-7.19	0.00	7.19	1,903.77	453.28	1,097.79	992.02	11.88	-0.73	0.013
150.00	0.00	-1.02	0.00	-1.36	0.00	1.36	1,811.80	431.38	994.33	897.94	12.65	-0.73	0.002

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:46 AM

Customer: DISH WIRELESS L.L.C.

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		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		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	86.3	171.7	1,712.9	0.0	0.0
10.00		168.1	1,592.6					0.0	254.9	168.1	1,847.4	0.0	0.0
15.00		167.1	1,558.6					0.0	254.9	167.1	1,813.5	0.0	0.0
20.00		170.4	1,524.7					0.0	254.9	170.4	1,779.5	0.0	0.0
25.00		174.7	1,490.7					0.0	254.9	174.7	1,745.6	0.0	0.0
30.00		177.5	1,456.7					0.0	254.9	177.5	1,711.6	0.0	0.0
35.00		179.1	1,422.8					0.0	254.9	179.1	1,677.6	0.0	0.0
40.00		179.8	1,388.8					0.0	254.9	179.8	1,643.7	0.0	0.0
45.00		127.4	1,354.8					0.0	254.9	127.4	1,609.7	0.0	0.0
47.08	Bot - Section 2	90.7	554.5					0.0	106.2	90.7	660.7	0.0	0.0
50.00		126.0	1,400.5					0.0	148.7	126.0	1,549.1	0.0	0.0
54.00	Top - Section 1	90.9	1,886.6					0.0	203.9	90.9	2,090.4	0.0	0.0
55.00		108.5	210.8					0.0	51.0	108.5	261.8	0.0	0.0
60.00		179.8	1,037.6					0.0	254.9	179.8	1,292.4	0.0	0.0
65.00		178.0	1,010.0					0.0	254.9	178.0	1,264.8	0.0	0.0
70.00		175.8	982.4					0.0	254.9	175.8	1,237.2	0.0	0.0
75.00		173.4	954.8					0.0	254.9	173.4	1,209.7	0.0	0.0
80.00		170.7	927.2					0.0	254.9	170.7	1,182.1	0.0	0.0
85.00		167.7	899.7					0.0	254.9	167.7	1,154.5	0.0	0.0
90.00		165.6	872.1					0.0	254.9	165.6	1,126.9	0.0	0.0
95.00		90.7	844.5					0.0	254.9	90.7	1,099.4	0.0	0.0
95.50	Bot - Section 3	83.6	82.9					0.0	25.5	83.6	108.4	0.0	0.0
100.00		92.1	1,310.0					0.0	229.4	92.1	1,539.4	0.0	0.0
101.00	Top - Section 2	82.9	285.7					0.0	51.0	82.9	336.7	0.0	0.0
105.00	Appurtenance(s)	148.7	494.2	542.3	0.0	0.0	3,132.1	0.0	203.9	691.0	3,830.2	0.0	0.0
110.00		164.8	598.6					0.0	243.2	164.8	841.8	0.0	0.0
115.00	Appurtenance(s)	164.3	577.4	392.2	0.0	0.0	907.1	0.0	243.2	556.5	1,727.7	0.0	0.0
120.00		114.8	556.2					0.0	223.4	114.8	779.6	0.0	0.0
122.00	Appurtenance(s)	81.8	216.5	713.1	0.0	0.0	2,770.0	0.0	89.4	794.9	3,075.9	0.0	0.0
125.00		65.3	318.4					0.0	117.0	65.3	435.5	0.0	0.0
126.00	Appurtenance(s)	71.2	104.4	967.1	0.0	0.0	3,691.5	0.0	39.0	1,038.3	3,835.0	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	1,030.7	0.0	0.0	3,049.6	0.0	152.1	1,156.7	3,672.9	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	311.8	0.0	0.0	2,500.0	0.0	92.9	371.2	3,021.7	0.0	0.0
Totals:										8,905.81	54,593.4	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:50 AM

Customer: DISH WIRELESS L.L.C.

