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-157-180326** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 56 Norfield Road, Weston, 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 16, 2018 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,

Melanie A. Bachman
Executive Director

MB/CMW/jmb

From: Mark Roberts [mailto:mark.roberts@qcdevelopment.net]
Sent: Thursday, May 17, 2018 4:57 PM
To: CSC-DL Siting Council
Subject: RE: Council Decision on extension request EM-CING-157-180326 - Norfield Rd.
Importance: High

Hello – Please see the attached revised Structural Analysis Report, which specifically identifies the proposed Handrail Kit and Stabilizer Angle kit per your 4/16 incomplete letter.

Thanks

Mark Roberts
QC Development
860-670-9068

Date: **May 08, 2018**

Cheryl Schultz
Crown Castle
3530 Toringdon WaySuite 300
Charlotte, NC 28277

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-8145

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2099
	Carrier Site Name:	WESTON DT
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	478068
	Crown Castle Work Order Number:	1568944
	Crown Castle Order Number:	421191 Rev. 6
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	194393
Site Data:	**56 Norfield Rd. (Town Hall), Weston, Fairfield County, CT** **Latitude *41° 12' 8.4"*, Longitude *-73° 22' 46.6"*** **190 Foot - Monopole Tower**	

Dear Cheryl Schultz,

Black & Veatch Corp. 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 1182979, in accordance with order 421191, revision 6.

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:

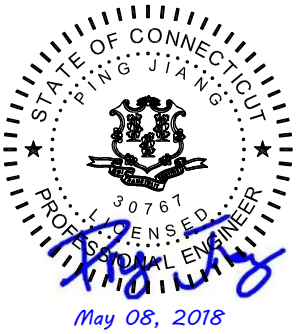
LC7: Existing/Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 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 with a maximum topographic factor, Kzt, of 1.000 and Risk Category II were used in this analysis.

We at *Black & Veatch Corp.* 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: Patdanai Chongcharoenkamon

Respectfully submitted by:



Ping Jiang, P.E.
Professional Engineer

tnxTower Report - version 7.0.5.1

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1) INTRODUCTION

This tower is a 190 ft Monopole tower designed by Pirod, Inc. in January of 2000 and mapped by Tower Engineering Professionals, Inc. in October of 2015. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The tower has been modified multiple times in the past to accommodate additional loading.

The tower has been modified per reinforcement drawings prepared by Tower Engineering Professionals and Sabre Tower & Poles, in January of 2012. Reinforcement consists of addition of reinforcement plates at elevation 0.83' – 51' and 57.5' – 112.5' and additional (8) anchor rods. Refer to Post Modification Inspection Report by Sabre Tower & Poles in November of 2012. This modification has been considered effective in this analysis.

The tower was later modified per reinforcement drawings prepared by Paul J. Ford and Company, in April of 2013. Reinforcement consisted of addition of jump plates at elevation 20', 40', 60' and 80', reinforcing plates at 80.25' to 87.25' and additional (4) transition stiffeners. Refer to Modification Inspection Report by Tower Engineering Professionals in November of 2014. This modification has been considered effective in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standard for Antenna Supporting Structures and Antennas using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
162.0	163.0	3	ericsson	RRUS 32	2 4	3/8 3/4	1,2
		3	ericsson	RRUS 32 B2			
		3	ericsson	RRUS 4478 B14			
		3	kathrein	80010965 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8C			
	162.0	1	site pro1	HRK-14 Handrail Kit [NA 510-1]			
		1	site pro1	PRK-SFS-L Reinforcement Kit			
		6	unknown	L1-1/2"x2-1/2"x1/4"x1'-2"			

Notes:
1) See Appendix B for proposed coax configuration
2) The addition of the proposed handrail kit will change the MCL from 160' to 162'

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
188.0	193.0	1	rfs celwave	PD201-7	-	-	1
	190.0	3	alcatel lucent	TD-RRH8x20-25	3	1-1/4	2
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	1 1	5/16 5/8	1
	188.0	1	cci tower mounts	Platform Mount [LP 403-1]	1	7/8	
	187.0	1	radiowaves	SP2-5.8	1	1-1/4	
185.0	188.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	800MHZ RRH			
	185.0	1	cci tower mounts	Side Arm Mount [SO 102-3]			
184.0	184.0	1	cci tower mounts	Side Arm Mount [SO 701-1]	-	-	1
179.0	185.0	2	rfs celwave	458-2D	2	7/8	1
	179.0	1	cci tower mounts	Platform Mount [LP 403-1]			
170.0	174.0	1	rfs celwave	PD201-7	2 13	7/8 1-5/8	1
	170.0	1	cci tower mounts	Platform Mount [LP 405-1]			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		4	ericsson	RRUS 11 B12			
160.0	163.0	3	ericsson	RRUS 32 B2	1 1 2 1	3/8 5/8 3/4 Conduit	3,4
		6	powerwave technologies	7020.00			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	2 12	7/8 1-5/8	1,5
		3	ericsson	RRUS 11			
		6	powerwave technologies	7020.00			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	160.0	1	cci tower mounts	Platform Mount [LP 403-1]			
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	TT19-08BP111-001	-	-	3
150.0	150.0	3	alcatel lucent	RRH2X60-1900	1	1-5/8	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	alcatel lucent	RRH2X60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	commscope	SBNHH-1D85C w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		2	antel	LPA-80080/6CF w/ Mount Pipe			
		1	cci tower mounts	Platform Mount [LP 403-1]			
		4	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
125.0	130.0	1	rfs celwave	PD128-1	1	1/2	1
		1	rfs celwave	PD201-1	1	7/8	
	125.0	2	cci tower mounts	Side Arm Mount [SO 901-1]			
110.0	115.0	2	rfs celwave	PD128-1	2	1/2	1
	110.0	2	cci tower mounts	Side Arm Mount [SO 901-1]			
100.0	101.0	1	gps	GPS_A	1	1/2	1
	100.0	1	cci tower mounts	Side Arm Mount [SO 901-1]			
95.0	100.0	2	rfs celwave	PD128-1	2	1/2	1
	95.0	2	cci tower mounts	Side Arm Mount [SO 901-1]			
80.0	85.0	1	decibel	DB222	2	1/2	1
		1	rfs celwave	PD128-1			
	80.0	2	cci tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Existing Equipment To Be Removed; Not Considered in This Analysis
4) (1) 5/8" Coax is Routed in (1) 2-1/2" Conduit
5) The addition of the proposed handrail kit will change the MCL from 160’ to 162’

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)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Arcnet architects, Inc.	3529916	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre Tower & Poles	3673725	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals, Inc.	5392198	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod, Inc.	3755295	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod, Inc. & Tower Engineering Professionals, Inc. (mapped)	7340070	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Sabre Tower & Poles	3667108	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	3801440	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Black & Veatch Corp.	7364332	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.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

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.
4) The existing base plate grout was not considered in this analysis.
5) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.
6) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, existing/proposed appurtenance loading, tower/foundation details, and geotechnical data. The existing/proposed loading on the structure is based on CAD level drawings and carrier applications provided by the owner. If any of this information is not current and correct, this report should be considered obsolete and further analysis will be required.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) (Monopole Tower)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
190 - 185	Pole	TP30x30x0.375	Pole	1.8%	Pass
185 - 180	Pole	TP30x30x0.375	Pole	4.5%	Pass
180 - 175	Pole	TP36x36x0.375	Pole	6.1%	Pass
175 - 170	Pole	TP36x36x0.375	Pole	8.8%	Pass
170 - 165	Pole	TP36x36x0.375	Pole	13.2%	Pass
165 - 160	Pole	TP36x36x0.375	Pole	18.7%	Pass
160 - 155	Pole	TP42x42x0.375	Pole	18.8%	Pass
155 - 150	Pole	TP42x42x0.375	Pole	23.7%	Pass
150 - 145	Pole	TP42x42x0.375	Pole	30.5%	Pass
145 - 140	Pole	TP42x42x0.375	Pole	37.3%	Pass
140 - 135	Pole	TP48x48x0.375	Pole	34.4%	Pass
135 - 130	Pole	TP48x48x0.375	Pole	39.9%	Pass
130 - 125	Pole	TP48x48x0.375	Pole	45.4%	Pass
125 - 120	Pole	TP48x48x0.375	Pole	51.2%	Pass
120 - 115	Pole	TP54x54x0.375	Pole	45.6%	Pass
115 - 112.67	Pole	TP54x54x0.375	Pole	47.8%	Pass
112.67 - 112.42	Pole + Reinf.	TP54x54x0.4875	Pole	36.8%	Pass
112.42 - 107.42	Pole + Reinf.	TP54x54x0.4875	Pole	40.6%	Pass
107.42 - 103.33	Pole + Reinf.	TP54x54x0.4875	Pole	43.6%	Pass
103.33 - 103.08	Pole + Reinf.	TP54x54x0.4875	Pole	43.8%	Pass
103.08 - 100	Pole + Reinf.	TP54x54x0.4875	Pole	46.2%	Pass
100 - 95	Pole + Reinf.	TP60x60x0.475	Pole	42.1%	Pass
95 - 90	Pole + Reinf.	TP60x60x0.475	Pole	45.5%	Pass
90 - 89.5	Pole + Reinf.	TP60x60x0.475	Pole	45.8%	Pass
89.5 - 89.25	Pole + Reinf.	TP60x60x0.5563	Pole	39.6%	Pass
89.25 - 85.5	Pole + Reinf.	TP60x60x0.5563	Pole	41.9%	Pass
85.5 - 85.25	Pole + Reinf.	TP60x60x0.6375	Pole	36.9%	Pass
85.25 - 84	Pole + Reinf.	TP60x60x0.6375	Pole	37.6%	Pass
84 - 83.75	Pole + Reinf.	TP60x60x0.525	Pole	45.0%	Pass
83.75 - 82.5	Pole + Reinf.	TP60x60x0.525	Pole	45.8%	Pass
82.5 - 82.25	Pole + Reinf.	TP60x60x0.45	Pole	53.7%	Pass
82.25 - 80	Pole + Reinf.	TP60x60x0.45	Pole	55.4%	Pass
80 - 75	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	45.5%	Pass
75 - 70	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	48.5%	Pass
70 - 65	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	51.6%	Pass
65 - 60	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	54.6%	Pass
60 - 58.5	Pole + Reinf.	TP60x60x0.7	Reinf. 3 Compression	45.9%	Pass
58.5 - 58.25	Pole	TP60x60x0.625	Pole	50.2%	Pass
58.25 - 53.25	Pole	TP60x60x0.625	Pole	53.1%	Pass
53.25 - 48.25	Pole	TP60x60x0.625	Pole	56.0%	Pass
48.25 - 48	Pole + Reinf.	TP60x60x0.775	Pole	45.8%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
48 - 43	Pole + Reinf.	TP60x60x0.775	Pole	48.2%	Pass
43 - 40	Pole + Reinf.	TP60x60x0.775	Pole	49.7%	Pass
40 - 35	Pole + Reinf.	TP60x60x0.775	Pole	52.2%	Pass
35 - 32.08	Pole + Reinf.	TP60x60x0.775	Pole	53.7%	Pass
32.08 - 31.83	Pole + Reinf.	TP60x60x0.9625	Pole	43.4%	Pass
31.83 - 28.75	Pole + Reinf.	TP60x60x0.9625	Pole	44.6%	Pass
28.75 - 28.5	Pole + Reinf.	TP60x60x0.8125	Pole	52.5%	Pass
28.5 - 23.5	Pole + Reinf.	TP60x60x0.8125	Pole	54.9%	Pass
23.5 - 20	Pole + Reinf.	TP60x60x0.8125	Pole	56.6%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.95	Pole	48.2%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.95	Pole	50.3%	Pass
14.75 - 9.75	Pole + Reinf.	TP60x60x0.95	Pole	52.4%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.95	Pole	54.6%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.95	Pole	56.6%	Pass
				Summary	
			Pole	56.6%	Pass
			Reinforcement	54.6%	Pass
			Overall	56.6%	Pass

Table 6 - Tower Component Stresses vs. Capacity (Monopole Tower) – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Bolts	180	4.0	Pass
	Flange Plate		4.5	Pass
1,2	Flange Bolts	160	17.7	Pass
	Flange Plate		18.7	Pass
1,2	Flange Bolts	140	37.6	Pass
	Flange Plate		37.6	Pass
1,2	Flange Bolts	120	53.3	Pass
	Flange Plate		53.3	Pass
1,2	Flange Bolts	100	53.1	Pass
	Flange Plate		53.1	Pass
1,2	Flange Bolts	80	35.2	Pass
	Flange Plate		55.4	Pass
	Jump Plates		66.0	Pass
1,2	Flange Bolts	60	38.5	Pass
	Flange Plate		54.6	Pass
	Jump Plates		63.2	Pass
1,2	Flange Bolts	40	41.3	Pass
	Flange Plate		49.7	Pass
	Jump Plates		69.1	Pass
1,2	Flange Bolts	20	43.4	Pass
	Flange Plate		56.6	Pass
	Jump Plates		70.9	Pass

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	65.4	Pass
	Base Plate		65.4	Pass
1,3	Base Foundation (Compared w/ Design Loads)	0	73.7	Pass

Structure Rating (max from all components) =	73.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Base/Flange plates have the same capacity as their respective splice bolts or shaft
3) Foundation capacity determined by comparing analysis reactions to original design reactions.

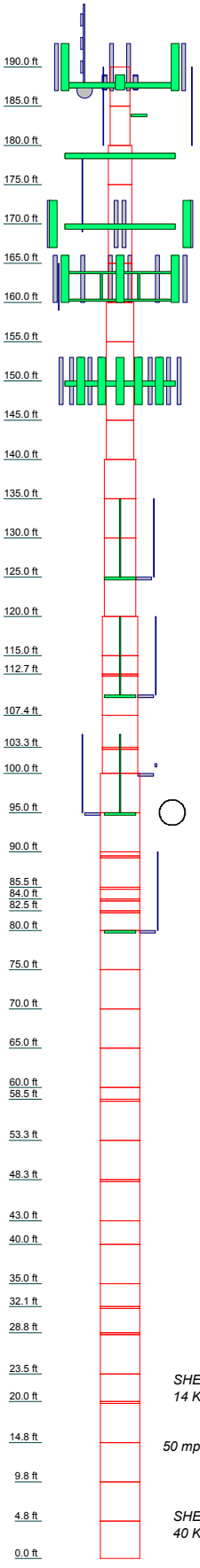
4.1) Recommendations

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	Size	Length (ft)	Grade	Weight (K)
1	P60x0.375	5.00	A53-B-42	0.6
2	P60x0.375	5.00		0.6
3	P60x0.375	5.00		0.7
4	P60x0.375	5.00		0.7
5	P60x0.375	5.00		0.7
6	P60x0.375	5.00		0.7
7	P52x0.375	5.00		0.8
8	P52x0.375	5.00		0.8
9	P52x0.375	5.00		0.8
10	P52x0.375	5.00		0.8
11	P53x0.375	5.00		1.0
12	P53x0.375	5.00		1.0
13	P48x0.375	5.00		1.0
14	P48x0.375	5.00		1.0
15	P48x0.375	5.00		1.1
16	P48x0.375	2.33		0.5
17	P48x0.375	0.42		0.1
18	P48x0.375	5.00		1.4
19	P48x0.375	4.08		1.1
20	P48x0.375	0.92		0.3
21	P48x0.375	3.00		0.9
22	P60x0.375	5.00		1.5
23	P60x0.375	5.00		1.5
24	P60x0.375	0.29		0.1
25	P60x0.375	0.71		0.2
26	P60x0.375	5.00		1.3
27	P60x0.375	0.71		0.2
28	P60x0.375	0.29		0.1
29	P60x0.375	2.00		0.6
30	P60x0.375	0.71		0.2
31	P60x0.375	0.29		0.1
32	P60x0.375	1.00		0.3
33	P60x0.375	5.00		1.8
34	P60x0.375	5.00		1.8
35	P60x0.375	5.00		1.8
36	P60x0.375	5.00		1.8
37	P60x0.375	0.50		0.2
38	P60x0.375	0.50		0.2
39	P60x0.375	5.00		2.0
40	P60x0.375	5.00		2.0
41	P60x0.375	0.25		0.1
42	P60x0.375	5.00		2.4
43	P60x0.375	3.00		1.4
44	P60x0.375	5.00		2.4
45	P60x0.375	2.92		1.4
46	P60x0.375	0.08		0.0
47	P60x0.375	0.25		0.1
48	P60x0.375	5.00		2.5
49	P60x0.375	0.25		0.1
50	P60x0.375	3.50		1.8
51	P60x0.375	0.50		0.2
52	P60x0.375	5.00		2.9
53	P60x0.375	5.00		2.9
54	P60x0.375	5.00		2.9
55	P60x0.375	4.75		2.8
				60.4



ALL REACTIONS ARE FACTORED

AXIAL 170 K

SHEAR 14 K — *MOMENT 1841 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 0.7500 in ICE

AXIAL 107 K

SHEAR 40 K — *MOMENT 5201 kip-ft*

TORQUE 1 kip-ft

REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 403-1]	188	RRUS 4478 B14	162
6' x 2" Mount Pipe	188	RRUS 4478 B14	162
6' x 2" Mount Pipe	188	RRUS 32 B2	162
6' x 2" Mount Pipe	188	RRUS 32 B2	162
APXVTM14-ALU-I20 w/ Mount Pipe	188	RRUS 32 B2	162
APXVTM14-ALU-I20 w/ Mount Pipe	188	DC6-48-60-18-8C	162
APXVTM14-ALU-I20 w/ Mount Pipe	188	DC6-48-60-18-8F	162
PD201-7	188	(2) LGP21401	162
APXVSPP18-C-A20 w/ Mount Pipe	188	(2) LGP21401	162
APXVSPP18-C-A20 w/ Mount Pipe	188	(2) LGP21401	162
APXVSPP18-C-A20 w/ Mount Pipe	188	(2) 7020.00	162
TD-RRH8x20-25	188	(2) 7020.00	162
TD-RRH8x20-25	188	(2) 7020.00	162
TD-RRH8x20-25	188	RRUS 11	162
SP2-5.8	188	RRUS 11	162
(2) 4' x 2" Pipe Mount	185	RRUS 11	162
(2) 4' x 2" Pipe Mount	185	Platform Mount [LP 403-1]	162
(2) 4' x 2" Pipe Mount	185	SBNHH-1D85C w/ Mount Pipe	150
800MHZ RRH	185	SBNHH-1D85C w/ Mount Pipe	150
800MHZ RRH	185	SBNHH-1D85C w/ Mount Pipe	150
800MHZ RRH	185	SBNHH-1D85C w/ Mount Pipe	150
1900MHz RRH	185	SBNHH-1D85C w/ Mount Pipe	150
1900MHz RRH	185	SBNHH-1D85C w/ Mount Pipe	150
1900MHz RRH	185	(2) DB846F65ZAXY w/ Mount Pipe	150
Side Arm Mount [SO 102-3]	185	(2) DB846F65ZAXY w/ Mount Pipe	150
4' x 2" Pipe Mount	184	(2) LPA-80080/6CF w/ Mount Pipe	150
Side Arm Mount [SO 701-1]	184	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
Side Arm Mount [SO 301-1]	179	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
Side Arm Mount [SO 301-1]	179	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
(4) 6' x 2" Mount Pipe	179	RRH2X60-700	150
(4) 6' x 2" Mount Pipe	179	RRH2X60-700	150
(4) 6' x 2" Mount Pipe	179	RRH2X60-700	150
458-2D	179	RRH4X45-AWS4 B66	150
458-2D	179	RRH4X45-AWS4 B66	150
Platform Mount [LP 403-1]	179	RRH4X45-AWS4 B66	150
4' x 2" Pipe Mount	170	RRH2X60-1900	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	RRH2X60-1900	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	RRH2X60-1900	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	DB-T1-6Z-8AB-0Z	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	DB-T1-6Z-8AB-0Z	150
		(2) FD9R6004/2C-3L	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	(2) FD9R6004/2C-3L	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	(2) FD9R6004/2C-3L	150
PD201-7	170	Platform Mount [LP 403-1]	150
KRY 112 144/1	170	Side Arm Mount [SO 901-1]	125
KRY 112 144/1	170	PD201-1	125
KRY 112 144/1	170	PD128-1	125
(2) RRUS 11 B12	170	Side Arm Mount [SO 901-1]	125
RRUS 11 B12	170	Side Arm Mount [SO 901-1]	110
RRUS 11 B12	170	PD128-1	110
Platform Mount [LP 405-1]	170	PD128-1	110
HRK-14 Handrail Kit [NA 510-1]	162	Side Arm Mount [SO 901-1]	110
PRK-SFS-L Reinforcement Kit	162	GPS_A	100
PRK-SFS-L Reinforcement Kit	162	Side Arm Mount [SO 901-1]	100
PRK-SFS-L Reinforcement Kit	162	Side Arm Mount [SO 901-1]	95
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	162	PD128-1	95
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	162	PD128-1	95
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	162	Side Arm Mount [SO 901-1]	95
6' x 2" Mount Pipe	162	Side Arm Mount [SO 901-1]	80
80010965 w/ Mount Pipe	162	PD128-1	80
80010965 w/ Mount Pipe	162	DB222	80
80010965 w/ Mount Pipe	162	Jump Plate 120" x 4.5" x 1"	80
7770.00 w/ Mount Pipe	162	Jump Plate 120" x 4.5" x 1"	80
7770.00 w/ Mount Pipe	162	Jump Plate 120" x 4.5" x 1"	80
7770.00 w/ Mount Pipe	162	Side Arm Mount [SO 901-1]	80
OPA-65R-LCUU-H6 w/ Mount Pipe	162	Jump Plate 120" x 6.5" x 1.25"	60
OPA-65R-LCUU-H6 w/ Mount Pipe	162	Jump Plate 120" x 6.5" x 1.25"	60
OPA-65R-LCUU-H6 w/ Mount Pipe	162	Jump Plate 120" x 6.5" x 1.25"	60
RRUS 32	162	(2) Jump Plate 120" x 6" x 1"	40
RRUS 32	162	(2) Jump Plate 120" x 6" x 1"	40
RRUS 32	162	(2) Jump Plate 120" x 6" x 1"	40
RRUS 4478 B14	162	(2) Jump Plate 120" x 6.5" x 1.25"	20
		(2) Jump Plate 120" x 6.5" x 1.25"	20
		(2) Jump Plate 120" x 6.5" x 1.25"	20

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 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

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Job:	***Weston/Rt-57/Norfield (BU# 829046)***		
Project:	***194393 (829046.1568944)***		
Client:	Crown Castle	Drawn by: Patdanai Chongcharoenkamon	App'd:
Code:	TIA-222-G	Date: 05/08/18	Scale: NTS
Path:	C:\Users\chongcharoenkamonp\Desktop\Tmp\829046\829046_1568944 - TIA\Structural\829046_1568944_Structural Analysis - Modified.eat		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:

3) Tower is located in Fairfield County, Connecticut.
4) Basic wind speed of 93 mph.
5) Structure Class II.
6) Exposure Category B.
7) Topographic Category 1.
8) Crest Height 0.00 ft.
9) Nominal ice thickness of 0.7500 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.
18) 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				

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	190.00-185.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L2	185.00-180.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L3	180.00-175.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L4	175.00-170.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L5	170.00-165.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L6	165.00-160.00	5.00	P36x0.375	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L7	160.00-155.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L8	155.00-150.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L9	150.00-145.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L10	145.00-140.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L11	140.00-135.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L12	135.00-130.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L13	130.00-125.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L14	125.00-120.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L15	120.00-115.00	5.00	P54x0.375	A53-B-42 (42 ksi)	
L16	115.00-112.67	2.33	P54x0.375	A53-B-42 (42 ksi)	
L17	112.67-112.42	0.25	P54x0.4875	A53-B-42 (42 ksi)	
L18	112.42-107.42	5.00	P54x0.4875	A53-B-42 (42 ksi)	
L19	107.42-103.33	4.08	P54x0.4875	A53-B-42 (42 ksi)	
L20	103.33-103.08	0.25	P54x0.4875	A53-B-42 (42 ksi)	
L21	103.08-100.00	3.08	P54x0.4875	A53-B-42 (42 ksi)	
L22	100.00-95.00	5.00	P60x0.475	A53-B-42 (42 ksi)	
L23	95.00-90.00	5.00	P60x0.475	A53-B-42 (42 ksi)	
L24	90.00-89.50	0.50	P60x0.475	A53-B-42 (42 ksi)	
L25	89.50-89.25	0.25	P60x0.55625	A53-B-42 (42 ksi)	
L26	89.25-85.50	3.75	P60x0.55625	A53-B-42 (42 ksi)	
L27	85.50-85.25	0.25	P60x0.6375	A53-B-42 (42 ksi)	
L28	85.25-84.00	1.25	P60x0.6375	A53-B-42 (42 ksi)	
L29	84.00-83.75	0.25	P60x0.525	A53-B-42 (42 ksi)	
L30	83.75-82.50	1.25	P60x0.525	A53-B-42 (42 ksi)	
L31	82.50-82.25	0.25	P60x0.45	A53-B-42 (42 ksi)	
L32	82.25-80.00	2.25	P60x0.45	A53-B-42 (42 ksi)	
L33	80.00-75.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L34	75.00-70.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L35	70.00-65.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L36	65.00-60.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L37	60.00-58.50	1.50	P60x0.7	A53-B-42 (42 ksi)	
L38	58.50-58.25	0.25	P60x0.625	A53-B-42 (42 ksi)	
L39	58.25-53.25	5.00	P60x0.625	A53-B-42 (42 ksi)	
L40	53.25-48.25	5.00	P60x0.625	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L41	48.25-48.00	0.25	P60x0.775	A53-B-42 (42 ksi)	
L42	48.00-43.00	5.00	P60x0.775	A53-B-42 (42 ksi)	
L43	43.00-40.00	3.00	P60x0.775	A53-B-42 (42 ksi)	
L44	40.00-35.00	5.00	P60x0.775	A53-B-42 (42 ksi)	
L45	35.00-32.08	2.92	P60x0.775	A53-B-42 (42 ksi)	
L46	32.08-31.83	0.25	P60x0.9625	A53-B-42 (42 ksi)	
L47	31.83-28.75	3.08	P60x0.9625	A53-B-42 (42 ksi)	
L48	28.75-28.50	0.25	P60x0.8125	A53-B-42 (42 ksi)	
L49	28.50-23.50	5.00	P60x0.8125	A53-B-42 (42 ksi)	
L50	23.50-20.00	3.50	P60x0.8125	A53-B-42 (42 ksi)	
L51	20.00-19.75	0.25	P60x0.95	A53-B-42 (42 ksi)	
L52	19.75-14.75	5.00	P60x0.95	A53-B-42 (42 ksi)	
L53	14.75-9.75	5.00	P60x0.95	A53-B-42 (42 ksi)	
L54	9.75-4.75	5.00	P60x0.95	A53-B-42 (42 ksi)	
L55	4.75-0.00	4.75	P60x0.95	A53-B-42 (42 ksi)	

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 190.00-185.00				1	1	1			
L2 185.00-180.00				1	1	1			
L3 180.00-175.00				1	1	1			
L4 175.00-170.00				1	1	1			
L5 170.00-165.00				1	1	1			
L6 165.00-160.00				1	1	1			
L7 160.00-155.00				1	1	1			
L8 155.00-150.00				1	1	1			
L9 150.00-145.00				1	1	1			
L10 145.00-140.00				1	1	1			
L11 140.00-135.00				1	1	1			
L12 135.00-130.00				1	1	1			
L13 130.00-125.00				1	1	1			
L14 125.00-120.00				1	1	1			
L15 120.00-115.00				1	1	1			
L16 115.00-				1	1	1			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
112.67									
L17 112.67-112.42				1	1	0.990478			
L18 112.42-107.42				1	1	0.990478			
L19 107.42-103.33				1	1	0.990478			
L20 103.33-103.08				1	1	0.990478			
L21 103.08-100.00				1	1	0.990478			
L22 100.00-95.00				1	1	0.993442			
L23 95.00-90.00				1	1	0.993442			
L24 90.00-89.50				1	1	0.993442			
L25 89.50-89.25				1	1	0.979451			
L26 89.25-85.50				1	1	0.979451			
L27 85.50-85.25				1	1	0.96934			
L28 85.25-84.00				1	1	0.96934			
L29 84.00-83.75				1	1	0.991333			
L30 83.75-82.50				1	1	0.991333			
L31 82.50-82.25				1	1	0.99474			
L32 82.25-80.00				1	1	0.99474			
L33 80.00-75.00				1	1	0.996424			
L34 75.00-70.00				1	1	0.996424			
L35 70.00-65.00				1	1	0.996424			
L36 65.00-60.00				1	1	0.996424			
L37 60.00-58.50				1	1	0.997508			
L38 58.50-58.25				1	1	1			
L39 58.25-53.25				1	1	1			
L40 53.25-48.25				1	1	1			
L41 48.25-48.00				1	1	0.977534			
L42 48.00-43.00				1	1	0.977534			
L43 43.00-40.00				1	1	0.977534			
L44 40.00-35.00				1	1	0.977534			
L45 35.00-32.08				1	1	0.977534			
L46 32.08-31.83				1	1	0.96816			
L47 31.83-28.75				1	1	0.96816			
L48 28.75-28.50				1	1	0.98265			
L49 28.50-23.50				1	1	0.98265			

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
L50 23.50-20.00				1	1	0.98265			
L51 20.00-19.75				1	1	0.973014			
L52 19.75-14.75				1	1	0.973014			
L53 14.75-9.75				1	1	0.973014			
L54 9.75-4.75				1	1	0.973014			
L55 4.75-0.00				1	1	0.973014			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	C	Surface Ar (CaAa)	190.00 - 10.00	1	1	0.000 0.010	0.3750		0.22
Climbing Rungs	C	Surface Ar (CaAa)	100.00 - 10.00	1	1	0.000 0.000	0.8000		7.90
188									
HB114-21U3M12-XXXF(1-1/4)	A	Surface Ar (CaAa)	188.00 - 6.00	3	3	0.400 0.480	1.5400		1.22
LDF7-50A(1-5/8)	A	Surface Ar (CaAa)	170.00 - 11.00	7	7	0.100 0.370	1.9800		0.82
160									
(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	A	Surface Ar (CaAa)	160.00 - 11.00	6	3	-0.100 -0.060	0.7950		0.58
LDF7-50A(1-5/8)	A	Surface Ar (CaAa)	160.00 - 11.00	12	6	-0.340 -0.100	1.9800		0.82
**********									
***MOD 2012 ***									
8.5" x 1.25" Flat Plate	A	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
8.5" x 1.25" Flat Plate	B	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
8.5" x 1.25" Flat Plate *	C	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
6.5" x 1.25" Flat Plate	A	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	B	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate *	C	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00
4.5" x 1" Flat Plate	A	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	B	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate *	C	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
6" x 1" Flat Plate	A	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate *	C	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	A	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
6" x 1" Flat Plate	B	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	C	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00
MOD 2013									
4.5" x 1" Flat Plate	A	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	B	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	C	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
**********									

