August 31, 2017

Mr. Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209-8242

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ModDwgs@btgrp.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2182
	Carrier Site Name:	Groton
Crown Castle Designation:	**Crown Castle BU Number:**	881533
	Crown Castle Site Name:	Groton Tower
	Crown Castle JDE Job Number:	415559
	Crown Castle Work Order Number:	1445738
	Crown Castle Application Number:	374247 Rev. 8
Engineering Firm Designation:	**B+T Group Project Number:**	92739.008.01
Site Data:	**75 Roberts Road, Groton, CT, New London County**	
	Latitude *41° 21' 36.8"*, Longitude *-72° 2' 55.1"*	
	144.5 Ft - Monopole	

Dear Mr. Howell,

B+T Group is pleased to submit this **"Structural Modification 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 1070634, in accordance with application 374247, revision 8.

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:

LC4.7: TSA specified load case with proposed modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

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

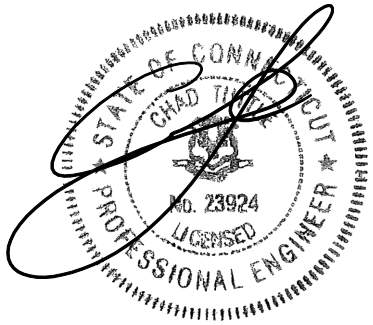
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *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 modification prepared by: Robert M. Frazier, P.E.

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564; Exp: 02/10/18

8/31/17



Chad E. Tuttle, P.E. tnxTower

Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This is a 144.5 ft. monopole designed by Engineered Endeavors, Inc. in January of 2001. The monopole was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This monopole has been modified by WEI in August of 2007, Vertical Structures in November of 2008, Crown Castle in February of 2014, B+T Group in July of 2015, October of 2015 and February of 2017 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

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

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
145.0	145.0	3	CCI Antennas	DTMABP7819VG12A	6 2 2	1-5/8 3/4 3/8	--
		3	CCI Antennas	TPA-65R-LCUUUU-H8			
		3	Ericsson	RRUS 32 B2			
		1	KMW Comm.	AM-X-CD-17-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
145.0	146.0	**3**	**Powerwave Tech.**	**7770.00**	**13 1**	**1-5/8 3/8**	**4**
	145.0	**6**	**ABC**	**DUAL BAND 800/1900 FULL BAND MASTHEAD**			
		6	**Kathrein**	**782-10250**			
		6	**Powerwave Tech.**	**7020.00**			
		6	**Powerwave Tech.**	**LGP21401**			
		1	**Powerwave Tech.**	**P65-17-XLH-RR**			
		1	Andrew	SBNH-1D6565C	2	3/4	1
		6	Ericsson	RRUS 11			
		1	KMW Comm.	AM-X-CD-17-65-00T-RET			
		6	Powerwave Tech.	7020.00			
		3	Powerwave Tech.	7770.00			
		1	Raycap	DC6-48-60-18-8F			
		1	--	Platform Mount [LP 601-1]			
135.0	137.0	3	Alcatel Lucent	B66A RRH4X45	1	1-5/8	2
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		3	Amphenol	QUAD656C0000X			
		6	Commscope	HBXX-6517DS-A2M			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	Andrew	LNX-6512DS-VTM	7	1-5/8	1
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
	135.0	1	--	Platform Mount [LP 601-1]			
125.0	126.0	3	Commscope	LNX-6515DS-A1M	12 1	1-5/8 1-1/4	1
		3	Ericsson	ERICSSON AIR 21 B2A B4P			
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
	125.0	1	--	Platform Mount [LP 601-1]			
113.0	113.0	3	Alcatel Lucent	TD-RRH8x20-25	3 1	1-1/4 5/8	1
		3	RFS Celwave	APXVSPP18-C-A20			
		3	RFS Celwave	APXVTM14-C-120			
		1	--	Platform Mount [LP 601-1]			
111.0	111.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	--	--	1
		1	--	Side Arm Mount [SO 102-3]			
	109.0	3	Alcatel Lucent	800MHz 2X50W RRH W/FILTER			
100.0	100.0	1	--	Platform Mount [LP 601-1]	--	--	3
51.0	52.0	1	Lucent	KS24019-L112A	1	1/2	1
	51.0	1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Empty Mount; Considered in This Analysis
4) 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)
145	145	12	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		
135	135	12	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		
125	125	9	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		
115	115	12	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		
105	105	12	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		
95	95	12	Allgon	7120.16	--	--
		1	Generic	Low Profile Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	AT&T Mobility Co-Locate, Rev. 8	374247	CCI Sites
Tower Manufacturer Drawing	EEI, Job No. 8409	1405782	CCI Sites
Foundation Drawing	URS, Project No. F301877.01/F04	1405796	CCI Sites
Geotech Report	Clarence Welti, Date: 03/13/2000	1406209	CCI Sites
Tower Modification Drawing	Walker Engineering, Job No. 0705-0147VRE	2048224	CCI Sites
	Vertical Structures, Date: 11/25/08	2353860	CCI Sites
	CCI, Date: 02/25/14	4491288	CCI Sites
	B+T Group, Project No. 92739.004.01	5756537	CCI Sites
	B+T Group, Project No. 92739.005.01	5916747	CCI Sites
	B+T Group, Project No. 92739.007.01	Date-02/21/17	CCI Sites
Modification Inspection Report	Vertical Structures, Project No. 2007-004-164	2304223	CCI Sites
	Vertical Structures, Project No. 2009-004-059	2435103	CCI Sites
	SGS, Project No. 145071	5246681	CCI Sites
	ETS, Project No. 151208	6017666	CCI Sites
	ETS, Project No. 151208	6089847	CCI Sites
Antenna Configuration	Previous SA by PJF, Project No. 37517-0635.003.7805	6912290	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.

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) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	144.5 - 139.5	Pole	TP22.092x21x0.1875	1	-2.197	-	14.6	Pass[1]
L2	139.5 - 134.5	Pole	TP23.184x22.092x0.1875	2	-4.436	-	29.7	Pass[1]
L3	134.5 - 129.5	Pole	TP24.276x23.184x0.1875	3	-4.827	-	48.2	Pass[1]
L4	129.5 - 124.5	Pole	TP25.368x24.276x0.1875	4	-7.289	-	66.2	Pass[1]
L5	124.5 - 121.41	Pole	TP26.882x25.368x0.1875	5	-7.655	-	78.9	Pass[1]
L6	121.41 - 116.41	Pole	TP26.737x25.668x0.25	6	-8.530	-	68.6	Pass[1]
L7	116.41 - 112.58	Pole	TP27.555x26.737x0.25	7	-10.844	-	77.9	Pass[1]
L8	112.58 - 112.33	Pole + Reinf.	TP27.609x27.555x0.425	8	-10.925	-	79.7	Pass[1]
L9	112.33 - 107.33	Pole + Reinf.	TP28.677x27.609x0.4188	9	-12.438	-	93.7	Pass[1]
L10	107.33 - 106	Pole + Reinf.	TP28.962x28.677x0.4188	10	-12.709	-	97.2	Pass[1]
L11	106 - 105.75	Pole + Reinf.	TP29.015x28.962x0.5313	11	-12.791	-	81.2	Pass[1]
L12	105.75 - 103.5	Pole + Reinf.	TP29.496x29.015x0.525	12	-13.318	-	86.1	Pass[1]
L13	103.5 - 103.25	Pole + Reinf.	TP29.549x29.496x0.7	13	-13.406	-	66.2	Pass[1]
L14	103.25 - 100.92	Pole + Reinf.	TP30.047x29.549x0.6875	14	-14.071	-	70.1	Pass[1]
L15	100.92 - 100.67	Pole + Reinf.	TP30.101x30.047x0.5188	15	-14.145	-	92.1	Pass[1]
L16	100.67 - 98.5	Pole + Reinf.	TP30.564x30.101x0.5125	16	-16.042	-	96.8	Pass[1]
L17	98.5 - 98.25	Pole + Reinf.	TP30.618x30.564x0.675	17	-16.135	-	74.8	Pass[1]
L18	98.25 - 98	Pole + Reinf.	TP30.671x30.618x0.675	18	-16.210	-	75.2	Pass[1]
L19	98 - 97.75	Pole + Reinf.	TP30.725x30.671x0.575	19	-16.276	-	85.6	Pass[1]
L20	97.75 - 92.75	Pole + Reinf.	TP31.793x30.725x0.5563	20	-17.617	-	94.7	Pass[1]
L21	92.75 - 91.74	Pole + Reinf.	TP32.997x31.793x0.55	21	-17.896	-	96.4	Pass[1]
L22	91.74 - 86.12	Pole	TP32.72x31.509x0.375	22	-20.069	-	89.1	Pass[1]
L23	86.12 - 81.12	Pole	TP33.798x32.72x0.375	23	-21.330	-	93.6	Pass[1]
L24	81.12 - 77.41	Pole	TP34.596x33.798x0.375	24	-22.284	-	96.6	Pass[1]
L25	77.41 - 77.16	Pole + Reinf.	TP34.65x34.596x0.6375	25	-22.406	-	91.2	Pass[1]
L26	77.16 - 72.16	Pole + Reinf.	TP35.727x34.65x0.625	26	-24.075	-	95.7	Pass[1]
L27	72.16 - 69	Pole + Reinf.	TP36.408x35.727x0.625	27	-25.158	-	98.4	Pass[1]
L28	69 - 68.75	Pole + Reinf.	TP36.462x36.408x0.8	28	-25.279	-	78.2	Pass[1]
L29	68.75 - 63.75	Pole + Reinf.	TP37.539x36.462x0.7875	29	-27.325	-	81.6	Pass[1]
L30	63.75 - 58.75	Pole + Reinf.	TP38.616x37.539x0.775	30	-29.419	-	84.8	Pass[1]
L31	58.75 - 58.5	Pole + Reinf.	TP38.67x38.616x0.775	31	-29.539	-	84.9	Pass[1]
L32	58.5 - 58.25	Pole + Reinf.	TP38.724x38.67x0.775	32	-29.656	-	85.7	Pass[1]
L33	58.25 - 58	Pole + Reinf.	TP38.778x38.724x0.775	33	-29.773	-	85.9	Pass[1]
L34	58 - 57.75	Pole + Reinf.	TP38.832x38.778x0.6125	34	-29.873	-	97.2	Pass[1]
L35	57.75 - 57.33	Pole + Reinf.	TP38.922x38.832x0.6125	35	-30.039	-	97.4	Pass[1]
L36	57.33 - 57.08	Pole + Reinf.	TP38.976x38.922x0.6125	36	-30.144	-	97.6	Pass[1]
L37	57.08 - 56.75	Pole + Reinf.	TP39.047x38.976x0.6125	37	-30.276	-	97.8	Pass[1]
L38	56.75 - 56.5	Pole + Reinf.	TP39.101x39.047x0.7375	38	-30.387	-	88.8	Pass[1]
L39	56.5 - 51.5	Pole + Reinf.	TP40.178x39.101x0.725	39	-32.538	-	91.6	Pass[1]
L40	51.5 - 47.82	Pole + Reinf.	TP42.216x40.178x0.7125	40	-34.235	-	93.5	Pass[1]
L41	47.82 - 41.04	Pole + Reinf.	TP41.678x40.221x0.7875	41	-39.516	-	91.2	Pass[1]

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L42	41.04 - 36.04	Pole + Reinf.	TP42.753x41.678x0.7875	42	-41.920	-	93.2	Pass[1]
L43	36.04 - 31.25	Pole + Reinf.	TP43.783x42.753x0.7625	43	-44.256	-	94.9	Pass[1]
L44	31.25 - 31	Pole + Reinf.	TP43.836x43.783x0.9375	44	-44.413	-	79.1	Pass[1]
L45	31 - 30.75	Pole + Reinf.	TP43.89x43.836x0.7125	45	-44.541	-	88.3	Pass[1]
L46	30.75 - 27.83	Pole + Reinf.	TP44.518x43.89x0.7125	46	-46.028	-	89.2	Pass[1]
L47	27.83 - 27.58	Pole + Reinf.	TP44.571x44.518x0.65	47	-46.176	-	90.9	Pass[1]
L48	27.58 - 27.25	Pole + Reinf.	TP44.642x44.571x0.65	48	-46.337	-	91.0	Pass[1]
L49	27.25 - 27	Pole + Reinf.	TP44.696x44.642x0.725	49	-46.462	-	92.8	Pass[1]
L50	27 - 22	Pole + Reinf.	TP45.771x44.696x0.7125	50	-48.898	-	94.2	Pass[1]
L51	22 - 17	Pole + Reinf.	TP46.846x45.771x0.7125	51	-51.382	-	95.5	Pass[1]
L52	17 - 12	Pole + Reinf.	TP47.921x46.846x0.7125	52	-53.898	-	96.8	Pass[1]
L53	12 - 7	Pole + Reinf.	TP48.995x47.921x0.7125	53	-56.445	-	97.9	Pass[1]
L54	7 - 2	Pole + Reinf.	TP50.07x48.995x0.7	54	-59.026	-	98.9	Pass[1]
L55	2 - 0	Pole + Reinf.	TP50.5x50.07x0.7	55	-60.069	-	99.3	Pass[1]
							Summary	
						Pole (L55)	99.3	Pass[1]
						Rating =	**99.3**	**Pass[1]**

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	88.7	Pass
1	Base Plate	Base	88.3	Pass
1	Base Foundation (Soil Interaction)	Base	61.1	Pass
1	Base Foundation (Steel)	Base	45.4	Pass

Structure Rating (max from all components) =	99.3%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

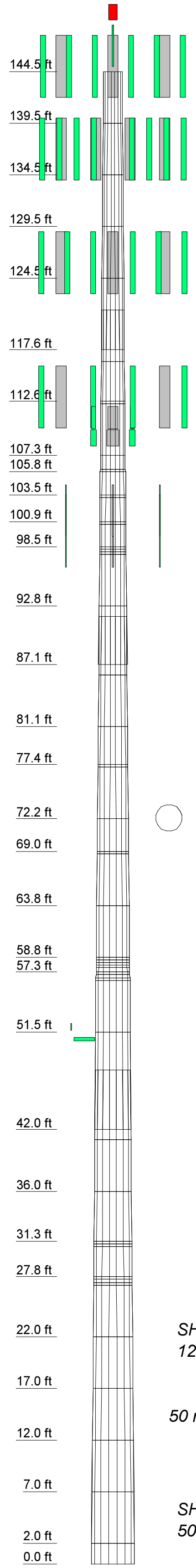
4.1) Recommendations

1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A

tnxTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.000	18	0.188		21.000	22.092	A572-65	0.2
2	5.000	18	0.188		22.092	23.184		0.2
3	5.000	18	0.188		23.184	24.276		0.2
4	5.000	18	0.188		24.276	25.368		0.2
5	[illegible]	18	0.188	3.841	25.368	26.882		0.4
6–19	[illegible]	18	[illegible]		[illegible]	[illegible]		[illegible]
20	5.000	18	0.550		[illegible]	[illegible]		0.9
21	[illegible]	18	0.550	4.625	[illegible]	[illegible]		1.0
22	[illegible]	18	0.375		[illegible]	[illegible]		0.7
23	5.000	18	0.375		[illegible]	[illegible]		0.7
24–25	[illegible]	18	[illegible]		[illegible]	[illegible]		[illegible]
26	5.000	18	0.625		[illegible]	[illegible]		1.1
27–28	[illegible]	18	[illegible]		[illegible]	[illegible]		[illegible]
29	5.000	18	[illegible]		[illegible]	[illegible]		1.5
30	[illegible]	18	[illegible]		[illegible]	[illegible]		1.5
31–38	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
39	5.000	18	[illegible]		[illegible]	[illegible]		1.5
40	[illegible]	18	0.713	5.776	40.178	42.215		3.0
41	[illegible]	18	[illegible]		[illegible]	[illegible]		2.3
42	5.000	18	[illegible]		[illegible]	[illegible]		1.7
43	[illegible]	18	[illegible]		[illegible]	[illegible]		1.7
44–49	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
50	5.000	18	[illegible]		[illegible]	[illegible]		1.7
51	5.000	18	0.713		45.771	46.846		1.8
52	5.000	18	0.713		46.846	47.921		1.8
53	5.000	18	0.713		47.921	48.995		1.8
54	5.000	18	0.700		48.995	50.070		1.8
55	2.000	18	0.700		50.070	50.505		0.7
								34.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
Strobe (E)	149.5
Lightning Rod 5/8" x 5' (E)	147
5' x 2" Pipe Mount (E-For Strobe)	147
Top Hat (E)	146
TPA-65R-LCUUUU-H8 w/ Mount Pipe (P)	145
TPA-65R-LCUUUU-H8 w/ Mount Pipe (P)	145
TPA-65R-LCUUUU-H8 w/ Mount Pipe (P)	145
AM-X-CD-17-65-00T-RET w/ Mount Pipe (P)	145
RRUS 32 B2 (P)	145
RRUS 32 B2 (P)	145
RRUS 32 B2 (P)	145
DTMABP7819VG12A (P)	145
DTMABP7819VG12A (P)	145
DTMABP7819VG12A (P)	145
DC6-48-60-18-8F (P)	145
7770.00 w/ Mount Pipe (E)	145
7770.00 w/ Mount Pipe (E)	145
7770.00 w/ Mount Pipe (E)	145
SBNH-1D6565C w/ Mount Pipe (E)	145
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	145
(2) 7020.00 (E)	145
(2) 7020.00 (E)	145
(2) 7020.00 (E)	145
(2) RRUS 11 (E)	145
(2) RRUS 11 (E)	145
(2) RRUS 11 (E)	145
DC6-48-60-18-8F (E)	145
8'x2" Antenna Mount Pipe (E)	145
8'x2" Antenna Mount Pipe (E)	145
8'x2" Antenna Mount Pipe (E)	145
Climbing Ladder (Flat)	145
Platform Mount [LP 601-1] (E)	145
QUAD656C0000X w/ Mount Pipe (R)	135
QUAD656C0000X w/ Mount Pipe (R)	135
QUAD656C0000X w/ Mount Pipe (R)	135
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	135
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	135
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	135
RRH2x60-700 (R)	135
RRH2x60-700 (R)	135
RRH2x60-700 (R)	135
RRH2X60-PCS (R)	135
RRH2X60-PCS (R)	135
RRH2X60-PCS (R)	135
B66A RRH4X45 (R)	135
B66A RRH4X45 (R)	135
B66A RRH4X45 (R)	135
DB-T1-6Z-8AB-0Z (R)	135
LNX-6512DS-VTM w/ Mount Pipe (E)	135
LNX-6512DS-VTM w/ Mount Pipe (E)	135

TYPE	ELEVATION
LNX-6512DS-VTM w/ Mount Pipe (E)	135
DB-T1-6Z-8AB-0Z (E)	135
Climbing Ladder (Flat)	135
Platform Mount [LP 601-1] (E)	135
LNX-6515DS-A1M w/ Mount Pipe (E)	125
LNX-6515DS-A1M w/ Mount Pipe (E)	125
LNX-6515DS-A1M w/ Mount Pipe (E)	125
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	125
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	125
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	125
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	125
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	125
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	125
KRY 112 144/1 (E)	125
KRY 112 144/1 (E)	125
KRY 112 144/1 (E)	125
RRUS 11 B12 (E)	125
RRUS 11 B12 (E)	125
RRUS 11 B12 (E)	125
Climbing Ladder (Flat)	125
Platform Mount [LP 601-1] (E)	125
APXVSPP18-C-A20 w/ Mount Pipe (E)	113
APXVSPP18-C-A20 w/ Mount Pipe (E)	113
APXVSPP18-C-A20 w/ Mount Pipe (E)	113
APXVTM14-C-120 w/ Mount Pipe (E)	113
APXVTM14-C-120 w/ Mount Pipe (E)	113
APXVTM14-C-120 w/ Mount Pipe (E)	113
TD-RRH8x20-25 (E)	113
TD-RRH8x20-25 (E)	113
TD-RRH8x20-25 (E)	113
Climbing Ladder (Flat)	113
Platform Mount [LP 601-1] (E)	113
PCS 1900MHz 4x45W-65MHz (E)	111
PCS 1900MHz 4x45W-65MHz (E)	111
PCS 1900MHz 4x45W-65MHz (E)	111
800MHz 2X50W RRH W/FILTER (E)	111
800MHz 2X50W RRH W/FILTER (E)	111
800MHz 2X50W RRH W/FILTER (E)	111
6' x 2" Mount Pipe (E)	111
6' x 2" Mount Pipe (E)	111
6' x 2" Mount Pipe (E)	111
Side Arm Mount [SO 102-3] (E)	111
5' x 2" Pipe Mount (E)	100
5' x 2" Pipe Mount (E)	100
5' x 2" Pipe Mount (E)	100
7'x2" Antenna Mount Pipe (E)	100
7'x2" Antenna Mount Pipe (E)	100
7'x2" Antenna Mount Pipe (E)	100
Climbing Ladder (Flat)	100
Platform Mount [LP 601-1] (E)	100
KS24019-L112A (E)	51
Side Arm Mount [SO 701-1] (E)	51

ALL REACTIONS ARE FACTORED

AXIAL
106 K
SHEAR
12 K
MOME
1420 ki
TORQUE 3 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL
60 K
SHEAR
50 K
MOME
5637 ki
TORQUE 5 kip-ft
REACTIONS - 105 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Tower Rating: 99.3%

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

Job: 92739.008.01 - GROTON TOWER, CT (BU# 881533)
Project:
Client: Crown Castle | Drawn by: CJangonda | App'd:
Code: TIA-222-G | Date: 08/28/17 | Scale: NTS
Path: | Dwg No. E-1

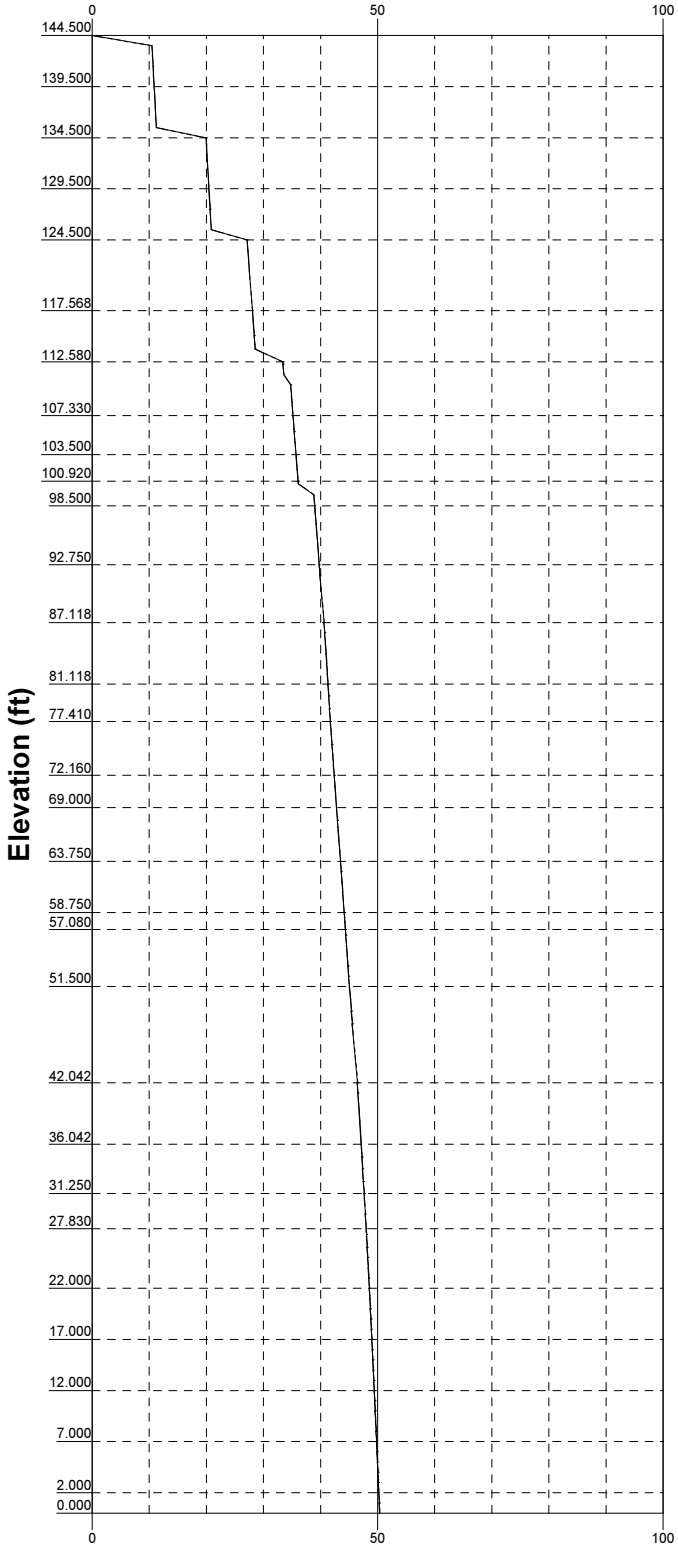
TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure C

