COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

August 15, 2013

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

Re: Notice of Exempt Modification
Crown Castle/T-Mobile co-location
Site ID CT11494B
Route 322/Meridian Road, Wolcott

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Crown Castle ("Crown") owns the existing lattice telecommunications tower and related facility at Route 322/Meridian Road (a/k/a 341 East Street) Wolcott Connecticut (latitude 41.55950 / longitude -72.94690). T-Mobile intends to replace three antennas and related equipment at this existing telecommunications facility in Wolcott ("Wolcott Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor, Thomas G. Dunn. Crown is also the property owner.

The existing Wolcott Facility consists of a 180 foot tall lattice structure. T-Mobile plans to replace three antennas at a centerline of 188 feet. (See the plans dated August 5, 2013 attached hereto as Exhibit A). T-Mobile will also remove 3 TMAs (tower mounted amplifiers), install hybrid cable and reuse existing coax cables. The existing Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated July 17, 2013 and attached hereto as Exhibit B.

The planned modifications to the Wolcott Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's existing antennas are at a centerline of 188 feet; the replacement antennas will be installed at the same 188 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The installation of the T-Mobile replacement equipment in the existing compound, as reflected on the attached site plan, will not require an extension of the site boundaries. T-Mobile's proposed equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated August 13, 2013 T-Mobile's operations would add 0.279% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 31.319% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Wolcott Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Wolcott, Mayor Thomas G. Dunn
Crown Castle
Scott Chase, Northeast Site Solutions

T-MOBILE USA, INC.
12920 SE 38TH STREET
BELLEVUE, WA 98006
(425) 378-4000

2654095
8/8/2013
2000011160

Invoice Number	Inv. Date	Description	Deductions	Voucher	Amount Paid
CKKMB00338	8/7/2013	AD CT11494B FILLING FEE	0.00	1101450175	625.00

FILE COPY

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW.
COPYBAN CAPTURE ANTI-FRAUD PROTECTION

T-MOBILE USA, INC.
12920 SE 38th Street
Bellevue, WA 98006
(425) 378-4000

The Bank of New York Mellon
Pittsburgh, PA
60-160/433

2654095
8/8/2013
VID 2000011160

PAY $625 00 CTS CTS
SIX TWO FIVE

*$625.00

Six Hundred Twenty Five Dollars Only*******

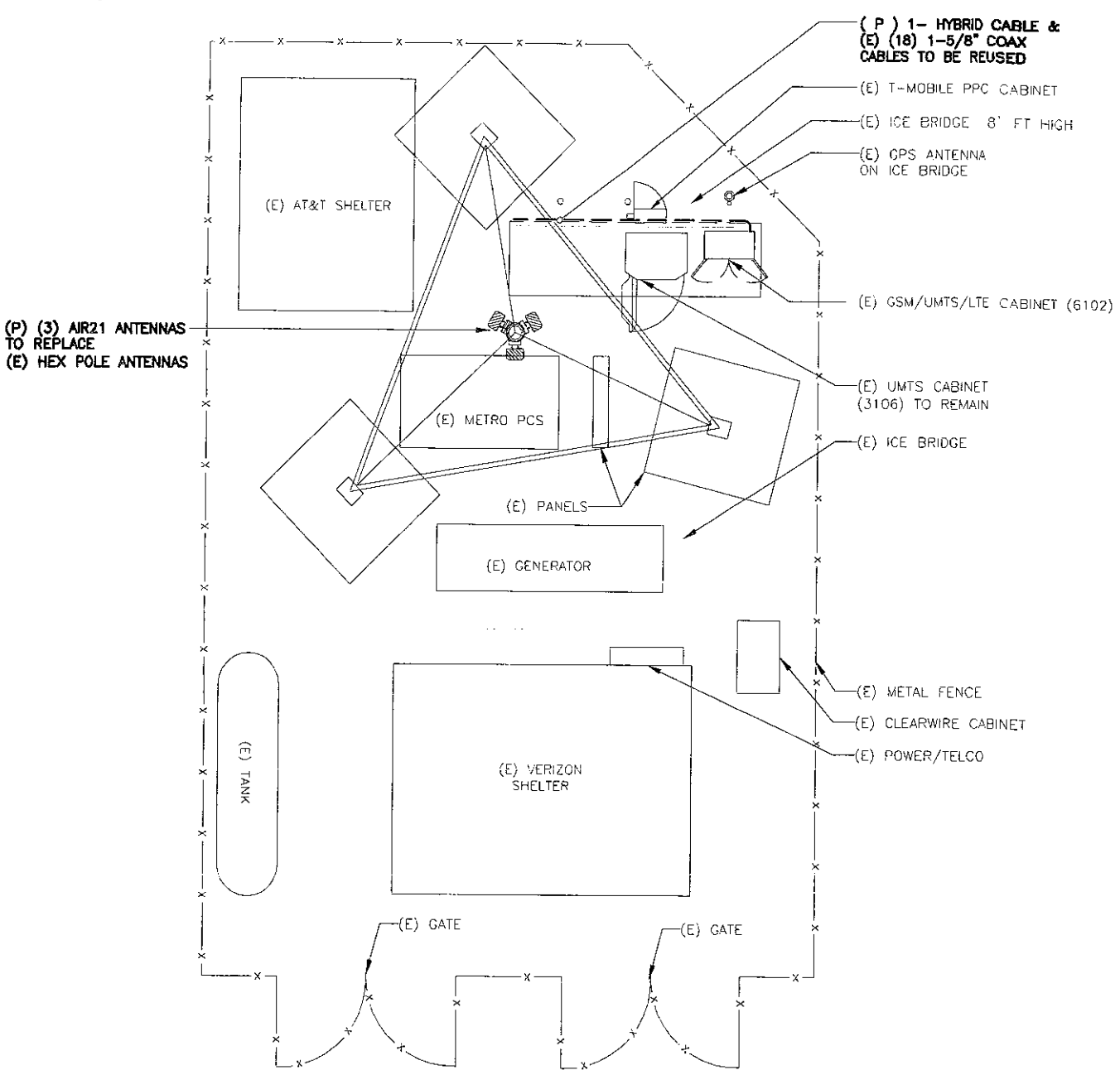
To The Order Of
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN, CT 06051

VOID AFTER 180 DAYS
THIS CHECK CLEARS THROUGH POSITIVE PAY

⑈000 2654095⑈ ⑆043301601⑆ 013⑈8430⑈

THE ORIGINAL DOCUMENT HAS A REFLECTIVE WATERMARK ON THE BACK. HOLD AT AN ANGLE TO VIEW. DO NOT CASH IF MISSING.

EXHIBIT A



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE / LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

ROOF PLAN

N.T.S

1 LE-1

1 LE-2

Configuration **1B**

SUBMITTALS	
LE REV A	08.05.13
LE REV 0	08.05.13

ATLANTIS GROUP
1340 Centre Street
Suite 203
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CT11494B

SITE NAME:
CT494/CCASTLE-WOLCOTT-SST

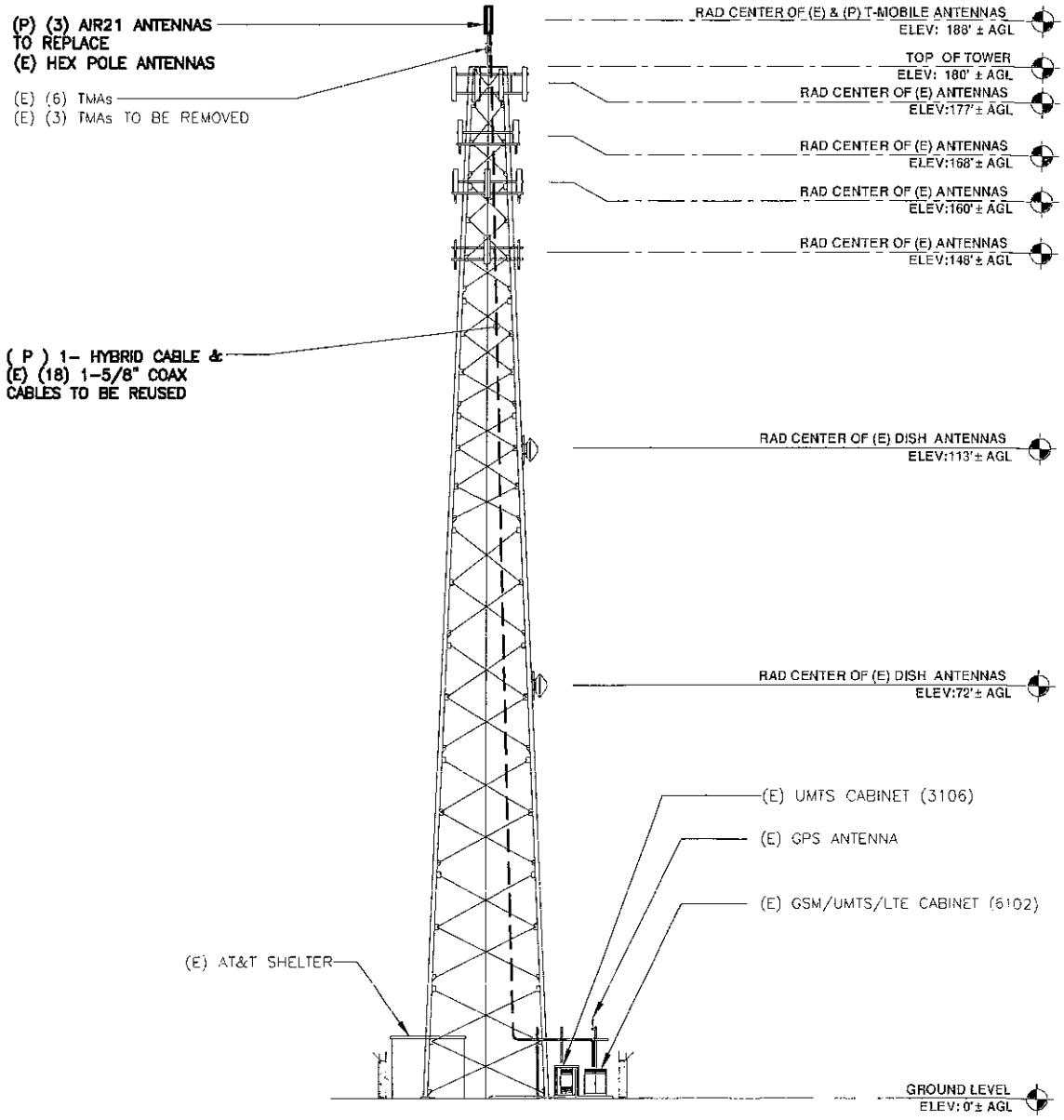
SITE ADDRESS:
RTE 322/ MERIDIAN RD
WOLCOTT, CT 06716