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
TYPE I(1-1/4)	A	No	Inside Pole	188.00 - 6.00	1	No Ice	0.00	0.63
						1/2" Ice	0.00	0.63
						1" Ice	0.00	0.63
ATCB-B01(5/16)	A	No	Inside Pole	188.00 - 6.00	1	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
LDF4.5-50(5/8)	A	No	Inside Pole	188.00 - 6.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
LDF5-50A(7/8)	A	No	Inside Pole	188.00 - 6.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
179								
LDF5-50A(7/8)	A	No	Inside Pole	179.00 - 6.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
170								
LDF5-50A(7/8)	A	No	Inside Pole	170.00 - 11.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LDF7-50A(1-5/8)	A	No	Inside Pole	170.00 - 11.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF5-50A(7/8)	A	No	Inside Pole	160.00 - 11.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
150								
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	150.00 - 6.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LDF7-50A(1-5/8)	B	No	Inside Pole	150.00 - 6.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
125								
LDF4-50A(1/2)	A	No	Inside Pole	125.00 - 6.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
LDF5-50A(7/8)	A	No	Inside Pole	125.00 - 6.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
110								
LDF4-50A(1/2)	A	No	Inside Pole	110.00 - 6.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
100								
LDF4-50A(1/2)	A	No	Inside Pole	100.00 - 6.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.15
95								
LDF4-50A(1/2)	A	No	Inside Pole	95.00 - 6.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
80								
LDF4-50A(1/2)	A	No	Inside Pole	80.00 - 6.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
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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	190.00-185.00	A	0.000	0.000	1.386	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L2	185.00-180.00	A	0.000	0.000	2.310	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L3	180.00-175.00	A	0.000	0.000	2.310	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L4	175.00-170.00	A	0.000	0.000	2.310	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L5	170.00-165.00	A	0.000	0.000	9.240	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L6	165.00-160.00	A	0.000	0.000	9.240	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L7	160.00-155.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L8	155.00-150.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.00
L9	150.00-145.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L10	145.00-140.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L11	140.00-135.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L12	135.00-130.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L13	130.00-125.00	A	0.000	0.000	16.372	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L14	125.00-120.00	A	0.000	0.000	16.372	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L15	120.00-115.00	A	0.000	0.000	16.372	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.188	0.000	0.00
L16	115.00-112.67	A	0.000	0.000	9.643	0.000	0.07
		B	0.000	0.000	2.000	0.000	0.03
		C	0.000	0.000	2.088	0.000	0.00
L17	112.67-112.42	A	0.000	0.000	1.069	0.000	0.01

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
		B	0.000	0.000	0.250	0.000	0.00
		C	0.000	0.000	0.259	0.000	0.00
L18	112.42-107.42	A	0.000	0.000	21.372	0.000	0.16
		B	0.000	0.000	5.000	0.000	0.06
		C	0.000	0.000	5.188	0.000	0.00
L19	107.42-103.33	A	0.000	0.000	19.453	0.000	0.13
		B	0.000	0.000	6.083	0.000	0.05
		C	0.000	0.000	6.236	0.000	0.00
L20	103.33-103.08	A	0.000	0.000	1.319	0.000	0.01
		B	0.000	0.000	0.500	0.000	0.00
		C	0.000	0.000	0.509	0.000	0.00
L21	103.08-100.00	A	0.000	0.000	14.928	0.000	0.10
		B	0.000	0.000	4.833	0.000	0.03
		C	0.000	0.000	4.949	0.000	0.00
L22	100.00-95.00	A	0.000	0.000	21.372	0.000	0.16
		B	0.000	0.000	5.000	0.000	0.06
		C	0.000	0.000	5.588	0.000	0.04
L23	95.00-90.00	A	0.000	0.000	22.122	0.000	0.16
		B	0.000	0.000	5.750	0.000	0.06
		C	0.000	0.000	6.338	0.000	0.04
L24	90.00-89.50	A	0.000	0.000	2.512	0.000	0.02
		B	0.000	0.000	0.875	0.000	0.01
		C	0.000	0.000	0.934	0.000	0.00
L25	89.50-89.25	A	0.000	0.000	1.256	0.000	0.01
		B	0.000	0.000	0.438	0.000	0.00
		C	0.000	0.000	0.467	0.000	0.00
L26	89.25-85.50	A	0.000	0.000	19.967	0.000	0.12
		B	0.000	0.000	7.688	0.000	0.04
		C	0.000	0.000	8.128	0.000	0.03
L27	85.50-85.25	A	0.000	0.000	1.444	0.000	0.01
		B	0.000	0.000	0.625	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L28	85.25-84.00	A	0.000	0.000	7.218	0.000	0.04
		B	0.000	0.000	3.125	0.000	0.01
		C	0.000	0.000	3.272	0.000	0.01
L29	84.00-83.75	A	0.000	0.000	1.444	0.000	0.01
		B	0.000	0.000	0.625	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L30	83.75-82.50	A	0.000	0.000	7.218	0.000	0.04
		B	0.000	0.000	3.125	0.000	0.01
		C	0.000	0.000	3.272	0.000	0.01
L31	82.50-82.25	A	0.000	0.000	1.444	0.000	0.01
		B	0.000	0.000	0.625	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L32	82.25-80.00	A	0.000	0.000	10.243	0.000	0.07
		B	0.000	0.000	2.875	0.000	0.03
		C	0.000	0.000	3.139	0.000	0.02
L33	80.00-75.00	A	0.000	0.000	20.122	0.000	0.16
		B	0.000	0.000	3.750	0.000	0.06
		C	0.000	0.000	4.338	0.000	0.04
L34	75.00-70.00	A	0.000	0.000	20.122	0.000	0.16
		B	0.000	0.000	3.750	0.000	0.06
		C	0.000	0.000	4.338	0.000	0.04
L35	70.00-65.00	A	0.000	0.000	20.122	0.000	0.16
		B	0.000	0.000	3.750	0.000	0.06
		C	0.000	0.000	4.338	0.000	0.04
L36	65.00-60.00	A	0.000	0.000	20.122	0.000	0.16
		B	0.000	0.000	3.750	0.000	0.06
		C	0.000	0.000	4.338	0.000	0.04
L37	60.00-58.50	A	0.000	0.000	6.037	0.000	0.05
		B	0.000	0.000	1.125	0.000	0.02
		C	0.000	0.000	1.301	0.000	0.01
L38	58.50-58.25	A	0.000	0.000	1.006	0.000	0.01
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.217	0.000	0.00
L39	58.25-53.25	A	0.000	0.000	17.310	0.000	0.16
		B	0.000	0.000	0.938	0.000	0.06
		C	0.000	0.000	1.525	0.000	0.04
L40	53.25-48.25	A	0.000	0.000	19.352	0.000	0.16

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
		B	0.000	0.000	2.979	0.000	0.06
		C	0.000	0.000	3.567	0.000	0.04
L41	48.25-48.00	A	0.000	0.000	1.089	0.000	0.01
		B	0.000	0.000	0.271	0.000	0.00
		C	0.000	0.000	0.300	0.000	0.00
L42	48.00-43.00	A	0.000	0.000	21.789	0.000	0.16
		B	0.000	0.000	5.417	0.000	0.06
		C	0.000	0.000	6.004	0.000	0.04
L43	43.00-40.00	A	0.000	0.000	13.073	0.000	0.10
		B	0.000	0.000	3.250	0.000	0.03
		C	0.000	0.000	3.603	0.000	0.02
L44	40.00-35.00	A	0.000	0.000	22.969	0.000	0.16
		B	0.000	0.000	6.597	0.000	0.06
		C	0.000	0.000	7.184	0.000	0.04
L45	35.00-32.08	A	0.000	0.000	16.862	0.000	0.09
		B	0.000	0.000	7.300	0.000	0.03
		C	0.000	0.000	7.643	0.000	0.02
L46	32.08-31.83	A	0.000	0.000	1.444	0.000	0.01
		B	0.000	0.000	0.625	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L47	31.83-28.75	A	0.000	0.000	17.785	0.000	0.10
		B	0.000	0.000	7.700	0.000	0.03
		C	0.000	0.000	8.062	0.000	0.03
L48	28.75-28.50	A	0.000	0.000	1.444	0.000	0.01
		B	0.000	0.000	0.625	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L49	28.50-23.50	A	0.000	0.000	26.164	0.000	0.16
		B	0.000	0.000	9.792	0.000	0.06
		C	0.000	0.000	10.379	0.000	0.04
L50	23.50-20.00	A	0.000	0.000	16.419	0.000	0.11
		B	0.000	0.000	4.958	0.000	0.04
		C	0.000	0.000	5.370	0.000	0.03
L51	20.00-19.75	A	0.000	0.000	1.173	0.000	0.01
		B	0.000	0.000	0.354	0.000	0.00
		C	0.000	0.000	0.384	0.000	0.00
L52	19.75-14.75	A	0.000	0.000	23.456	0.000	0.16
		B	0.000	0.000	7.083	0.000	0.06
		C	0.000	0.000	7.671	0.000	0.04
L53	14.75-9.75	A	0.000	0.000	19.940	0.000	0.13
		B	0.000	0.000	7.083	0.000	0.06
		C	0.000	0.000	7.641	0.000	0.04
L54	9.75-4.75	A	0.000	0.000	8.816	0.000	0.03
		B	0.000	0.000	7.083	0.000	0.04
		C	0.000	0.000	7.083	0.000	0.00
L55	4.75-0.00	A	0.000	0.000	5.549	0.000	0.00
		B	0.000	0.000	5.549	0.000	0.00
		C	0.000	0.000	5.549	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	190.00-185.00	A	1.785	0.000	0.000	3.071	0.000	0.05
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.972	0.000	0.02
L2	185.00-180.00	A	1.780	0.000	0.000	5.112	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.967	0.000	0.02
L3	180.00-175.00	A	1.775	0.000	0.000	5.106	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.962	0.000	0.02
L4	175.00-170.00	A	1.770	0.000	0.000	5.100	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.957	0.000	0.02
L5	170.00-165.00	A	1.765	0.000	0.000	15.961	0.000	0.27

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
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.952	0.000	0.02
L6	165.00-160.00	A	1.759	0.000	0.000	15.948	0.000	0.27
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.947	0.000	0.02
L7	160.00-155.00	A	1.754	0.000	0.000	29.234	0.000	0.53
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.941	0.000	0.02
L8	155.00-150.00	A	1.748	0.000	0.000	29.206	0.000	0.53
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.936	0.000	0.02
L9	150.00-145.00	A	1.742	0.000	0.000	29.177	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.930	0.000	0.02
L10	145.00-140.00	A	1.736	0.000	0.000	29.147	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.924	0.000	0.02
L11	140.00-135.00	A	1.730	0.000	0.000	29.116	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.918	0.000	0.02
L12	135.00-130.00	A	1.724	0.000	0.000	29.084	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.911	0.000	0.02
L13	130.00-125.00	A	1.717	0.000	0.000	29.051	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.905	0.000	0.02
L14	125.00-120.00	A	1.710	0.000	0.000	29.017	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.898	0.000	0.02
L15	120.00-115.00	A	1.703	0.000	0.000	28.981	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	1.891	0.000	0.02
L16	115.00-112.67	A	1.698	0.000	0.000	15.920	0.000	0.27
		B		0.000	0.000	2.405	0.000	0.05
		C		0.000	0.000	3.285	0.000	0.04
L17	112.67-112.42	A	1.696	0.000	0.000	1.748	0.000	0.03
		B		0.000	0.000	0.301	0.000	0.01
		C		0.000	0.000	0.395	0.000	0.00
L18	112.42-107.42	A	1.692	0.000	0.000	34.933	0.000	0.58
		B		0.000	0.000	6.008	0.000	0.12
		C		0.000	0.000	7.888	0.000	0.09
L19	107.42-103.33	A	1.685	0.000	0.000	31.168	0.000	0.50
		B		0.000	0.000	7.577	0.000	0.13
		C		0.000	0.000	9.106	0.000	0.10
L20	103.33-103.08	A	1.681	0.000	0.000	2.078	0.000	0.03
		B		0.000	0.000	0.634	0.000	0.01
		C		0.000	0.000	0.728	0.000	0.01
L21	103.08-100.00	A	1.678	0.000	0.000	24.012	0.000	0.38
		B		0.000	0.000	6.219	0.000	0.10
		C		0.000	0.000	7.369	0.000	0.08
L22	100.00-95.00	A	1.672	0.000	0.000	35.495	0.000	0.58
		B		0.000	0.000	6.672	0.000	0.12
		C		0.000	0.000	10.602	0.000	0.15
L23	95.00-90.00	A	1.663	0.000	0.000	36.383	0.000	0.59
		B		0.000	0.000	7.603	0.000	0.13
		C		0.000	0.000	11.517	0.000	0.16
L24	90.00-89.50	A	1.658	0.000	0.000	4.011	0.000	0.06
		B		0.000	0.000	1.136	0.000	0.02
		C		0.000	0.000	1.526	0.000	0.02
L25	89.50-89.25	A	1.657	0.000	0.000	2.005	0.000	0.03
		B		0.000	0.000	0.568	0.000	0.01
		C		0.000	0.000	0.763	0.000	0.01
L26	89.25-85.50	A	1.653	0.000	0.000	31.684	0.000	0.49
		B		0.000	0.000	10.135	0.000	0.15
		C		0.000	0.000	13.055	0.000	0.17
L27	85.50-85.25	A	1.650	0.000	0.000	2.273	0.000	0.03
		B		0.000	0.000	0.837	0.000	0.01
		C		0.000	0.000	1.032	0.000	0.01
L28	85.25-84.00	A	1.648	0.000	0.000	11.362	0.000	0.17

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
		B		0.000	0.000	4.185	0.000	0.06
		C		0.000	0.000	5.156	0.000	0.07
L29	84.00-83.75	A	1.647	0.000	0.000	2.272	0.000	0.03
		B		0.000	0.000	0.837	0.000	0.01
		C		0.000	0.000	1.031	0.000	0.01
L30	83.75-82.50	A	1.645	0.000	0.000	11.357	0.000	0.17
		B		0.000	0.000	4.184	0.000	0.06
		C		0.000	0.000	5.153	0.000	0.07
L31	82.50-82.25	A	1.644	0.000	0.000	2.271	0.000	0.03
		B		0.000	0.000	0.837	0.000	0.01
		C		0.000	0.000	1.030	0.000	0.01
L32	82.25-80.00	A	1.641	0.000	0.000	16.833	0.000	0.27
		B		0.000	0.000	3.931	0.000	0.07
		C		0.000	0.000	5.673	0.000	0.08
L33	80.00-75.00	A	1.634	0.000	0.000	34.018	0.000	0.56
		B		0.000	0.000	5.384	0.000	0.11
		C		0.000	0.000	9.239	0.000	0.14
L34	75.00-70.00	A	1.623	0.000	0.000	33.953	0.000	0.56
		B		0.000	0.000	5.373	0.000	0.11
		C		0.000	0.000	9.206	0.000	0.14
L35	70.00-65.00	A	1.611	0.000	0.000	33.883	0.000	0.56
		B		0.000	0.000	5.361	0.000	0.11
		C		0.000	0.000	9.171	0.000	0.14
L36	65.00-60.00	A	1.599	0.000	0.000	33.809	0.000	0.55
		B		0.000	0.000	5.349	0.000	0.11
		C		0.000	0.000	9.134	0.000	0.14
L37	60.00-58.50	A	1.590	0.000	0.000	10.127	0.000	0.16
		B		0.000	0.000	1.602	0.000	0.03
		C		0.000	0.000	2.733	0.000	0.04
L38	58.50-58.25	A	1.588	0.000	0.000	1.687	0.000	0.03
		B		0.000	0.000	0.267	0.000	0.01
		C		0.000	0.000	0.455	0.000	0.01
L39	58.25-53.25	A	1.581	0.000	0.000	29.702	0.000	0.51
		B		0.000	0.000	1.333	0.000	0.07
		C		0.000	0.000	5.082	0.000	0.10
L40	53.25-48.25	A	1.566	0.000	0.000	32.136	0.000	0.53
		B		0.000	0.000	3.840	0.000	0.09
		C		0.000	0.000	7.560	0.000	0.12
L41	48.25-48.00	A	1.558	0.000	0.000	1.761	0.000	0.03
		B		0.000	0.000	0.349	0.000	0.01
		C		0.000	0.000	0.534	0.000	0.01
L42	48.00-43.00	A	1.549	0.000	0.000	35.176	0.000	0.55
		B		0.000	0.000	6.966	0.000	0.12
		C		0.000	0.000	10.651	0.000	0.15
L43	43.00-40.00	A	1.535	0.000	0.000	21.055	0.000	0.33
		B		0.000	0.000	4.171	0.000	0.07
		C		0.000	0.000	6.365	0.000	0.09
L44	40.00-35.00	A	1.519	0.000	0.000	36.431	0.000	0.56
		B		0.000	0.000	8.369	0.000	0.13
		C		0.000	0.000	11.995	0.000	0.15
L45	35.00-32.08	A	1.502	0.000	0.000	25.394	0.000	0.36
		B		0.000	0.000	9.055	0.000	0.11
		C		0.000	0.000	11.153	0.000	0.13
L46	32.08-31.83	A	1.495	0.000	0.000	2.172	0.000	0.03
		B		0.000	0.000	0.775	0.000	0.01
		C		0.000	0.000	0.953	0.000	0.01
L47	31.83-28.75	A	1.487	0.000	0.000	26.720	0.000	0.37
		B		0.000	0.000	9.532	0.000	0.12
		C		0.000	0.000	11.726	0.000	0.13
L48	28.75-28.50	A	1.479	0.000	0.000	2.166	0.000	0.03
		B		0.000	0.000	0.773	0.000	0.01
		C		0.000	0.000	0.950	0.000	0.01
L49	28.50-23.50	A	1.465	0.000	0.000	39.778	0.000	0.57
		B		0.000	0.000	11.989	0.000	0.16
		C		0.000	0.000	15.505	0.000	0.18
L50	23.50-20.00	A	1.439	0.000	0.000	25.327	0.000	0.37
		B		0.000	0.000	5.965	0.000	0.09
		C		0.000	0.000	8.391	0.000	0.10
L51	20.00-19.75	A	1.426	0.000	0.000	1.805	0.000	0.03

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
		B		0.000	0.000	0.425	0.000	0.01
		C		0.000	0.000	0.597	0.000	0.01
L52	19.75-14.75	A	1.406	0.000	0.000	35.984	0.000	0.52
		B		0.000	0.000	8.489	0.000	0.12
		C		0.000	0.000	11.888	0.000	0.14
L53	14.75-9.75	A	1.358	0.000	0.000	30.032	0.000	0.42
		B		0.000	0.000	8.442	0.000	0.12
		C		0.000	0.000	11.581	0.000	0.13
L54	9.75-4.75	A	1.289	0.000	0.000	11.747	0.000	0.12
		B		0.000	0.000	8.372	0.000	0.10
		C		0.000	0.000	8.372	0.000	0.06
L55	4.75-0.00	A	1.153	0.000	0.000	6.452	0.000	0.04
		B		0.000	0.000	6.452	0.000	0.04
		C		0.000	0.000	6.452	0.000	0.04

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.00-185.00	-0.0492	-0.3346	-0.0762	-0.2160
L2	185.00-180.00	-0.0766	-0.5550	-0.1074	-0.5166
L3	180.00-175.00	-0.0782	-0.5659	-0.1158	-0.5556
L4	175.00-170.00	-0.0782	-0.5659	-0.1158	-0.5558
L5	170.00-165.00	-0.7657	-1.5500	-0.7386	-1.4316
L6	165.00-160.00	-0.7657	-1.5500	-0.7387	-1.4320
L7	160.00-155.00	-1.8147	-1.4171	-1.7340	-1.2464
L8	155.00-150.00	-1.8147	-1.4171	-1.7343	-1.2469
L9	150.00-145.00	-1.8147	-1.4171	-1.7345	-1.2473
L10	145.00-140.00	-1.8147	-1.4171	-1.7347	-1.2477
L11	140.00-135.00	-1.9161	-1.5004	-1.8914	-1.3636
L12	135.00-130.00	-1.9161	-1.5004	-1.8916	-1.3640
L13	130.00-125.00	-1.9161	-1.5004	-1.8917	-1.3645
L14	125.00-120.00	-1.9161	-1.5004	-1.8919	-1.3650
L15	120.00-115.00	-2.0045	-1.5730	-2.0366	-1.4722
L16	115.00-112.67	-1.5082	-1.1835	-1.6558	-1.1972
L17	112.67-112.42	-1.4483	-1.1365	-1.6056	-1.1610
L18	112.42-107.42	-1.4483	-1.1365	-1.6056	-1.1611
L19	107.42-103.33	-1.2750	-1.0005	-1.4392	-1.0411
L20	103.33-103.08	-1.1337	-0.8897	-1.2990	-0.9398
L21	103.08-100.00	-1.2512	-0.9819	-1.4030	-1.0151
L22	100.00-95.00	-1.5192	-1.1409	-1.6466	-1.0212
L23	95.00-90.00	-1.4615	-1.0976	-1.5974	-0.9915
L24	90.00-89.50	-1.2687	-0.9528	-1.4263	-0.8857
L25	89.50-89.25	-1.2687	-0.9528	-1.4263	-0.8858
L26	89.25-85.50	-1.1902	-0.8938	-1.3435	-0.8347
L27	85.50-85.25	-1.0890	-0.8179	-1.2359	-0.7681
L28	85.25-84.00	-1.0890	-0.8179	-1.2359	-0.7682
L29	84.00-83.75	-1.0890	-0.8179	-1.2359	-0.7683
L30	83.75-82.50	-1.0890	-0.8179	-1.2359	-0.7685
L31	82.50-82.25	-1.0890	-0.8179	-1.2359	-0.7686
L32	82.25-80.00	-1.4157	-1.0632	-1.5405	-0.9582
L33	80.00-75.00	-1.6263	-1.2213	-1.7178	-1.0693
L34	75.00-70.00	-1.6263	-1.2213	-1.7181	-1.0706
L35	70.00-65.00	-1.6263	-1.2213	-1.7183	-1.0720
L36	65.00-60.00	-1.6263	-1.2213	-1.7186	-1.0734
L37	60.00-58.50	-1.6263	-1.2213	-1.7188	-1.0745
L38	58.50-58.25	-1.6263	-1.2213	-1.7188	-1.0748
L39	58.25-53.25	-1.9328	-1.4515	-1.9966	-1.2493
L40	53.25-48.25	-1.7002	-1.2768	-1.8125	-1.1359
L41	48.25-48.00	-1.4866	-1.1164	-1.6249	-1.0191
L42	48.00-43.00	-1.4866	-1.1164	-1.6249	-1.0200
L43	43.00-40.00	-1.4866	-1.1164	-1.6250	-1.0215
L44	40.00-35.00	-1.4014	-1.0524	-1.5512	-0.9767
L45	35.00-32.08	-1.0890	-0.8179	-1.2636	-0.7969

