AMERICAN TOWER®
CORPORATION

Post Modification Structural Analysis Report

Structure	:	**181.9 ft Monopole**
ATC Site Name	:	**Harwinton, CT**
ATC Site Number	:	**302502**
Engineering Number	:	**OAA684307_C4_07**
Proposed Carrier	:	**Metro PCS**
Carrier Site Name	:	**ATC Harwinton Monopole**
Carrier Site Number	:	**CTNH517A**
Site Location	:	**159 Weingart Road** **Harwinton, CT 06791-1109** **41.787750,-73.092500**
County	:	**Litchfield**
Date	:	**December 22, 2016**
Max Usage	:	**92%**
Result	:	**Pass ***

Reviewed by:
William Garrett, PE
Chief Engineer

STATE OF CONNECTICUT
WILLIAM GARRETT
No. 23235
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PROFESSIONAL ENGINEER

Prepared By:
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Table of Contents

Introduction 1

Supporting Documents 1

Analysis 1

Conclusion 1

Existing and Reserved Equipment 2

Equipment to be Removed 2

Proposed Equipment 2

Structure Usages 3

Foundations 3

Deflection, Twist, and Sway 3

Standard Conditions 4

Calculations ..... Attached

Introduction

The purpose of this report is to summarize results of a post modification structural analysis performed on the 181.9 ft monopole to reflect the change in loading by Metro PCS.

Supporting Documents

Tower Drawings	Mapping by Smith Cullum Inc. Site #CT-0038, dated February 13, 2002
Foundation Drawing	Girard & Co. Engineers Job # 3C237, dated April 24, 1994
Geotechnical Report	Johnson Soils Engineering Co. Report # 14974-H dated January 28, 2002
Modifications	Hutter Trunkina Engineering Project # 03320B, dated August 4, 2003 ATC Project # 42504234, dated February 27, 2009 ATC Job # OAA684307_C6_06, dated November 16, 2016 (Pending)*

*** The modifications by ATC Job #OAA684307 are scheduled to be installed by [June 26, 2017].**

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:	91 mph (3-Second Gust, V_{asd}) / 117 mph (3-Second Gust, V_{ult})
Basic Wind Speed w/ Ice:	40 mph (3-Second Gust) w/ 1" radial ice concurrent
Code:	ANSI/TIA-222-G / 2012 IBC / 2016 Connecticut State Building Code
Structure Class:	II
Exposure Category:	B
Topographic Category:	1
Crest Height:	0 ft
Spectral Response:	Ss = 0.18, S_1 = 0.06
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report. If the pending modifications cited in the Supporting Documents table are not completed by the forecast date above, the results of this analysis are no longer valid, and Metro PCS should contact American Tower's Site Manager for further direction on how to proceed.

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

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
181.9	185.0	1	Andrew ABT-DFDM-ADB	Platform w/ Handrails	(12) 1 1/4" Coax (2) 0.78" 8 AWG 6 (1) 0.39" Fiber Trunk	AT&T Mobility
		6	Powerwave Allgon LGP21401			
		1	Raycap DC6-48-60-0-8F			
		6	Ericsson RRUS 11 (Band 12)			
		6	Powerwave Allgon 7770.00			
		3	KMW AM-X-CD-16-65-00T-RET			
175.0	175.0	6	RFS FD9R6004/2C-3L (3.1 lbs)	Low Profile Platform	(12) 1 5/8" Coax	Verizon
		3	Antel BXA-171063-12BF-EDIN-X			
		3	Antel BXA-70063-6CF-EDIN-X			
		6	Antel LPA-80063/6CF			
165.0	165.0	3	Ericsson AIR 21, 1.3 M, B2A B4P	-	(6) 1 5/8" Coax (1) 1 5/8" Fiber	Metro PCS
		3	Ericsson AIR 21, 1.3M, B4A B2P			
145.0	145.0	3	KMW TTA (HB-X-WM-17-65-00T)	Side Arms	(6) 1 5/8" Coax	Clearwire
		3	KMW HB-X-WM-17-65-00T			

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
165.0	165.0	3	RFS APXV18-206517-C	-	-	Metro PCS

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
165.0	165.0	3	Andrew LNX-6515DS-A1M	Platform w/ Handrails*	-	Metro PCS

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

*** Per application, carrier is proposing installation of a Platform w/ Handrails. This mount is to be composed of round members and not to exceed a total CaAa of 27.2 sqft. This service is void if otherwise.**

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	80%	Pass
Shaft	66%	Pass
Base Plate	38%	Pass
Flanges	43%	Pass
Reinforcement	92%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3,550.8	86%
Axial (Kips)	61.8	59%
Shear (Kips)	29.3	39%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
165.0	Andrew LNX-6515DS-A1M	Metro PCS	2.489	1.769

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

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Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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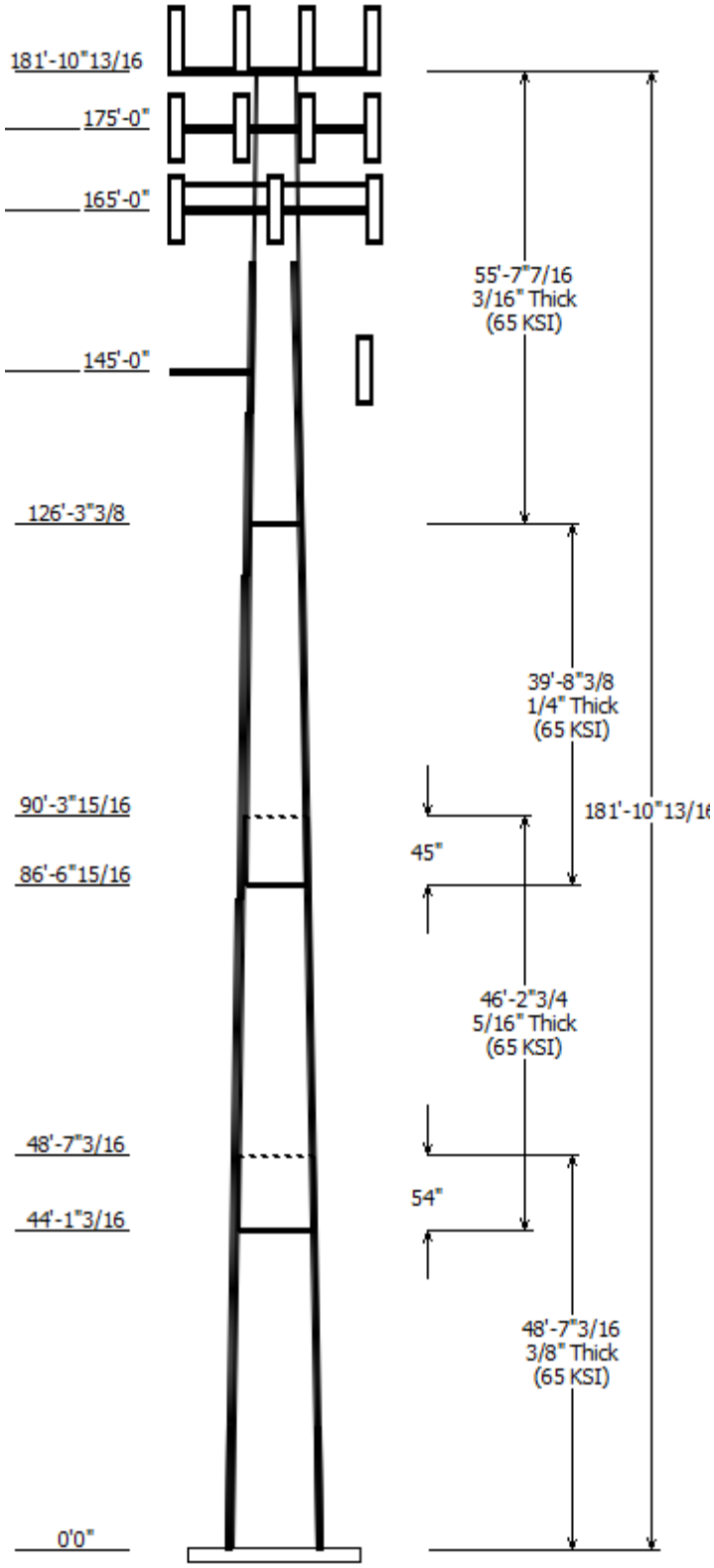


Job Information

Pole :	302502	Code:	ANSI/TIA-222-G
Description :	182 ft Monopole		
Client :	Metro PCS	Struct Class :	II
Location :	Harwinton, CT		
Shape :	12 Sides	Exposure :	B
Height :	181.90 (ft)	Topo :	1
Base Elev (ft):	0.00		
Taper:	0.162864 (in/ft)		

Sections Properties

Shaft Section	Length (ft)	Diameter (in) Accross Flats Top	Bottom	Thick (in)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)
1	48.600	35.08	43.00	0.375		0.000	0.162900	65
2	46.230	28.91	36.44	0.313	Slip Joint	54.000	0.162900	65
3	39.700	23.55	30.02	0.250	Slip Joint	45.000	0.162900	65
4	55.620	14.50	23.55	0.188	Butt Joint	0.000	0.162900	65

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
181.900	185.000	1	Raycap DC6-48-60-0-8F
181.900	185.000	1	Andrew ABT-DFDM-ADB
181.900	185.000	6	Ericsson RRUS 11 (Band 12)
181.900	185.000	3	KMW AM-X-CD-16-65-00T-RET
181.900	185.000	6	Powerwave Allgon LGP21401
181.900	181.900	1	Flat Platform w/ Handrails
181.900	185.000	6	Powerwave Allgon 7770.00
175.000	175.000	6	RFS FD9R6004/2C-3L (3.1 lbs)
175.000	175.000	3	Antel BXA-70063-6CF-EDIN-X
175.000	175.000	3	Antel BXA-171063-12BF-EDIN-X
175.000	175.000	1	Flat Low Profile Platform
175.000	175.000	6	Antel LPA-80063/6CF
165.000	165.000	3	Andrew LNX-6515DS-A1M
165.000	165.000	1	Round Platform w/ Handrails
165.000	165.000	3	Ericsson AIR 21, 1.3M, B4A B2P
165.000	165.000	3	Ericsson AIR 21, 1.3 M, B2A B4
145.000	145.000	1	Side Arms
145.000	145.000	3	KMW TTA (HB-X-WM-17-65-00T)
145.000	145.000	3	KMW HB-X-WM-17-65-00T

Linear Appurtenance

Elev (ft) From	To	Description	Exposed To Wind
140.0	160.0	3" Solid Rod	Yes
120.0	140.0	3.5" Solid Rod	Yes
80.000	120.0	4.0" Solid Rod	Yes
5.000	145.0	1 5/8" Coax	Yes
5.000	165.0	1 5/8" Coax	No
5.000	165.0	1 5/8" Fiber	No
5.000	175.0	1 5/8" Coax	No
5.000	181.9	0.39" Fiber Trunk	No
5.000	181.9	0.78" 8 AWG 6	No
5.000	181.9	1 1/4" Coax	No
0.000	20.000	#20Dywidag	Yes
0.000	80.000	4.25" Solid Rod	Yes

Load Cases

1.2D + 1.6W	91 mph with No Ice
0.9D + 1.6W	91 mph with No Ice (Reduced DL)

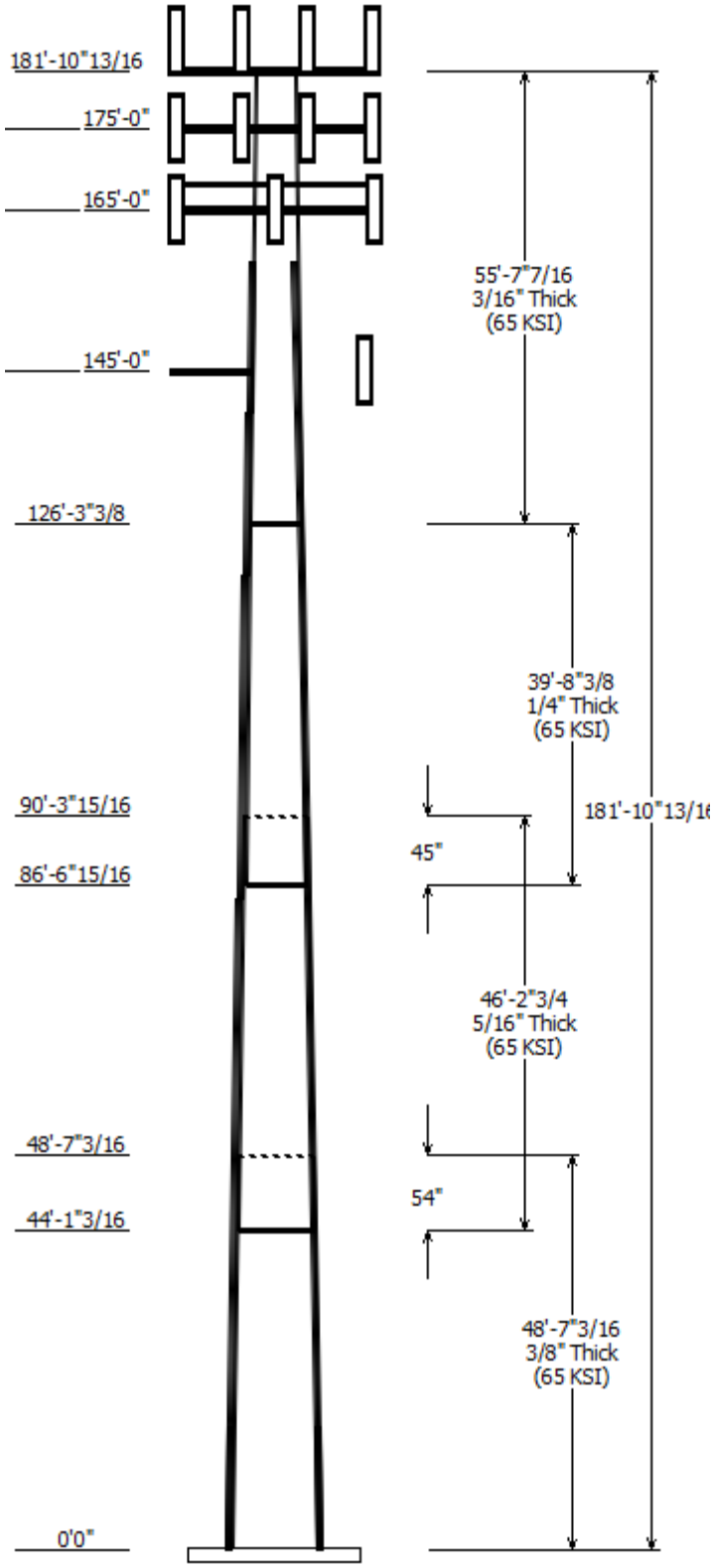
1.2D + 1.0Di + 1.0Wi	40 mph with 1.00 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph

