AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure	:	99 ft Monopole
ATC Asset Name	:	LIBERTY UT
ATC Asset Number	:	280216
Engineering Number	:	14842748_C3_02
Proposed Carrier	:	AT&T MOBILITY
Carrier Site Name	:	WSUTH0037797
Carrier Site Number	:	UTL06031
Site Location	:	4780 Wolf Creek Drive EDEN, UT 84310-9651 41.3194° N, 111.8295° W
County	:	Weber
Date	:	September 3, 2024
Max Usage	:	41%
Analysis Result	:	Pass

Esha Modi

Digitally signed by Esha Modi
Date: 2024.09.06 11:16:38 -04'00'

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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 99 ft Monopole tower to reflect the change in loading by AT&T MOBILITY.

Supporting Documents

Tower:	Valmont Order #200015, dated December 3, 2012
Foundation:	ATC Project #52292171B, dated February 6, 2013
Geotechnical:	Terracon Project #61135005, dated January 23, 2013

Analysis

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

Basic Wind Speed:	103 mph (3-second gust)
Basic Wind Speed w/ Ice:	40 mph (3-second gust) w/ 0.25" radial ice concurrent
Code(s):	ANSI/TIA-222-H / 2021 IBC
Exposure Category:	C
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Spectral Response:	Ss = 0.96, S_1 = 0.34
Site Class:	D - Stiff Soil - Default

Conclusion

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

If you have any questions or require additional information, please reach out to your American Tower contact. If you do not have an American Tower contact and have an Engineering question, please contact **Engineering@americantower.com** Please include the American Tower asset name, asset number, and engineering number in the subject line for any questions.

Structure Usages

Structural Component	Usage	Control	Result
Pole Shaft	41.3%	1.2D + 1.0W	Pass
Serviceability Usage	27.2%	1.0D + 1.0W	Pass
Base Plate @ 0.0 ft	40.2%	Rods	Pass
Pier	20.1%	Moment [Soil]	Pass

Maximum Reactions

Foundation	Moment (k-ft)	Axial (k)	Shear (k)
Monopole Base	742.3	20.7	10.1

Reactions shown reflect the results from the Load Case with maximum Moment

Structure base reactions were analyzed using available geotechnical and foundation information.

AT&T MOBILITY Final Loading

Elev (ft)	Qty	Equipment	Lines
101.0	3	Ericsson AIR 6419 B77D	-
99.0	1	Raycap DC6-48-60-18-8F ("Squid")	(2) 0.39" (10mm) Fiber Trunk (2) 0.76" (19.2mm) 8 AWG 6 (3) 0.96" (24.3mm) Cable (3) 2" conduit (1) 3/8" (0.38"- 9.5mm) RET Control Cable (6) 7/8" Coax
	1	Raycap DC9-48-60-24-8C-EV (Enclosure)	
	3	Ericsson RRUS 4478 B14 (16.5" Height)	
	3	Ericsson RRUS 4490	
	3	Ericsson RRUS 4890	
	6	Ace Technology XXQLH-654L8H8-iVT-V2	
97.0	3	Ericsson AIR 6419 B77G	-
	3	T-Arm	
40.0	1	Andrew Microwaves PL4·59	(1) EW52

Install proposed lines inside the pole shaft.

Other Existing/Reserved Loading

Elev (ft)	Qty	Equipment	Lines	Carrier
85.0	1	Platform with Handrails	(2) 1 3/8" (35.0mm) Hybrid	T-MOBILE
	3	CellMax CMA-BDHH/6521/E0-6		
	3	Ericsson RRUS 11 B4		
	3	Ericsson Radio 2217		
	3	Ericsson Radio 4449 B12,B71		
	3	RFS APXVAARR24_43-U-NA20		
75.0	2	Hanwha Techwin XNP-8300RW	(2) 0.35" (8.8mm) Cat 6A	PANO AI, INC.

(If table breaks across pages, please see previous page for data in merged cells)

Standard Conditions

All engineering services performed by ATC Tower Services, LLC 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, LLC

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

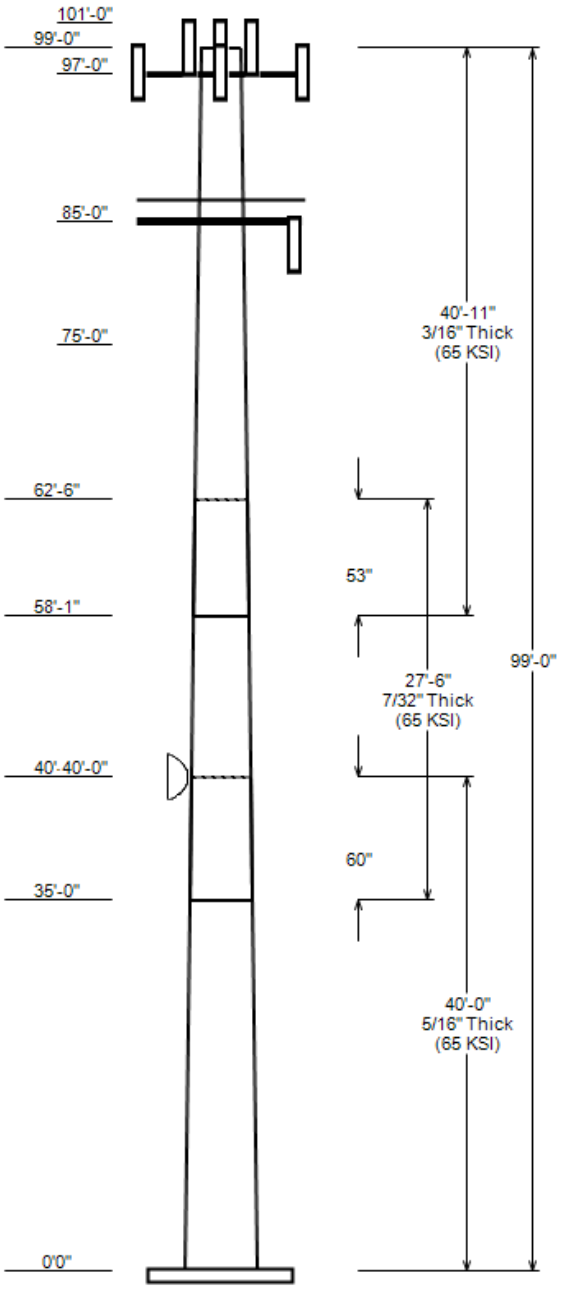
All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with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

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

ANALYSIS PARAMETERS

Design Wind:	103 mph	**Ice Wind:**	40 mph w/ 0.2" ice	**Service Wind:**	60 mph
Risk Category:	II	**Exposure:**	C	**S_s:** 0.955	**S_1:** 0.340
Topo Factor:	Method 1	**Topo Feature:**		**Topo Category:**	1
Structure Height:	99.0 ft	**Base Elevation:**	1.00 ft	**Structure Type:**	Taper
Base Diameter:	37.25 in	**Base Rotation:**	0.00°	**Taper:**	0.1660 (in/ft)



POLE SECTION PROPERTIES

Section	Length (ft)	Flat Diameter (in) Top	Flat Diameter (in) Bottom	Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
1	40.000	30.61	37.25	0.312		0.00	18 Sides	65
2	27.500	27.31	31.88	0.219	Slip Joint	60.00	18 Sides	65
3	40.917	21.63	28.42	0.188	Slip Joint	53.00	18 Sides	65

DISCRETE APPURTENANCE

Elev (ft)	Description
101.0	(3) Ericsson AIR 6419 B77D
99.0	(6) Ace Technology XXQLH-654L8H8-iV
99.0	(3) Ericsson RRUS 4478 B14 (16.5" Heig
99.0	(3) Ericsson RRUS 4490
99.0	(1) Raycap DC6-48-60-18-8F ("Squid")
99.0	(3) Ericsson RRUS 4890
99.0	(1) Raycap DC9-48-60-24-8C-EV (Enclo
97.0	(3) Ericsson AIR 6419 B77G
97.0	(3) Generic Round T-Arm
85.0	(3) Ericsson Radio 4449 B12,B71
85.0	(3) CellMax CMA-BDHH/6521/E0-6
85.0	(1) Generic Round Platform with Handrail
85.0	(3) Ericsson Radio 2217
85.0	(3) Ericsson RRUS 11 B4
85.0	(3) RFS APXVAARR24_43-U-NA20
75.0	(2) Hanwha Techwin XNP-8300RW
40.0	(1) Andrew Microwaves PL4-59

LINEAR APPURTENANCE

Elev To (ft)	Description
99.0	(2) 0.76" (19.2mm) 8 AWG 6
99.0	(3) 2" conduit
99.0	(6) 7/8" Coax
99.0	(1) 3/8" (0.38"- 9.5mm) RET Control Cabl
99.0	(3) 0.96" (24.3mm) Cable
99.0	(2) 0.39" (10mm) Fiber Trunk
85.0	(2) 1 3/8" (35.0mm) Hybrid
75.0	(2) 0.35" (8.8mm) Cat 6A
40.0	(1) EW52

DISH SERVICEABILITY

Load Case	Elevation (ft)	Deflection (in)	Rotation (°)
1.0D + 1.0W	40.0	1.6299	0.3814