Vx Vz

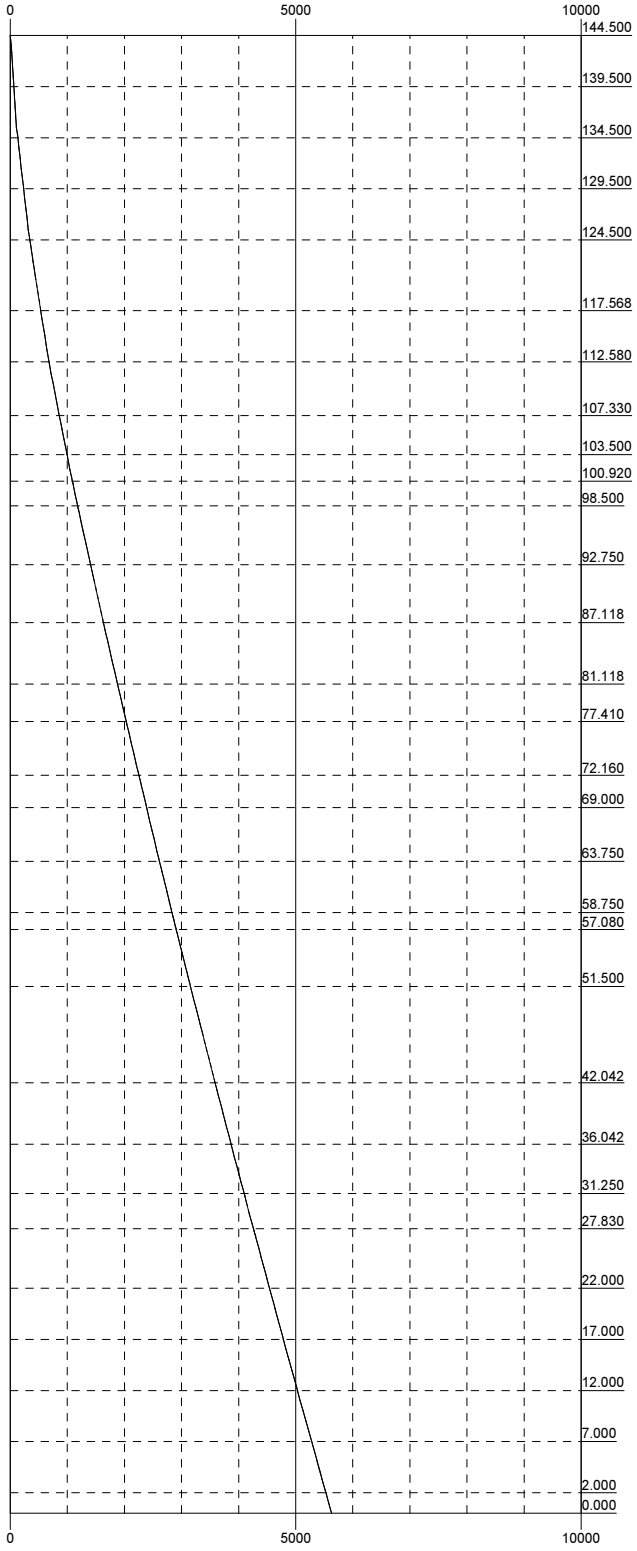
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

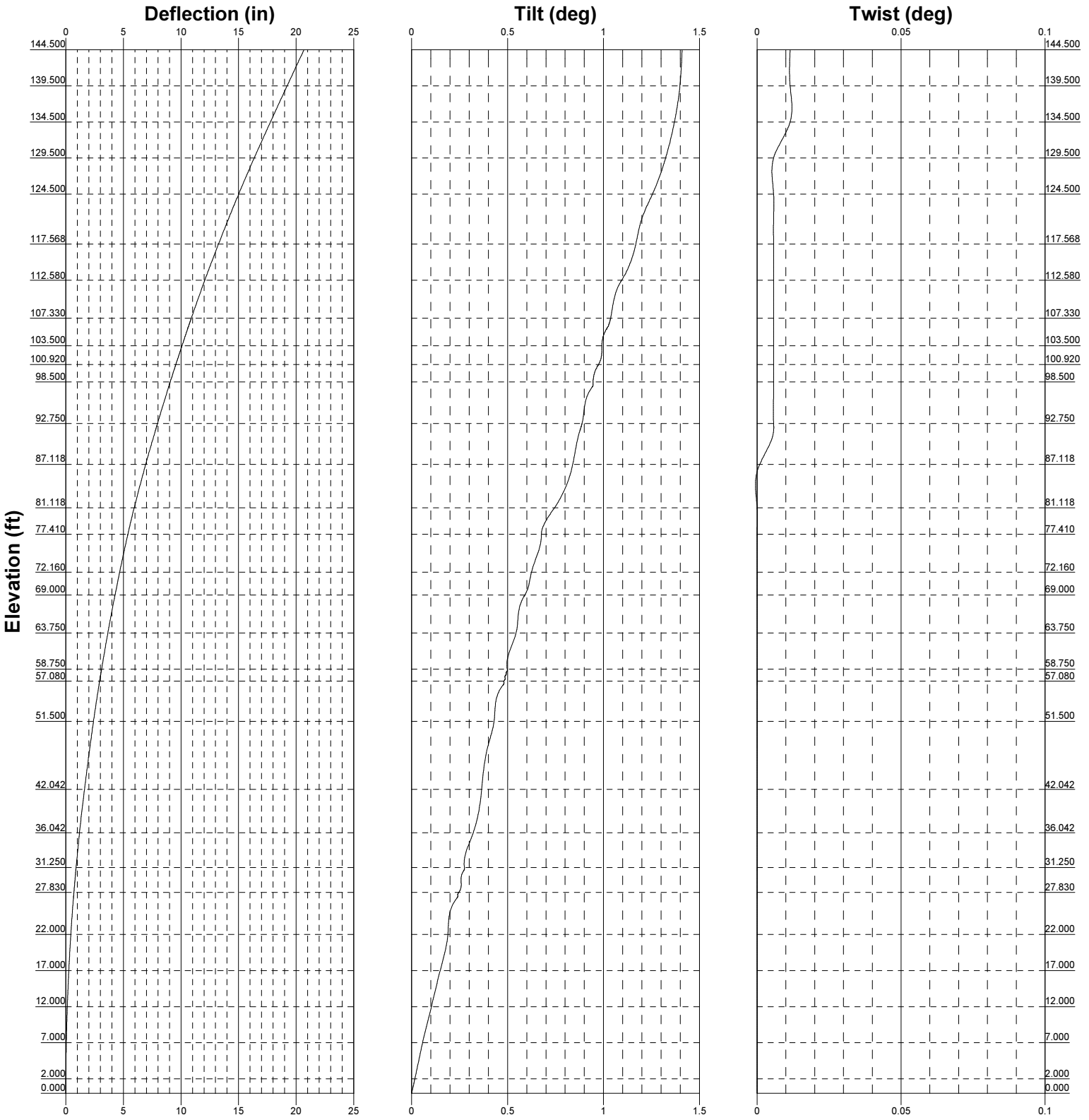


B+T Group
1717 S Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587-4630

Job: 92739.008.01 - GROTON TOWER, CT (BU# 881533)			
Project:			
Client: Crown Castle	Drawn by: CJangonda	App'd:	
Code: TIA-222-G	Date: 08/28/17	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values



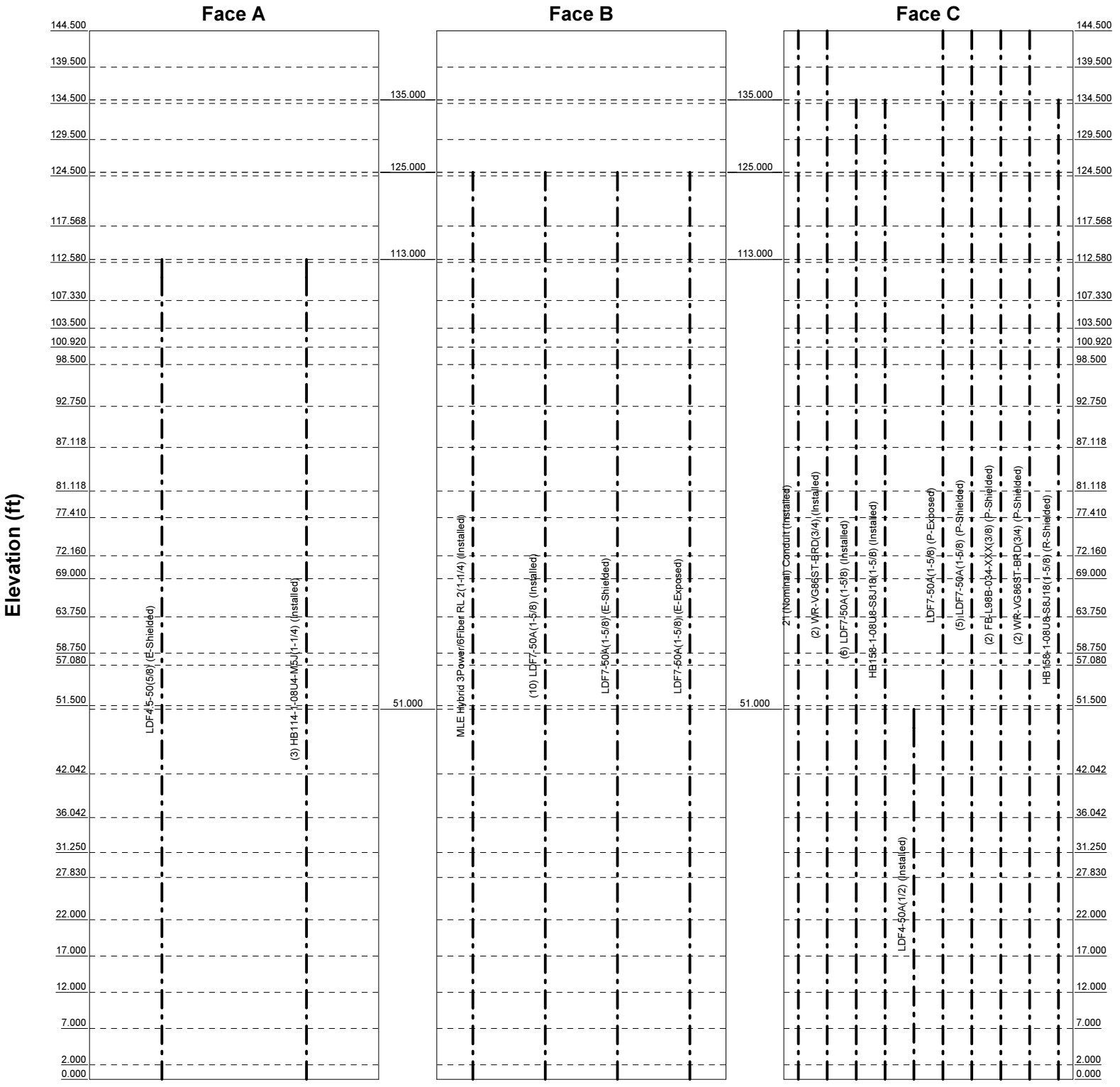
B+T GRP

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

Job: *92739.008.01 - GROTON TOWER, CT (BU# 881533)*			
Project:			
Client: Crown Castle	Drawn by: CJangonda	App'd:	
Code: TIA-222-G	Date: 08/28/17	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 144'6"

Round ___ Flat ___ App In Face ___ . ___ . ___ App Out Face ___ .. ___ Truss Leg



B+T GRP

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

Job: ***92739.008.01 - GROTON TOWER, CT (BU# 881533)***		
Project:		
Client: Crown Castle	Drawn by: CJangonda	App'd:
Code: TIA-222-G	Date: 08/28/17	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 New London County, Connecticut.
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 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		

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	144.500-139.500	5.000	0.000	18	21.000	22.092	0.188	0.750	A572-65 (65 ksi)
L2	139.500-134.500	5.000	0.000	18	22.092	23.184	0.188	0.750	A572-65 (65 ksi)
L3	134.500-129.50	5.000	0.000	18	23.184	24.276	0.188	0.750	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
	0								(65 ksi)
L4	129.500-124.50	5.000	0.000	18	24.276	25.368	0.188	0.750	A572-65
	0								(65 ksi)
L5	124.500-117.56	6.932	3.841	18	25.368	26.882	0.188	0.750	A572-65
	8								(65 ksi)
L6	117.568-116.40	5.000	0.000	18	25.668	26.737	0.250	1.000	A572-65
	9								(65 ksi)
L7	116.409-112.58	3.829	0.000	18	26.737	27.555	0.250	1.000	A572-65
	0								(65 ksi)
L8	112.580-112.33	0.250	0.000	18	27.555	27.609	0.425	1.700	A572-65
	0								(65 ksi)
L9	112.330-107.33	5.000	0.000	18	27.609	28.677	0.419	1.675	A572-65
	0								(65 ksi)
L10	107.330-106.00	1.330	0.000	18	28.677	28.962	0.419	1.675	A572-65
	0								(65 ksi)
L11	106.000-105.75	0.250	0.000	18	28.962	29.015	0.531	2.125	A572-65
	0								(65 ksi)
L12	105.750-103.50	2.250	0.000	18	29.015	29.496	0.525	2.100	A572-65
	0								(65 ksi)
L13	103.500-103.25	0.250	0.000	18	29.496	29.549	0.700	2.800	A572-65
	0								(65 ksi)
L14	103.250-100.92	2.330	0.000	18	29.549	30.047	0.688	2.750	A572-65
	0								(65 ksi)
L15	100.920-100.67	0.250	0.000	18	30.047	30.101	0.519	2.075	A572-65
	0								(65 ksi)
L16	100.670-98.500	2.170	0.000	18	30.101	30.564	0.512	2.050	A572-65
									(65 ksi)
L17	98.500-98.250	0.250	0.000	18	30.564	30.618	0.675	2.700	A572-65
									(65 ksi)
L18	98.250-98.000	0.250	0.000	18	30.618	30.671	0.675	2.700	A572-65
									(65 ksi)
L19	98.000-97.750	0.250	0.000	18	30.671	30.725	0.575	2.300	A572-65
									(65 ksi)
L20	97.750-92.750	5.000	0.000	18	30.725	31.793	0.556	2.225	A572-65
									(65 ksi)
L21	92.750-87.118	5.632	4.625	18	31.793	32.997	0.550	2.200	A572-65
									(65 ksi)
L22	87.118-86.118	5.625	0.000	18	31.509	32.720	0.375	1.500	A572-65
									(65 ksi)
L23	86.118-81.118	5.000	0.000	18	32.720	33.798	0.375	1.500	A572-65
									(65 ksi)
L24	81.118-77.410	3.708	0.000	18	33.798	34.596	0.375	1.500	A572-65
									(65 ksi)
L25	77.410-77.160	0.250	0.000	18	34.596	34.650	0.637	2.550	A572-65
									(65 ksi)
L26	77.160-72.160	5.000	0.000	18	34.650	35.727	0.625	2.500	A572-65
									(65 ksi)
L27	72.160-69.000	3.160	0.000	18	35.727	36.408	0.625	2.500	A572-65
									(65 ksi)
L28	69.000-68.750	0.250	0.000	18	36.408	36.462	0.800	3.200	A572-65
									(65 ksi)
L29	68.750-63.750	5.000	0.000	18	36.462	37.539	0.787	3.150	A572-65
									(65 ksi)
L30	63.750-58.750	5.000	0.000	18	37.539	38.616	0.775	3.100	A572-65
									(65 ksi)
L31	58.750-58.500	0.250	0.000	18	38.616	38.670	0.775	3.100	A572-65
									(65 ksi)
L32	58.500-58.250	0.250	0.000	18	38.670	38.724	0.775	3.100	A572-65
									(65 ksi)
L33	58.250-58.000	0.250	0.000	18	38.724	38.778	0.775	3.100	A572-65
									(65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L34	58.000-57.750	0.250	0.000	18	38.778	38.832	0.613	2.450	A572-65 (65 ksi)
L35	57.750-57.330	0.420	0.000	18	38.832	38.922	0.613	2.450	A572-65 (65 ksi)
L36	57.330-57.080	0.250	0.000	18	38.922	38.976	0.613	2.450	A572-65 (65 ksi)
L37	57.080-56.750	0.330	0.000	18	38.976	39.047	0.613	2.450	A572-65 (65 ksi)
L38	56.750-56.500	0.250	0.000	18	39.047	39.101	0.738	2.950	A572-65 (65 ksi)
L39	56.500-51.500	5.000	0.000	18	39.101	40.178	0.725	2.900	A572-65 (65 ksi)
L40	51.500-42.042	9.458	5.776	18	40.178	42.215	0.713	2.850	A572-65 (65 ksi)
L41	42.042-41.042	6.776	0.000	18	40.221	41.678	0.787	3.150	A572-65 (65 ksi)
L42	41.042-36.042	5.000	0.000	18	41.678	42.753	0.787	3.150	A572-65 (65 ksi)
L43	36.042-31.250	4.792	0.000	18	42.753	43.783	0.762	3.050	A572-65 (65 ksi)
L44	31.250-31.000	0.250	0.000	18	43.783	43.836	0.938	3.750	A572-65 (65 ksi)
L45	31.000-30.750	0.250	0.000	18	43.836	43.890	0.713	2.850	A572-65 (65 ksi)
L46	30.750-27.830	2.920	0.000	18	43.890	44.518	0.713	2.850	A572-65 (65 ksi)
L47	27.830-27.580	0.250	0.000	18	44.518	44.571	0.650	2.600	A572-65 (65 ksi)
L48	27.580-27.250	0.330	0.000	18	44.571	44.642	0.650	2.600	A572-65 (65 ksi)
L49	27.250-27.000	0.250	0.000	18	44.642	44.696	0.725	2.900	A572-65 (65 ksi)
L50	27.000-22.000	5.000	0.000	18	44.696	45.771	0.713	2.850	A572-65 (65 ksi)
L51	22.000-17.000	5.000	0.000	18	45.771	46.846	0.713	2.850	A572-65 (65 ksi)
L52	17.000-12.000	5.000	0.000	18	46.846	47.921	0.713	2.850	A572-65 (65 ksi)
L53	12.000-7.000	5.000	0.000	18	47.921	48.995	0.713	2.850	A572-65 (65 ksi)
L54	7.000-2.000	5.000	0.000	18	48.995	50.070	0.700	2.800	A572-65 (65 ksi)
L55	2.000-0.000	2.000		18	50.070	50.500	0.700	2.800	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.324	12.386	677.826	7.388	10.668	63.538	1356.544	6.194	3.366	17.952
	22.433	13.036	790.221	7.776	11.223	70.412	1581.483	6.519	3.558	18.977
L2	22.433	13.036	790.221	7.776	11.223	70.412	1581.483	6.519	3.558	18.977
	23.542	13.686	914.401	8.164	11.778	77.640	1830.006	6.844	3.750	20.002
L3	23.542	13.686	914.401	8.164	11.778	77.640	1830.006	6.844	3.750	20.002
	24.651	14.336	1050.954	8.551	12.332	85.220	2103.290	7.169	3.943	21.027
L4	24.651	14.336	1050.954	8.551	12.332	85.220	2103.290	7.169	3.943	21.027
	25.760	14.986	1200.465	8.939	12.887	93.153	2402.510	7.494	4.135	22.052
L5	25.760	14.986	1200.465	8.939	12.887	93.153	2402.510	7.494	4.135	22.052

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	27.297	15.887	1430.295	9.477	13.656	104.736	2862.472	7.945	4.401	23.474
L6	26.898	20.169	1646.369	9.024	13.040	126.260	3294.904	10.087	4.078	16.311
	27.149	21.017	1862.865	9.403	13.582	137.153	3728.181	10.511	4.266	17.063
L7	27.149	21.017	1862.865	9.403	13.582	137.153	3728.181	10.511	4.266	17.063
	27.980	21.667	2040.910	9.693	13.998	145.799	4084.505	10.835	4.410	17.639
L8	27.980	36.597	3403.264	9.631	13.998	243.124	6811.007	18.302	4.102	9.651
	28.035	36.669	3423.411	9.650	14.025	244.090	6851.327	18.338	4.111	9.673
L9	28.035	36.139	3375.394	9.652	14.025	240.666	6755.229	18.073	4.122	9.844
	29.120	37.559	3789.216	10.032	14.568	260.104	7583.417	18.783	4.310	10.293
L10	29.120	37.559	3789.216	10.032	14.568	260.104	7583.417	18.783	4.310	10.293
	29.408	37.937	3904.716	10.133	14.712	265.402	7814.569	18.972	4.360	10.413
L11	29.408	47.939	4895.400	10.093	14.712	332.738	9797.241	23.974	4.162	7.835
	29.463	48.029	4923.052	10.112	14.740	334.001	9852.581	24.019	4.172	7.852
L12	29.463	47.474	4868.337	10.114	14.740	330.289	9743.079	23.742	4.183	7.967
	29.951	48.276	5119.035	10.285	14.984	341.636	10244.805	24.142	4.267	8.128
L13	29.951	63.979	6702.438	10.223	14.984	447.309	13413.695	31.995	3.959	5.656
	30.005	64.097	6739.816	10.242	15.011	448.991	13488.501	32.055	3.969	5.67
L14	30.005	62.980	6628.071	10.246	15.011	441.546	13264.863	31.496	3.991	5.805
	30.511	64.067	6977.100	10.423	15.264	457.095	13963.380	32.039	4.078	5.932
L15	30.511	48.619	5355.838	10.483	15.264	350.880	10718.723	24.314	4.375	8.434
	30.565	48.707	5384.964	10.502	15.291	352.162	10777.013	24.358	4.385	8.452
L16	30.565	48.130	5323.457	10.504	15.291	348.140	10653.920	24.070	4.396	8.577
	31.036	48.885	5577.728	10.668	15.527	359.233	11162.794	24.447	4.477	8.736
L17	31.036	64.037	7227.748	10.611	15.527	465.503	14465.007	32.024	4.191	6.209
	31.090	64.151	7266.578	10.630	15.554	467.187	14542.718	32.082	4.201	6.223
L18	31.090	64.151	7266.578	10.630	15.554	467.187	14542.718	32.082	4.201	6.223
	31.144	64.266	7305.548	10.649	15.581	468.874	14620.708	32.139	4.210	6.237
L19	31.144	54.927	6285.692	10.684	15.581	403.419	12579.655	27.469	4.386	7.628
	31.199	55.025	6319.228	10.703	15.608	404.866	12646.772	27.518	4.396	7.644
L20	31.199	53.264	6124.579	10.710	15.608	392.395	12257.217	26.637	4.429	7.961
	32.284	55.150	6798.727	11.089	16.151	420.947	13606.400	27.580	4.617	8.3
L21	32.284	54.542	6726.373	11.091	16.151	416.467	13461.596	27.276	4.628	8.414
	33.506	56.643	7534.158	11.519	16.763	449.464	15078.230	28.327	4.839	8.799
L22	33.006	37.057	4538.007	11.052	16.006	283.512	9081.985	18.532	4.886	13.028
	33.225	38.499	5088.777	11.483	16.622	306.148	10184.250	19.253	5.099	13.597
L23	33.225	38.499	5088.777	11.483	16.622	306.148	10184.250	19.253	5.099	13.597
	34.319	39.781	5614.275	11.865	17.169	326.998	11235.937	19.894	5.288	14.102
L24	34.319	39.781	5614.275	11.865	17.169	326.998	11235.937	19.894	5.288	14.102
	35.130	40.732	6026.493	12.149	17.575	342.903	12060.916	20.370	5.429	14.477
L25	35.130	68.713	10011.083	12.055	17.575	569.623	20035.339	34.363	4.967	7.791
	35.185	68.822	10058.790	12.074	17.602	571.448	20130.816	34.418	4.976	7.806
L26	35.185	67.497	9872.436	12.079	17.602	560.861	19757.861	33.755	4.998	7.997
	36.278	69.634	10840.019	12.461	18.149	597.264	21694.301	34.824	5.188	8.301
L27	36.278	69.634	10840.019	12.461	18.149	597.264	21694.301	34.824	5.188	8.301
	36.970	70.985	11482.996	12.703	18.495	620.861	22981.102	35.499	5.308	8.492
L28	36.970	90.416	14483.639	12.641	18.495	783.100	28986.336	45.217	5.000	6.25
	37.024	90.553	14549.456	12.660	18.523	785.496	29118.058	45.285	5.009	6.262
L29	37.024	89.169	14337.187	12.664	18.523	774.036	28693.239	44.593	5.031	6.389
	38.118	91.861	15675.455	13.047	19.070	822.004	31371.535	45.939	5.221	6.63
L30	38.118	90.434	15442.384	13.051	19.070	809.782	30905.087	45.226	5.243	6.765
	39.212	93.083	16839.852	13.434	19.617	858.432	33701.862	46.551	5.432	7.01
L31	39.212	93.083	16839.852	13.434	19.617	858.432	33701.862	46.551	5.432	7.01
	39.267	93.216	16911.855	13.453	19.644	860.902	33845.964	46.617	5.442	7.022
L32	39.267	93.216	16911.855	13.453	19.644	860.902	33845.964	46.617	5.442	7.022
	39.321	93.348	16984.063	13.472	19.672	863.375	33990.474	46.683	5.451	7.034
L33	39.321	93.348	16984.063	13.472	19.672	863.375	33990.474	46.683	5.451	7.034
	39.376	93.481	17056.476	13.491	19.699	865.852	34135.395	46.749	5.461	7.046
L34	39.376	74.196	13653.782	13.549	19.699	693.118	27325.530	37.105	5.747	9.383
	39.431	74.301	13711.666	13.568	19.726	695.091	27441.374	37.157	5.756	9.398
L35	39.431	74.301	13711.666	13.568	19.726	695.091	27441.374	37.157	5.756	9.398
	39.522	74.477	13809.279	13.600	19.772	698.412	27636.729	37.245	5.772	9.424
L36	39.522	74.477	13809.279	13.600	19.772	698.412	27636.729	37.245	5.772	9.424

