STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

VIA ELECTRONIC MAIL

May 18, 2018

Mark Roberts
QC Development
P.O. Box 916
Storrs, CT 06268

RE: **EM-CING-109-180403** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 954 Norwich Road, Plainfield, Connecticut.

Dear Mr. Roberts:

The Connecticut Siting Council (Council) is in receipt of your email correspondence of May 17, 2018 submitted in response to the Council's April 12, 2018 notification of an incomplete request for exempt modification and May 2, 2018 letter stating that your request remained incomplete 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,

Melanie A. Bachman
Executive Director

MB/CMW/jmb

From: Mark Roberts [mailto:mark.roberts@qcdevelopment.net]
Sent: Thursday, May 17, 2018 5:09 PM
To: CSC-DL Siting Council
Subject: RE: Incomplete - EM-CING-109-180403 - Norwich Rd.
Importance: High

Hello – Please see the attached Revised Tower Structural Analysis report which specifically identifies the mount handrail kit per your 4/12 incomplete letter.

Mark Roberts
QC Development
860-670-9068

Date: **May 07, 2018**

Marianne Dunst
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5458
	Carrier Site Name:	PLAINFIELD SOUTH
Crown Castle Designation:	**Crown Castle BU Number:**	876359
	Crown Castle Site Name:	NORWICH
	Crown Castle JDE Job Number:	478173
	Crown Castle Work Order Number:	1569057
	Crown Castle Order Number:	421276 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1569057
Site Data:	**954 Norwich Road, PLAINFIELD, Windham County, CT** **Latitude *41° 39' 31.46"*, Longitude *-71° 55' 29.75"*** **130 Foot - Monopole Tower**	

Dear Marianne Dunst,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1569057, in accordance with order 421276, revision 1.

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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 135 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: Brad Sparks / RTC

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

tnxTower Report - version 7.0.5.1

STATE OF CONNECTICUT
MAHAM BARIMANI
30501
LICENSED
PROFESSIONAL ENGINEER

05-08-2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130 ft Monopole tower designed by Summit in July of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 50 mph with 0.75-inch ice thickness and 60 mph under service loads, exposure category B.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	116.0	3	ericsson	RRUS12/RRUS A2	-	-	-
114.0	115.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	2 1	3/4 3/8	-
		3	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		3	ericsson	RRUS 32			
		6	powerwave technologies	7020.00			
		1	raycap	DC6-48-60-18-8C			
	114.0	1	site pro 1	HRK-12 Handrail Kit			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	3 1	1-1/4 7/8	2
		6	alcatel lucent	RRH2X50-800			
		3	alcatel lucent	TD-RRH8X20-25			
		3	kmw communications	ETCR-654L12H6 w/ Mount Pipe			
		1	tower mounts	Miscellaneous [NA 509-3]			
		1	tower mounts	Miscellaneous [NA 510-1]			
		1	tower mounts	Platform Mount [LP 1201-1]	-	-	1
116.0	116.0	3	ericsson	RRUS-11	-	-	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
114.0	115.0	3	powerwave technologies	7770.00 w/ Mount Pipe	12 2 1 1	1-1/4 3/4 3/8 2” Conduit	1
		3	powerwave technologies	LGP21401			
		3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	-	-	3

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	powerwave technologies	7770.00 w/ Mount Pipe			
	114.0	3	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		1	raycap	DC6-48-60-18-8F	-	-	1
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing equipment
2) Reserved equipment
3) Equipment to be removed; not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130	130	12	Generic	DB98OH PCS	-	-
110	110	12	Generic	Panel Antenna	-	-
90	90	12	Generic	Pannel Antenna	-	-
80	80	1	Generic	GPS	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Vanasse Hangen Brustlin, INC.	1616503	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing, LLC	1616546	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC	1446983	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	130 - 83	Pole	TP26.06x16x0.25	1	-10.73	1418.92	73.1	Pass
L2	83 - 43.25	Pole	TP34.068x24.864x0.313	2	-16.96	2279.24	80.6	Pass
L3	43.25 - 0	Pole	TP42.7x32.533x0.375	3	-28.16	3420.09	77.4	Pass
							Summary	
						Pole (L2)	80.6	Pass
						Rating =	80.6	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	71.9	Pass
1	Base Plate	0	67.0	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	73.9	Pass

Structure Rating (max from all components) =	**80.6%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Foundation capacity determined by comparing analysis reactions to original design reactions.