GLOBAL BASE REACTIONS

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.0W	742.27	20.74	10.09
0.9D + 1.0W	735.14	15.55	10.08
1.2D + 1.0Di + 1.0Wi	140.05	21.82	2.02
1.2D + 1.0Ev + 1.0Eh	241.24	22.80	2.82
0.9D - 1.0Ev + 1.0Eh	236.52	12.60	2.81
1.0D + 1.0W	223.96	17.29	3.06

ANALYSIS PARAMETERS

Location:	Weber County,UT	**Height:**	99 ft
Type and Shape:	Taper, 18 Sides	**Base Diameter:**	37.25 in
Manufacturer:	Valmont	**Top Diameter:**	21.63 in
K_d (non-service):	0.95	**Taper:**	0.1660 in/ft
K_e:	0.83	**Rotation:**	0.000º

ICE & WIND PARAMETERS

Risk Category:	II	**Design Wind Speed:**	103 mph
Exposure Category:	C	**Design Wind Speed w/ Ice:**	40 mph
Topo Factor Procedure:	Method 1	**Design Ice Thickness:**	0.25 in
Topographic Category:	1	**Service Wind Speed:**	60 mph
Crest Height:	0 ft	**HMSL:**	5069.00 ft

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method				
Site Class:	D - Stiff Soil		**Period Based on Rayleigh Method (sec):**		1.82
T_L (sec):	8	**P:**	1	**C_s:**	0.162
S_{ds}:	0.764	**S_{d1}:**	0.444	**C_s Max:**	0.162
S_s:	0.955	**S_1:**	0.340	**C_s Min:**	0.034
F_a:	1.200	**F_v:**	1.960		

LOAD CASES

1.2D + 1.0W	103 mph Wind with No Ice
0.9D + 1.0W	103 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph Wind with 0.25" Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice

SHAFT SECTION PROPERTIES

Section	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Joint Len (in)	Weight (lb)	Bottom Dia (in)	Bottom Elev (ft)	Bottom Area (in^2)	Bottom Ix (in^4)	Bottom W/t Ratio	Bottom D/t Ratio	Top Dia (in)	Top Elev (ft)	Top Area (in^2)	Top Ix (in^4)	Top W/t Ratio	Top D/t Ratio	Taper (in/ft)
1-18	40.00	0.3125	65		0.00	4,538	37.25	0.000	36.64	6,315.3	19.25	119.20	30.61	40.00	30.05	3,485.2	15.51	97.95	0.1660
2-18	27.50	0.2188	65	Slip	60.00	1,909	31.88	35.000	21.99	2,784.1	23.93	145.69	27.31	62.50	18.82	1,745.1	20.25	124.83	0.1660
3-18	40.92	0.1875	65	Slip	53.00	2,058	28.42	58.083	16.80	1,692.2	24.96	151.58	21.63	99.00	12.76	741.2	18.58	115.36	0.1660
			Total Shaft Weight			**8,505**													

DISCRETE APPURTENANCE PROPERTIES

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	No Ice Weight (lb)	No Ice EPAa (sf)	No Ice Orientation Factor	Ice Weight (lb)	Ice EPAa (sf)	Ice Orientation Factor
101.00	Ericsson AIR 6419 B77D	3	0.80	0.000	63.10	4.186	0.67	80.97	4.411	0.67
99.00	Ericsson RRUS 4490	3	0.80	0.000	68.40	2.695	0.67	79.65	2.869	0.67
99.00	Ericsson RRUS 4478 B14 (16.5"	3	0.80	0.000	59.90	1.842	0.50	68.76	1.986	0.50
99.00	Raycap DC6-48-60-18-8F ("Squid	1	0.80	0.000	18.90	1.470	1.00	28.79	1.582	1.00
99.00	Raycap DC9-48-60-24-8C-EV (Enc	1	0.80	0.000	18.50	2.676	1.00	31.92	2.858	1.00
99.00	Ace Technology XXQLH-654L8H8-i	6	0.80	0.000	113.50	17.145	0.64	165.64	17.736	0.64
99.00	Ericsson RRUS 4890	3	0.80	0.000	69.50	2.695	0.67	80.88	2.869	0.67
97.00	Generic Round T-Arm	3	0.75	0.000	450.00	9.700	0.67	550.30	11.019	0.67
97.00	Ericsson AIR 6419 B77G	3	0.80	0.000	66.10	3.797	0.65	81.62	4.008	0.65
85.00	RFS APXVAARR24_43-U-NA20	3	0.75	-0.800	127.90	20.243	0.63	189.88	20.829	0.63
85.00	CellMax CMA-BDHH/6521/E0-6	3	0.75	-1.000	62.00	11.213	0.63	94.37	11.705	0.63
85.00	Ericsson RRUS 11 B4	3	0.75	-1.000	50.70	2.791	0.67	62.13	2.964	0.67
85.00	Ericsson Radio 4449 B12,B71	3	0.75	-0.300	74.00	1.639	0.50	82.84	1.772	0.50
85.00	Ericsson Radio 2217	3	0.75	-0.300	27.10	1.346	0.50	32.83	1.467	0.50
85.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	2755.72	31.059	1.00
75.00	Hanwha Techwin XNP-8300RW	2	1.00	0.000	11.90	0.767	1.00	16.54	0.862	1.00
40.00	Andrew Microwaves PL4·59	1	1.00	0.000	188.00	20.910	1.00	219.18	21.360	1.00
Totals	**Row Count: 17**	**45**			**6,786.30**			**8,275.22**		

LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg): 0.00

Elev From (ft)	Elev To (ft)	Qty	Description	Diameter (in)	Weight (lb/ft)	Flat	Max/ Row	Distance Between Rows(in)	Distance Between Cols(in)	Azimuth (deg)	Distance From Face (in)	Exposed To Wind	Carrier
0.00	99.00	6	7/8" Coax	1.09	0.33	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	99.00	3	0.96" (24.3mm) Cable	0.96	0.88	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	99.00	3	2" conduit	2.38	3.65	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	99.00	2	0.39" (10mm) Fiber Tr	0.39	0.06	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	99.00	2	0.76" (19.2mm) 8 AWG	0.76	0.53	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	99.00	1	3/8" (0.38"- 9.5mm) R	0.38	0.23	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	85.00	2	1 3/8" (35.0mm) Hybri	1.38	1.7	N	0	0	0	0	0	N	T-MOBILE
0.00	75.00	2	0.35" (8.8mm) Cat 6A	0.35	0.05	N	0	0	0	0	0	N	PANO AI, INC.
0.00	40.00	1	EW52	2.25	0.59	N	0	0	0	0	0	N	AT&T MOBILITY

SEGMENT PROPERTIES

Seg Top Elev (ft)	Description	(Max Length: 3 ft)	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			0.3125	37.250	36.636	6,315.30	19.25	119.20	78.8	333.9	0.0	0.0
3.00			0.3125	36.752	36.142	6,063.40	18.97	117.61	79.1	324.9	0.0	371.5
6.00			0.3125	36.254	35.648	5,818.20	18.69	116.01	79.4	316.1	0.0	366.4
9.00			0.3125	35.756	35.154	5,579.70	18.41	114.42	79.7	307.4	0.0	361.4
12.00			0.3125	35.258	34.660	5,347.80	18.13	112.83	80.1	298.7	0.0	356.3
15.00			0.3125	34.760	34.167	5,122.40	17.85	111.23	80.4	290.3	0.0	351.3
18.00			0.3125	34.262	33.673	4,903.40	17.57	109.64	80.7	281.9	0.0	346.3
21.00			0.3125	33.764	33.179	4,690.80	17.29	108.05	81.1	273.6	0.0	341.2
24.00			0.3125	33.266	32.685	4,484.40	17.01	106.45	81.4	265.5	0.0	336.2
27.00			0.3125	32.768	32.191	4,284.20	16.73	104.86	81.7	257.5	0.0	331.1
30.00			0.3125	32.270	31.697	4,090.00	16.45	103.26	82.1	249.6	0.0	326.1
33.00			0.3125	31.772	31.203	3,901.80	16.16	101.67	82.4	241.9	0.0	321.1
35.00	Bot - Section 2		0.3125	31.440	30.874	3,779.60	15.98	100.61	82.6	236.8	0.0	211.2
36.00			0.3125	31.274	30.709	3,719.40	15.88	100.08	82.6	234.2	0.0	179.4
39.00			0.3125	30.776	30.215	3,542.80	15.60	98.48	82.6	226.7	0.0	532.5
40.00	Top - Section 1		0.2188	31.048	21.409	2,570.90	23.26	141.90	74	163.1	0.0	175.6
42.00			0.2188	30.716	21.179	2,488.70	22.99	140.38	74.4	159.6	0.0	144.9
45.00			0.2188	30.218	20.833	2,368.80	22.59	138.11	74.8	154.4	0.0	214.4
48.00			0.2188	29.720	20.487	2,252.80	22.19	135.83	75.3	149.3	0.0	210.9
51.00			0.2188	29.222	20.141	2,140.60	21.79	133.56	75.8	144.3	0.0	207.4
54.00			0.2188	28.724	19.795	2,032.20	21.38	131.28	76.2	139.3	0.0	203.8
57.00			0.2188	28.226	19.450	1,927.60	20.98	129.00	76.7	134.5	0.0	200.3
58.08	Bot - Section 3		0.2188	28.046	19.325	1,890.70	20.84	128.18	76.9	132.8	0.0	71.5
60.00			0.2188	27.728	19.104	1,826.60	20.58	126.73	77.2	129.7	0.0	234.3
62.50	Top - Section 2		0.1875	27.688	16.366	1,563.80	24.28	147.67	72.8	111.2	0.0	301.6
63.00			0.1875	27.605	16.316	1,549.70	24.20	147.23	72.9	110.6	0.0	27.8
66.00			0.1875	27.107	16.020	1,466.80	23.73	144.57	73.5	106.6	0.0	165.1
69.00			0.1875	26.609	15.724	1,386.90	23.26	141.92	74	102.7	0.0	162.0
72.00			0.1875	26.111	15.427	1,309.90	22.79	139.26	74.6	98.8	0.0	159.0
75.00			0.1875	25.613	15.131	1,235.90	22.32	136.60	75.1	95.0	0.0	156.0
78.00			0.1875	25.115	14.835	1,164.70	21.86	133.95	75.7	91.3	0.0	152.9
81.00			0.1875	24.617	14.538	1,096.30	21.39	131.29	76.2	87.7	0.0	149.9
84.00			0.1875	24.119	14.242	1,030.60	20.92	128.64	76.8	84.2	0.0	146.9
85.00			0.1875	23.953	14.143	1,009.30	20.76	127.75	77	83.0	0.0	48.3
87.00			0.1875	23.621	13.946	967.60	20.45	125.98	77.3	80.7	0.0	95.6
90.00			0.1875	23.124	13.649	907.20	19.98	123.33	77.9	77.3	0.0	140.8
93.00			0.1875	22.626	13.353	849.40	19.51	120.67	78.4	73.9	0.0	137.8
96.00			0.1875	22.128	13.057	794.10	19.05	118.01	79	70.7	0.0	134.8
97.00			0.1875	21.962	12.958	776.20	18.89	117.13	79.2	69.6	0.0	44.3
99.00			0.1875	21.630	12.760	741.20	18.58	115.36	79.6	67.5	0.0	87.5
											Total:	**8,505.4**

