



AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure : 180 ft Monopole
ATC Asset Name : Colchester CT 6
ATC Asset Number : 302465
Engineering Number : 14097391_C3_05
Proposed Carrier : T-MOBILE
Carrier Site Name : CTHA059E
Carrier Site Number : CTHA059E
Site Location : 355 Route 85
Colchester, CT 06415-1825
41.5449, -72.3049
County : New London
Date : November 22, 2022
Max Usage : 67%
Analysis Result : Pass

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Reviewed



COA: PEC.0001553



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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 180 ft Monopole tower to reflect the change in loading by T-MOBILE.

Supporting Documents

Tower Drawing:	Valmont order #17494-98, dated June 8, 1998
Foundation Drawing:	Valmont drawing #17494-S-01, dated July 10, 1998
Geotechnical Report:	Tectonic Engineering Consultants Project #1170.C877, dated June 5, 1998
Modification:	ATC Project #13711921_C8_03, dated August 19, 2021

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:	125 mph (3-second gust)
Basic Wind Speed w/ Ice:	50 mph (3-second gust) w/ 1.00" radial ice concurrent
Code(s):	ANSI/TIA-222-H / 2021 IBC / 2022 Connecticut State Building Code
Exposure Category:	B
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Spectral Response:	$S_s = 0.20$, $S_1 = 0.06$
Site Class:	D - Stiff Soil - Default

Conclusion

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

If you have any questions or require additional information, please contact American Tower via email at **Engineering@americantower.com** Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing/Reserved Loading

Elev.*	Qty	Equipment	Lines	Carrier
170.0'	2	6' Omni	(2) 0.405" (10.3mm) Coax	SENET, INC.
	2	Side Arm		
163.0'	1	Platform with Handrails	(2) 1 5/8" Hybriflex	VERIZON WIRELESS
	2	RFS DB-B1-6C-12AB-OZ		
	3	Samsung B2/B66A RRH-BR049		
	3	Samsung B5/B13 RRH-BR04C		
	6	Commscope JAHH-65B-R3B		
150.0'	1	CCI HPA65R-BU6A	(2) 0.78" (19.7mm) 8 AWG 6 (1) 2" Carflex Non-Metallic Conduit (1) 3" conduit (2) 0.39" (10mm) Fiber Trunk (2) 0.65" (16.4mm) 8 AWG 2C (2) 0.78" (19.7mm) 8 AWG 6 (12) 1 1/4" Coax	AT&T MOBILITY
	1	Platform with Handrails		
	1	Kathrein Scala 80010965		
	2	CCI HPA65R-BU8A		
	2	Kathrein Scala 80010966		
	2	Raycap DC6-48-60-18-8F (23.5" Height)		
	3	Ericsson RRUS 4449 B5, B12		
	3	Ericsson Radio 8843 - B2 + B66A		
	3	Powerwave Allgon 7770.00		
	6	LGP Allgon LGP21903		
120.0'	6	Powerwave Allgon LGP21401	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	1	Commscope RDIDC-9181-PF-48		
	1	Platform with Handrails		
	3	Fujitsu TA08025-B604		
	3	Fujitsu TA08025-B605		
	3	JMA Wireless MX08FRO665-21		

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

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

Proposed Carrier Final Loading

Elev.*	Qty	Equipment	Lines	Carrier
180.0'	1	Platform with Handrails	(3) 1.99" (50.7mm) Hybrid	T-MOBILE
	3	Commscope VV-65A-R1B		
	3	Ericsson 4460 BAND 2/25		
	3	Ericsson 4480 BAND 71		
	3	Ericsson AIR 6419 B41		
	3	RFS APXVAALL24 43-U-NA20		

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

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

Install proposed lines inside the pole shaft.

Structure Usages

Structural Component	Usage	Pass/Fail
Anchor Rods	50%	Pass
Base Plate	24%	Pass
Shaft	67%	Pass

Foundation Reactions & Usages

Reaction Component	Analysis Reactions	Usage
Moment (k-ft)	4281.7	58%
Axial (k)	61.5	31%
Shear (k)	36.4	16%

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.

Antenna Deflection, Twist, and Sway

Elev.	Antenna	Carrier	Deflection	Twist	Sway [Rotation]
180.0'	Ericsson 4460 BAND 2/25	T-MOBILE	1.898'	N/A	1.200°
	Ericsson 4480 BAND 71				
	RFS APXVAALL24 43-U-NA20				
	Ericsson AIR 6419 B41				
	Commscope VV-65A-R1B				

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

Standard Conditions

All engineering services performed by A.T. Engineering 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 A.T. Engineering Services LLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering 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 A.T. Engineering 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. A.T. Engineering Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

ANALYSIS PARAMETERS

Nominal Wind: 125 mph	Ice Wind: 50 mph w/ 1" ice	Service Wind: 60 mph
Risk Category: II	Exposure: B	S _s : 0.205 S _i : 0.055
Topo Category: 1	Topo Factor: Method 1	Topo Feature:
Structure Height: 180 ft	Base Elevation: 0.00 ft	Structure Type: Taper
Base Diameter: 64 in	Base Rotation: 0°	Taper: 0.2610 (in/ft)

POLE SECTION PROPERTIES

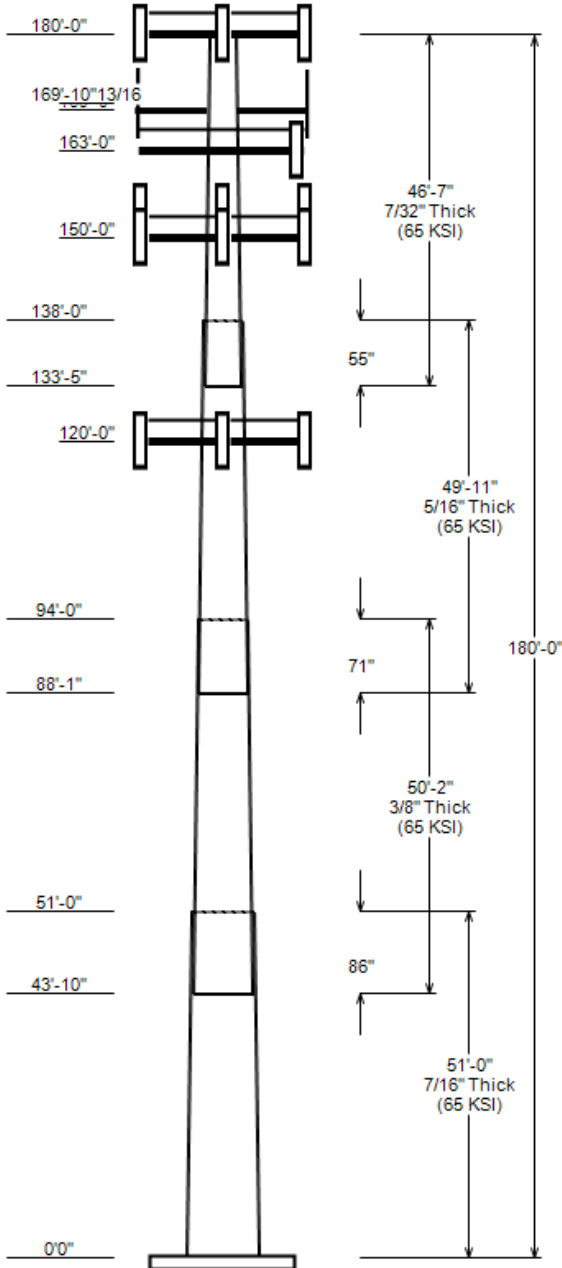
Section	Length (ft)	Flat Diameter (in)		Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
		Top	Bottom					
1	51.000	50.70	64.00	0.438		0.000	12 Sides	65
2	50.167	40.24	53.32	0.375	Slip Joint	86.000	12 Sides	65
3	49.917	29.39	42.40	0.312	Slip Joint	71.000	12 Sides	65
4	46.583	18.87	31.02	0.219	Slip Joint	55.000	12 Sides	65

DISCRETE APPURTENANCE

Elev (ft)	Description
180.0	(3) Ericsson 4460 BAND 2/25
180.0	(3) Ericsson 4480 BAND 71
180.0	(3) Commscope VV-65A-R1B
180.0	(3) Ericsson AIR 6419 B41
180.0	(3) RFS APXVAALL24 43-U-NA20
180.0	(1) Generic Round Platform with Ha
169.9	(2) Generic 6' Omni
169.0	(2) Generic Round Side Arm
163.0	(3) Samsung B5/B13 RRH-BR04C
163.0	(3) Samsung B2/B66A RRH-BR049
163.0	(2) RFS DB-B1-6C-12AB-0Z
163.0	(6) Commscope JAHH-65B-R3B
163.0	(1) Generic Round Platform with Ha
150.0	(6) LGP Allgon LGP21903
150.0	(6) Powerwave Allgon LGP21401
150.0	(2) Raycap DC6-48-60-18-8F (23.5"
150.0	(3) Ericsson Radio 8843 - B2 + B66
150.0	(3) Ericsson RRUS 4449 B5, B12
150.0	(3) Powerwave Allgon 7770.00
150.0	(1) CCI HPA65R-BU6A
150.0	(2) CCI HPA65R-BU8A
150.0	(1) Kathrein Scala 80010965
150.0	(2) Kathrein Scala 80010966
150.0	(1) Generic Round Platform with Ha
120.0	(1) Commscope RDIDC-9181-PF-48
120.0	(3) Fujitsu TA08025-B605
120.0	(3) Fujitsu TA08025-B604
120.0	(3) JMA Wireless MX08FRO665-21
120.0	(1) Generic Flat Platform with Han

LINEAR APPURTENANCE

Elev To (ft)	Description
180.0	(3) 1.99" (50.7mm) Hybrid
170.0	(2) 0.405" (10.3mm) Coax
163.0	(2) 1 5/8" Hybriflex
153.0	(1) 3" conduit
153.0	(1) 2" Carflex Non-Metallic Conduit
153.0	(2) 0.78" (19.7mm) 8 AWG 6
150.0	(12) 1 1/4" Coax
150.0	(2) 0.78" (19.7mm) 8 AWG 2C
150.0	(2) 0.39" (10mm) Fiber Trunk
120.0	(1) 1.60" (40.6mm) Hybrid



LOAD CASE KEY

1.2D + 1.0W	125 mph Wind with No Ice
0.9D + 1.0W	125 mph Wind with No Ice (Reduced)
1.2D + 1.0Di + 1.0Wi	50 mph Wind with 1" 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

GLOBAL BASE REACTIONS

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.0W	4281.68	61.53	36.42
0.9D + 1.0W	4229.50	46.14	36.40
1.2D + 1.0Di + 1.0Wi	937.61	79.69	7.76
1.2D + 1.0Ev + 1.0Eh	229.58	61.76	1.54
0.9D - 1.0Ev + 1.0Eh	225.77	42.52	1.54
1.0D + 1.0W	876.36	51.31	7.51

ANALYSIS PARAMETERS

Location:	New London County,CT	Height:	180 ft
Type and Shape:	Taper, 12 Sides	Base Diameter:	64.00 in
Manufacturer:	Valmont	Top Diameter:	18.87 in
K_d (non-service):	0.95	Taper:	0.2610 in/ft
K_e:	0.98	Rotation:	0.000°