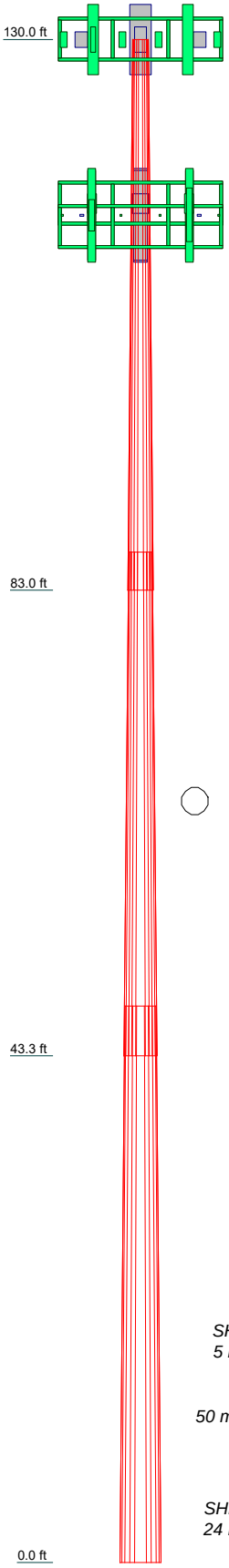
4.1) Recommendations

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	47.00	12	0.250	3.25	16.000	26.060		2.7
2	43.00	12	0.313	4.25	24.864	34.068	A607-65	4.3
3	47.50	12	0.375		32.533	42.700		7.3
								14.2



ALL REACTIONS ARE FACTORED

AXIAL 46 K

SHEAR 5 K

MOMENT 482 kip-ft

TORQUE 0 kip-ft

50 mph WIND - 0.750 in ICE

AXIAL 28 K

SHEAR 24 K

MOMENT 2256 kip-ft

TORQUE 0 kip-ft

REACTIONS - 105 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Top Hat - 12'	130	(2) 4' x 2" Pipe Mount	116
Lighting Rod 1" x 8'	130	(2) 4' x 2" Pipe Mount	116
ETCR-654L12H6 w/ Mount Pipe	130	(2) 4' x 2" Pipe Mount	116
ETCR-654L12H6 w/ Mount Pipe	130	Side Arm Mount [SO 102-3]	116
ETCR-654L12H6 w/ Mount Pipe	130	7770.00 w/ Mount Pipe	114
PCS 1900MHZ 4X45W-65MHZ	130	7770.00 w/ Mount Pipe	114
PCS 1900MHZ 4X45W-65MHZ	130	7770.00 w/ Mount Pipe	114
PCS 1900MHZ 4X45W-65MHZ	130	LGP21401	114
(2) RRH2X50-800	130	LGP21401	114
(2) RRH2X50-800	130	LGP21401	114
(2) RRH2X50-800	130	DC6-48-60-18-8F	114
TD-RRH8X20-25	130	HPA-65R-BUU-H8 w/ Mount Pipe	114
TD-RRH8X20-25	130	HPA-65R-BUU-H8 w/ Mount Pipe	114
TD-RRH8X20-25	130	HPA-65R-BUU-H8 w/ Mount Pipe	114
Miscellaneous [NA 510-1]	130	TPA-65R-LCUUUU-H8 w/ Mount Pipe	114
Miscellaneous [NA 509-3]	130	TPA-65R-LCUUUU-H8 w/ Mount Pipe	114
8' x 2" Mount Pipe	130	TPA-65R-LCUUUU-H8 w/ Mount Pipe	114
8' x 2" Mount Pipe	130	(2) 7020.00	114
8' x 2" Mount Pipe	130	(2) 7020.00	114
Platform Mount [LP 1201-1]	130	(2) 7020.00	114
RRUS-11	116	RRUS 32	114
RRUS-11	116	RRUS 32	114
RRUS-11	116	RRUS 32	114
RRUS12/RRUS A2	116	DC6-48-60-18-8C	114
RRUS12/RRUS A2	116	Site Pro HRK-12	114
RRUS12/RRUS A2	116	Platform Mount [LP 303-1]	114

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 80.6%

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: *BU 876359*			
Project:			
Client: Crown Castle	Drawn by: BSparks		App'd:
Code: TIA-222-G	Date: 05/04/18		Scale: NTS
Path: R:\SA Models - Letters\Work Area\BSparks\WIP\876359 WO 1569057\876359.eri			Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

4) Tower is located in Windham County, Connecticut.
5) Basic wind speed of 105 mph.
6) Structure Class II.
7) Exposure Category B.
8) Topographic Category 1.
9) Crest Height 0.00 ft.
10) Nominal ice thickness of 0.750 in.
11) Ice thickness is considered to increase with height.
12) Ice density of 56.00 pcf.
13) A wind speed of 50 mph is used in combination with ice.
14) Temperature drop of 50 °F.
15) Deflections calculated using a wind speed of 60 mph.
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

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	130.00-83.00	47.00	3.25	12	16.000	26.060	0.250	1.000	A607-65 (65 ksi)
L2	83.00-43.25	43.00	4.25	12	24.864	34.068	0.313	1.250	A607-65 (65 ksi)
L3	43.25-0.00	47.50		12	32.533	42.700	0.375	1.500	A607-65 (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	It/Q in^2	w in	w/t
L1	16.564	12.679	401.443	5.638	8.288	48.437	813.432	6.240	3.618	14.472
	26.979	20.777	1766.631	9.240	13.499	130.870	3579.673	10.226	6.314	25.256
L2	26.462	24.705	1900.838	8.790	12.880	147.584	3851.613	12.159	5.826	18.644
	35.270	33.966	4939.983	12.084	17.647	279.930	10009.745	16.717	8.293	26.537
L3	34.623	38.831	5125.708	11.513	16.852	304.155	10386.074	19.112	7.714	20.57
	44.206	51.107	11685.949	15.152	22.119	528.331	23678.901	25.154	10.439	27.836