CALCULATED FORCES

Load Case: 1.2D + 1.0W — 103 mph Wind with No Ice — 23 Iterations

Gust Response Factor: 1.10
Dead load Factor: 1.20
Wind Load Factor: 1.00

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	-20.74	-10.09	0.00	-742.3	0.00	742.27	2,596.69	642.96	2,145.15	1,972.34	0	0	0.385
3.00	-20.20	-9.99	0.00	-712.0	0.00	712.01	2,572.44	634.29	2,087.71	1,927.36	0.03	-0.1	0.378
6.00	-19.67	-9.88	0.00	-682.0	0.00	682.05	2,547.88	625.63	2,031.05	1,882.65	0.13	-0.2	0.370
9.00	-19.15	-9.78	0.00	-652.4	0.00	652.41	2,523.04	616.96	1,975.16	1,838.24	0.28	-0.29	0.363
12.00	-18.63	-9.68	0.00	-623.1	0.00	623.07	2,497.90	608.29	1,920.06	1,794.13	0.5	-0.39	0.355
15.00	-18.11	-9.57	0.00	-594.0	0.00	594.04	2,472.47	599.62	1,865.74	1,750.34	0.77	-0.49	0.347
18.00	-17.61	-9.46	0.00	-565.3	0.00	565.32	2,446.74	590.95	1,812.19	1,706.86	1.11	-0.59	0.339
21.00	-17.11	-9.35	0.00	-536.9	0.00	536.93	2,420.72	582.29	1,759.43	1,663.71	1.51	-0.68	0.330
24.00	-16.62	-9.24	0.00	-508.9	0.00	508.87	2,394.41	573.62	1,707.44	1,620.90	1.97	-0.78	0.321
27.00	-16.13	-9.12	0.00	-481.2	0.00	481.17	2,367.80	564.95	1,656.24	1,578.44	2.49	-0.87	0.312

CALCULATED FORCES

30.00	-15.65	-8.99	0.00	-453.8	0.00	453.82	2,340.90	556.28	1,605.81	1,536.34	3.07	-0.96	0.302
33.00	-15.18	-8.89	0.00	-426.8	0.00	426.84	2,313.70	547.61	1,556.16	1,494.60	3.7	-1.06	0.292
35.00	-14.87	-8.82	0.00	-409.1	0.00	409.06	2,293.77	541.84	1,523.50	1,465.93	4.16	-1.12	0.286
36.00	-14.62	-8.74	0.00	-400.2	0.00	400.24	2,281.54	538.95	1,507.30	1,450.26	4.4	-1.15	0.283
39.00	-13.90	-8.64	0.00	-374.0	0.00	374.02	2,244.84	530.28	1,459.21	1,403.76	5.14	-1.24	0.273
40.00	-13.45	-8.06	0.00	-365.4	0.00	365.37	1,426.73	375.73	1,046.23	905.70	5.41	-1.27	0.413
42.00	-13.21	-7.95	0.00	-349.3	0.00	349.26	1,417.36	371.69	1,023.82	890.00	5.95	-1.32	0.402
45.00	-12.87	-7.83	0.00	-325.4	0.00	325.41	1,403.07	365.62	990.66	866.54	6.82	-1.44	0.385
48.00	-12.53	-7.70	0.00	-301.9	0.00	301.92	1,388.48	359.55	958.05	843.19	7.76	-1.55	0.368
51.00	-12.20	-7.58	0.00	-278.8	0.00	278.82	1,373.60	353.48	925.98	819.97	8.77	-1.66	0.349
54.00	-11.87	-7.45	0.00	-256.1	0.00	256.09	1,358.43	347.41	894.46	796.88	9.85	-1.77	0.331
57.00	-11.55	-7.36	0.00	-233.8	0.00	233.75	1,342.96	341.34	863.49	773.94	11	-1.87	0.311
58.08	-11.44	-7.29	0.00	-225.8	0.00	225.79	1,337.30	339.15	852.44	765.69	11.43	-1.91	0.304
60.00	-11.10	-7.19	0.00	-211.8	0.00	211.81	1,327.20	335.27	833.06	751.15	12.21	-1.97	0.291
62.50	-10.68	-7.12	0.00	-193.8	0.00	193.83	1,073.01	287.22	713.41	607.78	13.26	-2.05	0.329
63.00	-10.63	-7.04	0.00	-190.3	0.00	190.27	1,071.12	286.35	709.11	604.87	13.48	-2.07	0.325
66.00	-10.35	-6.91	0.00	-169.1	0.00	169.14	1,059.60	281.15	683.59	587.43	14.81	-2.17	0.298
69.00	-10.08	-6.78	0.00	-148.4	0.00	148.40	1,047.80	275.95	658.54	570.06	16.2	-2.26	0.271
72.00	-9.81	-6.65	0.00	-128.0	0.00	128.05	1,035.70	270.75	633.95	552.78	17.65	-2.34	0.242
75.00	-9.52	-6.47	0.00	-108.1	0.00	108.11	1,023.30	265.55	609.83	535.60	19.14	-2.42	0.212
78.00	-9.26	-6.34	0.00	-88.7	0.00	88.69	1,010.62	260.35	586.18	518.53	20.69	-2.49	0.181
81.00	-9.01	-6.21	0.00	-69.7	0.00	69.67	997.63	255.15	563.00	501.56	22.27	-2.55	0.149
84.00	-8.76	-6.11	0.00	-51.0	0.00	51.05	984.36	249.95	540.28	484.72	23.88	-2.59	0.115
85.00	-4.56	-3.56	0.00	-44.9	0.00	44.94	979.87	248.21	532.82	479.14	24.43	-2.61	0.099
87.00	-4.40	-3.45	0.00	-37.8	0.00	37.81	970.79	244.75	518.04	468.02	25.53	-2.63	0.086
90.00	-4.18	-3.32	0.00	-27.5	0.00	27.46	956.93	239.55	496.26	451.45	27.19	-2.66	0.065
93.00	-3.96	-3.18	0.00	-17.5	0.00	17.51	942.77	234.34	474.94	435.04	28.87	-2.68	0.045
96.00	-3.74	-3.09	0.00	-8.0	0.00	7.96	928.32	229.14	454.10	418.79	30.55	-2.69	0.023
97.00	-1.84	-2.33	0.00	-4.9	0.00	4.86	923.44	227.41	447.26	413.41	31.12	-2.69	0.014
99.00	0.00	-2.24	0.00	-0.2	0.00	0.20	913.57	223.94	433.72	402.70	32.25	-2.7	0.001