ICE & WIND PARAMETERS

Risk Category:	II	Design Wind Speed:	125 mph
Exposure Category:	B	Design Wind Speed w/ Ice:	50 mph
Topo Factor Procedure:	Method 1	Design Ice Thickness:	1.00 in
Topographic Category:	1	Service Wind Speed:	60 mph
Crest Height:	0 ft	HMSL:	559.00 ft

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method		
Site Class:	D - Stiff Soil	Period Based on Rayleigh Method (sec):	2.71
T_L (sec):	6	P:	1
S_s:	0.205	S₁:	0.055
F_a:	1.600	F_v:	2.400
S_{ds}:	0.219	S_{d1}:	0.088
		C_s:	0.030
		C_s Max:	0.030
		C_s Min:	0.030

LOAD CASES

1.2D + 1.0W	125 mph Wind with No Ice
0.9D + 1.0W	125 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph Wind with 1" 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						Top						
							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	51.00	0.4375	65		0.00	13,914	64.00	0.000	89.54	46,176.7	36.52	146.29	50.70	51.00	70.81	22,831.2	28.37	115.89	0.2608
2-12	50.17	0.3750	65	Slip	86.00	9,565	53.32	43.833	63.93	22,872.5	35.42	142.18	40.24	94.00	48.13	9,761.2	26.07	107.30	0.2608
3-12	49.92	0.3125	65	Slip	71.00	6,082	42.40	88.083	42.35	9,577.7	33.68	135.69	29.39	138.00	29.25	3,156.3	22.52	94.04	0.2608
4-12	46.58	0.2188	65	Slip	55.00	2,761	31.02	133.417	21.70	2,627.4	35.31	141.77	18.87	180.00	13.14	583.5	20.43	86.24	0.2608
Total Shaft Weight						32,322													

DISCRETE APPURTENANCE PROPERTIES

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	No Ice			Ice											
					Weight (lb)	EPAA (sf)	Orientation Factor	Weight (lb)	EPAA (sf)	Orientation Factor									
180.00	Ericsson AIR 6419 B41	3	0.75	0.000	83.30	6.322	0.63	186.12	7.471	0.63									
180.00	RFS APXVAALL24 43-U-NA20	3	0.75	0.000	122.80	20.243	0.63	387.42	22.763	0.63									
180.00	Ericsson 4480 BAND 71	3	0.75	0.000	81.00	2.878	0.67	132.72	3.641	0.67									
180.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	3600.40	43.807	1.00									
180.00	Commscope VV-65A-R1B	3	0.75	0.000	24.70	5.887	0.63	104.11	7.325	0.63									
180.00	Ericsson 4460 BAND 2/25	3	0.75	0.000	109.00	2.564	0.67	169.05	3.280	0.67									
169.90	Generic 6' Omni	2	1.00	0.000	25.00	1.760	1.00	56.18	2.611	1.00									
169.00	Generic Round Side Arm	2	1.00	0.000	187.50	5.200	1.00	249.24	7.035	1.00									
163.00	Samsung B2/B66A RRH-BR049	3	0.75	0.000	84.40	1.875	0.50	127.33	2.482	0.50									
163.00	RFS DB-B1-6C-12AB-0Z	2	0.75	0.000	21.40	2.512	0.67	75.12	3.213	0.67									
163.00	Commscope JAHH-65B-R3B	6	0.75	0.000	60.60	9.113	0.69	196.75	10.980	0.69									
163.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	3590.06	43.651	1.00									
163.00	Samsung B5/B13 RRH-BR04C	3	0.75	0.000	70.30	1.875	0.50	108.80	2.482	0.50									
150.00	Generic Round Platform with Ha	1	1.00	0.000	2500.00	27.200	1.00	3580.22	43.502	1.00									
150.00	Kathrein Scala 80010965	1	0.75	0.000	97.60	13.814	1.00	275.40	15.849	1.00									
150.00	CCI HPA65R-BU8A	2	0.75	0.000	54.00	11.230	0.78	208.92	13.380	0.78									
150.00	CCI HPA65R-BU6A	1	0.75	0.000	41.90	7.864	1.00	158.78	9.705	1.00									
150.00	Powerwave Allgon 7770.00	3	0.75	3.000	35.00	5.508	0.65	110.81	6.926	0.65									
150.00	Ericsson RRUS 4449 B5, B12	3	0.75	0.000	71.00	1.969	0.50	113.98	2.591	0.50									
150.00	Ericsson Radio 8843 - B2 + B66	3	0.75	0.000	71.90	1.650	0.50	112.99	2.215	0.50									
150.00	Raycap DC6-48-60-18-8F (23.5")	2	0.75	3.000	20.00	1.260	1.00	55.12	1.699	1.00									
150.00	Powerwave Allgon LGP21401	6	0.75	3.000	14.10	1.104	0.50	30.74	1.580	0.50									
150.00	LGP Allgon LGP21903	6	0.75	2.000	5.50	0.231	0.50	11.11	0.457	0.50									
150.00	Kathrein Scala 80010966	2	0.75	0.000	114.60	17.363	0.72	328.75	19.823	0.72									
120.00	JMA Wireless MX08FRO665-21	3	0.75	0.000	64.50	12.489	0.64	232.06	14.321	0.64									
120.00	Fujitsu TA08025-B604	3	0.75	0.000	63.90	1.962	0.50	101.92	2.562	0.50									
120.00	Fujitsu TA08025-B605	3	0.75	0.000	75.00	1.962	0.50	115.84	2.562	0.50									
120.00	Commscope RDIDC-9181-PF-48	1	0.75	0.000	21.90	1.867	1.00	59.00	2.454	1.00									
120.00	Generic Flat Platform with Han	1	1.00	0.000	2500.00	42.400	1.00	3658.12	56.072	1.00									
Totals			Row Count: 29			76			14,358.00					24,309.69					

LINEAR APPURTENANCE PROPERTIES

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	180.00	3	1.99" (50.7mm) Hybrid	1.99	1.9	N	0	0	0	0	0	N	T-MOBILE
0.00	170.00	2	0.405" (10.3mm) Coax	0.41	0.11	N	0	0	0	0	0	N	SENET, INC.
0.00	163.00	2	1 5/8" Hybriflex	1.98	1.3	N	0	0	0	0	0	N	VERIZON WIRELESS
0.00	153.00	2	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	153.00	1	2" Carflex Non-Metall	2.36	0.68	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	153.00	1	3" conduit	3.5	7.58	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	150.00	12	1 1/4" Coax	1.55	0.63	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	150.00	2	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	150.00	2	0.39" (10mm) Fiber Tr	0.39	0.06	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	150.00	2	0.65" (16.4mm) 8 AWG	0.65	0.31	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	120.00	1	1.60" (40.6mm) Hybrid	1.6	2.34	N	0	0	0	0	0	N	DISH WIRELESS L.L.C.

SEGMENT PROPERTIES												
Seg Top Elev (ft)	Description	(Max Length: 5 ft)	Thick (in)	Flat Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Fy (ksi)	S (in ³)	Z (in ³)	Weight (lb)
0.00			0.4375	64.000	89.544	46,176.70	36.52	146.29	64.9	1393.9	0.0	0.0
5.00			0.4375	62.696	87.707	43,392.70	35.72	143.31	65.8	1337.1	0.0	1,507.9
10.00			0.4375	61.392	85.870	40,722.90	34.92	140.32	66.6	1281.4	0.0	1,476.6
15.00			0.4375	60.088	84.033	38,165.00	34.12	137.34	67.5	1227.0	0.0	1,445.4
20.00			0.4375	58.784	82.196	35,716.40	33.32	134.36	68.4	1173.8	0.0	1,414.1
25.00			0.4375	57.480	80.359	33,374.90	32.52	131.38	69.2	1121.7	0.0	1,382.8
30.00			0.4375	56.176	78.522	31,138.10	31.73	128.40	70.1	1070.8	0.0	1,351.6
35.00			0.4375	54.872	76.685	29,003.40	30.93	125.42	71	1021.1	0.0	1,320.3
40.00			0.4375	53.568	74.848	26,968.70	30.13	122.44	71.9	972.6	0.0	1,289.1
43.83	Bot - Section 2		0.4375	52.569	73.440	25,474.80	29.52	120.16	72.5	936.2	0.0	967.1
45.00			0.4375	52.264	73.011	25,031.40	29.33	119.46	72.7	925.2	0.0	543.8
50.00			0.4375	50.960	71.174	23,189.20	28.53	116.48	73.6	879.1	0.0	2,294.6
51.00	Top - Section 1		0.3750	51.450	61.673	20,534.70	34.08	137.20	67.5	771.0	0.0	452.0
55.00			0.3750	50.406	60.413	19,302.00	33.34	134.42	68.4	739.8	0.0	830.9
60.00			0.3750	49.103	58.838	17,831.80	32.41	130.94	69.4	701.6	0.0	1,014.5
65.00			0.3750	47.799	57.264	16,438.20	31.47	127.46	70.4	664.4	0.0	987.7
70.00			0.3750	46.495	55.689	15,119.20	30.54	123.99	71.4	628.2	0.0	960.9
75.00			0.3750	45.191	54.115	13,872.70	29.61	120.51	72.4	593.0	0.0	934.1
80.00			0.3750	43.887	52.540	12,696.70	28.68	117.03	73.4	558.9	0.0	907.3
85.00			0.3750	42.583	50.966	11,589.10	27.75	113.55	74.5	525.8	0.0	880.5
88.08	Bot - Section 3		0.3750	41.779	49.995	10,939.20	27.17	111.41	75.1	505.8	0.0	529.6
90.00			0.3750	41.279	49.391	10,547.80	26.82	110.08	75.5	493.6	0.0	598.7
94.00	Top - Section 2		0.3125	40.861	40.802	8,562.50	32.36	130.75	69.4	404.8	0.0	1,226.2
95.00			0.3125	40.600	40.539	8,398.40	32.13	129.92	69.7	399.6	0.0	138.4
100.00			0.3125	39.296	39.227	7,609.00	31.01	125.75	70.9	374.1	0.0	678.6
105.00			0.3125	37.992	37.915	6,870.70	29.90	121.57	72.1	349.4	0.0	656.2
110.00			0.3125	36.688	36.603	6,181.80	28.78	117.40	73.3	325.5	0.0	633.9
115.00			0.3125	35.384	35.291	5,540.60	27.66	113.23	74.5	302.5	0.0	611.6
120.00			0.3125	34.080	33.979	4,945.30	26.54	109.06	75.8	280.3	0.0	589.3
125.00			0.3125	32.776	32.666	4,394.20	25.42	104.88	77	259.0	0.0	566.9
130.00			0.3125	31.472	31.354	3,885.70	24.31	100.71	78.2	238.5	0.0	544.6
133.42	Bot - Section 4		0.3125	30.581	30.458	3,561.80	23.54	97.86	79	225.0	0.0	359.3
135.00			0.3125	30.168	30.042	3,418.00	23.19	96.54	79.4	218.9	0.0	279.1
138.00	Top - Section 3		0.2188	29.823	20.857	2,333.30	33.84	136.30	67.8	151.1	0.0	518.4
140.00			0.2188	29.302	20.490	2,212.10	33.20	133.92	68.5	145.8	0.0	140.7
145.00			0.2188	27.998	19.571	1,927.70	31.61	127.96	70.2	133.0	0.0	340.8
150.00			0.2188	26.694	18.653	1,668.80	30.01	122.00	72	120.8	0.0	325.2
155.00			0.2188	25.390	17.734	1,434.20	28.41	116.04	73.7	109.1	0.0	309.5
160.00			0.2188	24.086	16.815	1,222.60	26.82	110.08	75.5	98.1	0.0	293.9
163.00			0.2188	23.304	16.264	1,106.30	25.86	106.51	76.5	91.7	0.0	168.8
165.00			0.2188	22.782	15.897	1,033.00	25.22	104.12	77.2	87.6	0.0	109.4
169.00			0.2188	21.739	15.162	896.20	23.94	99.35	78.6	79.6	0.0	211.4
169.90			0.2188	21.504	14.996	867.20	23.66	98.28	78.9	77.9	0.0	46.2
170.00			0.2188	21.478	14.978	864.00	23.62	98.16	79	77.7	0.0	5.1
175.00			0.2188	20.174	14.059	714.60	22.03	92.20	80.7	68.4	0.0	247.0
180.00			0.2188	18.870	13.141	583.50	20.43	86.24	81.9	59.7	0.0	231.4
Total:												32,321.4