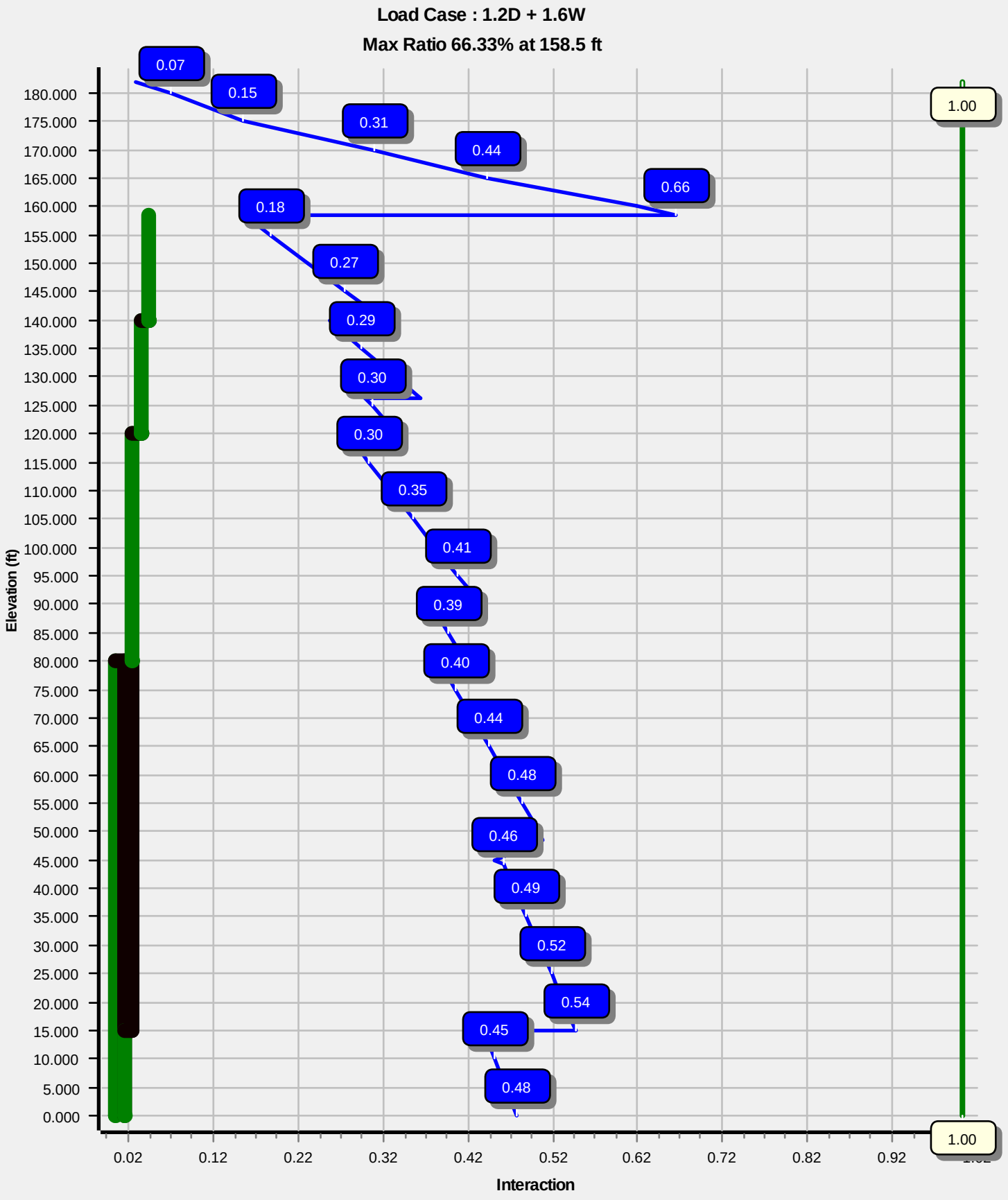
Reactions

Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	3550.83	29.26	61.79
0.9D + 1.6W	3493.01	29.23	46.34
1.2D + 1.0Di + 1.0Wi	693.74	5.13	100.16
(1.2 + 0.2Sds) * DL + E ELFM	299.96	2.02	61.56
(1.2 + 0.2Sds) * DL + E EMAM	389.44	2.85	61.56
(0.9 - 0.2Sds) * DL + E ELFM	293.90	2.01	42.79
(0.9 - 0.2Sds) * DL + E EMAM	380.87	2.84	42.79
1.0D + 1.0W	984.46	8.30	51.53

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
	0.00	0.000	0.000




Load Case : 1.2D + 1.6W
Max Ratio 66.33% at 158.5 ft
0.07
0.15
0.31
0.44
0.66
0.18
0.27
0.29
0.30
0.30
0.35
0.41
0.39
0.40
0.44
0.48
0.46
0.49
0.52
0.54
0.45
0.48
1.00
1.00
Elevation (ft)
180.000
175.000
170.000
165.000
160.000
155.000
150.000
145.000
140.000
135.000
130.000
125.000
120.000
115.000
110.000
105.000
100.000
95.000
90.000
85.000
80.000
75.000
70.000
65.000
60.000
55.000
50.000
45.000
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
0.000
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Interaction

Site Number:	302502	Code: ANSI/TIA-222-G	© 2007 - 2016 by ATC IP LLC. All rights reserved.
Site Name:	Harwinton, CT	Engineering Number:OAA684307_C4_07	12/23/2016 12:26:47 PM
Customer:	Metro PCS		

Analysis Parameters

Location:	Litchfield County, CT		
Code:	ANSI/TIA-222-G	Height (ft):	181.
Shape:	12 Sides	Base Diameter (in):	43.00
Pole Type:	Taper	Top Diameter (in):	14.50
Pole Manfacturer:	Mapped	Taper (in/ft) :	0.163

Ice & Wind Parameters

Structure Class:	II	Design Wind Speed Without Ice:	91 mph
Exposure Category:	B	Design Wind Speed With Ice:	40 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0.0 ft	Design Ice Thickness:	1.00 in

Seismic Parameters

Analysis Method:	Equivalent Modal Analysis & Equivalent Lateral Force Methods				
Site Class:	D - Stiff Soil				
Period Based on Rayleigh Method (sec):		3.01			
T_L (sec):	6	p:	1.3	C_s:	0.030
S_s:	0.182	S_1:	0.065	C_s Max:	0.030
F_a:	1.600	F_v :	2.400	C_s Min:	0.030
S_{ds}:	0.194	S_{d1}:	0.104		

Load Cases

1.2D + 1.6W	91 mph with No Ice
0.9D + 1.6W	91 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph with 1.00 in Radial Ice
(1.2 + 0.2Sds) * DL + E ELFM	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E EMAM	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E ELFM	Seismic (Reduced DL) Equivalent Lateral Forces Method
(0.9 - 0.2Sds) * DL + E EMAM	Seismic (Reduced DL) Equivalent Modal Analysis Method
1.0D + 1.0W	Serviceability 60 mph

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Shaft Section Properties

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint Len (in)	Weight (lb)	Bottom Dia (in)	Bottom Elev (ft)	Bottom Area (in 2)	Bottom Ix (in4)	Bottom W/t Ratio	Bottom D/t Ratio	Top Dia (in)	Top Elev (ft)	Top Area (in2)	Top Ix (in4)	Top W/t Ratio	Top D/t Ratio	Taper (in/ft)
1-12	48.600	0.3750	65		0.00	7,722	43.00	0.00	51.47	11936.2	28.05	114.67	35.08	48.60	41.91	6445.1	22.39	93.56	0.162864
2-12	46.230	0.3125	65	Slip	54.00	5,123	36.44	44.10	36.36	6057.6	28.57	116.62	28.91	90.33	28.78	3004.9	22.11	92.52	0.162864
3-12	39.700	0.2500	65	Slip	45.00	2,886	30.02	86.58	23.97	2712.1	29.50	120.10	23.55	126.28	18.76	1301.1	22.57	94.23	0.162864
4-12	55.620	0.1875	65	Butt	0.00	2,153	23.55	126.28	14.11	983.7	30.99	125.65	14.50	181.90	8.64	225.9	18.04	77.33	0.162864
				Shaft Weight		17,884													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice EPAa (sf)	No Ice Orientation Factor	Ice Weight (lb)	Ice EPAa (sf)	Ice Orientation Factor	Distance From Face (ft)	Vert Ecc (ft)
181.90	Andrew ABT-DFDM-ADB	1	1.10	0.050	0.50	11.38	0.269	0.50	0.000	3.100
181.90	Ericsson RRUS 11 (Band 12)	6	50.00	2.570	0.50	170.44	3.484	0.67	0.000	3.100
181.90	Flat Platform w/ Handrails	1	2000.00	42.400	1.00	3,934.73	70.951	1.00	0.000	0.000
181.90	KMW AM-X-CD-16-65-00T-	3	48.50	8.020	0.67	323.87	9.821	0.67	0.000	3.100
181.90	Powerwave Allgon 7770.00	6	35.00	5.510	0.65	233.76	6.976	0.65	0.000	3.100
181.90	Powerwave Allgon LGP21401	6	14.10	1.100	0.50	66.44	1.757	0.50	0.000	3.100
181.90	Raycap DC6-48-60-0-8F	1	32.80	1.190	1.00	162.12	2.910	1.00	0.000	3.100
175.00	Antel BXA-171063-12BF-EDIN-	3	15.00	4.730	0.72	193.34	6.432	0.72	0.000	0.000
175.00	Antel BXA-70063-6CF-EDIN-X	3	17.00	7.570	0.66	270.62	9.323	0.66	0.000	0.000
175.00	Antel LPA-80063/6CF	6	27.00	9.590	0.76	436.73	11.471	0.76	0.000	0.000
175.00	Flat Low Profile Platform	1	1500.00	26.100	1.00	2,377.81	51.967	1.00	0.000	0.000
175.00	RFS FD9R6004/2C-3L (3.1 lbs)	6	3.10	0.310	0.50	24.98	0.701	0.50	0.000	0.000
165.00	Andrew LNX-6515DS-A1M	3	49.80	11.450	0.70	426.62	13.696	0.70	0.000	0.000
165.00	Ericsson AIR 21, 1.3 M, B2A	3	83.00	6.050	0.71	325.57	7.559	0.71	0.000	0.000
165.00	Ericsson AIR 21, 1.3M, B4A	3	90.40	6.090	0.70	332.91	7.604	0.70	0.000	0.000
165.00	Round Platform w/ Handrails	1	2000.00	27.200	1.00	3,745.17	60.121	1.00	0.000	0.000
145.00	KMW HB-X-WM-17-65-00T	3	30.00	1.920	1.00	189.86	4.557	1.00	0.000	0.000
145.00	KMW TTA (HB-X-WM-17-65-	3	15.90	0.560	1.00	68.24	1.599	1.00	0.000	0.000
145.00	Side Arms	1	560.00	8.500	1.00	1,182.29	17.945	1.00	0.000	0.000
	Totals	60	7917.90			23,400.61			Number of Loadings :	19

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Flat	Projected Width (in)	Exposed To Wind	Carrier
5.00	181.90	1	0.39" Fiber Trunk	0.39	0.06	N	0.00	N	AT&T Mobility
5.00	181.90	2	0.78" 8 AWG 6	0.78	0.59	N	0.00	N	AT&T Mobility
5.00	181.90	12	1 1/4" Coax	1.55	0.63	N	0.00	N	AT&T Mobility
5.00	175.00	12	1 5/8" Coax	1.98	0.82	N	0.00	N	Verizon
5.00	165.00	6	1 5/8" Coax	1.98	0.82	N	0.00	N	Metro PCS
5.00	165.00	1	1 5/8" Fiber	1.63	1.61	N	0.00	N	Metro PCS
140.00	160.00	3	3" Solid Rod	3.00	0.00	N	6.00	Y	--
5.00	145.00	6	1 5/8" Coax	1.98	0.82	N	0.00	Y	Clearwire
120.00	140.00	3	3.5" Solid Rod	3.50	0.00	N	7.00	Y	--
80.00	120.00	3	4.0" Solid Rod	4.00	0.00	N	8.00	Y	--
0.00	80.00	3	4.25" Solid Rod	4.25	0.00	N	8.50	Y	--
0.00	20.00	3	#20Dywidag	2.50	0.00	N	10.00	Y	--

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Additional Steel

Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Offset (in)	Intermediate Connections Description	Spacing (in)	Len (in)	Connectors	Continuation?
0.00	80.00	3	SOL 4 1/4" SOLID	50	0.75	6" Angle Bracket	16.5	3.50	5/8" Hollo Bolt	No
0.00	15.00	3	SOL #20 All Thread	80	5.00	6" T Bracket	30.0	3.31	5/8" Hollo Bolt	No
80.00	120.0	3	SOL 4" SOLID	50	0.88	6" Angle Bracket	22.0	3.50	5/8" Hollo Bolt	No
120.0	140.0	3	SOL 3 1/2" SOLID	50	1.13	6" Angle Bracket	22.0	3.50	5/8" Hollo Bolt	No
140.0	158.5	3	SOL 3" SOLID	50	1.38	6" Angle Bracket	22.0	3.50	5/8" Hollo Bolt	No

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Segment Properties (Max Len : 5. ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	F'y (ksi)	S (in^3)	Z (in^3)	Weight (lb)	Additional Reinforcing Area (in^2)	Ix (in^4)	Weight (lb)
0.00		0.3750	43.000	51.470	11,936.2	28.05	114.67	74.1	536.3	0.0	0.0	57.28	18,54	0.0
5.00		0.3750	42.186	50.486	11,265.1	27.46	112.50	74.8	515.9	0.0	867.3	57.28	17,95	974.5
10.00		0.3750	41.371	49.503	10,619.6	26.88	110.32	75.4	495.9	0.0	850.6	57.28	17,36	974.5
15.00	Reinf. Top	0.3750	40.557	48.520	9,999.3	26.30	108.15	76.0	476.3	0.0	833.9	57.28	16,79	974.5
20.00		0.3750	39.743	47.537	9,403.6	25.72	105.98	76.7	457.1	0.0	817.1	42.55	11,05	724.0
25.00		0.3750	38.928	46.553	8,832.0	25.14	103.81	77.3	438.3	0.0	800.4	42.55	10,66	724.0
30.00		0.3750	38.114	45.570	8,284.1	24.55	101.64	77.9	419.9	0.0	783.7	42.55	10,28	724.0
35.00		0.3750	37.300	44.587	7,759.4	23.97	99.47	78.6	401.9	0.0	767.0	42.55	9,907	724.0
40.00		0.3750	36.485	43.603	7,257.2	23.39	97.29	79.2	384.3	0.0	750.2	42.55	9,537	724.0
44.10	Bot - Section 2	0.3750	35.818	42.797	6,862.0	22.91	95.51	79.7	370.1	0.0	602.7	42.55	9,239	593.7
45.00		0.3750	35.671	42.620	6,777.3	22.81	95.12	79.8	367.0	0.0	241.9	42.55	9,452	130.3
48.60	Top - Section 1	0.3125	35.710	35.619	5,696.4	27.94	114.27	74.2	308.2	0.0	957.7	42.55	9,192	521.3
50.00		0.3125	35.482	35.389	5,587.1	27.74	113.54	74.5	304.2	0.0	169.1	42.55	9,091	202.7
55.00		0.3125	34.667	34.570	5,207.9	27.05	110.94	75.2	290.2	0.0	595.1	42.55	8,738	724.0
60.00		0.3125	33.853	33.750	4,846.3	26.35	108.33	76.0	276.6	0.0	581.2	42.55	8,391	724.0
65.00		0.3125	33.039	32.931	4,501.8	25.65	105.72	76.7	263.2	0.0	567.3	42.55	8,052	724.0
70.00		0.3125	32.225	32.111	4,174.0	24.95	103.12	77.5	250.2	0.0	553.3	42.55	7,719	724.0
75.00		0.3125	31.410	31.292	3,862.6	24.25	100.51	78.3	237.6	0.0	539.4	42.55	7,394	724.0
80.00	Reinf. Top Reinf	0.3125	30.596	30.473	3,567.0	23.55	97.91	79.0	225.2	0.0	525.4	42.55	7,075	724.0
85.00		0.3125	29.782	29.653	3,286.9	22.86	95.30	79.8	213.2	0.0	511.5	37.69	5,986	641.4
86.58	Bot - Section 3	0.3125	29.524	29.394	3,201.6	22.64	94.48	80.0	209.5	0.0	158.7	37.69	5,901	202.7
90.00		0.3125	28.967	28.834	3,021.9	22.16	92.70	80.5	201.5	0.0	615.1	37.69	5,882	438.7
90.33	Top - Section 2	0.2500	29.413	23.477	2,548.6	28.85	117.65	73.3	167.4	0.0	58.7	37.69	5,864	42.3
95.00		0.2500	28.653	22.864	2,354.3	28.03	114.61	74.1	158.7	0.0	368.2	37.69	5,614	599.1
100.0		0.2500	27.839	22.209	2,157.6	27.16	111.35	75.1	149.7	0.0	383.4	37.69	5,354	641.4
105.0		0.2500	27.024	21.553	1,972.1	26.29	108.10	76.0	141.0	0.0	372.3	37.69	5,099	641.4
110.0		0.2500	26.210	20.898	1,797.6	25.41	104.84	77.0	132.5	0.0	361.1	37.69	4,851	641.4
115.0		0.2500	25.396	20.242	1,633.7	24.54	101.58	78.0	124.3	0.0	350.0	37.69	4,608	641.4
120.0	Reinf. Top Reinf	0.2500	24.581	19.587	1,480.1	23.67	98.33	78.9	116.3	0.0	338.8	37.69	4,372	641.4
125.0		0.2500	23.767	18.931	1,336.4	22.79	95.07	79.9	108.6	0.0	327.7	28.86	3,165	491.1
126.2	Top - Section 3	0.2500	23.559	18.763	1,301.1	22.57	94.23	80.1	106.7	0.0	82.1	28.86	3,121	125.7
126.2	Bot - Section 4	0.1875	23.559	14.110	983.7	30.99	125.65	70.9	80.7	0.0		28.86	3,121	
130.0		0.1875	22.953	13.744	909.2	30.12	122.41	71.9	76.5	0.0	176.3	28.86	2,994	365.4
135.0		0.1875	22.138	13.253	815.1	28.96	118.07	73.1	71.1	0.0	229.7	28.86	2,828	491.1
140.0	Reinf. Top Reinf	0.1875	21.324	12.761	727.7	27.79	113.73	74.4	65.9	0.0	221.3	28.86	2,666	491.1
145.0		0.1875	20.510	12.270	646.8	26.63	109.39	75.7	60.9	0.0	212.9	21.20	1,839	360.8
150.0		0.1875	19.695	11.778	572.1	25.47	105.04	76.9	56.1	0.0	204.6	21.20	1,728	360.8
155.0		0.1875	18.881	11.286	503.4	24.30	100.70	78.2	51.5	0.0	196.2	21.20	1,620	360.8
158.5	Reinf. Top	0.1875	18.311	10.942	458.7	23.49	97.66	79.1	48.4	0.0	132.4	21.20	1,546	252.5
160.0		0.1875	18.067	10.795	440.4	23.14	96.36	79.5	47.1	0.0	55.5			
165.0		0.1875	17.252	10.303	383.0	21.98	92.01	80.7	42.9	0.0	179.5			
170.0		0.1875	16.438	9.811	330.7	20.81	87.67	81.9	38.9	0.0	171.1			
175.0		0.1875	15.624	9.320	283.4	19.65	83.33	81.9	35.0	0.0	162.7			
180.0		0.1875	14.809	8.828	240.9	18.48	78.98	81.9	31.4	0.0	154.4			
181.9		0.1875	14.500	8.641	225.9	18.04	77.33	81.9	30.1	0.0	56.5			
											17,884.1			20,766.

