Transcend Wireless

10 Industrial Avenue, Suite 3
Mahwah, NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 17, 2017

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: TS-T-Mobile 086-160829
T-Mobile Site Id CTNH032H
41 Beckwith Road, Montville, CT
Notice of Construction Complete

Dear Attorney Bachman,

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to notify the Connecticut Siting Council ("Council") that the exempt modification decision conditions have been met and constructed in accordance with the documentation provided at the time of filing.

The Council acknowledged the above referenced T-Mobile notice of exempt modification on September 16, 2016. T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of May 26, 2017.

Sincerely,

Jennifer Dupont
Project Coordinator
Transcend Wireless LLC on behalf of T-Mobile
10 Industrial Ave, Suite 3
Mahwah, NJ 07430

Date: **September 29, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

CROWN CASTLE
2000 Corporate Dr.
Canonsburg PA 15317
(724) 416-9125

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CTNH032H
Crown Castle Designation:	**Crown Castle BU Number:**	876370
	Crown Castle Site Name:	MAYBROOK / BOND
	Crown Castle JDE Job Number:	382811
	Crown Castle Work Order Number:	1306197
	Crown Castle Application Number:	345818 Rev. 17
Engineering Firm Designation:	**Crown Castle Project Number:**	1306197
Site Data:	**41 Beckwith Rd., MONTVILLE, New London County, CT** **Latitude *41° 26' 7.66"*, Longitude *-72° 13' 15.07"*** **180 Foot - Monopole Tower**	

Dear Sean Dempsey,

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 1306197, in accordance with application 345818, revision 17.

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

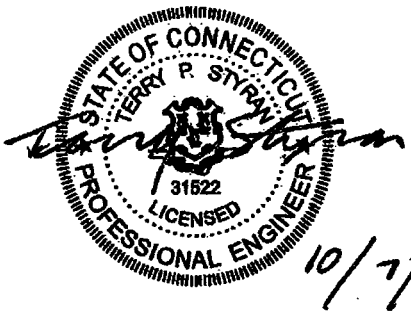
This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 135 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #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: Dolly Hsu, E.I.T. / Shan

Respectfully submitted by:



Terry P. Styran, P.E.
Senior Project Engineer

tnxTower Report - version 7.0.5.1

10/7/2016

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1) INTRODUCTION

This tower is a 180 ft. Monopole tower designed by ENGINEERED ENDEAVORS, INC. in September of 2000. 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, and 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
175.0	175.0	3	commscope	LNX-6515DS-A1M	1	1-5/8	-
		3	ericsson	RRUS 11 B12			
		6	ericsson	RRUS 11 B4			
		3	rfs celwave	APX16DWV-16DWV-S-E-A20			
		1	tower mounts	Platform Mount [LP 301-1]			

Table 2 - Existing 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
180.0	181.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
	180.0	1	tower mounts	Platform Mount [LP 601-1]			
167.0	167.0	3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Side Arm Mount [SO 202-3]			
		1	tower mounts	T-Arm Mount [TA 602-3]			
75.0	76.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment

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)
180	180	12	DAPA	48000	-	-
170	170	12	DAPA	48000	-	-
160	160	12	DAPA	48000	-	-
150	150	12	DAPA	48000	-	-
140	140	12	DAPA	48000	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	1532099	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	180 - 133	Pole	TP27.51x15.5x0.25	1	-8.54	1527.84	58.9	Pass
L2	133 - 87.3333	Pole	TP38.56x25.9879x0.375	2	-16.78	3257.30	49.1	Pass
L3	87.3333 - 42.6667	Pole	TP49.1x36.46x0.4375	3	-29.22	4757.64	45.7	Pass
L4	42.6667 - 0	Pole	TP59x46.5397x0.4375	4	-47.13	5529.76	49.9	Pass
							Summary	
						Pole (L1)	58.9	Pass
						Rating =	58.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	46.3	Pass
1	Base Plate	0	63.8	Pass
1, 2	Base Foundation (Compared w/ Design Loads)	0	57.8	Pass