NORTHEAST TOWERS
199 BRICKYARD ROAD
FARMINGTON, CT 06032
OFFICE: (860) 677-1999

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: MB | CHECKED BY: SM



ELEVATION

N.T.S

1

LE-2

Configuration
1B

SUBMITTALS	
LE REV A	08.05.13
LE REV 0	08.05.13

ATLANTIS GROUP
1340 Centre Street
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DRAWN BY: MB | CHECKED BY: SM

EXHIBIT B

Date: **July 17, 2013**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11494B
	Carrier Site Name:	Crown, Wolcott, CT
Crown Castle Designation:	**Crown Castle BU Number:**	806362
	Crown Castle Site Name:	NHV 108 943133
	Crown Castle JDE Job Number:	239028
	Crown Castle Work Order Number:	630937
	Crown Castle Application Number:	193664 Rev. 1
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	1343271400

Site Data: **INTERSECTION OF RTE 322/MERIDIAN RDWOLCOTT SITE, WOLCOTT, New Haven County,CT**
Latitude *41° 33' 34.41"*, Longitude *-72° 56' 49.1"*
180 Foot - Self Support Tower

Dear Veronica Harris,

FDH Engineering, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 561972, in accordance with application 193664, revision 1.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 85 mph fastest mile.

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 *FDH Engineering, Inc.* 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.

Respectfully submitted by:

Will Hammond, EI
Project Engineer

Reviewed by:

Christopher M. Murphy, PE
President
CT PE License No. 25842

tnxTower Report - version 6.1.2.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN in September of 1986. The tower was originally designed for E.I.A. zone C with 1" radial ice. The tower has been modified per reinforcement drawings prepared by All-Points Technology Corp, P.C., in August of 2002. Reinforcement consists of addition of concrete cap to existing foundations.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

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
180.0	188.0	3	ericsson	AIR 21	1	1-5/8	-

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
180.0	188.0	3	andrew	TMZXXX-6516-R2M w/ Mount Pipe	-	-	3
	180.0	6	rfs celwave	ATMAA1412D-1A20	18	1-5/8	1
	180.0	1	crown mounts	Pipe Mount			
177.0	177.0	2	andrew	DB846F65ZAXY w/ Mount Pipe	12	1-5/8	1
		1	antel	BXA-185063/12CFx2 w/ Mount Pipe			
		3	antel	BXA-70063/6CFx4 w/ Mount Pipe			
		2	antel	LPA-80063/6CFx5 w/ Mount Pipe			
		1	crown mounts	Sector Mount [SM 502-3]			
		2	rfs celwave	APX18-206516L-CT0 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		2	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
168.0	168.0	3	argus technologies	LLPX310R w/ Mount Pipe	3 1	5/16 1/2	1
		1	crown mounts	Sector Mount [SM 411-3]			
		1	dragonwave	A-ANT-18G-2-C			
		3	samsung telecommunications	FDD_R6_RRH			

158.0	160.0	6	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD	12 2 1	1-1/4 3/4 3/8	1
		2	andrew	SBNH-1D6565C w/ Mount Pipe			
		3	communication components inc.	DTMABP7819VG12A			
		6	ericsson	RRUS-11			
		4	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7020.00			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		1	raycap	DC6-48-60-18-8F			
	158.0	1	crown mounts	Sector Mount [SM 502-3]			
148.0	148.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
112.0	113.0	1	andrew	UHX6-59-D3A	-	-	2
	112.0	1	crown mounts	Pipe Mount [PM 601-1]	1	EW107	1
70.0	72.0	1	andrew	UHX10-59-D3A	-	-	2
	70.0	1	crown mounts	Pipe Mount [PM 602-1]	1	EW107	1
40.0	40.0	1	crown mounts	Side Arm Mount [SO 201-1]	1	1/2	1
		1	gps	GPS_A			

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

Table 3 - Design Antenna and Cable Information

180	180	4	RFS	PD10017	-	-
170	170	3	RFS	PD1132D	-	-
160	160	2	-	6' STD Dish	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2303630	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn	217670	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn	529684	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All Points Technology Corp.	903539	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.2.0), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

T1	180 - 160	Leg	ROHN 2.5 STD	2	-11.41	41.14	27.7	Pass
T2	160 - 140	Leg	ROHN 3 X-STR	41	-40.94	83.78	48.9	Pass
T3	140 - 120	Leg	ROHN 4 X-STR	80	-69.63	139.07	50.1	Pass
T4	120 - 100	Leg	ROHN 5 X-STR	119	-91.25	177.42	51.4	Pass
T5	100 - 80	Leg	ROHN 5 X-STR	146	-115.19	177.35	65.0	Pass
T6	80 - 60	Leg	ROHN 6 EHS	173	-136.88	212.13	64.5	Pass
T7	60 - 40	Leg	ROHN 6 X-STR	200	-159.66	264.22	60.4	Pass
T8	40 - 20	Leg	ROHN 6 X-STR	227	-181.03	264.19	68.5	Pass
T9	20 - 0	Leg	ROHN 8 EHS	254	-190.94	332.47	57.4	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	9	-5.59	15.54	36.0	Pass
T2	160 - 140	Diagonal	ROHN 2 STD	48	-7.73	13.38	57.7	Pass
T3	140 - 120	Diagonal	ROHN 2 STD	87	-7.36	11.51	64.0	Pass
T4	120 - 100	Diagonal	ROHN 2.5 STD	126	-9.93	14.43	68.8	Pass
T5	100 - 80	Diagonal	ROHN 2.5 STD	153	-8.78	12.60	69.7	Pass
T6	80 - 60	Diagonal	ROHN 2.5 STD	180	-9.94	11.15	89.2	Pass
T7	60 - 40	Diagonal	ROHN 2.5 X-STR	207	-9.90	12.30	80.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T8	40 - 20	Diagonal	ROHN 3 STD	234	-9.57	16.86	56.7	Pass
T9	20 - 0	Diagonal	ROHN 3 STD	267	-14.61	28.18	51.8 56.7 (b)	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	7	-3.00	20.29	14.8 17.5 (b)	Pass
T2	160 - 140	Horizontal	ROHN 1.5 STD	46	-4.78	17.38	27.5 27.8 (b)	Pass
T3	140 - 120	Horizontal	ROHN 2 STD	85	-5.05	24.65	20.5 29.4 (b)	Pass
T4	120 - 100	Horizontal	ROHN 2 STD	124	-5.83	20.43	28.6 34.6 (b)	Pass
T5	100 - 80	Horizontal	ROHN 2 STD	151	-5.72	14.77	38.7	Pass
T6	80 - 60	Horizontal	ROHN 2.5 STD	178	-7.07	25.42	27.8 41.2 (b)	Pass
T7	60 - 40	Horizontal	ROHN 2.5 STD	205	-7.19	19.66	36.6 42.3 (b)	Pass
T8	40 - 20	Horizontal	ROHN 2.5 STD	232	-7.20	15.57	46.2	Pass
T9	20 - 0	Horizontal	ROHN 3 STD	263	-7.95	27.51	28.9 46.3 (b)	Pass
T1	180 - 160	Top Girt	ROHN 1.5 STD	5	-1.23	20.34	6.1	Pass
T9	20 - 0	Redund Horz 1 Bracing	ROHN TS1.5x11 ga	261	-3.31	4.90	67.7	Pass
T9	20 - 0	Redund Diag 1 Bracing	ROHN 1.5 STD	262	-3.03	3.58	84.6	Pass
T9	20 - 0	Redund Hip 1 Bracing	ROHN TS1.5x11 ga	270	-0.04	4.35	0.9	Pass
T9	20 - 0	Redund Hip Diagonal Bracing	ROHN 2.5 STD	282	-0.07	6.98	0.9	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	16	-0.00	5.82	0.4	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	53	-0.01	4.29	0.5	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	91	-0.01	2.93	0.6	Pass
T4	120 - 100	Inner Bracing	L2x2x1/8	130	-0.01	1.66	0.9	Pass
T5	100 - 80	Inner Bracing	L2 1/2x2 1/2x3/16	157	-0.01	3.47	0.7	Pass
T6	80 - 60	Inner Bracing	L3x3x3/16	185	-0.01	4.55	0.8	Pass
T7	60 - 40	Inner Bracing	L3 1/2x3 1/2x1/4	212	-0.01	7.45	0.7	Pass
T8	40 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	238	-0.01	5.93	0.7	Pass
T9	20 - 0	Inner Bracing	ROHN 3 STD	284	-0.01	19.74	0.5	Pass
							Summary	
						Leg (T8)	68.5	Pass
						Diagonal (T6)	89.2	Pass
						Horizontal (T9)	46.3	Pass
						Top Girt (T1)	6.1	Pass
						Redund Horz 1 Bracing (T9)	67.7	Pass
						Redund Diag 1 Bracing (T9)	84.6	Pass
						Redund Hip 1 Bracing	0.9	Pass

