



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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Phone: (860) 827-2935 Fax: (860) 827-2950A
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

April 14, 2021

Denise Sabo
Northeast Site Solutions
4 Angela's Way
Burlington, CT 06013

RE: **EM-AT&T-058-210329** – AT&T notice of intent to modify an existing telecommunications facility located at 31 Yurechko Drive, Griswold, Connecticut

Dear Ms. Sabo:

The Connecticut Siting Council (Council) is in receipt of your correspondence of April 14, 2021 submitted in response to the Council's April 14, 2021 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

s/ Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr

From: Denise Sabo <denise@northeastsitesolutions.com>

Sent: Wednesday, April 14, 2021 10:48 AM

To: Robidoux, Evan <Evan.Robidoux@ct.gov>; Deborah Chase <deborah@northeastsitesolutions.com>

Cc: CSC-DL Siting Council <Siting.Council@ct.gov>

Subject: RE: Council Incomplete Letter for EM-AT&T-058-210329 (31 Yurechko Drive, Griswold)

Good morning, Evan

Please see attached structural. The signature is there, it is within the bottom of the stamp.
Let me know if this is acceptable.

Regards,
Denise



MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Date: **February 12, 2021**

Subject: **Structural Analysis Report**

Carrier Designation: **AT&T Mobility Co-Locate**
Site Number: 26185
Site Name: Griswold Central
FA Number: 10071048

Crown Castle Designation: **BU Number:** 842863
Site Name: Griswold Central
JDE Job Number: 617835
Work Order Number: 1916811
Order Number: 527501 Rev. 0

Engineering Firm Designation: **Morrison Hershfield Project Number:** CN7-238 / 2101398

Site Data: **31 Yurechko Drive, Jewett City, New London County, CT 06351**
Latitude 41° 35' 38.58", Longitude -71° 55' 59.37"
118 Foot - Monopole Tower

Morrison Hershfield is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code (2015 IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

G. Lance Cooke, P.E. (CT License No. PEN.0028133)
Senior Engineer

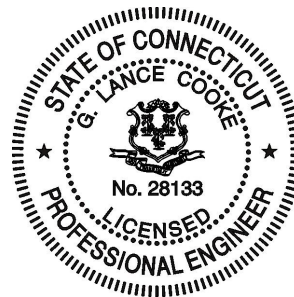


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Table 4 – Tower Component Stresses vs. Capacity – LC5

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 118 ft Monopole tower designed by Glen Martin Engineering, Inc. and mapped by FDH Velocitel, Inc., in March of 2016.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	135 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
117.0	120.0	2	raycap	DC6-48-60-18-8F	6 2 2 2	1-5/8 7/8 3/4 3/8
	119.0	3	powerwave technologies	7770.00		
		6	powerwave technologies	LGP21401		
	118.0	3	cci antennas	DMP65R-BU8D		
		3	cci antennas	OPA65R-BU8D		
		3	ericsson	RADIO 4449 B5/B12		
		3	ericsson	RADIO 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
	117.0	1	Site Pro 1	14.5' Platform Mount [#RMQLP-4120-H10]		

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	6125333	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5142129	CCISITES
4-TOWER MANUFACTURER DRAWINGS	6644519	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Table 1 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Morrison Hershfield should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	118 - 74.5	Pole	TP37.08x25.77x0.2188	1	-9.80	1528.34	40.0	Pass
L2	74.5 - 35	Pole	TP46.5x35.4374x0.2813	2	-16.51	2466.82	46.7	Pass
L3	35 - 0	Pole	TP55.3x44.4806x0.3438	3	-27.24	3701.65	46.2	Pass
							Summary	
						Pole (L2)	46.7	Pass
						Rating =	46.7	Pass

Table 4 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	21.6	Pass
1	Base Plate		19.2	Pass
1	Base Foundation	0	29.0	Pass
1	Base Foundation Soil Interaction		17.7	Pass

Structure Rating (max from all components) =	46.7%*
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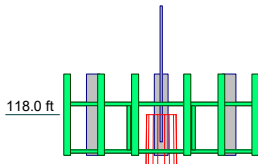
Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) *Rating per TIA-222-H, Section 15.5.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

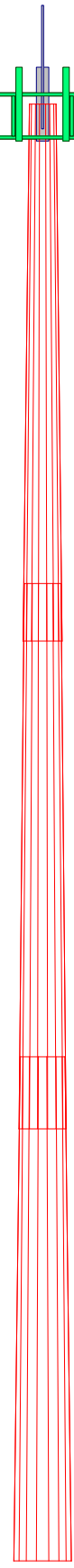
1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 46.7%

Section	1	2	3	16.3
Length (ft)	43.50	44.14	40.81	
Number of Sides	16	16	16	
Thickness (in)	0.2188	0.2813	0.3438	
Socket Length (ft)	4.64	5.81	44.4806	
Top Dia (in)	25.7700	35.4374	44.4806	
Bot Dia (in)	37.0800	46.5000	55.3000	
Grade		A572-65		
Weight (K)	3.2	5.5	7.5	

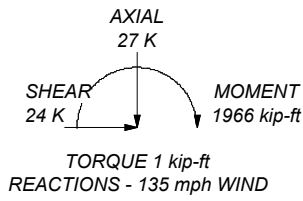
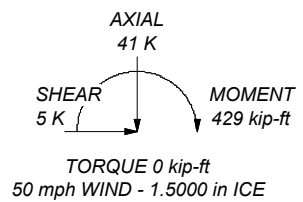
74.5 ft