CALCULATED FORCES													
Load Case: 1.2D + 1.0W				125 mph Wind with No Ice								25 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	-61.53	-36.42	0.00	-4,281.7	0.00	4,281.68	5,229.17	1,571.49	9,421.69	6,783.18	0	0	0.644
5.00	-59.47	-35.82	0.00	-4,099.6	0.00	4,099.57	5,190.65	1,539.25	9,039.18	6,594.14	0.07	-0.13	0.634
10.00	-57.44	-35.22	0.00	-3,920.5	0.00	3,920.48	5,149.25	1,507.01	8,664.60	6,403.58	0.28	-0.26	0.624
15.00	-55.45	-34.64	0.00	-3,744.4	0.00	3,744.36	5,104.97	1,474.78	8,297.94	6,211.74	0.62	-0.39	0.614
20.00	-53.49	-34.06	0.00	-3,571.2	0.00	3,571.17	5,057.81	1,442.54	7,939.21	6,018.84	1.11	-0.53	0.604
25.00	-51.58	-33.49	0.00	-3,400.9	0.00	3,400.87	5,007.77	1,410.30	7,588.41	5,825.12	1.74	-0.67	0.595

CALCULATED FORCES

30.00	-49.71	-32.93	0.00	-3,233.4	0.00	3,233.41	4,954.85	1,378.06	7,245.53	5,630.81	2.52	-0.81	0.585
35.00	-47.87	-32.35	0.00	-3,068.8	0.00	3,068.78	4,899.05	1,345.82	6,910.58	5,436.14	3.44	-0.95	0.575
40.00	-46.09	-31.82	0.00	-2,907.1	0.00	2,907.06	4,840.37	1,313.58	6,583.55	5,241.34	4.52	-1.1	0.565
43.83	-44.75	-31.50	0.00	-2,785.1	0.00	2,785.10	4,793.44	1,288.87	6,338.20	5,092.06	5.45	-1.22	0.557
45.00	-44.02	-31.13	0.00	-2,748.3	0.00	2,748.34	4,778.81	1,281.35	6,264.45	5,046.65	5.76	-1.25	0.554
50.00	-41.05	-30.71	0.00	-2,592.7	0.00	2,592.69	4,714.38	1,249.11	5,953.28	4,852.29	7.15	-1.4	0.544
51.00	-40.44	-30.39	0.00	-2,562.0	0.00	2,561.99	3,748.95	1,082.35	5,214.40	3,905.86	7.45	-1.44	0.668
55.00	-39.24	-29.83	0.00	-2,440.4	0.00	2,440.41	3,716.58	1,060.25	5,003.62	3,792.47	8.7	-1.56	0.655
60.00	-37.77	-29.21	0.00	-2,291.2	0.00	2,291.25	3,673.53	1,032.61	4,746.27	3,650.12	10.43	-1.74	0.639
65.00	-36.34	-28.58	0.00	-2,145.2	0.00	2,145.22	3,627.60	1,004.98	4,495.71	3,507.29	12.35	-1.91	0.622
70.00	-34.95	-27.94	0.00	-2,002.4	0.00	2,002.35	3,578.79	977.35	4,251.95	3,364.21	14.44	-2.09	0.606
75.00	-33.59	-27.31	0.00	-1,862.6	0.00	1,862.63	3,527.09	949.72	4,014.98	3,221.11	16.73	-2.27	0.589
80.00	-32.26	-26.68	0.00	-1,726.1	0.00	1,726.08	3,472.52	922.08	3,784.80	3,078.24	19.21	-2.46	0.571
85.00	-30.99	-26.16	0.00	-1,592.7	0.00	1,592.68	3,415.07	894.45	3,561.42	2,935.81	21.88	-2.64	0.552
88.08	-30.21	-25.84	0.00	-1,512.0	0.00	1,512.01	3,378.20	877.41	3,427.05	2,848.30	23.63	-2.76	0.541
90.00	-29.40	-25.46	0.00	-1,462.5	0.00	1,462.49	3,354.74	866.82	3,344.83	2,794.06	24.75	-2.83	0.533
94.00	-27.76	-25.09	0.00	-1,360.6	0.00	1,360.63	2,549.41	716.07	2,738.82	2,107.92	27.19	-2.99	0.658
95.00	-27.52	-24.75	0.00	-1,335.5	0.00	1,335.54	2,541.91	711.46	2,703.72	2,088.10	27.82	-3.03	0.652
100.00	-26.48	-24.14	0.00	-1,211.8	0.00	1,211.80	2,502.69	688.43	2,531.57	1,988.82	31.11	-3.24	0.621
105.00	-25.46	-23.55	0.00	-1,091.1	0.00	1,091.07	2,460.58	665.41	2,365.09	1,889.44	34.62	-3.46	0.589
110.00	-24.48	-22.95	0.00	-973.4	0.00	973.35	2,415.60	642.38	2,204.27	1,790.18	38.35	-3.67	0.555
115.00	-23.53	-22.37	0.00	-858.6	0.00	858.58	2,367.74	619.35	2,049.12	1,691.27	42.31	-3.88	0.519
120.00	-19.06	-18.70	0.00	-746.7	0.00	746.73	2,317.00	596.32	1,899.62	1,592.95	46.49	-4.09	0.478
125.00	-18.20	-18.13	0.00	-653.2	0.00	653.21	2,263.38	573.30	1,755.79	1,495.45	50.87	-4.29	0.446
130.00	-17.37	-17.64	0.00	-562.6	0.00	562.56	2,206.88	550.27	1,617.62	1,398.99	55.47	-4.49	0.411
133.42	-16.82	-17.35	0.00	-502.3	0.00	502.29	2,166.61	534.53	1,526.45	1,333.80	58.72	-4.62	0.385
135.00	-16.43	-17.09	0.00	-474.8	0.00	474.82	2,147.49	527.24	1,485.11	1,303.81	60.27	-4.68	0.373
138.00	-15.71	-16.79	0.00	-423.6	0.00	423.55	1,272.79	366.05	1,022.18	768.59	63.24	-4.79	0.566
140.00	-15.46	-16.44	0.00	-390.0	0.00	389.98	1,263.21	359.60	986.49	749.27	65.26	-4.87	0.535
145.00	-14.88	-15.93	0.00	-307.8	0.00	307.79	1,237.26	343.48	900.03	700.72	70.48	-5.09	0.453
150.00	-10.33	-10.83	0.00	-226.4	0.00	226.39	1,208.42	327.35	817.54	652.01	75.91	-5.29	0.357
155.00	-9.89	-10.34	0.00	-172.2	0.00	172.22	1,176.70	311.23	739.02	603.37	81.54	-5.46	0.295
160.00	-9.51	-9.95	0.00	-120.5	0.00	120.51	1,142.10	295.11	664.45	555.03	87.33	-5.6	0.227
163.00	-5.55	-6.43	0.00	-90.6	0.00	90.64	1,119.95	285.43	621.62	526.27	90.87	-5.68	0.178
165.00	-5.43	-6.17	0.00	-77.8	0.00	77.78	1,104.62	278.98	593.85	507.22	93.25	-5.72	0.159
169.00	-4.76	-5.40	0.00	-53.1	0.00	53.10	1,072.56	266.09	540.23	469.51	98.07	-5.79	0.118
169.90	-4.66	-5.19	0.00	-48.2	0.00	48.24	1,065.09	263.18	528.51	461.11	99.16	-5.81	0.109
170.00	-4.67	-4.98	0.00	-47.7	0.00	47.72	1,064.26	262.86	527.22	460.18	99.28	-5.81	0.108
175.00	-4.38	-4.56	0.00	-22.8	0.00	22.81	1,021.02	246.74	464.55	414.13	105.39	-5.87	0.060
180.00	0.00	-4.09	0.00	0.0	0.00	0.00	968.59	230.62	405.84	366.91	111.54	-5.89	0.000

CALCULATED FORCES

Load Case: 0.9D + 1.0W

125 mph Wind with No Ice (Reduced DL)