CALCULATED FORCES

Load Case: 0.9D + 1.0W — 103 mph Wind with No Ice (Reduced DL) — 23 Iterations

Gust Response Factor: 1.10
Dead load Factor: 0.90
Wind Load Factor: 1.00

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	-15.55	-10.08	0.00	-735.1	0.00	735.14	2,596.69	642.96	2,145.15	1,972.34	0	0	0.379
3.00	-15.15	-9.97	0.00	-704.9	0.00	704.89	2,572.44	634.29	2,087.71	1,927.36	0.03	-0.1	0.372
6.00	-14.74	-9.86	0.00	-675.0	0.00	674.98	2,547.88	625.63	2,031.05	1,882.65	0.12	-0.19	0.365
9.00	-14.35	-9.75	0.00	-645.4	0.00	645.40	2,523.04	616.96	1,975.16	1,838.24	0.28	-0.29	0.357
12.00	-13.95	-9.64	0.00	-616.2	0.00	616.15	2,497.90	608.29	1,920.06	1,794.13	0.49	-0.39	0.349
15.00	-13.56	-9.53	0.00	-587.2	0.00	587.23	2,472.47	599.62	1,865.74	1,750.34	0.77	-0.48	0.341
18.00	-13.18	-9.41	0.00	-558.6	0.00	558.64	2,446.74	590.95	1,812.19	1,706.86	1.1	-0.58	0.333
21.00	-12.80	-9.29	0.00	-530.4	0.00	530.40	2,420.72	582.29	1,759.43	1,663.71	1.5	-0.67	0.324
24.00	-12.43	-9.17	0.00	-502.5	0.00	502.52	2,394.41	573.62	1,707.44	1,620.90	1.95	-0.77	0.315
27.00	-12.06	-9.05	0.00	-475.0	0.00	475.00	2,367.80	564.95	1,656.24	1,578.44	2.46	-0.86	0.306
30.00	-11.70	-8.92	0.00	-447.9	0.00	447.86	2,340.90	556.28	1,605.81	1,536.34	3.03	-0.95	0.297
33.00	-11.35	-8.81	0.00	-421.1	0.00	421.09	2,313.70	547.61	1,556.16	1,494.60	3.66	-1.04	0.287
35.00	-11.11	-8.75	0.00	-403.5	0.00	403.46	2,293.77	541.84	1,523.50	1,465.93	4.11	-1.1	0.280
36.00	-10.93	-8.66	0.00	-394.7	0.00	394.72	2,281.54	538.95	1,507.30	1,450.26	4.35	-1.13	0.277
39.00	-10.38	-8.57	0.00	-368.7	0.00	368.74	2,244.84	530.28	1,459.21	1,403.76	5.09	-1.22	0.268
40.00	-10.04	-7.98	0.00	-360.2	0.00	360.17	1,426.73	375.73	1,046.23	905.70	5.35	-1.25	0.405
42.00	-9.87	-7.87	0.00	-344.2	0.00	344.22	1,417.36	371.69	1,023.82	890.00	5.88	-1.31	0.394
45.00	-9.61	-7.74	0.00	-320.6	0.00	320.61	1,403.07	365.62	990.66	866.54	6.74	-1.42	0.377
48.00	-9.35	-7.61	0.00	-297.4	0.00	297.40	1,388.48	359.55	958.05	843.19	7.67	-1.53	0.360
51.00	-9.10	-7.48	0.00	-274.6	0.00	274.57	1,373.60	353.48	925.98	819.97	8.67	-1.64	0.342
54.00	-8.85	-7.35	0.00	-252.1	0.00	252.13	1,358.43	347.41	894.46	796.88	9.74	-1.75	0.323
57.00	-8.61	-7.25	0.00	-230.1	0.00	230.09	1,342.96	341.34	863.49	773.94	10.87	-1.85	0.304
58.08	-8.52	-7.19	0.00	-222.2	0.00	222.23	1,337.30	339.15	852.44	765.69	11.29	-1.88	0.297
60.00	-8.27	-7.09	0.00	-208.4	0.00	208.45	1,327.20	335.27	833.06	751.15	12.06	-1.95	0.284
62.50	-7.95	-7.01	0.00	-190.7	0.00	190.73	1,073.01	287.22	713.41	607.78	13.1	-2.02	0.322
63.00	-7.91	-6.94	0.00	-187.2	0.00	187.23	1,071.12	286.35	709.11	604.87	13.31	-2.04	0.318
66.00	-7.70	-6.81	0.00	-166.4	0.00	166.41	1,059.60	281.15	683.59	587.43	14.63	-2.14	0.291
69.00	-7.50	-6.67	0.00	-146.0	0.00	145.99	1,047.80	275.95	658.54	570.06	16	-2.23	0.264
72.00	-7.29	-6.54	0.00	-126.0	0.00	125.97	1,035.70	270.75	633.95	552.78	17.43	-2.31	0.236
75.00	-7.08	-6.36	0.00	-106.3	0.00	106.34	1,023.30	265.55	609.83	535.60	18.9	-2.39	0.206
78.00	-6.88	-6.23	0.00	-87.2	0.00	87.25	1,010.62	260.35	586.18	518.53	20.43	-2.45	0.176
81.00	-6.69	-6.10	0.00	-68.6	0.00	68.56	997.63	255.15	563.00	501.56	21.99	-2.51	0.144
84.00	-6.51	-6.01	0.00	-50.3	0.00	50.26	984.36	249.95	540.28	484.72	23.58	-2.56	0.111
85.00	-3.38	-3.51	0.00	-44.3	0.00	44.26	979.87	248.21	532.82	479.14	24.12	-2.57	0.096
87.00	-3.27	-3.40	0.00	-37.2	0.00	37.25	970.79	244.75	518.04	468.02	25.2	-2.59	0.083
90.00	-3.10	-3.26	0.00	-27.1	0.00	27.06	956.93	239.55	496.26	451.45	26.84	-2.62	0.063
93.00	-2.93	-3.13	0.00	-17.3	0.00	17.26	942.77	234.34	474.94	435.04	28.49	-2.64	0.043
96.00	-2.77	-3.05	0.00	-7.9	0.00	7.86	928.32	229.14	454.10	418.79	30.16	-2.66	0.022
97.00	-1.35	-2.31	0.00	-4.8	0.00	4.82	923.44	227.41	447.26	413.41	30.71	-2.66	0.013
99.00	0.00	-2.24	0.00	-0.2	0.00	0.20	913.57	223.94	433.72	402.70	31.83	-2.66	0.001

CALCULATED FORCES

Load Case: 1.2D + 1.0Di + 1.0Wi — 40 mph Wind with 0.25" Radial Ice — 21 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