35.0 ft

0.0 ft



ALL REACTIONS ARE FACTORED



Morrison Hershfield
 1455 Lincoln Parkway, Suite 500
 Atlanta, GA 30346
 Phone: (770) 379-8500
 FAX: (770) 379-8501

Job: **CN7-238 / 2101398**
 Project: **842863 / Griswold Central**
 Client: Crown Castle USA
 Code: TIA-222-H
 Path: C:\09\Kings\SAICrow\CN7-238 - 842863 - GRISWOLD CENTRAL\CN7-238 SA\Analysis\CN7-238 BU - 842863 WD - 1916811.dwg

Drawn by: BV	App'd:
Date: 02/12/21	Scale: NTS
Dwg No. E-1	

Tower Input Data

The tower is a monopole.
 This tower is designed using the TIA-222-H standard.
 The following design criteria apply:
 Tower base elevation above sea level: 202.00 ft.
 Basic wind speed of 135 mph.
 Risk Category II.
 Exposure Category C.
 Simplified Topographic Factor Procedure for wind speed-up calculations is used.
 Topographic Category: 1.
 Crest Height: 0.00 ft.
 Nominal ice thickness of 1.5000 in.
 Ice thickness is considered to increase with height.
 Ice density of 56 pcf.
 A wind speed of 50 mph is used in combination with ice.
 Temperature drop of 50 °F.
 Deflections calculated using a wind speed of 60 mph.
 A non-linear (P-delta) analysis was used.
 Pressures are calculated at each section.
 Stress ratio used in pole design is 1.05.
 Tower analysis based on target reliabilities in accordance with Annex S.
 Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
 Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	118.00-74.50	43.50	4.64	16	25.7700	37.0800	0.2188	0.8750	A572-65 (65 ksi)
L2	74.50-35.00	44.14	5.81	16	35.4374	46.5000	0.2813	1.1250	A572-65 (65 ksi)
L3	35.00-0.00	40.81		16	44.4806	55.3000	0.3438	1.3750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	26.2320	17.8300	1470.5831	9.0962	13.1427	111.8935	2963.4326	8.8160	4.6929	21.453
	37.7636	25.7222	4415.3312	13.1226	18.9108	233.4820	8897.5158	12.7183	6.9436	31.742
L2	37.2611	31.5417	4924.9463	12.5156	18.0731	272.5019	9924.4624	15.5957	6.4924	23.084
	47.3559	41.4669	11190.5689	16.4539	23.7150	471.8772	22550.5766	20.5032	8.6938	30.911
L3	46.8557	48.3988	11911.0771	15.7127	22.6851	525.0618	24002.5023	23.9307	8.1676	23.76
	56.3160	60.2630	22993.1792	19.5644	28.2030	815.2742	46334.5032	29.7969	10.3206	30.024

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 118.00-74.50				1	1	1			
L2 74.50-35.00				1	1	1			
L3 35.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
*** Climbing Pegs ***	C	No	Surface Ar (CaAa)	118.00 - 1.00	1	1	-0.500 -0.400	0.7050		1.80

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf	
*** LDF7-50A(1-5/8)	A	No	No	Inside Pole	117.00 - 9.50	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
FB-L98B-034-	A	No	No	Inside Pole	117.00 - 9.50	2	No Ice 2" Ice	0.00 0.00	0.82 0.06

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} A _{AA} ft ² /ft	Weight plf
XXX(3/8)							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG66ST-BRD(7/8)	A	No	No	Inside Pole	117.00 - 9.50	2	No Ice	0.00	0.91
							1/2" Ice	0.00	0.91
							1" Ice	0.00	0.91
							2" Ice	0.00	0.91
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	117.00 - 9.50	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} A _{AA} In Face ft ²	C _{AA} A _{AA} Out Face ft ²	Weight K
L1	118.00-74.50	A	0.000	0.000	0.000	0.000	0.34
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.067	0.000	0.08
L2	74.50-35.00	A	0.000	0.000	0.000	0.000	0.32
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	2.785	0.000	0.07
L3	35.00-0.00	A	0.000	0.000	0.000	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	2.397	0.000	0.06

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} A _{AA} In Face ft ²	C _{AA} A _{AA} Out Face ft ²	Weight K
L1	118.00-74.50	A	1.418	0.000	0.000	0.000	0.000	0.34
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	15.399	0.000	0.24
L2	74.50-35.00	A	1.340	0.000	0.000	0.000	0.000	0.32
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	13.983	0.000	0.22
L3	35.00-0.00	A	1.196	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	11.510	0.000	0.18

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	118.00-74.50	0.4426	0.3215	1.1990	0.8711
L2	74.50-35.00	0.4439	0.3225	1.2468	0.9059
L3	35.00-0.00	0.4311	0.3132	1.1901	0.8647

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	2	Climbing Pegs	74.50 - 118.00	1.0000	1.0000
L2	2	Climbing Pegs	35.00 - 74.50	1.0000	1.0000
L3	2	Climbing Pegs	1.00 - 35.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K

Lightning Rod 1" x 6'	A	From Leg	0.00 0.00 3.00	0.0000	118.00	No Ice 0.50 1/2" 1.02 Ice 1.43 1" Ice 2.06 2" Ice 2.06	0.50 1.02 1.43 2.06 2.06	0.03 0.03 0.04 0.07

7770.00	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 5.51 1/2" 5.87 Ice 6.23 1" Ice 6.99 2" Ice 4.35	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 5.51 1/2" 5.87 Ice 6.23 1" Ice 6.99 2" Ice 4.35	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 5.51 1/2" 5.87 Ice 6.23 1" Ice 6.99 2" Ice 4.35	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
(2) LGP21401	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice 0.52	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice 0.52	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice 0.52	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
DC6-48-60-18-8F	A	From Leg	4.00 0.00 3.00	0.0000	117.00	No Ice 0.92 1/2" 1.46 Ice 1.64 1" Ice 2.04 2" Ice 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11