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	39.577	74.581	13867.601	13.619	19.800	700.393	27753.449	37.298	5.782	9.44
L37	39.577	74.581	13867.601	13.619	19.800	700.393	27753.449	37.298	5.782	9.44
	39.649	74.720	13944.837	13.644	19.836	703.011	27908.022	37.367	5.794	9.46
L38	39.649	89.676	16627.429	13.600	19.836	838.251	33276.737	44.846	5.574	7.558
	39.704	89.802	16697.654	13.619	19.863	840.632	33417.279	44.909	5.584	7.571
L39	39.704	88.309	16430.693	13.623	19.863	827.192	32883.007	44.163	5.606	7.732
	40.798	90.787	17853.412	14.006	20.410	874.721	35730.316	45.402	5.795	7.994
L40	40.798	89.250	17562.277	14.010	20.410	860.457	35147.662	44.634	5.817	8.165
	42.867	93.858	20425.266	14.734	21.445	952.428	40877.407	46.938	6.176	8.668
L41	42.102	98.566	19364.112	13.999	20.432	947.717	38753.704	49.292	5.693	7.229
	42.321	102.206	21590.087	14.516	21.172	1019.733	43208.583	51.113	5.949	7.555
L42	42.321	102.206	21590.087	14.516	21.172	1019.733	43208.583	51.113	5.949	7.555
	43.412	104.893	23337.693	14.898	21.718	1074.564	46706.094	52.456	6.138	7.795
L43	43.412	101.623	22637.223	14.906	21.718	1042.311	45304.232	50.821	6.182	8.108
	44.458	104.116	24344.325	15.272	22.242	1094.543	48720.683	52.068	6.364	8.346
L44	44.458	127.491	29567.758	15.210	22.242	1329.393	59174.423	63.758	6.056	6.459
	44.513	127.651	29679.155	15.229	22.269	1332.766	59397.363	63.838	6.065	6.47
L45	44.513	97.523	22912.937	15.309	22.269	1028.923	45856.024	48.771	6.461	9.068
	44.567	97.645	22998.705	15.328	22.296	1031.510	46027.672	48.832	6.471	9.082
L46	44.567	97.645	22998.705	15.328	22.296	1031.510	46027.672	48.832	6.471	9.082
	45.204	99.064	24016.359	15.551	22.615	1061.966	48064.319	49.542	6.581	9.237
L47	45.204	90.504	22003.575	15.573	22.615	972.963	44036.103	45.260	6.691	10.294
	45.259	90.614	22084.539	15.592	22.642	975.366	44198.137	45.316	6.701	10.309
L48	45.259	90.614	22084.539	15.592	22.642	975.366	44198.137	45.316	6.701	10.309
	45.331	90.761	22191.715	15.617	22.678	978.542	44412.631	45.389	6.713	10.328
L49	45.331	101.061	24625.918	15.591	22.678	1085.878	49284.238	50.540	6.581	9.077
	45.386	101.184	24716.429	15.610	22.706	1088.559	49465.381	50.602	6.591	9.09
L50	45.386	99.468	24311.006	15.614	22.706	1070.703	48654.000	49.743	6.613	9.281
	46.477	101.899	26137.107	15.996	23.252	1124.098	52308.607	50.959	6.802	9.546
L51	46.477	101.899	26137.107	15.996	23.252	1124.098	52308.607	50.959	6.802	9.546
	47.568	104.329	28052.436	16.377	23.798	1178.791	56141.783	52.174	6.991	9.812
L52	47.568	104.329	28052.436	16.377	23.798	1178.791	56141.783	52.174	6.991	9.812
	48.660	106.760	30059.122	16.759	24.344	1234.784	60157.797	53.390	7.180	10.077
L53	48.660	106.760	30059.122	16.759	24.344	1234.784	60157.797	53.390	7.180	10.077
	49.751	109.190	32159.294	17.140	24.890	1292.077	64360.904	54.606	7.369	10.343
L54	49.751	107.302	31619.641	17.145	24.890	1270.395	63280.888	53.661	7.391	10.559
	50.842	109.690	33778.008	17.526	25.436	1327.981	67600.462	54.856	7.580	10.829
L55	50.842	109.690	33778.008	17.526	25.436	1327.981	67600.462	54.856	7.580	10.829
	51.279	110.646	34668.132	17.679	25.654	1351.373	69381.881	55.333	7.656	10.937

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 144.500-139.500				1	1	1			
L2 139.500-134.500				1	1	1			
L3 134.500-129.500				1	1	1			
L4 129.500-124.500				1	1	1			
L5 124.500-117.568				1	1	1			
L6				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
117.568-116.409									
L7				1	1	1			
116.409-112.580									
L8				1	1	0.960189			
112.580-112.330									
L9				1	1	0.960029			
112.330-107.330									
L10				1	1	0.956414			
107.330-106.000									
L11				1	1	0.943719			
106.000-105.750									
L12				1	1	0.946801			
105.750-103.500									
L13				1	1	0.924379			
103.500-103.250									
L14				1	1	0.93099			
103.250-100.920									
L15				1	1	0.948268			
100.920-100.670									
L16				1	1	0.952348			
100.670-98.500									
L17				1	1	0.936822			
98.500-98.250									
L18				1	1	0.935813			
98.250-98.000									
L19				1	1	0.930175			
98.000-97.750									
L20				1	1	0.943433			
97.750-92.750									
L21				1	1	0.950546			
92.750-87.118									
L22				1	1	1			
87.118-86.118									
L23				1	1	1			
86.118-81.118									
L24				1	1	1			
81.118-77.410									
L25				1	1	0.946962			
77.410-77.160									
L26				1	1	0.95433			
77.160-72.160									
L27				1	1	0.947589			
72.160-69.000									
L28				1	1	0.942313			
69.000-68.750									
L29				1	1	0.942845			
68.750-63.750									
L30				1	1	0.944239			

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
63.750-58.750									
L31				1	1	0.943584			
58.750-58.500									
L32				1	1	1.05676			
58.500-58.250									
L33				1	1	1.05594			
58.250-58.000									
L34				1	1	1.08712			
58.000-57.750									
L35				1	1	1.086			
57.750-57.330									
L36				1	1	1.08534			
57.330-57.080									
L37				1	1	1.08446			
57.080-56.750									
L38				1	1	0.99352			
56.750-56.500									
L39				1	1	0.996859			
56.500-51.500									
L40				1	1	1.00442			
51.500-42.042									
L41				1	1	0.982267			
42.042-41.042									
L42				1	1	0.971338			
41.042-36.042									
L43				1	1	0.992321			
36.042-31.250									
L44				1	1	0.932362			
31.250-31.000									
L45				1	1	1.11082			
31.000-30.750									
L46				1	1	1.1037			
30.750-27.830									
L47				1	1	1.11778			
27.830-27.580									
L48				1	1	1.11706			
27.580-27.250									
L49				1	1	1.00273			
27.250-27.000									
L50				1	1	1.01034			
27.000-22.000									
L51				1	1	1.00111			
22.000-17.000									
L52				1	1	0.992299			
17.000-12.000									
L53				1	1	0.983878			
12.000-7.000									
L54				1	1	0.992999			
7.000-2.000									
L55				1	1	0.989822			
2.000-0.000									

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
2" (Nominal) Conduit (Installed)	C	No	Inside Pole	144.500 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
WR-VG86ST-BRD(3/4) (Installed)	C	No	Inside Pole	144.500 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
**								
LDF7-50A(1-5/8) (Installed)	C	No	Inside Pole	135.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8) (Installed)	C	No	Inside Pole	135.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
**								
MLE Hybrid 3Power/6Fiber RL 2(1-1/4) (Installed)	B	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8) (Installed)	B	No	Inside Pole	125.000 - 0.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8) (E-Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8) (E-Exposed)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
**								
LDF4.5-50(5/8) (E-Shielded)	A	No	CaAa (Out Of Face)	113.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
HB114-1-08U4-M5J(1-1/4) (Installed)	A	No	Inside Pole	113.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
**								
LDF4-50A(1/2) (Installed)	C	No	CaAa (Out Of Face)	51.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
**								
@								
LDF7-50A(1-5/8) (P-Exposed)	C	No	CaAa (Out Of Face)	144.500 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
LDF7-50A(1-5/8) (P-Shielded)	C	No	CaAa (Out Of Face)	144.500 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
FB-L98B-034-XXX(3/8) (P-Shielded)	C	No	CaAa (Out Of Face)	144.500 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
WR-VG86ST-BRD(3/4) (P-Shielded) **	C	No	CaAa (Out Of Face)	144.500 - 0.000	2	1" Ice No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000 0.000	0.002 0.001 0.001 0.003
HB158-1-08U8-S8J18(1-5/8) (R-Shielded) **	C	No	CaAa (Out Of Face)	135.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.003 0.005

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	144.500-139.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.990	0.040
L2	139.500-134.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.990	0.044
L3	134.500-129.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.990	0.078
L4	129.500-124.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.099	0.005
		C	0.000	0.000	0.000	0.990	0.078
L5	124.500-117.568	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	1.373	0.073
		C	0.000	0.000	0.000	1.373	0.108
L6	117.568-116.409	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.229	0.012
		C	0.000	0.000	0.000	0.229	0.018
L7	116.409-112.580	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.758	0.040
		C	0.000	0.000	0.000	0.758	0.060
L8	112.580-112.330	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L9	112.330-107.330	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L10	107.330-106.000	A	0.000	0.000	0.000	0.000	0.005
		B	0.000	0.000	0.000	0.263	0.014
		C	0.000	0.000	0.000	0.263	0.021
L11	106.000-105.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L12	105.750-103.500	A	0.000	0.000	0.000	0.000	0.008
		B	0.000	0.000	0.000	0.446	0.024
		C	0.000	0.000	0.000	0.446	0.035
L13	103.500-103.250	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L14	103.250-100.920	A	0.000	0.000	0.000	0.000	0.008
		B	0.000	0.000	0.000	0.461	0.025
		C	0.000	0.000	0.000	0.461	0.036
L15	100.920-100.670	A	0.000	0.000	0.000	0.000	0.001

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L16	100.670-98.500	A	0.000	0.000	0.000	0.000	0.007
		B	0.000	0.000	0.000	0.430	0.023
		C	0.000	0.000	0.000	0.430	0.034
L17	98.500-98.250	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L18	98.250-98.000	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L19	98.000-97.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L20	97.750-92.750	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L21	92.750-87.118	A	0.000	0.000	0.000	0.000	0.019
		B	0.000	0.000	0.000	1.115	0.059
		C	0.000	0.000	0.000	1.115	0.088
L22	87.118-86.118	A	0.000	0.000	0.000	0.000	0.003
		B	0.000	0.000	0.000	0.198	0.011
		C	0.000	0.000	0.000	0.198	0.016
L23	86.118-81.118	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L24	81.118-77.410	A	0.000	0.000	0.000	0.000	0.013
		B	0.000	0.000	0.000	0.734	0.039
		C	0.000	0.000	0.000	0.734	0.058
L25	77.410-77.160	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L26	77.160-72.160	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L27	72.160-69.000	A	0.000	0.000	0.000	0.000	0.011
		B	0.000	0.000	0.000	0.626	0.033
		C	0.000	0.000	0.000	0.626	0.049
L28	69.000-68.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L29	68.750-63.750	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L30	63.750-58.750	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L31	58.750-58.500	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L32	58.500-58.250	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L33	58.250-58.000	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L34	58.000-57.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L35	57.750-57.330	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.083	0.004

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	0.000	0.083	0.007
L36	57.330-57.080	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L37	57.080-56.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.065	0.003
		C	0.000	0.000	0.000	0.065	0.005
L38	56.750-56.500	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L39	56.500-51.500	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.078
L40	51.500-42.042	A	0.000	0.000	0.000	0.000	0.032
		B	0.000	0.000	0.000	1.873	0.100
		C	0.000	0.000	0.000	1.873	0.149
L41	42.042-41.042	A	0.000	0.000	0.000	0.000	0.003
		B	0.000	0.000	0.000	0.198	0.011
		C	0.000	0.000	0.000	0.198	0.016
L42	41.042-36.042	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L43	36.042-31.250	A	0.000	0.000	0.000	0.000	0.016
		B	0.000	0.000	0.000	0.949	0.050
		C	0.000	0.000	0.000	0.949	0.076
L44	31.250-31.000	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L45	31.000-30.750	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L46	30.750-27.830	A	0.000	0.000	0.000	0.000	0.010
		B	0.000	0.000	0.000	0.578	0.031
		C	0.000	0.000	0.000	0.578	0.046
L47	27.830-27.580	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L48	27.580-27.250	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.065	0.003
		C	0.000	0.000	0.000	0.065	0.005
L49	27.250-27.000	A	0.000	0.000	0.000	0.000	0.001
		B	0.000	0.000	0.000	0.050	0.003
		C	0.000	0.000	0.000	0.050	0.004
L50	27.000-22.000	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L51	22.000-17.000	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L52	17.000-12.000	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L53	12.000-7.000	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L54	7.000-2.000	A	0.000	0.000	0.000	0.000	0.017
		B	0.000	0.000	0.000	0.990	0.053
		C	0.000	0.000	0.000	0.990	0.079
L55	2.000-0.000	A	0.000	0.000	0.000	0.000	0.007
		B	0.000	0.000	0.000	0.396	0.021
		C	0.000	0.000	0.000	0.396	0.032

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	144.500-139.500	A	1.736	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	2.726	0.388
L2	139.500-134.500	A	1.729	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	2.719	0.394
L3	134.500-129.500	A	1.723	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	2.713	0.462
L4	129.500-124.500	A	1.716	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.271	0.013
		C		0.000	0.000	0.000	2.706	0.460
L5	124.500-117.568	A	1.708	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	3.741	0.183
		C		0.000	0.000	0.000	3.741	0.634
L6	117.568-116.409	A	1.702	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.625	0.031
		C		0.000	0.000	0.000	0.625	0.106
L7	116.409-112.580	A	1.699	0.000	0.000	0.000	0.000	0.004
		B		0.000	0.000	0.000	2.059	0.101
		C		0.000	0.000	0.000	2.059	0.348
L8	112.580-112.330	A	1.696	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.134	0.007
		C		0.000	0.000	0.000	0.134	0.023
L9	112.330-107.330	A	1.692	0.000	0.000	0.000	0.000	0.045
		B		0.000	0.000	0.000	2.682	0.131
		C		0.000	0.000	0.000	2.682	0.452
L10	107.330-106.000	A	1.687	0.000	0.000	0.000	0.000	0.012
		B		0.000	0.000	0.000	0.712	0.035
		C		0.000	0.000	0.000	0.712	0.120
L11	106.000-105.750	A	1.685	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.134	0.007
		C		0.000	0.000	0.000	0.134	0.023
L12	105.750-103.500	A	1.683	0.000	0.000	0.000	0.000	0.020
		B		0.000	0.000	0.000	1.203	0.059
		C		0.000	0.000	0.000	1.203	0.203
L13	103.500-103.250	A	1.681	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.134	0.007
		C		0.000	0.000	0.000	0.134	0.022
L14	103.250-100.920	A	1.679	0.000	0.000	0.000	0.000	0.021
		B		0.000	0.000	0.000	1.244	0.061
		C		0.000	0.000	0.000	1.244	0.209
L15	100.920-100.670	A	1.677	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.133	0.007
		C		0.000	0.000	0.000	0.133	0.022
L16	100.670-98.500	A	1.675	0.000	0.000	0.000	0.000	0.019
		B		0.000	0.000	0.000	1.157	0.056
		C		0.000	0.000	0.000	1.157	0.194
L17	98.500-98.250	A	1.673	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.133	0.006
		C		0.000	0.000	0.000	0.133	0.022
L18	98.250-98.000	A	1.673	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.133	0.006
		C		0.000	0.000	0.000	0.133	0.022
L19	98.000-97.750	A	1.672	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.133	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
		C		0.000	0.000	0.000	0.133	0.022
L20	97.750-92.750	A	1.668	0.000	0.000	0.000	0.000	0.044
		B		0.000	0.000	0.000	2.658	0.130
		C		0.000	0.000	0.000	2.658	0.445
L21	92.750-87.118	A	1.658	0.000	0.000	0.000	0.000	0.049
		B		0.000	0.000	0.000	2.983	0.145
		C		0.000	0.000	0.000	2.983	0.498
L22	87.118-86.118	A	1.652	0.000	0.000	0.000	0.000	0.009
		B		0.000	0.000	0.000	0.530	0.026
		C		0.000	0.000	0.000	0.530	0.088
L23	86.118-81.118	A	1.646	0.000	0.000	0.000	0.000	0.044
		B		0.000	0.000	0.000	2.636	0.128
		C		0.000	0.000	0.000	2.636	0.439
L24	81.118-77.410	A	1.637	0.000	0.000	0.000	0.000	0.032
		B		0.000	0.000	0.000	1.948	0.095
		C		0.000	0.000	0.000	1.948	0.323
L25	77.410-77.160	A	1.633	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.131	0.006
		C		0.000	0.000	0.000	0.131	0.022
L26	77.160-72.160	A	1.628	0.000	0.000	0.000	0.000	0.043
		B		0.000	0.000	0.000	2.618	0.127
		C		0.000	0.000	0.000	2.618	0.433
L27	72.160-69.000	A	1.618	0.000	0.000	0.000	0.000	0.027
		B		0.000	0.000	0.000	1.649	0.080
		C		0.000	0.000	0.000	1.649	0.272
L28	69.000-68.750	A	1.615	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.130	0.006
		C		0.000	0.000	0.000	0.130	0.021
L29	68.750-63.750	A	1.608	0.000	0.000	0.000	0.000	0.043
		B		0.000	0.000	0.000	2.598	0.126
		C		0.000	0.000	0.000	2.598	0.427
L30	63.750-58.750	A	1.596	0.000	0.000	0.000	0.000	0.042
		B		0.000	0.000	0.000	2.586	0.125
		C		0.000	0.000	0.000	2.586	0.424
L31	58.750-58.500	A	1.589	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L32	58.500-58.250	A	1.588	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L33	58.250-58.000	A	1.587	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L34	58.000-57.750	A	1.587	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L35	57.750-57.330	A	1.586	0.000	0.000	0.000	0.000	0.004
		B		0.000	0.000	0.000	0.216	0.010
		C		0.000	0.000	0.000	0.216	0.035
L36	57.330-57.080	A	1.585	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L37	57.080-56.750	A	1.584	0.000	0.000	0.000	0.000	0.003
		B		0.000	0.000	0.000	0.170	0.008
		C		0.000	0.000	0.000	0.170	0.028
L38	56.750-56.500	A	1.583	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.129	0.006
		C		0.000	0.000	0.000	0.129	0.021
L39	56.500-51.500	A	1.576	0.000	0.000	0.000	0.000	0.042
		B		0.000	0.000	0.000	2.566	0.124
		C		0.000	0.000	0.000	2.566	0.418

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
L40	51.500-42.042	A	1.553	0.000	0.000	0.000	0.000	0.078
		B		0.000	0.000	0.000	4.811	0.232
		C		0.000	0.000	0.000	4.811	0.818
L41	42.042-41.042	A	1.535	0.000	0.000	0.000	0.000	0.008
		B		0.000	0.000	0.000	0.509	0.025
		C		0.000	0.000	0.000	0.509	0.087
L42	41.042-36.042	A	1.523	0.000	0.000	0.000	0.000	0.041
		B		0.000	0.000	0.000	2.513	0.121
		C		0.000	0.000	0.000	2.513	0.424
L43	36.042-31.250	A	1.503	0.000	0.000	0.000	0.000	0.039
		B		0.000	0.000	0.000	2.389	0.115
		C		0.000	0.000	0.000	2.389	0.400
L44	31.250-31.000	A	1.491	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.124	0.006
		C		0.000	0.000	0.000	0.124	0.021
L45	31.000-30.750	A	1.490	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.124	0.006
		C		0.000	0.000	0.000	0.124	0.021
L46	30.750-27.830	A	1.482	0.000	0.000	0.000	0.000	0.023
		B		0.000	0.000	0.000	1.444	0.069
		C		0.000	0.000	0.000	1.444	0.240
L47	27.830-27.580	A	1.474	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.123	0.006
		C		0.000	0.000	0.000	0.123	0.020
L48	27.580-27.250	A	1.472	0.000	0.000	0.000	0.000	0.003
		B		0.000	0.000	0.000	0.163	0.008
		C		0.000	0.000	0.000	0.163	0.027
L49	27.250-27.000	A	1.471	0.000	0.000	0.000	0.000	0.002
		B		0.000	0.000	0.000	0.123	0.006
		C		0.000	0.000	0.000	0.123	0.020
L50	27.000-22.000	A	1.456	0.000	0.000	0.000	0.000	0.039
		B		0.000	0.000	0.000	2.446	0.117
		C		0.000	0.000	0.000	2.446	0.402
L51	22.000-17.000	A	1.423	0.000	0.000	0.000	0.000	0.038
		B		0.000	0.000	0.000	2.413	0.115
		C		0.000	0.000	0.000	2.413	0.392
L52	17.000-12.000	A	1.381	0.000	0.000	0.000	0.000	0.037
		B		0.000	0.000	0.000	2.371	0.112
		C		0.000	0.000	0.000	2.371	0.378
L53	12.000-7.000	A	1.324	0.000	0.000	0.000	0.000	0.036
		B		0.000	0.000	0.000	2.314	0.109
		C		0.000	0.000	0.000	2.314	0.360
L54	7.000-2.000	A	1.229	0.000	0.000	0.000	0.000	0.034
		B		0.000	0.000	0.000	2.219	0.103
		C		0.000	0.000	0.000	2.219	0.329
L55	2.000-0.000	A	1.057	0.000	0.000	0.000	0.000	0.012
		B		0.000	0.000	0.000	0.819	0.037
		C		0.000	0.000	0.000	0.819	0.109

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	144.500-139.500	-0.228	0.132	-0.478	0.276
L2	139.500-134.500	-0.230	0.133	-0.485	0.280
L3	134.500-129.500	-0.231	0.133	-0.491	0.284
L4	129.500-124.500	-0.206	0.146	-0.438	0.310

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L5	124.500-117.568	0.000	0.248	0.000	0.493
L6	117.568-116.409	0.000	0.249	0.000	0.496
L7	116.409-112.580	0.000	0.249	0.000	0.499
L8	112.580-112.330	0.000	0.250	0.000	0.502
L9	112.330-107.330	0.000	0.251	0.000	0.505
L10	107.330-106.000	0.000	0.252	0.000	0.509
L11	106.000-105.750	0.000	0.252	0.000	0.510
L12	105.750-103.500	0.000	0.252	0.000	0.511
L13	103.500-103.250	0.000	0.252	0.000	0.513
L14	103.250-100.920	0.000	0.253	0.000	0.514
L15	100.920-100.670	0.000	0.253	0.000	0.515
L16	100.670-98.500	0.000	0.253	0.000	0.517
L17	98.500-98.250	0.000	0.254	0.000	0.518
L18	98.250-98.000	0.000	0.254	0.000	0.518
L19	98.000-97.750	0.000	0.254	0.000	0.518
L20	97.750-92.750	0.000	0.254	0.000	0.521
L21	92.750-87.118	0.000	0.256	0.000	0.526
L22	87.118-86.118	0.000	0.256	0.000	0.527
L23	86.118-81.118	0.000	0.256	0.000	0.529
L24	81.118-77.410	0.000	0.257	0.000	0.533
L25	77.410-77.160	0.000	0.258	0.000	0.534
L26	77.160-72.160	0.000	0.258	0.000	0.536
L27	72.160-69.000	0.000	0.259	0.000	0.539
L28	69.000-68.750	0.000	0.259	0.000	0.540
L29	68.750-63.750	0.000	0.260	0.000	0.542
L30	63.750-58.750	0.000	0.260	0.000	0.544
L31	58.750-58.500	0.000	0.261	0.000	0.546
L32	58.500-58.250	0.000	0.261	0.000	0.546
L33	58.250-58.000	0.000	0.261	0.000	0.546
L34	58.000-57.750	0.000	0.261	0.000	0.546
L35	57.750-57.330	0.000	0.261	0.000	0.546
L36	57.330-57.080	0.000	0.261	0.000	0.546
L37	57.080-56.750	0.000	0.261	0.000	0.546
L38	56.750-56.500	0.000	0.261	0.000	0.546
L39	56.500-51.500	0.000	0.262	0.000	0.548
L40	51.500-42.042	0.000	0.263	0.000	0.550
L41	42.042-41.042	0.000	0.263	0.000	0.551
L42	41.042-36.042	0.000	0.263	0.000	0.549
L43	36.042-31.250	0.000	0.264	0.000	0.549
L44	31.250-31.000	0.000	0.264	0.000	0.549
L45	31.000-30.750	0.000	0.264	0.000	0.549
L46	30.750-27.830	0.000	0.264	0.000	0.549
L47	27.830-27.580	0.000	0.265	0.000	0.549
L48	27.580-27.250	0.000	0.265	0.000	0.549
L49	27.250-27.000	0.000	0.265	0.000	0.549
L50	27.000-22.000	0.000	0.265	0.000	0.548
L51	22.000-17.000	0.000	0.266	0.000	0.546
L52	17.000-12.000	0.000	0.266	0.000	0.541
L53	12.000-7.000	0.000	0.267	0.000	0.534
L54	7.000-2.000	0.000	0.267	0.000	0.520
L55	2.000-0.000	0.000	0.268	0.000	0.490