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-83.00				1	1	1			
L2 83.00-43.25				1	1	1			
L3 43.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
**								
130								
HB114-08U3M12-XXXF(7/8)	B	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
HB114-1-08U4-M5F(1-1/4)	B	No	Inside Pole	130.00 - 0.00	3	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
114								
LDF6-50A(1-1/4)	A	No	Inside Pole	114.00 - 0.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
FB-L98B-002-75000(3/8)	A	No	Inside Pole	114.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	114.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
FB-L98B-034-XXX(3/8)	A	No	Inside Pole	114.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	114.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
2" Rigid Conduit	A	No	Inside Pole	114.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-83.00	A	0.000	0.000	0.000	0.000	0.39
		B	0.000	0.000	0.000	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
L2	83.00-43.25	A	0.000	0.000	0.000	0.000	0.49
		B	0.000	0.000	0.000	0.000	0.18
		C	0.000	0.000	0.000	0.000	0.00
L3	43.25-0.00	A	0.000	0.000	0.000	0.000	0.54
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-83.00	A	1.684	0.000	0.000	0.000	0.000	0.39
		B		0.000	0.000	0.000	0.000	0.22
		C		0.000	0.000	0.000	0.000	0.00
L2	83.00-43.25	A	1.599	0.000	0.000	0.000	0.000	0.49
		B		0.000	0.000	0.000	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.00
L3	43.25-0.00	A	1.433	0.000	0.000	0.000	0.000	0.54
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130.00-83.00	0.000	0.000	0.000	0.000
L2	83.00-43.25	0.000	0.000	0.000	0.000
L3	43.25-0.00	0.000	0.000	0.000	0.000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
* Top Hat - 12'	C	None			0.000	130.00	No Ice	14.00	14.00	0.30

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	0.00	0.00	0.39
						1" Ice	0.00	0.00	0.48
Lighting Rod 1" x 8'	C	None		0.000	130.00	No Ice	0.80	0.80	0.03
						1/2" Ice	1.62	1.62	0.04
						1" Ice	2.45	2.45	0.05
**									
ETCR-654L12H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	13.27 13.88 14.45	6.54 7.71 8.61	0.10 0.19 0.29
ETCR-654L12H6 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	13.27 13.88 14.45	6.54 7.71 8.61	0.10 0.19 0.29
ETCR-654L12H6 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	13.27 13.88 14.45	6.54 7.71 8.61	0.10 0.19 0.29
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
(2) RRH2X50-800	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
(2) RRH2X50-800	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
(2) RRH2X50-800	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
TD-RRH8X20-25	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8X20-25	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8X20-25	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
Miscellaneous [NA 510-1]	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Miscellaneous [NA 509-3]	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	11.84 16.96 22.08	11.84 16.96 22.08	0.28 0.30 0.32
8' x 2" Mount Pipe	A	From Leg	4.00	0.000	130.00	No Ice	1.90	1.90	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
8' x 2" Mount Pipe	B	From Leg	4.00	0.000	130.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
8' x 2" Mount Pipe	C	From Leg	4.00	0.000	130.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
Platform Mount [LP 1201-1]	C	None		0.000	130.00	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
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RRUS-11	A	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS-11	B	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS-11	C	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS12/RRUS A2	A	From Leg	4.00	0.000	116.00	No Ice	3.14	1.84	0.07
			0.00			1/2" Ice	3.36	2.01	0.10
			0.00			1" Ice	3.59	2.20	0.13
RRUS12/RRUS A2	B	From Leg	4.00	0.000	116.00	No Ice	3.14	1.84	0.07
			0.00			1/2" Ice	3.36	2.01	0.10
			0.00			1" Ice	3.59	2.20	0.13
RRUS12/RRUS A2	C	From Leg	4.00	0.000	116.00	No Ice	3.14	1.84	0.07
			0.00			1/2" Ice	3.36	2.01	0.10
			0.00			1" Ice	3.59	2.20	0.13
(2) 4' x 2" Pipe Mount	A	From Leg	4.00	0.000	116.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
(2) 4' x 2" Pipe Mount	B	From Leg	4.00	0.000	116.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
(2) 4' x 2" Pipe Mount	C	From Leg	4.00	0.000	116.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
Side Arm Mount [SO 102-3]	C	None		0.000	116.00	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
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7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			1.00			1" Ice	6.61	5.71	0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice			
LGP21401	A	From Leg	4.00	0.000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice			
LGP21401	B	From Leg	4.00	0.000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice			
LGP21401	C	From Leg	4.00	0.000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.000	114.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			0.00			Ice	1.45	1.45	0.05
						1" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.00	0.000	114.00	No Ice	13.21	9.58	0.10
			0.00			1/2"	13.90	11.05	0.20
			1.00			Ice	14.59	12.50	0.30
						1" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.000	114.00	No Ice	13.21	9.58	0.10
			0.00			1/2"	13.90	11.05	0.20
			1.00			Ice	14.59	12.50	0.30
						1" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.000	114.00	No Ice	13.21	9.58	0.10
			0.00			1/2"	13.90	11.05	0.20
			1.00			Ice	14.59	12.50	0.30
						1" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.00	0.000	114.00	No Ice	13.54	10.96	0.11
			0.00			1/2"	14.24	12.49	0.22
			1.00			Ice	14.95	14.04	0.33
						1" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.000	114.00	No Ice	13.54	10.96	0.11
			0.00			1/2"	14.24	12.49	0.22
			1.00			Ice	14.95	14.04	0.33
						1" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.000	114.00	No Ice	13.54	10.96	0.11
			0.00			1/2"	14.24	12.49	0.22
			1.00			Ice	14.95	14.04	0.33
						1" Ice			
(2) 7020.00	A	From Leg	4.00	0.000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01
						1" Ice			
(2) 7020.00	B	From Leg	4.00	0.000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01
						1" Ice			
(2) 7020.00	C	From Leg	4.00	0.000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01
						1" Ice			
RRUS 32	A	From Leg	4.00	0.000	114.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	B	From Leg	4.00	0.000	114.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 32	C	From Leg	4.00 0.00 1.00	0.000	114.00	1" Ice No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
DC6-48-60-18-8C	C	From Leg	4.00 0.00 1.00	0.000	114.00	1" Ice No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	2.74 2.96 3.20	0.03 0.05 0.08
Site Pro HRK-12	C	None		0.000	114.00	1" Ice No Ice 1/2" Ice 1" Ice	4.80 6.70 8.60	4.80 6.70 8.60	0.25 0.29 0.34
Platform Mount [LP 303-1]	C	None		0.000	114.00	1" Ice No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
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Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 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