OPA65R-BU8D	A	From Leg	4.00 0.00 1.00	0.0000	117.00	No Ice 17.42 1/2" 18.44 Ice 19.47 1" Ice 21.59 2" Ice 10.19	6.48 7.38 8.30 10.19	0.08 0.18 0.28 0.52

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
OPA65R-BU8D	B	From Leg	4.00		0.0000	117.00	No Ice	17.42	6.48	0.08
			0.00				1/2"	18.44	7.38	0.18
			1.00				Ice	19.47	8.30	0.28
							1" Ice	21.59	10.19	0.52
							2" Ice			
OPA65R-BU8D	C	From Leg	4.00		0.0000	117.00	No Ice	17.42	6.48	0.08
			0.00				1/2"	18.44	7.38	0.18
			1.00				Ice	19.47	8.30	0.28
							1" Ice	21.59	10.19	0.52
							2" Ice			
DMP65R-BU8D	A	From Leg	4.00		0.0000	117.00	No Ice	15.86	5.95	0.11
			0.00				1/2"	16.80	6.78	0.20
			1.00				Ice	17.75	7.64	0.31
							1" Ice	19.71	9.39	0.55
							2" Ice			
DMP65R-BU8D	B	From Leg	4.00		0.0000	117.00	No Ice	15.86	5.95	0.11
			0.00				1/2"	16.80	6.78	0.20
			1.00				Ice	17.75	7.64	0.31
							1" Ice	19.71	9.39	0.55
							2" Ice			
DMP65R-BU8D	C	From Leg	4.00		0.0000	117.00	No Ice	15.86	5.95	0.11
			0.00				1/2"	16.80	6.78	0.20
			1.00				Ice	17.75	7.64	0.31
							1" Ice	19.71	9.39	0.55
							2" Ice			
RADIO 4478 B14	A	From Leg	4.00		0.0000	117.00	No Ice	2.02	1.25	0.06
			0.00				1/2"	2.20	1.40	0.08
			1.00				Ice	2.39	1.55	0.10
							1" Ice	2.78	1.89	0.15
							2" Ice			
(2) RADIO 4478 B14	B	From Leg	4.00		0.0000	117.00	No Ice	2.02	1.25	0.06
			0.00				1/2"	2.20	1.40	0.08
			1.00				Ice	2.39	1.55	0.10
							1" Ice	2.78	1.89	0.15
							2" Ice			
RRUS 8843 B2/B66A	A	From Leg	4.00		0.0000	117.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			1.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
(2) RRUS 8843 B2/B66A	C	From Leg	4.00		0.0000	117.00	No Ice	1.64	1.35	0.07
			0.00				1/2"	1.80	1.50	0.09
			1.00				Ice	1.97	1.65	0.11
							1" Ice	2.32	1.99	0.16
							2" Ice			
RADIO 4449 B5/B12	A	From Leg	4.00		0.0000	117.00	No Ice	1.64	1.30	0.07
			0.00				1/2"	1.80	1.45	0.09
			1.00				Ice	1.97	1.60	0.11
							1" Ice	2.33	1.92	0.16
							2" Ice			
RADIO 4449 B5/B12	B	From Leg	4.00		0.0000	117.00	No Ice	1.64	1.30	0.07
			0.00				1/2"	1.80	1.45	0.09
			1.00				Ice	1.97	1.60	0.11
							1" Ice	2.33	1.92	0.16
							2" Ice			
RADIO 4449 B5/B12	C	From Leg	4.00		0.0000	117.00	No Ice	1.64	1.30	0.07
			0.00				1/2"	1.80	1.45	0.09
			1.00				Ice	1.97	1.60	0.11
							1" Ice	2.33	1.92	0.16
							2" Ice			
DC6-48-60-18-8F	A	From Leg	4.00		0.0000	117.00	No Ice	0.92	0.92	0.02
			0.00				1/2"	1.46	1.46	0.04
			3.00				Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _{Front} ft ²	C _A A _{Side} ft ²	Weight K	
14.5' Platform Mount [#RMQLP-4120-H10]	C	None		0.0000	117.00	No Ice	51.27	49.52	3.98
						1/2" Ice	65.51	63.76	4.61
						Ice	79.76	78.00	5.23
						1" Ice	108.26	106.48	6.47
						2" Ice			

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	118 - 74.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.55	0.13	0.60
			Max. M _x	20	-9.81	450.43	1.18
			Max. M _y	2	-9.81	1.13	450.49
			Max. V _y	20	-13.95	450.43	1.18
			Max. V _x	2	-13.95	1.13	450.49
L2	74.5 - 35	Pole	Max. Torque	9			0.59
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.23	0.13	0.22
			Max. M _x	20	-16.51	1080.62	2.05
			Max. M _y	2	-16.51	2.13	1080.54
			Max. V _y	20	-18.98	1080.62	2.05
L3	35 - 0	Pole	Max. V _x	14	18.98	-1.91	-1080.48
			Max. Torque	9			0.59
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.33	0.13	-0.24
			Max. M _x	20	-27.24	1963.59	2.93
			Max. M _y	14	-27.24	-2.97	-1963.63
Max. V _y	20	-24.19	1963.59	2.93			
Max. V _x	14	24.19	-2.97	-1963.63			
Max. Torque	9			0.59			

