December 12, 2017

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Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	NM03XC066
	Carrier Site Name:	NM03XC066
Crown Castle Designation:	**Crown Castle BU Number:**	878782
	Crown Castle Site Name:	Portland Warren Ave
	Crown Castle JDE Job Number:	467085
	Crown Castle Work Order Number:	1494904
	Crown Castle Application Number:	412238 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	86959.010.01
Site Data:	**188 Warren Ave, Portland, Cumberland County, ME** **Latitude *43° 41' 15.16"*, Longitude *-70° 18' 14.96"*** **180 Foot - Monopole Tower**	

Dear Charles McGuirt,

B+T Group 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 1112216, in accordance with application 412238, revision 0.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA-222-G standard and IBC 2009 based upon a wind speed of 100 mph 3-second gust, exposure Category C with topographic category 1 and crest Height of 0 feet.

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

We at *B+T Group* 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: Leena Kantheti, E.I.T.

Respectfully submitted by: B&T Engineering, Inc.

STATE OF MAINE
SCOTT S. VANCE
14168
LICENSED
PROFESSIONAL ENGINEER

12/12/17

Scott S. Vance, P.E.

tnxTower Report - version 7.0.5.1

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1) INTRODUCTION

This is a 180 ft. monopole designed by Pittsburg Monopole Division in February of 1997. The monopole was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified multiple times to accommodate additional loading and these modifications are considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 100 mph with no ice, 40 mph with 1 inch ice thickness and 60 mph under service loads, exposure category C 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
177.0	179.0	6	Alcatel Lucent	800MHZ 2X50W RRH	1	1-1/4	--
		3	Alcatel Lucent	TD-RRH8x20-25			
		3	Commscope	DT465B-2XR			
		1	Rfs Celwave	APXVSPP18-C-A20			
		1	Rfs Celwave	FIM800CAB-C2D			
		1	Site Pro	PRK-1245			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
177.0	179.0	**1**	**Rfs Celwave**	**APXV9ERR18-C-A20**	**--**	**--**	**2**
		2	Rfs Celwave	APXVSPP18-C-A20	3	1-1/4	1
	177.0	3	Rfs Celwave	IBC1900BB-1			
		3	Rfs Celwave	IBC1900HG-2A			
		1	--	Miscellaneous [NA 510-1]			
		1	--	Platform Mount [LP 1201-1]			
	176.0	3	Alcatel Lucent	1900MHz 4X40W RRH			
175.0	176.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	--	--	1
	175.0	1	--	Side Arm Mount [SO 104-3]			
162.0	162.0	2	Cci Antennas	OPA-65R-LCUU-H6	12 4 2	1-5/8 5/8 3/8	1
		1	Cci Antennas	OPA-65R-LCUU-H8			
		1	Cci Antennas	HPA-65R-BUU-H8			
		2	Cci Antennas	HPA-65R-BUU-H6			
		6	Ericsson	RRUS-11			
		3	Ericsson	RRUS 11			
		3	Ericsson	RRUS A2			
		3	Ericsson	WCS RRUS-32-B30			
		2	Kmw Comm.	AM-X-CD-16-65-00T-RET			
		3	Powerwave Tech.	7020.00			
		3	Powerwave Tech.	7770.00			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		4	Powerwave Tech.	LGP21401			
		1	Powerwave Tech.	P65-17-XLH-RR			
		1	Powerwave Tech.	TT19-08BP111-001			
		2	Raycap	DC6-48-60-18-8F			
		1	--	Platform Mount [LP 301-1]			
110.0	110.0	3	Alcatel Lucent	B13 RRH 4X30	2	1-5/8	1
		3	Alcatel Lucent	B25 RRH4X30			
		3	Alcatel Lucent	B66A RRH4X45			
		6	Commscope	SBNHH-1D65C			
		2	Rfs Celwave	DB-B1-6C-12AB-0Z			
		1	--	T-Arm Mount [TA 702-3]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed; Not Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180	180	12	Generic	Antenna (4 sq. ft)	--	--
170	170	2	Generic	6'Dish	--	--
160	160	12	Generic	Antenna (4 sq. ft)	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	Sprint PCS Co-Locate, Rev# 0	412238	CCI Sites
Tower Manufacturer Drawings	Pittsburg Monopole Division, Project No. 96088-88	1451234	CCI Sites
Tower Modification Drawings	Crown Castle, Project No. 489572	3160195	CCI Sites
Post Modification Inspection	TEP, Project No. 127768	3360218	CCI Sites
Tower Modification Drawings	B+T Group, Project No. 86959.001.01	3671974	CCI Sites
Post Modification Inspection	TEP, Project No. 30386.4873	4138879	CCI Sites
Tower Modification Drawings	B+T Group, Project No. 86959.005.01	5755010	CCI Sites
Post Modification Inspection	FDH Velocitel Project No: 15CBPV1500	6085046	CCI Sites
Tower Modification Drawings	Crown Castle, Project No. 1183035	6110071	CCI Sites
Post Modification Inspection	ETS, Project No. 160656	6595143	CCI Sites
Mount Modification Report	HDG, LLC	Date: 11/14/2017	--
Foundation Drawings	Pittsburg Monopole Division, Project No. 96088-88	1480918	CCI Sites
Geotech Report	GGA Inc., Project No. 96127ME	1562092	CCI Sites
Antenna Configuration	Crown CAD Package	Date:09/29/2016	CCI Sites

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Mount areas and weights are assumed based on photographs provided.
5) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 175	Pole	P24x0.375	1	-5.049	901.775	4.8	Pass
L2	175 - 170	Pole	P24x0.375	2	-6.256	901.775	13.2	Pass
L3	170 - 165	Pole	P24x0.375	3	-6.875	901.775	21.9	Pass
L4	165 - 160	Pole	P24x0.375	4	-11.137	901.775	34.7	Pass
L5	160 - 155	Pole	P24x0.375	5	-11.866	901.775	52.4	Pass
L6	155 - 150	Pole	P24x0.375	6	-12.625	901.775	70.4	Pass
L7	150 - 145.7	Pole	P24x0.375	7	-13.300	901.775	86.2	Pass
L8	145.7 - 145.45	Pole	P24x0.675	8	-13.367	1602.580	48.4	Pass
L9	145.45 - 140.45	Pole	P24x0.675	9	-14.488	1602.580	58.7	Pass
L10	140.45 - 140	Pole	P24x0.675	10	-14.595	1602.580	4.8	Pass
L11	140 - 139.75	Pole	P36x0.5	11	-14.662	1806.730	13.2	Pass
L12	139.75 - 134.75	Pole	P36x0.5	12	-15.936	1806.730	21.9	Pass
L13	134.75 - 129.75	Pole	P36x0.5	13	-17.222	1806.730	34.7	Pass
L14	129.75 - 124.75	Pole	P36x0.5	14	-18.518	1806.730	52.4	Pass
L15	124.75 - 119.75	Pole	P36x0.5	15	-19.824	1806.730	70.4	Pass
L16	119.75 - 114.75	Pole	P36x0.5	16	-21.140	1806.730	86.2	Pass
L17	114.75 - 109.75	Pole + Reinf.	P36x0.5	17	-24.053	1806.730	49.9	Pass
L18	109.75 - 106.42	Pole + Reinf.	P36x0.5	18	-24.965	1806.730	60.7	Pass
L19	106.42 - 106.17	Pole + Reinf.	P36x0.7625	19	-25.067	2734.890	61.7	Pass
L20	106.17 - 101.17	Pole	P36x0.7625	20	-26.905	2734.890	37.1	Pass
L21	101.17 - 100	Pole	P36x0.7625	21	-27.337	2734.890	43.6	Pass
L22	100 - 99.75	Pole	P42x0.5	22	-27.421	2112.090	50.3	Pass
L23	99.75 - 94.75	Pole	P42x0.5	23	-28.959	2112.090	57.2	Pass
L24	94.75 - 89.75	Pole	P42x0.5	24	-30.514	2112.090	64.3	Pass
L25	89.75 - 86.25	Pole	P42x0.5	25	-31.608	2112.090	71.6	Pass
L26	86.25 - 86	Pole	P42x0.5875	26	-31.728	2476.480	79.1	Pass
L27	86 - 81	Pole	P42x0.5875	27	-33.932	2476.480	85.1	Pass
L28	81 - 78	Pole + Reinf.	P42x0.5875	28	-35.264	2476.480	57.4	Pass
L29	78 - 77.75	Pole + Reinf.	P42x0.875	29	-35.407	3662.760	63.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L30	77.75 - 72.75	Pole + Reinf.	P42x0.875	30	-38.094	3662.760	65.0	Pass
L31	72.75 - 67.75	Pole	P42x0.875	31	-40.795	3662.760	73.1	Pass
L32	67.75 - 62.75	Pole	P42x0.875	32	-43.505	3662.760	80.1	Pass
L33	62.75 - 60	Pole	P42x0.875	33	-44.995	3662.760	87.2	Pass
L34	60 - 59.75	Pole	P48x0.625	34	-45.113	3013.870	92.2	Pass
L35	59.75 - 54.75	Pole + Reinf.	P48x0.625	35	-47.240	3013.870	88.0	Pass
L36	54.75 - 49.75	Pole + Reinf.	P48x0.625	36	-49.383	3013.870	95.0	Pass
L37	49.75 - 46.25	Pole + Reinf.	P48x0.625	37	-50.887	3013.870	99.2	Pass
L38	46.25 - 46	Pole + Reinf.	P48x0.7	38	-51.037	3370.190	66.6	Pass
L39	46 - 41	Pole + Reinf.	P48x0.7	39	-53.828	3370.190	71.4	Pass
L40	41 - 36	Pole + Reinf.	P48x0.7	40	-56.635	3370.190	76.3	Pass
L41	36 - 32.67	Pole + Reinf.	P48x0.7	41	-58.508	3370.190	81.2	Pass
L42	32.67 - 32.42	Pole + Reinf.	P48x0.9625	42	-58.683	4608.290	84.0	Pass
L43	32.42 - 27.42	Pole	P48x0.9625	43	-61.965	4608.290	80.5	Pass
L44	27.42 - 22.42	Pole	P48x0.9625	44	-65.260	4608.290	85.3	Pass
L45	22.42 - 20	Pole	P48x0.9625	45	-66.855	4608.290	90.2	Pass
L46	20 - 19.75	Pole	P54x0.625	46	-66.985	3395.570	93.7	Pass
L47	19.75 - 14.75	Pole + Reinf.	P54x0.625	47	-69.380	3395.570	90.6	Pass
L48	14.75 - 11.25	Pole + Reinf.	P54x0.625	48	-71.064	3395.570	95.4	Pass
L49	11.25 - 11	Pole + Reinf.	P54x0.8	49	-71.227	4332.080	100.4	Pass[2]
L50	11 - 9	Pole + Reinf.	P54x0.8	50	-72.436	4332.080	103.7	Pass[2]
L51	9 - 8.75	Pole + Reinf.	P54x0.8875	51	-72.609	4798.000	76.9	Pass
L52	8.75 - 3.75	Pole + Reinf.	P54x0.8875	52	-75.913	4798.000	80.6	Pass
L53	3.75 - 0	Pole + Reinf.	P54x0.8875	53	-78.398	4798.000	84.4	Pass
							Summary	
						Pole (L48)	104.7	Pass[2]
						Rating =	104.7	Pass[2]

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Bridge Stiffeners	140	52.4	Pass
1	Flange Bolts	140	16.0	Pass
1	Flange Plate	140	12.7	Pass
1	Bridge Stiffeners	100	82.7	Pass
1	Flange Bolts	100	50.7	Pass
1	Flange Plate	100	22.5	Pass
1	Bridge Stiffeners	60	87.0	Pass
1	Flange Bolts	60	42.6	Pass
1	Flange Plate	60	19.4	Pass
1	Bridge Stiffeners	20	93.0	Pass
1	Flange Bolts	20	56.9	Pass
1	Flange Plate	20	24.7	Pass
1,2	Anchor Rods	Base	102.9	Pass
1	Base Plate	Base	42.8	Pass
1	Base Foundation	Base	99.2	Pass

Structure Rating (max from all components) =	104.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

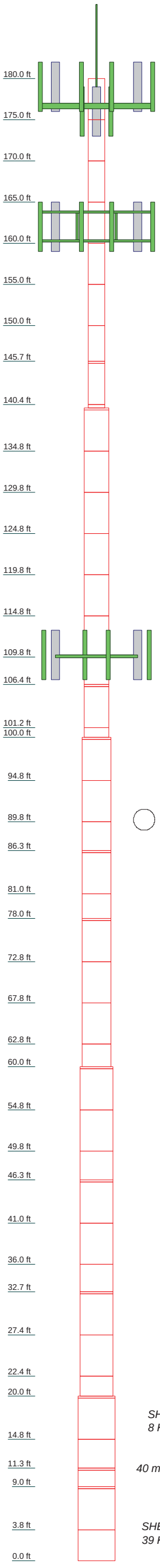
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P24x0.375	5.000	A36	0.5
2	P24x0.375	5.000	A36	0.5
3	P24x0.375	5.000	A36	0.5
4	P24x0.375	5.000	A36	0.5
5	P24x0.375	5.000	A36	0.5
6	P24x0.375	5.000	A36	0.5
7	P24x0.375	4.300	A36	0.4
8	P24x0.375	0.250	A36	0.0
9	P24x0.375	5.000	A36	0.8
10	P24x0.375	0.250	A36	0.0
11	P24x0.375	0.250	A36	0.0
12	P36x0.5	5.000	A36	0.9
13	P36x0.5	5.000	A36	0.9
14	P36x0.5	5.000	A36	0.9
15	P36x0.5	5.000	A36	0.9
16	P36x0.5	5.000	A36	0.9
17	P36x0.5	5.000	A36	0.9
18	P36x0.5	3.330	A36	0.6
19	P36x0.5	0.250	A36	0.1
20	P36x0.5	5.000	A36	1.4
21	P36x0.5	0.250	A36	0.1
22	P36x0.5	0.250	A36	0.1
23	P42x0.5	5.000	A36	1.1
24	P42x0.5	5.000	A36	1.1
25	P42x0.5	3.500	A36	0.8
26	P42x0.5	0.250	A36	0.1
27	P42x0.5	5.000	A36	1.7
28	P42x0.5	4.000	A36	1.0
29	P42x0.5	0.250	A36	0.1
30	P42x0.5	5.000	A36	2.1
31	P42x0.875	5.000	A36	2.1
32	P42x0.875	5.000	A36	2.1
33	P42x0.875	2.750	A36	1.1
34	P42x0.875	0.250	A36	0.1
35	P48x0.625	5.000	A36	1.6
36	P48x0.625	5.000	A36	1.6
37	P48x0.625	3.500	A36	1.1
38	P48x0.625	0.250	A36	0.1
39	P48x0.625	5.000	A36	2.1
40	P48x0.7	5.000	A36	2.1
41	P48x0.7	3.330	A36	1.4
42	P48x0.7	0.250	A36	0.1
43	P48x0.962	5.000	A36	2.5
44	P48x0.962	5.000	A36	2.5
45	P48x0.962	2.420	A36	1.2
46	P48x0.962	0.250	A36	0.1
47	P54x0.625	5.000	A36	1.8
48	P54x0.625	3.500	A36	1.2
49	P54x0.625	0.250	A36	0.1
50	P54x0.625	0.250	A36	0.1
51	P54x0.625	0.250	A36	0.1
52	P54x0.875	5.000	A36	2.6
53	P54x0.887	3.750	A36	1.9
				50.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 8' (E)	184	HPA-65R-BUU-H6 w/ Mount Pipe (E)	162
APXVSPP18-C-A20 w/ Mount Pipe (E)	177	HPA-65R-BUU-H6 w/ Mount Pipe (E)	162
APXVSPP18-C-A20 w/ Mount Pipe (E)	177	RRUS A2 (E)	162
IBC1900BB-1 (E)	177	RRUS A2 (E)	162
IBC1900BB-1 (E)	177	RRUS A2 (E)	162
IBC1900BB-1 (E)	177	RRUS 11 (E)	162
IBC1900HG-2A (E)	177	RRUS 11 (E)	162
IBC1900HG-2A (E)	177	RRUS 11 (E)	162
IBC1900HG-2A (E)	177	(2) RRUS-11 (E)	162
1900MHz 4X40W RRH (E-Per App)	177	(2) RRUS-11 (E)	162
1900MHz 4X40W RRH (E-Per App)	177	(2) RRUS-11 (E)	162
1900MHz 4X40W RRH (E-Per App)	177	WCS RRUS-32-B30 (E-Front Area Shielded/Photo)	162
APXVSPP18-C-A20 w/ Mount Pipe (P)	177	WCS RRUS-32-B30 (E-Front Area Shielded/Photo)	162
DT465B-2XR w/ Mount Pipe (P)	177	WCS RRUS-32-B30 (E-Front Area Shielded/Photo)	162
DT465B-2XR w/ Mount Pipe (P)	177	7020.00 (E)	162
DT465B-2XR w/ Mount Pipe (P)	177	7020.00 (E)	162
TD-RRH8x20-25 (P)	177	7020.00 (E)	162
TD-RRH8x20-25 (P)	177	TT19-08BP111-001 (E)	162
TD-RRH8x20-25 (P)	177	(2) LGP21401 (E)	162
(2) 800MHZ 2X50W RRH (P)	177	(2) LGP21401 (E)	162
(2) 800MHZ 2X50W RRH (P)	177	(2) DC6-48-60-18-8F (E-H.offset/Photo)	162
(2) 800MHZ 2X50W RRH (P)	177	(2) 3' x 2" Pipe Mount (E-For raycap/Photo)	162
FIM800CAB-C2D (P)	177	Platform Mount [LP 301-1] (E)	162
(3) 4' x 2" Pipe Mount (E)	177	Miscellaneous [NA 509-3] (E-Per Photo)	161
(3) 4' x 2" Pipe Mount (E)	177	(2) SBNHH-1D65C w/ Mount Pipe (E)	110
(3) 4' x 2" Pipe Mount (E)	177	(2) SBNHH-1D65C w/ Mount Pipe (E)	110
Miscellaneous [NA 510-1] (E-Per Photo)	177	(2) SBNHH-1D65C w/ Mount Pipe (E)	110
Platform Mount [LP 1201-1] (E)	177	B13 RRH 4X30 (E)	110
Miscellaneous [NA 509-3] (P-PRK-1245)	176	B13 RRH 4X30 (E)	110
PCS 1900MHz 4x45W-65MHz (E)	175	B13 RRH 4X30 (E)	110
PCS 1900MHz 4x45W-65MHz (E)	175	DB-B1-6C-12AB-0Z (E)	110
PCS 1900MHz 4x45W-65MHz (E)	175	DB-B1-6C-12AB-0Z (E)	110
5' x 2" Pipe Mount (E)	175	B25 RRH4X30 (E)	110
5' x 2" Pipe Mount (E)	175	B25 RRH4X30 (E)	110
5' x 2" Pipe Mount (E)	175	B25 RRH4X30 (E)	110
Side Arm Mount [SO 104-3] (E)	175	B66A RRH4X45 (E)	110
OPA-65R-LCUU-H8 w/ Mount Pipe (E)	162	B66A RRH4X45 (E)	110
OPA-65R-LCUU-H6 w/ Mount Pipe (E)	162	B66A RRH4X45 (E)	110
OPA-65R-LCUU-H6 w/ Mount Pipe (E)	162	(2) 5' x 2" Pipe Mount (E)	110
P65-17-XLH-RR w/ Mount Pipe (E)	162	(2) 5' x 2" Pipe Mount (E)	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	162	(2) 5' x 2" Pipe Mount (E)	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	162	T-Arm Mount [TA 702-3] (E)	110
7770.00 w/ Mount Pipe (E)	162		
7770.00 w/ Mount Pipe (E)	162		
7770.00 w/ Mount Pipe (E)	162		
HPA-65R-BUU-H8 w/ Mount Pipe (E)	162		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in Cumberland County, Maine.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 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 0.000 ft
8. TOWER RATING: 104.7%

ALL REACTIONS ARE FACTORED

AXIAL 134 K

SHEAR 8 K *MOMENT 1086 kip-ft*

TORQUE 0 kip-ft
40 mph WIND - 1.000 in ICE

AXIAL 78 K

SHEAR 39 K *MOMENT 4995 kip-ft*

TORQUE 1 kip-ft
REACTIONS - 100 mph WIND

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

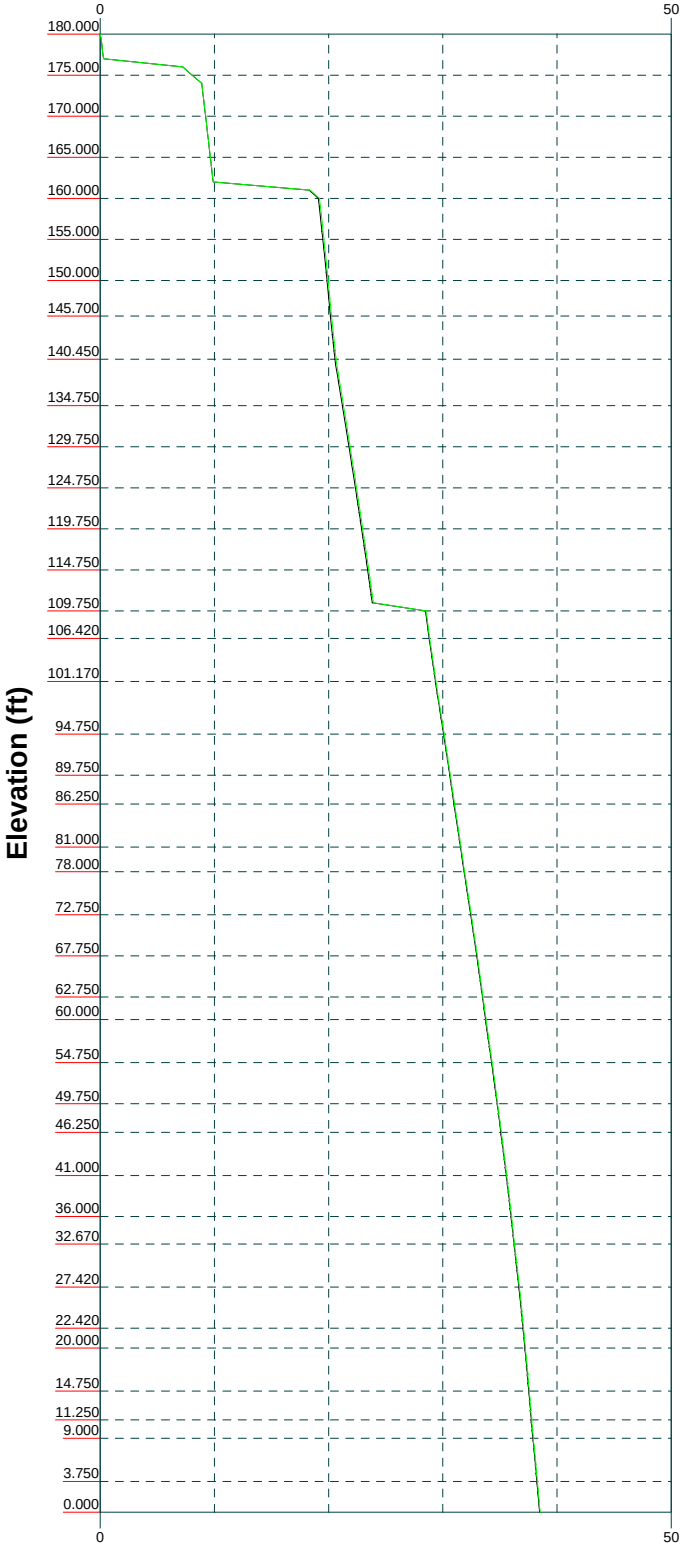
Job: **86959.010.01 - PORTLAND WARREN AVE, ME (BU# 87878**
Project:
Client: Crown Castle | Drawn by: Yathish | App'd:
Code: TIA-222-G | Date: 12/12/17 | Scale: NTS
Path: | Dwg No. E-1

TIA-222-G - 100 mph/40 mph 1.000 in Ice Exposure C

Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



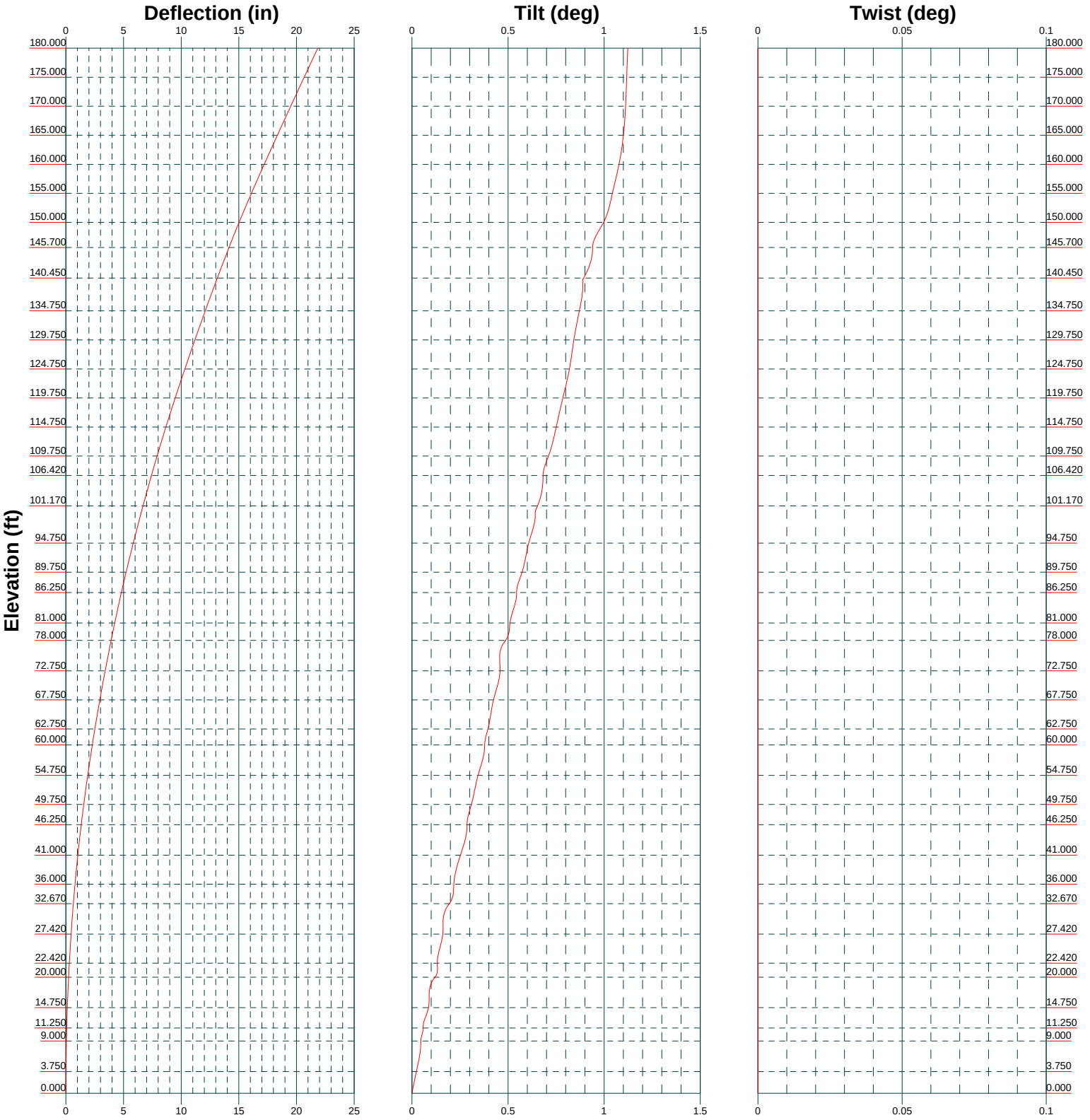
Global Mast Moment (kip-ft)

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 86959.010.01 - PORTLAND WARREN AVE, ME (BU# 87878.		
Project:		
Client: Crown Castle	Drawn by: Yathish	App'd:
Code: TIA-222-G	Date: 12/12/17	Scale: NTS
Path:		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