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	-56.65	-9.92	0.00	-1,054.64	0.00	1,054.64	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.146
5.00	-54.93	-9.78	0.00	-1,005.03	0.00	1,005.03	6,215.54	1,660.30	9,203.06	7,441.50	0.02	-0.03	0.144
10.00	-53.07	-9.64	0.00	-956.12	0.00	956.12	6,144.79	1,625.26	8,818.88	7,200.24	0.07	-0.07	0.141
15.00	-51.25	-9.50	0.00	-907.90	0.00	907.90	6,071.43	1,590.23	8,442.89	6,959.61	0.16	-0.10	0.139
20.00	-49.47	-9.36	0.00	-860.37	0.00	860.37	5,995.47	1,555.19	8,075.09	6,719.80	0.28	-0.13	0.136
25.00	-47.72	-9.21	0.00	-813.57	0.00	813.57	5,916.91	1,520.16	7,715.48	6,481.00	0.44	-0.17	0.134
30.00	-46.00	-9.06	0.00	-767.52	0.00	767.52	5,835.74	1,485.13	7,364.06	6,243.42	0.64	-0.20	0.131
35.00	-44.32	-8.90	0.00	-722.24	0.00	722.24	5,751.97	1,450.09	7,020.84	6,007.26	0.87	-0.24	0.128
40.00	-42.67	-8.74	0.00	-677.75	0.00	677.75	5,665.59	1,415.06	6,685.80	5,772.72	1.14	-0.28	0.125
45.00	-41.06	-8.62	0.00	-634.07	0.00	634.07	5,576.61	1,380.02	6,358.95	5,539.99	1.45	-0.31	0.122
47.08	-40.40	-8.54	0.00	-616.11	0.00	616.11	5,538.76	1,365.43	6,225.18	5,443.60	1.59	-0.33	0.121
50.00	-38.84	-8.42	0.00	-591.21	0.00	591.21	5,485.02	1,344.99	6,040.30	5,309.27	1.80	-0.35	0.118
54.00	-36.75	-8.33	0.00	-557.52	0.00	557.52	4,089.14	1,090.16	4,886.38	3,958.64	2.10	-0.38	0.150
55.00	-36.49	-8.23	0.00	-549.20	0.00	549.20	4,077.72	1,084.47	4,835.52	3,926.82	2.18	-0.39	0.149
60.00	-35.19	-8.07	0.00	-508.02	0.00	508.02	4,019.09	1,056.02	4,585.23	3,767.96	2.61	-0.43	0.144
65.00	-33.92	-7.91	0.00	-467.67	0.00	467.67	3,957.85	1,027.58	4,341.60	3,609.72	3.08	-0.47	0.138
70.00	-32.68	-7.75	0.00	-428.12	0.00	428.12	3,894.01	999.13	4,104.61	3,452.29	3.60	-0.51	0.132
75.00	-31.47	-7.58	0.00	-389.39	0.00	389.39	3,827.57	970.68	3,874.27	3,295.88	4.16	-0.56	0.126
80.00	-30.28	-7.42	0.00	-351.47	0.00	351.47	3,758.52	942.23	3,650.59	3,140.67	4.77	-0.60	0.120
85.00	-29.12	-7.26	0.00	-314.35	0.00	314.35	3,686.86	913.79	3,433.55	2,986.87	5.42	-0.64	0.113
90.00	-27.99	-7.11	0.00	-278.02	0.00	278.02	3,612.61	885.34	3,223.17	2,834.68	6.11	-0.68	0.106
95.00	-26.89	-7.01	0.00	-242.50	0.00	242.50	3,535.75	856.89	3,019.43	2,684.29	6.84	-0.72	0.098
95.50	-26.78	-6.93	0.00	-238.99	0.00	238.99	3,527.92	854.05	2,999.43	2,669.36	6.91	-0.72	0.097
100.00	-25.24	-6.83	0.00	-207.79	0.00	207.79	3,456.28	828.44	2,822.35	2,535.92	7.61	-0.75	0.089
101.00	-24.90	-6.75	0.00	-200.95	0.00	200.95	2,422.80	645.97	2,228.95	1,805.62	7.77	-0.76	0.122
105.00	-21.08	-6.02	0.00	-173.95	0.00	173.95	2,386.99	628.45	2,109.74	1,730.29	8.42	-0.79	0.109
110.00	-20.24	-5.86	0.00	-143.84	0.00	143.84	2,339.89	606.55	1,965.33	1,636.54	9.27	-0.83	0.097
115.00	-18.51	-5.29	0.00	-114.55	0.00	114.55	2,290.19	584.66	1,826.04	1,543.43	10.16	-0.86	0.082
120.00	-17.73	-5.17	0.00	-88.11	0.00	88.11	2,237.88	562.76	1,691.86	1,451.17	11.08	-0.90	0.069
122.00	-14.67	-4.33	0.00	-77.78	0.00	77.78	2,216.23	554.00	1,639.63	1,414.54	11.46	-0.91	0.062
125.00	-14.24	-4.26	0.00	-64.80	0.00	64.80	2,182.97	540.86	1,562.81	1,359.95	12.03	-0.92	0.054
126.00	-10.42	-3.16	0.00	-60.54	0.00	60.54	2,171.68	536.48	1,537.61	1,341.85	12.23	-0.93	0.050
130.00	-9.89	-3.03	0.00	-47.90	0.00	47.90	2,125.45	518.97	1,438.88	1,269.97	13.01	-0.94	0.042
135.00	-9.24	-2.89	0.00	-32.74	0.00	32.74	2,065.33	497.07	1,320.06	1,181.43	14.01	-0.96	0.032
140.00	-5.59	-1.68	0.00	-18.28	0.00	18.28	1,995.73	475.17	1,206.37	1,090.78	15.02	-0.97	0.020
145.00	-5.05	-1.55	0.00	-9.90	0.00	9.90	1,903.77	453.28	1,097.79	992.02	16.05	-0.98	0.013
150.00	0.00	-1.46	0.00	-2.17	0.00	2.17	1,811.80	431.38	994.33	897.94	17.08	-0.99	0.002

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:50 AM

Customer: DISH WIRELESS L.L.C.