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	41.33	0.00	0.00
	Max. H _x	20	27.25	24.18	0.03
	Max. H _z	2	27.25	0.03	24.18
	Max. M _x	2	1963.33	0.03	24.18
	Max. M _z	8	1963.37	-24.18	-0.03
	Max. Torsion	9	0.59	-24.18	-0.03
	Min. Vert	5	20.44	-12.07	20.93
	Min. H _x	8	27.25	-24.18	-0.03
	Min. H _z	14	27.25	-0.03	-24.18
	Min. M _x	14	-1963.63	-0.03	-24.18
	Min. M _z	20	-1963.59	24.18	0.03
	Min. Torsion	21	-0.59	24.18	0.03

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	22.71	0.00	0.00	0.13	0.09	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	27.25	-0.03	-24.18	-1963.33	3.19	-0.05
0.9 Dead+1.0 Wind 0 deg - No Ice	20.44	-0.03	-24.18	-1954.59	3.14	-0.05
1.2 Dead+1.0 Wind 30 deg - No Ice	27.25	12.07	-20.93	-1698.74	-978.97	-0.34
0.9 Dead+1.0 Wind 30 deg - No Ice	20.44	12.07	-20.93	-1691.18	-974.62	-0.34
1.2 Dead+1.0 Wind 60 deg - No Ice	27.25	20.93	-12.07	-978.93	-1698.78	-0.54
0.9 Dead+1.0 Wind 60 deg - No Ice	20.44	20.93	-12.07	-974.59	-1691.21	-0.54

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 90 deg - No Ice	27.25	24.18	0.03	3.23	-1963.37	-0.59
0.9 Dead+1.0 Wind 90 deg - No Ice	20.44	24.18	0.03	3.17	-1954.62	-0.59
1.2 Dead+1.0 Wind 120 deg - No Ice	27.25	20.96	12.11	984.55	-1701.85	-0.48
0.9 Dead+1.0 Wind 120 deg - No Ice	20.44	20.96	12.11	980.11	-1694.27	-0.48
1.2 Dead+1.0 Wind 150 deg - No Ice	27.25	12.11	20.96	1702.11	-984.29	-0.25
0.9 Dead+1.0 Wind 150 deg - No Ice	20.44	12.11	20.96	1694.46	-979.92	-0.25
1.2 Dead+1.0 Wind 180 deg - No Ice	27.25	0.03	24.18	1963.63	-2.97	0.05
0.9 Dead+1.0 Wind 180 deg - No Ice	20.44	0.03	24.18	1954.81	-2.98	0.06
1.2 Dead+1.0 Wind 210 deg - No Ice	27.25	-12.07	20.93	1699.04	979.18	0.34
0.9 Dead+1.0 Wind 210 deg - No Ice	20.44	-12.07	20.93	1691.40	974.78	0.34
1.2 Dead+1.0 Wind 240 deg - No Ice	27.25	-20.93	12.07	979.23	1699.00	0.54
0.9 Dead+1.0 Wind 240 deg - No Ice	20.44	-20.93	12.07	974.81	1691.37	0.54
1.2 Dead+1.0 Wind 270 deg - No Ice	27.25	-24.18	-0.03	-2.93	1963.59	0.59
0.9 Dead+1.0 Wind 270 deg - No Ice	20.44	-24.18	-0.03	-2.95	1954.78	0.59
1.2 Dead+1.0 Wind 300 deg - No Ice	27.25	-20.96	-12.11	-984.25	1702.07	0.48
0.9 Dead+1.0 Wind 300 deg - No Ice	20.44	-20.96	-12.11	-979.89	1694.43	0.48
1.2 Dead+1.0 Wind 330 deg - No Ice	27.25	-12.11	-20.96	-1701.81	984.51	0.25
0.9 Dead+1.0 Wind 330 deg - No Ice	20.44	-12.11	-20.96	-1694.23	980.08	0.25
1.2 Dead+1.0 Ice+1.0 Temp	41.33	0.00	0.00	0.24	0.13	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	41.33	-0.00	-5.35	-428.71	0.60	-0.01
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	41.33	2.67	-4.63	-371.01	-213.93	-0.09
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	41.33	4.63	-2.67	-213.84	-371.10	-0.15
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	41.33	5.35	0.00	0.69	-428.80	-0.17
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	41.33	4.63	2.68	215.09	-371.57	-0.14
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	41.33	2.68	4.63	371.92	-214.74	-0.08
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	41.33	0.00	5.35	429.15	-0.33	0.01
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	41.33	-2.67	4.63	371.45	214.20	0.09
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	41.33	-4.63	2.67	214.28	371.37	0.15
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	41.33	-5.35	-0.00	-0.25	429.07	0.17
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	41.33	-4.63	-2.68	-214.65	371.84	0.14
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	41.33	-2.68	-4.63	-371.48	215.01	0.08
Dead+Wind 0 deg - Service	22.71	-0.00	-4.50	-364.19	0.66	-0.01
Dead+Wind 30 deg - Service	22.71	2.25	-3.89	-315.10	-181.57	-0.06
Dead+Wind 60 deg - Service	22.71	3.89	-2.25	-181.54	-315.13	-0.10
Dead+Wind 90 deg - Service	22.71	4.50	0.00	0.70	-364.23	-0.11
Dead+Wind 120 deg - Service	22.71	3.90	2.25	182.78	-315.70	-0.09
Dead+Wind 150 deg - Service	22.71	2.25	3.90	315.92	-182.56	-0.05