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L46	32.08-31.83	-1.0890	-0.8179	-1.2635	-0.7975
L47	31.83-28.75	-1.0890	-0.8179	-1.2634	-0.7981
L48	28.75-28.50	-1.0890	-0.8179	-1.2632	-0.7987
L49	28.50-23.50	-1.2131	-0.9110	-1.3875	-0.8785
L50	23.50-20.00	-1.3690	-1.0281	-1.5389	-0.9770
L51	20.00-19.75	-1.3690	-1.0281	-1.5388	-0.9782
L52	19.75-14.75	-1.3690	-1.0281	-1.5385	-0.9801
L53	14.75-9.75	-1.0972	-0.8758	-1.2735	-0.8509
L54	9.75-4.75	-0.0348	-0.2756	-0.0576	-0.4558
L55	4.75-0.00	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
L1	1	Safety Line 3/8	185.00 - 190.00	1.0000	1.0000
L1	4	HB114-21U3M12-XXXF(1-1/4)	185.00 - 188.00	1.0000	1.0000
L2	1	Safety Line 3/8	180.00 - 185.00	1.0000	1.0000
L2	4	HB114-21U3M12-XXXF(1-1/4)	180.00 - 185.00	1.0000	1.0000
L3	1	Safety Line 3/8	175.00 - 180.00	1.0000	1.0000
L3	4	HB114-21U3M12-XXXF(1-1/4)	175.00 - 180.00	1.0000	1.0000
L4	1	Safety Line 3/8	170.00 - 175.00	1.0000	1.0000
L4	4	HB114-21U3M12-XXXF(1-1/4)	170.00 - 175.00	1.0000	1.0000
L5	1	Safety Line 3/8	165.00 - 170.00	1.0000	1.0000
L5	4	HB114-21U3M12-XXXF(1-1/4)	165.00 - 170.00	1.0000	1.0000
L5	15	LDF7-50A(1-5/8)	165.00 - 170.00	1.0000	1.0000
L6	1	Safety Line 3/8	160.00 - 165.00	1.0000	1.0000
L6	4	HB114-21U3M12-XXXF(1-1/4)	160.00 - 165.00	1.0000	1.0000
L6	15	LDF7-50A(1-5/8)	160.00 - 165.00	1.0000	1.0000
L7	1	Safety Line 3/8	155.00 - 160.00	1.0000	1.0000
L7	4	HB114-21U3M12-XXXF(1-1/4)	155.00 - 160.00	1.0000	1.0000
L7	15	LDF7-50A(1-5/8)	155.00 - 160.00	1.0000	1.0000
L7	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	155.00 - 160.00	1.0000	1.0000
L7	25	LDF7-50A(1-5/8)	155.00 - 160.00	1.0000	1.0000
L8	1	Safety Line 3/8	150.00 - 155.00	1.0000	1.0000
L8	4	HB114-21U3M12-XXXF(1-1/4)	150.00 - 155.00	1.0000	1.0000
L8	15	LDF7-50A(1-5/8)	150.00 - 155.00	1.0000	1.0000
L8	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-	150.00 - 155.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		XXX(3/8)			
L8	25	LDF7-50A(1-5/8)	150.00 - 155.00	1.0000	1.0000
L9	1	Safety Line 3/8	145.00 - 150.00	1.0000	1.0000
L9	4	HB114-21U3M12-XXXF(1-1/4)	145.00 - 150.00	1.0000	1.0000
L9	15	LDF7-50A(1-5/8)	145.00 - 150.00	1.0000	1.0000
L9	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	145.00 - 150.00	1.0000	1.0000
L9	25	LDF7-50A(1-5/8)	145.00 - 150.00	1.0000	1.0000
L10	1	Safety Line 3/8	140.00 - 145.00	1.0000	1.0000
L10	4	HB114-21U3M12-XXXF(1-1/4)	140.00 - 145.00	1.0000	1.0000
L10	15	LDF7-50A(1-5/8)	140.00 - 145.00	1.0000	1.0000
L10	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	140.00 - 145.00	1.0000	1.0000
L10	25	LDF7-50A(1-5/8)	140.00 - 145.00	1.0000	1.0000
L11	1	Safety Line 3/8	135.00 - 140.00	1.0000	1.0000
L11	4	HB114-21U3M12-XXXF(1-1/4)	135.00 - 140.00	1.0000	1.0000
L11	15	LDF7-50A(1-5/8)	135.00 - 140.00	1.0000	1.0000
L11	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	135.00 - 140.00	1.0000	1.0000
L11	25	LDF7-50A(1-5/8)	135.00 - 140.00	1.0000	1.0000
L12	1	Safety Line 3/8	130.00 - 135.00	1.0000	1.0000
L12	4	HB114-21U3M12-XXXF(1-1/4)	130.00 - 135.00	1.0000	1.0000
L12	15	LDF7-50A(1-5/8)	130.00 - 135.00	1.0000	1.0000
L12	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	130.00 - 135.00	1.0000	1.0000
L12	25	LDF7-50A(1-5/8)	130.00 - 135.00	1.0000	1.0000
L13	1	Safety Line 3/8	125.00 - 130.00	1.0000	1.0000
L13	4	HB114-21U3M12-XXXF(1-1/4)	125.00 - 130.00	1.0000	1.0000
L13	15	LDF7-50A(1-5/8)	125.00 - 130.00	1.0000	1.0000
L13	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	125.00 - 130.00	1.0000	1.0000
L13	25	LDF7-50A(1-5/8)	125.00 - 130.00	1.0000	1.0000
L14	1	Safety Line 3/8	120.00 - 125.00	1.0000	1.0000
L14	4	HB114-21U3M12-XXXF(1-1/4)	120.00 - 125.00	1.0000	1.0000
L14	15	LDF7-50A(1-5/8)	120.00 - 125.00	1.0000	1.0000
L14	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	120.00 - 125.00	1.0000	1.0000
L14	25	LDF7-50A(1-5/8)	120.00 - 125.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L15	1	Safety Line 3/8	115.00 - 120.00	1.0000	1.0000
L15	4	HB114-21U3M12-XXXF(1-1/4)	115.00 - 120.00	1.0000	1.0000
L15	15	LDF7-50A(1-5/8)	115.00 - 120.00	1.0000	1.0000
L15	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	115.00 - 120.00	1.0000	1.0000
L15	25	LDF7-50A(1-5/8)	115.00 - 120.00	1.0000	1.0000
L16	1	Safety Line 3/8	112.67 - 115.00	1.0000	1.0000
L16	4	HB114-21U3M12-XXXF(1-1/4)	112.67 - 115.00	1.0000	1.0000
L16	15	LDF7-50A(1-5/8)	112.67 - 115.00	1.0000	1.0000
L16	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	112.67 - 115.00	1.0000	1.0000
L16	25	LDF7-50A(1-5/8)	112.67 - 115.00	1.0000	1.0000
L16	59	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L16	60	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L16	61	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L17	1	Safety Line 3/8	112.42 - 112.67	1.0000	1.0000
L17	4	HB114-21U3M12-XXXF(1-1/4)	112.42 - 112.67	1.0000	1.0000
L17	15	LDF7-50A(1-5/8)	112.42 - 112.67	1.0000	1.0000
L17	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	112.42 - 112.67	1.0000	1.0000
L17	25	LDF7-50A(1-5/8)	112.42 - 112.67	1.0000	1.0000
L17	59	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L17	60	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L17	61	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L18	1	Safety Line 3/8	107.42 - 112.42	1.0000	1.0000
L18	4	HB114-21U3M12-XXXF(1-1/4)	107.42 - 112.42	1.0000	1.0000
L18	15	LDF7-50A(1-5/8)	107.42 - 112.42	1.0000	1.0000
L18	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	107.42 - 112.42	1.0000	1.0000
L18	25	LDF7-50A(1-5/8)	107.42 - 112.42	1.0000	1.0000
L18	59	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L18	60	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L18	61	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L19	1	Safety Line 3/8	103.33 - 107.42	1.0000	1.0000
L19	4	HB114-21U3M12-XXXF(1-1/4)	103.33 - 107.42	1.0000	1.0000
L19	15	LDF7-50A(1-5/8)	103.33 - 107.42	1.0000	1.0000
L19	19	(4) WR-VG86ST-BRD(3/4)	103.33 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		+ (2) FB-L98B-034-XXX(3/8)	107.42		
L19	25	LDF7-50A(1-5/8)	103.33 - 107.42	1.0000	1.0000
L19	55	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	56	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	57	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	59	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000
L19	60	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000
L19	61	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000
L20	1	Safety Line 3/8	103.08 - 103.33	1.0000	1.0000
L20	4	HB114-21U3M12-XXXF(1-1/4)	103.08 - 103.33	1.0000	1.0000
L20	15	LDF7-50A(1-5/8)	103.08 - 103.33	1.0000	1.0000
L20	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	103.08 - 103.33	1.0000	1.0000
L20	25	LDF7-50A(1-5/8)	103.08 - 103.33	1.0000	1.0000
L20	55	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	56	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	57	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	59	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	60	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	61	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L21	1	Safety Line 3/8	100.00 - 103.08	1.0000	1.0000
L21	4	HB114-21U3M12-XXXF(1-1/4)	100.00 - 103.08	1.0000	1.0000
L21	15	LDF7-50A(1-5/8)	100.00 - 103.08	1.0000	1.0000
L21	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	100.00 - 103.08	1.0000	1.0000
L21	25	LDF7-50A(1-5/8)	100.00 - 103.08	1.0000	1.0000
L21	55	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	56	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	57	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	59	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L21	60	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L21	61	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L22	1	Safety Line 3/8	95.00 - 100.00	1.0000	1.0000
L22	2	Climbing Rungs	95.00 - 100.00	1.0000	1.0000
L22	4	HB114-21U3M12-XXXF(1-1/4)	95.00 - 100.00	1.0000	1.0000
L22	15	LDF7-50A(1-5/8)	95.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			100.00		
L22	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	95.00 - 100.00	1.0000	1.0000
L22	25	LDF7-50A(1-5/8)	95.00 - 100.00	1.0000	1.0000
L22	55	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L22	56	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L22	57	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L23	1	Safety Line 3/8	90.00 - 95.00	1.0000	1.0000
L23	2	Climbing Rungs	90.00 - 95.00	1.0000	1.0000
L23	4	HB114-21U3M12-XXXF(1-1/4)	90.00 - 95.00	1.0000	1.0000
L23	15	LDF7-50A(1-5/8)	90.00 - 95.00	1.0000	1.0000
L23	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	90.00 - 95.00	1.0000	1.0000
L23	25	LDF7-50A(1-5/8)	90.00 - 95.00	1.0000	1.0000
L23	55	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	56	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	57	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	63	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L23	64	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L23	65	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L24	1	Safety Line 3/8	89.50 - 90.00	1.0000	1.0000
L24	2	Climbing Rungs	89.50 - 90.00	1.0000	1.0000
L24	4	HB114-21U3M12-XXXF(1-1/4)	89.50 - 90.00	1.0000	1.0000
L24	15	LDF7-50A(1-5/8)	89.50 - 90.00	1.0000	1.0000
L24	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	89.50 - 90.00	1.0000	1.0000
L24	25	LDF7-50A(1-5/8)	89.50 - 90.00	1.0000	1.0000
L24	55	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	56	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	57	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	63	4.5" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	64	4.5" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	65	4.5" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L25	1	Safety Line 3/8	89.25 - 89.50	1.0000	1.0000
L25	2	Climbing Rungs	89.25 - 89.50	1.0000	1.0000
L25	4	HB114-21U3M12-XXXF(1-1/4)	89.25 - 89.50	1.0000	1.0000
L25	15	LDF7-50A(1-5/8)	89.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			89.50		
L25	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	89.25 - 89.50	1.0000	1.0000
L25	25	LDF7-50A(1-5/8)	89.25 - 89.50	1.0000	1.0000
L25	55	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	56	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	57	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	63	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	64	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	65	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L26	1	Safety Line 3/8	85.50 - 89.25	1.0000	1.0000
L26	2	Climbing Rungs	85.50 - 89.25	1.0000	1.0000
L26	4	HB114-21U3M12-XXXF(1-1/4)	85.50 - 89.25	1.0000	1.0000
L26	15	LDF7-50A(1-5/8)	85.50 - 89.25	1.0000	1.0000
L26	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	85.50 - 89.25	1.0000	1.0000
L26	25	LDF7-50A(1-5/8)	85.50 - 89.25	1.0000	1.0000
L26	51	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	52	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	53	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	55	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	56	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	57	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	63	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	64	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	65	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L27	1	Safety Line 3/8	85.25 - 85.50	1.0000	1.0000
L27	2	Climbing Rungs	85.25 - 85.50	1.0000	1.0000
L27	4	HB114-21U3M12-XXXF(1-1/4)	85.25 - 85.50	1.0000	1.0000
L27	15	LDF7-50A(1-5/8)	85.25 - 85.50	1.0000	1.0000
L27	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	85.25 - 85.50	1.0000	1.0000
L27	25	LDF7-50A(1-5/8)	85.25 - 85.50	1.0000	1.0000
L27	51	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	52	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	53	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	55	6" x 1" Flat Plate	85.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			85.50		
L27	56	6" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	57	6" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	63	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	64	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	65	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L28	1	Safety Line 3/8	84.00 - 85.25	1.0000	1.0000
L28	2	Climbing Rungs	84.00 - 85.25	1.0000	1.0000
L28	4	HB114-21U3M12-XXXF(1-1/4)	84.00 - 85.25	1.0000	1.0000
L28	15	LDF7-50A(1-5/8)	84.00 - 85.25	1.0000	1.0000
L28	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	84.00 - 85.25	1.0000	1.0000
L28	25	LDF7-50A(1-5/8)	84.00 - 85.25	1.0000	1.0000
L28	51	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	52	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	53	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	55	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	56	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	57	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	63	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	64	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	65	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L29	1	Safety Line 3/8	83.75 - 84.00	1.0000	1.0000
L29	2	Climbing Rungs	83.75 - 84.00	1.0000	1.0000
L29	4	HB114-21U3M12-XXXF(1-1/4)	83.75 - 84.00	1.0000	1.0000
L29	15	LDF7-50A(1-5/8)	83.75 - 84.00	1.0000	1.0000
L29	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	83.75 - 84.00	1.0000	1.0000
L29	25	LDF7-50A(1-5/8)	83.75 - 84.00	1.0000	1.0000
L29	51	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	52	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	53	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	55	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	56	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	57	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	63	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L29	64	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	65	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L30	1	Safety Line 3/8	82.50 - 83.75	1.0000	1.0000
L30	2	Climbing Rungs	82.50 - 83.75	1.0000	1.0000
L30	4	HB114-21U3M12-XXXF(1-1/4)	82.50 - 83.75	1.0000	1.0000
L30	15	LDF7-50A(1-5/8)	82.50 - 83.75	1.0000	1.0000
L30	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	82.50 - 83.75	1.0000	1.0000
L30	25	LDF7-50A(1-5/8)	82.50 - 83.75	1.0000	1.0000
L30	51	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	52	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	53	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	55	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	56	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	57	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	63	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	64	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	65	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L31	1	Safety Line 3/8	82.25 - 82.50	1.0000	1.0000
L31	2	Climbing Rungs	82.25 - 82.50	1.0000	1.0000
L31	4	HB114-21U3M12-XXXF(1-1/4)	82.25 - 82.50	1.0000	1.0000
L31	15	LDF7-50A(1-5/8)	82.25 - 82.50	1.0000	1.0000
L31	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	82.25 - 82.50	1.0000	1.0000
L31	25	LDF7-50A(1-5/8)	82.25 - 82.50	1.0000	1.0000
L31	51	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	52	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	53	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	55	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	56	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	57	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	63	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	64	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	65	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L32	1	Safety Line 3/8	80.00 - 82.25	1.0000	1.0000
L32	2	Climbing Rungs	80.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			82.25		
L32	4	HB114-21U3M12-XXXF(1-1/4)	80.00 - 82.25	1.0000	1.0000
L32	15	LDF7-50A(1-5/8)	80.00 - 82.25	1.0000	1.0000
L32	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	80.00 - 82.25	1.0000	1.0000
L32	25	LDF7-50A(1-5/8)	80.00 - 82.25	1.0000	1.0000
L32	51	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	52	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	53	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	55	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	56	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	57	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	63	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L32	64	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L32	65	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L33	1	Safety Line 3/8	75.00 - 80.00	1.0000	1.0000
L33	2	Climbing Rungs	75.00 - 80.00	1.0000	1.0000
L33	4	HB114-21U3M12-XXXF(1-1/4)	75.00 - 80.00	1.0000	1.0000
L33	15	LDF7-50A(1-5/8)	75.00 - 80.00	1.0000	1.0000
L33	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	75.00 - 80.00	1.0000	1.0000
L33	25	LDF7-50A(1-5/8)	75.00 - 80.00	1.0000	1.0000
L33	51	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L33	52	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L33	53	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L34	1	Safety Line 3/8	70.00 - 75.00	1.0000	1.0000
L34	2	Climbing Rungs	70.00 - 75.00	1.0000	1.0000
L34	4	HB114-21U3M12-XXXF(1-1/4)	70.00 - 75.00	1.0000	1.0000
L34	15	LDF7-50A(1-5/8)	70.00 - 75.00	1.0000	1.0000
L34	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	70.00 - 75.00	1.0000	1.0000
L34	25	LDF7-50A(1-5/8)	70.00 - 75.00	1.0000	1.0000
L34	51	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L34	52	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L34	53	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L35	1	Safety Line 3/8	65.00 - 70.00	1.0000	1.0000
L35	2	Climbing Rungs	65.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			70.00		
L35	4	HB114-21U3M12-XXXF(1-1/4)	65.00 - 70.00	1.0000	1.0000
L35	15	LDF7-50A(1-5/8)	65.00 - 70.00	1.0000	1.0000
L35	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	65.00 - 70.00	1.0000	1.0000
L35	25	LDF7-50A(1-5/8)	65.00 - 70.00	1.0000	1.0000
L35	51	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L35	52	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L35	53	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L36	1	Safety Line 3/8	60.00 - 65.00	1.0000	1.0000
L36	2	Climbing Rungs	60.00 - 65.00	1.0000	1.0000
L36	4	HB114-21U3M12-XXXF(1-1/4)	60.00 - 65.00	1.0000	1.0000
L36	15	LDF7-50A(1-5/8)	60.00 - 65.00	1.0000	1.0000
L36	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	60.00 - 65.00	1.0000	1.0000
L36	25	LDF7-50A(1-5/8)	60.00 - 65.00	1.0000	1.0000
L36	51	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L36	52	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L36	53	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L37	1	Safety Line 3/8	58.50 - 60.00	1.0000	1.0000
L37	2	Climbing Rungs	58.50 - 60.00	1.0000	1.0000
L37	4	HB114-21U3M12-XXXF(1-1/4)	58.50 - 60.00	1.0000	1.0000
L37	15	LDF7-50A(1-5/8)	58.50 - 60.00	1.0000	1.0000
L37	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	58.50 - 60.00	1.0000	1.0000
L37	25	LDF7-50A(1-5/8)	58.50 - 60.00	1.0000	1.0000
L37	51	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L37	52	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L37	53	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L38	1	Safety Line 3/8	58.25 - 58.50	1.0000	1.0000
L38	2	Climbing Rungs	58.25 - 58.50	1.0000	1.0000
L38	4	HB114-21U3M12-XXXF(1-1/4)	58.25 - 58.50	1.0000	1.0000
L38	15	LDF7-50A(1-5/8)	58.25 - 58.50	1.0000	1.0000
L38	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	58.25 - 58.50	1.0000	1.0000
L38	25	LDF7-50A(1-5/8)	58.25 - 58.50	1.0000	1.0000
L38	51	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L38	52	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000
L38	53	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000
L39	1	Safety Line 3/8	53.25 - 58.25	1.0000	1.0000
L39	2	Climbing Rungs	53.25 - 58.25	1.0000	1.0000
L39	4	HB114-21U3M12-XXXF(1-1/4)	53.25 - 58.25	1.0000	1.0000
L39	15	LDF7-50A(1-5/8)	53.25 - 58.25	1.0000	1.0000
L39	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	53.25 - 58.25	1.0000	1.0000
L39	25	LDF7-50A(1-5/8)	53.25 - 58.25	1.0000	1.0000
L39	51	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L39	52	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L39	53	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L40	1	Safety Line 3/8	48.25 - 53.25	1.0000	1.0000
L40	2	Climbing Rungs	48.25 - 53.25	1.0000	1.0000
L40	4	HB114-21U3M12-XXXF(1-1/4)	48.25 - 53.25	1.0000	1.0000
L40	15	LDF7-50A(1-5/8)	48.25 - 53.25	1.0000	1.0000
L40	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	48.25 - 53.25	1.0000	1.0000
L40	25	LDF7-50A(1-5/8)	48.25 - 53.25	1.0000	1.0000
L40	47	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L40	48	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L40	49	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L41	1	Safety Line 3/8	48.00 - 48.25	1.0000	1.0000
L41	2	Climbing Rungs	48.00 - 48.25	1.0000	1.0000
L41	4	HB114-21U3M12-XXXF(1-1/4)	48.00 - 48.25	1.0000	1.0000
L41	15	LDF7-50A(1-5/8)	48.00 - 48.25	1.0000	1.0000
L41	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	48.00 - 48.25	1.0000	1.0000
L41	25	LDF7-50A(1-5/8)	48.00 - 48.25	1.0000	1.0000
L41	47	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L41	48	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L41	49	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L42	1	Safety Line 3/8	43.00 - 48.00	1.0000	1.0000
L42	2	Climbing Rungs	43.00 - 48.00	1.0000	1.0000
L42	4	HB114-21U3M12-XXXF(1-1/4)	43.00 - 48.00	1.0000	1.0000
L42	15	LDF7-50A(1-5/8)	43.00 - 48.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L42	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	43.00 - 48.00	1.0000	1.0000
L42	25	LDF7-50A(1-5/8)	43.00 - 48.00	1.0000	1.0000
L42	47	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L42	48	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L42	49	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L43	1	Safety Line 3/8	40.00 - 43.00	1.0000	1.0000
L43	2	Climbing Rungs	40.00 - 43.00	1.0000	1.0000
L43	4	HB114-21U3M12-XXXF(1-1/4)	40.00 - 43.00	1.0000	1.0000
L43	15	LDF7-50A(1-5/8)	40.00 - 43.00	1.0000	1.0000
L43	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	40.00 - 43.00	1.0000	1.0000
L43	25	LDF7-50A(1-5/8)	40.00 - 43.00	1.0000	1.0000
L43	47	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L43	48	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L43	49	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L44	1	Safety Line 3/8	35.00 - 40.00	1.0000	1.0000
L44	2	Climbing Rungs	35.00 - 40.00	1.0000	1.0000
L44	4	HB114-21U3M12-XXXF(1-1/4)	35.00 - 40.00	1.0000	1.0000
L44	15	LDF7-50A(1-5/8)	35.00 - 40.00	1.0000	1.0000
L44	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	35.00 - 40.00	1.0000	1.0000
L44	25	LDF7-50A(1-5/8)	35.00 - 40.00	1.0000	1.0000
L44	43	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	44	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	45	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	47	6.5" x 1.25" Flat Plate	35.00 - 40.00	1.0000	1.0000
L44	48	6.5" x 1.25" Flat Plate	35.00 - 40.00	1.0000	1.0000
L44	49	6.5" x 1.25" Flat Plate	35.00 - 40.00	1.0000	1.0000
L45	1	Safety Line 3/8	32.08 - 35.00	1.0000	1.0000
L45	2	Climbing Rungs	32.08 - 35.00	1.0000	1.0000
L45	4	HB114-21U3M12-XXXF(1-1/4)	32.08 - 35.00	1.0000	1.0000
L45	15	LDF7-50A(1-5/8)	32.08 - 35.00	1.0000	1.0000
L45	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	32.08 - 35.00	1.0000	1.0000
L45	25	LDF7-50A(1-5/8)	32.08 - 35.00	1.0000	1.0000
L45	43	8.5" x 1.25" Flat Plate	32.08 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			35.00		
L45	44	8.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	45	8.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	47	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	48	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	49	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L46	1	Safety Line 3/8	31.83 - 32.08	1.0000	1.0000
L46	2	Climbing Rungs	31.83 - 32.08	1.0000	1.0000
L46	4	HB114-21U3M12-XXXF(1-1/4)	31.83 - 32.08	1.0000	1.0000
L46	15	LDF7-50A(1-5/8)	31.83 - 32.08	1.0000	1.0000
L46	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	31.83 - 32.08	1.0000	1.0000
L46	25	LDF7-50A(1-5/8)	31.83 - 32.08	1.0000	1.0000
L46	43	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	44	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	45	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	47	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	48	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	49	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L47	1	Safety Line 3/8	28.75 - 31.83	1.0000	1.0000
L47	2	Climbing Rungs	28.75 - 31.83	1.0000	1.0000
L47	4	HB114-21U3M12-XXXF(1-1/4)	28.75 - 31.83	1.0000	1.0000
L47	15	LDF7-50A(1-5/8)	28.75 - 31.83	1.0000	1.0000
L47	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	28.75 - 31.83	1.0000	1.0000
L47	25	LDF7-50A(1-5/8)	28.75 - 31.83	1.0000	1.0000
L47	43	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	44	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	45	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	47	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	48	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	49	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L48	1	Safety Line 3/8	28.50 - 28.75	1.0000	1.0000
L48	2	Climbing Rungs	28.50 - 28.75	1.0000	1.0000
L48	4	HB114-21U3M12-XXXF(1-1/4)	28.50 - 28.75	1.0000	1.0000
L48	15	LDF7-50A(1-5/8)	28.50 - 28.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L48	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	28.50 - 28.75	1.0000	1.0000
L48	25	LDF7-50A(1-5/8)	28.50 - 28.75	1.0000	1.0000
L48	43	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	44	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	45	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	47	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	48	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	49	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L49	1	Safety Line 3/8	23.50 - 28.50	1.0000	1.0000
L49	2	Climbing Rungs	23.50 - 28.50	1.0000	1.0000
L49	4	HB114-21U3M12-XXXF(1-1/4)	23.50 - 28.50	1.0000	1.0000
L49	15	LDF7-50A(1-5/8)	23.50 - 28.50	1.0000	1.0000
L49	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	23.50 - 28.50	1.0000	1.0000
L49	25	LDF7-50A(1-5/8)	23.50 - 28.50	1.0000	1.0000
L49	43	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	44	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	45	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	47	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L49	48	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L49	49	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L50	1	Safety Line 3/8	20.00 - 23.50	1.0000	1.0000
L50	2	Climbing Rungs	20.00 - 23.50	1.0000	1.0000
L50	4	HB114-21U3M12-XXXF(1-1/4)	20.00 - 23.50	1.0000	1.0000
L50	15	LDF7-50A(1-5/8)	20.00 - 23.50	1.0000	1.0000
L50	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	20.00 - 23.50	1.0000	1.0000
L50	25	LDF7-50A(1-5/8)	20.00 - 23.50	1.0000	1.0000
L50	43	8.5" x 1.25" Flat Plate	20.00 - 23.50	1.0000	1.0000
L50	44	8.5" x 1.25" Flat Plate	20.00 - 23.50	1.0000	1.0000
L50	45	8.5" x 1.25" Flat Plate	20.00 - 23.50	1.0000	1.0000
L51	1	Safety Line 3/8	19.75 - 20.00	1.0000	1.0000
L51	2	Climbing Rungs	19.75 - 20.00	1.0000	1.0000
L51	4	HB114-21U3M12-XXXF(1-1/4)	19.75 - 20.00	1.0000	1.0000
L51	15	LDF7-50A(1-5/8)	19.75 - 20.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L51	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	19.75 - 20.00	1.0000	1.0000
L51	25	LDF7-50A(1-5/8)	19.75 - 20.00	1.0000	1.0000
L51	43	8.5" x 1.25" Flat Plate	19.75 - 20.00	1.0000	1.0000
L51	44	8.5" x 1.25" Flat Plate	19.75 - 20.00	1.0000	1.0000
L51	45	8.5" x 1.25" Flat Plate	19.75 - 20.00	1.0000	1.0000
L52	1	Safety Line 3/8	14.75 - 19.75	1.0000	1.0000
L52	2	Climbing Rungs	14.75 - 19.75	1.0000	1.0000
L52	4	HB114-21U3M12-XXXF(1-1/4)	14.75 - 19.75	1.0000	1.0000
L52	15	LDF7-50A(1-5/8)	14.75 - 19.75	1.0000	1.0000
L52	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	14.75 - 19.75	1.0000	1.0000
L52	25	LDF7-50A(1-5/8)	14.75 - 19.75	1.0000	1.0000
L52	43	8.5" x 1.25" Flat Plate	14.75 - 19.75	1.0000	1.0000
L52	44	8.5" x 1.25" Flat Plate	14.75 - 19.75	1.0000	1.0000
L52	45	8.5" x 1.25" Flat Plate	14.75 - 19.75	1.0000	1.0000
L53	1	Safety Line 3/8	10.00 - 14.75	1.0000	1.0000
L53	2	Climbing Rungs	10.00 - 14.75	1.0000	1.0000
L53	4	HB114-21U3M12-XXXF(1-1/4)	9.75 - 14.75	1.0000	1.0000
L53	15	LDF7-50A(1-5/8)	11.00 - 14.75	1.0000	1.0000
L53	19	(4) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	11.00 - 14.75	1.0000	1.0000
L53	25	LDF7-50A(1-5/8)	11.00 - 14.75	1.0000	1.0000
L53	43	8.5" x 1.25" Flat Plate	9.75 - 14.75	1.0000	1.0000
L53	44	8.5" x 1.25" Flat Plate	9.75 - 14.75	1.0000	1.0000
L53	45	8.5" x 1.25" Flat Plate	9.75 - 14.75	1.0000	1.0000
L54	4	HB114-21U3M12-XXXF(1-1/4)	6.00 - 9.75	1.0000	1.0000
L54	43	8.5" x 1.25" Flat Plate	4.75 - 9.75	1.0000	1.0000
L54	44	8.5" x 1.25" Flat Plate	4.75 - 9.75	1.0000	1.0000
L54	45	8.5" x 1.25" Flat Plate	4.75 - 9.75	1.0000	1.0000
L55	43	8.5" x 1.25" Flat Plate	0.83 - 4.75	1.0000	1.0000
L55	44	8.5" x 1.25" Flat Plate	0.83 - 4.75	1.0000	1.0000
L55	45	8.5" x 1.25" Flat Plate	0.83 - 4.75	1.0000	1.0000

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
188									
Platform Mount [LP 403-1]	C	None		0.0000	188.00	No Ice	18.85	18.85	1.50
						1/2" Ice	24.30	24.30	1.80
						1" Ice	29.75	29.75	2.09
6' x 2" Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Face	4.00 -7.00 2.00	70.0000	188.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Face	4.00 -7.00 2.00	45.0000	188.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Face	4.00 -7.00 2.00	60.0000	188.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						1" Ice	7.47	6.47	0.19
PD201-7	A	From Face	4.00 0.00 5.00	0.0000	188.00	No Ice	1.02	1.02	0.00
						1/2" Ice	1.81	1.81	0.01
						1" Ice	2.62	2.62	0.03
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.00 7.00 2.00	70.0000	188.00	No Ice	8.26	6.95	0.08
						1/2" Ice	8.82	8.13	0.15
						1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.00 7.00 2.00	45.0000	188.00	No Ice	8.26	6.95	0.08
						1/2" Ice	8.82	8.13	0.15
						1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.00 7.00 2.00	60.0000	188.00	No Ice	8.26	6.95	0.08
						1/2" Ice	8.82	8.13	0.15
						1" Ice	9.35	9.02	0.23
TD-RRH8x20-25	A	From Face	4.00 0.00 2.00	0.0000	188.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Face	4.00 0.00 2.00	0.0000	188.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Face	4.00 0.00 2.00	0.0000	188.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						1" Ice	4.56	1.90	0.13
185									
Side Arm Mount [SO 102-3]	C	None		0.0000	185.00	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
(2) 4' x 2" Pipe Mount	A	From Face	0.50 0.00 0.00	0.0000	185.00	No Ice	0.79	0.79	0.03
						1/2" Ice	1.03	1.03	0.04
							1.28	1.28	0.04

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" Ice			
(2) 4' x 2" Pipe Mount	B	From Face	0.50	0.0000	185.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
(2) 4' x 2" Pipe Mount	C	From Face	0.50	0.0000	185.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
800MHZ RRH	A	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			3.00			Ice	2.51	2.13	0.10
						1" Ice			
800MHZ RRH	B	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			3.00			Ice	2.51	2.13	0.10
						1" Ice			
800MHZ RRH	C	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			3.00			Ice	2.51	2.13	0.10
						1" Ice			
1900MHz RRH	A	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice			
1900MHz RRH	B	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice			
1900MHz RRH	C	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice			
184									
Side Arm Mount [SO 701-1]	B	From Leg	1.50	0.0000	184.00	No Ice	0.85	1.67	0.07
			0.00			1/2"	1.14	2.34	0.08
			0.00			Ice	1.43	3.01	0.09
						1" Ice			
4' x 2" Pipe Mount	B	From Leg	3.00	0.0000	184.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
179									
Platform Mount [LP 403-1]	C	None		0.0000	179.00	No Ice	18.85	18.85	1.50
						1/2"	24.30	24.30	1.80
						Ice	29.75	29.75	2.09
						1" Ice			
Side Arm Mount [SO 301-1]	A	From Face	4.00	0.0000	179.00	No Ice	1.00	0.90	0.02
			7.00			1/2"	1.39	1.42	0.03
			0.00			Ice	1.78	1.94	0.04
						1" Ice			
Side Arm Mount [SO 301-1]	B	From Face	4.00	0.0000	179.00	No Ice	1.00	0.90	0.02
			7.00			1/2"	1.39	1.42	0.03
			0.00			Ice	1.78	1.94	0.04
						1" Ice			
(4) 6' x 2" Mount Pipe	A	From Face	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(4) 6' x 2" Mount Pipe	B	From Face	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(4) 6' x 2" Mount Pipe	C	From Face	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	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			Ice 1" Ice	2.29	2.29	0.05
458-2D	A	From Face	5.00 7.00 6.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	3.67 5.03 6.41	3.67 5.03 6.41	0.02 0.05 0.08
458-2D	B	From Face	5.00 7.00 6.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	3.67 5.03 6.41	3.67 5.03 6.41	0.02 0.05 0.08
170									
Platform Mount [LP 405-1]	C	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice	20.80 28.10 35.40	20.80 28.10 35.40	1.80 2.07 2.33
4' x 2" Pipe Mount	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.00 -8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.00 -8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.00 -8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Face	4.00 8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Face	4.00 8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Face	4.00 8.50 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
PD201-7	A	From Face	4.00 0.00 4.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	1.02 1.81 2.62	1.02 1.81 2.62	0.00 0.01 0.03
KRY 112 144/1	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
(2) RRUS 11 B12	A	From Face	4.00 0.00 0.00	0.0000	170.00	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 Face	4.00 0.00	0.0000	170.00	No Ice 1/2"	2.83 3.04	1.18 1.33	0.05 0.07

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			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Face	4.00	0.0000	170.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
160									
Platform Mount [LP 403-1]	C	None		0.0000	162.00	No Ice	18.85	18.85	1.50
						1/2"	24.30	24.30	1.80
						Ice	29.75	29.75	2.09
						1" Ice			
HRK-14 Handrail Kit [NA 510-1]	C	None		0.0000	162.00	No Ice	6.00	6.00	0.30
						1/2"	8.50	8.50	0.40
						Ice	11.00	11.00	0.50
						1" Ice			
PRK-SFS-L Reinforcement Kit	A	From Face	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice			
PRK-SFS-L Reinforcement Kit	B	From Face	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice			
PRK-SFS-L Reinforcement Kit	C	From Face	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	A	From Face	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	B	From Face	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	C	From Face	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice			
6' x 2" Mount Pipe	A	From Face	4.00	0.0000	162.00	No Ice	1.43	1.43	0.02
			-6.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
80010965 w/ Mount Pipe	A	From Face	4.00	30.0000	162.00	No Ice	14.05	7.63	0.13
			0.00			1/2"	14.69	8.90	0.22
			1.00			Ice	15.30	9.96	0.33
						1" Ice			
80010965 w/ Mount Pipe	B	From Face	4.00	30.0000	162.00	No Ice	14.05	7.63	0.13
			0.00			1/2"	14.69	8.90	0.22
			1.00			Ice	15.30	9.96	0.33
						1" Ice			
80010965 w/ Mount Pipe	C	From Face	4.00	30.0000	162.00	No Ice	14.05	7.63	0.13
			0.00			1/2"	14.69	8.90	0.22
			1.00			Ice	15.30	9.96	0.33
						1" Ice			
7770.00 w/ Mount Pipe	A	From Face	4.00	23.0000	162.00	No Ice	5.75	4.25	0.06
			-7.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	B	From Face	4.00	23.0000	162.00	No Ice	5.75	4.25	0.06
			-7.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	C	From Face	4.00	23.0000	162.00	No Ice	5.75	4.25	0.06
			-7.00			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			
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Face	4.00	30.0000	162.00	No Ice	9.90	7.18	0.10
			7.00			1/2"	10.47	8.36	0.18
			1.00			Ice	11.01	9.26	0.26
						1" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Face	4.00	30.0000	162.00	No Ice	9.90	7.18	0.10
			7.00			1/2"	10.47	8.36	0.18
			1.00			Ice	11.01	9.26	0.26
						1" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Face	4.00	30.0000	162.00	No Ice	9.90	7.18	0.10
			7.00			1/2"	10.47	8.36	0.18
			1.00			Ice	11.01	9.26	0.26
						1" Ice			
RRUS 32	A	From Face	4.00	0.0000	162.00	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 Face	4.00	0.0000	162.00	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	C	From Face	4.00	0.0000	162.00	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 4478 B14	A	From Face	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice			
RRUS 4478 B14	B	From Face	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice			
RRUS 4478 B14	C	From Face	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice			
RRUS 32 B2	A	From Face	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Face	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Face	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
DC6-48-60-18-8C	A	From Face	1.00	0.0000	162.00	No Ice	1.14	1.14	0.03
			0.00			1/2"	1.79	1.79	0.05
			1.00			Ice	2.00	2.00	0.07
						1" Ice			
DC6-48-60-18-8F	A	From Face	1.00	0.0000	162.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice			
(2) LGP21401	A	From Face	4.00	0.0000	162.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			-2.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21401	B	From Face	4.00	0.0000	162.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			-2.00			Ice	1.38	0.54	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
						1" Ice			
(2) LGP21401	C	From Face	4.00	0.0000	162.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			-2.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) 7020.00	A	From Face	4.00	0.0000	162.00	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 Face	4.00	0.0000	162.00	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 Face	4.00	0.0000	162.00	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 11	A	From Face	4.00	0.0000	162.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.10
						1" Ice			
RRUS 11	B	From Face	4.00	0.0000	162.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.10
						1" Ice			
RRUS 11	C	From Face	4.00	0.0000	162.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.10
						1" Ice			
150									
Platform Mount [LP 403-1]	C	None		0.0000	150.00	No Ice	18.85	18.85	1.50
						1/2"	24.30	24.30	1.80
						Ice	29.75	29.75	2.09
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	A	From Face	4.00	5.0000	150.00	No Ice	11.63	9.79	0.08
			-2.33			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	B	From Face	4.00	15.0000	150.00	No Ice	11.63	9.79	0.08
			-2.33			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	C	From Face	4.00	15.0000	150.00	No Ice	11.63	9.79	0.08
			-2.33			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	A	From Face	4.00	4.0000	150.00	No Ice	11.63	9.79	0.08
			0.00			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	B	From Face	4.00	15.0000	150.00	No Ice	11.63	9.79	0.08
			0.00			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
SBNHH-1D85C w/ Mount Pipe	C	From Face	4.00	15.0000	150.00	No Ice	11.63	9.79	0.08
			0.00			1/2"	12.35	11.31	0.17
			0.00			Ice	13.07	12.85	0.27
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	A	From Face	4.00	5.0000	150.00	No Ice	7.27	7.82	0.05
			0.00			1/2"	7.83	9.01	0.11
			0.00			Ice	8.35	9.91	0.19
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	B	From Face	4.00	15.0000	150.00	No Ice	7.27	7.82	0.05
			0.00			1/2"	7.83	9.01	0.11
			0.00			Ice	8.35	9.91	0.19