25 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	-46.14	-36.40	0.00	-4,229.5	0.00	4,229.50	5,229.17	1,571.49	9,421.69	6,783.18	0	0	0.633
5.00	-44.57	-35.77	0.00	-4,047.5	0.00	4,047.48	5,190.65	1,539.25	9,039.18	6,594.14	0.07	-0.13	0.623
10.00	-43.03	-35.14	0.00	-3,868.6	0.00	3,868.65	5,149.25	1,507.01	8,664.60	6,403.58	0.27	-0.26	0.613
15.00	-41.52	-34.52	0.00	-3,693.0	0.00	3,692.96	5,104.97	1,474.78	8,297.94	6,211.74	0.61	-0.39	0.603
20.00	-40.04	-33.91	0.00	-3,520.4	0.00	3,520.35	5,057.81	1,442.54	7,939.21	6,018.84	1.09	-0.52	0.593
25.00	-38.59	-33.32	0.00	-3,350.8	0.00	3,350.78	5,007.77	1,410.30	7,588.41	5,825.12	1.72	-0.66	0.583
30.00	-37.16	-32.72	0.00	-3,184.2	0.00	3,184.20	4,954.85	1,378.06	7,245.53	5,630.81	2.48	-0.8	0.574
35.00	-35.77	-32.12	0.00	-3,020.6	0.00	3,020.58	4,899.05	1,345.82	6,910.58	5,436.14	3.4	-0.94	0.564
40.00	-34.42	-31.57	0.00	-2,860.0	0.00	2,859.99	4,840.37	1,313.58	6,583.55	5,241.34	4.46	-1.09	0.553
43.83	-33.41	-31.25	0.00	-2,739.0	0.00	2,738.97	4,793.44	1,288.87	6,338.20	5,092.06	5.38	-1.2	0.545
45.00	-32.85	-30.86	0.00	-2,702.5	0.00	2,702.52	4,778.81	1,281.35	6,264.45	5,046.65	5.68	-1.23	0.543
50.00	-30.61	-30.44	0.00	-2,548.2	0.00	2,548.22	4,714.38	1,249.11	5,953.28	4,852.29	7.05	-1.38	0.532
51.00	-30.15	-30.11	0.00	-2,517.8	0.00	2,517.79	3,748.95	1,082.35	5,214.40	3,905.86	7.34	-1.41	0.653
55.00	-29.23	-29.53	0.00	-2,397.3	0.00	2,397.34	3,716.58	1,060.25	5,003.62	3,792.47	8.58	-1.54	0.641
60.00	-28.12	-28.88	0.00	-2,249.7	0.00	2,249.68	3,673.53	1,032.61	4,746.27	3,650.12	10.28	-1.71	0.625
65.00	-27.03	-28.23	0.00	-2,105.3	0.00	2,105.26	3,627.60	1,004.98	4,495.71	3,507.29	12.17	-1.88	0.608
70.00	-25.97	-27.58	0.00	-1,964.1	0.00	1,964.09	3,578.79	977.35	4,251.95	3,364.21	14.23	-2.06	0.592
75.00	-24.94	-26.94	0.00	-1,826.2	0.00	1,826.17	3,527.09	949.72	4,014.98	3,221.11	16.48	-2.24	0.575
80.00	-23.94	-26.29	0.00	-1,691.5	0.00	1,691.49	3,472.52	922.08	3,784.80	3,078.24	18.92	-2.42	0.557
85.00	-22.97	-25.76	0.00	-1,560.0	0.00	1,560.04	3,415.07	894.45	3,561.42	2,935.81	21.55	-2.6	0.539
88.08	-22.38	-25.44	0.00	-1,480.6	0.00	1,480.60	3,378.20	877.41	3,427.05	2,848.30	23.27	-2.71	0.527
90.00	-21.76	-25.06	0.00	-1,431.8	0.00	1,431.84	3,354.74	866.82	3,344.83	2,794.06	24.37	-2.79	0.520
94.00	-20.53	-24.69	0.00	-1,331.6	0.00	1,331.62	2,549.41	716.07	2,738.82	2,107.92	26.77	-2.94	0.641
95.00	-20.35	-24.34	0.00	-1,306.9	0.00	1,306.93	2,541.91	711.46	2,703.72	2,088.10	27.39	-2.97	0.635
100.00	-19.55	-23.72	0.00	-1,185.2	0.00	1,185.25	2,502.69	688.43	2,531.57	1,988.82	30.62	-3.19	0.605
105.00	-18.78	-23.11	0.00	-1,066.7	0.00	1,066.67	2,460.58	665.41	2,365.09	1,889.44	34.07	-3.4	0.573
110.00	-18.03	-22.51	0.00	-951.1	0.00	951.13	2,415.60	642.38	2,204.27	1,790.18	37.73	-3.6	0.540
115.00	-17.31	-21.91	0.00	-838.6	0.00	838.61	2,367.74	619.35	2,049.12	1,691.27	41.62	-3.81	0.504
120.00	-14.01	-18.31	0.00	-729.0	0.00	729.05	2,317.00	596.32	1,899.62	1,592.95	45.72	-4.01	0.465
125.00	-13.36	-17.74	0.00	-637.5	0.00	637.48	2,263.38	573.30	1,755.79	1,495.45	50.02	-4.21	0.433
130.00	-12.73	-17.25	0.00	-548.8	0.00	548.81	2,206.88	550.27	1,617.62	1,398.99	54.53	-4.4	0.399
133.42	-12.32	-16.96	0.00	-489.9	0.00	489.87	2,166.61	534.53	1,526.45	1,333.80	57.72	-4.53	0.374
135.00	-12.03	-16.70	0.00	-463.0	0.00	463.01	2,147.49	527.24	1,485.11	1,303.81	59.24	-4.59	0.362
138.00	-11.48	-16.41	0.00	-412.9	0.00	412.90	1,272.79	366.05	1,022.18	768.59	62.15	-4.7	0.548
140.00	-11.30	-16.05	0.00	-380.1	0.00	380.08	1,263.21	359.60	986.49	749.27	64.14	-4.77	0.518
145.00	-10.86	-15.54	0.00	-299.8	0.00	299.82	1,237.26	343.48	900.03	700.72	69.25	-4.99	0.439
150.00	-7.54	-10.55	0.00	-220.4	0.00	220.36	1,208.42	327.35	817.54	652.01	74.58	-5.18	0.345
155.00	-7.21	-10.07	0.00	-167.6	0.00	167.59	1,176.70	311.23	739.02	603.37	80.09	-5.35	0.285
160.00	-6.93	-9.68	0.00	-117.2	0.00	117.25	1,142.10	295.11	664.45	555.03	85.76	-5.49	0.218
163.00	-4.03	-6.27	0.00	-88.2	0.00	88.20	1,119.95	285.43	621.62	526.27	89.23	-5.56	0.172
165.00	-3.94	-6.01	0.00	-75.6	0.00	75.65	1,104.62	278.98	593.85	507.22	91.56	-5.6	0.153
169.00	-3.46	-5.26	0.00	-51.6	0.00	51.62	1,072.56	266.09	540.23	469.51	96.28	-5.67	0.114
169.90	-3.39	-5.05	0.00	-46.9	0.00	46.88	1,065.09	263.18	528.51	461.11	97.35	-5.69	0.105
170.00	-3.40	-4.84	0.00	-46.4	0.00	46.38	1,064.26	262.86	527.22	460.18	97.47	-5.69	0.104
175.00	-3.19	-4.43	0.00	-22.2	0.00	22.16	1,021.02	246.74	464.55	414.13	103.45	-5.75	0.057
180.00	0.00	-4.09	0.00	0.0	0.00	0.00	968.59	230.62	405.84	366.91	109.48	-5.77	0.000

CALCULATED FORCES

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind with 1" Radial Ice 24 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	-79.69	-7.76	0.00	-937.6	0.00	937.61	5,229.17	1,571.49	9,421.69	6,783.18	0	0	0.153
5.00	-77.38	-7.64	0.00	-898.8	0.00	898.81	5,190.65	1,539.25	9,039.18	6,594.14	0.02	-0.03	0.151
10.00	-75.07	-7.53	0.00	-860.6	0.00	860.59	5,149.25	1,507.01	8,664.60	6,403.58	0.06	-0.06	0.149
15.00	-72.80	-7.42	0.00	-822.9	0.00	822.94	5,104.97	1,474.78	8,297.94	6,211.74	0.14	-0.09	0.147
20.00	-70.56	-7.31	0.00	-785.8	0.00	785.84	5,057.81	1,442.54	7,939.21	6,018.84	0.24	-0.12	0.145
25.00	-68.35	-7.20	0.00	-749.3	0.00	749.30	5,007.77	1,410.30	7,588.41	5,825.12	0.38	-0.15	0.142
30.00	-66.18	-7.09	0.00	-713.3	0.00	713.30	4,954.85	1,378.06	7,245.53	5,630.81	0.55	-0.18	0.140
35.00	-64.06	-6.98	0.00	-677.8	0.00	677.85	4,899.05	1,345.82	6,910.58	5,436.14	0.76	-0.21	0.138
40.00	-61.97	-6.87	0.00	-643.0	0.00	642.96	4,840.37	1,313.58	6,583.55	5,241.34	0.99	-0.24	0.136
43.83	-60.40	-6.81	0.00	-616.6	0.00	616.61	4,793.44	1,288.87	6,338.20	5,092.06	1.2	-0.27	0.134
45.00	-59.62	-6.74	0.00	-608.7	0.00	608.66	4,778.81	1,281.35	6,264.45	5,046.65	1.27	-0.28	0.133
50.00	-56.33	-6.65	0.00	-575.0	0.00	574.96	4,714.38	1,249.11	5,953.28	4,852.29	1.57	-0.31	0.130
51.00	-55.68	-6.59	0.00	-568.3	0.00	568.31	3,748.95	1,082.35	5,214.40	3,905.86	1.64	-0.32	0.160
55.00	-54.26	-6.48	0.00	-541.9	0.00	541.93	3,716.58	1,060.25	5,003.62	3,792.47	1.92	-0.34	0.158
60.00	-52.51	-6.36	0.00	-509.5	0.00	509.51	3,673.53	1,032.61	4,746.27	3,650.12	2.3	-0.38	0.154
65.00	-50.81	-6.24	0.00	-477.7	0.00	477.71	3,627.60	1,004.98	4,495.71	3,507.29	2.72	-0.42	0.150
70.00	-49.14	-6.11	0.00	-446.5	0.00	446.53	3,578.79	977.35	4,251.95	3,364.21	3.18	-0.46	0.147
75.00	-47.52	-5.99	0.00	-416.0	0.00	415.98	3,527.09	949.72	4,014.98	3,221.11	3.69	-0.5	0.143
80.00	-45.93	-5.86	0.00	-386.0	0.00	386.05	3,472.52	922.08	3,784.80	3,078.24	4.24	-0.54	0.139
85.00	-44.38	-5.75	0.00	-356.8	0.00	356.76	3,415.07	894.45	3,561.42	2,935.81	4.83	-0.59	0.135
88.08	-43.44	-5.69	0.00	-339.0	0.00	339.02	3,378.20	877.41	3,427.05	2,848.30	5.22	-0.61	0.132
90.00	-42.54	-5.61	0.00	-328.1	0.00	328.11	3,354.74	866.82	3,344.83	2,794.06	5.47	-0.63	0.130
94.00	-40.68	-5.54	0.00	-305.7	0.00	305.66	2,549.41	716.07	2,738.82	2,107.92	6.01	-0.66	0.161
95.00	-40.42	-5.47	0.00	-300.1	0.00	300.12	2,541.91	711.46	2,703.72	2,088.10	6.15	-0.67	0.160
100.00	-39.13	-5.35	0.00	-272.8	0.00	272.77	2,502.69	688.43	2,531.57	1,988.82	6.88	-0.72	0.153
105.00	-37.88	-5.23	0.00	-246.0	0.00	246.03	2,460.58	665.41	2,365.09	1,889.44	7.66	-0.77	0.146
110.00	-36.66	-5.11	0.00	-219.9	0.00	219.89	2,415.60	642.38	2,204.27	1,790.18	8.49	-0.82	0.138
115.00	-35.48	-4.99	0.00	-194.4	0.00	194.35	2,367.74	619.35	2,049.12	1,691.27	9.37	-0.86	0.130
120.00	-29.08	-4.21	0.00	-169.4	0.00	169.41	2,317.00	596.32	1,899.62	1,592.95	10.3	-0.91	0.119
125.00	-27.98	-4.09	0.00	-148.4	0.00	148.36	2,263.38	573.30	1,755.79	1,495.45	11.28	-0.96	0.112
130.00	-26.92	-3.99	0.00	-127.9	0.00	127.92	2,206.88	550.27	1,617.62	1,398.99	12.31	-1	0.104
133.42	-26.21	-3.92	0.00	-114.3	0.00	114.30	2,166.61	534.53	1,526.45	1,333.80	13.03	-1.03	0.098
135.00	-25.75	-3.87	0.00	-108.1	0.00	108.09	2,147.49	527.24	1,485.11	1,303.81	13.38	-1.05	0.095
138.00	-24.89	-3.80	0.00	-96.5	0.00	96.48	1,272.79	366.05	1,022.18	768.59	14.04	-1.07	0.145
140.00	-24.57	-3.73	0.00	-88.9	0.00	88.88	1,263.21	359.60	986.49	749.27	14.5	-1.09	0.138
145.00	-23.77	-3.62	0.00	-70.2	0.00	70.22	1,237.26	343.48	900.03	700.72	15.66	-1.14	0.120
150.00	-16.43	-2.49	0.00	-51.7	0.00	51.74	1,208.42	327.35	817.54	652.01	16.88	-1.18	0.093
155.00	-15.78	-2.38	0.00	-39.3	0.00	39.31	1,176.70	311.23	739.02	603.37	18.15	-1.22	0.079
160.00	-15.18	-2.29	0.00	-27.4	0.00	27.42	1,142.10	295.11	664.45	555.03	19.45	-1.26	0.063
163.00	-9.03	-1.46	0.00	-20.6	0.00	20.55	1,119.95	285.43	621.62	526.27	20.24	-1.27	0.047
165.00	-8.82	-1.40	0.00	-17.6	0.00	17.63	1,104.62	278.98	593.85	507.22	20.78	-1.28	0.043
169.00	-7.85	-1.23	0.00	-12.0	0.00	12.03	1,072.56	266.09	540.23	469.51	21.86	-1.3	0.033
169.90	-7.65	-1.18	0.00	-10.9	0.00	10.92	1,065.09	263.18	528.51	461.11	22.1	-1.3	0.031
170.00	-7.64	-1.13	0.00	-10.8	0.00	10.81	1,064.26	262.86	527.22	460.18	22.13	-1.3	0.031
175.00	-7.15	-1.03	0.00	-5.2	0.00	5.16	1,021.02	246.74	464.55	414.13	23.5	-1.32	0.019
180.00	0.00	-0.87	0.00	0.0	0.00	0.00	968.59	230.62	405.84	366.91	24.89	-1.32	0.000