Shielding Factor Ka

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8" x 5' (E)	C	None			0.000	147.000	No Ice	0.313	0.313	0.031
							1/2" Ice	0.826	0.826	0.035
							1" Ice	1.322	1.322	0.041
Strobe (E)	C	None			0.000	149.500	No Ice	4.500	3.000	0.020
							1/2" Ice	4.770	3.237	0.058
							1" Ice	5.048	3.481	0.100
5' x 2" Pipe Mount (E-For Strobe)	C	None			0.000	147.000	No Ice	1.000	1.000	0.029
							1/2" Ice	1.393	1.393	0.037
							1" Ice	1.703	1.703	0.048
Top Hat (E)	C	None			0.000	146.000	No Ice	3.000	3.000	0.081
							1/2" Ice	3.480	3.480	0.111
							1" Ice	3.960	3.960	0.141
/										
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	145.000	No Ice	13.535	10.960	0.114
			0.000				1/2" Ice	14.238	12.486	0.218
(P)			0.000				1" Ice	14.949	14.037	0.331
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	145.000	No Ice	13.535	10.960	0.114
			0.000				1/2" Ice	14.238	12.486	0.218
(P)			0.000				1" Ice	14.949	14.037	0.331
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	145.000	No Ice	13.535	10.960	0.114
			0.000				1/2" Ice	14.238	12.486	0.218
(P)			0.000				1" Ice	14.949	14.037	0.331
AM-X-CD-17-65-00T-RET w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	145.000	No Ice	11.549	8.938	0.092
			0.000				1/2" Ice	12.267	10.450	0.177
(P)			0.000				1" Ice	12.995	11.986	0.272
RRUS 32 B2	A	From Leg	4.000	0.000	0.000	145.000	No Ice	2.731	1.668	0.053
(P)			0.000				1/2" Ice	2.953	1.855	0.074
			0.000				1" Ice	3.182	2.049	0.098
RRUS 32 B2	B	From Leg	4.000	0.000	0.000	145.000	No Ice	2.731	1.668	0.053
(P)			0.000				1/2" Ice	2.953	1.855	0.074
			0.000				1" Ice	3.182	2.049	0.098
RRUS 32 B2	C	From Leg	4.000	0.000	0.000	145.000	No Ice	2.731	1.668	0.053
(P)			0.000				1/2" Ice	2.953	1.855	0.074
			0.000				1" Ice	3.182	2.049	0.098
DTMABP7819VG12A	A	From Leg	4.000	0.000	0.000	145.000	No Ice	0.976	0.339	0.019
(P)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
DTMABP7819VG12A	B	From Leg	4.000	0.000	0.000	145.000	No Ice	0.976	0.339	0.019
(P)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
DTMABP7819VG12A	C	From Leg	4.000	0.000	0.000	145.000	No Ice	0.976	0.339	0.019
(P)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
DC6-48-60-18-8F	B	From Leg	4.000	0.000	0.000	145.000	No Ice	0.917	0.917	0.019
(P)			0.000				1/2" Ice	1.458	1.458	0.037
			0.000				1" Ice	1.643	1.643	0.057
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	145.000	No Ice	5.746	4.254	0.055
(E)			0.000				1/2" Ice	6.179	5.014	0.103
			0.000				1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	145.000	No Ice	5.746	4.254	0.055
(E)			0.000				1/2" Ice	6.179	5.014	0.103
			0.000				1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	145.000	No Ice	5.746	4.254	0.055
(E)			0.000				1/2" Ice	6.179	5.014	0.103

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	6.607	5.711	0.157
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.000	0.000	145.000	No Ice	11.683	9.842	0.099
			0.000			1/2" Ice	12.404	11.366	0.189
(E)			0.000			1" Ice	13.135	12.914	0.288
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Leg	4.000	0.000	145.000	No Ice	11.549	8.938	0.092
			0.000			1/2" Ice	12.267	10.450	0.177
(E)			0.000			1" Ice	12.995	11.986	0.272
(2) 7020.00	A	From Leg	4.000	0.000	145.000	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
(2) 7020.00	B	From Leg	4.000	0.000	145.000	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
(2) 7020.00	C	From Leg	4.000	0.000	145.000	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
(2) RRUS 11	A	From Leg	4.000	0.000	145.000	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	145.000	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	145.000	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
DC6-48-60-18-8F	C	From Leg	4.000	0.000	145.000	No Ice	0.917	0.917	0.019
(E)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
8'x2" Antenna Mount Pipe	A	From Leg	4.000	0.000	145.000	No Ice	1.900	1.900	0.030
(E)			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
8'x2" Antenna Mount Pipe	B	From Leg	4.000	0.000	145.000	No Ice	1.900	1.900	0.030
(E)			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
8'x2" Antenna Mount Pipe	C	From Leg	4.000	0.000	145.000	No Ice	1.900	1.900	0.030
(E)			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
Climbing Ladder (Flat)	A	From Leg	3.000	0.000	145.000	No Ice	5.844	5.844	0.048
			0.000			1/2" Ice	10.300	10.300	0.071
			0.000			1" Ice	14.756	14.756	0.094
Platform Mount [LP 601-1]	C	None		0.000	145.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
/									
QUAD656C0000X w/ Mount Pipe	A	From Leg	4.000	0.000	135.000	No Ice	13.479	7.331	0.080
			0.000			1/2" Ice	14.096	8.547	0.174
(R)			2.000			1" Ice	14.682	9.500	0.277
QUAD656C0000X w/ Mount Pipe	B	From Leg	4.000	0.000	135.000	No Ice	13.479	7.331	0.080
			0.000			1/2" Ice	14.096	8.547	0.174
(R)			2.000			1" Ice	14.682	9.500	0.277
QUAD656C0000X w/ Mount Pipe	C	From Leg	4.000	0.000	135.000	No Ice	13.479	7.331	0.080
			0.000			1/2" Ice	14.096	8.547	0.174
(R)			2.000			1" Ice	14.682	9.500	0.277
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.000	0.000	135.000	No Ice	8.765	6.963	0.069
			0.000			1/2" Ice	9.342	8.182	0.139
(R)			2.000			1" Ice	9.889	9.144	0.217
(2) HBXX-6517DS-A2M w/	B	From Leg	4.000	0.000	135.000	No Ice	8.765	6.963	0.069

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
Mount Pipe			0.000			1/2" Ice	9.342	8.182	0.139
(R)			2.000			1" Ice	9.889	9.144	0.217
(2) HBXX-6517DS-A2M w/	C	From Leg	4.000	0.000	135.000	No Ice	8.765	6.963	0.069
Mount Pipe			0.000			1/2" Ice	9.342	8.182	0.139
(R)			2.000			1" Ice	9.889	9.144	0.217
RRH2x60-700	A	From Leg	4.000	0.000	135.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			2.000			1" Ice	4.029	2.289	0.109
RRH2x60-700	B	From Leg	4.000	0.000	135.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			2.000			1" Ice	4.029	2.289	0.109
RRH2x60-700	C	From Leg	4.000	0.000	135.000	No Ice	3.500	1.816	0.060
(R)			0.000			1/2" Ice	3.761	2.052	0.083
			2.000			1" Ice	4.029	2.289	0.109
RRH2X60-PCS	A	From Leg	4.000	0.000	135.000	No Ice	2.200	1.355	0.055
(R)			0.000			1/2" Ice	2.393	1.515	0.073
			2.000			1" Ice	2.593	1.682	0.094
RRH2X60-PCS	B	From Leg	4.000	0.000	135.000	No Ice	2.200	1.355	0.055
(R)			0.000			1/2" Ice	2.393	1.515	0.073
			2.000			1" Ice	2.593	1.682	0.094
RRH2X60-PCS	C	From Leg	4.000	0.000	135.000	No Ice	2.200	1.355	0.055
(R)			0.000			1/2" Ice	2.393	1.515	0.073
			2.000			1" Ice	2.593	1.682	0.094
B66A RRH4X45	A	From Leg	4.000	0.000	135.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			2.000			1" Ice	2.970	1.978	0.100
B66A RRH4X45	B	From Leg	4.000	0.000	135.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			2.000			1" Ice	2.970	1.978	0.100
B66A RRH4X45	C	From Leg	4.000	0.000	135.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			2.000			1" Ice	2.970	1.978	0.100
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	135.000	No Ice	4.800	2.000	0.044
(R)			0.000			1/2" Ice	5.070	2.193	0.080
			2.000			1" Ice	5.348	2.393	0.120
LNX-6512DS-VTM w/	A	From Leg	4.000	0.000	135.000	No Ice	5.268	4.476	0.039
Mount Pipe			0.000			1/2" Ice	5.655	5.085	0.087
(E)			2.000			1" Ice	6.049	5.704	0.140
LNX-6512DS-VTM w/	B	From Leg	4.000	0.000	135.000	No Ice	5.268	4.476	0.039
Mount Pipe			0.000			1/2" Ice	5.655	5.085	0.087
(E)			2.000			1" Ice	6.049	5.704	0.140
LNX-6512DS-VTM w/	C	From Leg	4.000	0.000	135.000	No Ice	5.268	4.476	0.039
Mount Pipe			0.000			1/2" Ice	5.655	5.085	0.087
(E)			2.000			1" Ice	6.049	5.704	0.140
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	135.000	No Ice	4.800	2.000	0.044
(E)			0.000			1/2" Ice	5.070	2.193	0.080
			2.000			1" Ice	5.348	2.393	0.120
Climbing Ladder (Flat)	A	From Leg	3.000	0.000	135.000	No Ice	5.844	5.844	0.048
			0.000			1/2" Ice	10.300	10.300	0.071
			0.000			1" Ice	14.756	14.756	0.094
Platform Mount [LP 601-1]	C	None		0.000	135.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
/									
LNX-6515DS-A1M w/	A	From Leg	4.000	0.000	125.000	No Ice	11.683	9.842	0.083
Mount Pipe			0.000			1/2" Ice	12.404	11.366	0.173
(E)			1.000			1" Ice	13.135	12.914	0.273

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
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	11.683 12.404	9.842 11.366	0.083 0.173
(E)			1.000			1" Ice	13.135	12.914	0.273
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	11.683 12.404	9.842 11.366	0.083 0.173
(E)			1.000			1" Ice	13.135	12.914	0.273
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0.112 0.169
(E)			1.000			1" Ice	7.214	7.131	0.233
KRY 112 144/1	A	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	0.350 0.426	0.175 0.234	0.011 0.014
(E)			1.000			1" Ice	0.509	0.301	0.019
KRY 112 144/1	B	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	0.350 0.426	0.175 0.234	0.011 0.014
(E)			1.000			1" Ice	0.509	0.301	0.019
KRY 112 144/1	C	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	0.350 0.426	0.175 0.234	0.011 0.014
(E)			1.000			1" Ice	0.509	0.301	0.019
RRUS 11 B12	A	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	2.833 3.043	1.182 1.330	0.051 0.072
(E)			1.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	B	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	2.833 3.043	1.182 1.330	0.051 0.072
(E)			1.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	C	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	2.833 3.043	1.182 1.330	0.051 0.072
(E)			1.000			1" Ice	3.259	1.485	0.095
Climbing Ladder (Flat)	A	From Leg	3.000 0.000	0.000	125.000	No Ice 1/2" Ice	5.844 10.300	5.844 10.300	0.048 0.071
			0.000			1" Ice	14.756	14.756	0.094
Platform Mount [LP 601-1]	C	None		0.000	125.000	No Ice 1/2" Ice	28.470 33.590	28.470 33.590	1.122 1.514
(E)						1" Ice	38.710	38.710	1.905
/									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	8.262 8.822	6.946 8.127	0.083 0.151
(E)			0.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	8.262 8.822	6.946 8.127	0.083 0.151
(E)			0.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	8.262 8.822	6.946 8.127	0.083 0.151

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
(E)			0.000			1" Ice	9.346	9.021	0.227
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(E)			0.000			1" Ice	7.473	6.472	0.193
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(E)			0.000			1" Ice	7.473	6.472	0.193
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(E)			0.000			1" Ice	7.473	6.472	0.193
TD-RRH8x20-25	A	From Leg	4.000	0.000	113.000	No Ice	3.704	1.294	0.066
(E)			0.000 0.000			1/2" Ice 1" Ice	3.946 4.196	1.465 1.642	0.090 0.117
TD-RRH8x20-25	B	From Leg	4.000	0.000	113.000	No Ice	3.704	1.294	0.066
(E)			0.000 0.000			1/2" Ice 1" Ice	3.946 4.196	1.465 1.642	0.090 0.117
TD-RRH8x20-25	C	From Leg	4.000	0.000	113.000	No Ice	3.704	1.294	0.066
(E)			0.000 0.000			1/2" Ice 1" Ice	3.946 4.196	1.465 1.642	0.090 0.117
Climbing Ladder (Flat)	A	From Leg	3.000	0.000	113.000	No Ice	5.844	5.844	0.048
			0.000 0.000			1/2" Ice 1" Ice	10.300 14.756	10.300 14.756	0.071 0.094
Platform Mount [LP 601-1]	C	None		0.000	113.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice 1" Ice	33.590 38.710	33.590 38.710	1.514 1.905
/									
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
800MHz 2X50W RRH W/FILTER	A	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.058 2.240	1.932 2.109	0.064 0.086
(E)			-2.000			1" Ice	2.429	2.293	0.111
800MHz 2X50W RRH W/FILTER	B	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.058 2.240	1.932 2.109	0.064 0.086
(E)			-2.000			1" Ice	2.429	2.293	0.111
800MHz 2X50W RRH W/FILTER	C	From Leg	1.000 0.000	0.000	111.000	No Ice 1/2" Ice	2.058 2.240	1.932 2.109	0.064 0.086
(E)			-2.000			1" Ice	2.429	2.293	0.111
6' x 2" Mount Pipe	A	From Leg	1.000	0.000	111.000	No Ice	1.425	1.425	0.022
(E)			0.000 0.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
6' x 2" Mount Pipe	B	From Leg	1.000	0.000	111.000	No Ice	1.425	1.425	0.022
(E)			0.000 0.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
6' x 2" Mount Pipe	C	From Leg	1.000	0.000	111.000	No Ice	1.425	1.425	0.022
(E)			0.000 0.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
Side Arm Mount [SO 102-3]	C	None		0.000	111.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice 1" Ice	3.480 3.960	3.480 3.960	0.111 0.141
/									

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
5' x 2" Pipe Mount	A	From Leg	4.000	0.000	100.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			2.000			1" Ice	1.703	1.703	0.048
5' x 2" Pipe Mount	B	From Leg	4.000	0.000	100.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			2.000			1" Ice	1.703	1.703	0.048
5' x 2" Pipe Mount	C	From Leg	4.000	0.000	100.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			2.000			1" Ice	1.703	1.703	0.048
7'x2" Antenna Mount Pipe	A	From Leg	4.000	0.000	100.000	No Ice	1.663	1.663	0.026
(E)			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
7'x2" Antenna Mount Pipe	B	From Leg	4.000	0.000	100.000	No Ice	1.663	1.663	0.026
(E)			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
7'x2" Antenna Mount Pipe	C	From Leg	4.000	0.000	100.000	No Ice	1.663	1.663	0.026
(E)			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
Climbing Ladder (Flat)	A	From Leg	3.000	0.000	100.000	No Ice	5.844	5.844	0.048
			0.000			1/2" Ice	10.300	10.300	0.071
			0.000			1" Ice	14.756	14.756	0.094
Platform Mount [LP 601-1]	C	None		0.000	100.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
/									
KS24019-L112A	C	From Leg	3.000	0.000	51.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			1.000			1" Ice	0.262	0.262	0.009
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	51.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
/									

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

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	20.683	47	1.409	0.010
L2	139.5 - 134.5	19.214	47	1.397	0.010
L3	134.5 - 129.5	17.766	47	1.370	0.009
L4	129.5 - 124.5	16.356	47	1.321	0.008
L5	124.5 - 117.568	15.006	47	1.255	0.007
L6	121.409 - 116.409	14.209	47	1.206	0.006
L7	116.409 - 112.58	12.969	47	1.156	0.006
L8	112.58 - 112.33	12.067	47	1.093	0.005
L9	112.33 - 107.33	12.010	47	1.090	0.005
L10	107.33 - 106	10.897	47	1.034	0.004
L11	106 - 105.75	10.611	47	1.019	0.004
L12	105.75 - 103.5	10.558	47	1.016	0.004
L13	103.5 - 103.25	10.084	47	0.994	0.004
L14	103.25 - 100.92	10.032	47	0.992	0.004
L15	100.92 - 100.67	9.553	47	0.973	0.004
L16	100.67 - 98.5	9.502	47	0.971	0.004
L17	98.5 - 98.25	9.066	47	0.947	0.004
L18	98.25 - 98	9.016	47	0.945	0.004
L19	98 - 97.75	8.967	47	0.943	0.004
L20	97.75 - 92.75	8.918	47	0.941	0.004

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L21	92.75 - 87.1178	7.960	47	0.888	0.003
L22	91.7428 - 86.1178	7.774	47	0.877	0.003
L23	86.1178 - 81.1178	6.764	47	0.829	0.003
L24	81.1178 - 77.41	5.940	47	0.743	0.002
L25	77.41 - 77.16	5.388	47	0.678	0.002
L26	77.16 - 72.16	5.353	47	0.676	0.002
L27	72.16 - 69	4.673	47	0.622	0.002
L28	69 - 68.75	4.273	47	0.588	0.002
L29	68.75 - 63.75	4.242	47	0.586	0.002
L30	63.75 - 58.75	3.651	47	0.543	0.001
L31	58.75 - 58.5	3.106	47	0.499	0.001
L32	58.5 - 58.25	3.080	47	0.497	0.001
L33	58.25 - 58	3.054	47	0.494	0.001
L34	58 - 57.75	3.028	47	0.492	0.001
L35	57.75 - 57.33	3.003	47	0.490	0.001
L36	57.33 - 57.08	2.960	47	0.485	0.001
L37	57.08 - 56.75	2.934	47	0.482	0.001
L38	56.75 - 56.5	2.901	47	0.479	0.001
L39	56.5 - 51.5	2.876	47	0.476	0.001
L40	51.5 - 42.0418	2.401	47	0.430	0.001
L41	47.8178 - 41.0418	2.083	47	0.396	0.001
L42	41.0418 - 36.0418	1.542	47	0.361	0.001
L43	36.0418 - 31.25	1.187	47	0.318	0.001
L44	31.25 - 31	0.889	47	0.276	0.001
L45	31 - 30.75	0.874	47	0.274	0.001
L46	30.75 - 27.83	0.860	47	0.272	0.001
L47	27.83 - 27.58	0.702	47	0.245	0.000
L48	27.58 - 27.25	0.689	47	0.242	0.000
L49	27.25 - 27	0.673	47	0.239	0.000
L50	27 - 22	0.660	47	0.237	0.000
L51	22 - 17	0.436	47	0.191	0.000
L52	17 - 12	0.259	47	0.147	0.000
L53	12 - 7	0.129	47	0.103	0.000
L54	7 - 2	0.044	47	0.060	0.000
L55	2 - 0	0.004	47	0.017	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Strobe	47	20.683	1.409	0.010	14700
147.000	Lightning Rod 5/8" x 5'	47	20.683	1.409	0.010	14700
146.000	Top Hat	47	20.683	1.409	0.010	14700
145.000	TPA-65R-LCUUUU-H8 w/ Mount Pipe	47	20.683	1.409	0.010	14700
135.000	QUAD656C0000X w/ Mount Pipe	47	17.909	1.374	0.009	8051
125.000	LNX-6515DS-A1M w/ Mount Pipe	47	15.138	1.263	0.007	4087
113.000	APXVSPP18-C-A20 w/ Mount Pipe	47	12.163	1.098	0.005	4115
111.000	PCS 1900MHz 4x45W-65MHz	47	11.708	1.076	0.005	4590
100.000	5' x 2" Pipe Mount	47	9.366	0.963	0.004	5909
51.000	KS24019-L112A	47	2.357	0.425	0.001	6649

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	113.240	2	7.721	0.052
L2	139.5 - 134.5	105.214	4	7.658	0.048
L3	134.5 - 129.5	97.306	4	7.510	0.045
L4	129.5 - 124.5	89.606	4	7.248	0.039
L5	124.5 - 117.568	82.230	4	6.888	0.034
L6	121.409 - 116.409	77.874	16	6.616	0.030
L7	116.409 - 112.58	71.093	16	6.347	0.027
L8	112.58 - 112.33	66.158	16	6.000	0.023
L9	112.33 - 107.33	65.845	16	5.985	0.023
L10	107.33 - 106	59.755	16	5.678	0.020
L11	106 - 105.75	58.189	16	5.593	0.020
L12	105.75 - 103.5	57.898	16	5.580	0.019
L13	103.5 - 103.25	55.305	16	5.457	0.018
L14	103.25 - 100.92	55.020	16	5.447	0.018
L15	100.92 - 100.67	52.394	16	5.344	0.018
L16	100.67 - 98.5	52.115	16	5.330	0.018
L17	98.5 - 98.25	49.728	16	5.201	0.017
L18	98.25 - 98	49.457	16	5.189	0.017
L19	98 - 97.75	49.186	16	5.178	0.016
L20	97.75 - 92.75	48.916	16	5.164	0.016
L21	92.75 - 87.1178	43.670	16	4.876	0.014
L22	91.7428 - 86.1178	42.650	16	4.816	0.014
L23	86.1178 - 81.1178	37.113	16	4.553	0.012
L24	81.1178 - 77.41	32.599	16	4.080	0.010
L25	77.41 - 77.16	29.572	16	3.726	0.009
L26	77.16 - 72.16	29.378	16	3.711	0.009
L27	72.16 - 69	25.650	16	3.416	0.007
L28	69 - 68.75	23.453	16	3.229	0.007
L29	68.75 - 63.75	23.285	16	3.217	0.007
L30	63.75 - 58.75	20.043	16	2.979	0.006
L31	58.75 - 58.5	17.051	16	2.739	0.005
L32	58.5 - 58.25	16.908	16	2.727	0.005
L33	58.25 - 58	16.766	16	2.715	0.005
L34	58 - 57.75	16.624	16	2.703	0.005
L35	57.75 - 57.33	16.483	16	2.688	0.005
L36	57.33 - 57.08	16.248	16	2.663	0.005
L37	57.08 - 56.75	16.109	16	2.648	0.005
L38	56.75 - 56.5	15.926	16	2.629	0.005
L39	56.5 - 51.5	15.789	16	2.616	0.005
L40	51.5 - 42.0418	13.184	16	2.363	0.004
L41	47.8178 - 41.0418	11.434	16	2.175	0.004
L42	41.0418 - 36.0418	8.468	16	1.985	0.003
L43	36.0418 - 31.25	6.516	16	1.747	0.003
L44	31.25 - 31	4.879	16	1.515	0.002
L45	31 - 30.75	4.800	16	1.505	0.002
L46	30.75 - 27.83	4.722	16	1.493	0.002
L47	27.83 - 27.58	3.855	16	1.344	0.002
L48	27.58 - 27.25	3.785	16	1.331	0.002
L49	27.25 - 27	3.693	16	1.312	0.002
L50	27 - 22	3.625	16	1.300	0.002
L51	22 - 17	2.395	16	1.050	0.001
L52	17 - 12	1.424	16	0.805	0.001
L53	12 - 7	0.707	16	0.564	0.001
L54	7 - 2	0.240	16	0.328	0.000
L55	2 - 0	0.019	16	0.093	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Strobe	2	113.240	7.721	0.052	2798
147.000	Lightning Rod 5/8" x 5'	2	113.240	7.721	0.052	2798
146.000	Top Hat	2	113.240	7.721	0.052	2798
145.000	TPA-65R-LCUUUU-H8 w/ Mount Pipe	2	113.240	7.721	0.052	2798
135.000	QUAD656C0000X w/ Mount Pipe	4	98.089	7.531	0.045	1534
125.000	LNX-6515DS-A1M w/ Mount Pipe	4	82.949	6.931	0.034	773
113.000	APXVSPP18-C-A20 w/ Mount Pipe	16	66.686	6.028	0.024	770
111.000	PCS 1900MHz 4x45W-65MHz	16	64.195	5.910	0.022	858
100.000	5' x 2" Pipe Mount	16	51.372	5.289	0.017	1098
51.000	KS24019-L112A	16	12.939	2.336	0.004	1215