Site Number: 302502 Code: ANSI/TIA-222-G © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Harwinton, CT Engineering Number:OAA684307_C4_07 12/23/2016 12:26:47 PM

Customer: Metro PCS

Load Case: 1.2D + 1.6W 91 mph with No Ice 27 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		273.5	0.0					0.0	0.0	273.5	0.0	0.0	0.0
5.00		541.8	1,040.8					125.1	1,169.5	667.0	2,210.3	0.0	0.0
10.00		531.4	1,020.7					125.1	1,350.0	656.5	2,370.7	0.0	0.0
15.00	Reinf. Top	520.9	1,000.7					125.1	1,350.0	646.0	2,350.6	0.0	0.0
20.00		510.4	980.6					125.1	1,049.4	635.6	2,030.0	0.0	0.0
25.00		500.0	960.5					62.6	1,049.4	562.5	2,009.9	0.0	0.0
30.00		495.3	940.4					62.6	1,049.4	557.9	1,989.8	0.0	0.0
35.00		500.7	920.3					63.3	1,049.4	564.0	1,969.7	0.0	0.0
40.00		462.6	900.3					64.6	1,049.4	527.2	1,949.7	0.0	0.0
44.10	Bot - Section 2	256.9	723.2					53.9	860.5	310.8	1,583.7	0.0	0.0
45.00		236.3	290.3					11.9	188.9	248.2	479.2	0.0	0.0
48.60	Top - Section 1	263.0	1,149.2					48.0	755.6	311.0	1,904.8	0.0	0.0
50.00		338.3	203.0					18.8	293.8	357.2	496.8	0.0	0.0
55.00		529.7	714.2					67.8	1,049.4	597.5	1,763.5	0.0	0.0
60.00		530.3	697.4					68.7	1,049.4	599.0	1,746.8	0.0	0.0
65.00		529.5	680.7					69.5	1,049.4	599.0	1,730.1	0.0	0.0
70.00		527.5	664.0					70.3	1,049.4	597.8	1,713.4	0.0	0.0
75.00		524.5	647.2					71.0	1,049.4	595.5	1,696.6	0.0	0.0
80.00	Reinf. Top Reinf	520.4	630.5					71.7	1,049.4	592.1	1,679.9	0.0	0.0
85.00		340.4	613.8					72.3	950.2	412.7	1,564.0	0.0	0.0
86.58	Bot - Section 3	259.3	190.5					23.0	300.3	282.3	490.7	0.0	0.0
90.00		195.1	738.2					50.0	649.9	245.1	1,388.1	0.0	0.0
90.33	Top - Section 2	257.7	70.5					4.8	62.7	262.5	133.2	0.0	0.0
95.00		494.8	441.8					68.7	887.5	563.5	1,329.3	0.0	0.0
100.00		504.7	460.1					74.1	950.2	578.8	1,410.3	0.0	0.0
105.00		496.8	446.7					74.6	950.2	571.4	1,396.9	0.0	0.0
110.00		488.3	433.4					75.1	950.2	563.4	1,383.6	0.0	0.0
115.00		479.2	420.0					75.6	950.2	554.8	1,370.2	0.0	0.0
120.00	Reinf. Top Reinf	469.5	406.6					76.1	950.2	545.5	1,356.8	0.0	0.0
125.00		290.9	393.2					76.5	769.8	367.4	1,163.0	0.0	0.0
126.28	Top - Section 3	227.0	98.5					19.7	197.1	246.7	295.6	0.0	0.0
130.00		389.9	211.6					57.3	572.8	447.2	784.3	0.0	0.0
135.00		437.3	275.6					77.4	769.8	514.7	1,045.4	0.0	0.0
140.00	Reinf. Top Reinf	425.6	265.6					77.8	769.8	503.4	1,035.4	0.0	0.0
145.00	Appertunance(s)	413.5	255.5	620.9	0.0	0.0	837.2	78.2	613.4	1,112.6	1,706.2	0.0	0.0
150.00		400.9	245.5					78.6	583.9	479.5	829.4	0.0	0.0
155.00		331.5	235.4					79.0	583.9	410.4	819.3	0.0	0.0
158.50	Reinf. Top	190.7	158.8					55.5	408.7	246.2	567.6	0.0	0.0
160.00		209.8	66.6					23.8	45.3	233.6	111.9	0.0	0.0
165.00	Appertunance(s)	300.7	215.4	2,606.5	0.0	0.0	3,203.5	0.0	151.0	2,907.2	3,569.9	0.0	0.0
170.00		289.0	205.3					0.0	111.8	289.0	317.2	0.0	0.0
175.00	Appertunance(s)	277.0	195.3	3,370.0	0.0	0.0	2,131.9	0.0	111.8	3,647.0	2,439.0	0.0	0.0
180.00		185.3	185.3					0.0	52.8	185.3	238.1	0.0	0.0
181.90		49.8	67.8					0.0	20.1	49.8	87.8	0.0	0.0
									Totals:	26,118.1	58,508.6	0.00	0.00

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Load Case: 1.2D + 1.6W 91 mph with No Ice 27 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-61.79	-29.26	0.00	-3,550.83	0.00	3,550.83	3,433.77	1,716.88	6,036.76	2,981.33	0.00	0.00	0.475
5.00	-59.50	-28.76	0.00	-3,404.55	0.00	3,404.55	3,397.00	1,698.50	5,857.04	2,892.57	0.09	-0.16	0.462
10.00	-57.06	-28.25	0.00	-3,260.77	0.00	3,260.77	3,359.11	1,679.56	5,677.90	2,804.10	0.35	-0.32	0.449
15.00	-54.63	-27.74	0.00	-3,119.52	0.00	3,119.52	3,320.10	1,660.05	5,499.48	2,715.99	0.77	-0.49	0.436
15.00	-54.63	-27.74	0.00	-3,119.52	0.00	3,119.52	3,320.10	1,660.05	5,499.48	2,715.99	0.77	-0.49	0.544
20.00	-52.52	-27.25	0.00	-2,980.81	0.00	2,980.81	3,279.97	1,639.98	5,321.88	2,628.28	1.37	-0.65	0.530
25.00	-50.43	-26.84	0.00	-2,844.54	0.00	2,844.54	3,238.71	1,619.36	5,145.22	2,541.03	2.16	-0.85	0.515
30.00	-48.35	-26.42	0.00	-2,710.32	0.00	2,710.32	3,196.33	1,598.17	4,969.60	2,454.30	3.16	-1.05	0.501
35.00	-46.30	-25.98	0.00	-2,578.20	0.00	2,578.20	3,152.83	1,576.41	4,795.15	2,368.14	4.37	-1.26	0.486
40.00	-44.28	-25.55	0.00	-2,448.28	0.00	2,448.28	3,108.20	1,554.10	4,621.97	2,282.62	5.80	-1.46	0.471
44.10	-42.66	-25.28	0.00	-2,343.51	0.00	2,343.51	3,070.77	1,535.38	4,481.00	2,213.00	7.12	-1.63	0.459
45.00	-42.15	-25.08	0.00	-2,320.76	0.00	2,320.76	3,062.45	1,531.23	4,450.19	2,197.78	7.43	-1.66	0.448
48.60	-40.22	-24.78	0.00	-2,230.48	0.00	2,230.48	2,379.97	1,189.99	3,474.54	1,715.94	8.74	-1.81	0.505
50.00	-39.67	-24.50	0.00	-2,195.78	0.00	2,195.78	2,371.43	1,185.72	3,439.58	1,698.68	9.28	-1.86	0.500
55.00	-37.85	-23.98	0.00	-2,073.28	0.00	2,073.28	2,340.22	1,170.11	3,315.01	1,637.16	11.34	-2.07	0.481
60.00	-36.04	-23.44	0.00	-1,953.38	0.00	1,953.38	2,307.88	1,153.94	3,191.02	1,575.92	13.62	-2.27	0.461
65.00	-34.26	-22.89	0.00	-1,836.17	0.00	1,836.17	2,274.42	1,137.21	3,067.70	1,515.02	16.11	-2.48	0.442
70.00	-32.49	-22.33	0.00	-1,721.70	0.00	1,721.70	2,239.83	1,119.92	2,945.16	1,454.51	18.82	-2.68	0.422
75.00	-30.75	-21.76	0.00	-1,610.03	0.00	1,610.03	2,204.12	1,102.06	2,823.54	1,394.44	21.73	-2.88	0.402
80.00	-29.03	-21.18	0.00	-1,501.22	0.00	1,501.22	2,167.29	1,083.65	2,702.93	1,334.88	24.85	-3.08	0.383
80.00	-29.03	-21.18	0.00	-1,501.22	0.00	1,501.22	2,167.29	1,083.65	2,702.93	1,334.88	24.85	-3.08	0.414
85.00	-27.45	-20.75	0.00	-1,395.30	0.00	1,395.30	2,129.34	1,064.67	2,583.46	1,275.87	28.17	-3.27	0.394
86.58	-26.94	-20.49	0.00	-1,362.52	0.00	1,362.52	2,117.11	1,058.55	2,545.96	1,257.35	29.27	-3.34	0.387
90.00	-25.54	-20.19	0.00	-1,292.46	0.00	1,292.46	2,090.26	1,045.13	2,465.23	1,217.49	31.71	-3.48	0.366
90.33	-25.39	-19.97	0.00	-1,285.80	0.00	1,285.80	1,547.78	773.89	1,862.15	919.64	31.95	-3.49	0.431
95.00	-24.03	-19.40	0.00	-1,192.55	0.00	1,192.55	1,525.71	762.86	1,787.32	882.69	35.46	-3.68	0.406
100.00	-22.59	-18.81	0.00	-1,095.53	0.00	1,095.53	1,500.99	750.50	1,707.51	843.28	39.42	-3.88	0.379
105.00	-21.18	-18.22	0.00	-1,001.47	0.00	1,001.47	1,475.16	737.58	1,628.14	804.08	43.59	-4.08	0.353
110.00	-19.78	-17.62	0.00	-910.37	0.00	910.37	1,448.19	724.10	1,549.32	765.15	47.96	-4.27	0.327
115.00	-18.40	-17.02	0.00	-822.27	0.00	822.27	1,420.11	710.05	1,471.16	726.55	52.53	-4.46	0.301
120.00	-17.04	-16.42	0.00	-737.16	0.00	737.16	1,390.90	695.45	1,393.78	688.34	57.29	-4.64	0.276
120.00	-17.04	-16.42	0.00	-737.16	0.00	737.16	1,390.90	695.45	1,393.78	688.34	57.29	-4.64	0.334
125.00	-15.88	-15.99	0.00	-655.05	0.00	655.05	1,360.57	680.28	1,317.29	650.56	62.23	-4.80	0.304
126.28	-15.58	-15.75	0.00	-634.58	0.00	634.58	1,352.62	676.31	1,297.87	640.97	63.53	-4.86	0.296
126.28	-15.58	-15.75	0.00	-634.58	0.00	634.58	900.61	450.31	868.79	429.06	63.53	-4.86	0.361
130.00	-14.79	-15.28	0.00	-576.01	0.00	576.01	888.95	444.47	835.13	412.44	67.37	-5.00	0.332
135.00	-13.75	-14.72	0.00	-499.61	0.00	499.61	872.29	436.14	789.93	390.12	72.71	-5.20	0.293
140.00	-12.72	-14.16	0.00	-426.02	0.00	426.02	854.50	427.25	744.88	367.87	78.24	-5.38	0.254
140.00	-12.72	-14.16	0.00	-426.02	0.00	426.02	854.50	427.25	744.88	367.87	78.24	-5.38	0.321
145.00	-11.09	-12.92	0.00	-355.22	0.00	355.22	835.60	417.80	700.09	345.75	83.96	-5.54	0.273
150.00	-10.28	-12.40	0.00	-290.61	0.00	290.61	815.57	407.78	655.68	323.81	89.86	-5.73	0.229
155.00	-9.48	-11.93	0.00	-228.63	0.00	228.63	794.42	397.21	611.76	302.12	95.94	-5.89	0.184
158.50	-8.92	-11.63	0.00	-186.89	0.00	186.89	778.94	389.47	581.37	287.12	100.28	-5.98	0.154
158.50	-8.92	-11.63	0.00	-186.89	0.00	186.89	778.94	389.47	581.37	287.12	100.28	-5.98	0.663
160.00	-8.79	-11.43	0.00	-169.44	0.00	169.44	772.14	386.07	568.44	280.73	102.17	-6.02	0.616
165.00	-5.50	-8.19	0.00	-112.30	0.00	112.30	748.74	374.37	525.85	259.70	108.72	-6.48	0.440
170.00	-5.18	-7.89	0.00	-71.36	0.00	71.36	723.19	361.60	483.41	238.74	115.68	-6.82	0.307
175.00	-3.19	-3.98	0.00	-31.92	0.00	31.92	686.95	343.48	435.91	215.28	122.94	-7.04	0.153
180.00	-2.97	-3.77	0.00	-12.01	0.00	12.01	650.71	325.36	390.87	193.04	130.36	-7.15	0.067
181.90	0.00	-3.37	0.00	-4.84	0.00	4.84	636.94	318.47	374.40	184.90	133.20	-7.17	0.026