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - Service	22.71	0.00	4.50	364.44	-0.48	0.01
Dead+Wind 210 deg - Service	22.71	-2.25	3.89	315.35	181.75	0.06
Dead+Wind 240 deg - Service	22.71	-3.89	2.25	181.79	315.31	0.10
Dead+Wind 270 deg - Service	22.71	-4.50	-0.00	-0.45	364.41	0.11
Dead+Wind 300 deg - Service	22.71	-3.90	-2.25	-182.53	315.88	0.09
Dead+Wind 330 deg - Service	22.71	-2.25	-3.90	-315.67	182.74	0.05

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-22.71	0.00	0.00	22.71	0.00	0.000%
2	-0.03	-27.25	-24.18	0.03	27.25	24.18	0.000%
3	-0.03	-20.44	-24.18	0.03	20.44	24.18	0.000%
4	12.07	-27.25	-20.93	-12.07	27.25	20.93	0.000%
5	12.07	-20.44	-20.93	-12.07	20.44	20.93	0.000%
6	20.93	-27.25	-12.07	-20.93	27.25	12.07	0.000%
7	20.93	-20.44	-12.07	-20.93	20.44	12.07	0.000%
8	24.18	-27.25	0.03	-24.18	27.25	-0.03	0.000%
9	24.18	-20.44	0.03	-24.18	20.44	-0.03	0.000%
10	20.96	-27.25	12.11	-20.96	27.25	-12.11	0.000%
11	20.96	-20.44	12.11	-20.96	20.44	-12.11	0.000%
12	12.11	-27.25	20.96	-12.11	27.25	-20.96	0.000%
13	12.11	-20.44	20.96	-12.11	20.44	-20.96	0.000%
14	0.03	-27.25	24.18	-0.03	27.25	-24.18	0.000%
15	0.03	-20.44	24.18	-0.03	20.44	-24.18	0.000%
16	-12.07	-27.25	20.93	12.07	27.25	-20.93	0.000%
17	-12.07	-20.44	20.93	12.07	20.44	-20.93	0.000%
18	-20.93	-27.25	12.07	20.93	27.25	-12.07	0.000%
19	-20.93	-20.44	12.07	20.93	20.44	-12.07	0.000%
20	-24.18	-27.25	-0.03	24.18	27.25	0.03	0.000%
21	-24.18	-20.44	-0.03	24.18	20.44	0.03	0.000%
22	-20.96	-27.25	-12.11	20.96	27.25	12.11	0.000%
23	-20.96	-20.44	-12.11	20.96	20.44	12.11	0.000%
24	-12.11	-27.25	-20.96	12.11	27.25	20.96	0.000%
25	-12.11	-20.44	-20.96	12.11	20.44	20.96	0.000%
26	0.00	-41.33	0.00	0.00	41.33	0.00	0.000%
27	-0.00	-41.33	-5.35	0.00	41.33	5.35	0.000%
28	2.67	-41.33	-4.63	-2.67	41.33	4.63	0.000%
29	4.63	-41.33	-2.67	-4.63	41.33	2.67	0.000%
30	5.35	-41.33	0.00	-5.35	41.33	-0.00	0.000%
31	4.63	-41.33	2.68	-4.63	41.33	-2.68	0.000%
32	2.68	-41.33	4.63	-2.68	41.33	-4.63	0.000%
33	0.00	-41.33	5.35	-0.00	41.33	-5.35	0.000%
34	-2.67	-41.33	4.63	2.67	41.33	-4.63	0.000%
35	-4.63	-41.33	2.67	4.63	41.33	-2.67	0.000%
36	-5.35	-41.33	-0.00	5.35	41.33	0.00	0.000%
37	-4.63	-41.33	-2.68	4.63	41.33	2.68	0.000%
38	-2.68	-41.33	-4.63	2.68	41.33	4.63	0.000%
39	-0.00	-22.71	-4.50	0.00	22.71	4.50	0.000%
40	2.25	-22.71	-3.89	-2.25	22.71	3.89	0.000%
41	3.89	-22.71	-2.25	-3.89	22.71	2.25	0.000%
42	4.50	-22.71	0.00	-4.50	22.71	-0.00	0.000%
43	3.90	-22.71	2.25	-3.90	22.71	-2.25	0.000%
44	2.25	-22.71	3.90	-2.25	22.71	-3.90	0.000%
45	0.00	-22.71	4.50	-0.00	22.71	-4.50	0.000%
46	-2.25	-22.71	3.89	2.25	22.71	-3.89	0.000%
47	-3.89	-22.71	2.25	3.89	22.71	-2.25	0.000%
48	-4.50	-22.71	-0.00	4.50	22.71	0.00	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
49	-3.90	-22.71	-2.25	3.90	22.71	2.25	0.000%
50	-2.25	-22.71	-3.90	2.25	22.71	3.90	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00002314
3	Yes	4	0.00000001	0.00001186
4	Yes	4	0.00000001	0.00085951
5	Yes	4	0.00000001	0.00052203
6	Yes	4	0.00000001	0.00090058
7	Yes	4	0.00000001	0.00054816
8	Yes	4	0.00000001	0.00005458
9	Yes	4	0.00000001	0.00003313
10	Yes	4	0.00000001	0.00086183
11	Yes	4	0.00000001	0.00052307
12	Yes	4	0.00000001	0.00089454
13	Yes	4	0.00000001	0.00054380
14	Yes	4	0.00000001	0.00002144
15	Yes	4	0.00000001	0.00001056
16	Yes	4	0.00000001	0.00089097
17	Yes	4	0.00000001	0.00054203
18	Yes	4	0.00000001	0.00085127
19	Yes	4	0.00000001	0.00051682
20	Yes	4	0.00000001	0.00006138
21	Yes	4	0.00000001	0.00003743
22	Yes	4	0.00000001	0.00090691
23	Yes	4	0.00000001	0.00055148
24	Yes	4	0.00000001	0.00087282
25	Yes	4	0.00000001	0.00052984
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00039867
28	Yes	4	0.00000001	0.00041399
29	Yes	4	0.00000001	0.00041398
30	Yes	4	0.00000001	0.00039746
31	Yes	4	0.00000001	0.00041341
32	Yes	4	0.00000001	0.00041347
33	Yes	4	0.00000001	0.00039669
34	Yes	4	0.00000001	0.00041280
35	Yes	4	0.00000001	0.00041290
36	Yes	4	0.00000001	0.00039809
37	Yes	4	0.00000001	0.00041562
38	Yes	4	0.00000001	0.00041547
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000969
41	Yes	4	0.00000001	0.00001100
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000966
44	Yes	4	0.00000001	0.00001053
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00001062
47	Yes	4	0.00000001	0.00000955
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00001100
50	Yes	4	0.00000001	0.00000990