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	144.5 - 139.5 (1)	TP22.092x21x0.188	5.000	0.000	0.0	13.036	-2.197	927.796	0.002
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	5.000	0.000	0.0	13.686	-4.436	959.202	0.005
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	5.000	0.000	0.0	14.336	-4.827	989.196	0.005
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	5.000	0.000	0.0	14.986	-7.289	1017.780	0.007
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	6.932	0.000	0.0	15.387	-7.655	1034.750	0.007
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	5.000	0.000	0.0	21.017	-8.530	1538.440	0.006
L7	116.409 - 112.58 (7)	TP27.555x26.737x0.25	3.829	0.000	0.0	21.667	-10.844	1572.760	0.007
L8	112.58 - 112.33 (8)	TP27.609x27.555x0.425	0.250	0.000	0.0	36.669	-10.925	2724.360	0.004
L9	112.33 - 107.33 (9)	TP28.677x27.609x0.419	5.000	0.000	0.0	37.559	-12.438	2790.430	0.004
L10	107.33 - 106 (10)	TP28.962x28.677x0.419	1.330	0.000	0.0	37.937	-12.709	2818.500	0.005
L11	106 - 105.75 (11)	TP29.015x28.962x0.531	0.250	0.000	0.0	48.029	-12.791	3568.310	0.004
L12	105.75 - 103.5 (12)	TP29.496x29.015x0.525	2.250	0.000	0.0	48.276	-13.318	3586.640	0.004
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.7	0.250	0.000	0.0	64.097	-13.406	4762.110	0.003
L14	103.25 - 100.92 (14)	TP30.047x29.549x0.688	2.330	0.000	0.0	64.067	-14.071	4759.830	0.003
L15	100.92 - 100.67 (15)	TP30.101x30.047x0.519	0.250	0.000	0.0	48.707	-14.145	3618.690	0.004
L16	100.67 - 98.5 (16)	TP30.564x30.101x0.513	2.170	0.000	0.0	48.885	-16.042	3631.900	0.004

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L17	98.5 - 98.25 (17)	TP30.618x30.564x0.675	0.250	0.000	0.0	64.151	-16.135	4766.110	0.003
L18	98.25 - 98 (18)	TP30.671x30.618x0.675	0.250	0.000	0.0	64.266	-16.210	4774.620	0.003
L19	98 - 97.75 (19)	TP30.725x30.671x0.575	0.250	0.000	0.0	55.025	-16.276	4088.070	0.004
L20	97.75 - 92.75 (20)	TP31.793x30.725x0.556	5.000	0.000	0.0	55.150	-17.617	4097.390	0.004
L21	92.75 - 87.1178 (21)	TP32.997x31.793x0.55	5.632	0.000	0.0	54.917	-17.896	4080.080	0.004
L22	87.1178 - 86.1178 (22)	TP32.72x31.509x0.375	5.625	0.000	0.0	38.499	-20.069	2860.290	0.007
L23	86.1178 - 81.1178 (23)	TP33.798x32.72x0.375	5.000	0.000	0.0	39.781	-21.330	2955.540	0.007
L24	81.1178 - 77.41 (24)	TP34.596x33.798x0.375	3.708	0.000	0.0	40.732	-22.284	3026.180	0.007
L25	77.41 - 77.16 (25)	TP34.65x34.596x0.638	0.250	0.000	0.0	68.822	-22.406	5113.130	0.004
L26	77.16 - 72.16 (26)	TP35.727x34.65x0.625	5.000	0.000	0.0	69.634	-24.075	5173.470	0.005
L27	72.16 - 69 (27)	TP36.408x35.727x0.625	3.160	0.000	0.0	70.985	-25.158	5273.800	0.005
L28	69 - 68.75 (28)	TP36.462x36.408x0.8	0.250	0.000	0.0	90.553	-25.279	6727.610	0.004
L29	68.75 - 63.75 (29)	TP37.539x36.462x0.788	5.000	0.000	0.0	91.861	-27.325	6824.840	0.004
L30	63.75 - 58.75 (30)	TP38.616x37.539x0.775	5.000	0.000	0.0	93.084	-29.419	6915.640	0.004
L31	58.75 - 58.5 (31)	TP38.67x38.616x0.775	0.250	0.000	0.0	93.216	-29.539	6925.480	0.004
L32	58.5 - 58.25 (32)	TP38.724x38.67x0.775	0.250	0.000	0.0	93.349	-29.656	6935.320	0.004
L33	58.25 - 58 (33)	TP38.778x38.724x0.775	0.250	0.000	0.0	93.481	-29.773	6945.170	0.004
L34	58 - 57.75 (34)	TP38.832x38.778x0.613	0.250	0.000	0.0	74.301	-29.873	5520.170	0.005
L35	57.75 - 57.33 (35)	TP38.922x38.832x0.613	0.420	0.000	0.0	74.477	-30.039	5533.240	0.005
L36	57.33 - 57.08 (36)	TP38.976x38.922x0.613	0.250	0.000	0.0	74.581	-30.144	5541.020	0.005
L37	57.08 - 56.75 (37)	TP39.047x38.976x0.613	0.330	0.000	0.0	74.719	-30.276	5551.290	0.005
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	0.250	0.000	0.0	89.802	-30.387	6671.830	0.005
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	5.000	0.000	0.0	90.787	-32.538	6745.030	0.005
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	9.458	0.000	0.0	91.044	-34.235	6764.120	0.005
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	6.776	0.000	0.0	102.206	-39.516	7593.410	0.005
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	5.000	0.000	0.0	104.893	-41.920	7793.000	0.005
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	4.792	0.000	0.0	104.116	-44.256	7735.310	0.006
L44	31.25 - 31 (44)	TP43.836x43.783x0.938	0.250	0.000	0.0	127.651	-44.413	9483.820	0.005
L45	31 - 30.75 (45)	TP43.89x43.836x0.713	0.250	0.000	0.0	97.645	-44.541	7254.530	0.006
L46	30.75 - 27.83 (46)	TP44.518x43.89x0.713	2.920	0.000	0.0	99.064	-46.028	7359.990	0.006
L47	27.83 - 27.58 (47)	TP44.571x44.518x0.65	0.250	0.000	0.0	90.614	-46.176	6732.200	0.007
L48	27.58 - 27.25 (48)	TP44.642x44.571x0.65	0.330	0.000	0.0	90.761	-46.337	6743.070	0.007
L49	27.25 - 27 (49)	TP44.696x44.642x0.725	0.250	0.000	0.0	101.184	-46.462	7517.480	0.006
L50	27 - 22 (50)	TP45.771x44.696x0.713	5.000	0.000	0.0	101.899	-48.898	7570.550	0.006
L51	22 - 17 (51)	TP46.846x45.771x0.713	5.000	0.000	0.0	104.329	-51.382	7751.130	0.007
L52	17 - 12 (52)	TP47.921x46.846x0.713	5.000	0.000	0.0	106.760	-53.898	7931.710	0.007
L53	12 - 7 (53)	TP48.995x47.921x0.713	5.000	0.000	0.0	109.190	-56.445	8112.300	0.007

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L54	7 - 2 (54)	TP50.07x48.995x0.7	5.000	0.000	0.0	109.690	-59.026	8149.450	0.007
L55	2 - 0 (55)	TP50.5x50.07x0.7	2.000	0.000	0.0	110.646	-60.069	8220.420	0.007

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	144.5 - 139.5 (1)	TP22.092x21x0.188	59.868	417.617	0.143	0.000	417.617	0.000
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	131.940	453.461	0.291	0.000	453.461	0.000
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	233.023	490.027	0.476	0.000	490.027	0.000
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	343.782	527.221	0.652	0.000	527.221	0.000
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	428.451	550.488	0.778	0.000	550.488	0.000
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	568.124	836.617	0.679	0.000	836.617	0.000
L7	116.409 - 112.58 (7)	TP27.555x26.737x0.25	679.483	881.950	0.770	0.000	881.950	0.000
L8	112.58 - 112.33 (8)	TP27.609x27.555x0.425	687.850	1511.217	0.455	0.000	1511.217	0.000
L9	112.33 - 107.33 (9)	TP28.677x27.609x0.419	860.300	1610.367	0.534	0.000	1610.367	0.000
L10	107.33 - 106 (10)	TP28.962x28.677x0.419	907.267	1643.167	0.552	0.000	1643.167	0.000
L11	106 - 105.75 (11)	TP29.015x28.962x0.531	916.125	2067.883	0.443	0.000	2067.883	0.000
L12	105.75 - 103.5 (12)	TP29.496x29.015x0.525	996.208	2115.150	0.471	0.000	2115.150	0.000
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.7	1005.150	2779.817	0.362	0.000	2779.817	0.000
L14	103.25 - 100.92 (14)	TP30.047x29.549x0.688	1088.933	2829.992	0.385	0.000	2829.992	0.000
L15	100.92 - 100.67 (15)	TP30.101x30.047x0.519	1097.975	2180.325	0.504	0.000	2180.325	0.000
L16	100.67 - 98.5 (16)	TP30.564x30.101x0.513	1181.117	2224.100	0.531	0.000	2224.100	0.000
L17	98.5 - 98.25 (17)	TP30.618x30.564x0.675	1190.875	2892.475	0.412	0.000	2892.475	0.000
L18	98.25 - 98 (18)	TP30.671x30.618x0.675	1200.650	2902.917	0.414	0.000	2902.917	0.000
L19	98 - 97.75 (19)	TP30.725x30.671x0.575	1210.425	2506.633	0.483	0.000	2506.633	0.000
L20	97.75 - 92.75 (20)	TP31.793x30.725x0.556	1407.792	2606.183	0.540	0.000	2606.183	0.000
L21	92.75 - 87.1178 (21)	TP32.997x31.793x0.55	1447.958	2614.417	0.554	0.000	2614.417	0.000
L22	87.1178 - 86.1178 (22)	TP32.72x31.509x0.375	1675.100	1895.433	0.884	0.000	1895.433	0.000
L23	86.1178 - 81.1178 (23)	TP33.798x32.72x0.375	1880.417	2024.525	0.929	0.000	2024.525	0.000
L24	81.1178 - 77.41 (24)	TP34.596x33.798x0.375	2034.492	2123.000	0.958	0.000	2123.000	0.000
L25	77.41 - 77.16 (25)	TP34.65x34.596x0.638	2044.933	3537.983	0.578	0.000	3537.983	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 $\frac{M_{uy}}{\phi M_{ny}}$
L26	77.16 - 72.16 (26)	TP35.727x34.65x0.625	2255.500	3697.808	0.610	0.000	3697.808	0.000
L27	72.16 - 69 (27)	TP36.408x35.727x0.625	2390.225	3843.908	0.622	0.000	3843.908	0.000
L28	69 - 68.75 (28)	TP36.462x36.408x0.8	2400.942	4863.200	0.494	0.000	4863.200	0.000
L29	68.75 - 63.75 (29)	TP37.539x36.462x0.788	2616.958	5089.233	0.514	0.000	5089.233	0.000
L30	63.75 - 58.75 (30)	TP38.616x37.539x0.775	2836.283	5314.767	0.534	0.000	5314.767	0.000
L31	58.75 - 58.5 (31)	TP38.67x38.616x0.775	2847.333	5330.058	0.534	0.000	5330.058	0.000
L32	58.5 - 58.25 (32)	TP38.724x38.67x0.775	2858.392	5345.367	0.535	0.000	5345.367	0.000
L33	58.25 - 58 (33)	TP38.778x38.724x0.775	2869.458	5360.708	0.535	0.000	5360.708	0.000
L34	58 - 57.75 (34)	TP38.832x38.778x0.613	2880.533	4303.483	0.669	0.000	4303.483	0.000
L35	57.75 - 57.33 (35)	TP38.922x38.832x0.613	2899.158	4324.042	0.670	0.000	4324.042	0.000
L36	57.33 - 57.08 (36)	TP38.976x38.922x0.613	2910.250	4336.308	0.671	0.000	4336.308	0.000
L37	57.08 - 56.75 (37)	TP39.047x38.976x0.613	2924.908	4352.517	0.672	0.000	4352.517	0.000
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	2936.025	5204.558	0.564	0.000	5204.558	0.000
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	3159.925	5415.617	0.583	0.000	5415.617	0.000
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	3327.225	5545.550	0.600	0.000	5545.550	0.000
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	3639.825	6313.417	0.577	0.000	6313.417	0.000
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	3874.300	6652.891	0.582	0.000	6652.891	0.000
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	4101.617	6776.583	0.605	0.000	6776.583	0.000
L44	31.25 - 31 (44)	TP43.836x43.783x0.938	4113.542	8251.483	0.499	0.000	8251.483	0.000
L45	31 - 30.75 (45)	TP43.89x43.836x0.713	4125.483	6386.341	0.646	0.000	6386.341	0.000
L46	30.75 - 27.83 (46)	TP44.518x43.89x0.713	4265.350	6574.891	0.649	0.000	6574.891	0.000
L47	27.83 - 27.58 (47)	TP44.571x44.518x0.65	4277.367	6038.733	0.708	0.000	6038.733	0.000
L48	27.58 - 27.25 (48)	TP44.642x44.571x0.65	4293.242	6058.400	0.709	0.000	6058.400	0.000
L49	27.25 - 27 (49)	TP44.696x44.642x0.725	4305.267	6739.541	0.639	0.000	6739.541	0.000
L50	27 - 22 (50)	TP45.771x44.696x0.713	4547.125	6959.567	0.653	0.000	6959.567	0.000
L51	22 - 17 (51)	TP46.846x45.771x0.713	4791.292	7298.191	0.657	0.000	7298.191	0.000
L52	17 - 12 (52)	TP47.921x46.846x0.713	5037.592	7644.858	0.659	0.000	7644.858	0.000
L53	12 - 7 (53)	TP48.995x47.921x0.713	5285.925	7999.575	0.661	0.000	7999.575	0.000
L54	7 - 2 (54)	TP50.07x48.995x0.7	5536.275	8221.867	0.673	0.000	8221.867	0.000
L55	2 - 0 (55)	TP50.5x50.07x0.7	5636.967	8366.667	0.674	0.000	8366.667	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	144.5 - 139.5 (1)	TP22.092x21x0.188	10.870	463.898	0.023	1.446	836.258	0.002
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	19.933	479.601	0.042	3.104	908.033	0.003

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 $\frac{T_u}{\phi T_n}$
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	20.504	494.598	0.041	2.026	981.250	0.002
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	27.213	508.890	0.053	2.778	1055.733	0.003
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	27.597	517.374	0.053	2.763	1102.325	0.003
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	28.291	769.221	0.037	2.728	1675.275	0.002
L7	116.409 - 112.58 (7)	TP27.555x26.737x0.25	33.467	786.379	0.043	3.426	1766.050	0.002
L8	112.58 - 112.33 (8)	TP27.609x27.555x0.425	33.492	1362.180	0.025	3.425	3026.133	0.001
L9	112.33 - 107.33 (9)	TP28.677x27.609x0.419	35.243	1395.220	0.025	3.393	3224.675	0.001
L10	107.33 - 106 (10)	TP28.962x28.677x0.419	35.423	1409.250	0.025	3.385	3290.358	0.001
L11	106 - 105.75 (11)	TP29.015x28.962x0.531	35.452	1784.150	0.020	3.375	4140.833	0.001
L12	105.75 - 103.5 (12)	TP29.496x29.015x0.525	35.768	1793.320	0.020	3.365	4235.475	0.001
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.7	35.801	2381.060	0.015	3.356	5566.425	0.001
L14	103.25 - 100.92 (14)	TP30.047x29.549x0.688	36.144	2379.920	0.015	3.345	5666.900	0.001
L15	100.92 - 100.67 (15)	TP30.101x30.047x0.519	36.176	1809.350	0.020	3.336	4365.975	0.001
L16	100.67 - 98.5 (16)	TP30.564x30.101x0.513	39.045	1815.950	0.022	4.061	4453.650	0.001
L17	98.5 - 98.25 (17)	TP30.618x30.564x0.675	39.075	2383.060	0.016	4.053	5792.017	0.001
L18	98.25 - 98 (18)	TP30.671x30.618x0.675	39.111	2387.310	0.016	4.051	5812.933	0.001
L19	98 - 97.75 (19)	TP30.725x30.671x0.575	39.146	2044.030	0.019	4.049	5019.392	0.001
L20	97.75 - 92.75 (20)	TP31.793x30.725x0.556	39.834	2048.700	0.019	4.014	5218.750	0.001
L21	92.75 - 87.1178 (21)	TP32.997x31.793x0.55	39.968	2040.040	0.020	4.006	5235.217	0.001
L22	87.1178 - 86.1178 (22)	TP32.72x31.509x0.375	40.807	1430.150	0.029	3.960	3795.508	0.001
L23	86.1178 - 81.1178 (23)	TP33.798x32.72x0.375	41.376	1477.770	0.028	3.916	4054.000	0.001
L24	81.1178 - 77.41 (24)	TP34.596x33.798x0.375	41.792	1513.090	0.028	3.886	4251.192	0.001
L25	77.41 - 77.16 (25)	TP34.65x34.596x0.638	41.806	2556.570	0.016	3.875	7084.617	0.001
L26	77.16 - 72.16 (26)	TP35.727x34.65x0.625	42.460	2586.730	0.016	3.839	7404.667	0.001
L27	72.16 - 69 (27)	TP36.408x35.727x0.625	42.862	2636.900	0.016	3.812	7697.217	0.000
L28	69 - 68.75 (28)	TP36.462x36.408x0.8	42.886	3363.800	0.013	3.803	9738.333	0.000
L29	68.75 - 63.75 (29)	TP37.539x36.462x0.788	43.562	3412.420	0.013	3.766	10190.917	0.000
L30	63.75 - 58.75 (30)	TP38.616x37.539x0.775	44.215	3457.820	0.013	3.722	10642.500	0.000
L31	58.75 - 58.5 (31)	TP38.67x38.616x0.775	44.238	3462.740	0.013	3.714	10673.167	0.000
L32	58.5 - 58.25 (32)	TP38.724x38.67x0.775	44.271	3467.660	0.013	3.711	10703.833	0.000
L33	58.25 - 58 (33)	TP38.778x38.724x0.775	44.304	3472.580	0.013	3.709	10734.500	0.000
L34	58 - 57.75 (34)	TP38.832x38.778x0.613	44.334	2760.090	0.016	3.707	8617.500	0.000
L35	57.75 - 57.33 (35)	TP38.922x38.832x0.613	44.387	2766.620	0.016	3.705	8658.667	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 $\frac{T_u}{\phi T_n}$
L36	57.33 - 57.08 (36)	TP38.976x38.922x0.613	44.415	2770.510	0.016	3.701	8683.250	0.000
L37	57.08 - 56.75 (37)	TP39.047x38.976x0.613	44.456	2775.640	0.016	3.699	8715.667	0.000
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	44.486	3335.910	0.013	3.696	10421.833	0.000
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	45.119	3372.520	0.013	3.658	10844.500	0.000
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	45.630	3382.060	0.013	3.784	11104.667	0.000
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	46.615	3796.710	0.012	3.722	12642.249	0.000
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	47.182	3896.500	0.012	3.678	13322.083	0.000
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	47.706	3867.650	0.012	3.638	13569.749	0.000
L44	31.25 - 31 (44)	TP43.836x43.783x0.938	47.716	4741.910	0.010	3.628	16523.167	0.000
L45	31 - 30.75 (45)	TP43.89x43.836x0.713	47.743	3627.270	0.013	3.626	12788.333	0.000
L46	30.75 - 27.83 (46)	TP44.518x43.89x0.713	48.066	3680.000	0.013	3.611	13165.833	0.000
L47	27.83 - 27.58 (47)	TP44.571x44.518x0.65	48.066	3366.100	0.014	3.598	12092.249	0.000
L48	27.58 - 27.25 (48)	TP44.642x44.571x0.65	48.099	3371.530	0.014	3.596	12131.583	0.000
L49	27.25 - 27 (49)	TP44.696x44.642x0.725	48.122	3758.740	0.013	3.594	13495.583	0.000
L50	27 - 22 (50)	TP45.771x44.696x0.713	48.617	3785.280	0.013	3.558	13936.167	0.000
L51	22 - 17 (51)	TP46.846x45.771x0.713	49.063	3875.570	0.013	3.516	14614.249	0.000
L52	17 - 12 (52)	TP47.921x46.846x0.713	49.472	3965.860	0.012	3.477	15308.416	0.000
L53	12 - 7 (53)	TP48.995x47.921x0.713	49.877	4056.150	0.012	3.436	16018.749	0.000
L54	7 - 2 (54)	TP50.07x48.995x0.7	50.275	4074.730	0.012	3.395	16463.833	0.000
L55	2 - 0 (55)	TP50.5x50.07x0.7	50.433	4110.210	0.012	3.379	16753.833	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	144.5 - 139.5 (1)	0.002	0.143	0.000	0.023	0.002	0.146 ✔	1.000	4.8.2 ✔
L2	139.5 - 134.5 (2)	0.005	0.291	0.000	0.042	0.003	0.298 ✔	1.000	4.8.2 ✔
L3	134.5 - 129.5 (3)	0.005	0.476	0.000	0.041	0.002	0.482 ✔	1.000	4.8.2 ✔
L4	129.5 - 124.5 (4)	0.007	0.652	0.000	0.053	0.003	0.662 ✔	1.000	4.8.2 ✔
L5	124.5 - 117.568 (5)	0.007	0.778	0.000	0.053	0.003	0.789 ✔	1.000	4.8.2 ✔
L6	117.568 - 116.409 (6)	0.006	0.679	0.000	0.037	0.002	0.686 ✔	1.000	4.8.2 ✔
L7	116.409 - 112.58 (7)	0.007	0.770	0.000	0.043	0.002	0.779 ✔	1.000	4.8.2 ✔
L8	112.58 - 112.33 (8)	0.004	0.455	0.000	0.025	0.001	0.460 ✔	1.000	4.8.2 ✔
L9	112.33 - 107.33 (9)	0.004	0.534	0.000	0.025	0.001	0.539 ✔	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
L10	107.33 - 106 (10)	0.005	0.552	0.000	0.025	0.001	0.557 ✔	1.000	4.8.2 ✔
L11	106 - 105.75 (11)	0.004	0.443	0.000	0.020	0.001	0.447 ✔	1.000	4.8.2 ✔
L12	105.75 - 103.5 (12)	0.004	0.471	0.000	0.020	0.001	0.475 ✔	1.000	4.8.2 ✔
L13	103.5 - 103.25 (13)	0.003	0.362	0.000	0.015	0.001	0.365 ✔	1.000	4.8.2 ✔
L14	103.25 - 100.92 (14)	0.003	0.385	0.000	0.015	0.001	0.388 ✔	1.000	4.8.2 ✔
L15	100.92 - 100.67 (15)	0.004	0.504	0.000	0.020	0.001	0.508 ✔	1.000	4.8.2 ✔
L16	100.67 - 98.5 (16)	0.004	0.531	0.000	0.022	0.001	0.536 ✔	1.000	4.8.2 ✔
L17	98.5 - 98.25 (17)	0.003	0.412	0.000	0.016	0.001	0.415 ✔	1.000	4.8.2 ✔
L18	98.25 - 98 (18)	0.003	0.414	0.000	0.016	0.001	0.417 ✔	1.000	4.8.2 ✔
L19	98 - 97.75 (19)	0.004	0.483	0.000	0.019	0.001	0.487 ✔	1.000	4.8.2 ✔
L20	97.75 - 92.75 (20)	0.004	0.540	0.000	0.019	0.001	0.545 ✔	1.000	4.8.2 ✔
L21	92.75 - 87.1178 (21)	0.004	0.554	0.000	0.020	0.001	0.559 ✔	1.000	4.8.2 ✔
L22	87.1178 - 86.1178 (22)	0.007	0.884	0.000	0.029	0.001	0.892 ✔	1.000	4.8.2 ✔
L23	86.1178 - 81.1178 (23)	0.007	0.929	0.000	0.028	0.001	0.937 ✔	1.000	4.8.2 ✔
L24	81.1178 - 77.41 (24)	0.007	0.958	0.000	0.028	0.001	0.966 ✔	1.000	4.8.2 ✔
L25	77.41 - 77.16 (25)	0.004	0.578	0.000	0.016	0.001	0.583 ✔	1.000	4.8.2 ✔
L26	77.16 - 72.16 (26)	0.005	0.610	0.000	0.016	0.001	0.615 ✔	1.000	4.8.2 ✔
L27	72.16 - 69 (27)	0.005	0.622	0.000	0.016	0.000	0.627 ✔	1.000	4.8.2 ✔
L28	69 - 68.75 (28)	0.004	0.494	0.000	0.013	0.000	0.498 ✔	1.000	4.8.2 ✔
L29	68.75 - 63.75 (29)	0.004	0.514	0.000	0.013	0.000	0.518 ✔	1.000	4.8.2 ✔
L30	63.75 - 58.75 (30)	0.004	0.534	0.000	0.013	0.000	0.538 ✔	1.000	4.8.2 ✔
L31	58.75 - 58.5 (31)	0.004	0.534	0.000	0.013	0.000	0.539 ✔	1.000	4.8.2 ✔
L32	58.5 - 58.25 (32)	0.004	0.535	0.000	0.013	0.000	0.539 ✔	1.000	4.8.2 ✔
L33	58.25 - 58 (33)	0.004	0.535	0.000	0.013	0.000	0.540 ✔	1.000	4.8.2 ✔
L34	58 - 57.75 (34)	0.005	0.669	0.000	0.016	0.000	0.675 ✔	1.000	4.8.2 ✔
L35	57.75 - 57.33 (35)	0.005	0.670	0.000	0.016	0.000	0.676 ✔	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
L36	57.33 - 57.08 (36)	0.005	0.671	0.000	0.016	0.000	0.677 ✔	1.000	4.8.2 ✔
L37	57.08 - 56.75 (37)	0.005	0.672	0.000	0.016	0.000	0.678 ✔	1.000	4.8.2 ✔
L38	56.75 - 56.5 (38)	0.005	0.564	0.000	0.013	0.000	0.569 ✔	1.000	4.8.2 ✔
L39	56.5 - 51.5 (39)	0.005	0.583	0.000	0.013	0.000	0.588 ✔	1.000	4.8.2 ✔
L40	51.5 - 42.0418 (40)	0.005	0.600	0.000	0.013	0.000	0.605 ✔	1.000	4.8.2 ✔
L41	42.0418 - 41.0418 (41)	0.005	0.577	0.000	0.012	0.000	0.582 ✔	1.000	4.8.2 ✔
L42	41.0418 - 36.0418 (42)	0.005	0.582	0.000	0.012	0.000	0.588 ✔	1.000	4.8.2 ✔
L43	36.0418 - 31.25 (43)	0.006	0.605	0.000	0.012	0.000	0.611 ✔	1.000	4.8.2 ✔
L44	31.25 - 31 (44)	0.005	0.499	0.000	0.010	0.000	0.503 ✔	1.000	4.8.2 ✔
L45	31 - 30.75 (45)	0.006	0.646	0.000	0.013	0.000	0.652 ✔	1.000	4.8.2 ✔
L46	30.75 - 27.83 (46)	0.006	0.649	0.000	0.013	0.000	0.655 ✔	1.000	4.8.2 ✔
L47	27.83 - 27.58 (47)	0.007	0.708	0.000	0.014	0.000	0.715 ✔	1.000	4.8.2 ✔
L48	27.58 - 27.25 (48)	0.007	0.709	0.000	0.014	0.000	0.716 ✔	1.000	4.8.2 ✔
L49	27.25 - 27 (49)	0.006	0.639	0.000	0.013	0.000	0.645 ✔	1.000	4.8.2 ✔
L50	27 - 22 (50)	0.006	0.653	0.000	0.013	0.000	0.660 ✔	1.000	4.8.2 ✔
L51	22 - 17 (51)	0.007	0.657	0.000	0.013	0.000	0.663 ✔	1.000	4.8.2 ✔
L52	17 - 12 (52)	0.007	0.659	0.000	0.012	0.000	0.666 ✔	1.000	4.8.2 ✔
L53	12 - 7 (53)	0.007	0.661	0.000	0.012	0.000	0.668 ✔	1.000	4.8.2 ✔
L54	7 - 2 (54)	0.007	0.673	0.000	0.012	0.000	0.681 ✔	1.000	4.8.2 ✔
L55	2 - 0 (55)	0.007	0.674	0.000	0.012	0.000	0.681 ✔	1.000	4.8.2 ✔