Structure Rating (max from all components) =	63.8%

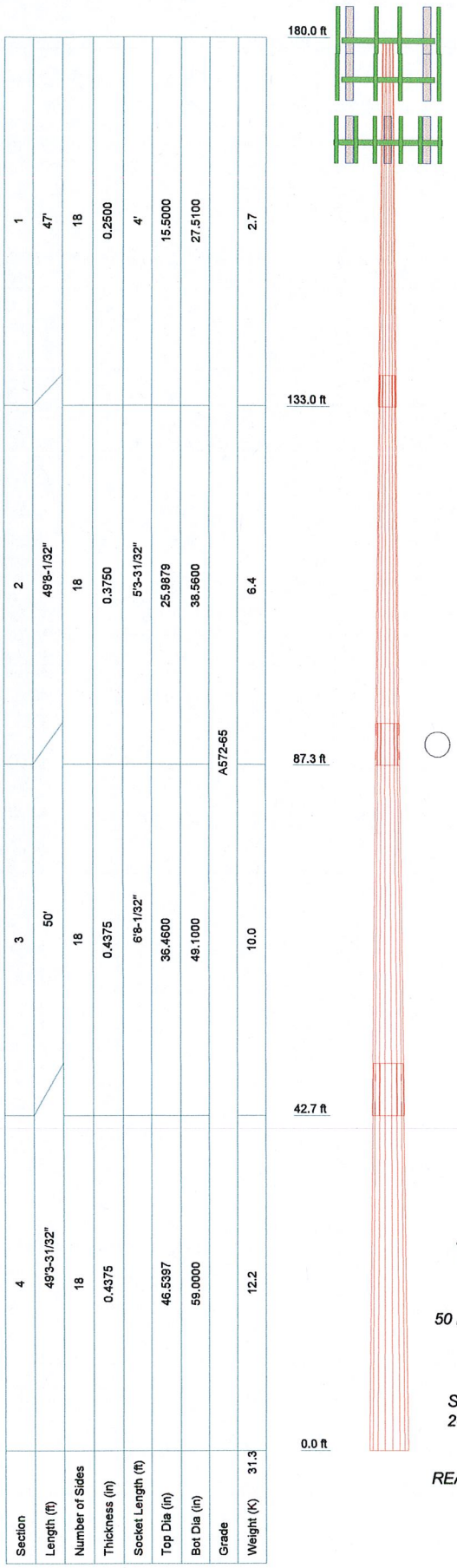
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Foundation capacity determined by comparing analysis reactions to original design reactions.

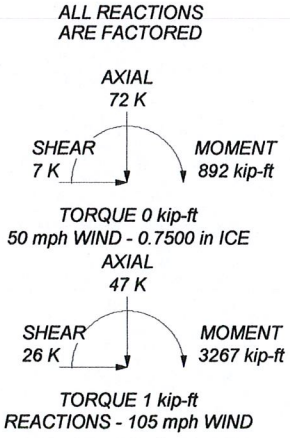
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90E-M w/ Mount Pipe	180	(2) LPA-80080/4CF w/ Mount Pipe	167
(2) DB980H90E-M w/ Mount Pipe	180	(2) LPA-80080/4CF w/ Mount Pipe	167
(2) DB980H90E-M w/ Mount Pipe	180	BXA-70063-6CF-2 w/ Mount Pipe	167
Platform Mount [LP 601-1]	180	BXA-70063-6CF-2 w/ Mount Pipe	167
10' Climbing Ladder (Flat)	180	BXA-70063-6CF-2 w/ Mount Pipe	167
APX16DWV-16DWV-S-E-A20	175	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167
APX16DWV-16DWV-S-E-A20	175		
APX16DWV-16DWV-S-E-A20	175	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167
LNX-6515DS-A1M	175		
LNX-6515DS-A1M	175	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167
LNX-6515DS-A1M	175		
(2) RRUS 11 B4	175	(2) FD9R6004/2C-3L	167
(2) RRUS 11 B4	175	(2) FD9R6004/2C-3L	167
(2) RRUS 11 B4	175	(2) FD9R6004/2C-3L	167
RRUS 11 B12	175	Side Arm Mount [SO 202-3]	167
RRUS 11 B12	175	T-Arm Mount [TA 602-3]	167
RRUS 11 B12	175	KS24019-L112A	75
Platform Mount [LP 301-1]	175	Side Arm Mount [SO 701-1]	75
(2) LPA-80080/4CF w/ Mount Pipe	167		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London 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'
8. TOWER RATING: 58.9%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Dr.
Canonsburg PA 15317
Phone: (724) 416-9125
FAX: (724) 416-4623

Job: **BU# 876370**			
Project:			
Client: Crown Castle	Drawn by: Dolly Hsu		App'd:
Code: TIA-222-G	Date: 09/29/16		Scale: NTS
Path: X:\ENG Work Area\DHsu\WIP\876370 WO 1306197\876370.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:

2) Tower is located in New London County, Connecticut.
3) Basic wind speed of 105 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0'.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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	180'-133'	47'	4'	18	15.5000	27.5100	0.2500	1.0000	A572-65 (65 ksi)
L2	133'-87'3-31/32"	49'8-1/32"	5'3-31/32"	18	25.9879	38.5600	0.3750	1.5000	A572-65 (65 ksi)
L3	87'3-31/32"-42'8-1/32"	50'	6'8-1/32"	18	36.4600	49.1000	0.4375	1.7500	A572-65 (65 ksi)
L4	42'8-1/32"-0'	49'3-31/32"		18	46.5397	59.0000	0.4375	1.7500	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	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	27.9344	21.6308	2030.7756	9.6773	13.9751	145.3141	4064.2233	10.8175	4.4018	17.607
L2	27.4169	30.4857	2526.6814	9.0926	13.2018	191.3886	5056.6874	15.2458	3.9139	10.437
	39.1549	45.4497	8372.4782	13.5557	19.5885	427.4185	16755.973 1	22.7292	6.1266	16.337
L3	38.3915	50.0217	8200.5504	12.7880	18.5217	442.7545	16411.891 3	25.0156	5.6470	12.907
	49.8574	67.5740	20216.486 5	17.2752	24.9428	810.5139	40459.574 4	33.7934	7.8716	17.992
L4	48.9674	64.0186	17190.414 0	16.3663	23.6421	727.1088	34403.447 6	32.0154	7.4210	16.962
	59.9102	81.3214	35235.566 2	20.7897	29.9720	1175.6161	70517.496 3	40.6684	9.6140	21.975