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 74.5	6.862	49	0.5223	0.0009
L2	79.135 - 35	3.068	49	0.3732	0.0003
L3	40.8125 - 0	0.800	49	0.1782	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	Lightning Rod 1" x 6'	49	6.862	0.5223	0.0009	78131
117.00	7770.00	49	6.757	0.5189	0.0009	78131

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 74.5	36.981	22	2.8135	0.0049
L2	79.135 - 35	16.540	22	2.0122	0.0016
L3	40.8125 - 0	4.314	22	0.9605	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	Lightning Rod 1" x 6'	22	36.981	2.8135	0.0050	14577
117.00	7770.00	22	36.413	2.7950	0.0049	14577

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	118 - 74.5 (1)	TP37.08x25.77x0.2188	43.50	0.00	0.0	24.881 3	-9.80	1455.56	0.007
L2	74.5 - 35 (2)	TP46.5x35.4374x0.2813	44.13	0.00	0.0	40.159 8	-16.51	2349.35	0.007
L3	35 - 0 (3)	TP55.3x44.4806x0.3438	40.81	0.00	0.0	60.263 0	-27.24	3525.38	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux}	ϕM_{nx}	Ratio	M_{uy}	ϕM_{ny}	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{nx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ny}}$
L1	118 - 74.5 (1)	TP37.08x25.77x0.2188	451.40	1093.80	0.413	0.00	1093.80	0.000
L2	74.5 - 35 (2)	TP46.5x35.4374x0.2813	1082.38	2244.72	0.482	0.00	2244.72	0.000
L3	35 - 0 (3)	TP55.3x44.4806x0.3438	1966.22	4125.74	0.477	0.00	4125.74	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	ϕV_n	Ratio	Actual	ϕT_n	Ratio
			V_u K	K	$\frac{V_u}{\phi V_n}$	T_u kip-ft	kip-ft	$\frac{T_u}{\phi T_n}$
L1	118 - 74.5 (1)	TP37.08x25.77x0.2188	13.97	436.67	0.032	0.25	1365.28	0.000
L2	74.5 - 35 (2)	TP46.5x35.4374x0.2813	19.00	704.80	0.027	0.48	2766.38	0.000
L3	35 - 0 (3)	TP55.3x44.4806x0.3438	24.22	1057.62	0.023	0.25	5096.61	0.000