CALCULATED FORCES

Load Case: 1.0D + 1.0W

60 mph Wind with No Ice

24 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	-51.31	-7.51	0.00	-876.4	0.00	876.36	5,229.17	1,571.49	9,421.69	6,783.18	0	0	0.139
5.00	-49.65	-7.38	0.00	-838.8	0.00	838.83	5,190.65	1,539.25	9,039.18	6,594.14	0.01	-0.03	0.137
10.00	-48.02	-7.25	0.00	-802.0	0.00	801.95	5,149.25	1,507.01	8,664.60	6,403.58	0.06	-0.05	0.135
15.00	-46.43	-7.12	0.00	-765.7	0.00	765.71	5,104.97	1,474.78	8,297.94	6,211.74	0.13	-0.08	0.132
20.00	-44.86	-7.00	0.00	-730.1	0.00	730.08	5,057.81	1,442.54	7,939.21	6,018.84	0.23	-0.11	0.130
25.00	-43.32	-6.88	0.00	-695.1	0.00	695.08	5,007.77	1,410.30	7,588.41	5,825.12	0.36	-0.14	0.128
30.00	-41.82	-6.76	0.00	-660.7	0.00	660.68	4,954.85	1,378.06	7,245.53	5,630.81	0.51	-0.17	0.126
35.00	-40.35	-6.64	0.00	-626.9	0.00	626.88	4,899.05	1,345.82	6,910.58	5,436.14	0.7	-0.2	0.124
40.00	-38.91	-6.53	0.00	-593.7	0.00	593.69	4,840.37	1,313.58	6,583.55	5,241.34	0.92	-0.23	0.121
43.83	-37.83	-6.46	0.00	-568.7	0.00	568.68	4,793.44	1,288.87	6,338.20	5,092.06	1.12	-0.25	0.120
45.00	-37.25	-6.38	0.00	-561.1	0.00	561.14	4,778.81	1,281.35	6,264.45	5,046.65	1.18	-0.26	0.119
50.00	-34.80	-6.29	0.00	-529.2	0.00	529.23	4,714.38	1,249.11	5,953.28	4,852.29	1.46	-0.29	0.116
51.00	-34.32	-6.23	0.00	-522.9	0.00	522.94	3,748.95	1,082.35	5,214.40	3,905.86	1.52	-0.29	0.143
55.00	-33.36	-6.11	0.00	-498.0	0.00	498.02	3,716.58	1,060.25	5,003.62	3,792.47	1.78	-0.32	0.140
60.00	-32.20	-5.98	0.00	-467.5	0.00	467.47	3,673.53	1,032.61	4,746.27	3,650.12	2.13	-0.35	0.137
65.00	-31.06	-5.85	0.00	-437.6	0.00	437.58	3,627.60	1,004.98	4,495.71	3,507.29	2.52	-0.39	0.133
70.00	-29.95	-5.71	0.00	-408.3	0.00	408.34	3,578.79	977.35	4,251.95	3,364.21	2.95	-0.43	0.130
75.00	-28.86	-5.58	0.00	-379.8	0.00	379.77	3,527.09	949.72	4,014.98	3,221.11	3.42	-0.46	0.126
80.00	-27.80	-5.45	0.00	-351.9	0.00	351.86	3,472.52	922.08	3,784.80	3,078.24	3.93	-0.5	0.122
85.00	-26.77	-5.34	0.00	-324.6	0.00	324.60	3,415.07	894.45	3,561.42	2,935.81	4.47	-0.54	0.118
88.08	-26.15	-5.28	0.00	-308.1	0.00	308.13	3,378.20	877.41	3,427.05	2,848.30	4.83	-0.56	0.116
90.00	-25.49	-5.20	0.00	-298.0	0.00	298.01	3,354.74	866.82	3,344.83	2,794.06	5.06	-0.58	0.114
94.00	-24.15	-5.12	0.00	-277.2	0.00	277.22	2,549.41	716.07	2,738.82	2,107.92	5.56	-0.61	0.141
95.00	-23.98	-5.05	0.00	-272.1	0.00	272.09	2,541.91	711.46	2,703.72	2,088.10	5.69	-0.62	0.140
100.00	-23.15	-4.93	0.00	-246.8	0.00	246.84	2,502.69	688.43	2,531.57	1,988.82	6.36	-0.66	0.133
105.00	-22.34	-4.80	0.00	-222.2	0.00	222.21	2,460.58	665.41	2,365.09	1,889.44	7.07	-0.71	0.127
110.00	-21.55	-4.68	0.00	-198.2	0.00	198.20	2,415.60	642.38	2,204.27	1,790.18	7.84	-0.75	0.120
115.00	-20.79	-4.56	0.00	-174.8	0.00	174.80	2,367.74	619.35	2,049.12	1,691.27	8.64	-0.79	0.112
120.00	-16.93	-3.81	0.00	-152.0	0.00	152.01	2,317.00	596.32	1,899.62	1,592.95	9.5	-0.83	0.103
125.00	-16.22	-3.69	0.00	-133.0	0.00	132.96	2,263.38	573.30	1,755.79	1,495.45	10.39	-0.87	0.096
130.00	-15.54	-3.59	0.00	-114.5	0.00	114.49	2,206.88	550.27	1,617.62	1,398.99	11.33	-0.92	0.089
133.42	-15.09	-3.53	0.00	-102.2	0.00	102.22	2,166.61	534.53	1,526.45	1,333.80	11.99	-0.94	0.084
135.00	-14.77	-3.48	0.00	-96.6	0.00	96.62	2,147.49	527.24	1,485.11	1,303.81	12.31	-0.95	0.081
138.00	-14.17	-3.42	0.00	-86.2	0.00	86.18	1,272.79	366.05	1,022.18	768.59	12.92	-0.98	0.123
140.00	-13.97	-3.35	0.00	-79.3	0.00	79.34	1,263.21	359.60	986.49	749.27	13.33	-0.99	0.117
145.00	-13.49	-3.24	0.00	-62.6	0.00	62.61	1,237.26	343.48	900.03	700.72	14.39	-1.04	0.100
150.00	-9.38	-2.20	0.00	-46.0	0.00	46.04	1,208.42	327.35	817.54	652.01	15.5	-1.08	0.078
155.00	-9.00	-2.10	0.00	-35.0	0.00	35.02	1,176.70	311.23	739.02	603.37	16.65	-1.11	0.066
160.00	-8.66	-2.02	0.00	-24.5	0.00	24.50	1,142.10	295.11	664.45	555.03	17.83	-1.14	0.052
163.00	-5.11	-1.31	0.00	-18.4	0.00	18.43	1,119.95	285.43	621.62	526.27	18.56	-1.16	0.040
165.00	-4.99	-1.26	0.00	-15.8	0.00	15.81	1,104.62	278.98	593.85	507.22	19.04	-1.17	0.036
169.00	-4.38	-1.10	0.00	-10.8	0.00	10.79	1,072.56	266.09	540.23	469.51	20.03	-1.18	0.027
169.90	-4.28	-1.05	0.00	-9.8	0.00	9.80	1,065.09	263.18	528.51	461.11	20.25	-1.18	0.025
170.00	-4.28	-1.01	0.00	-9.7	0.00	9.70	1,064.26	262.86	527.22	460.18	20.28	-1.18	0.025
175.00	-4.00	-0.93	0.00	-4.6	0.00	4.63	1,021.02	246.74	464.55	414.13	21.52	-1.2	0.015
180.00	0.00	-0.84	0.00	0.0	0.00	0.00	968.59	230.62	405.84	366.91	22.78	-1.2	0.000

EQUIVALENT LATERAL FORCES METHOD ANALYSIS

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

Spectral Response Acceleration for Short Period (S_s):	0.205
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.055
Long-Period Transition Period (T_L – Seconds):	6
Importance Factor (I_e):	1.000
Site Coefficient F_a :	1.600
Site Coefficient F_v :	2.400
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.219
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.088
Seismic Response Coefficient (C_s):	0.030
Upper Limit C_s :	0.030
Lower Limit C_s :	0.030
Period based on Rayleigh Method (sec):	2.710
Redundancy Factor (ρ):	1.000
Seismic Force Distribution Exponent (k):	2.000
Total Unfactored Dead Load:	51.310 k
Seismic Base Shear (E):	1.540 k