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 180'-133'				1	1	1			
L2 133'-87'3-31/32"				1	1	1			
L3 87'3-31/32"-42'8-1/32"				1	1	1			
L4 42'8-1/32"-0'				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 plf
***										

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 plf
LDF7-50A(1-5/8")	B	No	Inside Pole	180' - 0'	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
*								
LDF7-50A(1-5/8")	A	No	Inside Pole	167' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
*								
LDF4-50A(1/2")	A	No	Inside Pole	75' - 0'	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
*								
MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	B	No	Inside Pole	175' - 0'	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
***								

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	180'-133'	A	0.000	0.000	0.000	0.000	0.33
		B	0.000	0.000	0.000	0.000	0.28
		C	0.000	0.000	0.000	0.000	0.00
L2	133'-87'3-31/32"	A	0.000	0.000	0.000	0.000	0.45
		B	0.000	0.000	0.000	0.000	0.27
		C	0.000	0.000	0.000	0.000	0.00
L3	87'3-31/32"-42'8-1/32"	A	0.000	0.000	0.000	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.27
		C	0.000	0.000	0.000	0.000	0.00
L4	42'8-1/32"-0'	A	0.000	0.000	0.000	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.26
		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	180'-133'	A	1.750	0.000	0.000	0.000	0.000	0.33
		B		0.000	0.000	0.000	0.000	0.28
		C		0.000	0.000	0.000	0.000	0.00
L2	133'-87'3-31/32"	A	1.691	0.000	0.000	0.000	0.000	0.45
		B		0.000	0.000	0.000	0.000	0.27
		C		0.000	0.000	0.000	0.000	0.00
L3	87'3-31/32"-42'8-1/32"	A	1.604	0.000	0.000	0.000	0.000	0.44
		B		0.000	0.000	0.000	0.000	0.27
		C		0.000	0.000	0.000	0.000	0.00
L4	42'8-1/32"-0'	A	1.432	0.000	0.000	0.000	0.000	0.43
		B		0.000	0.000	0.000	0.000	0.26
		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	180'-133'	0.0000	0.0000	0.0000	0.0000
L2	133'-87'3-31/32"	0.0000	0.0000	0.0000	0.0000
L3	87'3-31/32"-42'8-1/32"	0.0000	0.0000	0.0000	0.0000
L4	42'8-1/32"-0'	0.0000	0.0000	0.0000	0.0000

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 Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.000	180'	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.000	180'	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.000	180'	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
Platform Mount [LP 601-1]	C	None		0.000	180'	No Ice 1/2" Ice 1" Ice	28.47 33.59 38.71	28.47 33.59 38.71	1.12 1.51 1.91
10' Climbing Ladder (Flat)	B	From Leg	2.00 0' -5'	0.000	180'	No Ice 1/2" Ice 1" Ice	5.84 10.30 14.76	5.84 10.30 14.76	0.05 0.07 0.09
*									
APX16DWV-16DWV-S-E-A20	A	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	6.59 6.96 7.34	2.15 2.49 2.84	0.04 0.07 0.11
APX16DWV-16DWV-S-E-A20	B	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	6.59 6.96 7.34	2.15 2.49 2.84	0.04 0.07 0.11
APX16DWV-16DWV-S-E-A20	C	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	6.59 6.96 7.34	2.15 2.49 2.84	0.04 0.07 0.11
LNX-6515DS-A1M	A	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	7.70 8.29 8.89	0.05 0.12 0.19
LNX-6515DS-A1M	B	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	7.70 8.29 8.89	0.05 0.12 0.19
LNX-6515DS-A1M	C	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	7.70 8.29 8.89	0.05 0.12 0.19
(2) RRUS 11 B4	A	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
(2) RRUS 11 B4	B	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
(2) RRUS 11 B4	C	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	A	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0' 0'	0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10