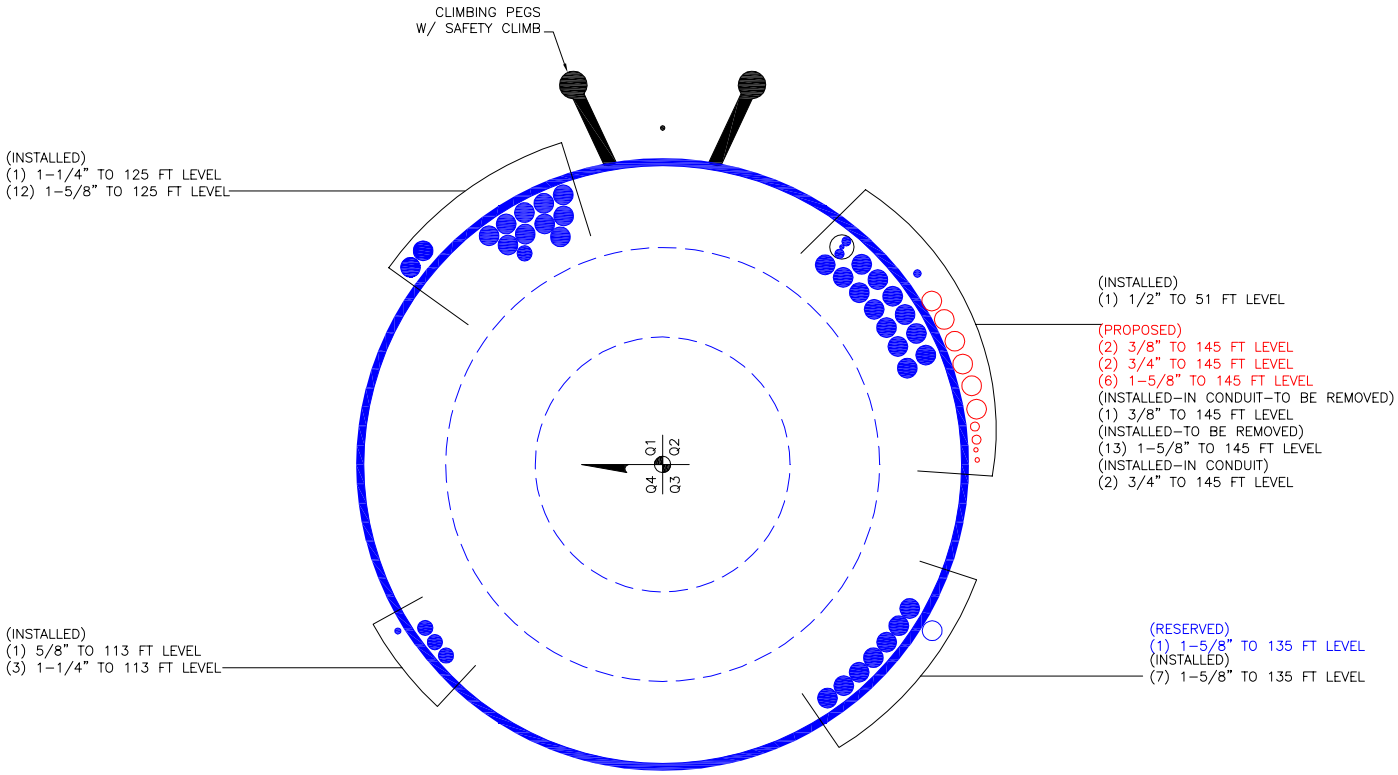
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	144.5 - 139.5	Pole	TP22.092x21x0.188	1	-2.197	927.796	14.6	Pass
L2	139.5 - 134.5	Pole	TP23.184x22.092x0.188	2	-4.436	959.202	29.7	Pass
L3	134.5 - 129.5	Pole	TP24.276x23.184x0.188	3	-4.827	989.196	48.2	Pass
L4	129.5 - 124.5	Pole	TP25.368x24.276x0.188	4	-7.289	1017.780	66.2	Pass
L5	124.5 - 117.568	Pole	TP26.882x25.368x0.188	5	-7.655	1034.750	78.9	Pass
L6	117.568 - 116.409	Pole	TP26.737x25.668x0.25	6	-8.530	1538.440	68.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L7	116.409 - 112.58	Pole	TP27.555x26.737x0.25	7	-10.844	1572.760	77.9	Pass
L8	112.58 - 112.33	Pole	TP27.609x27.555x0.425	8	-10.925	2724.360	79.7	Pass
L9	112.33 - 107.33	Pole	TP28.677x27.609x0.419	9	-12.438	2790.430	93.7	Pass
L10	107.33 - 106	Pole	TP28.962x28.677x0.419	10	-12.709	2818.500	97.2	Pass
L11	106 - 105.75	Pole	TP29.015x28.962x0.531	11	-12.791	3568.310	81.2	Pass
L12	105.75 - 103.5	Pole	TP29.496x29.015x0.525	12	-13.318	3586.640	86.1	Pass
L13	103.5 - 103.25	Pole	TP29.549x29.496x0.7	13	-13.406	4762.110	66.2	Pass
L14	103.25 - 100.92	Pole	TP30.047x29.549x0.688	14	-14.071	4759.830	70.1	Pass
L15	100.92 - 100.67	Pole	TP30.101x30.047x0.519	15	-14.145	3618.690	92.1	Pass
L16	100.67 - 98.5	Pole	TP30.564x30.101x0.513	16	-16.042	3631.900	96.8	Pass
L17	98.5 - 98.25	Pole	TP30.618x30.564x0.675	17	-16.135	4766.110	74.8	Pass
L18	98.25 - 98	Pole	TP30.671x30.618x0.675	18	-16.210	4774.620	75.2	Pass
L19	98 - 97.75	Pole	TP30.725x30.671x0.575	19	-16.276	4088.070	85.6	Pass
L20	97.75 - 92.75	Pole	TP31.793x30.725x0.556	20	-17.617	4097.390	94.7	Pass
L21	92.75 - 87.1178	Pole	TP32.997x31.793x0.55	21	-17.896	4080.080	96.4	Pass
L22	87.1178 - 86.1178	Pole	TP32.72x31.509x0.375	22	-20.069	2860.290	89.1	Pass
L23	86.1178 - 81.1178	Pole	TP33.798x32.72x0.375	23	-21.330	2955.540	93.6	Pass
L24	81.1178 - 77.41	Pole	TP34.596x33.798x0.375	24	-22.284	3026.180	96.6	Pass
L25	77.41 - 77.16	Pole	TP34.65x34.596x0.638	25	-22.406	5113.130	91.2	Pass
L26	77.16 - 72.16	Pole	TP35.727x34.65x0.625	26	-24.075	5173.470	95.7	Pass
L27	72.16 - 69	Pole	TP36.408x35.727x0.625	27	-25.158	5273.800	98.4	Pass
L28	69 - 68.75	Pole	TP36.462x36.408x0.8	28	-25.279	6727.610	78.2	Pass
L29	68.75 - 63.75	Pole	TP37.539x36.462x0.788	29	-27.325	6824.840	81.6	Pass
L30	63.75 - 58.75	Pole	TP38.616x37.539x0.775	30	-29.419	6915.640	84.8	Pass
L31	58.75 - 58.5	Pole	TP38.67x38.616x0.775	31	-29.539	6925.480	84.9	Pass
L32	58.5 - 58.25	Pole	TP38.724x38.67x0.775	32	-29.656	6935.320	85.7	Pass
L33	58.25 - 58	Pole	TP38.778x38.724x0.775	33	-29.773	6945.170	85.9	Pass
L34	58 - 57.75	Pole	TP38.832x38.778x0.613	34	-29.873	5520.170	97.2	Pass
L35	57.75 - 57.33	Pole	TP38.922x38.832x0.613	35	-30.039	5533.240	97.4	Pass
L36	57.33 - 57.08	Pole	TP38.976x38.922x0.613	36	-30.144	5541.020	97.6	Pass
L37	57.08 - 56.75	Pole	TP39.047x38.976x0.613	37	-30.276	5551.290	97.8	Pass
L38	56.75 - 56.5	Pole	TP39.101x39.047x0.738	38	-30.387	6671.830	88.8	Pass
L39	56.5 - 51.5	Pole	TP40.178x39.101x0.725	39	-32.538	6745.030	91.6	Pass
L40	51.5 - 42.0418	Pole	TP42.216x40.178x0.713	40	-34.235	6764.120	93.5	Pass
L41	42.0418 - 41.0418	Pole	TP41.678x40.221x0.788	41	-39.516	7593.410	91.2	Pass
L42	41.0418 - 36.0418	Pole	TP42.753x41.678x0.788	42	-41.920	7793.000	93.2	Pass
L43	36.0418 - 31.25	Pole	TP43.783x42.753x0.763	43	-44.256	7735.310	94.9	Pass
L44	31.25 - 31	Pole	TP43.836x43.783x0.938	44	-44.413	9483.820	79.1	Pass
L45	31 - 30.75	Pole	TP43.89x43.836x0.713	45	-44.541	7254.530	88.3	Pass
L46	30.75 - 27.83	Pole	TP44.518x43.89x0.713	46	-46.028	7359.990	89.2	Pass
L47	27.83 - 27.58	Pole	TP44.571x44.518x0.65	47	-46.176	6732.200	90.9	Pass
L48	27.58 - 27.25	Pole	TP44.642x44.571x0.65	48	-46.337	6743.070	91.0	Pass
L49	27.25 - 27	Pole	TP44.696x44.642x0.725	49	-46.462	7517.480	92.8	Pass
L50	27 - 22	Pole	TP45.771x44.696x0.713	50	-48.898	7570.550	94.2	Pass
L51	22 - 17	Pole	TP46.846x45.771x0.713	51	-51.382	7751.130	95.5	Pass
L52	17 - 12	Pole	TP47.921x46.846x0.713	52	-53.898	7931.710	96.8	Pass
L53	12 - 7	Pole	TP48.995x47.921x0.713	53	-56.445	8112.300	97.9	Pass
L54	7 - 2	Pole	TP50.07x48.995x0.7	54	-59.026	8149.450	98.9	Pass
L55	2 - 0	Pole	TP50.5x50.07x0.7	55	-60.069	8220.420	99.3	Pass
							Summary	
						Pole (L55)	99.3	Pass
						RATING =	**99.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881533

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 881533

Work Order: 1445738

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	144.5	26.9323	3.8411	18	21	26.8823	0.1875	0.75	A572-65
2	121.4088	34.291	4.625	18	25.67	32.9971	0.25	1	A572-65
3	91.7428	49.701	5.776	18	31.51	42.2155	0.375	1.5	A572-65
4	47.8178	47.8178	0	18	40.22	50.5	0.4375	1.75	A572-65

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	91.5	98.5	plate	CCI-SFP-045100	3		E2						E2						E2				
2	0	31.25	plate	CCI-WSFP-085125	3		E3								E3						E3		
3	27.83	57.33	plate	CCI-SFP-065125	1				E3														
4	31.25	57.33	plate	CCI-SFP-065125	2										E3						E3		
5	57.33	77.41	plate	CCI-SFP-065125	3				E3						E3						E3		
6	91.5	103.5	plate	CCI-SFP-045100	3			E3						E3						E3			
7	100.92	112.58	plate	CCI-SFP-045100	3						E4						E4						E4
8	0	27.25	plate	CCI-SFP-065125	1															E5			
9	31	58.5	plate	CCI-SFP-085125	1							E5											
10	98	106	plate	CCI-SFP-040075	3				E5						E5						E5		
11	27.25	56.75	plate	CCI-SFP-065125	1													P					
12	58	69	plate	CCI-SFP-060100	3						P						P						P
13																							

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	8.5	1.25	10.625	0.625	n/a	45.000	17.000	9.063	1.1875	A572-65
3	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
4	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
5	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
6	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
7	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
8	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
9	8.5	1.25	10.625	0.625	45.000	45.000	17.000	9.063	1.1875	A572-65
10	4	0.75	3	0.375	12.000	12.000	16.000	2.063	1.1875	A572-65
11	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
12	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	144.5 - 139.5	5		18	21.000	22.092	0.1875	A572-65	1.000
2	139.5 - 134.5	5		18	22.092	23.184	0.1875	A572-65	1.000
3	134.5 - 129.5	5		18	23.184	24.276	0.1875	A572-65	1.000
4	129.5 - 124.5	5		18	24.276	25.368	0.1875	A572-65	1.000
5	124.5 - 121.409	6.9323	3.8411	18	25.368	26.882	0.1875	A572-65	1.000
6	121.409 - 116.409	5		18	25.668	26.737	0.25	A572-65	1.000
7	116.409 - 112.58	3.8288		18	26.737	27.555	0.25	A572-65	1.000
8	112.58 - 112.33	0.25		18	27.555	27.609	0.425	A572-65	0.960
9	112.33 - 107.33	5		18	27.609	28.677	0.41875	A572-65	0.960
10	107.33 - 106	1.33		18	28.677	28.962	0.41875	A572-65	0.956
11	106 - 105.75	0.25		18	28.962	29.015	0.53125	A572-65	0.944
12	105.75 - 103.5	2.25		18	29.015	29.496	0.525	A572-65	0.947
13	103.5 - 103.25	0.25		18	29.496	29.549	0.7	A572-65	0.924
14	103.25 - 100.92	2.33		18	29.549	30.047	0.6875	A572-65	0.931
15	100.92 - 100.67	0.25		18	30.047	30.101	0.51875	A572-65	0.948
16	100.67 - 98.5	2.17		18	30.101	30.564	0.5125	A572-65	0.952
17	98.5 - 98.25	0.25		18	30.564	30.618	0.675	A572-65	0.937
18	98.25 - 98	0.25		18	30.618	30.671	0.675	A572-65	0.936
19	98 - 97.75	0.25		18	30.671	30.725	0.575	A572-65	0.930
20	97.75 - 92.75	5		18	30.725	31.793	0.55625	A572-65	0.943
21	92.75 - 91.7428	5.6322	4.625	18	31.793	32.997	0.55	A572-65	0.951
22	91.7428 - 86.1178	5.625		18	31.509	32.720	0.375	A572-65	1.000
23	86.1178 - 81.1178	5		18	32.720	33.798	0.375	A572-65	1.000
24	81.1178 - 77.41	3.7078		18	33.798	34.596	0.375	A572-65	1.000
25	77.41 - 77.16	0.25		18	34.596	34.650	0.6375	A572-65	0.947
26	77.16 - 72.16	5		18	34.650	35.727	0.625	A572-65	0.954
27	72.16 - 69	3.16		18	35.727	36.408	0.625	A572-65	0.948
28	69 - 68.75	0.25		18	36.408	36.462	0.8	A572-65	0.942
29	68.75 - 63.75	5		18	36.462	37.539	0.7875	A572-65	0.943
30	63.75 - 58.75	5		18	37.539	38.616	0.775	A572-65	0.944
31	58.75 - 58.5	0.25		18	38.616	38.670	0.775	A572-65	0.944
32	58.5 - 58.25	0.25		18	38.670	38.724	0.775	A572-65	1.057
33	58.25 - 58	0.25		18	38.724	38.778	0.775	A572-65	1.056
34	58 - 57.75	0.25		18	38.778	38.832	0.6125	A572-65	1.087
35	57.75 - 57.33	0.42		18	38.832	38.922	0.6125	A572-65	1.086
36	57.33 - 57.08	0.25		18	38.922	38.976	0.6125	A572-65	1.085
37	57.08 - 56.75	0.33		18	38.976	39.047	0.6125	A572-65	1.084
38	56.75 - 56.5	0.25		18	39.047	39.101	0.7375	A572-65	0.994
39	56.5 - 51.5	5		18	39.101	40.178	0.725	A572-65	0.997
40	51.5 - 47.8178	9.4582	5.776	18	40.178	42.216	0.7125	A572-65	1.004
41	47.8178 - 41.0418	6.776		18	40.221	41.678	0.7875	A572-65	0.982
42	41.0418 - 36.0418	5		18	41.678	42.753	0.7875	A572-65	0.971
43	36.0418 - 31.25	4.7918		18	42.753	43.783	0.7625	A572-65	0.992
44	31.25 - 31	0.25		18	43.783	43.836	0.9375	A572-65	0.932
45	31 - 30.75	0.25		18	43.836	43.890	0.7125	A572-65	1.111
46	30.75 - 27.83	2.92		18	43.890	44.518	0.7125	A572-65	1.104
47	27.83 - 27.58	0.25		18	44.518	44.571	0.65	A572-65	1.118
48	27.58 - 27.25	0.33		18	44.571	44.642	0.65	A572-65	1.117
49	27.25 - 27	0.25		18	44.642	44.696	0.725	A572-65	1.003
50	27 - 22	5		18	44.696	45.771	0.7125	A572-65	1.010
51	22 - 17	5		18	45.771	46.846	0.7125	A572-65	1.001
52	17 - 12	5		18	46.846	47.921	0.7125	A572-65	0.992
53	12 - 7	5		18	47.921	48.995	0.7125	A572-65	0.984
54	7 - 2	5		18	48.995	50.070	0.7	A572-65	0.993
55	2 - 0	2		18	50.070	50.500	0.7	A572-65	0.990

TNX Section Forces

Increment (ft): 5

	Section Height (ft)	TNX Output P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	144.5 - 139.5	2.2016	59.868	10.869
2	139.5 - 134.5	4.4504	131.94	19.93
3	134.5 - 129.5	4.827	233.02	20.504
4	129.5 - 124.5	7.2885	343.78	27.213
5	124.5 - 121.409	7.6554	428.45	27.597
6	121.409 - 116.409	8.5298	568.12	28.291
7	116.409 - 112.58	10.844	679.48	33.467
8	112.58 - 112.33	10.924	687.85	33.492
9	112.33 - 107.33	12.438	860.3	35.244
10	107.33 - 106	12.709	907.27	35.423
11	106 - 105.75	12.791	916.12	35.452
12	105.75 - 103.5	13.318	996.21	35.768
13	103.5 - 103.25	13.406	1005.2	35.801
14	103.25 - 100.92	14.071	1088.9	36.144
15	100.92 - 100.67	14.145	1098	36.176
16	100.67 - 98.5	16.042	1181.1	39.045
17	98.5 - 98.25	16.135	1190.9	39.075
18	98.25 - 98	16.21	1200.6	39.111
19	98 - 97.75	16.276	1210.4	39.146
20	97.75 - 92.75	17.617	1407.8	39.834
21	92.75 - 91.7428	17.896	1448	39.968
22	91.7428 - 86.1178	20.069	1675.1	40.807
23	86.1178 - 81.1178	21.33	1880.4	41.376
24	81.1178 - 77.41	22.284	2034.5	41.792
25	77.41 - 77.16	22.406	2044.9	41.806
26	77.16 - 72.16	24.075	2255.5	42.46
27	72.16 - 69	25.158	2390.2	42.862
28	69 - 68.75	25.279	2400.9	42.886
29	68.75 - 63.75	27.325	2617	43.562
30	63.75 - 58.75	29.419	2836.3	44.215
31	58.75 - 58.5	29.539	2847.3	44.238
32	58.5 - 58.25	29.656	2858.4	44.271
33	58.25 - 58	29.773	2869.5	44.304
34	58 - 57.75	29.873	2880.5	44.334
35	57.75 - 57.33	30.039	2899.2	44.387
36	57.33 - 57.08	30.144	2910.3	44.415
37	57.08 - 56.75	30.276	2924.9	44.456
38	56.75 - 56.5	30.387	2936	44.486
39	56.5 - 51.5	32.5	3159.9	45.1
40	51.5 - 47.8178	34.2	3327.2	45.6
41	47.8178 - 41.0418	39.5	3639.8	46.6
42	41.0418 - 36.0418	41.9	3874.3	47.2
43	36.0418 - 31.25	44.3	4101.6	47.7
44	31.25 - 31	44.4	4113.5	47.7
45	31 - 30.75	44.5	4125.5	47.7
46	30.75 - 27.83	46.0	4265.4	48.1
47	27.83 - 27.58	46.2	4277.4	48.1
48	27.58 - 27.25	46.3	4293.2	48.1
49	27.25 - 27	46.5	4305.3	48.1
50	27 - 22	48.9	4547.1	48.6
51	22 - 17	51.4	4791.3	49.1
52	17 - 12	53.9	5037.6	49.5
53	12 - 7	56.4	5285.9	49.9
54	7 - 2	59.0	5536.3	50.3
55	2 - 0	60.1	5637.0	50.4