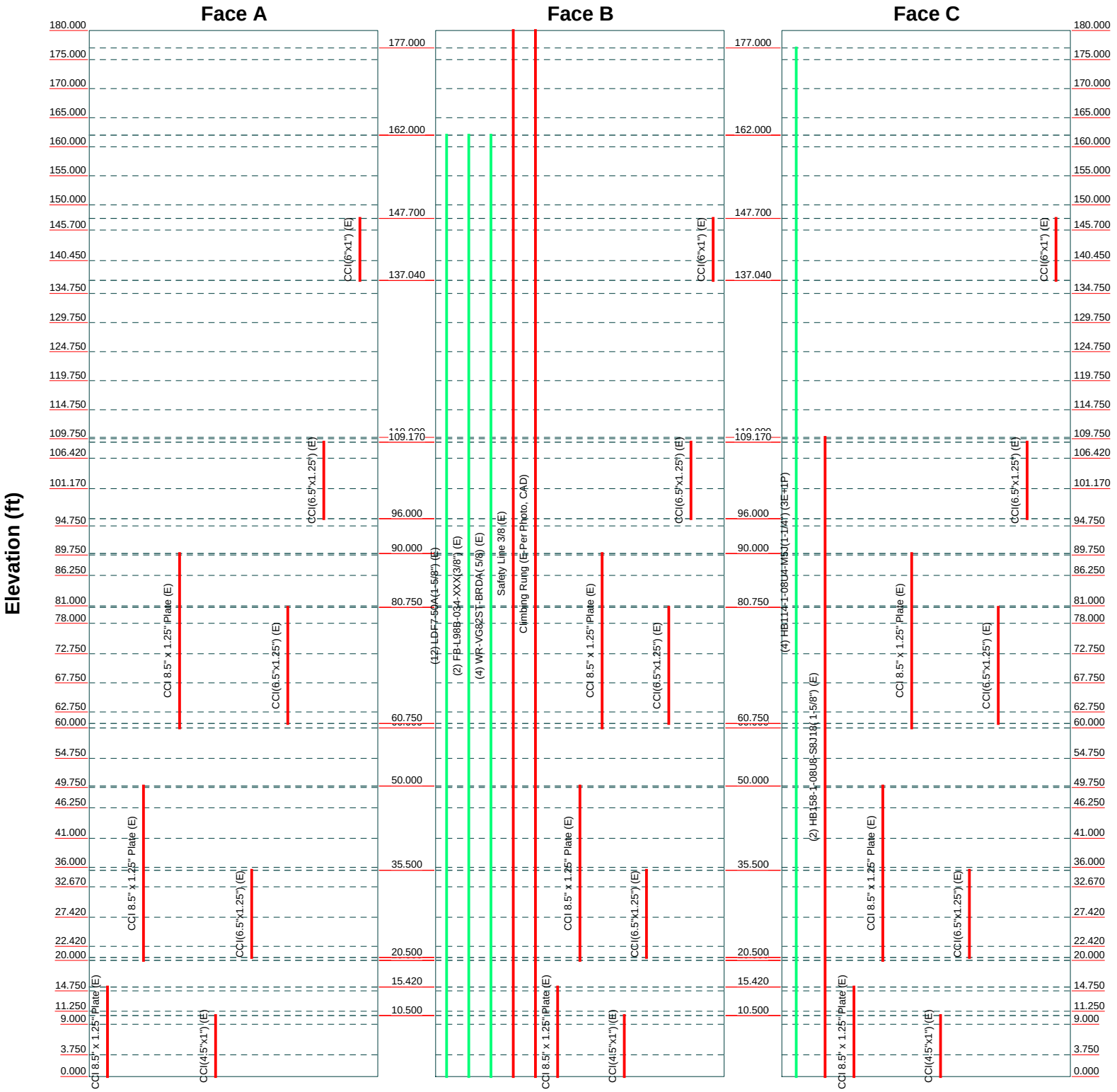
B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***86959.010.01 - PORTLAND WARREN AVE, ME (BU# 87878***.			
Project:			
Client: Crown Castle	Drawn by: Yathish	App'd:	
Code: TIA-222-G	Date: 12/12/17	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: ***86959.010.01 - PORTLAND WARREN AVE, ME (BU# 87878*** Project:	
	Client: Crown Castle	Drawn by: Yathish / App'd:
	Code: TIA-222-G	Date: 12/12/17 / Scale: NTS
	Path:	Dwg No. E-7

Tower Input Data

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

Tower is located in Cumberland County, Maine.
Basic wind speed of 100 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	180.000-175.000	5.000	P24x0.375	A36 (36 ksi)	
L2	175.000-170.000	5.000	P24x0.375	A36 (36 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L3	170.000-165.000	5.000	P24x0.375	A36 (36 ksi)	
L4	165.000-160.000	5.000	P24x0.375	A36 (36 ksi)	
L5	160.000-155.000	5.000	P24x0.375	A36 (36 ksi)	
L6	155.000-150.000	5.000	P24x0.375	A36 (36 ksi)	
L7	150.000-145.700	4.300	P24x0.375	A36 (36 ksi)	
L8	145.700-145.450	0.250	P24x0.675	A36 (36 ksi)	
L9	145.450-140.450	5.000	P24x0.675	A36 (36 ksi)	
L10	140.450-140.000	0.450	P24x0.675	A36 (36 ksi)	
L11	140.000-139.750	0.250	P36x0.5	A36 (36 ksi)	
L12	139.750-134.750	5.000	P36x0.5	A36 (36 ksi)	
L13	134.750-129.750	5.000	P36x0.5	A36 (36 ksi)	
L14	129.750-124.750	5.000	P36x0.5	A36 (36 ksi)	
L15	124.750-119.750	5.000	P36x0.5	A36 (36 ksi)	
L16	119.750-114.750	5.000	P36x0.5	A36 (36 ksi)	
L17	114.750-109.750	5.000	P36x0.5	A36 (36 ksi)	
L18	109.750-106.420	3.330	P36x0.5	A36 (36 ksi)	
L19	106.420-106.170	0.250	P36x0.7625	A36 (36 ksi)	
L20	106.170-101.170	5.000	P36x0.7625	A36 (36 ksi)	
L21	101.170-100.000	1.170	P36x0.7625	A36 (36 ksi)	
L22	100.000-99.750	0.250	P42x0.5	A36 (36 ksi)	
L23	99.750-94.750	5.000	P42x0.5	A36 (36 ksi)	
L24	94.750-89.750	5.000	P42x0.5	A36 (36 ksi)	
L25	89.750-86.250	3.500	P42x0.5	A36 (36 ksi)	
L26	86.250-86.000	0.250	P42x0.5875	A36 (36 ksi)	
L27	86.000-81.000	5.000	P42x0.5875	A36 (36 ksi)	
L28	81.000-78.000	3.000	P42x0.5875	A36 (36 ksi)	
L29	78.000-77.750	0.250	P42x0.875	A36 (36 ksi)	
L30	77.750-72.750	5.000	P42x0.875	A36 (36 ksi)	
L31	72.750-67.750	5.000	P42x0.875	A36 (36 ksi)	
L32	67.750-62.750	5.000	P42x0.875	A36 (36 ksi)	
L33	62.750-60.000	2.750	P42x0.875	A36	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L34	60.000-59.750	0.250	P48x0.625	A36 (36 ksi)	
L35	59.750-54.750	5.000	P48x0.625	A36 (36 ksi)	
L36	54.750-49.750	5.000	P48x0.625	A36 (36 ksi)	
L37	49.750-46.250	3.500	P48x0.625	A36 (36 ksi)	
L38	46.250-46.000	0.250	P48x0.7	A36 (36 ksi)	
L39	46.000-41.000	5.000	P48x0.7	A36 (36 ksi)	
L40	41.000-36.000	5.000	P48x0.7	A36 (36 ksi)	
L41	36.000-32.670	3.330	P48x0.7	A36 (36 ksi)	
L42	32.670-32.420	0.250	P48x0.9625	A36 (36 ksi)	
L43	32.420-27.420	5.000	P48x0.9625	A36 (36 ksi)	
L44	27.420-22.420	5.000	P48x0.9625	A36 (36 ksi)	
L45	22.420-20.000	2.420	P48x0.9625	A36 (36 ksi)	
L46	20.000-19.750	0.250	P54x0.625	A36 (36 ksi)	
L47	19.750-14.750	5.000	P54x0.625	A36 (36 ksi)	
L48	14.750-11.250	3.500	P54x0.625	A36 (36 ksi)	
L49	11.250-11.000	0.250	P54x0.8	A36 (36 ksi)	
L50	11.000-9.000	2.000	P54x0.8	A36 (36 ksi)	
L51	9.000-8.750	0.250	P54x0.8875	A36 (36 ksi)	
L52	8.750-3.750	5.000	P54x0.8875	A36 (36 ksi)	
L53	3.750-0.000	3.750	P54x0.8875	A36 (36 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 180.000-175.000				1	1	1			
L2 175.000-170.000				1	1	1			
L3 170.000-165.000				1	1	1			
L4 165.000-160.0				1	1	1			

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
00									
L5				1	1	1			
160.000-155.0									
00									
L6				1	1	1			
155.000-150.0									
00									
L7				1	1	1			
150.000-145.7									
00									
L8				1	1	0.926614			
145.700-145.4									
50									
L9				1	1	0.926614			
145.450-140.4									
50									
L10				1	1	0.926614			
140.450-140.0									
00									
L11				1	1	1			
140.000-139.7									
50									
L12				1	1	1			
139.750-134.7									
50									
L13				1	1	1			
134.750-129.7									
50									
L14				1	1	1			
129.750-124.7									
50									
L15				1	1	1			
124.750-119.7									
50									
L16				1	1	1			
119.750-114.7									
50									
L17				1	1	1			
114.750-109.7									
50									
L18				1	1	1			
109.750-106.4									
20									
L19				1	1	0.949391			
106.420-106.1									
70									
L20				1	1	0.949391			
106.170-101.1									
70									
L21				1	1	0.949391			
101.170-100.0									
00									
L22				1	1	1			
100.000-99.75									
0									
L23				1	1	1			
99.750-94.750									
L24				1	1	1			
94.750-89.750									

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
L25 89.750-86.250				1	1	1			
L26 86.250-86.000				1	1	1.26989			
L27 86.000-81.000				1	1	1.26989			
L28 81.000-78.000				1	1	1.26989			
L29 78.000-77.750				1	1	1.07421			
L30 77.750-72.750				1	1	1.07421			
L31 72.750-67.750				1	1	1.07421			
L32 67.750-62.750				1	1	1.07421			
L33 62.750-60.000				1	1	1.07421			
L34 60.000-59.750				1	1	1			
L35 59.750-54.750				1	1	1			
L36 54.750-49.750				1	1	1			
L37 49.750-46.250				1	1	1			
L38 46.250-46.000				1	1	1.20071			
L39 46.000-41.000				1	1	1.20071			
L40 41.000-36.000				1	1	1.20071			
L41 36.000-32.670				1	1	1.20071			
L42 32.670-32.420				1	1	1.04949			
L43 32.420-27.420				1	1	1.04949			
L44 27.420-22.420				1	1	1.04949			
L45 22.420-20.000				1	1	1.04949			
L46 20.000-19.750				1	1	1			
L47 19.750-14.750				1	1	1			
L48 14.750-11.250				1	1	1			
L49 11.250-11.000				1	1	1.02222			
L50 11.000-9.000				1	1	1.02222			
L51 9.000-8.750				1	1	1.01411			
L52 8.750-3.750				1	1	1.01411			
L53 3.750-0.000				1	1	1.01411			

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 klf
--*-*									
HB158-1-08U8-S8J18(1-5/8")	C	Surface Ar	110.000 - 0.000	2	2	-0.450	1.980		0.001
(E)		(CaAa)				-0.350			
--*-*									
Safety Line 3/8	B	Surface Ar	180.000 - 0.000	1	1	0.000	0.375		0.000
(E)		(CaAa)				0.000			
Climbing Rung	B	Surface Ar	180.000 - 0.000	1	1	0.000	1.000		0.008
(E-Per Photo, CAD)		(CaAa)				0.000			
--*-*									
CCI 8.5" x 1.25" Plate	A	Surface Af	15.420 - 0.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	B	Surface Af	15.420 - 0.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	C	Surface Af	15.420 - 0.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
*									
CCI 8.5" x 1.25" Plate	A	Surface Af	50.000 - 20.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	B	Surface Af	50.000 - 20.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	C	Surface Af	50.000 - 20.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
*									
CCI 8.5" x 1.25" Plate	A	Surface Af	90.000 - 60.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	B	Surface Af	90.000 - 60.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
CCI 8.5" x 1.25" Plate	C	Surface Af	90.000 - 60.000	1	1	0.000	8.500	19.500	0.000
(E)		(CaAa)				0.000			
*									
CCI(4.5"x1")	A	Surface Af	10.500 - 0.000	1	1	0.000	4.500	11.000	0.000
(E)		(CaAa)				0.000			
CCI(4.5"x1")	B	Surface Af	10.500 - 0.000	1	1	0.000	4.500	11.000	0.000
(E)		(CaAa)				0.000			
CCI(4.5"x1")	C	Surface Af	10.500 - 0.000	1	1	0.000	4.500	11.000	0.000
(E)		(CaAa)				0.000			
*									
CCI(6.5"x1.25")	A	Surface Af	35.500 - 20.500	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
CCI(6.5"x1.25")	B	Surface Af	35.500 - 20.500	1	1	0.000	6.500	畋 片摩	0.000
(E)		(CaAa)				0.000		ｻﾝﾑ禳搗0	
CCI(6.5"x1.25")	C	Surface Af	35.500 - 20.500	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
*									
CCI(6.5"x1.25")	A	Surface Af	80.750 - 60.750	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
CCI(6.5"x1.25")	B	Surface Af	80.750 - 60.750	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
CCI(6.5"x1.25")	C	Surface Af	80.750 - 60.750	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
*									
CCI(6.5"x1.25")	A	Surface Af	109.170 - 96.000	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			
CCI(6.5"x1.25")	B	Surface Af	109.170 - 96.000	1	1	0.000	6.500	15.500	0.000
(E)		(CaAa)				0.000			

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
CCI(6.5"x1.25") (E) *	C	Surface Af (CaAa)	109.170 - 96.000	1	1	0.000 0.000	6.500	15.500	0.000
CCI(6"x1") (E)	A	Surface Af (CaAa)	147.700 - 137.040	1	1	0.000 0.000	6.000	14.000	0.000
CCI(6"x1") (E)	B	Surface Af (CaAa)	147.700 - 137.040	1	1	0.000 0.000	6.000	14.000	0.000
CCI(6"x1") (E) *	C	Surface Af (CaAa)	147.700 - 137.040	1	1	0.000 0.000	6.000	14.000	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB114-1-08U4-M5J(1-1/4") (3E+1P) *-*-*-*	C	No	Inside Pole	177.000 - 0.000	4	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	162.000 - 0.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
FB-L98B-034-XXX(3/8") (E)	B	No	Inside Pole	162.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
WR-VG82ST-BRDA(5/8) (E) *-*-*-* *	B	No	Inside Pole	162.000 - 0.000	4	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.000-175.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.043
		C	0.000	0.000	0.000	0.000	0.009
L2	175.000-170.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.043
		C	0.000	0.000	0.000	0.000	0.022
L3	170.000-165.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.043
		C	0.000	0.000	0.000	0.000	0.022
L4	165.000-160.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.065
		C	0.000	0.000	0.000	0.000	0.022
L5	160.000-155.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022
L6	155.000-150.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022

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
L7	150.000-145.700	A	0.000	0.000	2.000	0.000	0.000
		B	0.000	0.000	2.591	0.000	0.085
		C	0.000	0.000	2.000	0.000	0.019
L8	145.700-145.450	A	0.000	0.000	0.250	0.000	0.000
		B	0.000	0.000	0.284	0.000	0.005
		C	0.000	0.000	0.250	0.000	0.001
L9	145.450-140.450	A	0.000	0.000	5.000	0.000	0.000
		B	0.000	0.000	5.688	0.000	0.099
		C	0.000	0.000	5.000	0.000	0.022
L10	140.450-140.000	A	0.000	0.000	0.450	0.000	0.000
		B	0.000	0.000	0.512	0.000	0.009
		C	0.000	0.000	0.450	0.000	0.002
L11	140.000-139.750	A	0.000	0.000	0.250	0.000	0.000
		B	0.000	0.000	0.284	0.000	0.005
		C	0.000	0.000	0.250	0.000	0.001
L12	139.750-134.750	A	0.000	0.000	2.710	0.000	0.000
		B	0.000	0.000	3.398	0.000	0.099
		C	0.000	0.000	2.710	0.000	0.022
L13	134.750-129.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022
L14	129.750-124.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022
L15	124.750-119.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022
L16	119.750-114.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.000	0.000	0.022
L17	114.750-109.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	0.099	0.000	0.022
L18	109.750-106.420	A	0.000	0.000	2.979	0.000	0.000
		B	0.000	0.000	3.437	0.000	0.066
		C	0.000	0.000	4.298	0.000	0.023
L19	106.420-106.170	A	0.000	0.000	0.271	0.000	0.000
		B	0.000	0.000	0.305	0.000	0.005
		C	0.000	0.000	0.370	0.000	0.002
L20	106.170-101.170	A	0.000	0.000	5.417	0.000	0.000
		B	0.000	0.000	6.104	0.000	0.099
		C	0.000	0.000	7.397	0.000	0.035
L21	101.170-100.000	A	0.000	0.000	1.268	0.000	0.000
		B	0.000	0.000	1.428	0.000	0.023
		C	0.000	0.000	1.731	0.000	0.008
L22	100.000-99.750	A	0.000	0.000	0.271	0.000	0.000
		B	0.000	0.000	0.305	0.000	0.005
		C	0.000	0.000	0.370	0.000	0.002
L23	99.750-94.750	A	0.000	0.000	4.063	0.000	0.000
		B	0.000	0.000	4.750	0.000	0.099
		C	0.000	0.000	6.043	0.000	0.035
L24	94.750-89.750	A	0.000	0.000	0.354	0.000	0.000
		B	0.000	0.000	1.042	0.000	0.099
		C	0.000	0.000	2.334	0.000	0.035
L25	89.750-86.250	A	0.000	0.000	4.958	0.000	0.000
		B	0.000	0.000	5.440	0.000	0.069
		C	0.000	0.000	6.344	0.000	0.024
L26	86.250-86.000	A	0.000	0.000	0.354	0.000	0.000
		B	0.000	0.000	0.389	0.000	0.005
		C	0.000	0.000	0.453	0.000	0.002
L27	86.000-81.000	A	0.000	0.000	7.083	0.000	0.000

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	7.771	0.000	0.099
		C	0.000	0.000	9.063	0.000	0.035
L28	81.000-78.000	A	0.000	0.000	7.229	0.000	0.000
		B	0.000	0.000	7.642	0.000	0.059
		C	0.000	0.000	8.417	0.000	0.021
L29	78.000-77.750	A	0.000	0.000	0.625	0.000	0.000
		B	0.000	0.000	0.659	0.000	0.005
		C	0.000	0.000	0.724	0.000	0.002
L30	77.750-72.750	A	0.000	0.000	12.500	0.000	0.000
		B	0.000	0.000	13.188	0.000	0.099
		C	0.000	0.000	14.480	0.000	0.035
L31	72.750-67.750	A	0.000	0.000	12.500	0.000	0.000
		B	0.000	0.000	13.188	0.000	0.099
		C	0.000	0.000	14.480	0.000	0.035
L32	67.750-62.750	A	0.000	0.000	12.500	0.000	0.000
		B	0.000	0.000	13.188	0.000	0.099
		C	0.000	0.000	14.480	0.000	0.035
L33	62.750-60.000	A	0.000	0.000	6.063	0.000	0.000
		B	0.000	0.000	6.441	0.000	0.054
		C	0.000	0.000	7.152	0.000	0.019
L34	60.000-59.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.034	0.000	0.005
		C	0.000	0.000	0.099	0.000	0.002
L35	59.750-54.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.688	0.000	0.099
		C	0.000	0.000	1.980	0.000	0.035
L36	54.750-49.750	A	0.000	0.000	0.354	0.000	0.000
		B	0.000	0.000	1.042	0.000	0.099
		C	0.000	0.000	2.334	0.000	0.035
L37	49.750-46.250	A	0.000	0.000	4.958	0.000	0.000
		B	0.000	0.000	5.440	0.000	0.069
		C	0.000	0.000	6.344	0.000	0.024
L38	46.250-46.000	A	0.000	0.000	0.354	0.000	0.000
		B	0.000	0.000	0.389	0.000	0.005
		C	0.000	0.000	0.453	0.000	0.002
L39	46.000-41.000	A	0.000	0.000	7.083	0.000	0.000
		B	0.000	0.000	7.771	0.000	0.099
		C	0.000	0.000	9.063	0.000	0.035
L40	41.000-36.000	A	0.000	0.000	7.083	0.000	0.000
		B	0.000	0.000	7.771	0.000	0.099
		C	0.000	0.000	9.063	0.000	0.035
L41	36.000-32.670	A	0.000	0.000	7.783	0.000	0.000
		B	0.000	0.000	8.241	0.000	0.066
		C	0.000	0.000	9.102	0.000	0.023
L42	32.670-32.420	A	0.000	0.000	0.625	0.000	0.000
		B	0.000	0.000	0.659	0.000	0.005
		C	0.000	0.000	0.724	0.000	0.002
L43	32.420-27.420	A	0.000	0.000	12.500	0.000	0.000
		B	0.000	0.000	13.188	0.000	0.099
		C	0.000	0.000	14.480	0.000	0.035
L44	27.420-22.420	A	0.000	0.000	12.500	0.000	0.000
		B	0.000	0.000	13.188	0.000	0.099
		C	0.000	0.000	14.480	0.000	0.035
L45	22.420-20.000	A	0.000	0.000	5.508	0.000	0.000
		B	0.000	0.000	5.841	0.000	0.048
		C	0.000	0.000	6.467	0.000	0.017
L46	20.000-19.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.034	0.000	0.005
		C	0.000	0.000	0.099	0.000	0.002
L47	19.750-14.750	A	0.000	0.000	0.949	0.000	0.000
		B	0.000	0.000	1.637	0.000	0.099

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
		C	0.000	0.000	2.929	0.000	0.035
L48	14.750-11.250	A	0.000	0.000	4.958	0.000	0.000
		B	0.000	0.000	5.440	0.000	0.069
		C	0.000	0.000	6.344	0.000	0.024
L49	11.250-11.000	A	0.000	0.000	0.354	0.000	0.000
		B	0.000	0.000	0.389	0.000	0.005
		C	0.000	0.000	0.453	0.000	0.002
L50	11.000-9.000	A	0.000	0.000	3.958	0.000	0.000
		B	0.000	0.000	4.233	0.000	0.040
		C	0.000	0.000	4.750	0.000	0.014
L51	9.000-8.750	A	0.000	0.000	0.542	0.000	0.000
		B	0.000	0.000	0.576	0.000	0.005
		C	0.000	0.000	0.641	0.000	0.002
L52	8.750-3.750	A	0.000	0.000	10.833	0.000	0.000
		B	0.000	0.000	11.521	0.000	0.099
		C	0.000	0.000	12.813	0.000	0.035
L53	3.750-0.000	A	0.000	0.000	8.125	0.000	0.000
		B	0.000	0.000	8.641	0.000	0.074
		C	0.000	0.000	9.610	0.000	0.026

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.000-175.000	A	2.366	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.420	0.000	0.131
		C		0.000	0.000	0.000	0.000	0.009
L2	175.000-170.000	A	2.360	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.407	0.000	0.131
		C		0.000	0.000	0.000	0.000	0.022
L3	170.000-165.000	A	2.353	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.393	0.000	0.130
		C		0.000	0.000	0.000	0.000	0.022
L4	165.000-160.000	A	2.346	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.379	0.000	0.152
		C		0.000	0.000	0.000	0.000	0.022
L5	160.000-155.000	A	2.338	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.364	0.000	0.185
		C		0.000	0.000	0.000	0.000	0.022
L6	155.000-150.000	A	2.331	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.349	0.000	0.185
		C		0.000	0.000	0.000	0.000	0.022
L7	150.000-145.700	A	2.324	0.000	0.000	2.360	0.000	0.041
		B		0.000	0.000	6.948	0.000	0.200
		C		0.000	0.000	2.360	0.000	0.060
L8	145.700-145.450	A	2.320	0.000	0.000	0.295	0.000	0.005
		B		0.000	0.000	0.561	0.000	0.014
		C		0.000	0.000	0.295	0.000	0.006
L9	145.450-140.450	A	2.316	0.000	0.000	5.896	0.000	0.103
		B		0.000	0.000	11.215	0.000	0.286
		C		0.000	0.000	5.896	0.000	0.124
L10	140.450-140.000	A	2.311	0.000	0.000	0.530	0.000	0.009
		B		0.000	0.000	1.008	0.000	0.026
		C		0.000	0.000	0.530	0.000	0.011
L11	140.000-139.750	A	2.311	0.000	0.000	0.295	0.000	0.005
		B		0.000	0.000	0.560	0.000	0.014
		C		0.000	0.000	0.295	0.000	0.006

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
L12	139.750-134.750	A	2.306	0.000	0.000	3.193	0.000	0.055
		B		0.000	0.000	8.493	0.000	0.239
		C		0.000	0.000	3.193	0.000	0.077
L13	134.750-129.750	A	2.298	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.283	0.000	0.183
		C		0.000	0.000	0.000	0.000	0.022
L14	129.750-124.750	A	2.289	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.265	0.000	0.182
		C		0.000	0.000	0.000	0.000	0.022
L15	124.750-119.750	A	2.280	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.247	0.000	0.182
		C		0.000	0.000	0.000	0.000	0.022
L16	119.750-114.750	A	2.270	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.228	0.000	0.181
		C		0.000	0.000	0.000	0.000	0.022
L17	114.750-109.750	A	2.260	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.208	0.000	0.180
		C		0.000	0.000	0.265	0.000	0.026
L18	109.750-106.420	A	2.252	0.000	0.000	3.583	0.000	0.058
		B		0.000	0.000	7.041	0.000	0.178
		C		0.000	0.000	7.106	0.000	0.132
L19	106.420-106.170	A	2.248	0.000	0.000	0.326	0.000	0.005
		B		0.000	0.000	0.585	0.000	0.014
		C		0.000	0.000	0.590	0.000	0.011
L20	106.170-101.170	A	2.243	0.000	0.000	6.510	0.000	0.105
		B		0.000	0.000	11.683	0.000	0.284
		C		0.000	0.000	11.789	0.000	0.216
L21	101.170-100.000	A	2.236	0.000	0.000	1.523	0.000	0.024
		B		0.000	0.000	2.730	0.000	0.066
		C		0.000	0.000	2.756	0.000	0.050
L22	100.000-99.750	A	2.234	0.000	0.000	0.325	0.000	0.005
		B		0.000	0.000	0.583	0.000	0.014
		C		0.000	0.000	0.589	0.000	0.011
L23	99.750-94.750	A	2.228	0.000	0.000	4.877	0.000	0.078
		B		0.000	0.000	10.021	0.000	0.256
		C		0.000	0.000	10.138	0.000	0.188
L24	94.750-89.750	A	2.217	0.000	0.000	0.465	0.000	0.006
		B		0.000	0.000	5.586	0.000	0.184
		C		0.000	0.000	5.711	0.000	0.116
L25	89.750-86.250	A	2.206	0.000	0.000	6.503	0.000	0.084
		B		0.000	0.000	10.072	0.000	0.208
		C		0.000	0.000	10.165	0.000	0.160
L26	86.250-86.000	A	2.201	0.000	0.000	0.464	0.000	0.006
		B		0.000	0.000	0.719	0.000	0.015
		C		0.000	0.000	0.726	0.000	0.011
L27	86.000-81.000	A	2.195	0.000	0.000	9.278	0.000	0.119
		B		0.000	0.000	14.355	0.000	0.295
		C		0.000	0.000	14.496	0.000	0.228
L28	81.000-78.000	A	2.184	0.000	0.000	9.685	0.000	0.126
		B		0.000	0.000	12.718	0.000	0.232
		C		0.000	0.000	12.807	0.000	0.191
L29	78.000-77.750	A	2.179	0.000	0.000	0.838	0.000	0.011
		B		0.000	0.000	1.090	0.000	0.020
		C		0.000	0.000	1.098	0.000	0.016
L30	77.750-72.750	A	2.172	0.000	0.000	16.744	0.000	0.217
		B		0.000	0.000	21.776	0.000	0.392
		C		0.000	0.000	21.934	0.000	0.325
L31	72.750-67.750	A	2.157	0.000	0.000	16.718	0.000	0.215
		B		0.000	0.000	21.719	0.000	0.389
		C		0.000	0.000	21.889	0.000	0.323
L32	67.750-62.750	A	2.141	0.000	0.000	16.689	0.000	0.213