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
RRUS 11 B12	C	From Leg	4.00 0' 0'		0.000	175'	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
Platform Mount [LP 301-1]	C	None			0.000	175'	No Ice 1/2" Ice 1" Ice	30.10 40.80 51.50	30.10 40.80 51.50	1.59 2.03 2.47
*										
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	2.86 3.22 3.59	6.57 7.19 7.84	0.03 0.08 0.13
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	2.86 3.22 3.59	6.57 7.19 7.84	0.03 0.08 0.13
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	2.86 3.22 3.59	6.57 7.19 7.84	0.03 0.08 0.13
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	3.18 3.56 3.93	3.35 3.97 4.60	0.03 0.06 0.10
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	3.18 3.56 3.93	3.35 3.97 4.60	0.03 0.06 0.10
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	3.18 3.56 3.93	3.35 3.97 4.60	0.03 0.06 0.10
(2) FD9R6004/2C-3L	A	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00 0' 0'		0.000	167'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
Side Arm Mount [SO 202-3]	C	None			0.000	167'	No Ice 1/2" Ice 1" Ice	6.18 8.56 10.94	6.18 8.56 10.94	0.33 0.40 0.47
T-Arm Mount [TA 602-3]	C	None			0.000	167'	No Ice 1/2" Ice 1" Ice	11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21

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
*									
KS24019-L112A	A	From Leg	1.50 0' 1'	0.000	75'	No Ice 1/2" Ice 1" Ice	0.10 0.18 0.26	0.10 0.18 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	From Leg	0.75 0' 0'	0.000	75'	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									

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
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

Comb. No.	Description
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	180 - 133	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.44	-0.32	-0.19
			Max. Mx	8	-8.54	-480.15	-0.06
			Max. My	14	-8.54	-0.10	-480.08
			Max. Vy	8	14.28	-480.15	-0.06
			Max. Vx	14	14.28	-0.10	-480.08
			Max. Torque	4			-0.86
L2	133 - 87.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.74	-0.32	-0.19
			Max. Mx	8	-16.78	-1195.04	-0.06
			Max. My	14	-16.78	-0.13	-1194.96
			Max. Vy	8	18.06	-1195.04	-0.06
			Max. Vx	2	-18.06	-0.13	1194.80
			Max. Torque	4			-0.85
L3	87.3333 - 42.6667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.12	-0.32	0.15
			Max. Mx	8	-29.22	-2068.20	0.14
			Max. My	2	-29.22	-0.14	2067.25
			Max. Vy	8	22.18	-2068.20	0.14
			Max. Vx	2	-22.15	-0.14	2067.25
			Max. Torque	4			-0.85
L4	42.6667 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.90	-0.32	0.15
			Max. Mx	8	-47.13	-3266.96	0.14
			Max. My	2	-47.13	-0.14	3264.26
			Max. Vy	8	26.36	-3266.96	0.14
			Max. Vx	2	-26.33	-0.14	3264.26
			Max. Torque	4			-0.75

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	71.90	-7.06	0.00
	Max. H_x	20	47.14	26.34	-0.00
	Max. H_z	2	47.14	-0.00	26.30
	Max. M_x	2	3264.26	-0.00	26.30
	Max. M_z	8	3266.96	-26.34	-0.00
	Max. Torsion	16	0.75	13.17	-22.78
	Min. Vert	17	35.36	13.17	-22.78
	Min. H_x	8	47.14	-26.34	-0.00
	Min. H_z	14	47.14	-0.00	-26.30
	Min. M_x	14	-3263.99	-0.00	-26.30
	Min. M_z	20	-3266.67	26.34	-0.00
	Min. Torsion	4	-0.75	-13.17	22.78