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" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	C	From Face	4.00 0.00 0.00	15.0000	150.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	A	From Face	4.00 2.33 0.00	5.0000	150.00	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.35	0.04 0.09 0.14
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	B	From Face	4.00 2.33 0.00	15.0000	150.00	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.35	0.04 0.09 0.14
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	C	From Face	4.00 2.33 0.00	15.0000	150.00	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.35	0.04 0.09 0.14
RRH2X60-700	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-700	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-700	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH4X45-AWS4 B66	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH4X45-AWS4 B66	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH4X45-AWS4 B66	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH2X60-1900	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
DB-T1-6Z-8AB-0Z	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
DB-T1-6Z-8AB-0Z	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
(2) FD9R6004/2C-3L	A	From Face	4.00 0.00 0.00	0.0000	150.00	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

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) FD9R6004/2C-3L	B	From Face	4.00 0.00 0.00	0.0000	150.00	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 Face	4.00 0.00 0.00	0.0000	150.00	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
125									
Side Arm Mount [SO 901-1]	B	From Face	1.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
Side Arm Mount [SO 901-1]	C	From Face	1.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
PD201-1	B	From Face	3.00 0.00 5.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.18 2.09 3.02	1.18 2.09 3.02	0.00 0.01 0.02
PD128-1	C	From Face	3.00 0.00 5.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.28 2.27 3.28	1.28 2.27 3.28	0.01 0.02 0.04
110									
Side Arm Mount [SO 901-1]	B	From Face	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
Side Arm Mount [SO 901-1]	C	From Face	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
PD128-1	B	From Face	3.00 0.00 5.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.28 2.27 3.28	1.28 2.27 3.28	0.01 0.02 0.04
PD128-1	C	From Face	3.00 0.00 5.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.28 2.27 3.28	1.28 2.27 3.28	0.01 0.02 0.04
100									
Side Arm Mount [SO 901-1]	B	From Face	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
GPS_A	B	From Face	3.00 0.00 1.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
95									
Side Arm Mount [SO 901-1]	A	From Face	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
Side Arm Mount [SO 901-1]	C	From Face	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
PD128-1	A	From Face	3.00 0.00 5.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice	1.28 2.27 3.28	1.28 2.27 3.28	0.01 0.02 0.04
PD128-1	C	From Face	3.00	0.0000	95.00	No Ice	1.28	1.28	0.01

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 5.00			1/2" Ice 1" Ice	2.27 3.28	2.27 3.28	0.02 0.04
80									
Side Arm Mount [SO 901-1]	B	From Face	1.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
Side Arm Mount [SO 901-1]	C	From Face	1.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	0.50 0.68 0.86	0.88 1.13 1.38	0.11 0.11 0.11
PD128-1	B	From Face	3.00 0.00 5.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	1.28 2.27 3.28	1.28 2.27 3.28	0.01 0.02 0.04
DB222	C	From Face	3.00 0.00 5.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	1.60 2.88 4.16	1.60 2.88 4.16	0.02 0.02 0.03
MOD 2013									
Jump Plate 120" x 4.5" x 1"	A	From Face	0.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	7.50 9.24 11.01	2.21 3.09 3.99	0.21 0.25 0.28
Jump Plate 120" x 4.5" x 1"	B	From Face	0.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	7.50 9.24 11.01	2.21 3.09 3.99	0.21 0.25 0.28
Jump Plate 120" x 4.5" x 1"	C	From Face	0.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	7.50 9.24 11.01	2.21 3.09 3.99	0.21 0.25 0.28
***									
Jump Plate 120" x 6.5" x 1.25"	A	From Face	0.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice	9.65 11.23 12.83	3.08 3.97 4.87	0.41 0.47 0.51
Jump Plate 120" x 6.5" x 1.25"	B	From Face	0.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice	9.65 11.23 12.83	3.08 3.97 4.87	0.41 0.47 0.51
Jump Plate 120" x 6.5" x 1.25"	C	From Face	0.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice	9.65 11.23 12.83	3.08 3.97 4.87	0.41 0.47 0.51
***									
(2) Jump Plate 120" x 6" x 1"	A	From Face	0.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice	9.17 10.78 12.43	2.42 3.30 4.19	0.30 0.35 0.38
(2) Jump Plate 120" x 6" x 1"	B	From Face	0.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice	9.17 10.78 12.43	2.42 3.30 4.19	0.30 0.35 0.38
(2) Jump Plate 120" x 6" x 1"	C	From Face	0.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice	9.17 10.78 12.43	2.42 3.30 4.19	0.30 0.35 0.38
***									
(2) Jump Plate 120" x 6.5" x 1.25"	A	From Face	0.00 0.00 0.00	0.0000	20.00	No Ice 1/2" Ice 1" Ice	9.65 11.23 12.83	3.08 3.97 4.87	0.41 0.47 0.51
(2) Jump Plate 120" x 6.5"	B	From Face	0.00	0.0000	20.00	No Ice	9.65	3.08	0.41

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
x 1.25"			0.00 0.00			1/2" Ice 1" Ice	11.23 12.83	3.97 4.87	0.47 0.51
(2) Jump Plate 120" x 6.5" x 1.25" ***	C	From Face	0.00 0.00 0.00	0.0000	20.00	No Ice 1/2" Ice 1" Ice	9.65 11.23 12.83	3.08 3.97 4.87	0.41 0.47 0.51

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
SP2-5.8 ***	A	Paraboloid w/Radome	From Face	4.00 0.00 -1.00	15.0000		188.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.02 0.04 0.06

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

Comb. No.	Description
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	190 - 185	Pole	Max Tension	48	0.00	-0.00	-0.00
			Max. Compression	26	-7.12	0.69	0.43
			Max. Mx	20	-3.31	14.59	-0.12
			Max. My	2	-3.31	-0.08	14.29
			Max. Vy	8	3.57	-14.39	0.27
			Max. Vx	14	3.52	0.29	-14.18
			Max. Torque	14			-0.84
L2	185 - 180	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.13	0.15	0.18
			Max. Mx	8	-4.75	-39.47	0.34
			Max. My	14	-4.75	0.22	-38.92
			Max. Vy	8	4.84	-39.47	0.34
			Max. Vx	14	4.81	0.22	-38.92
			Max. Torque	14			-0.84
L3	180 - 175	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-15.84	-1.40	1.69
			Max. Mx	8	-7.74	-73.96	0.89
			Max. My	2	-7.74	-1.22	72.57
			Max. Vy	8	7.09	-73.96	0.89
			Max. Vx	14	7.06	0.13	-72.50
			Max. Torque	22			-1.45
L4	175 - 170	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.22	-1.36	1.79
			Max. Mx	8	-8.61	-110.48	1.16
			Max. My	14	-8.62	0.37	-108.81
			Max. Vy	8	7.52	-110.48	1.16
			Max. Vx	14	7.48	0.37	-108.81
			Max. Torque	22			-1.45
L5	170 - 165	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.57	0.17	2.90
			Max. Mx	8	-12.87	-164.67	1.61
			Max. My	2	-12.88	-1.12	163.22
			Max. Vy	8	11.12	-164.67	1.61
			Max. Vx	14	11.05	0.98	-162.82
			Max. Torque	8			1.56
L6	165 - 160	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.58	1.48	3.30
			Max. Mx	8	-18.06	-233.79	1.82
			Max. My	2	-18.07	-0.93	232.23
			Max. Vy	8	16.42	-233.79	1.82
			Max. Vx	14	16.35	1.42	-231.86
			Max. Torque	8			1.56

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L7	160 - 155	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.64	2.19	3.75
			Max. Mx	8	-19.24	-316.88	2.05
			Max. My	2	-19.25	-0.87	315.05
			Max. Vy	8	16.89	-316.88	2.05
			Max. Vx	14	16.83	1.73	-314.69
			Max. Torque	8			1.53
L8	155 - 150	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.69	2.91	4.21
			Max. Mx	8	-20.42	-402.32	2.27
			Max. My	2	-20.43	-0.82	400.22
			Max. Vy	8	17.36	-402.32	2.27
			Max. Vx	14	17.29	2.03	-399.86
			Max. Torque	8			1.53
L9	150 - 145	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.97	3.64	2.44
			Max. Mx	8	-25.01	-519.92	1.59
			Max. My	14	-25.03	1.91	-517.05
			Max. Vy	8	23.79	-519.92	1.59
			Max. Vx	14	23.58	1.91	-517.05
			Max. Torque	8			1.53
L10	145 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.08	4.37	2.90
			Max. Mx	20	-26.28	639.84	-0.30
			Max. My	14	-26.29	1.80	-635.92
			Max. Vy	8	24.23	-639.75	1.40
			Max. Vx	14	24.02	1.80	-635.92
			Max. Torque	14			-0.82
L11	140 - 135	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.40	5.18	3.41
			Max. Mx	20	-27.69	762.21	0.10
			Max. My	14	-27.70	1.72	-757.14
			Max. Vy	8	24.73	-761.91	1.23
			Max. Vx	14	24.52	1.72	-757.14
			Max. Torque	14			-0.82
L12	135 - 130	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.71	5.99	3.92
			Max. Mx	20	-29.10	887.07	0.50
			Max. My	14	-29.11	1.64	-880.84
			Max. Vy	8	25.22	-886.56	1.06
			Max. Vx	14	25.01	1.64	-880.84
			Max. Torque	14			-0.82
L13	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.01	6.80	4.43
			Max. Mx	20	-30.52	1014.35	0.90
			Max. My	14	-30.53	1.56	-1006.96
			Max. Vy	8	25.70	-1013.63	0.88
			Max. Vx	14	25.49	1.56	-1006.96
			Max. Torque	14			-0.82
L14	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.74	6.94	4.42
			Max. Mx	20	-32.21	1144.86	1.06
			Max. My	14	-32.23	1.05	-1136.98
			Max. Vy	8	26.32	-1144.75	0.39
			Max. Vx	14	26.11	1.05	-1136.98
			Max. Torque	14			-0.82
L15	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.25	7.83	4.98
			Max. Mx	20	-33.78	1277.78	1.51
			Max. My	14	-33.79	0.95	-1268.66
			Max. Vy	8	26.85	-1277.41	0.20
			Max. Vx	14	26.63	0.95	-1268.66
			Max. Torque	12			-0.55
L16	115 - 112.666	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.50	8.24	5.24
			Max. Mx	20	-34.51	1340.72	1.72
			Max. My	14	-34.52	0.91	-1331.02
			Max. Vy	8	27.09	-1340.22	0.11

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	26.87	0.91	-1331.02
			Max. Torque	12			-0.55
L17	112.666 - 112.416	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.65	8.29	5.27
			Max. Mx	20	-34.61	1347.49	1.74
			Max. My	14	-34.62	0.91	-1337.73
			Max. Vy	8	27.11	-1346.98	0.10
			Max. Vx	14	26.89	0.91	-1337.73
			Max. Torque	12			-0.55
L18	112.416 - 107.416	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.17	8.34	5.35
			Max. Mx	8	-36.82	-1484.98	-0.38
			Max. My	14	-36.83	0.33	-1474.52
			Max. Vy	8	27.80	-1484.98	-0.38
			Max. Vx	14	27.57	0.33	-1474.52
			Max. Torque	12			-0.55
L19	107.416 - 103.333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.75	9.06	5.80
			Max. Mx	20	-38.40	1599.11	2.33
			Max. My	14	-38.41	0.23	-1587.82
			Max. Vy	8	28.21	-1599.10	-0.56
			Max. Vx	14	27.99	0.23	-1587.82
			Max. Torque	20			0.45
L20	103.333 - 103.083	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.92	9.11	5.83
			Max. Mx	20	-38.50	1606.17	2.35
			Max. My	14	-38.51	0.22	-1594.82
			Max. Vy	8	28.23	-1606.15	-0.57
			Max. Vx	14	28.01	0.22	-1594.82
			Max. Torque	20			0.45
L21	103.083 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.87	9.65	6.17
			Max. Mx	20	-39.69	1693.69	2.65
			Max. My	14	-39.70	0.15	-1681.56
			Max. Vy	8	28.54	-1693.51	-0.71
			Max. Vx	14	28.32	0.15	-1681.56
			Max. Torque	20			0.45
L22	100 - 95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.37	10.06	6.92
			Max. Mx	8	-41.94	-1837.93	-0.83
			Max. My	14	-41.95	-0.39	-1824.47
			Max. Vy	8	29.13	-1837.93	-0.83
			Max. Vx	14	28.92	-0.39	-1824.47
			Max. Torque	20			0.45
L23	95 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.18	11.89	6.84
			Max. Mx	20	-44.35	1986.39	3.38
			Max. My	14	-44.36	0.01	-1971.86
			Max. Vy	8	29.83	-1985.39	-1.45
			Max. Vx	14	29.61	0.01	-1971.86
			Max. Torque	10			-0.62
L24	90 - 89.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.53	11.98	6.88
			Max. Mx	20	-44.57	2001.32	3.41
			Max. My	14	-44.58	0.00	-1986.67
			Max. Vy	8	29.88	-2000.29	-1.49
			Max. Vx	14	29.66	0.00	-1986.67
			Max. Torque	10			-0.62
L25	89.5 - 89.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.72	12.03	6.90
			Max. Mx	20	-44.69	2008.79	3.43
			Max. My	14	-44.70	-0.00	-1994.08
			Max. Vy	8	29.91	-2007.75	-1.50
			Max. Vx	14	29.68	-0.00	-1994.08

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	10			-0.62
L26	89.25 - 85.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.59	12.75	7.22
			Max. Mx	20	-46.49	2121.72	3.72
			Max. My	14	-46.50	-0.08	-2106.12
			Max. Vy	8	30.31	-2120.45	-1.75
			Max. Vx	14	30.09	-0.08	-2106.12
			Max. Torque	10			-0.62
L27	85.5 - 85.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.80	12.80	7.24
			Max. Mx	20	-46.62	2129.30	3.74
			Max. My	14	-46.63	-0.08	-2113.64
			Max. Vy	8	30.34	-2128.02	-1.77
			Max. Vx	14	30.11	-0.08	-2113.64
			Max. Torque	10			-0.62
L28	85.25 - 84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.85	13.04	7.34
			Max. Mx	20	-47.29	2167.32	3.83
			Max. My	14	-47.30	-0.11	-2151.36
			Max. Vy	8	30.48	-2165.95	-1.85
			Max. Vx	14	30.25	-0.11	-2151.36
			Max. Torque	10			-0.62
L29	84 - 83.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-90.04	13.08	7.36
			Max. Mx	20	-47.41	2174.94	3.85
			Max. My	14	-47.42	-0.11	-2158.92
			Max. Vy	8	30.50	-2173.56	-1.87
			Max. Vx	14	30.28	-0.11	-2158.92
			Max. Torque	10			-0.62
L30	83.75 - 82.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91.00	13.32	7.47
			Max. Mx	20	-47.98	2213.16	3.94
			Max. My	14	-47.99	-0.14	-2196.83
			Max. Vy	8	30.64	-2211.70	-1.95
			Max. Vx	14	30.41	-0.14	-2196.83
			Max. Torque	10			-0.62
L31	82.5 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91.18	13.37	7.49
			Max. Mx	20	-48.09	2220.82	3.96
			Max. My	14	-48.10	-0.14	-2204.43
			Max. Vy	8	30.66	-2219.35	-1.97
			Max. Vx	14	30.43	-0.14	-2204.43
			Max. Torque	10			-0.62
L32	82.25 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.66	13.80	7.68
			Max. Mx	20	-49.01	2290.07	4.13
			Max. My	14	-49.02	-0.19	-2273.13
			Max. Vy	8	30.89	-2288.46	-2.11
			Max. Vx	14	30.66	-0.19	-2273.13
			Max. Torque	10			-0.62
L33	80 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-97.84	13.88	7.83
			Max. Mx	20	-52.55	2448.63	4.23
			Max. My	14	-52.56	-0.82	-2431.25
			Max. Vy	8	31.96	-2447.74	-2.78
			Max. Vx	14	31.73	-0.82	-2431.25
			Max. Torque	20			0.81
L34	75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.49	14.82	8.25
			Max. Mx	20	-55.07	2609.67	4.63
			Max. My	14	-55.08	-0.95	-2591.02
			Max. Vy	8	32.45	-2608.47	-3.14
			Max. Vx	14	32.21	-0.95	-2591.02
			Max. Torque	20			0.81
L35	70 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-105.13	15.75	8.66
			Max. Mx	20	-57.60	2773.07	5.04
			Max. My	14	-57.61	-1.08	-2753.16
			Max. Vy	8	32.91	-2771.56	-3.50

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	32.67	-1.08	-2753.16
			Max. Torque	20			0.81
L36	65 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.77	16.68	9.06
			Max. Mx	20	-60.14	2938.72	5.45
			Max. My	14	-60.14	-1.20	-2917.54
			Max. Vy	8	33.35	-2936.90	-3.86
			Max. Vx	14	33.11	-1.20	-2917.54
			Max. Torque	20			0.81
L37	60 - 58.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-111.91	16.96	9.18
			Max. Mx	20	-62.50	2989.60	5.57
			Max. My	14	-62.51	-1.24	-2968.04
			Max. Vy	8	33.99	-2987.69	-3.97
			Max. Vx	14	33.76	-1.24	-2968.04
			Max. Torque	20			0.81
L38	58.5 - 58.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.10	17.00	9.20
			Max. Mx	20	-62.64	2998.10	5.59
			Max. My	14	-62.65	-1.25	-2976.48
			Max. Vy	8	34.01	-2996.17	-3.98
			Max. Vx	14	33.77	-1.25	-2976.48
			Max. Torque	20			0.81
L39	58.25 - 53.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-115.80	17.90	9.59
			Max. Mx	20	-65.37	3169.20	5.99
			Max. My	14	-65.38	-1.38	-3146.32
			Max. Vy	8	34.43	-3166.96	-4.34
			Max. Vx	14	34.19	-1.38	-3146.32
			Max. Torque	20			0.81
L40	53.25 - 48.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-119.56	18.76	9.96
			Max. Mx	20	-68.11	3342.30	6.40
			Max. My	14	-68.11	-1.50	-3318.16
			Max. Vy	8	34.81	-3339.76	-4.70
			Max. Vx	14	34.58	-1.50	-3318.16
			Max. Torque	20			0.81
L41	48.25 - 48	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-119.77	18.80	9.98
			Max. Mx	20	-68.27	3351.01	6.42
			Max. My	14	-68.28	-1.51	-3326.80
			Max. Vy	8	34.83	-3348.45	-4.72
			Max. Vx	14	34.59	-1.51	-3326.80
			Max. Torque	20			0.81
L42	48 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-124.10	19.65	10.35
			Max. Mx	20	-71.50	3526.15	6.82
			Max. My	14	-71.50	-1.64	-3500.68
			Max. Vy	8	35.22	-3523.28	-5.07
			Max. Vx	14	34.99	-1.64	-3500.68
			Max. Torque	20			0.81
L43	43 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-126.69	20.16	10.57
			Max. Mx	20	-73.44	3632.14	7.07
			Max. My	14	-73.44	-1.71	-3605.92
			Max. Vy	8	35.44	-3629.09	-5.29
			Max. Vx	14	35.21	-1.71	-3605.92
			Max. Torque	20			0.81
L44	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-133.96	21.00	10.93
			Max. Mx	20	-78.79	3814.23	7.47
			Max. My	14	-78.80	-1.84	-3786.75
			Max. Vy	8	36.59	-3810.87	-5.64
			Max. Vx	14	36.35	-1.84	-3786.75
			Max. Torque	20			0.81
L45	35 - 32.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-136.59	21.49	11.14

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-80.68	3921.33	7.71
			Max. My	14	-80.69	-1.91	-3893.12
			Max. Vy	8	36.78	-3917.79	-5.85
			Max. Vx	14	36.54	-1.91	-3893.12
			Max. Torque	20			0.81
L46	32.08 - 31.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-136.85	21.53	11.16
			Max. Mx	20	-80.88	3930.53	7.73
			Max. My	14	-80.89	-1.92	-3902.25
			Max. Vy	8	36.78	-3926.97	-5.87
			Max. Vx	14	36.55	-1.92	-3902.25
			Max. Torque	20			0.81
L47	31.83 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-140.02	22.04	11.38
			Max. Mx	20	-83.27	4044.13	7.98
			Max. My	14	-83.27	-2.00	-4015.09
			Max. Vy	8	36.99	-4040.39	-6.09
			Max. Vx	14	36.75	-2.00	-4015.09
			Max. Torque	20			0.81
L48	28.75 - 28.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-140.25	22.08	11.39
			Max. Mx	20	-83.44	4053.38	8.00
			Max. My	14	-83.45	-2.00	-4024.27
			Max. Vy	8	36.99	-4049.62	-6.11
			Max. Vx	14	36.76	-2.00	-4024.27
			Max. Torque	20			0.81
L49	28.5 - 23.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-144.79	22.90	11.74
			Max. Mx	20	-86.83	4239.09	8.40
			Max. My	14	-86.84	-2.13	-4208.73
			Max. Vy	8	37.29	-4235.02	-6.46
			Max. Vx	14	37.05	-2.13	-4208.73
			Max. Torque	20			0.81
L50	23.5 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-147.89	23.47	11.99
			Max. Mx	20	-89.21	4369.90	8.68
			Max. My	14	-89.22	-2.22	-4338.67
			Max. Vy	8	37.48	-4365.62	-6.71
			Max. Vx	14	37.24	-2.22	-4338.67
			Max. Torque	20			0.81
L51	20 - 19.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-151.88	23.51	12.00
			Max. Mx	20	-92.35	4379.48	8.70
			Max. My	14	-92.36	-2.23	-4348.18
			Max. Vy	8	38.29	-4375.17	-6.73
			Max. Vx	14	38.06	-2.23	-4348.18
			Max. Torque	20			0.81
L52	19.75 - 14.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-156.75	24.30	12.34
			Max. Mx	20	-96.21	4571.63	9.10
			Max. My	14	-96.21	-2.35	-4539.10
			Max. Vy	8	38.57	-4567.03	-7.08
			Max. Vx	14	38.34	-2.35	-4539.10
			Max. Torque	20			0.81
L53	14.75 - 9.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-161.48	24.89	12.59
			Max. Mx	20	-100.04	4765.05	9.48
			Max. My	14	-100.04	-2.54	-4731.36
			Max. Vy	8	38.83	-4760.26	-7.45
			Max. Vx	14	38.60	-2.54	-4731.36
			Max. Torque	20			0.81
L54	9.75 - 4.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-165.76	24.90	12.71
			Max. Mx	20	-103.68	4959.50	9.88
			Max. My	14	-103.68	-2.92	-4924.83
			Max. Vy	8	39.07	-4954.92	-7.80

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	38.84	-2.92	-4924.83
			Max. Torque	20			0.81
L55	4.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-169.62	24.90	12.71
			Max. Mx	20	-107.07	5145.28	10.23
			Max. My	14	-107.07	-3.29	-5109.73
			Max. Vy	8	39.28	-5140.91	-8.17
			Max. Vx	14	39.05	-3.29	-5109.73
			Max. Torque	20			0.81

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	169.62	0.00	0.00
	Max. H_x	20	107.07	39.22	0.07
	Max. H_z	2	107.07	0.07	38.99
	Max. M_x	2	5104.35	0.07	38.99
	Max. M_z	8	5140.91	-39.26	-0.08
	Max. Torsion	20	0.81	39.22	0.07
	Min. Vert	5	80.31	-20.02	34.53
	Min. H_x	8	107.07	-39.26	-0.08
	Min. H_z	14	107.07	-0.08	-39.03
	Min. M_x	14	-5109.73	-0.08	-39.03
	Min. M_z	20	-5145.28	39.22	0.07
	Min. Torsion	6	-0.77	-33.93	19.42

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	89.23	0.00	0.00	-1.24	5.19	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	107.07	-0.07	-38.99	-5104.35	15.10	0.10
0.9 Dead+1.6 Wind 0 deg - No Ice	80.31	-0.07	-38.99	-5062.65	13.39	0.10
1.2 Dead+1.6 Wind 30 deg - No Ice	107.07	20.02	-34.53	-4494.13	-2602.97	0.54
0.9 Dead+1.6 Wind 30 deg - No Ice	80.31	20.02	-34.53	-4457.50	-2583.56	0.53
1.2 Dead+1.6 Wind 60 deg - No Ice	107.07	33.93	-19.42	-2543.21	-4442.07	0.77
0.9 Dead+1.6 Wind 60 deg - No Ice	80.31	33.93	-19.42	-2522.23	-4407.71	0.77
1.2 Dead+1.6 Wind 90 deg - No Ice	107.07	39.26	0.08	8.17	-5140.91	0.76
0.9 Dead+1.6 Wind 90 deg - No Ice	80.31	39.26	0.08	8.51	-5100.89	0.75
1.2 Dead+1.6 Wind 120 deg - No Ice	107.07	34.04	19.58	2562.06	-4456.47	0.67
0.9 Dead+1.6 Wind 120 deg - No Ice	80.31	34.04	19.58	2541.72	-4421.99	0.67
1.2 Dead+1.6 Wind 150 deg - No Ice	107.07	19.69	33.84	4430.72	-2574.88	0.42
0.9 Dead+1.6 Wind 150 deg - No Ice	80.31	19.69	33.84	4395.26	-2555.64	0.42
1.2 Dead+1.6 Wind 180 deg - No Ice	107.07	0.08	39.03	5109.73	-3.29	0.04
0.9 Dead+1.6 Wind 180 deg	80.31	0.08	39.03	5068.76	-4.88	0.04

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+1.6 Wind 210 deg - No Ice	107.07	-20.00	34.56	4497.05	2612.39	-0.46
0.9 Dead+1.6 Wind 210 deg - No Ice	80.31	-20.00	34.56	4461.16	2589.71	-0.46
1.2 Dead+1.6 Wind 240 deg - No Ice	107.07	-33.90	19.44	2543.55	4448.91	-0.75
0.9 Dead+1.6 Wind 240 deg - No Ice	80.31	-33.90	19.44	2523.35	4411.30	-0.75
1.2 Dead+1.6 Wind 270 deg - No Ice	107.07	-39.22	-0.07	-10.23	5145.28	-0.81
0.9 Dead+1.6 Wind 270 deg - No Ice	80.31	-39.22	-0.07	-9.76	5102.04	-0.80
1.2 Dead+1.6 Wind 300 deg - No Ice	107.07	-34.01	-19.56	-2561.87	4464.71	-0.63
0.9 Dead+1.6 Wind 300 deg - No Ice	80.31	-34.01	-19.56	-2540.76	4426.97	-0.63
1.2 Dead+1.6 Wind 330 deg - No Ice	107.07	-19.67	-33.82	-4429.21	2584.44	-0.39
0.9 Dead+1.6 Wind 330 deg - No Ice	80.31	-19.67	-33.82	-4392.98	2561.93	-0.39
1.2 Dead+1.0 Ice+1.0 Temp	169.62	-0.00	-0.00	-12.71	24.90	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	169.62	-0.02	-13.09	-1726.95	27.95	0.27
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	169.62	7.19	-12.46	-1605.03	-893.19	0.34
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	169.62	11.33	-6.52	-867.02	-1458.68	0.30
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	169.62	13.58	0.02	-9.90	-1732.09	0.18
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	169.62	11.36	6.57	847.67	-1462.79	0.03
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	169.62	6.57	11.35	1475.07	-835.36	-0.12
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	169.62	0.02	13.10	1703.28	22.26	-0.24
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	169.62	-7.18	12.47	1580.75	942.82	-0.32
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	169.62	-11.32	6.53	842.11	1507.67	-0.30
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	169.62	-13.57	-0.02	-15.59	1780.48	-0.19
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	169.62	-11.35	-6.56	-872.61	1512.13	-0.02
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	169.62	-6.56	-11.35	-1499.69	885.02	0.13
Dead+Wind 0 deg - Service	89.23	-0.02	-9.07	-1182.94	7.35	0.02
Dead+Wind 30 deg - Service	89.23	4.66	-8.04	-1041.66	-598.93	0.12
Dead+Wind 60 deg - Service	89.23	7.90	-4.52	-589.86	-1024.80	0.18
Dead+Wind 90 deg - Service	89.23	9.14	0.02	0.96	-1186.63	0.18
Dead+Wind 120 deg - Service	89.23	7.92	4.56	592.36	-1028.13	0.16
Dead+Wind 150 deg - Service	89.23	4.58	7.88	1025.09	-592.41	0.10
Dead+Wind 180 deg - Service	89.23	0.02	9.08	1182.32	3.08	0.01
Dead+Wind 210 deg - Service	89.23	-4.66	8.05	1040.47	608.81	-0.11
Dead+Wind 240 deg - Service	89.23	-7.89	4.52	588.07	1034.07	-0.17
Dead+Wind 270 deg - Service	89.23	-9.13	-0.02	-3.30	1195.33	-0.19
Dead+Wind 300 deg - Service	89.23	-7.92	-4.55	-594.18	1037.74	-0.15
Dead+Wind 330 deg - Service	89.23	-4.58	-7.87	-1026.60	602.32	-0.09