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	21.659	0.000	0.386
		C		0.000	0.000	21.841	0.000	0.320
L33	62.750-60.000	A	2.128	0.000	0.000	8.048	0.000	0.102
		B		0.000	0.000	10.767	0.000	0.196
		C		0.000	0.000	10.872	0.000	0.160
L34	60.000-59.750	A	2.123	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.247	0.000	0.009
		C		0.000	0.000	0.256	0.000	0.005
L35	59.750-54.750	A	2.113	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	4.914	0.000	0.171
		C		0.000	0.000	5.117	0.000	0.105
L36	54.750-49.750	A	2.094	0.000	0.000	0.459	0.000	0.006
		B		0.000	0.000	5.334	0.000	0.176
		C		0.000	0.000	5.551	0.000	0.110
L37	49.750-46.250	A	2.076	0.000	0.000	6.412	0.000	0.077
		B		0.000	0.000	9.800	0.000	0.196
		C		0.000	0.000	9.961	0.000	0.150
L38	46.250-46.000	A	2.068	0.000	0.000	0.458	0.000	0.005
		B		0.000	0.000	0.699	0.000	0.014
		C		0.000	0.000	0.711	0.000	0.011
L39	46.000-41.000	A	2.056	0.000	0.000	9.139	0.000	0.109
		B		0.000	0.000	13.939	0.000	0.277
		C		0.000	0.000	14.184	0.000	0.212
L40	41.000-36.000	A	2.031	0.000	0.000	9.114	0.000	0.107
		B		0.000	0.000	13.864	0.000	0.274
		C		0.000	0.000	14.128	0.000	0.209
L41	36.000-32.670	A	2.008	0.000	0.000	9.839	0.000	0.122
		B		0.000	0.000	12.971	0.000	0.231
		C		0.000	0.000	13.159	0.000	0.189
L42	32.670-32.420	A	1.997	0.000	0.000	0.788	0.000	0.010
		B		0.000	0.000	1.022	0.000	0.018
		C		0.000	0.000	1.037	0.000	0.015
L43	32.420-27.420	A	1.980	0.000	0.000	15.736	0.000	0.193
		B		0.000	0.000	20.384	0.000	0.356
		C		0.000	0.000	20.687	0.000	0.292
L44	27.420-22.420	A	1.945	0.000	0.000	15.682	0.000	0.188
		B		0.000	0.000	20.259	0.000	0.350
		C		0.000	0.000	20.588	0.000	0.286
L45	22.420-20.000	A	1.914	0.000	0.000	6.904	0.000	0.081
		B		0.000	0.000	9.089	0.000	0.158
		C		0.000	0.000	9.259	0.000	0.127
L46	20.000-19.750	A	1.901	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.224	0.000	0.008
		C		0.000	0.000	0.243	0.000	0.005
L47	19.750-14.750	A	1.874	0.000	0.000	1.030	0.000	0.013
		B		0.000	0.000	5.466	0.000	0.171
		C		0.000	0.000	5.848	0.000	0.108
L48	14.750-11.250	A	1.822	0.000	0.000	5.362	0.000	0.065
		B		0.000	0.000	8.394	0.000	0.174
		C		0.000	0.000	8.689	0.000	0.130
L49	11.250-11.000	A	1.794	0.000	0.000	0.382	0.000	0.005
		B		0.000	0.000	0.596	0.000	0.012
		C		0.000	0.000	0.618	0.000	0.009
L50	11.000-9.000	A	1.775	0.000	0.000	4.506	0.000	0.055
		B		0.000	0.000	6.201	0.000	0.116
		C		0.000	0.000	6.383	0.000	0.091
L51	9.000-8.750	A	1.754	0.000	0.000	0.623	0.000	0.007
		B		0.000	0.000	0.832	0.000	0.015
		C		0.000	0.000	0.856	0.000	0.012
L52	8.750-3.750	A	1.693	0.000	0.000	12.391	0.000	0.143
		B		0.000	0.000	16.466	0.000	0.291

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
		C		0.000	0.000	16.983	0.000	0.230
L53	3.750-0.000	A	1.501	0.000	0.000	9.148	0.000	0.092
		B		0.000	0.000	11.916	0.000	0.196
		C		0.000	0.000	12.412	0.000	0.151

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180.000-175.000	0.173	-0.100	0.834	-0.481
L2	175.000-170.000	0.173	-0.100	0.832	-0.481
L3	170.000-165.000	0.173	-0.100	0.831	-0.480
L4	165.000-160.000	0.173	-0.100	0.830	-0.479
L5	160.000-155.000	0.173	-0.100	0.829	-0.478
L6	155.000-150.000	0.173	-0.100	0.827	-0.478
L7	150.000-145.700	0.105	-0.060	0.559	-0.323
L8	145.700-145.450	0.072	-0.042	0.408	-0.235
L9	145.450-140.450	0.072	-0.042	0.407	-0.235
L10	140.450-140.000	0.072	-0.042	0.407	-0.235
L11	140.000-139.750	0.089	-0.052	0.528	-0.305
L12	139.750-134.750	0.115	-0.066	0.662	-0.382
L13	134.750-129.750	0.175	-0.101	0.946	-0.546
L14	129.750-124.750	0.175	-0.101	0.944	-0.545
L15	124.750-119.750	0.175	-0.101	0.941	-0.544
L16	119.750-114.750	0.175	-0.101	0.939	-0.542
L17	114.750-109.750	0.196	-0.080	0.959	-0.492
L18	109.750-106.420	0.313	0.151	0.826	0.103
L19	106.420-106.170	0.287	0.139	0.771	0.096
L20	106.170-101.170	0.287	0.139	0.770	0.096
L21	101.170-100.000	0.287	0.139	0.769	0.096
L22	100.000-99.750	0.310	0.149	0.850	0.105
L23	99.750-94.750	0.349	0.168	0.935	0.116
L24	94.750-89.750	0.531	0.256	1.284	0.160
L25	89.750-86.250	0.272	0.131	0.731	0.092
L26	86.250-86.000	0.272	0.131	0.730	0.092
L27	86.000-81.000	0.272	0.131	0.729	0.092
L28	81.000-78.000	0.200	0.097	0.545	0.069
L29	78.000-77.750	0.196	0.094	0.532	0.068
L30	77.750-72.750	0.196	0.094	0.531	0.068
L31	72.750-67.750	0.196	0.094	0.530	0.068
L32	67.750-62.750	0.196	0.094	0.528	0.068
L33	62.750-60.000	0.212	0.102	0.568	0.074
L34	60.000-59.750	0.566	0.273	1.395	0.180
L35	59.750-54.750	0.566	0.273	1.392	0.180
L36	54.750-49.750	0.541	0.260	1.336	0.174
L37	49.750-46.250	0.292	0.141	0.779	0.103
L38	46.250-46.000	0.292	0.141	0.778	0.103
L39	46.000-41.000	0.292	0.141	0.776	0.103
L40	41.000-36.000	0.292	0.141	0.772	0.104
L41	36.000-32.670	0.222	0.107	0.604	0.082
L42	32.670-32.420	0.213	0.103	0.580	0.079
L43	32.420-27.420	0.213	0.103	0.578	0.080
L44	27.420-22.420	0.213	0.103	0.573	0.080
L45	22.420-20.000	0.226	0.109	0.600	0.085
L46	20.000-19.750	0.571	0.275	1.399	0.199
L47	19.750-14.750	0.513	0.247	1.284	0.185

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L48	14.750-11.250	0.310	0.149	0.845	0.125
L49	11.250-11.000	0.310	0.149	0.839	0.126
L50	11.000-9.000	0.262	0.126	0.706	0.107
L51	9.000-8.750	0.249	0.120	0.667	0.102
L52	8.750-3.750	0.249	0.120	0.657	0.104
L53	3.750-0.000	0.249	0.120	0.622	0.108

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	9	Safety Line 3/8	175.00 - 180.00	1.0000	1.0000
L1	10	Climbing Rung	175.00 - 180.00	1.0000	1.0000
L2	9	Safety Line 3/8	170.00 - 175.00	1.0000	1.0000
L2	10	Climbing Rung	170.00 - 175.00	1.0000	1.0000
L3	9	Safety Line 3/8	165.00 - 170.00	1.0000	1.0000
L3	10	Climbing Rung	165.00 - 170.00	1.0000	1.0000
L4	9	Safety Line 3/8	160.00 - 165.00	1.0000	1.0000
L4	10	Climbing Rung	160.00 - 165.00	1.0000	1.0000
L5	9	Safety Line 3/8	155.00 - 160.00	1.0000	1.0000
L5	10	Climbing Rung	155.00 - 160.00	1.0000	1.0000
L6	9	Safety Line 3/8	150.00 - 155.00	1.0000	1.0000
L6	10	Climbing Rung	150.00 - 155.00	1.0000	1.0000
L7	9	Safety Line 3/8	145.70 - 150.00	1.0000	1.0000
L7	10	Climbing Rung	145.70 - 150.00	1.0000	1.0000
L7	44	CCI(6"x1")	145.70 - 147.70	1.0000	1.0000
L7	45	CCI(6"x1")	145.70 - 147.70	1.0000	1.0000
L7	46	CCI(6"x1")	145.70 - 147.70	1.0000	1.0000
L8	9	Safety Line 3/8	145.45 - 145.70	1.0000	1.0000
L8	10	Climbing Rung	145.45 - 145.70	1.0000	1.0000
L8	44	CCI(6"x1")	145.45 - 145.70	1.0000	1.0000
L8	45	CCI(6"x1")	145.45 - 145.70	1.0000	1.0000
L8	46	CCI(6"x1")	145.45 - 145.70	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L9	9	Safety Line 3/8	140.45 - 145.45	1.0000	1.0000
L9	10	Climbing Rung	140.45 - 145.45	1.0000	1.0000
L9	44	CCI(6"x1")	140.45 - 145.45	1.0000	1.0000
L9	45	CCI(6"x1")	140.45 - 145.45	1.0000	1.0000
L9	46	CCI(6"x1")	140.45 - 145.45	1.0000	1.0000
L10	9	Safety Line 3/8	140.00 - 140.45	1.0000	1.0000
L10	10	Climbing Rung	140.00 - 140.45	1.0000	1.0000
L10	44	CCI(6"x1")	140.00 - 140.45	1.0000	1.0000
L10	45	CCI(6"x1")	140.00 - 140.45	1.0000	1.0000
L10	46	CCI(6"x1")	140.00 - 140.45	1.0000	1.0000
L11	9	Safety Line 3/8	139.75 - 140.00	1.0000	1.0000
L11	10	Climbing Rung	139.75 - 140.00	1.0000	1.0000
L11	44	CCI(6"x1")	139.75 - 140.00	1.0000	1.0000
L11	45	CCI(6"x1")	139.75 - 140.00	1.0000	1.0000
L11	46	CCI(6"x1")	139.75 - 140.00	1.0000	1.0000
L12	9	Safety Line 3/8	134.75 - 139.75	1.0000	1.0000
L12	10	Climbing Rung	134.75 - 139.75	1.0000	1.0000
L12	44	CCI(6"x1")	137.04 - 139.75	1.0000	1.0000
L12	45	CCI(6"x1")	137.04 - 139.75	1.0000	1.0000
L12	46	CCI(6"x1")	137.04 - 139.75	1.0000	1.0000
L13	9	Safety Line 3/8	129.75 - 134.75	1.0000	1.0000
L13	10	Climbing Rung	129.75 - 134.75	1.0000	1.0000
L14	9	Safety Line 3/8	124.75 - 129.75	1.0000	1.0000
L14	10	Climbing Rung	124.75 - 129.75	1.0000	1.0000
L15	9	Safety Line 3/8	119.75 - 124.75	1.0000	1.0000
L15	10	Climbing Rung	119.75 - 124.75	1.0000	1.0000
L16	9	Safety Line 3/8	114.75 - 119.75	1.0000	1.0000
L16	10	Climbing Rung	114.75 - 119.75	1.0000	1.0000
L17	7	HB158-1-08U8-S8J18(1-5/8")	109.75 - 110.00	1.0000	1.0000
L17	9	Safety Line 3/8	109.75 - 114.75	1.0000	1.0000
L17	10	Climbing Rung	109.75 - 114.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L18	7	HB158-1-08U8-S8J18(1-5/8")	106.42 - 109.75	1.0000	1.0000
L18	9	Safety Line 3/8	106.42 - 109.75	1.0000	1.0000
L18	10	Climbing Rung	106.42 - 109.75	1.0000	1.0000
L18	40	CCI(6.5"x1.25")	106.42 - 109.17	1.0000	1.0000
L18	41	CCI(6.5"x1.25")	106.42 - 109.17	1.0000	1.0000
L18	42	CCI(6.5"x1.25")	106.42 - 109.17	1.0000	1.0000
L19	7	HB158-1-08U8-S8J18(1-5/8")	106.17 - 106.42	1.0000	1.0000
L19	9	Safety Line 3/8	106.17 - 106.42	1.0000	1.0000
L19	10	Climbing Rung	106.17 - 106.42	1.0000	1.0000
L19	40	CCI(6.5"x1.25")	106.17 - 106.42	1.0000	1.0000
L19	41	CCI(6.5"x1.25")	106.17 - 106.42	1.0000	1.0000
L19	42	CCI(6.5"x1.25")	106.17 - 106.42	1.0000	1.0000
L20	7	HB158-1-08U8-S8J18(1-5/8")	101.17 - 106.17	1.0000	1.0000
L20	9	Safety Line 3/8	101.17 - 106.17	1.0000	1.0000
L20	10	龕mbing Rung	101.17 - 106.17	1.0000	1.0000
L20	40	CCI(6.5"x1.25")	101.17 - 106.17	1.0000	1.0000
L20	41	CCI(6.5"x1.25")	101.17 - 106.17	1.0000	1.0000
L20	42	CCI(6.5"x1.25")	101.17 - 106.17	1.0000	1.0000
L21	7	HB158-1-08U8-S8J18(1-5/8")	100.00 - 101.17	1.0000	1.0000
L21	9	Safety Line 3/8	100.00 - 101.17	1.0000	1.0000
L21	10	Climbing Rung	100.00 - 101.17	1.0000	1.0000
L21	40	CCI(6.5"x1.25")	100.00 - 101.17	1.0000	1.0000
L21	41	CCI(6.5"x1.25")	100.00 - 101.17	1.0000	1.0000
L21	42	CCI(6.5"x1.25")	100.00 - 101.17	1.0000	1.0000
L22	7	HB158-1-08U8-S8J18(1-5/8")	99.75 - 100.00	1.0000	1.0000
L22	9	Safety Line 3/8	99.75 - 100.00	1.0000	1.0000
L22	10	Climbing Rung	99.75 - 100.00	1.0000	1.0000
L22	40	CCI(6.5"x1.25")	99.75 - 100.00	1.0000	1.0000
L22	41	CCI(6.5"x1.25")	99.75 - 100.00	1.0000	1.0000
L22	42	CCI(6.5"x1.25")	99.75 - 100.00	1.0000	1.0000
L23	7	HB158-1-08U8-S8J18(1-5/8")	94.75 - 99.75	1.0000	1.0000
L23	9	Safety Line 3/8	94.75 - 99.75	1.0000	1.0000
L23	10	Climbing Rung	94.75 - 99.75	1.0000	1.0000
L23	40	CCI(6.5"x1.25")	96.00 - 99.75	1.0000	1.0000
L23	41	CCI(6.5"x1.25")	96.00 - 99.75	1.0000	1.0000
L23	42	CCI(6.5"x1.25")	96.00 - 99.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L24	7	HB158-1-08U8-S8J18(1-5/8")	89.75 - 94.75	1.0000	1.0000
L24	9	Safety Line 3/8	89.75 - 94.75	1.0000	1.0000
L24	10	Climbing Rung	89.75 - 94.75	1.0000	1.0000
L24	24	CCI 8.5" x 1.25" Plate	89.75 - 90.00	1.0000	1.0000
L24	25	CCI 8.5" x 1.25" Plate	89.75 - 90.00	1.0000	1.0000
L24	26	CCI 8.5" x 1.25" Plate	89.75 - 90.00	1.0000	1.0000
L25	7	HB158-1-08U8-S8J18(1-5/8")	86.25 - 89.75	1.0000	1.0000
L25	9	Safety Line 3/8	86.25 - 89.75	1.0000	1.0000
L25	10	Climbing Rung	86.25 - 89.75	1.0000	1.0000
L25	24	CCI 8.5" x 1.25" Plate	86.25 - 89.75	1.0000	1.0000
L25	25	CCI 8.5" x 1.25" Plate	86.25 - 89.75	1.0000	1.0000
L25	26	CCI 8.5" x 1.25" Plate	86.25 - 89.75	1.0000	1.0000
L26	7	HB158-1-08U8-S8J18(1-5/8")	86.00 - 86.25	1.0000	1.0000
L26	9	Safety Line 3/8	86.00 - 86.25	1.0000	1.0000
L26	10	Climbing Rung	86.00 - 86.25	1.0000	1.0000
L26	24	CCI 8.5" x 1.25" Plate	86.00 - 86.25	1.0000	1.0000
L26	25	CCI 8.5" x 1.25" Plate	86.00 - 86.25	1.0000	1.0000
L26	26	CCI 8.5" x 1.25" Plate	86.00 - 86.25	1.0000	1.0000
L27	7	HB158-1-08U8-S8J18(1-5/8")	81.00 - 86.00	1.0000	1.0000
L27	9	Safety Line 3/8	81.00 - 86.00	1.0000	1.0000
L27	10	Climbing Rung	81.00 - 86.00	1.0000	1.0000
L27	24	CCI 8.5" x 1.25" Plate	81.00 - 86.00	1.0000	1.0000
L27	25	CCI 8.5" x 1.25" Plate	81.00 - 86.00	1.0000	1.0000
L27	26	CCI 8.5" x 1.25" Plate	81.00 - 86.00	1.0000	1.0000
L28	7	HB158-1-08U8-S8J18(1-5/8")	78.00 - 81.00	1.0000	1.0000
L28	9	Safety Line 3/8	78.00 - 81.00	1.0000	1.0000
L28	10	Climbing Rung	78.00 - 81.00	1.0000	1.0000
L28	24	CCI 8.5" x 1.25" Plate	78.00 - 81.00	1.0000	1.0000
L28	25	CCI 8.5" x 1.25" Plate	78.00 - 81.00	1.0000	1.0000
L28	26	CCI 8.5" x 1.25" Plate	78.00 - 81.00	1.0000	1.0000
L28	36	CCI(6.5"x1.25")	78.00 - 80.75	1.0000	1.0000
L28	37	CCI(6.5"x1.25")	78.00 - 80.75	1.0000	1.0000
L28	38	CCI(6.5"x1.25")	78.00 - 80.75	1.0000	1.0000
L29	7	HB158-1-08U8-S8J18(1-5/8")	77.75 - 78.00	1.0000	1.0000
L29	9	Safety Line 3/8	77.75 - 78.00	1.0000	1.0000
L29	10	Climbing Rung	77.75 - 78.00	1.0000	1.0000
L29	24	CCI 8.5" x 1.25" Plate	77.75 - 78.00	1.0000	1.0000
L29	25	CCI 8.5" x 1.25" Plate	77.75 - 78.00	1.0000	1.0000
L29	26	CCI 8.5" x 1.25" Plate	77.75 - 78.00	1.0000	1.0000
L29	36	CCI(6.5"x1.25")	77.75 - 78.00	1.0000	1.0000
L29	37	CCI(6.5"x1.25")	77.75 - 78.00	1.0000	1.0000
L29	38	CCI(6.5"x1.25")	77.75 - 78.00	1.0000	1.0000
L30	7	HB158-1-08U8-S8J18(1-5/8")	72.75 - 77.75	1.0000	1.0000
L30	9	Safety Line 3/8	72.75 - 77.75	1.0000	1.0000
L30	10	Climbing Rung	72.75 - 77.75	1.0000	1.0000
L30	24	CCI 8.5" x 1.25" Plate	72.75 - 77.75	1.0000	1.0000
L30	25	CCI 8.5" x 1.25" Plate	72.75 - 77.75	1.0000	1.0000
L30	26	CCI 8.5" x 1.25" Plate	72.75 - 77.75	1.0000	1.0000
L30	36	CCI(6.5"x1.25")	72.75 - 77.75	1.0000	1.0000
L30	37	CCI(6.5"x1.25")	72.75 - 77.75	1.0000	1.0000
L30	38	CCI(6.5"x1.25")	72.75 - 77.75	1.0000	1.0000
L31	7	HB158-1-08U8-S8J18(1-5/8")	67.75 - 72.75	1.0000	1.0000
L31	9	Safety Line 3/8	67.75 - 72.75	1.0000	1.0000
L31	10	Climbing Rung	67.75 - 72.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L31	24	CCI 8.5" x 1.25" Plate	67.75 - 72.75	1.0000	1.0000
L31	25	CCI 8.5" x 1.25" Plate	67.75 - 72.75	1.0000	1.0000
L31	26	CCI 8.5" x 1.25" Plate	67.75 - 72.75	1.0000	1.0000
L31	36	CCI(6.5"x1.25")	67.75 - 72.75	1.0000	1.0000
L31	37	CCI(6.5"x1.25")	67.75 - 72.75	1.0000	1.0000
L31	38	CCI(6.5"x1.25")	67.75 - 72.75	1.0000	1.0000
L32	7	HB158-1-08U8-S8J18(1-5/8")	62.75 - 67.75	1.0000	1.0000
L32	9	Safety Line 3/8	62.75 - 67.75	1.0000	1.0000
L32	10	Climbing Rung	62.75 - 67.75	1.0000	1.0000
L32	24	CCI 8.5" x 1.25" Plate	62.75 - 67.75	1.0000	1.0000
L32	25	CCI 8.5" x 1.25" Plate	62.75 - 67.75	1.0000	1.0000
L32	26	CCI 8.5" x 1.25" Plate	62.75 - 67.75	1.0000	1.0000
L32	36	CCI(6.5"x1.25")	62.75 - 67.75	1.0000	1.0000
L32	37	CCI(6.5"x1.25")	62.75 - 67.75	1.0000	1.0000
L32	38	CCI(6.5"x1.25")	62.75 - 67.75	1.0000	1.0000
L33	7	HB158-1-08U8-S8J18(1-5/8")	60.00 - 62.75	1.0000	1.0000
L33	9	Safety Line 3/8	60.00 - 62.75	1.0000	1.0000
L33	10	Climbing Rung	60.00 - 62.75	1.0000	1.0000
L33	24	CCI 8.5" x 1.25" Plate	60.00 - 62.75	1.0000	1.0000
L33	25	CCI 8.5" x 1.25" Plate	60.00 - 62.75	1.0000	1.0000
L33	26	CCI 8.5" x 1.25" Plate	60.00 - 62.75	1.0000	1.0000
L33	36	CCI(6.5"x1.25")	60.75 - 62.75	1.0000	1.0000
L33	37	CCI(6.5"x1.25")	60.75 - 62.75	1.0000	1.0000
L33	38	CCI(6.5"x1.25")	60.75 - 62.75	1.0000	1.0000
L34	7	HB158-1-08U8-S8J18(1-5/8")	59.75 - 60.00	1.0000	1.0000
L34	9	Safety Line 3/8	59.75 - 60.00	1.0000	1.0000
L34	10	Climbing Rung	59.75 - 60.00	1.0000	1.0000
L35	7	HB158-1-08U8-S8J18(1-5/8")	54.75 - 59.75	1.0000	1.0000
L35	9	Safety Line 3/8	54.75 - 59.75	1.0000	1.0000
L35	10	Climbing Rung	54.75 - 59.75	1.0000	1.0000
L36	7	HB158-1-08U8-S8J18(1-5/8")	49.75 - 54.75	1.0000	1.0000
L36	9	Safety Line 3/8	49.75 - 54.75	1.0000	1.0000
L36	10	Climbing Rung	49.75 - 54.75	1.0000	1.0000
L36	20	CCI 8.5" x 1.25" Plate	49.75 - 50.00	1.0000	1.0000
L36	21	CCI 8.5" x 1.25" Plate	49.75 - 50.00	1.0000	1.0000
L36	22	CCI 8.5" x 1.25" Plate	49.75 - 50.00	1.0000	1.0000
L37	7	HB158-1-08U8-S8J18(1-5/8")	46.25 - 49.75	1.0000	1.0000
L37	9	Safety Line 3/8	46.25 - 49.75	1.0000	1.0000
L37	10	Climbing Rung	46.25 - 49.75	1.0000	1.0000
L37	20	CCI 8.5" x 1.25" Plate	46.25 - 49.75	1.0000	1.0000
L37	21	CCI 8.5" x 1.25" Plate	46.25 - 49.75	1.0000	1.0000
L37	22	CCI 8.5" x 1.25" Plate	46.25 - 49.75	1.0000	1.0000
L38	7	HB158-1-08U8-S8J18(1-5/8")	46.00 - 46.25	1.0000	1.0000
L38	9	Safety Line 3/8	46.00 - 46.25	1.0000	1.0000
L38	10	Climbing Rung	46.00 - 46.25	1.0000	1.0000
L38	20	CCI 8.5" x 1.25" Plate	46.00 - 46.25	1.0000	1.0000
L38	21	CCI 8.5" x 1.25" Plate	46.00 - 46.25	1.0000	1.0000
L38	22	CCI 8.5" x 1.25" Plate	46.00 - 46.25	1.0000	1.0000
L39	7	HB158-1-08U8-S8J18(1-5/8")	41.00 - 46.00	1.0000	1.0000
L39	9	Safety Line 3/8	41.00 - 46.00	1.0000	1.0000
L39	10	Climbing Rung	41.00 - 46.00	1.0000	1.0000
L39	20	CCI 8.5" x 1.25" Plate	41.00 - 46.00	1.0000	1.0000
L39	21	CCI 8.5" x 1.25" Plate	41.00 - 46.00	1.0000	1.0000
L39	22	CCI 8.5" x 1.25" Plate	41.00 - 46.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L40	7	HB158-1-08U8-S8J18(1-5/8")	36.00 - 41.00	1.0000	1.0000
L40	9	Safety Line 3/8	36.00 - 41.00	1.0000	1.0000
L40	10	Climbing Rung	36.00 - 41.00	1.0000	1.0000
L40	20	CCI 8.5" x 1.25" Plate	36.00 - 41.00	1.0000	1.0000
L40	21	CCI 8.5" x 1.25" Plate	36.00 - 41.00	1.0000	1.0000
L40	22	CCI 8.5" x 1.25" Plate	36.00 - 41.00	1.0000	1.0000
L41	7	HB158-1-08U8-S8J18(1-5/8")	32.67 - 36.00	1.0000	1.0000
L41	9	Safety Line 3/8	32.67 - 36.00	1.0000	1.0000
L41	10	Climbing Rung	32.67 - 36.00	1.0000	1.0000
L41	20	CCI 8.5" x 1.25" Plate	32.67 - 36.00	1.0000	1.0000
L41	21	CCI 8.5" x 1.25" Plate	32.67 - 36.00	1.0000	1.0000
L41	22	CCI 8.5" x 1.25" Plate	32.67 - 36.00	1.0000	1.0000
L41	32	CCI(6.5"x1.25")	32.67 - 35.50	1.0000	1.0000
L41	33	CCI(6.5"x1.25")	32.67 - 35.50	1.0000	1.0000
L41	34	CCI(6.5"x1.25")	32.67 - 35.50	1.0000	1.0000
L42	7	HB158-1-08U8-S8J18(1-5/8")	32.42 - 32.67	1.0000	1.0000
L42	9	Safety Line 3/8	32.42 - 32.67	1.0000	1.0000
L42	10	Climbing Rung	32.42 - 32.67	1.0000	1.0000
L42	20	CCI 8.5" x 1.25" Plate	32.42 - 32.67	1.0000	1.0000
L42	21	CCI 8.5" x 1.25" Plate	32.42 - 32.67	1.0000	1.0000
L42	22	CCI 8.5" x 1.25" Plate	32.42 - 32.67	1.0000	1.0000
L42	32	CCI(6.5"x1.25")	32.42 - 32.67	1.0000	1.0000
L42	33	CCI(6.5"x1.25")	32.42 - 32.67	1.0000	1.0000
L42	34	CCI(6.5"x1.25")	32.42 - 32.67	1.0000	1.0000
L43	7	HB158-1-08U8-S8J18(1-5/8")	27.42 - 32.42	1.0000	1.0000
L43	9	Safety Line 3/8	27.42 - 32.42	1.0000	1.0000
L43	10	Climbing Rung	27.42 - 32.42	1.0000	1.0000
L43	20	CCI 8.5" x 1.25" Plate	27.42 - 32.42	1.0000	1.0000
L43	21	CCI 8.5" x 1.25" Plate	27.42 - 32.42	1.0000	1.0000
L43	22	CCI 8.5" x 1.25" Plate	27.42 - 32.42	1.0000	1.0000
L43	32	CCI(6.5"x1.25")	27.42 - 32.42	1.0000	1.0000
L43	33	CCI(6.5"x1.25")	27.42 - 32.42	1.0000	1.0000
L43	34	CCI(6.5"x1.25")	27.42 - 32.42	1.0000	1.0000
L44	7	HB158-1-08U8-S8J18(1-5/8")	22.42 - 27.42	1.0000	1.0000
L44	9	Safety Line 3/8	22.42 - 27.42	1.0000	1.0000
L44	10	Climbing Rung	22.42 - 27.42	1.0000	1.0000
L44	20	CCI 8.5" x 1.25" Plate	22.42 - 27.42	1.0000	1.0000
L44	21	CCI 8.5" x 1.25" Plate	22.42 - 27.42	1.0000	1.0000
L44	22	CCI 8.5" x 1.25" Plate	22.42 - 27.42	1.0000	1.0000
L44	32	CCI(6.5"x1.25")	22.42 - 27.42	1.0000	1.0000
L44	33	CCI(6.5"x1.25")	22.42 - 27.42	1.0000	1.0000
L44	34	CCI(6.5"x1.25")	22.42 - 27.42	1.0000	1.0000
L45	7	HB158-1-08U8-S8J18(1-5/8")	20.00 - 22.42	1.0000	1.0000
L45	9	Safety Line 3/8	20.00 - 22.42	1.0000	1.0000
L45	10	Climbing Rung	20.00 - 22.42	1.0000	1.0000
L45	20	CCI 8.5" x 1.25" Plate	20.00 - 22.42	1.0000	1.0000
L45	21	CCI 8.5" x 1.25" Plate	20.00 - 22.42	1.0000	1.0000
L45	22	CCI 8.5" x 1.25" Plate	20.00 - 22.42	1.0000	1.0000
L45	32	CCI(6.5"x1.25")	20.50 - 22.42	1.0000	1.0000
L45	33	CCI(6.5"x1.25")	20.50 - 22.42	1.0000	1.0000
L45	34	CCI(6.5"x1.25")	20.50 - 22.42	1.0000	1.0000
L46	7	HB158-1-08U8-S8J18(1-5/8")	19.75 - 20.00	1.0000	1.0000
L46	9	Safety Line 3/8	19.75 - 20.00	1.0000	1.0000
L46	10	Climbing Rung	19.75 - 20.00	1.0000	1.0000
L47	7	HB158-1-08U8-S8J18(	14.75 - 19.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		1-5/8")			
L47	9	Safety Line 3/8	14.75 - 19.75	1.0000	1.0000
L47	10	Climbing Rung	14.75 - 19.75	1.0000	1.0000
L47	16	CCI 8.5" x 1.25" Plate	14.75 - 15.42	1.0000	1.0000
L47	17	CCI 8.5" x 1.25" Plate	14.75 - 15.42	1.0000	1.0000
L47	18	CCI 8.5" x 1.25" Plate	14.75 - 15.42	1.0000	1.0000
L48	7	HB158-1-08U8-S8J18(	11.25 - 14.75	1.0000	1.0000
		1-5/8")			
L48	9	Safety Line 3/8	11.25 - 14.75	1.0000	1.0000
L48	10	Climbing Rung	11.25 - 14.75	1.0000	1.0000
L48	16	CCI 8.5" x 1.25" Plate	11.25 - 14.75	1.0000	1.0000
L48	17	CCI 8.5" x 1.25" Plate	11.25 - 14.75	1.0000	1.0000
L48	18	CCI 8.5" x 1.25" Plate	11.25 - 14.75	1.0000	1.0000
L49	7	HB158-1-08U8-S8J18(	11.00 - 11.25	1.0000	1.0000
		1-5/8")			
L49	9	Safety Line 3/8	11.00 - 11.25	1.0000	1.0000
L49	10	Climbing Rung	11.00 - 11.25	1.0000	1.0000
L49	16	CCI 8.5" x 1.25" Plate	11.00 - 11.25	1.0000	1.0000
L49	17	CCI 8.5" x 1.25" Plate	11.00 - 11.25	1.0000	1.0000
L49	18	CCI 8.5" x 1.25" Plate	11.00 - 11.25	1.0000	1.0000
L50	7	HB158-1-08U8-S8J18(	9.00 - 11.00	1.0000	1.0000
		1-5/8")			
L50	9	Safety Line 3/8	9.00 - 11.00	1.0000	1.0000
L50	10	Climbing Rung	9.00 - 11.00	1.0000	1.0000
L50	16	CCI 8.5" x 1.25" Plate	9.00 - 11.00	1.0000	1.0000
L50	17	CCI 8.5" x 1.25" Plate	9.00 - 11.00	1.0000	1.0000
L50	18	CCI 8.5" x 1.25" Plate	9.00 - 11.00	1.0000	1.0000
L50	28	CCI(4.5"x1")	9.00 - 10.50	1.0000	1.0000
L50	29	CCI(4.5"x1")	9.00 - 10.50	1.0000	1.0000
L50	30	CCI(4.5"x1")	9.00 - 10.50	1.0000	1.0000
L51	7	HB158-1-08U8-S8J18(	8.75 - 9.00	1.0000	1.0000
		1-5/8")			
L51	9	Safety Line 3/8	8.75 - 9.00	1.0000	1.0000
L51	10	Climbing Rung	8.75 - 9.00	1.0000	1.0000
L51	16	CCI 8.5" x 1.25" Plate	8.75 - 9.00	1.0000	1.0000
L51	17	CCI 8.5" x 1.25" Plate	8.75 - 9.00	1.0000	1.0000
L51	18	CCI 8.5" x 1.25" Plate	8.75 - 9.00	1.0000	1.0000
L51	28	CCI(4.5"x1")	8.75 - 9.00	1.0000	1.0000
L51	29	CCI(4.5"x1")	8.75 - 9.00	1.0000	1.0000
L51	30	CCI(4.5"x1")	8.75 - 9.00	1.0000	1.0000
L52	7	HB158-1-08U8-S8J18(	3.75 - 8.75	1.0000	1.0000
		1-5/8")			
L52	9	Safety Line 3/8	3.75 - 8.75	1.0000	1.0000
L52	10	Climbing Rung	3.75 - 8.75	1.0000	1.0000
L52	16	CCI 8.5" x 1.25" Plate	3.75 - 8.75	1.0000	1.0000
L52	17	CCI 8.5" x 1.25" Plate	3.75 - 8.75	1.0000	1.0000
L52	18	CCI 8.5" x 1.25" Plate	3.75 - 8.75	1.0000	1.0000
L52	28	CCI(4.5"x1")	3.75 - 8.75	1.0000	1.0000
L52	29	CCI(4.5"x1")	3.75 - 8.75	1.0000	1.0000
L52	30	CCI(4.5"x1")	3.75 - 8.75	1.0000	1.0000
L53	7	HB158-1-08U8-S8J18(	0.00 - 3.75	1.0000	1.0000
		1-5/8")			
L53	9	Safety Line 3/8	0.00 - 3.75	1.0000	1.0000
L53	10	Climbing Rung	0.00 - 3.75	1.0000	1.0000
L53	16	CCI 8.5" x 1.25" Plate	0.00 - 3.75	1.0000	1.0000
L53	17	CCI 8.5" x 1.25" Plate	0.00 - 3.75	1.0000	1.0000
L53	18	CCI 8.5" x 1.25" Plate	0.00 - 3.75	1.0000	1.0000
L53	28	CCI(4.5"x1")	0.00 - 3.75	1.0000	1.0000
L53	29	CCI(4.5"x1")	0.00 - 3.75	1.0000	1.0000
L53	30	CCI(4.5"x1")	0.00 - 3.75	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
Lighting Rod 5/8" x 8'	C	None		0.000	184.000	No Ice	0.500	0.500	0.031
(E)						1/2" Ice	1.314	1.314	0.037
						1" Ice	2.144	2.144	0.047
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APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	177.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(E)			2.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	177.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(E)			2.000			1" Ice	9.346	9.021	0.227
IBC1900BB-1	A	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
IBC1900BB-1	B	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
IBC1900BB-1	C	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	A	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	B	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	C	From Leg	4.000	0.000	177.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			0.000			1" Ice	1.223	0.660	0.039
1900MHz 4X40W RRH	A	From Leg	4.000	0.000	177.000	No Ice	2.322	2.236	0.060
(E-Per App)			0.000			1/2" Ice	2.527	2.439	0.083
			-1.000			1" Ice	2.739	2.648	0.109
1900MHz 4X40W RRH	B	From Leg	4.000	0.000	177.000	No Ice	2.322	2.236	0.060
(E-Per App)			0.000			1/2" Ice	2.527	2.439	0.083
			-1.000			1" Ice	2.739	2.648	0.109
1900MHz 4X40W RRH	C	From Leg	4.000	0.000	177.000	No Ice	2.322	2.236	0.060
(E-Per App)			0.000			1/2" Ice	2.527	2.439	0.083
			-1.000			1" Ice	2.739	2.648	0.109
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	177.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(P)			2.000			1" Ice	9.346	9.021	0.227
DT465B-2XR w/ Mount Pipe	A	From Leg	4.000	0.000	177.000	No Ice	9.336	7.634	0.084
(P)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245
DT465B-2XR w/ Mount Pipe	B	From Leg	4.000	0.000	177.000	No Ice	9.336	7.634	0.084
(P)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245
DT465B-2XR w/ Mount Pipe	C	From Leg	4.000	0.000	177.000	No Ice	9.336	7.634	0.084
(P)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TD-RRH8x20-25	A	From Leg	4.000	0.000	177.000	No Ice	4.045	1.535	0.070
(P)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	B	From Leg	4.000	0.000	177.000	No Ice	4.045	1.535	0.070
(P)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	C	From Leg	4.000	0.000	177.000	No Ice	4.045	1.535	
(P)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
(2) 800MHZ 2X50W RRH	A	From Leg	4.000	0.000	177.000	No Ice	2.134	1.773	0.053
(P)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
(2) 800MHZ 2X50W RRH	B	From Leg	4.000	0.000	177.000	No Ice	2.134	1.773	0.053
(P)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
(2) 800MHZ 2X50W RRH	C	From Leg	4.000	0.000	177.000	No Ice	2.134	1.773	0.053
(P)			0.000			1/2" Ice	2.320	1.946	0.074
			2.000			1" Ice	2.512	2.127	0.098
FIM800CAB-C2D	A	From Leg	4.000	0.000	177.000	No Ice	1.222	1.077	0.053
(P)			0.000			1/2" Ice	1.364	1.212	0.066
			2.000			1" Ice	1.513	1.355	0.081
(3) 4' x 2" Pipe Mount	A	From Leg	4.000	0.000	177.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
(3) 4' x 2" Pipe Mount	B	From Leg	4.000	0.000	177.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
(3) 4' x 2" Pipe Mount	C	From Leg	4.000	0.000	177.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Miscellaneous [NA 510-1]	C	None		0.000	177.000	No Ice	6.000	6.000	0.256
(E-Per Photo)						1/2" Ice	8.500	8.500	0.340
						1" Ice	11.000	11.000	0.423
Platform Mount [LP 1201-1]	C	None		0.000	177.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
Miscellaneous [NA 509-3]	C	None		0.000	176.000	No Ice	11.840	11.840	0.275
(P-PRK-1245)						1/2" Ice	16.960	16.960	0.296
						1" Ice	22.080	22.080	0.317
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PCS 1900MHz	A	From Leg	1.000	0.000	175.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			1.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	B	From Leg	1.000	0.000	175.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			1.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	C	From Leg	1.000	0.000	175.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			1.000			1" Ice	2.739	2.651	0.110
5' x 2" Pipe Mount	A	From Leg	0.500	0.000	175.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
5' x 2" Pipe Mount	B	From Leg	0.500	0.000	175.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
5' x 2" Pipe Mount	C	From Leg	0.500	0.000	175.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	1.703	1.703	0.048
Side Arm Mount [SO 104-3] (E)	C	None		0.000	175.000	No Ice	3.300	3.300	0.287
						1/2" Ice	4.130	4.130	0.317
						1" Ice	4.960	4.960	0.347
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OPA-65R-LCUU-H8 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	12.984 13.669 14.357	9.319 10.790 12.242	0.120 0.214 0.318
OPA-65R-LCUU-H6 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	7.179 8.362 9.259	0.099 0.175 0.261
OPA-65R-LCUU-H6 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	7.179 8.362 9.259	0.099 0.175 0.261
P65-17-XLH-RR w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	11.704 12.424 13.153	8.938 10.450 11.986	0.092 0.178 0.273
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.304 7.479 8.368	0.074 0.139 0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.304 7.479 8.368	0.074 0.139 0.212
7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
7770.00 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
HPA-65R-BUU-H8 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	13.213 13.899 14.587	9.582 11.052 12.496	0.100 0.196 0.303
HPA-65R-BUU-H6 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	8.113 9.304 10.209	0.077 0.158 0.248
HPA-65R-BUU-H6 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	8.113 9.304 10.209	0.077 0.158 0.248
RRUS A2 (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	2.066 2.245 2.431	0.498 0.607 0.724	0.022 0.035 0.050
RRUS A2 (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	2.066 2.245 2.431	0.498 0.607 0.724	0.022 0.035 0.050
RRUS A2 (E)	C	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	2.066 2.245 2.431	0.498 0.607 0.724	0.022 0.035 0.050
RRUS 11 (E)	A	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
RRUS 11 (E)	B	From Leg	4.000 0.000 0.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
RRUS 11	C	From Leg	4.000	0.000	162.000	No Ice	2.784	1.187	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000				1/2" Ice	2.992	1.334	0.068
			0.000				1" Ice	3.207	1.490	0.092
(2) RRUS-11	A	From Leg	4.000	0.000	0.000	162.000	No Ice	2.784	1.187	0.048
(E)			0.000				1/2" Ice	2.992	1.334	0.068
			0.000				1" Ice	3.207	1.490	0.092
(2) RRUS-11	B	From Leg	4.000	0.000	0.000	162.000	No Ice	2.784	1.187	0.048
(E)			0.000				1/2" Ice	2.992	1.334	0.068
			0.000				1" Ice	3.207	1.490	0.092
(2) RRUS-11	C	From Leg	4.000	0.000	0.000	162.000	No Ice	2.784	1.187	0.048
(E)			0.000				1/2" Ice	2.992	1.334	0.068
			0.000				1" Ice	3.207	1.490	0.092
WCS RRUS-32-B30	A	From Leg	4.000	0.000	0.000	162.000	No Ice	0.000	2.424	0.077
(E-Front Area			0.000				1/2" Ice	0.000	2.638	0.105
Shielded/Photo)			0.000				1" Ice	0.000	2.860	0.136
WCS RRUS-32-B30	B	From Leg	4.000	0.000	0.000	162.000	No Ice	0.000	2.424	0.077
(E-Front Area			0.000				1/2" Ice	0.000	2.638	0.105
Shielded/Photo)			0.000				1" Ice	0.000	2.860	0.136
WCS RRUS-32-B30	C	From Leg	4.000	0.000	0.000	162.000	No Ice	0.000	2.424	0.077
(E-Front Area			0.000				1/2" Ice	0.000	2.638	0.105
Shielded/Photo)			0.000				1" Ice	0.000	2.860	0.136
7020.00	A	From Leg	4.000	0.000	0.000	162.000	No Ice	0.102	0.175	0.002
(E)			0.000				1/2" Ice	0.147	0.239	0.005
			0.000				1" Ice	0.199	0.311	0.009
7020.00	B	From Leg	4.000	0.000	0.000	162.000	No Ice	0.102	0.175	0.002
(E)			0.000				1/2" Ice	0.147	0.239	0.005
			0.000				1" Ice	0.199	0.311	0.009
7020.00	C	From Leg	4.000	0.000	0.000	162.000	No Ice	0.102	0.175	0.002
(E)			0.000				1/2" Ice	0.147	0.239	0.005
			0.000				1" Ice	0.199	0.311	0.009
TT19-08BP111-001	A	From Leg	4.000	0.000	0.000	162.000	No Ice	0.545	0.442	0.016
(E)			0.000				1/2" Ice	0.641	0.530	0.022
			0.000				1" Ice	0.743	0.626	0.029
(2) LGP21401	B	From Leg	4.000	0.000	0.000	162.000	No Ice	1.104	0.207	0.014
(E)			0.000				1/2" Ice	1.239	0.274	0.021
			0.000				1" Ice	1.381	0.348	0.030
(2) LGP21401	C	From Leg	4.000	0.000	0.000	162.000	No Ice	1.104	0.207	0.014
(E)			0.000				1/2" Ice	1.239	0.274	0.021
			0.000				1" Ice	1.381	0.348	0.030
(2) DC6-48-60-18-8F	B	From Leg	2.000	0.000	0.000	162.000	No Ice	0.917	0.917	0.019
(E-H.offset/Photo)			0.000				1/2" Ice	1.458	1.458	0.037
			0.000				1" Ice	1.643	1.643	0.057
(2) 3' x 2" Pipe Mount	B	From Leg	2.000	0.000	0.000	162.000	No Ice	0.583	0.583	0.011
(E-For raycap/Photo)			0.000				1/2" Ice	0.770	0.770	0.017
			0.000				1" Ice	0.967	0.967	0.024
Platform Mount [LP 301-1]	C	None			0.000	162.000	No Ice	30.100	30.100	1.589
(E)							1/2" Ice	40.800	40.800	2.029
							1" Ice	51.500	51.500	2.470
Miscellaneous [NA 509-3]	C	None			0.000	161.000	No Ice	11.840	11.840	0.275
(E-Per Photo)							1/2" Ice	16.960	16.960	0.296
							1" Ice	22.080	22.080	0.317
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(2) SBNHH-1D65C w/	A	From Leg	3.000	0.000	0.000	110.000	No Ice	11.626	9.793	0.082
Mount Pipe			0.000				1/2" Ice	12.346	11.311	0.172
(E)			0.000				1" Ice	13.074	12.854	0.271
(2) SBNHH-1D65C w/	B	From Leg	3.000	0.000	0.000	110.000	No Ice	11.626	9.793	0.082
Mount Pipe			0.000				1/2" Ice	12.346	11.311	0.172
(E)			0.000				1" Ice	13.074	12.854	0.271