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):	2.19
Redundancy Factor (p):	1.00
Seismic Force Distribution Exponent (k):	1.84
Total Unfactored Dead Load:	56.65 k
Seismic Base Shear (E):	1.88 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	5,234	0.021	40	637
35	142.50	543	5,111	0.021	39	663
34	137.50	623	5,494	0.023	42	761
33	132.50	645	5,306	0.022	41	787
32	128.00	531	4,100	0.017	32	648
31	125.50	143	1,068	0.004	8	175
30	123.50	435	3,148	0.013	24	532
29	121.00	306	2,130	0.009	16	374
28	117.50	780	5,141	0.021	40	952
27	112.50	821	4,994	0.020	38	1,002
26	107.50	842	4,711	0.019	36	1,028
25	103.00	698	3,611	0.015	28	852
24	100.50	337	1,664	0.007	13	411
23	97.75	1,539	7,229	0.030	56	1,880
22	95.25	108	485	0.002	4	132
21	92.50	1,099	4,663	0.019	36	1,342
20	87.50	1,127	4,314	0.018	33	1,376
19	82.50	1,155	3,965	0.016	30	1,410
18	77.50	1,182	3,617	0.015	28	1,443
17	72.50	1,210	3,273	0.013	25	1,477
16	67.50	1,237	2,934	0.012	23	1,511
15	62.50	1,265	2,603	0.011	20	1,545
14	57.50	1,292	2,280	0.009	18	1,578
13	54.50	262	418	0.002	3	320
12	52.00	2,090	3,064	0.013	24	2,553

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:50 AM

Customer: DISH WIRELESS L.L.C.

11	48.54	1,549	2,000	0.008	15	1,892
10	46.04	661	774	0.003	6	807
9	42.50	1,610	1,626	0.007	13	1,966
8	37.50	1,644	1,318	0.005	10	2,007
7	32.50	1,678	1,033	0.004	8	2,049
6	27.50	1,712	774	0.003	6	2,090
5	22.50	1,746	545	0.002	4	2,132
4	17.50	1,780	350	0.001	3	2,173
3	12.50	1,813	192	0.001	1	2,214
2	7.50	1,847	76	0.000	1	2,256
1	2.50	1,713	9	0.000	0	2,092
Powerwave Allgon TT0	150.00	66	683	0.003	5	81
Nokia AirScale RRH 4	150.00	110	1,142	0.005	9	135
Raycap DC6-48-60-18-	150.00	33	339	0.001	3	40
Raycap DC6-48-60-0-8	150.00	16	166	0.001	1	20
Raycap DC6-48-60-18-	150.00	16	166	0.001	1	20
Nokia AHLBBA	150.00	284	2,943	0.012	23	347
Alcatel-Lucent RRH4X	150.00	210	2,173	0.009	17	256
Nokia AirScale Dual	150.00	265	2,738	0.011	21	323
Nokia AEQK AirScale	150.00	298	3,080	0.013	24	363
Commscope JAH4-65C-R	150.00	262	2,710	0.011	21	320
CCI TPA65R-BU8D	150.00	495	5,122	0.021	39	604
Generic Round Platfo	150.00	2,500	25,871	0.106	199	3,053
Powerwave Allgon LGP	140.00	59	541	0.002	4	73
Ericsson Radio 4449	140.00	210	1,913	0.008	15	256
Ericsson 8843 Rev 2	140.00	225	2,050	0.008	16	275
Raycap RRFDC-3315-PF	140.00	54	490	0.002	4	66
Ericsson AIR 6449 B7	140.00	245	2,231	0.009	17	299
Antel BXA-80063/8CF	140.00	72	656	0.003	5	88
Commscope NHH-65C-R2	140.00	310	2,821	0.012	22	378
Generic Round Low Pr	140.00	1,875	17,084	0.070	131	2,290
Andrew ETW190VS12UB	126.00	33	248	0.001	2	40
Nokia AirScale Dual	126.00	251	1,886	0.008	15	307
Nokia FRIG w/o Solar	126.00	162	1,215	0.005	9	198
Nokia FHFB	126.00	146	1,092	0.004	8	178
Raycap ASU9338TYP01	126.00	15	112	0.000	1	18
Andrew TMBXX-6516-A2	126.00	208	1,557	0.006	12	254
Commscope FFHH-65C-R	126.00	377	2,829	0.012	22	460
Generic Round Platfo	126.00	2,500	18,755	0.077	144	3,053
Generic 48" x 12" Pa	122.00	270	1,908	0.008	15	330
Generic Flat Platfor	122.00	2,500	17,671	0.072	136	3,053
DragonWave Horizon D	115.00	14	89	0.000	1	17
Samsung 2.5GHz nRRHv	115.00	152	964	0.004	7	186
Argus LLPX310R	115.00	86	544	0.002	4	105
Andrew Microwaves VH	115.00	95	603	0.002	5	116
Side Arms	115.00	560	3,549	0.015	27	684
Commscope RDIDC-9181	105.00	22	117	0.000	1	27
Fujitsu TA08025-B604	105.00	192	1,027	0.004	8	234
Fujitsu TA08025-B605	105.00	225	1,206	0.005	9	275
JMA Wireless MX08FRO	105.00	193	1,037	0.004	8	236
Generic Round Platfo	105.00	2,500	13,397	0.055	103	3,053
		56,648	243,982	1.000	1,876	69,174