Comb. No.	Description
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	130 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.20	0.23	-0.58
			Max. Mx	20	-10.73	523.74	-0.14
			Max. My	14	-10.73	0.04	-523.84
			Max. Vy	20	-16.01	523.74	-0.14
			Max. Vx	14	16.01	0.04	-523.84
			Max. Torque	10			-0.45
L2	83 - 43.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.41	0.23	-0.58
			Max. Mx	20	-16.96	1215.73	-0.15
			Max. My	14	-16.96	0.05	-1215.83
			Max. Vy	20	-19.71	1215.73	-0.15
			Max. Vx	14	19.71	0.05	-1215.83
			Max. Torque	10			-0.45
L3	43.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.32	0.23	-0.58
			Max. Mx	20	-28.16	2255.66	-0.15
			Max. My	14	-28.16	0.05	-2255.76
			Max. Vy	20	-24.09	2255.66	-0.15
			Max. Vx	14	24.09	0.05	-2255.76
			Max. Torque	10			-0.45

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	46.32	0.00	-4.75
	Max. H_x	21	21.14	24.06	-0.00
	Max. H_z	3	21.14	0.00	24.06
	Max. M_x	2	2255.44	0.00	24.06
	Max. M_z	8	2255.55	-24.06	-0.00
	Max. Torsion	22	0.45	20.83	12.03
	Min. Vert	13	21.14	-12.03	-20.83
	Min. H_x	9	21.14	-24.06	-0.00
	Min. H_z	15	21.14	0.00	-24.06
	Min. M_x	14	-2255.76	0.00	-24.06
	Min. M_z	20	-2255.66	24.06	-0.00
	Min. Torsion	10	-0.45	-20.83	-12.03