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	39.29	0.00	0.00	-0.11	-0.11	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	47.14	0.00	-26.30	-3264.26	-0.14	0.74
0.9 Dead+1.6 Wind 0 deg - No Ice	35.36	0.00	-26.30	-3230.07	-0.10	0.73
1.2 Dead+1.6 Wind 30 deg - No Ice	47.14	13.17	-22.78	-2826.97	-1633.55	0.75
0.9 Dead+1.6 Wind 30 deg - No Ice	35.36	13.17	-22.78	-2797.34	-1616.43	0.75
1.2 Dead+1.6 Wind 60 deg - No Ice	47.14	22.81	-13.15	-1632.21	-2829.30	0.57
0.9 Dead+1.6 Wind 60 deg - No Ice	35.36	22.81	-13.15	-1615.09	-2799.66	0.57
1.2 Dead+1.6 Wind 90 deg - No Ice	47.14	26.34	0.00	-0.14	-3266.96	0.23
0.9 Dead+1.6 Wind 90 deg - No Ice	35.36	26.34	0.00	-0.11	-3232.75	0.23
1.2 Dead+1.6 Wind 120 deg - No Ice	47.14	22.81	13.15	1631.93	-2829.30	-0.17
0.9 Dead+1.6 Wind 120 deg - No Ice	35.36	22.81	13.15	1614.88	-2799.66	-0.16
1.2 Dead+1.6 Wind 150 deg - No Ice	47.14	13.17	22.78	2826.69	-1633.56	-0.52
0.9 Dead+1.6 Wind 150 deg - No Ice	35.36	13.17	22.78	2797.14	-1616.43	-0.52
1.2 Dead+1.6 Wind 180 deg - No Ice	47.14	0.00	26.30	3263.99	-0.14	-0.74
0.9 Dead+1.6 Wind 180 deg - No Ice	35.36	0.00	26.30	3229.87	-0.10	-0.73
1.2 Dead+1.6 Wind 210 deg - No Ice	47.14	-13.17	22.78	2826.69	1633.28	-0.75
0.9 Dead+1.6 Wind 210 deg - No Ice	35.36	-13.17	22.78	2797.13	1616.23	-0.75
1.2 Dead+1.6 Wind 240 deg - No Ice	47.14	-22.81	13.15	1631.93	2829.02	-0.57
0.9 Dead+1.6 Wind 240 deg - No Ice	35.36	-22.81	13.15	1614.88	2799.46	-0.57
1.2 Dead+1.6 Wind 270 deg - No Ice	47.14	-26.34	0.00	-0.14	3266.67	-0.23
0.9 Dead+1.6 Wind 270 deg - No Ice	35.36	-26.34	0.00	-0.11	3232.54	-0.23
1.2 Dead+1.6 Wind 300 deg - No Ice	47.14	-22.81	-13.15	-1632.20	2829.02	0.17
0.9 Dead+1.6 Wind 300 deg - No Ice	35.36	-22.81	-13.15	-1615.09	2799.45	0.16
1.2 Dead+1.6 Wind 330 deg - No Ice	47.14	-13.17	-22.78	-2826.96	1633.28	0.52
0.9 Dead+1.6 Wind 330 deg - No Ice	35.36	-13.17	-22.78	-2797.34	1616.22	0.52
1.2 Dead+1.0 Ice+1.0 Temp	71.90	0.00	0.00	-0.15	-0.32	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	71.90	0.00	-7.05	-890.62	-0.39	0.40
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	71.90	3.53	-6.10	-771.32	-446.12	0.42
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	71.90	6.11	-3.52	-445.38	-772.42	0.34
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	71.90	7.06	0.00	-0.14	-891.86	0.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	71.90	6.11	3.52	445.10	-772.42	-0.06
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	71.90	3.53	6.10	771.05	-446.12	-0.26
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	71.90	0.00	7.05	890.35	-0.39	-0.40
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	71.90	-3.53	6.10	771.04	445.34	-0.42