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	5,234	0.021	40	458
35	142.50	543	5,111	0.021	39	477
34	137.50	623	5,494	0.023	42	548
33	132.50	645	5,306	0.022	41	566

Site Number: 306042

Code: ANSI/TIA-222-H

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:50 AM

Customer: DISH WIRELESS L.L.C.

32	128.00	531	4,100	0.017	32	467
31	125.50	143	1,068	0.004	8	126
30	123.50	435	3,148	0.013	24	383
29	121.00	306	2,130	0.009	16	269
28	117.50	780	5,141	0.021	40	685
27	112.50	821	4,994	0.020	38	721
26	107.50	842	4,711	0.019	36	740
25	103.00	698	3,611	0.015	28	614
24	100.50	337	1,664	0.007	13	296
23	97.75	1,539	7,229	0.030	56	1,353
22	95.25	108	485	0.002	4	95
21	92.50	1,099	4,663	0.019	36	966
20	87.50	1,127	4,314	0.018	33	990
19	82.50	1,155	3,965	0.016	30	1,015
18	77.50	1,182	3,617	0.015	28	1,039
17	72.50	1,210	3,273	0.013	25	1,063
16	67.50	1,237	2,934	0.012	23	1,087
15	62.50	1,265	2,603	0.011	20	1,112
14	57.50	1,292	2,280	0.009	18	1,136
13	54.50	262	418	0.002	3	230
12	52.00	2,090	3,064	0.013	24	1,837
11	48.54	1,549	2,000	0.008	15	1,361
10	46.04	661	774	0.003	6	581
9	42.50	1,610	1,626	0.007	13	1,415
8	37.50	1,644	1,318	0.005	10	1,445
7	32.50	1,678	1,033	0.004	8	1,474
6	27.50	1,712	774	0.003	6	1,504
5	22.50	1,746	545	0.002	4	1,534
4	17.50	1,780	350	0.001	3	1,564
3	12.50	1,813	192	0.001	1	1,594
2	7.50	1,847	76	0.000	1	1,624
1	2.50	1,713	9	0.000	0	1,505
Powerwave Allgon TT0	150.00	66	683	0.003	5	58
Nokia AirScale RRH 4	150.00	110	1,142	0.005	9	97
Raycap DC6-48-60-18-	150.00	33	339	0.001	3	29
Raycap DC6-48-60-0-8	150.00	16	166	0.001	1	14
Raycap DC6-48-60-18-	150.00	16	166	0.001	1	14
Nokia AHLBBA	150.00	284	2,943	0.012	23	250
Alcatel-Lucent RRH4X	150.00	210	2,173	0.009	17	185
Nokia AirScale Dual	150.00	265	2,738	0.011	21	233
Nokia AEQK AirScale	150.00	298	3,080	0.013	24	262
Commscope JAH4-65C-R	150.00	262	2,710	0.011	21	230
CCI TPA65R-BU8D	150.00	495	5,122	0.021	39	435
Generic Round Platfo	150.00	2,500	25,871	0.106	199	2,197
Powerwave Allgon LGP	140.00	59	541	0.002	4	52
Ericsson Radio 4449	140.00	210	1,913	0.008	15	185
Ericsson 8843 Rev 2	140.00	225	2,050	0.008	16	198
Raycap RRFDC-3315-PF	140.00	54	490	0.002	4	47
Ericsson AIR 6449 B7	140.00	245	2,231	0.009	17	215
Antel BXA-80063/8CF	140.00	72	656	0.003	5	63
Commscope NHH-65C-R2	140.00	310	2,821	0.012	22	272
Generic Round Low Pr	140.00	1,875	17,084	0.070	131	1,648
Andrew ETW190VS12UB	126.00	33	248	0.001	2	29
Nokia AirScale Dual	126.00	251	1,886	0.008	15	221
Nokia FRIG w/o Solar	126.00	162	1,215	0.005	9	142
Nokia FHFB	126.00	146	1,092	0.004	8	128
Raycap ASU9338TYP01	126.00	15	112	0.000	1	13
Andrew TMBXX-6516-A2	126.00	208	1,557	0.006	12	182
Commscope FFHH-65C-R	126.00	377	2,829	0.012	22	331
Generic Round Platfo	126.00	2,500	18,755	0.077	144	2,197
Generic 48" x 12" Pa	122.00	270	1,908	0.008	15	237
Generic Flat Platfor	122.00	2,500	17,671	0.072	136	2,197
DragonWave Horizon D	115.00	14	89	0.000	1	12
Samsung 2.5GHz nRRHv	115.00	152	964	0.004	7	134