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	-21.82	-2.02	0.00	-140.0	0.00	140.05	2,596.69	642.96	2,145.15	1,972.34	0	0	0.079
3.00	-21.27	-1.99	0.00	-134.0	0.00	133.99	2,572.44	634.29	2,087.71	1,927.36	0.01	-0.02	0.078
6.00	-20.72	-1.97	0.00	-128.0	0.00	128.01	2,547.88	625.63	2,031.05	1,882.65	0.02	-0.04	0.076
9.00	-20.18	-1.94	0.00	-122.1	0.00	122.11	2,523.04	616.96	1,975.16	1,838.24	0.05	-0.06	0.074
12.00	-19.65	-1.91	0.00	-116.3	0.00	116.30	2,497.90	608.29	1,920.06	1,794.13	0.09	-0.07	0.073
15.00	-19.12	-1.88	0.00	-110.6	0.00	110.56	2,472.47	599.62	1,865.74	1,750.34	0.15	-0.09	0.071
18.00	-18.60	-1.85	0.00	-104.9	0.00	104.91	2,446.74	590.95	1,812.19	1,706.86	0.21	-0.11	0.069
21.00	-18.08	-1.82	0.00	-99.4	0.00	99.35	2,420.72	582.29	1,759.43	1,663.71	0.28	-0.13	0.067
24.00	-17.57	-1.79	0.00	-93.9	0.00	93.88	2,394.41	573.62	1,707.44	1,620.90	0.37	-0.14	0.065
27.00	-17.07	-1.76	0.00	-88.5	0.00	88.49	2,367.80	564.95	1,656.24	1,578.44	0.47	-0.16	0.063
30.00	-16.57	-1.73	0.00	-83.2	0.00	83.20	2,340.90	556.28	1,605.81	1,536.34	0.57	-0.18	0.061
33.00	-16.08	-1.70	0.00	-78.0	0.00	78.01	2,313.70	547.61	1,556.16	1,494.60	0.69	-0.2	0.059
35.00	-15.75	-1.69	0.00	-74.6	0.00	74.60	2,293.77	541.84	1,523.50	1,465.93	0.78	-0.21	0.058
36.00	-15.50	-1.67	0.00	-72.9	0.00	72.91	2,281.54	538.95	1,507.30	1,450.26	0.82	-0.21	0.057
39.00	-14.76	-1.64	0.00	-67.9	0.00	67.91	2,244.84	530.28	1,459.21	1,403.76	0.96	-0.23	0.055
40.00	-14.29	-1.54	0.00	-66.3	0.00	66.27	1,426.73	375.73	1,046.23	905.70	1.01	-0.23	0.083
42.00	-14.04	-1.52	0.00	-63.2	0.00	63.18	1,417.36	371.69	1,023.82	890.00	1.11	-0.25	0.081
45.00	-13.68	-1.48	0.00	-58.6	0.00	58.63	1,403.07	365.62	990.66	866.54	1.27	-0.27	0.077
48.00	-13.33	-1.45	0.00	-54.2	0.00	54.18	1,388.48	359.55	958.05	843.19	1.44	-0.29	0.074
51.00	-12.97	-1.42	0.00	-49.8	0.00	49.82	1,373.60	353.48	925.98	819.97	1.63	-0.31	0.070
54.00	-12.63	-1.39	0.00	-45.6	0.00	45.57	1,358.43	347.41	894.46	796.88	1.83	-0.32	0.066
57.00	-12.28	-1.36	0.00	-41.4	0.00	41.41	1,342.96	341.34	863.49	773.94	2.04	-0.34	0.063
58.08	-12.16	-1.35	0.00	-39.9	0.00	39.93	1,337.30	339.15	852.44	765.69	2.12	-0.35	0.061
60.00	-11.82	-1.32	0.00	-37.4	0.00	37.36	1,327.20	335.27	833.06	751.15	2.26	-0.36	0.059
62.50	-11.37	-1.30	0.00	-34.0	0.00	34.05	1,073.01	287.22	713.41	607.78	2.45	-0.37	0.067
63.00	-11.32	-1.28	0.00	-33.4	0.00	33.40	1,071.12	286.35	709.11	604.87	2.49	-0.38	0.066
66.00	-11.02	-1.25	0.00	-29.6	0.00	29.56	1,059.60	281.15	683.59	587.43	2.73	-0.39	0.061
69.00	-10.72	-1.22	0.00	-25.8	0.00	25.81	1,047.80	275.95	658.54	570.06	2.99	-0.41	0.056
72.00	-10.43	-1.18	0.00	-22.2	0.00	22.16	1,035.70	270.75	633.95	552.78	3.25	-0.43	0.050
75.00	-10.12	-1.14	0.00	-18.6	0.00	18.62	1,023.30	265.55	609.83	535.60	3.52	-0.44	0.045
78.00	-9.83	-1.11	0.00	-15.2	0.00	15.20	1,010.62	260.35	586.18	518.53	3.8	-0.45	0.039
81.00	-9.55	-1.07	0.00	-11.9	0.00	11.88	997.63	255.15	563.00	501.56	4.09	-0.46	0.033
84.00	-9.28	-1.05	0.00	-8.7	0.00	8.66	984.36	249.95	540.28	484.72	4.38	-0.47	0.027
85.00	-4.91	-0.63	0.00	-7.6	0.00	7.61	979.87	248.21	532.82	479.14	4.48	-0.47	0.021
87.00	-4.73	-0.60	0.00	-6.4	0.00	6.36	970.79	244.75	518.04	468.02	4.68	-0.47	0.018
90.00	-4.48	-0.56	0.00	-4.6	0.00	4.57	956.93	239.55	496.26	451.45	4.98	-0.48	0.015
93.00	-4.23	-0.53	0.00	-2.9	0.00	2.88	942.77	234.34	474.94	435.04	5.28	-0.48	0.011
96.00	-3.98	-0.51	0.00	-1.3	0.00	1.29	928.32	229.14	454.10	418.79	5.59	-0.49	0.007
97.00	-2.01	-0.37	0.00	-0.8	0.00	0.78	923.44	227.41	447.26	413.41	5.69	-0.49	0.004
99.00	0.00	-0.36	0.00	-0.0	0.00	0.03	913.57	223.94	433.72	402.70	5.89	-0.49	0.000

CALCULATED FORCES

Load Case: 1.0D + 1.0W 60 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.10
Dead load Factor: 1.00
Wind Load Factor: 1.00

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	-17.29	-3.06	0.00	-224.0	0.00	223.96	2,596.69	642.96	2,145.15	1,972.34	0	0	0.120
3.00	-16.86	-3.03	0.00	-214.8	0.00	214.78	2,572.44	634.29	2,087.71	1,927.36	0.01	-0.03	0.118
6.00	-16.42	-3.00	0.00	-205.7	0.00	205.69	2,547.88	625.63	2,031.05	1,882.65	0.04	-0.06	0.116
9.00	-16.00	-2.96	0.00	-196.7	0.00	196.71	2,523.04	616.96	1,975.16	1,838.24	0.08	-0.09	0.113
12.00	-15.58	-2.93	0.00	-187.8	0.00	187.82	2,497.90	608.29	1,920.06	1,794.13	0.15	-0.12	0.111
15.00	-15.16	-2.90	0.00	-179.0	0.00	179.03	2,472.47	599.62	1,865.74	1,750.34	0.23	-0.15	0.108
18.00	-14.75	-2.86	0.00	-170.3	0.00	170.33	2,446.74	590.95	1,812.19	1,706.86	0.34	-0.18	0.106
21.00	-14.35	-2.83	0.00	-161.8	0.00	161.75	2,420.72	582.29	1,759.43	1,663.71	0.46	-0.21	0.103
24.00	-13.94	-2.79	0.00	-153.3	0.00	153.26	2,394.41	573.62	1,707.44	1,620.90	0.59	-0.23	0.100
27.00	-13.55	-2.75	0.00	-144.9	0.00	144.89	2,367.80	564.95	1,656.24	1,578.44	0.75	-0.26	0.098
30.00	-13.16	-2.72	0.00	-136.6	0.00	136.63	2,340.90	556.28	1,605.81	1,536.34	0.92	-0.29	0.095
33.00	-12.77	-2.68	0.00	-128.5	0.00	128.48	2,313.70	547.61	1,556.16	1,494.60	1.12	-0.32	0.092
35.00	-12.52	-2.66	0.00	-123.1	0.00	123.11	2,293.77	541.84	1,523.50	1,465.93	1.25	-0.34	0.089
36.00	-12.32	-2.64	0.00	-120.4	0.00	120.45	2,281.54	538.95	1,507.30	1,450.26	1.32	-0.35	0.088
39.00	-11.72	-2.61	0.00	-112.5	0.00	112.54	2,244.84	530.28	1,459.21	1,403.76	1.55	-0.37	0.085
40.00	-11.34	-2.43	0.00	-109.9	0.00	109.93	1,426.73	375.73	1,046.23	905.70	1.63	-0.38	0.129
42.00	-11.15	-2.40	0.00	-105.1	0.00	105.07	1,417.36	371.69	1,023.82	890.00	1.79	-0.4	0.126
45.00	-10.87	-2.36	0.00	-97.9	0.00	97.88	1,403.07	365.62	990.66	866.54	2.06	-0.43	0.121
48.00	-10.60	-2.32	0.00	-90.8	0.00	90.80	1,388.48	359.55	958.05	843.19	2.34	-0.47	0.115
51.00	-10.33	-2.28	0.00	-83.8	0.00	83.84	1,373.60	353.48	925.98	819.97	2.64	-0.5	0.110
54.00	-10.07	-2.24	0.00	-77.0	0.00	77.00	1,358.43	347.41	894.46	796.88	2.97	-0.53	0.104
57.00	-9.80	-2.21	0.00	-70.3	0.00	70.27	1,342.96	341.34	863.49	773.94	3.31	-0.56	0.098
58.08	-9.71	-2.19	0.00	-67.9	0.00	67.87	1,337.30	339.15	852.44	765.69	3.44	-0.57	0.096
60.00	-9.43	-2.16	0.00	-63.7	0.00	63.67	1,327.20	335.27	833.06	751.15	3.68	-0.59	0.092
62.50	-9.08	-2.14	0.00	-58.3	0.00	58.26	1,073.01	287.22	713.41	607.78	4	-0.62	0.104
63.00	-9.04	-2.12	0.00	-57.2	0.00	57.19	1,071.12	286.35	709.11	604.87	4.06	-0.62	0.103
66.00	-8.82	-2.08	0.00	-50.8	0.00	50.83	1,059.60	281.15	683.59	587.43	4.46	-0.65	0.095
69.00	-8.59	-2.04	0.00	-44.6	0.00	44.60	1,047.80	275.95	658.54	570.06	4.88	-0.68	0.086
72.00	-8.37	-2.00	0.00	-38.5	0.00	38.48	1,035.70	270.75	633.95	552.78	5.32	-0.71	0.078
75.00	-8.13	-1.94	0.00	-32.5	0.00	32.49	1,023.30	265.55	609.83	535.60	5.77	-0.73	0.069
78.00	-7.92	-1.90	0.00	-26.7	0.00	26.66	1,010.62	260.35	586.18	518.53	6.23	-0.75	0.059
81.00	-7.71	-1.86	0.00	-20.9	0.00	20.94	997.63	255.15	563.00	501.56	6.71	-0.77	0.050
84.00	-7.50	-1.84	0.00	-15.4	0.00	15.35	984.36	249.95	540.28	484.72	7.19	-0.78	0.039
85.00	-3.91	-1.07	0.00	-13.5	0.00	13.52	979.87	248.21	532.82	479.14	7.36	-0.78	0.032
87.00	-3.78	-1.04	0.00	-11.4	0.00	11.37	970.79	244.75	518.04	468.02	7.69	-0.79	0.028
90.00	-3.59	-1.00	0.00	-8.3	0.00	8.26	956.93	239.55	496.26	451.45	8.19	-0.8	0.022
93.00	-3.40	-0.96	0.00	-5.3	0.00	5.27	942.77	234.34	474.94	435.04	8.69	-0.81	0.016
96.00	-3.22	-0.93	0.00	-2.4	0.00	2.40	928.32	229.14	454.10	418.79	9.2	-0.81	0.009
97.00	-1.61	-0.70	0.00	-1.5	0.00	1.47	923.44	227.41	447.26	413.41	9.37	-0.81	0.005
99.00	0.00	-0.68	0.00	-0.1	0.00	0.06	913.57	223.94	433.72	402.70	9.71	-0.81	0.000