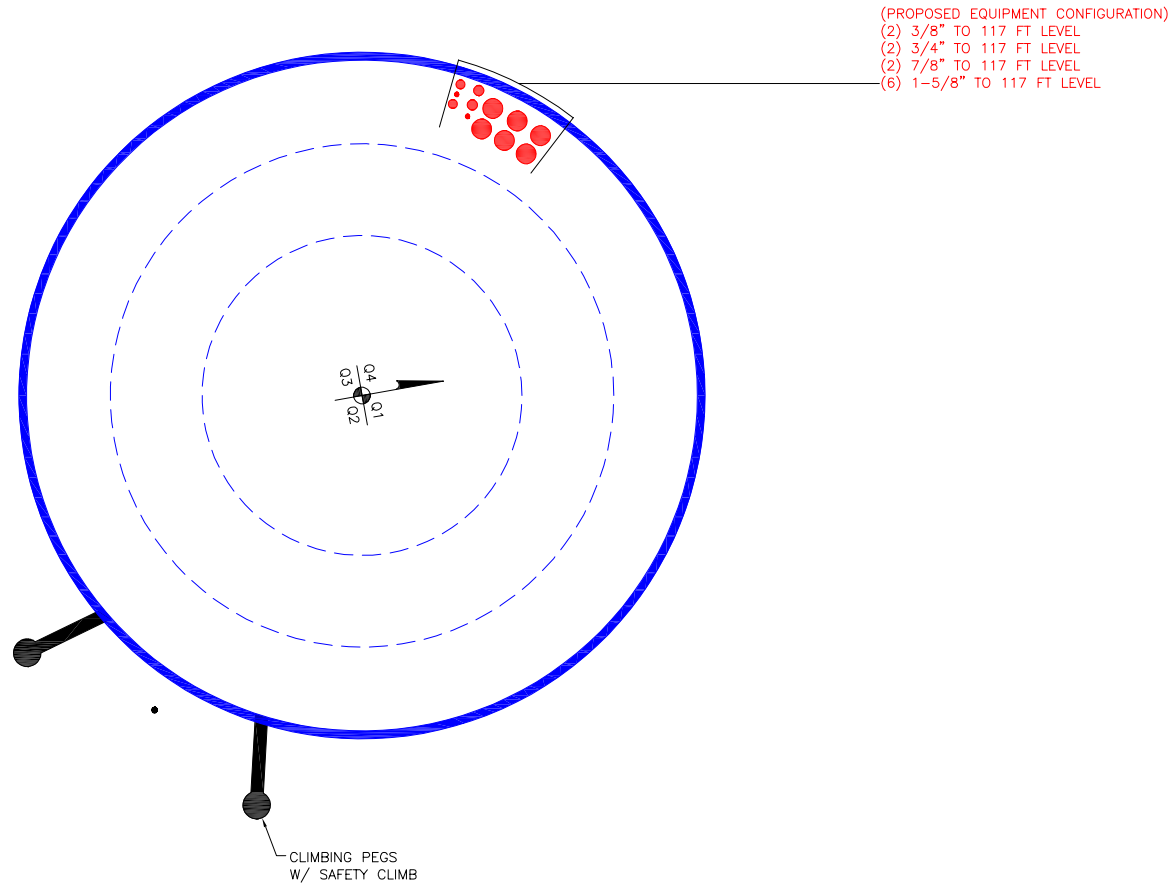
Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\frac{P_u}{\phi P_n}$	$\frac{M_{ux}}{\phi M_{nx}}$	$\frac{M_{uy}}{\phi M_{ny}}$	$\frac{V_u}{\phi V_n}$	$\frac{T_u}{\phi T_n}$			
L1	118 - 74.5 (1)	0.007	0.413	0.000	0.032	0.000	0.420	1.050	4.8.2
L2	74.5 - 35 (2)	0.007	0.482	0.000	0.027	0.000	0.490	1.050	4.8.2
L3	35 - 0 (3)	0.008	0.477	0.000	0.023	0.000	0.485	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	118 - 74.5	Pole	TP37.08x25.77x0.2188	1	-9.80	1528.34	40.0	Pass
L2	74.5 - 35	Pole	TP46.5x35.4374x0.2813	2	-16.51	2466.82	46.7	Pass
L3	35 - 0	Pole	TP55.3x44.4806x0.3438	3	-27.24	3701.65	46.2	Pass
Summary								
Pole (L2)							46.7	Pass
RATING =							46.7	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

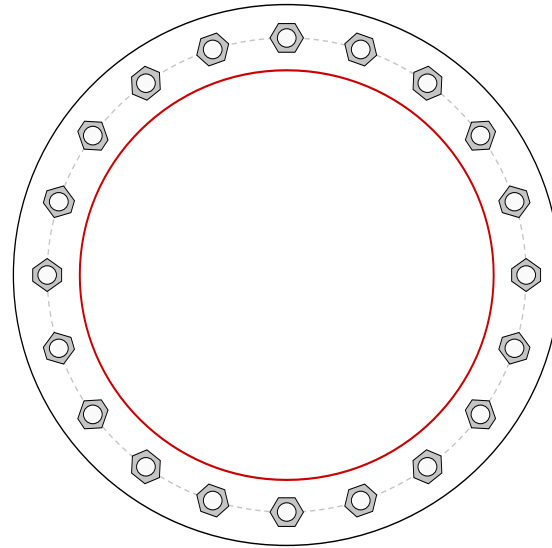


Site Info	
BU #	842863
Site Name	Griswold Central
Order #	527501 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	1966.22
Axial Force (kips)	27.24
Shear Force (kips)	24.22

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(20) 2-1/2" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 64" BC
Base Plate Data
73" OD x 3" Plate (A572-55; $F_y=55$ ksi, $F_u=70$ ksi)
Stiffener Data
N/A
Pole Data
55.3" x 0.34375" 16-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary	<i>(units of kips, kip-in)</i>	
$Pu_c = 75.05$	$\phi Pn_c = 331.34$	Stress Rating
$Vu = 1.21$	$\phi Vn = 149.1$	21.6%
$Mu = n/a$	$\phi Mn = n/a$	Pass
Base Plate Summary		
Max Stress (ksi):	9.99	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	19.2%	Pass

Drilled Pier Foundation



BU #: 842863
 Site Name: Griswold Central
 Order Number: 527501 Rev. 0

TIA-222 Revision: H
 Tower Type: Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	2065.58	
Axial Force (kips)	27.68	
Shear Force (kips)	25.04	

Material Properties	
Concrete Strength, f'c:	4 ksi
Rebar Strength, Fy:	60 ksi
Tie Yield Strength, Fyt:	40 ksi

Pier Design Data	
Depth	35 ft
Ext. Above Grade	1 ft
Pier Section 1	
<i>From 1' above grade to 35' below grade</i>	
Pier Diameter	8 ft
Rebar Quantity	25
Rebar Size	11
Clear Cover to Ties	3 in
Tie Size	4
Tie Spacing	12 in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check		
	Compression	Uplift
D _{v=0} (ft from TOC)	10.12	-
Soil Safety Factor	18.46	-
Max Moment (kip-ft)	2264.21	-
Rating*	6.9%	-
Soil Vertical Check		
	Compression	Uplift
Skin Friction (kips)	1203.17	-
End Bearing (kips)	693.66	-
Weight of Concrete (kips)	325.72	-
Total Capacity (kips)	1896.83	-
Axial (kips)	353.40	-
Rating*	17.7%	-
Reinforced Concrete Flexure		
	Compression	Uplift
Critical Depth (ft from TOC)	10.21	-
Critical Moment (kip-ft)	2264.18	-
Critical Moment Capacity	7428.85	-
Rating*	29.0%	-
Reinforced Concrete Shear		
	Compression	Uplift
Critical Depth (ft from TOC)	26.59	-
Critical Shear (kip)	183.95	-
Critical Shear Capacity	756.43	-
Rating*	23.2%	-
Soil Interaction Rating*		17.7%
Structural Foundation Rating*		29.0%