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

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Site Name: Woods Chapel, MO**Engineering Number:13683130_C3_03****6/25/2021 11:34:50 AM****Customer: DISH WIRELESS L.L.C.**

Argus LLPX310R	115.00	86	544	0.002	4	75
Andrew Microwaves VH	115.00	95	603	0.002	5	84
Side Arms	115.00	560	3,549	0.015	27	492
Commscope RDIDC-9181	105.00	22	117	0.000	1	19
Fujitsu TA08025-B604	105.00	192	1,027	0.004	8	168
Fujitsu TA08025-B605	105.00	225	1,206	0.005	9	198
JMA Wireless MX08FRO	105.00	193	1,037	0.004	8	170
Generic Round Platfo	105.00	2,500	13,397	0.055	103	2,197
		56,648	243,982	1.000	1,876	49,787

Site Number: 306042

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Site Name: Woods Chapel, MO

Engineering Number:13683130_C3_03

6/25/2021 11:34:50 AM

Customer: DISH WIRELESS L.L.C.

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	-67.08	-1.88	0.00	-231.17	0.00	231.17	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.041
5.00	-64.83	-1.89	0.00	-221.77	0.00	221.77	6,215.54	1,660.30	9,203.06	7,441.50	0.00	-0.01	0.040
10.00	-62.61	-1.89	0.00	-212.33	0.00	212.33	6,144.79	1,625.26	8,818.88	7,200.24	0.02	-0.01	0.040
15.00	-60.44	-1.90	0.00	-202.86	0.00	202.86	6,071.43	1,590.23	8,442.89	6,959.61	0.03	-0.02	0.039
20.00	-58.31	-1.90	0.00	-193.37	0.00	193.37	5,995.47	1,555.19	8,075.09	6,719.80	0.06	-0.03	0.039
25.00	-56.22	-1.90	0.00	-183.86	0.00	183.86	5,916.91	1,520.16	7,715.48	6,481.00	0.10	-0.04	0.038
30.00	-54.17	-1.90	0.00	-174.35	0.00	174.35	5,835.74	1,485.13	7,364.06	6,243.42	0.14	-0.05	0.037
35.00	-52.16	-1.90	0.00	-164.85	0.00	164.85	5,751.97	1,450.09	7,020.84	6,007.26	0.19	-0.05	0.037
40.00	-50.19	-1.89	0.00	-155.37	0.00	155.37	5,665.59	1,415.06	6,685.80	5,772.72	0.25	-0.06	0.036
45.00	-49.39	-1.89	0.00	-145.93	0.00	145.93	5,576.61	1,380.02	6,358.95	5,539.99	0.32	-0.07	0.035
47.08	-47.50	-1.87	0.00	-142.00	0.00	142.00	5,538.76	1,365.43	6,225.18	5,443.60	0.36	-0.07	0.035
50.00	-44.94	-1.85	0.00	-136.54	0.00	136.54	5,485.02	1,344.99	6,040.30	5,309.27	0.40	-0.08	0.034
54.00	-44.62	-1.85	0.00	-129.14	0.00	129.14	4,089.14	1,090.16	4,886.38	3,958.64	0.47	-0.09	0.044
55.00	-43.04	-1.83	0.00	-127.29	0.00	127.29	4,077.72	1,084.47	4,835.52	3,926.82	0.49	-0.09	0.043