Tower Mast Reaction Summary

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 Only	23.49	0.00	0.00	0.12	0.04	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	28.19	-0.00	-24.06	-2255.44	0.05	-0.31
0.9 Dead+1.6 Wind 0 deg - No Ice	21.14	-0.00	-24.06	-2224.98	0.04	-0.31
1.2 Dead+1.6 Wind 30 deg - No Ice	28.19	12.03	-20.83	-1953.25	-1127.75	-0.10
0.9 Dead+1.6 Wind 30 deg - No Ice	21.14	12.03	-20.83	-1926.88	-1112.52	-0.10
1.2 Dead+1.6 Wind 60 deg - No Ice	28.19	20.83	-12.03	-1127.64	-1953.36	0.13
0.9 Dead+1.6 Wind 60 deg - No Ice	21.14	20.83	-12.03	-1112.44	-1926.96	0.13
1.2 Dead+1.6 Wind 90 deg - No Ice	28.19	24.06	0.00	0.15	-2255.55	0.33
0.9 Dead+1.6 Wind 90 deg - No Ice	21.14	24.06	0.00	0.11	-2225.06	0.33
1.2 Dead+1.6 Wind 120 deg - No Ice	28.19	20.83	12.03	1127.96	-1953.36	0.45
0.9 Dead+1.6 Wind 120 deg - No Ice	21.14	20.83	12.03	1112.67	-1926.96	0.44
1.2 Dead+1.6 Wind 150 deg - No Ice	28.19	12.03	20.83	1953.57	-1127.75	0.44
0.9 Dead+1.6 Wind 150 deg - No Ice	21.14	12.03	20.83	1927.11	-1112.52	0.44
1.2 Dead+1.6 Wind 180 deg - No Ice	28.19	-0.00	24.06	2255.76	0.05	0.31
0.9 Dead+1.6 Wind 180 deg - No Ice	21.14	-0.00	24.06	2225.22	0.04	0.31
1.2 Dead+1.6 Wind 210 deg - No Ice	28.19	-12.03	20.83	1953.57	1127.86	0.10
0.9 Dead+1.6 Wind 210 deg - No Ice	21.14	-12.03	20.83	1927.12	1112.59	0.10
1.2 Dead+1.6 Wind 240 deg - No Ice	28.19	-20.83	12.03	1127.96	1953.47	-0.13
0.9 Dead+1.6 Wind 240 deg - No Ice	21.14	-20.83	12.03	1112.67	1927.04	-0.13
1.2 Dead+1.6 Wind 270 deg - No Ice	28.19	-24.06	0.00	0.15	2255.66	-0.33
0.9 Dead+1.6 Wind 270 deg - No Ice	21.14	-24.06	0.00	0.11	2225.14	-0.33
1.2 Dead+1.6 Wind 300 deg - No Ice	28.19	-20.83	-12.03	-1127.65	1953.46	-0.45
0.9 Dead+1.6 Wind 300 deg - No Ice	21.14	-20.83	-12.03	-1112.44	1927.04	-0.44
1.2 Dead+1.6 Wind 330 deg - No Ice	28.19	-12.03	-20.83	-1953.26	1127.85	-0.44
0.9 Dead+1.6 Wind 330 deg - No Ice	21.14	-12.03	-20.83	-1926.89	1112.59	-0.44
1.2 Dead+1.0 Ice+1.0 Temp	46.32	-0.00	0.00	0.58	0.23	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	46.32	-0.00	-4.75	-480.29	0.26	-0.05
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	46.32	2.38	-4.12	-415.85	-240.22	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	46.32	4.12	-2.38	-239.81	-416.26	0.05
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	46.32	4.75	0.00	0.67	-480.70	0.08
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	46.32	4.12	2.38	241.15	-416.26	0.09
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	46.32	2.38	4.12	417.19	-240.22	0.08
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	46.32	-0.00	4.75	481.63	0.26	0.05
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	46.32	-2.38	4.12	417.19	240.74	-0.00

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
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	46.32	-4.12	2.38	241.15	416.79	-0.05
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	46.32	-4.75	0.00	0.67	481.22	-0.08
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	46.32	-4.12	-2.38	-239.81	416.79	-0.09
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	46.32	-2.38	-4.12	-415.85	240.74	-0.08
Dead+Wind 0 deg - Service	23.49	0.00	-4.39	-409.12	0.05	-0.06
Dead+Wind 30 deg - Service	23.49	2.20	-3.80	-354.29	-204.58	-0.02
Dead+Wind 60 deg - Service	23.49	3.80	-2.20	-204.49	-354.38	0.02
Dead+Wind 90 deg - Service	23.49	4.39	0.00	0.13	-409.21	0.06
Dead+Wind 120 deg - Service	23.49	3.80	2.20	204.76	-354.38	0.08
Dead+Wind 150 deg - Service	23.49	2.20	3.80	354.55	-204.58	0.08
Dead+Wind 180 deg - Service	23.49	0.00	4.39	409.38	0.05	0.06
Dead+Wind 210 deg - Service	23.49	-2.20	3.80	354.55	204.67	0.02
Dead+Wind 240 deg - Service	23.49	-3.80	2.20	204.76	354.47	-0.02
Dead+Wind 270 deg - Service	23.49	-4.39	0.00	0.13	409.30	-0.06
Dead+Wind 300 deg - Service	23.49	-3.80	-2.20	-204.49	354.47	-0.08
Dead+Wind 330 deg - Service	23.49	-2.20	-3.80	-354.29	204.67	-0.08