						(T9)		
						Redund Hip Diagonal Bracing (T9)	0.9	Pass
						Inner Bracing (T4)	0.9	Pass
						Bolt Checks	56.7	Pass
						RATING =	**89.2**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC7

-	Anchor Rods	0	47.6	Pass
1	Base Foundation Soil Interaction	0	25.6	Pass

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

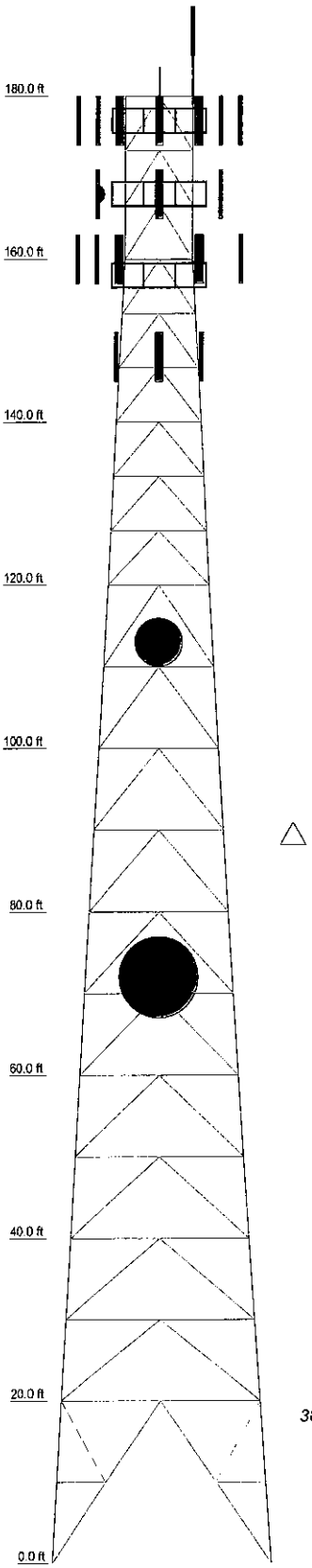
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EHS	ROHN 6 X-STR		ROHN 6 EHS	A572-50		ROHN 4 X-STR	ROHN 3 X-STR	ROHN 2.5 STD
Leg Grade						ROHN 2.5 STD			
Diagonals	ROHN 3 STD		ROHN 2.5 X-STR		ROHN2.5 STD			ROHN 2 STD	
Diagonal Grade					A572-50				
Top Girts				N.A.					ROHN 1.5 STD
Horizontals	ROHN 3 STD		ROHN 2.5 STD			ROHN 2 STD		ROHN 1.5 STD	
Red. Horizontals	ROHN TS1.5x11 ga				N.A.				
Red. Diagonals	ROHN 1.5 STD				N.A.				
Red. Hips	ROHN TS1.5x11 ga			L3x3x3/16	N.A.	L2 1/2x2 1/2x3/16	L2x2x1/8		
Inner Bracing	ROHN 3 STD	L3 1/2x3 1/2x1/4							
Face Width (ft)	27.6771	25.1771	22.5417	20.0417	17.5417	14.9583	12.7083	10.625	8.54167
# Panels @ (ft)		1 @ 20		10 @ 10				9 @ 6.66667	8.5
Weight (K)	25.9	45	44	42	32	26	19	15	11



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	181.5	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
8'x2 1/2" Pipe Mount	180	7770.00 w/ Mount Pipe	158
(3) AIR 21	180	(2) LGP13519	158
(6) ATMAA1412D-1A20	180	(2) SBNH-1D6565C w/ Mount Pipe	158
(2) DB846F65ZAXY w/ Mount Pipe	177	DTMABP7819VG12A	158
BXA-185063/12CFx2 w/ Mount Pipe	177	(2) RRUS-11	158
BXA-70063/6CFx4 w/ Mount Pipe	177	7020.00	158
(2) FD9R6004/2C-3L	177	DTMABP7819VG12A	158
BXA-70063/6CFx4 w/ Mount Pipe	177	(2) RRUS-11	158
(2) LPA-80063/6CFx5 w/ Mount Pipe	177	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	158
APX18-206516L-CT0 w/ Mount Pipe	177	7020.00	158
(2) FD9R6004/2C-3L	177	7770.00 w/ Mount Pipe	158
BXA-70063/6CFx4 w/ Mount Pipe	177	(2) LGP13519	158
APX18-206516L-CT0 w/ Mount Pipe	177	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
(2) FD9R6004/2C-3L	177	Sector Mount [SM 502-3]	158
(2) SC-E 6014 rev2 w/ Mount Pipe	177	Empty Mount Pipe	158
Sector Mount [SM 502-3]	177	Empty Mount Pipe	158
LLPX310R w/ Mount Pipe	168	Empty Mount Pipe	158
FDD_R6_RRH	168	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
LLPX310R w/ Mount Pipe	168	APXV18-206517S-C w/ Mount Pipe	148
FDD_R6_RRH	168	APXV18-206517S-C w/ Mount Pipe	148
LLPX310R w/ Mount Pipe	168	APXV18-206517S-C w/ Mount Pipe	148
FDD_R6_RRH	168	Pipe Mount [PM 601-1]	112
Sector Mount [SM 411-3]	168	UHX6-59-D3A	112
A-ANT-18G-2-C	168	Pipe Mount [PM 602-1]	70
7770.00 w/ Mount Pipe	158	UHX10-59-D3A	70
(2) LGP13519	158	GPS_A	40
DTMABP7819VG12A	158	Side Arm Mount [SO 201-1]	40
(2) RRUS-11	158		
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	158		
7020.00	158		
DC6-48-60-18-8F	158		

MATERIAL STRENGTH

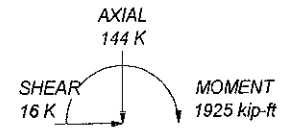
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

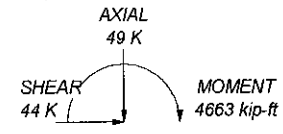
1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 38 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 89.2%

MAX. CORNER REACTIONS AT BASE:
DOWN: 211 K
SHEAR: 26 K

UPLIFT: -176 K
SHEAR: 23 K



TORQUE 13 kip-ft
38 mph WIND - 1.2500 in ICE



TORQUE 33 kip-ft
REACTIONS - 85 mph WIND

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
Phone: (919) 755-1012
FAX: (919) 755-1031
Tower Analysis

Job: NHV 108 943133, CT (BU# 806362)			
Project: 1343271400			
Client: Crown Castle	Drawn by: Will Hammond	App'd:	
Code: TIA/EIA-222-F	Date: 07/17/13	Scale: NTS	
Path:		Dwg No. E-1	

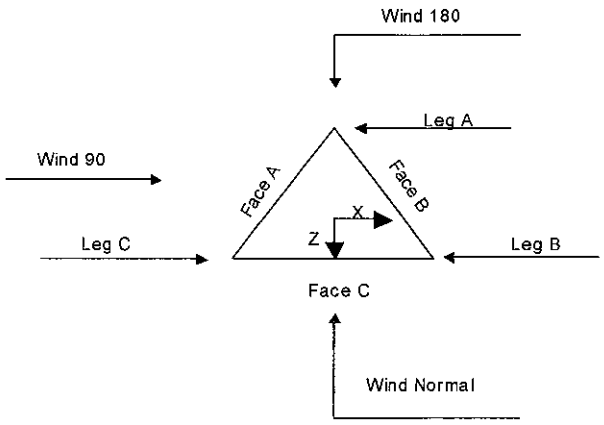
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.50 ft at the top and 27.68 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 1.2500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate	√	Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension	√	All Leg Panels Have Same Allowable
√	Escalate Ice		Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.	√	Include Angle Block Shear Check
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas	[redacted]	
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends		Include Shear-Torsion Interaction
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			8.50	1	20.00
T2	160.00-140.00			8.54	1	20.00
T3	140.00-120.00			10.63	1	20.00
T4	120.00-100.00			12.71	1	20.00
T5	100.00-80.00			14.96	1	20.00
T6	80.00-60.00			17.54	1	20.00
T7	60.00-40.00			20.04	1	20.00
T8	40.00-20.00			22.54	1	20.00
T9	20.00-0.00			25.18	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	140.00-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	20.00-0.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	ROHN 3 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-120.00	Pipe	ROHN 4 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 120.00-100.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T5 100.00-80.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T6 80.00-60.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T7 60.00-40.00	Pipe	ROHN 6 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)
T8 40.00-20.00	Pipe	ROHN 6 X-STR	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 20.00-0.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T7 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T8 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T9 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
ft						
T1 180.00-160.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 160.00-140.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 140.00-120.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 120.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T5 100.00-80.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 80.00-60.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 60.00-40.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 40.00-20.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T9 20.00-0.00	Solid Round		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
ft					
T9 20.00-0.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN TS1.5x11 ga	1
		Diagonal (1)	Pipe	ROHN 1.5 STD	1
		Hip (1)	Pipe	ROHN TS1.5x11 ga	1
		Hip Diagonal		ROHN 2.5 STD	1

Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-160.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-80.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.00-60.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.00-40.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.00-20.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.00-0.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-160.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T2 160.00-140.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T9 20.00-0.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 100.00-80.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T6 80.00-60.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T7 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T8 40.00-20.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T9 20.00-0.00	Flange	1.0000 A449	8	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LCF158-50A(1-5/8")	C	Yes	Ar (CfAe)	158.00 - 0.00	-1.0000	-0.4	31	12	1.9800	1.9800		0.80
LCF158-50A(1-5/8")	C	Yes	Ar (CfAe)	180.00 - 158.00	-1.5000	-0.4	19	14	1.9800	1.9800		0.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***												
561(1-5/8")	A	Yes	Ar (CfAe)	177.00 - 0.00	1.0000	-0.35	12	2	1.6250	1.6250		1.35
***												
7983A(1/2")	A	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.48	1	1	0.5800	0.0000		0.08
9207(5/16")	A	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.48	3	3	0.3300	0.0000		0.60
1 1/2" Rigid Conduit	A	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.48	2	2	1.5000	1.5000		1.00
FB-L98B-002-75000(3/8")	C	Yes	Ar (CfAe)	158.00 - 0.00	1.0000	-0.45	1	1	0.3937	0.3937		0.06
WR-VG86ST-BRD(3/4)	C	Yes	Ar (CfAe)	158.00 - 0.00	1.0000	-0.48	2	2	0.7740	0.7740		0.59
***												
LCF158-50JL(1-5/8")	A	Yes	Ar (CfAe)	148.00 - 0.00	0.0000	0.4	6	3	1.9800	1.9800		0.52
***												
EW107(ELLIPTICAL)	A	Yes	Ar (CfAe)	112.00 - 70.00	0.0000	-0.45	1	1	1.1700	1.1700		0.29
EW107(ELLIPTICAL)	A	Yes	Ar (CfAe)	70.00 - 0.00	0.0000	-0.45	2	2	1.1700	1.1700		0.29
LDF4-50A(1/2")	A	Yes	Ar (CfAe)	40.00 - 0.00	0.0000	-0.45	1	1	0.6300	0.6300		0.15
***												
Feedline Ladder (Af) 1.5"	A	Yes	Af (CfAe)	177.00 - 0.00	0.0000	-0.4	1	1	1.5000	1.5000	6.0000	4.20
Feedline Ladder (Af) 1.5"	A	Yes	Af (CfAe)	168.00 - 0.00	0.0000	0.4	1	1	1.5000	1.5000	6.0000	4.20
T-Brackets	A	Yes	Af (CfAe)	177.00 - 0.00	0.0000	-0.35	1	1	1.0000	1.0000	4.0000	8.40
Feedline Ladder (Af)	C	Yes	Af (CfAe)	180.00 - 0.00	-2.0000	-0.4	2	1	3.0000	3.0000	12.0000	8.40
***												

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
***							
***							

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
T1	180.00-160.00	A	6.604	4.542	0.000	0.000	0.55
		B	0.000	0.000	0.000	0.000	0.00
		C	46.200	5.000	0.000	0.000	0.64
T2	160.00-140.00	A	14.377	6.667	0.000	0.000	0.76
		B	0.000	0.000	0.000	0.000	0.00
		C	43.173	5.000	0.000	0.000	0.84
T3	140.00-120.00	A	20.317	6.667	0.000	0.000	0.80
		B	0.000	0.000	0.000	0.000	0.00

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	42.836	5.000	0.000	0.000	0.86
T4	120.00-100.00	A	21.487	6.667	0.000	0.000	0.80
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86
T5	100.00-80.00	A	22.267	6.667	0.000	0.000	0.81
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86
T6	80.00-60.00	A	23.242	6.667	0.000	0.000	0.81
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86
T7	60.00-40.00	A	24.217	6.667	0.000	0.000	0.81
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86
T8	40.00-20.00	A	25.267	6.667	0.000	0.000	0.81
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86
T9	20.00-0.00	A	25.267	6.667	0.000	0.000	0.81
		B	0.000	0.000	0.000	0.000	0.00
		C	42.836	5.000	0.000	0.000	0.86

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
T1	180.00-160.00	A	1.522	13.701	18.687	0.000	0.000	1.86
		B		0.000	0.000	0.000	0.000	0.00
		C		8.372	94.182	0.000	0.000	3.40
T2	160.00-140.00	A	1.499	28.515	33.457	0.000	0.000	2.81
		B		0.000	0.000	0.000	0.000	0.00
		C		19.043	84.573	0.000	0.000	4.77
T3	140.00-120.00	A	1.474	33.067	41.207	0.000	0.000	3.24
		B		0.000	0.000	0.000	0.000	0.00
		C		19.982	83.455	0.000	0.000	4.89
T4	120.00-100.00	A	1.444	36.638	41.012	0.000	0.000	3.25
		B		0.000	0.000	0.000	0.000	0.00
		C		19.689	83.390	0.000	0.000	4.85
T5	100.00-80.00	A	1.410	38.657	40.783	0.000	0.000	3.24
		B		0.000	0.000	0.000	0.000	0.00
		C		19.345	83.313	0.000	0.000	4.80
T6	80.00-60.00	A	1.368	37.819	42.454	0.000	0.000	3.21
		B		0.000	0.000	0.000	0.000	0.00
		C		18.927	83.220	0.000	0.000	4.74
T7	60.00-40.00	A	1.314	36.736	44.043	0.000	0.000	3.17
		B		0.000	0.000	0.000	0.000	0.00
		C		18.385	83.100	0.000	0.000	4.66
T8	40.00-20.00	A	1.250	40.675	43.617	0.000	0.000	3.13
		B		0.000	0.000	0.000	0.000	0.00
		C		17.746	82.958	0.000	0.000	4.57
T9	20.00-0.00	A	1.250	40.675	43.617	0.000	0.000	3.13
		B		0.000	0.000	0.000	0.000	0.00
		C		17.746	82.958	0.000	0.000	4.57

Feed Line Shielding

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T1	180.00-160.00	A	0.879	6.739	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	4.037	19.546	0.000	0.000
T2	160.00-140.00	A	1.548	11.645	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	3.543	18.307	0.000	0.000
T3	140.00-120.00	A	1.999	13.147	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	3.544	17.445	0.000	0.000
T4	120.00-100.00	A	1.712	10.400	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.910	13.203	0.000	0.000
T5	100.00-80.00	A	1.647	9.833	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.724	12.180	0.000	0.000
T6	80.00-60.00	A	1.746	9.663	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.792	11.808	0.000	0.000
T7	60.00-40.00	A	1.742	9.193	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.698	11.113	0.000	0.000
T8	40.00-20.00	A	1.967	9.671	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.947	11.162	0.000	0.000
T9	20.00-0.00	A	1.995	10.852	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.988	12.525	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	12.3715	10.5568	9.9235	7.9569
T2	160.00-140.00	10.8991	7.3520	8.8193	5.8340
T3	140.00-120.00	11.0076	5.3435	9.4729	5.1623
T4	120.00-100.00	11.9243	6.2240	10.6602	6.4955
T5	100.00-80.00	13.3107	7.2477	11.7125	7.6787
T6	80.00-60.00	13.3311	7.7316	13.2299	8.0514
T7	60.00-40.00	14.1515	8.7202	15.1988	8.6907
T8	40.00-20.00	14.0608	9.2889	14.6486	10.0422
T9	20.00-0.00	14.0923	9.2750	14.7819	10.1231