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 240 deg+1.0 Ice+1.0 Temp	71.90	-6.11	3.52	445.10	771.64	-0.34
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	71.90	-7.06	0.00	-0.14	891.07	-0.16
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	71.90	-6.11	-3.52	-445.38	771.64	0.06
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	71.90	-3.53	-6.10	-771.32	445.34	0.26
Dead+Wind 0 deg - Service	39.29	0.00	-4.80	-592.88	-0.12	0.14
Dead+Wind 30 deg - Service	39.29	2.40	-4.16	-513.47	-296.75	0.14
Dead+Wind 60 deg - Service	39.29	4.16	-2.40	-296.50	-513.90	0.11
Dead+Wind 90 deg - Service	39.29	4.81	0.00	-0.11	-593.38	0.04
Dead+Wind 120 deg - Service	39.29	4.16	2.40	296.27	-513.90	-0.03
Dead+Wind 150 deg - Service	39.29	2.40	4.16	513.24	-296.75	-0.10
Dead+Wind 180 deg - Service	39.29	0.00	4.80	592.66	-0.12	-0.14
Dead+Wind 210 deg - Service	39.29	-2.40	4.16	513.24	296.51	-0.14
Dead+Wind 240 deg - Service	39.29	-4.16	2.40	296.27	513.66	-0.11
Dead+Wind 270 deg - Service	39.29	-4.81	0.00	-0.11	593.14	-0.04
Dead+Wind 300 deg - Service	39.29	-4.16	-2.40	-296.50	513.66	0.03
Dead+Wind 330 deg - Service	39.29	-2.40	-4.16	-513.47	296.51	0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-39.29	0.00	0.00	39.29	0.00	0.000%
2	0.00	-47.14	-26.30	-0.00	47.14	26.30	0.000%
3	0.00	-35.36	-26.30	-0.00	35.36	26.30	0.000%
4	13.17	-47.14	-22.78	-13.17	47.14	22.78	0.000%
5	13.17	-35.36	-22.78	-13.17	35.36	22.78	0.000%
6	22.81	-47.14	-13.15	-22.81	47.14	13.15	0.000%
7	22.81	-35.36	-13.15	-22.81	35.36	13.15	0.000%
8	26.34	-47.14	0.00	-26.34	47.14	-0.00	0.000%
9	26.34	-35.36	0.00	-26.34	35.36	0.00	0.000%
10	22.81	-47.14	13.15	-22.81	47.14	-13.15	0.000%
11	22.81	-35.36	13.15	-22.81	35.36	-13.15	0.000%
12	13.17	-47.14	22.78	-13.17	47.14	-22.78	0.000%
13	13.17	-35.36	22.78	-13.17	35.36	-22.78	0.000%
14	0.00	-47.14	26.30	-0.00	47.14	-26.30	0.000%
15	0.00	-35.36	26.30	-0.00	35.36	-26.30	0.000%
16	-13.17	-47.14	22.78	13.17	47.14	-22.78	0.000%
17	-13.17	-35.36	22.78	13.17	35.36	-22.78	0.000%
18	-22.81	-47.14	13.15	22.81	47.14	-13.15	0.000%
19	-22.81	-35.36	13.15	22.81	35.36	-13.15	0.000%
20	-26.34	-47.14	0.00	26.34	47.14	-0.00	0.000%
21	-26.34	-35.36	0.00	26.34	35.36	0.00	0.000%
22	-22.81	-47.14	-13.15	22.81	47.14	13.15	0.000%
23	-22.81	-35.36	-13.15	22.81	35.36	13.15	0.000%
24	-13.17	-47.14	-22.78	13.17	47.14	22.78	0.000%
25	-13.17	-35.36	-22.78	13.17	35.36	22.78	0.000%
26	0.00	-71.90	0.00	0.00	71.90	0.00	0.000%
27	0.00	-71.90	-7.05	-0.00	71.90	7.05	0.000%
28	3.53	-71.90	-6.10	-3.53	71.90	6.10	0.000%
29	6.11	-71.90	-3.52	-6.11	71.90	3.52	0.000%
30	7.06	-71.90	0.00	-7.06	71.90	0.00	0.000%
31	6.11	-71.90	3.52	-6.11	71.90	-3.52	0.000%
32	3.53	-71.90	6.10	-3.53	71.90	-6.10	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	-71.90	7.05	-0.00	71.90	-7.05	0.000%
34	-3.53	-71.90	6.10	3.53	71.90	-6.10	0.000%
35	-6.11	-71.90	3.52	6.11	71.90	-3.52	0.000%
36	-7.06	-71.90	0.00	7.06	71.90	0.00	0.000%
37	-6.11	-71.90	-3.52	6.11	71.90	3.52	0.000%
38	-3.53	-71.90	-6.10	3.53	71.90	6.10	0.000%
39	0.00	-39.29	-4.80	0.00	39.29	4.80	0.000%
40	2.40	-39.29	-4.16	-2.40	39.29	4.16	0.000%
41	4.16	-39.29	-2.40	-4.16	39.29	2.40	0.000%
42	4.81	-39.29	0.00	-4.81	39.29	0.00	0.000%
43	4.16	-39.29	2.40	-4.16	39.29	-2.40	0.000%
44	2.40	-39.29	4.16	-2.40	39.29	-4.16	0.000%
45	0.00	-39.29	4.80	0.00	39.29	-4.80	0.000%
46	-2.40	-39.29	4.16	2.40	39.29	-4.16	0.000%
47	-4.16	-39.29	2.40	4.16	39.29	-2.40	0.000%
48	-4.81	-39.29	0.00	4.81	39.29	0.00	0.000%
49	-4.16	-39.29	-2.40	4.16	39.29	2.40	0.000%
50	-2.40	-39.29	-4.16	2.40	39.29	4.16	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	0.00058854
3	Yes	4	0.00000001	0.00029235
4	Yes	5	0.00000001	0.00074295
5	Yes	5	0.00000001	0.00032188
6	Yes	5	0.00000001	0.00071977
7	Yes	5	0.00000001	0.00031057
8	Yes	4	0.00000001	0.00046926
9	Yes	4	0.00000001	0.00018440
10	Yes	5	0.00000001	0.00072916
11	Yes	5	0.00000001	0.00031513
12	Yes	5	0.00000001	0.00073722
13	Yes	5	0.00000001	0.00031907
14	Yes	4	0.00000001	0.00058858
15	Yes	4	0.00000001	0.00029236
16	Yes	5	0.00000001	0.00071765
17	Yes	5	0.00000001	0.00030962
18	Yes	5	0.00000001	0.00074032
19	Yes	5	0.00000001	0.00032063
20	Yes	4	0.00000001	0.00046905
21	Yes	4	0.00000001	0.00018435
22	Yes	5	0.00000001	0.00073044
23	Yes	5	0.00000001	0.00031583
24	Yes	5	0.00000001	0.00072289
25	Yes	5	0.00000001	0.00031217
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00038251
28	Yes	5	0.00000001	0.00047774
29	Yes	5	0.00000001	0.00047083
30	Yes	5	0.00000001	0.00038281
31	Yes	5	0.00000001	0.00047366
32	Yes	5	0.00000001	0.00047592
33	Yes	5	0.00000001	0.00038288
34	Yes	5	0.00000001	0.00046956
35	Yes	5	0.00000001	0.00047615
36	Yes	5	0.00000001	0.00038175
37	Yes	5	0.00000001	0.00047224
38	Yes	5	0.00000001	0.00047030
39	Yes	4	0.00000001	0.00002876
40	Yes	4	0.00000001	0.00013336
41	Yes	4	0.00000001	0.00011824
42	Yes	4	0.00000001	0.00002514