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-23.49	0.00	0.00	23.49	0.00	0.000%
2	0.00	-28.19	-24.06	0.00	28.19	24.06	0.000%
3	0.00	-21.14	-24.06	0.00	21.14	24.06	0.000%
4	12.03	-28.19	-20.83	-12.03	28.19	20.83	0.000%
5	12.03	-21.14	-20.83	-12.03	21.14	20.83	0.000%
6	20.83	-28.19	-12.03	-20.83	28.19	12.03	0.000%
7	20.83	-21.14	-12.03	-20.83	21.14	12.03	0.000%
8	24.06	-28.19	0.00	-24.06	28.19	-0.00	0.000%
9	24.06	-21.14	0.00	-24.06	21.14	-0.00	0.000%
10	20.83	-28.19	12.03	-20.83	28.19	-12.03	0.000%
11	20.83	-21.14	12.03	-20.83	21.14	-12.03	0.000%
12	12.03	-28.19	20.83	-12.03	28.19	-20.83	0.000%
13	12.03	-21.14	20.83	-12.03	21.14	-20.83	0.000%
14	0.00	-28.19	24.06	0.00	28.19	-24.06	0.000%
15	0.00	-21.14	24.06	0.00	21.14	-24.06	0.000%
16	-12.03	-28.19	20.83	12.03	28.19	-20.83	0.000%
17	-12.03	-21.14	20.83	12.03	21.14	-20.83	0.000%
18	-20.83	-28.19	12.03	20.83	28.19	-12.03	0.000%
19	-20.83	-21.14	12.03	20.83	21.14	-12.03	0.000%
20	-24.06	-28.19	0.00	24.06	28.19	-0.00	0.000%
21	-24.06	-21.14	0.00	24.06	21.14	-0.00	0.000%
22	-20.83	-28.19	-12.03	20.83	28.19	12.03	0.000%
23	-20.83	-21.14	-12.03	20.83	21.14	12.03	0.000%
24	-12.03	-28.19	-20.83	12.03	28.19	20.83	0.000%
25	-12.03	-21.14	-20.83	12.03	21.14	20.83	0.000%
26	0.00	-46.32	0.00	0.00	46.32	-0.00	0.000%
27	0.00	-46.32	-4.75	0.00	46.32	4.75	0.000%
28	2.38	-46.32	-4.12	-2.38	46.32	4.12	0.000%
29	4.12	-46.32	-2.38	-4.12	46.32	2.38	0.000%
30	4.75	-46.32	0.00	-4.75	46.32	-0.00	0.000%
31	4.12	-46.32	2.38	-4.12	46.32	-2.38	0.000%
32	2.38	-46.32	4.12	-2.38	46.32	-4.12	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.00	-46.32	4.75	0.00	46.32	-4.75	0.000%
34	-2.38	-46.32	4.12	2.38	46.32	-4.12	0.000%
35	-4.12	-46.32	2.38	4.12	46.32	-2.38	0.000%
36	-4.75	-46.32	0.00	4.75	46.32	-0.00	0.000%
37	-4.12	-46.32	-2.38	4.12	46.32	2.38	0.000%
38	-2.38	-46.32	-4.12	2.38	46.32	4.12	0.000%
39	0.00	-23.49	-4.39	0.00	23.49	4.39	0.000%
40	2.20	-23.49	-3.80	-2.20	23.49	3.80	0.000%
41	3.80	-23.49	-2.20	-3.80	23.49	2.20	0.000%
42	4.39	-23.49	0.00	-4.39	23.49	0.00	0.000%
43	3.80	-23.49	2.20	-3.80	23.49	-2.20	0.000%
44	2.20	-23.49	3.80	-2.20	23.49	-3.80	0.000%
45	0.00	-23.49	4.39	0.00	23.49	-4.39	0.000%
46	-2.20	-23.49	3.80	2.20	23.49	-3.80	0.000%
47	-3.80	-23.49	2.20	3.80	23.49	-2.20	0.000%
48	-4.39	-23.49	0.00	4.39	23.49	0.00	0.000%
49	-3.80	-23.49	-2.20	3.80	23.49	2.20	0.000%
50	-2.20	-23.49	-3.80	2.20	23.49	3.80	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	5	0.00000001	0.00003192
3	Yes	4	0.00000001	0.00071802
4	Yes	6	0.00000001	0.00017217
5	Yes	6	0.00000001	0.00004905
6	Yes	6	0.00000001	0.00017206
7	Yes	6	0.00000001	0.00004902
8	Yes	5	0.00000001	0.00003455
9	Yes	4	0.00000001	0.00072728
10	Yes	6	0.00000001	0.00017445
11	Yes	6	0.00000001	0.00004982
12	Yes	6	0.00000001	0.00017095
13	Yes	6	0.00000001	0.00004861
14	Yes	5	0.00000001	0.00003192
15	Yes	4	0.00000001	0.00071824
16	Yes	6	0.00000001	0.00017310
17	Yes	6	0.00000001	0.00004936
18	Yes	6	0.00000001	0.00017321
19	Yes	6	0.00000001	0.00004939
20	Yes	5	0.00000001	0.00003456
21	Yes	4	0.00000001	0.00072736
22	Yes	6	0.00000001	0.00017087
23	Yes	6	0.00000001	0.00004860
24	Yes	6	0.00000001	0.00017437
25	Yes	6	0.00000001	0.00004981
26	Yes	4	0.00000001	0.00000603
27	Yes	5	0.00000001	0.00046962
28	Yes	5	0.00000001	0.00064290
29	Yes	5	0.00000001	0.00064169
30	Yes	5	0.00000001	0.00047065
31	Yes	5	0.00000001	0.00064998
32	Yes	5	0.00000001	0.00064550
33	Yes	5	0.00000001	0.00047262
34	Yes	5	0.00000001	0.00064928
35	Yes	5	0.00000001	0.00065056
36	Yes	5	0.00000001	0.00047183
37	Yes	5	0.00000001	0.00064240
38	Yes	5	0.00000001	0.00064680
39	Yes	4	0.00000001	0.00008551
40	Yes	4	0.00000001	0.00040341
41	Yes	4	0.00000001	0.00040249
42	Yes	4	0.00000001	0.00008604