Site Number: 302502 Code: ANSI/TIA-222-G © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Harwinton, CT Engineering Number: OAA684307_C4_07 12/23/2016 12:26:49 PM

Customer: Metro PCS

Load Case: 0.9D + 1.6W 91 mph with No Ice (Reduced DL) 26 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces Wind FX (lb)	Shaft Forces Dead Load (lb)	Discrete Forces Wind FX (lb)	Discrete Forces Torsion MY (lb-ft)	Discrete Forces Moment MZ (lb-ft)	Discrete Forces Dead Load (lb)	Linear Forces Wind FX (lb)	Linear Forces Dead Load (lb)	Sum of Forces Wind FX (lb)	Sum of Forces Dead Load (lb)	Sum of Forces Torsion MY (lb-ft)	Sum of Forces Moment MZ (lb)
0.00		273.5	0.0					0.0	0.0	273.5	0.0	0.0	0.0
5.00		541.8	780.6					125.1	877.1	667.0	1,657.7	0.0	0.0
10.00		531.4	765.5					125.1	1,012.5	656.5	1,778.0	0.0	0.0
15.00	Reinf. Top	520.9	750.5					125.1	1,012.5	646.0	1,763.0	0.0	0.0
20.00		510.4	735.4					125.1	787.0	635.6	1,522.5	0.0	0.0
25.00		500.0	720.4					62.6	787.0	562.5	1,507.4	0.0	0.0
30.00		495.3	705.3					62.6	787.0	557.9	1,492.4	0.0	0.0
35.00		500.7	690.3					63.3	787.0	564.0	1,477.3	0.0	0.0
40.00		462.6	675.2					64.6	787.0	527.2	1,462.2	0.0	0.0
44.10	Bot - Section 2	256.9	542.4					53.9	645.4	310.8	1,187.8	0.0	0.0
45.00		236.3	217.7					11.9	141.7	248.2	359.4	0.0	0.0
48.60	Top - Section 1	263.0	861.9					48.0	566.7	311.0	1,428.6	0.0	0.0
50.00		338.3	152.2					18.8	220.4	357.2	372.6	0.0	0.0
55.00		529.7	535.6					67.8	787.0	597.5	1,322.7	0.0	0.0
60.00		530.3	523.1					68.7	787.0	599.0	1,310.1	0.0	0.0
65.00		529.5	510.5					69.5	787.0	599.0	1,297.6	0.0	0.0
70.00		527.5	498.0					70.3	787.0	597.8	1,285.0	0.0	0.0
75.00		524.5	485.4					71.0	787.0	595.5	1,272.5	0.0	0.0
80.00	Reinf. Top Reinf	520.4	472.9					71.7	787.0	592.1	1,259.9	0.0	0.0
85.00		340.4	460.3					72.3	712.6	412.7	1,173.0	0.0	0.0
86.58	Bot - Section 3	259.3	142.9					23.0	225.2	282.3	368.1	0.0	0.0
90.00		195.1	553.6					50.0	487.5	245.1	1,041.1	0.0	0.0
90.33	Top - Section 2	257.7	52.9					4.8	47.0	262.5	99.9	0.0	0.0
95.00		494.8	331.4					68.7	665.6	563.5	997.0	0.0	0.0
100.00		504.7	345.1					74.1	712.6	578.8	1,057.7	0.0	0.0
105.00		496.8	335.1					74.6	712.6	571.4	1,047.7	0.0	0.0
110.00		488.3	325.0					75.1	712.6	563.4	1,037.7	0.0	0.0
115.00		479.2	315.0					75.6	712.6	554.8	1,027.6	0.0	0.0
120.00	Reinf. Top Reinf	469.5	304.9					76.1	712.6	545.5	1,017.6	0.0	0.0
125.00		290.9	294.9					76.5	577.4	367.4	872.3	0.0	0.0
126.28	Top - Section 3	227.0	73.9					19.7	147.8	246.7	221.7	0.0	0.0
130.00		389.9	158.7					57.3	429.6	447.2	588.2	0.0	0.0
135.00		437.3	206.7					77.4	577.4	514.7	784.1	0.0	0.0
140.00	Reinf. Top Reinf	425.6	199.2					77.8	577.4	503.4	776.5	0.0	0.0
145.00	Appertunance(s)	413.5	191.6	620.9	0.0	0.0	627.9	78.2	460.1	1,112.6	1,279.6	0.0	0.0
150.00		400.9	184.1					78.6	437.9	479.5	622.0	0.0	0.0
155.00		331.5	176.6					79.0	437.9	410.4	614.5	0.0	0.0
158.50	Reinf. Top	190.7	119.1					55.5	306.5	246.2	425.7	0.0	0.0
160.00		209.8	49.9					23.8	34.0	233.6	83.9	0.0	0.0
165.00	Appertunance(s)	300.7	161.5	2,606.5	0.0	0.0	2,402.6	0.0	113.3	2,907.2	2,677.4	0.0	0.0
170.00		289.0	154.0					0.0	83.9	289.0	237.9	0.0	0.0
175.00	Appertunance(s)	277.0	146.5	3,370.0	0.0	0.0	1,598.9	0.0	83.9	3,647.0	1,829.3	0.0	0.0
180.00		185.3	138.9					0.0	39.6	185.3	178.5	0.0	0.0
181.90		49.8	50.8					0.0	15.0	49.8	65.9	0.0	0.0
									Totals:	26,118.1	43,881.4	0.00	0.00

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Load Case: 0.9D + 1.6W 91 mph with No Ice (Reduced DL) 26 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-46.34	-29.23	0.00	-3,493.01	0.00	3,493.01	3,433.77	1,716.88	6,036.76	2,981.33	0.00	0.00	0.466
5.00	-44.60	-28.69	0.00	-3,346.85	0.00	3,346.85	3,397.00	1,698.50	5,857.04	2,892.57	0.09	-0.16	0.453
10.00	-42.75	-28.14	0.00	-3,203.41	0.00	3,203.41	3,359.11	1,679.56	5,677.90	2,804.10	0.34	-0.32	0.440
15.00	-40.91	-27.60	0.00	-3,062.70	0.00	3,062.70	3,320.10	1,660.05	5,499.48	2,715.99	0.76	-0.48	0.427
15.00	-40.91	-27.60	0.00	-3,062.70	0.00	3,062.70	3,320.10	1,660.05	5,499.48	2,715.99	0.76	-0.48	0.532
20.00	-39.31	-27.07	0.00	-2,924.71	0.00	2,924.71	3,279.97	1,639.98	5,321.88	2,628.28	1.35	-0.64	0.518
25.00	-37.72	-26.62	0.00	-2,789.35	0.00	2,789.35	3,238.71	1,619.36	5,145.22	2,541.03	2.12	-0.84	0.504
30.00	-36.15	-26.16	0.00	-2,656.26	0.00	2,656.26	3,196.33	1,598.17	4,969.60	2,454.30	3.10	-1.03	0.489
35.00	-34.59	-25.69	0.00	-2,525.44	0.00	2,525.44	3,152.83	1,576.41	4,795.15	2,368.14	4.30	-1.23	0.474
40.00	-33.06	-25.23	0.00	-2,397.00	0.00	2,397.00	3,108.20	1,554.10	4,621.97	2,282.62	5.69	-1.43	0.459
44.10	-31.84	-24.95	0.00	-2,293.54	0.00	2,293.54	3,070.77	1,535.38	4,481.00	2,213.00	6.99	-1.59	0.447
45.00	-31.45	-24.74	0.00	-2,271.09	0.00	2,271.09	3,062.45	1,531.23	4,450.19	2,197.78	7.30	-1.63	0.437
48.60	-29.99	-24.43	0.00	-2,182.04	0.00	2,182.04	2,379.97	1,189.99	3,474.54	1,715.94	8.58	-1.77	0.493
50.00	-29.57	-24.13	0.00	-2,147.84	0.00	2,147.84	2,371.43	1,185.72	3,439.58	1,698.68	9.11	-1.83	0.487
55.00	-28.19	-23.59	0.00	-2,027.18	0.00	2,027.18	2,340.22	1,170.11	3,315.01	1,637.16	11.13	-2.03	0.468
60.00	-26.82	-23.04	0.00	-1,909.23	0.00	1,909.23	2,307.88	1,153.94	3,191.02	1,575.92	13.37	-2.23	0.449
65.00	-25.47	-22.47	0.00	-1,794.05	0.00	1,794.05	2,274.42	1,137.21	3,067.70	1,515.02	15.81	-2.43	0.430
70.00	-24.14	-21.90	0.00	-1,681.68	0.00	1,681.68	2,239.83	1,119.92	2,945.16	1,454.51	18.46	-2.62	0.411
75.00	-22.83	-21.32	0.00	-1,572.18	0.00	1,572.18	2,204.12	1,102.06	2,823.54	1,394.44	21.31	-2.82	0.392
80.00	-21.53	-20.74	0.00	-1,465.56	0.00	1,465.56	2,167.29	1,083.65	2,702.93	1,334.88	24.36	-3.01	0.372
80.00	-21.53	-20.74	0.00	-1,465.56	0.00	1,465.56	2,167.29	1,083.65	2,702.93	1,334.88	24.36	-3.01	0.403
85.00	-20.33	-20.31	0.00	-1,361.86	0.00	1,361.86	2,129.34	1,064.67	2,583.46	1,275.87	27.62	-3.20	0.383
86.58	-19.95	-20.04	0.00	-1,329.77	0.00	1,329.77	2,117.11	1,058.55	2,545.96	1,257.35	28.69	-3.27	0.376
90.00	-18.90	-19.76	0.00	-1,261.23	0.00	1,261.23	2,090.26	1,045.13	2,465.23	1,217.49	31.08	-3.40	0.356
90.33	-18.78	-19.53	0.00	-1,254.71	0.00	1,254.71	1,547.78	773.89	1,862.15	919.64	31.32	-3.42	0.419
95.00	-17.75	-18.96	0.00	-1,163.52	0.00	1,163.52	1,525.71	762.86	1,787.32	882.69	34.75	-3.60	0.394
100.00	-16.67	-18.37	0.00	-1,068.72	0.00	1,068.72	1,500.99	750.50	1,707.51	843.28	38.62	-3.80	0.369
105.00	-15.61	-17.78	0.00	-976.85	0.00	976.85	1,475.16	737.58	1,628.14	804.08	42.70	-3.99	0.343
110.00	-14.56	-17.19	0.00	-887.93	0.00	887.93	1,448.19	724.10	1,549.32	765.15	46.98	-4.18	0.318
115.00	-13.52	-16.61	0.00	-801.96	0.00	801.96	1,420.11	710.05	1,471.16	726.55	51.45	-4.36	0.293
120.00	-12.50	-16.02	0.00	-718.92	0.00	718.92	1,390.90	695.45	1,393.78	688.34	56.11	-4.53	0.268
120.00	-12.50	-16.02	0.00	-718.92	0.00	718.92	1,390.90	695.45	1,393.78	688.34	56.11	-4.53	0.325
125.00	-11.64	-15.61	0.00	-638.82	0.00	638.82	1,360.57	680.28	1,317.29	650.56	60.94	-4.70	0.295
126.28	-11.41	-15.36	0.00	-618.84	0.00	618.84	1,352.62	676.31	1,297.87	640.97	62.21	-4.75	0.288
126.28	-11.41	-15.36	0.00	-618.84	0.00	618.84	900.61	450.31	868.79	429.06	62.21	-4.75	0.351
130.00	-10.82	-14.90	0.00	-561.70	0.00	561.70	888.95	444.47	835.13	412.44	65.96	-4.89	0.322
135.00	-10.03	-14.35	0.00	-487.20	0.00	487.20	872.29	436.14	789.93	390.12	71.19	-5.08	0.284
140.00	-9.27	-13.81	0.00	-415.46	0.00	415.46	854.50	427.25	744.88	367.87	76.60	-5.26	0.246
140.00	-9.27	-13.81	0.00	-415.46	0.00	415.46	854.50	427.25	744.88	367.87	76.60	-5.26	0.311
145.00	-8.06	-12.60	0.00	-346.43	0.00	346.43	835.60	417.80	700.09	345.75	82.19	-5.42	0.265
150.00	-7.45	-12.09	0.00	-283.41	0.00	283.41	815.57	407.78	655.68	323.81	87.95	-5.60	0.222
155.00	-6.85	-11.63	0.00	-222.98	0.00	222.98	794.42	397.21	611.76	302.12	93.89	-5.75	0.179
158.50	-6.44	-11.35	0.00	-182.26	0.00	182.26	778.94	389.47	581.37	287.12	98.14	-5.85	0.149
158.50	-6.44	-11.35	0.00	-182.26	0.00	182.26	778.94	389.47	581.37	287.12	98.14	-5.85	0.644
160.00	-6.33	-11.14	0.00	-165.23	0.00	165.23	772.14	386.07	568.44	280.73	99.99	-5.89	0.598
165.00	-3.93	-7.99	0.00	-109.53	0.00	109.53	748.74	374.37	525.85	259.70	106.39	-6.33	0.427
170.00	-3.69	-7.69	0.00	-69.58	0.00	69.58	723.19	361.60	483.41	238.74	113.19	-6.66	0.297
175.00	-2.29	-3.86	0.00	-31.11	0.00	31.11	686.95	343.48	435.91	215.28	120.28	-6.88	0.148
180.00	-2.13	-3.66	0.00	-11.79	0.00	11.79	650.71	325.36	390.87	193.04	127.54	-6.99	0.064
181.90	0.00	-3.37	0.00	-4.84	0.00	4.84	636.94	318.47	374.40	184.90	130.31	-7.01	0.026

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Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph with 1.00 in Radial Ice 26 Iterations

Gust Response Factor : 1.10 Ice Dead Load Factor : 1.00 Wind Importance Factor : 1.00
Dead Load Factor : 1.20 Ice Importance Factor : 1.00
Wind Load Factor : 1.00