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) SBNHH-1D65C w/ Mount Pipe	C	From Leg	3.000 0.000	0.000	110.000	No Ice 1/2" Ice	11.626 12.346	9.793 11.311	0.082 0.172
(E)			0.000			1" Ice	13.074	12.854	0.271
B13 RRH 4X30	A	From Leg	1.500	0.000	110.000	No Ice	2.055	1.320	0.056
(E)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
B13 RRH 4X30	B	From Leg	1.500	0.000	110.000	No Ice	2.055	1.320	0.056
(E)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
B13 RRH 4X30	C	From Leg	1.500	0.000	110.000	No Ice	2.055	1.320	0.056
(E)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
DB-B1-6C-12AB-0Z	B	From Leg	1.500	0.000	110.000	No Ice	3.364	2.192	0.021
(E)			0.000			1/2" Ice	3.597	2.395	0.050
			0.000			1" Ice	3.838	2.606	0.082
DB-B1-6C-12AB-0Z	C	From Leg	1.500	0.000	110.000	No Ice	3.364	2.192	0.021
(E)			0.000			1/2" Ice	3.597	2.395	0.050
			0.000			1" Ice	3.838	2.606	0.082
B25 RRH4X30	A	From Leg	3.000	0.000	110.000	No Ice	2.200	1.742	0.055
(E)			0.000			1/2" Ice	2.393	1.920	0.075
			0.000			1" Ice	2.593	2.106	0.099
B25 RRH4X30	B	From Leg	3.000	0.000	110.000	No Ice	2.200	1.742	0.055
(E)			0.000			1/2" Ice	2.393	1.920	0.075
			0.000			1" Ice	2.593	2.106	0.099
B25 RRH4X30	C	From Leg	3.000	0.000	110.000	No Ice	2.200	1.742	0.055
(E)			0.000			1/2" Ice	2.393	1.920	0.075
			0.000			1" Ice	2.593	2.106	0.099
B66A RRH4X45	A	From Leg	3.000	0.000	110.000	No Ice	2.580	1.630	0.057
(E)			0.000			1/2" Ice	2.794	1.811	0.077
			0.000			1" Ice	3.015	1.999	0.101
B66A RRH4X45	B	From Leg	3.000	0.000	110.000	No Ice	2.580	1.630	0.057
(E)			0.000			1/2" Ice	2.794	1.811	0.077
			0.000			1" Ice	3.015	1.999	0.101
B66A RRH4X45	C	From Leg	3.000	0.000	110.000	No Ice	2.580	1.630	0.057
(E)			0.000			1/2" Ice	2.794	1.811	0.077
			0.000			1" Ice	3.015	1.999	0.101
(2) 5' x 2" Pipe Mount	A	From Leg	1.500	0.000	110.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
(2) 5' x 2" Pipe Mount	B	From Leg	1.500	0.000	110.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
(2) 5' x 2" Pipe Mount	C	From Leg	1.500	0.000	110.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
T-Arm Mount [TA 702-3]	C	None		0.000	110.000	No Ice	5.640	5.640	0.339
(E)						1/2" Ice	6.550	6.550	0.429
						1" Ice	7.460	7.460	0.519
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Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
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	180 - 175	Pole	Max Tension	45	0.000	0.000	0.000
			Max. Compression	26	-14.071	-0.135	0.830

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-5.052	-23.024	0.323
			Max. My	2	-5.049	-0.049	23.354
			Max. Vy	8	8.063	-23.024	0.323
			Max. Vx	2	-8.072	-0.049	23.354
			Max. Torque	8			0.293
L2	175 - 170	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-16.644	-0.285	0.922
			Max. Mx	8	-6.260	-68.487	0.361
			Max. My	2	-6.256	-0.100	68.843
			Max. Vy	8	9.228	-68.487	0.361
			Max. Vx	2	-9.237	-0.100	68.843
			Max. Torque	8			0.293
L3	170 - 165	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.756	-0.435	1.015
			Max. Mx	8	-6.879	-115.709	0.398
			Max. My	2	-6.875	-0.151	116.090
			Max. Vy	8	9.643	-115.709	0.398
			Max. Vx	2	-9.652	-0.151	116.090
			Max. Torque	8			0.293
L4	165 - 160	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-33.279	-1.610	2.048
			Max. Mx	8	-11.149	-182.550	0.509
			Max. My	2	-11.134	-0.355	183.149
			Max. Vy	8	19.106	-182.550	0.509
			Max. Vx	2	-19.208	-0.355	183.149
			Max. Torque	8			1.593
L5	160 - 155	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.454	-1.781	2.154
			Max. Mx	8	-11.880	-279.093	0.552
			Max. My	2	-11.866	-0.410	280.182
			Max. Vy	8	19.496	-279.093	0.552
			Max. Vx	2	-19.598	-0.410	280.182
			Max. Torque	8			1.593
L6	155 - 150	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.628	-1.949	2.256
			Max. Mx	8	-12.639	-377.520	0.593
			Max. My	2	-12.625	-0.464	379.099
			Max. Vy	8	19.863	-377.520	0.593
			Max. Vx	2	-19.965	-0.464	379.099
			Max. Torque	8			1.593
L7	150 - 145.7	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.760	-2.092	2.339
			Max. Mx	8	-13.314	-463.583	0.625
			Max. My	2	-13.300	-0.510	465.585
			Max. Vy	8	20.159	-463.583	0.625
			Max. Vx	2	-20.261	-0.510	465.585
			Max. Torque	8			1.592
L8	145.7 - 145.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.852	-2.102	2.345
			Max. Mx	8	-13.381	-468.626	0.628
			Max. My	2	-13.367	-0.513	470.652
			Max. Vy	8	20.172	-468.626	0.628
			Max. Vx	2	-20.274	-0.513	470.652
			Max. Torque	8			1.591
L9	145.45 - 140.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.698	-2.263	2.439
			Max. Mx	8	-14.501	-570.487	0.664
			Max. My	2	-14.488	-0.566	573.004
			Max. Vy	8	20.558	-570.487	0.664
			Max. Vx	2	-20.661	-0.566	573.004

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	8			1.591
L10	140.45 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.863	-2.278	2.447
			Max. Mx	8	-14.608	-579.748	0.667
			Max. My	2	-14.595	-0.570	582.309
			Max. Vy	8	20.589	-579.748	0.667
			Max. Vx	2	-20.691	-0.570	582.309
			Max. Torque	8			1.591
L11	140 - 139.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.974	-2.294	2.456
			Max. Mx	8	-14.675	-584.901	0.671
			Max. My	2	-14.662	-0.575	587.487
			Max. Vy	8	20.618	-584.901	0.671
			Max. Vx	2	-20.720	-0.575	587.487
			Max. Torque	8			1.591
L12	139.75 - 134.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.047	-2.511	2.580
			Max. Mx	8	-15.949	-689.527	0.719
			Max. My	2	-15.936	-0.650	692.594
			Max. Vy	8	21.209	-689.527	0.719
			Max. Vx	2	-21.311	-0.650	692.594
			Max. Torque	8			1.591
L13	134.75 - 129.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-42.952	-2.732	2.706
			Max. Mx	8	-17.234	-797.068	0.768
			Max. My	2	-17.222	-0.725	800.619
			Max. Vy	8	21.786	-797.068	0.768
			Max. Vx	2	-21.888	-0.725	800.619
			Max. Torque	8			1.591
L14	129.75 - 124.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.854	-2.952	2.830
			Max. Mx	8	-18.529	-907.454	0.816
			Max. My	2	-18.518	-0.801	911.489
			Max. Vy	8	22.348	-907.454	0.816
			Max. Vx	2	-22.450	-0.801	911.489
			Max. Torque	8			1.590
L15	124.75 - 119.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-46.753	-3.171	2.954
			Max. Mx	8	-19.835	-1020.604	0.864
			Max. My	2	-19.824	-0.877	1025.123
			Max. Vy	8	22.893	-1020.604	0.864
			Max. Vx	2	-22.996	-0.877	1025.123
			Max. Torque	8			1.590
L16	119.75 - 114.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-48.649	-3.390	3.075
			Max. Mx	8	-21.151	-1136.432	0.911
			Max. My	2	-21.140	-0.952	1141.434
			Max. Vy	8	23.420	-1136.432	0.911
			Max. Vx	2	-23.523	-0.952	1141.434
			Max. Torque	8			1.589
L17	114.75 - 109.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.606	-3.612	2.627
			Max. Mx	8	-24.061	-1255.983	0.899
			Max. My	2	-24.053	-1.029	1261.379
			Max. Vy	8	28.489	-1255.983	0.899