43	Yes	4	0.00000001	0.00042304
44	Yes	4	0.00000001	0.00039482
45	Yes	4	0.00000001	0.00008576
46	Yes	4	0.00000001	0.00041186
47	Yes	4	0.00000001	0.00041281
48	Yes	4	0.00000001	0.00008613
49	Yes	4	0.00000001	0.00039372
50	Yes	4	0.00000001	0.00042189

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83	20.952	45	1.488	0.001
L2	86.25 - 43.25	8.823	45	1.035	0.001
L3	47.5 - 0	2.519	46	0.502	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Top Hat - 12'	45	20.952	1.488	0.001	30448
116.00	RRUS-11	45	16.754	1.358	0.001	10874
114.00	7770.00 w/ Mount Pipe	45	16.167	1.339	0.001	9515

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83	115.409	14	8.215	0.007
L2	86.25 - 43.25	48.645	14	5.714	0.003
L3	47.5 - 0	13.891	14	2.771	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Top Hat - 12'	14	115.409	8.215	0.007	5703
116.00	RRUS-11	14	92.309	7.495	0.006	2034
114.00	7770.00 w/ Mount Pipe	14	89.078	7.388	0.005	1779

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 83 (1)	TP26.06x16x0.25	47.00	0.00	0.0	20.217	-10.73	1418.92	0.008
L2	83 - 43.25 (2)	TP34.068x24.864x0.313	43.00	0.00	0.0	33.051	-16.96	2279.24	0.007
L3	43.25 - 0 (3)	TP42.7x32.533x0.375	47.50	0.00	0.0	51.107	-28.16	3420.09	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 83 (1)	TP26.06x16x0.25	523.85	724.52	0.723	0.00	724.52	0.000
L2	83 - 43.25 (2)	TP34.068x24.864x0.313	1215.84	1522.77	0.798	0.00	1522.77	0.000
L3	43.25 - 0 (3)	TP42.7x32.533x0.375	2255.77	2946.31	0.766	0.00	2946.31	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 83 (1)	TP26.06x16x0.25	16.01	709.46	0.023	0.10	1469.11	0.000
L2	83 - 43.25 (2)	TP34.068x24.864x0.313	19.71	1139.62	0.017	0.10	3087.69	0.000
L3	43.25 - 0 (3)	TP42.7x32.533x0.375	24.09	1710.04	0.014	0.10	5974.20	0.000

Pole Interaction Design Data

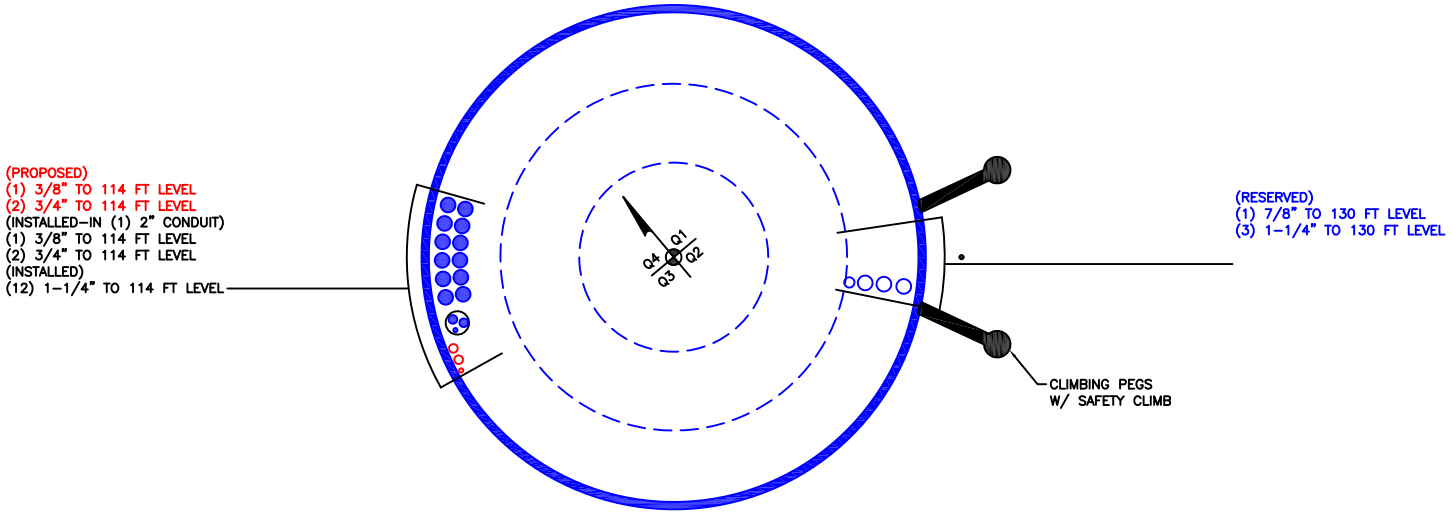
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 83 (1)	0.008	0.723	0.000	0.023	0.000	0.731	1.000	4.8.2
L2	83 - 43.25 (2)	0.007	0.798	0.000	0.017	0.000	0.806	1.000	4.8.2
L3	43.25 - 0 (3)	0.008	0.766	0.000	0.014	0.000	0.774	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	130 - 83	Pole	TP26.06x16x0.25	1	-10.73	1418.92	73.1	Pass
L2	83 - 43.25	Pole	TP34.068x24.864x0.313	2	-16.96	2279.24	80.6	Pass
L3	43.25 - 0	Pole	TP42.7x32.533x0.375	3	-28.16	3420.09	77.4	Pass
							Summary	
						Pole (L2)	80.6	Pass
						RATING =	**80.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876359 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876359*
Site Name: *NORWICH*
App #: *421276 - Rev. 1*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	50	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	48	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	6	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	42.7	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	2256	ft-kips
Factored Axial, Pu:	28	kips
Factored Shear, Vu:	24	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	186.8	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	71.9%	**Pass**