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces Wind FX (lb)	Shaft Forces Dead Load (lb)	Discrete Forces Wind FX (lb)	Discrete Forces Torsion MY (lb-ft)	Discrete Forces Moment MZ (lb-ft)	Discrete Forces Dead Load (lb)	Linear Forces Wind FX (lb)	Linear Forces Dead Load (lb)	Sum of Forces Wind FX (lb)	Sum of Forces Dead Load (lb)	Sum of Forces Torsion MY (lb-ft)	Sum of Forces Moment MZ (lb)
0.00		35.3	0.0					0.0	0.0	35.3	0.0	0.0	0.0
5.00		70.3	1,478.3					37.0	1,350.7	107.3	2,829.0	0.0	0.0
10.00		69.5	1,501.8					38.0	1,660.2	107.5	3,162.0	0.0	0.0
15.00	Reinf. Top	68.4	1,498.4					38.6	1,677.4	107.0	3,175.8	0.0	0.0
20.00		67.3	1,486.2					39.0	1,388.7	106.3	2,874.9	0.0	0.0
25.00		66.2	1,469.4					18.5	1,311.4	84.7	2,780.8	0.0	0.0
30.00		65.8	1,449.8					18.6	1,317.0	84.4	2,766.8	0.0	0.0
35.00		66.8	1,428.1					19.2	1,321.8	85.9	2,749.9	0.0	0.0
40.00		61.9	1,405.0					20.1	1,326.0	81.9	2,731.0	0.0	0.0
44.10	Bot - Section 2	34.4	1,134.9					17.1	1,090.1	51.5	2,225.0	0.0	0.0
45.00		31.7	382.4					3.8	239.6	35.5	622.0	0.0	0.0
48.60	Top - Section 1	35.3	1,513.7					15.5	959.5	50.8	2,473.2	0.0	0.0
50.00		45.6	344.6					6.1	373.6	51.7	718.2	0.0	0.0
55.00		71.5	1,212.4					22.3	1,336.1	93.8	2,548.5	0.0	0.0
60.00		71.8	1,189.3					23.0	1,338.9	94.8	2,528.3	0.0	0.0
65.00		71.9	1,165.7					23.6	1,341.5	95.6	2,507.3	0.0	0.0
70.00		71.9	1,141.6					24.2	1,344.0	96.1	2,485.6	0.0	0.0
75.00		71.8	1,117.1					24.7	1,346.3	96.5	2,463.4	0.0	0.0
80.00	Reinf. Top Reinf	71.5	1,092.2					25.3	1,348.4	96.8	2,440.6	0.0	0.0
85.00		46.9	1,067.0					24.8	1,242.3	71.7	2,309.3	0.0	0.0
86.58	Bot - Section 3	35.8	333.1					7.9	393.0	43.7	726.1	0.0	0.0
90.00		26.9	1,047.3					17.3	851.2	44.3	1,898.6	0.0	0.0
90.33	Top - Section 2	35.7	100.3					1.7	82.2	37.4	182.5	0.0	0.0
95.00		68.7	855.3					24.0	1,163.8	92.7	2,019.1	0.0	0.0
100.00		70.4	893.4					26.2	1,247.7	96.6	2,141.1	0.0	0.0
105.00		69.6	870.5					26.6	1,249.4	96.2	2,119.9	0.0	0.0
110.00		68.8	847.4					27.0	1,250.9	95.8	2,098.4	0.0	0.0
115.00		67.8	824.2					27.4	1,252.5	95.2	2,076.6	0.0	0.0
120.00	Reinf. Top Reinf	66.8	800.7					27.8	1,253.9	94.6	2,054.6	0.0	0.0
125.00		41.6	777.1					25.9	1,057.0	67.5	1,834.0	0.0	0.0
126.28	Top - Section 3	32.6	196.3					6.7	270.8	39.3	467.1	0.0	0.0
130.00		56.2	489.5					19.6	787.5	75.8	1,277.0	0.0	0.0
135.00		63.4	638.5					26.6	1,059.5	90.0	1,698.0	0.0	0.0
140.00	Reinf. Top Reinf	62.2	617.7					26.9	1,060.8	89.1	1,678.5	0.0	0.0
145.00	Appertunance(s)	60.8	596.8	171.3	0.0	0.0	1,976.1	24.9	888.0	257.0	3,460.9	0.0	0.0
150.00		59.5	575.8					25.2	709.4	84.6	1,285.3	0.0	0.0
155.00		49.5	554.7					25.4	709.9	75.0	1,264.7	0.0	0.0
158.50	Reinf. Top	28.7	377.0					18.0	497.2	46.6	874.2	0.0	0.0
160.00		36.4	159.1					7.7	83.3	44.2	242.4	0.0	0.0
165.00	Appertunance(s)	55.0	512.1	516.1	0.0	0.0	7,134.4	0.0	151.0	571.1	7,797.5	0.0	0.0
170.00		53.5	490.7					0.0	111.8	53.5	602.5	0.0	0.0
175.00	Appertunance(s)	51.9	469.1	602.5	0.0	0.0	6,695.2	0.0	111.8	654.3	7,276.2	0.0	0.0
180.00		35.0	447.5					0.0	52.8	35.0	500.3	0.0	0.0
181.90		9.5	165.8					0.0	20.1	9.5	185.9	0.0	0.0
								Totals:		4,524.12	92,153.0	0.00	0.00

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Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph with 1.00 in Radial Ice 26 Iterations

Gust Response Factor : 1.10 Ice Dead Load Factor : 1.00 Wind Importance Factor : 1.00
Dead Load Factor : 1.20 Ice Importance Factor : 1.00
Wind Load Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-100.16	-5.13	0.00	-693.74	0.00	693.74	3,433.77	1,716.88	6,036.76	2,981.33	0.00	0.00	0.105
5.00	-97.33	-5.08	0.00	-668.07	0.00	668.07	3,397.00	1,698.50	5,857.04	2,892.57	0.02	-0.03	0.102
10.00	-94.16	-5.02	0.00	-642.67	0.00	642.67	3,359.11	1,679.56	5,677.90	2,804.10	0.07	-0.06	0.100
15.00	-90.99	-4.96	0.00	-617.55	0.00	617.55	3,320.10	1,660.05	5,499.48	2,715.99	0.15	-0.10	0.097
15.00	-90.99	-4.96	0.00	-617.55	0.00	617.55	3,320.10	1,660.05	5,499.48	2,715.99	0.15	-0.10	0.121
20.00	-88.11	-4.91	0.00	-592.74	0.00	592.74	3,279.97	1,639.98	5,321.88	2,628.28	0.27	-0.13	0.118
25.00	-85.32	-4.88	0.00	-568.20	0.00	568.20	3,238.71	1,619.36	5,145.22	2,541.03	0.42	-0.17	0.115
30.00	-82.55	-4.84	0.00	-543.83	0.00	543.83	3,196.33	1,598.17	4,969.60	2,454.30	0.62	-0.21	0.112
35.00	-79.80	-4.80	0.00	-519.63	0.00	519.63	3,152.83	1,576.41	4,795.15	2,368.14	0.86	-0.25	0.109
40.00	-77.07	-4.76	0.00	-495.63	0.00	495.63	3,108.20	1,554.10	4,621.97	2,282.62	1.15	-0.29	0.106
44.10	-74.84	-4.72	0.00	-476.14	0.00	476.14	3,070.77	1,535.38	4,481.00	2,213.00	1.41	-0.32	0.104
45.00	-74.22	-4.70	0.00	-471.89	0.00	471.89	3,062.45	1,531.23	4,450.19	2,197.78	1.47	-0.33	0.102
48.60	-71.74	-4.66	0.00	-454.96	0.00	454.96	2,379.97	1,189.99	3,474.54	1,715.94	1.73	-0.36	0.115
50.00	-71.02	-4.64	0.00	-448.43	0.00	448.43	2,371.43	1,185.72	3,439.58	1,698.68	1.84	-0.37	0.114
55.00	-68.47	-4.58	0.00	-425.23	0.00	425.23	2,340.22	1,170.11	3,315.01	1,637.16	2.25	-0.41	0.110
60.00	-65.94	-4.51	0.00	-402.33	0.00	402.33	2,307.88	1,153.94	3,191.02	1,575.92	2.71	-0.46	0.106
65.00	-63.43	-4.44	0.00	-379.76	0.00	379.76	2,274.42	1,137.21	3,067.70	1,515.02	3.21	-0.50	0.102
70.00	-60.94	-4.37	0.00	-357.54	0.00	357.54	2,239.83	1,119.92	2,945.16	1,454.51	3.76	-0.54	0.098
75.00	-58.48	-4.29	0.00	-335.69	0.00	335.69	2,204.12	1,102.06	2,823.54	1,394.44	4.35	-0.58	0.094
80.00	-56.04	-4.21	0.00	-314.24	0.00	314.24	2,167.29	1,083.65	2,702.93	1,334.88	4.98	-0.62	0.090
80.00	-56.04	-4.21	0.00	-314.24	0.00	314.24	2,167.29	1,083.65	2,702.93	1,334.88	4.98	-0.62	0.097
85.00	-53.73	-4.14	0.00	-293.19	0.00	293.19	2,129.34	1,064.67	2,583.46	1,275.87	5.65	-0.66	0.093
86.58	-53.00	-4.10	0.00	-286.66	0.00	286.66	2,117.11	1,058.55	2,545.96	1,257.35	5.88	-0.68	0.091
90.00	-51.10	-4.05	0.00	-272.62	0.00	272.62	2,090.26	1,045.13	2,465.23	1,217.49	6.37	-0.71	0.087
90.33	-50.92	-4.03	0.00	-271.28	0.00	271.28	1,547.78	773.89	1,862.15	919.64	6.42	-0.71	0.102
95.00	-48.89	-3.95	0.00	-252.46	0.00	252.46	1,525.71	762.86	1,787.32	882.69	7.14	-0.75	0.097
100.00	-46.75	-3.86	0.00	-232.72	0.00	232.72	1,500.99	750.50	1,707.51	843.28	7.95	-0.79	0.091
105.00	-44.63	-3.76	0.00	-213.43	0.00	213.43	1,475.16	737.58	1,628.14	804.08	8.80	-0.84	0.085
110.00	-42.53	-3.67	0.00	-194.62	0.00	194.62	1,448.19	724.10	1,549.32	765.15	9.70	-0.88	0.079
115.00	-40.45	-3.57	0.00	-176.28	0.00	176.28	1,420.11	710.05	1,471.16	726.55	10.64	-0.92	0.073
120.00	-38.40	-3.46	0.00	-158.45	0.00	158.45	1,390.90	695.45	1,393.78	688.34	11.62	-0.95	0.068
120.00	-38.40	-3.46	0.00	-158.45	0.00	158.45	1,390.90	695.45	1,393.78	688.34	11.62	-0.95	0.082
125.00	-36.57	-3.38	0.00	-141.14	0.00	141.14	1,360.57	680.28	1,317.29	650.56	12.64	-0.99	0.075
126.28	-36.10	-3.35	0.00	-136.81	0.00	136.81	1,352.62	676.31	1,297.87	640.97	12.90	-1.00	0.073
126.28	-36.10	-3.35	0.00	-136.81	0.00	136.81	900.61	450.31	868.79	429.06	12.90	-1.00	0.090
130.00	-34.82	-3.27	0.00	-124.37	0.00	124.37	888.95	444.47	835.13	412.44	13.70	-1.03	0.083
135.00	-33.12	-3.17	0.00	-108.02	0.00	108.02	872.29	436.14	789.93	390.12	14.80	-1.08	0.074
140.00	-31.44	-3.07	0.00	-92.16	0.00	92.16	854.50	427.25	744.88	367.87	15.95	-1.11	0.065
140.00	-31.44	-3.07	0.00	-92.16	0.00	92.16	854.50	427.25	744.88	367.87	15.95	-1.11	0.082
145.00	-27.99	-2.76	0.00	-76.80	0.00	76.80	835.60	417.80	700.09	345.75	17.14	-1.15	0.070
150.00	-26.70	-2.67	0.00	-62.98	0.00	62.98	815.57	407.78	655.68	323.81	18.36	-1.19	0.060
155.00	-25.44	-2.58	0.00	-49.63	0.00	49.63	794.42	397.21	611.76	302.12	19.63	-1.22	0.050
158.50	-24.56	-2.52	0.00	-40.59	0.00	40.59	778.94	389.47	581.37	287.12	20.54	-1.25	0.043
158.50	-24.56	-2.52	0.00	-40.59	0.00	40.59	778.94	389.47	581.37	287.12	20.54	-1.25	0.173
160.00	-24.32	-2.50	0.00	-36.81	0.00	36.81	772.14	386.07	568.44	280.73	20.93	-1.25	0.163
165.00	-16.54	-1.77	0.00	-24.32	0.00	24.32	748.74	374.37	525.85	259.70	22.30	-1.35	0.116
170.00	-15.93	-1.72	0.00	-15.46	0.00	15.46	723.19	361.60	483.41	238.74	23.76	-1.43	0.087
175.00	-8.67	-0.89	0.00	-6.85	0.00	6.85	686.95	343.48	435.91	215.28	25.28	-1.47	0.044
180.00	-8.18	-0.84	0.00	-2.41	0.00	2.41	650.71	325.36	390.87	193.04	26.84	-1.50	0.025
181.90	0.00	-0.63	0.00	-0.81	0.00	0.81	636.94	318.47	374.40	184.90	27.44	-1.50	0.004

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Load Case: 1.0D + 1.0W Serviceability 60 mph 25 Iterations

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

Wind Importance Factor : 1.00

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces Wind FX (lb)	Shaft Forces Dead Load (lb)	Discrete Forces Wind FX (lb)	Discrete Forces Torsion MY (lb-ft)	Discrete Forces Moment MZ (lb-ft)	Discrete Forces Dead Load (lb)	Linear Forces Wind FX (lb)	Linear Forces Dead Load (lb)	Sum of Forces Wind FX (lb)	Sum of Forces Dead Load (lb)	Sum of Forces Torsion MY (lb-ft)	Sum of Forces Moment MZ (lb)
0.00		74.3	0.0					0.0	0.0	74.3	0.0	0.0	0.0
5.00		147.2	867.3					51.6	974.5	198.8	1,841.9	0.0	0.0
10.00		144.4	850.6					51.6	1,125.0	195.9	1,975.6	0.0	0.0
15.00	Reinf. Top	141.5	833.9					51.6	1,125.0	193.1	1,958.9	0.0	0.0
20.00		138.7	817.1					51.6	874.5	190.3	1,691.6	0.0	0.0
25.00		135.8	800.4					25.8	874.5	161.6	1,674.9	0.0	0.0
30.00		134.6	783.7					25.8	874.5	160.4	1,658.2	0.0	0.0
35.00		136.0	767.0					26.1	874.5	162.1	1,641.4	0.0	0.0
40.00		125.7	750.2					26.6	874.5	152.3	1,624.7	0.0	0.0
44.10	Bot - Section 2	69.8	602.7					22.2	717.1	92.0	1,319.8	0.0	0.0
45.00		64.2	241.9					4.9	157.4	69.1	399.3	0.0	0.0
48.60	Top - Section 1	71.5	957.7					19.8	629.6	91.3	1,587.3	0.0	0.0
50.00		91.9	169.1					7.8	244.9	99.7	414.0	0.0	0.0
55.00		143.9	595.1					27.9	874.5	171.9	1,469.6	0.0	0.0
60.00		144.1	581.2					28.3	874.5	172.4	1,455.7	0.0	0.0
65.00		143.9	567.3					28.6	874.5	172.5	1,441.7	0.0	0.0
70.00		143.3	553.3					29.0	874.5	172.3	1,427.8	0.0	0.0
75.00		142.5	539.4					29.3	874.5	171.8	1,413.9	0.0	0.0
80.00	Reinf. Top Reinf	141.4	525.4					29.5	874.5	170.9	1,399.9	0.0	0.0
85.00		92.5	511.5					29.8	791.8	122.3	1,303.3	0.0	0.0
86.58	Bot - Section 3	70.5	158.7					9.5	250.2	79.9	409.0	0.0	0.0
90.00		53.0	615.1					20.6	541.6	73.6	1,156.7	0.0	0.0
90.33	Top - Section 2	70.0	58.7					2.0	52.3	72.0	111.0	0.0	0.0
95.00		134.4	368.2					28.3	739.6	162.7	1,107.8	0.0	0.0
100.00		137.1	383.4					30.5	791.8	167.7	1,175.3	0.0	0.0
105.00		135.0	372.3					30.7	791.8	165.7	1,164.1	0.0	0.0
110.00		132.7	361.1					31.0	791.8	163.6	1,153.0	0.0	0.0
115.00		130.2	350.0					31.2	791.8	161.3	1,141.8	0.0	0.0
120.00	Reinf. Top Reinf	127.6	338.8					31.4	791.8	158.9	1,130.7	0.0	0.0
125.00		79.0	327.7					31.5	641.5	110.6	969.2	0.0	0.0
126.28	Top - Section 3	61.7	82.1					8.1	164.2	69.8	246.3	0.0	0.0
130.00		105.9	176.3					23.6	477.3	129.5	653.6	0.0	0.0
135.00		118.8	229.7					31.9	641.5	150.7	871.2	0.0	0.0
140.00	Reinf. Top Reinf	115.6	221.3					32.1	641.5	147.7	862.8	0.0	0.0
145.00	Appertunance(s)	112.3	212.9	168.7	0.0	0.0	697.7	31.6	511.2	312.6	1,421.8	0.0	0.0
150.00		108.9	204.6					31.9	486.6	140.8	691.2	0.0	0.0
155.00		90.1	196.2					32.2	486.6	122.3	682.8	0.0	0.0
158.50	Reinf. Top	51.8	132.4					22.7	340.6	74.5	473.0	0.0	0.0
160.00		57.0	55.5					9.8	37.8	66.8	93.2	0.0	0.0
165.00	Appertunance(s)	81.7	179.5	708.2	0.0	0.0	2,669.6	0.0	125.8	789.9	2,974.9	0.0	0.0
170.00		78.5	171.1					0.0	93.2	78.5	264.3	0.0	0.0
175.00	Appertunance(s)	75.3	162.7	915.7	0.0	0.0	1,776.6	0.0	93.2	990.9	2,032.5	0.0	0.0
180.00		50.3	154.4					0.0	44.0	50.3	198.4	0.0	0.0
181.90		13.5	56.5					0.0	16.7	13.5	73.2	0.0	0.0
									Totals:	7,449.06	48,757.1	0.00	0.00