43	Yes	4	0.00000001	0.00012380
44	Yes	4	0.00000001	0.00012915
45	Yes	4	0.00000001	0.00002877
46	Yes	4	0.00000001	0.00011698
47	Yes	4	0.00000001	0.00013147
48	Yes	4	0.00000001	0.00002510
49	Yes	4	0.00000001	0.00012449
50	Yes	4	0.00000001	0.00011976

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	21.850	42	1.304	0.004
L2	137 - 87.3333	11.429	42	0.907	0.001
L3	92.6667 - 42.6667	4.809	42	0.517	0.000
L4	49.3333 - 0	1.315	42	0.248	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180'	(2) DB980H90E-M w/ Mount Pipe	42	21.850	1.304	0.004	35919
175'	APX16DWV-16DWV-S-E-A20	42	20.537	1.258	0.004	35919
167'	(2) LPA-80080/4CF w/ Mount Pipe	42	18.456	1.184	0.003	13815
75'	KS24019-L112A	42	3.078	0.395	0.000	8948

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	120.229	8	7.174	0.022
L2	137 - 87.3333	62.949	8	4.996	0.005
L3	92.6667 - 42.6667	26.494	8	2.850	0.001
L4	49.3333 - 0	7.245	8	1.366	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180'	(2) DB980H90E-M w/ Mount Pipe	8	120.229	7.174	0.022	6699
175'	APX16DWV-16DWV-S-E-A20	8	113.012	6.922	0.019	6699
167'	(2) LPA-80080/4CF w/ Mount Pipe	8	101.579	6.519	0.016	2574
75'	KS24019-L112A	8	16.955	2.178	0.001	1627

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	180 - 133 (1)	TP27.51x15.5x0.25	47'	0'	0.0	20.8198	-8.54	1527.84	0.006
L2	133 - 87.3333 (2)	TP38.56x25.9879x0.375	49'8-1/32"	0'	0.0	43.8428	-16.78	3257.30	0.005
L3	87.3333 - 42.6667 (3)	TP49.1x36.46x0.4375	50'	0'	0.0	65.2337	-29.22	4757.64	0.006
L4	42.6667 - 0 (4)	TP59x46.5397x0.4375	49'3-31/32"	0'	0.0	81.3214	-47.13	5529.76	0.009

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	180 - 133 (1)	TP27.51x15.5x0.25	480.17	822.96	0.583	0.00	822.96	0.000
L2	133 - 87.3333 (2)	TP38.56x25.9879x0.375	1195.06	2461.57	0.485	0.00	2461.57	0.000
L3	87.3333 - 42.6667 (3)	TP49.1x36.46x0.4375	2068.20	4589.28	0.451	0.00	4589.28	0.000
L4	42.6667 - 0 (4)	TP59x46.5397x0.4375	3266.96	6661.72	0.490	0.00	6661.72	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	180 - 133 (1)	TP27.51x15.5x0.25	14.28	763.92	0.019	0.00	1647.94	0.000
L2	133 - 87.3333 (2)	TP38.56x25.9879x0.375	18.06	1628.65	0.011	0.00	4929.16	0.000
L3	87.3333 - 42.6667 (3)	TP49.1x36.46x0.4375	22.18	2378.82	0.009	0.23	9189.83	0.000
L4	42.6667 - 0 (4)	TP59x46.5397x0.4375	26.36	2764.88	0.010	0.23	13339.75	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	180 - 133 (1)	0.006	0.583	0.000	0.019	0.000	0.589 ✔	1.000	4.8.2 ✔
L2	133 - 87.3333 (2)	0.005	0.485	0.000	0.011	0.000	0.491 ✔	1.000	4.8.2 ✔
L3	87.3333 - 42.6667 (3)	0.006	0.451	0.000	0.009	0.000	0.457 ✔	1.000	4.8.2 ✔