Discrete Tower Loads

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
Lightning Rod	C	None		0.0000	181.50	No Ice	0.25	0.25	0.03
						1/2" Ice	0.66	0.66	0.03
						1" Ice	0.97	0.97	0.04
						2" Ice	1.49	1.49	0.06
						4" Ice	2.68	2.68	0.14
****									
8'x2 1/2" Pipe Mount	B	From Leg	0.00 0.00 4.00	0.0000	180.00	No Ice	2.30	2.30	0.04
						1/2" Ice	3.13	3.13	0.06
						1" Ice	3.62	3.62	0.08
						2" Ice	4.62	4.62	0.14
						4" Ice	6.73	6.73	0.33
(3) AIR 21	B	From Leg	0.00 0.00 8.00	0.0000	180.00	No Ice	6.42	4.28	0.08
						1/2" Ice	6.86	4.69	0.12
						1" Ice	7.30	5.11	0.17
						2" Ice	8.22	5.98	0.28
						4" Ice	10.17	7.82	0.57
(6) ATMAA1412D-1A20	B	From Leg	0.00 0.00 0.00	0.0000	180.00	No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
***									
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	7.27	7.82	0.05
						1/2" Ice	7.88	9.01	0.11
						1" Ice	8.48	9.91	0.19
						2" Ice	9.72	11.81	0.37
						4" Ice	12.33	15.98	0.87
BXA-185063/12CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.03	5.29	0.04
						1/2" Ice	5.59	6.46	0.09
						1" Ice	6.11	7.35	0.14
						2" Ice	7.17	9.15	0.27
						4" Ice	9.44	12.95	0.68
BXA-70063/6CFx4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	7.97	5.40	0.04
						1/2" Ice	8.61	6.55	0.10
						1" Ice	9.22	7.41	0.17
						2" Ice	10.46	9.18	0.33
						4" Ice	13.07	12.93	0.79
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
BXA-70063/6CFx4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	7.97	5.40	0.04
						1/2" Ice	8.61	6.55	0.10
						1" Ice	9.22	7.41	0.17
						2" Ice	10.46	9.18	0.33
						4" Ice	13.07	12.93	0.79
(2) LPA-80063/6CFx5 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	10.55	10.65	0.05
						1/2" Ice	11.21	11.91	0.14
						1" Ice	11.84	12.88	0.25
						2" Ice	13.13	14.89	0.48
						4" Ice	15.83	19.13	1.09
APX18-206516L-CT0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	3.74	3.29	0.04
						1/2" Ice	4.16	4.00	0.07
						1" Ice	4.59	4.66	0.11
						2" Ice	5.54	6.04	0.21
						4" Ice	7.57	9.02	0.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
BXA-70063/6CFx4 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
APX18-206516L-CT0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.74 4.16 4.59 5.54 7.57	3.29 4.00 4.66 6.04 9.02	0.04 0.07 0.11 0.21 0.52
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) SC-E 6014 rev2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.78 4.18 4.59 5.44 7.29	4.40 5.01 5.64 6.96 9.90	0.03 0.07 0.12 0.22 0.54
Sector Mount [SM 502-3]	C	None		0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	33.02 47.36 61.70 90.38 147.74	33.02 47.36 61.70 90.38 147.74	1.67 2.22 2.77 3.88 6.08
***									
LLPX310R w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
FDD_R6_RRH	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
LLPX310R w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
FDD_R6_RRH	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
LLPX310R w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
FDD_R6_RRH	C	From Leg	4.00	0.0000	168.00	No Ice	1.79	0.78	0.03

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
			0.00			1/2" Ice	1.97	0.92	0.04
			0.00			1" Ice	2.16	1.07	0.06
						2" Ice	2.57	1.39	0.09
						4" Ice	3.49	2.14	0.20
Sector Mount [SM 411-3]	C	None		0.0000	168.00	No Ice	21.88	21.88	1.07
						1/2" Ice	30.68	30.68	1.48
						1" Ice	39.48	39.48	1.90
						2" Ice	57.08	57.08	2.73
						4" Ice	92.28	92.28	4.40
***									
***									
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP13519	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	0.01 0.01 0.01 0.02 0.07
DTMABP7819VG12A	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
(2) RRUS-11	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
7020.00	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.78	0.20 0.28 0.36 0.56 1.05	0.00 0.01 0.01 0.02 0.07
DC6-48-60-18-8F	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	0.02 0.05 0.09 0.17 0.38
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	B	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	158.00	No Ice	6.12	4.25	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	6.63	5.01	0.10
			2.00				1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) LGP13519	B	From Leg	4.00		0.0000	158.00	No Ice	0.34	0.21	0.01
			0.00				1/2" Ice	0.42	0.28	0.01
			2.00				1" Ice	0.51	0.36	0.01
							2" Ice	0.73	0.55	0.02
							4" Ice	1.25	1.03	0.07
(2) SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00		0.0000	158.00	No Ice	11.68	9.84	0.10
			0.00				1/2" Ice	12.40	11.37	0.19
			2.00				1" Ice	13.14	12.91	0.29
							2" Ice	14.60	15.27	0.52
							4" Ice	17.87	20.14	1.17
DTMABP7819VG12A	B	From Leg	4.00		0.0000	158.00	No Ice	1.14	0.39	0.02
			0.00				1/2" Ice	1.28	0.49	0.03
			2.00				1" Ice	1.44	0.59	0.04
							2" Ice	1.77	0.83	0.06
							4" Ice	2.54	1.41	0.14
(2) RRUS-11	B	From Leg	4.00		0.0000	158.00	No Ice	2.94	1.25	0.06
			0.00				1/2" Ice	3.17	1.41	0.07
			2.00				1" Ice	3.41	1.59	0.10
							2" Ice	3.91	1.96	0.15
							4" Ice	5.02	2.82	0.30
7020.00	B	From Leg	4.00		0.0000	158.00	No Ice	0.12	0.20	0.00
			0.00				1/2" Ice	0.17	0.28	0.01
			2.00				1" Ice	0.23	0.36	0.01
							2" Ice	0.38	0.56	0.02
							4" Ice	0.78	1.05	0.07
DTMABP7819VG12A	C	From Leg	4.00		0.0000	158.00	No Ice	1.14	0.39	0.02
			0.00				1/2" Ice	1.28	0.49	0.03
			2.00				1" Ice	1.44	0.59	0.04
							2" Ice	1.77	0.83	0.06
							4" Ice	2.54	1.41	0.14
(2) RRUS-11	C	From Leg	4.00		0.0000	158.00	No Ice	2.94	1.25	0.06
			0.00				1/2" Ice	3.17	1.41	0.07
			2.00				1" Ice	3.41	1.59	0.10
							2" Ice	3.91	1.96	0.15
							4" Ice	5.02	2.82	0.30
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00		0.0000	158.00	No Ice	8.50	6.30	0.07
			0.00				1/2" Ice	9.15	7.48	0.14
			2.00				1" Ice	9.77	8.37	0.21
							2" Ice	11.03	10.18	0.38
							4" Ice	13.68	14.02	0.87
7020.00	C	From Leg	4.00		0.0000	158.00	No Ice	0.12	0.20	0.00
			0.00				1/2" Ice	0.17	0.28	0.01
			2.00				1" Ice	0.23	0.36	0.01
							2" Ice	0.38	0.56	0.02
							4" Ice	0.78	1.05	0.07
7770.00 w/ Mount Pipe	C	From Leg	4.00		0.0000	158.00	No Ice	6.12	4.25	0.06
			0.00				1/2" Ice	6.63	5.01	0.10
			2.00				1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) LGP13519	C	From Leg	4.00		0.0000	158.00	No Ice	0.34	0.21	0.01
			0.00				1/2" Ice	0.42	0.28	0.01
			2.00				1" Ice	0.51	0.36	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	C	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
Sector Mount [SM 502-3]	C	None		0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	33.02 47.36 61.70 90.38 147.74	33.02 47.36 61.70 90.38 147.74	1.67 2.22 2.77 3.88 6.08
***									
Empty Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
Empty Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
Empty Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
***									
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	0.50 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	0.50 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	0.50 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
***									
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	112.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.74 4.48 5.96 8.92	0.90 1.12 1.34 1.78 2.66	0.07 0.08 0.09 0.12 0.18
Pipe Mount [PM 602-1]	A	From Leg	0.50 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.25 6.50 7.75 10.25 15.25	1.58 1.95 2.32 3.06 4.54	0.09 0.12 0.14 0.19 0.29
***									

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
GPS_A	A	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.00 0.00 0.01 0.02 0.08
Side Arm Mount [SO 201-1]	A	From Leg	0.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.96 4.10 5.24 7.52 12.08	2.11 2.93 3.75 5.39 8.67	0.10 0.12 0.14 0.18 0.26
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-18G-2-C	C	Paraboloid w/o Radome	From Leg	3.00 0.00 0.00	90.0000		168.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19
UHX6-59-D3A	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 1.00	90.0000		112.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.27 29.07 29.86 31.44 34.60	0.32 0.58 0.85 1.38 2.43
UHX10-59-D3A	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 2.00	31.0000		70.00	10.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	78.54 79.85 81.17 83.80 89.06	0.58 0.98 1.39 2.21 3.85
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice

Comb. No.	Description
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.583	31	0.1780	0.0632
T2	160 - 140	2.829	31	0.1694	0.0517
T3	140 - 120	2.124	31	0.1483	0.0365
T4	120 - 100	1.524	31	0.1234	0.0258
T5	100 - 80	1.037	31	0.1015	0.0191
T6	80 - 60	0.652	31	0.0771	0.0133
T7	60 - 40	0.366	35	0.0542	0.0088
T8	40 - 20	0.166	35	0.0354	0.0055
T9	20 - 0	0.043	35	0.0163	0.0027

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.50	Lightning Rod	31	3.583	0.1780	0.0632	441125
180.00	8'x2 1/2" Pipe Mount	31	3.583	0.1780	0.0632	441125
177.00	(2) DB846F65ZAXY w/ Mount Pipe	31	3.469	0.1772	0.0616	441125
168.00	A-ANT-18G-2-C	31	3.128	0.1740	0.0568	183802

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	31	2.755	0.1679	0.0503	93859
148.00	APXV18-206517S-C w/ Mount Pipe	31	2.396	0.1579	0.0425	54793
113.00	UHX6-59-D3A	31	1.341	0.1156	0.0235	43594
112.00	Pipe Mount [PM 601-1]	31	1.316	0.1146	0.0232	43930
72.00	UHX10-59-D3A	35	0.526	0.0675	0.0113	50605
70.00	Pipe Mount [PM 602-1]	35	0.497	0.0652	0.0108	51212
40.00	GPS_A	35	0.166	0.0354	0.0055	67062