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>
Shear Design Options	
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>
Utilize Shear-Friction Methodology:	<input type="checkbox"/>
Override Critical Depth:	<input type="checkbox"/>

[Go to Soil Calculations](#)

Soil Profile			
Groundwater Depth	39	# of Layers	9

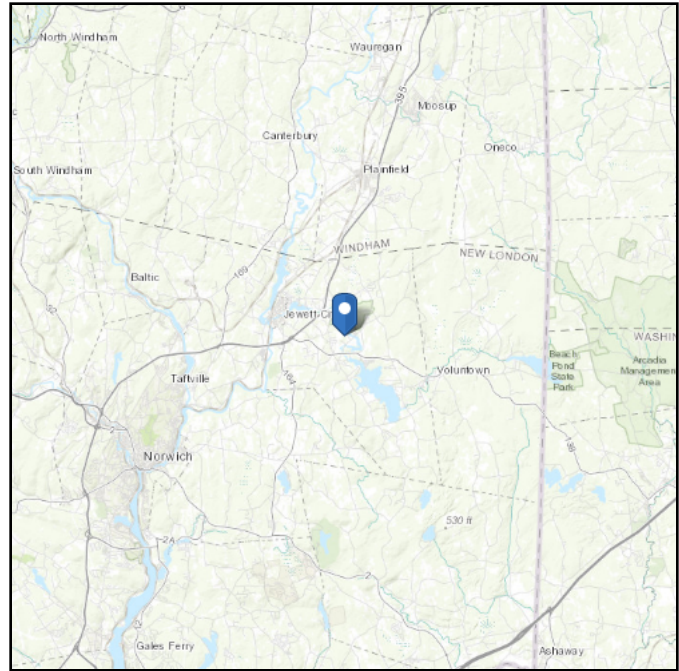
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	Y _{soil} (pcf)	Y _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4	4	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	4	5	1	135	150	0	38	0.000	0.000	0.00	0.00			Cohesionless
3	5	8	3	135	150	0	38	0.000	0.000	1.22	1.22			Cohesionless
4	8	10	2	140	150	0	39	0.000	0.000	2.16	2.16			Cohesionless
5	10	15	5	130	150	0	36	0.000	0.000	1.89	1.89			Cohesionless
6	15	20	5	130	150	0	36	0.000	0.000	2.16	2.16			Cohesionless
7	20	25	5	125	150	0	34	0.00	0.00	1.98	1.98			Cohesionless
8	25	30	5	125	150	0	34	0.00	0.00	2.16	2.16			Cohesionless
9	30	35	5	130	150	0	37	0.00	0.00	2.98	2.98	18.4		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 202.05 ft (NAVD 88)
Latitude: 41.59405
Longitude: -71.933158



Wind

Results:

Wind Speed:	132 Vmph
10-year MRI	79 Vmph
25-year MRI	89 Vmph
50-year MRI	98 Vmph
100-year MRI	107 Vmph

135 mph Ultimate Wind Speed per New London County Exception

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

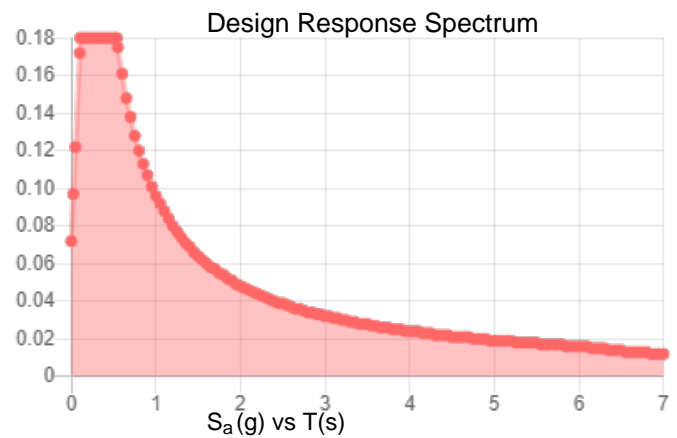
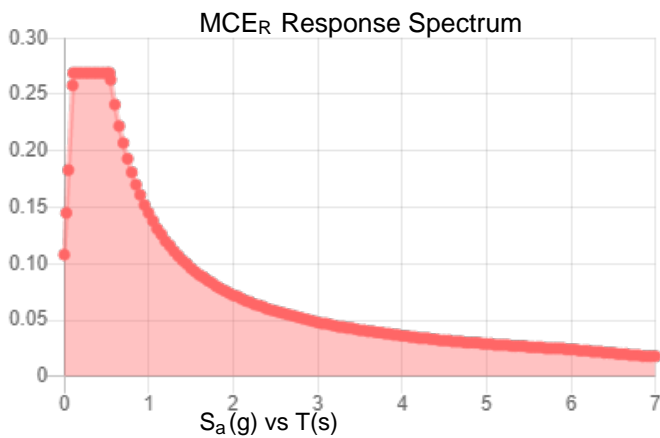
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.168	S_{DS} :	0.18
S_1 :	0.06	S_{D1} :	0.096
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.084
S_{MS} :	0.269	PGA _M :	0.135
S_{M1} :	0.145	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Thu Feb 11 2021

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Thu Feb 11 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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