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-89.23	0.00	0.00	89.23	0.00	0.000%
2	-0.07	-107.07	-38.99	0.07	107.07	38.99	0.000%
3	-0.07	-80.31	-38.99	0.07	80.31	38.99	0.000%
4	20.02	-107.07	-34.53	-20.02	107.07	34.53	0.000%
5	20.02	-80.31	-34.53	-20.02	80.31	34.53	0.000%
6	33.93	-107.07	-19.42	-33.93	107.07	19.42	0.000%
7	33.93	-80.31	-19.42	-33.93	80.31	19.42	0.000%
8	39.26	-107.07	0.08	-39.26	107.07	-0.08	0.000%
9	39.26	-80.31	0.08	-39.26	80.31	-0.08	0.000%
10	34.04	-107.07	19.58	-34.04	107.07	-19.58	0.000%
11	34.04	-80.31	19.58	-34.04	80.31	-19.58	0.000%
12	19.69	-107.07	33.84	-19.69	107.07	-33.84	0.000%
13	19.69	-80.31	33.84	-19.69	80.31	-33.84	0.000%
14	0.08	-107.07	39.03	-0.08	107.07	-39.03	0.000%
15	0.08	-80.31	39.03	-0.08	80.31	-39.03	0.000%
16	-20.00	-107.07	34.56	20.00	107.07	-34.56	0.000%
17	-20.00	-80.31	34.56	20.00	80.31	-34.56	0.000%
18	-33.90	-107.07	19.44	33.90	107.07	-19.44	0.000%
19	-33.90	-80.31	19.44	33.90	80.31	-19.44	0.000%
20	-39.22	-107.07	-0.07	39.22	107.07	0.07	0.000%
21	-39.22	-80.31	-0.07	39.22	80.31	0.07	0.000%
22	-34.01	-107.07	-19.56	34.01	107.07	19.56	0.000%
23	-34.01	-80.31	-19.56	34.01	80.31	19.56	0.000%
24	-19.67	-107.07	-33.82	19.67	107.07	33.82	0.000%
25	-19.67	-80.31	-33.82	19.67	80.31	33.82	0.000%
26	0.00	-169.62	0.00	0.00	169.62	0.00	0.000%
27	-0.02	-169.62	-13.09	0.02	169.62	13.09	0.000%
28	7.19	-169.62	-12.46	-7.19	169.62	12.46	0.000%
29	11.33	-169.62	-6.52	-11.33	169.62	6.52	0.000%
30	13.58	-169.62	0.02	-13.58	169.62	-0.02	0.000%
31	11.36	-169.62	6.57	-11.36	169.62	-6.57	0.000%
32	6.57	-169.62	11.35	-6.57	169.62	-11.35	0.000%
33	0.02	-169.62	13.10	-0.02	169.62	-13.10	0.000%
34	-7.18	-169.62	12.47	7.18	169.62	-12.47	0.000%
35	-11.32	-169.62	6.53	11.32	169.62	-6.53	0.000%
36	-13.57	-169.62	-0.02	13.57	169.62	0.02	0.000%
37	-11.35	-169.62	-6.56	11.35	169.62	6.56	0.000%
38	-6.56	-169.62	-11.35	6.56	169.62	11.35	0.000%
39	-0.02	-89.23	-9.07	0.02	89.23	9.07	0.000%
40	4.66	-89.23	-8.04	-4.66	89.23	8.04	0.000%
41	7.90	-89.23	-4.52	-7.90	89.23	4.52	0.000%
42	9.14	-89.23	0.02	-9.14	89.23	-0.02	0.000%
43	7.92	-89.23	4.56	-7.92	89.23	-4.56	0.000%
44	4.58	-89.23	7.88	-4.58	89.23	-7.88	0.000%
45	0.02	-89.23	9.08	-0.02	89.23	-9.08	0.000%
46	-4.66	-89.23	8.05	4.66	89.23	-8.05	0.000%
47	-7.89	-89.23	4.52	7.89	89.23	-4.52	0.000%
48	-9.13	-89.23	-0.02	9.13	89.23	0.02	0.000%
49	-7.92	-89.23	-4.55	7.92	89.23	4.55	0.000%
50	-4.58	-89.23	-7.87	4.58	89.23	7.87	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	0.00011329
3	Yes	5	0.00000001	0.00004407
4	Yes	6	0.00000001	0.00007635
5	Yes	6	0.00000001	0.00002830
6	Yes	6	0.00000001	0.00007257
7	Yes	5	0.00000001	0.00095563

8	Yes	5	0.00000001	0.00012500
9	Yes	5	0.00000001	0.00005184
10	Yes	6	0.00000001	0.00007509
11	Yes	5	0.00000001	0.00098957
12	Yes	6	0.00000001	0.00007351
13	Yes	5	0.00000001	0.00096855
14	Yes	5	0.00000001	0.00011300
15	Yes	5	0.00000001	0.00004391
16	Yes	6	0.00000001	0.00007571
17	Yes	5	0.00000001	0.00099491
18	Yes	6	0.00000001	0.00007444
19	Yes	5	0.00000001	0.00098020
20	Yes	5	0.00000001	0.00012074
21	Yes	5	0.00000001	0.00004904
22	Yes	6	0.00000001	0.00007375
23	Yes	5	0.00000001	0.00096982
24	Yes	6	0.00000001	0.00007487
25	Yes	5	0.00000001	0.00098516
26	Yes	5	0.00000001	0.00006903
27	Yes	6	0.00000001	0.00028563
28	Yes	6	0.00000001	0.00031881
29	Yes	6	0.00000001	0.00029847
30	Yes	6	0.00000001	0.00028280
31	Yes	6	0.00000001	0.00029600
32	Yes	6	0.00000001	0.00029655
33	Yes	6	0.00000001	0.00028056
34	Yes	6	0.00000001	0.00032067
35	Yes	6	0.00000001	0.00030374
36	Yes	6	0.00000001	0.00029194
37	Yes	6	0.00000001	0.00030882
38	Yes	6	0.00000001	0.00030836
39	Yes	4	0.00000001	0.00055012
40	Yes	5	0.00000001	0.00003586
41	Yes	5	0.00000001	0.00003416
42	Yes	4	0.00000001	0.00055507
43	Yes	5	0.00000001	0.00003538
44	Yes	5	0.00000001	0.00003437
45	Yes	4	0.00000001	0.00054939
46	Yes	5	0.00000001	0.00003565
47	Yes	5	0.00000001	0.00003547
48	Yes	4	0.00000001	0.00055920
49	Yes	5	0.00000001	0.00003491
50	Yes	5	0.00000001	0.00003567

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 185	13.890	46	0.5964	0.0004
L2	185 - 180	13.266	46	0.5959	0.0003
L3	180 - 175	12.643	46	0.5936	0.0003
L4	175 - 170	12.023	46	0.5909	0.0002
L5	170 - 165	11.406	46	0.5865	0.0002
L6	165 - 160	10.795	46	0.5798	0.0002
L7	160 - 155	10.193	46	0.5703	0.0002
L8	155 - 150	9.600	46	0.5619	0.0002
L9	150 - 145	9.017	46	0.5508	0.0002
L10	145 - 140	8.447	46	0.5366	0.0002
L11	140 - 135	7.895	46	0.5186	0.0002
L12	135 - 130	7.359	46	0.5042	0.0002
L13	130 - 125	6.840	46	0.4872	0.0002
L14	125 - 120	6.339	46	0.4675	0.0001
L15	120 - 115	5.861	46	0.4452	0.0001
L16	115 - 112.666	5.404	46	0.4277	0.0001
L17	112.666 - 112.416	5.197	46	0.4188	0.0001
L18	112.416 -	5.175	46	0.4181	0.0001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
	107.416				
L19	107.416 - 103.333	4.746	46	0.4022	0.0001
L20	103.333 - 103.083	4.408	46	0.3881	0.0001
L21	103.083 - 100	4.387	46	0.3872	0.0001
L22	100 - 95	4.141	46	0.3757	0.0001
L23	95 - 90	3.755	46	0.3609	0.0001
L24	90 - 89.5	3.386	46	0.3449	0.0001
L25	89.5 - 89.25	3.350	46	0.3432	0.0001
L26	89.25 - 85.5	3.332	46	0.3425	0.0001
L27	85.5 - 85.25	3.067	46	0.3314	0.0001
L28	85.25 - 84	3.050	46	0.3307	0.0001
L29	84 - 83.75	2.963	46	0.3273	0.0001
L30	83.75 - 82.5	2.946	46	0.3265	0.0001
L31	82.5 - 82.25	2.861	46	0.3223	0.0001
L32	82.25 - 80	2.845	46	0.3213	0.0001
L33	80 - 75	2.695	46	0.3123	0.0001
L34	75 - 70	2.377	46	0.2958	0.0001
L35	70 - 65	2.076	46	0.2782	0.0001
L36	65 - 60	1.795	46	0.2594	0.0001
L37	60 - 58.5	1.533	46	0.2394	0.0001
L38	58.5 - 58.25	1.459	46	0.2343	0.0001
L39	58.25 - 53.25	1.447	46	0.2333	0.0001
L40	53.25 - 48.25	1.213	46	0.2134	0.0001
L41	48.25 - 48	1.000	46	0.1924	0.0000
L42	48 - 43	0.990	46	0.1915	0.0000
L43	43 - 40	0.799	46	0.1735	0.0000
L44	40 - 35	0.693	46	0.1622	0.0000
L45	35 - 32.08	0.534	46	0.1426	0.0000
L46	32.08 - 31.83	0.450	46	0.1308	0.0000
L47	31.83 - 28.75	0.443	46	0.1299	0.0000
L48	28.75 - 28.5	0.363	46	0.1194	0.0000
L49	28.5 - 23.5	0.357	46	0.1184	0.0000
L50	23.5 - 20	0.243	46	0.0976	0.0000
L51	20 - 19.75	0.177	46	0.0824	0.0000
L52	19.75 - 14.75	0.173	46	0.0815	0.0000
L53	14.75 - 9.75	0.098	46	0.0621	0.0000
L54	9.75 - 4.75	0.043	46	0.0419	0.0000
L55	4.75 - 0	0.010	46	0.0208	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	Platform Mount [LP 403-1]	46	13.641	0.5964	0.0004	207252
187.00	SP2-5.8	46	13.516	0.5963	0.0004	207252
185.00	Side Arm Mount [SO 102-3]	46	13.266	0.5959	0.0004	207252
184.00	Side Arm Mount [SO 701-1]	46	13.141	0.5956	0.0004	173325
179.00	Platform Mount [LP 403-1]	46	12.519	0.5931	0.0003	100246
170.00	Platform Mount [LP 405-1]	46	11.406	0.5865	0.0002	50614
162.00	Platform Mount [LP 403-1]	46	10.433	0.5741	0.0002	31883
150.00	Platform Mount [LP 403-1]	46	9.017	0.5508	0.0002	22633
125.00	Side Arm Mount [SO 901-1]	46	6.339	0.4675	0.0001	13604
110.00	Side Arm Mount [SO 901-1]	46	4.966	0.4106	0.0001	17505
100.00	Side Arm Mount [SO 901-1]	46	4.141	0.3757	0.0001	17297
95.00	Side Arm Mount [SO 901-1]	46	3.755	0.3609	0.0001	18573
80.00	Side Arm Mount [SO 901-1]	46	2.695	0.3123	0.0001	16198
60.00	Jump Plate 120" x 6.5" x 1.25"	46	1.533	0.2394	0.0001	14900
40.00	(2) Jump Plate 120" x 6" x 1"	46	0.693	0.1622	0.0000	15017
20.00	(2) Jump Plate 120" x 6.5" x 1.25"	46	0.177	0.0824	0.0000	14032

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 185	60.004	16	2.5796	0.0017
L2	185 - 180	57.305	16	2.5775	0.0015
L3	180 - 175	54.612	16	2.5673	0.0014
L4	175 - 170	51.931	16	2.5555	0.0011
L5	170 - 165	49.266	16	2.5362	0.0009
L6	165 - 160	46.626	16	2.5071	0.0009
L7	160 - 155	44.022	16	2.4655	0.0009
L8	155 - 150	41.460	16	2.4288	0.0009
L9	150 - 145	38.942	16	2.3808	0.0010
L10	145 - 140	36.481	16	2.3191	0.0008
L11	140 - 135	34.093	16	2.2415	0.0008
L12	135 - 130	31.778	16	2.1789	0.0007
L13	130 - 125	29.535	16	2.1053	0.0007
L14	125 - 120	27.375	16	2.0203	0.0006
L15	120 - 115	25.309	16	1.9238	0.0006
L16	115 - 112.666	23.335	16	1.8479	0.0005
L17	112.666 - 112.416	22.441	16	1.8096	0.0005
L18	112.416 - 107.416	22.346	16	1.8063	0.0005
L19	107.416 - 103.333	20.491	16	1.7376	0.0005
L20	103.333 - 103.083	19.031	16	1.6764	0.0005
L21	103.083 - 100	18.943	16	1.6725	0.0005
L22	100 - 95	17.879	16	1.6231	0.0005
L23	95 - 90	16.213	16	1.5591	0.0004
L24	90 - 89.5	14.617	16	1.4898	0.0004
L25	89.5 - 89.25	14.461	16	1.4826	0.0004
L26	89.25 - 85.5	14.383	16	1.4794	0.0004
L27	85.5 - 85.25	13.240	16	1.4312	0.0004
L28	85.25 - 84	13.166	16	1.4284	0.0004
L29	84 - 83.75	12.794	16	1.4137	0.0004
L30	83.75 - 82.5	12.720	16	1.4101	0.0004
L31	82.5 - 82.25	12.353	16	1.3921	0.0004
L32	82.25 - 80	12.280	16	1.3878	0.0004
L33	80 - 75	11.635	16	1.3490	0.0004
L34	75 - 70	10.260	16	1.2775	0.0004
L35	70 - 65	8.962	16	1.2012	0.0003
L36	65 - 60	7.746	16	1.1199	0.0003
L37	60 - 58.5	6.618	16	1.0337	0.0003
L38	58.5 - 58.25	6.297	16	1.0115	0.0003
L39	58.25 - 53.25	6.244	16	1.0073	0.0003
L40	53.25 - 48.25	5.234	16	0.9213	0.0002
L41	48.25 - 48	4.317	16	0.8306	0.0002
L42	48 - 43	4.273	16	0.8268	0.0002
L43	43 - 40	3.448	16	0.7488	0.0002
L44	40 - 35	2.993	16	0.7001	0.0002
L45	35 - 32.08	2.303	16	0.6157	0.0001
L46	32.08 - 31.83	1.942	16	0.5644	0.0001
L47	31.83 - 28.75	1.913	16	0.5608	0.0001
L48	28.75 - 28.5	1.566	16	0.5155	0.0001
L49	28.5 - 23.5	1.539	16	0.5111	0.0001
L50	23.5 - 20	1.050	16	0.4212	0.0001
L51	20 - 19.75	0.766	16	0.3558	0.0001
L52	19.75 - 14.75	0.747	16	0.3517	0.0001
L53	14.75 - 9.75	0.422	16	0.2681	0.0001
L54	9.75 - 4.75	0.187	16	0.1808	0.0000
L55	4.75 - 0	0.045	16	0.0898	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	Platform Mount [LP 403-1]	16	58.924	2.5795	0.0016	48200
187.00	SP2-5.8	16	58.384	2.5791	0.0016	48200
185.00	Side Arm Mount [SO 102-3]	16	57.305	2.5775	0.0015	48200
184.00	Side Arm Mount [SO 701-1]	16	56.766	2.5760	0.0015	40430
179.00	Platform Mount [LP 403-1]	16	54.075	2.5651	0.0013	23728
170.00	Platform Mount [LP 405-1]	16	49.266	2.5362	0.0009	11882
162.00	Platform Mount [LP 403-1]	16	45.059	2.4822	0.0009	7426
150.00	Platform Mount [LP 403-1]	16	38.942	2.3808	0.0010	5267
125.00	Side Arm Mount [SO 901-1]	16	27.375	2.0203	0.0006	3165
110.00	Side Arm Mount [SO 901-1]	16	21.441	1.7741	0.0005	4066
100.00	Side Arm Mount [SO 901-1]	16	17.879	1.6231	0.0005	4012
95.00	Side Arm Mount [SO 901-1]	16	16.213	1.5591	0.0005	4306
80.00	Side Arm Mount [SO 901-1]	16	11.635	1.3490	0.0004	3751
60.00	Jump Plate 120" x 6.5" x 1.25"	16	6.618	1.0337	0.0003	3451
40.00	(2) Jump Plate 120" x 6" x 1"	16	2.993	0.7001	0.0002	3478
20.00	(2) Jump Plate 120" x 6.5" x 1.25"	16	0.766	0.3558	0.0001	3251

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	190 - 185 (1)	P30x0.375	5.00	0.00	0.0	34.9011	-3.31	1311.06	0.003
L2	185 - 180 (2)	P30x0.375	5.00	0.00	0.0	34.9011	-4.75	1311.06	0.004
L3	180 - 175 (3)	P36x0.375	5.00	0.00	0.0	41.9697	-7.74	1490.10	0.005
L4	175 - 170 (4)	P36x0.375	5.00	0.00	0.0	41.9697	-8.61	1490.10	0.006
L5	170 - 165 (5)	P36x0.375	5.00	0.00	0.0	41.9697	-12.87	1490.10	0.009
L6	165 - 160 (6)	P36x0.375	5.00	0.00	0.0	41.9697	-18.06	1490.10	0.012
L7	160 - 155 (7)	P42x0.375	5.00	0.00	0.0	49.0383	-19.24	1668.87	0.012
L8	155 - 150 (8)	P42x0.375	5.00	0.00	0.0	49.0383	-20.43	1668.87	0.012
L9	150 - 145 (9)	P42x0.375	5.00	0.00	0.0	49.0383	-25.01	1668.87	0.015
L10	145 - 140 (10)	P42x0.375	5.00	0.00	0.0	49.0383	-26.28	1668.87	0.016
L11	140 - 135 (11)	P48x0.375	5.00	0.00	0.0	56.1069	-27.69	1847.49	0.015
L12	135 - 130 (12)	P48x0.375	5.00	0.00	0.0	56.1069	-29.10	1847.49	0.016
L13	130 - 125 (13)	P48x0.375	5.00	0.00	0.0	56.1069	-30.52	1847.49	0.017
L14	125 - 120 (14)	P48x0.375	5.00	0.00	0.0	56.1069	-32.20	1847.49	0.017
L15	120 - 115 (15)	P54x0.375	5.00	0.00	0.0	63.1755	-33.77	2026.00	0.017
L16	115 - 112.666 (16)	P54x0.375	2.33	0.00	0.0	63.1755	-34.50	2026.00	0.017
L17	112.666 - 112.416 (17)	P54x0.4875	0.25	0.00	0.0	81.9558	-34.60	2797.17	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L18	112.416 - 107.416 (18)	P54x0.4875	5.00	0.00	0.0	81.9558	-36.80	2797.17	0.013
L19	107.416 - 103.333 (19)	P54x0.4875	4.08	0.00	0.0	81.9558	-38.38	2797.17	0.014
L20	103.333 - 103.083 (20)	P54x0.4875	0.25	0.00	0.0	81.9558	-38.48	2797.17	0.014
L21	103.083 - 100 (21)	P54x0.4875	3.08	0.00	0.0	81.9558	-39.68	2797.17	0.014
L22	100 - 95 (22)	P60x0.475	5.00	0.00	0.0	88.8266	-41.93	2934.04	0.014
L23	95 - 90 (23)	P60x0.475	5.00	0.00	0.0	88.8266	-44.34	2934.04	0.015
L24	90 - 89.5 (24)	P60x0.475	0.50	0.00	0.0	88.8266	-44.55	2934.04	0.015
L25	89.5 - 89.25 (25)	P60x0.55625	0.25	0.00	0.0	103.8790	-44.67	3570.37	0.013
L26	89.25 - 85.5 (26)	P60x0.55625	3.75	0.00	0.0	103.8790	-46.47	3570.37	0.013
L27	85.5 - 85.25 (27)	P60x0.6375	0.25	0.00	0.0	118.8890	-46.61	4245.55	0.011
L28	85.25 - 84 (28)	P60x0.6375	1.25	0.00	0.0	118.8890	-47.27	4245.55	0.011
L29	84 - 83.75 (29)	P60x0.525	0.25	0.00	0.0	98.0943	-47.39	3321.02	0.014
L30	83.75 - 82.5 (30)	P60x0.525	1.25	0.00	0.0	98.0943	-47.97	3321.02	0.014
L31	82.5 - 82.25 (31)	P60x0.45	0.25	0.00	0.0	84.1868	-48.08	2746.08	0.018
L32	82.25 - 80 (32)	P60x0.45	2.25	0.00	0.0	84.1868	-48.99	2746.08	0.018
L33	80 - 75 (33)	P60x0.575	5.00	0.00	0.0	107.3460	-52.53	3722.74	0.014
L34	75 - 70 (34)	P60x0.575	5.00	0.00	0.0	107.3460	-55.06	3722.74	0.015
L35	70 - 65 (35)	P60x0.575	5.00	0.00	0.0	107.3460	-57.59	3722.74	0.015
L36	65 - 60 (36)	P60x0.575	5.00	0.00	0.0	107.3460	-60.12	3722.74	0.016
L37	60 - 58.5 (37)	P60x0.7	1.50	0.00	0.0	130.4080	-62.49	4791.24	0.013
L38	58.5 - 58.25 (38)	P60x0.625	0.25	0.00	0.0	116.5830	-62.63	4139.15	0.015
L39	58.25 - 53.25 (39)	P60x0.625	5.00	0.00	0.0	116.5830	-65.36	4139.15	0.016
L40	53.25 - 48.25 (40)	P60x0.625	5.00	0.00	0.0	116.5830	-68.09	4139.15	0.016
L41	48.25 - 48 (41)	P60x0.775	0.25	0.00	0.0	144.1970	-68.26	5450.65	0.013
L42	48 - 43 (42)	P60x0.775	5.00	0.00	0.0	144.1970	-71.49	5450.65	0.013
L43	43 - 40 (43)	P60x0.775	3.00	0.00	0.0	144.1970	-73.43	5450.65	0.013
L44	40 - 35 (44)	P60x0.775	5.00	0.00	0.0	144.1970	-78.78	5450.65	0.014
L45	35 - 32.08 (45)	P60x0.775	2.92	0.00	0.0	144.1970	-80.67	5450.65	0.015
L46	32.08 - 31.83 (46)	P60x0.9625	0.25	0.00	0.0	178.5170	-80.87	6747.93	0.012
L47	31.83 - 28.75 (47)	P60x0.9625	3.08	0.00	0.0	178.5170	-83.26	6747.93	0.012
L48	28.75 - 28.5 (48)	P60x0.8125	0.25	0.00	0.0	151.0790	-83.43	5710.78	0.015
L49	28.5 - 23.5 (49)	P60x0.8125	5.00	0.00	0.0	151.0790	-86.83	5710.78	0.015
L50	23.5 - 20 (50)	P60x0.8125	3.50	0.00	0.0	151.0790	-89.21	5710.78	0.016
L51	20 - 19.75 (51)	P60x0.95	0.25	0.00	0.0	176.2350	-92.35	6661.70	0.014
L52	19.75 - 14.75	P60x0.95	5.00	0.00	0.0	176.23	-96.21	6661.70	0.014

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	(52)					50			
L53	14.75 - 9.75 (53)	P60x0.95	5.00	0.00	0.0	176.23 50	-100.04	6661.70	0.015
L54	9.75 - 4.75 (54)	P60x0.95	5.00	0.00	0.0	176.23 50	-103.68	6661.70	0.016
L55	4.75 - 0 (55)	P60x0.95	4.75	0.00	0.0	176.23 50	-107.07	6661.70	0.016

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	190 - 185 (1)	P30x0.375	14.61	947.86	0.015	0.00	947.86	0.000
L2	185 - 180 (2)	P30x0.375	39.47	947.86	0.042	0.00	947.86	0.000
L3	180 - 175 (3)	P36x0.375	74.06	1338.81	0.055	0.00	1338.81	0.000
L4	175 - 170 (4)	P36x0.375	110.60	1338.81	0.083	0.00	1338.81	0.000
L5	170 - 165 (5)	P36x0.375	164.89	1338.81	0.123	0.00	1338.81	0.000
L6	165 - 160 (6)	P36x0.375	233.96	1338.81	0.175	0.00	1338.81	0.000
L7	160 - 155 (7)	P42x0.375	316.98	1796.56	0.176	0.00	1796.56	0.000
L8	155 - 150 (8)	P42x0.375	402.35	1796.56	0.224	0.00	1796.56	0.000
L9	150 - 145 (9)	P42x0.375	519.92	1796.56	0.289	0.00	1796.56	0.000
L10	145 - 140 (10)	P42x0.375	639.84	1796.56	0.356	0.00	1796.56	0.000
L11	140 - 135 (11)	P48x0.375	762.21	2321.11	0.328	0.00	2321.11	0.000
L12	135 - 130 (12)	P48x0.375	887.07	2321.11	0.382	0.00	2321.11	0.000
L13	130 - 125 (13)	P48x0.375	1014.35	2321.11	0.437	0.00	2321.11	0.000
L14	125 - 120 (14)	P48x0.375	1145.32	2321.11	0.493	0.00	2321.11	0.000
L15	120 - 115 (15)	P54x0.375	1278.69	2912.46	0.439	0.00	2912.46	0.000
L16	115 - 112.666 (16)	P54x0.375	1341.88	2912.46	0.461	0.00	2912.46	0.000
L17	112.666 - 112.416 (17)	P54x0.4875	1348.68	3864.47	0.349	0.00	3864.47	0.000
L18	112.416 - 107.416 (18)	P54x0.4875	1487.10	3864.47	0.385	0.00	3864.47	0.000
L19	107.416 - 103.333 (19)	P54x0.4875	1602.13	3864.47	0.415	0.00	3864.47	0.000
L20	103.333 - 103.083 (20)	P54x0.4875	1609.23	3864.47	0.416	0.00	3864.47	0.000
L21	103.083 - 100 (21)	P54x0.4875	1697.41	3864.47	0.439	0.00	3864.47	0.000
L22	100 - 95 (22)	P60x0.475	1842.58	4598.57	0.401	0.00	4598.57	0.000
L23	95 - 90 (23)	P60x0.475	1992.79	4598.57	0.433	0.00	4598.57	0.000
L24	90 - 89.5 (24)	P60x0.475	2007.87	4598.57	0.437	0.00	4598.57	0.000
L25	89.5 - 89.25 (25)	P60x0.55625	2015.42	5456.53	0.369	0.00	5456.53	0.000
L26	89.25 - 85.5 (26)	P60x0.55625	2129.57	5456.53	0.390	0.00	5456.53	0.000
L27	85.5 - 85.25 (27)	P60x0.6375	2137.24	6334.56	0.337	0.00	6334.56	0.000
L28	85.25 - 84 (28)	P60x0.6375	2175.71	6334.56	0.343	0.00	6334.56	0.000
L29	84 - 83.75 (29)	P60x0.525	2183.42	5124.16	0.426	0.00	5124.16	0.000
L30	83.75 - 82.5 (30)	P60x0.525	2222.11	5124.16	0.434	0.00	5124.16	0.000
L31	82.5 - 82.25 (31)	P60x0.45	2229.87	4338.67	0.514	0.00	4338.67	0.000
L32	82.25 - 80 (32)	P60x0.45	2300.01	4338.67	0.530	0.00	4338.67	0.000
L33	80 - 75 (33)	P60x0.575	2461.13	5657.38	0.435	0.00	5657.38	0.000
L34	75 - 70 (34)	P60x0.575	2624.32	5657.38	0.464	0.00	5657.38	0.000
L35	70 - 65 (35)	P60x0.575	2789.96	5657.38	0.493	0.00	5657.38	0.000
L36	65 - 60 (36)	P60x0.575	2957.95	5657.38	0.523	0.00	5657.38	0.000
L37	60 - 58.5 (37)	P60x0.7	3009.56	7023.43	0.429	0.00	7023.43	0.000
L38	58.5 - 58.25	P60x0.625	3018.18	6198.18	0.487	0.00	6198.18	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
L39	58.25 - 53.25 (38)	P60x0.625	3191.72	6198.18	0.515	0.00	6198.18	0.000
L40	53.25 - 48.25 (39)	P60x0.625	3367.28	6198.18	0.543	0.00	6198.18	0.000
L41	48.25 - 48 (40)	P60x0.775	3376.12	7865.35	0.429	0.00	7865.35	0.000
L42	48 - 43 (41)	P60x0.775	3553.82	7865.35	0.452	0.00	7865.35	0.000
L43	43 - 40 (42)	P60x0.775	3661.41	7865.35	0.466	0.00	7865.35	0.000
L44	40 - 35 (43)	P60x0.775	3846.26	7865.35	0.489	0.00	7865.35	0.000
L45	35 - 32.08 (44)	P60x0.775	3955.04	7865.35	0.503	0.00	7865.35	0.000
L46	32.08 - 31.83 (45)	P60x0.9625	3964.38	10041.58	0.395	0.00	10041.58	0.000
L47	31.83 - 28.75 (46)	P60x0.9625	4079.87	10041.58	0.406	0.00	10041.58	0.000
L48	28.75 - 28.5 (47)	P60x0.8125	4089.27	8292.48	0.493	0.00	8292.48	0.000
L49	28.5 - 23.5 (48)	P60x0.8125	4278.18	8292.48	0.516	0.00	8292.48	0.000
L50	23.5 - 20 (49)	P60x0.8125	4411.32	8292.48	0.532	0.00	8292.48	0.000
L51	20 - 19.75 (50)	P60x0.95	4421.05	9893.33	0.447	0.00	9893.33	0.000
L52	19.75 - 14.75 (51)	P60x0.95	4616.62	9893.33	0.467	0.00	9893.33	0.000
L53	14.75 - 9.75 (52)	P60x0.95	4813.54	9893.33	0.487	0.00	9893.33	0.000
L54	9.75 - 4.75 (53)	P60x0.95	5011.57	9893.33	0.507	0.00	9893.33	0.000
L55	4.75 - 0 (54)	P60x0.95	5200.77	9893.33	0.526	0.00	9893.33	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	190 - 185 (1)	P30x0.375	3.54	655.53	0.005	0.68	1598.37	0.000
L2	185 - 180 (2)	P30x0.375	4.84	655.53	0.007	0.25	1598.37	0.000
L3	180 - 175 (3)	P36x0.375	7.09	745.05	0.010	0.65	2189.07	0.000
L4	175 - 170 (4)	P36x0.375	7.52	745.05	0.010	0.65	2189.07	0.000
L5	170 - 165 (5)	P36x0.375	11.09	745.05	0.015	1.15	2189.07	0.001
L6	165 - 160 (6)	P36x0.375	16.39	745.05	0.022	1.40	2189.07	0.001
L7	160 - 155 (7)	P42x0.375	16.86	834.44	0.020	1.40	2868.84	0.000
L8	155 - 150 (8)	P42x0.375	17.33	834.44	0.021	1.40	2868.84	0.000
L9	150 - 145 (9)	P42x0.375	23.79	834.44	0.029	0.00	2868.84	0.000
L10	145 - 140 (10)	P42x0.375	24.18	834.44	0.029	0.05	2868.84	0.000
L11	140 - 135 (11)	P48x0.375	24.69	923.75	0.027	0.05	3637.70	0.000
L12	135 - 130 (12)	P48x0.375	25.18	923.75	0.027	0.05	3637.70	0.000
L13	130 - 125 (13)	P48x0.375	25.66	923.75	0.028	0.05	3637.70	0.000
L14	125 - 120 (14)	P48x0.375	26.41	923.75	0.029	0.21	3637.70	0.000
L15	120 - 115 (15)	P54x0.375	26.95	1013.00	0.027	0.21	4495.63	0.000
L16	115 - 112.666 (16)	P54x0.375	27.21	1013.00	0.027	0.21	4495.63	0.000
L17	112.666 - 112.416 (17)	P54x0.4875	27.23	1398.58	0.019	0.21	6181.02	0.000
L18	112.416 - 107.416 (18)	P54x0.4875	27.95	1398.58	0.020	0.16	6181.02	0.000
L19	107.416 - 103.333 (19)	P54x0.4875	28.41	1398.58	0.020	0.16	6181.02	0.000
L20	103.333 - 103.083 (20)	P54x0.4875	28.43	1398.58	0.020	0.16	6181.02	0.000
L21	103.083 - 100 (21)	P54x0.4875	28.78	1398.58	0.021	0.16	6181.02	0.000
L22	100 - 95 (22)	P60x0.475	29.39	1467.02	0.020	0.25	7219.87	0.000
L23	95 - 90 (23)	P60x0.475	30.11	1467.02	0.021	0.05	7219.87	0.000