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-28.541	-1.029	1261.379
			Max. Torque	8			1.589
L18	109.75 - 106.42	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-59.100	-3.831	2.642
			Max. Mx	8	-24.972	-1351.420	0.919
			Max. My	2	-24.965	-1.091	1356.944
			Max. Vy	8	28.813	-1351.420	0.919
			Max. Vx	2	-28.864	-1.091	1356.944
			Max. Torque	10			1.319
L19	106.42 - 106.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-59.240	-3.854	2.646
			Max. Mx	8	-25.074	-1358.629	0.921
			Max. My	2	-25.067	-1.096	1364.162
			Max. Vy	8	28.833	-1358.629	0.921
			Max. Vx	2	-28.884	-1.096	1364.162
			Max. Torque	10			1.319
L20	106.17 - 101.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.031	-4.176	2.664
			Max. Mx	8	-26.912	-1504.179	0.951
			Max. My	2	-26.905	-1.190	1509.904
			Max. Vy	8	29.361	-1504.179	0.951
			Max. Vx	2	-29.412	-1.190	1509.904
			Max. Torque	10			1.319
L21	101.17 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.683	-4.252	2.669
			Max. Mx	8	-27.343	-1538.612	0.958
			Max. My	2	-27.336	-1.212	1544.382
			Max. Vy	8	29.482	-1538.612	0.958
			Max. Vx	2	-29.533	-1.212	1544.382
			Max. Torque	10			1.319
L22	100 - 99.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.811	-4.277	2.673
			Max. Mx	8	-27.428	-1545.990	0.961
			Max. My	2	-27.421	-1.218	1551.768
			Max. Vy	8	29.506	-1545.990	0.961
			Max. Vx	2	-29.557	-1.218	1551.768
			Max. Torque	10			1.319
L23	99.75 - 94.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-65.293	-4.641	2.692
			Max. Mx	8	-28.965	-1695.016	0.994
			Max. My	2	-28.958	-1.326	1700.975
			Max. Vy	8	30.075	-1695.016	0.994
			Max. Vx	2	-30.126	-1.326	1700.975
			Max. Torque	10			1.319
L24	94.75 - 89.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67.556	-5.009	2.712
			Max. Mx	8	-30.520	-1846.810	1.027
			Max. My	2	-30.514	-1.434	1852.950
			Max. Vy	8	30.618	-1846.810	1.027
			Max. Vx	2	-30.669	-1.434	1852.950
			Max. Torque	10			1.318
L25	89.75 - 86.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.375	-5.264	2.725
			Max. Mx	8	-31.613	-1954.650	1.050
			Max. My	2	-31.608	-1.510	1960.915
			Max. Vy	8	30.985	-1954.650	1.050
			Max. Vx	2	-31.036	-1.510	1960.915
			Max. Torque	10			1.318

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L26	86.25 - 86	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.537	-5.288	2.729
			Max. Mx	8	-31.734	-1962.402	1.052
			Max. My	2	-31.728	-1.515	1968.676
			Max. Vy	8	31.006	-1962.402	1.052
			Max. Vx	2	-31.056	-1.515	1968.676
			Max. Torque	10			1.318
L27	86 - 81	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-72.779	-5.643	2.745
			Max. Mx	8	-33.938	-2118.873	1.085
			Max. My	2	-33.932	-1.623	2125.327
			Max. Vy	8	31.555	-2118.873	1.085
			Max. Vx	2	-31.606	-1.623	2125.327
			Max. Torque	10			1.317
L28	81 - 78	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-74.887	-5.859	2.756
			Max. Mx	8	-35.269	-2214.036	1.104
			Max. My	2	-35.264	-1.687	2220.597
			Max. Vy	8	31.868	-2214.036	1.104
			Max. Vx	2	-31.919	-1.687	2220.597
			Max. Torque	10			1.317
L29	78 - 77.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-75.089	-5.884	2.760
			Max. Mx	8	-35.413	-2222.009	1.106
			Max. My	2	-35.407	-1.693	2228.579
			Max. Vy	8	31.889	-2222.009	1.106
			Max. Vx	2	-31.940	-1.693	2228.579
			Max. Torque	10			1.317
L30	77.75 - 72.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-79.115	-6.233	2.775
			Max. Mx	8	-38.099	-2382.929	1.138
			Max. My	2	-38.094	-1.800	2389.678
			Max. Vy	8	32.449	-2382.929	1.138
			Max. Vx	2	-32.500	-1.800	2389.678
			Max. Torque	10			1.317
L31	72.75 - 67.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-83.131	-6.549	2.779
			Max. Mx	8	-40.799	-2546.558	1.170
			Max. My	2	-40.795	-1.908	2553.486
			Max. Vy	8	32.979	-2546.558	1.170
			Max. Vx	2	-33.029	-1.908	2553.486
			Max. Torque	10			1.317
L32	67.75 - 62.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-87.133	-6.863	2.784
			Max. Mx	8	-43.509	-2712.756	1.201
			Max. My	2	-43.505	-2.016	2719.861
			Max. Vy	8	33.479	-2712.756	1.201
			Max. Vx	2	-33.530	-2.016	2719.861
			Max. Torque	10			1.316
L33	62.75 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-89.285	-7.033	2.786
			Max. Mx	8	-44.999	-2805.206	1.219
			Max. My	2	-44.995	-2.075	2812.409
			Max. Vy	8	33.746	-2805.206	1.219
			Max. Vx	2	-33.796	-2.075	2812.409
			Max. Torque	10			1.316
L34	60 - 59.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-89.428	-7.057	2.789
			Max. Mx	8	-45.117	-2813.647	1.221
			Max. My	2	-45.113	-2.081	2820.859
			Max. Vy	8	33.761	-2813.647	1.221

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-33.811	-2.081	2820.859
			Max. Torque	10			1.316
L35	59.75 - 54.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-92.277	-7.404	2.793
			Max. Mx	8	-47.244	-2983.830	1.255
			Max. My	2	-47.240	-2.202	2991.209
			Max. Vy	8	34.283	-2983.830	1.255
			Max. Vx	2	-34.333	-2.202	2991.209
			Max. Torque	10			1.316
L36	54.75 - 49.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-95.135	-7.752	2.798
			Max. Mx	8	-49.386	-3156.511	1.290
			Max. My	2	-49.383	-2.323	3164.056
			Max. Vy	8	34.769	-3156.511	1.290
			Max. Vx	2	-34.819	-2.323	3164.056
			Max. Torque	10			1.316
L37	49.75 - 46.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-97.351	-7.994	2.802
			Max. Mx	8	-50.890	-3278.792	1.314
			Max. My	2	-50.887	-2.407	3286.453
			Max. Vy	8	35.092	-3278.792	1.314
			Max. Vx	2	-35.142	-2.407	3286.453
			Max. Torque	10			1.315
L38	46.25 - 46	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-97.542	-8.016	2.805
			Max. Mx	8	-51.040	-3287.570	1.315
			Max. My	2	-51.037	-2.413	3295.238
			Max. Vy	8	35.104	-3287.570	1.315
			Max. Vx	2	-35.153	-2.413	3295.238
			Max. Torque	10			1.315
L39	46 - 41	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-101.345	-8.354	2.809
			Max. Mx	8	-53.830	-3464.324	1.349
			Max. My	2	-53.828	-2.533	3472.157
			Max. Vy	8	35.571	-3464.324	1.349
			Max. Vx	2	-35.620	-2.533	3472.157
			Max. Torque	10			1.315
L40	41 - 36	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-105.133	-8.691	2.815
			Max. Mx	8	-56.637	-3643.272	1.382
			Max. My	2	-56.635	-2.653	3651.267
			Max. Vy	8	35.992	-3643.272	1.382
			Max. Vx	2	-36.041	-2.653	3651.267
			Max. Torque	10			1.315
L41	36 - 32.67	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-107.799	-8.914	2.819
			Max. Mx	8	-58.510	-3763.572	1.404
			Max. My	2	-58.508	-2.732	3771.675
			Max. Vy	8	36.251	-3763.572	1.404
			Max. Vx	2	-36.300	-2.732	3771.675
			Max. Torque	10			1.315
L42	32.67 - 32.42	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-108.025	-8.934	2.821
			Max. Mx	8	-58.685	-3772.638	1.406
			Max. My	2	-58.683	-2.738	3780.749
			Max. Vy	8	36.257	-3772.638	1.406
			Max. Vx	2	-36.306	-2.738	3780.749
			Max. Torque	10			1.315
L43	32.42 - 27.42	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-112.545	-9.260	2.826
			Max. Mx	8	-61.967	-3955.037	1.439

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-61.965	-2.857	3963.309
			Max. Vy	8	36.674	-3955.037	1.439
			Max. Vx	2	-36.723	-2.857	3963.309
			Max. Torque	10			1.315
L44	27.42 - 22.42	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-117.036	-9.583	2.832
			Max. Mx	8	-65.262	-4139.364	1.471
			Max. My	2	-65.260	-2.976	4147.795
			Max. Vy	8	37.039	-4139.364	1.471
			Max. Vx	2	-37.088	-2.976	4147.795
			Max. Torque	10			1.315
L45	22.42 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-119.172	-9.737	2.835
			Max. Mx	8	-66.857	-4229.207	1.486
			Max. My	2	-66.855	-3.033	4237.716
			Max. Vy	8	37.203	-4229.207	1.486
			Max. Vx	2	-37.252	-3.033	4237.716
			Max. Torque	10			1.315
L46	20 - 19.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-119.326	-9.757	2.836
			Max. Mx	8	-66.986	-4238.512	1.488
			Max. My	2	-66.985	-3.039	4247.027
			Max. Vy	8	37.206	-4238.512	1.488
			Max. Vx	2	-37.255	-3.039	4247.027
			Max. Torque	10			1.315
L47	19.75 - 14.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-122.423	-10.104	2.843
			Max. Mx	8	-69.381	-4425.470	1.523
			Max. My	2	-69.380	-3.171	4434.132
			Max. Vy	8	37.549	-4425.470	1.523
			Max. Vx	2	-37.597	-3.171	4434.132
			Max. Torque	10			1.315
L48	14.75 - 11.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-124.744	-10.342	2.849
			Max. Mx	8	-71.065	-4557.275	1.548
			Max. My	2	-71.064	-3.263	4566.039
			Max. Vy	8	37.760	-4557.275	1.548
			Max. Vx	2	-37.808	-3.263	4566.039
			Max. Torque	10			1.314
L49	11.25 - 11	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-124.942	-10.360	2.850
			Max. Mx	8	-71.228	-4566.717	1.550
			Max. My	2	-71.227	-3.269	4575.489
			Max. Vy	8	37.757	-4566.717	1.550
			Max. Vx	2	-37.805	-3.269	4575.489
			Max. Torque	10			1.314
L50	11 - 9	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-126.572	-10.492	2.852
			Max. Mx	8	-72.437	-4642.406	1.564
			Max. My	2	-72.436	-3.322	4651.236
			Max. Vy	8	37.902	-4642.406	1.564
			Max. Vx	2	-37.950	-3.322	4651.236
			Max. Torque	10			1.314
L51	9 - 8.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-126.790	-10.509	2.853
			Max. Mx	8	-72.610	-4651.886	1.565
			Max. My	2	-72.609	-3.328	4660.723
			Max. Vy	8	37.906	-4651.886	1.565
			Max. Vx	2	-37.954	-3.328	4660.723
			Max. Torque	10			1.314
L52	8.75 - 3.75	Pole	Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-131.123	-10.826	2.862
			Max. Mx	8	-75.914	-4842.365	1.600
			Max. My	2	-75.914	-3.458	4851.345
			Max. Vy	8	38.252	-4842.365	1.600
			Max. Vx	2	-38.300	-3.458	4851.345
			Max. Torque	10			1.314
L53	3.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-134.263	-11.042	2.869
			Max. Mx	8	-78.398	-4986.287	1.626
			Max. My	2	-78.398	-3.556	4995.374
			Max. Vy	8	38.493	-4986.287	1.626
			Max. Vx	2	-38.540	-3.556	4995.374
			Max. Torque	10			1.314

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	134.263	-0.000	0.000
	Max. H_x	20	78.409	38.470	0.000
	Max. H_z	2	78.409	0.000	38.517
	Max. M_x	2	4995.374	0.000	38.517
	Max. M_z	8	4986.287	-38.470	0.000
	Max. Torsion	10	1.314	-33.316	-19.259
	Min. Vert	19	58.807	33.316	-19.259
	Min. H_x	8	78.409	-38.470	0.000
	Min. H_z	14	78.409	0.000	-38.517
	Min. M_x	14	-4992.109	0.000	-38.517
	Min. M_z	20	-4979.188	38.470	0.000
	Min. Torsion	22	-1.313	33.316	19.259

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	65.341	0.000	0.000	-1.285	-2.838	-0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	78.409	0.000	-38.517	-4995.374	-3.556	0.386
0.9 Dead+1.6 Wind 0 deg - No Ice	58.807	0.000	-38.517	-4940.114	-2.636	0.382
1.2 Dead+1.6 Wind 30 deg - No Ice	78.409	19.243	-33.371	-4327.387	-2495.514	-0.312
0.9 Dead+1.6 Wind 30 deg - No Ice	58.807	19.243	-33.371	-4279.466	-2467.251	-0.310
1.2 Dead+1.6 Wind 60 deg - No Ice	78.409	33.316	-19.259	-2498.510	-4318.725	-0.927
0.9 Dead+1.6 Wind 60 deg - No Ice	58.807	33.316	-19.259	-2470.668	-4270.451	-0.919
1.2 Dead+1.6 Wind 90 deg - No Ice	78.409	38.470	0.000	-1.625	-4986.287	-1.294
0.9 Dead+1.6 Wind 90 deg - No	58.807	38.470	0.000	-1.200	-4930.690	-1.282

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
Ice						
1.2 Dead+1.6 Wind 120 deg - No Ice	78.409	33.316	19.259	2495.256	-4318.718	-1.314
0.9 Dead+1.6 Wind 120 deg - No Ice	58.807	33.316	19.259	2468.265	-4270.446	-1.302
1.2 Dead+1.6 Wind 150 deg - No Ice	78.409	19.235	33.357	4323.083	-2494.906	-0.982
0.9 Dead+1.6 Wind 150 deg - No Ice	58.807	19.235	33.357	4276.023	-2466.648	-0.972
1.2 Dead+1.6 Wind 180 deg - No Ice	78.409	0.000	38.517	4992.109	-3.556	-0.386
0.9 Dead+1.6 Wind 180 deg - No Ice	58.807	0.000	38.517	4937.704	-2.636	-0.382
1.2 Dead+1.6 Wind 210 deg - No Ice	78.409	-19.243	33.371	4324.130	2488.399	0.313
0.9 Dead+1.6 Wind 210 deg - No Ice	58.807	-19.243	33.371	4277.062	2461.977	0.310
1.2 Dead+1.6 Wind 240 deg - No Ice	78.409	-33.316	19.259	2495.261	4311.616	0.928
0.9 Dead+1.6 Wind 240 deg - No Ice	58.807	-33.316	19.259	2468.269	4265.181	0.920
1.2 Dead+1.6 Wind 270 deg - No Ice	78.409	-38.470	0.000	-1.625	4979.188	1.294
0.9 Dead+1.6 Wind 270 deg - No Ice	58.807	-38.470	0.000	-1.200	4925.426	1.282
1.2 Dead+1.6 Wind 300 deg - No Ice	78.409	-33.316	-19.259	-2498.516	4311.622	1.313
0.9 Dead+1.6 Wind 300 deg - No Ice	58.807	-33.316	-19.259	-2470.671	4265.186	1.301
1.2 Dead+1.6 Wind 330 deg - No Ice	78.409	-19.235	-33.357	-4326.350	2487.804	0.981
0.9 Dead+1.6 Wind 330 deg - No Ice	58.807	-19.235	-33.357	-4278.434	2461.383	0.971
1.2 Dead+1.0 Ice+1.0 Temp	134.263	0.000	-0.000	-2.869	-11.042	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	134.263	0.000	-7.642	-1028.174	-11.381	0.113
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	134.263	3.897	-6.740	-899.850	-530.039	-0.019
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	134.263	6.628	-3.821	-515.573	-900.695	-0.147
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	134.263	7.653	-0.000	-2.972	-1038.272	-0.235
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	134.263	6.628	3.821	509.628	-900.694	-0.260
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	134.263	4.088	7.071	934.517	-553.486	-0.217
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	134.263	0.000	7.642	1022.229	-11.381	-0.113
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	134.263	-3.897	6.740	893.906	507.276	0.019
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	134.263	-6.628	3.821	509.629	877.933	0.146
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	134.263	-7.653	-0.000	-2.972	1015.511	0.234
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	134.263	-6.628	-3.821	-515.573	877.934	0.259
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	134.263	-4.088	-7.071	-940.463	530.724	0.216
Dead+Wind 0 deg - Service	65.341	0.000	-7.754	-1000.442	-2.946	0.078
Dead+Wind 30 deg - Service	65.341	3.874	-6.718	-866.801	-501.510	-0.063
Dead+Wind 60 deg - Service	65.341	6.707	-3.877	-500.899	-866.275	-0.188

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 90 deg - Service	65.341	7.745	0.000	-1.353	-999.829	-0.262
Dead+Wind 120 deg - Service	65.341	6.707	3.877	498.193	-866.274	-0.266
Dead+Wind 150 deg - Service	65.341	3.872	6.715	863.886	-501.389	-0.199
Dead+Wind 180 deg - Service	65.341	0.000	7.754	997.735	-2.946	-0.078
Dead+Wind 210 deg - Service	65.341	-3.874	6.718	864.095	495.617	0.063
Dead+Wind 240 deg - Service	65.341	-6.707	3.877	498.193	860.382	0.188
Dead+Wind 270 deg - Service	65.341	-7.745	0.000	-1.353	993.937	0.262
Dead+Wind 300 deg - Service	65.341	-6.707	-3.877	-500.899	860.382	0.266
Dead+Wind 330 deg - Service	65.341	-3.872	-6.715	-866.592	495.497	0.198

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-65.341	0.000	0.000	65.341	0.000	0.000%
2	0.000	-78.409	-38.517	0.000	78.409	38.517	0.000%
3	0.000	-58.807	-38.517	0.000	58.807	38.517	0.000%
4	19.243	-78.409	-33.371	-19.243	78.409	33.371	0.000%
5	19.243	-58.807	-33.371	-19.243	58.807	33.371	0.000%
6	33.316	-78.409	-19.259	-33.316	78.409	19.259	0.000%
7	33.316	-58.807	-19.259	-33.316	58.807	19.259	0.000%
8	38.470	-78.409	0.000	-38.470	78.409	0.000	0.000%
9	38.470	-58.807	0.000	-38.470	58.807	0.000	0.000%
10	33.316	-78.409	19.259	-33.316	78.409	-19.259	0.000%
11	33.316	-58.807	19.259	-33.316	58.807	-19.259	0.000%
12	19.235	-78.409	33.357	-19.235	78.409	-33.357	0.000%
13	19.235	-58.807	33.357	-19.235	58.807	-33.357	0.000%
14	0.000	-78.409	38.517	0.000	78.409	-38.517	0.000%
15	0.000	-58.807	38.517	0.000	58.807	-38.517	0.000%
16	-19.243	-78.409	33.371	19.243	78.409	-33.371	0.000%
17	-19.243	-58.807	33.371	19.243	58.807	-33.371	0.000%
18	-33.316	-78.409	19.259	33.316	78.409	-19.259	0.000%
19	-33.316	-58.807	19.259	33.316	58.807	-19.259	0.000%
20	-38.470	-78.409	0.000	38.470	78.409	0.000	0.000%
21	-38.470	-58.807	0.000	38.470	58.807	0.000	0.000%
22	-33.316	-78.409	-19.259	33.316	78.409	19.259	0.000%
23	-33.316	-58.807	-19.259	33.316	58.807	19.259	0.000%
24	-19.235	-78.409	-33.357	19.235	78.409	33.357	0.000%
25	-19.235	-58.807	-33.357	19.235	58.807	33.357	0.000%
26	0.000	-134.263	0.000	-0.000	134.263	0.000	0.000%
27	0.000	-134.263	-7.642	-0.000	134.263	7.642	0.000%
28	3.897	-134.263	-6.740	-3.897	134.263	6.740	0.000%
29	6.628	-134.263	-3.821	-6.628	134.263	3.821	0.000%
30	7.653	-134.263	0.000	-7.653	134.263	0.000	0.000%
31	6.628	-134.263	3.821	-6.628	134.263	-3.821	0.000%
32	4.088	-134.263	7.071	-4.088	134.263	-7.071	0.000%
33	0.000	-134.263	7.642	-0.000	134.263	-7.642	0.000%
34	-3.897	-134.263	6.740	3.897	134.263	-6.740	0.000%
35	-6.628	-134.263	3.821	6.628	134.263	-3.821	0.000%
36	-7.653	-134.263	0.000	7.653	134.263	0.000	0.000%
37	-6.628	-134.263	-3.821	6.628	134.263	3.821	0.000%
38	-4.088	-134.263	-7.071	4.088	134.263	7.071	0.000%
39	0.000	-65.341	-7.754	-0.000	65.341	7.754	0.000%
40	3.874	-65.341	-6.718	-3.874	65.341	6.718	0.000%
41	6.707	-65.341	-3.877	-6.707	65.341	3.877	0.000%
42	7.745	-65.341	0.000	-7.745	65.341	0.000	0.000%
43	6.707	-65.341	3.877	-6.707	65.341	-3.877	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
44	3.872	-65.341	6.715	-3.872	65.341	-6.715	0.000%
45	0.000	-65.341	7.754	-0.000	65.341	-7.754	0.000%
46	-3.874	-65.341	6.718	3.874	65.341	-6.718	0.000%
47	-6.707	-65.341	3.877	6.707	65.341	-3.877	0.000%
48	-7.745	-65.341	0.000	7.745	65.341	0.000	0.000%
49	-6.707	-65.341	-3.877	6.707	65.341	3.877	0.000%
50	-3.872	-65.341	-6.715	3.872	65.341	6.715	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	0.00029233
3	Yes	5	0.00000001	0.00011901
4	Yes	6	0.00000001	0.00094932
5	Yes	6	0.00000001	0.00031478
6	Yes	6	0.00000001	0.00096391
7	Yes	6	0.00000001	0.00032030
8	Yes	5	0.00000001	0.00063188
9	Yes	5	0.00000001	0.00029309
10	Yes	6	0.00000001	0.00093458
11	Yes	6	0.00000001	0.00030978
12	Yes	6	0.00000001	0.00096395
13	Yes	6	0.00000001	0.00032040
14	Yes	5	0.00000001	0.00029210
15	Yes	5	0.00000001	0.00011895
16	Yes	6	0.00000001	0.00095324
17	Yes	6	0.00000001	0.00031684
18	Yes	6	0.00000001	0.00093672
19	Yes	6	0.00000001	0.00031088
20	Yes	5	0.00000001	0.00063120
21	Yes	5	0.00000001	0.00029289
22	Yes	6	0.00000001	0.00096637
23	Yes	6	0.00000001	0.00032153
24	Yes	6	0.00000001	0.00093866
25	Yes	6	0.00000001	0.00031129
26	Yes	4	0.00000001	0.00097950
27	Yes	7	0.00000001	0.00012657
28	Yes	7	0.00000001	0.00014395
29	Yes	7	0.00000001	0.00014352
30	Yes	7	0.00000001	0.00012751
31	Yes	7	0.00000001	0.00014174
32	Yes	7	0.00000001	0.00014996
33	Yes	7	0.00000001	0.00012484
34	Yes	7	0.00000001	0.00013927
35	Yes	7	0.00000001	0.00013842
36	Yes	7	0.00000001	0.00012428
37	Yes	7	0.00000001	0.00014020
38	Yes	7	0.00000001	0.00014838
39	Yes	4	0.00000001	0.00081385
40	Yes	5	0.00000001	0.00018548
41	Yes	5	0.00000001	0.00019520
42	Yes	4	0.00000001	0.00094767
43	Yes	5	0.00000001	0.00017691
44	Yes	5	0.00000001	0.00019432

45	Yes	4	0.00000001	0.00081028
46	Yes	5	0.00000001	0.00018638
47	Yes	5	0.00000001	0.00017715
48	Yes	4	0.00000001	0.00094155
49	Yes	5	0.00000001	0.00019621
50	Yes	5	0.00000001	0.00017834

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 175	21.840	40	1.120	0.002
L2	175 - 170	20.667	40	1.119	0.002
L3	170 - 165	19.498	40	1.112	0.002
L4	165 - 160	18.340	40	1.099	0.002
L5	160 - 155	17.200	40	1.077	0.002
L6	155 - 150	16.088	40	1.043	0.002
L7	150 - 145.7	15.020	40	0.995	0.001
L8	145.7 - 145.45	14.147	40	0.941	0.001
L9	145.45 - 140.45	14.098	40	0.939	0.001
L10	140.45 - 140	13.137	40	0.895	0.001
L11	140 - 139.75	13.053	40	0.891	0.001
L12	139.75 - 134.75	13.006	40	0.890	0.001
L13	134.75 - 129.75	12.085	40	0.869	0.001
L14	129.75 - 124.75	11.188	40	0.845	0.001
L15	124.75 - 119.75	10.318	40	0.817	0.001
L16	119.75 - 114.75	9.479	40	0.785	0.001
L17	114.75 - 109.75	8.674	40	0.750	0.001
L18	109.75 - 106.42	7.909	40	0.711	0.000
L19	106.42 - 106.17	7.422	40	0.683	0.000
L20	106.17 - 101.17	7.387	40	0.682	0.000
L21	101.17 - 100	6.689	40	0.650	0.000
L22	100 - 99.75	6.530	40	0.643	0.000
L23	99.75 - 94.75	6.497	40	0.641	0.000
L24	94.75 - 89.75	5.843	40	0.608	0.000
L25	89.75 - 86.25	5.224	40	0.572	0.000
L26	86.25 - 86	4.815	40	0.545	0.000
L27	86 - 81	4.786	40	0.543	0.000
L28	81 - 78	4.236	40	0.508	0.000
L29	78 - 77.75	3.924	40	0.485	0.000
L30	77.75 - 72.75	3.899	40	0.484	0.000
L31	72.75 - 67.75	3.406	40	0.456	0.000
L32	67.75 - 62.75	2.944	40	0.427	0.000
L33	62.75 - 60	2.513	40	0.395	0.000
L34	60 - 59.75	2.290	40	0.377	0.000
L35	59.75 - 54.75	2.271	40	0.376	0.000
L36	54.75 - 49.75	1.894	40	0.344	0.000
L37	49.75 - 46.25	1.551	40	0.311	0.000
L38	46.25 - 46	1.332	40	0.286	0.000
L39	46 - 41	1.317	40	0.284	0.000
L40	41 - 36	1.036	40	0.251	0.000
L41	36 - 32.67	0.792	40	0.216	0.000
L42	32.67 - 32.42	0.649	40	0.192	0.000
L43	32.42 - 27.42	0.639	40	0.191	0.000
L44	27.42 - 22.42	0.454	40	0.163	0.000
L45	22.42 - 20	∫鐳æ㘎0	40	0.133	0.000
L46	20 - 19.75	0.235	40	0.119	0.000
L47	19.75 - 14.75	0.229	40	0.117	0.000
L48	14.75 - 11.25	0.123	40	0.084	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L49	11.25 - 11	0.070	40	0.060	0.000
L50	11 - 9	0.067	40	0.059	0.000
L51	9 - 8.75	0.045	40	0.047	0.000
L52	8.75 - 3.75	0.043	40	0.046	0.000
L53	3.75 - 0	0.008	40	0.020	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
184.000	Lighting Rod 5/8" x 8'	40	21.840	1.120	0.002	76811
177.000	APXVSPP18-C-A20 w/ Mount Pipe	40	21.136	1.120	0.002	76811
176.000	Miscellaneous [NA 509-3]	40	20.902	1.120	0.002	76811
175.000	PCS 1900MHz 4x45W-65MHz	40	20.667	1.119	0.002	76811
162.000	OPA-65R-LCUU-H8 w/ Mount Pipe	40	17.653	1.087	0.002	12558
161.000	Miscellaneous [NA 509-3]	40	17.426	1.083	0.002	11458
110.000	(2) SBNHH-1D65C w/ Mount Pipe	40	7.946	0.714	0.000	7126