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	10.238	6	0.5036	0.1826
T2	160 - 140	8.099	6	0.4816	0.1494
T3	140 - 120	6.087	6	0.4229	0.1054
T4	120 - 100	4.371	6	0.3526	0.0746
T5	100 - 80	2.976	6	0.2903	0.0554
T6	80 - 60	1.880	10	0.2208	0.0384
T7	60 - 40	1.058	10	0.1553	0.0254
T8	40 - 20	0.480	10	0.1014	0.0161
T9	20 - 0	0.124	10	0.0466	0.0078

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.50	Lightning Rod	6	10.238	0.5036	0.1826	174995
180.00	8'x2 1/2" Pipe Mount	6	10.238	0.5036	0.1826	174995
177.00	(2) DB846F65ZAXY w/ Mount Pipe	6	9.915	0.5016	0.1781	174995
168.00	A-ANT-18G-2-C	6	8.948	0.4938	0.1640	72914
158.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	6	7.889	0.4773	0.1453	36111
148.00	APXV18-206517S-C w/ Mount Pipe	6	6.865	0.4499	0.1229	19761
113.00	UHX6-59-D3A	6	3.847	0.3305	0.0679	15319
112.00	Pipe Mount [PM 601-1]	6	3.776	0.3274	0.0670	15436
72.00	UHX10-59-D3A	10	1.520	0.1932	0.0327	17677
70.00	Pipe Mount [PM 602-1]	10	1.437	0.1865	0.0314	17882
40.00	GPS_A	10	0.480	0.1014	0.0161	23456

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.7500	4	1.76	19.44	0.090 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	1.86	6.44	0.289 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	1.50	6.44	0.233 ✔	1.333	Bolt Shear
T2	160	Leg	A325N	0.8750	4	7.97	26.46	0.301 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	2.65	6.44	0.412 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.39	6.44	0.371 ✔	1.333	Bolt Shear
T3	140	Leg	A325N	1.0000	4	14.43	34.56	0.418 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	2.53	6.44	0.393 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.52	6.44	0.392 ✔	1.333	Bolt Shear
T4	120	Leg	A325N	1.0000	4	19.16	34.56	0.555 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3.31	6.44	0.514 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.97	6.44	0.461 ✔	1.333	Bolt Shear
T5	100	Leg	A325N	1.0000	6	16.25	34.56	0.470 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	2.98	6.44	0.462 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.86	6.44	0.444 ✔	1.333	Bolt Shear
T6	80	Leg	A325N	1.0000	6	19.30	34.56	0.559 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3.31	6.44	0.514 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.54	6.44	0.549 ✔	1.333	Bolt Shear
T7	60	Leg	A325N	1.0000	6	22.42	34.56	0.649 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3.30	6.44	0.512 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.63	6.44	0.564 ✔	1.333	Bolt Shear
T8	40	Leg	A325N	1.0000	8	18.93	34.56	0.548 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3.19	6.44	0.495 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.68	6.44	0.571 ✔	1.333	Bolt Shear
T9	20	Leg	A449	1.0000	8	19.75	31.10	0.635 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.87	6.44	0.756 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.97	6.44	0.617 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 2.5 STD	20.00	6.67	84.4 K=1.00	18.110	1.7040	-11.41	30.86	0.370 ✔
T2	160 - 140	ROHN 3 X-STR	20.04	6.68	70.5	20.840	3.0159	-40.94	62.85	0.651

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=1.00					✓
T3	140 - 120	ROHN 4 X-STR	20.04	6.68	54.3 K=1.00	23.671	4.4074	-69.63	104.33	0.667 ✓
T4	120 - 100	ROHN 5 X-STR	20.04	10.02	65.4 K=1.00	21.776	6.1120	-91.25	133.10	0.686 ✓
T5	100 - 80	ROHN 5 X-STR	20.06	10.03	65.4 K=1.00	21.769	6.1120	-115.19	133.05	0.866 ✓
T6	80 - 60	ROHN 6 EHS	20.05	10.03	54.1 K=1.00	23.705	6.7133	-136.88	159.14	0.860 ✓
T7	60 - 40	ROHN 6 X-STR	20.05	10.03	54.8 K=1.00	23.583	8.4049	-159.66	198.21	0.806 ✓
T8	40 - 20	ROHN 6 X-STR	20.06	10.03	54.8 K=1.00	23.580	8.4049	-181.03	198.19	0.913 ✓
T9	20 - 0	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	25.662	9.7193	-190.94	249.41	0.766 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 2 STD	7.92	7.70	117.3 K=1.00	10.850	1.0745	-5.59	11.66	0.480 ✓
T2	160 - 140	ROHN 2 STD	8.53	8.29	126.4 K=1.00	9.342	1.0745	-7.73	10.04	0.770 ✓
T3	140 - 120	ROHN 2 STD	9.21	8.94	136.3 K=1.00	8.039	1.0745	-7.36	8.64	0.853 ✓
T4	120 - 100	ROHN 2.5 STD	12.49	12.10	153.3 K=1.00	6.353	1.7040	-9.93	10.82	0.917 ✓
T5	100 - 80	ROHN 2.5 STD	13.31	12.96	164.1 K=1.00	5.546	1.7040	-8.78	9.45	0.929 ✓
T6	80 - 60	ROHN 2.5 STD	14.16	13.77	174.4 K=1.00	4.908	1.7040	-9.94	8.36	1.189 ✓
T7	60 - 40	ROHN 2.5 X-STR	15.07	14.70	190.9 K=1.00	4.096	2.2535	-9.90	9.23	1.072 ✓
T8	40 - 20	ROHN 3 STD	16.08	15.73	162.2 K=1.00	5.675	2.2285	-9.57	12.65	0.756 ✓
T9	20 - 0	ROHN 3 STD	24.33	12.17	125.5 K=1.00	9.486	2.2285	-14.61	21.14	0.691 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.53	4.14	79.9 K=1.00	19.038	0.7995	-3.00	15.22	0.197 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	160 - 140	ROHN 1.5 STD	9.93	4.82	92.9 K=1.00	16.310	0.7995	-4.78	13.04	0.367 ✓
T3	140 - 120	ROHN 2 STD	12.01	5.82	88.7 K=1.00	17.212	1.0745	-5.05	18.50	0.273 ✓
T4	120 - 100	ROHN 2 STD	13.83	6.68	101.9 K=1.00	14.260	1.0745	-5.83	15.32	0.381 ✓
T5	100 - 80	ROHN 2 STD	16.25	7.89	120.3 K=1.00	10.313	1.0745	-5.72	11.08	0.516 ✓
T6	80 - 60	ROHN 2.5 STD	18.79	9.12	115.5 K=1.00	11.192	1.7040	-7.07	19.07	0.371 ✓
T7	60 - 40	ROHN 2.5 STD	21.29	10.37	131.3 K=1.00	8.656	1.7040	-7.19	14.75	0.487 ✓
T8	40 - 20	ROHN 2.5 STD	23.86	11.65	147.6 K=1.00	6.854	1.7040	-7.20	11.68	0.616 ✓
T9	20 - 0	ROHN 3 STD	25.18	12.31	127.0 K=1.00	9.262	2.2285	-7.95	20.64	0.385 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	19.091	0.7995	-1.23	15.26	0.081 ✓

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN TS1.5x11 ga	6.29	5.93	145.4 K=1.00	7.062	0.5202	-3.31	3.67	0.902 ✓

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN 1.5 STD	11.50	10.94	210.9 K=1.00	3.357	0.7995	-3.03	2.68	1.128 ✓

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN TS1.5x11 ga	6.29	6.29	154.2 K=1.00	6.278	0.5202	-0.04	3.27	0.013 ✔

Redundam Hip Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN 2.5 STD	15.07	15.07	190.9 K=1.00	4.096	1.7040	-0.07	6.98	0.009* ✔

* DL controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.25	4.25	128.3 K=1.00	9.074	0.4844	-0.02	4.39	0.005 ✔
T2	160 - 140	L2x2x1/8	4.97	4.97	149.9 K=1.00	6.648	0.4844	-0.01	3.22	0.002 ✔
T3	140 - 120	L2x2x1/8	6.01	6.01	181.3 K=1.00	4.542	0.4844	-0.01	2.20	0.003 ✔
T4	120 - 100	L2x2x1/8	6.92	6.92	208.8 K=1.00	3.426	0.4844	-0.01	1.66	0.004* ✔
T5	100 - 80	L2 1/2x2 1/2x3/16	8.13	8.13	197.0 K=1.00	3.849	0.9020	-0.01	3.47	0.002* ✔
T6	80 - 60	L3x3x3/16	9.40	9.40	189.2 K=1.00	4.173	1.0900	-0.01	4.55	0.002* ✔
T7	60 - 40	L3 1/2x3 1/2x1/4	10.65	10.65	184.1 K=1.00	4.407	1.6900	-0.01	7.45	0.002* ✔
T8	40 - 20	L3 1/2x3 1/2x1/4	11.93	11.93	206.3 K=1.00	3.510	1.6900	-0.01	5.93	0.002* ✔
T9	20 - 0	ROHN 3 STD	12.59	12.59	129.8 K=1.00	8.860	2.2285	-0.01	19.74	0.001* ✔