EQUIVALENT LATERAL FORCES METHOD ANALYSIS

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

Spectral Response Acceleration for Short Period (S_S):	0.955
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.340
Long-Period Transition Period (T_L – Seconds):	8
Importance Factor (I_e):	1.000
Site Coefficient F_a:	1.200
Site Coefficient F_v:	1.960
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.764
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.444
Seismic Response Coefficient (C_s):	0.162
Upper Limit C_S:	0.162
Lower Limit C_S:	0.034
Period based on Rayleigh Method (sec):	1.820
Redundancy Factor (p):	1.000
Seismic Force Distribution Exponent (k):	1.660
Total Unfactored Dead Load:	17.290 k
Seismic Base Shear (E):	2.810 k

SEISMIC FORCES

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)
39	98	121	247	0.014	38	164
38	96.5	61	121	0.007	19	83
37	94.5	186	356	0.019	55	251
36	91.5	189	343	0.019	53	255
35	88.5	192	329	0.018	51	259
34	86	130	212	0.012	33	175
33	84.5	69	109	0.006	17	93
32	82.5	208	318	0.017	49	281
31	79.5	211	303	0.017	47	286
30	76.5	214	289	0.016	44	290
29	73.5	217	274	0.015	42	294
28	70.5	220	260	0.014	40	298
27	67.5	223	245	0.013	38	302
26	64.5	226	230	0.013	35	306
25	62.75	38	37	0.002	6	51
24	61.25	353	329	0.018	50	477
23	59.0417	274	240	0.013	37	370
22	57.5417	94	79	0.004	12	127
21	55.5	262	207	0.011	32	354
20	52.5	265	191	0.010	29	359
19	49.5	269	176	0.010	27	364
18	46.5	272	161	0.009	25	368
17	43.5	276	146	0.008	22	373
16	41	186	89	0.005	14	251
15	39.5	197	88	0.005	14	266
14	37.5	596	246	0.013	38	806
13	35.5	200	75	0.004	12	271
12	34	253	89	0.005	14	343
11	31.5	384	119	0.006	18	520
10	28.5	389	102	0.006	16	527
9	25.5	394	86	0.005	13	533
8	22.5	399	70	0.004	11	540
7	19.5	404	56	0.003	9	547
6	16.5	409	43	0.002	7	554
5	13.5	415	31	0.002	5	561
4	10.5	420	21	0.001	3	568
3	7.5	425	12	0.001	2	574
2	4.5	430	5	0.000	1	581

SEISMIC FORCES

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)
1	1.5	435	1	0.000	0	588
Ericsson AIR 6419 B77D	99	189	392	0.021	60	256
Raycap DC6-48-60-18-8F ("Squid")	99	19	39	0.002	6	26
Ericsson RRUS 4478 B14 (16.5" Height)	99	180	372	0.020	57	243
Raycap DC9-48-60-24-8C-EV (Enclosure)	99	18	38	0.002	6	25
Ericsson RRUS 4890	99	208	431	0.024	66	282
Ericsson RRUS 4490	99	205	425	0.023	65	278
Ace Technology XXQLH-654L8H8-iVT-V2	99	681	1,409	0.077	216	921
Ericsson AIR 6419 B77G	97	198	397	0.022	61	268
Generic Round T-Arm	97	1,350	2,701	0.147	414	1,826
Ericsson Radio 2217	85	81	131	0.007	20	110
Ericsson Radio 4449 B12,B71	85	222	357	0.020	55	300
Ericsson RRUS 11 B4	85	152	244	0.013	37	206
CellMax CMA-BDHH/6521/E0-6	85	186	299	0.016	46	252
RFS APXVAARR24_43-U-NA20	85	384	616	0.034	95	519
Generic Round Platform with Handrails	85	2,500	4,016	0.219	616	3,382
Hanwha Techwin XNP-8300RW	75	24	31	0.002	5	32
Andrew Microwaves PL4·59	40	188	86	0.005	13	254
	Totals:	**17,293**	**18,319**	**1.000**	**2,809**	**23,394**

SEISMIC FORCES

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)
39	98	121	247	0.014	38	91
38	96.5	61	121	0.007	19	46
37	94.5	186	356	0.019	55	139
36	91.5	189	343	0.019	53	141
35	88.5	192	329	0.018	51	143
34	86	130	212	0.012	33	97
33	84.5	69	109	0.006	17	51
32	82.5	208	318	0.017	49	155
31	79.5	211	303	0.017	47	158
30	76.5	214	289	0.016	44	160
29	73.5	217	274	0.015	42	162
28	70.5	220	260	0.014	40	165
27	67.5	223	245	0.013	38	167
26	64.5	226	230	0.013	35	169
25	62.75	38	37	0.002	6	28
24	61.25	353	329	0.018	50	264
23	59.0417	274	240	0.013	37	204
22	57.5417	94	79	0.004	12	70
21	55.5	262	207	0.011	32	196
20	52.5	265	191	0.010	29	198
19	49.5	269	176	0.010	27	201
18	46.5	272	161	0.009	25	203
17	43.5	276	146	0.008	22	206
16	41	186	89	0.005	14	139
15	39.5	197	88	0.005	14	147
14	37.5	596	246	0.013	38	445
13	35.5	200	75	0.004	12	150
12	34	253	89	0.005	14	189
11	31.5	384	119	0.006	18	287
10	28.5	389	102	0.006	16	291
9	25.5	394	86	0.005	13	295
8	22.5	399	70	0.004	11	298
7	19.5	404	56	0.003	9	302
6	16.5	409	43	0.002	7	306
5	13.5	415	31	0.002	5	310
4	10.5	420	21	0.001	3	313
3	7.5	425	12	0.001	2	317

SEISMIC FORCES

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)
2	4.5	430	5	0.000	1	321
1	1.5	435	1	0.000	0	325
Ericsson AIR 6419 B77D	99	189	392	0.021	60	141
Raycap DC6-48-60-18-8F ("Squid")	99	19	39	0.002	6	14
Ericsson RRUS 4478 B14 (16.5" Height)	99	180	372	0.020	57	134
Raycap DC9-48-60-24-8C-EV (Enclosure)	99	18	38	0.002	6	14
Ericsson RRUS 4890	99	208	431	0.024	66	156
Ericsson RRUS 4490	99	205	425	0.023	65	153
Ace Technology XXQLH-654L8H8-iVT-V2	99	681	1,409	0.077	216	509
Ericsson AIR 6419 B77G	97	198	397	0.022	61	148
Generic Round T-Arm	97	1,350	2,701	0.147	414	1,009
Ericsson Radio 2217	85	81	131	0.007	20	61
Ericsson Radio 4449 B12,B71	85	222	357	0.020	55	166
Ericsson RRUS 11 B4	85	152	244	0.013	37	114
CellMax CMA-BDHH/6521/E0-6	85	186	299	0.016	46	139
RFS APXVAARR24_43-U-NA20	85	384	616	0.034	95	287
Generic Round Platform with Handrails	85	2,500	4,016	0.219	616	1,868
Hanwha Techwin XNP-8300RW	75	24	31	0.002	5	18
Andrew Microwaves PL4·59	40	188	86	0.005	13	140
	Totals:	**17,293**	**18,319**	**1.000**	**2,809**	**12,921**