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
144.5 - 139.5	Pole	TP22.092x21x0.1875	Pole	14.6%	Pass
139.5 - 134.5	Pole	TP23.184x22.092x0.1875	Pole	29.7%	Pass
134.5 - 129.5	Pole	TP24.276x23.184x0.1875	Pole	48.2%	Pass
129.5 - 124.5	Pole	TP25.368x24.276x0.1875	Pole	66.2%	Pass
124.5 - 121.41	Pole	TP26.882x25.368x0.1875	Pole	78.9%	Pass
121.41 - 116.41	Pole	TP26.737x25.668x0.25	Pole	68.6%	Pass
116.41 - 112.58	Pole	TP27.555x26.737x0.25	Pole	77.9%	Pass
112.58 - 112.33	Pole + Reinf.	TP27.609x27.555x0.425	Reinf. 7 Tension Rupture	79.7%	Pass
112.33 - 107.33	Pole + Reinf.	TP28.677x27.609x0.4188	Reinf. 7 Tension Rupture	93.7%	Pass
107.33 - 106	Pole + Reinf.	TP28.962x28.677x0.4188	Reinf. 7 Tension Rupture	97.2%	Pass
106 - 105.75	Pole + Reinf.	TP29.015x28.962x0.5313	Reinf. 10 Tension Rupture	81.2%	Pass
105.75 - 103.5	Pole + Reinf.	TP29.496x29.015x0.525	Reinf. 10 Tension Rupture	86.1%	Pass
103.5 - 103.25	Pole + Reinf.	TP29.549x29.496x0.7	Reinf. 10 Tension Rupture	66.2%	Pass
103.25 - 100.92	Pole + Reinf.	TP30.047x29.549x0.6875	Reinf. 10 Tension Rupture	70.1%	Pass
100.92 - 100.67	Pole + Reinf.	TP30.101x30.047x0.5188	Reinf. 10 Tension Rupture	92.1%	Pass
100.67 - 98.5	Pole + Reinf.	TP30.564x30.101x0.5125	Reinf. 10 Tension Rupture	96.8%	Pass
98.5 - 98.25	Pole + Reinf.	TP30.618x30.564x0.675	Reinf. 10 Tension Rupture	74.8%	Pass
98.25 - 98	Pole + Reinf.	TP30.671x30.618x0.675	Reinf. 10 Tension Rupture	75.2%	Pass
98 - 97.75	Pole + Reinf.	TP30.725x30.671x0.575	Reinf. 1 Tension Rupture	85.6%	Pass
97.75 - 92.75	Pole + Reinf.	TP31.793x30.725x0.5563	Reinf. 1 Tension Rupture	94.7%	Pass
92.75 - 91.74	Pole + Reinf.	TP32.997x31.793x0.55	Reinf. 1 Tension Rupture	96.4%	Pass
91.74 - 86.12	Pole	TP32.72x31.509x0.375	Pole	89.1%	Pass
86.12 - 81.12	Pole	TP33.798x32.72x0.375	Pole	93.6%	Pass
81.12 - 77.41	Pole	TP34.596x33.798x0.375	Pole	96.6%	Pass
77.41 - 77.16	Pole + Reinf.	TP34.65x34.596x0.6375	Reinf. 5 Tension Rupture	91.2%	Pass
77.16 - 72.16	Pole + Reinf.	TP35.727x34.65x0.625	Reinf. 5 Tension Rupture	95.7%	Pass
72.16 - 69	Pole + Reinf.	TP36.408x35.727x0.625	Reinf. 5 Tension Rupture	98.4%	Pass
69 - 68.75	Pole + Reinf.	TP36.462x36.408x0.8	Reinf. 12 Tension Rupture	78.2%	Pass
68.75 - 63.75	Pole + Reinf.	TP37.539x36.462x0.7875	Reinf. 12 Tension Rupture	81.6%	Pass
63.75 - 58.75	Pole + Reinf.	TP38.616x37.539x0.775	Reinf. 12 Tension Rupture	84.8%	Pass
58.75 - 58.5	Pole + Reinf.	TP38.67x38.616x0.775	Reinf. 12 Tension Rupture	84.9%	Pass
58.5 - 58.25	Pole + Reinf.	TP38.724x38.67x0.775	Reinf. 12 Tension Rupture	85.7%	Pass
58.25 - 58	Pole + Reinf.	TP38.778x38.724x0.775	Reinf. 12 Tension Rupture	85.9%	Pass
58 - 57.75	Pole + Reinf.	TP38.832x38.778x0.6125	Reinf. 5 Tension Rupture	97.2%	Pass
57.75 - 57.33	Pole + Reinf.	TP38.922x38.832x0.6125	Reinf. 5 Tension Rupture	97.4%	Pass
57.33 - 57.08	Pole + Reinf.	TP38.976x38.922x0.6125	Reinf. 3 Tension Rupture	97.6%	Pass
57.08 - 56.75	Pole + Reinf.	TP39.047x38.976x0.6125	Reinf. 3 Tension Rupture	97.8%	Pass
56.75 - 56.5	Pole + Reinf.	TP39.101x39.047x0.7375	Reinf. 3 Tension Rupture	88.8%	Pass
56.5 - 51.5	Pole + Reinf.	TP40.178x39.101x0.725	Reinf. 3 Tension Rupture	91.6%	Pass
51.5 - 47.82	Pole + Reinf.	TP42.216x40.178x0.7125	Reinf. 3 Tension Rupture	93.5%	Pass
47.82 - 41.04	Pole + Reinf.	TP41.678x40.221x0.7875	Reinf. 3 Tension Rupture	91.2%	Pass
41.04 - 36.04	Pole + Reinf.	TP42.753x41.678x0.7875	Reinf. 3 Tension Rupture	93.2%	Pass
36.04 - 31.25	Pole + Reinf.	TP43.783x42.753x0.7625	Reinf. 3 Tension Rupture	94.9%	Pass
31.25 - 31	Pole + Reinf.	TP43.836x43.783x0.9375	Reinf. 11 Tension Rupture	79.1%	Pass
31 - 30.75	Pole + Reinf.	TP43.89x43.836x0.7125	Reinf. 2 Compression	88.3%	Pass
30.75 - 27.83	Pole + Reinf.	TP44.518x43.89x0.7125	Reinf. 2 Compression	89.2%	Pass
27.83 - 27.58	Pole + Reinf.	TP44.571x44.518x0.65	Reinf. 2 Compression	90.9%	Pass
27.58 - 27.25	Pole + Reinf.	TP44.642x44.571x0.65	Reinf. 2 Compression	91.0%	Pass
27.25 - 27	Pole + Reinf.	TP44.696x44.642x0.725	Reinf. 2 Compression	92.8%	Pass
27 - 22	Pole + Reinf.	TP45.771x44.696x0.7125	Reinf. 2 Compression	94.2%	Pass
22 - 17	Pole + Reinf.	TP46.846x45.771x0.7125	Reinf. 2 Compression	95.5%	Pass
17 - 12	Pole + Reinf.	TP47.921x46.846x0.7125	Reinf. 2 Compression	96.8%	Pass
12 - 7	Pole + Reinf.	TP48.995x47.921x0.7125	Reinf. 2 Compression	97.9%	Pass
7 - 2	Pole + Reinf.	TP50.07x48.995x0.7	Reinf. 2 Compression	98.9%	Pass
2 - 0	Pole + Reinf.	TP50.5x50.07x0.7	Reinf. 2 Compression	99.3%	Pass
				Summary	
			Pole	96.6%	Pass
			Reinforcement	99.3%	Pass
			Overall	99.3%	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	R9	R10	R11	R12
144.5 - 139.5	790	n/a	790	13.04	n/a	13.04	14.6%												
139.5 - 134.5	914	n/a	914	13.69	n/a	13.69	29.7%												
134.5 - 129.5	1051	n/a	1051	14.34	n/a	14.34	48.2%												
129.5 - 124.5	1200	n/a	1200	14.99	n/a	14.99	66.2%												
124.5 - 121.41	1299	n/a	1299	15.39	n/a	15.39	78.9%												
121.41 - 116.41	1862	n/a	1862	21.02	n/a	21.02	68.6%												
116.41 - 112.58	2040	n/a	2040	21.67	n/a	21.67	77.9%												
112.58 - 112.33	2052	1393	3445	21.71	13.50	35.21	46.2%							79.7%					
112.33 - 107.33	2302	1498	3800	22.56	13.50	36.06	55.0%							93.7%					
107.33 - 106	2372	1527	3899	22.78	13.50	36.28	57.2%							97.2%					
106 - 105.75	2385	2535	4920	22.82	22.50	45.32	45.9%							77.9%			81.2%		
105.75 - 103.5	2507	2617	5124	23.21	22.50	45.71	49.0%							82.7%			86.1%		
103.5 - 103.25	2521	4213	6733	23.25	36.00	59.25	37.7%						63.6%	63.6%			66.2%		
103.25 - 100.92	2651	4350	7002	23.64	36.00	59.64	40.1%						67.3%	67.3%			70.1%		
100.92 - 100.67	2666	2721	5387	23.69	22.50	46.19	52.7%						88.4%				92.1%		
100.67 - 98.5	2792	2803	5594	24.05	22.50	46.55	55.7%						92.9%				96.8%		
98.5 - 98.25	2807	4511	7318	24.10	36.00	60.10	43.1%	71.8%					71.8%				74.8%		
98.25 - 98	2821	4526	7348	24.14	36.00	60.14	43.4%	72.2%					72.2%				75.2%		
98 - 97.75	2836	3421	6257	24.18	27.00	51.18	51.4%	85.6%					85.6%						
97.75 - 92.75	3145	3653	6799	25.03	27.00	52.03	57.6%	94.7%					94.7%						
92.75 - 91.74	3210	3701	6911	25.20	27.00	52.20	58.8%	96.4%					96.4%						
91.74 - 86.12	5087	n/a	5087	38.50	n/a	38.50	89.1%												
86.12 - 81.12	5612	n/a	5612	39.78	n/a	39.78	93.6%												
81.12 - 77.41	6024	n/a	6024	40.73	n/a	40.73	96.6%												
77.41 - 77.16	6053	3971	10024	40.79	24.38	65.17	57.6%					91.2%							
77.16 - 72.16	6642	4211	10852	42.08	24.38	66.45	60.6%					95.7%							
72.16 - 69	7033	4365	11398	42.89	24.38	67.26	62.3%					98.4%							
69 - 68.75	7064	7563	14627	42.95	42.38	85.33	48.8%					77.1%							78.2%
68.75 - 63.75	7716	7998	15714	44.23	42.38	86.61	51.0%					80.5%							81.6%
63.75 - 58.75	8407	8446	16852	45.51	42.38	87.89	53.3%					83.6%							84.8%
58.75 - 58.5	8442	8469	16911	45.58	42.38	87.95	53.4%					83.8%							84.9%
58.5 - 58.25	8484	8661	17145	45.64	53.00	98.64	54.0%					77.3%				58.2%			85.7%
58.25 - 58	8520	8684	17204	45.71	53.00	98.71	54.1%					77.4%				58.3%			85.9%
58 - 57.75	8571	5226	13797	45.77	35.00	80.77	69.6%					97.2%				69.1%			
57.75 - 57.33	8631	5249	13881	45.88	35.00	80.88	69.8%					97.4%				69.3%			
57.33 - 57.08	8667	5263	13931	45.94	35.00	80.94	70.0%			97.6%	97.6%					69.4%			
57.08 - 56.75	8715	5281	13997	46.03	35.00	81.03	70.1%			97.8%	97.8%					69.6%			
56.75 - 56.5	8809	7891	16700	46.09	43.13	89.22	60.3%			88.8%	88.1%					69.8%		79.4%	
56.5 - 51.5	9562	8314	17876	47.37	43.13	90.50	62.7%			91.6%	90.9%					72.2%		82.1%	
51.5 - 47.82	10144	8633	18776	48.32	43.13	91.44	64.4%			93.5%	92.8%					73.9%		84.0%	
47.82 - 41.04	12369	9355	21724	57.27	43.13	100.39	60.6%			91.2%	90.7%					73.5%		83.0%	
41.04 - 36.04	13359	9826	23185	58.76	43.13	101.88	62.0%			93.2%	92.6%					75.3%		85.0%	
36.04 - 31.25	14356	10288	24645	60.19	43.13	103.31	63.2%			94.9%	94.3%					76.9%		86.7%	
31.25 - 31	14355	15528	29883	60.26	58.75	119.01	51.2%		78.4%	75.5%						74.0%		79.1%	
31 - 30.75	14522	8779	23301	60.34	48.13	108.46	67.7%		88.3%	86.4%								80.1%	
30.75 - 27.83	15159	9023	24181	61.21	48.13	109.33	68.5%		89.2%	87.3%								81.1%	
27.83 - 27.58	15504	6979	22483	61.28	40.00	101.28	78.3%		90.9%									89.0%	
27.58 - 27.25	15578	7001	22579	61.38	40.00	101.38	78.4%		91.0%									89.1%	
27.25 - 27	15256	9465	24721	61.46	40.00	101.46	66.4%		92.8%						89.8%				
27 - 22	16393	9909	26302	62.95	40.00	102.95	67.9%		94.2%						91.3%				
22 - 17	17556	10786	28342	64.44	40.00	104.44	68.3%		95.5%						92.7%				
17 - 12	18803	11269	30072	65.93	40.00	105.93	69.6%		96.8%						94.0%				
12 - 7	20108	11763	31871	67.43	40.00	107.43	70.9%		97.9%						95.2%				
7 - 2	21472	12268	33740	68.92	40.00	108.92	72.1%		98.9%						96.3%				
2 - 0	22035	12472	34507	69.52	40.00	109.52	72.6%		99.3%						96.7%				

Note: Section capacity checked in 5 degree increments.

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

Site Information	
ID:	881533
Name:	GROTON TOWER
App. #:	374247; Rev.8

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	5637	ft-kip
Axial:	60	kip
Shear:	50	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	16	
Diameter:	2.25	in
Material:	A615 GR 75	
Bolt Circle:	59.0	in
Bolt Spacing:		in
Bolt Group Area:	63.62	in^2
Bolt Group MOIx:	27698	in^4

Reactions Seen by Original AR Group		
Moment:	4407.9	kip-ft
Axial:	60.1	kip
Shear:	50.4	kip

Original AR Capacity Check		
Combined Load:	230.4	kip
Allowable load:	259.8	kip
AR Capacity:	88.7%	Pass

First Added Anchor Rod Data		
Quantity:	7	
Diameter:	1.75	in
Material:	F1554 GR 105	
Bolt Circle:	62.6	in
Bolt Group Area:	16.84	in^2
Bolt Group MOIx:	7725	in^4

Reactions Seen by First Added AR Group		
Moment:	1229.4	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Combined Load:	143.6	kip
Allowable load:	189.9	kip
AR Capacity:	75.6%	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#:	*881533*
Site Name:	*GROTON TOWER*
App #:	*374247; Rev.8*
Pole Manufacturer:	*Other*

Reactions		
Mu:	4333	ft-kips
Axial, Pu:	60.1	kips
Shear, Vu:	50.4	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59	in

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

Plate Data		
Diam:	65	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.02	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.375	in
Width:	6.75	in
Height:	17.75	in
Thick:	0.625	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	50.5	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	230.4 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	88.6% **Pass**	

Base Plate Results

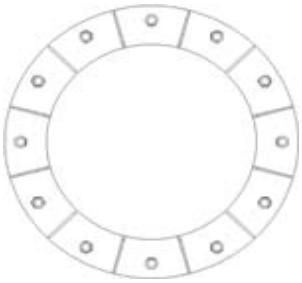
	Flexural Check	Stiffened
Base Plate Stress:	37.8 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	69.9% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	76.1% **Pass**
Vertical Weld:	49.9% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	33.2% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	86.2% **Pass**
Plate Comp. (AISC Bracket):	88.3% **Pass**

Pole Results

Pole Punching Shear Check:	14.1% **Pass**



* 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

Proj. Number	92739.008.01
Proj. Name	Groton Tower, CT
Code	Rev. G

Previously Added Anchor Rods

Diameter	1.75	in
Grade	F1554-105	
Quantity	7	
Bolt Circle	62.6	in

Existing Mfg Anchor Rods

Diameter	2.25	in
Quantity	16	
Bolt Circle	59	in

Summary Output

- Anchor Rod Bracket Checks

Tube Stress:	**76.2%**
Max. Weld Stress:	**54.1%**

Analysis Criteria

Load for Calcs?	**AR Capacity**	
Current Load	143.6	kips
Capacity	190	kips

Foundation Properties

Type	Pad	
Pad Thickness	5	ft
f'_c	4000	psi
Clear Cover	3	inch
Pad Width	30	ft
	10	
	18	
	3	
	60	

Tower Properties

Fy_{pole} =	65	ksi
Fu_{pole} =	80	ksi
Fy_{base} =	60	ksi
Fu_{base} =	75	ksi

Anchor Rod Bracket Properties

Gusset Properties

Thickness	1.25	inch
Pole to Tube CL	6	inch
Height	30	inch
Width at Tube	4	inch
Fy_{plate} =	65	ksi
Fu_{plate} =	80	ksi
Gap =	0	inch
Notch =	0.75	inch

Pipe /Tube Properties

Size	HSS4x4x1/2	
L_{pipe} =	27	inch
Length Above Gusset	3	inch
F_{ypipe} =	46	ksi
D_{pipe} =	4	inch
t_{pipe} =	0.5	inch
A_{pipe} =	6.02	$inch^2$
I_{pipe} =	11.9	$inch^4$
r_{pipe} =	1.41	inch

Weld Properties

F_{EXX} =	70	ksi	Weld Material Grade
Load Angle	45	degrees	

- Bracket to Tube Weld

Weld Type	Double Fillet		
Fillet Size	5		Vertical fillet weld size in sixteenths
N/A		inch	
$l_{weldpipe}$ =	24	inch	Length of Vertical Weld to Pipe

- Bracket to Pole Weld

Weld Type	Double Fillet		
D_{vpole} =	5		Vertical fillet weld size *in sixteenths*
H =	30	inch	Height of vertical weld from base plate

- Gusset to Base Plate Weld

Weld Type	Double Bevel+Fillet		
Bevel Depth	0.5625	inch	Bevel depth in inches
Fillet Size	9		Fillet weld size in sixteenths

Additional Variables

C_1 =	1.00	Electrode Strength Coefficient
k_{rt} =	0	Transverse Reinforcement Index :
ψ_t =	1	Rebar Location Factor :

PROJECT	**92739.008.01 - GROTON TOWER, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**08/28/17**	PAGE	1	OF	1

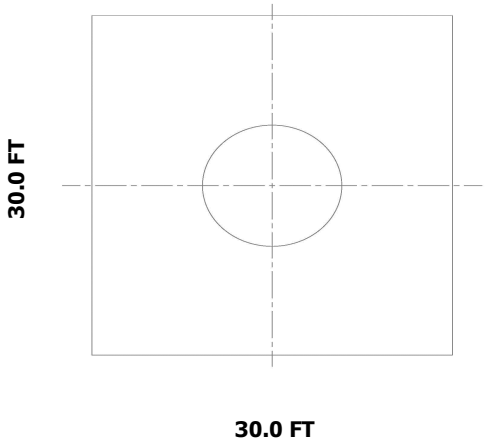
B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

Rev. Type: G

Design Loads:

	Input factored loads	
Shear:	50.0	kips
Moment:	5,637.0	ft-kips
Tower Height:	144.5	ft
Tower Weight:	60.0	kips



Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	50.50	in
Bearing Depth:	5.0	ft
Pad Width:	30.0	ft
Neglected Depth:	3.3	ft
Thickness:	5.0	ft
Pier Diameter:	0.0	ft
Pier Height Above Grade:	0.0	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pad Rebar Size:	8	
Pad Rebar Quanity:	44	
Rebar Yield Strength:	60000	psi
Concrete Strength:	4000	psi
Concrete Unit Weight:	0.15	kcf

Soil Data:

	Allowable Values	
Soil Unit Weight:	0.120	kcf
Ult. Bearing Capacity:	24.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.200	

** Notes:

Summary of Results

Overturning	61.1%
Shear Capacity	45.4%
Bearing	11.4%
Pad Shear - 1-way	28.2%
Pad Moment Capacity	39.9%

APPENDIX D

TOWER MODIFICATION DRAWINGS

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: GROTON TOWER
BU NUMBER: 881533

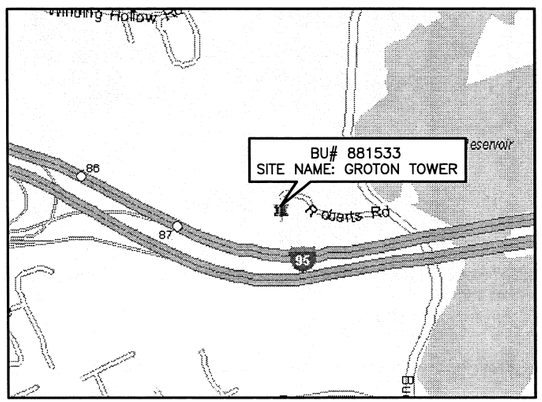
SITE ADDRESS:
75 ROBERTS ROAD
GROTON, CT 06340
NEW LONDON COUNTY, USA

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER
   DAN VADNEY
   (518) 373-3510
   DAN.VADNEY@CROWNCASTLE.COM

2. CROWN CONSTRUCTION MANAGER
   JASON D'AMICO
   (860) 209-0104
   JASON.D'AMICO@CROWNCASTLE.COM

3. B+T GROUP RFI CONTACT
   ROBERT M. FRAZIER, P.E.
   (918) 587-4630
   RFRAZIER@BTGRP.COM
   MODDWGS@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119



MAP

DIRECTIONS

95 N TO 117 S TO BUDDINGTON RD. RIGHT ON BUDDINGTON TO ROBERTS RD. LEFT ON ROBERTS RD TO TOP OF HILL. *NOTE* ZAKJAK PLOWS SITE

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM B+T GROUP TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT B+T GROUP AT MODDWGS@BTGRP.COM.

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	EEI / GS52968
TOWER HEIGHT / TYPE:	144.5' MONOPOLE
TOWER LOCATION:	LAT. 41° 21' 36.8"
DATUM: (NAD 1983)	LONG. -72° 2' 55.1"
	ELEV. 125 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 1445738
STRUCTURAL ANALYSIS REPORT:	PAUL J. FORD / WO. # 1413851
STRUCTURAL ANALYSIS DATE:	06/08/17
APPLICATION ID / REVISION #:	374247 / 8
CCISITES DOCUMENT ID:	6912290

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN HAS BEEN PERFORMED IN ACCORDANCE WITH THE 2016 CONNECTICUT STATE BUILDING CODE BASED UPON AN ULTIMATE 3-SECOND GUST WIND SPEED OF 135 MPH CONVERTED TO A NOMINAL 3-SECOND GUST WIND SPEED OF 105 MPH PER SECTION 1609.3 AND APPENDIX N AS REQUIRED FOR USE IN THE TIA-222-G STANDARD PER EXCEPTION #5 OF SECTION 1609.1.1. EXPOSURE CATEGORY C AND RISK CATEGORY II WERE USED IN THIS REINFORCEMENT DESIGN.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES
S4	NG2 BOLT NOTES AND DETAILS
S5	FORGBOLT NOTES AND DETAILS
S6	AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S7	TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAGRAM
S8	TOWER SECTIONS (24.5'–59.5' AND 56'–71')

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800–788–7011.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

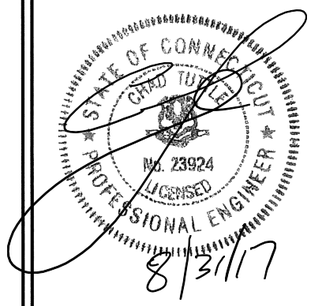
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER: S1

REVISION: 0

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
PRE-CONSTRUCTION		
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE–MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON–STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG–STD–10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON–DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG–SOW–10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
CONSTRUCTION (PERFORMED BY CONTRACTOR)		
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG–PRC–10012 FOR INCLUSION IN THE MI REPORT.
N/A	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG–SOW–10066, ENG–STD–10069 AND SRV–STD–10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB–GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON–SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG–BUL–10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS–BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
POST-CONSTRUCTION		
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL–OUT TESTING	POST–INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG–PRC–10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		
NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT		

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG–BUL–10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG–SOW–10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON–SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN–FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON–SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG–SOW–10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON–SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE–TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON–SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON–SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE–ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS–BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG–SOW–10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE–CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG–SOW–10007.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

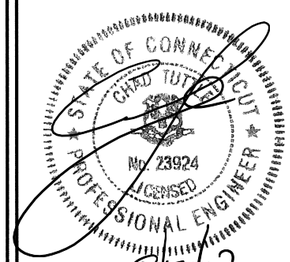
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE

MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER:	REVISION:
S2	0

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA-222-G STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES IN ACCORDANCE WITH ENG-BUL-10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.
1.6 ALL CONSTRUCTION MEANS AND METHODS: INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
1.7 ALL THE PARTS STARTING WITH "CCI-" DESIGNATION - REFER TO "CROWN CASTLE APPROVED REINFORCEMENT COMPONENTS CATALOGUE EDITION 1" FOR PART DETAILS.
1.8 BLIND BOLTS ARE TO BE 20MM DIAMETER WITH CORRESPONDING 29MM DIAMETER SLEEVE WITH SPECIFIED STEEL GRADE.
1.9 ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION PER ASTM A153 / A153M OR A123, AS APPLICABLE. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED IN ACCORDANCE WITH ENG-BUL-10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.10 ALL SHIMS SHALL BE ASTM A36.
1.11 HOLES FOR BOLTS AND SHEAR SLEEVES ARE 30MM, U.N.O.
1.12 SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
1.13 IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
1.14 THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
1.15 WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
1.16 ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

FIELD NDE MINIMUM REQUIREMENTS

3.1 ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
3.2 FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
3.3 FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".
3.4 FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: TOWER BASE PLATE NDE, AND ENG-BUL-10051: NDE REQUIREMENTS FOR MONOPOLE TO PREVENT CONNECTION FAILURE. NOTIFY THE E.O.R. AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
3.5 ALL TESTING LIMITATIONS SHALL BE NOTED IN THE NDE REPORT.