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Load Case: 1.0D + 1.0W Serviceability 60 mph 25 Iterations

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

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-51.53	-8.30	0.00	-984.46	0.00	984.46	3,433.77	1,716.88	6,036.76	2,981.33	0.00	0.00	0.136
5.00	-49.68	-8.14	0.00	-942.97	0.00	942.97	3,397.00	1,698.50	5,857.04	2,892.57	0.02	-0.04	0.133
10.00	-47.70	-7.98	0.00	-902.29	0.00	902.29	3,359.11	1,679.56	5,677.90	2,804.10	0.10	-0.09	0.129
15.00	-45.73	-7.81	0.00	-862.41	0.00	862.41	3,320.10	1,660.05	5,499.48	2,715.99	0.21	-0.13	0.125
15.00	-45.73	-7.81	0.00	-862.41	0.00	862.41	3,320.10	1,660.05	5,499.48	2,715.99	0.21	-0.13	0.155
20.00	-44.04	-7.66	0.00	-823.34	0.00	823.34	3,279.97	1,639.98	5,321.88	2,628.28	0.38	-0.18	0.151
25.00	-42.35	-7.53	0.00	-785.05	0.00	785.05	3,238.71	1,619.36	5,145.22	2,541.03	0.60	-0.24	0.147
30.00	-40.69	-7.40	0.00	-747.39	0.00	747.39	3,196.33	1,598.17	4,969.60	2,454.30	0.87	-0.29	0.142
35.00	-39.04	-7.27	0.00	-710.37	0.00	710.37	3,152.83	1,576.41	4,795.15	2,368.14	1.21	-0.35	0.138
40.00	-37.41	-7.14	0.00	-674.02	0.00	674.02	3,108.20	1,554.10	4,621.97	2,282.62	1.60	-0.40	0.134
44.10	-36.09	-7.06	0.00	-644.74	0.00	644.74	3,070.77	1,535.38	4,481.00	2,213.00	1.97	-0.45	0.130
45.00	-35.69	-7.00	0.00	-638.39	0.00	638.39	3,062.45	1,531.23	4,450.19	2,197.78	2.06	-0.46	0.127
48.60	-34.10	-6.91	0.00	-613.19	0.00	613.19	2,379.97	1,189.99	3,474.54	1,715.94	2.42	-0.50	0.143
50.00	-33.68	-6.83	0.00	-603.51	0.00	603.51	2,371.43	1,185.72	3,439.58	1,698.68	2.57	-0.51	0.142
55.00	-32.21	-6.68	0.00	-569.37	0.00	569.37	2,340.22	1,170.11	3,315.01	1,637.16	3.13	-0.57	0.136
60.00	-30.75	-6.52	0.00	-535.99	0.00	535.99	2,307.88	1,153.94	3,191.02	1,575.92	3.76	-0.63	0.130
65.00	-29.30	-6.36	0.00	-503.40	0.00	503.40	2,274.42	1,137.21	3,067.70	1,515.02	4.45	-0.68	0.125
70.00	-27.87	-6.19	0.00	-471.61	0.00	471.61	2,239.83	1,119.92	2,945.16	1,454.51	5.19	-0.74	0.119
75.00	-26.45	-6.03	0.00	-440.64	0.00	440.64	2,204.12	1,102.06	2,823.54	1,394.44	6.00	-0.79	0.114
80.00	-25.05	-5.86	0.00	-410.50	0.00	410.50	2,167.29	1,083.65	2,702.93	1,334.88	6.86	-0.85	0.108
80.00	-25.05	-5.86	0.00	-410.50	0.00	410.50	2,167.29	1,083.65	2,702.93	1,334.88	6.86	-0.85	0.117
85.00	-23.74	-5.73	0.00	-381.19	0.00	381.19	2,129.34	1,064.67	2,583.46	1,275.87	7.77	-0.90	0.111
86.58	-23.33	-5.66	0.00	-372.14	0.00	372.14	2,117.11	1,058.55	2,545.96	1,257.35	8.07	-0.92	0.109
90.00	-22.18	-5.57	0.00	-352.78	0.00	352.78	2,090.26	1,045.13	2,465.23	1,217.49	8.74	-0.96	0.103
90.33	-22.06	-5.51	0.00	-350.94	0.00	350.94	1,547.78	773.89	1,862.15	919.64	8.81	-0.96	0.121
95.00	-20.95	-5.35	0.00	-325.21	0.00	325.21	1,525.71	762.86	1,787.32	882.69	9.78	-1.01	0.114
100.00	-19.78	-5.18	0.00	-298.46	0.00	298.46	1,500.99	750.50	1,707.51	843.28	10.86	-1.07	0.107
105.00	-18.61	-5.01	0.00	-272.57	0.00	272.57	1,475.16	737.58	1,628.14	804.08	12.01	-1.12	0.099
110.00	-17.46	-4.84	0.00	-247.53	0.00	247.53	1,448.19	724.10	1,549.32	765.15	13.21	-1.17	0.092
115.00	-16.32	-4.67	0.00	-223.34	0.00	223.34	1,420.11	710.05	1,471.16	726.55	14.47	-1.22	0.085
120.00	-15.18	-4.50	0.00	-200.01	0.00	200.01	1,390.90	695.45	1,393.78	688.34	15.78	-1.27	0.077
120.00	-15.18	-4.50	0.00	-200.01	0.00	200.01	1,390.90	695.45	1,393.78	688.34	15.78	-1.27	0.094
125.00	-14.22	-4.37	0.00	-177.54	0.00	177.54	1,360.57	680.28	1,317.29	650.56	17.13	-1.32	0.085
126.28	-13.97	-4.30	0.00	-171.94	0.00	171.94	1,352.62	676.31	1,297.87	640.97	17.49	-1.33	0.083
126.28	-13.97	-4.30	0.00	-171.94	0.00	171.94	900.61	450.31	868.79	429.06	17.49	-1.33	0.101
130.00	-13.32	-4.17	0.00	-155.94	0.00	155.94	888.95	444.47	835.13	412.44	18.54	-1.37	0.093
135.00	-12.44	-4.01	0.00	-135.11	0.00	135.11	872.29	436.14	789.93	390.12	20.01	-1.42	0.082
140.00	-11.58	-3.85	0.00	-115.07	0.00	115.07	854.50	427.25	744.88	367.87	21.53	-1.47	0.071
140.00	-11.58	-3.85	0.00	-115.07	0.00	115.07	854.50	427.25	744.88	367.87	21.53	-1.47	0.090
145.00	-10.17	-3.51	0.00	-95.84	0.00	95.84	835.60	417.80	700.09	345.75	23.09	-1.52	0.077
150.00	-9.48	-3.35	0.00	-78.32	0.00	78.32	815.57	407.78	655.68	323.81	24.71	-1.57	0.064
155.00	-8.80	-3.22	0.00	-61.55	0.00	61.55	794.42	397.21	611.76	302.12	26.37	-1.61	0.052
158.50	-8.32	-3.13	0.00	-50.29	0.00	50.29	778.94	389.47	581.37	287.12	27.56	-1.64	0.044
158.50	-8.32	-3.13	0.00	-50.29	0.00	50.29	778.94	389.47	581.37	287.12	27.56	-1.64	0.186
160.00	-8.23	-3.07	0.00	-45.59	0.00	45.59	772.14	386.07	568.44	280.73	28.08	-1.65	0.173
165.00	-5.28	-2.20	0.00	-30.23	0.00	30.23	748.74	374.37	525.85	259.70	29.87	-1.77	0.123
170.00	-5.01	-2.12	0.00	-19.20	0.00	19.20	723.19	361.60	483.41	238.74	31.78	-1.86	0.087
175.00	-3.01	-1.07	0.00	-8.58	0.00	8.58	686.95	343.48	435.91	215.28	33.76	-1.92	0.044
180.00	-2.81	-1.01	0.00	-3.24	0.00	3.24	650.71	325.36	390.87	193.04	35.79	-1.95	0.021
181.90	0.00	-0.92	0.00	-1.31	0.00	1.31	636.94	318.47	374.40	184.90	36.57	-1.96	0.007

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Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period (S_s):	0.18	
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06	
Long-Period Transition Period (T_L):	6	
Importance Factor (I_E):	1.00	
Site Coefficient F_a:	1.60	
Site Coeffiecient F_v:	2.40	
Response Modification Coefficient (R):	1.50	
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.19	
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10	
Seismic Response Coefficient (C_s):	0.03	
Upper Limit C_s	0.03	
Lower Limit C_s	0.03	
Period based on Rayleigh Method (sec):	3.01	
Redundancy Factor (p):	1.30	
Seismic Force Distribution Exponent (k):	2.00	
Total Unfactored Dead Load:	51.53	k
Seismic Base Shear (E):	2.01	k

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Equivalent Modal Forces Analysis

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period (S_s):	0.18
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Importance Factor (I_E):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.19
Desing Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10
Period Based on Rayleigh Method (sec):	3.01
Redundancy Factor (p):	1.30

Load Case (1.2 + 0.2Sds) * DL + E ELFM

Seismic Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
43	180.95	73	1.870	1.878	1.103	0.353	22	63
42	177.50	198	1.800	1.537	0.977	0.308	53	171
41	172.50	256	1.700	1.121	0.814	0.248	55	220
40	167.50	264	1.603	0.787	0.674	0.194	44	228
39	162.50	305	1.508	0.522	0.553	0.145	38	263
38	159.25	93	1.449	0.382	0.484	0.116	9	80
37	156.75	473	1.403	0.290	0.435	0.095	39	407
36	152.50	683	1.328	0.162	0.362	0.063	37	588
35	147.50	691	1.243	0.049	0.288	0.030	18	595
34	142.50	724	1.160	-0.030	0.226	0.003	2	624
33	137.50	863	1.080	-0.081	0.175	-0.020	-15	743
32	132.50	871	1.003	-0.109	0.133	-0.037	-28	750
31	128.14	654	0.938	-0.120	0.103	-0.048	-27	563
30	125.64	246	0.902	-0.122	0.088	-0.052	-11	212
29	122.50	969	0.857	-0.120	0.072	-0.056	-47	835
28	117.50	1,131	0.789	-0.110	0.051	-0.057	-56	974
27	112.50	1,142	0.723	-0.094	0.035	-0.053	-53	983
26	107.50	1,153	0.660	-0.074	0.023	-0.044	-44	993
25	102.50	1,164	0.600	-0.053	0.015	-0.031	-31	1,003
24	97.50	1,175	0.543	-0.032	0.009	-0.014	-14	1,012
23	92.67	1,108	0.490	-0.013	0.007	0.003	3	954
22	90.17	111	0.464	-0.003	0.006	0.011	1	96
21	88.29	1,157	0.445	0.003	0.006	0.017	17	996
20	85.79	409	0.420	0.012	0.006	0.025	9	352
19	82.50	1,303	0.389	0.022	0.007	0.033	38	1,122
18	77.50	1,400	0.343	0.035	0.009	0.044	53	1,206
17	72.50	1,414	0.300	0.045	0.012	0.051	62	1,218
16	67.50	1,428	0.260	0.053	0.016	0.055	68	1,230
15	62.50	1,442	0.223	0.060	0.020	0.057	71	1,242
14	57.50	1,456	0.189	0.064	0.025	0.057	72	1,254
13	52.50	1,470	0.157	0.067	0.029	0.057	72	1,266
12	49.30	414	0.139	0.069	0.032	0.056	20	357
11	46.80	1,587	0.125	0.070	0.034	0.056	77	1,367
10	44.55	399	0.113	0.070	0.035	0.055	19	344

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9	42.05	1,320	0.101	0.071	0.037	0.055	63	1,137
8	37.50	1,625	0.080	0.072	0.040	0.054	76	1,399
7	32.50	1,641	0.060	0.072	0.041	0.053	75	1,414
6	27.50	1,658	0.043	0.071	0.042	0.052	74	1,428
5	22.50	1,675	0.029	0.068	0.040	0.050	72	1,442
4	17.50	1,692	0.017	0.062	0.037	0.047	69	1,457
3	12.50	1,959	0.009	0.053	0.031	0.042	71	1,687
2	7.50	1,976	0.003	0.038	0.021	0.032	55	1,701
1	2.50	1,842	0.000	0.015	0.008	0.015	24	1,586
Andrew ABT-DFDM-ADB	181.90	1	1.890	1.980	1.140	0.366	0	1
Powerwave Allgon LGP	181.90	85	1.890	1.980	1.140	0.366	27	73
Raycap DC6-48-60-0-8	181.90	33	1.890	1.980	1.140	0.366	10	28
Ericsson RRUS 11 (Ba	181.90	300	1.890	1.980	1.140	0.366	95	258
Powerwave Allgon 777	181.90	210	1.890	1.980	1.140	0.366	67	181
KMW AM-X-CD-16-65-00	181.90	146	1.890	1.980	1.140	0.366	46	125
Flat Platform w/ Han	181.90	2,000	1.890	1.980	1.140	0.366	634	1,722
RFS FD9R6004/2C-3L (	175.00	19	1.749	1.318	0.892	0.277	4	16
Antel BXA-171063-12B	175.00	45	1.749	1.318	0.892	0.277	11	39
Antel BXA-70063-6CF-	175.00	51	1.749	1.318	0.892	0.277	12	44
Antel LPA-80063/6CF	175.00	162	1.749	1.318	0.892	0.277	39	140
Flat Low Profile Pla	175.00	1,500	1.749	1.318	0.892	0.277	361	1,292
Ericsson AIR 21, 1.3	165.00	249	1.555	0.646	0.611	0.168	36	214
Ericsson AIR 21, 1.3	165.00	271	1.555	0.646	0.611	0.168	40	234
Andrew LNX-6515DS-A1	165.00	149	1.555	0.646	0.611	0.168	22	129
Round Platform w/ Ha	165.00	2,000	1.555	0.646	0.611	0.168	292	1,722
KMW TTA (HB-X-WM-17-	145.00	48	1.201	0.006	0.256	0.016	1	41
KMW HB-X-WM-17-65-00	145.00	90	1.201	0.006	0.256	0.016	1	78
Side Arms	145.00	560	1.201	0.006	0.256	0.016	8	482
		51,531	59.362	29.912	22.810	6.788	2,859	44,377