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

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-22.80	-2.82	0.00	-241.24	0.00	241.24	2,596.69	642.96	2,145	1,972.34	0.00	0.00	0.13
3.00	-22.22	-2.83	0.00	-232.79	0.00	232.79	2,572.44	634.29	2,088	1,927.36	0.01	-0.03	0.13
6.00	-21.65	-2.84	0.00	-224.31	0.00	224.31	2,547.88	625.63	2,031	1,882.65	0.04	-0.06	0.13
9.00	-21.08	-2.84	0.00	-215.80	0.00	215.80	2,523.04	616.96	1,975	1,838.24	0.09	-0.10	0.13
12.00	-20.51	-2.85	0.00	-207.27	0.00	207.27	2,497.90	608.29	1,920	1,794.13	0.16	-0.13	0.12
15.00	-19.96	-2.85	0.00	-198.72	0.00	198.72	2,472.47	599.62	1,866	1,750.34	0.25	-0.16	0.12
18.00	-19.41	-2.85	0.00	-190.16	0.00	190.16	2,446.74	590.95	1,812	1,706.86	0.37	-0.19	0.12
21.00	-18.87	-2.85	0.00	-181.60	0.00	181.60	2,420.72	582.29	1,759	1,663.71	0.50	-0.23	0.12
24.00	-18.33	-2.85	0.00	-173.05	0.00	173.05	2,394.41	573.62	1,707	1,620.90	0.65	-0.26	0.11
27.00	-17.81	-2.84	0.00	-164.51	0.00	164.51	2,367.80	564.95	1,656	1,578.44	0.82	-0.29	0.11
30.00	-17.28	-2.83	0.00	-155.99	0.00	155.99	2,340.90	556.28	1,606	1,536.34	1.02	-0.32	0.11
33.00	-16.94	-2.82	0.00	-147.51	0.00	147.51	2,313.70	547.61	1,556	1,494.60	1.23	-0.35	0.11
35.00	-16.67	-2.81	0.00	-141.87	0.00	141.87	2,293.77	541.84	1,524	1,465.93	1.38	-0.38	0.10
36.00	-15.86	-2.77	0.00	-139.06	0.00	139.06	2,281.54	538.95	1,507	1,450.26	1.46	-0.39	0.10
39.00	-15.59	-2.76	0.00	-130.74	0.00	130.74	2,244.84	530.28	1,459	1,403.76	1.71	-0.42	0.10
40.00	-15.09	-2.74	0.00	-127.98	0.00	127.98	1,426.73	375.73	1,046	905.70	1.80	-0.43	0.15
42.00	-14.71	-2.72	0.00	-122.51	0.00	122.51	1,417.36	371.69	1,024	890.00	1.99	-0.45	0.15
45.00	-14.34	-2.70	0.00	-114.35	0.00	114.35	1,403.07	365.62	991	866.54	2.28	-0.49	0.14
48.00	-13.98	-2.68	0.00	-106.24	0.00	106.24	1,388.48	359.55	958	843.19	2.60	-0.53	0.14
51.00	-13.62	-2.66	0.00	-98.20	0.00	98.20	1,373.60	353.48	926	819.97	2.94	-0.57	0.13
54.00	-13.26	-2.63	0.00	-90.22	0.00	90.22	1,358.43	347.41	894	796.88	3.31	-0.60	0.12
57.00	-13.14	-2.62	0.00	-82.33	0.00	82.33	1,342.96	341.34	863	773.94	3.70	-0.64	0.12
58.08	-12.76	-2.59	0.00	-79.49	0.00	79.49	1,337.30	339.15	852	765.69	3.85	-0.65	0.11
60.00	-12.29	-2.54	0.00	-74.53	0.00	74.53	1,327.20	335.27	833	751.15	4.12	-0.68	0.11
62.50	-12.23	-2.53	0.00	-68.19	0.00	68.19	1,073.01	287.22	713	607.78	4.48	-0.70	0.12
63.00	-11.93	-2.50	0.00	-66.93	0.00	66.93	1,071.12	286.35	709	604.87	4.55	-0.71	0.12
66.00	-11.62	-2.46	0.00	-59.43	0.00	59.43	1,059.60	281.15	684	587.43	5.01	-0.74	0.11
69.00	-11.33	-2.43	0.00	-52.04	0.00	52.04	1,047.80	275.95	659	570.06	5.49	-0.78	0.10
72.00	-11.03	-2.39	0.00	-44.76	0.00	44.76	1,035.70	270.75	634	552.78	5.98	-0.81	0.09
75.00	-10.71	-2.34	0.00	-37.61	0.00	37.61	1,023.30	265.55	610	535.60	6.50	-0.83	0.08
78.00	-10.42	-2.29	0.00	-30.60	0.00	30.60	1,010.62	260.35	586	518.53	7.03	-0.86	0.07
81.00	-10.14	-2.24	0.00	-23.73	0.00	23.73	997.63	255.15	563	501.56	7.58	-0.88	0.06
84.00	-10.05	-2.22	0.00	-17.01	0.00	17.01	984.36	249.95	540	484.72	8.13	-0.89	0.05
85.00	-5.12	-1.25	0.00	-14.79	0.00	14.79	979.87	248.21	533	479.14	8.32	-0.90	0.04

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
87.00	-4.86	-1.19	0.00	-12.30	0.00	12.30	970.79	244.75	518	468.02	8.70	-0.90	0.03
90.00	-4.61	-1.14	0.00	-8.72	0.00	8.72	956.93	239.55	496	451.45	9.27	-0.91	0.02
93.00	-4.36	-1.08	0.00	-5.31	0.00	5.31	942.77	234.34	475	435.04	9.84	-0.92	0.02
96.00	-4.27	-1.06	0.00	-2.08	0.00	2.08	928.32	229.14	454	418.79	10.42	-0.92	0.01
97.00	-2.02	-0.51	0.00	-1.02	0.00	1.02	923.44	227.41	447	413.41	10.62	-0.92	0.01
99.00	0.00	-0.48	0.00	0.00	0.00	0.00	913.57	223.94	434	402.70	11.00	-0.92	0.00

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

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-12.60	-2.81	0.00	-236.52	0.00	236.52	2,596.69	642.96	2,145	1,972.34	0.00	0.00	0.13
3.00	-12.27	-2.82	0.00	-228.08	0.00	228.08	2,572.44	634.29	2,088	1,927.36	0.01	-0.03	0.12
6.00	-11.95	-2.82	0.00	-219.63	0.00	219.63	2,547.88	625.63	2,031	1,882.65	0.04	-0.06	0.12
9.00	-11.64	-2.83	0.00	-211.16	0.00	211.16	2,523.04	616.96	1,975	1,838.24	0.09	-0.09	0.12
12.00	-11.33	-2.83	0.00	-202.69	0.00	202.69	2,497.90	608.29	1,920	1,794.13	0.16	-0.13	0.12
15.00	-11.02	-2.82	0.00	-194.21	0.00	194.21	2,472.47	599.62	1,866	1,750.34	0.25	-0.16	0.12
18.00	-10.72	-2.82	0.00	-185.73	0.00	185.73	2,446.74	590.95	1,812	1,706.86	0.36	-0.19	0.11
21.00	-10.42	-2.82	0.00	-177.27	0.00	177.27	2,420.72	582.29	1,759	1,663.71	0.49	-0.22	0.11
24.00	-10.12	-2.81	0.00	-168.83	0.00	168.83	2,394.41	573.62	1,707	1,620.90	0.64	-0.25	0.11
27.00	-9.83	-2.79	0.00	-160.41	0.00	160.41	2,367.80	564.95	1,656	1,578.44	0.81	-0.28	0.11
30.00	-9.54	-2.78	0.00	-152.02	0.00	152.02	2,340.90	556.28	1,606	1,536.34	0.99	-0.32	0.10
33.00	-9.35	-2.77	0.00	-143.68	0.00	143.68	2,313.70	547.61	1,556	1,494.60	1.20	-0.35	0.10
35.00	-9.20	-2.76	0.00	-138.14	0.00	138.14	2,293.77	541.84	1,524	1,465.93	1.35	-0.37	0.10
36.00	-8.75	-2.72	0.00	-135.38	0.00	135.38	2,281.54	538.95	1,507	1,450.26	1.43	-0.38	0.10
39.00	-8.61	-2.71	0.00	-127.22	0.00	127.22	2,244.84	530.28	1,459	1,403.76	1.68	-0.41	0.09
40.00	-8.33	-2.68	0.00	-124.51	0.00	124.51	1,426.73	375.73	1,046	905.70	1.76	-0.42	0.14
42.00	-8.12	-2.66	0.00	-119.14	0.00	119.14	1,417.36	371.69	1,024	890.00	1.94	-0.44	0.14
45.00	-7.91	-2.64	0.00	-111.15	0.00	111.15	1,403.07	365.62	991	866.54	2.23	-0.48	0.13
48.00	-7.71	-2.62	0.00	-103.22	0.00	103.22	1,388.48	359.55	958	843.19	2.54	-0.51	0.13
51.00	-7.51	-2.59	0.00	-95.36	0.00	95.36	1,373.60	353.48	926	819.97	2.88	-0.55	0.12
54.00	-7.31	-2.56	0.00	-87.58	0.00	87.58	1,358.43	347.41	894	796.88	3.23	-0.59	0.12
57.00	-7.24	-2.55	0.00	-79.88	0.00	79.88	1,342.96	341.34	863	773.94	3.62	-0.62	0.11
58.08	-7.04	-2.52	0.00	-77.12	0.00	77.12	1,337.30	339.15	852	765.69	3.76	-0.64	0.11
60.00	-6.77	-2.47	0.00	-72.29	0.00	72.29	1,327.20	335.27	833	751.15	4.02	-0.66	0.10
62.50	-6.75	-2.46	0.00	-66.12	0.00	66.12	1,073.01	287.22	713	607.78	4.37	-0.69	0.12
63.00	-6.58	-2.43	0.00	-64.89	0.00	64.89	1,071.12	286.35	709	604.87	4.44	-0.69	0.11
66.00	-6.41	-2.39	0.00	-57.61	0.00	57.61	1,059.60	281.15	684	587.43	4.89	-0.72	0.10
69.00	-6.24	-2.35	0.00	-50.43	0.00	50.43	1,047.80	275.95	659	570.06	5.35	-0.76	0.09
72.00	-6.08	-2.31	0.00	-43.37	0.00	43.37	1,035.70	270.75	634	552.78	5.84	-0.78	0.08
75.00	-5.90	-2.26	0.00	-36.43	0.00	36.43	1,023.30	265.55	610	535.60	6.34	-0.81	0.07
78.00	-5.74	-2.22	0.00	-29.65	0.00	29.65	1,010.62	260.35	586	518.53	6.86	-0.83	0.06
81.00	-5.59	-2.17	0.00	-23.00	0.00	23.00	997.63	255.15	563	501.56	7.39	-0.85	0.05
84.00	-5.54	-2.15	0.00	-16.49	0.00	16.49	984.36	249.95	540	484.72	7.93	-0.87	0.04
85.00	-2.82	-1.21	0.00	-14.34	0.00	14.34	979.87	248.21	533	479.14	8.11	-0.87	0.03
87.00	-2.68	-1.16	0.00	-11.93	0.00	11.93	970.79	244.75	518	468.02	8.48	-0.88	0.03
90.00	-2.54	-1.10	0.00	-8.46	0.00	8.46	956.93	239.55	496	451.45	9.04	-0.89	0.02
93.00	-2.40	-1.05	0.00	-5.15	0.00	5.15	942.77	234.34	475	435.04	9.60	-0.90	0.01
96.00	-2.35	-1.03	0.00	-2.01	0.00	2.01	928.32	229.14	454	418.79	10.16	-0.90	0.01
97.00	-1.11	-0.49	0.00	-0.99	0.00	0.99	923.44	227.41	447	413.41	10.35	-0.90	0.00
99.00	0.00	-0.48	0.00	0.00	0.00	0.00	913.57	223.94	434	402.70	10.72	-0.90	0.00