60.00	-41.50	-1.82	0.00	-118.12	0.00	118.12	4,019.09	1,056.02	4,585.23	3,767.96	0.59	-0.10	0.042
65.00	-39.99	-1.80	0.00	-109.03	0.00	109.03	3,957.85	1,027.58	4,341.60	3,609.72	0.69	-0.11	0.040
70.00	-38.51	-1.78	0.00	-100.02	0.00	100.02	3,894.01	999.13	4,104.61	3,452.29	0.81	-0.12	0.039
75.00	-37.07	-1.75	0.00	-91.13	0.00	91.13	3,827.57	970.68	3,874.27	3,295.88	0.94	-0.13	0.037
80.00	-35.66	-1.73	0.00	-82.36	0.00	82.36	3,758.52	942.23	3,650.59	3,140.67	1.08	-0.14	0.036
85.00	-34.28	-1.70	0.00	-73.72	0.00	73.72	3,686.86	913.79	3,433.55	2,986.87	1.23	-0.15	0.034
90.00	-32.94	-1.66	0.00	-65.24	0.00	65.24	3,612.61	885.34	3,223.17	2,834.68	1.38	-0.16	0.032
95.00	-32.81	-1.66	0.00	-56.93	0.00	56.93	3,535.75	856.89	3,019.43	2,684.29	1.55	-0.16	0.030
95.50	-30.93	-1.60	0.00	-56.10	0.00	56.10	3,527.92	854.05	2,999.43	2,669.36	1.57	-0.17	0.030
100.00	-30.51	-1.59	0.00	-48.89	0.00	48.89	3,456.28	828.44	2,822.35	2,535.92	1.73	-0.17	0.028
101.00	-29.66	-1.56	0.00	-47.30	0.00	47.30	2,422.80	645.97	2,228.95	1,805.62	1.77	-0.18	0.038
105.00	-24.81	-1.39	0.00	-41.05	0.00	41.05	2,386.99	628.45	2,109.74	1,730.29	1.92	-0.18	0.034
110.00	-23.81	-1.35	0.00	-34.13	0.00	34.13	2,339.89	606.55	1,965.33	1,636.54	2.11	-0.19	0.031
115.00	-21.75	-1.26	0.00	-27.39	0.00	27.39	2,290.19	584.66	1,826.04	1,543.43	2.32	-0.20	0.027
120.00	-21.38	-1.24	0.00	-21.09	0.00	21.09	2,237.88	562.76	1,691.86	1,451.17	2.53	-0.21	0.024
122.00	-17.46	-1.06	0.00	-18.60	0.00	18.60	2,216.23	554.00	1,639.63	1,414.54	2.62	-0.21	0.021
125.00	-17.29	-1.05	0.00	-15.44	0.00	15.44	2,182.97	540.86	1,562.81	1,359.95	2.75	-0.21	0.019
126.00	-12.13	-0.78	0.00	-14.39	0.00	14.39	2,171.68	536.48	1,537.61	1,341.85	2.80	-0.21	0.016
130.00	-11.34	-0.74	0.00	-11.25	0.00	11.25	2,125.45	518.97	1,438.88	1,269.97	2.98	-0.22	0.014
135.00	-10.58	-0.70	0.00	-7.54	0.00	7.54	2,065.33	497.07	1,320.06	1,181.43	3.21	-0.22	0.012
140.00	-6.20	-0.43	0.00	-4.06	0.00	4.06	1,995.73	475.17	1,206.37	1,090.78	3.44	-0.23	0.007
145.00	-5.56	-0.38	0.00	-1.92	0.00	1.92	1,903.77	453.28	1,097.79	992.02	3.68	-0.23	0.005
150.00	0.00	-0.36	0.00	0.00	0.00	0.00	1,811.80	431.38	994.33	897.94	3.92	-0.23	0.000

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Customer: DISH WIRELESS L.L.C.