* DL controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	180 - 160	ROHN 2.5 STD	20.00	6.67	84.4	30.000	1.7040	7.03	51.12	0.137 ✓
T2	160 - 140	ROHN 3 X-STR	20.04	6.68	70.5	30.000	3.0159	31.88	90.48	0.352 ✓
T3	140 - 120	ROHN 4 X-STR	20.04	6.68	54.3	30.000	4.4074	57.74	132.22	0.437 ✓
T4	120 - 100	ROHN 5 X-STR	20.04	10.02	65.4	30.000	6.1120	76.65	183.36	0.418 ✓
T5	100 - 80	ROHN 5 X-STR	20.06	10.03	65.4	30.000	6.1120	97.51	183.36	0.532 ✓
T6	80 - 60	ROHN 6 EHS	20.05	10.03	54.1	30.000	6.7133	115.81	201.40	0.575 ✓
T7	60 - 40	ROHN 6 X-STR	20.05	10.03	54.8	30.000	8.4049	134.51	252.15	0.533 ✓
T8	40 - 20	ROHN 6 X-STR	20.06	10.03	54.8	30.000	8.4049	151.46	252.15	0.601 ✓
T9	20 - 0	ROHN 8 EHS	20.05	10.03	41.2	30.000	9.7193	158.29	291.58	0.543 ✓

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	180 - 160	ROHN 2 STD	7.92	7.70	117.3	30.000	1.0745	5.53	32.24	0.172 ✓
T2	160 - 140	ROHN 2 STD	8.31	8.08	123.2	30.000	1.0745	7.89	32.24	0.245 ✓
T3	140 - 120	ROHN 2 STD	8.75	8.48	129.2	30.000	1.0745	7.50	32.24	0.233 ✓
T4	120 - 100	ROHN 2.5 STD	12.49	12.10	153.3	30.000	1.7040	9.78	51.12	0.191 ✓
T5	100 - 80	ROHN 2.5 STD	12.89	12.54	158.8	30.000	1.7040	8.76	51.12	0.171 ✓
T6	80 - 60	ROHN 2.5 STD	14.16	13.77	174.4	30.000	1.7040	9.67	51.12	0.189 ✓
T7	60 - 40	ROHN 2.5 X-STR	14.61	14.24	184.9	30.000	2.2535	9.54	67.61	0.141 ✓
T8	40 - 20	ROHN 3 STD	15.57	15.22	157.0	30.000	2.2285	9.13	66.85	0.137 ✓
T9	20 - 0	ROHN 3 STD	24.33	12.17	125.5	30.000	2.2285	14.09	66.85	0.211 ✓

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.53	4.14	79.9	30.000	0.7995	2.98	23.98	0.124 ✔
T2	160 - 140	ROHN 1.5 STD	9.93	4.82	92.9	30.000	0.7995	4.78	23.98	0.199 ✔
T3	140 - 120	ROHN 2 STD	12.01	5.82	88.7	30.000	1.0745	5.02	32.24	0.156 ✔
T4	120 - 100	ROHN 2 STD	13.83	6.68	101.9	30.000	1.0745	5.94	32.24	0.184 ✔
T5	100 - 80	ROHN 2 STD	16.25	7.89	120.3	30.000	1.0745	5.69	32.24	0.176 ✔
T6	80 - 60	ROHN 2.5 STD	18.79	9.12	115.5	30.000	1.7040	6.87	51.12	0.134 ✔
T7	60 - 40	ROHN 2.5 STD	21.29	10.37	131.3	30.000	1.7040	7.26	51.12	0.142 ✔
T8	40 - 20	ROHN 2.5 STD	23.86	11.65	147.6	30.000	1.7040	7.36	51.12	0.144 ✔
T9	20 - 0	ROHN 3 STD	25.18	12.31	127.0	30.000	2.2285	7.87	66.85	0.118 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.50	4.13	79.6	30.000	0.7995	1.24	23.98	0.052 ✔

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN TS1.5x11 ga	6.29	5.93	145.4	30.000	0.5202	3.31	15.61	0.212 ✔

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN 1.5 STD	11.50	10.94	210.9	30.000	0.7995	3.03	23.98	0.126 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Redundant Hip Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	20 - 0	ROHN 2.5 STD	15.07	15.07	190.9	30.000	1.7040	0.06	51.12	0.001* ✔

* DL controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	4.25	4.25	81.4	21.600	0.4844	0.02	10.46	0.002 ✔
T2	160 - 140	L2x2x1/8	4.27	4.27	81.8	21.600	0.4844	0.00	10.46	0.000 ✔
T3	140 - 120	L2x2x1/8	5.31	5.31	101.8	21.600	0.4844	0.00	10.46	0.000 ✔
T4	120 - 100	L2x2x1/8	6.35	6.35	121.8	21.600	0.4844	0.00	10.46	0.000 ✔
T5	100 - 80	L2 1/2x2 1/2x3/16	7.48	7.48	115.4	21.600	0.9020	0.00	19.48	0.000 ✔

Section Capacity Table

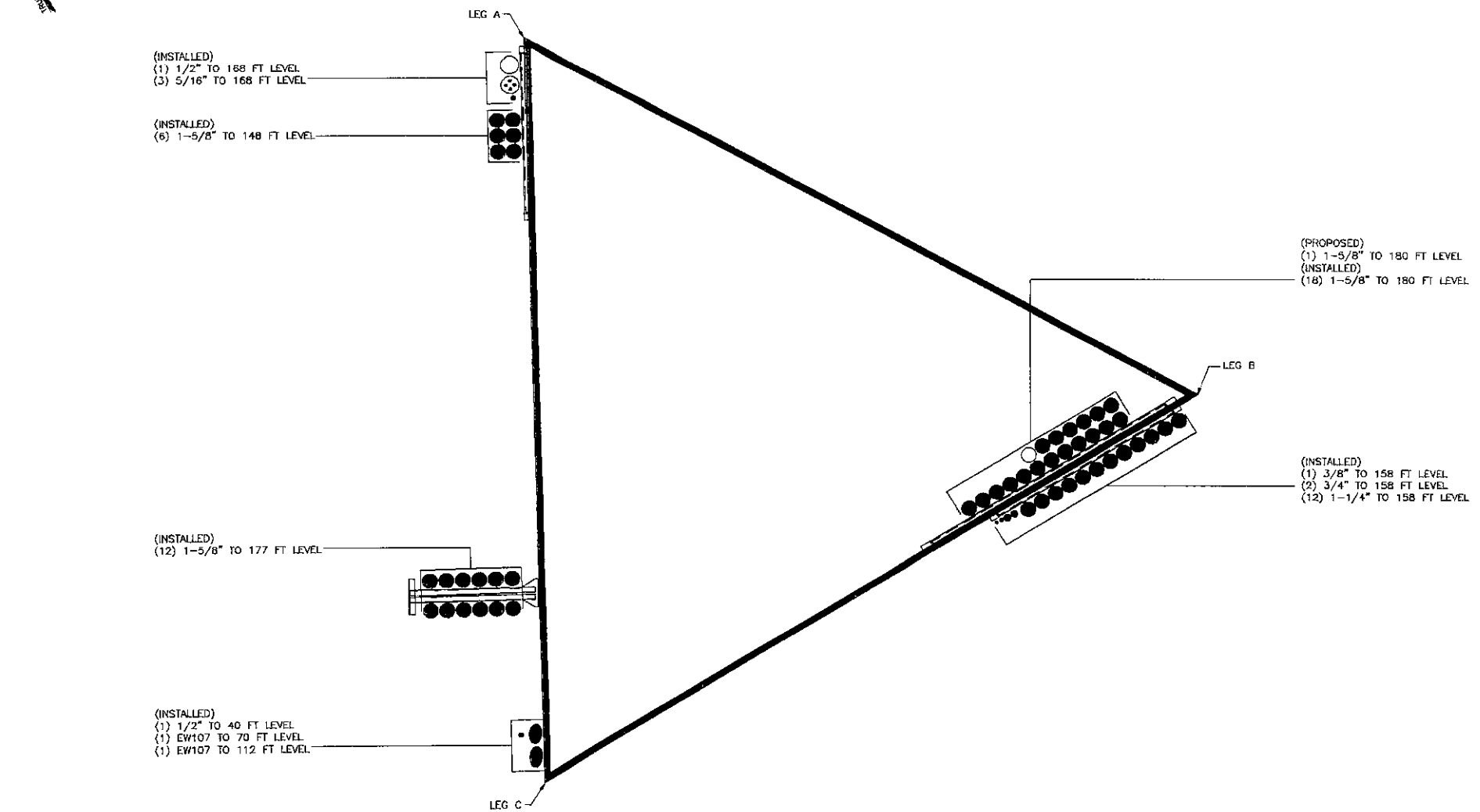
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 2.5 STD	2	-11.41	41.14	27.7	Pass
T2	160 - 140	Leg	ROHN 3 X-STR	41	-40.94	83.78	48.9	Pass
T3	140 - 120	Leg	ROHN 4 X-STR	80	-69.63	139.07	50.1	Pass
T4	120 - 100	Leg	ROHN 5 X-STR	119	-91.25	177.42	51.4	Pass
T5	100 - 80	Leg	ROHN 5 X-STR	146	-115.19	177.35	65.0	Pass
T6	80 - 60	Leg	ROHN 6 EHS	173	-136.88	212.13	64.5	Pass
T7	60 - 40	Leg	ROHN 6 X-STR	200	-159.66	264.22	60.4	Pass
T8	40 - 20	Leg	ROHN 6 X-STR	227	-181.03	264.19	68.5	Pass
T9	20 - 0	Leg	ROHN 8 EHS	254	-190.94	332.47	57.4	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	9	-5.59	15.54	36.0	Pass
T2	160 - 140	Diagonal	ROHN 2 STD	48	-7.73	13.38	57.7	Pass
T3	140 - 120	Diagonal	ROHN 2 STD	87	-7.36	11.51	64.0	Pass
T4	120 - 100	Diagonal	ROHN 2.5 STD	126	-9.93	14.43	68.8	Pass
T5	100 - 80	Diagonal	ROHN 2.5 STD	153	-8.78	12.60	69.7	Pass
T6	80 - 60	Diagonal	ROHN 2.5 STD	180	-9.94	11.15	89.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T7	60 - 40	Diagonal	ROHN 2.5 X-STR	207	-9.90	12.30	80.5	Pass
T8	40 - 20	Diagonal	ROHN 3 STD	234	-9.57	16.86	56.7	Pass
T9	20 - 0	Diagonal	ROHN 3 STD	267	-14.61	28.18	51.8	Pass
							56.7 (b)	
T1	180 - 160	Horizontal	ROHN 1.5 STD	7	-3.00	20.29	14.8	Pass
							17.5 (b)	
T2	160 - 140	Horizontal	ROHN 1.5 STD	46	-4.78	17.38	27.5	Pass
							27.8 (b)	
T3	140 - 120	Horizontal	ROHN 2 STD	85	-5.05	24.65	20.5	Pass
							29.4 (b)	
T4	120 - 100	Horizontal	ROHN 2 STD	124	-5.83	20.43	28.6	Pass
							34.6 (b)	
T5	100 - 80	Horizontal	ROHN 2 STD	151	-5.72	14.77	38.7	Pass
T6	80 - 60	Horizontal	ROHN 2.5 STD	178	-7.07	25.42	27.8	Pass
							41.2 (b)	
T7	60 - 40	Horizontal	ROHN 2.5 STD	205	-7.19	19.66	36.6	Pass
							42.3 (b)	
T8	40 - 20	Horizontal	ROHN 2.5 STD	232	-7.20	15.57	46.2	Pass
T9	20 - 0	Horizontal	ROHN 3 STD	263	-7.95	27.51	28.9	Pass
							46.3 (b)	
T1	180 - 160	Top Girt	ROHN 1.5 STD	5	-1.23	20.34	6.1	Pass
T9	20 - 0	Redund Horz 1 Bracing	ROHN TS1.5x11 ga	261	-3.31	4.90	67.7	Pass
T9	20 - 0	Redund Diag 1 Bracing	ROHN 1.5 STD	262	-3.03	3.58	84.6	Pass
T9	20 - 0	Redund Hip 1 Bracing	ROHN TS1.5x11 ga	270	-0.04	4.35	0.9	Pass
T9	20 - 0	Redund Hip Diagonal Bracing	ROHN 2.5 STD	282	-0.07	6.98	0.9	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	16	-0.00	5.82	0.4	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	53	-0.01	4.29	0.5	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	91	-0.01	2.93	0.6	Pass
T4	120 - 100	Inner Bracing	L2x2x1/8	130	-0.01	1.66	0.9	Pass
T5	100 - 80	Inner Bracing	L2 1/2x2 1/2x3/16	157	-0.01	3.47	0.7	Pass
T6	80 - 60	Inner Bracing	L3x3x3/16	185	-0.01	4.55	0.8	Pass
T7	60 - 40	Inner Bracing	L3 1/2x3 1/2x1/4	212	-0.01	7.45	0.7	Pass
T8	40 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	238	-0.01	5.93	0.7	Pass
T9	20 - 0	Inner Bracing	ROHN 3 STD	284	-0.01	19.74	0.5	Pass
							Summary	
						Leg (T8)	68.5	Pass
						Diagonal (T6)	89.2	Pass
						Horizontal (T9)	46.3	Pass
						Top Girt (T1)	6.1	Pass
						Redund Horz 1 Bracing (T9)	67.7	Pass
						Redund Diag 1 Bracing (T9)	84.6	Pass
						Redund Hip 1 Bracing (T9)	0.9	Pass
						Redund Hip Diagonal Bracing (T9)	0.9	Pass
						Inner Bracing (T4)	0.9	Pass
						Bolt Checks	56.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						RATING =	**89.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