ANALYSIS SUMMARY

	Base Reactions						Max Usage	
Load Case	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	10.09	0.00	20.74	0.00	0.00	742.27	40.00	0.41
0.9D + 1.0W	10.08	0.00	15.55	0.00	0.00	735.14	40.00	0.41
1.2D + 1.0Di + 1.0Wi	2.02	0.00	21.82	0.00	0.00	140.05	40.00	0.08
1.2D + 1.0Ev + 1.0Eh	2.82	0.00	22.80	0.00	0.00	241.24	40.00	0.15
0.9D - 1.0Ev + 1.0Eh	2.81	0.00	12.60	0.00	0.00	236.52	40.00	0.14
1.0D + 1.0W	3.06	0.00	17.29	0.00	0.00	223.96	40.00	0.13

ASSET:	280216, LIBERTY UT	CODE:	ANSI/TIA-222-H
CUSTOMER:	AT&T MOBILITY	PROJECT:	14842748

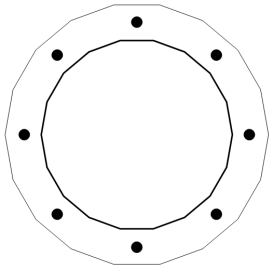
BASE PLATE ANALYSIS @ 0 FT

APPLIED REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
742.27	20.74	10.09

PLATE PARAMETERS (ID# 29767)

Width:	51.1	in
Shape:	18	
Thickness:	3	in
Grade:	A572-50	
Yield Strength:	50	ksi
Tensile Strength:	65	ksi
Rod Detail Type:	d	
Clear Distance	3.25	in
Base Weld Size:	0.125	in
Orientation Offset:	-	°
Analysis Type:	Plastic	
Neutral Axis:	0	°



ANCHOR ROD PARAMETERS

Class	Arrangement	Quantity	Diameter (in)	Circle (in)	Grade	F_y (ksi)	F_u (ksi)	Spacing (in)	Offset (°)
Original [ID#30553]	Radial	8	2.25	44.32	A615-75	75	100	-	-

COMPONENT PROPERTIES

Component	ID	Gross Area (in^2)	Net Area (in^2)	Individual Inertia (in^4)	Moment of Inertia (in^4)	Threads/in
Pole	37.25"ø x 0.3125" (18 Sides)	36.0795	-	-	6154.44	-
Bolt Group	Original (8) 2.25"ø	3.9761	3.2477	0.8393	5652.74	4.5

REACTION DISTRIBUTION

Component	ID	Moment M_u (k-ft)	Axial Load P_u (k)	Shear V_u (k)	Moment Factor
Pole	37.25"ø x 0.3125" (18 Sides)	742.3	20.74	10.09	1.000
Bolt Group	Original (8) 2.25"ø	742.3	-	10.09	1.000

BASE PLATE BEND LINE ANALYSIS @ 0 FT

POLE PROPERTIES

Flat-to-Flat Diameter:	37.38	in	Flat Width:	6.590	in	Neutral Axis:	0	°
Point-to-Point Diameter:	37.95	in	Flat Radians:	0.349	rad	Bend Line Limits:	0.978 to 2.164	rad
Orientation Offset:	-	°						

PLATE PROPERTIES

Bend Line	Chord Length (in)	Additional Length (in)	Section Modulus (in^3)	Applied Moment M_u (k-in)	Moment Capacity ΦM_n (k-in)	Flexure Result $M_u/\Phi M_n$	
Flats	29.654	0.00	66.721	236.0	3002.5	7.9%	✓
Corners	28.912	0.00	65.053	204.5	2927.4	7.0%	✓
Circumferential	37.195	0.00	83.688	204.5	3766.0	5.4%	✓

PLASTIC ANCHOR ROD ANALYSIS

Class	Group Quantity	Rod Diameter (in)	Applied Axial Load P_u (k)	Applied Shear Load V_u (k)	Compressive Capacity ΦP_n (k)	Interaction Result	
Original	8	2.25	93.8	2.1	243.6	40.2%	✓

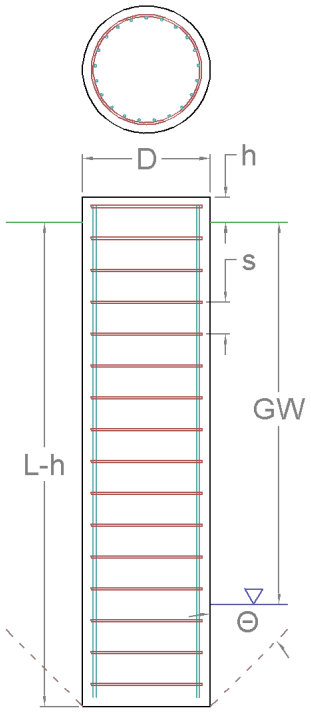
PIER FOUNDATION ANALYSIS

GLOBAL REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
742.27	20.74	10.09

FOUNDATION PARAMETERS

Pier Diameter:	D	7.00	ft
Pier Embedment Depth:	L-h	18.0	ft
Pier Height above Grade:	h	0.50	ft
Concrete Compressive Strength:		4,500	psi
Vertical Rebar:		(32) #9 bars [60 ksi]	
Tie Rebar:	s	#5 bars @ 12.0" c/c [60 ksi]	
Rebar Clear Cover:		3.00	in



SOIL PARAMETERS

Water Table Depth [BGL]: GW - ft

Layer Depth (ft) Top	Layer Depth (ft) Bottom	Unit Weight pcf	Cohesion psf	Friction Angle °	Ultimate Skin Friction psf	Ultimate Net Bearing psf
0	4	105	0	0	0	0
4	10	132	0	43	0	0
10	15	132	0	41	1,500	0
15	16.5	140	0	45	1,850	0
16.5	21.5	140	0	45	2,000	67,600

SOIL STRENGTH ANALYSIS

Volume of Concrete (ft^3)	Buoyant Weight of Concrete (k)	Skin Friction Resistance (k)	Inflection Point [BGL] (ft)
711.96	106.79	291.93	13.38

SOIL MOMENT ANALYSIS

Total Lateral Resistance (k)	Moment at Inflection Point, M_u (k-ft)	Additional Resistance (k-ft)	Nominal Moment Capacity, ΦM_n (k-ft)	Soil Moment Usage, $M_u / \Phi M_n$	
1,796.66	882.28	0.00	4,383.29	**20.1%**	✓

SOIL COMPRESSION ANALYSIS

Compressive Bearing Resistance (k)	Compressive Force, P_u (k)	Additional Resistance (k)	Nominal Compressive Capacity, ΦP_n (k)	Soil Compressive Usage, $P_u / \Phi P_n$	
2,601.55	39.58	0.00	2,170.11	**1.8%**	✓

REINFORCING STEEL STRENGTH ANALYSIS

Rebar Cage Diameter (in)	Steel Elastic Modulus, E (ksi)	Strength Bending/Tension Reduction Factor, Φ_b	Strength Shear Reduction Factor, Φ_v	Strength Compression Reduction Factor, Φ_c
75.622	29,000	0.9	0.75	0.65

PIER REINFORCING MOMENT ANALYSIS

Design Moment, M_u (k-ft)	Nominal Moment Capacity, $\Phi_b M_n$ (k-ft)	Bending Reinforcement Ratio	Pier Rebar Flexure Usage, $M_u/\Phi_b M_n$
747.89	5,327.81	0.01	**14.0%**

PIER REINFORCING COMPRESSION ANALYSIS

Buoyant Weight of Concrete (k)	Design Compression, P_u (k)	Nominal Compressive Capacity, $\Phi_p P_n$ (k)	Pier Rebar Compressive Usage, $P_u / \Phi_p P_n$
106.79	39.58	11,957.33	**0.3%**

PIER REINFORCING SHEAR ANALYSIS

Design Shear, V_u (k)	Nominal Shear Capacity, $\Phi_v V_n$ (k)	Pier Rebar Shear Usage, $V_u / \Phi_v V_n$
106.53	714.91	**14.9%**