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 $\frac{T_u}{\phi T_n}$
L24	90 - 89.5 (24)	P60x0.475	30.17	1467.02	0.021	0.05	7219.87	0.000
L25	89.5 - 89.25 (25)	P60x0.55625	30.20	1785.19	0.017	0.05	8762.00	0.000
L26	89.25 - 85.5 (26)	P60x0.55625	30.65	1785.19	0.017	0.05	8762.00	0.000
L27	85.5 - 85.25 (27)	P60x0.6375	30.68	2122.77	0.014	0.05	10390.75	0.000
L28	85.25 - 84 (28)	P60x0.6375	30.83	2122.77	0.015	0.05	10390.75	0.000
L29	84 - 83.75 (29)	P60x0.525	30.86	1660.51	0.019	0.05	8158.53	0.000
L30	83.75 - 82.5 (30)	P60x0.525	31.01	1660.51	0.019	0.05	8158.53	0.000
L31	82.5 - 82.25 (31)	P60x0.45	31.04	1373.04	0.023	0.05	6763.00	0.000
L32	82.25 - 80 (32)	P60x0.45	31.28	1373.04	0.023	0.05	6763.00	0.000
L33	80 - 75 (33)	P60x0.575	32.37	1861.37	0.017	0.46	9130.17	0.000
L34	75 - 70 (34)	P60x0.575	32.87	1861.37	0.018	0.46	9130.17	0.000
L35	70 - 65 (35)	P60x0.575	33.36	1861.37	0.018	0.46	9130.17	0.000
L36	65 - 60 (36)	P60x0.575	33.82	1861.37	0.018	0.46	9130.17	0.000
L37	60 - 58.5 (37)	P60x0.7	34.47	2395.62	0.014	0.46	11701.92	0.000
L38	58.5 - 58.25 (38)	P60x0.625	34.48	2069.58	0.017	0.46	10134.58	0.000
L39	58.25 - 53.25 (39)	P60x0.625	34.90	2069.58	0.017	0.46	10134.58	0.000
L40	53.25 - 48.25 (40)	P60x0.625	35.30	2069.58	0.017	0.46	10134.58	0.000
L41	48.25 - 48 (41)	P60x0.775	35.32	2725.33	0.013	0.46	13279.17	0.000
L42	48 - 43 (42)	P60x0.775	35.74	2725.33	0.013	0.46	13279.17	0.000
L43	43 - 40 (43)	P60x0.775	35.97	2725.33	0.013	0.46	13279.17	0.000
L44	40 - 35 (44)	P60x0.775	37.14	2725.33	0.014	0.46	13279.17	0.000
L45	35 - 32.08 (45)	P60x0.775	37.36	2725.33	0.014	0.46	13279.17	0.000
L46	32.08 - 31.83 (46)	P60x0.9625	37.36	3373.96	0.011	0.46	16337.25	0.000
L47	31.83 - 28.75 (47)	P60x0.9625	37.60	3373.96	0.011	0.46	16337.25	0.000
L48	28.75 - 28.5 (48)	P60x0.8125	37.61	2855.39	0.013	0.46	13895.50	0.000
L49	28.5 - 23.5 (49)	P60x0.8125	37.93	2855.39	0.013	0.46	13895.50	0.000
L50	23.5 - 20 (50)	P60x0.8125	38.14	2855.39	0.013	0.46	13895.50	0.000
L51	20 - 19.75 (51)	P60x0.95	38.95	3330.85	0.012	0.46	16135.25	0.000
L52	19.75 - 14.75 (52)	P60x0.95	39.25	3330.85	0.012	0.46	16135.25	0.000
L53	14.75 - 9.75 (53)	P60x0.95	39.51	3330.85	0.012	0.46	16135.25	0.000
L54	9.75 - 4.75 (54)	P60x0.95	39.74	3330.85	0.012	0.46	16135.25	0.000
L55	4.75 - 0 (55)	P60x0.95	39.96	3330.85	0.012	0.46	16135.25	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	190 - 185 (1)	0.003	0.015	0.000	0.005	0.000	0.018	1.000	4.8.2
L2	185 - 180 (2)	0.004	0.042	0.000	0.007	0.000	0.045	1.000	4.8.2
L3	180 - 175 (3)	0.005	0.055	0.000	0.010	0.000	0.061	1.000	4.8.2
L4	175 - 170 (4)	0.006	0.083	0.000	0.010	0.000	0.088	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
L5	170 - 165 (5)	0.009	0.123	0.000	0.015	0.001	0.132	1.000	4.8.2
L6	165 - 160 (6)	0.012	0.175	0.000	0.022	0.001	0.187	1.000	4.8.2
L7	160 - 155 (7)	0.012	0.176	0.000	0.020	0.000	0.188	1.000	4.8.2
L8	155 - 150 (8)	0.012	0.224	0.000	0.021	0.000	0.237	1.000	4.8.2
L9	150 - 145 (9)	0.015	0.289	0.000	0.029	0.000	0.305	1.000	4.8.2
L10	145 - 140 (10)	0.016	0.356	0.000	0.029	0.000	0.373	1.000	4.8.2
L11	140 - 135 (11)	0.015	0.328	0.000	0.027	0.000	0.344	1.000	4.8.2
L12	135 - 130 (12)	0.016	0.382	0.000	0.027	0.000	0.399	1.000	4.8.2
L13	130 - 125 (13)	0.017	0.437	0.000	0.028	0.000	0.454	1.000	4.8.2
L14	125 - 120 (14)	0.017	0.493	0.000	0.029	0.000	0.512	1.000	4.8.2
L15	120 - 115 (15)	0.017	0.439	0.000	0.027	0.000	0.456	1.000	4.8.2
L16	115 - 112.666 (16)	0.017	0.461	0.000	0.027	0.000	0.478	1.000	4.8.2
L17	112.666 - 112.416 (17)	0.012	0.349	0.000	0.019	0.000	0.362	1.000	4.8.2
L18	112.416 - 107.416 (18)	0.013	0.385	0.000	0.020	0.000	0.398	1.000	4.8.2
L19	107.416 - 103.333 (19)	0.014	0.415	0.000	0.020	0.000	0.429	1.000	4.8.2
L20	103.333 - 103.083 (20)	0.014	0.416	0.000	0.020	0.000	0.431	1.000	4.8.2
L21	103.083 - 100 (21)	0.014	0.439	0.000	0.021	0.000	0.454	1.000	4.8.2
L22	100 - 95 (22)	0.014	0.401	0.000	0.020	0.000	0.415	1.000	4.8.2
L23	95 - 90 (23)	0.015	0.433	0.000	0.021	0.000	0.449	1.000	4.8.2
L24	90 - 89.5 (24)	0.015	0.437	0.000	0.021	0.000	0.452	1.000	4.8.2
L25	89.5 - 89.25 (25)	0.013	0.369	0.000	0.017	0.000	0.382	1.000	4.8.2
L26	89.25 - 85.5 (26)	0.013	0.390	0.000	0.017	0.000	0.404	1.000	4.8.2
L27	85.5 - 85.25 (27)	0.011	0.337	0.000	0.014	0.000	0.349	1.000	4.8.2
L28	85.25 - 84 (28)	0.011	0.343	0.000	0.015	0.000	0.355	1.000	4.8.2
L29	84 - 83.75 (29)	0.014	0.426	0.000	0.019	0.000	0.441	1.000	4.8.2
L30	83.75 - 82.5 (30)	0.014	0.434	0.000	0.019	0.000	0.448	1.000	4.8.2
L31	82.5 - 82.25 (31)	0.018	0.514	0.000	0.023	0.000	0.532	1.000	4.8.2
L32	82.25 - 80 (32)	0.018	0.530	0.000	0.023	0.000	0.548	1.000	4.8.2
L33	80 - 75 (33)	0.014	0.435	0.000	0.017	0.000	0.449	1.000	4.8.2
L34	75 - 70 (34)	0.015	0.464	0.000	0.018	0.000	0.479	1.000	4.8.2
L35	70 - 65 (35)	0.015	0.493	0.000	0.018	0.000	0.509	1.000	4.8.2
L36	65 - 60 (36)	0.016	0.523	0.000	0.018	0.000	0.539	1.000	4.8.2
L37	60 - 58.5 (37)	0.013	0.429	0.000	0.014	0.000	0.442	1.000	4.8.2
L38	58.5 - 58.25 (38)	0.015	0.487	0.000	0.017	0.000	0.502	1.000	4.8.2
L39	58.25 - 53.25 (39)	0.016	0.515	0.000	0.017	0.000	0.531	1.000	4.8.2
L40	53.25 - 48.25 (40)	0.016	0.543	0.000	0.017	0.000	0.560	1.000	4.8.2
L41	48.25 - 48 (41)	0.013	0.429	0.000	0.013	0.000	0.442	1.000	4.8.2
L42	48 - 43 (42)	0.013	0.452	0.000	0.013	0.000	0.465	1.000	4.8.2
L43	43 - 40 (43)	0.013	0.466	0.000	0.013	0.000	0.479	1.000	4.8.2
L44	40 - 35 (44)	0.014	0.489	0.000	0.014	0.000	0.504	1.000	4.8.2
L45	35 - 32.08 (45)	0.015	0.503	0.000	0.014	0.000	0.518	1.000	4.8.2
L46	32.08 - 31.83 (46)	0.012	0.395	0.000	0.011	0.000	0.407	1.000	4.8.2
L47	31.83 - 28.75 (47)	0.012	0.406	0.000	0.011	0.000	0.419	1.000	4.8.2
L48	28.75 - 28.5 (48)	0.015	0.493	0.000	0.013	0.000	0.508	1.000	4.8.2
L49	28.5 - 23.5 (49)	0.015	0.516	0.000	0.013	0.000	0.531	1.000	4.8.2
L50	23.5 - 20 (50)	0.016	0.532	0.000	0.013	0.000	0.548	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
L51	20 - 19.75 (51)	0.014	0.447	0.000	0.012	0.000	0.461	1.000	4.8.2
L52	19.75 - 14.75 (52)	0.014	0.467	0.000	0.012	0.000	0.481	1.000	4.8.2
L53	14.75 - 9.75 (53)	0.015	0.487	0.000	0.012	0.000	0.502	1.000	4.8.2
L54	9.75 - 4.75 (54)	0.016	0.507	0.000	0.012	0.000	0.522	1.000	4.8.2
L55	4.75 - 0 (55)	0.016	0.526	0.000	0.012	0.000	0.542	1.000	4.8.2

Section Capacity Table

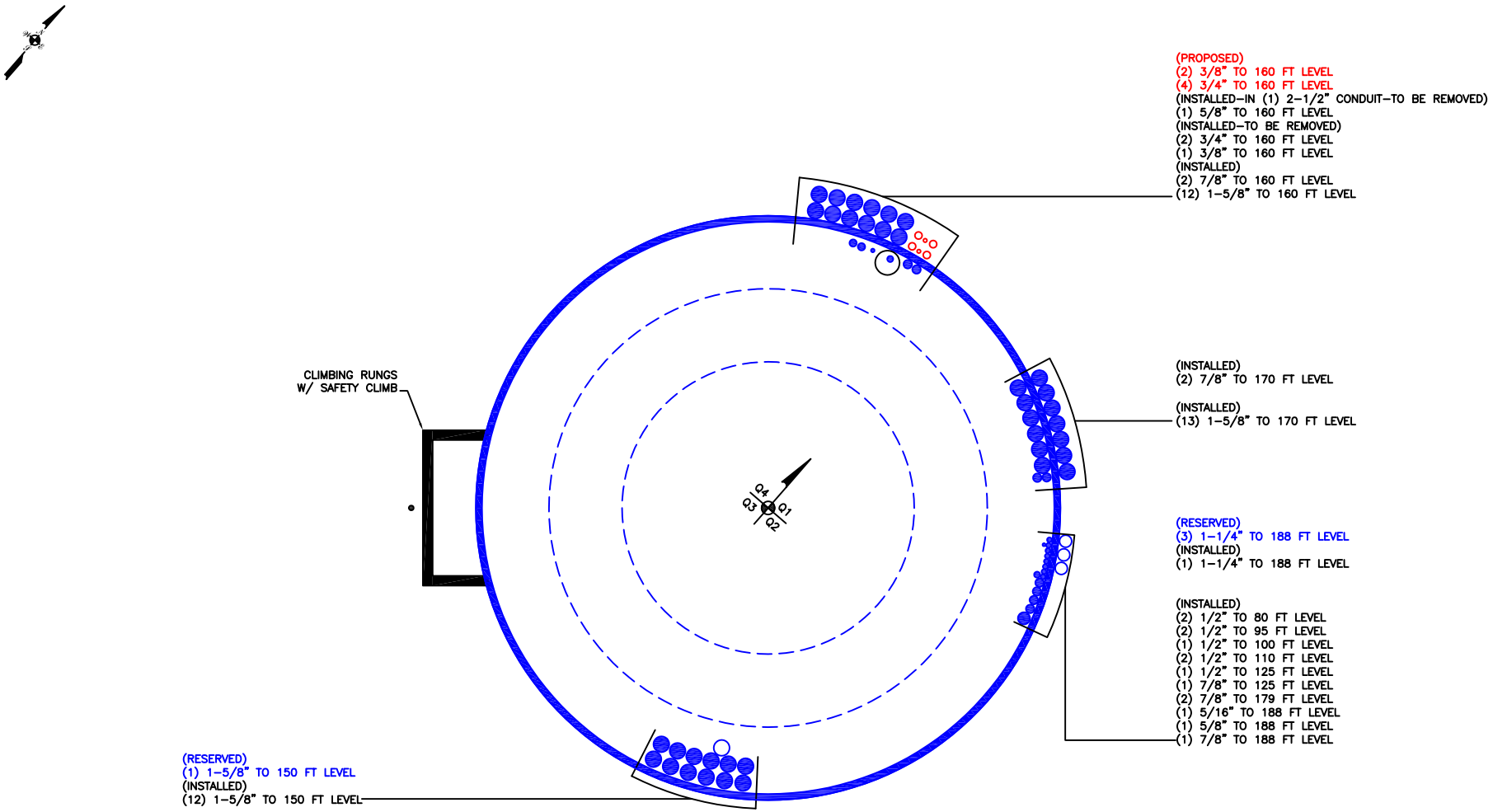
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	190 - 185	Pole	P30x0.375	1	-3.31	1311.06	1.8	Pass
L2	185 - 180	Pole	P30x0.375	2	-4.75	1311.06	4.5	Pass
L3	180 - 175	Pole	P36x0.375	3	-7.74	1490.10	6.1	Pass
L4	175 - 170	Pole	P36x0.375	4	-8.61	1490.10	8.8	Pass
L5	170 - 165	Pole	P36x0.375	5	-12.87	1490.10	13.2	Pass
L6	165 - 160	Pole	P36x0.375	6	-18.06	1490.10	18.7	Pass
L7	160 - 155	Pole	P42x0.375	7	-19.24	1668.87	18.8	Pass
L8	155 - 150	Pole	P42x0.375	8	-20.43	1668.87	23.7	Pass
L9	150 - 145	Pole	P42x0.375	9	-25.01	1668.87	30.5	Pass
L10	145 - 140	Pole	P42x0.375	10	-26.28	1668.87	37.3	Pass
L11	140 - 135	Pole	P48x0.375	11	-27.69	1847.49	34.4	Pass
L12	135 - 130	Pole	P48x0.375	12	-29.10	1847.49	39.9	Pass
L13	130 - 125	Pole	P48x0.375	13	-30.52	1847.49	45.4	Pass
L14	125 - 120	Pole	P48x0.375	14	-32.20	1847.49	51.2	Pass
L15	120 - 115	Pole	P54x0.375	15	-33.77	2026.00	45.6	Pass
L16	115 - 112.666	Pole	P54x0.375	16	-34.50	2026.00	47.8	Pass
L17	112.666 - 112.416	Pole	P54x0.4875	17	-34.60	2797.17	36.2	Pass
L18	112.416 - 107.416	Pole	P54x0.4875	18	-36.80	2797.17	39.8	Pass
L19	107.416 - 103.333	Pole	P54x0.4875	19	-38.38	2797.17	42.9	Pass
L20	103.333 - 103.083	Pole	P54x0.4875	20	-38.48	2797.17	43.1	Pass
L21	103.083 - 100	Pole	P54x0.4875	21	-39.68	2797.17	45.4	Pass
L22	100 - 95	Pole	P60x0.475	22	-41.93	2934.04	41.5	Pass
L23	95 - 90	Pole	P60x0.475	23	-44.34	2934.04	44.9	Pass
L24	90 - 89.5	Pole	P60x0.475	24	-44.55	2934.04	45.2	Pass
L25	89.5 - 89.25	Pole	P60x0.55625	25	-44.67	3570.37	38.2	Pass
L26	89.25 - 85.5	Pole	P60x0.55625	26	-46.47	3570.37	40.4	Pass
L27	85.5 - 85.25	Pole	P60x0.6375	27	-46.61	4245.55	34.9	Pass
L28	85.25 - 84	Pole	P60x0.6375	28	-47.27	4245.55	35.5	Pass
L29	84 - 83.75	Pole	P60x0.525	29	-47.39	3321.02	44.1	Pass
L30	83.75 - 82.5	Pole	P60x0.525	30	-47.97	3321.02	44.8	Pass
L31	82.5 - 82.25	Pole	P60x0.45	31	-48.08	2746.08	53.2	Pass
L32	82.25 - 80	Pole	P60x0.45	32	-48.99	2746.08	54.8	Pass
L33	80 - 75	Pole	P60x0.575	33	-52.53	3722.74	44.9	Pass
L34	75 - 70	Pole	P60x0.575	34	-55.06	3722.74	47.9	Pass
L35	70 - 65	Pole	P60x0.575	35	-57.59	3722.74	50.9	Pass
L36	65 - 60	Pole	P60x0.575	36	-60.12	3722.74	53.9	Pass
L37	60 - 58.5	Pole	P60x0.7	37	-62.49	4791.24	44.2	Pass
L38	58.5 - 58.25	Pole	P60x0.625	38	-62.63	4139.15	50.2	Pass
L39	58.25 - 53.25	Pole	P60x0.625	39	-65.36	4139.15	53.1	Pass
L40	53.25 - 48.25	Pole	P60x0.625	40	-68.09	4139.15	56.0	Pass
L41	48.25 - 48	Pole	P60x0.775	41	-68.26	5450.65	44.2	Pass
L42	48 - 43	Pole	P60x0.775	42	-71.49	5450.65	46.5	Pass
L43	43 - 40	Pole	P60x0.775	43	-73.43	5450.65	47.9	Pass
L44	40 - 35	Pole	P60x0.775	44	-78.78	5450.65	50.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L45	35 - 32.08	Pole	P60x0.775	45	-80.67	5450.65	51.8	Pass
L46	32.08 - 31.83	Pole	P60x0.9625	46	-80.87	6747.93	40.7	Pass
L47	31.83 - 28.75	Pole	P60x0.9625	47	-83.26	6747.93	41.9	Pass
L48	28.75 - 28.5	Pole	P60x0.8125	48	-83.43	5710.78	50.8	Pass
L49	28.5 - 23.5	Pole	P60x0.8125	49	-86.83	5710.78	53.1	Pass
L50	23.5 - 20	Pole	P60x0.8125	50	-89.21	5710.78	54.8	Pass
L51	20 - 19.75	Pole	P60x0.95	51	-92.35	6661.70	46.1	Pass
L52	19.75 - 14.75	Pole	P60x0.95	52	-96.21	6661.70	48.1	Pass
L53	14.75 - 9.75	Pole	P60x0.95	53	-100.04	6661.70	50.2	Pass
L54	9.75 - 4.75	Pole	P60x0.95	54	-103.68	6661.70	52.2	Pass
L55	4.75 - 0	Pole	P60x0.95	55	-107.07	6661.70	54.2	Pass
							Summary	
						Pole (L40)	56.0	Pass
						RATING =	**56.0**	**Pass**

Note: Above stress ratio for reinforced sections are approximate. More exact calculation are presented in Appendix C.

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 829046 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 829046

Work Order: 1568944

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	190	10		0	30	30	0.375	n/a	A53-B-42
2	180	20		0	36.00	36	0.375	n/a	A53-B-42
3	160	20		0	42.00	42	0.375	n/a	A53-B-42
4	140	20		0	48.00	48	0.375	n/a	A53-B-42
5	120	20		0	54.00	54	0.375	n/a	A53-B-42
6	100	20		0	60.00	60	0.375	n/a	A53-B-42
7	80	20		0	60.00	60	0.5	n/a	A53-B-42
8	60	20		0	60.00	60	0.625	n/a	A53-B-42
9	40	20		0	60.00	60	0.625	n/a	A53-B-42
10	20	20		0	60.00	60	0.75	n/a	A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	32.08	plate	MS-850 (1.1875")	3	0	120	240															
2	28.75	48.25	plate	MS-650 (1.1875")	3	24	144	264															
3	58.5	85.5	plate	MS-450 (1.1875")	3	0	120	240															
4	84	103.333	plate	MS-600 (1.1875")	3	21	141	261															
5	103.333	112.666	plate	MS-600 (1.1875")	3				0	120	240												
6	82.5	89.5	plate	MS-450 (1.1875")	3							90	210	330									
7																							
8																							
9		20																					
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	8.5	1.25	10.625	0.625	45.000	45.000	17.250	9.063	1.1875	A572-65
2	6.5	1.25	8.125	0.625	33.000	33.000	19.250	6.563	1.1875	A572-65
3	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
6	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	190 - 185	5		0	30.000	30.000	0.375	A53-B-42	1.000
2	185 - 180	5	0	0	30.000	30.000	0.375	A53-B-42	1.000
3	180 - 175	5		0	36.000	36.000	0.375	A53-B-42	1.000
4	175 - 170	5		0	36.000	36.000	0.375	A53-B-42	1.000
5	170 - 165	5		0	36.000	36.000	0.375	A53-B-42	1.000
6	165 - 160	5	0	0	36.000	36.000	0.375	A53-B-42	1.000
7	160 - 155	5		0	42.000	42.000	0.375	A53-B-42	1.000
8	155 - 150	5		0	42.000	42.000	0.375	A53-B-42	1.000
9	150 - 145	5		0	42.000	42.000	0.375	A53-B-42	1.000
10	145 - 140	5	0	0	42.000	42.000	0.375	A53-B-42	1.000
11	140 - 135	5		0	48.000	48.000	0.375	A53-B-42	1.000
12	135 - 130	5		0	48.000	48.000	0.375	A53-B-42	1.000
13	130 - 125	5		0	48.000	48.000	0.375	A53-B-42	1.000
14	125 - 120	5	0	0	48.000	48.000	0.375	A53-B-42	1.000
15	120 - 115	5		0	54.000	54.000	0.375	A53-B-42	1.000
16	115 - 112.666	2.334		0	54.000	54.000	0.375	A53-B-42	1.000
17	112.666 - 112.416	0.25		0	54.000	54.000	0.4875	A53-B-42	0.990
18	112.416 - 107.416	5		0	54.000	54.000	0.4875	A53-B-42	0.990
19	107.416 - 103.333	4.083		0	54.000	54.000	0.4875	A53-B-42	0.990
20	103.333 - 103.083	0.25		0	54.000	54.000	0.4875	A53-B-42	0.990
21	103.083 - 100	3.083	0	0	54.000	54.000	0.4875	A53-B-42	0.990
22	100 - 95	5		0	60.000	60.000	0.475	A53-B-42	0.993
23	95 - 90	5		0	60.000	60.000	0.475	A53-B-42	0.993
24	90 - 89.5	0.5		0	60.000	60.000	0.475	A53-B-42	0.993
25	89.5 - 89.25	0.25		0	60.000	60.000	0.55625	A53-B-42	0.979
26	89.25 - 85.5	3.75		0	60.000	60.000	0.55625	A53-B-42	0.979
27	85.5 - 85.25	0.25		0	60.000	60.000	0.6375	A53-B-42	0.969
28	85.25 - 84	1.25		0	60.000	60.000	0.6375	A53-B-42	0.969
29	84 - 83.75	0.25		0	60.000	60.000	0.525	A53-B-42	0.991
30	83.75 - 82.5	1.25		0	60.000	60.000	0.525	A53-B-42	0.991
31	82.5 - 82.25	0.25		0	60.000	60.000	0.45	A53-B-42	0.995
32	82.25 - 80	2.25	0	0	60.000	60.000	0.45	A53-B-42	0.995
33	80 - 75	5		0	60.000	60.000	0.575	A53-B-42	0.996
34	75 - 70	5		0	60.000	60.000	0.575	A53-B-42	0.996
35	70 - 65	5		0	60.000	60.000	0.575	A53-B-42	0.996
36	65 - 60	5	0	0	60.000	60.000	0.575	A53-B-42	0.996
37	60 - 58.5	1.5		0	60.000	60.000	0.7	A53-B-42	0.998
38	58.5 - 58.25	0.25		0	60.000	60.000	0.625	A53-B-42	1.000
39	58.25 - 53.25	5		0	60.000	60.000	0.625	A53-B-42	1.000
40	53.25 - 48.25	5		0	60.000	60.000	0.625	A53-B-42	1.000
41	48.25 - 48	0.25		0	60.000	60.000	0.775	A53-B-42	0.978
42	48 - 43	5		0	60.000	60.000	0.775	A53-B-42	0.978
43	43 - 40	3	0	0	60.000	60.000	0.775	A53-B-42	0.978
44	40 - 35	5		0	60.000	60.000	0.775	A53-B-42	0.978
45	35 - 32.08	2.92		0	60.000	60.000	0.775	A53-B-42	0.978
46	32.08 - 31.83	0.25		0	60.000	60.000	0.9625	A53-B-42	0.968
47	31.83 - 28.75	3.08		0	60.000	60.000	0.9625	A53-B-42	0.968
48	28.75 - 28.5	0.25		0	60.000	60.000	0.8125	A53-B-42	0.983
49	28.5 - 23.5	5		0	60.000	60.000	0.8125	A53-B-42	0.983
50	23.5 - 20	3.5	0	0	60.000	60.000	0.8125	A53-B-42	0.983
51	20 - 19.75	0.25		0	60.000	60.000	0.95	A53-B-42	0.973
52	19.75 - 14.75	5		0	60.000	60.000	0.95	A53-B-42	0.973
53	14.75 - 9.75	5		0	60.000	60.000	0.95	A53-B-42	0.973
54	9.75 - 4.75	5		0	60.000	60.000	0.95	A53-B-42	0.973
55	4.75 - 0	4.75		0	60.000	60.000	0.95	A53-B-42	0.973

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	190 - 185	3.31	14.61	3.54
2	185 - 180	4.75	39.47	4.84
3	180 - 175	7.74	74.06	7.09
4	175 - 170	8.61	110.60	7.52
5	170 - 165	12.87	164.89	11.09
6	165 - 160	18.06	233.96	16.39
7	160 - 155	19.24	316.98	16.86
8	155 - 150	20.43	402.35	17.33
9	150 - 145	25.01	519.92	23.79
10	145 - 140	26.28	639.84	24.18
11	140 - 135	27.69	762.21	24.69
12	135 - 130	29.10	887.07	25.18
13	130 - 125	30.52	1014.35	25.66
14	125 - 120	32.20	1145.32	26.41
15	120 - 115	33.77	1278.69	26.95
16	115 - 112.666	34.50	1341.87	27.21
17	112.666 - 112.416	34.60	1348.68	27.23
18	112.416 - 107.416	36.80	1487.10	27.95
19	107.416 - 103.333	38.38	1602.13	28.41
20	103.333 - 103.083	38.48	1609.23	28.43
21	103.083 - 100	39.68	1697.41	28.78
22	100 - 95	41.93	1842.58	29.39
23	95 - 90	44.34	1992.79	30.11
24	90 - 89.5	44.55	2007.87	30.17
25	89.5 - 89.25	44.67	2015.42	30.20
26	89.25 - 85.5	46.47	2129.57	30.65
27	85.5 - 85.25	46.61	2137.24	30.68
28	85.25 - 84	47.27	2175.70	30.83
29	84 - 83.75	47.39	2183.42	30.86
30	83.75 - 82.5	47.97	2222.11	31.01
31	82.5 - 82.25	48.08	2229.87	31.04
32	82.25 - 80	48.99	2300.01	31.28
33	80 - 75	52.53	2461.13	32.37
34	75 - 70	55.06	2624.31	32.87
35	70 - 65	57.59	2789.96	33.36
36	65 - 60	60.12	2957.95	33.82
37	60 - 58.5	62.49	3009.56	34.47
38	58.5 - 58.25	62.63	3018.18	34.48
39	58.25 - 53.25	65.36	3191.71	34.90
40	53.25 - 48.25	68.09	3367.29	35.30
41	48.25 - 48	68.26	3376.12	35.32
42	48 - 43	71.49	3553.82	35.74
43	43 - 40	73.43	3661.41	35.97
44	40 - 35	78.78	3846.25	37.14
45	35 - 32.08	80.67	3955.04	37.36
46	32.08 - 31.83	80.87	3964.39	37.36
47	31.83 - 28.75	83.26	4079.86	37.60
48	28.75 - 28.5	83.43	4089.27	37.61
49	28.5 - 23.5	86.83	4278.17	37.93
50	23.5 - 20	89.21	4411.31	38.14
51	20 - 19.75	92.35	4421.05	38.95
52	19.75 - 14.75	96.21	4616.62	39.25
53	14.75 - 9.75	100.04	4813.54	39.51
54	9.75 - 4.75	103.68	5011.56	39.74
55	4.75 - 0	107.07	5200.77	39.96