SEISMIC FORCES

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
45	177.5	260	8,188	0.014	21	323
44	172.5	276	8,198	0.014	21	343
43	169.95	6	164	0.000	0	7
42	169.45	52	1,479	0.002	4	64
41	167	235	6,555	0.011	17	292
40	164	121	3,262	0.006	9	151
39	161.5	194	5,070	0.009	13	242
38	157.5	337	8,348	0.014	22	419
37	152.5	380	8,848	0.015	23	473
36	147.5	462	10,059	0.017	26	575
35	142.5	478	9,706	0.016	25	595
34	139	196	3,779	0.006	10	243
33	136.5	601	11,193	0.019	29	747
32	134.2084	323	5,810	0.010	15	401
31	131.7084	453	7,860	0.013	20	564
30	127.5	682	11,084	0.019	29	848
29	122.5	704	10,567	0.018	28	876
28	117.5	738	10,191	0.017	27	918
27	112.5	760	9,625	0.016	25	946
26	107.5	783	9,046	0.015	24	974
25	102.5	805	8,459	0.014	22	1,001
24	97.5	827	7,866	0.013	21	1,029
23	94.5	168	1,502	0.002	4	209
22	92	1,345	11,387	0.019	30	1,673
21	89.0417	656	5,199	0.009	14	816
20	86.5417	621	4,654	0.008	12	773
19	82.5	1,029	7,006	0.012	18	1,280
18	77.5	1,056	6,344	0.011	17	1,314
17	72.5	1,083	5,693	0.010	15	1,347
16	67.5	1,110	5,056	0.009	13	1,380
15	62.5	1,137	4,440	0.008	12	1,414
14	57.5	1,163	3,846	0.006	10	1,447
13	53	950	2,668	0.004	7	1,182
12	50.5	482	1,229	0.002	3	599
11	47.5	2,444	5,513	0.009	14	3,039
10	44.4167	579	1,141	0.002	3	720
9	41.9167	1,081	1,900	0.003	5	1,345
8	37.5	1,438	2,022	0.003	5	1,788

SEISMIC FORCES

1.2D + 1.0Ev + 1.0Eh	Seismic	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
7		32.5	1,469	1,552	0.003	4	1,827
6		27.5	1,500	1,135	0.002	3	1,866
5		22.5	1,532	775	0.001	2	1,905
4		17.5	1,563	479	0.001	1	1,944
3		12.5	1,594	249	0.000	1	1,983
2		7.5	1,626	91	0.000	0	2,022
1		2.5	1,657	10	0.000	0	2,061
Ericsson 4460 BAND 2/25		180	327	10,595	0.018	28	407
Ericsson 4480 BAND 71		180	243	7,873	0.013	21	302
Commscope VV-65A-R1B		180	74	2,401	0.004	6	92
Ericsson AIR 6419 B41		180	250	8,097	0.014	21	311
RFS APXVAALL24 43-U-NA20		180	368	11,936	0.020	31	458
Generic Round Platform with Handrails		180	2,500	81,000	0.137	211	3,109
Generic Round Platform with Handrails		163	2,500	66,422	0.112	173	3,109
Generic Round Platform with Handrails		150	2,500	56,250	0.095	147	3,109
Generic 6' Omni		169.9	50	1,443	0.002	4	62
Generic Round Side Arm		169	375	10,710	0.018	28	466
Samsung B5/B13 RRH-BR04C		163	211	5,603	0.010	15	262
Samsung B2/B66A RRH-BR049		163	253	6,727	0.011	18	315
RFS DB-B1-6C-12AB-0Z		163	43	1,137	0.002	3	53
Commscope JAHH-65B-R3B		163	364	9,660	0.016	25	452
LGP Allgon LGP21903		150	33	742	0.001	2	41
Powerwave Allgon LGP21401		150	85	1,904	0.003	5	105
Raycap DC6-48-60-18-8F (23.5" Height)		150	40	900	0.002	2	50
Ericsson Radio 8843 - B2 + B66A		150	216	4,853	0.008	13	268
Ericsson RRUS 4449 B5, B12		150	213	4,792	0.008	12	265
Powerwave Allgon 7770.00		150	105	2,362	0.004	6	131
CCI HPA65R-BU6A		150	42	943	0.002	2	52
CCI HPA65R-BU8A		150	108	2,430	0.004	6	134
Kathrein Scala 80010965		150	98	2,196	0.004	6	121
Kathrein Scala 80010966		150	229	5,157	0.009	13	285
Commscope RDIDC-9181-PF-48		120	22	315	0.000	1	27
Fujitsu TA08025-B605		120	225	3,240	0.006	8	280
Fujitsu TA08025-B604		120	192	2,760	0.005	7	238
JMA Wireless MX08FRO665-21		120	194	2,786	0.005	7	241
Generic Flat Platform with Handrails		120	2,500	36,000	0.061	94	3,109
Totals:			51,314	590,489	1.000	1,539	63,821

SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
45		177.5	260	8,188	0.014	21	223
44		172.5	276	8,198	0.014	21	236
43		169.95	6	164	0.000	0	5
42		169.45	52	1,479	0.002	4	44
41		167	235	6,555	0.011	17	201
40		164	121	3,262	0.006	9	104
39		161.5	194	5,070	0.009	13	166
38		157.5	337	8,348	0.014	22	288
37		152.5	380	8,848	0.015	23	326
36		147.5	462	10,059	0.017	26	396
35		142.5	478	9,706	0.016	25	409
34		139	196	3,779	0.006	10	167
33		136.5	601	11,193	0.019	29	514
32		134.2084	323	5,810	0.010	15	276
31		131.7084	453	7,860	0.013	20	388
30		127.5	682	11,084	0.019	29	584
29		122.5	704	10,567	0.018	28	603
28		117.5	738	10,191	0.017	27	632
27		112.5	760	9,625	0.016	25	651

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)
26	107.5	783	9,046	0.015	24	670
25	102.5	805	8,459	0.014	22	689
24	97.5	827	7,866	0.013	21	709
23	94.5	168	1,502	0.002	4	144
22	92	1,345	11,387	0.019	30	1,152
21	89.0417	656	5,199	0.009	14	562
20	86.5417	621	4,654	0.008	12	532
19	82.5	1,029	7,006	0.012	18	881
18	77.5	1,056	6,344	0.011	17	904
17	72.5	1,083	5,693	0.010	15	927
16	67.5	1,110	5,056	0.009	13	950
15	62.5	1,137	4,440	0.008	12	973
14	57.5	1,163	3,846	0.006	10	996
13	53	950	2,668	0.004	7	813
12	50.5	482	1,229	0.002	3	412
11	47.5	2,444	5,513	0.009	14	2,092
10	44.4167	579	1,141	0.002	3	495
9	41.9167	1,081	1,900	0.003	5	926
8	37.5	1,438	2,022	0.003	5	1,231
7	32.5	1,469	1,552	0.003	4	1,258
6	27.5	1,500	1,135	0.002	3	1,285
5	22.5	1,532	775	0.001	2	1,312
4	17.5	1,563	479	0.001	1	1,338
3	12.5	1,594	249	0.000	1	1,365
2	7.5	1,626	91	0.000	0	1,392
1	2.5	1,657	10	0.000	0	1,419
Ericsson 4460 BAND 2/25	180	327	10,595	0.018	28	280
Ericsson 4480 BAND 71	180	243	7,873	0.013	21	208
Commscope VV-65A-R1B	180	74	2,401	0.004	6	63
Ericsson AIR 6419 B41	180	250	8,097	0.014	21	214
RFS APXVAALL24 43-U-NA20	180	368	11,936	0.020	31	315
Generic Round Platform with Handrails	180	2,500	81,000	0.137	211	2,141
Generic Round Platform with Handrails	163	2,500	66,422	0.112	173	2,141
Generic Round Platform with Handrails	150	2,500	56,250	0.095	147	2,141
Generic 6' Omni	169.9	50	1,443	0.002	4	43
Generic Round Side Arm	169	375	10,710	0.018	28	321
Samsung B5/B13 RRH-BR04C	163	211	5,603	0.010	15	181
Samsung B2/B66A RRH-BR049	163	253	6,727	0.011	18	217
RFS DB-B1-6C-12AB-0Z	163	43	1,137	0.002	3	37
Commscope JAHH-65B-R3B	163	364	9,660	0.016	25	311
LGP Allgon LGP21903	150	33	742	0.001	2	28
Powerwave Allgon LGP21401	150	85	1,904	0.003	5	72
Raycap DC6-48-60-18-8F (23.5" Height)	150	40	900	0.002	2	34
Ericsson Radio 8843 - B2 + B66A	150	216	4,853	0.008	13	185
Ericsson RRUS 4449 B5, B12	150	213	4,792	0.008	12	182
Powerwave Allgon 7770.00	150	105	2,362	0.004	6	90
CCI HPA65R-BU6A	150	42	943	0.002	2	36
CCI HPA65R-BU8A	150	108	2,430	0.004	6	92
Kathrein Scala 80010965	150	98	2,196	0.004	6	84
Kathrein Scala 80010966	150	229	5,157	0.009	13	196
Commscope RDIDC-9181-PF-48	120	22	315	0.000	1	19
Fujitsu TA08025-B605	120	225	3,240	0.006	8	193
Fujitsu TA08025-B604	120	192	2,760	0.005	7	164
JMA Wireless MX08FRO665-21	120	194	2,786	0.005	7	166
Generic Flat Platform with Handrails	120	2,500	36,000	0.061	94	2,141
Totals:		51,314	590,489	1.000	1,539	43,938

1.2D + 1.0Ev + 1.0Eh

Seismic

CALCULATED FORCES

Seg Elev	Pu	Vu	Tu	Mu	Mu	Resultant	Phi	Phi	Phi	Phi	Total	Rotation	Ratio
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CALCULATED FORCES