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	-48.28	-1.88	0.00	-228.61	0.00	228.61	6,283.69	1,695.33	9,595.43	7,683.17	0.00	0.00	0.037
5.00	-46.66	-1.88	0.00	-219.22	0.00	219.22	6,215.54	1,660.30	9,203.06	7,441.50	0.00	-0.01	0.037
10.00	-45.06	-1.89	0.00	-209.80	0.00	209.80	6,144.79	1,625.26	8,818.88	7,200.24	0.02	-0.01	0.036
15.00	-43.50	-1.89	0.00	-200.36	0.00	200.36	6,071.43	1,590.23	8,442.89	6,959.61	0.03	-0.02	0.036
20.00	-41.96	-1.89	0.00	-190.90	0.00	190.90	5,995.47	1,555.19	8,075.09	6,719.80	0.06	-0.03	0.035
25.00	-40.46	-1.89	0.00	-181.45	0.00	181.45	5,916.91	1,520.16	7,715.48	6,481.00	0.10	-0.04	0.035
30.00	-38.99	-1.89	0.00	-172.00	0.00	172.00	5,835.74	1,485.13	7,364.06	6,243.42	0.14	-0.05	0.034
35.00	-37.54	-1.88	0.00	-162.57	0.00	162.57	5,751.97	1,450.09	7,020.84	6,007.26	0.19	-0.05	0.034
40.00	-36.13	-1.87	0.00	-153.16	0.00	153.16	5,665.59	1,415.06	6,685.80	5,772.72	0.25	-0.06	0.033
45.00	-35.54	-1.87	0.00	-143.81	0.00	143.81	5,576.61	1,380.02	6,358.95	5,539.99	0.32	-0.07	0.032
47.08	-34.18	-1.85	0.00	-139.91	0.00	139.91	5,538.76	1,365.43	6,225.18	5,443.60	0.35	-0.07	0.032
50.00	-32.35	-1.83	0.00	-134.51	0.00	134.51	5,485.02	1,344.99	6,040.30	5,309.27	0.40	-0.08	0.031
54.00	-32.12	-1.83	0.00	-127.18	0.00	127.18	4,089.14	1,090.16	4,886.38	3,958.64	0.47	-0.08	0.040
55.00	-30.98	-1.81	0.00	-125.35	0.00	125.35	4,077.72	1,084.47	4,835.52	3,926.82	0.48	-0.09	0.040
60.00	-29.87	-1.80	0.00	-116.28	0.00	116.28	4,019.09	1,056.02	4,585.23	3,767.96	0.58	-0.10	0.038
65.00	-28.78	-1.78	0.00	-107.29	0.00	107.29	3,957.85	1,027.58	4,341.60	3,609.72	0.68	-0.11	0.037
70.00	-27.72	-1.76	0.00	-98.40	0.00	98.40	3,894.01	999.13	4,104.61	3,452.29	0.80	-0.12	0.036
75.00	-26.68	-1.73	0.00	-89.63	0.00	89.63	3,827.57	970.68	3,874.27	3,295.88	0.93	-0.13	0.034
80.00	-25.66	-1.70	0.00	-80.98	0.00	80.98	3,758.52	942.23	3,650.59	3,140.67	1.06	-0.13	0.033
85.00	-24.67	-1.67	0.00	-72.47	0.00	72.47	3,686.86	913.79	3,433.55	2,986.87	1.21	-0.14	0.031
90.00	-23.71	-1.64	0.00	-64.13	0.00	64.13	3,612.61	885.34	3,223.17	2,834.68	1.37	-0.15	0.029
95.00	-23.61	-1.63	0.00	-55.95	0.00	55.95	3,535.75	856.89	3,019.43	2,684.29	1.53	-0.16	0.028
95.50	-22.26	-1.58	0.00	-55.13	0.00	55.13	3,527.92	854.05	2,999.43	2,669.36	1.55	-0.16	0.027
100.00	-21.96	-1.56	0.00	-48.04	0.00	48.04	3,456.28	828.44	2,822.35	2,535.92	1.71	-0.17	0.025
101.00	-21.35	-1.54	0.00	-46.48	0.00	46.48	2,422.80	645.97	2,228.95	1,805.62	1.74	-0.17	0.035
105.00	-17.86	-1.36	0.00	-40.34	0.00	40.34	2,386.99	628.45	2,109.74	1,730.29	1.89	-0.18	0.031
110.00	-17.13	-1.32	0.00	-33.53	0.00	33.53	2,339.89	606.55	1,965.33	1,636.54	2.08	-0.19	0.028
115.00	-15.65	-1.24	0.00	-26.91	0.00	26.91	2,290.19	584.66	1,826.04	1,543.43	2.28	-0.20	0.024
120.00	-15.38	-1.22	0.00	-20.73	0.00	20.73	2,237.88	562.76	1,691.86	1,451.17	2.49	-0.20	0.021
122.00	-12.57	-1.04	0.00	-18.28	0.00	18.28	2,216.23	554.00	1,639.63	1,414.54	2.58	-0.21	0.019
125.00	-12.44	-1.03	0.00	-15.17	0.00	15.17	2,182.97	540.86	1,562.81	1,359.95	2.71	-0.21	0.017
126.00	-8.73	-0.77	0.00	-14.14	0.00	14.14	2,171.68	536.48	1,537.61	1,341.85	2.76	-0.21	0.015
130.00	-8.16	-0.73	0.00	-11.06	0.00	11.06	2,125.45	518.97	1,438.88	1,269.97	2.93	-0.22	0.013
135.00	-7.62	-0.68	0.00	-7.42	0.00	7.42	2,065.33	497.07	1,320.06	1,181.43	3.16	-0.22	0.010
140.00	-4.46	-0.42	0.00	-3.99	0.00	3.99	1,995.73	475.17	1,206.37	1,090.78	3.39	-0.22	0.006
145.00	-4.00	-0.38	0.00	-1.89	0.00	1.89	1,903.77	453.28	1,097.79	992.02	3.63	-0.22	0.004
150.00	0.00	-0.36	0.00	0.00	0.00	0.00	1,811.80	431.38	994.33	897.94	3.86	-0.22	0.000

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

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Site Name: Woods Chapel, MO**Engineering Number:13683130_C3_03****6/25/2021 11:34:50 AM****Customer: DISH WIRELESS L.L.C.**