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
190 - 185	Pole	TP30x30x0.375	Pole	1.8%	Pass
185 - 180	Pole	TP30x30x0.375	Pole	4.5%	Pass
180 - 175	Pole	TP36x36x0.375	Pole	6.1%	Pass
175 - 170	Pole	TP36x36x0.375	Pole	8.8%	Pass
170 - 165	Pole	TP36x36x0.375	Pole	13.2%	Pass
165 - 160	Pole	TP36x36x0.375	Pole	18.7%	Pass
160 - 155	Pole	TP42x42x0.375	Pole	18.8%	Pass
155 - 150	Pole	TP42x42x0.375	Pole	23.7%	Pass
150 - 145	Pole	TP42x42x0.375	Pole	30.5%	Pass
145 - 140	Pole	TP42x42x0.375	Pole	37.3%	Pass
140 - 135	Pole	TP48x48x0.375	Pole	34.4%	Pass
135 - 130	Pole	TP48x48x0.375	Pole	39.9%	Pass
130 - 125	Pole	TP48x48x0.375	Pole	45.4%	Pass
125 - 120	Pole	TP48x48x0.375	Pole	51.2%	Pass
120 - 115	Pole	TP54x54x0.375	Pole	45.6%	Pass
115 - 112.67	Pole	TP54x54x0.375	Pole	47.8%	Pass
112.67 - 112.42	Pole + Reinf.	TP54x54x0.4875	Pole	36.8%	Pass
112.42 - 107.42	Pole + Reinf.	TP54x54x0.4875	Pole	40.6%	Pass
107.42 - 103.33	Pole + Reinf.	TP54x54x0.4875	Pole	43.6%	Pass
103.33 - 103.08	Pole + Reinf.	TP54x54x0.4875	Pole	43.8%	Pass
103.08 - 100	Pole + Reinf.	TP54x54x0.4875	Pole	46.2%	Pass
100 - 95	Pole + Reinf.	TP60x60x0.475	Pole	42.1%	Pass
95 - 90	Pole + Reinf.	TP60x60x0.475	Pole	45.5%	Pass
90 - 89.5	Pole + Reinf.	TP60x60x0.475	Pole	45.8%	Pass
89.5 - 89.25	Pole + Reinf.	TP60x60x0.5563	Pole	39.6%	Pass
89.25 - 85.5	Pole + Reinf.	TP60x60x0.5563	Pole	41.9%	Pass
85.5 - 85.25	Pole + Reinf.	TP60x60x0.6375	Pole	36.9%	Pass
85.25 - 84	Pole + Reinf.	TP60x60x0.6375	Pole	37.6%	Pass
84 - 83.75	Pole + Reinf.	TP60x60x0.525	Pole	45.0%	Pass
83.75 - 82.5	Pole + Reinf.	TP60x60x0.525	Pole	45.8%	Pass
82.5 - 82.25	Pole + Reinf.	TP60x60x0.45	Pole	53.7%	Pass
82.25 - 80	Pole + Reinf.	TP60x60x0.45	Pole	55.4%	Pass
80 - 75	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	45.5%	Pass
75 - 70	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	48.5%	Pass
70 - 65	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	51.6%	Pass
65 - 60	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	54.6%	Pass
60 - 58.5	Pole + Reinf.	TP60x60x0.7	Reinf. 3 Compression	45.9%	Pass
58.5 - 58.25	Pole	TP60x60x0.625	Pole	50.2%	Pass
58.25 - 53.25	Pole	TP60x60x0.625	Pole	53.1%	Pass
53.25 - 48.25	Pole	TP60x60x0.625	Pole	56.0%	Pass
48.25 - 48	Pole + Reinf.	TP60x60x0.775	Pole	45.8%	Pass
48 - 43	Pole + Reinf.	TP60x60x0.775	Pole	48.2%	Pass
43 - 40	Pole + Reinf.	TP60x60x0.775	Pole	49.7%	Pass
40 - 35	Pole + Reinf.	TP60x60x0.775	Pole	52.2%	Pass
35 - 32.08	Pole + Reinf.	TP60x60x0.775	Pole	53.7%	Pass
32.08 - 31.83	Pole + Reinf.	TP60x60x0.9625	Pole	43.4%	Pass
31.83 - 28.75	Pole + Reinf.	TP60x60x0.9625	Pole	44.6%	Pass
28.75 - 28.5	Pole + Reinf.	TP60x60x0.8125	Pole	52.5%	Pass
28.5 - 23.5	Pole + Reinf.	TP60x60x0.8125	Pole	54.9%	Pass
23.5 - 20	Pole + Reinf.	TP60x60x0.8125	Pole	56.6%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.95	Pole	48.2%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.95	Pole	50.3%	Pass
14.75 - 9.75	Pole + Reinf.	TP60x60x0.95	Pole	52.4%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.95	Pole	54.6%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.95	Pole	56.6%	Pass
				Summary	
			Pole	56.6%	Pass
			Reinforcement	54.6%	Pass
			Overall	56.6%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity						
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6
190 - 185	3829	n/a	3829	34.90	n/a	34.90	1.8%						
185 - 180	3829	n/a	3829	34.90	n/a	34.90	4.5%						
180 - 175	6659	n/a	6659	41.97	n/a	41.97	6.1%						
175 - 170	6659	n/a	6659	41.97	n/a	41.97	8.8%						
170 - 165	6659	n/a	6659	41.97	n/a	41.97	13.2%						
165 - 160	6659	n/a	6659	41.97	n/a	41.97	18.7%						
160 - 155	10622	n/a	10622	49.04	n/a	49.04	18.8%						
155 - 150	10622	n/a	10622	49.04	n/a	49.04	23.7%						
150 - 145	10622	n/a	10622	49.04	n/a	49.04	30.5%						
145 - 140	10622	n/a	10622	49.04	n/a	49.04	37.3%						
140 - 135	15908	n/a	15908	56.11	n/a	56.11	34.4%						
135 - 130	15908	n/a	15908	56.11	n/a	56.11	39.9%						
130 - 125	15908	n/a	15908	56.11	n/a	56.11	45.4%						
125 - 120	15908	n/a	15908	56.11	n/a	56.11	51.2%						
120 - 115	22710	n/a	22710	63.18	n/a	63.18	45.6%						
115 - 112.67	22710	n/a	22710	63.18	n/a	63.18	47.8%						
112.67 - 112.42	22710	6834	29544	63.18	18.00	81.18	36.8%					32.9%	
112.42 - 107.42	22710	6834	29544	63.18	18.00	81.18	40.6%					36.3%	
107.42 - 103.33	22710	6834	29544	63.18	18.00	81.18	43.6%					39.0%	
103.33 - 103.08	22710	6834	29544	63.18	18.00	81.18	43.8%				39.2%		
103.08 - 100	22710	6834	29544	63.18	18.00	81.18	46.2%				41.3%		
100 - 95	31217	8400	39617	70.24	18.00	88.24	42.1%				37.2%		
95 - 90	31217	8400	39617	70.24	18.00	88.24	45.5%				40.2%		
90 - 89.5	31217	8400	39617	70.24	18.00	88.24	45.8%				40.5%		
89.5 - 89.25	31217	14691	45908	70.24	31.50	101.74	39.6%				35.1%		38.7%
89.25 - 85.5	31217	14691	45908	70.24	31.50	101.74	41.9%				37.0%		40.9%
85.5 - 85.25	31217	20982	52199	70.24	45.00	115.24	36.9%			36.1%	32.7%		36.1%
85.25 - 84	31217	20982	52199	70.24	45.00	115.24	37.6%			36.7%	33.2%		36.7%
84 - 83.75	31217	12582	43799	70.24	27.00	97.24	45.0%			44.0%			44.0%
83.75 - 82.5	31217	12582	43799	70.24	27.00	97.24	45.8%			44.8%			44.8%
82.5 - 82.25	31217	6291	37508	70.24	13.50	83.74	53.7%			52.5%			
82.25 - 80	31217	6291	37508	70.24	13.50	83.74	55.4%			54.1%			
80 - 75	41363	6291	47654	93.46	13.50	106.96	45.4%			45.5%			
75 - 70	41363	6291	47654	93.46	13.50	106.96	48.4%			48.5%			
70 - 65	41363	6291	47654	93.46	13.50	106.96	51.4%			51.6%			
65 - 60	41363	6291	47654	93.46	13.50	106.96	54.5%			54.6%			
60 - 58.5	51381	6291	57672	116.58	13.50	130.08	44.6%			45.9%			
58.5 - 58.25	51381	n/a	51381	116.58	n/a	116.58	50.2%						
58.25 - 53.25	51381	n/a	51381	116.58	n/a	116.58	53.1%						
53.25 - 48.25	51381	n/a	51381	116.58	n/a	116.58	56.0%						
48.25 - 48	51381	11475	62856	116.58	24.38	140.96	45.8%		42.0%				
48 - 43	51381	11475	62856	116.58	24.38	140.96	48.2%		44.2%				
43 - 40	51381	11475	62856	116.58	24.38	140.96	49.7%		45.6%				
40 - 35	51381	11475	62856	116.58	24.38	140.96	52.2%		47.9%				
35 - 32.08	51381	11475	62856	116.58	24.38	140.96	53.7%		49.2%				
32.08 - 31.83	51381	26521	77901	116.58	56.25	172.83	43.4%	37.9%	39.8%				
31.83 - 28.75	51381	26521	77901	116.58	56.25	172.83	44.6%	39.0%	40.9%				
28.75 - 28.5	51381	15046	66426	116.58	31.88	148.46	52.5%	45.9%					
28.5 - 23.5	51381	15046	66426	116.58	31.88	148.46	54.9%	48.0%					
23.5 - 20	51381	15046	66426	116.58	31.88	148.46	56.6%	49.5%					
20 - 19.75	61271	15046	76317	139.60	31.88	171.48	48.2%	43.2%					
19.75 - 14.75	61271	15046	76317	139.60	31.88	171.48	50.3%	45.1%					
14.75 - 9.75	61271	15046	76317	139.60	31.88	171.48	52.4%	47.0%					
9.75 - 4.75	61271	15046	76317	139.60	31.88	171.48	54.6%	48.9%					
4.75 - 0	61271	15046	76317	139.60	31.88	171.48	56.6%	50.8%					

Note: Section capacity checked in 5 degree increments.

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Reactions		
Mu	39.47	ft-kips
Axial, Pu:	4.75	kips
Shear, Vu:	4.84	kips
Elevation:	180	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	24			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	33			

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

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

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	
Max Bolt directly applied Tu:	2.19	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.031	in	
Min PL "treq" for actual **T w/ Pry**:	0.157	in	
Min PL "t1" for actual **T w/o Pry**:	0.207	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	2.19	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	4.0%	**Pass**	

Rigid
φ*Tn
φTn[(1-(Vu/φVn)^2]^0.5

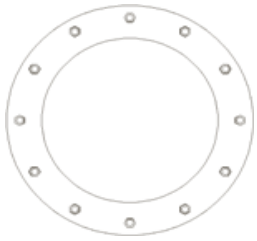
Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress:	32.4	ksi
Compression Plate Stress Ratio:	Rohn/Piroc	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK

Rigid
TIA G
φ*Fy
Comp. Y.L. Length:
13.75

n/a

Stiffener Results	N/A for Rohn / Pirod
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



* 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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Manufacturer:	Pirod

Reactions		
Moment:	39.47	ft-kips
Axial:	4.75	kips
Shear:	4.84	kips
Exterior Flange Run, T+q:	2.19	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 180 feet

Bolt Data			
Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	33	in	

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

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

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	2.2	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	4.0%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	2.6	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Piroc	OK

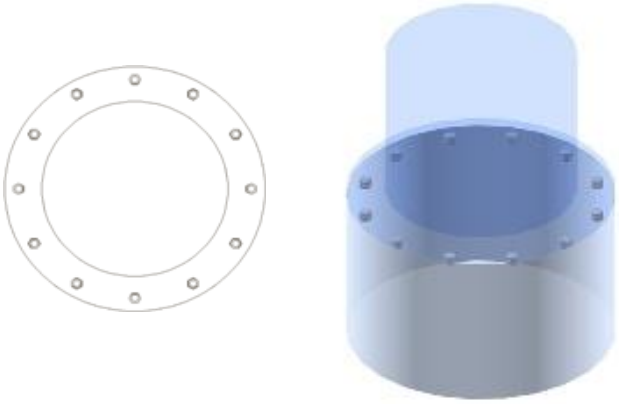
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Reactions		
Mu	233.96	ft-kips
Axial, Pu:	18.06	kips
Shear, Vu:	16.39	kips
Elevation:	160	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	28			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	39			

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

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

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	
Max Bolt directly applied Tu:	9.64	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.017	in	
Min PL "treq" for actual **T w/ Pry**:	0.324	in	
Min PL "t1" for actual **T w/o Pry**:	0.427	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	9.64	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	17.7%	**Pass**	

Rigid
φ*Tn
φTn[(1-(Vu/φVn)^2]^0.5

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress:	32.4	ksi
Compression Plate Stress Ratio:	Rohn/Piroc	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK

Rigid
TIA G
φ*Fy
Comp. Y.L. Length:
15.00

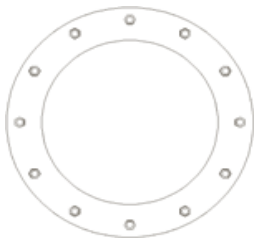
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Manufacturer:	Pirod

Reactions		
Moment:	233.96	ft-kips
Axial:	18.06	kips
Shear:	16.39	kips
Exterior Flange Run, T+q:	9.64	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 160 feet

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	39	in	

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

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

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	9.6	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	17.7%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	10.9	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Piroc	OK

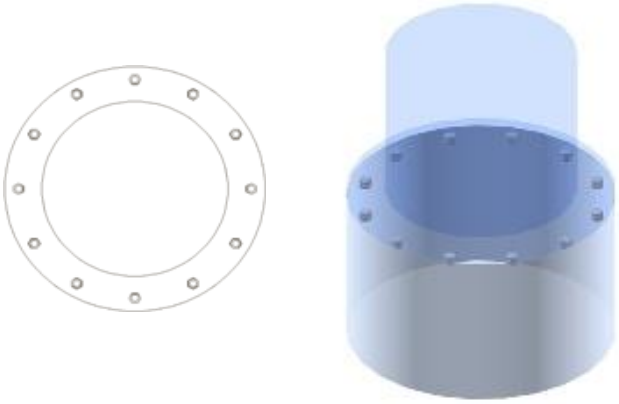
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Reactions		
Mu	639.84	ft-kips
Axial, Pu:	26.28	kips
Shear, Vu:	24.18	kips
Elevation:	140	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	32			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	45			

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

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

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

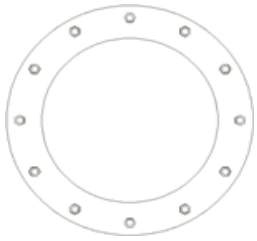
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid: φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.52	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	20.51	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.006	in	
Min PL "treq" for actual **T w/ Pry**:	0.467	in	
Min PL "t1" for actual **T w/o Pry**:	0.617	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	20.51	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	37.6%	**Pass**	

Exterior Flange Plate Results — Flexural Check

Compression Side Plate Stress:	Rohn/Piroc	OK	Rigid: TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Piroc	OK	Comp. Y.L. Length: 16.16
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

n/a

Stiffener Results	N/A for Rohn / Pirod
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



* 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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Manufacturer:	Pirod

Bolt Data

Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	45	in	

Plate Data

Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

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

Pole Data

Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions

Moment:	639.84	ft-kips
Axial:	26.28	kips
Shear:	24.18	kips
Exterior Flange Run, T+q:	20.51	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 140 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	20.5	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	37.6%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	22.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Piroc	OK

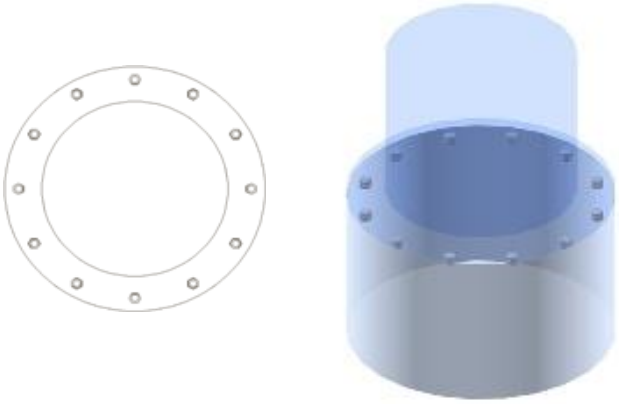
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Reactions		
Mu	1145.32	ft-kips
Axial, Pu:	32.20	kips
Shear, Vu:	26.41	kips
Elevation:	120	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	36			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	51			

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

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

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	
Max Bolt directly applied Tu:	29.05	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.998	in	
Min PL "treq" for actual **T w/ Pry**:	0.551	in	
Min PL "t1" for actual **T w/o Pry**:	0.729	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	29.05	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	53.3%	**Pass**	

Rigid
φ*Tn
φTn[(1-(Vu/φVn)^2]^0.5

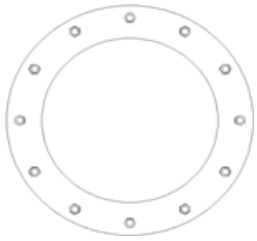
Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress:	32.4	ksi
Compression Plate Stress Ratio:	Rohn/Piroc	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK

Rigid
TIA G
φ*Fy
Comp. Y.L. Length:
17.23

n/a

Stiffener Results	N/A for Rohn / Pirod
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



* 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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Manufacturer:	Pirod

Bolt Data

Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	51	in	

Plate Data

Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

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

Pole Data

Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions

Moment:	1145.32	ft-kips
Axial:	32.20	kips
Shear:	26.41	kips
Exterior Flange Run, T+q:	29.05	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 120 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	29.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	53.3%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	30.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Piroc	OK

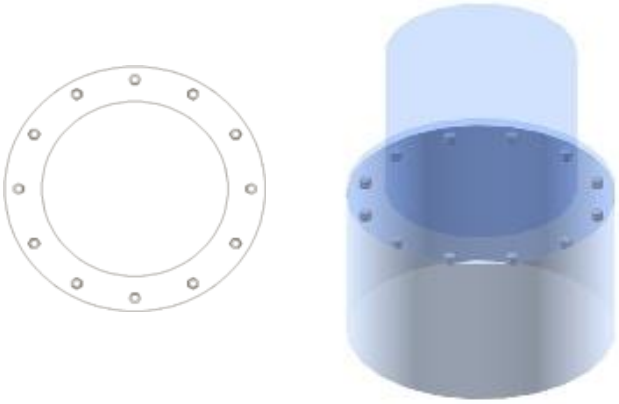
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Reactions		
Mu	1697.41	ft-kips
Axial, Pu:	39.68	kips
Shear, Vu:	28.78	kips
Elevation:	100	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	48			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	57			

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

				Stiffened
Bolt Tension Capacity, φ*Tn, **B1**:	54.54	kips		φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips		φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	28.95	Kips		
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in		
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in		
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in		
T allowable	54.54	kips	<-- B, Stiffened	
Prying Force, q:	0.00	kips	Stiffened	
Total Bolt Tension=Tu+q:	28.95	kips		
Non-Prying Bolt Stress Ratio, Tu/B:	53.1%	**Pass**		

Exterior Flange Plate Results Shear Check Only

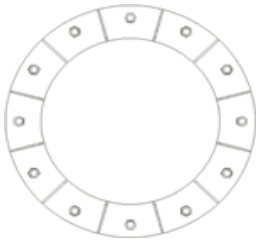
			Stiffened
Compression Side Plate Stress:	Rohn/Piroc	OK	TIA G
Allowable Plate Stress:	19.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Piroc	OK	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

Stiffener Results N/A for Rohn / Pirod

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



* 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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57/ Norfield R*
App #: *421191 Rev. 6*

Manufacturer:	Pirod

Reactions		
Moment:	1697.41	ft-kips
Axial:	39.68	kips
Shear:	28.78	kips
Exterior Flange Run, T+q:	28.95	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 100 feet

Bolt Data			
Qty:	48		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	57	in	

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.88	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	29.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty	54.5	Kips
Bolt Stress Ratio:	53.1%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	30.6	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Piroc	OK

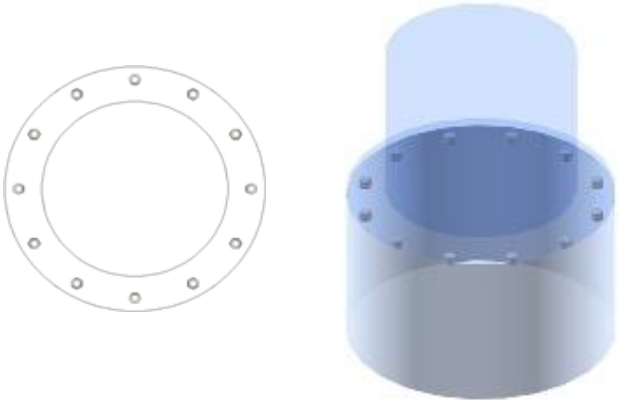
n/a

Stiffener Results N/A for Rohn / Pirod

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



* 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

BU: 829046
WO: 1568944

Done By: PCN
Checked By:
Date: 5/8/2018

Jump Plate Reinforcement Check

Elevation: 80ft

DETERMINE MAXIMUM FORCES ON JUMP PLATE

Jump Plate Properties

$N := 3$

$BC := 63in$

$Ag := 4.5in^2$

$r_x := 0.2887in$

Flange Bolt Poperties

$N_{fb} := 64$

$Dia_{fb} := 1.25in$

$BC_{fb} := 50in$

$Ag_{fb} := 1.23in^2$

Reactions

$M := 2300.01kip \cdot ft$

$P := 48.99kip$

$V := 31.28kip$

Combined Section Properties

$$I_{fb} := \frac{N_{fb} \cdot BC_{fb}^2 \cdot Ag_{fb}}{8} = 24600 \cdot in^4$$

$$I_{bs} := \frac{N \cdot BC^2 \cdot Ag}{8} = 6697.69 \cdot in^4$$

$$I_{tot} := I_{fb} + I_{bs} = 31297.69 \cdot in^4$$

$$Ag_{tot} := N \cdot Ag + N_{fb} \cdot Ag_{fb} = 92.22 \cdot in^2$$

Division of Forces

Jump Plates

$$M_s := M \cdot \left(\frac{I_{bs}}{I_{tot}} \right) = 492.2 \cdot kip \cdot ft$$

$$P_s := P \cdot \left(\frac{N \cdot Ag}{Ag_{tot}} \right) = 7.17 \cdot kip$$

$$V_s := 0kip$$

Flange Bolts

$$M_b := M \cdot \left(\frac{I_{fb}}{I_{tot}} \right) = 1807.81 \cdot kip \cdot ft$$

$$P_b := P \cdot \left(\frac{N_{fb} \cdot Ag_{fb}}{Ag_{tot}} \right) = 41.82 \cdot kip$$

$$V_b := V = 31.28 \cdot kip$$

Flange bolts to take full shear load

Maximum Axial Forces in Single Jump Plate

$$C := \frac{BC}{2} = 31.5 \cdot in$$

$$P_{Comp} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag + \frac{P_s}{N} = 127.39 \cdot kip$$

$$P_{Tens} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag - \frac{P_s}{N} = 122.61 \cdot kip$$

CHECK BOLT CONNECTION TO TOWER

AJAX Bolt Properties per ENG-STD-10148 (M20 Bolt with Aero-HS Sleeve)

$N_b := 6$ $Dia := 0.7874in$ $Fu_{bolt} := 120ksi$ $Ag_b := 0.4869in^2$ $\phi := 0.75$

$t_{shaft} := 0.375in$ $F_{yshaft} := 42ksi$ $F_{ushaft} := 60ksi$

Bolt Shear Capacity

$$V_{max} := \frac{P_{Comp}}{N_b} = 21.23 \cdot kip$$

$\phi R_{nv} := 37kip$

$$\text{\% Capacity} = \frac{V_{max}}{\phi R_{nv}} = 57.38 \cdot \%$$

Tension Check (bolts above neutral axis) AISC 13th Edition, pg 7-12

$ecc := 1.5in$

BoltType :=

$n' := 3$ number of bolts above neutral axis

$d_m := 9in$ moment arm between resultant tensile and resultant compressive force

$$r_{ut} := \frac{P_{Comp} \cdot ecc}{n' \cdot d_m} = 7.08 \cdot kip$$ Tension force due to eccentric load

$$\phi R_{nt} := \begin{cases} \phi R_{ntFB} & \text{if BoltType} = \text{"FORGBolt"} \\ 32.9\,kip & \text{otherwise} \end{cases}$$

$$\phi R_{nt} = 32.9 \cdot kip$$

% Capacity = $\dfrac{r_{ut}}{\phi R_{nt}} = 21.51 \cdot \%$

Combined Shear and Tension Check — TIA-222-G, 4.9.6.4

$$\left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 = 0.38$$

$$\text{check} := \begin{cases} \text{"OK"} & \text{if } \left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 \le 1 \\ \text{"Not Good"} & \text{otherwise} \end{cases}$$

check = "OK" % Capacity = $\dfrac{\text{Combined}}{1} = 37.56 \cdot \%$

Shaft Bearing Capacity — TIA-222-G, 4.9.6.2

$L_c := 1.8125in$ clear distance from edge of hole to edge of adjacent hole

$$0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} = 43.4 \cdot kip$$

$$2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} = 42.52 \cdot kip$$

$$\phi R_{nshaft} := \begin{cases} 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} & \text{if } 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} \le 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} \\ 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} & \text{otherwise} \end{cases}$$

$\phi R_{nshaft} = 42.52 \cdot kip$

% Capacity = $\frac{V_{max}}{\phi R_{nshaft}} = 49.94 \cdot \%$

CHECK JUMP PLATE CAPACITY

Compression Check — AISC, part 16, ch. E

$L := 20.625in$ $K := 0.8$ $F_y := 65ksi$ $F_u := 80ksi$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L}{r_x}\right)^2} = 87.62 \cdot ksi$$

$$\frac{K \cdot L}{r_x} = 57.15 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_y}} = 99.49 \quad \therefore \quad F_{cr} := 0.658^{\frac{F_y}{F_e}} \cdot F_y = 47.65 \cdot ksi$$

$\phi P_n := 0.9 \cdot F_{cr} \cdot Ag = 192.99 \cdot kip$

% Capacity = $\frac{P_{Comp}}{\phi P_n} = 66.01 \cdot \%$

Tension Check — AISC, part 16, ch. D

Gross Section Yield

$\phi P_t := 0.90 \cdot F_y \cdot Ag = 263.25 \cdot kip$

% Capacity = $\frac{P_{Tens}}{\phi P_t} = 46.58 \cdot \%$

Net Section Fracture

$BH := 1.1875in$ $T := 1in$

$$A_n := Ag - \left(BH + \frac{1}{16}in\right) \cdot T = 3.25 \cdot in^2$$

$$A_e := \min\left(A_n, 0.85 \cdot Ag\right) = 3.25 \cdot in^2$$

$$\phi F_n := 0.75 \cdot F_u \cdot A_e = 195 \cdot kip$$

% Capacity = $\frac{P_{Tens}}{\phi F_n} = 62.88 \cdot \%$

ANCHOR ROD ANALYSIS

Anchor Rod Information

TIA Code	G
eta Factor	0.5
Number of Bolt Circles	2
Base Plate Type	Circular

Reactions

Moment	1807.81	kip-ft
Axial	41.82	kip
Shear	31.28	kip

	1st BC	2nd BC	
Anchor Rod Quantity	32	32	
Anchor Rod Diameter	1.25	1.25	in
Anchor Rod Material	A325	A325	ksi
Bolt Circle Diameter	47	53	in
Base Plate or Bracketed Connection?		Base Plate	

The tower shaft and flange plate bolts are passing, thus the flange plate is passing because the tower is PiRod.

Bolt #	Orientation of Anchor Bolts (Degrees)	
1	0.0	0
2	11.3	11.3
3	22.5	22.5
4	33.8	33.8
5	45.0	45
6	56.3	56.3
7	67.5	67.5
8	78.8	78.8
9	90.0	90.0
10	101.3	101.3
11	112.5	112.5
12	123.8	123.8
13	135.0	135.0
14	146.3	146.3
15	157.5	157.5
16	168.8	168.8
17	180.0	180.0
18	191.3	191.3
19	202.5	202.5
20	213.8	213.8
21	225.0	225.0
22	236.3	236.3
23	**247.5**	247.5
24	*258.8*	258.8
25	270.0	270.0
26	281.3	281.3
27	**292.5**	292.5
28	*303.8*	303.8
29	315.0	315.0
30	326.3	326.3
31	337.5	337.5
32	348.8	348.8

Anchor Rod Results

	1st BC	2nd BC	
Moment on Bolt Group	795.8	1012.0	kip-ft
Axial on Bolt Group	41.8	0.0	kip
Shear on Bolt Group	31.3	0.0	kip
Combined Load per Anchor Rod	28.7	28.6	kip
Anchor Rod Capacity	81.4	81.4	kip
Max Stress Ratio	**35.2%**	**35.2%**	

(it is assumed that all Axial and Shear loads will go to the original anchor rods)

BU: 829046
WO: 1568944

Done By: PCN
Checked By:
Date: 5/8/2018

Jump Plate Reinforcement Check

Elevation: 60ft

DETERMINE MAXIMUM FORCES ON JUMP PLATE

Jump Plate Properties

$N := 3$

$BC := 63.25in$

$Ag := 8.125in^2$

$r_x := 0.3608in$

Flange Bolt Poperties

$N_{fb} := 64$

$Dia_{fb} := 1.25in$

$BC_{fb} := 50in$

$Ag_{fb} := 1.23in^2$

Reactions

$M := 2957.95kip \cdot ft$

$P := 60.12kip$

$V := 33.82kip$

Combined Section Properties

$$I_{fb} := \frac{N_{fb} \cdot BC_{fb}^2 \cdot Ag_{fb}}{8} = 24600 \cdot in^4$$

$$I_{bs} := \frac{N \cdot BC^2 \cdot Ag}{8} = 12189.21 \cdot in^4$$

$$I_{tot} := I_{fb} + I_{bs} = 36789.21 \cdot in^4$$

$$Ag_{tot} := N \cdot Ag + N_{fb} \cdot Ag_{fb} = 103.09 \cdot in^2$$

Division of Forces

Jump Plates

$$M_s := M \cdot \left(\frac{I_{bs}}{I_{tot}} \right) = 980.05 \cdot kip \cdot ft$$

$$P_s := P \cdot \left(\frac{N \cdot Ag}{Ag_{tot}} \right) = 14.21 \cdot kip$$

$V_s := 0kip$

Flange Bolts

$$M_b := M \cdot \left(\frac{I_{fb}}{I_{tot}} \right) = 1977.9 \cdot kip \cdot ft$$

$$P_b := P \cdot \left(\frac{N_{fb} \cdot Ag_{fb}}{Ag_{tot}} \right) = 45.91 \cdot kip$$

$V_b := V = 33.82 \cdot kip$

Flange bolts to take full shear load

Maximum Axial Forces in Single Jump Plate

$$C := \frac{BC}{2} = 31.63 \cdot in$$

$$P_{Comp} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag + \frac{P_s}{N} = 252.65 \cdot kip$$

$$P_{Tens} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag - \frac{P_s}{N} = 243.18 \cdot kip$$

CHECK BOLT CONNECTION TO TOWER

AJAX Bolt Properties per ENG-STD-10148 (M20 Bolt with Aero-HS Sleeve)

$N_b := 11$ $Dia := 0.7874in$ $Fu_{bolt} := 120ksi$ $Ag_b := 0.4869in^2$ $\phi := 0.75$

$t_{shaft} := 0.5in$ $F_{yshaft} := 42ksi$ $F_{ushaft} := 60ksi$

Bolt Shear Capacity

$$V_{max} := \frac{P_{Comp}}{N_b} = 22.97 \cdot kip$$

$\phi R_{nv} := 37kip$

$$\text{\% Capacity} = \frac{V_{max}}{\phi R_{nv}} = 62.08 \cdot \%$$

Tension Check (bolts above neutral axis) AISC 13th Edition, pg 7-12

$ecc := 1.625in$

BoltType :=

$n' := 5$ number of bolts above neutral axis

$d_m := 15in$ moment arm between resultant tensile and resultant compressive force

$$r_{ut} := \frac{P_{Comp} \cdot ecc}{n' \cdot d_m} = 5.47 \cdot kip$$ Tension force due to eccentric load

$$\phi R_{nt} := \begin{cases} \phi R_{ntFB} & \text{if BoltType} = \text{"FORGBolt"} \\ 32.9\,kip & \text{otherwise} \end{cases}$$

$$\phi R_{nt} = 32.9\cdot kip$$

% Capacity = $\dfrac{r_{ut}}{\phi R_{nt}} = 16.64\cdot\%$

Combined Shear and Tension Check — TIA-222-G, 4.9.6.4

$$\left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 = 0.41$$

$$\text{check} := \begin{cases} \text{"OK"} & \text{if } \left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 \le 1 \\ \text{"Not Good"} & \text{otherwise} \end{cases}$$

check = "OK" % Capacity = $\dfrac{\text{Combined}}{1} = 41.3\cdot\%$

Shaft Bearing Capacity — TIA-222-G, 4.9.6.2

$L_c := 1.8125in$ clear distance from edge of hole to edge of adjacent hole

$$0.80\cdot 1.2\cdot\left(L_c + \frac{Dia}{4}\right)\cdot t_{shaft}\cdot F_{ushaft} = 57.87\cdot kip$$

$$2.4\cdot Dia\cdot t_{shaft}\cdot F_{ushaft} = 56.69\cdot kip$$

$$\phi R_{nshaft} := \begin{cases} 2.4\cdot Dia\cdot t_{shaft}\cdot F_{ushaft} & \text{if } 2.4\cdot Dia\cdot t_{shaft}\cdot F_{ushaft} \le 0.80\cdot 1.2\cdot\left(L_c + \frac{Dia}{4}\right)\cdot t_{shaft}\cdot F_{ushaft} \\ 0.80\cdot 1.2\cdot\left(L_c + \frac{Dia}{4}\right)\cdot t_{shaft}\cdot F_{ushaft} & \text{otherwise} \end{cases}$$

$\phi R_{nshaft} = 56.69 \cdot kip$

% Capacity = $\frac{V_{max}}{\phi R_{nshaft}} = 40.51 \cdot \%$

CHECK JUMP PLATE CAPACITY

Compression Check — AISC, part 16, ch. E

$L := 19.25in$ $K := 0.8$ $F_y := 65ksi$ $F_u := 80ksi$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L}{r_x}\right)^2} = 157.1 \cdot ksi$$

$$\frac{K \cdot L}{r_x} = 42.68 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_y}} = 99.49 \quad \therefore \quad F_{cr} := 0.658^{\frac{F_y}{F_e}} \cdot F_y = 54.66 \cdot ksi$$

$\phi P_n := 0.9 \cdot F_{cr} \cdot Ag = 399.74 \cdot kip$

% Capacity = $\frac{P_{Comp}}{\phi P_n} = 63.21 \cdot \%$

Tension Check — AISC, part 16, ch. D

Gross Section Yield

$\phi P_t := 0.90 \cdot F_y \cdot Ag = 475.31 \cdot kip$

% Capacity = $\frac{P_{Tens}}{\phi P_t} = 51.16 \cdot \%$

Net Section Fracture

$BH := 1.1875in$ $T := 1in$

$$A_n := Ag - \left(BH + \frac{1}{16}in\right) \cdot T = 6.875 \cdot in^2$$

$$A_e := \min\left(A_n, 0.85 \cdot Ag\right) = 6.87 \cdot in^2$$

$$\phi F_n := 0.75 \cdot F_u \cdot A_e = 412.5 \cdot kip$$

% Capacity = $\frac{P_{Tens}}{\phi F_n} = 58.95 \cdot \%$

ANCHOR ROD ANALYSIS

Anchor Rod Information

TIA Code	G
eta Factor	0.5
Number of Bolt Circles	2
Base Plate Type	Circular

Reactions

Moment	1977.9	kip-ft
Axial	45.91	kip
Shear	33.82	kip

	1st BC	2nd BC	
Anchor Rod Quantity	32	32	
Anchor Rod Diameter	1.25	1.25	in
Anchor Rod Material	A325	A325	ksi
Bolt Circle Diameter	47	53	in
Base Plate or Bracketed Connection?		Base Plate	

The tower shaft and flange plate bolts are passing, thus the flange plate is passing because the tower is PiRod.