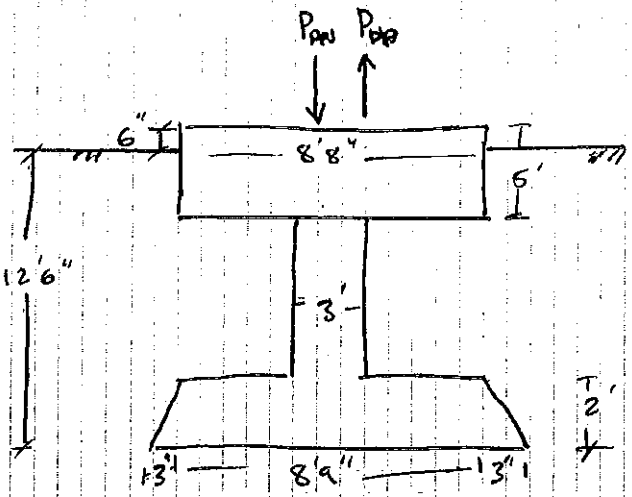
BUSINESS UNIT: 806362 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

FDH

Project: BU 806362
Sheet ____ of ____ Date: ____
By: ____ FDH Project #: ____
Checked By: ____ Drawing #: ____



FROM TNX:

P_{up} : 176 K

P_{DN} : 211 K

$W_C = (V_{MOD} + V_{PIER} + V_{PAD})\,\gamma_C$

$W_C = \left[(9^2 \times 2) + (3^2 \times 6) + (8.67^2 \times 5)\right](.150)$

$W_C = 88.78$ K

$W_S = 0.135\ KCF\ \left[\left[(9.25\ FT)^2 - (3\ FT)^2\right](10.5' - 6')\right]$

$+ \ 0.12\ KCF\ \left[\left[(9.25\ FT)^2 - (3\ FT)^2\right](6' - 4.5')\right]$

$+ \ 0.12\ KCF\ \left[\left\{(9.25\ FT)^2 - (8.75\ FT)^2\right\} 4.5\right] = 46.51\ K + 13.78\ K + 4.86\ K$

$W_S = 65.15$ K

COMPRESSION (ALLOWABLE BEARING CAPACITY = 8000 PSF) - FDH GEO

$P_{BEARING\ RESIST\ ULT} = (8\ KSF)(3)(0.75)(9.25')^2 = 1540.125$ K

$P_{DN-TOT} = P_{DN} + W_C + W_S = 211\ K + 88.78\ K + 65.15\ K = 364.93$ K

$CAPACITY = \dfrac{364.93\ K}{1540.125\ K} = \boxed{23.7\ \%}$

6521 Meridien Drive, Raleigh, NC 27616 (919) 755-1012 Fax: (919) 755-1031 www.fdh-inc.com

UPLIFT

UPLIFT RESISTANCE DUE TO COHESION (7 KSF FROM 6'-10.5')

$= (4)(9.25')(10.5' - 6')(7\ KSF) = 1165.5\ K$

$$U_{RESISTANCE} = \text{MIN} \begin{cases} \dfrac{88.78\ K}{1.25} + \dfrac{65.15\ K}{2.0} + \dfrac{1165.5\ K}{2.0} = 686.35\ K \\ \dfrac{88.78\ K + 65.15\ K + 1165.5\ K}{1.5} = 879.62\ K \end{cases}$$

$$\text{CAPACITY} = \frac{176\ K}{686.35\ K} = \boxed{25.6\ \%}$$

EXHIBIT C

EBI Consulting
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RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11494B

Crown Castle Wolcott
341 East Street
Wolcott, CT 06107

August 13, 2013

EBI Project Number: 62139484

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

August 13, 2013

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Re: Emissions Values for Site: **CT11494B - Crown Castle Wolcott**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 341 East Street, Wolcott, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS band is 1000 μW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 341 East Street, Wolcott, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz / 1980.000 MHz—to 1985.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
3) 2 LTE channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications

7) The antenna mounting height centerline of the proposed antennas is **188 feet** above ground level (AGL)
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT11494B - Crown Castle Wolcott
Site Addresss	341 East Street, Wolcott, CT 06107
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS	Passive	PCS - 1950 MHz	GSM / UMTS	30	4	120	-3.95	188	182	7/8"	1.2	0	36.659053	0.397873	0.03979%
1B	RFS	APX16DWV-16DWVS	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.95	188	182	7/8"	1.2	0	48.878738	0.530497	0.05305%
														Sector total Power Density Value:			0.093%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS	Passive	PCS - 1950 MHz	GSM / UMTS	30	4	120	-3.95	188	182	7/8"	1.2	0	36.659053	0.397873	0.03979%
1B	RFS	APX16DWV-16DWVS	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.95	188	182	1-5/8"	1.2	0	48.878738	0.530497	0.05305%
														Sector total Power Density Value:			0.093%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS	Passive	PCS - 1950 MHz	GSM / UMTS	30	4	120	-3.95	188	182	7/8"	1.2	0	36.659053	0.397873	0.03979%
1B	RFS	APX16DWV-16DWVS	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.95	188	182	1-5/8"	1.2	0	48.878738	0.530497	0.05305%
														Sector total Power Density Value:			0.093%

Site Composite MPE %

Carrier	MPE %
T-Mobile	0.279%
AT&T	15.650%
Clearwire	0.660%
MetroPCS	5.550%
Verizon Wireless	9.180%
Total Site MPE %	**31.319%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the T-Mobile facility are **0.279% (0.093% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **31.319%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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