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 175	108.949	2	5.588	0.011
L2	175 - 170	103.108	2	5.583	0.011
L3	170 - 165	97.285	2	5.550	0.011
L4	165 - 160	91.514	2	5.482	0.010
L5	160 - 155	85.833	2	5.377	0.010
L6	155 - 150	80.293	2	5.207	0.008
L7	150 - 145.7	74.968	2	4.966	0.007
L8	145.7 - 145.45	70.617	2	4.700	0.005
L9	145.45 - 140.45	70.371	2	4.690	0.005
L10	140.45 - 140	65.577	2	4.469	0.004
L11	140 - 139.75	65.157	2	4.447	0.004
L12	139.75 - 134.75	64.924	2	4.443	0.004
L13	134.75 - 129.75	60.329	2	4.339	0.004
L14	129.75 - 124.75	55.851	2	4.218	0.004
L15	124.75 - 119.75	51.509	2	4.080	0.003
L16	119.75 - 114.75	47.320	2	3.923	0.003
L17	114.75 - 109.75	43.305	2	3.748	0.003
L18	109.75 - 106.42	39.483	2	3.553	0.002
L19	106.42 - 106.17	37.055	2	3.412	0.002
L20	106.17 - 101.17	36.877	2	3.405	0.002
L21	101.17 - 100	33.394	2	3.249	0.002
L22	100 - 99.75	32.603	2	3.210	0.002
L23	99.75 - 94.75	32.435	2	3.202	0.002
L24	94.75 - 89.75	29.169	2	3.037	0.002
L25	89.75 - 86.25	26.082	2	2.857	0.002
L26	86.25 - 86	24.038	2	2.722	0.001
L27	86 - 81	23.895	2	2.713	0.001
L28	81 - 78	21.147	2	2.536	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L29	78 - 77.75	19.589	2	2.423	0.001
L30	77.75 - 72.75	19.463	2	2.416	0.001
L31	72.75 - 67.75	17.004	2	2.279	0.001
L32	67.75 - 62.75	14.695	2	2.132	0.001
L33	62.75 - 60	12.544	2	1.975	0.001
L34	60 - 59.75	11.433	2	1.884	0.001
L35	59.75 - 54.75	11.335	2	1.877	0.001
L36	54.75 - 49.75	9.452	2	1.718	0.001
L37	49.75 - 46.25	7.740	2	1.551	0.001
L38	46.25 - 46	6.648	2	1.427	0.001
L39	46 - 41	6.574	2	1.419	0.001
L40	41 - 36	5.173	2	1.254	0.001
L41	36 - 32.67	3.950	2	1.080	0.000
L42	32.67 - 32.42	3.239	2	0.959	0.000
L43	32.42 - 27.42	3.189	2	0.952	0.000
L44	27.42 - 22.42	2.265	2	0.812	0.000
L45	22.42 - 20	1.490	2	0.666	0.000
L46	20 - 19.75	1.171	2	0.592	0.000
L47	19.75 - 14.75	1.141	2	0.584	0.000
L48	14.75 - 11.25	0.615	2	0.419	0.000
L49	11.25 - 11	0.352	2	0.299	0.000
L50	11 - 9	0.336	2	0.292	0.000
L51	9 - 8.75	0.225	2	0.236	0.000
L52	8.75 - 3.75	0.213	2	0.230	0.000
L53	3.75 - 0	0.040	2	0.101	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
184.000	Lighting Rod 5/8" x 8'	2	108.949	5.588	0.011	16229
177.000	APXVSPP18-C-A20 w/ Mount Pipe	2	105.443	5.588	0.011	16229
176.000	Miscellaneous [NA 509-3]	2	104.275	5.586	0.011	16229
175.000	PCS 1900MHz 4x45W-65MHz	2	103.108	5.583	0.011	16229
162.000	OPA-65R-LCUU-H8 w/ Mount Pipe	2	88.092	5.425	0.010	2582
161.000	Miscellaneous [NA 509-3]	2	86.960	5.402	0.010	2355
110.000	(2) SBNHH-1D65C w/ Mount Pipe	2	39.670	3.564	0.002	1437

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 175 (1)	P24x0.375	5.000	0.000	0.0	27.833	-5.049	901.775	0.006
L2	175 - 170 (2)	P24x0.375	5.000	0.000	0.0	27.833	-6.256	901.775	0.007
L3	170 - 165 (3)	P24x0.375	5.000	0.000	0.0	27.833	-6.875	901.775	0.008
L4	165 - 160 (4)	P24x0.375	5.000	0.000	0.0	27.833	-11.137	901.775	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L5	160 - 155 (5)	P24x0.375	5.000	0.000	0.0	27.833	-11.866	901.775	0.013
L6	155 - 150 (6)	P24x0.375	5.000	0.000	0.0	27.833	-12.625	901.775	0.014
L7	150 - 145.7 (7)	P24x0.375	4.300	0.000	0.0	27.833	-13.300	901.775	0.015
L8	145.7 - 145.45 (8)	P24x0.675	0.250	0.000	0.0	49.462	-13.367	1602.580	0.008
L9	145.45 - 140.45 (9)	P24x0.675	5.000	0.000	0.0	49.462	-14.488	1602.580	0.009
L10	140.45 - 140 (10)	P24x0.675	0.450	0.000	0.0	49.462	-14.595	1602.580	0.009
L11	140 - 139.75 (11)	P36x0.5	0.250	0.000	0.0	55.763	-14.662	1806.730	0.008
L12	139.75 - 134.75 (12)	P36x0.5	5.000	0.000	0.0	55.763	-15.936	1806.730	0.009
L13	134.75 - 129.75 (13)	P36x0.5	5.000	0.000	0.0	55.763	-17.222	1806.730	0.010
L14	129.75 - 124.75 (14)	P36x0.5	5.000	0.000	0.0	55.763	-18.518	1806.730	0.010
L15	124.75 - 119.75 (15)	P36x0.5	5.000	0.000	0.0	55.763	-19.824	1806.730	0.011
L16	119.75 - 114.75 (16)	P36x0.5	5.000	0.000	0.0	55.763	-21.140	1806.730	0.012
L17	114.75 - 109.75 (17)	P36x0.5	5.000	0.000	0.0	55.763	-24.053	1806.730	0.013
L18	109.75 - 106.42 (18)	P36x0.5	3.330	0.000	0.0	55.763	-24.965	1806.730	0.014
L19	106.42 - 106.17 (19)	P36x0.7625	0.250	0.000	0.0	84.410	-25.067	2734.890	0.009
L20	106.17 - 101.17 (20)	P36x0.7625	5.000	0.000	0.0	84.410	-26.905	2734.890	0.010
L21	101.17 - 100 (21)	P36x0.7625	1.170	0.000	0.0	84.410	-27.337	2734.890	0.010
L22	100 - 99.75 (22)	P42x0.5	0.250	0.000	0.0	65.188	-27.421	2112.090	0.013
L23	99.75 - 94.75 (23)	P42x0.5	5.000	0.000	0.0	65.188	-28.959	2112.090	0.014
L24	94.75 - 89.75 (24)	P42x0.5	5.000	0.000	0.0	65.188	-30.514	2112.090	0.014
L25	89.75 - 86.25 (25)	P42x0.5	3.500	0.000	0.0	65.188	-31.608	2112.090	0.015
L26	86.25 - 86 (26)	P42x0.5875	0.250	0.000	0.0	76.435	-31.728	2476.480	0.013
L27	86 - 81 (27)	P42x0.5875	5.000	0.000	0.0	76.435	-33.932	2476.480	0.014
L28	81 - 78 (28)	P42x0.5875	3.000	0.000	0.0	76.435	-35.264	2476.480	0.014
L29	78 - 77.75 (29)	P42x0.875	0.250	0.000	0.0	113.048	-35.407	3662.760	0.010
L30	77.75 - 72.75 (30)	P42x0.875	5.000	0.000	0.0	113.048	-38.094	3662.760	0.010
L31	72.75 - 67.75 (31)	P42x0.875	5.000	0.000	0.0	113.048	-40.795	3662.760	0.011
L32	67.75 - 62.75 (32)	P42x0.875	5.000	0.000	0.0	113.048	-43.505	3662.760	0.012
L33	62.75 - 60 (33)	P42x0.875	2.750	0.000	0.0	113.048	-44.995	3662.760	0.012
L34	60 - 59.75 (34)	P48x0.625	0.250	0.000	0.0	93.021	-45.113	3013.870	0.015
L35	59.75 - 54.75 (35)	P48x0.625	5.000	0.000	0.0	93.021	-47.240	3013.870	0.016
L36	54.75 - 49.75 (36)	P48x0.625	5.000	0.000	0.0	93.021	-49.383	3013.870	0.016
L37	49.75 - 46.25 (37)	P48x0.625	3.500	0.000	0.0	93.021	-50.887	3013.870	0.017
L38	46.25 - 46 (38)	P48x0.7	0.250	0.000	0.0	104.018	-51.037	3370.190	0.015
L39	46 - 41 (39)	P48x0.7	5.000	0.000	0.0	104.018	-53.828	3370.190	0.016
L40	41 - 36 (40)	P48x0.7	5.000	0.000	0.0	104.018	-56.635	3370.190	0.017

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L41	36 - 32.67 (41)	P48x0.7	3.330	0.000	0.0	104.018	-58.508	3370.190	0.017
L42	32.67 - 32.42 (42)	P48x0.9625	0.250	0.000	0.0	142.231	-58.683	4608.290	0.013
L43	32.42 - 27.42 (43)	P48x0.9625	5.000	0.000	0.0	142.231	-61.965	4608.290	0.013
L44	27.42 - 22.42 (44)	P48x0.9625	5.000	0.000	0.0	142.231	-65.260	4608.290	0.014
L45	22.42 - 20 (45)	P48x0.9625	2.420	0.000	0.0	142.231	-66.855	4608.290	0.015
L46	20 - 19.75 (46)	P54x0.625	0.250	0.000	0.0	104.802	-66.985	3395.570	0.020
L47	19.75 - 14.75 (47)	P54x0.625 4.8.2 (1.02 CR) - 47	5.000	0.000	0.0	104.802	-69.380	3395.570	0.020
L48	14.75 - 11.25 (48)	P54x0.625 4.8.2 (1.05 CR) - 48	3.500	0.000	0.0	104.802	-71.064	3395.570	0.021
L49	11.25 - 11 (49)	P54x0.8	0.250	0.000	0.0	133.706	-71.227	4332.080	0.016
L50	11 - 9 (50)	P54x0.8	2.000	0.000	0.0	133.706	-72.436	4332.080	0.017
L51	9 - 8.75 (51)	P54x0.8875	0.250	0.000	0.0	148.086	-72.609	4798.000	0.015
L52	8.75 - 3.75 (52)	P54x0.8875	5.000	0.000	0.0	148.086	-75.913	4798.000	0.016
L53	3.75 - 0 (53)	P54x0.8875	3.750	0.000	0.0	148.086	-78.398	4798.000	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	180 - 175 (1)	P24x0.375	23.354	550.881	0.042	0.000	550.881	0.000
L2	175 - 170 (2)	P24x0.375	68.843	550.881	0.125	0.000	550.881	0.000
L3	170 - 165 (3)	P24x0.375	116.091	550.881	0.211	0.000	550.881	0.000
L4	165 - 160 (4)	P24x0.375	183.168	550.881	0.333	0.000	550.881	0.000
L5	160 - 155 (5)	P24x0.375	280.182	550.881	0.509	0.000	550.881	0.000
L6	155 - 150 (6)	P24x0.375	379.099	550.881	0.688	0.000	550.881	0.000
L7	150 - 145.7 (7)	P24x0.375	465.585	550.881	0.845	0.000	550.881	0.000
L8	145.7 - 145.45 (8)	P24x0.675	470.652	991.817	0.475	0.000	991.817	0.000
L9	145.45 - 140.45 (9)	P24x0.675	573.005	991.817	0.578	0.000	991.817	0.000
L10	140.45 - 140 (10)	P24x0.675	582.309	991.817	0.587	0.000	991.817	0.000
L11	140 - 139.75 (11)	P36x0.5	587.487	1623.158	0.362	0.000	1623.158	0.000
L12	139.75 - 134.75 (12)	P36x0.5	692.595	1623.158	0.427	0.000	1623.158	0.000
L13	134.75 - 129.75 (13)	P36x0.5	800.619	1623.158	0.493	0.000	1623.158	0.000
L14	129.75 - 124.75 (14)	P36x0.5	911.492	1623.158	0.562	0.000	1623.158	0.000
L15	124.75 - 119.75 (15)	P36x0.5	1025.125	1623.158	0.632	0.000	1623.158	0.000
L16	119.75 - 114.75 (16)	P36x0.5	1141.433	1623.158	0.703	0.000	1623.158	0.000
L17	114.75 - 109.75 (17)	P36x0.5	1261.383	1623.158	0.777	0.000	1623.158	0.000
L18	109.75 - 106.42 (18)	P36x0.5	1356.942	1623.158	0.836	0.000	1623.158	0.000
L19	106.42 -	P36x0.7625	1364.167	2556.708	0.534	0.000	2556.708	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 $\frac{M_{uy}}{\phi M_{ny}}$
L20	106.17 (19) 106.17 - 101.17 (20)	P36x0.7625	1509.908	2556.708	0.591	0.000	2556.708	0.000
L21	101.17 - 100 (21)	P36x0.7625	1544.383	2556.708	0.604	0.000	2556.708	0.000
L22	100 - 99.75 (22)	P42x0.5	1551.767	2162.842	0.717	0.000	2162.842	0.000
L23	99.75 - 94.75 (23)	P42x0.5	1700.975	2162.842	0.786	0.000	2162.842	0.000
L24	94.75 - 89.75 (24)	P42x0.5	1852.950	2162.842	0.857	0.000	2162.842	0.000
L25	89.75 - 86.25 (25)	P42x0.5	1960.917	2162.842	0.907	0.000	2162.842	0.000
L26	86.25 - 86 (26)	P42x0.5875	1968.675	2598.633	0.758	0.000	2598.633	0.000
L27	86 - 81 (27)	P42x0.5875	2125.325	2598.633	0.818	0.000	2598.633	0.000
L28	81 - 78 (28)	P42x0.5875	2220.600	2598.633	0.855	0.000	2598.633	0.000
L29	78 - 77.75 (29)	P42x0.875	2228.583	3996.217	0.558	0.000	3996.217	0.000
L30	77.75 - 72.75 (30)	P42x0.875	2389.675	3996.217	0.598	0.000	3996.217	0.000
L31	72.75 - 67.75 (31)	P42x0.875	2553.483	3996.217	0.639	0.000	3996.217	0.000
L32	67.75 - 62.75 (32)	P42x0.875	2719.858	3996.217	0.681	0.000	3996.217	0.000
L33	62.75 - 60 (33)	P42x0.875	2812.408	3996.217	0.704	0.000	3996.217	0.000
L34	60 - 59.75 (34)	P48x0.625	2820.858	3573.958	0.789	0.000	3573.958	0.000
L35	59.75 - 54.75 (35)	P48x0.625	2991.208	3573.958	0.837	0.000	3573.958	0.000
L36	54.75 - 49.75 (36)	P48x0.625	3164.058	3573.958	0.885	0.000	3573.958	0.000
L37	49.75 - 46.25 (37)	P48x0.625	3286.450	3573.958	0.920	0.000	3573.958	0.000
L38	46.25 - 46 (38)	P48x0.7	3295.242	4069.325	0.810	0.000	4069.325	0.000
L39	46 - 41 (39)	P48x0.7	3472.158	4069.325	0.853	0.000	4069.325	0.000
L40	41 - 36 (40)	P48x0.7	3651.267	4069.325	0.897	0.000	4069.325	0.000
L41	36 - 32.67 (41)	P48x0.7	3771.675	4069.325	0.927	0.000	4069.325	0.000
L42	32.67 - 32.42 (42)	P48x0.9625	3780.750	5750.608	0.657	0.000	5750.608	0.000
L43	32.42 - 27.42 (43)	P48x0.9625	3963.308	5750.608	0.689	0.000	5750.608	0.000
L44	27.42 - 22.42 (44)	P48x0.9625	4147.800	5750.608	0.721	0.000	5750.608	0.000
L45	22.42 - 20 (45)	P48x0.9625	4237.717	5750.608	0.737	0.000	5750.608	0.000
L46	20 - 19.75 (46)	P54x0.625	4247.025	4453.000	0.954	0.000	4453.000	0.000
L47	19.75 - 14.75 (47)	P54x0.625	4434.133	4453.000	0.996	0.000	4453.000	0.000
L48	14.75 - 11.25 (48)	P54x0.625	4566.042	4453.000	1.025	0.000	4453.000	0.000
L49	11.25 - 11 (49)	P54x0.8	4575.492	5900.141	0.775	0.000	5900.141	0.000
L50	11 - 9 (50)	P54x0.8	4651.233	5900.141	0.788	0.000	5900.141	0.000
L51	9 - 8.75 (51)	P54x0.8875	4660.725	6654.700	0.700	0.000	6654.700	0.000
L52	8.75 - 3.75 (52)	P54x0.8875	4851.350	6654.700	0.729	0.000	6654.700	0.000
L53	3.75 - 0 (53)	P54x0.8875	4995.383	6654.700	0.751	0.000	6654.700	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 175 (1)	P24x0.375	8.072	450.887	0.018	0.001	874.033	0.000
L2	175 - 170 (2)	P24x0.375	9.237	450.887	0.020	0.001	874.033	0.000
L3	170 - 165 (3)	P24x0.375	9.652	450.887	0.021	0.001	874.033	0.000
L4	165 - 160 (4)	P24x0.375	19.184	450.887	0.043	0.459	874.033	0.001
L5	160 - 155 (5)	P24x0.375	19.598	450.887	0.043	0.389	874.033	0.000
L6	155 - 150 (6)	P24x0.375	19.965	450.887	0.044	0.389	874.033	0.000
L7	150 - 145.7 (7)	P24x0.375	20.261	450.887	0.045	0.389	874.033	0.000
L8	145.7 - 145.45 (8)	P24x0.675	20.274	801.291	0.025	0.389	1514.975	0.000
L9	145.45 - 140.45 (9)	P24x0.675	20.661	801.291	0.026	0.388	1514.975	0.000
L10	140.45 - 140 (10)	P24x0.675	20.691	801.291	0.026	0.388	1514.975	0.000
L11	140 - 139.75 (11)	P36x0.5	20.720	903.365	0.023	0.388	2635.858	0.000
L12	139.75 - 134.75 (12)	P36x0.5	21.311	903.365	0.024	0.388	2635.858	0.000
L13	134.75 - 129.75 (13)	P36x0.5	21.888	903.365	0.024	0.388	2635.858	0.000
L14	129.75 - 124.75 (14)	P36x0.5	22.450	903.365	0.025	0.388	2635.858	0.000
L15	124.75 - 119.75 (15)	P36x0.5	22.996	903.365	0.025	0.388	2635.858	0.000
L16	119.75 - 114.75 (16)	P36x0.5	23.523	903.365	0.026	0.388	2635.858	0.000
L17	114.75 - 109.75 (17)	P36x0.5	28.541	903.365	0.032	0.388	2635.858	0.000
L18	109.75 - 106.42 (18)	P36x0.5	28.864	903.365	0.032	0.388	2635.858	0.000
L19	106.42 - 106.17 (19)	P36x0.7625	28.884	1367.440	0.021	0.388	3932.233	0.000
L20	106.17 - 101.17 (20)	P36x0.7625	29.412	1367.440	0.022	0.388	3932.233	0.000
L21	101.17 - 100 (21)	P36x0.7625	29.533	1367.440	0.022	0.388	3932.233	0.000
L22	100 - 99.75 (22)	P42x0.5	29.557	1056.050	0.028	0.388	3609.208	0.000
L23	99.75 - 94.75 (23)	P42x0.5	30.126	1056.050	0.029	0.387	3609.208	0.000
L24	94.75 - 89.75 (24)	P42x0.5	30.669	1056.050	0.029	0.387	3609.208	0.000
L25	89.75 - 86.25 (25)	P42x0.5	31.036	1056.050	0.029	0.387	3609.208	0.000
L26	86.25 - 86 (26)	P42x0.5875	31.056	1238.240	0.025	0.387	4214.283	0.000
L27	86 - 81 (27)	P42x0.5875	31.606	1238.240	0.026	0.387	4214.283	0.000
L28	81 - 78 (28)	P42x0.5875	31.919	1238.240	0.026	0.387	4214.283	0.000
L29	78 - 77.75 (29)	P42x0.875	31.940	1831.380	0.017	0.387	6148.325	0.000
L30	77.75 - 72.75 (30)	P42x0.875	32.500	1831.380	0.018	0.387	6148.325	0.000
L31	72.75 - 67.75 (31)	P42x0.875	33.029	1831.380	0.018	0.387	6148.325	0.000
L32	67.75 - 62.75 (32)	P42x0.875	33.530	1831.380	0.018	0.387	6148.325	0.000
L33	62.75 - 60 (33)	P42x0.875	33.796	1831.380	0.018	0.387	6148.325	0.000
L34	60 - 59.75 (34)	P48x0.625	33.811	1506.930	0.022	0.387	5872.808	0.000
L35	59.75 - 54.75 (35)	P48x0.625	34.333	1506.930	0.023	0.387	5872.808	0.000
L36	54.75 - 49.75 (36)	P48x0.625	34.819	1506.930	0.023	0.387	5872.808	0.000
L37	49.75 - 46.25	P48x0.625	35.142	1506.930	0.023	0.387	5872.808	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 $\frac{T_u}{\phi T_n}$
	(37)							
L38	46.25 - 46 (38)	P48x0.7	35.153	1685.090	0.021	0.387	6546.650	0.000
L39	46 - 41 (39)	P48x0.7	35.620	1685.090	0.021	0.387	6546.650	0.000
L40	41 - 36 (40)	P48x0.7	36.041	1685.090	0.021	0.387	6546.650	0.000
L41	36 - 32.67 (41)	P48x0.7	36.300	1685.090	0.022	0.386	6546.650	0.000
L42	32.67 - 32.42 (42)	P48x0.9625	36.306	2304.150	0.016	0.386	8854.333	0.000
L43	32.42 - 27.42 (43)	P48x0.9625	36.723	2304.150	0.016	0.386	8854.333	0.000
L44	27.42 - 22.42 (44)	P48x0.9625	37.088	2304.150	0.016	0.386	8854.333	0.000
L45	22.42 - 20 (45)	P48x0.9625	37.252	2304.150	0.016	0.386	8854.333	0.000
L46	20 - 19.75 (46)	P54x0.625	37.255	1697.790	0.022	0.386	7465.225	0.000
L47	19.75 - 14.75 (47)	P54x0.625	37.597	1697.790	0.022	0.386	7465.225	0.000
L48	14.75 - 11.25 (48)	P54x0.625	37.808	1697.790	0.022	0.386	7465.225	0.000
L49	11.25 - 11 (49)	P54x0.8	37.805	2166.040	0.017	0.386	9462.667	0.000
L50	11 - 9 (50)	P54x0.8	37.950	2166.040	0.018	0.386	9462.667	0.000
L51	9 - 8.75 (51)	P54x0.8875	37.954	2399.000	0.016	0.386	10446.500	0.000
L52	8.75 - 3.75 (52)	P54x0.8875	38.300	2399.000	0.016	0.386	10446.500	0.000
L53	3.75 - 0 (53)	P54x0.8875	38.545	2399.000	0.016	0.312	10446.500	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 175 (1)	0.006	0.042	0.000	0.018	0.000	0.048 ✔	1.000	4.8.2 ✔
L2	175 - 170 (2)	0.007	0.125	0.000	0.020	0.000	0.132 ✔	1.000	4.8.2 ✔
L3	170 - 165 (3)	0.008	0.211	0.000	0.021	0.000	0.219 ✔	1.000	4.8.2 ✔
L4	165 - 160 (4)	0.012	0.333	0.000	0.043	0.001	0.347 ✔	1.000	4.8.2 ✔
L5	160 - 155 (5)	0.013	0.509	0.000	0.043	0.000	0.524 ✔	1.000	4.8.2 ✔
L6	155 - 150 (6)	0.014	0.688	0.000	0.044	0.000	0.704 ✔	1.000	4.8.2 ✔
L7	150 - 145.7 (7)	0.015	0.845	0.000	0.045	0.000	0.862 ✔	1.000	4.8.2 ✔
L8	145.7 - 145.45 (8)	0.008	0.475	0.000	0.025	0.000	0.484 ✔	1.000	4.8.2 ✔
L9	145.45 - 140.45 (9)	0.009	0.578	0.000	0.026	0.000	0.587 ✔	1.000	4.8.2 ✔
L10	140.45 - 140 (10)	0.009	0.587	0.000	0.026	0.000	0.597 ✔	1.000	4.8.2 ✔
L11	140 - 139.75 (11)	0.008	0.362	0.000	0.023	0.000	0.371 ✔	1.000	4.8.2 ✔
L12	139.75 -	0.009	0.427	0.000	0.024	0.000	0.436	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	134.75 (12)						✔		
L13	134.75 - 129.75 (13)	0.010	0.493	0.000	0.024	0.000	0.503 ✔	1.000	4.8.2 ✔
L14	129.75 - 124.75 (14)	0.010	0.562	0.000	0.025	0.000	0.572 ✔	1.000	4.8.2 ✔
L15	124.75 - 119.75 (15)	0.011	0.632	0.000	0.025	0.000	0.643 ✔	1.000	4.8.2 ✔
L16	119.75 - 114.75 (16)	0.012	0.703	0.000	0.026	0.000	0.716 ✔	1.000	4.8.2 ✔
L17	114.75 - 109.75 (17)	0.013	0.777	0.000	0.032	0.000	0.791 ✔	1.000	4.8.2 ✔
L18	109.75 - 106.42 (18)	0.014	0.836	0.000	0.032	0.000	0.851 ✔	1.000	4.8.2 ✔
L19	106.42 - 106.17 (19)	0.009	0.534	0.000	0.021	0.000	0.543 ✔	1.000	4.8.2 ✔
L20	106.17 - 101.17 (20)	0.010	0.591	0.000	0.022	0.000	0.601 ✔	1.000	4.8.2 ✔
L21	101.17 - 100 (21)	0.010	0.604	0.000	0.022	0.000	0.615 ✔	1.000	4.8.2 ✔
L22	100 - 99.75 (22)	0.013	0.717	0.000	0.028	0.000	0.731 ✔	1.000	4.8.2 ✔
L23	99.75 - 94.75 (23)	0.014	0.786	0.000	0.029	0.000	0.801 ✔	1.000	4.8.2 ✔
L24	94.75 - 89.75 (24)	0.014	0.857	0.000	0.029	0.000	0.872 ✔	1.000	4.8.2 ✔
L25	89.75 - 86.25 (25)	0.015	0.907	0.000	0.029	0.000	0.922 ✔	1.000	4.8.2 ✔
L26	86.25 - 86 (26)	0.013	0.758	0.000	0.025	0.000	0.771 ✔	1.000	4.8.2 ✔
L27	86 - 81 (27)	0.014	0.818	0.000	0.026	0.000	0.832 ✔	1.000	4.8.2 ✔
L28	81 - 78 (28)	0.014	0.855	0.000	0.026	0.000	0.869 ✔	1.000	4.8.2 ✔
L29	78 - 77.75 (29)	0.010	0.558	0.000	0.017	0.000	0.568 ✔	1.000	4.8.2 ✔
L30	77.75 - 72.75 (30)	0.010	0.598	0.000	0.018	0.000	0.609 ✔	1.000	4.8.2 ✔
L31	72.75 - 67.75 (31)	0.011	0.639	0.000	0.018	0.000	0.650 ✔	1.000	4.8.2 ✔
L32	67.75 - 62.75 (32)	0.012	0.681	0.000	0.018	0.000	0.693 ✔	1.000	4.8.2 ✔
L33	62.75 - 60 (33)	0.012	0.704	0.000	0.018	0.000	0.716 ✔	1.000	4.8.2 ✔
L34	60 - 59.75 (34)	0.015	0.789	0.000	0.022	0.000	0.805 ✔	1.000	4.8.2 ✔
L35	59.75 - 54.75 (35)	0.016	0.837	0.000	0.023	0.000	0.853 ✔	1.000	4.8.2 ✔
L36	54.75 - 49.75 (36)	0.016	0.885	0.000	0.023	0.000	0.902 ✔	1.000	4.8.2 ✔
L37	49.75 - 46.25 (37)	0.017	0.920	0.000	0.023	0.000	0.937 ✔	1.000	4.8.2 ✔
L38	46.25 - 46 (38)	0.015	0.810	0.000	0.021	0.000	0.825	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
L39	46 - 41 (39)	0.016	0.853	0.000	0.021	0.000	0.870	1.000	4.8.2
L40	41 - 36 (40)	0.017	0.897	0.000	0.021	0.000	0.915	1.000	4.8.2
L41	36 - 32.67 (41)	0.017	0.927	0.000	0.022	0.000	0.945	1.000	4.8.2
L42	32.67 - 32.42 (42)	0.013	0.657	0.000	0.016	0.000	0.670	1.000	4.8.2
L43	32.42 - 27.42 (43)	0.013	0.689	0.000	0.016	0.000	0.703	1.000	4.8.2
L44	27.42 - 22.42 (44)	0.014	0.721	0.000	0.016	0.000	0.736	1.000	4.8.2
L45	22.42 - 20 (45)	0.015	0.737	0.000	0.016	0.000	0.752	1.000	4.8.2
L46	20 - 19.75 (46)	0.020	0.954	0.000	0.022	0.000	0.974	1.000	4.8.2
L47	19.75 - 14.75 (47)	0.020	0.996	0.000	0.022	0.000	1.017	1.000	4.8.2
L48	14.75 - 11.25 (48)	0.021	1.025	0.000	0.022	0.000	1.047	1.000	4.8.2
L49	11.25 - 11 (49)	0.016	0.775	0.000	0.017	0.000	0.792	1.000	4.8.2
L50	11 - 9 (50)	0.017	0.788	0.000	0.018	0.000	0.805	1.000	4.8.2
L51	9 - 8.75 (51)	0.015	0.700	0.000	0.016	0.000	0.716	1.000	4.8.2
L52	8.75 - 3.75 (52)	0.016	0.729	0.000	0.016	0.000	0.745	1.000	4.8.2
L53	3.75 - 0 (53)	0.016	0.751	0.000	0.016	0.000	0.767	1.000	4.8.2