Bolt #	Orientation of Anchor Bolts (Degrees)	
1	0.0	0
2	11.3	11.3
3	22.5	22.5
4	33.8	33.8
5	45.0	45
6	56.3	56.3
7	67.5	67.5
8	78.8	78.8
9	90.0	90.0
10	101.3	101.3
11	112.5	112.5
12	123.8	123.8
13	135.0	135.0
14	146.3	146.3
15	157.5	157.5
16	168.8	168.8
17	180.0	180.0
18	191.3	191.3
19	202.5	202.5
20	213.8	213.8
21	225.0	225.0
22	236.3	236.3
23	**247.5**	247.5
24	*258.8*	258.8
25	270.0	270.0
26	281.3	281.3
27	**292.5**	292.5
28	*303.8*	303.8
29	315.0	315.0
30	326.3	326.3
31	337.5	337.5
32	348.8	348.8

Anchor Rod Results

	1st BC	2nd BC	
Moment on Bolt Group	870.7	1107.2	kip-ft
Axial on Bolt Group	45.9	0.0	kip
Shear on Bolt Group	33.8	0.0	kip
Combined Load per Anchor Rod	31.3	31.3	kip
Anchor Rod Capacity	81.4	81.4	kip
Max Stress Ratio	**38.5%**	**38.5%**	

(it is assumed that all Axial and Shear loads will go to the original anchor rods)

BU: 829046
WO: 1568944

Done By: PCN
Checked By:
Date: 5/8/2018

Jump Plate Reinforcement Check

Elevation: 40ft

DETERMINE MAXIMUM FORCES ON JUMP PLATE

Jump Plate Properties

$N := 6$

$BC := 63in$

$Ag := 6in^2$

$r_x := 0.2887in$

Flange Bolt Poperties

$N_{fb} := 64$

$Dia_{fb} := 1.25in$

$BC_{fb} := 50in$

$Ag_{fb} := 1.23in^2$

Reactions

$M := 3661.41kip \cdot ft$

$P := 73.43kip$

$V := 35.97kip$

Combined Section Properties

$$I_{fb} := \frac{N_{fb} \cdot BC_{fb}^2 \cdot Ag_{fb}}{8} = 24600 \cdot in^4$$

$$I_{bs} := \frac{N \cdot BC^2 \cdot Ag}{8} = 17860.5 \cdot in^4$$

$$I_{tot} := I_{fb} + I_{bs} = 42460.5 \cdot in^4$$

$$Ag_{tot} := N \cdot Ag + N_{fb} \cdot Ag_{fb} = 114.72 \cdot in^2$$

Division of Forces

Jump Plates

$$M_s := M \cdot \left(\frac{I_{bs}}{I_{tot}} \right) = 1540.13 \cdot kip \cdot ft$$

$$P_s := P \cdot \left(\frac{N \cdot Ag}{Ag_{tot}} \right) = 23.04 \cdot kip$$

$$V_s := 0kip$$

Flange Bolts

$$M_b := M \cdot \left(\frac{I_{fb}}{I_{tot}} \right) = 2121.28 \cdot kip \cdot ft$$

$$P_b := P \cdot \left(\frac{N_{fb} \cdot Ag_{fb}}{Ag_{tot}} \right) = 50.39 \cdot kip$$

$$V_b := V = 35.97 \cdot kip$$

Flange bolts to take full shear load

Maximum Axial Forces in Single Jump Plate

$$C := \frac{BC}{2} = 31.5 \cdot in$$

$$P_{Comp} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag + \frac{P_s}{N} = 199.41 \cdot kip$$

$$P_{Tens} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag - \frac{P_s}{N} = 191.73 \cdot kip$$

CHECK BOLT CONNECTION TO TOWER

AJAX Bolt Properties per ENG-STD-10148 (M20 Bolt with Aero-HS Sleeve)

$N_b := 8$ $Dia := 0.7874in$ $Fu_{bolt} := 120ksi$ $Ag_b := 0.4869in^2$ $\phi := 0.75$

$t_{shaft} := 0.625in$ $F_{yshaft} := 42ksi$ $F_{ushaft} := 60ksi$

Bolt Shear Capacity

$$V_{max} := \frac{P_{Comp}}{N_b} = 24.93 \cdot kip$$

$\phi R_{nv} := 37kip$

$$\text{\% Capacity} = \frac{V_{max}}{\phi R_{nv}} = 67.37 \cdot \%$$

Tension Check (bolts above neutral axis) AISC 13th Edition, pg 7-12

$ecc := 1.5in$

BoltType :=

$n' := 4$ number of bolts above neutral axis

$d_m := 12in$ moment arm between resultant tensile and resultant compressive force

$$r_{ut} := \frac{P_{Comp} \cdot ecc}{n' \cdot d_m} = 6.23 \cdot kip$$ Tension force due to eccentric load

$$\phi R_{nt} := \begin{cases} \phi R_{ntFB} & \text{if BoltType} = \text{"FORGBolt"} \\ 32.9\,kip & \text{otherwise} \end{cases}$$

$$\phi R_{nt} = 32.9 \cdot kip$$

% Capacity = $\frac{r_{ut}}{\phi R_{nt}} = 18.94 \cdot \%$

Combined Shear and Tension Check — TIA-222-G, 4.9.6.4

$$\left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 = 0.49$$

$$check := \begin{cases} \text{"OK"} & \text{if } \left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 \le 1 \\ \text{"Not Good"} & \text{otherwise} \end{cases}$$

check = "OK"

% Capacity = $\frac{\text{Combined}}{1} = 48.97 \cdot \%$

Shaft Bearing Capacity — TIA-222-G, 4.9.6.2

$L_c := 1.8125in$ clear distance from edge of hole to edge of adjacent hole

$$0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} = 72.34 \cdot kip$$

$$2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} = 70.87 \cdot kip$$

$$\phi R_{nshaft} := \begin{cases} 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} & \text{if } 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} \le 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} \\ 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} & \text{otherwise} \end{cases}$$

$\phi R_{nshaft} = 70.87 \cdot kip$

% Capacity = $\frac{V_{max}}{\phi R_{nshaft}} = 35.17 \cdot \%$

CHECK JUMP PLATE CAPACITY

Compression Check — AISC, part 16, ch. E

$L := 16.375in$ $K := 0.8$ $F_y := 65ksi$ $F_u := 80ksi$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L}{r_x}\right)^2} = 139.01 \cdot ksi$$

$$\frac{K \cdot L}{r_x} = 45.38 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_y}} = 99.49 \quad \therefore \quad F_{cr} := 0.658^{\frac{F_y}{F_e}} \cdot F_y = 53.45 \cdot ksi$$

$\phi P_n := 0.9 \cdot F_{cr} \cdot Ag = 288.61 \cdot kip$

% Capacity = $\frac{P_{Comp}}{\phi P_n} = 69.09 \cdot \%$

Tension Check — AISC, part 16, ch. D

Gross Section Yield

$\phi P_t := 0.90 \cdot F_y \cdot Ag = 351 \cdot kip$

% Capacity = $\frac{P_{Tens}}{\phi P_t} = 54.62 \cdot \%$

Net Section Fracture

$BH := 1.1875in$ $T := 1in$

$$A_n := Ag - \left(BH + \frac{1}{16}in\right) \cdot T = 4.75 \cdot in^2$$

$$A_e := \min\left(A_n, 0.85 \cdot Ag\right) = 4.75 \cdot in^2$$

$$\phi F_n := 0.75 \cdot F_u \cdot A_e = 285 \cdot kip$$

% Capacity = $\frac{P_{Tens}}{\phi F_n} = 67.27 \cdot \%$

ANCHOR ROD ANALYSIS

Anchor Rod Information

TIA Code	G
eta Factor	0.5
Number of Bolt Circles	2
Base Plate Type	Circular

Reactions

Moment	2121.28	kip-ft
Axial	50.39	kip
Shear	35.97	kip

	1st BC	2nd BC	
Anchor Rod Quantity	32	32	
Anchor Rod Diameter	1.25	1.25	in
Anchor Rod Material	A325	A325	ksi
Bolt Circle Diameter	47	53	in
Base Plate or Bracketed Connection?		Base Plate	

The tower shaft and flange plate bolts are passing, thus the flange plate is passing because the tower is PiRod.

Bolt #	Orientation of Anchor Bolts (Degrees)	
1	0.0	0
2	11.3	11.3
3	22.5	22.5
4	33.8	33.8
5	45.0	45
6	56.3	56.3
7	67.5	67.5
8	78.8	78.8
9	90.0	90.0
10	101.3	101.3
11	112.5	112.5
12	123.8	123.8
13	135.0	135.0
14	146.3	146.3
15	157.5	157.5
16	168.8	168.8
17	180.0	180.0
18	191.3	191.3
19	202.5	202.5
20	213.8	213.8
21	225.0	225.0
22	236.3	236.3
23	**247.5**	247.5
24	*258.8*	258.8
25	270.0	270.0
26	281.3	281.3
27	**292.5**	292.5
28	*303.8*	303.8
29	315.0	315.0
30	326.3	326.3
31	337.5	337.5
32	348.8	348.8

Anchor Rod Results

	1st BC	2nd BC	
Moment on Bolt Group	933.8	1187.5	kip-ft
Axial on Bolt Group	50.4	0.0	kip
Shear on Bolt Group	36.0	0.0	kip
Combined Load per Anchor Rod	33.6	33.6	kip
Anchor Rod Capacity	81.4	81.4	kip
Max Stress Ratio	**41.3%**	**41.3%**	

(it is assumed that all Axial and Shear loads will go to the original anchor rods)

BU: 829046
WO: 1568944

Done By: PCN
Checked By:
Date: 5/8/2018

Jump Plate Reinforcement Check

Elevation: 20ft

DETERMINE MAXIMUM FORCES ON JUMP PLATE

Jump Plate Properties

$N := 6$

$BC := 63.25in$

$Ag := 8.125in^2$

$r_x := .3608in$

Flange Bolt Poperties

$N_{fb} := 64$

$Dia_{fb} := 1.25in$

$BC_{fb} := 50in$

$Ag_{fb} := 1.23in^2$

Reactions

$M := 4411.31kip \cdot ft$

$P := 89.21kip$

$V := 39.96kip$

Combined Section Properties

$$I_{fb} := \frac{N_{fb} \cdot BC_{fb}^2 \cdot Ag_{fb}}{8} = 24600 \cdot in^4$$

$$I_{bs} := \frac{N \cdot BC^2 \cdot Ag}{8} = 24378.43 \cdot in^4$$

$$I_{tot} := I_{fb} + I_{bs} = 48978.43 \cdot in^4$$

$$Ag_{tot} := N \cdot Ag + N_{fb} \cdot Ag_{fb} = 127.47 \cdot in^2$$

Division of Forces

Jump Plates

$$M_s := M \cdot \left(\frac{I_{bs}}{I_{tot}} \right) = 2195.68 \cdot kip \cdot ft$$

$$P_s := P \cdot \left(\frac{N \cdot Ag}{Ag_{tot}} \right) = 34.12 \cdot kip$$

$$V_s := 0kip$$

Flange Bolts

$$M_b := M \cdot \left(\frac{I_{fb}}{I_{tot}} \right) = 2215.63 \cdot kip \cdot ft$$

$$P_b := P \cdot \left(\frac{N_{fb} \cdot Ag_{fb}}{Ag_{tot}} \right) = 55.09 \cdot kip$$

$$V_b := V = 39.96 \cdot kip$$

Flange bolts to take full shear load

Maximum Axial Forces in Single Jump Plate

$$C := \frac{BC}{2} = 31.63 \cdot in$$

$$P_{Comp} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag + \frac{P_s}{N} = 283.4 \cdot kip$$

$$P_{Tens} := \frac{M_s \cdot C}{I_{bs}} \cdot Ag - \frac{P_s}{N} = 272.03 \cdot kip$$

CHECK BOLT CONNECTION TO TOWER

AJAX Bolt Properties per ENG-STD-10148 (M20 Bolt with Aero-HS Sleeve)

$N_b := 11$ $Dia := 0.7874in$ $Fu_{bolt} := 120ksi$ $Ag_b := 0.4869in^2$ $\phi := 0.75$

$t_{shaft} := 0.625in$ $F_{yshaft} := 42ksi$ $F_{ushaft} := 60ksi$

Bolt Shear Capacity

$$V_{max} := \frac{P_{Comp}}{N_b} = 25.76 \cdot kip$$

$\phi R_{nv} := 37kip$

$$\text{\% Capacity} = \frac{V_{max}}{\phi R_{nv}} = 69.63 \cdot \%$$

Tension Check (bolts above neutral axis) AISC 13th Edition, pg 7-12

$ecc := 1.625in$

BoltType :=

$n' := 5$ number of bolts above neutral axis

$d_m := 15in$ moment arm between resultant tensile and resultant compressive force

$$r_{ut} := \frac{P_{Comp} \cdot ecc}{n' \cdot d_m} = 6.14 \cdot kip$$ Tension force due to eccentric load

$$\phi R_{nt} := \begin{cases} \phi R_{ntFB} & \text{if BoltType} = \text{"FORGBolt"} \\ 32.9\,kip & \text{otherwise} \end{cases}$$

$$\phi R_{nt} = 32.9 \cdot kip$$

% Capacity = $\dfrac{r_{ut}}{\phi R_{nt}} = 18.66 \cdot \%$

Combined Shear and Tension Check — TIA-222-G, 4.9.6.4

$$\left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 = 0.52$$

$$\text{check} := \begin{cases} \text{"OK"} & \text{if } \left(\frac{V_{max}}{\phi R_{nv}}\right)^2 + \left(\frac{r_{ut}}{\phi R_{nt}}\right)^2 \le 1 \\ \text{"Not Good"} & \text{otherwise} \end{cases}$$

check = "OK" % Capacity = $\dfrac{\text{Combined}}{1} = 51.97 \cdot \%$

Shaft Bearing Capacity — TIA-222-G, 4.9.6.2

$L_c := 1.8125in$ clear distance from edge of hole to edge of adjacent hole

$$0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} = 72.34 \cdot kip$$

$$2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} = 70.87 \cdot kip$$

$$\phi R_{nshaft} := \begin{cases} 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} & \text{if } 2.4 \cdot Dia \cdot t_{shaft} \cdot F_{ushaft} \le 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} \\ 0.80 \cdot 1.2 \cdot \left(L_c + \frac{Dia}{4}\right) \cdot t_{shaft} \cdot F_{ushaft} & \text{otherwise} \end{cases}$$

$\phi R_{nshaft} = 70.87 \cdot kip$

% Capacity = $\frac{V_{max}}{\phi R_{nshaft}} = 36.36 \cdot \%$

CHECK JUMP PLATE CAPACITY

Compression Check — AISC, part 16, ch. E

$L := 19.25in$ $K := 0.8$ $F_y := 65ksi$ $F_u := 80ksi$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L}{r_x}\right)^2} = 157.1 \cdot ksi$$

$$\frac{K \cdot L}{r_x} = 42.68 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_y}} = 99.49 \quad \therefore \quad F_{cr} := 0.658^{\frac{F_y}{F_e}} \cdot F_y = 54.66 \cdot ksi$$

$\phi P_n := 0.9 \cdot F_{cr} \cdot Ag = 399.74 \cdot kip$

% Capacity = $\frac{P_{Comp}}{\phi P_n} = 70.9 \cdot \%$

Tension Check — AISC, part 16, ch. D

Gross Section Yield

$\phi P_t := 0.90 \cdot F_y \cdot Ag = 475.31 \cdot kip$

% Capacity = $\frac{P_{Tens}}{\phi P_t} = 57.23 \cdot \%$

Net Section Fracture

$BH := 1.1875in$ $T := 1in$

$$A_n := Ag - \left(BH + \frac{1}{16}in\right) \cdot T = 6.875 \cdot in^2$$

$$A_e := \min\left(A_n, 0.85 \cdot Ag\right) = 6.87 \cdot in^2$$

$$\phi F_n := 0.75 \cdot F_u \cdot A_e = 412.5 \cdot kip$$

% Capacity = $\frac{P_{Tens}}{\phi F_n} = 65.95 \cdot \%$

ANCHOR ROD ANALYSIS

Anchor Rod Information

TIA Code	G
eta Factor	0.5
Number of Bolt Circles	2
Base Plate Type	Circular

Reactions

Moment	2215.63	kip-ft
Axial	55.09	kip
Shear	39.96	kip

	1st BC	2nd BC	
Anchor Rod Quantity	32	32	
Anchor Rod Diameter	1.25	1.25	in
Anchor Rod Material	A325	A325	ksi
Bolt Circle Diameter	47	53	in
Base Plate or Bracketed Connection?		Base Plate	

The tower shaft and flange plate bolts are passing, thus the flange plate is passing because the tower is PiRod.

Bolt #	Orientation of Anchor Bolts (Degrees)	
1	0.0	0
2	11.3	11.3
3	22.5	22.5
4	33.8	33.8
5	45.0	45
6	56.3	56.3
7	67.5	67.5
8	78.8	78.8
9	90.0	90.0
10	101.3	101.3
11	112.5	112.5
12	123.8	123.8
13	135.0	135.0
14	146.3	146.3
15	157.5	157.5
16	168.8	168.8
17	180.0	180.0
18	191.3	191.3
19	202.5	202.5
20	213.8	213.8
21	225.0	225.0
22	236.3	236.3
23	**247.5**	247.5
24	*258.8*	258.8
25	270.0	270.0
26	281.3	281.3
27	**292.5**	292.5
28	*303.8*	303.8
29	315.0	315.0
30	326.3	326.3
31	337.5	337.5
32	348.8	348.8

Anchor Rod Results

	1st BC	2nd BC	
Moment on Bolt Group	975.4	1240.3	kip-ft
Axial on Bolt Group	55.1	0.0	kip
Shear on Bolt Group	40.0	0.0	kip
Combined Load per Anchor Rod	35.3	35.1	kip
Anchor Rod Capacity	81.4	81.4	kip
Max Stress Ratio	**43.4%**	**43.1%**	

(it is assumed that all Axial and Shear loads will go to the original anchor rods)

ANCHOR ROD ANALYSIS

Anchor Rod Information

TIA Code	G
eta Factor	0.5
Number of Bolt Circles	3
Base Plate Type	Circular

Reactions

Moment	5200.77	kip-ft
Axial	107.07	kip
Shear	39.96	kip

	1st BC	2nd BC	3rd BC	
Anchor Rod Quantity	26	8	26	
Anchor Rod Diameter	1.25	2.25	1.25	in
Anchor Rod Material	F1554 GR 105	F1554 GR 105	F1554 GR 105	ksi
Bolt Circle Diameter	67	76	67	in
Base Plate or Bracketed Connection?		Bracket*	Base Plate	

The tower shaft and base plate bolts are passing, thus the base plate is passing because the tower is PiRod.

Bolt #	Orientation of Anchor Bolts (Degrees)		
1	0.0	10.35	6.9
2	13.8	45	20.75
3	27.7	93.5	34.6
4	41.5	135	48.45
5	55.4	183.5	62.3
6	69.2	225	76.15
7	83.1	273.5	90
8	96.9	315	103.85
9	110.8		117.7
10	124.6		131.6
11	138.5		145.4
12	152.3		159.3
13	166.2		173.1
14	180.0		186.9
15	193.8		200.8
16	207.7		214.6
17	221.5		228.5
18	235.4		242.3
19	249.2		256.2
20	263.1		270.0
21	276.9		283.9
22	290.8		297.7
23	304.6		311.6
24	318.5		325.4
25	332.3		339.3
26	346.2		353.1

Anchor Rod Results

	1st BC	2nd BC	3rd BC	
Moment on Bolt Group	1602.9	1995.0	1602.9	kip-ft
Axial on Bolt Group	107.1	0.0	0.0	kip
Shear on Bolt Group	40.0	0.0	0.0	kip
Combined Load per Anchor Rod	51.5	162.9	44.3	kip
Anchor Rod Capacity	96.9	324.8	96.9	kip
Max Stress Ratio	**53.2%**	**50.2%**	**45.8%**	

(it is assumed that all Axial and Shear loads will go to the original anchor rods)

*Bracket Calculations & Results are on the following pages.

ANCHOR ROD BRACKET CALCULATIONS

TIA-222-G Reference

Tower & Foundation Properties		
Monopole Thickness at Base	0.75	in
Monopole Material	A500 Gr.B (Rnd)	
Yield Stress, Fy	42	ksi
Ultimate Stress, Fu	58	ksi
Base Plate Material	A36	
Yield Stress, Fy	36	ksi
Ultimate Stress, Fu	58	ksi
Pier Foundation Diameter	7.5	ft
Rebar Yield Stress	60	ksi
Concrete Strength	5000	psi
Clear Cover	3	in
Rebar Size	9	
Tie Size	4	
Vertical Rebar Quantity	47	
	2nd BC	
Analysis or Design of Bracket?	Analysis	
Bracket Loading Information		
Moment on Bolt Group	1995.0	kip-ft
Axial Load on Anchor Rod	162.9	kip
Anchor Rod Capacity	324.8	kip
Tube Properties		
Tube Section	HSS4x4x0.5	
Length	24	in
Gap Between Base Plate and Tube	0	in
Outside Width/Diameter	4	in
Thickness	0.5	in
Area	6.02	in^2
Moment of Inertia	11.9	in^4
Radius of Gyration	1.41	in
Material	A500 Gr.C	
Yield Stress	46	ksi
Ultimate Stress	62	ksi
Gusset Plate Properties		
Width	6.25	in
Thickness	1.25	in
Height of Plate at Pole, L_{plate1}	30	in
Height of Plate at Tube, L_{plate2}	24	in
Notch Size	0.75	in
Material	A572 Gr. 50	
Yield Stress	50	ksi
Ultimate Stress	80	ksi
Weld Properties		
Plate to Monopole Weld Size	0.3125	in
Plate to Tube Weld Size	0.625	in
Plate to Base Plate Weld Size	0.625	in
Electrode	E80	
Material Grade, F_{EXX}	80	ksi
Anchor Rod Embedment Properties		
Embedment Depth	6	ft
Epoxy Material	Hilti RE 500 V3	
Bond Strength	1.11	ksi

AISCM Table 1-12

ANCHOR ROD BRACKET CALCULATIONS

TIA-222-G Reference

Tube Analysis

Bearing Check

ϕ_b =	0.75		
$\phi P_n = \phi_b 1.8 F_y A_g$ =	373.84	kip	AISCM Eq (J7-1)
Stress Ratio	**43.6%**		

Compression Check

ϕ_c =	0.90		
K =	1		
KL/r =	17.02		
$4.71\sqrt{(E/F_y)}$ =	118.26		
$F_e = \pi^2 E/(KL/r)^2$ =	987.90	ksi	AISCM Eq (E3-4)
$F_{cr} = 0.658^{(Fy/Fe)} F_y$ =	45.11	ksi	AISCM Eq (E3-2)
$\phi P_n = \phi_c F_y A_g$ =	249.23	kip	AISCM Eq (J4-6)
Stress Ratio	**65.4%**		

Gusset Plate Analysis

Plate Shear Yielding Check

ϕ_v =	1		
$A_{nv} = A_g = t_{plate} * L_{tube}$ =	30	in^2	
$\phi V_n = \phi_v 0.6 A_g F_y$ =	900	kip	AISCM Eq (J4-3)
Stress Ratio	**18.1%**		

Plate Shear Rupture Check

ϕ_v =	0.75		
$\phi V_n = \phi_v 0.6 A_{nv} F_u$ =	1080.00	kip	AISCM Eq (J4-4)
Stress Ratio	**15.1%**		

Plate to Monopole Punching Shear Check

ϕ_v =	0.90		
$e = w_{plate} + d_{tube} - t_{tube} - D_b/2$ =	8.63	in	
M = P * e =	1405.14	kip-in	
$f_v = 6M/L_{plate1}^2$ =	9.37	kip/in	
$\phi F_v = \phi_v 0.6 F_{ymp}(2t_{mp})$ =	34.02	kip/in	
Stress Ratio	**27.5%**		

Plate to Tube Punching Shear Check

$e = d_{tube} - t_{tube} - D_b/2$ =	2.38	in	
M = P * e =	386.92	kip-in	
$f_v = 6M/L_{plate2}^2$ =	4.03	kip/in	
$\phi F_v = \phi_v 0.6 F_{ytube}(2t_{tube})$ =	24.84	kip/in	
Stress Ratio	**16.1%**		

Gusset Plate to Monopole Weld Analysis

ϕ_{wg} =	0.75		
$\phi R_{nweld} = \phi_{wg} 0.6 F_{EXX}$ =	36.0	ksi	
$\phi R_{nplate} = \phi_{wg} 0.6 F_{uplate}$ =	26.1	ksi	
$\phi R_{npole} = \phi_{wg} 0.6 F_{upole}$ =	26.1	ksi	
Stress Ratio	**55.9%**		

Gusset Plate to Tube Weld Analysis

ϕ_w =	0.75		
$a = (d_{tube} - t_{tube} - D_b/2)/L_{plate2}$ =	0.09		
C =	1.03		
C_1 =	3.71		
$\phi R_n = \phi_w C C_1 D L_{plate2}$ =	687.83	kip	
Stress Ratio	**23.7%**		

ANCHOR ROD BRACKET CALCULATIONS

TIA-222-G Reference

Embedment Depth Analysis

Development Length Calculation — ACI 318-08 Chapter 12

Transverse Reinforcement Index, k_{rt} =	0	
Rebar Location Factor, ψ_t =	1	
Rebar Coating Factor, ψ_e =	1	
Rebar Size Factor, ψs =	1	
Concrete Weight Factor, λ =	1	
Diameter of Rebar, d_b =	1.13	in
Diameter of Tie, d_{tie} =	0.50	in
$BC_{rebar} = D_{pier} - 2c_c - 2d_{tie} - d_b$ =	81.88	in
$S_{rebar} = \pi BC_{rebar} / n$ =	5.47	in
$c_b = c_c + d_{tie} + d_b/2$ =	2.74	in
$l_d = [3/40\ (f_y/\lambda\sqrt{f'_c})\ \psi_t\psi_e\psi_s/(c_b+k_{rt}/d_b)]d_b$ =	29.43	in

Development Length Check

$A = S_{rebar} / 2$ =	2.74	in
$B = BC_{rebar}/2 - BC_{bracket}/2$ =	2.94	in
$G = \sqrt{(A^2 + B^2)}$ =	4.01	in
$l'_d = l_d + G/1.5 + 3in$ =	35.11	in
S_b =	1.11	ksi
ϕ_{bond} =	0.55	
$L_{be} = P_n / (\pi D_b S_b \phi_{bond})$ =	37.75	in
$L_{min1} = L_{be} + 6in$ =	43.75	in
$L_{min2} = l'_d + 0.25L_{be}$ =	44.55	in
Stress Ratio	**61.9%**	

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Client:	Crown Castle	*Design:*	PCN
Project:	194393 (829046.1568944)	*Date:*	5/8/2018
Site:	Weston/ Rt-57/ Norfield R	*Verify:*	
Title:	**Monopole Tower Foundation Capacity Comparison**	*Date:*	
		Code:	TIA-222-G

Template Version 1.5

FOUNDATION ANALYSIS:

Original Tower Design Reactions:

Foundation:

Shear:	52.8	Kip*
Overturning moment:	7052.7	Kip-ft*

*Design loads were multiplied by 1.35 for comparison as allowed by TIA-222-G, Section 15.5.1.

TnxTower Reactions:

Foundation:

Shear:	40.0	Kip
Overturning moment:	5201.0	Kip-ft

Stress Ratio:

Foundation:

Shear:	**75.8%**
Overturning moment:	**73.7%**

Conclusion: **When the calculated reactions are compared to the original design reactions, the existing foundation is considered to have been designed and constructed with adequate capacity to support the existing and proposed loads.**

Controlling Foundation Stress Ratio: **73.7%**

NOTE: Although the shear capacity is at 75.8%, the moment reaction is the governing criteria for a monopole drilled shaft foundation. Therefore, the overall capacity for this foundation is 73.7%.