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
43	180.95	73	1.870	1.878	1.103	0.353	22	63
42	177.50	198	1.800	1.537	0.977	0.308	53	171
41	172.50	256	1.700	1.121	0.814	0.248	55	220
40	167.50	264	1.603	0.787	0.674	0.194	44	228
39	162.50	305	1.508	0.522	0.553	0.145	38	263
38	159.25	93	1.449	0.382	0.484	0.116	9	80
37	156.75	473	1.403	0.290	0.435	0.095	39	407
36	152.50	683	1.328	0.162	0.362	0.063	37	588
35	147.50	691	1.243	0.049	0.288	0.030	18	595
34	142.50	724	1.160	-0.030	0.226	0.003	2	624
33	137.50	863	1.080	-0.081	0.175	-0.020	-15	743
32	132.50	871	1.003	-0.109	0.133	-0.037	-28	750
31	128.14	654	0.938	-0.120	0.103	-0.048	-27	563
30	125.64	246	0.902	-0.122	0.088	-0.052	-11	212
29	122.50	969	0.857	-0.120	0.072	-0.056	-47	835
28	117.50	1,131	0.789	-0.110	0.051	-0.057	-56	974
27	112.50	1,142	0.723	-0.094	0.035	-0.053	-53	983
26	107.50	1,153	0.660	-0.074	0.023	-0.044	-44	993
25	102.50	1,164	0.600	-0.053	0.015	-0.031	-31	1,003
24	97.50	1,175	0.543	-0.032	0.009	-0.014	-14	1,012
23	92.67	1,108	0.490	-0.013	0.007	0.003	3	954
22	90.17	111	0.464	-0.003	0.006	0.011	1	96
21	88.29	1,157	0.445	0.003	0.006	0.017	17	996
20	85.79	409	0.420	0.012	0.006	0.025	9	352
19	82.50	1,303	0.389	0.022	0.007	0.033	38	1,122
18	77.50	1,400	0.343	0.035	0.009	0.044	53	1,206

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17	72.50	1,414	0.300	0.045	0.012	0.051	62	1,218
16	67.50	1,428	0.260	0.053	0.016	0.055	68	1,230
15	62.50	1,442	0.223	0.060	0.020	0.057	71	1,242
14	57.50	1,456	0.189	0.064	0.025	0.057	72	1,254
13	52.50	1,470	0.157	0.067	0.029	0.057	72	1,266
12	49.30	414	0.139	0.069	0.032	0.056	20	357
11	46.80	1,587	0.125	0.070	0.034	0.056	77	1,367
10	44.55	399	0.113	0.070	0.035	0.055	19	344
9	42.05	1,320	0.101	0.071	0.037	0.055	63	1,137
8	37.50	1,625	0.080	0.072	0.040	0.054	76	1,399
7	32.50	1,641	0.060	0.072	0.041	0.053	75	1,414
6	27.50	1,658	0.043	0.071	0.042	0.052	74	1,428
5	22.50	1,675	0.029	0.068	0.040	0.050	72	1,442
4	17.50	1,692	0.017	0.062	0.037	0.047	69	1,457
3	12.50	1,959	0.009	0.053	0.031	0.042	71	1,687
2	7.50	1,976	0.003	0.038	0.021	0.032	55	1,701
1	2.50	1,842	0.000	0.015	0.008	0.015	24	1,586
Andrew ABT-DFDM-ADB	181.90	1	1.890	1.980	1.140	0.366	0	1
Powerwave Allgon LGP	181.90	85	1.890	1.980	1.140	0.366	27	73
Raycap DC6-48-60-0-8	181.90	33	1.890	1.980	1.140	0.366	10	28
Ericsson RRUS 11 (Ba	181.90	300	1.890	1.980	1.140	0.366	95	258
Powerwave Allgon 777	181.90	210	1.890	1.980	1.140	0.366	67	181
KMW AM-X-CD-16-65-00	181.90	146	1.890	1.980	1.140	0.366	46	125
Flat Platform w/ Han	181.90	2,000	1.890	1.980	1.140	0.366	634	1,722
RFS FD9R6004/2C-3L (	175.00	19	1.749	1.318	0.892	0.277	4	16
Antel BXA-171063-12B	175.00	45	1.749	1.318	0.892	0.277	11	39
Antel BXA-70063-6CF-	175.00	51	1.749	1.318	0.892	0.277	12	44
Antel LPA-80063/6CF	175.00	162	1.749	1.318	0.892	0.277	39	140
Flat Low Profile Pla	175.00	1,500	1.749	1.318	0.892	0.277	361	1,292
Ericsson AIR 21, 1.3	165.00	249	1.555	0.646	0.611	0.168	36	214
Ericsson AIR 21, 1.3	165.00	271	1.555	0.646	0.611	0.168	40	234
Andrew LNX-6515DS-A1	165.00	149	1.555	0.646	0.611	0.168	22	129
Round Platform w/ Ha	165.00	2,000	1.555	0.646	0.611	0.168	292	1,722
KMW TTA (HB-X-WM-17-	145.00	48	1.201	0.006	0.256	0.016	1	41
KMW HB-X-WM-17-65-00	145.00	90	1.201	0.006	0.256	0.016	1	78
Side Arms	145.00	560	1.201	0.006	0.256	0.016	8	482
		51,531	59.362	29.912	22.810	6.788	2,859	44,377

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
43	180.95	73	1.870	1.878	1.103	0.353	22	63
42	177.50	198	1.800	1.537	0.977	0.308	53	171
41	172.50	256	1.700	1.121	0.814	0.248	55	220
40	167.50	264	1.603	0.787	0.674	0.194	44	228
39	162.50	305	1.508	0.522	0.553	0.145	38	263
38	159.25	93	1.449	0.382	0.484	0.116	9	80
37	156.75	473	1.403	0.290	0.435	0.095	39	407
36	152.50	683	1.328	0.162	0.362	0.063	37	588
35	147.50	691	1.243	0.049	0.288	0.030	18	595
34	142.50	724	1.160	-0.030	0.226	0.003	2	624
33	137.50	863	1.080	-0.081	0.175	-0.020	-15	743
32	132.50	871	1.003	-0.109	0.133	-0.037	-28	750
31	128.14	654	0.938	-0.120	0.103	-0.048	-27	563
30	125.64	246	0.902	-0.122	0.088	-0.052	-11	212
29	122.50	969	0.857	-0.120	0.072	-0.056	-47	835
28	117.50	1,131	0.789	-0.110	0.051	-0.057	-56	974
27	112.50	1,142	0.723	-0.094	0.035	-0.053	-53	983
26	107.50	1,153	0.660	-0.074	0.023	-0.044	-44	993

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25	102.50	1,164	0.600	-0.053	0.015	-0.031	-31	1,003
24	97.50	1,175	0.543	-0.032	0.009	-0.014	-14	1,012
23	92.67	1,108	0.490	-0.013	0.007	0.003	3	954
22	90.17	111	0.464	-0.003	0.006	0.011	1	96
21	88.29	1,157	0.445	0.003	0.006	0.017	17	996
20	85.79	409	0.420	0.012	0.006	0.025	9	352
19	82.50	1,303	0.389	0.022	0.007	0.033	38	1,122
18	77.50	1,400	0.343	0.035	0.009	0.044	53	1,206
17	72.50	1,414	0.300	0.045	0.012	0.051	62	1,218
16	67.50	1,428	0.260	0.053	0.016	0.055	68	1,230
15	62.50	1,442	0.223	0.060	0.020	0.057	71	1,242
14	57.50	1,456	0.189	0.064	0.025	0.057	72	1,254
13	52.50	1,470	0.157	0.067	0.029	0.057	72	1,266
12	49.30	414	0.139	0.069	0.032	0.056	20	357
11	46.80	1,587	0.125	0.070	0.034	0.056	77	1,367
10	44.55	399	0.113	0.070	0.035	0.055	19	344
9	42.05	1,320	0.101	0.071	0.037	0.055	63	1,137
8	37.50	1,625	0.080	0.072	0.040	0.054	76	1,399
7	32.50	1,641	0.060	0.072	0.041	0.053	75	1,414
6	27.50	1,658	0.043	0.071	0.042	0.052	74	1,428
5	22.50	1,675	0.029	0.068	0.040	0.050	72	1,442
4	17.50	1,692	0.017	0.062	0.037	0.047	69	1,457
3	12.50	1,959	0.009	0.053	0.031	0.042	71	1,687
2	7.50	1,976	0.003	0.038	0.021	0.032	55	1,701
1	2.50	1,842	0.000	0.015	0.008	0.015	24	1,586
Andrew ABT-DFDM-ADB	181.90	1	1.890	1.980	1.140	0.366	0	1
Powerwave Allgon LGP	181.90	85	1.890	1.980	1.140	0.366	27	73
Raycap DC6-48-60-0-8	181.90	33	1.890	1.980	1.140	0.366	10	28
Ericsson RRUS 11 (Ba	181.90	300	1.890	1.980	1.140	0.366	95	258
Powerwave Allgon 777	181.90	210	1.890	1.980	1.140	0.366	67	181
KMW AM-X-CD-16-65-00	181.90	146	1.890	1.980	1.140	0.366	46	125
Flat Platform w/ Han	181.90	2,000	1.890	1.980	1.140	0.366	634	1,722
RFS FD9R6004/2C-3L (	175.00	19	1.749	1.318	0.892	0.277	4	16
Antel BXA-171063-12B	175.00	45	1.749	1.318	0.892	0.277	11	39
Antel BXA-70063-6CF-	175.00	51	1.749	1.318	0.892	0.277	12	44
Antel LPA-80063/6CF	175.00	162	1.749	1.318	0.892	0.277	39	140
Flat Low Profile Pla	175.00	1,500	1.749	1.318	0.892	0.277	361	1,292
Ericsson AIR 21, 1.3	165.00	249	1.555	0.646	0.611	0.168	36	214
Ericsson AIR 21, 1.3	165.00	271	1.555	0.646	0.611	0.168	40	234
Andrew LNX-6515DS-A1	165.00	149	1.555	0.646	0.611	0.168	22	129
Round Platform w/ Ha	165.00	2,000	1.555	0.646	0.611	0.168	292	1,722
KMW TTA (HB-X-WM-17-	145.00	48	1.201	0.006	0.256	0.016	1	41
KMW HB-X-WM-17-65-00	145.00	90	1.201	0.006	0.256	0.016	1	78
Side Arms	145.00	560	1.201	0.006	0.256	0.016	8	482
		51,531	59.362	29.912	22.810	6.788	2,859	44,377

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
43	180.95	73	1.870	1.878	1.103	0.353	22	63
42	177.50	198	1.800	1.537	0.977	0.308	53	171
41	172.50	256	1.700	1.121	0.814	0.248	55	220
40	167.50	264	1.603	0.787	0.674	0.194	44	228
39	162.50	305	1.508	0.522	0.553	0.145	38	263
38	159.25	93	1.449	0.382	0.484	0.116	9	80
37	156.75	473	1.403	0.290	0.435	0.095	39	407
36	152.50	683	1.328	0.162	0.362	0.063	37	588
35	147.50	691	1.243	0.049	0.288	0.030	18	595
34	142.50	724	1.160	-0.030	0.226	0.003	2	624

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33	137.50	863	1.080	-0.081	0.175	-0.020	-15	743
32	132.50	871	1.003	-0.109	0.133	-0.037	-28	750
31	128.14	654	0.938	-0.120	0.103	-0.048	-27	563
30	125.64	246	0.902	-0.122	0.088	-0.052	-11	212
29	122.50	969	0.857	-0.120	0.072	-0.056	-47	835
28	117.50	1,131	0.789	-0.110	0.051	-0.057	-56	974
27	112.50	1,142	0.723	-0.094	0.035	-0.053	-53	983
26	107.50	1,153	0.660	-0.074	0.023	-0.044	-44	993
25	102.50	1,164	0.600	-0.053	0.015	-0.031	-31	1,003
24	97.50	1,175	0.543	-0.032	0.009	-0.014	-14	1,012
23	92.67	1,108	0.490	-0.013	0.007	0.003	3	954
22	90.17	111	0.464	-0.003	0.006	0.011	1	96
21	88.29	1,157	0.445	0.003	0.006	0.017	17	996
20	85.79	409	0.420	0.012	0.006	0.025	9	352
19	82.50	1,303	0.389	0.022	0.007	0.033	38	1,122
18	77.50	1,400	0.343	0.035	0.009	0.044	53	1,206
17	72.50	1,414	0.300	0.045	0.012	0.051	62	1,218
16	67.50	1,428	0.260	0.053	0.016	0.055	68	1,230
15	62.50	1,442	0.223	0.060	0.020	0.057	71	1,242
14	57.50	1,456	0.189	0.064	0.025	0.057	72	1,254
13	52.50	1,470	0.157	0.067	0.029	0.057	72	1,266
12	49.30	414	0.139	0.069	0.032	0.056	20	357
11	46.80	1,587	0.125	0.070	0.034	0.056	77	1,367
10	44.55	399	0.113	0.070	0.035	0.055	19	344
9	42.05	1,320	0.101	0.071	0.037	0.055	63	1,137
8	37.50	1,625	0.080	0.072	0.040	0.054	76	1,399
7	32.50	1,641	0.060	0.072	0.041	0.053	75	1,414
6	27.50	1,658	0.043	0.071	0.042	0.052	74	1,428
5	22.50	1,675	0.029	0.068	0.040	0.050	72	1,442
4	17.50	1,692	0.017	0.062	0.037	0.047	69	1,457
3	12.50	1,959	0.009	0.053	0.031	0.042	71	1,687
2	7.50	1,976	0.003	0.038	0.021	0.032	55	1,701
1	2.50	1,842	0.000	0.015	0.008	0.015	24	1,586
Andrew ABT-DFDM-ADB	181.90	1	1.890	1.980	1.140	0.366	0	1
Powerwave Allgon LGP	181.90	85	1.890	1.980	1.140	0.366	27	73
Raycap DC6-48-60-0-8	181.90	33	1.890	1.980	1.140	0.366	10	28
Ericsson RRUS 11 (Ba	181.90	300	1.890	1.980	1.140	0.366	95	258
Powerwave Allgon 777	181.90	210	1.890	1.980	1.140	0.366	67	181
KMW AM-X-CD-16-65-00	181.90	146	1.890	1.980	1.140	0.366	46	125
Flat Platform w/ Han	181.90	2,000	1.890	1.980	1.140	0.366	634	1,722
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KMW HB-X-WM-17-65-00	145.00	90	1.201	0.006	0.256	0.016	1	78
Side Arms	145.00	560	1.201	0.006	0.256	0.016	8	482
		51,531	59.362	29.912	22.810	6.788	2,859	44,377

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Analysis Summary

Load Case	Reactions Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Max Usage Elev (ft)	Interaction Ratio
1.2D + 1.6W	29.26	0.00	61.79	0.00	0.00	3550.83	158.50	0.66
0.9D + 1.6W	29.23	0.00	46.34	0.00	0.00	3493.01	158.50	0.64
1.2D + 1.0Di + 1.0Wi	5.13	0.00	100.16	0.00	0.00	693.74	158.50	0.17
(1.2 + 0.2Sds) * DL + E ELFM	2.02	0.00	61.56	0.00	0.00	299.96	158.50	0.07
(1.2 + 0.2Sds) * DL + E EMAM	2.85	0.00	61.56	0.00	0.00	389.44	158.50	0.13
(0.9 - 0.2Sds) * DL + E ELFM	2.01	0.00	42.79	0.00	0.00	293.90	158.50	0.06
(0.9 - 0.2Sds) * DL + E EMAM	2.84	0.00	42.79	0.00	0.00	380.87	158.50	0.13
1.0D + 1.0W	8.30	0.00	51.53	0.00	0.00	984.46	158.50	0.19