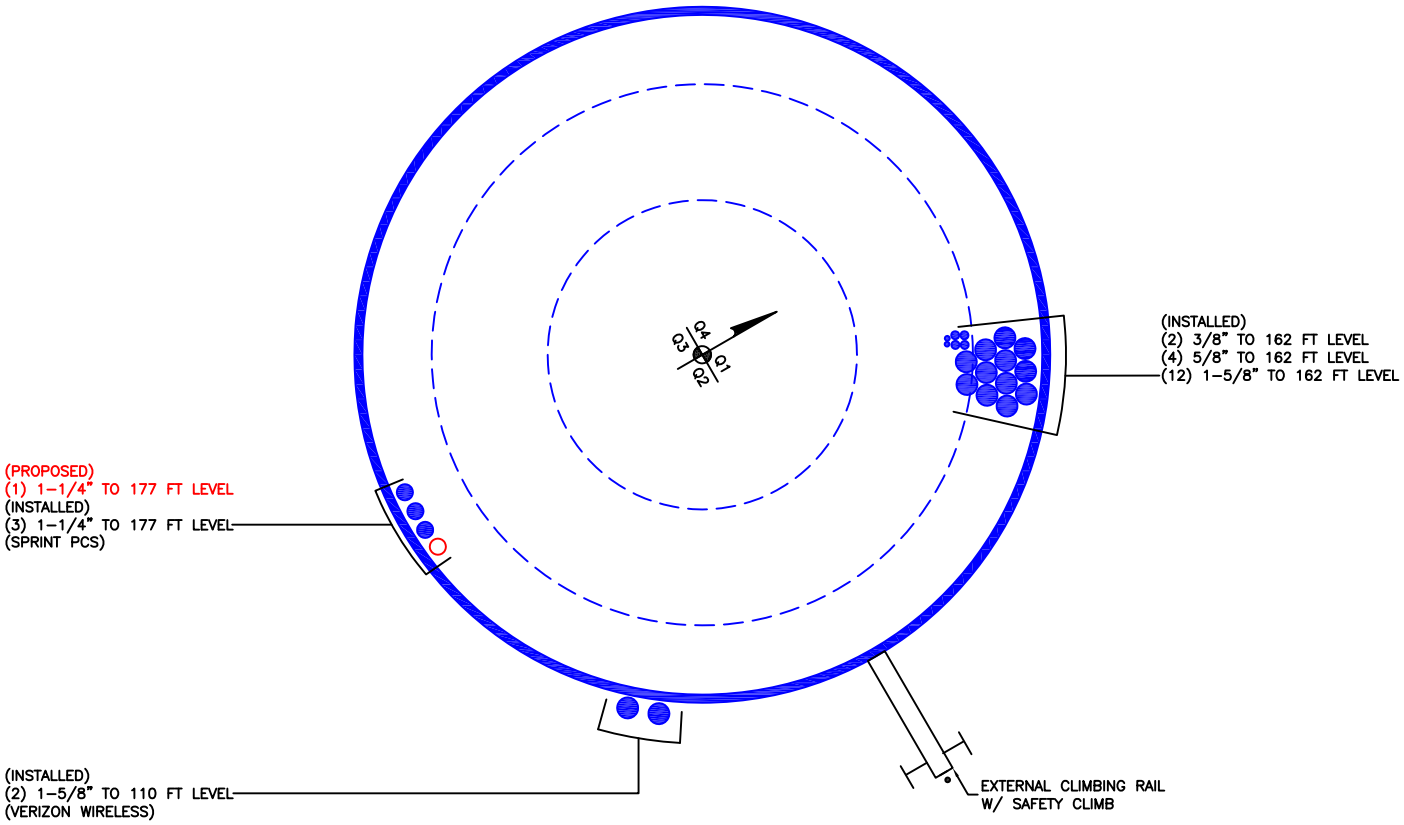
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 175	Pole	P24x0.375	1	-5.049	901.775	4.8	Pass
L2	175 - 170	Pole	P24x0.375	2	-6.256	901.775	6.9	Pass
L3	170 - 165	Pole	P24x0.375	3	-6.875	901.775	21.9	Pass
L4	165 - 160	Pole	P24x0.375	4	-11.137	901.775	34.7	Pass
L5	160 - 155	Pole	P24x0.375	5	-11.866	901.775	52.4	Pass
L6	155 - 150	Pole	P24x0.375	6	-12.625	901.775	70.4	Pass
L7	150 - 145.7	Pole	P24x0.375	7	-13.300	901.775	86.2	Pass
L8	145.7 - 145.45	Pole	P24x0.675	8	-13.367	1602.580	48.4	Pass
L9	145.45 - 140.45	Pole	P24x0.675	9	-14.488	1602.580	58.7	Pass
L10	140.45 - 140	Pole	P24x0.675	10	-14.595	1602.580	4.8	Pass
L11	140 - 139.75	Pole	P36x0.5	11	-14.662	1806.730	13.2	Pass
L12	139.75 - 134.75	Pole	P36x0.5	12	-15.936	1806.730	21.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L13	134.75 - 129.75	Pole	P36x0.5	13	-17.222	1806.730	34.7	Pass
L14	129.75 - 124.75	Pole	P36x0.5	14	-18.518	1806.730	52.4	Pass
L15	124.75 - 119.75	Pole	P36x0.5	15	-19.824	1806.730	70.4	Pass
L16	119.75 - 114.75	Pole	P36x0.5	16	-21.140	1806.730	86.2	Pass
L17	114.75 - 109.75	Pole + Reinf.	P36x0.5	17	-24.053	1806.730	49.9	Pass
L18	109.75 - 106.42	Pole + Reinf.	P36x0.5	18	-24.965	1806.730	60.7	Pass
L19	106.42 - 106.17	Pole + Reinf.	P36x0.7625	19	-25.067	2734.890	61.7	Pass
L20	106.17 - 101.17	Pole	P36x0.7625	20	-26.905	2734.890	37.1	Pass
L21	101.17 - 100	Pole	P36x0.7625	21	-27.337	2734.890	43.6	Pass
L22	100 - 99.75	Pole	P42x0.5	22	-27.421	2112.090	50.3	Pass
L23	99.75 - 94.75	Pole	P42x0.5	23	-28.959	2112.090	57.2	Pass
L24	94.75 - 89.75	Pole	P42x0.5	24	-30.514	2112.090	64.3	Pass
L25	89.75 - 86.25	Pole	P42x0.5	25	-31.608	2112.090	71.6	Pass
L26	86.25 - 86	Pole	P42x0.5875	26	-31.728	2476.480	79.1	Pass
L27	86 - 81	Pole	P42x0.5875	27	-33.932	2476.480	85.1	Pass
L28	81 - 78	Pole + Reinf.	P42x0.5875	28	-35.264	2476.480	57.4	Pass
L29	78 - 77.75	Pole + Reinf.	P42x0.875	29	-35.407	3662.760	63.5	Pass
L30	77.75 - 72.75	Pole + Reinf.	P42x0.875	30	-38.094	3662.760	65.0	Pass
L31	72.75 - 67.75	Pole	P42x0.875	31	-40.795	3662.760	73.1	Pass
L32	67.75 - 62.75	Pole	P42x0.875	32	-43.505	3662.760	80.1	Pass
L33	62.75 - 60	Pole	P42x0.875	33	-44.995	3662.760	87.2	Pass
L34	60 - 59.75	Pole	P48x0.625	34	-45.113	3013.870	92.2	Pass
L35	59.75 - 54.75	Pole + Reinf.	P48x0.625	35	-47.240	3013.870	88.0	Pass
L36	54.75 - 49.75	Pole + Reinf.	P48x0.625	36	-49.383	3013.870	95.0	Pass
L37	49.75 - 46.25	Pole + Reinf.	P48x0.625	37	-50.887	3013.870	99.2	Pass
L38	46.25 - 46	Pole + Reinf.	P48x0.7	38	-51.037	3370.190	66.6	Pass
L39	46 - 41	Pole + Reinf.	P48x0.7	39	-53.828	3370.190	71.4	Pass
L40	41 - 36	Pole + Reinf.	P48x0.7	40	-56.635	3370.190	76.3	Pass
L41	36 - 32.67	Pole + Reinf.	P48x0.7	41	-58.508	3370.190	81.2	Pass
L42	32.67 - 32.42	Pole + Reinf.	P48x0.9625	42	-58.683	4608.290	84.0	Pass
L43	32.42 - 27.42	Pole	P48x0.9625	43	-61.965	4608.290	80.5	Pass
L44	27.42 - 22.42	Pole	P48x0.9625	44	-65.260	4608.290	85.3	Pass
L45	22.42 - 20	Pole	P48x0.9625	45	-66.855	4608.290	90.2	Pass
L46	20 - 19.75	Pole	P54x0.625	46	-66.985	3395.570	93.7	Pass
L47	19.75 - 14.75	Pole + Reinf.	P54x0.625	47	-69.380	3395.570	90.6	Pass
L48	14.75 - 11.25	Pole + Reinf.	P54x0.625	48	-71.064	3395.570	95.4	Pass
L49	11.25 - 11	Pole + Reinf.	P54x0.8	49	-71.227	4332.080	100.4	Pass
L50	11 - 9	Pole + Reinf.	P54x0.8	50	-72.436	4332.080	103.7	Pass
L51	9 - 8.75	Pole + Reinf.	P54x0.8875	51	-72.609	4798.000	76.9	Pass
L52	8.75 - 3.75	Pole + Reinf.	P54x0.8875	52	-75.913	4798.000	80.6	Pass
L53	3.75 - 0	Pole + Reinf.	P54x0.8875	53	-78.398	4798.000	84.4	Pass
							Summary	
						Pole (L48)	104.7	Pass
						RATING =	**104.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 878782

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 878782

Work Order: 1494904

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	180	40		0	24	24	0.375	n/a	A36
2	140	40		0	36.00	36	0.5	n/a	A36
3	100	40		0	42.00	42	0.5	n/a	A36
4	60	40		0	48.00	48	0.625	n/a	A36
5	20	20		0	54.00	54	0.625	n/a	A36

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	9	plate	CCI-SFP-045100	3	41	161	281															
2	20	32.67	plate	CCI-CFP-06512515	3	1	121	222															
3	60	78	plate	CCI-CFP-06512515	3	1	121	222															
4	100	106.42	plate	CCI-SFP-065125	3	71	191	311															
5	140	145.7	plate	CCI-SFP-060100	3	71	191	311															
6	0	11.25	plate	CCI-SFP-085125	3	1	126	226															
7	20	46.25	plate	CCI-CFP-08512530	3	49	81	303															
8	60	86.25	plate	CCI-CFP-08512530	3	49	81	303															
9																							
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	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
2	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.523	1.2188	A572-65
3	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.523	1.2188	A572-65
4	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65
6	8.5	1.25	10.625	0.625	45.000	45.000	17.000	9.063	1.1875	A572-65
7	8.5	1.25	10.625	0.625	45.000	45.000	11.000	9.023	1.2188	A572-65
8	8.5	1.25	10.625	0.625	45.000	45.000	11.000	9.023	1.2188	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	180 - 175	5		0	24.000	24.000	0.375	A36	1.000
2	175 - 170	5		0	24.000	24.000	0.375	A36	1.000
3	170 - 165	5		0	24.000	24.000	0.375	A36	1.000
4	165 - 160	5		0	24.000	24.000	0.375	A36	1.000
5	160 - 155	5		0	24.000	24.000	0.375	A36	1.000
6	155 - 150	5		0	24.000	24.000	0.375	A36	1.000
7	150 - 145.7	4.3		0	24.000	24.000	0.375	A36	1.000
8	145.7 - 145.45	0.25		0	24.000	24.000	0.675	A36	0.927
9	145.45 - 140.45	5		0	24.000	24.000	0.675	A36	0.927
10	140.45 - 140	0.45	0	0	24.000	24.000	0.675	A36	0.927
11	140 - 139.75	0.25		0	36.000	36.000	0.5	A36	1.000
12	139.75 - 134.75	5		0	36.000	36.000	0.5	A36	1.000
13	134.75 - 129.75	5		0	36.000	36.000	0.5	A36	1.000
14	129.75 - 124.75	5		0	36.000	36.000	0.5	A36	1.000
15	124.75 - 119.75	5		0	36.000	36.000	0.5	A36	1.000
16	119.75 - 114.75	5		0	36.000	36.000	0.5	A36	1.000
17	114.75 - 109.75	5		0	36.000	36.000	0.5	A36	1.000
18	109.75 - 106.42	3.33		0	36.000	36.000	0.5	A36	1.000
19	106.42 - 106.17	0.25		0	36.000	36.000	0.7625	A36	0.949
20	106.17 - 101.17	5		0	36.000	36.000	0.7625	A36	0.949
21	101.17 - 100	1.17	0	0	36.000	36.000	0.7625	A36	0.949
22	100 - 99.75	0.25		0	42.000	42.000	0.5	A36	1.000
23	99.75 - 94.75	5		0	42.000	42.000	0.5	A36	1.000
24	94.75 - 89.75	5		0	42.000	42.000	0.5	A36	1.000
25	89.75 - 86.25	3.5		0	42.000	42.000	0.5	A36	1.000
26	86.25 - 86	0.25		0	42.000	42.000	0.5875	A36	1.270
27	86 - 81	5		0	42.000	42.000	0.5875	A36	1.270
28	81 - 78	3		0	42.000	42.000	0.5875	A36	1.270
29	78 - 77.75	0.25		0	42.000	42.000	0.875	A36	1.074
30	77.75 - 72.75	5		0	42.000	42.000	0.875	A36	1.074
31	72.75 - 67.75	5		0	42.000	42.000	0.875	A36	1.074
32	67.75 - 62.75	5		0	42.000	42.000	0.875	A36	1.074
33	62.75 - 60	2.75	0	0	42.000	42.000	0.875	A36	1.074
34	60 - 59.75	0.25		0	48.000	48.000	0.625	A36	1.000
35	59.75 - 54.75	5		0	48.000	48.000	0.625	A36	1.000
36	54.75 - 49.75	5		0	48.000	48.000	0.625	A36	1.000
37	49.75 - 46.25	3.5		0	48.000	48.000	0.625	A36	1.000
38	46.25 - 46	0.25		0	48.000	48.000	0.7	A36	1.201
39	46 - 41	5		0	48.000	48.000	0.7	A36	1.201
40	41 - 36	5		0	48.000	48.000	0.7	A36	1.201
41	36 - 32.67	3.33		0	48.000	48.000	0.7	A36	1.201
42	32.67 - 32.42	0.25		0	48.000	48.000	0.9625	A36	1.049
43	32.42 - 27.42	5		0	48.000	48.000	0.9625	A36	1.049
44	27.42 - 22.42	5		0	48.000	48.000	0.9625	A36	1.049
45	22.42 - 20	2.42	0	0	48.000	48.000	0.9625	A36	1.049
46	20 - 19.75	0.25		0	54.000	54.000	0.625	A36	1.000
47	19.75 - 14.75	5		0	54.000	54.000	0.625	A36	1.000
48	14.75 - 11.25	3.5		0	54.000	54.000	0.625	A36	1.000
49	11.25 - 11	0.25		0	54.000	54.000	0.8	A36	1.022
50	11 - 9	2		0	54.000	54.000	0.8	A36	1.022
51	9 - 8.75	0.25		0	54.000	54.000	0.8875	A36	1.014
52	8.75 - 3.75	5		0	54.000	54.000	0.8875	A36	1.014
53	3.75 - 0	3.75		0	54.000	54.000	0.8875	A36	1.014

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	180 - 175	5.05	23.35	8.07
2	175 - 170	6.26	68.84	9.24
3	170 - 165	6.87	116.09	9.65
4	165 - 160	11.14	183.17	19.18
5	160 - 155	11.87	280.18	19.60
6	155 - 150	12.62	379.10	19.97
7	150 - 145.7	13.30	465.58	20.26
8	145.7 - 145.45	13.37	470.65	20.27
9	145.45 - 140.45	14.49	573.00	20.66
10	140.45 - 140	14.60	582.31	20.69
11	140 - 139.75	14.66	587.49	20.72
12	139.75 - 134.75	15.94	692.59	21.31
13	134.75 - 129.75	17.22	800.62	21.89
14	129.75 - 124.75	18.52	911.49	22.45
15	124.75 - 119.75	19.82	1025.12	23.00
16	119.75 - 114.75	21.14	1141.43	23.52
17	114.75 - 109.75	24.05	1261.38	28.54
18	109.75 - 106.42	24.96	1356.94	28.86
19	106.42 - 106.17	25.07	1364.16	28.88
20	106.17 - 101.17	26.90	1509.90	29.41
21	101.17 - 100	27.34	1544.38	29.53
22	100 - 99.75	27.42	1551.77	29.56
23	99.75 - 94.75	28.96	1700.98	30.13
24	94.75 - 89.75	30.51	1852.95	30.67
25	89.75 - 86.25	31.61	1960.92	31.04
26	86.25 - 86	31.73	1968.68	31.06
27	86 - 81	33.93	2125.33	31.61
28	81 - 78	35.26	2220.60	31.92
29	78 - 77.75	35.41	2228.58	31.94
30	77.75 - 72.75	38.09	2389.68	32.50
31	72.75 - 67.75	40.79	2553.49	33.03
32	67.75 - 62.75	43.50	2719.86	33.53
33	62.75 - 60	45.00	2812.41	33.80
34	60 - 59.75	45.11	2820.86	33.81
35	59.75 - 54.75	47.24	2991.21	34.33
36	54.75 - 49.75	49.38	3164.06	34.82
37	49.75 - 46.25	50.89	3286.45	35.14
38	46.25 - 46	51.04	3295.24	35.15
39	46 - 41	53.83	3472.16	35.62
40	41 - 36	56.63	3651.27	36.04
41	36 - 32.67	58.51	3771.68	36.30
42	32.67 - 32.42	58.68	3780.75	36.31
43	32.42 - 27.42	61.96	3963.31	36.72
44	27.42 - 22.42	65.26	4147.80	37.09
45	22.42 - 20	66.86	4237.72	37.25
46	20 - 19.75	66.98	4247.03	37.25
47	19.75 - 14.75	69.38	4434.13	37.60
48	14.75 - 11.25	71.06	4566.04	37.81
49	11.25 - 11	71.23	4575.49	37.81
50	11 - 9	72.44	4651.24	37.95
51	9 - 8.75	72.61	4660.72	37.95
52	8.75 - 3.75	75.91	4851.35	38.30
53	3.75 - 0	78.40	4995.38	38.55

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
180 - 175	Pole	TP24x24x0.375	Pole	4.8%	Pass
175 - 170	Pole	TP24x24x0.375	Pole	13.2%	Pass
170 - 165	Pole	TP24x24x0.375	Pole	21.9%	Pass
165 - 160	Pole	TP24x24x0.375	Pole	34.7%	Pass
160 - 155	Pole	TP24x24x0.375	Pole	52.4%	Pass
155 - 150	Pole	TP24x24x0.375	Pole	70.4%	Pass
150 - 145.7	Pole	TP24x24x0.375	Pole	86.2%	Pass
145.7 - 145.45	Pole + Reinf.	TP24x24x0.675	Pole	49.9%	Pass
145.45 - 140.45	Pole + Reinf.	TP24x24x0.675	Pole	60.7%	Pass
140.45 - 140	Pole + Reinf.	TP24x24x0.675	Pole	61.7%	Pass
140 - 139.75	Pole	TP36x36x0.5	Pole	37.1%	Pass
139.75 - 134.75	Pole	TP36x36x0.5	Pole	43.6%	Pass
134.75 - 129.75	Pole	TP36x36x0.5	Pole	50.3%	Pass
129.75 - 124.75	Pole	TP36x36x0.5	Pole	57.2%	Pass
124.75 - 119.75	Pole	TP36x36x0.5	Pole	64.3%	Pass
119.75 - 114.75	Pole	TP36x36x0.5	Pole	71.6%	Pass
114.75 - 109.75	Pole	TP36x36x0.5	Pole	79.1%	Pass
109.75 - 106.42	Pole	TP36x36x0.5	Pole	85.1%	Pass
106.42 - 106.17	Pole + Reinf.	TP36x36x0.7625	Pole	57.4%	Pass
106.17 - 101.17	Pole + Reinf.	TP36x36x0.7625	Pole	63.5%	Pass
101.17 - 100	Pole + Reinf.	TP36x36x0.7625	Pole	65.0%	Pass
100 - 99.75	Pole	TP42x42x0.5	Pole	73.1%	Pass
99.75 - 94.75	Pole	TP42x42x0.5	Pole	80.1%	Pass
94.75 - 89.75	Pole	TP42x42x0.5	Pole	87.2%	Pass
89.75 - 86.25	Pole	TP42x42x0.5	Pole	92.2%	Pass
86.25 - 86	Pole + Reinf.	TP42x42x0.5875	Pole	88.0%	Pass
86 - 81	Pole + Reinf.	TP42x42x0.5875	Pole	95.0%	Pass
81 - 78	Pole + Reinf.	TP42x42x0.5875	Pole	99.2%	Pass
78 - 77.75	Pole + Reinf.	TP42x42x0.875	Pole	66.6%	Pass
77.75 - 72.75	Pole + Reinf.	TP42x42x0.875	Pole	71.4%	Pass
72.75 - 67.75	Pole + Reinf.	TP42x42x0.875	Pole	76.3%	Pass
67.75 - 62.75	Pole + Reinf.	TP42x42x0.875	Pole	81.2%	Pass
62.75 - 60	Pole + Reinf.	TP42x42x0.875	Pole	84.0%	Pass
60 - 59.75	Pole	TP48x48x0.625	Pole	80.5%	Pass
59.75 - 54.75	Pole	TP48x48x0.625	Pole	85.3%	Pass
54.75 - 49.75	Pole	TP48x48x0.625	Pole	90.2%	Pass
49.75 - 46.25	Pole	TP48x48x0.625	Pole	93.7%	Pass
46.25 - 46	Pole + Reinf.	TP48x48x0.7	Pole	90.6%	Pass
46 - 41	Pole + Reinf.	TP48x48x0.7	Pole	95.4%	Pass
41 - 36	Pole + Reinf.	TP48x48x0.7	Pole	100.4%	Pass
36 - 32.67	Pole + Reinf.	TP48x48x0.7	Pole	103.7%	Pass
32.67 - 32.42	Pole + Reinf.	TP48x48x0.9625	Pole	76.9%	Pass
32.42 - 27.42	Pole + Reinf.	TP48x48x0.9625	Pole	80.6%	Pass
27.42 - 22.42	Pole + Reinf.	TP48x48x0.9625	Pole	84.4%	Pass
22.42 - 20	Pole + Reinf.	TP48x48x0.9625	Pole	86.2%	Pass
20 - 19.75	Pole	TP54x54x0.625	Pole	97.4%	Pass
19.75 - 14.75	Pole	TP54x54x0.625	Pole	101.7%	Pass
14.75 - 11.25	Pole	TP54x54x0.625	Pole	104.7%	Pass
11.25 - 11	Pole + Reinf.	TP54x54x0.8	Pole	84.1%	Pass
11 - 9	Pole + Reinf.	TP54x54x0.8	Pole	85.5%	Pass
9 - 8.75	Pole + Reinf.	TP54x54x0.8875	Pole	77.1%	Pass
8.75 - 3.75	Pole + Reinf.	TP54x54x0.8875	Pole	80.3%	Pass
3.75 - 0	Pole + Reinf.	TP54x54x0.8875	Pole	82.7%	Pass
				Summary	
			Pole	104.7%	Pass
			Reinforcement	75.2%	Pass
			Overall	104.7%	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	R7	R8
180 - 175	1942	n/a	1942	27.83	n/a	27.83	4.8%								
175 - 170	1942	n/a	1942	27.83	n/a	27.83	13.2%								
170 - 165	1942	n/a	1942	27.83	n/a	27.83	21.9%								
165 - 160	1942	n/a	1942	27.83	n/a	27.83	34.7%								
160 - 155	1942	n/a	1942	27.83	n/a	27.83	52.4%								
155 - 150	1942	n/a	1942	27.83	n/a	27.83	70.4%								
150 - 145.7	1942	n/a	1942	27.83	n/a	27.83	86.2%								
145.7 - 145.45	1942	1434	3376	27.83	18.00	45.83	49.9%					44.8%			
145.45 - 140.45	1942	1434	3376	27.83	18.00	45.83	60.7%					54.4%			
140.45 - 140	1942	1434	3376	27.83	18.00	45.83	61.7%					55.3%			
140 - 139.75	8786	n/a	8786	55.76	n/a	55.76	37.1%								
139.75 - 134.75	8786	n/a	8786	55.76	n/a	55.76	43.6%								
134.75 - 129.75	8786	n/a	8786	55.76	n/a	55.76	50.3%								
129.75 - 124.75	8786	n/a	8786	55.76	n/a	55.76	57.2%								
124.75 - 119.75	8786	n/a	8786	55.76	n/a	55.76	64.3%								
119.75 - 114.75	8786	n/a	8786	55.76	n/a	55.76	71.6%								
114.75 - 109.75	8786	n/a	8786	55.76	n/a	55.76	79.1%								
109.75 - 106.42	8786	n/a	8786	55.76	n/a	55.76	85.1%								
106.42 - 106.17	8786	4272	13058	55.76	24.38	80.14	57.4%				49.0%				
106.17 - 101.17	8786	4272	13058	55.76	24.38	80.14	63.5%				54.2%				
101.17 - 100	8786	4272	13058	55.76	24.38	80.14	65.0%				55.5%				
100 - 99.75	14036	n/a	14036	65.19	n/a	65.19	73.1%								
99.75 - 94.75	14036	n/a	14036	65.19	n/a	65.19	80.1%								
94.75 - 89.75	14036	n/a	14036	65.19	n/a	65.19	87.2%								
89.75 - 86.25	14036	n/a	14036	65.19	n/a	65.19	92.2%								
86.25 - 86	14784	2238	17021	65.19	31.88	97.06	88.0%								46.8%
86 - 81	14784	2238	17021	65.19	31.88	97.06	95.0%								50.5%
81 - 78	14784	2238	17021	65.19	31.88	97.06	99.3%								52.7%
78 - 77.75	14399	10029	24428	65.19	56.25	121.44	66.6%			51.8%					43.5%
77.75 - 72.75	14399	10029	24428	65.19	56.25	121.44	71.4%			55.6%					46.6%
72.75 - 67.75	14399	10029	24428	65.19	56.25	121.44	76.3%			59.4%					49.8%
67.75 - 62.75	14399	10029	24428	65.19	56.25	121.44	81.2%			63.3%					53.0%
62.75 - 60	14399	10029	24428	65.19	56.25	121.44	84.0%			65.4%					54.8%
60 - 59.75	26101	n/a	26101	93.02	n/a	93.02	80.5%								
59.75 - 54.75	26101	n/a	26101	93.02	n/a	93.02	85.3%								
54.75 - 49.75	26101	n/a	26101	93.02	n/a	93.02	90.2%								
49.75 - 46.25	26101	n/a	26101	93.02	n/a	93.02	93.7%								
46.25 - 46	26853	3225	30079	93.02	31.88	124.90	90.6%							53.7%	
46 - 41	26853	3225	30079	93.02	31.88	124.90	95.4%							56.6%	
41 - 36	26853	3225	30079	93.02	31.88	124.90	100.4%							59.6%	
36 - 32.67	26853	3225	30079	93.02	31.88	124.90	103.7%							61.5%	
32.67 - 32.42	26546	13142	39688	93.02	56.25	149.27	76.9%		61.1%					52.8%	
32.42 - 27.42	26546	13142	39688	93.02	56.25	149.27	80.6%		64.1%					55.4%	
27.42 - 22.42	26546	13142	39688	93.02	56.25	149.27	84.4%		67.0%					58.0%	
22.42 - 20	26546	13142	39688	93.02	56.25	149.27	86.2%		68.5%					59.2%	
20 - 19.75	37326	n/a	37326	104.80	n/a	104.80	97.4%								
19.75 - 14.75	37326	n/a	37326	104.80	n/a	104.80	101.7%								
14.75 - 11.25	37326	n/a	37326	104.80	n/a	104.80	104.7%								
11.25 - 11	37338	9642	46979	104.80	31.88	136.68	84.1%						61.9%		
11 - 9	37338	9642	46979	104.80	31.88	136.68	85.5%						62.9%		
9 - 8.75	37336	14762	52097	104.80	45.38	150.18	77.1%	70.2%					57.0%		
8.75 - 3.75	37336	14762	52097	104.80	45.38	150.18	80.3%	73.1%					59.4%		
3.75 - 0	37336	14762	52097	104.80	45.38	150.18	82.7%	75.2%					61.1%		

Note: Section capacity checked in 5 degree increments.