(ft)	FY (-) (kips)	FX (-) (kips)	MY (ft-kips)	MZ (fr-kips)	Mx (ft-kips)	Moment (ft-kips)	Pn (kips)	Vn (kips)	Tn (kips)	Mn (kips)	Deflect (in)	(deg)	
0.00	-61.76	-1.54	0.00	-229.58	0.00	229.58	5,229.17	1,571.49	9,422	6,783.18	0.00	0.00	0.05
5.00	-59.74	-1.55	0.00	-221.87	0.00	221.87	5,190.65	1,539.25	9,039	6,594.14	0.00	-0.01	0.05
10.00	-57.75	-1.56	0.00	-214.12	0.00	214.12	5,149.25	1,507.01	8,665	6,403.58	0.01	-0.01	0.05
15.00	-55.81	-1.56	0.00	-206.34	0.00	206.34	5,104.97	1,474.78	8,298	6,211.74	0.03	-0.02	0.04
20.00	-53.91	-1.57	0.00	-198.54	0.00	198.54	5,057.81	1,442.54	7,939	6,018.84	0.06	-0.03	0.04
25.00	-52.04	-1.57	0.00	-190.71	0.00	190.71	5,007.77	1,410.30	7,588	5,825.12	0.09	-0.04	0.04
30.00	-50.21	-1.57	0.00	-182.87	0.00	182.87	4,954.85	1,378.06	7,246	5,630.81	0.14	-0.04	0.04
35.00	-48.42	-1.57	0.00	-175.02	0.00	175.02	4,899.05	1,345.82	6,911	5,436.14	0.19	-0.05	0.04
40.00	-47.08	-1.57	0.00	-167.16	0.00	167.16	4,840.37	1,313.58	6,584	5,241.34	0.25	-0.06	0.04
43.83	-46.36	-1.57	0.00	-161.14	0.00	161.14	4,793.44	1,288.87	6,338	5,092.06	0.30	-0.07	0.04
45.00	-43.32	-1.56	0.00	-159.31	0.00	159.31	4,778.81	1,281.35	6,264	5,046.65	0.32	-0.07	0.04
50.00	-42.72	-1.56	0.00	-151.53	0.00	151.53	4,714.38	1,249.11	5,953	4,852.29	0.40	-0.08	0.04
51.00	-41.54	-1.55	0.00	-149.97	0.00	149.97	3,748.95	1,082.35	5,214	3,905.86	0.41	-0.08	0.05
55.00	-40.09	-1.55	0.00	-143.77	0.00	143.77	3,716.58	1,060.25	5,004	3,792.47	0.48	-0.09	0.05
60.00	-38.68	-1.54	0.00	-136.05	0.00	136.05	3,673.53	1,032.61	4,746	3,650.12	0.58	-0.10	0.05
65.00	-37.30	-1.53	0.00	-128.36	0.00	128.36	3,627.60	1,004.98	4,496	3,507.29	0.69	-0.11	0.05
70.00	-35.95	-1.52	0.00	-120.71	0.00	120.71	3,578.79	977.35	4,252	3,364.21	0.81	-0.12	0.05
75.00	-34.64	-1.51	0.00	-113.11	0.00	113.11	3,527.09	949.72	4,015	3,221.11	0.94	-0.13	0.05
80.00	-33.35	-1.49	0.00	-105.58	0.00	105.58	3,472.52	922.08	3,785	3,078.24	1.08	-0.14	0.04
85.00	-32.58	-1.48	0.00	-98.13	0.00	98.13	3,415.07	894.45	3,561	2,935.81	1.24	-0.15	0.04
88.08	-31.77	-1.47	0.00	-93.56	0.00	93.56	3,378.20	877.41	3,427	2,848.30	1.34	-0.16	0.04
90.00	-30.09	-1.44	0.00	-90.74	0.00	90.74	3,354.74	866.82	3,345	2,794.06	1.40	-0.17	0.04
94.00	-29.88	-1.44	0.00	-84.98	0.00	84.98	2,549.41	716.07	2,739	2,107.92	1.55	-0.17	0.05
95.00	-28.85	-1.42	0.00	-83.54	0.00	83.54	2,541.91	711.46	2,704	2,088.10	1.58	-0.18	0.05
100.00	-27.85	-1.40	0.00	-76.45	0.00	76.45	2,502.69	688.43	2,532	1,988.82	1.78	-0.19	0.05
105.00	-26.88	-1.38	0.00	-69.45	0.00	69.45	2,460.58	665.41	2,365	1,889.44	1.98	-0.20	0.05
110.00	-25.93	-1.36	0.00	-62.56	0.00	62.56	2,415.60	642.38	2,204	1,790.18	2.20	-0.22	0.05
115.00	-25.01	-1.33	0.00	-55.77	0.00	55.77	2,367.74	619.35	2,049	1,691.27	2.44	-0.23	0.04
120.00	-20.24	-1.17	0.00	-49.11	0.00	49.11	2,317.00	596.32	1,900	1,592.95	2.69	-0.24	0.04
125.00	-19.40	-1.14	0.00	-43.25	0.00	43.25	2,263.38	573.30	1,756	1,495.45	2.95	-0.26	0.04
130.00	-18.83	-1.12	0.00	-37.53	0.00	37.53	2,206.88	550.27	1,618	1,398.99	3.23	-0.27	0.04
133.42	-18.43	-1.11	0.00	-33.69	0.00	33.69	2,166.61	534.53	1,526	1,333.80	3.43	-0.28	0.03
135.00	-17.68	-1.08	0.00	-31.93	0.00	31.93	2,147.49	527.24	1,485	1,303.81	3.52	-0.28	0.03
138.00	-17.44	-1.07	0.00	-28.69	0.00	28.69	1,272.79	366.05	1,022	768.59	3.70	-0.29	0.05
140.00	-16.85	-1.04	0.00	-26.55	0.00	26.55	1,263.21	359.60	986	749.27	3.83	-0.30	0.05
145.00	-16.27	-1.02	0.00	-21.33	0.00	21.33	1,237.26	343.48	900	700.72	4.15	-0.31	0.04
150.00	-11.24	-0.76	0.00	-16.24	0.00	16.24	1,208.42	327.35	818	652.01	4.48	-0.33	0.03
155.00	-10.82	-0.73	0.00	-12.46	0.00	12.46	1,176.70	311.23	739	603.37	4.83	-0.34	0.03
160.00	-10.58	-0.72	0.00	-8.79	0.00	8.79	1,142.10	295.11	664	555.03	5.19	-0.35	0.03
163.00	-6.23	-0.45	0.00	-6.63	0.00	6.63	1,119.95	285.43	622	526.27	5.41	-0.35	0.02
165.00	-5.94	-0.43	0.00	-5.73	0.00	5.73	1,104.62	278.98	594	507.22	5.56	-0.36	0.02
169.00	-5.41	-0.40	0.00	-3.99	0.00	3.99	1,072.56	266.09	540	469.51	5.86	-0.36	0.01
169.90	-5.34	-0.39	0.00	-3.63	0.00	3.63	1,065.09	263.18	529	461.11	5.93	-0.36	0.01
170.00	-5.00	-0.37	0.00	-3.60	0.00	3.60	1,064.26	262.86	527	460.18	5.94	-0.36	0.01
175.00	-4.68	-0.35	0.00	-1.74	0.00	1.74	1,021.02	246.74	465	414.13	6.32	-0.37	0.01
180.00	0.00	-0.32	0.00	0.00	0.00	0.00	968.59	230.62	406	366.91	6.71	-0.37	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	-42.52	-1.54	0.00	-225.77	0.00	225.77	5,229.17	1,571.49	9,422	6,783.18	0.00	0.00	0.04
5.00	-41.13	-1.55	0.00	-218.07	0.00	218.07	5,190.65	1,539.25	9,039	6,594.14	0.00	-0.01	0.04
10.00	-39.76	-1.55	0.00	-210.34	0.00	210.34	5,149.25	1,507.01	8,665	6,403.58	0.01	-0.01	0.04
15.00	-38.42	-1.55	0.00	-202.59	0.00	202.59	5,104.97	1,474.78	8,298	6,211.74	0.03	-0.02	0.04
20.00	-37.11	-1.56	0.00	-194.82	0.00	194.82	5,057.81	1,442.54	7,939	6,018.84	0.06	-0.03	0.04
25.00	-35.83	-1.56	0.00	-187.04	0.00	187.04	5,007.77	1,410.30	7,588	5,825.12	0.09	-0.04	0.04
30.00	-34.57	-1.56	0.00	-179.26	0.00	179.26	4,954.85	1,378.06	7,246	5,630.81	0.13	-0.04	0.04
35.00	-33.34	-1.55	0.00	-171.48	0.00	171.48	4,899.05	1,345.82	6,911	5,436.14	0.19	-0.05	0.04
40.00	-32.41	-1.55	0.00	-163.70	0.00	163.70	4,840.37	1,313.58	6,584	5,241.34	0.24	-0.06	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
43.83	-31.92	-1.55	0.00	-157.75	0.00	157.75	4,793.44	1,288.87	6,338	5,092.06	0.29	-0.07	0.04
45.00	-29.82	-1.54	0.00	-155.94	0.00	155.94	4,778.81	1,281.35	6,264	5,046.65	0.31	-0.07	0.04
50.00	-29.41	-1.54	0.00	-148.25	0.00	148.25	4,714.38	1,249.11	5,953	4,852.29	0.39	-0.08	0.04
51.00	-28.60	-1.53	0.00	-146.71	0.00	146.71	3,748.95	1,082.35	5,214	3,905.86	0.40	-0.08	0.05
55.00	-27.60	-1.52	0.00	-140.58	0.00	140.58	3,716.58	1,060.25	5,004	3,792.47	0.47	-0.09	0.04
60.00	-26.63	-1.52	0.00	-132.96	0.00	132.96	3,673.53	1,032.61	4,746	3,650.12	0.57	-0.10	0.04
65.00	-25.68	-1.51	0.00	-125.39	0.00	125.39	3,627.60	1,004.98	4,496	3,507.29	0.68	-0.11	0.04
70.00	-24.75	-1.49	0.00	-117.86	0.00	117.86	3,578.79	977.35	4,252	3,364.21	0.79	-0.12	0.04
75.00	-23.84	-1.48	0.00	-110.39	0.00	110.39	3,527.09	949.72	4,015	3,221.11	0.92	-0.13	0.04
80.00	-22.96	-1.46	0.00	-103.00	0.00	103.00	3,472.52	922.08	3,785	3,078.24	1.06	-0.14	0.04
85.00	-22.43	-1.45	0.00	-95.68	0.00	95.68	3,415.07	894.45	3,561	2,935.81	1.21	-0.15	0.04
88.08	-21.87	-1.44	0.00	-91.20	0.00	91.20	3,378.20	877.41	3,427	2,848.30	1.31	-0.16	0.04
90.00	-20.72	-1.41	0.00	-88.44	0.00	88.44	3,354.74	866.82	3,345	2,794.06	1.38	-0.16	0.04
94.00	-20.57	-1.41	0.00	-82.80	0.00	82.80	2,549.41	716.07	2,739	2,107.92	1.52	-0.17	0.05
95.00	-19.86	-1.39	0.00	-81.39	0.00	81.39	2,541.91	711.46	2,704	2,088.10	1.55	-0.17	0.05
100.00	-19.17	-1.37	0.00	-74.45	0.00	74.45	2,502.69	688.43	2,532	1,988.82	1.74	-0.19	0.05
105.00	-18.50	-1.35	0.00	-67.61	0.00	67.61	2,460.58	665.41	2,365	1,889.44	1.94	-0.20	0.04
110.00	-17.85	-1.32	0.00	-60.87	0.00	60.87	2,415.60	642.38	2,204	1,790.18	2.16	-0.21	0.04
115.00	-17.22	-1.30	0.00	-54.26	0.00	54.26	2,367.74	619.35	2,049	1,691.27	2.39	-0.23	0.04
120.00	-13.94	-1.14	0.00	-47.76	0.00	47.76	2,317.00	596.32	1,900	1,592.95	2.63	-0.24	0.04
125.00	-13.35	-1.11	0.00	-42.05	0.00	42.05	2,263.38	573.30	1,756	1,495.45	2.89	-0.25	0.03
130.00	-12.96	-1.10	0.00	-36.47	0.00	36.47	2,206.88	550.27	1,618	1,398.99	3.16	-0.26	0.03
133.42	-12.69	-1.08	0.00	-32.73	0.00	32.73	2,166.61	534.53	1,526	1,333.80	3.35	-0.27	0.03
135.00	-12.17	-1.05	0.00	-31.02	0.00	31.02	2,147.49	527.24	1,485	1,303.81	3.45	-0.28	0.03
138.00	-12.01	-1.04	0.00	-27.87	0.00	27.87	1,272.79	366.05	1,022	768.59	3.62	-0.28	0.05
140.00	-11.60	-1.01	0.00	-25.79	0.00	25.79	1,263.21	359.60	986	749.27	3.74	-0.29	0.04
145.00	-11.20	-0.99	0.00	-20.72	0.00	20.72	1,237.26	343.48	900	700.72	4.06	-0.30	0.04
150.00	-7.73	-0.73	0.00	-15.77	0.00	15.77	1,208.42	327.35	818	652.01	4.38	-0.32	0.03
155.00	-7.45	-0.71	0.00	-12.10	0.00	12.10	1,176.70	311.23	739	603.37	4.72	-0.33	0.03
160.00	-7.28	-0.70	0.00	-8.54	0.00	8.54	1,142.10	295.11	664	555.03	5.07	-0.34	0.02
163.00	-4.29	-0.44	0.00	-6.44	0.00	6.44	1,119.95	285.43	622	526.27	5.29	-0.35	0.02
165.00	-4.09	-0.42	0.00	-5.57	0.00	5.57	1,104.62	278.98	594	507.22	5.43	-0.35	0.02
169.00	-3.73	-0.39	0.00	-3.88	0.00	3.88	1,072.56	266.09	540	469.51	5.73	-0.35	0.01
169.90	-3.68	-0.38	0.00	-3.53	0.00	3.53	1,065.09	263.18	529	461.11	5.80	-0.35	0.01
170.00	-3.44	-0.36	0.00	-3.49	0.00	3.49	1,064.26	262.86	527	460.18	5.80	-0.36	0.01
175.00	-3.22	-0.34	0.00	-1.69	0.00	1.69	1,021.02	246.74	465	414.13	6.18	-0.36	0.01
180.00	0.00	-0.32	0.00	0.00	0.00	0.00	968.59	230.62	406	366.91	6.56	-0.36	0.00