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	36.62	0.00	67.94	0.00	0.00	3913.60	54.00	0.54
0.9D + 1.0W	36.60	0.00	50.94	0.00	0.00	3875.51	54.00	0.53
1.2D + 1.0Di + 1.0Wi	6.89	0.00	107.64	0.00	0.00	766.23	54.00	0.12
1.2D + 1.0Ev + 1.0Eh	1.88	0.00	67.08	0.00	0.00	231.17	54.00	0.04
0.9D - 1.0Ev + 1.0Eh	1.88	0.00	48.28	0.00	0.00	228.61	54.00	0.04
1.0D + 1.0W	9.92	0.00	56.65	0.00	0.00	1054.64	54.00	0.15



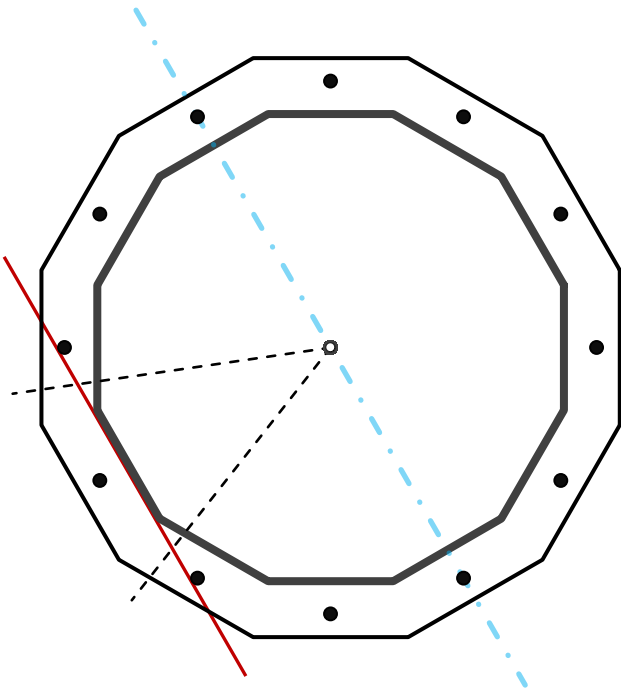
Base Plate & Anchor Rod Analysis

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

Base Reactions		
Moment, Mu	3,913.6	k-ft
Axial, Pu	67.9	k
Shear, Vu	36.6	k
Neutral Axis	120	°

Report Capacities		
Component	Capacity	Result
Base Plate	16%	Pass
Anchor Rods	100%	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	736.9	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	240.0	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	36.6	3913.6	1.00
Anchor Rod Forces	36.6	3913.6	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	240.0	k
Applied Shear, Vu	2.5	k
Compressive Capacity, ϕP_n	243.6	k
Tensile Capacity, ϕR_n	0.985	OK
Interaction Capacity	1.004	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	736.9	k-ft
Bending Capacity, ϕM_n	4733.9	k-ft
Capacity, Mu/ ϕM_n	0.156	OK

Chord Length AB	43.500	in
Additional AB	5.250	in
Section Modulus, Z	83.980	in ³
Applied Moment, Mu	480.2	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	736.9	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

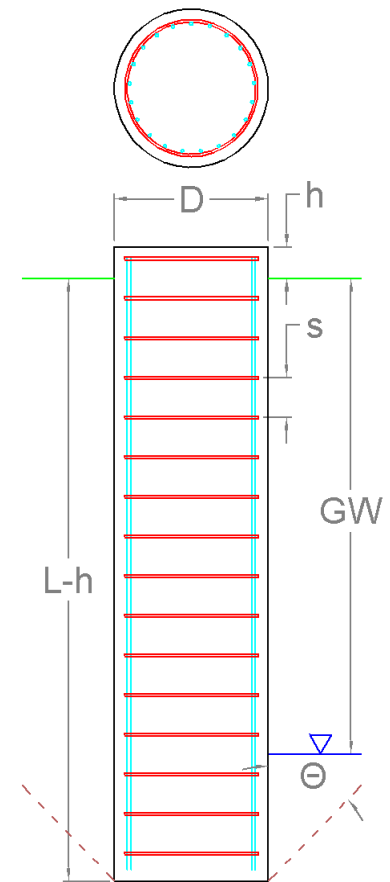
Moment, M_u	3,913.6	k-ft
Shear, V_u	36.6	k
Axial, P_u	67.9	k
Uplift, T_u	0.0	k

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	138.4	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	4,830.2	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	3,932.7	k-ft
Moment Capacity, $\phi_B M_n$	6,190.9	k-ft
$M_u / \phi_B M_n$	63.5%	
Design Shear, V_u	403.8	k
Shear Capacity, $\phi_V V_n$	712.7	k
$V_u / \phi_V V_n$	56.7%	
Design Compression, P_u	138.4	k
Compression Capacity, $\phi_P P_n$	10,553.9	k
$P_u / \phi_P P_n$	1.3%	
Bending Reinforcement Ratio	0.004	