PROJECT	**86959.010.01 - PORTLAND WARREN AVE, ME**		
SUBJECT	**Welded Existing Bridge Stiffener @ 140 ft**		
DATE	**12/12/17**	PAGE 1	OF 2

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Rev. Type: G

Determine Load to Bridge Stiffener:

M	=	582.31	k-ft	From tnx Model
I	=	8416.89	in^4	From AutoCAD Sketch
y_{bar}	=	21.00	in	
S	=	400.804	in^3	I/y
fc	=	17.434	ksi	M/S
A_g	=	6.250	in^2	
P_u	=	108.964	k	fc x Ag

Stiffener Width	=	5.000	in
Stiffener Thickness	=	1.250	in
Stiffener Height	=	48.000	in
Fy	=	65	ksi
Step Width	=	6.00	in
Fillet Weld to Pole	=	3/8	in
Bolt Circle	=	29.50	in
Number of Bolts	=	24	
Bolt Size	=	3/4	in
Bolt Area	=	0.44	in^2
Notch	=	2.000	in

Determine ΦPn (Allowable Axial Load):

$P_n = F_{cr} \times A_g$ — Eqn E3-1, AISC 13th Edition, Section E3.

K	=	1		
l	=	8.000	in	Unsupported Length
I_y	=	0.814	in^4	Local Weak Axis Moment of Intertia
A_g	=	6.250	in^2	Stiffener Cross Sectional Area
r_y	=	0.361	in	Radius of Gyration (Weak Axis)
kl/r	=	22.170		

$4.71 \times \sqrt{(E/F_y)}$ = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

F_e	=	582.31	ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
F_{cr}	=	62.03	ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
P_n	=	387.71	k	Nominal Compressive Strength
ΦP_n	=	348.94	k	Allowable Compressive Strength

Unity% = 31.2 %

Determine ΦMn (Allowable Strong Axis Moment on Bridge Stiffener):

P_u	=	108.96	k	From Above
e	=	5.50	in	Eccentricity
M_u	=	599.30	k-in	Moment Due to Eccentric Load on Bridge Stiffener
M_p	=	23400.00	k-in	Plastic Moment - Eqn F11-1, AISC 13th Edition, Section F11.
$L_b d/t^2$	=	76.80		For All Bridge Stiffeners, Eqn F11-2 Will Control.
M_y	=	31200.00	k-in	Moment at Yield
M_n	=	45952.43	k-in	Nominal moment - Eqn F11-2, AISC 13th Edition, Section F11.
ΦM_n	=	41357.18	k-in	Allowable Strong Axis Moment

Unity% = 2.6 %

Moment to Existing Bolt Group:

I(Bolts) = 1153.4 in^4

I(Total) = 8416.89

$$\frac{I(Bolts)}{I(Total)} = \frac{1153.39}{8416.89} = 0.137$$

Meq = 79.80 k-ft <-------Insert into Flange Spreadsheet

PROJECT	**86959.010.01 - PORTLAND WARREN AVE, ME**			
SUBJECT	**Welded Existing Bridge Stiffener @ 140 ft**			
DATE	**12/12/17**	PAGE 2	OF 2	

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Check for Welded Connection

Weld Size = **3/8** D = 6 in
Weld grade = **70 ksi**
Plate Dia = **35 in**

	Upper pole	Lower Pole
Pole dia	**24 in**	**36 in**
Weld Length	**20 in**	**20 in**
Eccentricity	9.875 in	3.875
a	0.49	0.19
C1	1	1
K	0	0
C	2.311	3.534
P(Allowable)	207.96 K	318.03 K
Unity (%)	**52.4%**	**34.3%**

Unity% = 52.4%

PROJECT	**86959.010.01 - Portland Warren Ave, ME**				
SUBJECT	**Existing Flat Plate Bridge Stiffeners @ 140'**				
DATE	**12/12/17**	PAGE	1	OF	1

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(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	582.3 k-ft	From Risa Model	**Stiffener Width**	**6.000 in**
I =	8416.9 in^4	From AutoCAD Sketch	**Stiffener Thickness**	**1.000 in**
ybar =	18.500 in			
S =	454.97 in^3	I/y	**Fy**	**65 ksi**
fc =	15.36 ksi	M/S	**Fu**	**80 ksi**
Ag =	6.000 in^2			
Pu =	92.15 k	fc x Ag	**Bolt Circle**	**29.50 in**
			Number of Bolts	**24**
			Bolt Size	**3/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag		Eqn E3-1, AISC 13th Edition, Section E3.
K =	1	
l =	16.000 in	Unsupported Length
Iy =	.500 in^4	Local Weak Axis Moment of Intertia
Ag =	6.000 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	55.43	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	93.17 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	48.54 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	291.24 k	Nominal Compressive Strength
ΦPn =	262.12 k	Allowable Compressive Strength

Unity% = 35.2 %

Tension Rupture Check: AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	6.000 in^2	Gross Area
An =	4.750 in^2	Net Area
Ae =	4.750 in^2	Effective Area
ΦRn =	351.00 k	Tension Yielding: Eqn J4-1
ΦRn =	285.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	285.00 ksi	

Unity% 32.3 %

Moment to Existing Bolt Group:

S_{BG} =	570.64 in^3	# Bolts Acting	6
ft =	12.25 ksi		
Ab =	.442 in^2		
T =	32.46 k		
Arm =	29.50 ksi		
M_{EQ} =	79.8 k-ft	**<-------Insert into Crown Spreadsheet**	

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

Site Data

BU#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Reactions		
Mu	79.8	ft-kips
Axial, Pu:	14.595	kips
Shear, Vu:	20.691	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	24		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	29.5		

Plate Data		
Diam:	34.75	in
Thick, t:	1.875	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.04	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	4.80	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.318	in	
Min PL "treq" for actual **T w/ Pry**:	0.399	in	
Min PL "t1" for actual **T w/o Pry**:	0.527	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	4.80	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	16.0%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	3.4	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	10.4%	**Pass**	Comp. Y.L. Length:
No Prying			17.15
Tension Side Stress Ratio, (treq/t)^2:	4.5%	**Pass**	

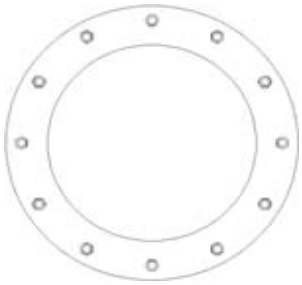
n/a

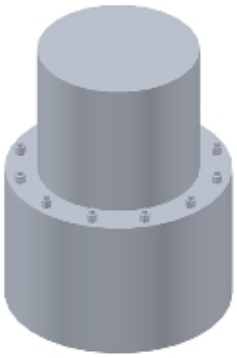
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	79.8	ft-kips
Axial:	14.595	kips
Shear:	20.691	kips
Exterior Flange Run, T+q:	4.8	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Elevation: 140 feet

Bolt Data			
Qty:	24		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	29.5	in	

Plate Data		
Plate Outer Diam:	35	in
Plate Inner Diam:	24.25	in (Hole @ Ctr)
Thick:	1.875	in
Grade:	36	ksi
Effective Width:	4.58	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.5	in
Pole Inner Diam:	35	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	4.8	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	30.0	Kips
Bolt Stress Ratio:	16.0%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	6.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	4.1	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	12.7%	**Pass**

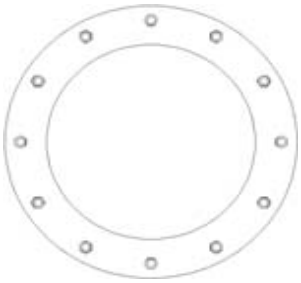
n/a

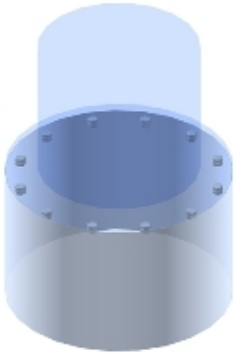
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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

PROJECT	**86959.010.01 - Portland Warren Ave, ME**				
SUBJECT	**Existing Flat Plate Bridge Stiffeners @ 100'**				
DATE	**12/12/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	1544.4 k-ft	From Risa Model	**Stiffener Width**	**6.500 in**
I =	10001.1 in^4	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	21.625 in			
S =	462.48 in^3	I/y	**Fy**	**65 ksi**
fc =	40.07 ksi	M/S	**Fu**	**80 ksi**
Ag =	8.125 in^2			
Pu =	325.59 k	fc x Ag	**Bolt Circle**	**38.50 in**
			Number of Bolts	**52**
			Bolt Size	**3/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	1	
l =	16.000 in	Unsupported Length
Iy =	1.058 in^4	Local Weak Axis Moment of Intertia
Ag =	8.125 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	44.34	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	145.58 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	53.92 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	438.10 k	Nominal Compressive Strength
ΦPn =	394.29 k	Allowable Compressive Strength

Unity% = 82.6 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	8.125 in^2	Gross Area
An =	6.563 in^2	Net Area
Ae =	6.563 in^2	Effective Area
ΦRn =	475.31 k	Tension Yielding: Eqn J4-1
ΦRn =	393.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	393.75 ksi	

Unity% 82.7 %

Moment to Existing Bolt Group:

S_{BG} =	519.54 in^3	# Bolts Acting	13
ft =	35.67 ksi		
Ab =	.442 in^2		
T =	204.87 k		
Arm =	38.50 ksi		
M_{EQ} =	657.3 k-ft	**<-------Insert into Crown Spreadsheet**	

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

Site Data

BU#: *878782*
Site Name: *Portland Warren Ave,ME*
App #: *412238 Revision # 0*

Reactions		
Mu	657.3	ft-kips
Axial, Pu:	27.337	kips
Shear, Vu:	29.533	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	52		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	38.5		

Plate Data		
Diam:	40.75	in
Thick, t:	2.125	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.17	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	36	in
Thick:	0.5	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.05	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	15.23	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.962	in	
Min PL "treq" for actual **T w/ Pry**:	0.537	in	
Min PL "t1" for actual **T w/o Pry**:	0.685	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	15.23	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	50.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	5.3	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	16.3%	**Pass**	Comp. Y.L. Length:
No Prying			13.65
Tension Side Stress Ratio, (treq/t)^2:	6.4%	**Pass**	

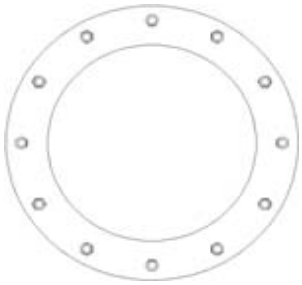
n/a

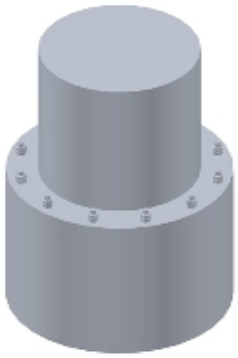
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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#: *878782*
Site Name: *Portland Warren Ave,ME*
App #: *412238 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	657.3	ft-kips
Axial:	27.337	kips
Shear:	29.533	kips
Exterior Flange Run, T+q:	15.23	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Elevation: 100 feet

Bolt Data			
Qty:	52		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	38.5	in	

Plate Data		
Plate Outer Diam:	41	in
Plate Inner Diam:	36.25	in (Hole @ Ctr)
Thick:	2.125	in
Grade:	36	ksi
Effective Width:	2.48	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.5	in
Pole Inner Diam:	41	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	15.2	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	30.0	Kips
Bolt Stress Ratio:	50.7%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	16.3	Kips, Ext. Cu=Interior Cu
Plate Stress:	7.3	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	22.5%	**Pass**

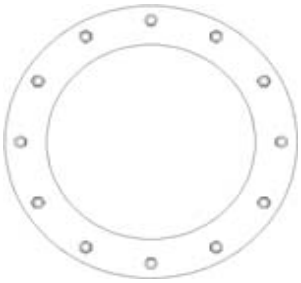
n/a

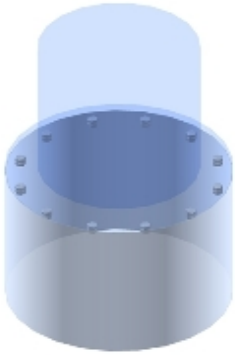
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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

PROJECT	**86959.010.01 - Portland Warren Ave, ME**				
SUBJECT	**Existing Flat Plate Bridge Stiffeners @ 60'**				
DATE	**12/12/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	2812.4 k-ft	From Risa Model	**Stiffener Width**	**6.500 in**
I =	19702.1 in^4	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	24.625 in			
S =	800.09 in^3	I/y	**Fy**	**65 ksi**
fc =	42.18 ksi	M/S	**Fu**	**80 ksi**
Ag =	8.125 in^2			
Pu =	342.73 k	fc x Ag	**Bolt Circle**	**44.38 in**
			Number of Bolts	**56**
			Bolt Size	**3/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	1	
l =	16.000 in	Unsupported Length
Iy =	1.058 in^4	Local Weak Axis Moment of Intertia
Ag =	8.125 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	44.34	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	145.58 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	53.92 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	438.10 k	Nominal Compressive Strength
ΦPn =	394.29 k	Allowable Compressive Strength

Unity% = 86.9 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	8.125 in^2	Gross Area
An =	6.563 in^2	Net Area
Ae =	6.563 in^2	Effective Area
ΦRn =	475.31 k	Tension Yielding: Eqn J4-1
ΦRn =	393.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	393.75 ksi	

Unity% 87.0 %

Moment to Existing Bolt Group:

S_{BG} =	887.98 in^3	# Bolts Acting	14
ft =	38.01 ksi		
Ab =	.442 in^2		
T =	235.07 k		
Arm =	44.38 ksi		
M_{EQ} =	869.3 k-ft	**<-------Insert into Crown Spreadsheet**	

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

Site Data

BU#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Reactions		
Mu	869.3	ft-kips
Axial, Pu:	44.995	kips
Shear, Vu:	33.796	kips
Elevation:	60	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
27.34

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	56		
Diameter (in.):	0.75	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	44.375		

Plate Data		
Diam:	46.5	in
Thick, t:	2.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.36	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	42	in
Thick:	0.5	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	37.58	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	37.57	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	15.99	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.996	in	
Min PL "treq" for actual **T w/ Pry**:	0.505	in	
Min PL "t1" for actual **T w/o Pry**:	0.650	in	
T allowable w/o Prying:	37.58	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	15.99	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	42.6%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	4.5	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	13.9%	**Pass**	Comp. Y.L. Length:
No Prying			14.32
Tension Side Stress Ratio, (treq/t)^2:	5.0%	**Pass**	

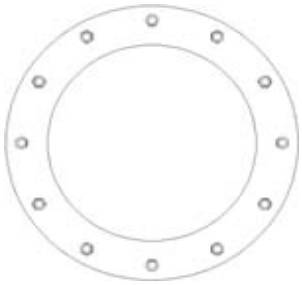
n/a

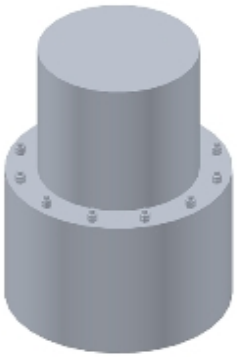
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	869.3	ft-kips
Axial:	44.995	kips
Shear:	33.796	kips
Exterior Flange Run, T+q:	15.99	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
27.34

Elevation: 60 feet

Bolt Data			
Qty:	56		
Diam:	0.75	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	44.375	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	16.0	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty),	37.6	Kips
Bolt Stress Ratio:	42.6%	**Pass**

Plate Data		
Plate Outer Diam:	46.75	in
Plate Inner Diam:	42.25	in (Hole @ Ctr)
Thick:	2.25	in
Grade:	36	ksi
Effective Width:	2.62	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	17.6	Kips, Ext. Cu=Interior Cu
Plate Stress:	6.3	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	19.4%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

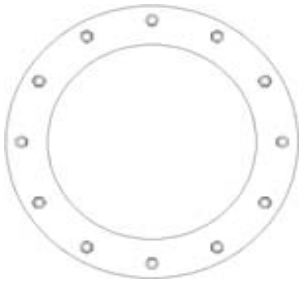
Stiffener Results

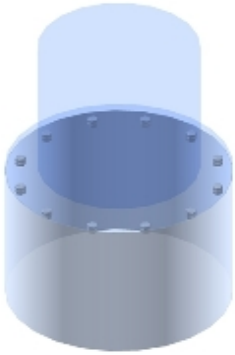
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.625	in
Pole Inner Diam:	46.75	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi





* 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

PROJECT	**86959.010.01 - Portland Warren Ave, ME**				
SUBJECT	**Flat Plate Bridge Stiffeners @ 20'**				
DATE	**12/12/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	4237.7 k-ft	From Risa Model	**Stiffener Width**	**8.500 in**
I =	31128.9 in^4	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	27.625 in			
S =	1126.84 in^3	I/y	**Fy**	**65 ksi**
fc =	45.13 ksi	M/S	**Fu**	**80 ksi**
Ag =	10.625 in^2			
Pu =	479.49 k	fc x Ag	**Bolt Circle**	**50.38 in**
			Number of Bolts	**52**
			Bolt Size	**1**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	1	
l =	16.000 in	Unsupported Length
Iy =	1.383 in^4	Local Weak Axis Moment of Intertia
Ag =	10.625 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	44.34	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	145.58 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	53.92 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	572.90 k	Nominal Compressive Strength
ΦPn =	515.61 k	Allowable Compressive Strength

Unity% = 93.0 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	10.625 in^2	Gross Area
An =	9.063 in^2	Net Area
Ae =	9.063 in^2	Effective Area
ΦRn =	621.56 k	Tension Yielding: Eqn J4-1
ΦRn =	543.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	543.75 ksi	

Unity% 88.2 %

Moment to Existing Bolt Group:

S_{BG} =	1235.89 in^3	# Bolts Acting	13
ft =	41.15 ksi		
Ab =	.785 in^2		
T =	420.11 k		
Arm =	50.38 ksi		
M_{EQ} =	1763.6 k-ft	**<-------Insert into Crown Spreadsheet**	

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

Site Data

BU#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Reactions		
Mu	1763.6	ft-kips
Axial, Pu:	66.855	kips
Shear, Vu:	37.252	kips
Elevation:	20	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	52		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	50.375		

Plate Data		
Diam:	52.5	in
Thick, t:	2.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.90	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48	in
Thick:	0.625	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
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:	31.03	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.995	in	
Min PL "treq" for actual **T w/ Pry**:	0.587	in	
Min PL "t1" for actual **T w/o Pry**:	0.750	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	31.03	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	56.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	5.7	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	17.7%	**Pass**	Comp. Y.L. Length:
No Prying			15.29
Tension Side Stress Ratio, (treq/t)^2:	5.5%	**Pass**	

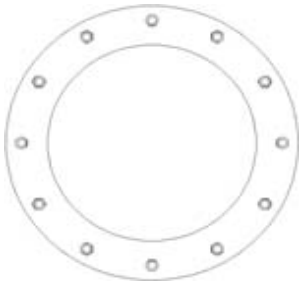
n/a

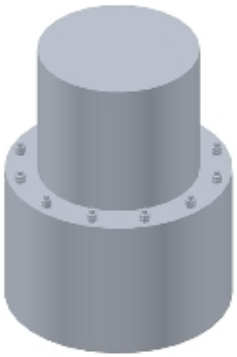
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





* 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#: *878782*
Site Name: *Portland Warren Ave, ME*
App #: *412238 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	1763.6	ft-kips
Axial:	66.855	kips
Shear:	37.252	kips
Exterior Flange Run, T+q:	31.03	kips

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

Elevation: 20 feet

Bolt Data			
Qty:	52		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	50.375	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	31.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	54.5	Kips
Bolt Stress Ratio:	56.9%	**Pass**

Plate Data		
Plate Outer Diam:	52.75	in
Plate Inner Diam:	48.25	in (Hole @ Ctr)
Thick:	2.5	in
Grade:	36	ksi
Effective Width:	3.19	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	33.6	Kips, Ext. Cu=Interior Cu
Plate Stress:	8.0	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	24.7%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

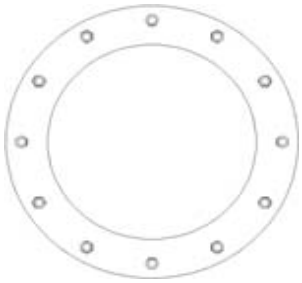
Stiffener Results

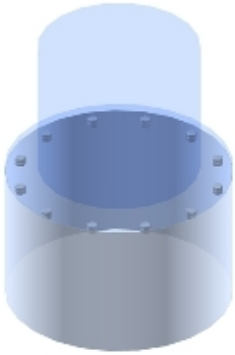
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.625	in
Pole Inner Diam:	52.75	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi





* 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

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	878782
Name:	PORTLAND WARREN AVE
App. #:	412238 Rev# 0

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	4995	ft-kip
Axial:	78	kip
Shear:	39	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	105%
eta Factor:	0.50

Original Anchor Rod Data

Quantity:	28	
Diameter:	2.00	in
Material:	A36	
Bolt Circle:	60.1	in
Bolt Spacing:		in
Bolt Group Area:	87.96	in^2
Bolt Group MOIx:	39749	in^4

Reactions Seen by Original AR Group

Moment:	3989.2	kip-ft
Axial:	78.0	kip
Shear:	39.0	kip

Original AR Capacity Check

Combined Load:	119.3	kip
Allowable load:	115.9	kip
AR Capacity:	102.9%	Pass

First Added Anchor Rod Data

Quantity:	4	
Diameter:	2.25	in
Material:	F1554 GR 105	
Bolt Circle:	71.0	in
Bolt Group Area:	15.90	in^2
Bolt Group MOIx:	10022	in^4

Reactions Seen by First Added AR Group

Moment:	1005.8	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check

Combined Load:	168.9	kip
Allowable load:	324.8	kip
AR Capacity:	52.0%	Pass

Second Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

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

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

Site Data

BU#: *878782*
Site Name: *PORTLAND WARREN AV*
App #: *412238 Rev# 0*
Pole Manufacturer: *Other*

Reactions		
Mu:	3989.2	ft-kips
Axial, Pu:	78	kips
Shear, Vu:	39	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	28	
Diam:	2	in
Rod Material:	Other	
Strength (Fu):	58	ksi
Yield (Fy):	36	ksi
Bolt Circle:	60.125	in

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

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	66	in
Thick:	3.25	in
Grade:	36	ksi
Single-Rod B-eff:	6.06	in

Base Plate Results Flexural Check

Base Plate Stress:	13.9	ksi
Allowable Plate Stress:	32.4	ksi
Base Plate Stress Ratio:	42.8%	**Pass**

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 26.44

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

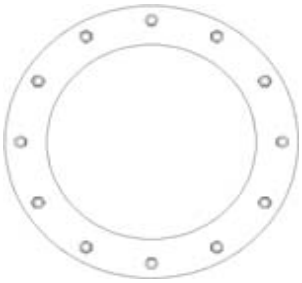
Stiffener Results

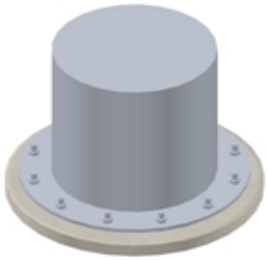
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	54	in
Thick:	0.625	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

PROJECT **86959.010.01 - Portland Warren Ave, ME**
SUBJECT **Foundation Analysis**
DATE **12/12/17** PAGE 1 OF 1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Weight of Concrete

Wc= γ*w1*w2*D

= .15*12*12*5

= 108 kips

MOI of Anchor Group

I/A= Σn*d^2

= [2*14*5.6'^2+2*2*(4.7'^2+3.9'^2+3.0'^2+2.15'^2+1.3'^2+0.43'^2)]*144

= 156854.82 in^4/in^2

Effective Moment at Anchors

Me= M+V*D

= 4995 + 39 * 5

= 5190 k-ft

Max Comp. in Anchor

Cu= (P+ϕWc)/N+ Me*c/(I/A)

= (71k+1*108k)/52 + (5148*12)k-in * (7.95*12)in / (156854in^4/in^2)

= 41.4 kips

Max Tension in Anchor

Tu= (-P+ϕWc)/N+ Me*c/(I/A)

= (-71k+.9*108k)/52 + (5148*12)k-in * (7.95*12)in / (156854in^4/in^2)

= 38.2 kips

Axial Capacity of Anchor

ϕPn= ϕFy*Ay

= 0.9*60ksi*1.0in^2

= 54.0 kips

% Capacity

= 76.7%

Rock to Grout Bond

P_{RG}= ϕ*SA*Fb

= 0.5*2.5in*π * (45ksi*8ft*12)

= 169.6 kips

Ultimate Bond Stength
450 psi

% Capacity

= 22.5%

Factored Loads

M	4995	k-ft
P	78	k
V	39	k

Block

W1	12	ft
W2	12	ft
D	5	ft

Anchor

Size	1.128	
Qty	14	per face
Spacing	10.77	in
Grade	60	ksi
Hole Size	2.5	in

Steel to Grout Bond

P_{RG}= ϕ*SA*Fb

= 0.5*1.125in*π * (.32ksi*8ft*12)

= 54.4 kips

Steel-to-Grout Bond

4.2*sqrt(f'c)

- f'c of SikaGrout 212 >= 5800psi

= 320psi

% Capacity

= 99.2%

Rock Group Forces

Moment Resistance from Concrete Weigth

ϕMc= 0.9 * 108k * 2.8284ft

= 274.9 k-ft (Diagonal)

ϕMc= 0.9 * 108k * 6ft

= 583.2 k-ft (Orthogonal)

Group Uplift Force

Diagonal

Ugd= 556.3 kips

Orthogonal

Ugo= 455.5 kips

Rock Group Weight

ϕRw= ϕ*Vol*γ_{rock}

= 0.75 * 581.6 ft′ *

= 69.8 kips

γ_{rock}

0.16kcf

Rock Shear Strength

ϕRs= ϕ*SA*v_{rock}*cos(30)

= 576.8 kips

ϕ 0.75

SA 222 ft^2

v_{rock} 4 ksf

% Capacity

= 86.0%

Soil Bearing

σ= P/A+M/S

= 78 / 12^2 + 4995 / 203.6

= 25.1 ksf

q_{all} 30 ksf

S=(12^3/6/sqrt(2))

= 203.6 ft^3

% Capacity

= 83.6%