ANALYSIS SUMMARY

Load Case	Base 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	36.42	0.00	61.53	0.00	0.00	4281.68	51.00	0.67
0.9D + 1.0W	36.40	0.00	46.14	0.00	0.00	4229.50	51.00	0.65
1.2D + 1.0Di + 1.0Wi	7.76	0.00	79.69	0.00	0.00	937.61	94.00	0.16
1.2D + 1.0Ev + 1.0Eh	1.57	0.00	61.76	0.00	0.00	229.58	94.00	0.05
0.9D - 1.0Ev + 1.0Eh	1.56	0.00	42.52	0.00	0.00	225.77	94.00	0.05
1.0D + 1.0W	7.51	0.00	51.31	0.00	0.00	876.36	51.00	0.14

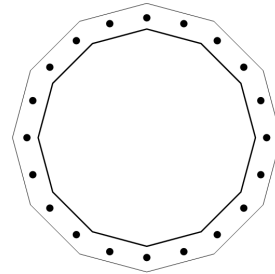
BASE PLATE ANALYSIS @ 0 FT

APPLIED REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
4281.68	61.53	36.42

PLATE PARAMETERS (ID# 19756)

Width:	78.76	in
Shape:	12	
Thickness:	2.5	in
Grade:	A871-60	
Yield Strength:	60	ksi
Tensile Strength:	75	ksi
Rod Detail Type:	d	
Clear Distance	6	in
Base Weld Size:	0.125	in
Orientation Offset:	-	°
Analysis Type:	Plastic	
Neutral Axis:	342	°



ANCHOR ROD PARAMETERS

Class	Arrangement	Quantity	Diameter (in)	Circle (in)	Grade	F _y (ksi)	F _u (ksi)	Spacing (in)	Offset (°)
Original [ID#20268]	Radial	20	2.25	72.76	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	64"Ø x 0.4375" (12 Sides)	86.3687	-	-	43623.80	-
Bolt Group	Original (20) 2.25"Ø	3.9761	3.2477	0.8393	39954.58	4.5

REACTION DISTRIBUTION

Component	ID	Moment M _u (k-ft)	Axial Load P _u (k)	Shear V _u (k)	Moment Factor
Pole	64"Ø x 0.4375" (12 Sides)	4281.7	61.53	36.42	1.000
Bolt Group	Original (20) 2.25"Ø	4281.7	-	36.42	1.000

BASE PLATE BEND LINE ANALYSIS @ 0 FT

POLE PROPERTIES

Flat-to-Flat Diameter:	64.12	in
Point-to-Point Diameter:	66.39	in
Orientation Offset:	-	°

Flat Width:	17.182	in
Flat Radians:	0.524	rad

PLATE PROPERTIES

Neutral Axis:	342	°
Bend Line Limits:	0.766 to 1.747	rad

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 /ΦM _n
Flats	41.071	0.00	64.173	816.3	3465.3	23.6%
Corners	37.304	0.00	58.287	325.1	3147.5	10.3%
Circumferential	49.380	0.00	77.157	813.8	4166.5	19.5%

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)	Plastic Result
Original	20	2.25	122.3	2.9	243.6	50.2%

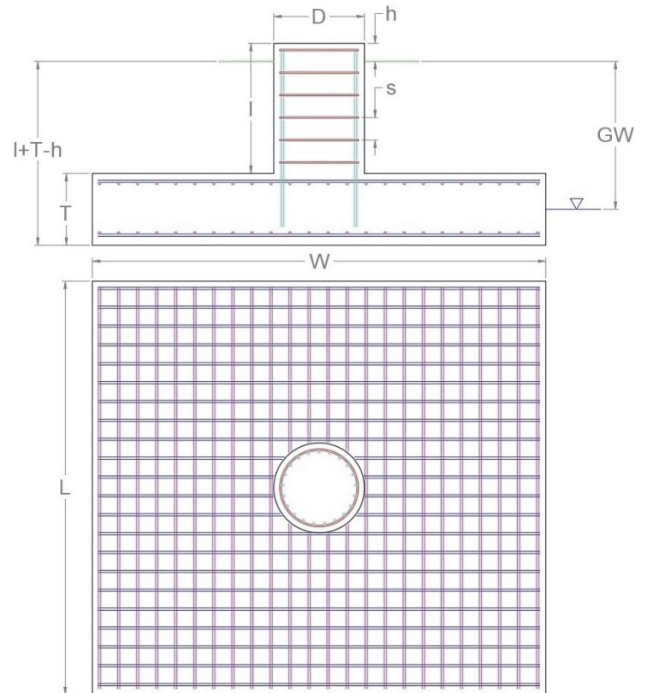
MONOLITHIC MAT & PIER FOUNDATION ANALYSIS

APPLIED GLOBAL REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
4,281.68	61.53	36.42

FOUNDATION PARAMETERS

Mat Length:	L	25	ft
Mat Width:	W	25	ft
Mat Thickness:	T	3.5	ft
Base Depth:	L+T-h	8.5	ft
Pier Shape:		Round	
Pier Diameter:	D	7	ft
Pier Height above Grade:	h	0.5	ft
Concrete Compressive Strength:		4,000	psi
Mat Top Rebar:		(30) #11 bars [60 ksi]	
Mat Bottom Rebar:		(30) #11 bars [60 ksi]	
Pier Vertical Rebar:		(30) #11 bars [60 ksi]	
Pier Rebar Ties:	s	#5 bars @ 12.0" c/c [60 ksi]	
Rebar Clear Cover:		3.0	in
Tower Eccentricity:	ecc	0	ft
Tower Leg Count		1	



SOIL PARAMETERS

Water Table Depth [BGL]:	GW	10	ft
Soil Unit Weight:		125	pcf
Ultimate Skin Friction:		0	psf
Ultimate Bearing Pressure:		10,000	psf
Bearing Pressure Type:		Gross	
Coefficient of Shear Friction:		0.3	

SOIL STRENGTH ANALYSIS

Soil Strength Reduction Factor, Φ_s	Uplift Strength Reduction Factor, Φ_s	Asset Dead Load Factor	Dead Load Factor
0.75	0.75	0.9	1.2

SOIL OVERTURNING ANALYSIS

Design Moment, $M_{u,Design}$ (k-ft)	Nominal Overturning Capacity, $\Phi_m M_n$ (k-ft)	Soil Overturning Usage, $M_{u,Design} / \Phi_m M_n$
4,609.46	9,430.66	48.9% ✔

SOIL BEARING ANALYSIS

Net Bearing Pressure, $P_{u,Net}$ (psf)	Nominal Bearing Capacity, $\Phi_b P_n$ (k-ft)	Bearing Pressure Controlling Load Direction	Soil Bearing Usage, $P_{u,net} / \Phi_b P_n$
2,331.00	7,500.00	Diagonal to Pad Edge	31.1% ✔

SOIL SLIDING SHEAR ANALYSIS

Applied Shear Force, V_u (k)	Friction Resistance (k)	Passive Pressure (psf)	Passive Pressure Resistance (k)	Nominal Shear Capacity, $\Phi_s V_n$ (k)	Soil Sliding Shear Usage, $V_u / \Phi_s V_n$
36.42	0.00	843.8	73.83	230.36	16.0% ✔

MAT REINFORCING STEEL STRENGTH ANALYSIS

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

MAT REINFORCING ONE WAY SHEAR ANALYSIS

One Way Design Shear, V_u (k)	Nominal One Way Shear Capacity, $\Phi_c V_n$ (k)	One Way Shear Controlling Load Direction	Mat One Way Shear Usage, $V_u / \Phi_c V_n$
154.72	945.95	Diagonal to Pad Edge	16.4%

MAT REINFORCING PUNCHING SHEAR ANALYSIS

Punching Shear Design Stress, v_u (psi)	Nominal Punching Shear Capacity, $\Phi_c v_n$ (psi)	Mat Punching Shear Usage, $v_u / \Phi_c v_n$
39.5	189.7	20.8%

MAT REINFORCING MOMENT TRANSFER ANALYSIS

Moment Transfer Effective Flexural Width, w_t (in)	Neutral Axis Depth (in)	Pier Moment at Joint, M_{ut} (k-in)	Nominal Moment Transfer Capacity, $\Phi M_{sc,f}$ (k-in)	Mat Moment Transfer Usage, $0.6 M_{ut} / \Phi M_{sc,f}$
17.50	2.85	0.00	66,755.1	0.0%

MAT REINFORCING FLEXURE ANALYSIS – UPPER STEEL

Factored Moment, M_u (k-ft)	Nominal Flexural Capacity, ΦM_n (k-ft)	Flexural Steel Controlling Load Direction	Mat Upper Rebar Flexure Usage, $M_u / \Phi M_n$
1,164.38	7,677.42	Parallel to Pad Edge	15.2%

MAT REINFORCING FLEXURE ANALYSIS – LOWER STEEL

Factored Moment, M_u (k-ft)	Nominal Flexural Capacity, ΦM_n (k-ft)	Flexural Steel Controlling Load Direction	Mat Lower Rebar Flexure Usage, $M_u / \Phi M_n$
1,701.70	7,677.42	Parallel to Pad Edge	22.2%

PIER 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
75.38	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, $M_u / \Phi_b M_n$
4,481.99	7,768.29	0.008	57.7%

PIER REINFORCING COMPRESSION ANALYSIS

Design Compression, P_u (k)	Nominal Compressive Capacity, $\Phi_p P_n$ (k)	Pier Rebar Compressive Usage, $P_u / \Phi_p P_n$
61.53	9,763.78	0.6%

PIER REINFORCING SHEAR ANALYSIS

Design Shear, V_u (k)	Nominal Shear Capacity, $\Phi_v V_n$ (k)	Pier Rebar Shear Usage, $V_u / \Phi_v V_n$
36.42	684.90	5.3%