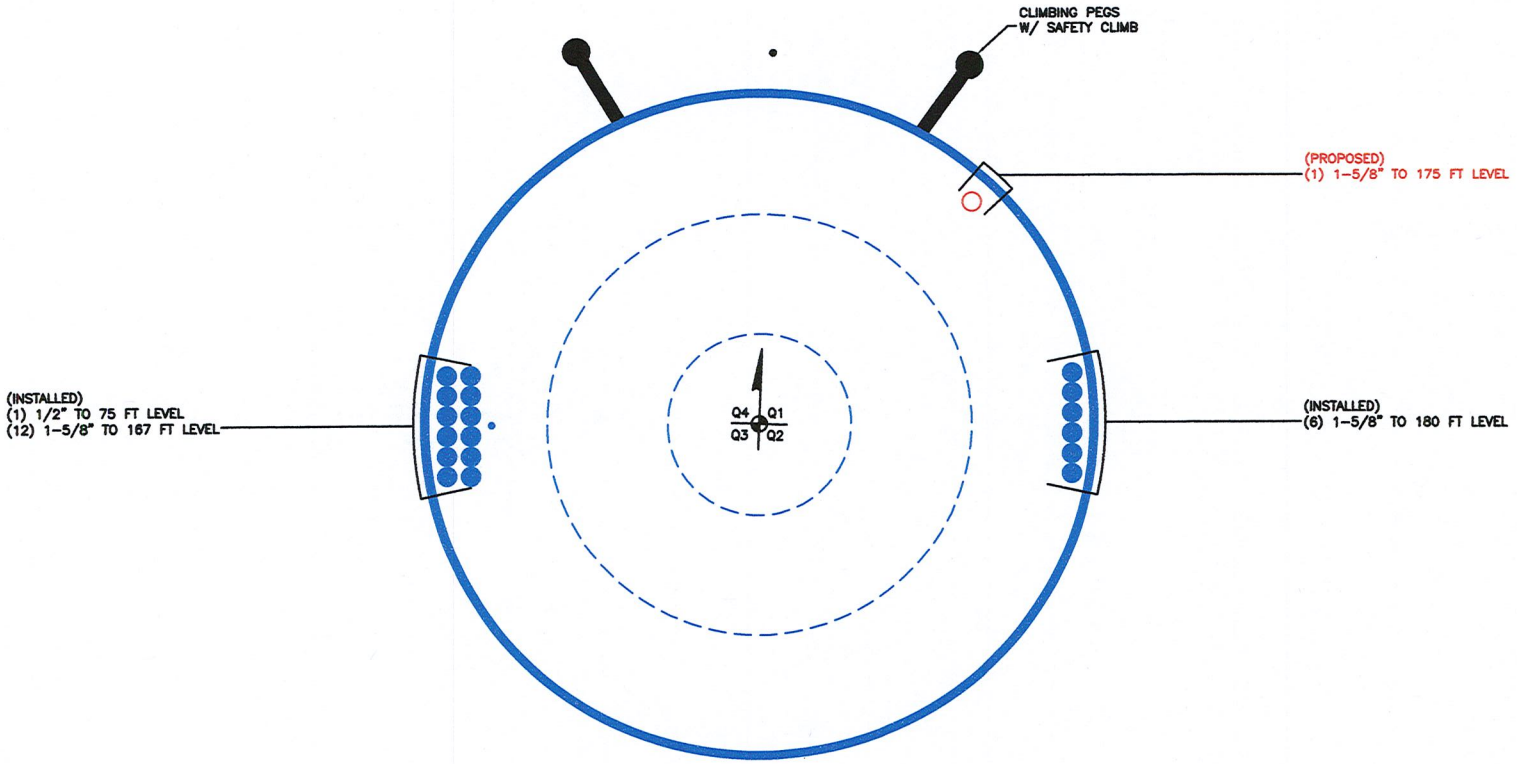
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L4	42.6667 - 0 (4)	0.009	0.490	0.000	0.010	0.000	0.499 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 133	Pole	TP27.51x15.5x0.25	1	-8.54	1527.84	58.9	Pass
L2	133 - 87.3333	Pole	TP38.56x25.9879x0.375	2	-16.78	3257.30	49.1	Pass
L3	87.3333 - 42.6667	Pole	TP49.1x36.46x0.4375	3	-29.22	4757.64	45.7	Pass
L4	42.6667 - 0	Pole	TP59x46.5397x0.4375	4	-47.13	5529.76	49.9	Pass
							Summary	
						Pole (L1)	58.9	Pass
						RATING =	**58.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876370 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU: 876370
Work Order: 1306197
Application: 345818 Rev. 17

	Degrees	Minutes	Seconds		
Site Latitude =	41	46	7.66	41.7688	degrees
Site Longitude =	-72	13	15.07	-72.2209	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 =	0.165	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.059	

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} =	0.176	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.094	*(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*

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876370*
Site Name: *MAYBROOK / BOND*
App #: *345818 Rev. 17*

Pole Manufacturer:	*Other*

Reactions		
Mu:	3267	ft-kips
Axial, Pu:	47	kips
Shear, Vu:	26	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	68	in

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ή):	120.3 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	46.3% **Pass**	

Plate Data		
Diam:	74	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.36	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	34.5 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	63.8% **Pass**	Y.L. Length: 33.81

Stiffener Data (Welding at both sides)		
Config:	0	*
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

n/a

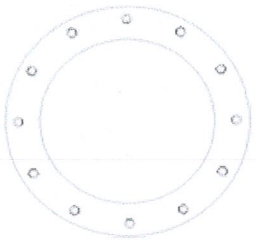
Stiffener Results

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

Pole Data		
Diam:	59	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** 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# 876370
WO# 1306197

REACTIONS	DESIGN REACTIONS	*MODIFIED DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	4315.6	5826.1	3267.0	56.1%
SHEAR (kips)	33.3	45.0	26.0	57.8%

Design loads from: CCIsites Doc #1532099

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