Additional Steel Summary

Elev From (ft)	Elev To (ft)	Member	Intermediate Connectors VQ/I (lb/in)	Shear Applied (kips)	Shear phiVn (kips)	Upper Termination Connectors MQ/I (kips)	phiVn (kips)	Num Reqd	Num Actual	Lower Termination Connectors MQ/I (kips)	phiVn (kips)	Num Reqd	Num Actual	Max Member Pu (kip)	phiPn (kip)	Ratio
0.00	80.0	(3) SOL-4 1/4" SOLID	513.1	8.5	16.8	436.4	25.3	18	0	0.0	25.3	0	0	581.6	635.6	0.915
0.00	15.0	(3) SOL-#20 All Thre	136.8	4.1	16.8	184.6	25.3	8	12	0.0	25.3	0	0	196.2	330.5	0.594
80.0	120.	(3) SOL-4" SOLID	534.7	11.8	16.8	288.0	25.3	12	0	418.5	25.3	17	0	423.9	560.5	0.756
120.	140.	(3) SOL-3 1/2" SOLID	543.3	12.0	16.8	196.2	25.3	8	0	267.7	25.3	11	0	271.1	428.0	0.633
140.	158.	(3) SOL-3" SOLID	505.1	11.1	16.8	95.1	25.3	4	0	182.4	25.3	8	0	185.0	313.1	0.591

Reinforcement Splice Connection Calcs

Date	12/22/2016
Engineer	FB
Site #	302502
Carrier	Metro PCS

Bolt	1.25" A325	
ϕRv / bolt	31.8	k

Double Shear Connections

Elevation (ft)	# Bolts	Total Bolt ϕRv (k)	MQ/I Bottom (k)	MQ/I Top (k)	Stress Ratio
80	8	508.8	436.4	418.6	0.86
120	6	381.6	288.1	267.8	0.75
140	6	381.6	196.4	182.6	0.51

Intermediate Connectors

length	4	in
C	1.724375	per Table 8-4 AISC 14th Edition

Elevation (ft)	Weld Size (in)	ϕRn (k)	Shear Applied (k)	Stress Ratio
0-80	0.25	20.6925	8.5	0.41
80-120	0.25	20.6925	11.8	0.57
120-140	0.1875	15.519375	12	0.77
140-160	0.1875	15.519375	11.1	0.72

Top Termination

length	18	in
C	3.63889	per Table 8-4 AISC 14th Edition
Weld Size	0.1875	in
ϕRv	147.375	k
MQ/I	95.3	k
Stress Ratio	0.65	

Code Rev.	G	Date	8/25/2016
		Engineer	CLJ
		Site #	302502
Moment	3550.8 k-ft	Carrier	Metro PCS
Axial	61.8 k		

Base/Flange Plate	Plate Type	*Baseplate*	
	Pole Diameter	43	in
	Pole Thickness	0.375	in
	Plate Diameter	55	in
	Plate Thickness	2.5	in
	Plate Fy	50	ksi
	Weld Length	0.25	in
	ϕ_s Resistance	700.26	k-in
	Applied	268.35	k-in
Stiffeners	#	*0*	

Bolts	#	*12*	
	Bolt Circle	49.25	in
	(R)adial / (S)quare	R	
	Diameter	2.25	in
	Hole Diameter	2.625	in
	Type	A615-75	
	Fy	75	ksi
	Fu	100	ksi
	ϕ_s Resistance	259.82	k
	Applied	171.74	k
Reinforcement ●	#	*3*	
	DYW. Circle	55.5	in
	Offset Angle	45	°
	Type	#20	
	Diameter	2.5	in
	Fu	100	ksi
	ϕ_s Resistance	392.70	k
	Applied	328.22	k
Extra Bolts O	#	*3*	
	Bolt Circle	63	in
	(R)adial / (S)quare	R	
	Offset Angle	15	°
	Diameter	1.4142	in (equiv. to (2) 1" bolts)
	Type	A354-BC	
	Fy	105	ksi
	Fu	125	ksi
	ϕ_s Resistance	123.08	k
	Applied	98.60	k

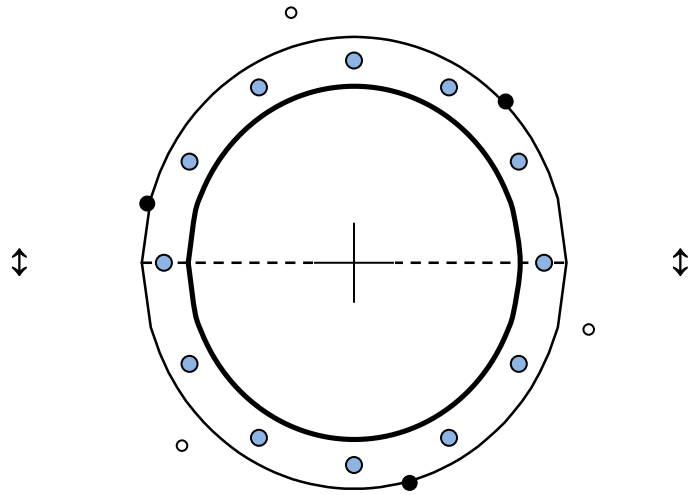


Plate Stress Ratio:	0.38	(Pass)
Bolt Stress Ratio:	0.66	(Pass)
Extra Bolt Stress Ratio:	0.80	(Pass)
Reinforcement Stress Ratio:	0.84	(Pass)

Base/Flange Plate	Plate Type	***Flange***	***@ 126.3 ft***
	Pole Diameter	23.55	in
	Pole Thickness	0.1875	in
	Plate Diameter	30	in
	Plate Thickness	1	in
	Plate Fy	36	ksi
	Weld Length	0.1875	in
	ϕ_s Resistance	43.14	k-in
	Applied	18.40	k-in
Stiffeners	#	***0***	

Bolts	#	***13***	
	Bolt Circle	27	in
	(R)adial / (S)quare	R	
	Diameter	1	in
	Hole Diameter	1.125	in
	Type	A325	
	Fy	92	ksi
	Fu	120	ksi
	ϕ_s Resistance	54.52	k
	Applied	18.87	k
Reinforcement ●	#	***3***	
	DYW. Circle	29.3	in
	Offset Angle	0	°
	Type	Other	
	Diameter	3.5	in
	Fu	65	ksi
	ϕ_s Resistance	500.30	k
	Applied	229.04	k
Extra Bolts O	#	***0***	

Code Rev. ***G***

Moment 634.6 k-ft

Axial 15.6 k

Date	12/22/2016
Engineer	FB
Site #	302502
Carrier	Metro PCS

Required Flange Thickness:

0.65 in OK

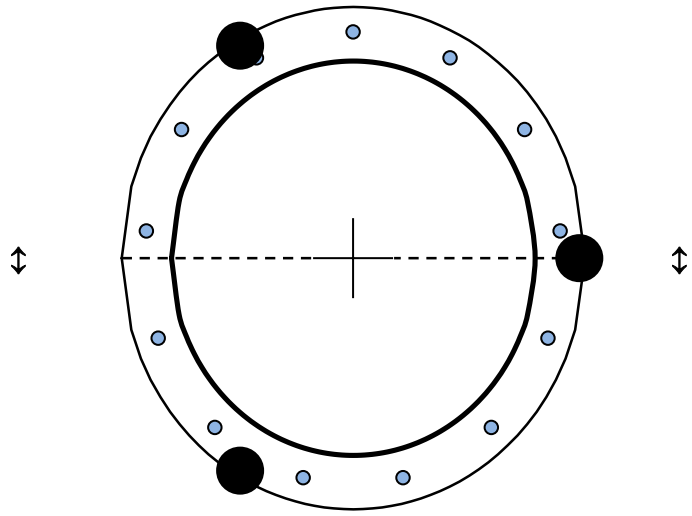


Plate Stress Ratio:

0.43 (Pass)

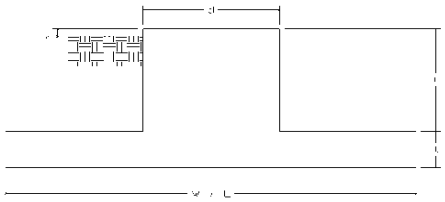
Bolt Stress Ratio:

0.35 (Pass)

Reinforcement Stress Ratio:

0.46 (Pass)

Site Name:	Harwinton, CT	*Program Last Updated:*	*5/13/2014*
Site Number:	302502		
Engineering Number:	OAA684307_C4_07		
Engineer:	FB		
Date:	12/22/16		
Tower Type:	MP		



Design Loads (Factored) - Analysis per TIA-222-G Standards

Design / Analysis / Mapping:	Analysis				
Compression/Leg:	61.8	k	Concrete Strength (f'_c):	3000	psi
Uplift/Leg:	0.0	k	Pad Tension Steel Depth:	32.00	in
Total Shear:	29.3	k	ϕ_{Shear}:	0.75	
Moment:	3550.8	k-ft	$\phi_{Flexure\ /\ Tension}$:	0.90	
Tower + Appurtenance Weight:	61.8	k	$\phi_{Compression:}$	0.65	
Depth to Base of Foundation (l + t - h):	8.00	ft	β:	0.85	
Diameter of Pier (d):	10.16	ft	Bottom Pad Rebar Size #:	10	
Height of Pier above Ground (h):	0.50		# of Bottom Pad Rebar:	40	
Width of Pad (W):	20.00	ft	Pad Bottom Steel Area:	50.80	in^2
Length of Pad (L):	20.00	ft	Pad Steel F_y:	60000	psi
Thickness of Pad (t):	3.00	ft	Top Pad Rebar Size #:	5	
Tower Leg Center to Center:	0.00	ft	# of Top Pad Rebar:	40	
Number of Tower Legs:	1.0	(1 if MP or GT)	Pad Top Steel Area:	12.40	in^2
Tower Center from Mat Center:	0.00	ft	Pier Rebar Size #:	11	
Depth Below Ground Surface to Water Table:	99.00	ft	Pier Steel Area (Single Bar):	1.56	in^2
Unit Weight of Concrete:	150.0	pcf	# of Pier Rebar:	52	
Unit Weight of Soil Above Water Table:	100.0	pcf	Pier Steel F_y:	60000	psi
Unit Weight of Water:	62.4	pcf	Pier Cage Diameter:	113.9	in
Unit Weight of Soil Below Water Table:	50.0	pcf	Rebar Strain Limit:	0.008	
Friction Angle of Uplift:	15.0	Degrees	Steel Elastic Modulus:	29000	ksi
Ultimate Coefficient of Shear Friction:	0.35		Tie Rebar Size #:	4	
Ultimate Compressive Bearing Pressure:	12000.0	psf	Tie Steel Area (Single Bar):	0.20	in^2
Ultimate Passive Pressure on Pad Face:	0.0	psf	Tie Spacing:	12	in
$\phi_{Soil\ and\ Concrete\ Weight}$:	0.9		Tie Steel F_y:	60000	psi
ϕ_{Soil}:	0.75				

Overturning Moment Usage

Design OTM:	3799.5	k-ft
OTM Resistance:	4440.0	k-ft
Design OTM / OTM Resistance:	0.86	Result: OK

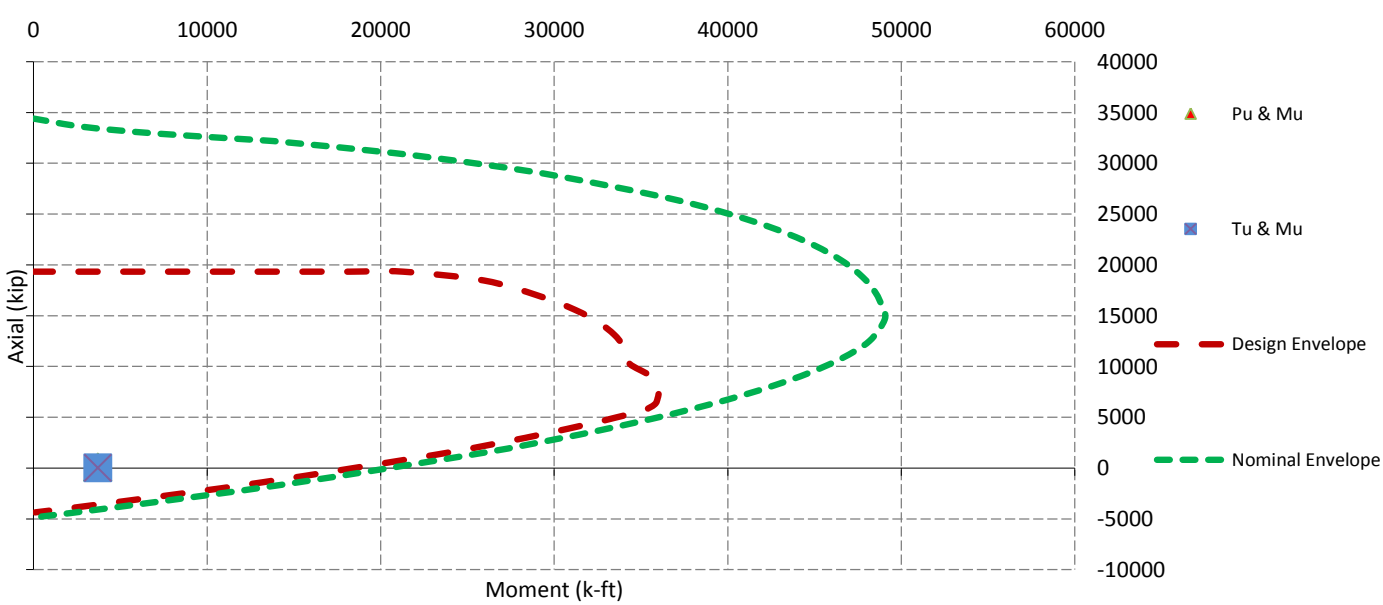
Soil Bearing Pressure Usage

Net Bearing Pressure:	5331	psf
Factored Nominal Bearing Pressure:	9000	psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.59	Result: OK
Load Direction Controling Design Bearing Pressure:	Diagonal to Pad Edge	

Sliding Factor of Safety

Total Factored Sliding Resistance:	120.2	k
Sliding Design / Sliding Resistance:	0.24	Result: OK

One Way Shear, Flexual Capacity, and Punching Shear

Factored One Way Shear (V_u):	155.8	k
One Way Shear Capacity (ϕV_c):	403.7	k - ACI11.3.1.1
V_u / ϕV_c:	0.39	Result: OK
Load Direction Controling Shear Capacity:	Diagonal to Pad Edge	
Lower Steel Pad Factored Moment (M_u):	921.4	k-ft
Lower Steel Pad Moment Capacity (ϕM_n):	5975.2	k-ft - ACI10.3
M_u / ϕM_n:	0.15	Result: OK
Load Direction Controling Flexural Capacity:	Diagonal to Pad Edge	
Upper Steel Pad Factored Moment (M_u):	368.3	k-ft
Upper Steel Pad Moment Capacity (ϕM_n):	1756.8	k-ft
M_u / ϕM_n:	0.21	Result: OK
Lower Pad Flexural Reinforcement Ratio:	0.0066	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0016	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Reinforcement Spacing:	6	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Reinforcement Spacing:	6	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Factored Punching Shear (V_u):	0.0	k
Nominal Punching Shear Capacity ($\phi_c V_n$):	2541.6	k - ACI11.12.2.1
V_u / ϕV_c:	0.00	Result: OK
Factored Moment in Pier (M_u):	3711.8	k-ft
Pier Moment Capacity (ϕM_n):	20322.6	k-ft
M_u / ϕM_n:	0.18	Result: OK
Factored Shear in Pier (V_u):	29.3	k
Pier Shear Capacity (ϕV_n):	960.8	k
V_u / ϕV_c:	0.03	Result: OK
Pier Shear Reinforcement Ratio:	0.0002	No Ties Necessary for Shear - ACI11.5.6.1
Factored Tension in Pier (T_u):	0.0	k
Pier Tension Capacity (ϕT_n):	4380.5	k
T_u / ϕT_n:	0.00	Result: OK
Factored Compression in Pier (P_u):	61.8	k
Pier Compression Capacity (ϕP_n):	15357.6	k - ACI10.3.6.2
P_u / ϕP_n:	0.00	Result: OK
Pier Compression Reinforcement Ratio:	0.007	OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.18	Result: OK

Nominal and Design Moment Capacity and Factored Design Loads