KEY NOTES

(#) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

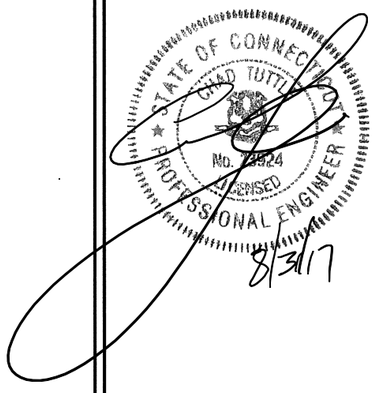
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE

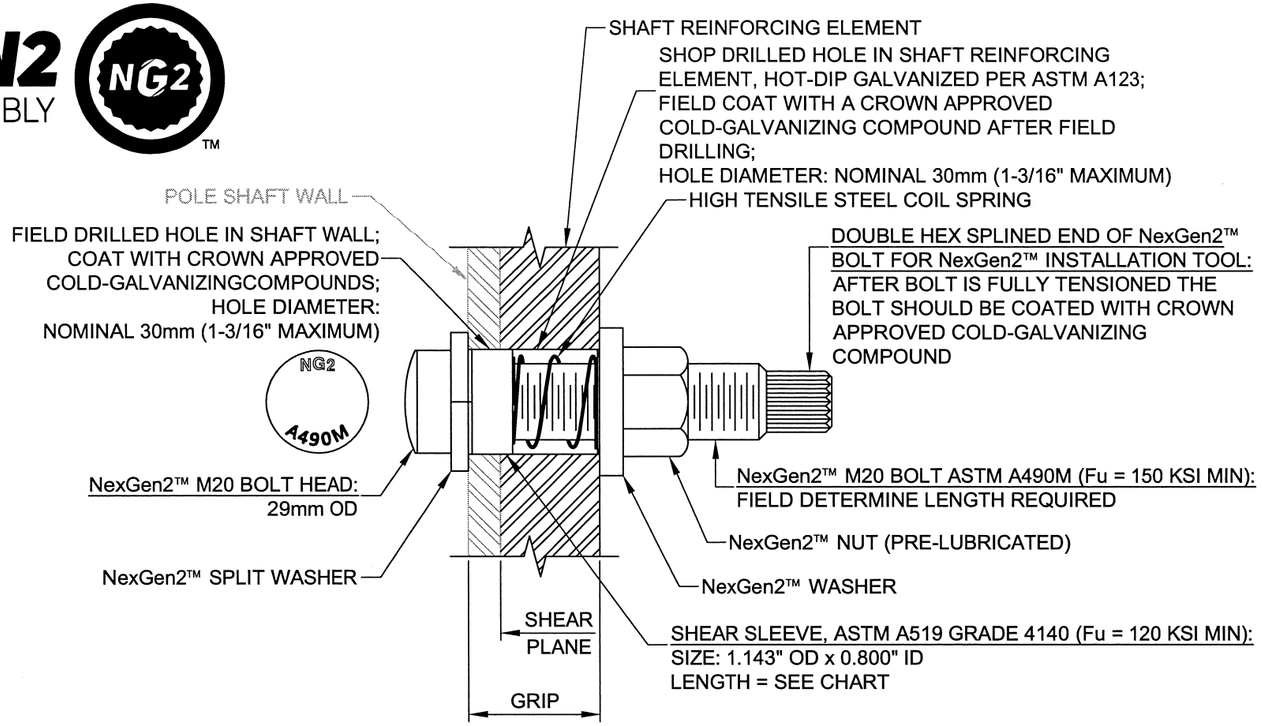
GENERAL NOTES

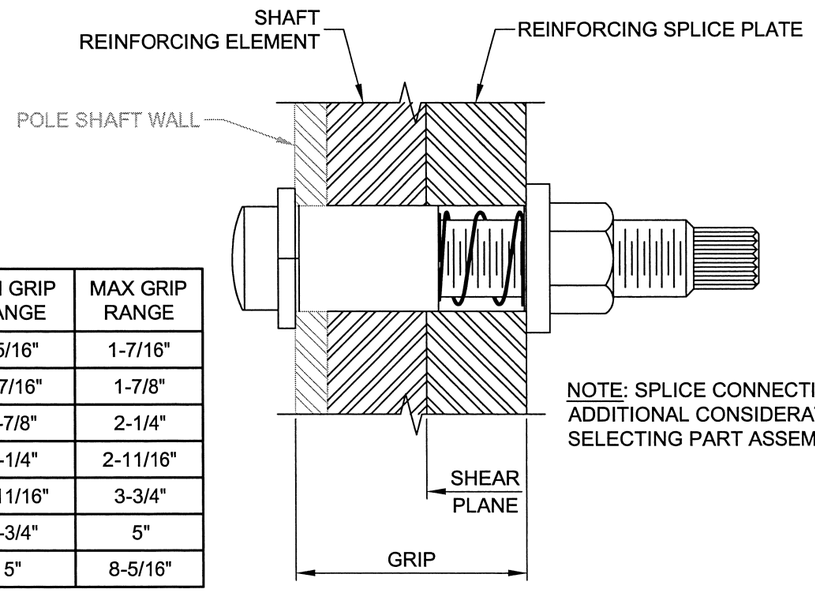
SHEET NUMBER: S3

REVISION: 0

INTERIOR OF POLE SHAFT	EXTERIOR OF POLE SHAFT

NEXGEN2
BLIND BOLT ASSEMBLY
- PATENT PENDING -





NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTES:

1. ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
2. NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.
3. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER:

ALLFASTENERS
959 LAKE ROAD
MEDINA, OHIO, USA 44256
PHONE: 440-232-6060
WEBSITES: WWW.ALLFASTENERS.COM WWW.AFTOWER.COM

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

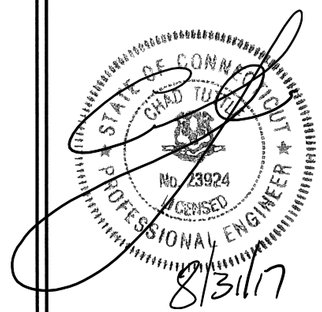
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

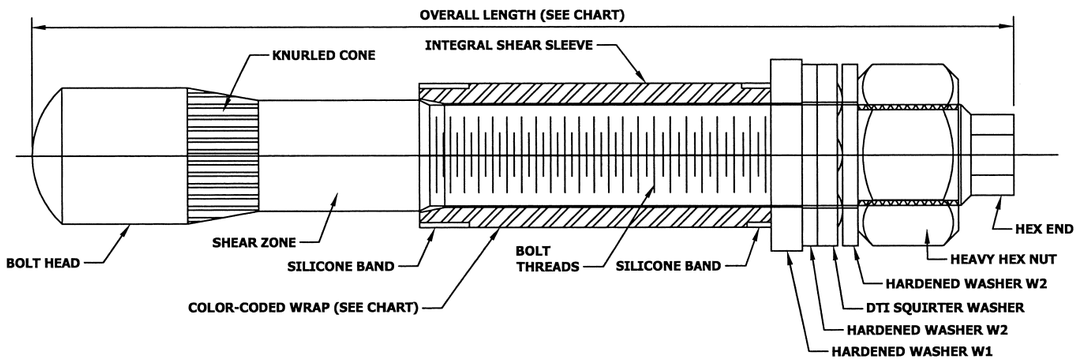
75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

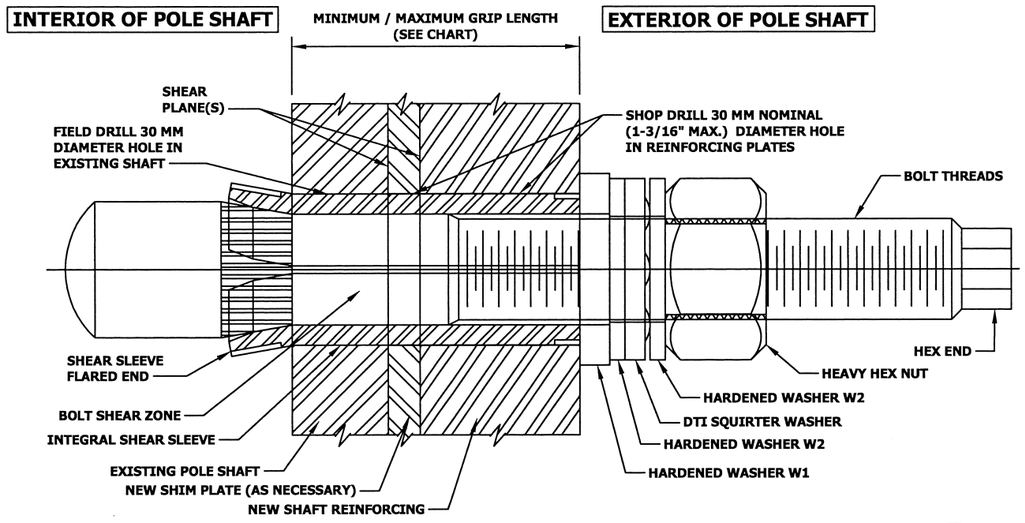
SHEET TITLE
NG2 BOLT NOTES AND DETAILS

SHEET NUMBER:	REVISION:
S4	0

NOTES:
1. **ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**
2. **ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2

BOLT HOLE NOTES:

1. **ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".**
2. **ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.**

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: **888-926-4857**
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

CONTAINS PROPRIETARY INFORMATION
PATENT PENDING

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	**135**	5.31	1.3	3/8" to 1"	--	**RED**
2	**160**	6.30	1.6	3/4" to 1-1/2"	--	**GREEN**
3	**195**	7.68	1.9	1-1/4" to 2-1/4"	--	**BLUE**
4	**260**	10.24	2.6	2" to 3-1/2"	Splice Bolt	**YELLOW**
5	**365**	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	**ORANGE**
6	**440**	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	**BLACK**
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORGBolt™ Installation

Follow all Manufacturer/Distributer Recommendations for Installation, Tightening, and Inspection.

1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

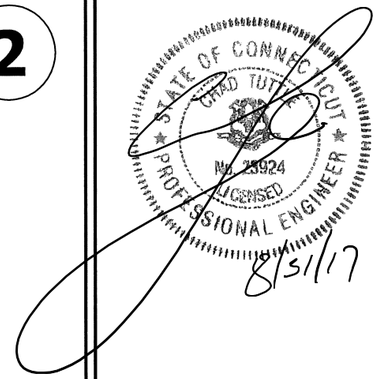
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE
FORGBOLT NOTES AND DETAILS

SHEET NUMBER: S5

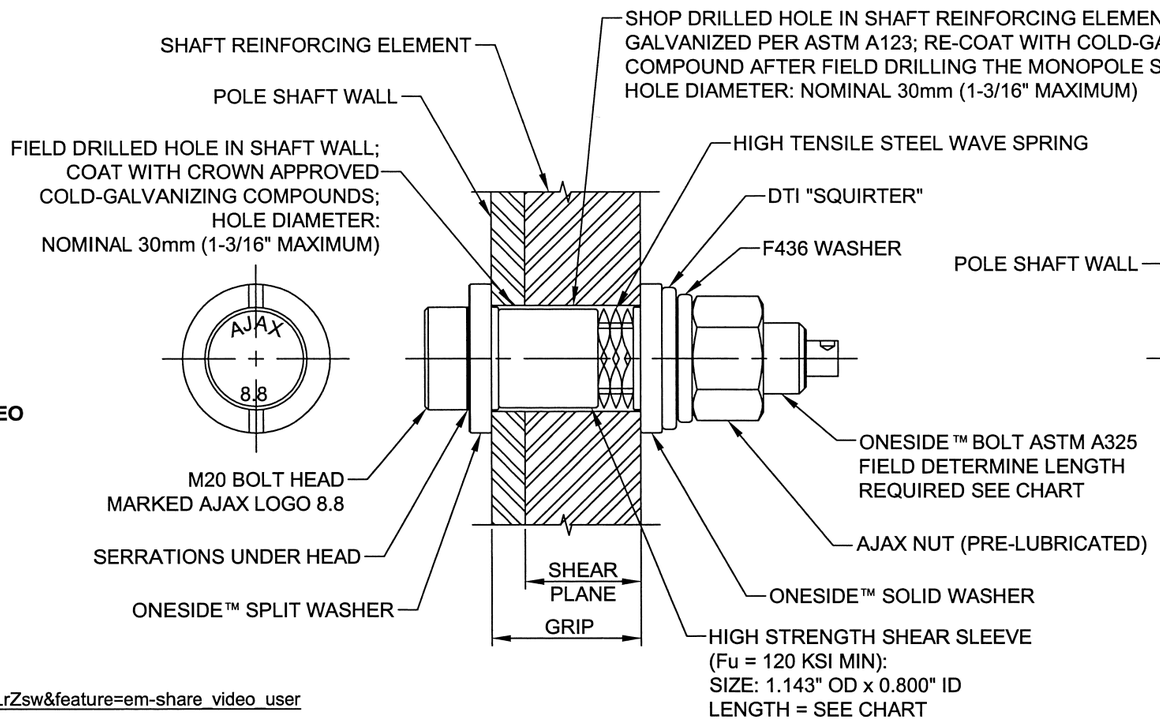
REVISION: 0

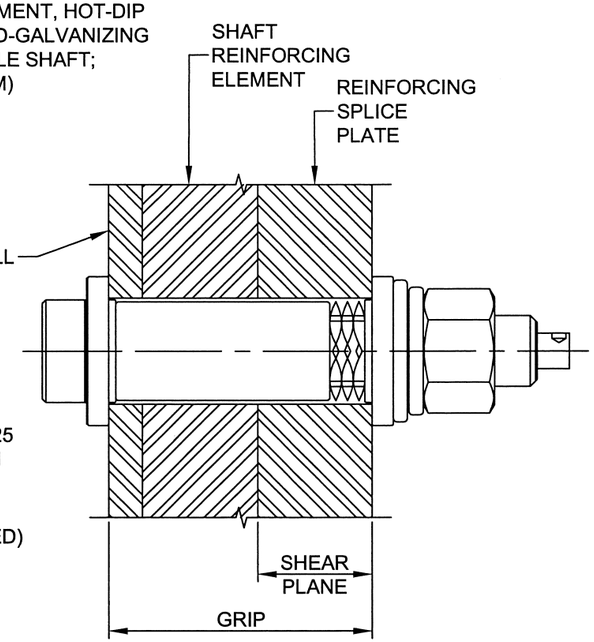
INTERIOR OF POLE SHAFT | EXTERIOR OF POLE SHAFT

AJAX FASTENERS

ONESIDE™

PATENT US 7,373,709B2





NOTE:
SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

MANUFACTURER INSTALLATION VIDEO

https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user

AJAX ONESIDE BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

MANUFACTURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

DISTRIBUTOR
IRA SVENSGAARD AND ASSOCIATES
PETER SVENDSGAARD - PETERS@IRASVENS.COM
JOHN KILLAM - JOHN@IRASVENS.COM
PHONE (530) 647-8225
FAX (530) 647-8229

BOLT ASSEMBLY AND INSTALLATION:
1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

INSPECTION:
1. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
2. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW*.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

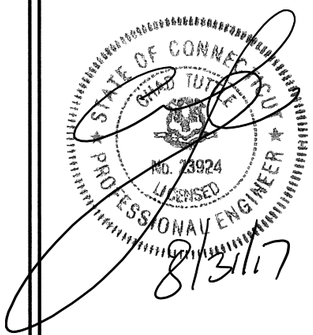
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

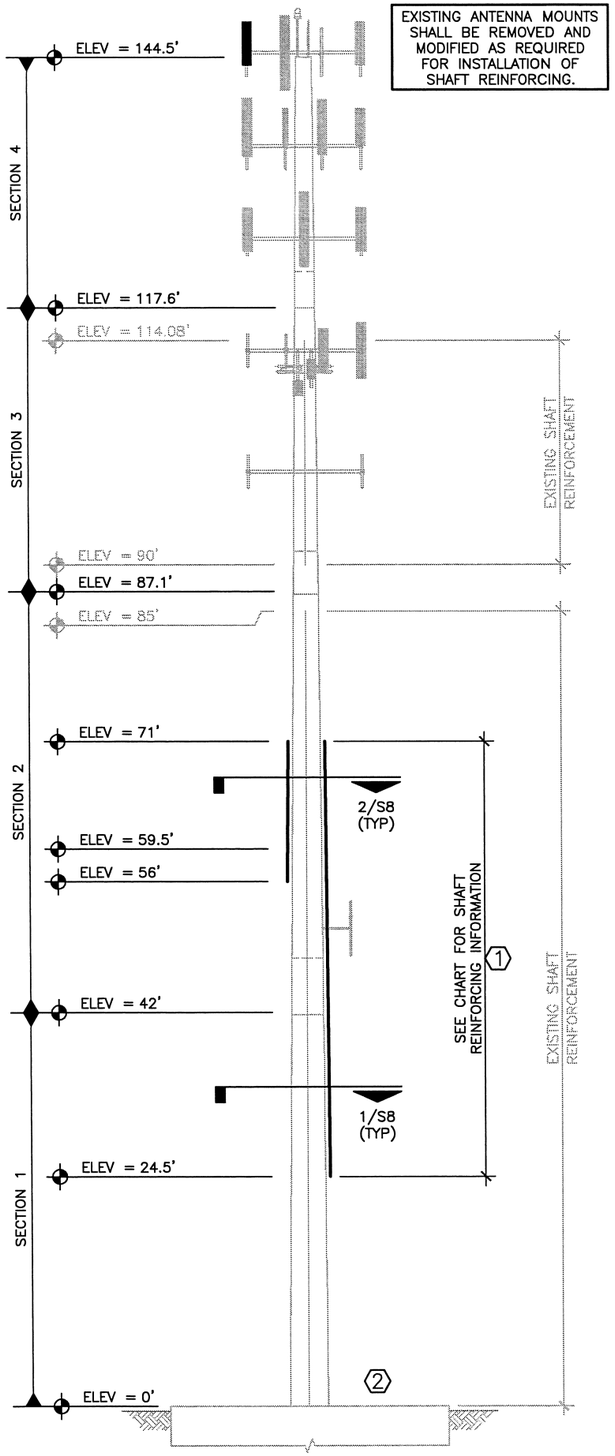
75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE
AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

SHEET NUMBER: S6

REVISION: 0



1 TOWER ELEVATION
SCALE: N.T.S.

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	FLAT #	BOLTS PER PLATE	TOTAL BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
24'–6"	59'–6"	CCI–SFP–06512535	35'–0"	1	13	40	40	11	11	19"	967	LBS.
56'–0"	71'–0"	CCI–SFP–06010015	15'–0"	3	6, 12 & 18	24	72	8	8	16"	918	LBS.
							112				1885	LBS.

ALL BOLTS SHALL BE PRE–APPROVED BLIND M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT E.O.R. APPROVAL.
2. FOR PLATES STARTING AT 6", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" +/– 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE RUN SHALL BEGIN AT THE PROPOSED ELEVATION +/– 3". FOR MULTIPLE PLATE SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE BOTTOM PLATE TO THE TOP OF THE TOP PLATE.

TOWER MODIFICATIONS:

1. INSTALL NEW REINFORCING ELEMENTS FROM 24.5' TO 71' RE: SHEET S8.
2. INSTALL SIGNAGE AT BASE OF TOWER NOTING OBSTRUCTION IN CLIMBING PATH.

* PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR FABRICATOR.

** THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S7.

*** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.

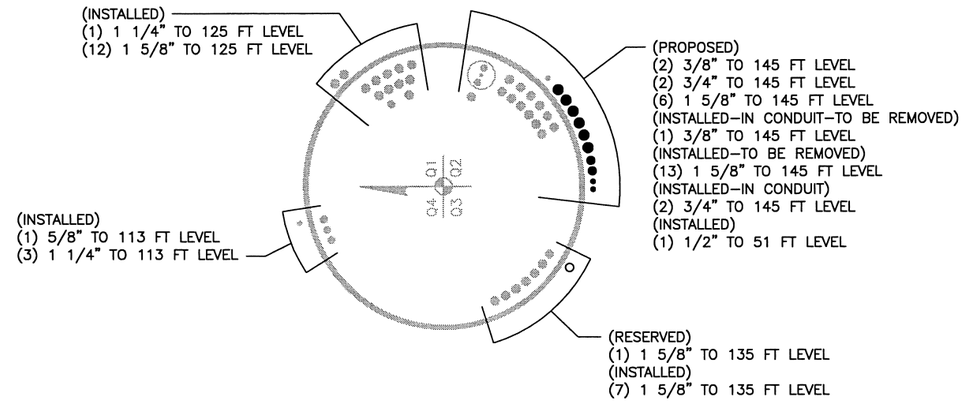
EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	ASTM STEEL GRADE	Fy (ksi)	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.438"	A572	65	50.500"	40.221"	69"
2	18	0.375"	A572	65	42.215"	31.509"	56"
3	18	0.250"	A572	65	32.997"	25.668"	46"
4	18	0.188"	A572	65	26.882"	21.000"	---

EXISTING BASE PLATE GRADE = 60 ksi (ASTM GRADE = A572)

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED

REFERENCE DRAWINGS BY:	DATE
WALKER ENGINEERING INCORPORATED	08/01/07
VERTICAL STRUCTURES, INC.	11/25/08
CROWN CASTLE	02/25/14
B+T GROUP	07/23/15
B+T GROUP	10/20/15
B+T GROUP	02/21/17



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

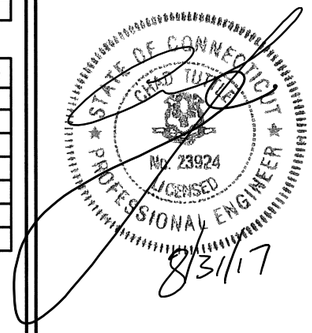
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

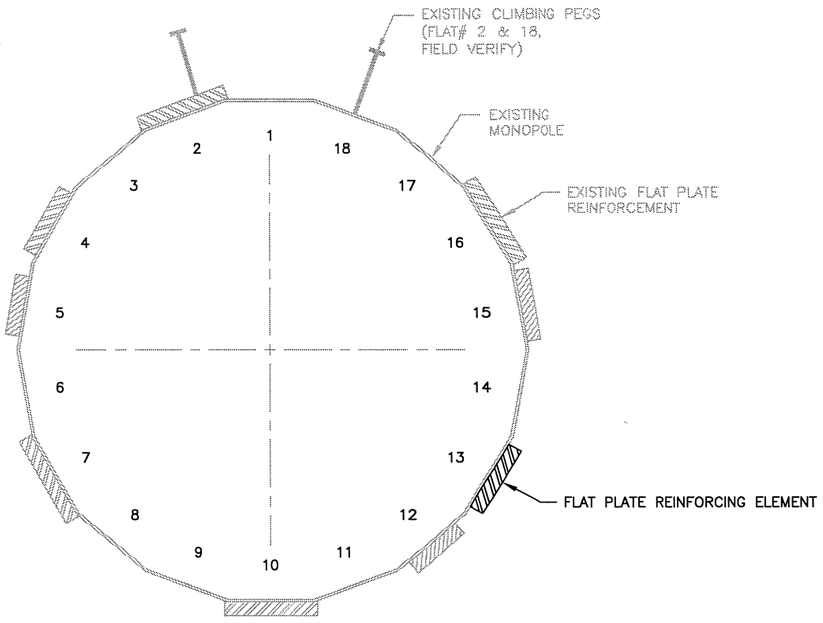
75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAGRAM

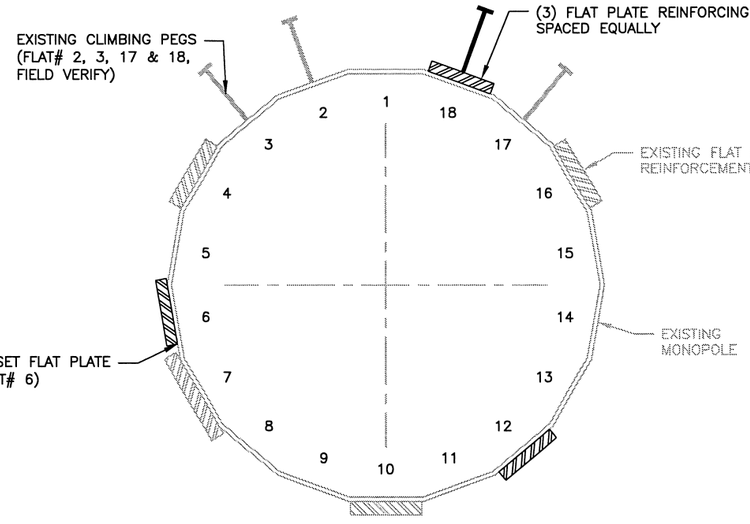
SHEET NUMBER: S7

REVISION: 0



1 TOWER SECTION (24.5'-59.5')
SCALE: N.T.S.

CONTRACTOR TO INCLUDE PROVISION FOR RELOCATION / REPLACEMENT OF EXISTING CLIMBING FACILITIES AS REQUIRED. REFERENCE CC APPROVED REINFORCEMENT COMPONENTS CATALOGUE FOR APPROVED OPTIONS.



2 TOWER SECTION (56'-71')
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

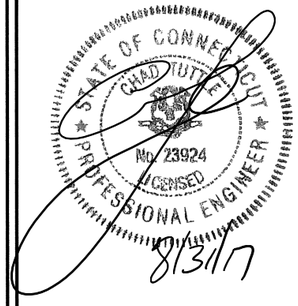
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	08/31/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	92739.008.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	SDP / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18



GROTON TOWER
881533

75 ROBERTS ROAD
GROTON, CT

EXISTING 144.5' MONOPOLE

SHEET TITLE
TOWER SECTIONS
(24.5'-59.5' AND 56'-71')

SHEET NUMBER: S8

REVISION: 0