Base Plate Results	Flexural Check	
Base Plate Stress:	30.1	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	67.0%	**Pass**

PL Ref. Data
Yield Line (in): 25.18
Max PL Length: 25.18

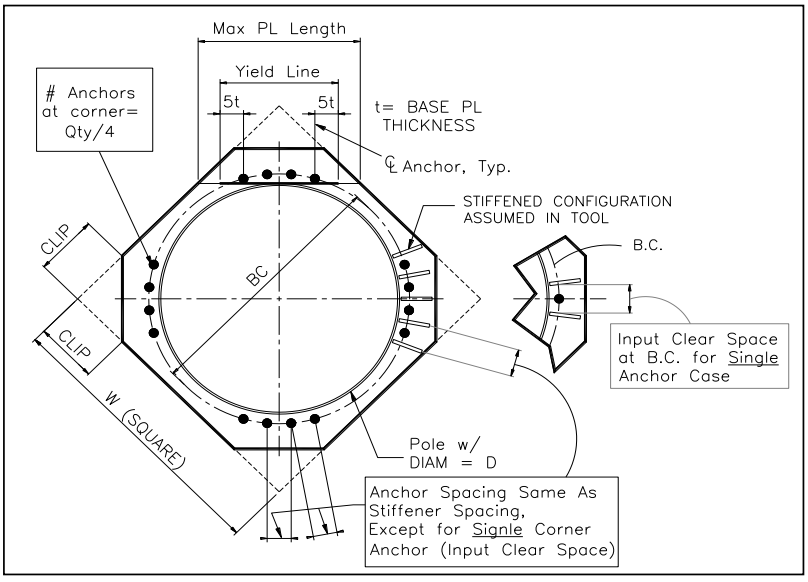
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

FOUNDATION REACTION COMPARISON

BU# 876359
WO# 1569057

REACTIONS	DESIGN REACTIONS	*MODIFIED DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	2260.0	3051.0	2256.0	73.9%
SHEAR (kips)	26.0	35.1	24.0	68.4%

Design loads from: CCIsites Doc #1446983

* Design loads were multiplied by 1.35 for comparison as allowed by TIA-222-G, Section 15.5.

CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU:	876359
Work Order:	1569057
Application:	421276 Rev. 1

	Degrees	Minutes	Seconds		
Site Latitude =	41	39	31.46	0.0000	degrees
Site Longitude =	-71	55	29.75	0.0000	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				*(Table 2-1)*
Site Class =	D - Stiff Soil				*(Table 2-11)*

Spectral response acceleration short periods, S_S =	0.170	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.061	

Importance Factor, I =	1.0	*(Table 2-3)*
Acceleration-based site coefficient, F_a =	1.6	*(Table 2-12)*
Velocity-based site coefficient, F_v =	2.4	*(Table 2-13)*

Design spectral response acceleration short period, S_{DS} =	0.181	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.098	*(2.7.6)*

Seismic Design Category - Short Period Response =	B	*ASCE 7-05 Table 11.6-1*
Seismic Design Category - 1s Period Response =	B	*ASCE 7-05 Table 11.6-2*

Worst Case Seismic Design Category =	B	*ASCE 7-05 Tables 11.6-1 and 6-2*